

USE AND MAINTENANCE MANUAL

WATER TREATMENT SYSTEM W-CARE ADVANCED PLUS

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1. GENERAL SAFETY RULES AND EQUIPMENT DESCRIPTION

1.1 General Safety use

These instructions must be followed to ensure safety, proper installation, operation, and maintenance of the machine. All personnel involved in the installation, operation and maintenance of the machine, or associated equipment, should be made aware of these instructions.

The equipment must be installed and operated by qualified personnel trained in the safety requirements of the national regulations in force in the country of installation, including EN 60204-1 and Directive 2006/42/EC.

Equipment:

- shall not be used in explosive (EX) environments,
- shall not be used to dose flammable chemicals,
- shall not be used with radioactive chemical material.

Accident-prevention equipment, required to prevent accidents during installation and maintenance and during operation, must comply with the national regulations in force in the Country of installation.

In case of doubt with one of the rules described below, please contact our technical department for alternative procedures. Always remember that, any operation with mechanical machinery, could be dangerous so be sure to follow all possible precautions before and during assembly and maintenance.

SAFETY FIRST!

WARNING: Failure to comply with these instructions will void all applicable warranties. **W-tech** is not responsible for any damage to things and people due to the lack of the precautions described here.

1.2 General description

The use of evaporative systems for cooling leads to an important reduction of energy consumption, but introduces the need for water management. A correct water treatment in the tower, extends the life of the system and the tower itself, by reducing the consumption of water to a minimum. W-Tech, in addition to producing evaporative cooling units, offers several solutions that can meet the needs of very small and large installations.

The “**Advanced Plus**” system is able to manage the automatic purging of the water inside the evaporative system (Evaporative Tower, Cooler and Evaporative Condenser) through the use of a digital instrument, the conductivity meter and its probe. Thanks to the pumps installed in the W-care, it is possible to automatically manage both the dosage of the anti scale/anticorrosive additive in proportion to the water replenished, and the dosage of the biocide/anti-legionella disease with programmable intervals. This type of system reduces water consumption by optimizing the use of chemicals and extends the life of the entire cooling system.

The system is supplied pre-assembled on skid, fully wired (IP65) and includes a first supply of two chemical products.

1.3 Structure

The unit is built with "Magnelis" ZM310 (steel,zinc,aluminum,magnesium) panels, to ensure maximum surface protection comparable to a galvanized sheet with over 1000 g/m2 of zinc. The small parts, used to assembly, are in stainless steel 304. AISI 304, 316 stainless steel or painted sheet metal are available on request.

1.4 General maintenance instructions

In order to assure the best performance, care should be taken to ensure that chemical products supply is correct and that the pipings, in the distribution system, are clean and unclogged. Replace chemical suction and delivery piping with equivalent material suitable for use, if needed.

Note: periodically clean the walls of the glasses (outflow electrode holders) installed at the bottom of the instrument panel. The presence of waterlogged water, algae, scale, etc. will not allow the probes to work properly.

1.5 Filter

To prevent the possibility of suspended solids, that circulates in the water of the tower, to getting to the instruments reading probes, on W-Care Advanced series is installed a wire-wound cartridge filter in PP with a filtration degree of 100 µ, not washable but which must be replaced, on average, every 3 months.

This timing, however, depends on several factors such as the amount of water flowing through it the pre-treatment of the water upstream of the cartridge, the degree of purity of the water entering the filter. A visual check helps to know if it is time to make the replacement, the wire filter generally changes color when it is dirty.

1.6 Inductive conductivity probe

For the **Advanced Plus** model, the conductivity is measured by an **inductive sensor** made of PEEK, a professional system that makes the measurement more stable, cause it's not affected by polarization phenomenon and dirt deposits on the electrode. The measurement method of conductivity inductives, is based on the detection of the output current, which is proportional to the conductivity. Complete with PT100 temperature compensation, high degree of stability to temperature (up to 85°C) and pressure and, wide measuring capacity over 30mS. If the response from the electrode is inaccurate, it is likely that the

probe is too dirty, in this case clean to remove any scale, gently wash the electrode with descaling and anti-scale cleaners and then rinse with running water.

Note: do not dry by rubbing! This would cause the formation of electrostatic charges that could affect the reading capacity of the electrode. After drying the probe, calibrate the instrument again, follow the instructions in the probe calibration section. Always use new buffer solutions.

1.7 Ph Probe

The **Advanced Plus** model, in addition to the measurement of conductivity, is also present the probe of **pH** reading, another very important factor in determining the chemical and physical characteristics of water. The life of the electrode depends on the working conditions: temperature, type of solution (acid or alkaline), increasing the temperature will drastically reduce the life of the electrode. Electrodes not in solution age slowly. The frequency of calibration depends on the solution to be measured and on the knowledge of the plant operator. For this operation, remove the electrode from the holder, gently wash the electrode with running water and then immerse it in an acidic solution with HCl (maximum concentration 10%) for about 5 minutes.

Rinse thoroughly with running water and dry by shaking the electrode in the air.

Note: Do not wipe dry! This would cause electrostatic charges to build up which could affect the reading performance of the electrode.

When the electrode is ready, carry out the new calibration following the instructions given in the pH probe calibration paragraph. Always use fresh buffer solutions. If it is necessary to interrupt the operation of the instrument, always keep the electrodes in the original bottles / protective caps containing the maintenance liquid (transparent pH 4 - KCl). Electrodes that are left dry will be irreparably damaged!

Note: The cup containing the pH probe is equipped with a flow sensor that interacts with the conductivity meter by interrupting the operation of the purge valve and any other pumps (which you can manage with the instrument) if there is no flow in the skid piping.

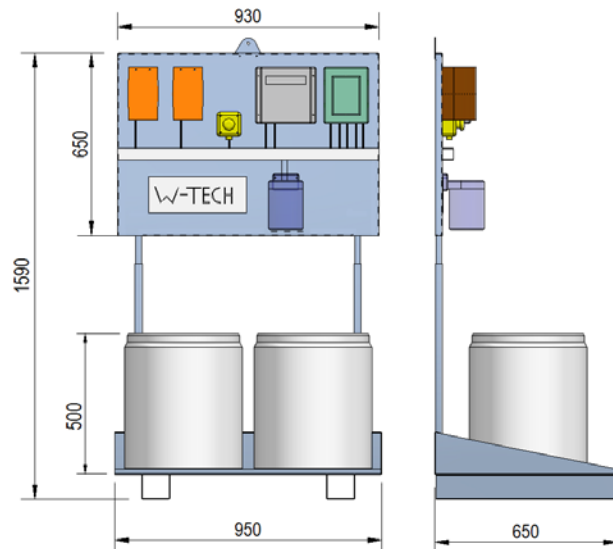
2. HANDLING AND DELIVERY

2.1 Delivery methods

All models of this series are supplied on wooden pallets. Any connecting elements, piping or other items are supplied in a separate box or inside the tanks.

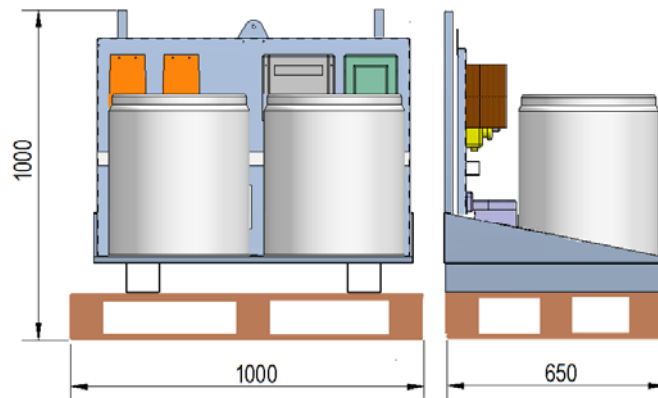
THE WOODEN SUPPORT AND THE PLASTIC SHEETS ARE TO BE REMOVED BEFORE INSTALLING THE SKID IN ITS FINAL POSITION. PAY ATTENTION TO THE PIPES AND THE PUMPING SYSTEM AND MAKE SURE THEY ARE FREE OF OBJECTS THAT COULD CAUSE PROBLEMS OR DAMAGE THE NORMAL FUNCTION OF THE WATER TREATMENT.

2.1.1 Weight and dimensions skid ADVANCED series

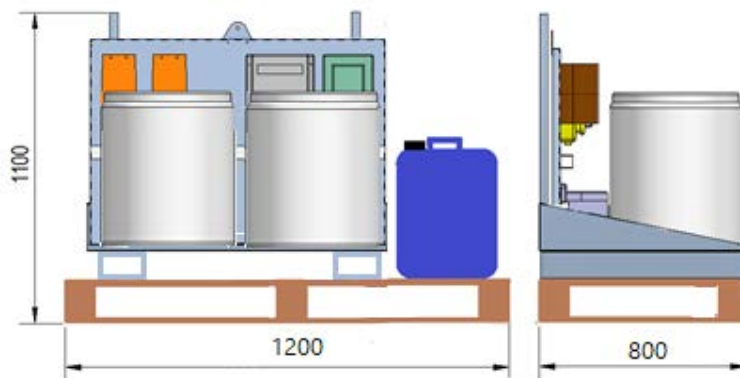


Mode: installation
Chemical products: excluded
Weight: 60kg

Chemical products: included
Weight: 110kg



Mode: Shipping
Chemical products: excluded
Weight: 70kg



Mode: Shipping
Chemical products: included
Weight: 130kg

NOTE : it's possible that the shipment will be made on pallets of different sizes from those shown or on multiple pallets. All images are for illustrative purposes only and may differ from reality. The products may be changed, for transport contact W-tech.

3. INSTALLATION

3.1 Positioning and anchoring

These units do not require a special basement. They can be placed on a concrete floor slab or concrete covered ground, making sure to anchor the skid to the floor or wall.

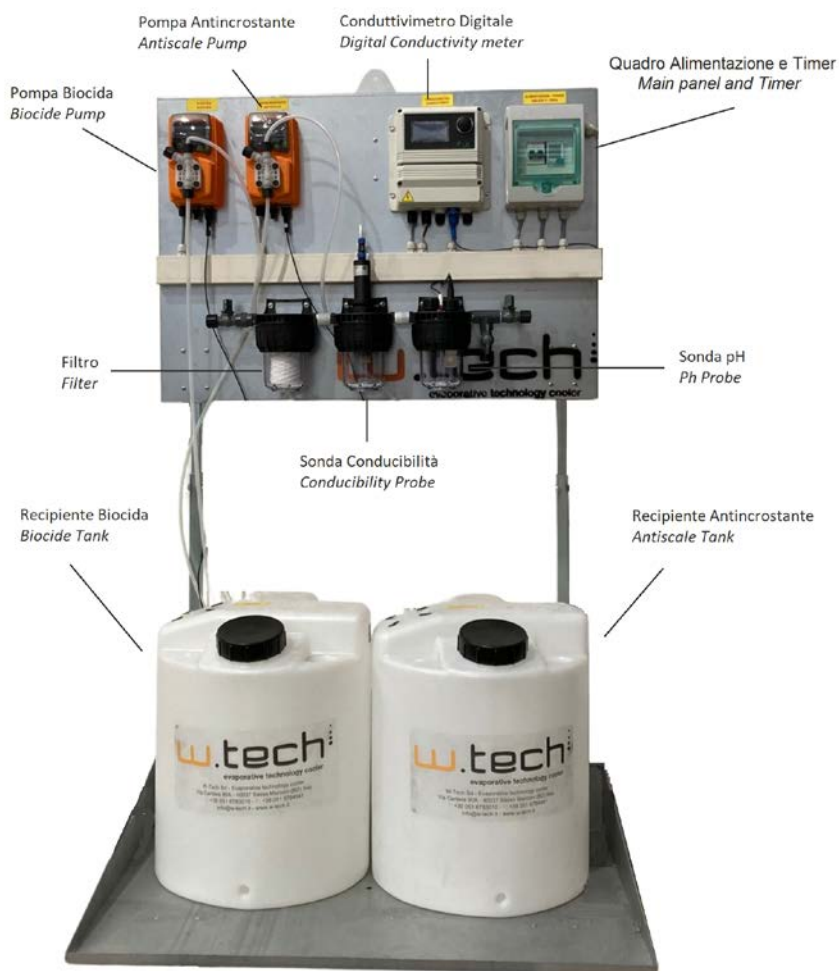
3.2 Positioning conditions

The skid can be placed both in free area or in a closed on all four sides. The skid should be maintained near the evaporative machine. It is required to maintain a distance between the chemical products pump and the unit, below the maximum distance allowed by the prevalence indicated on the pump.

3.3 Assembly

Before installing the skid, make sure that all items provided inside the graduated containers are removed. Inside the tank there are two square rods, fit them inside the rods with greater width that are placed vertically to the structure. Lock the rods together with the bolts provided. Position the instrument panel on the top by sliding the rods inside the rails fixed at the back of the panel itself. If possible, fix the panel to the wall with a screw and dowel to limit oscillation.

NOTE: All images included are for illustrative purposes only and may differ from reality. Follow the instructions on the instrument itself.

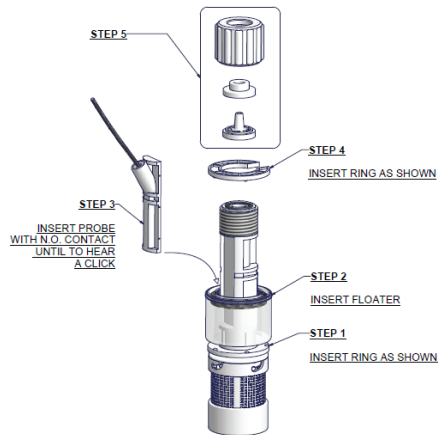


ADVANCED PLUS

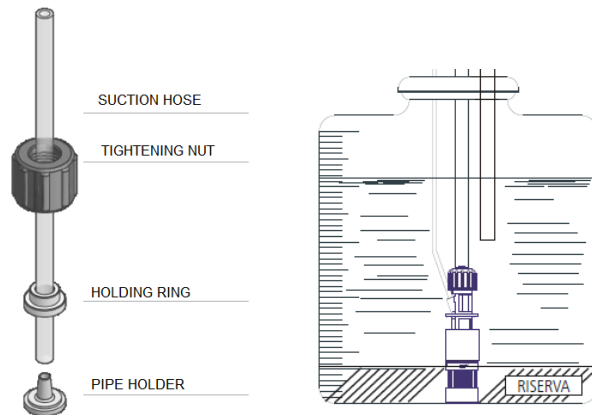
Once the structure has been positioned, connect the piping to the pump using the pipe holders and pipe retainers and tighten the fixing nuts using only the strength of your hands. Connect the BNC level probe connector of the two tanks to the space dedicated to the respective pumps. The bottom filter will be already assembled and positioned at the bottom of each chemical tank. If it is necessary to move the tanks, the **maximum suction pipe height** is 1.5 meters.

Note: Make sure that the float is in the upright position before and after filling the two tanks.

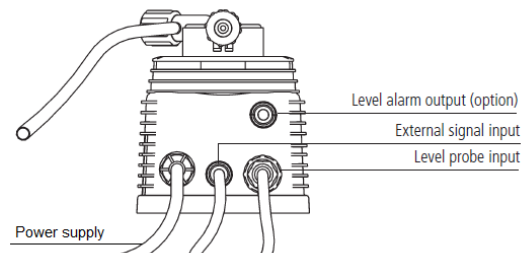
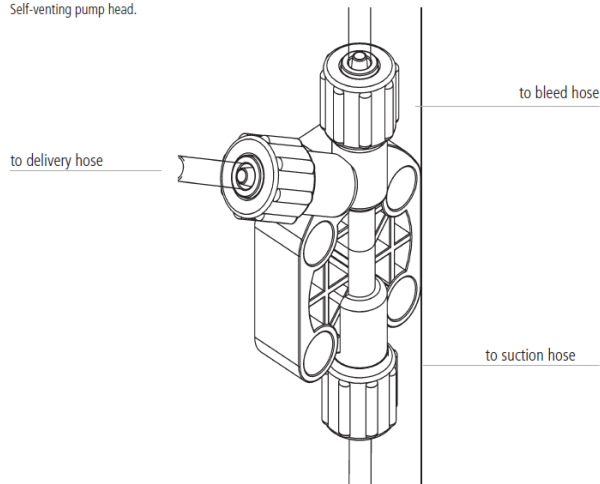
Assembling foot filter with level probe



Assembling suction probe / pump body



Self-venting pump head.



Important: connect ,the BNC connector of the pulse meter (liter counter), to the input contact on the scale inhibitor pump, to allow the system to operate in proportion to the water replenished.
The input connector of the biocide pump will remain free.

The pipes must be placed in the following order:

1. From biocide container to bottom (suction) connection of biocide pump,
2. From top connection(purge) of biocide pump to biocide tank,
3. From the side connection (discharge) of the biocide pump to the make-up supply line of the evaporative unit,
4. From the scale inhibitor container to the bottom connection(suction) of the scale inhibitor pump,
5. From the top connection (purge) of the scale inhibitor pump to the scale inhibitor tank,
6. From the side connection (discharge) of the pump to the make-up line of the evaporative unit,
7. From evaporative unit to the filter cup holder of the skid,
8. From the last probe holder cup of the skid to the evaporative unit tank or to the purge.



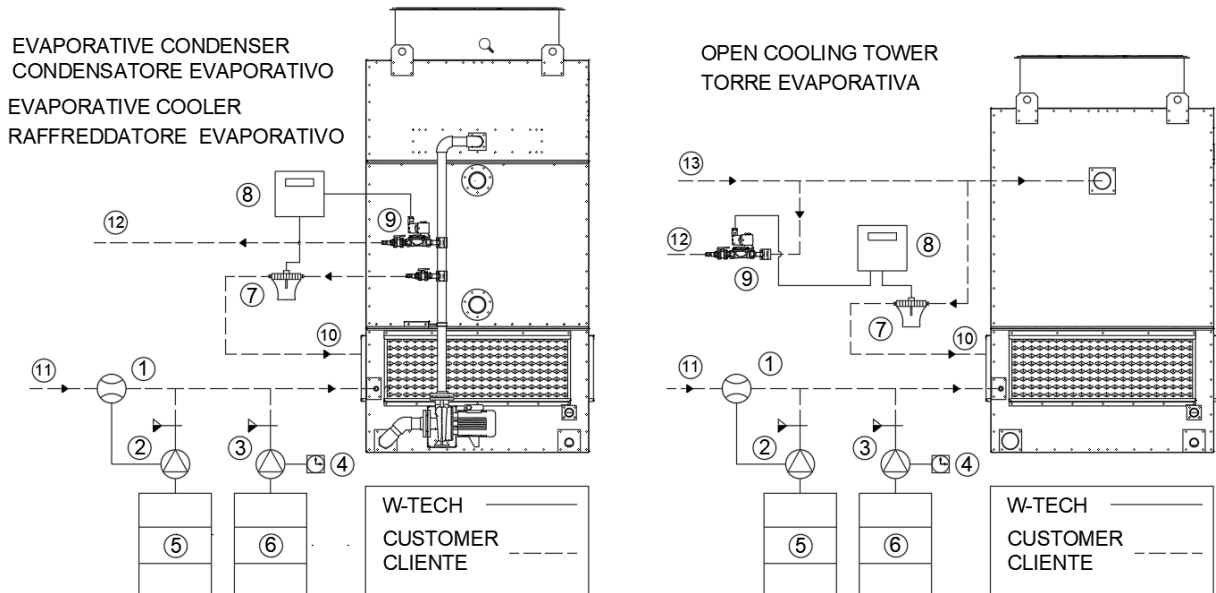
Attention: The chemical products shall be injected into the unit make-up line or alternatively into piping where water is flowing. Do not put the delivery pipe of the pumps directly into the tank because it would cause a non-uniform dosage of the product on the volume of water to be treated and even worse, it could be the cause of spot corrosion of the sheet metal of the tank.

3.4 Piping and instrument drawing

Check the type of unit , if it is equipped with a pump for the recirculation of the water in the basin ,it will be a Condenser or an Evaporative Cooler, if it is not equipped ,it will be an Evaporative Tower.

Identify the purchased model with at least one of those shown below and follow the indications as in the chart and legend

- In the case of an evaporative tower, it is necessary to create a spillage on the discharge pipe to take a small portion of the water entering the tower and send it to the skid,
- In the case of an evaporative unit equipped with a pump, there will be the predisposition for the draining on the rise of the pump itself. It will be enough to connect the pipe to the rings on the unit and on the skid.



Legend:

- 1 Turbine pulse emitter water meter
- 2 Anti-scaling dosing pump, controlled by flowmeter 1,
- 3 Biocide dosing pump, controlled by time switch,
- 4 Time switch,
- 5 Antiscale / anticorrosive storage,
- 6 Biocide / anti legionella storage,
- 7 Filter and conductivity, and ph probes, holders,
- 8 Conductivity meter,
- 9 Purge valve (if provided),
- 10 Return line of water passing through the probe, alternatively it can flow on the purge line 12,
- 11 Evaporative unit tank water make-up line,
- 12 Water purge line,
- 13 Water inlet line (for Evaporative Tower only).

3.5 Electrical wiring

Our skids are normally supplied already wired and tested. The electrical power cable is available outside the skid in order to minimize the work on site. It is necessary to supply the power supply to start the equipment. Before making the electrical connection, make sure that the power supply corresponds to the electrical data on the plate. Use cables of the right section in order to avoid overheating and/or excessive voltage drop.

Installation and maintenance operations must be carried out by EN 60204-1 trained personnel. Do not tamper with the wiring in order not to invalidate the warranty on the electrical components and not to interfere with the proper functioning of the water treatment skid.

3.6 Chemical products

All chemical products, supplied with the different water treatment skids, require special attention regarding transportation, storage, use and disposal.

W-tech provides the technical and safety data sheets of chemical products together with the W-Care manual, just to allow the customer to identify the substance and the dangers associated with it, first aid measures in case of inhalation, contact or indigestion, fire fighting measures or accidental release, ecological information and much more.

If the customer does not have this information, it is strongly recommended to request them to W-tech technical department, which is not responsible for any wrong use of the supplied product.

3.7 Operation to carry out before the start up

Ensure that water and chemical distribution piping are clean, unclogged, and not folded back on themselves to allow the proper recirculation of fluids.

Make sure that chemical containers have been emptied of the delivered documents/accessories before being filled with the corresponding chemical products.

Note: make sure the level probes in the respective bins are placed upright and sitting on the bottom!

Connect the BNC connector of the litre-counter cable to the input jack of the antiscaling pump, follow "Antiscaling-Anti-Corrosive Dosing System Adjustment" paragraph in the next chapter.

Attention: before start-up the system and bring the water to the skid remove the bottle containing the maintenance solution from the bulb of **pH probe**.

4. W-CARE START UP

The Advanced skid consists of:

1. Biocide dosing system;
2. Dosing system of the antiscaling agent;
3. Conductivity and pH water reading system

4.1 Setting Biocide/Algaecide dosing system

Additive:	Biocide/Algaecide with dispersing agent/Anti-legionella
Functions:	Scheduled
Value to set:	60 min
Max suction height:	1,5 m
Max delivery pressure :	7 bar
Environment temperature:	0 ÷ 45°C
Additive temperature:	0 ÷ 50°C
Protection degree:	IP 65



Pump



Level probe with axial bottom filter (PVDF)



Injection valve (PVDF)

4.1.1 Reset default settings

Carry out this operation if the equipment has not retained the set values or if the product is replaced. This operation will erase all the setting data and reset the equipment to the factory default ones.

- Disconnect the power supply
- Reconnect the power supply, press and hold **↵** key to enter
- Confirm password "0000" (default) to access the menu press the **→** e **↵**, then enter the main menu PROG 2 SETUP, scroll to "SET FACTORY" and press **↵**
- Change the entry to "Y" and press **↵**
- Press Esc to return to the main menu.

4.1.2 Dosage setting

Progr. setting mode (amount of product to be dosed over time)

- Press and hold **↵** key to enter
- the display shows Code "0000" (default) press **→** and **↵** again to confirm
- use the buttons "**↑** and **→**" to scroll to the various items, and click on **↵** to access the menu PROG 1 MODE
- scroll to "**TIMER**" mode then press **↵**, the display shows:
START (start time)
TIME (duration)
QUANTITY (of product to be dosed)
DAY OF THE WEEK (on which to activate dosing)
- To change these values, use the "**↑** e **→**" keys (change value). To confirm, press the **↵** key.
- Select "**Program 1**" with the up and right keys and click **↵** to confirm (up to 16 daily programs can be set).
- The display shows:
ST (start): set 06:00 and confirm with **↵**
TIME: 01:00, confirm with **↵**
QUANTITY: 00:50 (liter)
DAY OF THE WEEK: **Y** to activate the program. **N** to put the pump off.
Mon Y / Tue N / Wed Y / Thu N / Fri Y / Sat N / Sun N confirm with **↵**.
- Press ESC to return to the main menu.

With this setting, the pump will dose 500cc (0.5 liters) of biocide, keeping the pump on for 1 hour from 6:00 a.m. three times a week (MONDAY / WEDNESDAY / FRIDAY).

Note: The minimum dosing time should be calculated based on the dosing capacity of the pump.

It is strongly not recommended to strain the pump by reducing the dosing time to the minimum to avoid damaging the internal components.

Setting mode CC ST (amount of product to be dosed in relation to the pulses to be supplied to the magnet):

- confirm password to access menu → - ←
- select Prog 2 "SET UP" ↑ - ←
- select set 1 "CC ST" ↑ - ←
- set the "CC ST" value according to the pump used 0,37 cc/imp (modello VMSA MF 4 l/h = 0,37)
- save ←
- exit the menu ESC

Setting mode UNIT (pump unit of measurement, liters or gallons):

- select set 6 "UNIT" ↑ - ←
- set the "L" liter and save ↑ - ←
- exit the menu ESC

Note: If you want to change the password (8), the language (12) or the time (13) by selecting the other parameters in the "Prog 2 Set Up" menu list

4.1.3 Biocide dosage calculation

The dosage of Biocide generally changes with the degree of pollution and with the system to be sterilized. It is based on an accurate study of the circuit and the microbiological analysis of the water to be treated.

A shock dosage of 100 to 200 ppm (gr/m³) should be used for dosing during the first start-up, and it is generally preferred to repeat this shock dosage periodically.

An indicative maintenance dosage in the tower can range between 50 and 100 ppm (gr/m³) in relation to the volume of the tank depending on the season (higher dosage in the warmer months). The product may give rise to foaming phenomena due to the biomass dispersant present in the formulation. It is a phenomenon that, if it occurs, should not alarm.

NOTE: Never set two programs that coincide in time. This will prevent the pump from completing the last program entered.

If you notice the presence of algae or fungal and bacterial pathogens, you need to increase the maintenance dosage and the number of shocks!

4.2 Antiscale/Anti-corrosive dosing system setting

Additive:	Antiscale/Anticorrosion
Functions:	CC ST; DIVIDE
Set value:	CC ST (Per VMMSA MF 4 l/h = 0,37 cc/imp)
Set value:	DIVIDE = "N"
Pulse counters:	Threaded turbine flowmeter (4 imp/l)
Max suction height:	1,5 m
Max delivery pressure:	7 bar
Environment temperature:	0 ÷ 45°C
Additive temperature:	0 ÷ 50°C
Protection degree:	IP 65



Pump



Level probe with axial bottom filter (PVDF)



Injection valve (PVDF)

4.2.1 Reset default settings

Carry out this operation if the equipment has not retained the set values or if the product is replaced. This operation will erase all the setting data and reset the equipment to the factory default ones.

- Disconnect the power supply
- Reconnect the power supply, press and hold $\leftarrow$ key to enter
- Confirm password "0000" (default) to access the menu press the $\rightarrow$ e $\leftarrow$, then enter the main menu PROG 2 SETUP, scroll to "SET FACTORY" and press $\leftarrow$
- Change the entry to "Y" and press $\leftarrow$
- Press Esc to return to the main menu.

4.2.2 Dosage settings

Setting mode DIVIDE (the pulses supplied by the counter that's connected to the pump, are divided by the value set during the programming phase and they determine the frequency of dosage).

- confirm password to access menu $\rightarrow$ - $\leftarrow$
- select Prog 1 "MODE" $\leftarrow$
- select Mode 2 "DIVIDE" $\rightarrow$ - $\leftarrow$
- set value "N" XX (see. Section 4.2.5, calculating the division value)
- save E
- exit the menu ESC – ESC

Setting mode CC ST (amount of product to be dosed in relation to the pulses to be supplied to the magnet):

- confirm password to access menu $\rightarrow$ - $\leftarrow$
- select Prog 2 "SET UP" $\uparrow$ - $\leftarrow$
- select set 1 "CC ST" $\uparrow$ - $\leftarrow$
- set the "CC ST" value according to the pump used 0,37 cc/imp (modello VMMSA MF 4 l/h = 0,37)
- save $\leftarrow$
- exit the menu ESC

Setting mode WMETER (to enter the pulses supplied by the pulse counter meter):

- select set 4 "WMETER" $\uparrow$ - $\leftarrow$
- set the "4 imp/liter" and save $\uparrow$ - $\leftarrow$
- exit the menu ESC

Setting mode UNIT (pump unit of measurement, liters or gallons):

- select set 6 "UNIT" $\uparrow$ - $\leftarrow$
- set the "L" liter and save $\uparrow$ - $\leftarrow$
- exit the menu ESC

Note: If you want to change the password (8), the language (12) or the time (13) by selecting the other parameters in the "Prog 2 Set Up" menu list

For all other functions (for example pump priming, alarms, etc.) and troubleshooting, refer to the pump operating manual supplied with the skid or request it from the W-tech technical office.

4.2.3 Dosage calculation

The dosage of Antiscale/Anti-corrosive for recirculated circuits depends on the type of make-up water treatment and the temperature of the water in the circuit. Normally it's recommended a dosage between from 80 and the 150 ppm (gr/m³) based on the water make-up, according to the chemical characteristics of the water to be treated and the technical data of the circuit, in order to have an indicative concentration of residue in the tank water of 200 ppm (gr/m³).

The product, totally organic, based on dispersing polymers and phosphonates, is suitable to prevent the formation of scale and corrosive phenomena in cooling systems replenished with softened or hard water.

The best dosage is established by technicians specialized in water treatment after an accurate study of the system and following specific chemical analysis carried out on samples of water to be treated.

4.2.4 Pulse counter connection

Install the threaded cold water meter on the tower make-up line so that it can provide a continuous reading of the "fresh" water being replenished in the tower.

Then connect the BNC connector to the INPUT port on the antiscala pump.

4.2.5 Pulse division value calculation

The calculation of the number of division that the pump must accomplish is to be done as following:

$$\frac{\left[\frac{\text{imp}}{\text{l}}\right] \times [\text{cc}]}{[\text{ppm}] \times [\text{K}]} \times 1000 = N$$

N - value of division to be set; [imp/l]- litre pulses supplied by the pulse generator counter; [cc] - quantity of product dosed per single injection (expressed in cc) of the dosing pump to be used; [ppm] - amount of product to be dosed expressed in parts per million (gr/m³); [K] - coefficient of product to be dosed.

Pure product K=1.

NOTE: THE MINIMUM CONCENTRATION OF THE PRODUCT TO BE USED IN A TOWER DEPENDS ON THE CHEMICAL CHARACTERISTICS OF THE WATER; IN THE ABSENCE OF A SPECIFIC CHEMICAL ANALYSIS, IT IS POSSIBLE TO USE THE PARAMETERS RECOMMENDED BY US AND, IN ANY CASE, CHECK THAT THERE IS NO FORMATION OF SCALE OR WHITE RUST ON THE SURFACES. IF NECESSARY, INCREASE THE AMOUNT OF PRODUCT TO BE DOSED IN THE TANK.

Example of calculation:

- Pulse generator counter of 4 l/h; -VMSA MF 4 l/h = 0,37 cc/imp; - Pure product K=1
- Amount of product to dose in parts per million (gr/m³)= 150 ppm

$$\frac{[4] \times [0,37]}{[150] \times [1]} \times 1000 = 10 = N$$

4.3 Conductivity control system regulation

Voltage: 90÷240VAC
Inductive probe
pH Probe

Frequency 50/60Hz
Temperature probe: PT100

Power: 12 Watt Protection degree: IP 65
Measuring scale: 0÷30 mS



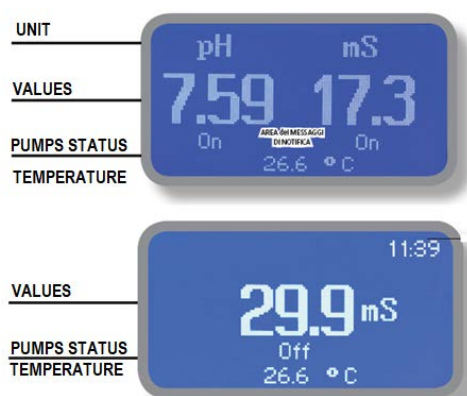
4.3.1 Reset default settings

Carry out this operation if the equipment has not retained the set values or if the product is replaced. This operation will erase all the setting data and reset the equipment to the factory default ones.

To reset the device to factory default values (including password), press the knob 5 times and entering the password 0000 (default setting), you access the main menu "Main Menu".

Turn the knob to the item 12 "INSTRUMENT RESET" press the knob and display "ON". Press again, select "OK" and press to confirm. The message "CHECKSUM ERROR" will appear. Press the knob to return to the "Main Menu". Select "EXIT" and press. The instrument has reloaded the factory values. It is now necessary to repeat all calibration and parameter programming procedures.

4.3.2 Main screen



Unit:

"mS" are the units of measurement of the conductivity probe;
pH is the unit for measuring the pH probe
(ADVANCED PLUS version only)

Pumps Status (dispensing devices):

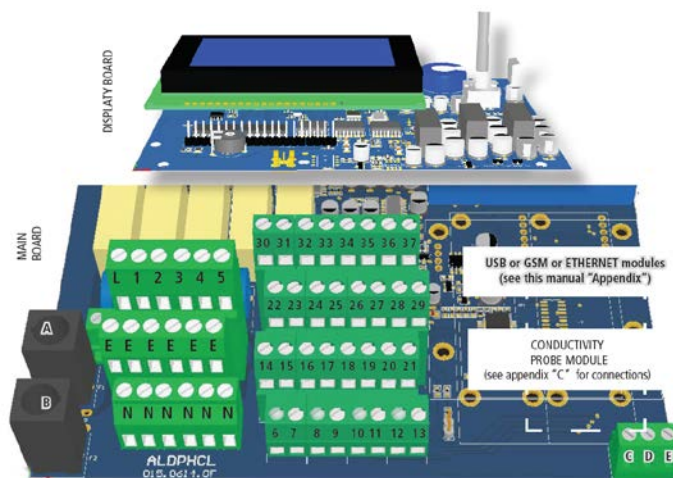
These fields show the current status of the outputs and the activity of the instrument. A notification message indicates the presence of critical issues. Turn the knob one full turn clockwise to check the instrument settings and the current status of the outputs.

Attention: the pumps referred to, are not the two pumps installed on the w-care!

Note: when a flow, level, dosing, broken probe, set-point alarm, etc is detected, "alarm" appears on the screen, the outputs are disabled and/or the screen turns red. The purge valve will also remain in the self-closing position.

4.3.3 Electrical connections

Disconnect the device from the power supply to make the connections to the selected probes and/or outputs according to the figure below.



A: General fuse (6A T) - B: Fuse for the instrument (3.15A T)

L(Phase) - E (Earth) - N (Neutral): 85÷264VAC - 50/60 Hz

1(Phase) - E(Earth) - N(Neutral): 85÷264VAC - 5A 50/60 Hz Relay 1 Output "CH1 PH RELAY" (outlet for purge valve)

2(Phase) - E(Earth) - N(Neutral): 85÷264VAC - 5A 50/60 Hz Relay 2 Output "CH2 MS RELAY (outlet for purge valve)

3(Phase) - E(Earth) - N(Neutral) : 85÷264VAC - 50/60 Hz alarm output

21(GND) - 28(+RS485) - 29(-RS485): RS485

14(Transparent flow sensor) - 15(Blue flow sensor) - 16/17 (bridge) (flow detection in probe holders)

The pH probe must be connected to the blue connector outside the instrument **only on ADVANCED PLUS model**.

inductive conductivity probe ADVANCED PLUS version (MDIND module)

temperature probe PT100 (remove the heating element before installing the probe):

clamp n.6 (green) make a bridge between n.7

clamp n.8 (white) make a bridge between n.9



Module MDIND

Inductive probe ADVANCED PLUS

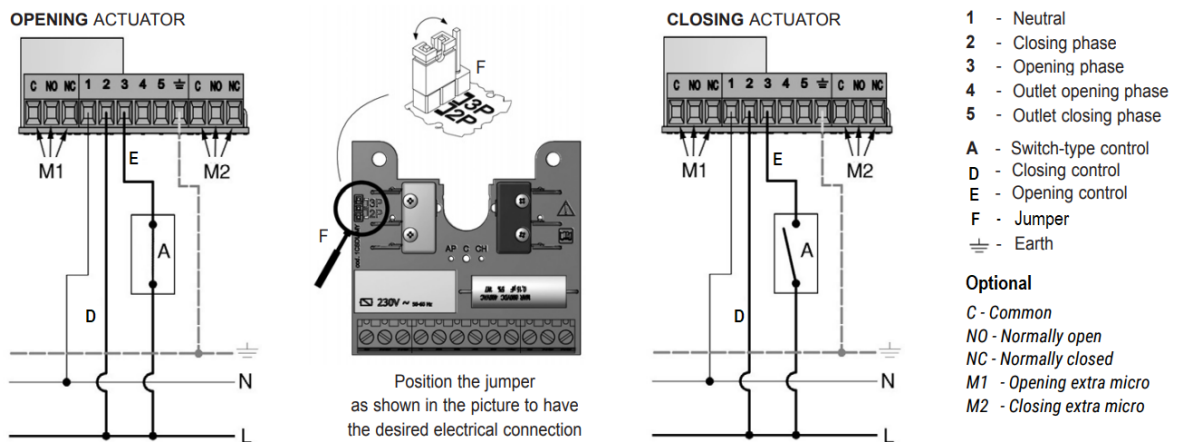
Clamps n1 and n2: blue wire (earth)

Clamp n3 :brown wire (signal)

Clamp n.4 : yellow wire (power)

4.3.4 Electrical connection purge valve and conductivity meter

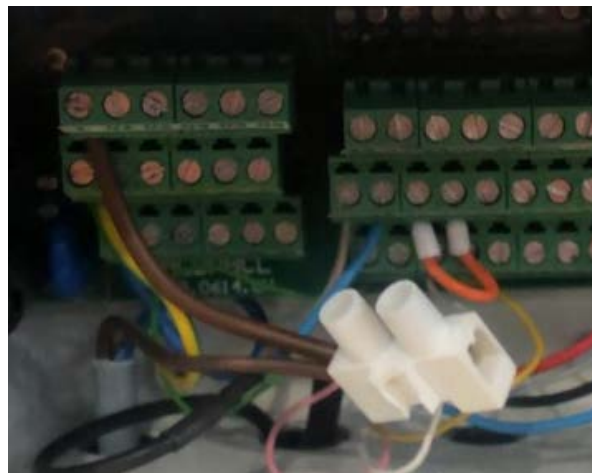
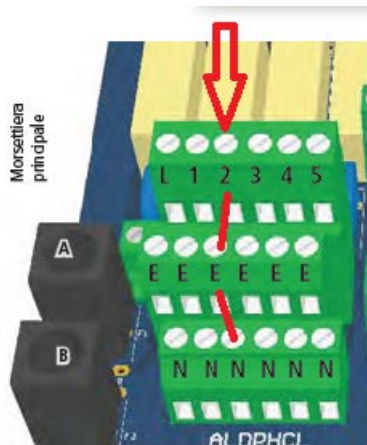
The purge valve will be used according to the 2-point ON/OFF connection, where one clamp will be used for the fixed phase of electrical self-closing and one clamp will be used for the opening phase. Following the connection diagram of the purge valve.



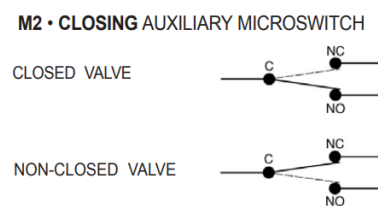
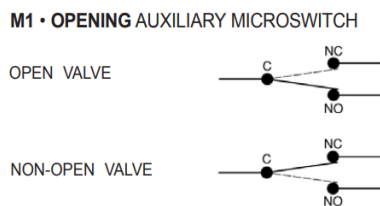
- Purge valve clamp 1 → clamp N of conductivity meter
- Valve clamp 2 → white clamping box to which the phase L of the conductivity meter is also connected (see photo)
- Purge valve clamp 3 → conductivity meter clamp 2
- Purge valve earth clamp → conductivity meter clamp E

Note: If there is an anti-condensation heater inside the purge valve terminal box, it should be connect to neutral clamp 1 and to phase 5 so that it will be active when the valve is closed.

The clamps of the conductivity meter to be connected to the valve must all be on the column of clamp 2 as below.



The contacts of the additional microswitches (optional) are placed as shown in the following figures.



4.3.5 Quick check

Placed in the upper right corner, there is the instrument control knob. The knob can be rotated in either direction to scroll through menus and pressed to select the item shown.

Note: after selecting the option, move to "OK" and press to save and exit the sub-menu. Press "ESC" to exit without saving.

From the main menu, turn the knob clockwise a full turn to scroll through the main instrument parameters and current status (the values in the figure are for illustrative purposes only).

	Status Time: 11 :39 Date: 20/Apr/11 CD: 29.9	Local Time Local Date Conductivity probe reading
	Status Temperature: 26.6 °C Dos. Alarm: NO Probe Fail: NO Alarm: NO	Temperature probe reading Dosing alarm condition Probe failure status Alarm contact status
	Status Flow: YES Level: NO Cal.CD Fail: YES Cal.CD day: 01/Jan/10	Flow contact status (SEPR) Tank Level 1 status Last conductivity calibration result Last conductivity calibration date
	Status Cal.Temp Fail: YES Cal.Temp day: 01/Jan/10	Last Temperature calibration result Last Temperature calibration date
	Outputs Status Pulse pH1: 82 P/m Relay pH2: ON Pulse pH3: 82 P/m Pulse mS: 180 P/m Relay mS: ON	Output status

To access the main menu press the knob on the main screen and enter the password. At the first access the password to be entered is 0000 (default setting). Press the knob 5 times to enter the Main Menu. Otherwise, press the knob once and enter the password. Select the numbers by turning the knob.

Note: to set a new password, choose "PARAMETERS" from the "Main Menu", select "New Pcode", press the knob and enter 4 numbers. Select "EXIT" and answer "YES" to save. The new password is now active.

Be careful not to forget the password (if modified). In this case, contact the technical office for the unlocking procedure. The password is not recoverable in any way. If not strictly necessary, it is recommended to leave the original password.

4.3.6 Conductivity meter and probe configuration

After entering the main menu turn the knob and select "Calibration" to choose the kind of conductivity probe. Scroll to the "Select probe" menu and choose the 0-30 mS probe, then press the knob.

Exit the "Calibration" menu and return to the "Set-Point" item, then press the knob.

Select "CH1 pH relay" and enable the function as follows:

- Working Mode: ON/OFF
- Set the values 09.00 pH = ON and 08.50 pH = OFF. The difference between the two values is called the HYSTERESIS.
- Pulse Speed: Set the value to 0.

Turn the knob to OK and press to save, then exit to the previous menu.

In this operating mode, when the pH probe reading is 9, Relay 1 output "CH1 PH RELAY" will be activated, which controls the opening of the purge valve.

When the pH value drops below the value 08.50, the output will be disabled and the valve will close automatically.

Select "CH2 mS relay" and enable the function as follows:

- Working Mode: ON/OFF
- Set the values 01.50 mS = ON and 01.00 mS = OFF. The difference between the two values is called the HYSTERESIS.
- Pulse Speed: Set the value to 0.

Turn the knob to OK and press to save, then exit to the previous menu.

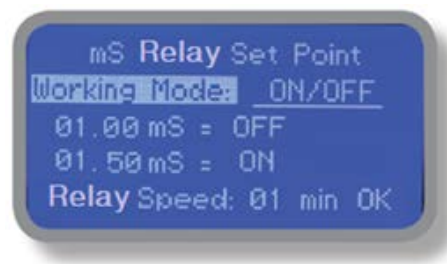
In this operating mode, when the conductivity probe reading is 01.50 mS, Relay 2 output "CH2 mS RELAY" will be activated, which controls the opening of the purge valve.

When the mS value drops below the value 01.00, the output will be disabled and the valve will close automatically.

WARNING:

The values indicated above are generic, and must be calibrated based on the characteristics of the process water!

Contact a specialized water treatment company for the correct evaluation of the parameters and chemical dosage.



The other functions "CH1 PH Pulse" "CH2 mS Pulse" are not of interest, so they will remain DISABLED

4.3.7 Calibration of conductivity probe and temperature probe PT100

Carry out this operation if the equipment has not been used for a long period of time or the set values are wrong.

The calibration of the conductivity probe is performed in one of two ways. In both cases to obtain reliable results:

- the device must be installed correctly;
- the conductivity probe must be connected to the device and be in good condition;
- calibration must be done using the temperature of the installation or the results may not be reliable.

From menù "Calibration" choose "pH probe".

FULL calibration: zero (P1) and calibration of a second point (P2) using a buffer solution with a value close to the working value.

FAST calibration: a single point (value close to the working value).

In the procedure for **Full calibration**, the conductivity probe must be dry and clean and NOT installed on the system yet.

Move the knob on the instrument to "P1" and, leaving the probe in the air, press the knob. The display will read 0.00, then enter the value of the chosen buffer solution in the Cal.at box and move the cursor to "OK" and press the knob again to confirm. "Cal ok" will flash in the bottom left. If "Cal Error" is displayed, this means that the calibration was not successful and the probe may be faulty.

Move the cursor to "P2", press the knob and enter the value of the buffer solution you are about to use. Immerse the tip of the conductivity probe into the buffer solution and wait for the reading to stabilize. The display will read X.XX, then enter the value of the chosen buffer solution in the Cal.at box and move the cursor to "OK" and press the knob again to confirm. A "Cal ok" will flash at the bottom left.

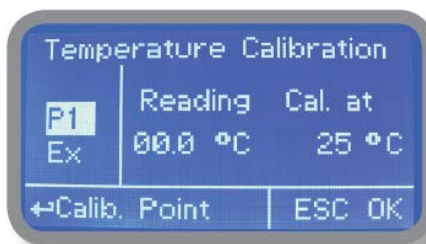
If "Cal Error" is displayed, it means that the calibration was not successful and the probe may be faulty.

Note: The buffer solution should have a value near to that of the water to be used in the cooling tower; it would be optimal to remain in the conductivity range between 1.00 mS and 2.50 mS.



A professional thermometer is required to make the temperature calibration. From the calibration menu choose **Temperature Calibration**. To obtain reliable results the instrument must be installed correctly and the PT100 temperature probe must be in good condition.

Once the temperature has been read by the thermometer, edit the "Cal. at" field by entering the value in degrees, then confirm by pressing the knob. To end the calibration, move the slider to "OK" and press to save or not to save. If an error occurs during calibration, the instrument will display a message and ask to repeat the calibration. Delete the settings or restore the default values.



4.3.8 Calibration of pH probe (Advanced Plus version only)

Carry out this operation if the equipment has not been used for a long period of time or the set values are wrong.

From menù "Calibration" choose "pH probe".



FAST calibration: one point only (value close to working value)

FULL calibration: calibration in this pH mode must be performed on two points (P1 and P2) and therefore requires two buffer solutions which by default are pH 7.00 and pH 4.00.

Calibration of the 1st point (P1).

In the "pH Calibration" menu select "P1" and press the knob to enter the first point to be calibrated. Prepare 7.00pH buffer solution and immerse the probe sensor in it. Wait until the reading is steady. Enter the value of the buffer solution in the "Cal. at" field. Select "OK" and press to confirm.

A "Cal ok" will flash at the bottom left. If Cal Error appears, the calibration was not successful and the probe may be faulty.

Calibration of the 2nd point (P2).

In the "pH Calibration" menu select "P2" and press the knob to enter the second point to be calibrated. Prepare 4.00pH buffer solution and immerse the probe sensor in it. Wait until the reading is steady. Enter the value of the buffer solution in the "Cal. at" field. Select "OK" and press to confirm.

A "Cal ok" will flash at the bottom left. If Cal Error appears, the calibration was not successful and the probe may be faulty.



Attention: The value of the buffer solution may change if the environment temperature is different from 20°C. Read the label of the buffer solution for more information. In this case the "pH Default" value must be changed.

4.3.9 Time and date setting

The International menu allows you to set the international settings for:

- format time/date (Europe IS or USA),
- time,
- date.



4.3.10 Flow rate sensor setting

The FLOW contact (electrical connections paragraph) can be enabled to interrupt the conductivity meter activities using a N.O. (normally open contact) or N.C. (normally closed contact) function.

Turn the knob to select the most suitable type of operation between: "DISABLE", "REVERSE" (N.O. contact) or "DIRECT" (N.C. contact).

The FLOW contact can also interrupt the dosing process after a determined time interval from the closing (or opening) of the contact. To set the time interval turn the knob to "Time:00 min", press and turn to change the interval (from 0 to 99 minutes). Press again to confirm the setting.

The values to be set are: mode **DIRECT** and Time **00 min**.

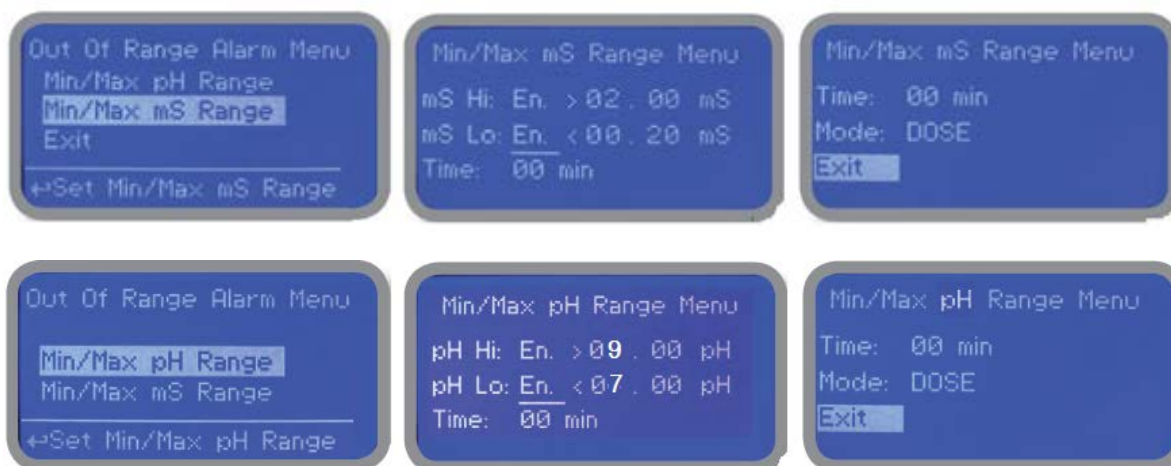
4.3.11 Setting alarm "out of range values"

The "Out of range alarm" indicates the reading scale of the Conductivity probe and the pH probe.

Activate the Min/Max pH Range and Min/Max mS Range functions as shown in the figures below.

The values recommended by W-tech for the recirculation / process water are between $7 < \text{pH} < 9$ and conductivity $0.25 < \text{mS} < 2.5$, according to what is indicated in the Water Chemical Properties of the H2O FactSheet file downloadable from the website www.w-tech.it.

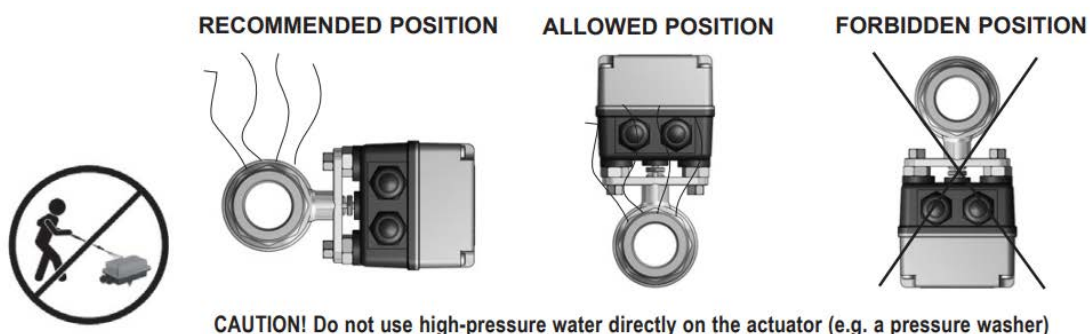
Please note: Outside this range, the instrument stops its activities and returns an alarm message on the dedicated alarm output and the display turns orange!



4.3.12 Automatic purge valve (optional)

Thanks to the reading of the conductivity and pH of the water circulating in the evaporative tower, the **W-care Advanced Plus system**, will automatically give the ok to the opening of the purge valve, thus reducing the concentration of salts in the water itself. Once the set concentration value is reached, the system will cut off the power supply to the opening phase allowing the valve to close. This system will ensure the reintegration of "fresh" water, therefore the reduction of water concentration, and the maintenance of the characteristics of the water most suitable for the evaporative unit, avoiding, at the same time, unnecessary waste.

For the electrical connection, refer to paragraph 4.3.4, for installation to paragraph 3.4.



5. PREVENTIVE MAINTENANCE SUMMARY CHART

OPERATIONS TO BE CARRIED OUT	PIPES	PROBE HOLDER	PROBES	FILTER	TIME SWITCH	CONDUCTIVITY METER	DOSAGE PUMPS	CHEMICAL PRODUCTS TANKS	PURGE VALVE
GENERAL CONDITIONS INSPECTION	M	M	M	M		M		M	M
FOULING INSPECTION	M	M	M						N
CLEANING / REPLACEMENT	N	M	N	T/N					
LEAKS INSPECTION	N								
OPERATING CONDITIONS CHECK					T	T	T		
CYCLES OF CONCENTRATION AND PURGE CHECK									M
CHEMICAL PRODUCTS LEVEL CHECK								M	

M = Every month

T = Every Three Months

N = When Needed



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