

MICRODOS

Oxy

Installation, Programming and Maintenance User Guide



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WARNINGS

Please read carefully the instructions given below, as they supply you with all the needed information, necessary for installation, use and maintenance.

Once you receive the MICRODOS OXY check out for its integrity and all its components, in case of any anomalies, please consult a skilled staff before making any operation. The equipment must be operated by skilled persons.

For a correct functioning it is necessary to use original spare parts and original accessories. Microdos declines whatever responsibility in reference to break down due to tampering or the use of not original spare parts and accessories.

The electrical plant must be in conformity with the rules of the country where it is realised.

During maintenance and repair of parts in contact with chemicals, always use personal protection measures (gloves, aprons, goggles, etc.).

The usage room temperature cannot overtake 45 °C. The minimum temperature depends on the chemical that must remain in the liquid state.

Microdos declines all responsibility in reference to any intervention on the equipment from a non-skilled staff.



HAZARDS

Ignoring the instructions can result in equipment damage and, in extreme cases, injury to persons.

Before installing the equipment make sure that the electrical data reported on the label correspond to those of your electrical plant.

All maintenance or repair must be performed with the system electrically isolated.

Whenever you need to access the connection box, turn off MICRODOS OXY and isolate it electrically.

Do not operate on the equipment with wet hands or feet.

Do not leave the equipment exposed to the action of atmospheric agents.

In case of an improper functioning of the equipment switch off and contact our technical assistance for any reparation request.



WARNING: PROPER AND IMPROPER USE

The instrument MICRODOS OXY should be used only for the purposes for which it was designed that is, the measurement and control of the values of the chemical and physical parameters.

Uses other than these are considered improper and therefore dangerous.

The instrument is NOT designed for use in environment with danger of explosion.

Microdos declines any responsibility for any damage resulting from the improper and / or unreasonable use of the instrument.

WARRANTY CERTIFICATE

The controllers manufactured by Microdos are warranted to be free from defects in workmanship and material for 24months of operation starting from the delivery date to the first purchaser.

Within the above stated period Microdos will supply free of charge any part that upon examination by Microdos or by an authorised dealer, is disclosed to have been defective in workmanship or material, or at its option, it will repair the parts directly or through authorized workshops. It remains anyway excluded from whatever responsibility and obligation for other costs, damages and direct or indirect losses that come from the use or the not use availability, either total or partial. They remain anyway at charge of the purchaser the costs of plan controllers mounting and disassembling, transport cost and using materials. Producer's' duties, as above are not valid when:

The controllers are not used according to Microdos's instructions as in the operating manual and maintenance instructions.

The controllers are repaired, disassembled, modified by workshops not authorized from Microdos.

They have used not original spare parts.

The electronic plans have been damaged because of external causes such as whatever type of over tensions.

At the end of the 24 months from the delivery date, Microdos will be free from any liability and from all the duties as above. This guarantee, that starts from the 1st of January 2006, nullifies and substitutes whatever guarantee, expressed or implicit, and cannot be modified but in writing.



Design standard

Built accordingly to the current general standards endowed with CE mark in conformity with the following European directives:

- 2014/30/CE "regarding "electromagnetic compatibilities".
- 2014/35/CE regarding "low voltages",
- 2014/53/EU "RED Radio Equipment Directive"

TECHNICAL DATA

- **Maximum ambient temperature:** 45 °C
- **IP:** 55
- **Material:** ABS
- **Electrical data:** see type plate on the unit.

Frequency and transmission power data referred to the pump with wi-fi circuit:

- **Transmission frequency:** DFS transmission protocol on 2.4GHz and 5GHz
- **Power:** 20dB

1. IMPORTANT SAFETY INSTRUCTIONS



PLEASE READ AND FOLLOW THESE INSTRUCTIONS

It is essential when installing a control and disinfection system at a pool to take certain precautions while handling equipment, also more generally when using the pool.

DANGER: Low-voltage electricity risk: Do not open or touch the control unit: there is a risk of electric shock. Contact your local retailer or the manufacturer.

Follow the electricity safety instructions specified by your company, also local or national regulations.



DANGER: Risk of accidents or drowning: Use of the pool calls for special care. Observe the safety and hygiene instructions laid down. These are displayed near the pool, or in accordance with local or national regulations.

1.1. ELECTRICAL SPECIFICATIONS AND FEATURES

ELECTRICAL SPECIFICATIONS:

Power supply	110÷240 VAC
Operating frequency	50 Hz
Energy consumption when not running	120 mA.
Oxidation sequence consumption at 6 amps	350 mA
Ionisation sequence consumption at 2 amps	180 mA
Operating temperature	+ 5° / + 55 °C
Maximum operating humidity	95% with no condensation
Protection of the environment	IP55
Maximum voltage at the Titanium compartment	12 VDC (with galvanic separation)
Maximum voltage at the Copper compartment	12 VDC (with galvanic separation)

OPERATING ALGORITHMS:

Manual/ automatic operation?	Yes
User programs?	Yes
Temperature display	At 0°/55 °C intervals; accurate to +/- 0.1°C
pH display	At 0/14 pH intervals
ORP display	At intervals of 0/1000 mV.
Automatic pH dose corrector	By peristaltic pump
Automatic Rx dosing	By peristaltic pump
Touch-screen	Colour 10"
Programming	By touchscreen and passwords (expert and installer)
Type of programming	User-friendly and intuitive



WARNINGS FOR GENERAL OPERATION OF MICRODOS OXY

ATTENTION: the device is designed to stay on 24 hours a day, avoiding frequent shutdown cycles.

- SMALL POOLS AND SPAS - We must pay attention to the power of the device and follow the following indications:
 - Starting from an OXY HOME 80 model (with 8 amperes factory settings) you have to reduce the power according to the following table:

POOL-SPA < 10 m3	2 Amps
FROM 10 TO 20 m3	4 Amps
FROM 20 TO 40 m3	6 Amps

TO REDUCE THE AMPS, GO TO:

- **SETTINGS → OXY/ION → ELECTRODES MAX.CURRENT.**
- **DECREASE THE AMPS VALUE IN THE SUBMENU.**
- **PRESS SAVE TO CONFIRM.**

- Install a redox probe for the ORP control.
 - Fix the Set-point 0% of Rx to 630 mV.
 - Turn ON the Rx DEPENDENCE OPTION in GENERAL SETTINGS.
- INDOOR/COVERED POOLS - Due to low water pollution, it can be that the power set by factory can be excessive and may cause a strange and different smell (disinfection smell, identical to the smell of chlorine).
In this case:
 - activate the COVER input and set the desired current percentage in: **SETTINGS → OXY/ION → WITH COVER.**
 - follow the previous indications 1.2 to 1.4.
- POOLS WITH LINER. - As the Microdos Oxy uses copper as a residual disinfectant, we have to pay specially attention to the pH. It must never be beyond 7.6, because from this point, metals (manganese, iron, copper...) precipitate and may produce stains.



IF PH IS OVER 7.5PH, THE IONIZATION WILL BE STOPPED AND THE MESSAGE "NO IONIZATION OVER 7.5pH" WILL APPEAR IN THE STATUS BOX MESSAGE IN THE HOME PAGE

- STAINLESS STEEL POOLS - To pay special attention:
 - It is fundamental that the swimming pool has a ground power
 - Do not use copper as a residual disinfectant, use instead peroxide or anti-algae polymer based
 - Install a redox probe for ORP control, follow points 1.2 to 1.4 above mentioned
- VERIFY PROGRAMMING AFTER UPDATING THE DEVICE: OXY CURRENT MAX, TIME PROGRAMMING, PH AND RX SET POINTS, HEATING, ETC...
- ACCESS CODE - For menus and special functions:

Expert Password	11222
Installer Password	07591

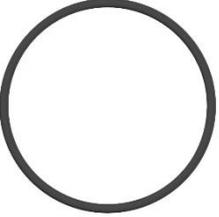
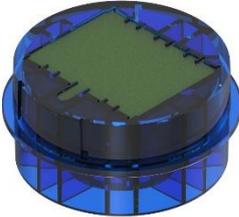
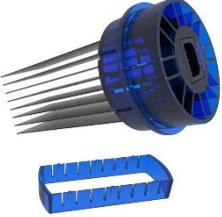
The installer password can be changed (see page 49)

- If necessary, in order to increase conductivity, we can use the following minerals, in a single or mixed form, in order to down OXY voltage operation power:
 - Sea Salt/Swimming pool salt (NaCl) Is the most economic and most efficient, but we run the risk of generating a little chlorine in extreme situations (too much power in small pools, too much salt charged electrically etc....) in normal situation, this does not appear.
 - Sodium Bicarbonate (HCO₃), Increases the alkalinity of the water but check that it does not exceed 200 mg/l
 - Calcium Carbonate (CaCO₃), Not to use if the water is hard, because it increases water hardness.
- DURATION OF TITANIUM ELECTRODES. - In order to not considerably shorten the duration of the electrodes:
 - Make sure to make and adequate and regular maintenance
 - Avoiding damaging the electrodes during the cleaning
 - Avoid operating at more than 9.5 volt. Continuously
 - Avoid operating without water

- Avoiding operation with limestone or with a superior power to the one recommended.

2. MICRODOS OXY CONTENT

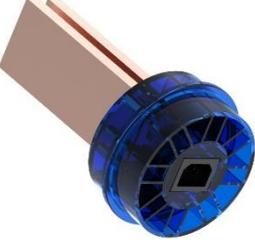
2.1. INCLUDED ITEMS

	1 x CONTROL UNIT		1 x TEMPERATURE PROBE
	1 x OXY CHAMBER		1 x TEMPERATURE PROBE HOLDER
	REDUCES 2 x 75 - 63 mm 2 x 75 - 50 mm		6 x CAP + OR
	2 x END CAP		PH KIT 1 x PH PERISTALTIC PUMP 1 x PH PROBE 1 x PH PROBE HOLDER 2 x BUFFER SOLUTION (7 / 9 PH) 1 x PVC HOSE 1 x PE HOSE 1 x INJECTION VALVE 1 x ASPIRATION FILTER
	2 x ELECTRODE HOLDER OR		1 x EMPTY ELECTRODE HOLDER
	1 x TITANIUM ELECTRODE 1 x TITANIUM COMB		

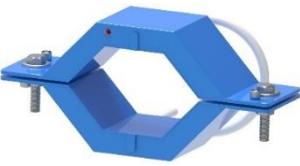
ATTENTION:

in **PUBLIC** models the accessories included vary according to the configuration. The pumps are not supplied.

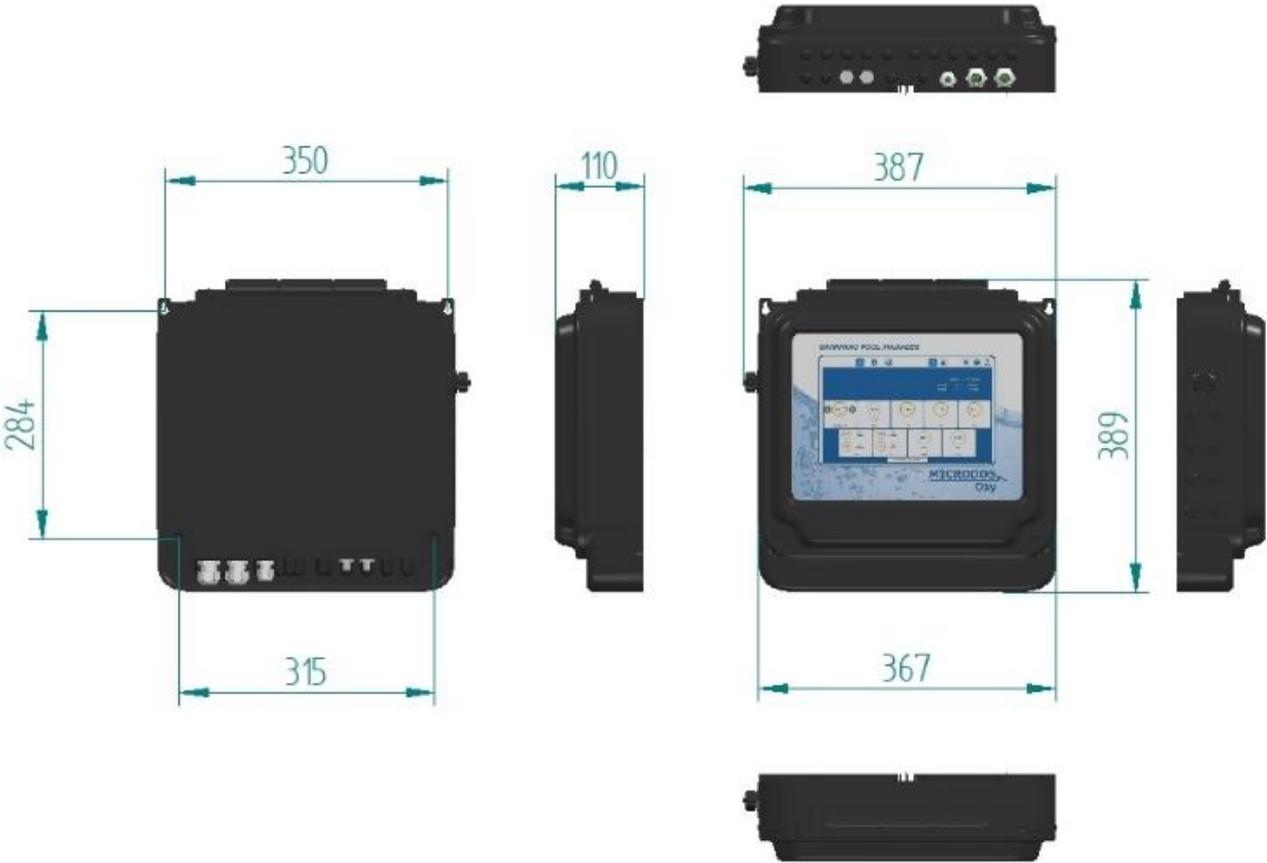
2.2. OPTIONS

<p>PH KIT</p> <ul style="list-style-type: none"> - 1 x pH Peristaltic Pump* - 1 x pH Probe - 2 x Buffer Solution (7 / 9 pH) - 1 x PVC Hose* - 1 x PE Hose* - 1 x Injection Valve* - 1 x Aspiration Filter* - 1 x Probe Holder <p>*INCLUDED IN SPA AND HOME MODEL, NOT IN PUBLIC</p>	
<p>REDOX KIT</p> <ul style="list-style-type: none"> - 1 x Rx Peristaltic Pump* - 1 x Rx Probe - 1 x Buffer Solution (468 mV) - 1 x PVC Hose* - 1 x PE Hose* - 1 x Injection Valve* - 1 x Aspiration Filter* - 1 x Probe Holder - Redox Software <p>*INCLUDED IN SPA AND HOME MODEL, NOT IN PUBLIC</p>	
<p>AMPEROMETRIC / POTENTIOSTATIC CHLORINE KIT</p> <ul style="list-style-type: none"> - 1 x CL Peristaltic Pump* - 1 x CL Probe Panel - 1 x PVC Hose* - 1 x PE Hose* - 1 x Injection Valve* - 1 x Aspiration Filter* - Chlorine Software <p>*INCLUDED IN SPA AND HOME MODEL, NOT IN PUBLIC</p>	
<p>COPPER ELECTRODE KIT</p> <ul style="list-style-type: none"> - 1 x Copper Electrode - 1 x Electrode Holder OR - Copper Software 	

2.3. ACCESSORIES

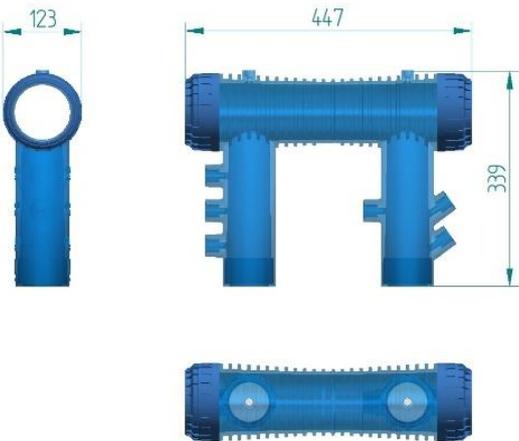
ENVIRONMENTALLY FRIENDLY DESCALING	FLOW SENSOR	LEVEL SENSOR	GRIPPING COLAR
			

2.4. MICRODOS OXY DIMENSIONS



Length: 387 mm Depth: 389 mm Height: 110 mm

ELETRODES HOLDER / CHAMBER



Length: 447 mm Depth: 123 mm Height: 339 mm

COMPLETE PACKING



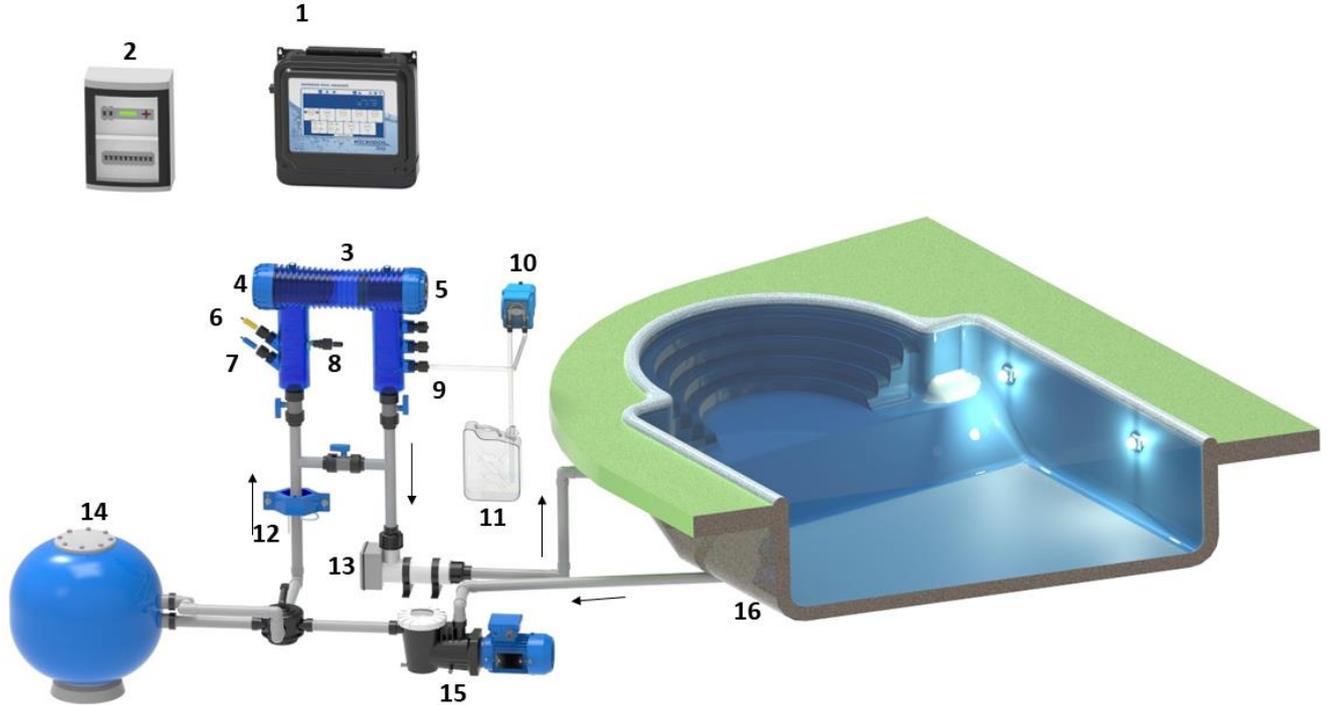
14 Kg. (It depends on the model and options)

Length: 580 mm
Depth: 340 mm
Height: 555 mm

3. MICRODOS OXY SYSTEM INSTALLATION

3.1. PLUMBING

ORIENTATIVE DIAGRAM



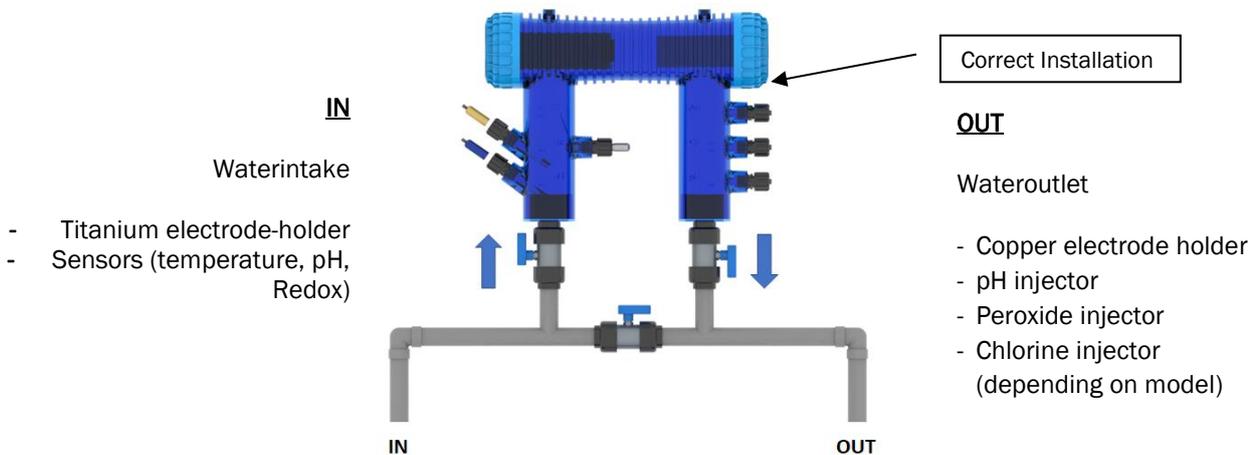
- | | | | |
|-----------------------|----------------------|----------------------|------------------------|
| 1. Control unit | 5. Copper electrode | 9. pH injection | 13. Heat pump |
| 2. Electric panel | 6. Rx probe | 10. Peristaltic pump | 14. Filter |
| 3. Oxy chamber | 7. pH probe | 11. pH tank | 15. Recirculation pump |
| 4. Titanium electrode | 8. Temperature probe | 12. Descaling system | 16. Swimming pool |

3.1.1. ELECTRODES HOLDERS - CHAMBER INSTALLATION

The chamber is installed as a by-pass on the pool's return line at the filter outlet. All pool-water will pass through the compartment, at which the operating titanium electrode continually generates hydroxyl ions. This will have the effect of raising the pool-water's ORP to the system's technical limit.

Considering that the titanium electrodes should be installed at the water's entry-point and the copper electrodes to the water's exit-point.

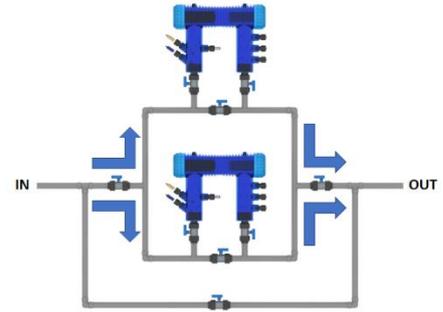
The equipment is compatible with PVC adhesives.



3.1.1.1. PARALLEL

It is essential to consider the diameter of the recirculation pipe in relation to the time required for full recirculation. We must install the number of compartments required in order that all pool-water shall pass through the compartments, and so that the circulation flow shall not fall below <10%, as a by-pass and in parallel. For example, we recommend using PVC pipes:

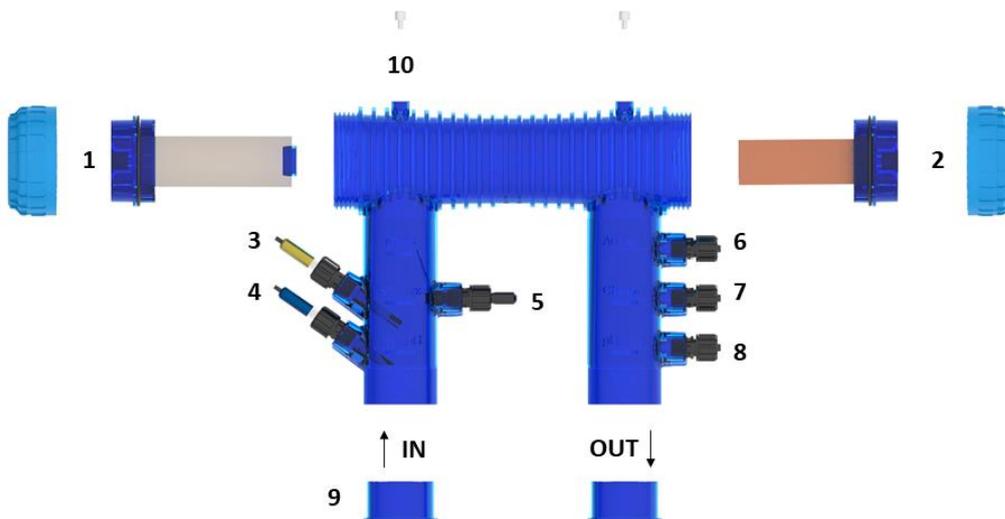
PIPE ≤ 63 mm	-- 1 chamber
PIPE from 63 to 90 mm	-- 1 chamber or 2 in line
PIPE from 90 to 225 mm	-- Min. 2 chambers in parallel
PIPE from 225 to 300 mm	-- Min. 3 chambers in parallel



3.1.2. CONTROL UNIT INSTALLATION

Fix the **control unit AT LESS THAN 3 METERS** and dosing pumps to the wall close to the compartment, near the product deposits.

3.1.3. INSTALLATION OF ELEMENTS IN THE CHAMBER: ELECTRODES HOLDERS, PROBES, INJECTORS, ETC...



- 1. Titanium electrodes
- 2. Copper electrodes
- 3. Redox probe

- 4. pH probe
- 5. Temperature probe
- 6. Auxiliary injection

- 7. Chlorine injection
- 8. pH injection
- 9. Reducer

- 10. Purge screw

PROBES AND INJECTIONS

For installation of the pH sound compartment and injection canal, you should use the probe-holder (included), and then proceed in the sequence shown in the photo.

WARNINGS:



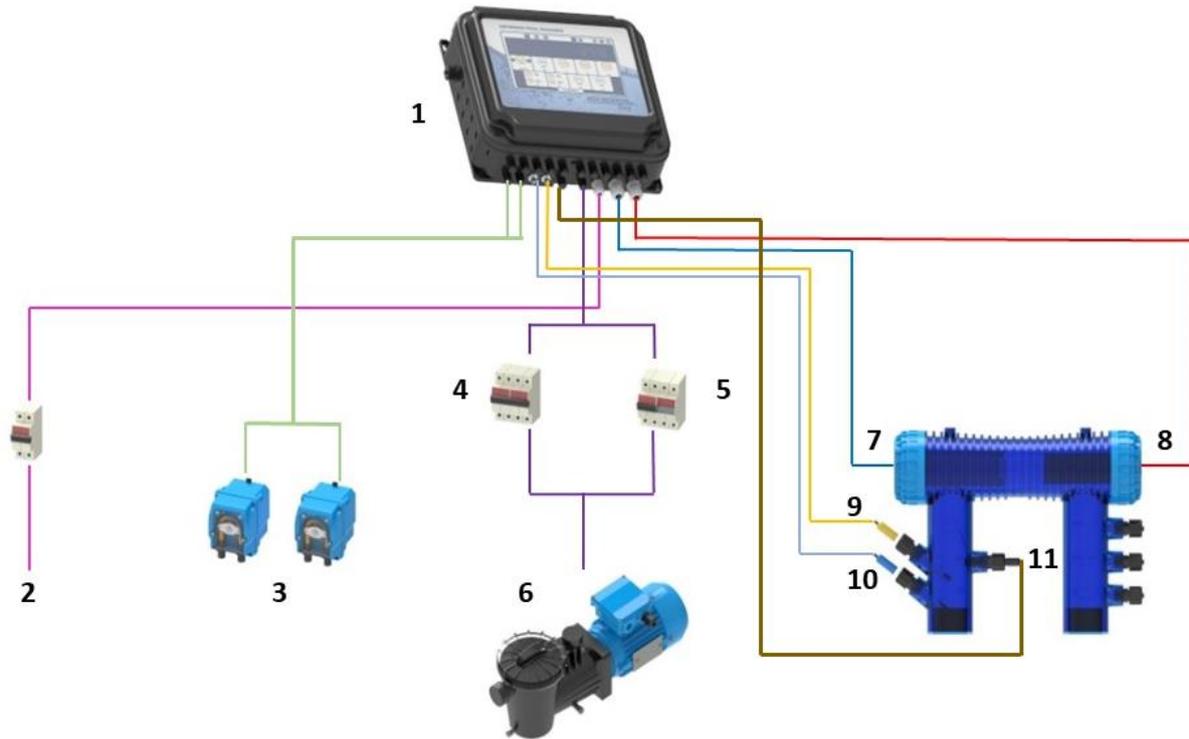
Do not leave the system without water when probes are installed. If pH or RX probes dry out, they will be damaged and cannot be used.

USE OF SULPHURIC ACID AS PH REDUCER. USE OF CHLORIDRIC ACID, DRASTICALLY REDUCE THE LIFETIME OF THE SILICON INJECTION PIPES

3.2. ELECTRICITY

3.2.1. ELECTRIC CONNECTION OF THE CONTROL UNIT

The system is supplied ready to be used in the installations. There is no need for any power adaptor, but we recommend installing a motor protector before connecting to the mains, to avoid a possible surge in voltage that would severely damage Microdos Oxy's electronics (Such problems are not covered under the guarantee). (See illustration). Place the power cables of the control unit to the electrical box of the pump with protector or plugging into an outlet of the engine room.



- | | | | |
|------------------------------|-----------------------|------------------------|-----------------------|
| 1. Microdos Oxy control unit | 4. Contactor | 7. Titanium electrodes | 10. pH probe |
| 2. Overload switch 230 Vac | 5. Motor guard | 8. Copper electrodes | 11. Temperature probe |
| 3. Peristaltic pump | 6. Recirculation pump | 9. Redox probe | |

We remind installers that Microdos OXY has only one power input, which goes from the control unit to the main power grid. We must be careful **not to connect the pump or any component to the main power supply.**

The power supply to the peripheral circuit systems is provided as follows:

PERISTALTIC PUMPS for pH, Redox, Peroxide, Direct outlet to the mains (*)

RECIRCULATION PUMP Dry contact ()**

(*) The voltage output depends on the mains input. If the mains are 117VAC, the output to the peristaltic pump will be 117VAC; if the mains is 230VAC, the peristaltic pump output will be 230VAC.

(**) OXY's cut-off relay is 5 amps at 230VAC: we therefore need to use contactors or motor shields with a consumption coil less than or equal to 5 amps at 230VAC.



Since Microdos Oxy is a pool manager, it should control and command the recirculation pump.

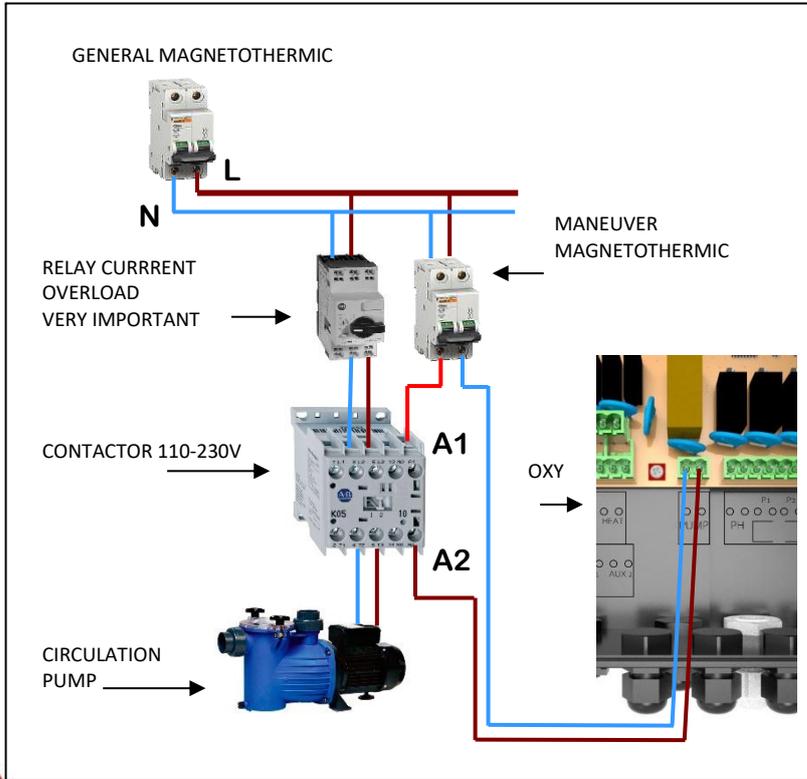
IMPORTANT: It is also possible to choose not to manage the recirculation pump working time (NO PROGRAM).

In this case, however, Microdos Oxy cannot allow the functioning of OXYDATION, IONIZATION and HEATING.

3.2.2. CONNECTING UP THE MAIN PUMP TO MICRODOS OXY

Microdos Oxy connects/disconnects the coil of the recirculation-pump contactor. For this, we create a bridge with the Microdos Oxy at the cable that runs from the pump's circuit-breaker to the A2 of the contactor's coil (SEE BELOW).

CONNECTING OF THE CIRCULATION PUMP TO ELECTRIC PANEL AND TO MICRODOS OXY



If the recirculation pump already has a timer, do not connect it to OXY or set it to manual (24 hour operation).

3.2.3. FRONT PANEL OPENING/CLOSING



OPENING

To access the connection compartment it is necessary to open the front panel:

- Unscrew the 2 screws
- Remove the cover

CLOSING

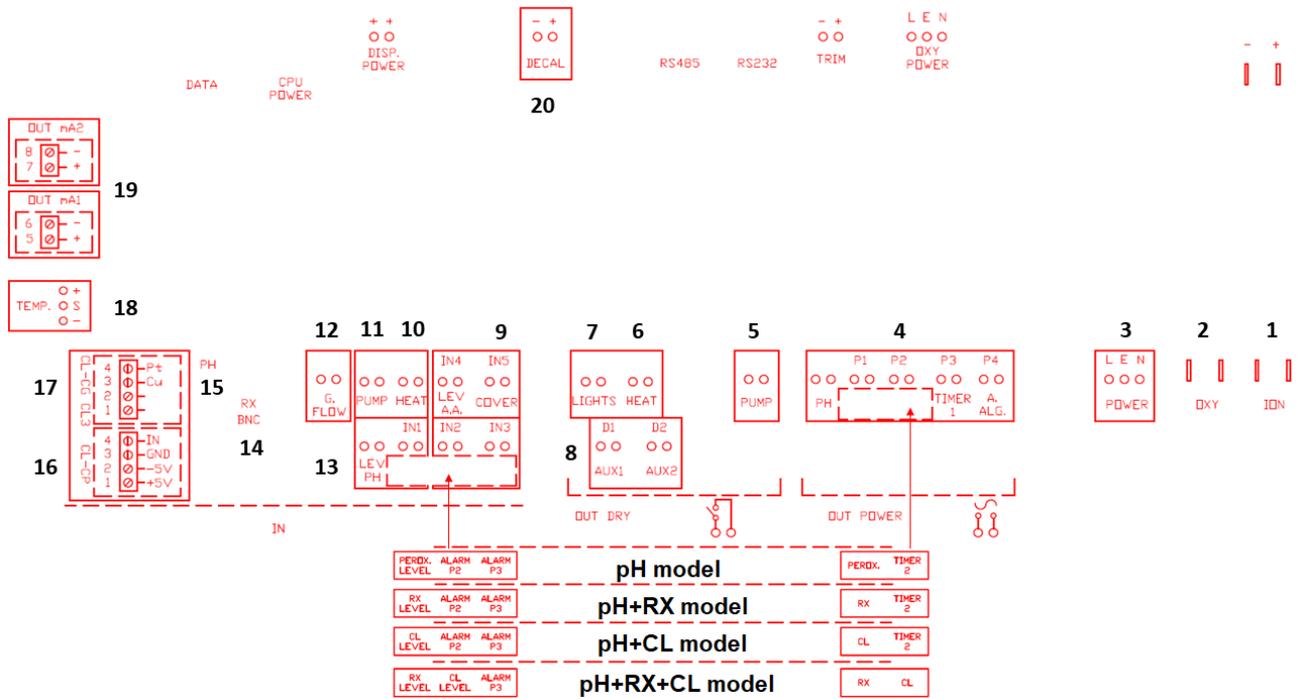
To close the front panel it is necessary to hold the 2 tabs on the back at the same time, as indicated by the red arrows.

3.2.4. INTERCONNECTIONS

Below we see the connections that can be made with Microdos Oxy.
All connections are without electric current, except:

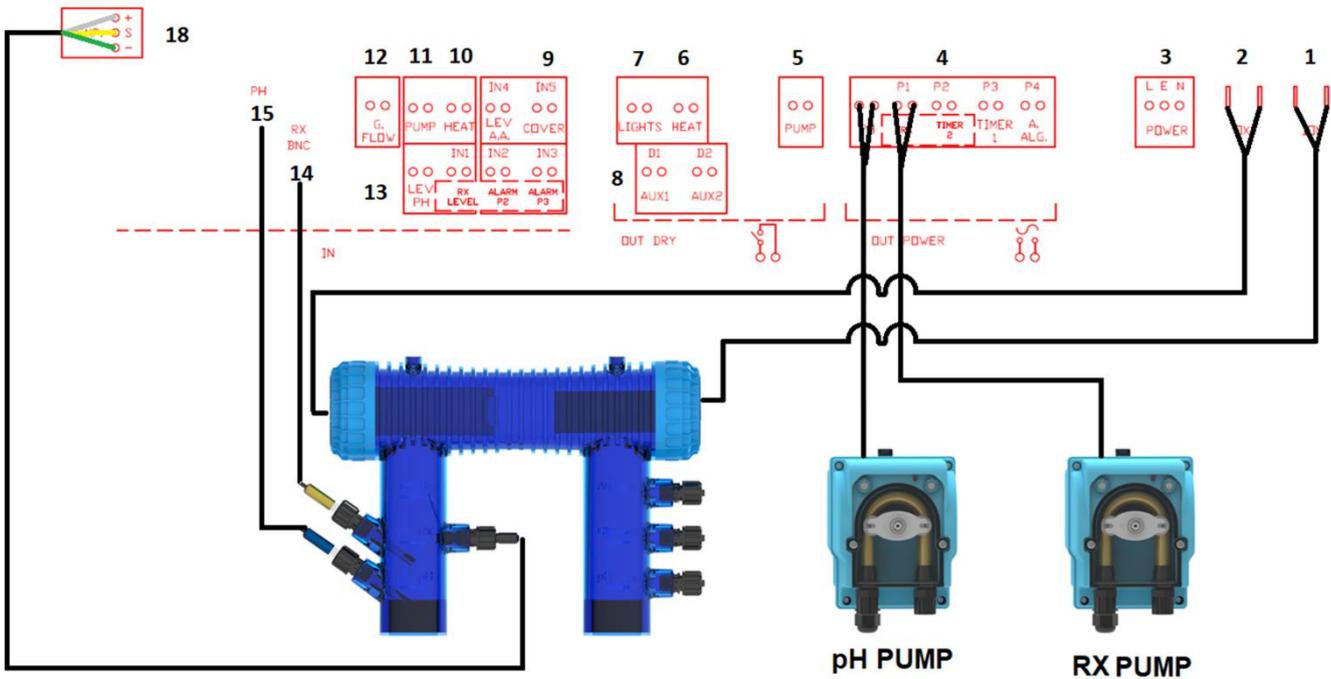


the dosing pumps (PH, P1,P2,P3,P4), mains supply (POWER), OXY and ION which are electrically POWERED.
The voltage output depends on the mains input. If the mains is 230VAC, the peristaltic pump output will be 230VAC.

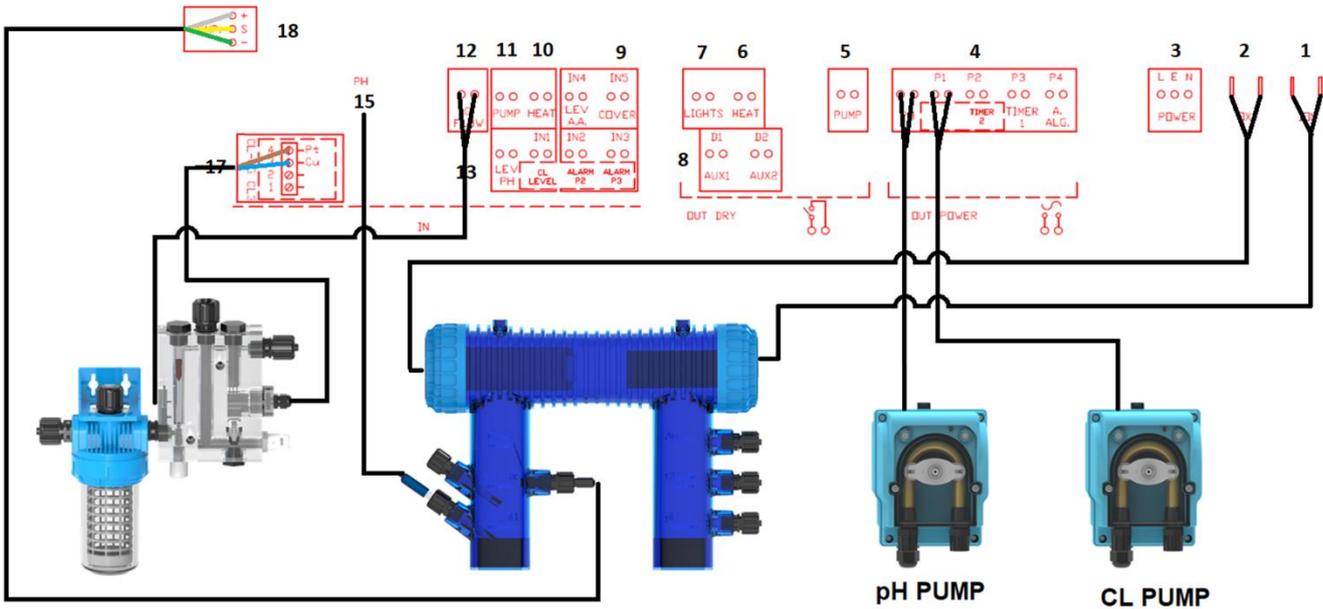


Terminal	Description
1	Connection to the Copper electrode - ION
2	Connection to the Titanium electrode - OXY
3	Main power connection (Max 240 Vac) (L – brown, E – yellow/green, N blue)
4	Output power connection (230 Vac) for pH, Rx, Cl, Algicide and auxiliary pump. (PH, P1,P2,P3,P4). (Max 10A, 230Vac)
5	Connection to the MAIN PUMP (filtration) of the pool at a DRY CONTACT. (Max 5A, 230Vac)
6	Connection to the HEAT PUMP (dry contact WITHOUT ELECTRIC CURRENT N.A.) (Max 5A,230Vac)
7	Connection to the LIGHTS (dry contact WITHOUT ELECTRIC CURRENT N.A.) (Max 5A,230Vac)
8	Connection AUX 1 and AUX 2 (dry contact WITHOUT ELECTRIC CURRENT N.A.) (Max 5A,230Vac)
9	Connection input from COVER
10	Connection input from HEATING alarm
11	Connection input from MAIN PUMP alarm
12	Connection input from FLOW sensor (N. O.)
13	Connection input from LEVEL sensor for pH, Rx, Cl, Algicide and auxiliary pump
14	BNC connection to Rx probe
15	BNC connection to pH probe
16	Connection to potentiostatic chlorine (4 = white, 3 = yellow, 2 = brown, 1 = green)
17	Connection to amperometric chlorine (4 = brown, 3 = blue)
18	Connection to temperature probe (- = green, s = yellow, + = white)
19	mA output connection
20	Connection to descaling

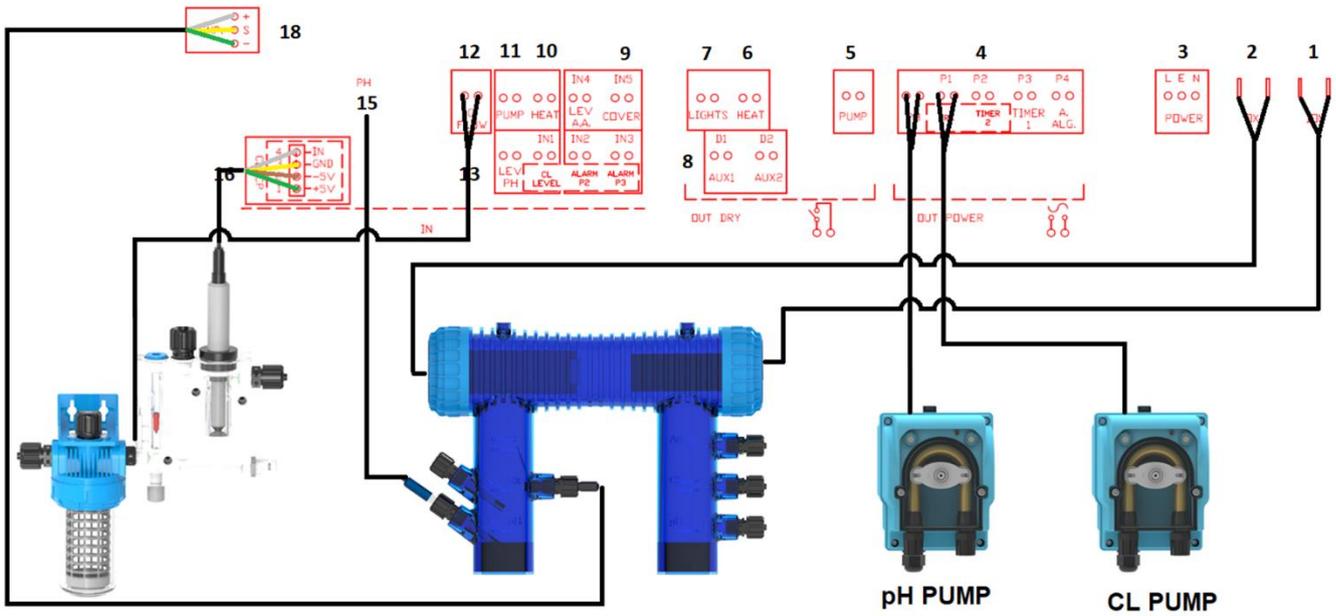
3.2.4.1. PH-RX MP2-B PUMPS



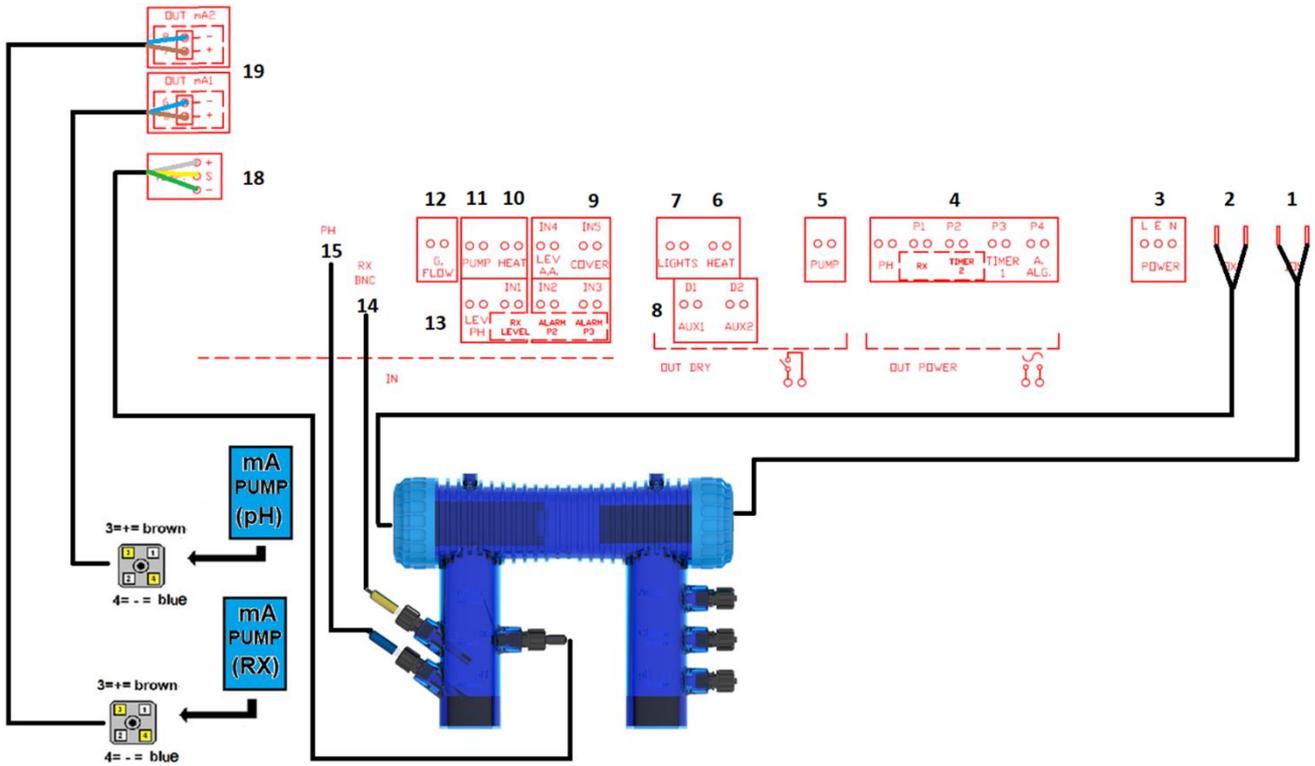
3.2.4.2. PH-CL CG CL3 MP2-B PUMPS



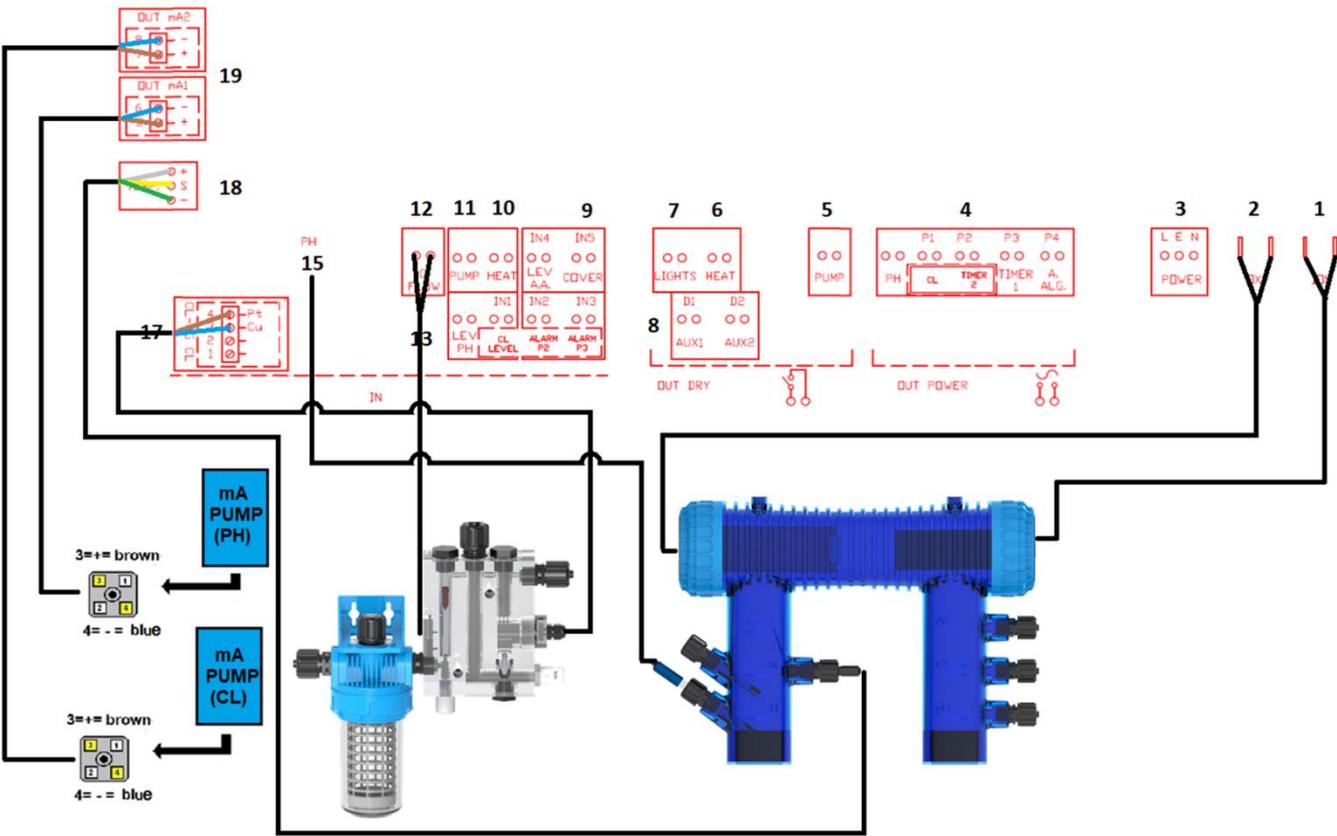
3.2.4.3. PH-CL CP MP2-B PUMPS



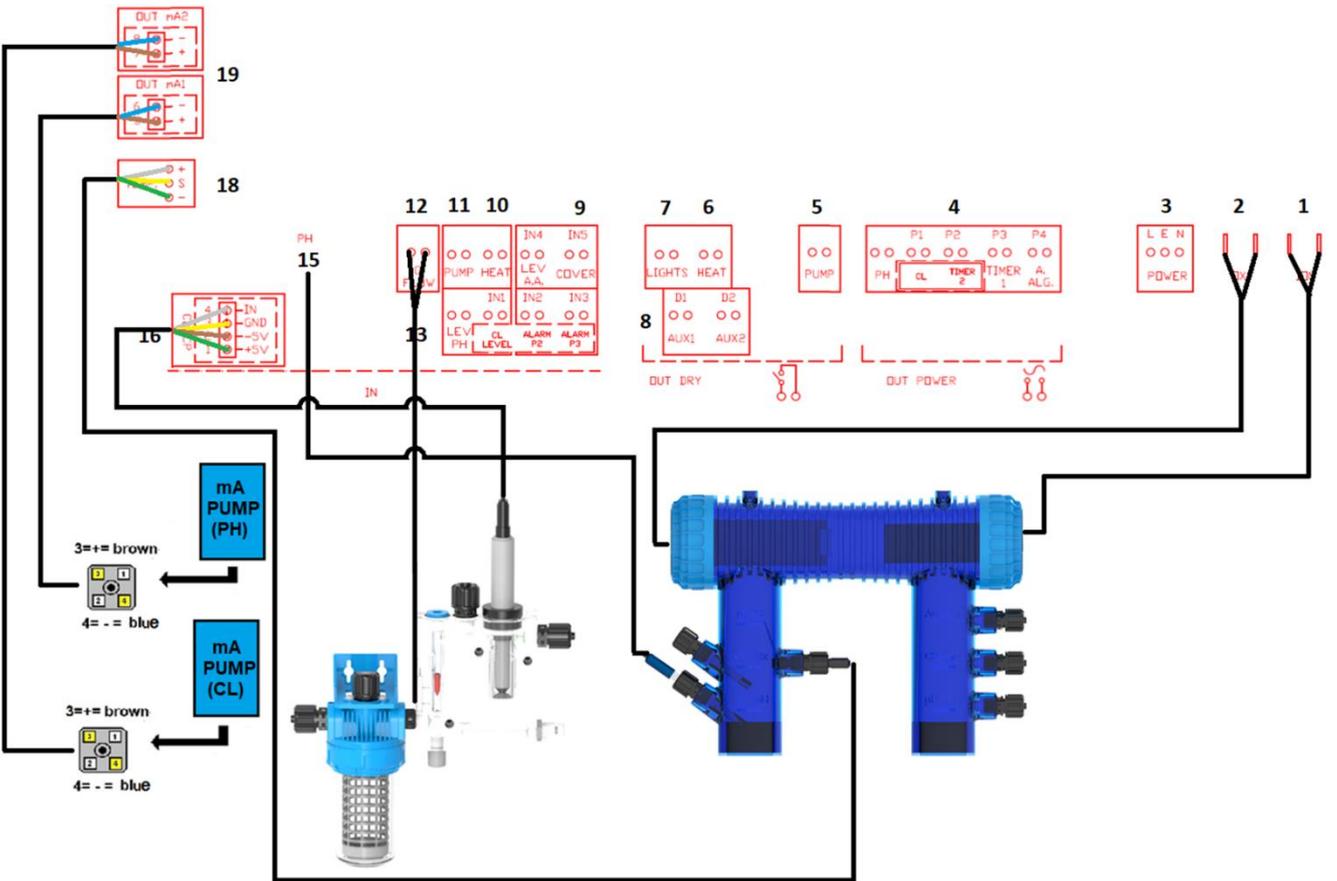
3.2.4.4. PH-RX mA PUMPS



3.2.4.5. PH-CL CG CL3 mA PUMPS



3.2.4.6. PH-CL CP mA PUMPS



4. CORRECT USE OF ELECTRODES

OXY MAX CURRENT is the maximum power that comes from the control unit and reaches the titanium electrodes, and can be of 4 to 12 amps, depending on the model.

The power is directly related to the **NUMBER OF ELECTRODES** of each titanium electrode holder.

	MAX POWER	N° ELECTRODES
SPA	4 Amp	4
HOME 50	6 Amp	5
HOME 80	8 Amp	6
HOME 125	10 Amp	7
HOME 175	12 Amp	8
PUBLIC 400	12 Amp	3 UDS x 4 Electrodes



4.1 TITANIUM AND COPPER ELECTRODE HOLDERS

Screw **titanium and copper electrodes** in order input and output taking into the guides on the bottom.

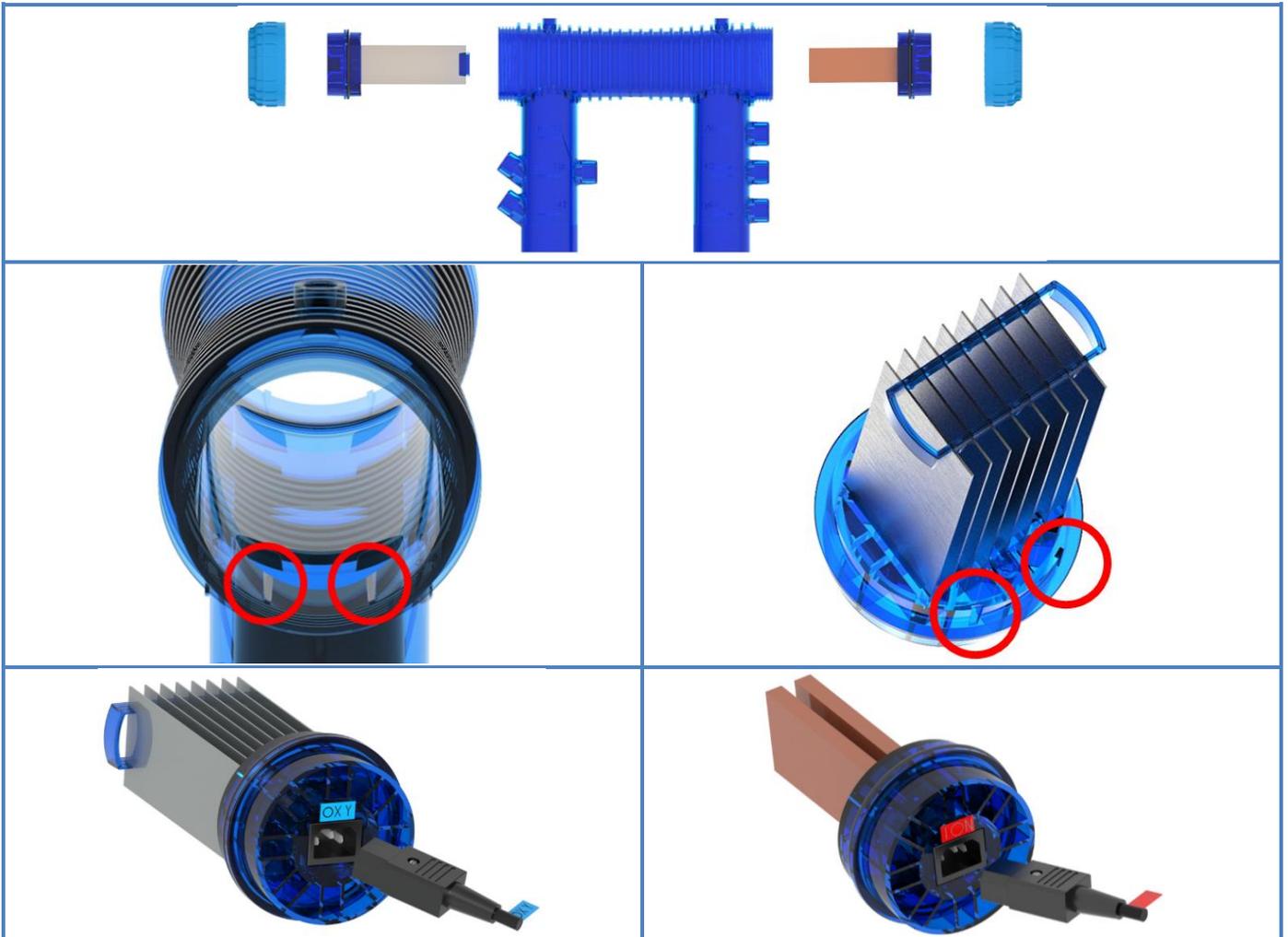
Tighten with hands securely, or with a special key if necessary.

NOTE:



DO NOT REMOVE THE COMB SEPARATOR of the titanium electrodes.

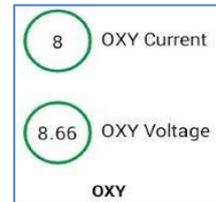
ENSURE THAT THE CABLES ARE IN THE MATCHING TERMINALS.



4.2. OPTIMUM OPERATION OF THE ELECTRODES

To find out if the electrodes are working properly, we can look on the main screen:

- **OXY CURRENT** must always be at the maximum power of the device.
- **OXY Voltage** must always be below 9,5 Volts (this value goes up with the water conductivity)



The titanium electrodes have a special coating (gel-coat) that allows the hydrolysis function of the water. When the coating disappears by use or burns, the OXY current goes down, and the OXY voltage rises above 10 volts. There is no way to restore the optimal operating parameters even if we increase the conductivity of the water, in which case, the electrodes are worn out and we have to replace them:

4.3. FACTORS REDUCING THE DURATION OF ELECTRODES

- Cleaning with metal or corrosive tools that scratch, harm, or remove the coating.
- Operating for some time at more than 10 volts
- Operation for some time with scaling
- Operation in hard water (lots of limestone) with frequent cleaning
- Operation for a certain time without water (empty chamber)
- Operation for some time with stagnant water in the chamber (valves closed or pump stopped)
- Operation with a power higher than that accepted by the number of electrodes (for example 6 electrodes and 12 amps)

NOTE: Each of these factors, or their sum, may cause that the electrodes last less than the normal duration.



4.4. HOW TO INCREASE THE LIFETIME OF ELECTRODES

- Avoid all previous points and do a proper maintenance.
- Increase the conductivity of the water to always operate at less than 9.5 volts.
- Always use the correct number of electrodes and correct power, specific to each model.

4.5. INFLUENCE OF POLARITY REVERSAL SELF-CLEANING ON THE LIFETIME OF THE ELECTRODES

It is proven that the polarity inversion mechanism promotes 2 phenomena:

- Erosion of the Ruthenium/Iridium coating
- The **passivation of the electrode** (the metal is no longer conductive) due to a titanium oxidation layer.

Explanation:

1. **Before polarity inversion of the electrode:**

The reaction of the water generates a gaseous release of hydrogen.

This release of gas causes a slight erosion of the protective coating. This erosion exposes small areas of titanium (on a microscopic scale). Up until this point, the phenomenon is not harmful to the life of the electrode.

2. **When inverting the polarity of the electrode:**

Polarity inversion = The cathodes (-) become anodes (+)

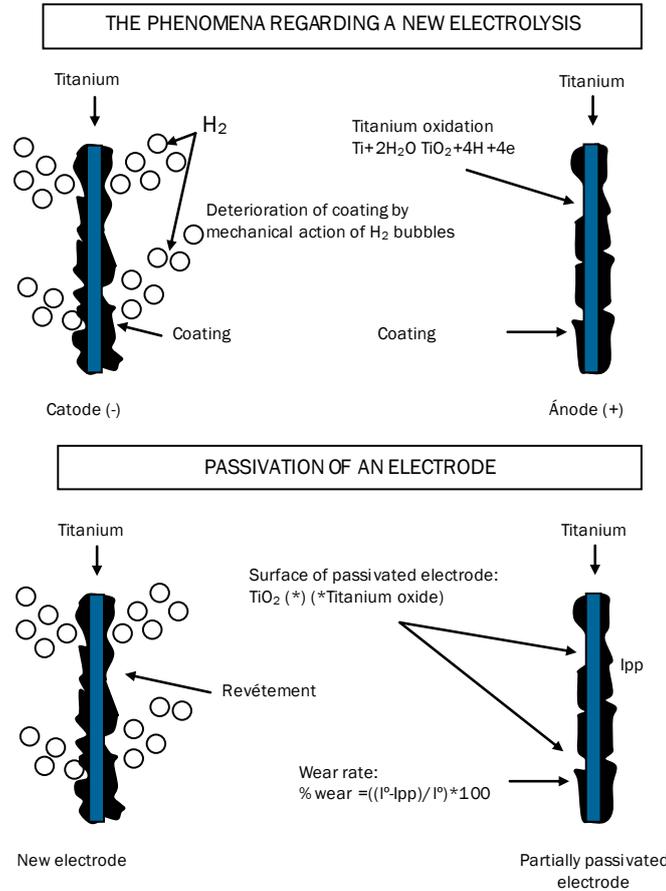
When salt water and the electrolysis current are in direct contact with the partially exposed titanium, the oxidation of the electrode and the development of a titanium oxide layer (TiO₂) can be observed between the metal and the coating.

The appearance of this electrically insulating layer has 2 consequences:

- It intensifies the erosion of the protective coating,
- It passivates the electrode (the metal no longer conducts current)

This phenomenon results in a decrease in the power consumption of the cell, proportional to its loss of power to produce OH-, until it becomes zero.

Bare titanium should never act as an anode (+) while it performs very well as a cathode (-). Furthermore, we see that an electrode without polarity reversal has no coating on its cathodes (uncoated titanium) without harming its life expectancy, quite the contrary.



4.6. CLEANING OF THE ELECTRODES

The electrodes are self-cleaning and will change their polarity automatically: default 180 MINUTES for TITANIUM ELECTRODES and 2 MINUTES for COPPER ELECTRODES.

Despite this, there are types of water that have a high lime content and there may form incrustations. If we discover a crust or many white spots on the titanium electrodes, we need to clean them.

As soon as you notice any dirt, disconnect the cables, unscrew the electrodes from the chambers, soak them for 30 minutes in a 50% vinegar - 50% water solution (or a special anti-scale product) and gently brush them with a toothbrush, so as not to damage the patented alloy layer (coating) the electrodes have.

Never use a metal brush nor scrape with anything hard as this will seriously damage the electrodes and make them unusable.

When replacing them, remember their position in the chamber and leave the separating comb in place.

The average frequency of cleaning will depend on water quality. Visually check the electrodes approximately every month and clean them when dirt or white spots are seen between the plates.

5. PROGRAMMING THE CONTROL UNIT

5.1. HOME PAGE: REAL-TIME INFORMATION

Connect MICRODOS OXY to a mains socket (110v-230v), wait until the screen starts up (**IT MAY SOMETIMES BE NECESSARY TO WAIT A FEW MINUTES**). Once the system has started up, the first thing you will see is HOME PAGE, from which you can operate the **touch-screen's** buttons. The system is pre-programmed at the factory. However, if you do not need to do any additional programming, you need merely to press the **AUTO** key, and Microdos Oxy will function using the programs as set (defaults, see section DEFAULT CONFIGURATION pag. 58).



By using the  button, from navigation at any time, you will access the HOME page.

System status. The system will tell you if all is well, or if there is any error.

Information on pump programming and electrodes functioning.

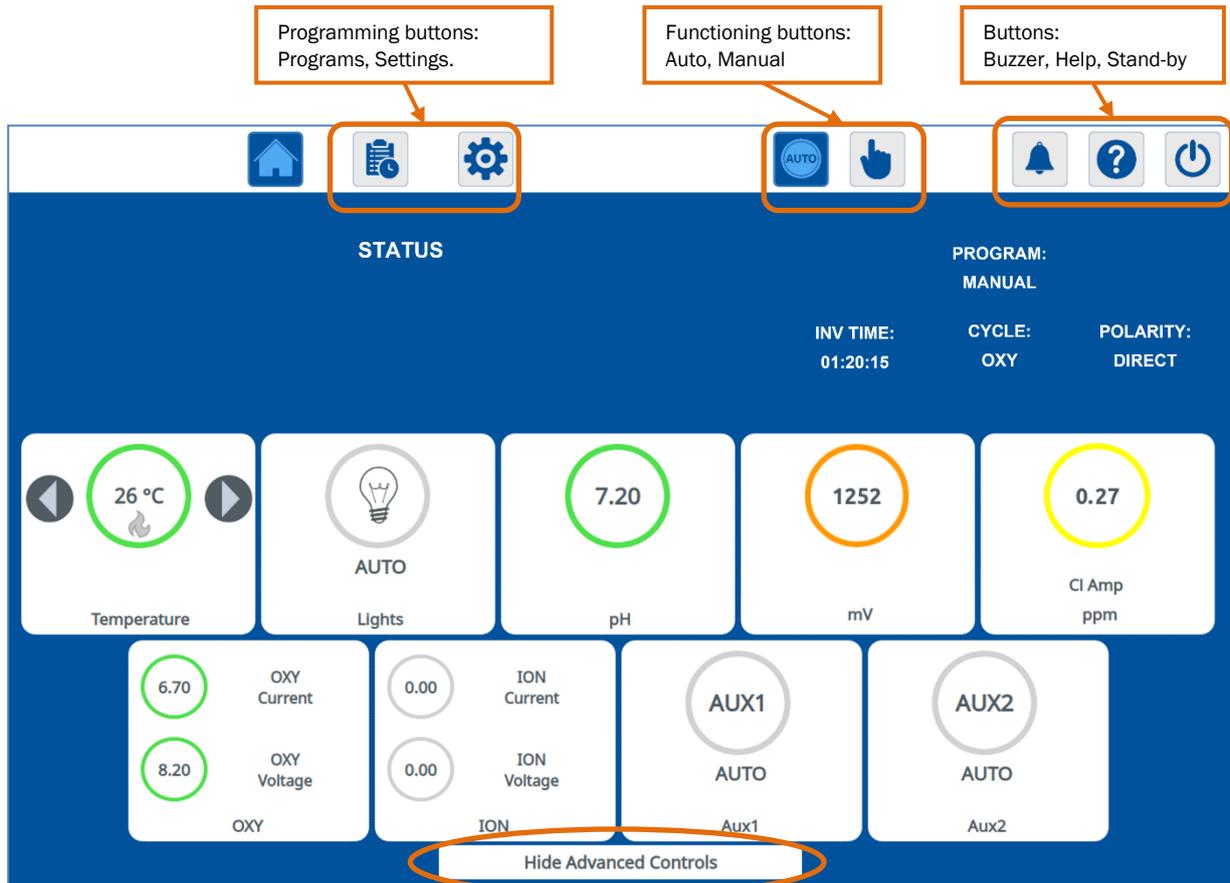
Real-time values for:

- Temperature
- Electrode power

Real-time values for:
pH, Redox, Chlorine.

- GREEN: EXCELLENT VALUE
- YELLOW: GOOD VALUE
- ORANGE: VALUE TO BE MONITORED

5.2. ICONS



By pressing the "HIDE ADVANCED CONTROLS" button, you can minimise the second row to display information about the IDN/MODEL/TIME.

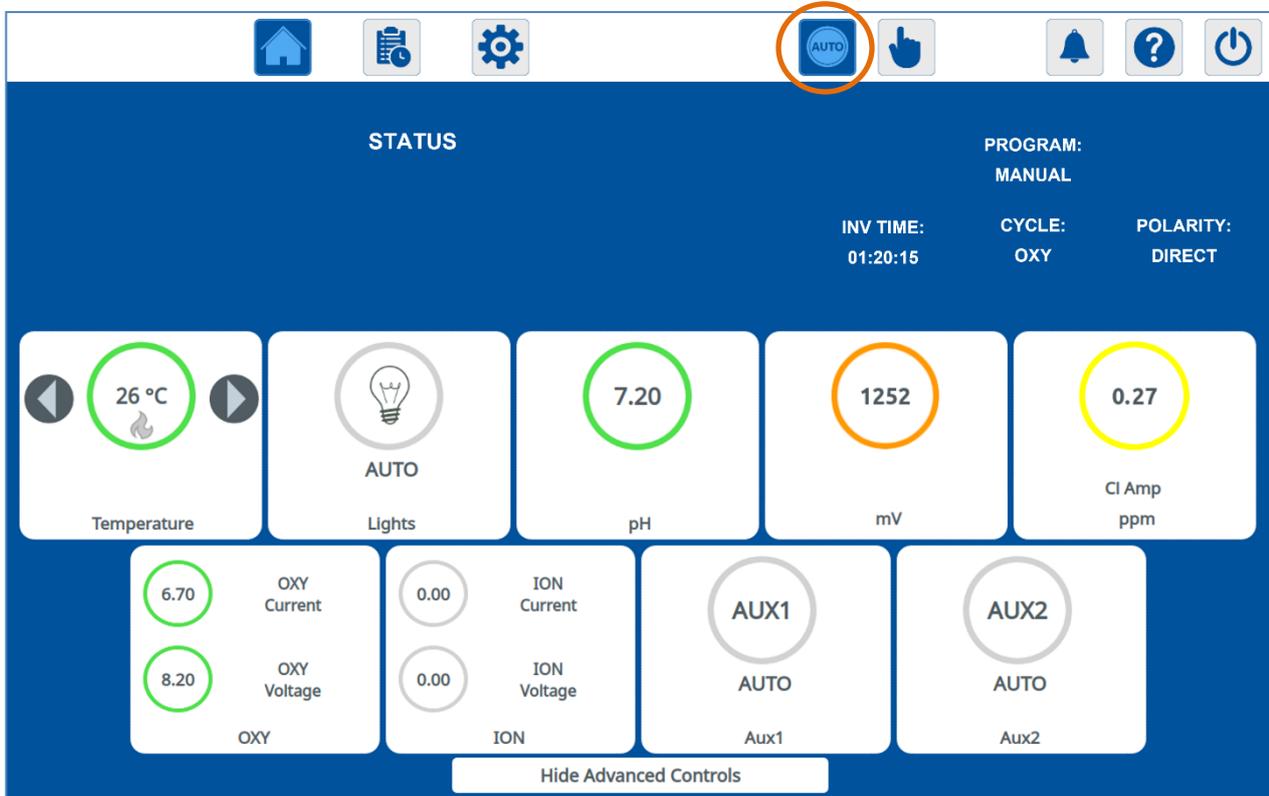


	HOME PAGE	Real-time values for the various measurements. System status & Information on pump programming and electrodes functioning.
	PROGRAMS	Access to configure the working programs for recirculation pump, oxidation, and ionization.
	SETTINGS	Access to configure the device settings for measurements, outputs, and operations.
	AUTO	In AUTO MODE, the system will work automatically in accordance with the operating program, settings and set points entered. When working in Auto Mode, the Home Page background colour is BLUE.
	MANUAL	Inside the MANUAL PAGE, you can manually manage the device and activate/deactivate all the OUTPUTS. When working in Manual Mode, the Home Page and Manual Page background colour is YELLOW.
	BUZZER	If there is a fault of any kind, visual and audible alarms will be activated. To silence the audible alarm, press the BUZZER button. The SYSTEM STATUS window in the Home Page will show the alarm.
	HELP	If you need help while configuring the system, you can consult the help menu on your device. Display a help page with a description of the elements in the current page.
	STAND-BY	Put the control unit in stand-by mode. All the operations are stopped but the measures are still displayed. To shut down the system, you need to unplug the power supply.

5.3. AUTO FUNCTIONING



By using the  button, the system will work automatically in accordance with the operating program, settings and set-points entered.



NOTE:

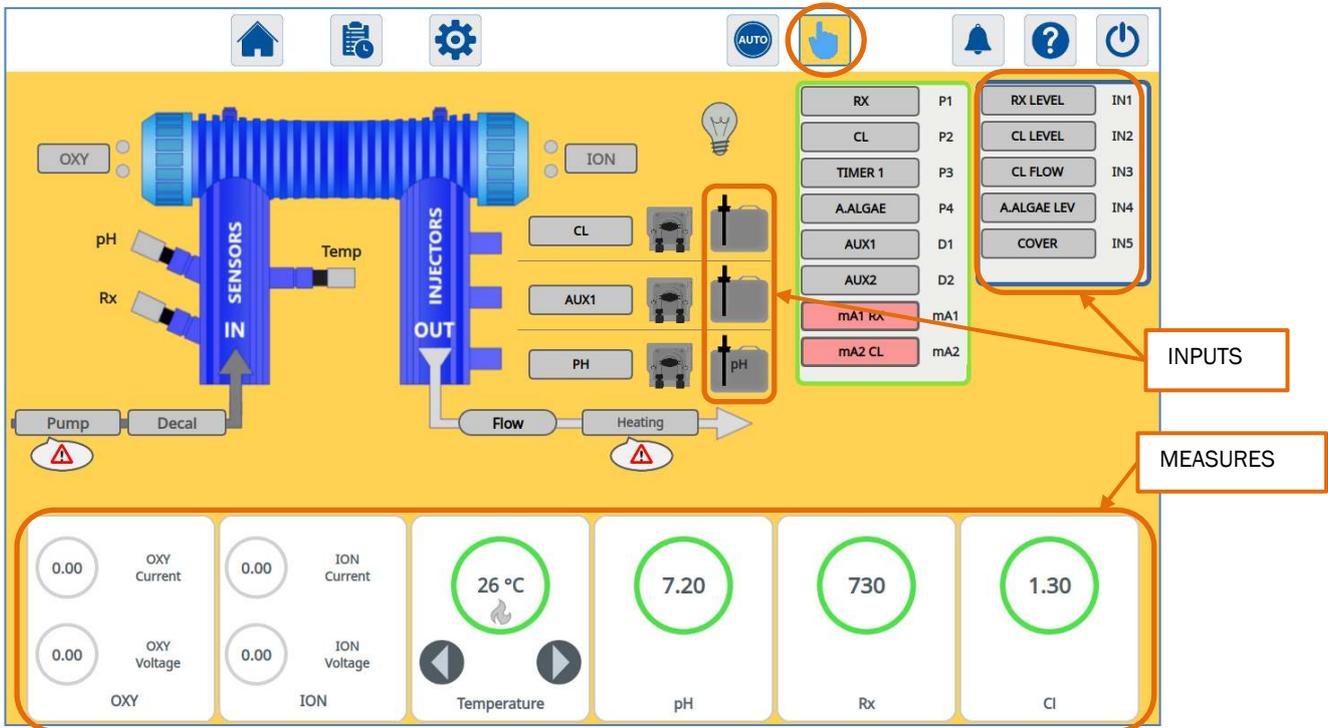


When working in Automatic Mode, the Home Page background colour is BLUE.

5.4. MANUAL FUNCTIONING

By using the  button, from navigation at any time, you will access the MANUAL page.

From this page you can display the real-time state of the inputs and outputs of the device and **simply by a touch you can activate and deactivate an output (OXY, ION, PUMP, HEAT, pH pump, etc....)**.



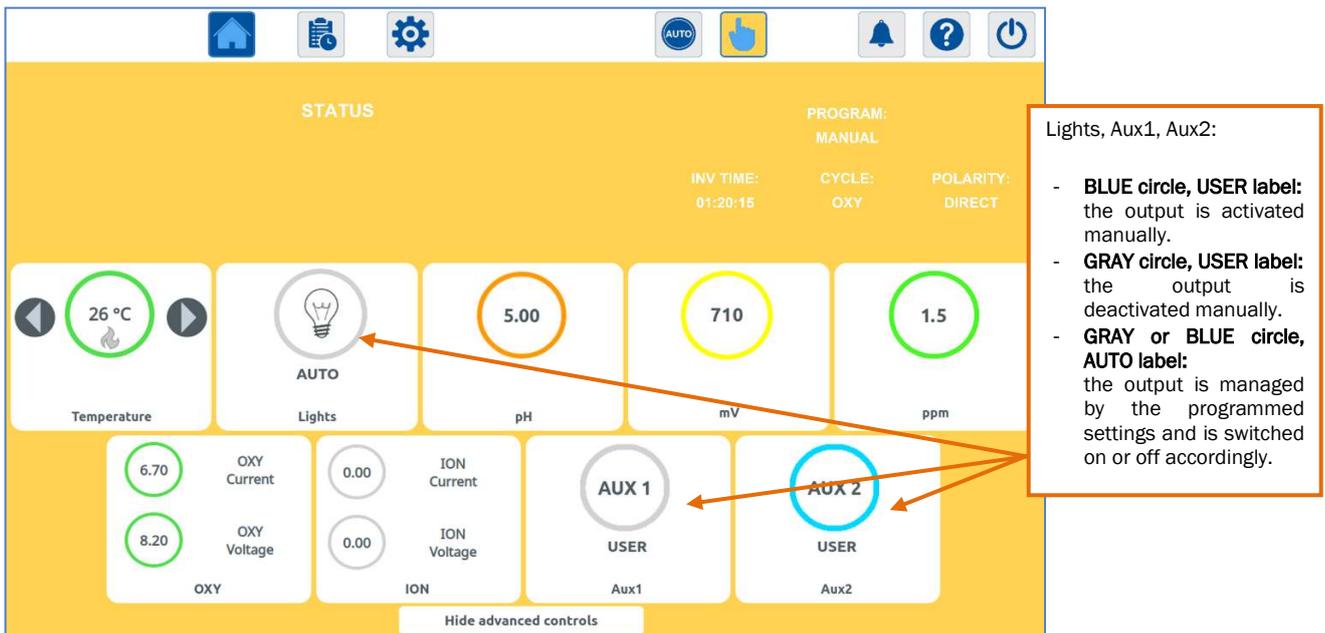
NOTE:



THIS PAGE CAN BE FREELY CONFIGURED BY THE INSTALLER (INSTALLER PASSWORD NEEDED) TO BE VERY SIMILAR TO THE REAL PLANT (see INSTALLER reference).

IF YOU WANT TO GO BACK TO AUTO FUNCTIONING, TOUCH  to return the system into automatic operation (MANUAL PAGE background colour turns WHITE and HOME PAGE background colour turns to BLUE).

IF YOU WANT TO GO BACK TO HOME PAGE, TOUCH  . YOU WILL SEE THE HOME PAGE BACKGROUND COLOUR IN YELLOW.



When the background of the page is yellow, with a short press inside the Lights, Aux1 and Aux2 circle, you can choose to manually manage these outputs. If you do not touch these circles, the output will continue to follow the automatic functioning.

5.5. PROGRAMMING THE SYSTEM

To configure the various function of MICRODOS OXY, you can access the programming in 2 different ways:

The screenshot shows the STATUS screen with the following data:

- Temperature: 26 °C
- Lights: AUTO
- pH: 7.20
- mV: 1252
- Cl Amp ppm: 0.27
- OXY Current: 6.70
- OXY Voltage: 8.20
- ION Current: 0.00
- ION Voltage: 0.00
- Aux1: AUTO
- Aux2: AUTO

Callouts:

- Programming buttons: Programs, Settings.
- By holding the buttons down, you can access the corresponding settings channel to change commands.

5.5.1. PASSWORD

If you attempt to access the EXPERT programming, you need to enter **password 11222**.



5.5.2. PROGRAMS: PROGRAMMING RECIRCULATION PUMP AND ELECTRODES OPERATION

Change the recirculation pump and electrodes programs by pressing the icon. The following window will appear.

The AVAILABLE PROGRAMS screen shows the following programs and their status:

- AUTOTEMP: OFF
- USER PROGRAM: OFF
- PUBLIC POOL: OFF
- WINTER: OFF
- NO PROGRAM: ON

Callouts:

- To select any program, press the ON/OFF button next to each program.
- To enter any program for the configuration, press on the chosen program.

There are five possible operating programs for the recirculation pump, oxidation, and ionization.

AUTOTEMP	Operation will depend on the water temperature. The system measures the water temperature after 2 minutes from the filtration beginning and automatically calculates the operating time of the pump and the OXY and ION duration. These times are recalculated every 30 minutes based on the water temperature.
USER	The user can program up to 3 daily timers for the activation of the recirculation pump and the duration of oxidation and ionization.
PUBLIC POOL	The recirculation pump and OXY electrodes are factory set for 24 hours a day. It is possible to decide Oxidation and Ionization time freely.
WINTER	The user can program up to 3 daily timers for the activation of the recirculation pump. The OXY/ION electrodes cannot work. It is possible to set a water frost protection.
NO PROGRAM	There is no program for the activation of the recirculation pump. Heating and OXY/ION electrodes cannot work.



NOTE: if you need help while configuring the various programs, please consult the help menu on your device.

PROGRAMS

5.5.2.1. AUTOTEMP:

Operation will depend on the water temperature.

NOTE:



1. To activate the program:
 - With a short press on the day, you access in the settings for the selected day.
 - With a second short press on the day, the program is activated on that day (blue colour).
 - If you wish to use the daily program already set, copy it for the entire week by pressing SET ALL WEEK.
2. Weekdays colour:
 - a. BLUE: the program is active on the day.
 - b. GREY: the program is not active on the day.
3. Always press SAVE to make the modification effective.
4. Pump On "00:00" → no programming

BASIC MENU:

EXPERT MENU:

AUTOTEMP [?] [BACK] [SAVE]

Mon Tue Wen Thu Fri Sat Sun [SET ALL WEEK]

Pump on hh mm 00 00

Oxy duration hh mm 00 00

Ion duration mm ss 00 00

OFF EXPERT

EXPERT PROGRAMMING.

- OFF: the Oxy and Ion Duration periods are automatically calculated by the program and cannot be changed.
- ON: allows the manual change of Oxy and Ion Duration periods.

When the Expert Programming is ON it is possible to modify Oxy/Ion duration automatically calculated by the program.

5.5.2.2. USER PROGRAM

Configure up to 3 daily timers to program the activation of the recirculation pump and the duration of oxidation and ionization.

NOTE:



- To activate the program:**
 - With a short press on the day, you access in the settings for the selected day.
 - With a second short press on the day, the program is activated on that day (blue colour).
 - If you wish to use the daily program already set, copy it for the entire week by pressing SET ALL WEEK.
- Weekdays colour:**
 - BLUE:** the program is active on the day.
 - GREY:** the program is not active on the day.
- Always press SAVE to make the modification effective.**
- Values of On at "00:00" and Off at "00:00" → no programming**

USER PROG [?] [BACK] [SAVE]

Mon Tue Wen Thu Fri Sat Sun [SET ALL WEEK]

Pump ON	hh mm 00 00	Oxy Duration	hh mm 00 00
Pump OFF	hh mm 00 00	Ion Duration	hh mm 00 00

5.5.2.4. PUBLIC POOL

Keep the recirculation pump on 24 hours a day.

- Default Oxy duration: 24h.
- Default Ion duration: 00:00.

It is possible to freely change these settings. When Ion duration increases, Oxy duration decreases accordingly

NOTE:



Always press SAVE to make the modification effective.

5.5.2.4. WINTER

NOTE: Only the recirculation pump works, the operation of Titanium and Copper electrodes is not allowed.

Configure up to 3 daily timers to program the activation of the recirculation pump.



1. To activate the program:
 - With a short press on the day, you access in the settings for the selected day.
 - With a second short press on the day, the program is activated on that day (blue colour).
 - If you wish to use the daily program already set, copy it for the entire week by pressing SET ALL WEEK.
2. Weekdays colour:
 - a. BLUE: the program is active on the day.
 - b. GREY: the program is not active on the day.
3. Always press SAVE to make the modification effective.
4. Values of On at "00:00" and Off at "00:00" → no programming on recirculation pump

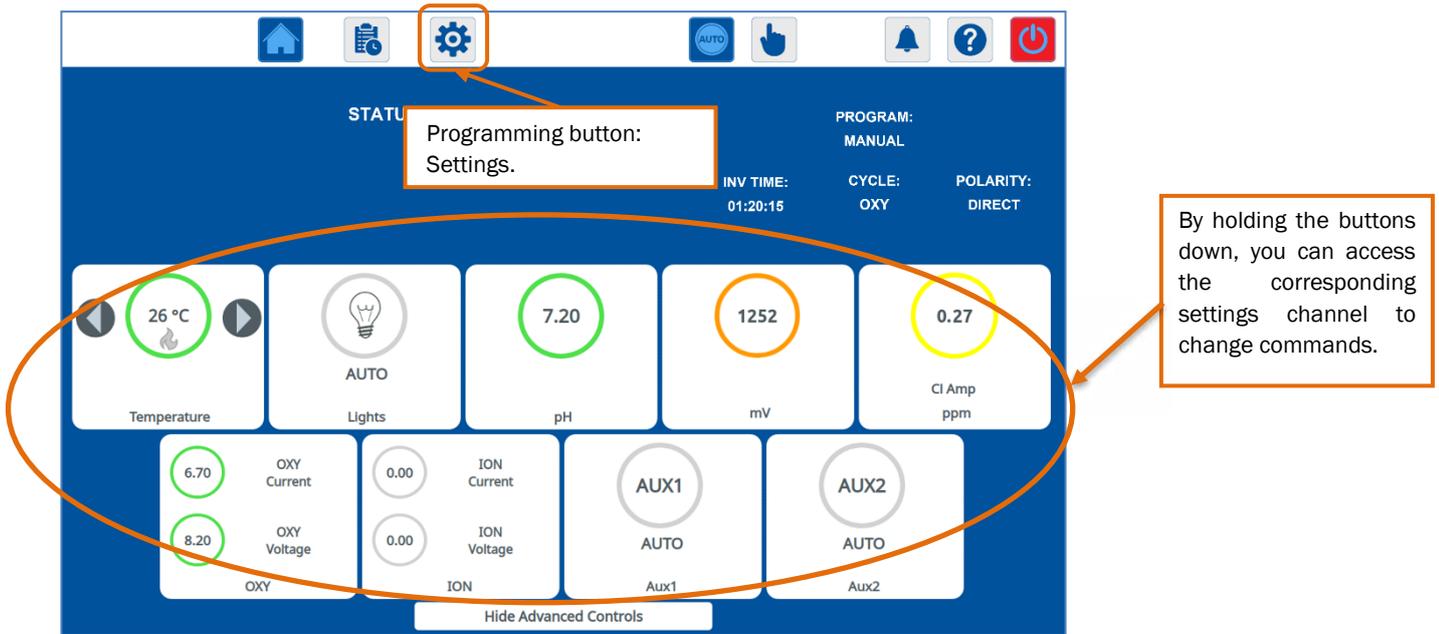
The screenshot shows the 'WINTER' settings screen. At the top right are buttons for help (?), 'BACK', and 'SAVE'. The main content area is titled 'WINTER'. A 'FROST PROTECTION' section is highlighted with an orange box, containing 'OFF Over: 5.0 °C' and 'ON Under: 3.0 °C' with up and down arrows. Below this is a row of day buttons (Mon, Tue, Wen, Thu, Fri, Sat, Sun) and a 'SET ALL WEEK' button. The bottom section shows three rows of 'Pump ON' and 'Pump OFF' settings, each with 'hh' and 'mm' time inputs, all currently set to '00'.

FROST PROTECTION:

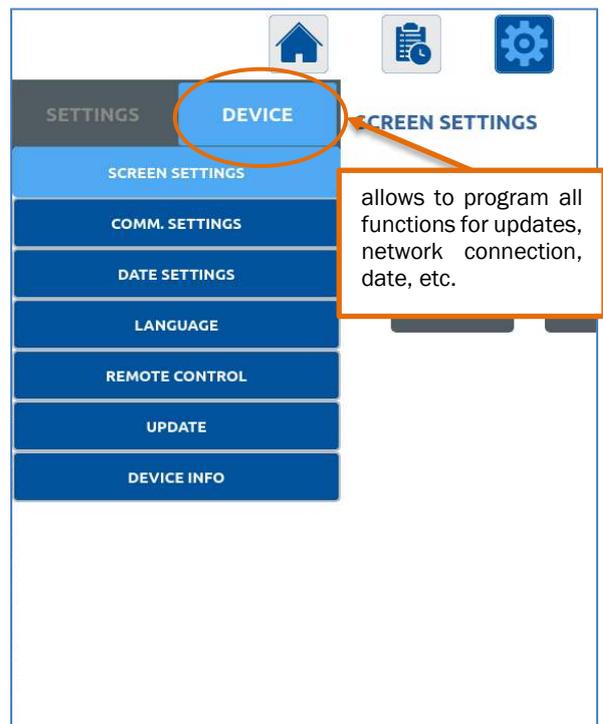
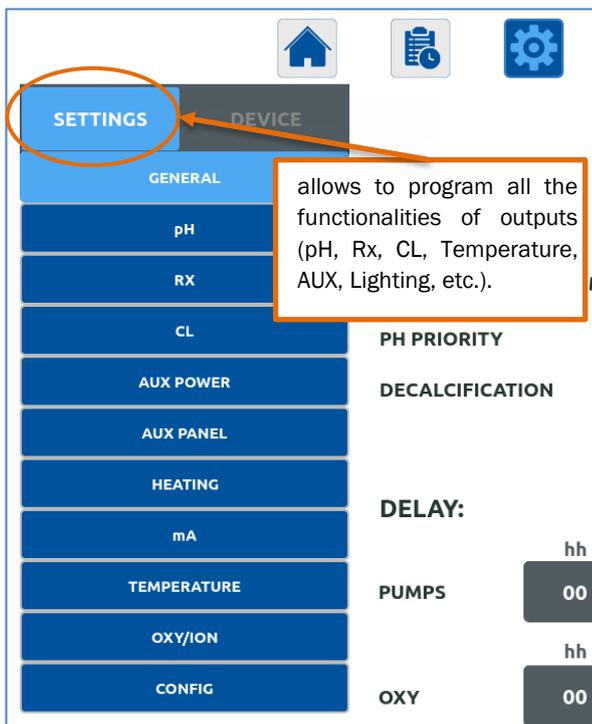
Set the minimum and maximum water temperature for the frost protection function.

The pump is activated during no-working periods, every hour for 10 minutes and the water temperature is monitored. If the temperature is below the ON under value, the pump continues to work until it reaches the OFF over temperature.

5.5.3. SETTINGS



When you access the Settings Menu, you can find 2 different sub-menus:



5.5.3.1. MODIFY PARAMETERS VALUE

NOTE: It is possible to edit all the numeric values inside the boxes.



1. Press on the box of the value you wish to modify.
2. Modify using the arrows.
3. Always press SAVE to make the modification effective.
4. Value on "00:00" → no programming

5.5.3.2. GENERAL:

Display alarm report on HOME PAGE.

If you have installed a flow-detector in the pipe and connected it to the control unit, you need to enable General flow alarm. Operation is normally open.

PH PRIORITY: Blocks the chlorine dosage (RX and CL output) when the pH is not within the optimal range.

If you have purchased the water softener, you can activate/deactivate it.

Delay on the beginning of chemical dosing, after switching on the recirculation pump, after a flow alarm, stand by and after a general alarm.

SAVE

Activates/deactivates the oxidation and ionization.

Enables oxidation depending on the RX measurement value.

DELAY:

Delay on the beginning of oxidation, after switching on the recirculation pump.

SAVE

5.5.3.2.1. GENERAL FLOW ALARM

The flow sensor must be wired to poles 12 of the main board (see page 15 **Errore. Il segnalibro non è definito.**). Depending on the model, it is possible to have 2 different cables:

- a pair of black cables
- a pair of brown and black cables

Flow alarm operation is normally open.

VERY IMPORTANT NOTE:



If in menu “ NO PROGRAM” is ON, the recirculation pump is independent from OXY and in case of a flow alarm on OXY, this will stop dosing and all the outputs dependent on water flow.



If in menu a program is active (AUTOTEMP, USER PROGRAM, PUBLIC POOL, WINTER), the recirculation pump is driven from OXY and in case of a flow alarm, OXY will stop the recirculation pump.

To esc from this alarm you need to check the recirculation plant to solve the problem and then, when you want to restart the pump, you need to deactivate GENERAL FLOW ALARM (OFF→SAVE), wait for a while and when the recirculation pump is running you can activate GENERAL FLOW ALARM again (ON→SAVE).

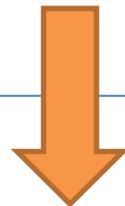
NOTE: to apply the changes it is always necessary to press the **SAVE** button.

5.5.3.3. MEASUREMENT (PH, RX, CL) FUNCTION (BASIC/EXPERT)

By pressing the measure button, a window like this will appear:

The screenshot shows a control interface for pH measurement. On the left is a vertical menu with options: SETTINGS, DEVICE, GENERAL, pH, RX, CL, AUX POWER, AUX PANEL, HEATING, mA, TEMPERATURE, OXY/ION, and CONFIG. The main area displays 'PH HOME' with an 'ON' button and 'PH OUTPUT' with an 'ON' button. A large circular gauge shows a '6.8 pH' measurement value. Below the gauge is a slider with a green '7.20' setpoint and an orange '8.20' maximum threshold. At the bottom, there is a 'Last Calibration' field showing '00/00/0000', a 'CALIBRATE' button, an 'EXPERT' button, and a 'SAVE' button. Annotations with arrows point to various elements: 'Visualization in the home page.' points to the 'PH HOME' button; 'Enables/disables the chemical dosing.' points to the 'PH OUTPUT' button; 'Setpoint - desired value. No dosing.' points to the '7.20' value; 'Maximum Threshold. Maximum dosing.' points to the '8.20' value; 'MEASURE VALUE' points to the '6.8 pH' gauge; 'Date of the last calibration and button to calibrate test-probe.' points to the 'Last Calibration' field and 'CALIBRATE' button; 'Access a menu with more complex settings. Expert PASSWORD required.' points to the 'EXPERT' button.

By pressing the EXPERT button, this window will appear:



OVERDOSE: maximum dosing time alarm. If you wish to dose a specified quantity of chemical, you can set a maximum daily dosing time. When the set time is reached, the alarm stops the dosing.

OVERDOSE LIMIT: maximum dosing time alarm with measure below LOW or above HIGH. When the set time is reached, the alarm stops the dosing.

Value "00:00" → no programming

Information about the probe:
- Real physical input
- information about last probe calibration.

Factory Reset of parameters or calibrations related to the displayed measurement.
Expert PASSWORD required.

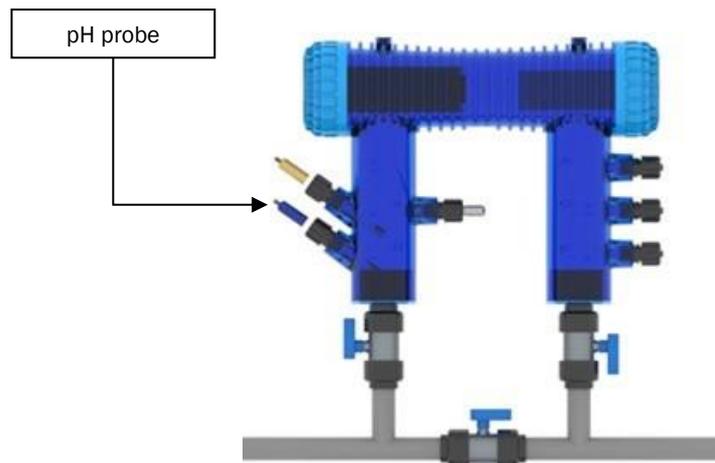
Turn off the Overdose or Overdose Limits alarm and restores the chemical dosing.



NOTE: To make effective the expert settings, press SAVE before pressing HIDE.

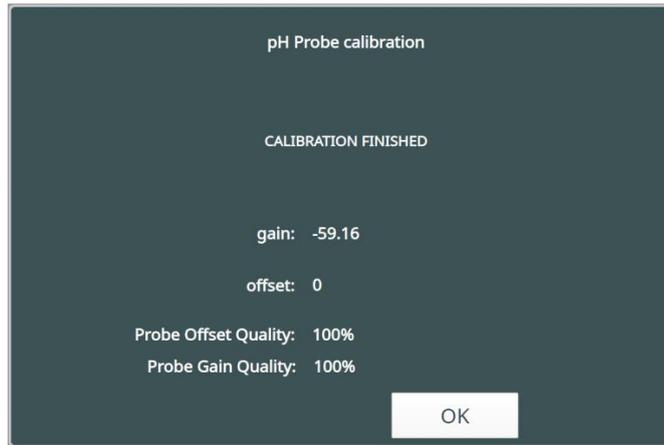
5.5.3.4. PROBES CALIBRATION

5.5.3.4.1. CALIBRATE THE PH PROBE



1. Press the **STAND-BY**  button. Open the by-pass valve and shut off both valves to the chamber.
2. Unscrew the probe holder base, take out the pH probe and insert it into buffer solution pH7 (supplied with the system).
3. With the probe in the 7pH solution, wait for the stabilization of the measurement. Once the measure is stable,
4. Press the **"Calibrate"** button inside the pH settings menu.
5. Insert the EXPERT PASSWORD (11222) to enter the calibration procedure.
NOTE: it is possible to exit from the calibration procedure simply pushing "CANCEL."
6. When "Read value" is stable hit **OK**. You will hear a beep when you press OK (to communicate that the measurement is recorded).
7. Remove the probe from the buffer solution pH7, clean it with a little water.

8. Insert the probe in the buffer solution pH9 (supplied with the system), wait for the stabilization of the measurement. Once the measure is stable hit **OK**.



9. A window with the values of OFFSET and GAIN obtained from the calibration and the PROBE QUALITY CONTROL will appear.
100% = Excellent probe
50% = Good probe to be monitored
25% = probe that you should change
0% = fully exhausted probe

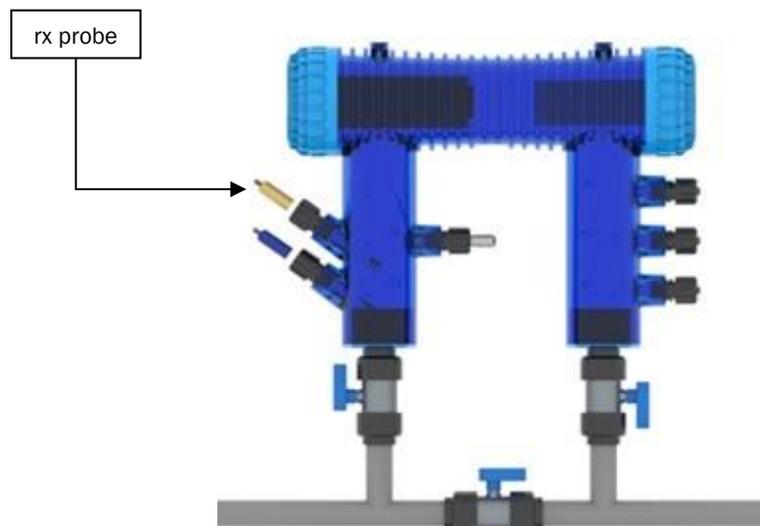
IF THE PROBE QUALITY IS LESS THAN 25%, PLEASE REPEAT CALIBRATION PAYING ATTENTION TO THE VALUES OF BUFFER SOLUTION. IF THE CALIBRATION GIVES THE SAME RESULTS CONTACT YOUR INSTALLER.

10. Press **OK** to return to the pH MENU. The “**Last Calibration**” box will be updated to the current date.
11. Insert the probe into the chamber again and screw the probe holder base.

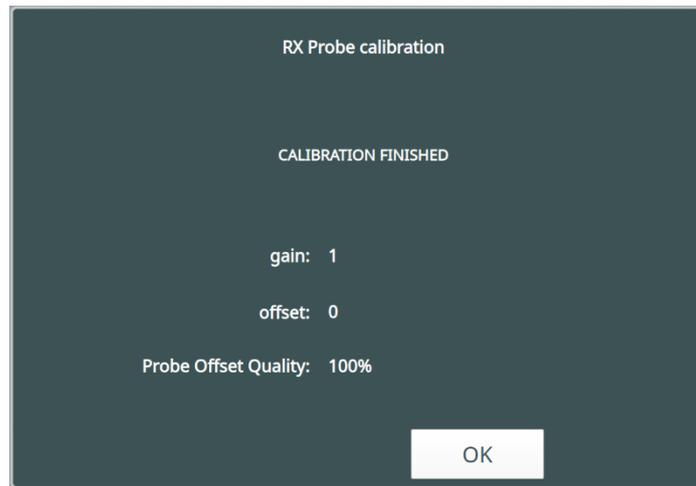
NOTE: follow next step, only if you do not have to calibrate RX probe.

12. Open the valves to the chamber and shut off the by-pass valve. On device, press the **STAND-BY**  button to return to the working mode, and press the **AUTO** button so that our system will now operate applying the new calibration.

5.5.3.4.2. CALIBRATE THE RX PROBE



1. Press the **STAND-BY**  button. Open the by-pass valve and shut off both valves to the chamber.
2. Unscrew the probe holder base, take out the RX probe and insert it into buffer solution 468mV (supplied with the system).
3. With the probe in the 468mV solution, wait for the stabilization of the measurement. Once the measure is stable,
4. Press the “**Calibrate**” button inside the RX settings menu.
5. Insert the EXPERT PASSWORD (11222) to enter the calibration procedure.
NOTE: it is possible to exit from the calibration procedure simply pushing “CANCEL.”
6. When reading is stable hit **OK**.



7. A window with the values of OFFSET obtained from the calibration and the PROBE QUALITY CONTROL will appear. Quality of the Offset of the RX probe:

100% = Excellent probe
50% = Good probe to be monitored
25% = probe that you should change
0% = fully exhausted probe

IF THE PROBE QUALITY IS LESS THAN 25%, PLEASE REPEAT CALIBRATION PAYING ATTENTION TO THE VALUES OF BUFFER SOLUTION. IF THE CALIBRATION GIVES THE SAME RESULT CONTACT YOUR INSTALLER

8. Press **OK** to return to the RX MENU. The “**Last Calibration**” box will be updated to the current date.
9. Insert the probe into the chamber again and screw the probe holder base.
10. Open the valves to the chamber and shut off the by-pass valve.
11. On device, press the **STAND-BY**  button to return to the working mode, and press the **AUTO** button so that our system will now operate applying the new calibration.

5.5.3.4.3. CALIBRATE THE AMPEROMETRIC CHLORINE PROBE

NOTE:

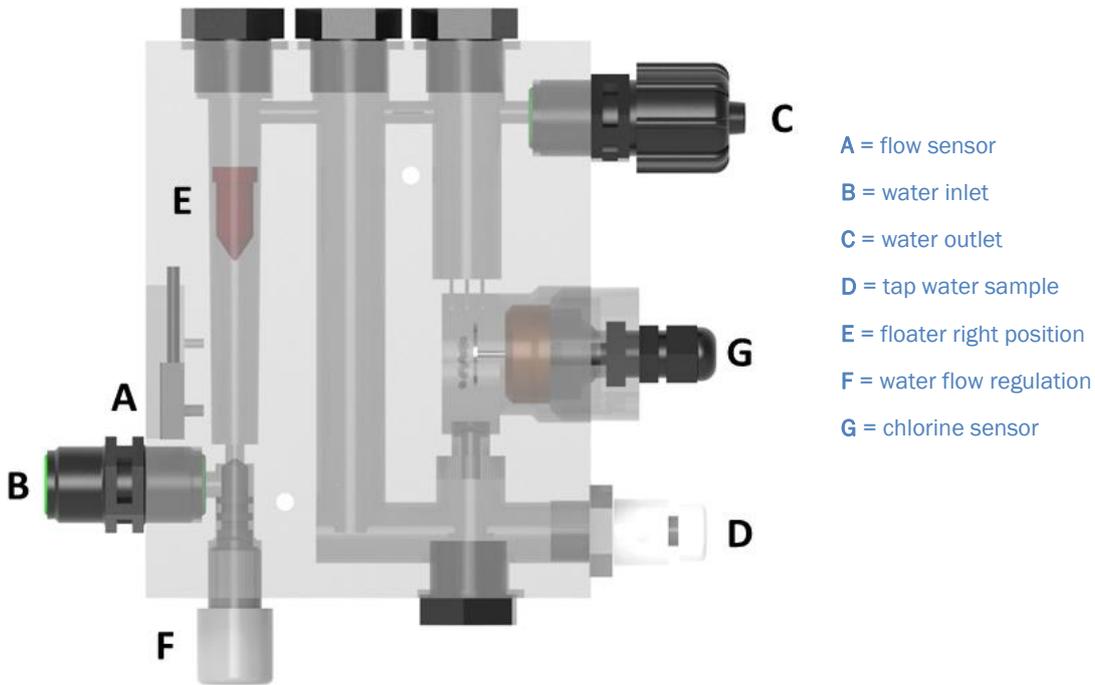


- it will be necessary to do a comparative free chlorine test (e.g., a DPD1 photometric test).
- **ZERO CALIBRATION** is factory performed then it is not possible.
- **Only GAIN CALIBRATION** is possible.

GAIN CALIBRATION

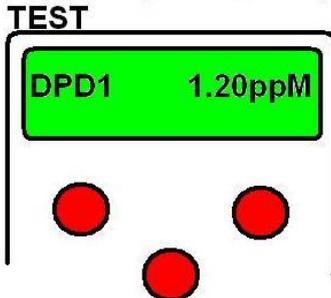
RECOMMENDATIONS: before doing **GAIN** calibration, **PAY ATTENTION TO THE FOLLOWING INSTRUCTIONS:**

1. It is necessary to stabilize the water flow by turning the knob regulation till the floater stays in the upper position (60l/h). This is important because the right water flow rate allows the glass spheres to clean adequately the copper surface.
2. Before calibrating the **GAIN** of the chlorine probe, stabilize the pH at the working conditions. (We recommend choosing a value from 7.0 to 7.3pH).
3. It is necessary to do the Chlorine gain calibration at concentration values nearest possible to the desired setpoint. For example, if the chlorine concentration desired is 1.20ppM it is strictly recommended to do the gain calibration with water in those conditions. Use a DPD1 photometric test to check the chlorine concentration in the water sample taken from the Tap (see the figure here below).



It is recommended to do the gain calibration after at least 2 or 3 hours of optimal working conditions, or alternatively it is possible to do a first gain calibration after having installed *Microdos Oxy* and the probe in the plant and then perform the definitive calibration after 24 hours of working of the probe.

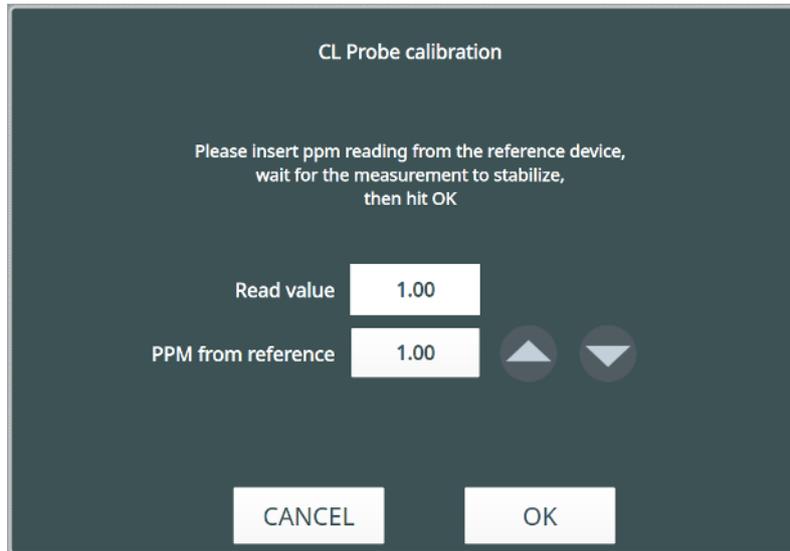
After having stabilized the flow and the pH and having stabilized the chlorine concentration at the optimal and desired value, wait for the stabilization of the reading on the *Microdos Oxy* display.



Do a DPD1 test on the water sample taken from the Tap of the probe holder (D).

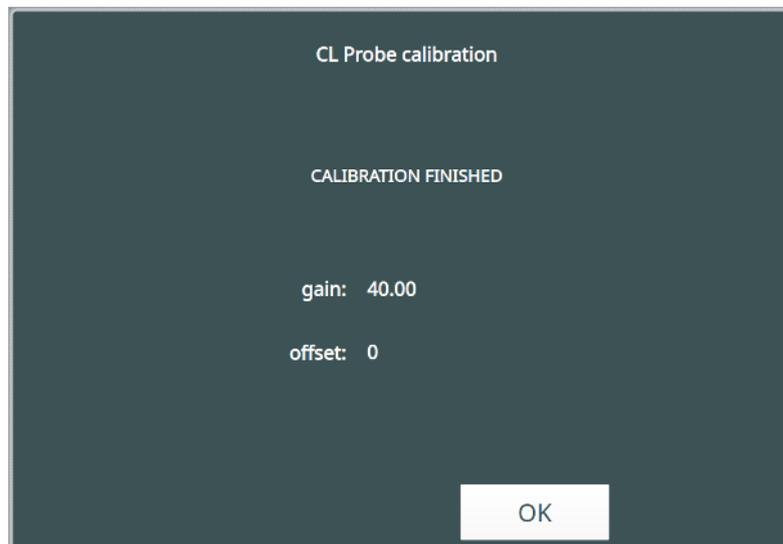
On device:

1. Press the “**Calibrate**” button inside the CL settings menu.
2. Insert the EXPERT PASSWORD (11222) to enter the calibration procedure. The window will appear as the following:



NOTE: it is possible to exit from the calibration procedure simply pushing "CANCEL."

3. Press the arrows ▲ ▼ to insert the value measured by the reference DPD1 test. Enter the right value then press OK.



4. A window with the value of GAIN obtained from the calibration will appear.
5. Press **OK** to return to the CL menu. The "**Last Calibration**" box will be updated to the current date.

5.5.3.4.4. CALIBRATE THE POTENTIOSTATIC CHLORINE PROBE

NOTE:



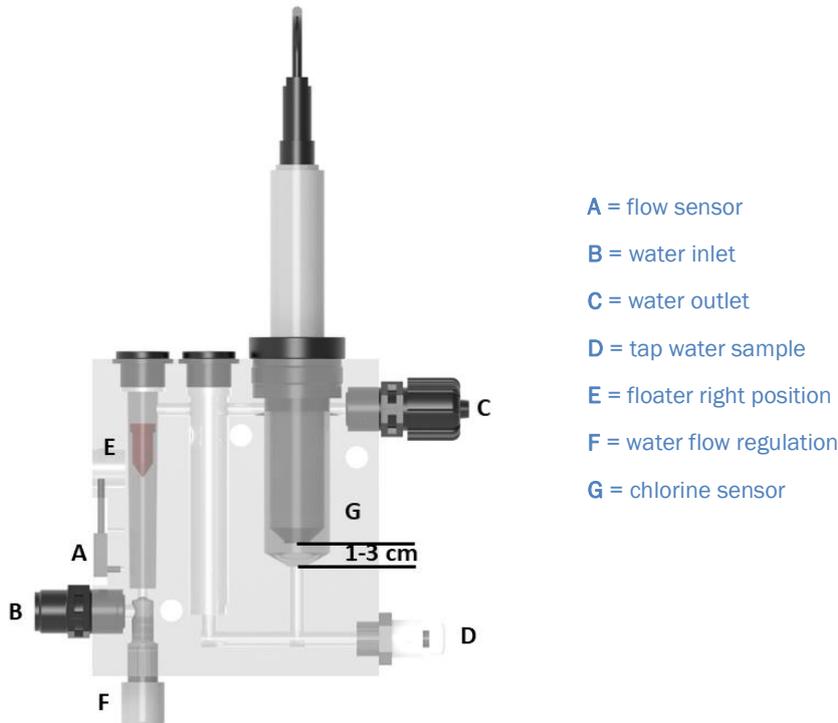
- it will be necessary to do a comparative free chlorine test (e.g., a DPD1 photometric test).
- ZERO CALIBRATION is factory performed then it is not possible.
- Only GAIN CALIBRATION is possible.

GAIN CALIBRATION

RECOMMENDATIONS: before doing GAIN calibration, PAY ATTENTION TO THE FOLLOWING INSTRUCTIONS:

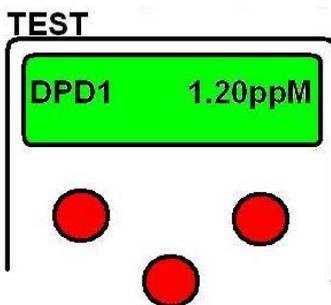
1. It is necessary to stabilize the water flow by turning the knob regulation till the floater stays in the upper position (60l/h).
2. Before calibrating the GAIN of the chlorine probe, stabilize the pH at the working conditions. (We recommend choosing a value from 7.0 to 7.3pH).

- It is necessary to do the Chlorine gain calibration at concentration values nearest possible to the desired setpoint. For example, if the chlorine concentration desired is 1.20ppM it is strictly recommended to do the gain calibration with water in those conditions. Use a DPD1 photometric test to check the chlorine concentration in the water sample taken from the Tap (see the figure here below).



It is recommended to do the gain calibration after at least 2 or 3 hours of optimal working conditions, or alternatively it is possible to do a first gain calibration after having installed *Microdos Oxy* and the probe in the plant and then perform the definitive calibration after 24 hours of working of the probe.

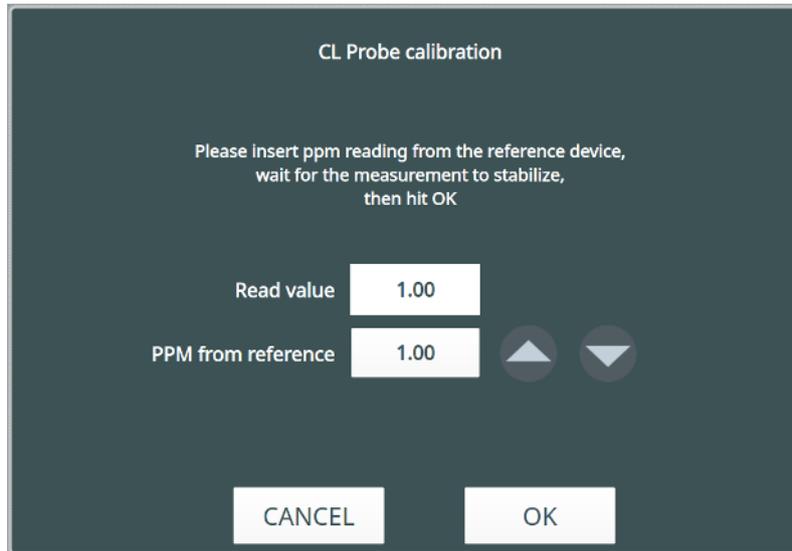
After having stabilized the flow and the pH and having stabilized the chlorine concentration at the optimal and desired value, wait for the stabilization of the reading on the *Microdos Oxy* display.



Do a DPD1 test on the water sample taken from the Tap of the probe holder (D).

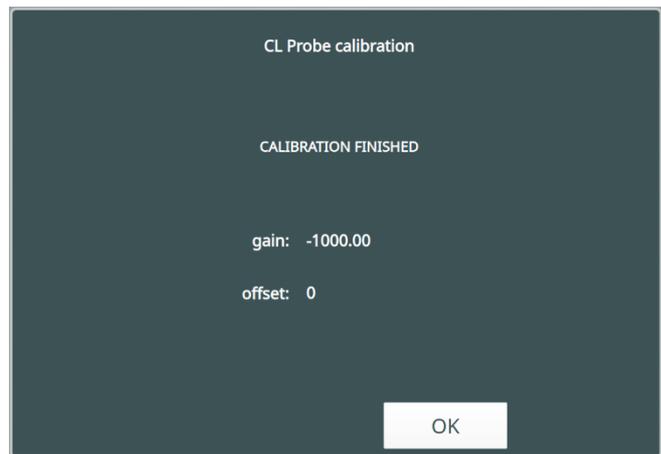
On device:

- Press the “**Calibrate**” button inside the CL settings menu.
- Insert the EXPERT PASSWORD (11222) to enter the calibration procedure. The window will appear as the following:

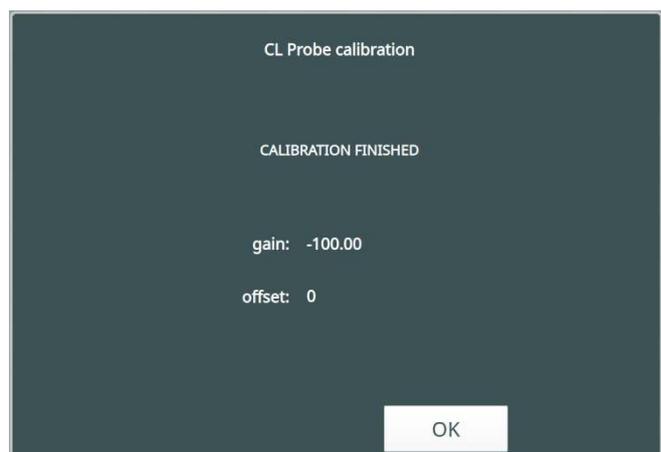


NOTE: it is possible to exit from the calibration procedure simply pushing "CANCEL."

3. Press the arrows ▲ ▼ to insert the value measured by the reference DPD1 test. Enter the right value then press OK.
4. A window with the value of GAIN obtained from the calibration will appear.



For CL_PB the gain value will be:



For CL_PM the gain value will be:

5. Press **OK** to return to the CL menu. The "**Last Calibration**" box will be updated to the current date.

5.5.3.5. TEMPERATURE

Choose Centigrade degrees or Fahrenheit degrees.

Real time temperature, measured in the water (same as home page)

Using ▲ ▼ it is possible to correct the temperature value by adding an offset. Press CALIBRATE, to save the temperature correction.

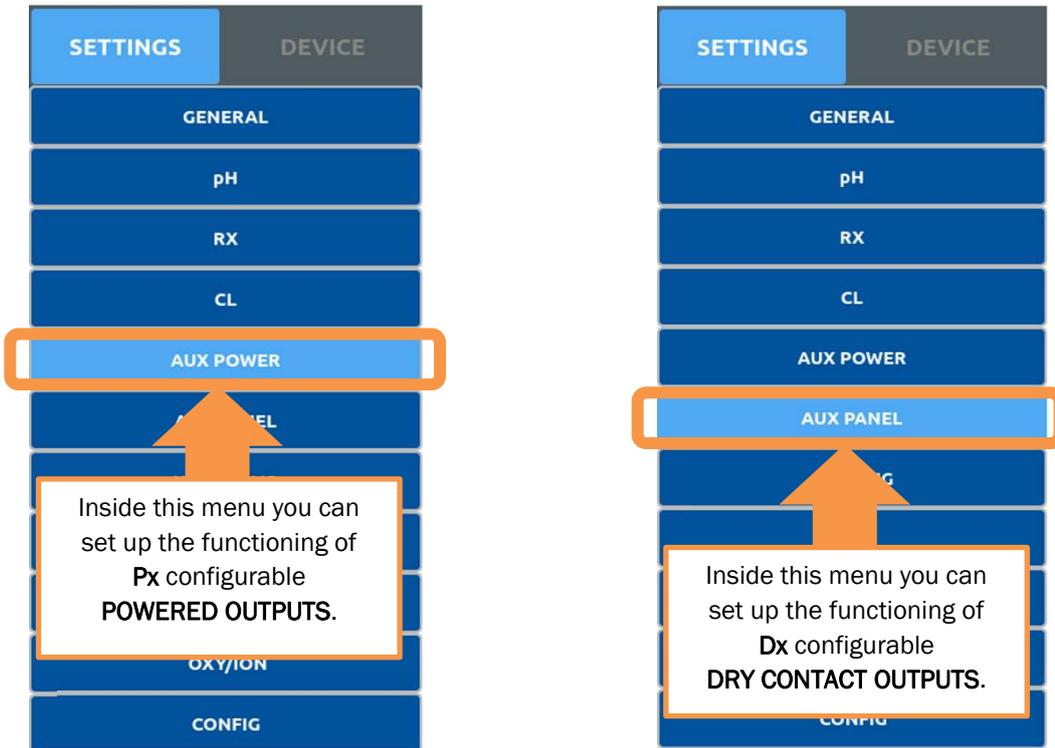
Information about the temperature detected by the probe in the water, without any correction.

NOTE:



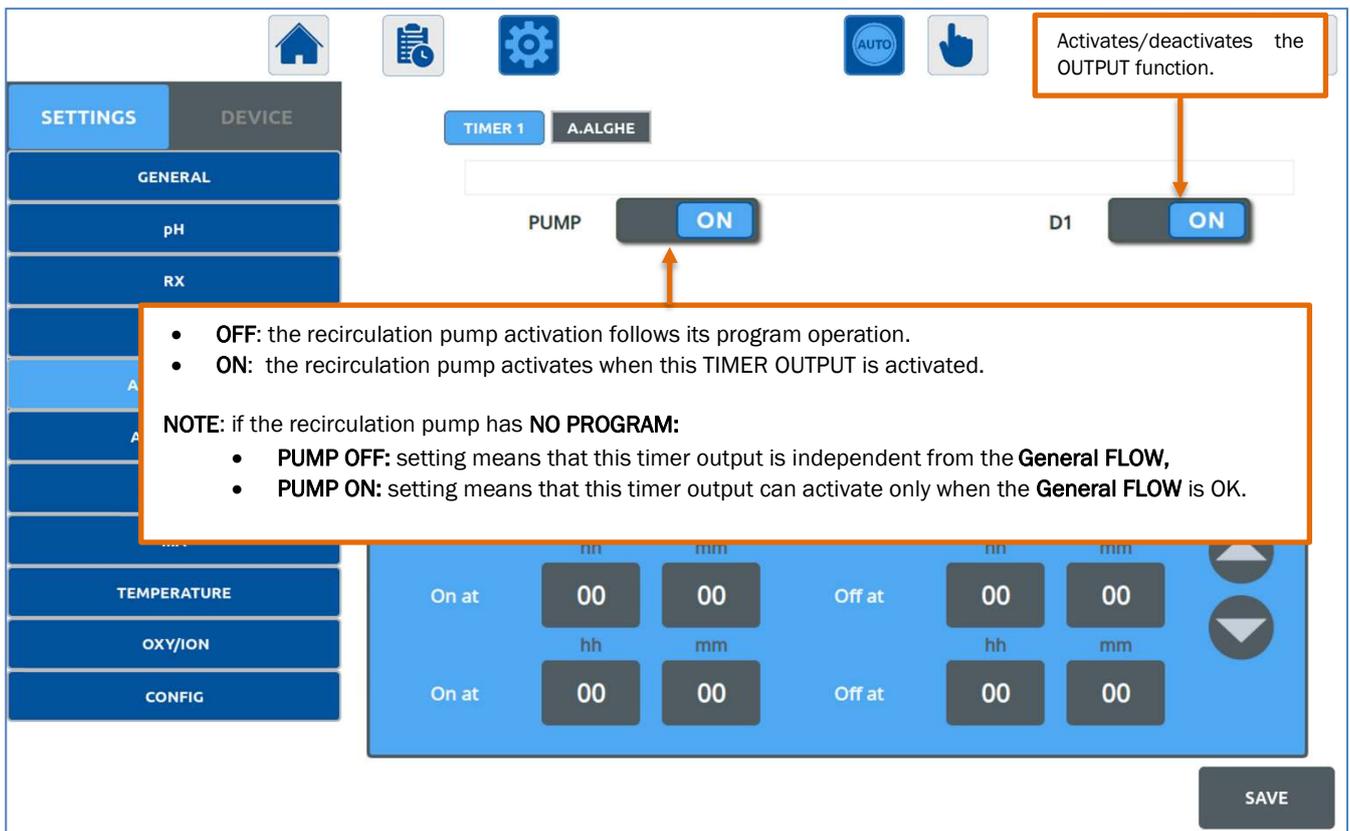
Always press SAVE to make the modification effective.

5.5.3.6. AUXILIARY OUTPUTS CONFIGURABLE TYPES



5.5.3.6.1. TIMER TYPE

Configure up to 3 daily timers to program the activation of the output.:



With a short press on the day, you access in the settings for the selected day.

With a second short press on the day, the timer you activate the timer on that day (blue colour).

With a short press on the box hh:mm you can modify the On/Off time (hours and minutes) using the ▲ ▼ arrows.

If you wish to use the daily program already set, copy it for the entire week by pressing SET ALL WEEK

NOTE:



1. Weekdays colour:
 - a. BLUE: the timer is active on the day.
 - b. GREY: the timer is not active on the day.
2. Always press SAVE to make the modification effective.
3. Values of On at "00:00" and Off at "00:00" → no programming

5.5.3.6.2. MICRODOSE TYPE

A dosage is performed at the beginning of each hour of filtration.

The dosing time is automatically calculated based on the pool volume and the filtering hours of the day.

Activates/deactivates the OUTPUT function.

Pool volume in cubic meters.

FOLLOW PUMP PROGRAMS:

- ON: the chemical dosing follows the operating times of the PUMP PROGRAM selected in Programs.
- OFF: the chemical dosing follows the water flow detected by FLOW SENSOR.

If "Follow Pump Programs" is OFF, you need to set the Total Daily Filtering Period for every weekday.
With a short press on the day, you access in the settings for the selected day.
With a second short press on the day, the dosage is active on that day (blue colour).
Set the Total Filtration day Time value using the ▲ ▼ arrows.
If you wish to use the daily program already set, copy it for the entire week by pressing SET ALL WEEK

NOTE: when the "Follow Pump Program" is in OFF mode:



1. Weekdays colour:
 - a. BLUE: the dosage is active on the day.
 - b. GREY: the dosage is not active on the day.
2. Always press SAVE to make the modification effective.

5.5.3.6.3. REPEAT TYPE

This type of output repeats the functioning of the selected inputs or outputs (one or more).
The output is activated when an input or an output among the chosen ones is activated.
It is possible to activate this output when the device is performing a pH priority, an Oxy delay, and a dosing delay.

NOTE:

1. Inside the "INCLUDE" section you can choose up to 4 INPUTS or OUTPUTS you wish to repeat.
 - Press the arrow ▼ to view the drop-down menu for the choice.
2. for the OUTPUT repetition it is recommended to include only one option.
3. Always press SAVE to make the modification effective.

The screenshot shows the configuration interface for the REPEAT TYPE. The sidebar on the left lists various settings categories. The main area is divided into 'LIGHTS', 'AUX 1', and 'AUX 2' sections. The 'AUX 1' section is active, showing a table with 'INPUT' and 'OUTPUT' columns. The 'INCLUDE' column has a dropdown menu. A callout box points to the 'OUTPUT' column, stating: 'Defines the output functioning: Normally Open (N.O). Normally Closed (N.C)'. Another callout box points to the 'INCLUDE' dropdown, stating: 'INPUT/OUTPUT activates the relative column for the choice.' A third callout box points to the 'OUTPUT' column, listing possible outputs to repeat: PUMP, P1, P2, P3, P4, D2, LIGHTS, PH, and HEAT.

Possible INPUT to repeat:

- - (not set)
- IN1
- IN2
- IN3
- IN4
- IN5
- HEAT
- PUMP
- FL
- PH
- PH PRIORITY
- OXY DELAY
- DOSING DELAY

Possible OUTPUT to repeat:

- - (not set)
- PUMP
- P1
- P2
- P3
- P4
- D2
- LIGHTS
- PH
- HEAT

5.5.3.6.4. DRY AUXILIARY OUTPUTS

Inside this menu you can set up the functioning of Lights and D1/D2 configurable Dry Outputs.



IMPORTANT: DRY CONTACTS ARE FREE OF POTENTIAL (RELAYS) WITH A PROTECTION OF 5 AMPERES. DO NOT EXCEED THIS ELECTRICAL INTENSITY.

5.5.3.6.5. LIGHTS

Configure up to 3 daily timers to program the activation of lights.

Activates/deactivates the LIGHTS Output.

With a short press on the day, you access in the settings for the selected day.
With a second short press on the day, the timer you activate the timer on that day (blue colour).

With a short press on the box hh and mm you can modify the On/Off time (hour and minutes) using the ▲ ▼ arrows
If you wish to use the daily program already set, copy it for the entire week by pressing SET ALL WEEK

NOTE:



1. Weekdays colour:
 - a. BLUE: the timer is active on the day.
 - b. GREY: the timer is not active on the day.
2. Always press SAVE to make the modification effective.
3. Values of On at "00:00" and Off at "00:00" → no programming

5.5.3.6.6. HEATING FUNCTION

- 1) Program the daily activation of the HEATING program.
- 2) Enter the values of MIN and MAX temperature thresholds required to start up and shut down the heater. Once the temperature reaches the value of the maximum temperature, heater will shut down and, when it falls to the minimum, it will start up again.

Activates/deactivates the HEATING output.

Shut-down and start-up temperature of the heater during its hours of operation.

Max Temperature 28.0

Min Temperature 26.0

Mon Tue Wen Thu Fri Sat Sun SET ALL WEEK

On at hh mm Off at hh mm

On at hh mm Off at hh mm

On at hh mm Off at hh mm

SAVE

NOTE:



- To activate the heat control:
 - With a short press on the day, you access in the settings for the selected day.
 - With a second short press on the day, the heat control is activated on that day (blue colour).
 - Set the desired time values using the ▲ ▼ arrows.
 - If you wish to use the daily program already set, copy it for the entire week by pressing SET ALL WEEK.
- Weekdays colour:
 - a. BLUE: the heat control is active on the day.
 - b. GREY: the heat control is not active on the day.

- Always press SAVE to make the modification effective.
- Values of On at "00:00" and Off at "00:00" → no programming

5.5.3.7. MA OUTPUT (OPTIONAL)

It is possible (OPTIONAL) to add up to 2 milliamperes (mA) outputs to connect the Microdos Oxy to regulation pumps that are controlled by 0/4 – 20mA standard:

By pressing the EXPERT button, this window will appear:

NOTE:



TO MODIFY THE PARAMETERS VALUE:

- Press on the button of the value you wish to modify and use the ▲ ▼ arrows.
- Press SAVE to make the modification effective.

5.5.3.8. OXY/ION SETTINGS

Using this function, you can view information on the Titanium and Copper electrodes.

The screenshot shows the 'OXY/ION' settings screen. On the left is a sidebar menu with 'OXY/ION' selected. The main content area is divided into sections: 'Electrodes' with a table of settings for Oxy and Ion; 'Electrodes Lifetime' with digital displays and 'Reset' buttons; 'Electrode Protection' with an 'OFF' toggle; and 'Limit °F/°C' with a digital display and up/down arrows. A 'SAVE' button is located at the bottom right.

Electrodes	MAX CURRENT	POLARITY TIME (Min)	ALARM	WITH COVER
Oxy	10	180	50%	50%
Ion	1	AUTO	50%	50%

Electrodes Lifetime

Oxy	00:00:00	Reset OXY Values
Ion	00:00:00	Reset ION Values

Electrode Protection: OFF

Limit °F/°C: 18 °C

SAVE

1. **OXY MAX CURRENT:** maximum current for titanium electrodes.
2. **ION MAX CURRENT:** maximum current for copper electrodes.
3. **OXY POLARITY TIME:** polarity inversion time of the titanium electrodes for the **self-cleaning** function.

WARNING:



Short times (less than 180 minutes for Titanium) drastically reduce the electrodes lifetime.

4. **ION POLARITY TIME:** polarity of copper electrodes automatically reverts each time ionization activates.
5. **OXY/ION ALARM:** percentage of the maximum current. Currents below this value are displayed in orange in HOME PAGE.
6. **OXY/ION WITH COVER:** percentage of the maximum current. The electrodes will be operating with this current when the Cover input (IN5) is active (covered pool).
7. **RESET OXY values and RESET ION values:** reset the counter to zero whenever a worn-out electrode is replaced.
To confirm this operation, insert the INSTALLER PASSWORD.
8. **ELECTRODE PROTECTION:** enable the Titanium electrode protection system for water temperatures that are too low. For temperatures below the limit value, the titanium electrodes will stop working (Default 18 °C).
9. **LIMIT °F/°C:** limit value of water temperature for the electrode protection system.

5.5.3.9. CONFIG MENU

NOTE:



To configure these output types, please consult your Installer.

Inside this menu you can display the setup of the configurable Inputs and Outputs.

No changes are allowed to the user inside this Menu. Modifications are only allowed to the Installer (INSTALLER PASSWORD required)

The installer can change his password

It is possible to rename all the INPUTS and the OUTPUTS

Defines if the INPUT functioning is: Normally Open (N.O). Normally Closed (N.C).

OUTPUTS		INPUTS	
NAME	TYPE	NAME	TYPE
P1	Rx	IN1	Rx LEVEL
P2	Cl	IN2	Cl LEVEL
P3	TIMER 1	IN3	Cl FLOW
P4	A.ALGAE	IN4	A.ALGAE LEV.
D1	AUX1	IN5	COVER
D2	AUX2		

It is possible to define the OUTPUT TYPE to choose between:

- TIMER
- REPEAT
- pH
- Rx
- CL
- TEMP
- MICRODOSE

Define the INPUT TYPE, to choose between:

- NOT SET
- AL.P1
- AL.P2
- AL.P3
- AL.P4
- AL.D1
- AL.D2
- ALERT
- GENERAL

5.5.4. DEVICE SETTINGS

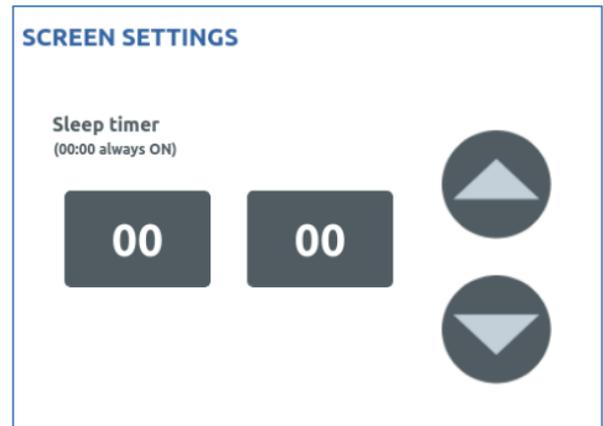
5.5.4.1. SET THE SLEEP TIMER OF THE SCREEN

The unit has an automatic screen stop system as a function of time that you can program. The screen will then turn off, but the unit will continue to operate normally. To turn it back on, simply touch the screen.

If you put 00:00 it will never go out.

NOTE:

Always press **SAVE** to make the modification effective.

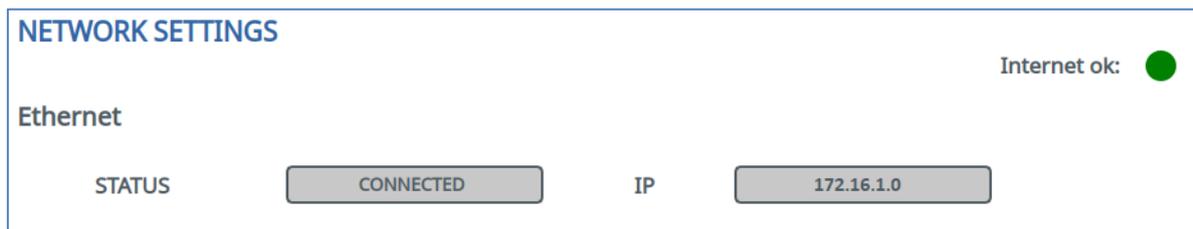
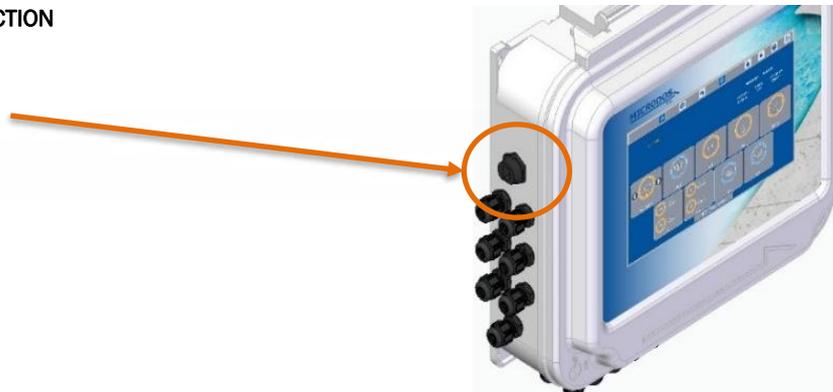


5.5.4.2. CONNECTION WIFI OR ETHERNET

It is advisable to have access to Internet service, to update the software and to manipulate, maintain and have full information on your system through your computer or mobile phones (Android and iOS apps are available). To do this you can use an Ethernet connection or a WIFI connection. Follow next steps:

ETHERNET CABLE CONNECTION

- connect the LAN cable
- Turn on Ethernet



WHEN THE DEVICE DETECTS THE CONNECTION AND CONNECTS TO INTERNET, THE STATE AND THE IP WILL APPEAR. Also, the "Internet ok" dot will turn from **RED** to **GREEN**.

If it does not connect, the message "NOT CONNECTED" will appear on the STATUS and the "Internet ok" dot will stay **RED**.

Wi-Fi CONNECTION

To establish the internet connection via Wi-Fi:

1. Turn on the Wi-Fi

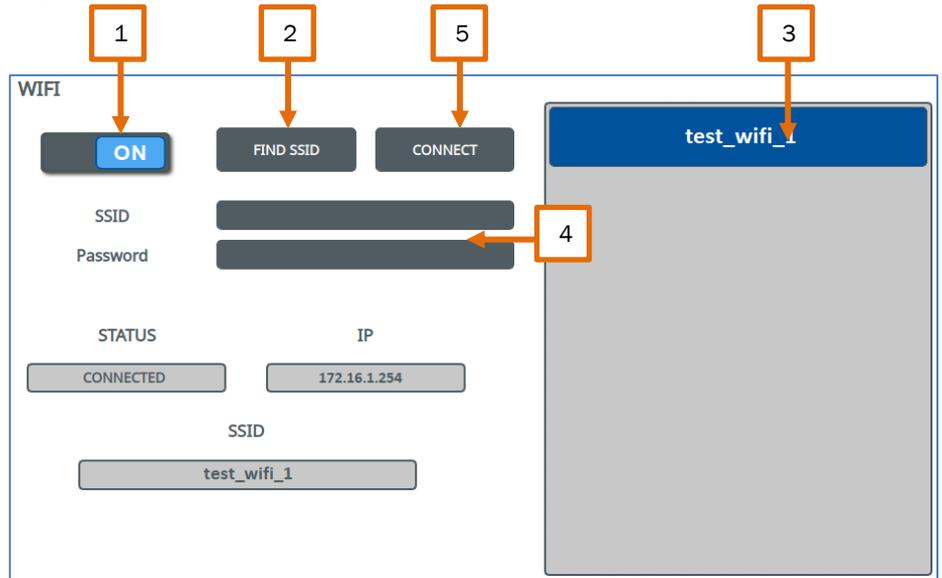
2. Press the "FIND SSID" button

A list of Wi-Fi networks available for connection will appear in the side box.

3. Select the desired Wi-Fi network from the list

4. Enter the password (if requested)

5. Press CONNECT

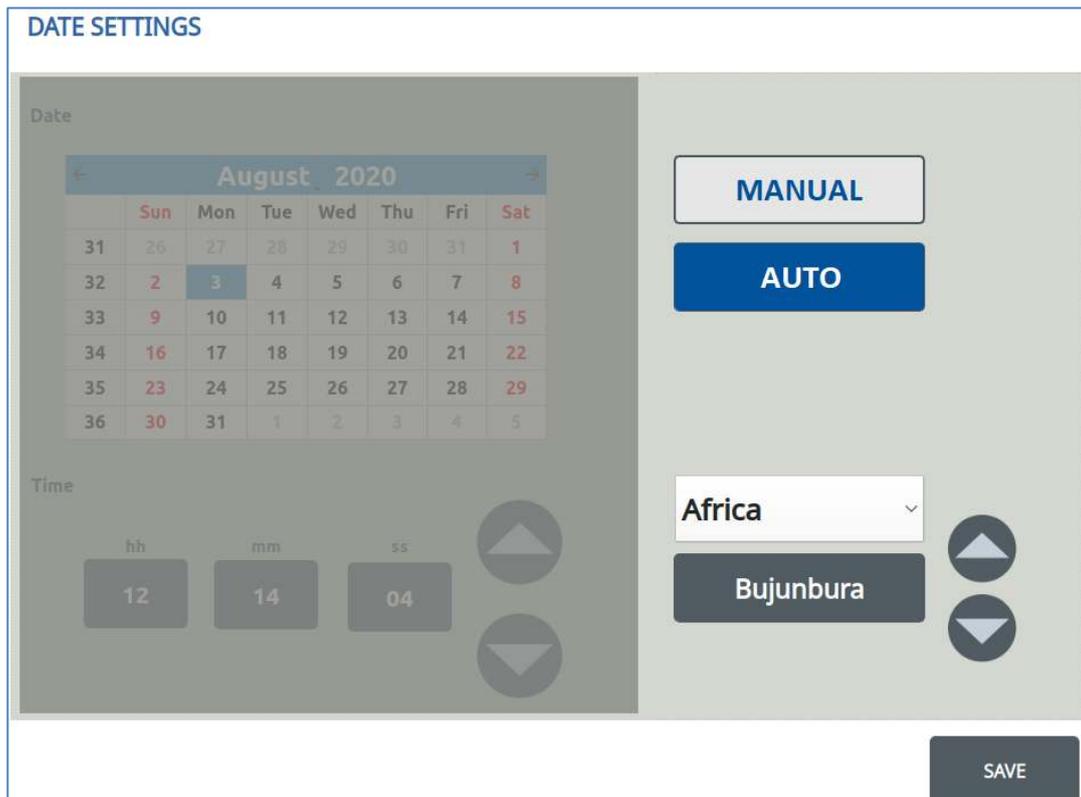


Once connected to the network via Wi-Fi, STATUS displays the status of the connection, IP the address and SSID the name of the network to which you are connected.

5.5.4.3. DATE AND TIME

To configure the date/time you can choose between two possible options:

- **AUTO:** If the system is connected to internet, you can choose the AUTO MODE. Press the AUTO button and set the time zone. The system will automatically set the date and time accordingly. **Press SAVE to make the modification effective.**



- **MANUAL:**

If the system is not connected to the internet, you can choose the MANUAL MODE.

Press the MANUAL button.

You can set date, time, and the time zone manually. **Press SAVE to make the modification effective.**

DATE SETTINGS

Date

	Sun	Mon	Tue	Wed	Thu	Fri	Sat
31	26	27	28	29	30	31	1
32	2	3	4	5	6	7	8
33	9	10	11	12	13	14	15
34	16	17	18	19	20	21	22
35	23	24	25	26	27	28	29
36	30	31	1	2	3	4	5

Time

hh: 00 mm: 00 ss: 00

Africa

Bujunbura

SAVE

5.5.4.4. CHANGING THE LANGUAGE

To change the system language, select a language and **press SAVE**.

LANGUAGE SETTINGS

Language

English

Save

Available languages:

- English
- French
- Italian
- Spanish
- Dutch
- German
- Russian

5.5.4.5. ACTIVATE/DEACTIVATE REMOTE CONTROL

To activate/deactivate remote control and enable remote/Internet system access, you need to set this option to ON.

REMOTE CONTROL SETTINGS

Remote control

OFF

When ON, this option enables the connection to the Server:

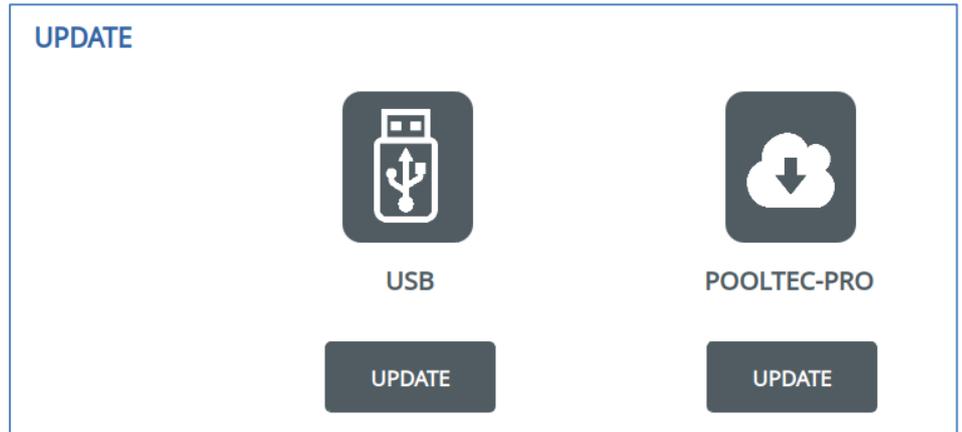
<https://www.pooltec-pro.com/>

Press SAVE to make the modification effective.

5.5.4.6. UPDATE SOFTWARE (DOWNLOAD)

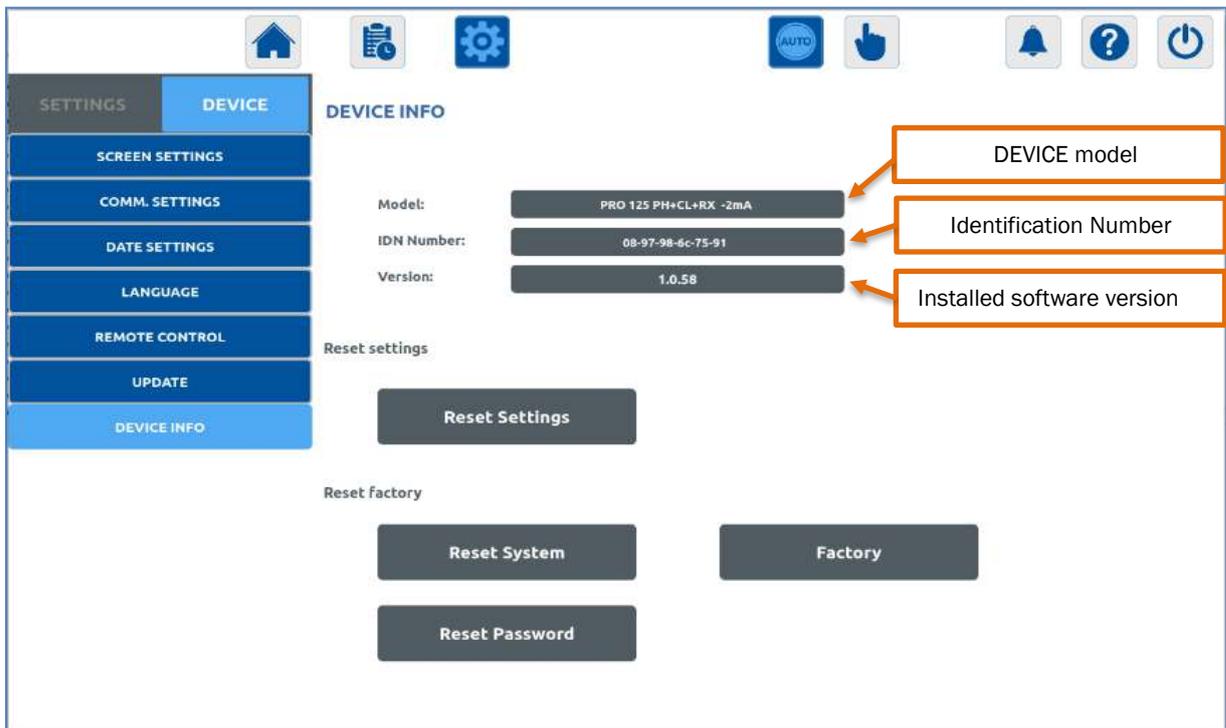
Download and install system updates.
For the correct installation of the software:

- Choose if you want to **DOWNLOAD** the update from USB or from the pooltec-pro.com server.
- The corresponding **UPDATE** button will appear.
- Press **UPDATE**.



The system will reboot with the updated version of the software.

5.5.4.7. DEVICE INFO: SYSTEM MODEL AND SERIAL NUMBER: SOFTWARE VERSION



Inside this page is also possible to perform 3 different Resets:

RESET SETTINGS: press to reset all parameters to default values (see page 58). Probe calibrations, all modification done in CONFIG page and measurement history will not be erased.

RESET SYSTEM: press to reset the system to the initial factory configuration (Probe calibration and all modification done in CONFIG page will be erased, measurement history will not be erased).

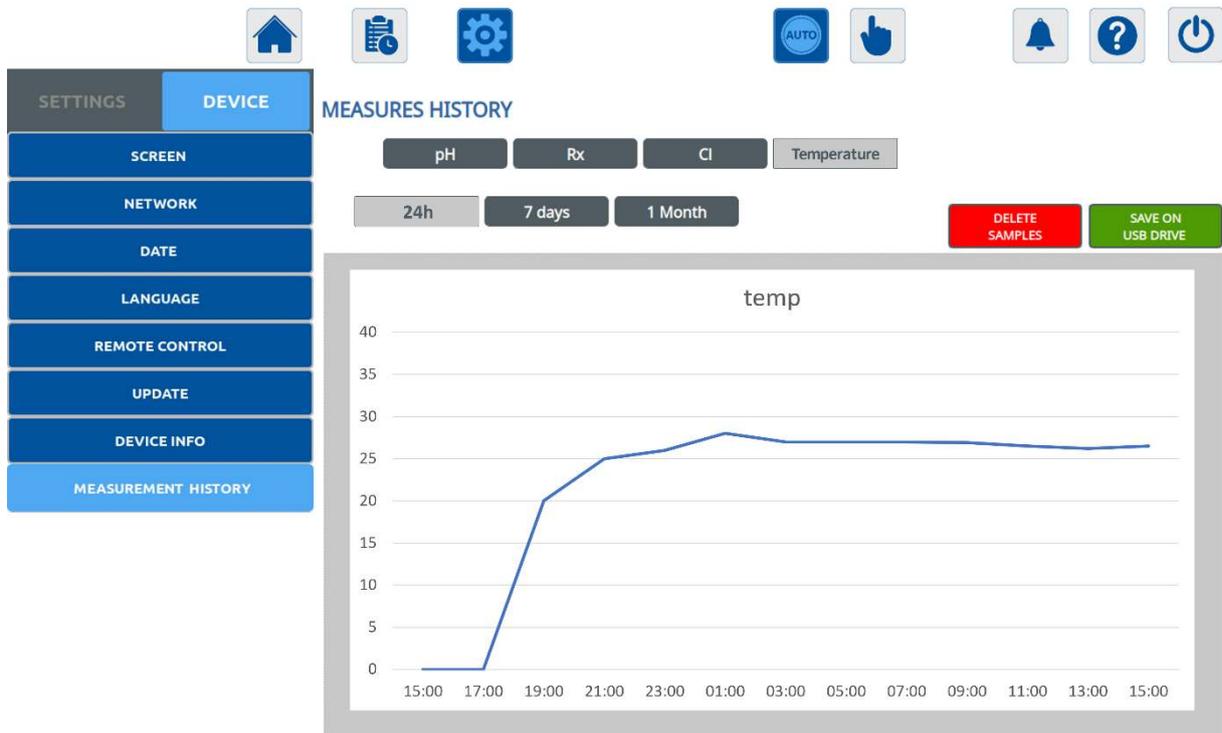
PASSWORD RESET: press to reset the installer password to the factory value. To do this you will need a *Passepartout*: please contact the customer care service.



AFTER A RESET, THE SYSTEM WILL REBOOT

There is also the **FACTORY** configuration, only accessible from the manufacturer.

5.5.4.8. Measurement History



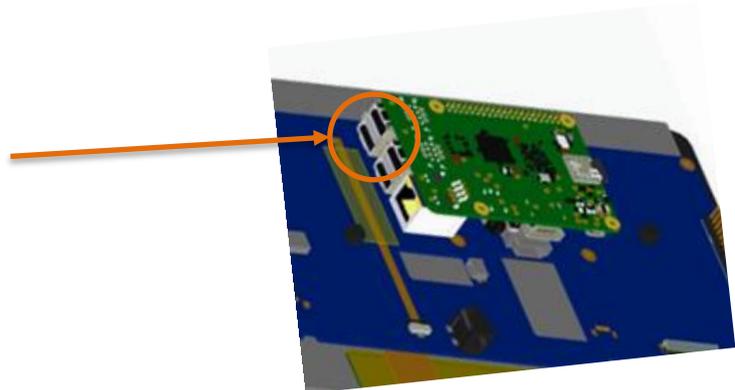
History of measurements recorded every 30 minutes

It is possible to display PH, REDOX, CHLORINE, TEMPERATURE measurement value graphics of:

- **The day.**
- **The week.**
- **The month.**

It is strongly necessary to delete samples at least every 6 months.
Take care to save before in a usb pen drive.

If you connect a **USB DRIVE** in the system, it is also possible to download the recorded measurement values in CSV file format.



NOTE:



AFTER ANY CHANGE INSIDE THE "DATE MENU", ALWAYS DELETE THE RECORDED SAMPLES WITH THE "DELETE SAMPLES" RED BUTTON.

6. POOLTEC PRO

6.1. Registration

To control the device remotely, register it on www.pooltec-pro.com

6.1.1. NEW USER REGISTRATION

Click on **Register as customer**

Fill in all the fields (username, password, e-mail) and then click on **Register**

New Customer Registration

	Username *
	Password *
	Confirm Password *
	E-Mail *
	Confirm E-mail *

* Fields Required

Register

Step 1 Completed

Dear customer,

A code has been sent to your e-mail address. Please follow the instructions in the e-mail to continue the registration process.
If you have not received an e-mail, please check your spam folder.

Wait for the confirmation email sent by postmaster@pooltec-pro.com (check the SPAM folder).

MICRODOS - VERIFICATION CODE

Microdos <postmaster@pooltec-pro.com>

Dear,

Welcome in Microdos.

Please click on the following link in order to continue with the registration.

www.pooltec-pro.com//home_activation.php?registrationCode=

To continue registration click on the link.

Fill in all the fields (name, address, etc.), accept the terms and then click on **Register**.

Customer Registration - Final Step

	Name *
	Address *
	Zip Code *
	City *
	Afghanistan ▼
	Telephone *

The field below is a not-mandatory field. If filled in, you accept the terms of use.

	Installer Code
--	----------------

* Fields Required

I accept [terms of use and privacy policy](#).

Register

6.1.2. NEW DEVICE REGISTRATION

Do the Login by entering your username and password.
Click on **DEVICES** and then on **ADD NEW DEVICE**.
Fill in all fields:

idn: enter the alphanumeric code reported in **DEVICE INFO** (see page 53).

Alias: choose a name to assign to the device.

Serial: enter the numeric code S/N shown on the label.

Alarm Mail: necessary to receive notifications in real time about any alarms in progress

Subsequent data is required only for the purpose of geolocation, to allow the installer to locate the device more quickly.

Welcome.

HomeDevicesAccountManualFAQContactTerms & PrivacyLogout

Discover t

Filter... 🔍

DEVICE

Please insert your new device's data

idn	<input type="text" value="idn"/>
Alias	<input type="text" value="alias"/>
Serial	<input type="text" value="serial"/>

Next information allows emails alarms and device geolocation

Alarm Mail	<input type="text" value="Alarm Email"/>
Alarm Mail 2	<input type="text" value="Second Alarm Email"/>

Country	<input type="text"/>
City	<input type="text" value="City"/>
Address	<input type="text" value="Address"/>
Street Number	<input type="text" value="Street Number"/>
Zipcode	<input type="text" value="zip code"/>

Cancel

OK

MICRODOS
Oxy
Pooltec

ADD NEW DEVICE

Diving systems

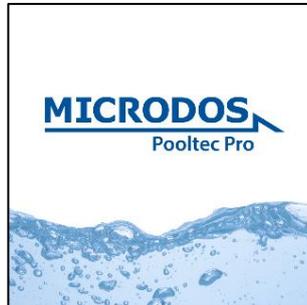
Company Microdos Srl
VAT Number 00969435574
Address Via Maestri del Lavoro, 5 - 02100 Rieti
Email info@microdos.it
Telephone +39 0746 229564

6.2. App

6.2.1. ANDROID APP

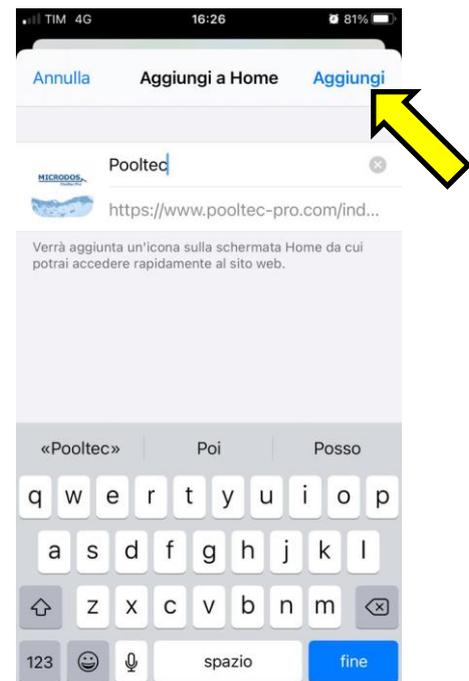
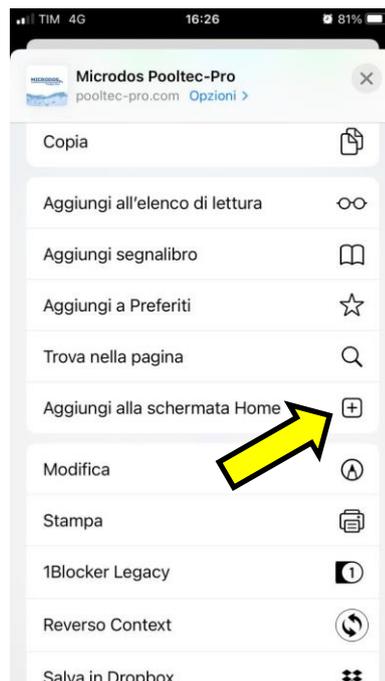
Download the app from the Google Play

https://play.google.com/store/apps/details?id=com.hustay.swing_d6b234b5ea2814363a9b6bd4a236d74d8&gl=IT



6.2.2. IOS APP

To install the App on your iPhone:



- 1) Open Safari
- 2) Go to www.pooltec-pro.com
- 3) Touch 
- 4) Select "Add to Home" 
- 5) Press "Add"



7. STARTING UP

7.1. DEFAULT CONFIGURATION

FUNCTIONING MODE

AUTO/MANUAL	AUTO
-------------	------

PROGRAM SET

AUTOTEMP		OFF
USER PROGRAM		OFF
PUBLIC POOL		OFF
WINTER		OFF
NO PROGRAM		ON

GENERAL SETTINGS:

REPORT	ON
GENERAL FLOW ALARM	OFF
PH PRIORITY	OFF
DECALCIFICATION	OFF
OXY	ON
ION	ON
RX DEPENDENCE	OFF
OXY DELAY	00:00
DOSING PUMPS DELAY	00:00

MEASUREMENTS SETTINGS:

MEASURE	PH	RX	CL
BASIC			
HOME	ON	ON	ON
REGULATION PUMP	OFF	OFF	OFF
0%	7.20PH	730mV	1.30ppm
100%	8.20PH	630mV	0.30ppm
EXPERT			
LOW	6.80PH	250mV	0.30ppm
HIGH	8.40PH	900mV	2.00ppm
OVERDOSE	00:00	00:00	00:00
OVERDOSE LIMITS	00:00	00:00	00:00

TIMER (VALID FOR ALL TYPES):

WEEKDAYS	NO DAYS
ON AT	00:00
OFF AT	00:00

TIMER TYPE:

PUMP	OFF
Px	OFF

MICRODOSE TYPE:

VOLUME MC	0
FOLLOW PUMP PROGRAM	Off
TOTAL DAILY FILTRATION	00:00
Px	OFF

LIGHTS:

LIGHTS	OFF
--------	-----

REPEAT TYPE:

Px	N.O
INPUT/OUTPUT	INPUT
INCLUDE	-

HEAT PUMP:

HEAT PUMP	OFF
MIN TEMPERATURE	26°C
MAX TEMPERATURE	28°C

mA OUTPUTS:

OUTPUT	mA1		mA2	
MODEL CONFIGURATION	pH	pH-RX	pH-CL	pH-RX-CL
BASIC				
MEASURE	PH	RX	CL	CL
4mA	7.20PH	730mV	1.30ppm	1.30ppm
20mA	8.20PH	630mV	0.30ppm	0.30ppm
EXPERT				
AL.mA	0.00mA	0.00mA	0.00mA	0.00mA
OVERDOSE	00:00	00:00	00:00	00:00
OVERDOSE LIMITS	00:00	00:00	00:00	00:00

TEMPERATURE:

°C/°F	°C
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OXY/ION SETTINGS:

	Max current	Polarity Time (min)	Alarm	With Cover
OXY	Refer to model	180	50%	50%
ION	Refer to model	AUTO	50%	50%
Electrode protection				
Electrode protection	OFF			
Limit °C	18			

7.2. RECOMMENDED TIME SCHEDULE FOR PRIVATE/PUBLIC POOLS

For the Oxy system to be efficient, we need to remember that the hours of daily operation depend directly on the water temperature. The higher the temperature, the greater the number of hours of operation required.

For this, we recommend:

Private pools: we recommend the AUTO-TEMP program.

Public pools: we recommend the PUBLIC POOL program (24 hours continuously)

7.3. PROGRAMMING THE RECOMMENDED PH AND RX SET-POINT: CHLORINE SETTINGS

To change the set-points, refer to page 31.

pH ⇨ 7.2

Rx ⇨ 730 mV

Chlorine ⇨ 1.2 ppm

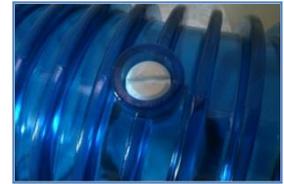
7.4. PUTTING INTO OPERATION, STEP BY STEP

7.4.1. START UP THE HIGH-SPEED PUMP AND TEST COMPONENTS

Open up the three by-pass valves and set Oxy AUTO mode, then shut off the by-pass valve to make the water pass through the chamber.

Water runs through the chamber. Purge all air from the chamber if necessary, by slightly unscrewing the upper caps with a flat-blade screwdriver.

Verify that all components are operating correctly (pumps, probes, lighting, etc.)



7.4.2. CONDITIONING OF THE WATER:

The water must be properly balanced in order to ensure correct disinfection of the water, to prevent any metal precipitation, limescale, staining of any kind, cloudy or green water, etc., in the pool, irrespective of the method used (Chlorine, Bromine, Oxygen, Peroxide; Ozone, etc.) To this end, you need to check the parameters shown below:

TABLE OF RECOMMENDED POOL PARAMETERS

PARAMETER	RECOMMENDED VALUE	INCREASE	DECREASE
Total alkalinity (ppm)	80 - 175	Alkalinity increaser Calcium carbonate (CaCO ₃): 1kg/50m ³ increase 10 ppm.	Alkalinity reducer Hydrochloric acid (HCl) or sodium bisulphite (NaHSO ₃).
TDS (Total dissolved solids) (ppm)	+600	Salt (NaCl): 25-50 Kg per 50m ³	Not necessary
pH	6.8 - 7.6	pH increaser Sodium carbonate (NaCO ₃) or bicarbonate (Na(HCO ₃) ₂)	pH reducer Sulphuric acid (H ₂ SO ₄) is better than hydrochloric acid (HCl)

7.4.3. TEST OF WATER CONDUCTIVITY AND ELECTRODES' ELECTRIC POWER

For the titanium electrodes to function 100%, disinfect thoroughly and suffer minimal wear-and-tear, it is essential that they operate at a voltage of less than or equal to 10v, otherwise their working life will fall to just a few months.

We can see this at the lower portion of the initial screen.

Test the amps and voltage of the titanium electrodes **IN REAL TIME**, with the system in operation. It is necessary to wait a few minutes to obtain a reading.



OXY CURRENT MUST BE 4, 6, 8, 10 or 12 AMPS (DEPENDING ON MODEL)
OXY VOLTAGE MUST ALWAYS BE LESS THAN OR EQUAL TO 10V, IRRESPECTIVE OF AMPS.



If the voltage is $\geq 10V$, top up with common salt (NaCl) directly into the vessel (25-50 Kg for each 50m³ water by volume). Calcium carbonate (CaCO₃) or Sodium bicarbonate (NaHCO₃).



This adjustment is to be carried out only whilst operating and when salinity falls owing to many water replacements, etc... It is important to emphasise that the higher the water's electric conductivity or TDS the better, since in this way the voltage at the titanium electrodes will be lower, and consequently wear-and-tear in use will also be lower. In general, for correct operation of the system, TDSs must be greater than 600 ppm or, which amounts to the same thing, the water's electric conductivity must be greater than 1200 $\mu S/cm$.

The **GUARANTEE** does not cover wear-and-tear to electrodes. It is advisable to measure the voltage weekly (20 seconds). To do this in situations where the voltage at electrodes is greater than 10v, all we need to do is top our sea salt (NaCl) into the water. **EXPLANATION:** In order to reduce the voltage at the titanium electrodes, it is necessary to increase the water's electric conductivity (TDS). To increase the conductivity of the water we can use any of the following mineral salts, uniquely or mixed until we get down to 9 volts the working power of the equipment (Oxy Voltage):

- Common salt (NaCl) It is the most economical and effective but we run the risk of generating some chlorine in some extreme situations of work (excess power with little water, lots of salt, water charged electrically, etc ...) in normal situations this does not happen
- Calcium carbonate (CaCO₃), do not use if the water is hard as it increases the hardness of the water.
- Sodium bicarbonate (NaHCO₃), increases alkalinity but watch out that it does not exceed 200 mg / l.



If the **power is excessive** for the pool's conditions (temperature, water volume, or if there is a change in the conditions of use), it can happen that the pool acquires an unusual odour (odour of disinfectant). In this situation, shut down the system and consult your technician or the manufacturers.

7.4.4. SHOCK CHLORINATION

Always carry out shock chlorination before. We recommend granulated dichlorine in order to obtain a level of 10-15 mg/l Cl quickly (48 hours) if it falls to < 2 mg/l.

Steps to follow:

1. Top up using a sufficient amount in accordance with the instructions on the jar in order to bring the chlorine up to 10 mg/l (ppm). In practice, and purely as a guide, pour 2-3 kg dichlorine for each 50 m³ water.
2. With recirculation in operation, pour half into the skimmers with the remainder distributed in the vessel. It is not necessary to dilute it.
3. Leave filtration running during a full replacement of the water. This will depend on the flow from the pump, but is normally 4-5 hours.
4. Shut down the pump and wait 8 hours (till the next day).
5. If there are algae, rub the walls and floor down with a brush. Place the cleaner and pour away the algae residues and dirt away from the pool (must not pass through the filter, nor run back into the pool).
6. Carry out cleaning of the filter and rinse.

Once chlorine in the pool has fallen to < 2 mg/l, the pool is ready for use.

7.4.5. ADJUST RESIDUAL COPPER (Cu⁺⁺)

Measure the dissolved copper in the water using the colour-graded gauge,

- If we have a copper level between 0.2 and 0.5 ppm, we can start up the OXY system with the programs already set.
- If we have a copper level above 0.7 ppm, we must attempt to reduce it. To do this, we can replace some of the water in the pool without copper, or use a metal-removing agent.



IMPORTANT: This adjustment is to be performed only when starting up and we are going to perform a weekly check at the start, since Oxy takes care of maintaining the water's copper level. The recommended dose (0.2 and 0.5 ppm) does not affect the health since, according to the WHO (World Health Organization), water is potable with up to 2 mg/l copper.

7.5. PARAMETERS TO BE CHECKED FOR CORRECT OPERATION

WHEN THE PUMP STARTS OPERATING AND THE SYSTEM IS STARTED UP MANUALLY OR AUTOMATICALLY, WE MUST VERIFY THE SCREEN'S PARAMETERS.

When all windows are in **green**, everything is in order under the programming and set-points we have customised.



ALL GREEN



ALL CORRECT

Parameters to be checked:

pH
Rx
Cl
Temperature
OxyCurrent
OxyVoltage

IF ANYTHING IS NOT IN ORDER, IT WILL BE HIGHLIGHTED IN YELLOW OR ORANGE, and the panel showing the state of the pool will indicate what the problem is.



8. MAINTENANCE OF THE MICRODOS OXY

8.1. MAINTENANCE AND CONTROL PANEL

From now on, the only thing we need to do is to maintain the system, checking the parameters detailed below:

GENERAL MAINTENANCE

- Replenish/ replace the tanks for products used. You must never allow these to get low.
- Change the electrodes when they exhausted.
- Change the measurement probes for pH and Rx as soon as the calibration frequency increases, or they fail to calibrate (Approximately 2 years under normal conditions of use). Never allow a probe to have no water.
- It is strongly necessary to delete samples of measurements at least every 6 months (DEVICE→HISTORY MEASUREMENTS→DELETE SAMPLES)

DAILY MAINTENANCE

- Ensure that the pump is working, and that no alarms have been triggered (visually in orange).
- Ensure that the water is clean and clear (visually).

WEEKLY MAINTENANCE

- Measure the copper using the drip-measurement kit (Copper kit – not included) during the first month of operation, and once a month there after.

MONTHLY MAINTENANCE

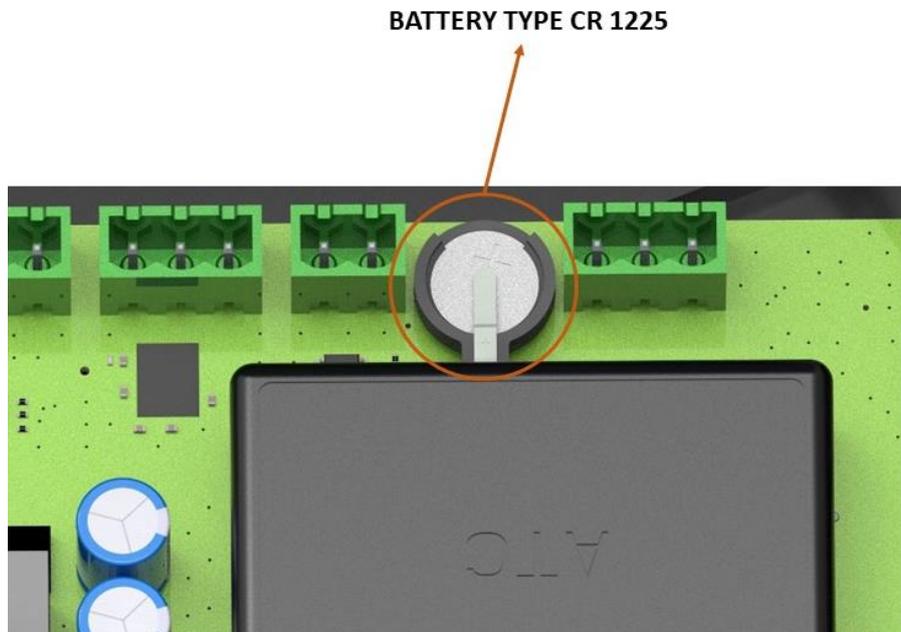
- Check the voltage and amps of the electrodes (Initial Microdos Oxy screen; $\leq 10V$).
- Check the pH in the vessel at least once a month (using colour-graded or digital gauges).
- If the water is hard, check that titanium electrodes have no white lime incrustations. Clean if need be, but without removing the coating that covers the electrodes.
- Measure the copper.

BI-MONTHLY MAINTENANCE

- Calibrate the pH and Rx probes, or whenever the vessel measurement does not agree with what is indicated on the control unit by ± 0.2 pH.
- Check the silicon injection pipe, product pipes and injectors of the dosing pump(s).

8.2. BATTERY REPLACEMENT

The device has a buffer battery inside to keep the date and time in memory when it is not powered. To replace the battery it is necessary to open the cover and access the internal compartment.



9. INCOMPATIBILITIES AND POSSIBLE FAULTS

Microdos OXY is fully compatible with any other treatment apart from chlorine, bromine, active oxygen, etc...



WARNING: In the case of pools with a liner covering, special care must be taken to ensure pH does not exceed 7.6 since, above that level, copper will begin to precipitate and, given the properties of the liner, the pool may stain blue: such stains are difficult to eliminate. There will be no problem maintaining pH below 7.6 with any other covering material.

10. PROBLEMS AND SOLUTIONS

10.1. VOLTAGE HAS RISEN > 10V AND THE TITANIUM ELECTRODES HAVE WHITE LIMESCALE STAINS

Disconnect the cables, unscrew the electrode base from the chamber and clean it

10.2. VOLTAGE HAS RISEN > 10V, BUT THE TITANIUM ELECTRODES ARE CLEAN

Add Common Salt, Calcium carbonate (CaCO_3), do not use if the water is hard as it increases the hardness of the water. Sodium bicarbonate (NaHCO_3), increases alkalinity but watch out that it does not exceed 200 mg / l.

10.3. SCREEN DOES NOT START UP

Check the electric connection to the mains (110-240Vac) and wait a few minutes.

10.4. OXY CURRENT IS 0Amp AND THE PUMP HAS STARTED ITS HOURS OF OPERATION

There is a loose cable, which is failing to supply power to the electrodes. Check the cables and electrode plugs.

10.5. BLUE OR BLUEY-GREEN STAINS IN THE POOL

There is too much copper. With our technology this can happen only as a result of faulty installation, programming or control. If we notice blue or bluey-green stains on the ceramic tiles or liner, there may be too much copper in the water, or an increase in pH and temperature that has not been monitored. The solution:

- 1.- Measure the copper in the water several times and at various locations. If there is > 0.7 ppm copper, we need to identify and remedy the problem, which may be caused by:
 - Poor installation: Cables changed (OXY - ION)
 - Faulty programming: Too many minutes each day
 - Lack of proper maintenance
- 2.- Switch off the copper function by the program.
- 3.- Lower the level of copper in the pool. This can be done in two ways:
 - Replace some or all of the water in the pool, carry out cleaning, etc. Check and take daily measurement readings.
 - Empty out the pool and clean ceramic tiles with acid.
 - Use a metal flocculant or a special copper remover.

A copper level of up to 2 ppm is not harmful to the health, but can cause staining.

10.6. POOL IS CLOUDY / GREEN, OR ALGAE APPEAR.

This is brought about through a lack of disinfection, which can occur from various causes. We need to perform a check of the system, electrodes, voltage, etc. To verify that everything is in order.

If the system itself is in order, there may be one or more causes:

- Hours of treatment are insufficient for the water temperature. The hours of treatment must be continuous.
- Alkalinity is low: correct parameters are between 80 and 175 mg/l.
- Poor recirculation by the pump and 'dead' areas
- Lack of copper
- Water is stale and/or out of balance.
- In the event that algae prove to be copper-resistant, we advise using a chlorine-free algicide for pools that is based on polymers.
- Once the problem has been identified, carry out rapid chlorination and remedy the problem.

11. HIBERNATION

Better to deactivate Ti oxidation below 16 °C

11.1 PRODUCTION OF HYDROXYL RADICALS AND WATER TEMPERATURE

As you know, production varies according to the temperature of the water.

NB: The electrical conductivity of the water in a salt-laden pool increases by 2% per additional degree of temperature. The production of OH- thus increases in the same proportion.

Example: if the pool water goes from 15 °C to 28 °C, the production of OH- will increase by 26% (28 °C - 15 °C = 13 °C x 2% = 26%)... which is not negligible!

The problem is that the lowering of the temperature, and therefore the conductivity of the water, causes deterioration of electrode coating.

11.2 TIPS FOR THE WINTER SEASON

It is therefore recommended to always stop the production of the hydrolyser during the winter. The cell can remain in place but not powered, even if the filtration is continued a few hours a day, the pH control continues to work to control the acidity of the water.

Indeed, the pH should be monitored very frequently because the soda, generated by the hydrolysis, raises the pH slightly. (This is why it is recommended the hydrolyser be connected to an automatic pH regulator.)

At the same time, it is necessary to monitor the total alkalinity titration (alkalinity of the water) because it conditions the maintenance of a balanced pH.