This manual contains safety information that if ignored can endanger life or result in serious injury. They are indicated by this icon.

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

OPERATING INSTRUCTIONS FOR "MTOWER PLUS" INSTRUMENT

CD/PH/CL Version
CD/PH/PS Version

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

Read Carefully !

ENGLISH Version

Descrizione Prodotto *Product Description*	Sistema per torri evaporative, serie MTOWER - MTOWER 2HC - MTOUER PLUS *System for evaporative tower, MTOWER - MTOWER 2HC - MTOUER PLUS - series*
Codici Identificativi Prodotto (i simboli "_" completano il codice del prodotto in base alla configurazione delle varianti) *Product Identification Codes* *(the "_" symbols complete the product code based on the configuration of the variants)*	**MTOWERN _____**

GENERAL SAFETY GUIDELINES

Danger!

In emergencies the instrument should be switched off immediately! Disconnect the power cable from the power supply!

When installing always observe local regulations!

Manufacturer is not liable for any unauthorized use or misuse of this product that may cause injury, damage to persons and / or materials.

Caution!

Instrument must be accessible at all times for both operating and servicing. Access must not be obstructed in any way!

Feeder should be interlocked with a no-flow protection device to automatically shut-off the pumps when there is no flow!

Pumps and accessories must be serviced and repaired by qualified and authorized personnel only!

Always discharge the liquid end before servicing the instrument!

Empty and rinse the liquid end before work on a pump which has been used with hazardous or unknown chemicals!

Always read chemical safety datasheet!

Always wear protective clothing when handling hazardous or unknown chemicals!

Instrument must be operated / serviced by trained technicians only!

All connection operations must be performed while the instrument is not connected to main supply!

Introduction.

The “MTOWER PLUS” is a fully featured cooling towers controller with two-way biocide options and inhibitor / bleed control.Cooling towers are heat removal devices used to transfer process waste heat to the atmosphere. Cooling towers may either use the evaporation of water to remove process heat and cool the working fluid to near the wet-bulb air temperature or rely solely on air to cool the working fluid to near the dry-bulb air temperature. Common applications include cooling the circulating water used in oil refineries, chemical plants, power plants and building cooling

All information is provided through a large backlit LCD display (240x64). Using a revolutionary wheel control the instrument can be easily programmed. “MTOWER PLUS” is housed in an IP65 plastic box.
Measures are: L325 x H235 x D125 (including wheel and connectors).

Main features of “MTOWER PLUS” are:

BLEED

INHIBITOR with 5 working modes
(Feed&Bleed, Feed&Bleed Percentual , PercentalTime, WaterMeter, WaterMeter PPM)

BIOCIDE with weekly program

Conductivity, pH and Chlorine Meter with Proportional and Digital outputs

The wheel.

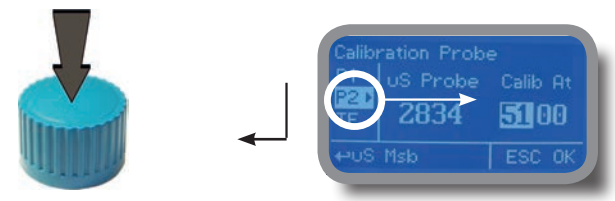
Located in the upper right side of “MTOWER PLUS” there is a wheel used to control the instrument.
Wheel can be rotated in both directions to scroll over menus and / or pressed to confirm highlighted selection / value

- Edit single field submenu by pressing wheel twice.

- When in main screen keep wheel pressed to switch “OFF” instrument. Repeat procedure to switch “ON” instrument.

Rotate the wheel to cycle-loop through all available options.

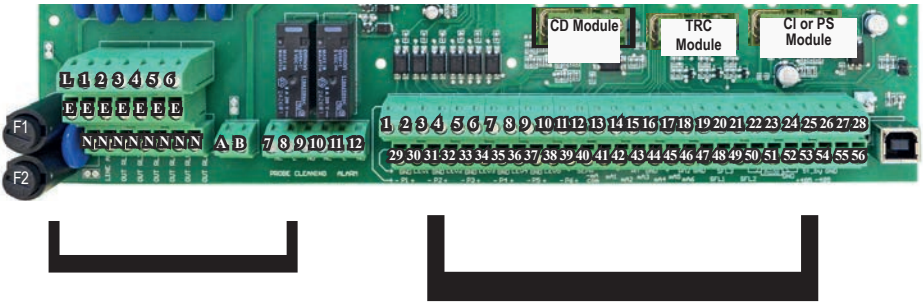
Clockwise or Counterclockwise.



Press wheel to move on submenu for selected option.

Mainboard Connections.

Unplug instrument from main power supply then perform connections to probes and / or selected outputs by following the above picture. **For easy understanding board has been divided into two parts: Power connections and I/O connections. For Br probe installation see page 37.**



Power Connections

I/O Connections

Power Connections:

F1: General fuse (6.3AT)
F2: Circuit fuse (3.15AT)

A-B: 230Vac Out (fuse protected)

Main power supply (from 90VAC to 265VAC):
L (live), E (earth), N(neutral)

Setpoint Outputs
(voltage output is the same as for main power supply):

1 - E - N	(F1 fuse protected) D1 pH
2 - E - N	(F1 fuse protected) Inhibitor
3 - E - N	(F1 fuse protected) D1 Cl (Biocide 1)
4 - E - N	(F1 fuse protected) Biocide 2
5 - E - N	(F1 fuse protected) Pre-biocide 1
6 - E - N	(F1 fuse protected) Pre-biocide 2

Bleed Valve (Free Voltage Version): 7(N.C.), 8(C), 9(N.O.) Free Voltage contact

General Alarm output: 10(N.C.), 11(C), 12(N.O.) Free Voltage contact

Warning: Connections must be performed by qualified and trained personnel only.

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

I/O Connections:

	STANDBY OUT (1-6)			PROPORTIONAL OUT (7-12)		
Proportional / Standby Outputs:	1: - D1 Cl (Biocide1) 2 + D1 Cl (Biocide1)	3: - Biocide2 4: + Biocide2	5: - Pre-biocide1 6: + Pre-biocide1	7: - (Cl) 8: + (Cl)	9: - pH 10: + pH	11: - Inhibitor 12: + Inhibitor

mA outputs (500 Ohm max resistive load):

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

13: Common
14: mA output 1 (conductivity)
15: mA output 2 (temperature)
16: mA output 3 (pH)
17: mA output 4 (Cl)

GND shared!

RS485:

26: + Signal RS485 (A)
27: - Signal RS485 (B)

GNS shared!

Tank Level inputs:

29 (-) ; 30 (+) Cl Level
31 (-) ; 32 (+) Biocide 2 Level
33 (-) ; 34 (+) Pre-biocide 1 Level
35(-) ; 36(+) Pre-biocide 2 Level
37 (-) ; 38 (+) Inhibitor Level
54 (+) ; 55(-) pH Level

(-) GND shared

OPTIONS

FLOW sensor (mod. "SEPR") input:

39(+ Brown) ; 40(Black) ; 41(- Blue)
41 shortcut with block n.37

MANIFOLD input:

39(White) ; 40(Black)
41 shortcut with block n.37

OPTIONS

(Hall effect) pulse sender water meter (makeup water): 42(+12VDC) ; 43(INPUT) ; 44(GND)
(Contact) Pulse sender water meter (makeup water): 43(INPUT) ; 44(GND)

OPTIONS

(Hall effect) Pulse sender water meter (bleed water): 45(+12VDC) ; 46(INPUT) ; 47(GND)
(Contact) Pulse sender water meter (bleed water): 46(INPUT) ; 47(GND)

Temperature Probe input (mod. "ETEPT"):

50(green) ; 51(brown) ; 52(white) ; 53(yellow)
(remove resistance before to install probe)

Cooling tower basic knowledge.

What is a (wet, atmospheric) cooling tower?

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

Common applications for cooling towers are providing cooled water for air-conditioning, manufacturing and electric power generation. The smallest cooling towers are designed to handle water streams of only a few gallons of water per minute supplied in small pipes like those might see in a residence, while the largest cool hundreds of thousands of gallons per minute supplied in pipes as much as 15 feet (about 5 meters) in diameter on a large power plant.

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

A direct, or open circuit cooling tower is an enclosed structure with internal means to distribute the warm water fed to it over a labyrinth-like packing or “fill.” The fill provides a vastly expanded air-water interface for heating of the air and evaporation to take place. The water is cooled as it descends through the fill by gravity while in direct contact with air that passes over it. The cooled water is then collected in a cold water basin below the fill from which it is pumped back through the process to absorb more heat. The heated and moisture laden air leaving the fill is discharged to the atmosphere at a point remote enough from the air inlets to prevent its being drawn back into the cooling tower.

The fill may consist of multiple, mainly vertical, wetted surfaces upon which a thin film of water spreads (film fill), or several levels of horizontal splash elements which create a cascade of many small droplets that have a large combined surface area (splash fill)

An indirect, or closed circuit cooling tower involves no direct contact of the air and the fluid, usually water or a glycol mixture, being cooled. Unlike the open cooling tower, the indirect cooling tower has two separate fluid circuits. One is an external circuit in which water is recirculated on the outside of the second circuit, which is tube bundles (closed coils) which are connected to the process for the hot fluid being cooled and returned in a closed circuit. Air is drawn through the recirculating water cascading over the outside of the hot tubes, providing evaporative cooling similar to an open cooling tower. In operation the heat flows from the internal fluid circuit, through the tube walls of the coils, to the external circuit and then by heating of the air and evaporation of some of the water, to the atmosphere. Operation of the indirect cooling towers is therefore very similar to the open cooling tower with one exception. The process fluid being cooled is contained in a “closed” circuit and is not directly exposed to the atmosphere or the recirculated external water.

In a counter-flow cooling tower air travels upward through the fill or tube bundles, opposite to the downward motion of the water. In a cross-flow cooling tower air moves horizontally through the fill as the water moves downwar

Cooling towers are also characterized by the means by which air is moved. Mechanical-draft cooling towers rely on power-driven fans to draw or force the air through the tower. Natural-draft cooling towers use the buoyancy of the exhaust air rising in a tall chimney to provide the draft. A fan-assisted natural-draft cooling tower employs mechanical draft to augment the buoyancy effect. Many early cooling towers relied only on prevailing wind to generate the draft of air.

Cooling tower basic knowledge.

If cooled water is returned from the cooling tower to be reused, some water must be added to replace, or make-up, the portion of the flow that evaporates. Because evaporation consists of pure water, the concentration of dissolved minerals and other solids in circulating water will tend to increase unless some means of dissolved-solids control, such as blow-down, is provided. Some water is also lost by droplets being carried out with the exhaust air (drift), but this is typically reduced to a very small amount by installing baffle-like devices, called drift eliminators, to collect the droplets. The make-up amount must equal the total of the evaporation, blow-down, drift, and other water losses such as wind blowout and leakage, to maintain a steady water level.

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

Drift - Water droplets that are carried out of the cooling tower with the exhaust air. Drift droplets have the same concentration of impurities as the water entering the tower. The drift rate is typically reduced by employing baffle-like devices, called drift eliminators, through which the air must travel after leaving the fill and spray zones of the towe .

Blow-out - Water droplets blown out of the cooling tower by wind, generally at the air inlet openings. Water may also be lost, in the absence of wind, through splashing or misting. Devices such as wind screens, louvers, splash deflectors and water diverters are used to limit these losses.

Plume - The stream of saturated exhaust air leaving the cooling tower. The plume is visible when water vapor it contains condenses in contact with cooler ambient air, like the saturated air in one's breath fogs on a cold day. Under certain conditions, a cooling tower plume may present fogging or icing hazards to its surroundings. Note that the water evaporated in the cooling process is "pure" water, in contrast to the very small percentage of drift droplets or water blown out of the air inlets.

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

Leaching - The loss of wood preservative chemicals by the washing action of the water flowing through a wood structure cooling tower.

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

“MTOWER PLUS” basic treatments.

“MTOWER PLUS” basically operates three main treatments to grant cooling efficiency: inhibito , bleed and biocide.

What is the purpose of inhibitor ?

Inhibitor is a chemical compound that, when added to water, decreases the corrosion rate of a metal or an alloy. It prevents cooling tower plant to mantain hoses efficiency in water circulating system

To set:

Working Mode

To setup and configure this function see page 22

What does it mean bleed ?

A method for controlling the amount and concentration of make-up water and chemicals introduced into the recirculating water of a cooling tower system. A float operated make-up valve controls the addition of make-up water to the tower. As make-up water is added to the tower a vacuum is produced at an injector valve which draws chemicals from a chemical holding tank into the make-up water, thereby allowing precise control of the chemical concentration in the make-up liquid. Further, a bleed valve is provided which is responsive to the vacuum produced at the injector valve and bleeds a portion of the recirculating water to waste.

To set:

Setpoint
Dead band
Time Limit

To setup and configure this function see page 24

What is a biocide ?

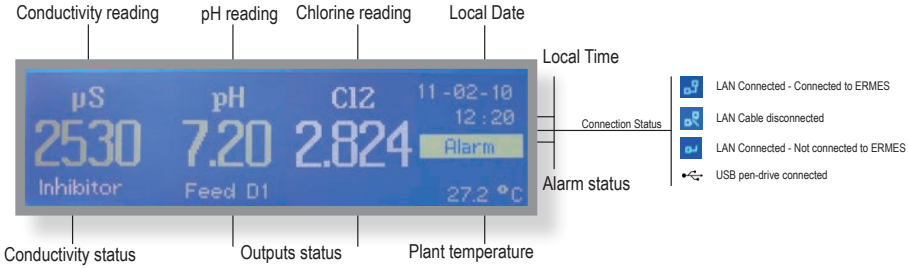
A biocide is a chemical substance capable of killing living organisms, usually in a selective way. They prevent the fouling of cooling tower water. Cooling tower users frequently apply biocides to the circulating cooling water to control growth of microorganisms, algae, and macroorganisms. Another very important reason for using biocides in cooling towers is to prevent the growth of Legionella, including species that cause legionellosis or Legionnaires’ disease, most notably L. pneumophila. “MTOWER PLUS” can be set to perform also a pre-biocide (biocide activator or pre biocide treatment) activity.

To set:

Pre-bleed
Pre-biocide
Biocide
Lockout
Week

To setup and configure this function see page 23

“MTOWER PLUS” main screen.



“MTOWER PLUS” main display shows more information about plant proper functioning. By rotating wheel clockwise the instrument will show: “Status Output”, “Status Totalizer”, “Status Level”, “Status Alarm”, “Status Biocide”.
See above table for messages explanation.

“MTOWER PLUS” Operating Status Messages.

Conductivity status	*Message Explanation*	*Action Required*
“INHIBITOR”	INHIBITOR mode in progress. Ouput 2-E-N active **Corrosion inhibitor dosage in progress.**	No action required.
“BLEED hh:mm”	BLEED hh:mm mode in progress. Bleed Valve active **Restoring conductivity.**	No action required.
“PRE BLEED”	PRE BLEED mode in progress. Bleed Valve active **Water discharge before dosing biocide.**	No action required.
“PRE BIOCIDE 1” “PRE BIOCIDE 2”	PRE BIOCIDE 1 or 2 in progress Output 5-E-N or 6-E-N active **Biocide activator dosage in progress.**	No action required.
“BIOCIDE 2”	BIOCIDE 2 in progress Output 4-E-N active **Killing dangerous organism in progress.**	No action required.
“LOCKOUT 1” “LOCKOUT 2”	LOCKOUT 1 or 2 in progress Bleed Valve disabled **Bleed mode locked after biocide dosage.**	No action required.
“BLEED TIMEOUT”	Pre-bleed activity time exceeded	Check biocide 1 or 2 menu

Alarm status	*Message Explanation*	*Action Required*
“ALARM”	ALARM Output 10-11-12 active (see contact mode)	Check alarm by rotating wheel in main screen until to show “Status Alarm” Once alarm status is fixed the instrument will resume interrputed activities.

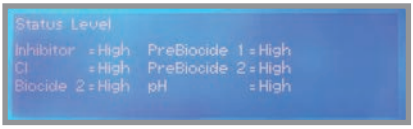
Outputs status	*Message Explanation*	*Action Required*
“FEED D1”	D1 output active	No action required.
“FEED P1”	P1 Proportional output active	No action required.

“MTOWER PLUS” status screen.

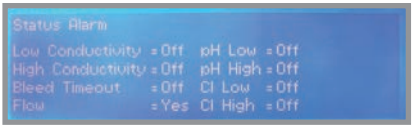
From main screen rotate wheel (one click - one menu) clockwise for more information about instrument functioning. For more information rotate the wheel clockwise. The instrument will show: “Status Output”, “Status Totalizer”, “Status Level”, “Status Alarm”, “Status Biocide”, “Service” (For ERMES Communication).

Status Output
PreBiocide 1 or 2 : Pre Biocide 1 or 2 status
Biocide 1 or 2 : Biocide 1 or 2 status
PreBleed: Pre Bleed status
Inhibitor: Inhibitor status
Bleed: Output status
Alarm: Output status

Status Totalizer (1unit = 1lt)
Water Meter Input: Main water input totalizer
Water Meter Bleed: Bleed water input totalizer
Water Meter Delta: Plant water totalizer (“delta” between WMI and WMB)



Status Level
PreBiocide 1 or 2 : Pre Biocide 1 or 2 tank level
Biocide 1 or 2 : Biocide 1 or 2 tank level
Inhibitor: Inhibitor tank level
Cl: product level for Chlorine (HIGH or LOW)
pH: product level for pH (HIGH or LOW)



Status Alarm
High conductivity: HIGH Conductivity Alarm
Low conductivity: LOW Conductivity Alarm
pH High: HIGH pH Alarm
pH Low: LOW pH Alarm
Bleed Timeout: Bleed Timeout Alarm
Flow: No / YES Flow Alarm
Cl High: high Chlorine reading alarm
Cl Low: low Chlorine reading alarm
Off: *alarm not active* - ***ON:*** *alarm active*

Status Biocide
Week: Week number
Day: dosing day
Next: Next dosing activity

Connection Code for ERMES (through USB cable)

Connection Code for ERMES (through LAN cable)

“MTOWER PLUS” basic settings.

Basic settings are: PASSCODEs, Time & Date, International Units.
Standard settings are: Probes calibration and operating modes (bleed - inhibitor - biocide).
Advanced settings are: Flow meter, Alarm and Option menu.

All these three settings must be set in order to properly operate the instrument.

PASSCODE for “Setup” and “Probe” menu access.

To grant access into “Setup” menu press the wheel from main screen, choose “Setup” and enter the PASSCODE.
If this is the first time here then the PASSCODE is 0000 (factory preset). Press wheel 5 times to grant access.
Otherwise press the wheel 1 time and enter the PASSCODE. Numbers can be selected by rotating the wheel.

To set a new PASSCODE choose “PASSCODE ” from “Setup” menu and enter a four numbers code. Click on “EXIT” and choose “YES” to save request. The new PASSCODE is now ready.

To change default PASSCODE for “PROBE” menu, repeat procedure once into that submenu.

Note: both the PASSCODEs are independent!

Lost PASSCODE ?
Please dont’ forget the PASSCODE (if changed). In the unfortunate event, please call your local distributor for unlocking procedure. There is no way for you to recover lost PASSCODE.

Time & Date setup.

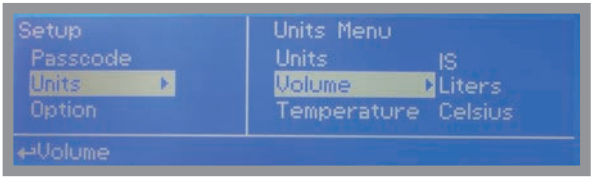
To grant access into “Setup” menu press the wheel from main screen, choose “Setup” and enter the PASSCODE. Move on “CLOCK” and press the wheel.

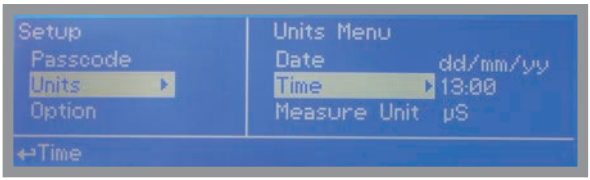
To end procedure move cursor on “EXIT” and press wheel to proceed to “Save” request screen. Move wheel on “YES” to save or “NO” to discard changes.

WARNING: when programming instrument (BIOCIDE) check into STATUS menu that DATE is correct, otherwise dosing accuracy could be affected. In this case set the correct date and reset instrument (default settings).

Units setup.

To grant access into “Setup” menu press the wheel from main screen, choose “Setup” and enter the PASSCODE. Move on “UNITS” and press the wheel.





Once into submenu press wheel twice on “UNITS” and rotate to choose between “US” unit standard or “IS” international unit standard. See table for differences.

EUROPE IS (International Standard)	USA
Date (DD/MM/YY)	Date (MM/DD/YY)
Time 24h	Time AM / PM
°C Celsius	°F Farhenheit
Liters	Gallons

To change conductivity reading scale from uS to PPM move wheel on “MEASURE UNIT” and press it twice.

To end procedure move cursor on “EXIT” and press wheel to proceed to “Save” request screen. Move wheel on “YES” to save or “NO” to discard changes.

“MTOWER PLUS” standard settings.

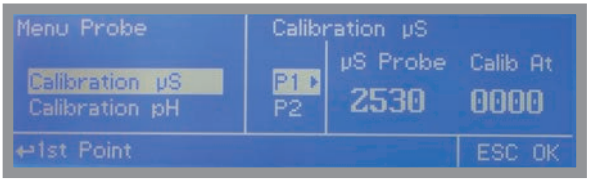
Standard settings are: Probes calibration and operating modes (bleed - inhibitor - biocide).

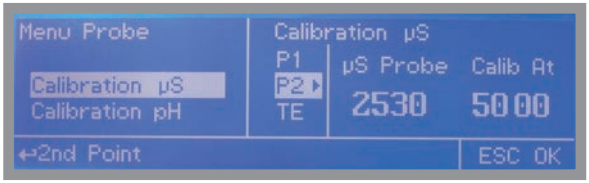
PASSCODE for “Probe” menu access.

To grant access into “Probe” menu press the wheel from main screen, choose “Setup” and enter the PASSCODE. If this is the first time here then the PASSCODE is 0000 (factory preset). Press wheel 5 times to grant access. Otherwise press the wheel 1 time and enter the PASSCODE. Numbers can be selected by rotating the wheel.

“Calibration uS” menu.

“Calibration uS” menu includes conductivity calibration , temperature compensation and manual or automatic temperature compensation. **Avant de commencer l’étalonnage choisir l’échelle de la sonde en utilisant l’option FS (Full Scale)**





Conductivity calibration procedure involves a zero calibration (P1) and a 2nd calibration point (P2) that requires a buffer solution with value near working range. Furthermore TE (Temperature) and CA (Automatic Compensation) must be set. Note: This procedure assumes that instrument is correctly installed and configured, connected to a working probe. Calibrate using plant’s temperature otherwise unattended results might occur.

P1 & P2

During this procedure probe must be dry and clean and not installed in plant. Move wheel on “P1” then press wheel, move cursor on “OK” and press wheel again. Move wheel on “P2” then press wheel to enter into second point calibration submenu. Prepare buffer solution and dip probe’s sensor on it. Wait until reading value is stable and according to buffer solution value move wheel until it is the same on display (“uS default” field). End procedure moving cursor on “OK”

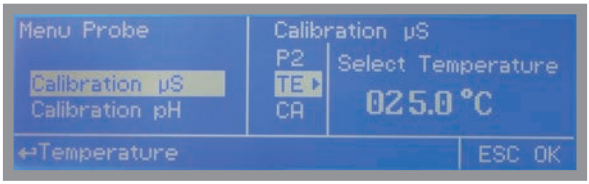
TE & CA

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

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

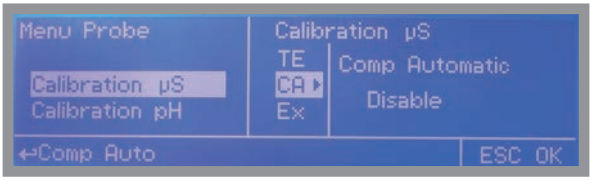
Samples alphas (a) are listed in the table above. To determine that “a” of other solutions, simply measure conductivity at a range of temperatures and graChlorine the change in conductivity versus the change in temperature.

“MTOWER PLUS” has either fixed or adjustable automatic temperature compensation referenced to a standard temperature of 25°C. For **manual temperature compensation** move cursor on “TE”, press wheel and adjust manual temperature compensation.



Move cursor on “OK” and press wheel again. Move cursor on “CA”, press wheel and choose DISABLE for manual temperature compensation.

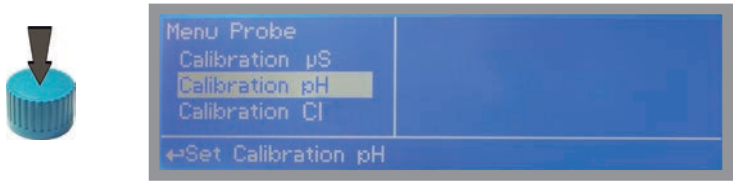
Otherwise for **automatic temperature compensation** choose “ENABLE” and see “COEFF TEMP” in “OPTIONS” menu to set % Alpha value.



To end procedure move cursor on “EXIT” and press wheel to proceed to “Save” request screen. Move wheel on “YES” to save or “NO” to discard changes.

“Calibration pH” menu.

pH calibration procedure involves two calibration points and it requires two buffer solutions. Default buffer solutions are pH 4.00 and pH 7.00. pH reading value can be also 30°C temperature compensated from “CA” field. From “Probe” menu choose “Calibration pH”.



In the following example instrument will calibrate pH using default buffer solutions values.

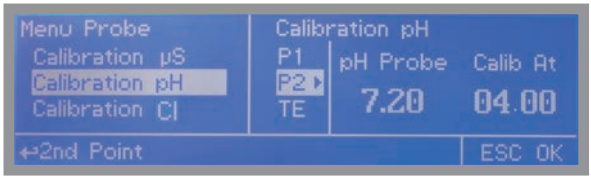
Note: this procedure assumes that instrument is correctly configured and a working pH probe connected. Otherwise unattended results might occurr.

Calib 1st Point.

Once into “pH Calibration” menu move wheel on “P1” then press wheel to enter into first point calibration submenu. Prepare 7.00pH buffer solution and dip probe’s sensor on it. Wait until reading value is stable and according to buffer solution value move wheel until it is the same on display (“Cal. at” field). Default value is 7.00pH. To end procedure move cursor on “OK” and press wheel to proceed to next step.

Note: buffer solution value may change if environment temperature it’s different than 20°C. Read solution’s label for more information. According to this occurrence “pH Default” must be changed.

“Calibration pH” menu.



pH4

Calib 2nd Point.

Move wheel on “P2” then press wheel to enter into second point calibration submenu. Prepare 4.00pH buffer solution and dip probe’s sensor on it. Wait until reading value is stable and according to buffer solution value move wheel until it is the same on display (“Cal. at” field). Default value is 4.00pH.

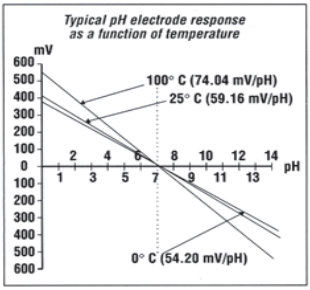
To end procedure rotate cursor on “OK” and move on TE submenu.

Note: buffer solution value may change if environment temperature it’s different than 20°C. Read solution’s label for more information. According to this occurrence “pH Default” must be changed.

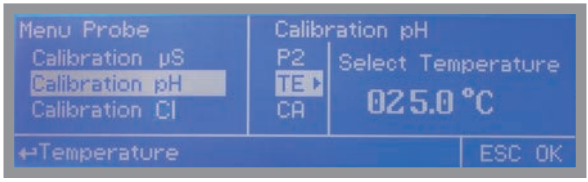
“Calibration pH” menu.

TE & CA

pH measurements are temperature dependent. The degree to which temperature affects conductivity varies from solution to solution and can be calculated using the following graphic.



“MTOWER plus” has either fixed or adjustable automatic temperature compensation referenced to a standard temperature of 25°C. For **manual temperature compensation** move cursor on “TE”, press wheel and adjust manual temperature compensation.



Move cursor on “OK” and press wheel again. Move cursor on “CA”, press wheel and choose DISABLE for manual temperature compensation.

Otherwise for **automatic temperature compensation** choose “ENABLE”

To end procedure move cursor on “EX” and press wheel to proceed to “Save” request screen. Move wheel on “YES” to save or “NO” to discard changes.

“Calibration Cl” menu.

Cl calibration procedure involves probe’s selection, Zero and 2nd Point calibration.

This procedure assumes that instrument is correctly configured and a working Chlorine probe connected and installed on system. Measurement must be performed using plant water.
Otherwise unattended results may occurr.

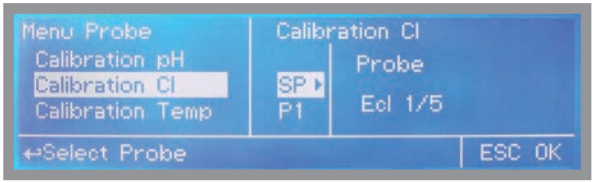
Select Probe.

Once into “Calibration Cl” menu move on “SP” (select probe) then press wheel to enter into probe list. According to system choose most suitable probe by moving the wheel. Then press to confirm

Probe	Scale (mg/l)
ECL 1/2	2.000mg/l Cl_2
ECL 1/5	5.00mg/l Cl_2
ECL 1/20	20.00mg/l Cl_2
ECL 1/200	200.0mg/l Cl_2
ECL 2/2	2.000mg/l Cl_2O_2
ECL 2/20	20.00mg/l Cl_2O_2
ECL 3/2	2.000mg/l Cl_2
ECL 3/10	10.00mg/l Cl_2
ECL4,5,6,7	10.00mg/l Cl_2 or Br
ECL 17/10	10.00mg/l Cl_2O_2
ECL 18/10	10.00 mg/l Cl_2

P1 & P2

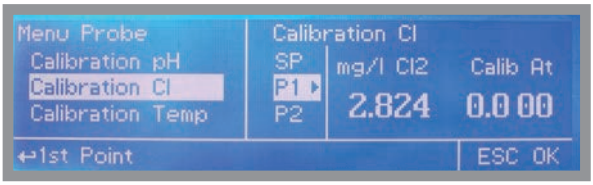
Cl calibration procedure involves probe's selection, Zero (P1) and 2nd Point (P2) calibration. From "Menu Calibration" choose "Cl probe".



Note: This procedure assumes that instrument is correctly configured and a working Chlorine probe connected and installed on system. Measurement must be performed using plant water. Otherwise unattended results may occurr.

Calib Zero (P1).

Once into "Cl calibration" menu move on "P1" then press wheel to enter into calibration mode. For a correct system calibration proceed as follows.

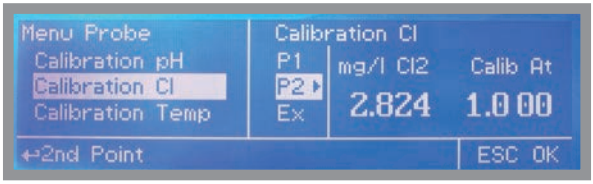


Carbon Filter System

- install an "activated carbon filter" prior to probe s holder.
- let system water flow into probe holder for about 30 minutes
- press wheel (cursor must be on "Cal.at"). Remove filte .

Calib 2nd point (P2).

Now move on "P2" then press wheel to enter into calibration mode. For a correct system calibration use a Photometer or a DPD device to read chlorine on system. Enter value using the wheel then move cursor on "OK". Now press the wheel.



Photometer

To end procedure move cursor on "OK" and press wheel to proceed to "Save" request screen. Move wheel on "YES" to save or "NO" to discard changes. If an error occurred during calibration procedure then the instrument will show an error message and will ask to proceed to a new calibration, cancel current operation or restore default settings.

“Calibration Temp” menu.

To calibrate probe’s temperature enter into “Calibration Temp” menu. A professional thermometer is required to obtain a reliable calibration. From “Menu Calibration” choose “Calibration Temp”.

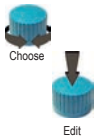
Note: This procedure assumes that instrument is correctly installed and configured, connected to a working probe. Calibrate using plant’s temperature otherwise unattended results may occur.

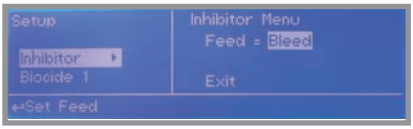
Using an external thermometer read actual temperature and edit related field “Calib. at”. Confirm by pressing wheel

To end procedure move cursor on “EXIT” and press wheel to proceed to “Save” request screen. Move wheel on “YES” to save or “NO” to discard changes.

“Inhibitor” menu.

Inhibitor function can operate in 5 feeding modes. Press wheel and rotate to choose most suitable mode. “WM PPM” submenu can be edited within “L/h” or “cc/st”.



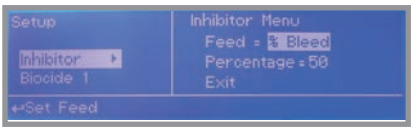


Affected I/O on board: 2-E-N

Feed & Bleed.

Once Bleed mode has been set, the operating time for feeding procedure will be the same as for bleeding.Before setting this mode first configure “Bleed Menu” from “Men Setup”.

No further options need to be set.

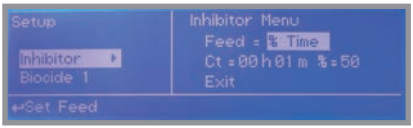


Affected I/O on board: 2-E-N

Feed & % Bleed.

Once Bleed mode has been set, the operating time for feeding procedure will be a percentage of total time needed for bleeding.Before setting this mode first configure “Bleed Menu” from “Menu Setup”.

Set percentage time.

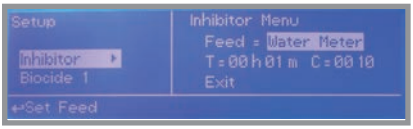


Affected I/O on board: 2-E-N

Feed & % Time.

The operating time for feeding procedure will be a percentage (%) of cycle time (Ct).

E.g.: Ct= 1h 00m and %=50.
Inhibitor activity: 0h 30m.

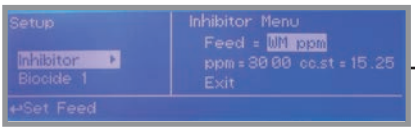


Affected I/O on board: 2-E-N and WMI (Makeup)

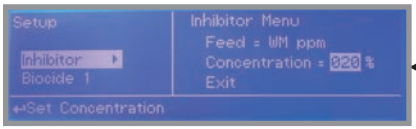
Feed & Water Meter (WMI).

The operating time for feeding procedure will be active for a time (T) every (C) water meter pulses. Before setting this mode first configure “Flow meter menu” from “Men Setup”.

E.g.: T= 00h 30m and C=0050.
Inhibitor activity: 30min every 50 pulses from water meter (WMI)



Affected I/O on board: 2-E-N and WMI (Makeup) and IS



Affected I/O on board: 2-E-N and WMI (Makeup) and IS

Feed & WM Ppm (WMI).

The operating time for feeding procedure will be active to keep product concentration (Ppm) based on pump’s flow (L/h liters per hour) and Water Meter counter with a minium of 10 seconds activity. Furthermore pump’s capacity can be edited into cc per stroke (cc/st) using ppm to set strokes needed to dose. Otherwise manual concentration value (%) can be set (rotate wheel). Before setting this mode first connect IS pump to the instrument and configure “Flow meter menu” from “Menu Setup”.

“Biocide 1” and “Biocide 2” menu.

Usually two types of chemicals (e.g.: chlorine based chemical and bromine based chemical) are used to obtain best results in killing dangerous microorganisms. Use “Biocide 1” and “Biocide 2” menus to configure these tasks. Parameters to set are the same for both menus.

Note: “Biocide 1” can’t be changed if “Setpoint Cl” working mode is set to “Constant Mode” (see page 25).

Parameters to set are:

Pre-bleed **(PBLD)**: Timered or conductivity (uS/PPM) setpoint for bleed valve activity.

Time mode

Bleed valve is open for set time

Setpoint mode (conductivity probe reading)

Bleed valve is open if probe’s conductivity read value exceeds set value

Pre-biocide **(PBIO)**: This option set Pre-biocide (1 or 2) output active for set time.
Pre-biocide is generally used for biocide-activator chemicals.
Pre-biocide 1 will activate 5-E-N output. Pre-biocide 2 will activate 6-E-N output.

Lockout **(LCK)**: This option lock (keep closed) bleed valve for set time at the end of biocide activity.

Week **(WK)**: This option set events repetitivity on daily basis for set amount of time.

E.g.: 00 01 @ 01:00 (hh mm / hh mm)
Biocide activity will start every
Tuesday for 1 minute at 01:00 AM*

NOTES:

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

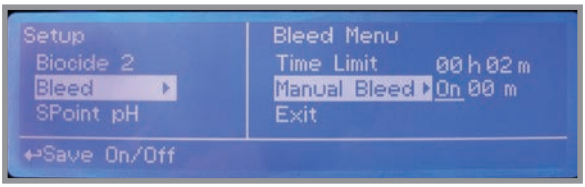
2) Pre-bleed option in conductivity mode has a time limit that can be set from “BLEED” menu. If conductivity value can’t be restored within a time then the bleed valve will be closed and an alarm generated (“Bleed Timeout”).

3) Set 00h 00m to disable single option

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

“Bleed” menu.

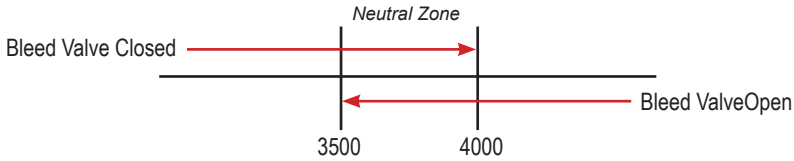
A method for controlling the amount and concentration of make-up water and chemicals introduced into the recirculating water of a cooling tower system. A float operated make-up valve controls the addition of make-up water to the tower. As make-up water is added to the tower a vacuum is produced at an injector valve which draws chemicals from a chemical holding tank into the make-up water, thereby allowing precise control of the chemical concentration in the make-up liquid. Further, a bleed valve is provided which is responsive to the vacuum produced at the injector valve and bleeds a portion of the recirculating water to waste. From “Menu Setup” choose “Bleed” and configure the following parameters



Setpoint: target value for conductivity.

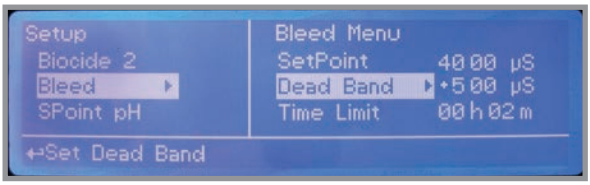
Dead Band: “MTOWER PLUS” opens bleed valve when reaching setpoint and it leaves valve opens until conductivity value reaches dead band set value. Choose “-“ before Dead Band value to invert bleed valve working mode.

E.g.: Setpoint is 4000 uS and Dead Band is 500 uS



Time Limit: this option set a time limit within restoring conductivity value. Outreaching this time the “MTOWER PLUS” will close bleed valve and generate an alarm.

Manual Bleed: this option manually operates bleed valve for set time. Valve operation begins immediately after wheel is pressed to confirm working time



To end procedure move cursor on “EXIT” and press wheel to proceed to “Save” request screen. Move wheel on “YES” to save or “NO” to discard changes.

“Set-Point Cl menu” working modes

For “**Digital D1”** output , setpoint can be set between **On/Off mode, PWM mode or disabled (OFF).**
For **“Proportional P1”** output (blocks 9 and 10), setpoint can be set using **Proportional mode or disabled (OFF).**

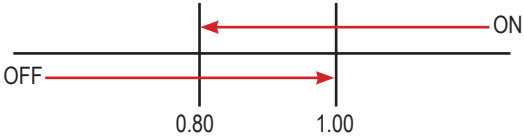
Both options can be operated as “Timer Biocide 1” (Cl channel operates within Biocide 1 set time) or “Constant” (three channels are all independent). Move wheel on “working mode” to change it.

“Set-Point Cl” (on/off) mode - Digital D1

This mode is valid for “Digital D1” output. On/Off mode set the instrument to operate using two set values that enable or disable the Cl pump. To use this mode move cursor on On/Off working mode. Press the wheel and select it.

ON/OFF mode
Set Cl value at 0.80 mg/l ON and 1.00 mg/l OFF. The difference between the two Cl values is called HYSTERESIS.
Instrument will enable the Chlorine pump when reading value will decrease at 0.80mg/l
At 0.80mg/l the Chlorine pump will be enabled until reading value will increase at 1.00mg/l.

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



“Set-Point Cl” (PWM) mode - Digital D1

This mode is valid for “Digital D1” output.

Pulse-width modulation (PWM) of a signal or power source involves the modulation of its duty cycle, to either convey information over a communications channel or control the amount of power sent to a load.

This mode works over a settable (0 to 100 seconds) time to switch on or off selected output.
During this time if reading value will move towards a set value (on or off) the PWM will operate the output on timered basis. Reaching the set value the PWM will permanently leave on or off the output.

Parameters to set for this mode are:

Unit Value + %: (time activity towards set value. 0% means 0 seconds. 100% means 100 seconds.**)**
Cl range: two Cl values within PWM operates.

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

“Set-Point Cl” - Proportional P1

This mode is valid for “Proportional P1” output (blocks 9 and 10).

Proportional mode set the instrument to operate using a calculated percentage between two set values that enable or disable the Cl pump. To use this mode move cursor on “Proportional P1”. Press the wheel and select it.

PROPORTIONAL mode between 1.00Cl (0 p/m) and 0.50Cl(180 p/m). p/m is : pulses per minute
In this mode the Cl pump will be “ON” for values lower than 0.50mg/l with set pulses/minute capacity (e.g.: 180) and it’ll be “OFF” for values greater than 1mg/l. For values of 0.75mg/l pump will be “ON” with 90 p/m capacity. The calculation is based on 180 pulse / minute. To end procedure move cursor on “OK” and press wheel to proceed to “Save” request screen. Move wheel on “YES” to save or “NO” to discard changes.

To end procedure move cursor on “OK” and press wheel to proceed to “Save” request screen. Move wheel on “YES” to save or “NO” to discard changes.

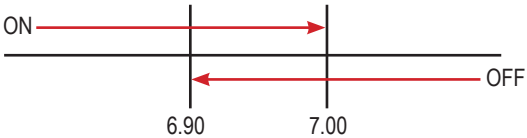
“Set-Point pH menu” working modes

For “**Digital D1”** output, setpoint can be set between **On/Off mode, PWM mode or disabled (OFF).**
For **“Proportional P1”** output (blocks 9 and 10), setpoint can be set using **Proportional mode or disabled (OFF).**

“Set-Point pH” (on/off) mode ALKALI

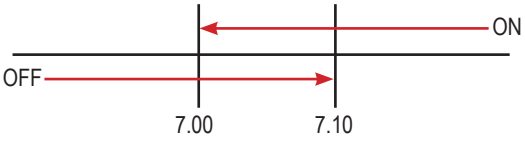
This mode is valid for “Digital D1” output. On/Off mode set the instrument to operate using two set values that enable or disable the pH pump. To use this mode move cursor on “Working Mode”. Press the wheel and select it.

ON/OFF mode while dosing ALKALI
Set pH value at 7.00 OFF and 6.90 ON. Set Pulse Speed per minute (strokes per minute) based on dosing device capabilities.
Instrument will leave the pH pump active until reading value will increase up to 7.00pH.
At 7.00pH the pH pump will be disabled until reading value will decrease under 6.90pH.



“Set-Point pH” (on/off) mode ACID

This mode is valid for “Digital D1” output. ON/OFF mode while dosing ACID
Set pH value at 7.00 OFF and 7.10 ON. Set Pulse Speed per minute (strokes per minute) based on dosing device capabilities.
Instrument will leave the pH pump active until reading value will decrease up to 7.00pH
At 7.00pH the pH pump will be disabled until reading value will increase up to 7.10pH.



To end procedure move cursor on “OK” and press wheel to proceed to “Save” request screen. Move wheel on “YES” to save or “NO” to discard changes.

Did you know ?

In chemistry, an alkali is a basic, ionic salt of an alkali metal or alkaline earth metal element. Alkalis are best known for being bases (compounds with pH greater than 7) that dissolve in water. The adjective alkaline is commonly used in English as a synonym for base, especially for soluble bases. This broad use of the term is likely to have come about because alkalis were the first bases known to obey the Arrhenius definition of a base and are still among the more common bases. Since Brønsted-Lowry acid-base theory, the term alkali in chemistry is normally restricted to those salts containing alkali and alkaline earth metal elements.

An acid (often represented by the generic formula HA [H+A−]) is traditionally considered any chemical compound that, when dissolved in water, gives a solution with a hydrogen ion activity greater than in pure water, i.e. a pH less than 7.0. That approximates the modern definition of Johannes Nicolaus Brønsted and Martin Lowry, who independently defined an acid as a compound which donates a hydrogen ion (H+) to another compound (called a base). Common examples include acetic acid (in vinegar) and sulfuric acid (used in car batteries). Acid/base systems are different from Cl reactions in that there is no change in oxidation state.

“Set-Point pH” (PWM)

This mode is valid for “Digital D1” output. Pulse-width modulation (PWM) of a signal or power source involves the modulation of its duty cycle, to either convey information over a communications channel or control the amount of power sent to a load.

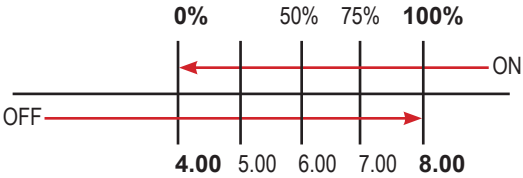
This mode works over a settable (0 to 100 seconds) time to switch on or off selected output.
During this time if reading value will move towards a set value (on or off) the PWM will operate the output on timered basis. Reaching the set value the PWM will permanently leave on or off the output.

Parameters to set for this mode are:

Unit Value + %: (time activity towards set value. 0% means 0 seconds. 100% means 100 seconds.**)**
pH range: two pH values within PWM operates.

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

For reading value of 7.00 the output will be OFF for 25 seconds, ON for 75 seconds.
For reading value of 6.00 the output will be OFF for 50 seconds, ON for 50 seconds.



“Set-Point pH” (Proportional)

This mode is valid for “Proportional P1” output (blocks 9 and 10).

Proportional mode set the instrument to operate using a calculated percentage between two set values that enable or disable the pH pump. To use this mode move cursor on “Proportional P1”. Press the wheel and select it.

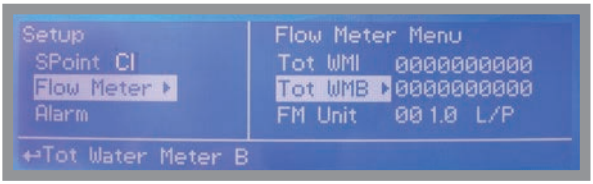
PROPORTIONAL mode between 7pH(0 P/m) and 8pH (180 P/m). p/m is : pulses per minute
In this mode the pH pump will be “ON” for values greater than 8pH with maximum set pulses per minute capacity (e.g.: 180) and it’ll be “OFF” for values lower than 7pH. For values of 7.5pH pump will be “ON” with 90 pulses per minute capacity. To end procedure move cursor on “OK” and press wheel to proceed to “Save” request screen. Move wheel on “YES” to save or “NO” to discard changes.

“MTOWER PLUS” advanced settings.

Advanced settings are: Flow meter, Alarm and Option menu.

“Flow meter” menu.

This menu allows to configure: totalizer for water meter input , totalizer for water meter bleed, working mode and counters reset.



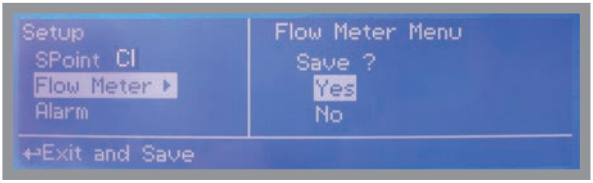
WMI: Main water input totalizer (not editable)

WMB: Bleed water input totalizer (not editable)

FM Unit: L/P (liters per pulses) or P/L (pulses per liters)

RST TOT : reset both WMI and WMB counters

To end procedure move cursor on “EXIT” and press wheel to proceed to “Save” request screen. Move wheel on “YES” to save or “NO” to discard changes.



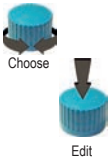
“Alarm” menu.

This menu allows to enable / disable / set all system alarms and related outputs.

LOC: “LOW CONDUCTIVITY” alarm.
LPH: “LOW pH” alarm.
LCI: “LOW Chlorine” alarm.

OFF: alarm disabled
ABS: (absolute) alarm on set value*
TRK: (track) alarm on bleed setpoint minus track value*

Track alarm (TRK) e.g.:
Bleed setpoint is set to 4000 and track alarm is set to 1000.
Alarm will switch on at 3000.



HIC: “HIGH CONDUCTIVITY” alarm.
HPH: “HIGH pH” alarm.
HCI: “HIGH Chlorine” alarm.

OFF: alarm disabled
ABS: (absolute) alarm on set value*
TRK: (track) alarm on bleed setpoint minus track value*

Track alarm (TRK) e.g.:
Bleed setpoint is set to 4000 and track alarm is set to 1000.
Alarm will switch on at 5000 (4000+1000).

CLS: Chemicals level alarm.
STOP: low chemical tank level alarm is generated and related output disabled
NO: option disabled

NFW: flow sensor alar
STOP: no flow alarm generated
NO: option disabled

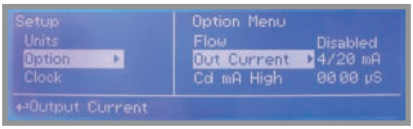
OUT AL: Alarm contact activation
EN: Alarm contact enabled
DIS: Alarm contact disabled

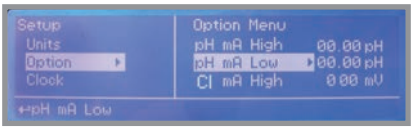
*Alarm contact (10-11-12) enabled, all outputs disabled.

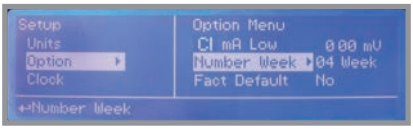
To end procedure move cursor on “EXIT” and press wheel to proceed to “Save” request screen. Move wheel on “YES” to save or “NO” to discard changes.

“Options” menu.

Press wheel and rotate to choose.







TAU: if probes reading values are displayed too fast increase TAU value to stabilize them. Default value is 03. Maximum value is 30.

Coeff Temp: Temperature compensation. Minimum value is 0% (disabled), maximum value is 5%. See page 15 for more info.

Startup Delay: Startup time delay at instrument startup (power on). Minimum value is 0m (disabled), maximum value is 99minutes.

FLOW: Flow contact (34-35-36) working mode.
Set to “NORMAL” for Normally Open (N.O.) contact type.
Set to “REVERSE” for Normally closed (N.C.) contact type.
Set to “DISABLED” to disable contact.

OUT CURRENT: mA current output configuration.
Set to 4/20 mA for 4 (setpoint low) and 20 (setpoint high) mode.
Set to 0/20 mA for 0 (setpoint low) and 20 (setpoint high) mode.

Cd mA High and Cd mA Low are related to maximum and minimum **conductivity** value for “mA output 1”.

Temp mA HI and Temp mA LO are related to maximum and minimum **temperature** value for “mA output 2”.

pH mA High and pH mA Low are related to maximum and minimum **pH** value for “mA output 3”.

Cl mA High and Cl mA Low are related to maximum and minimum **Chlorine** value for “mA output 4”.

NUMBER WEEK: Set weeks number for “Biocide 1” and “Biocide 2” working mode. See page 18 for more info.

FACT. DEFAULT: it reverts instrument to factory settings including PASSCODE (“0000”).

IF ALARM: set this option to DISABLE if mA outputs must be disabled during an alarm event or ENABLE to let mA outputs enabled during an alarm event.

“Manual” menu.

This menu allows to manually operate all outputs. Move wheel on related output, press wheel ***two times*** to enable (ON) and press wheel one more time to disable (OFF) selected output. Press one time again to re-enable (ON) output and so on.

Outputs available are:

OUT D1 pH
This option manually operate output on 1-E-N blocks.

OUT Prop pH
This option manually operate output on 9 - 10 blocks (I/O connections)

OUT Prop Cl
This option manually operate output on 7 - 8 blocks (I/O connections)

OUT Inhibitor
This option manually operate output on 11 - 12 blocks (I/O connections)

OUT Bleed
This option manually operate “Bleed” output on 7-8-9 blocks.

OUT INHIB
This option manually operate “inhibitor” output on 2-E-N blocks.

OUT PRE-BIO 1
This option manually operate “pre-biocide 1” output on 5-E-N blocks.

OUT PRE-BIO 2
This option manually operate “pre-biocide 2” output on 6-E-N blocks.

OUT D1 Cl
This option manually operate output on 3-E-N blocks.

OUT BIO 2
This option manually operate “biocide 2” output on 4-E-N blocks.

OUT ALARM
This option manually operate “general alarm output” output on 10-11-12 blocks.

OUT mA 1
This option manually operate “mA output 1” output on 13-14 blocks.

OUT mA 2
This option manually operate “mA output 2” output on 13-15 blocks.

OUT mA 3
This option manually operate “mA output 3” output on 13-16 blocks.

OUT mA 4
This option manually operate “mA output 4” output on 13-17 blocks.

Move wheel on “EXIT” to return to “Menu setup” and automatically revert outputs to their original status.

Appendix A - Conductivity Probe Module.

Located in **upperside of mainboard** there are four connectors that can be used to install probe modules. Modules come pre-installed upon request. Identify installed modules to correctly connect probes.

MDCD

Connect probe as follows:

Block n.1 : n/a
Block n.2 : Power IN (probe)
Block n.3 : Signal OUT (probe)

For versions PT / NTC connect the remaining wires on the main board in the temperature input

Conductivity probe connections with internal or external PT100

MDIND

Block n.1 : GND
Block n.2 : GND
Block n.3 : SIGNAL
Block n.4 : POWER

Connect the wires for external PT100 to the terminal board of the main board as follows:

Block n. 50 : green
Block n. 51 : pink / orange
Block n. 52 : white
Block n. 53 : yellow

MDECDSIND

Block n.1 : GND
Block n.2 : SIGNAL
Block n.3 : POWER

Connect the wires for internal PT100 to the terminal board of the main board as follows:

Blocks n. 50 + 51: white
Blocks n. 52 + 53: green

Appendix C - Chlorine Probe Module.

Modules come pre-installed upon request. Identify installed modules to correctly connect probes.

MDCL-1

Module suitable for:

ECL1
ECL2
ECL3
EBR1/20*
ECL8
ECL9
ECL10
ECL11
ECL17
ECL18

Connect probe as follows:

1. V+
2. V-
3. IN
4. GND

***Br is shown as unit measure**

MDCL-6

Module suitable for:

ECL4
ECL5
ECL6
ECL7

Connect probe as follows:

1. GND
2. IN

MDSCL

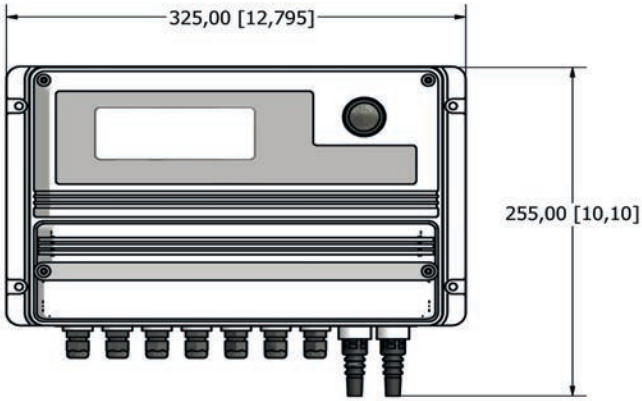
Module suitable for:

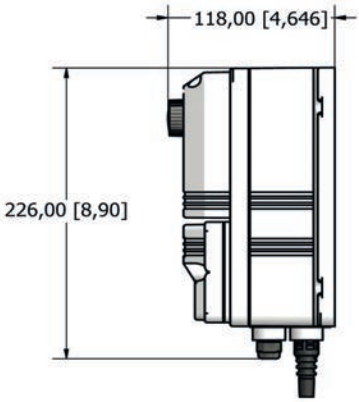
SCLxx probes

Connect probe
as follows:

1. -485
2. +485
3. GND
4. +5VDC

Appendix C - Dimensions





ENCLOSURE

IP65 enclosure (NEMA4x)
MTOWER control instruments are manufactured in ABS housing to ensure protection against aggressive chemicals and tough environment.

ENVIRONMENT

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

Appendix D - Communication “RS485” menu.

Prior to install the instrument into an RS485 local system a unique ID NUMBER (from 1 to 30) and ID NAME (station name) must be set. Rotate wheel and edit fields. If ID number has already assigned an error message will follow after ID Check (move cursor on CHECK and press wheel). In this event try using another number.

“GSM” menu.

Instrument may remotely send SMS alarm messages using its own modem (sold as option). It can be configured as follows:

SMS1 / SMS2 /SMS3.
Using the wheel enter a mobile phone that will receive alert SMS messages if something wrong occurrs. SMS number must be set using local number format. For example : 3391349134 will send an SMS message to mobile phone.
Log level (and SMS frequency alert) may be set using options in “ACTIVE MSG” within “GSM menu”.

(this menu may looks differently, ex.:)

MSG Flow (Flow)
MSG Bio 1 e 2 (Biocide)
MSG PreBio 1 e 2 (Pre-biocide)
MSG Inhib (Inhibitor)
MSG HI uS
MSG Lo uS
MSG Bld T (Bleed)

- TO AVOID UNDESIRED MESSAGES USE CAREFULLY LOG SETUP -

- WARNING: THIS FUNCTION COULD NOT BE FREE OF CHARGE. DEPENDING ON YOUR OPERATOR CONTRACT IT COULD GENERATE PAYING SMS TRAFFIC !

“Service”

This “view only” menu shows probes reading live and instrument ID for ERMES connection (if device’s connected). Press “ESC” to exit.

Connection Code for ERMES (through USB cable)

Connection Code for ERMES (through LAN cable)

“TCP/IP” menu.

The instrument can be remotely operated using a standard ethernet connection (sold as option). A static or dynamic IP address and a CAT5 ethernet cable is required. According to your network capacity connection speed is 10/100Mbps. To obtain a valid IP address and subnet mask contact your net administrator. Enter parameters and move cursor on “SAVE” to store parameters then move on “OK” and press wheel to save and activate configuration.

Based on your network configuration choose to obtain network parameters automatically (DYNAMIC) or manually (STATIC).

See “ERMES Communication Software” manual for proper PC software configuration.

What is a static IP address/dynamic IP address?

A static IP address is a number (in the form of a dotted quad) that is assigned to a computer by an Internet service provider (ISP) to be its permanent address on the Internet. Computers use IP addresses to locate and talk to each other on the Internet, much the same way people use phone numbers to locate and talk to one another on the telephone. When you want to visit whatis.com, your computer asks a domain name system (DNS) server (think telephone information operator) for the correct dotted quad number (think phone number) for whatis.com and your computer uses the answer it receives to connect to the whatis.com server.
It would be simple if every computer that connects to the Internet could have its own static IP number, but when the Internet was first conceived, the architects didn’t foresee the need for an unlimited number of I addresses. Consequently, there are not enough IP numbers to go around. To get around that problem, many Internet service providers limit the number of static IP addresses they allocate, and economize on the remaining number of IP addresses they possess by temporarily assigning an IP address to a requesting Dynamic Host Configuration Protocol (DHCP) computer from a pool of I addresses. The temporary IP address is called a dynamic IP address.

Requesting DHCP computers receive a dynamic IP address (think temporary phone number) for the duration of that Internet session or for some other specified amount of time. Once the user disconnects from the Internet, their dynamic I address goes back into the IP address pool so it can be assigned to another user. Even if the user reconnects immediately, odds are they will not be assigned the same IP address from the pool. To keep our telephone telephone analogy going, using a dynamic IP address is similar to using a pay phone. Unless there is a reason to receive a call, the user does not care what number he or she is calling from.

There are times, however, when users who connect to the Internet using dynamic IP wish to allow other computers to locate them. Perhaps they want to use CU-SeeMe or use a VoIP application to make long distance phone calls using their IP connection. In that case, they would need a static IP address. The user has two choices; they can contact their ISP and request a static IP address, or they can use a dynamic DNS service. Either choice will probably involve an additional monthly fee.

Using a dynamic DNS service works as if there was an old-fashioned telephone message service at your computer’s disposal. When a user registers with a DNS service and connects to the Internet with a dynamic IP address, the user’s computer contacts the DNS service and lets them know what IP address it has been assigned from the pool; the service works with the DNS server to forward the correct address to the requesting DHCP computer. (Think of calling the message service and saying “Hi. I can be reached at 435.44.32.111 right now. Please tell anyone who tries to reach me to call that number.) Using a dynamic DNS service to arrange for computers to find you even though you are using a dynamic I address is the next-best thing to having a static IP.

“GPRS” menu.

Instrument can be remotely operated using an embedded standard GPRS modem (sold as option). In order to activate this service please ensure that the following steps are correctly completed:

- Make certain the antenna location is not shielded by metal objects or near sources of electrical ‘noise’.

- Make certain the distance from the antenna to the “MTOWER” unit is within cable length.

- Do not route the cable where it could be pinched in doors, windows etc.

- Ensure that SIM into “MTOWER” modem is correctly inserted, activated and within operator range.

See “ERMES Communication Software” manual for proper PC software configuration.

Instrument can be set for automatic configuration (Configuration option set to “Automatic”) or manually (Configurati option set to “Manual”) based on your SIM data access parameters. For manual configuration option enter APN (access point name) and SIM phone number. Move wheel on “OK” to save and move on “ESC” to go back to main menu.

WARNING: THIS FUNCTION COULD NOT BE FREE OF CHARGE. DEPENDING ON YOUR OPERATOR CONTRACT IT COULD GENERATE PAYING DATA TRAFFIC !

“Email” menu.

If Ethernet module or GPRS module is installed (sold as option) the instrument can be configured to send email alarm messages up to two recipients. Click on “Email 1” or “Email 2” and enter email address.

“LOG” menu.

This function records instrument acitvity (date, hour, temperature, uS, totalizer I/O, alarms, outputs). It starts for selected frequency period (every) at requested time (time). SET DATE & TIME BEFORE TO ENABLE LOG. IF NOT POWERED FOR ABOUT 30 DAYS THE INSTRUMENT WILL LOOSE DATE/TIME

Set ACTIVE to “enabled” to activate log recording.

TIME: recording start time (time format 23h e 59min)

EVERY: recording frequency (time format 23h e 59min)

Note: advanced log control (graph, printing, comparison tables, event filtering, etc) is available through “ERMES Communication Software” for PC.

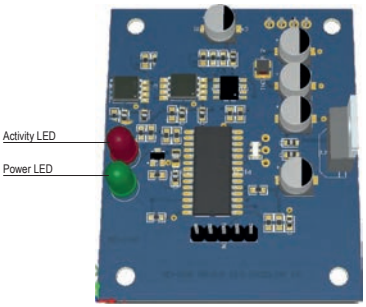
See “ERMES Communication Software” manual for proper PC software configuration.

Access point name (APN) identifies an I packet data network (PDN), that a mobile data user wants to communicate with. In addition to identifying a PDN, an APN may also be used to define the type of service, (eg connection to wireless application protocol (AP) server, multimedia messaging service (MMS)), that is provided by the PDN. APN is used in 3GPP data access networks, eg general packet radio service (GPRS), evolved packet core (EPC).

"LOG USB" Module

Located under mainboard cover there is a four pins connector that can be used to install "USB data log module" or "SMS module". Modules come pre-installed upon request and may appear different as shown (different configurations).

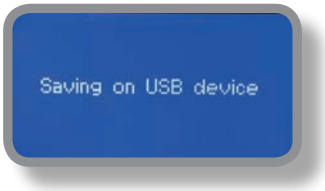
"USB data log module" records instrument activities. These information can be permanently stored into a standard USB pendrive. Pendrive can be connected to a PC using "ERMES" web **www.ermes-server.com** to review and print instrument's activities. **To obtain reliable results with this feature please set instrument ID and NAME from "RS485 Setup" menu and activate log recording from "LOG SETUP" menu.**



Standard USB pendrive
(not included)

Insert USB pendrive here
(right side of instrument)
After usage put back USB cap

HOW TO RECORD INSTRUMENT'S ACTIVITIES INTO USB PENDRIVE ?
Insert USB pendrive into USB connector (located on the right side of instrument). Instrument will save data log on USB pendrive.



HOW TO REVIEW INSTRUMENT'S ACTIVITIES RECORDED INTO USB PENDRIVE ?
It's necessary to connect to web "ERMES" **www.ermes-server.com** to review USB pendrive info on a PC.

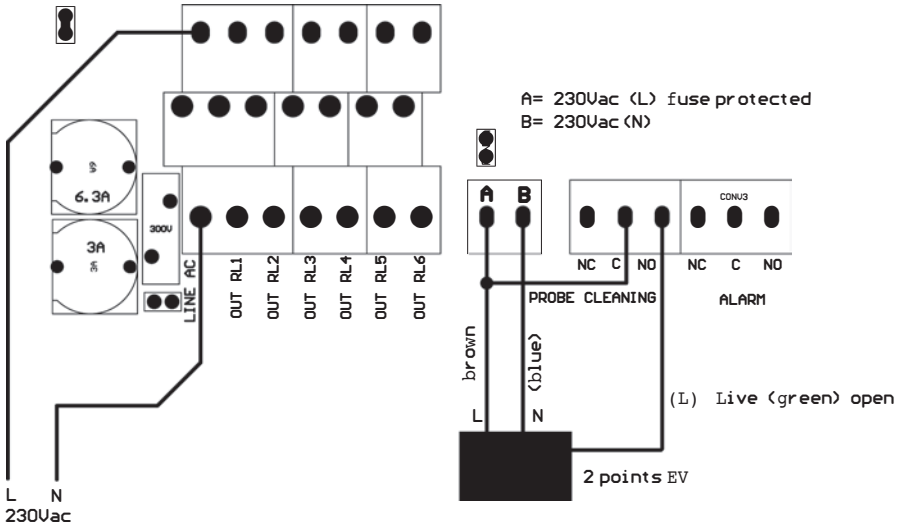
Appendix - MODBUS Setup

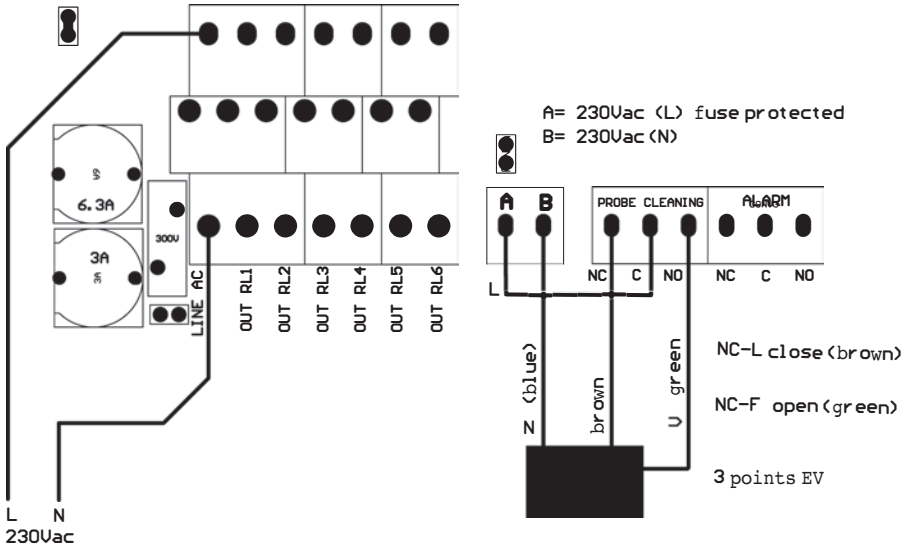
Modbus is a serial communications protocol originally published by Modicon (now Schneider Electric) in 1979 for use with its programmable logic controllers (PLCs). Simple and robust, it has since become a de facto standard communication protocol, and it is now a commonly available means of connecting industrial electronic devices.

From main menu select SETUP then MODBUS to access the options. Set the communication speed according to the PLC system available. Set the ID assigning an UNIQUE address to avoid conflicts.

In the OPTIONS menu the ERMES functionality must be set to NO to use the MODBUS protocol.

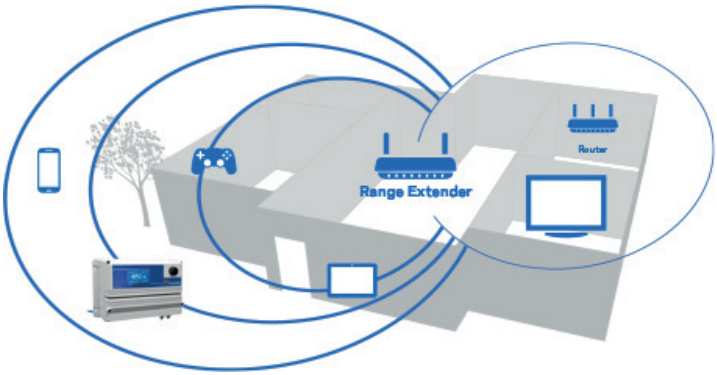
Appendix - Motorized valve connection





Appendix - WIFI Connection

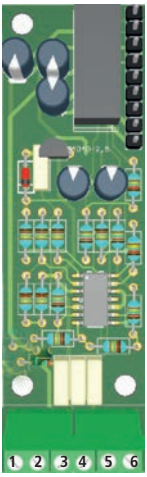
Within Communication Menu choose "WIFI" to bring wireless sub-menu. Wait until desired wireless network appears, move wheel on it then click. Enter WEP / WPA / WPA2 password (if required) and wait until connection has been estabilished and WiFi signal strength appears. To obtain a reliable connection be sure to install the controller within WiFi range. See your router features and installation procedure for best results.



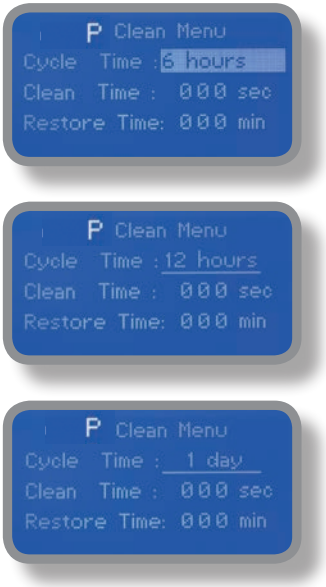
WiFi signal strength

Appendix - Potentiostat Probe Module MDPS

Located under mainboard cover there are two connectors that can be used to install probe modules. Modules come pre-installed upon request and may appear different as shown (different configurations). Identify installed modules to correctly connect probes.



Block n. 1	**Probe Wire Green**
Block n. 2	**Probe Wire White**
Block n. 3	**Probe Wire Brown**
Block n. 4	**Probe Wire Blue + Wire Yellow**
Block n. 5	**n/a (block could be not available)**
Block n. 6	**n/a (block could be not available)**



Within "SETUP MENU" is located "P. Clean Menu" (Probe cleaning menu). Options are:

Cycle Time: time between cleaning procedure and next procedure (adjustable from 6 hours to 10 days)

Clean Time: time required to complete probe cleaning procedure (adjustable from 0 to 999 seconds)

Restore Time: time to wait after cleaning to restore probe reading functionalities (adjustable from 0 to 999 minutes)

Clean on Alarm: Threshold alarm before to start procedure (out of range alarm)

To find optimal values refers to probe manufacturer.

During cleaning procedure all outputs are disabled.

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PRECAUTIONS RELATING TO DIRECTIVES, REGULATIONS AND STANDARDS

§ CE/EU and UKCA marking

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

• CE/EU harmonized directives and standards

Directives

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

Harmonized standards

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

• UKCA harmonized regulations and standards

Regulations

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

Harmonized standards

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

Disposal of end-of-life equipment by users

This symbol warns you not to dispose of the product with normal waste. Respect human health and the environment by giving the discarded equipment to a designated collection center for the recycling of electronic and electrical equipment. For more information visit the online site.

When dismantling a pump please separate material types and send them according to local recycling disposal requirements. We appreciate your efforts in supporting your local Recycle Environmental Program. Working together we'll form an active union to assure the world's invaluable resources are conserved.