



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 “MAX5” INSTRUMENT



Configuration and screenshots may be different and not including some functions. A maximum of 5 channels can be set.



ERMES COMMUNICATION  
[www.ermes-server.com](http://www.ermes-server.com)

Read Carefully !



ENGLISH Version

R51-01-19



NORME CE  
EC RULES(STANDARD EC)  
NORMAS DE LA CE

Direttiva Bassa Tensione  
Low Voltage Directive  
Directiva de baja tensión } 2014/35/UE

Direttiva EMC Compatibilità Elettromagnetica  
EMC electromagnetic compatibility directive  
EMC directiva de compatibilidad electromagnética } 2014/30/UE

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## 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 MAX5 is a multiple digital controller system. It reads and controls up to 5 channels that can be programmed to control\* pH - ORP - Chlorine - Turbidity - Temperature - Combined Chlorine (see Chlorine function for main options) - Total Chlorine control (see Chlorine function for main options) - Conductivity - Dissolved Oxygen. It features 6 setpoint outputs, 6 proportional pump outputs, 6 mA outputs, 1 cleaning probe output and 5 level tank inputs. Three way setpoint outputs program mode: on/off - PID - PWM. MAX5 can be connected to a PC for remote controlling / programming using a standard USB port, RS485 connection, GSM or GPRS modem, ETHERNET.

Working ranges are:

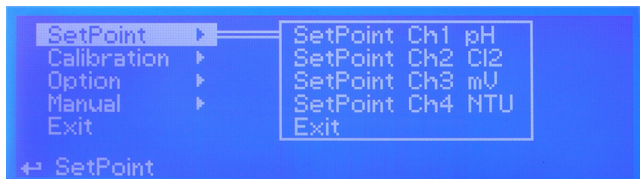
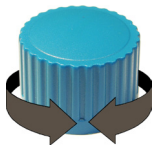
pH : from 0 to 14pH  
ORP: from 0 to 1000mv  
Chlorine: from 0 to 10 mg/l  
Turbidity: from 0 to 9999 NTU  
Temperature: from 0 to 200 °C  
Conductivity: from 0 to 300.0 mS  
Dissolved Oxygen: from 0 to 20 mg/l

All information are provided through a widescreen LCD display (240x64). Using a revolutionary wheel control the instrument can be easily programmed. MAX5 is housed into an IP65 plastic box. Measures are: L325 x H235 x D125 (including wheel and connectors).

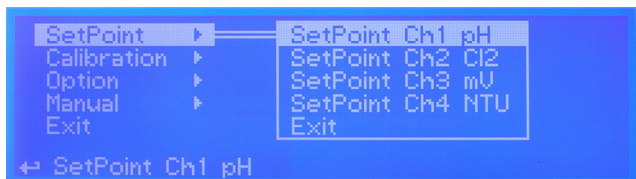
## The wheel.

Located in the upper right side of MAX5 there is a wheel that must be used to control the instrument. Wheel can be rotated in both directions to scroll over the menus and / or pressed to confirm highlighted selection / value.

**NOTE:** Once changes are made press "OK" to save and exit from submenu. Press "ESC" to exit without saving.



Into main menu rotate the wheel to cycle-loop through all options.  
Clockwise: setpoint --> Calibration --> Option --> Manual -->Exit  
or Counterclockwise.



Press wheel to move on submenu for selected option.

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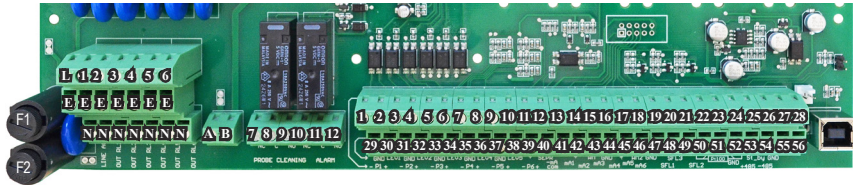
\*configuration and screenshots may be different and not including some functions. A maximum of 5 channels can be set.

# 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 as been divided into two parts: Power connections and I/O connections.

**For ECix series probes, NTU connections and ETHERNET version, see APPENDIX A at page 30.**

Block numbers are related only to its own part of the board.



Power Connections



I/O Connections

## Power Connections:

F1: Main fuse (6.3AT)

F2: Circuit fuse (3.15AT)

A(-) - B(+): Optional 24VDC output

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

Setpoint Outputs (VAC same on main power supply):

(free contact versions are NOT fuse protected with a max insulation of 250V)

- 1 - E - N (F2 fuse protected)
- 2 - E - N (F2 fuse protected)
- 3 - E - N (F2 fuse protected)
- 4 - E - N (F2 fuse protected)
- 5 - E - N (F2 fuse protected)
- 6 - E - N (F2 fuse protected)

Probe Cleaning output: 7(N.C.), 8(C), 9(N.O.) Voltage free contact

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

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



## I/O Connections:

Proportional pump (mod. "IS" driven by pulses) outputs:

1(-); 2(+): Output P1  
 3(-); 4(+): Output P2  
 5(-); 6(+): Output P3  
 7(-); 8(+): Output P4  
 9(-); 10(+): Output P5  
 11(-); 12(+): Output P6

OPTO COUPLED  
 SIGNALS  
 (-) is NOT a shared  
 signal !

mA outputs (max resistive load: 500 Ohm):

13: Common  
 14: mA output 1  
 15: mA output 2  
 16: mA output 3  
 17: mA output 4  
 18: mA output 5  
 19: mA output 6 (temperature\*)  
 \*0°C / 4mA - 100°C / 20mA

THE SELECTION  
 OF THE OUTPUTS  
 THROUGH THE MENU IS  
 SUBORDINATE TO THE  
 NUMBER OF CHANNELS  
 AVAILABLE TO THE  
 ORDER.

RS485:

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

GND is a shared ground

Tank Level inputs:

29 (-); 30 (+) Level 1  
 31 (-); 32 (+) Level 2  
 33 (-); 34 (+) Level 3  
 35 (-); 36 (+) Level 4  
 37 (-); 38 (+) Level 5

(-) is a shared (GND)  
 ground signal !

Proximity Sensor (mod. "SEPR") input:

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

Contact input\*:

39(White) ; 40(Black)  
 41 shortcut with block n.37  
 set flow option from setup menu

OPTIONS

Proximity Sensor (mod. "SEPR") input n.2  
 (DOUBLE SEPR MAX5 VERSION ONLY)

45(+ Brown) ; 28(Black) ; 56(- Blue)  
 55 shortcut with block n.56

(Hall effect) pulse sender water meter:

(Contact) Pulse sender water meter:

42(+12VDC) ; 43(INPUT) ; 44(GND)  
 43(INPUT) ; 44(GND)

OPTIONS

Temperature Probe input for mod. "PT100"\*\*\* only:

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

Temperature Probe input for "PT100" with  
 ECDIND probe:

50(green) ; 51(orange or pink) ; 52(white) ; 53(yellow)  
 (Ref. A Appendix - Inductive Conductivity module)

OPTIONS

Standby signal input:

(NOT AVAILABLE ON DOUBLE SEPR MAX5 VERSION)

54(+) ; 55(GND)

\*This is "FLOW1" for "MAX5 PH CL PH CL double flow" model only

\*\*This is "TEMP2" for "MAX5 PH CL PH CL double flow" model only




# Main screen.

From main screen all instrument functions can be reached by rotating the wheel and highlighting the selected option. Options available are located in the low right corner of the screen.



fig. 1

## Connection Status

-  LAN CONNECTION OK - ERMES CONNECTION OK
-  LAN CABLE DISCONNECTED
-  LAN CABLE CONNECTED - ERMES NOT AVAILABLE

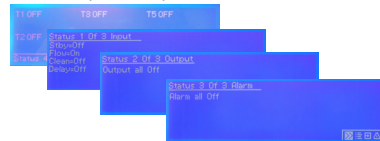
**Status control.** Press here to scroll through:



## main menu alternate view



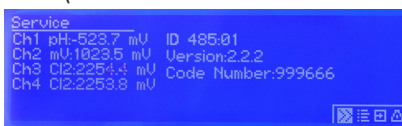
## status of inputs - outputs - alarms - timers



## log entries



## service (it shows also ID DEVICE and ID USB DEVICE)



Use **Code Number** when register for ERMES WEB services



**Setup menu.** (passcode protected area)




**Off menu.** Press here to turn off instrument

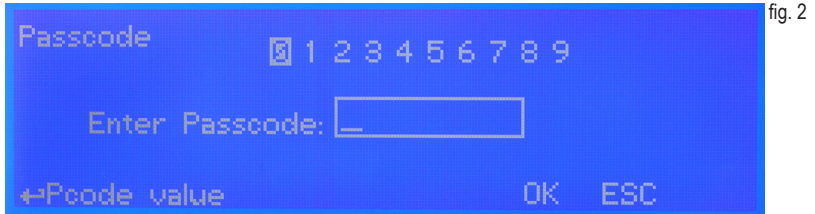


**Alarm menu.** Press here to stop alarms

## Passcode.

From main screen rotate wheel until to highlight  then press wheel.

Note: This is a passcode protected area. For this reason every time this menu is reached, the instrument will ask for a passcode as shown.




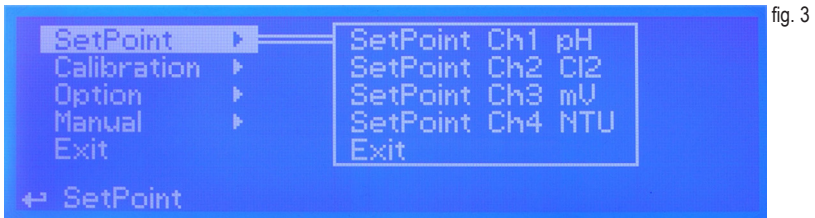
If this is a "first time visit" the default passcode is "0000" (both Administrator and User).

Just press four times the wheel. Otherwise rotate wheel to move through digits and press wheel to choose.

Rotate wheel to ESC and press wheel to go back to main screen without accessing setup menu.

## Setup.

From main screen rotate wheel until to highlight  then press wheel. Enter passcode as described in previous paragraph.



Rotate wheel to scroll through all options and press wheel to enter into menu of selected option.

**Setpoint option.** Use this menu to define instrument operating mode, output configuration, alarm condition, mA outputs.

**Calibration option.** Use this menu to calibrate main instrument readings (pH, ORP Chlorine, Turbidity and, Temperature ).

**Option.** Use this menu for TAU setup, delay output, flow detect, clock setup, probe clean, reset, RS485 setup, alarm setup, log setup, passcode setup.

**Manual.** Use this menu for manual outputs activation (Relay, pulse, mA, level).

**Exit.** Use this option to go back to main screen.

# Setpoint.

From setup menu (fig.3) rotate wheel to highlight "Setpoint" then press wheel. Again rotate wheel until to reach desired measure between pH - Cl<sub>2</sub> - mV - NTU - Temperature. Customized version includes: potentiostat (mg/l Cl<sub>2</sub>) and Fluorine (F)



fig. 4

Once into "measure submenu"\*, is possible to edit (all or some) the following setpoint parameters:

**[Da]** "setpoint output A" that can be configured as on/off, PWM or PID and settable as 1 to 6 channel

**[Db]** "setpoint output B" that can be configured as on/off, PWM or PID and settable as 1 to 6 channel

**[Pa]** "proportional pump output A" and settable as 1 to 6 channel

**[Pb]** "proportional pump output B" and settable as 1 to 6 channel

**[mA]** "mA output" settable as 1 to 6 channel

**[Aa]** "general alarm A" for "out of limits" reading parameters

**[Ab]** "general alarm B" for "out of limits" reading parameters

**[Ad]** "general alarm" for maximum dosing time

**[Ar]** "general alarm" for damaged probe (same reading after a set time)

Total amount of output-channels available is 6. This number decreases every time a channel is assigned to a specific function during setup. Once there are no more channels available the instrument will read only probe's value. For temperature channel is available ON/OFF mode only during setpoint setup.

## Da and Db.

Using Da and / or Db is possible to control the status of "setpoint outputs" and "level outputs" based on some rules. Refer to "power connections" and "I/O connections" blocks at page 4 and 5 to locate these outputs on mainboard.

Once that Da or Db function is enabled (move wheel over "disable" , press, rotate to "enable", press again to exit) the main parameters are **MODE (ON/OFF - PWM - PID), RL, LEV and STOP.**

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\*"Channel" is the related output of mainboard connections.

\*Setpoint pH or Cl<sub>2</sub> or mV or NTU

## Da and Db WORKING MODES.

### ON/OFF Mode.

On/Off mode set the instrument to operate using two set values that enable or disable the related setpoint output. Parameters to set for this mode are:

**ON:** Activate RL and LEV on moving towards the unit value (for example: pH)

**OFF:** Disable RL and LEV on moving towards the unit value (for example: pH)

**IN:** assign "input" number then edit the name by moving wheel. If the "input" number is already used then it will not be shown. Choose "X" instead of a number to disable input.

**RL:** assign "relay" number then edit the name by moving wheel. If the "relay" number is already used then it will not be shown. Choose "X" instead of a number to disable relay.

**STOP:** ("ON": when product into tank is ending, then the related output will be off and an alarm condition will pop-up. "OFF": when product into tank is ending, then the related output will continue to stay on and an alarm condition will pop-up.)

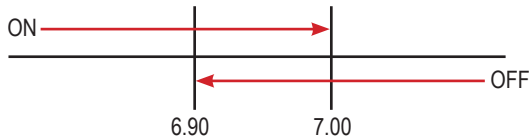
**MSG:** when flagged an SMS or EMAIL alarm message will be sent to destination edited in GSM menu.

#### ON/OFF mode while dosing ALKALI

Set pH value at 6.90 ON and 7.00 OFF.

Instrument will leave related output active until reading value will increase up to 7.00pH.

At 7.00pH the related output will be disabled until reading value will decrease under 6.90pH.



#### ON/OFF mode while dosing ACID

Set pH value at 7.00 OFF and 7.10 ON.

Instrument will leave related output active until reading value will decrease up to 7.00pH

At 7.00pH the related output will be disabled until reading value will increase up to 7.10pH.

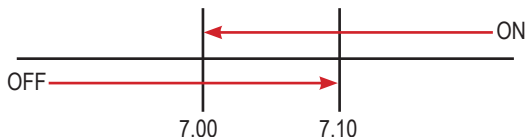


fig. 5

## PWM Mode.

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.

Time resolution is 5 seconds, 5 steps. During this time if reading value will move towards a set value (on or off) the PWM will operate the output on timed 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.)

**IN:** assign "input" number then edit the name by moving wheel. If the "input" number is already used then it will not be shown. Choose "X" instead of a number to disable input.

**RL:** assign "relay" number then edit the name by moving wheel. If the "relay" number is already used then it will not be shown. Choose "X" instead of a number to disable relay.

**STOP:** ("ON": when product into tank is ending, then the related output will be off and an alarm condition will pop-up.  
"OFF": when product into tank is ending, then the related output will continue to stay on and an alarm condition will pop-up.)

**MSG:** when flagged an SMS or EMAIL alarm message will be sent to destination edited in GSM menu.

For example: set first pH value at 10.00 = 100% and second pH value at 5.0 = 0%.

For reading values  $\geq$  10.00 the output will be permanently ON.

For reading values  $\leq$  5.0 the output will be permanently OFF.

For reading value of 9.50 the output will be OFF for 10 seconds, ON for 90 seconds.

**If reading value decreases to 8.00 then the output will be OFF for 20 seconds, ON for 80 seconds.**

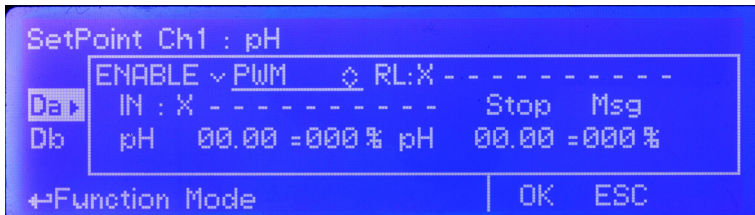


fig. 5

**Notes:** for values within 1% and 5% MAX5 will assume 5% as usable value.  
for values within 95% and 99% MAX5 will assume 95% as usable value.

## PID Mode.

A proportional–integral–derivative controller (PID controller) is a generic control loop feedback mechanism. PID controller attempts to correct the error between a measured process variable and a desired setpoint by calculating and then outputting a corrective action that can adjust the process accordingly.

The PID controller calculation (algorithm) involves three separate parameters; the Proportional, the Integral and Derivative values. The Proportional value determines the reaction to the current error, the Integral determines the reaction based on the sum of recent errors and the Derivative determines the reaction to the rate at which the error has been changing. The weighted sum of these three actions is used to adjust the process. By “tuning” the three constants in the PID controller algorithm the PID can provide control action designed for specific process requirements. The response of the controller can be described in terms of the responsiveness of the controller to an error, the degree to which the controller overshoots the setpoint and the degree of system oscillation. Note that the use of the PID algorithm for control does not guarantee optimal control of the system or system stability.

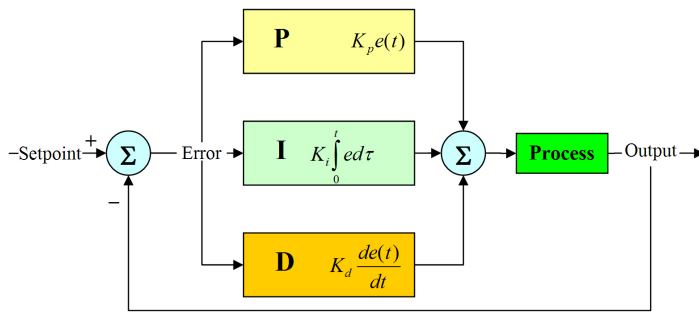


fig. 6

$(K_p)$  is the constant proportional gain

$(K_i)$  is the constant integral gain

$(K_d)$  is the constant derivative gain

(e): error

(t): Time in the past contributing to the integral response

Parameters to set for this mode are:

**IN:** assign “input” number then edit the name by moving wheel. If the “input” number is already used then it will not be shown. Choose “X” instead of a number to disable input.

**RL:** assign “relay” number then edit the name by moving wheel. If the “relay” number is already used then it will not be shown. Choose “X” instead of a number to disable relay.

**STOP:** (“ON”: when product into tank is ending, then the related output will be off and an alarm condition will pop-up. “OFF”: when product into tank is ending, then the related output will continue to stay on and an alarm condition will pop-up.)

**ON:** Activate RL and LEV on moving proportionally towards the unit value (for example: pH)

**OFF:** Disable RL and LEV on moving proportionally towards the unit value (for example: pH)

**I:** integral time (from 0s to 59m:59s)

**D:** derivative time (from 0s to 59m:59s)

## Pa and Pb.

Using PxA and / or PxB is possible to control the status of "Proportional pump outputs" based on some parameters. Refer to "I/O connections" blocks at page 5 to locate these outputs over the mainboard. Once that PxA or PxB function is enabled (move wheel over "disable", press, rotate to "enable", press again to exit) then main parameters are **OUTOPTO**, **LEV**, **STOP** and **pH - PM**.

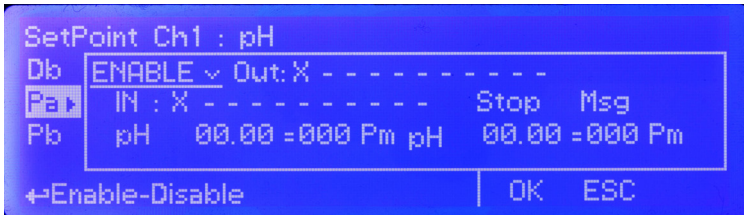


fig. 6

**OUT:** is referred to "Porportional pump outputs" from "I/O Connections" of mainboard. Set this value between available outputs. If an output is already used then it'll be hided from list.

**IN:** assign "input" number then edit the name by moving wheel. If the "input" number is already used then it will not be shown. Choose "X" instead of a number to disable input.

**STOP:** ("ON": when product into tank is ending, then the related output will be off and an alarm condition will pop-up. "OFF": when product into tank is ending, then the related output will continue to stay on and an alarm condition will pop-up.)

**MSG:** when flagged an SMS or EMAIL alarm message will be sent to destination edited in GSM menu.

### pH - PM

These fields require to set two pH values with pulses for a proportional working mode. This mode let the instrument to modulate output pulses proportionally to reaching value.

For example: Set first pH to 10.00 with 250PM. Set second pH to 7.00 with 0PM.

If reading value is 10.00 then 250pulses per minute will be forwarded to related output.

If reading value is 7.00 then no pulses will be forwarded to related output.

If reading values are 8.5 then 125pulses per minute will be forwarded to related output.



## mA.

Using mA is possible to control the status of "mA outputs" based on some parameters. Refer to "I/O connections" blocks at page 5 to locate these outputs over the mainboard. Once that mA1 function is enabled (move wheel over "disable", press, rotate to "enable", press again to exit) then main parameters are **OUTmA**, **LEV**, **STOP** and **pH - mA**.

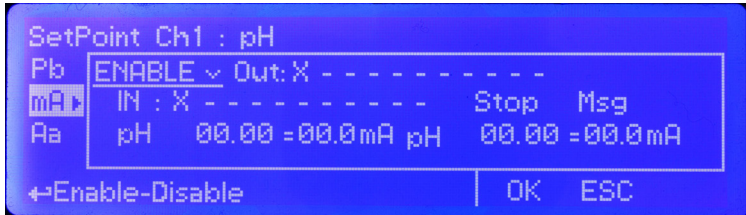


fig. 7

**Out:** is referred to "mA outputs" from "I/O Connections" of mainboard. Set this value between available outputs. If an output is already used then it'll be hidden from list.

**IN:** assign "input" number then edit the name by moving wheel. If the "input" number is already used then it will not be shown. Choose "X" instead of a number to disable input.

**STOP:** ("ON": when product into tank is ending, then the related output will be off and an alarm condition will pop-up. "OFF": when product into tank is ending, then the related output will continue to stay on and an alarm condition will pop-up.)

**MSG:** when flagged an SMS or EMAIL alarm message will be sent to destination edited in GSM menu.

### pH - mA

These fields require to set two pH values with mA for a proportional working mode. This mode let the instrument to modulate mA proportionally to reaching value. mA range is from 0 to 20mA.

For example: Set first pH to 10.00 with 15mA. Set second pH to 7.00 with 0mA.

If reading value is 10.00 then 15mA will be forwarded to related output.

If reading value is 7.00 then no mA will be forwarded to related output.

If reading values are 8.5 then 7.5mA will be forwarded to related output.

**Note:** for 2 CD channels and 5 4/20mA outputs version the setpoint on Ch. 2 operates for all mA outputs

## Aa and Ab

Using Aa and / or Ab is possible to set a visual alarm with delay for values  $\geq$  or  $\leq$  than set value. Once that Aa or Ab function is enabled (move wheel over "disable", press, rotate to "enable", press again to exit) then main parameters are **ALARM** and **DELAY**.



fig. 8

### ALARM.

Alarm condition can be set "ON" or "OFF" and for pH values  $\geq$  or  $\leq$  than set value. Reaching that value an alarm message will pop-up.

### DELAY.

A delay from 0 to 99 minutes can be set before the instrument generates the alarm.

### MSG.

when flagged an SMS or EMAIL alarm message will be sent to destination edited in GSM menu.

## AD

Using AD is possible to set a maximum dosing time. This alarm prevents connected pump to dose if set time is reached. Time can be set between 1minute and 9hours and 59minutes. Related setpoint output will be disabled when AD alarm condition is reached.

### MSG.

when flagged an SMS or EMAIL alarm message will be sent to destination edited in GSM menu.

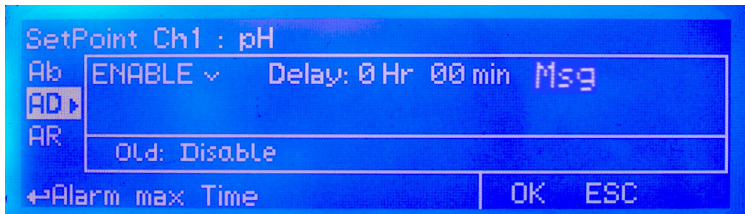


fig. 9

## AR

Using AR is possible to set a visual alarm if probe's reading value continues to be the same for a set time. Time can be set between 1minute and 9hours and 59minutes.

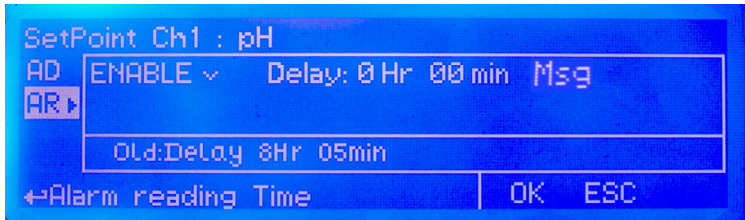


fig. 10

## MSG.

when flagged an SMS or EMAIL alarm message will be sent to destination edited in GSM menu.

# Calibration.

From setup menu (fig.3) rotate wheel to highlight "Calibration" then press wheel. Again rotate wheel until to reach desired calibration measure pH - Cl2 - mV - NTU and Temperature. Some calibrations, as pH channel, need to use SLOPE and OFFSET. For example: offset and slope are the parameters of a linear regression function between a pH value and potential (voltage). A slope value of -60 mV means that the voltage drops by 60 mV per 1 pH unit increase. Unstable and low slopes indicate probe aging or bad handling (wrong solution filled in?). The offset is the mV reading of the electrode when it's submerged in pH 7 buffer. The theoretical offset is 0 mV; however, the offset shouldn't exceed  $\pm 30$  mV. The slope of the electrode is calculated by determining the mV change between two different pH buffers. By dividing the mV difference by the change in pH units, users can get the actual slope of the electrode. If users then divide the slope of the electrode by the theoretical slope of 59.16 mV and multiply by 100, they can get an overall percentage condition of the electrode.

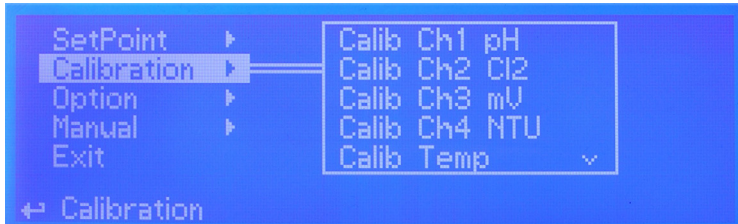


fig. 11

## pH Calibration.

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 automatically temperature compensated.



fig. 12

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

**This procedure assumes that instrument is correctly configured and a working pH probe connected.  
Otherwise unattended results may occur.**

### Calib 1st Point.

Once into "Calibration pH" menu move wheel on "Calib 1st Pt" 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 ("pH default" 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.**

### Calib 2nd Point.

Move wheel on "Calib 2nd Pt" 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 ("pH default" field). Default value is 4.00pH. 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.

### Comp Auto / Select Temp.

Once into submenu, to enable automatic temperature compensation, move wheel on "DISABLE", press it and change option to "ENABLE". This procedure will automatically set temperature compensation.

Otherwise exit from this menu, move wheel on "Select Temp" and according to the following table enter required temperature. This procedure will manually set temperature compensation.

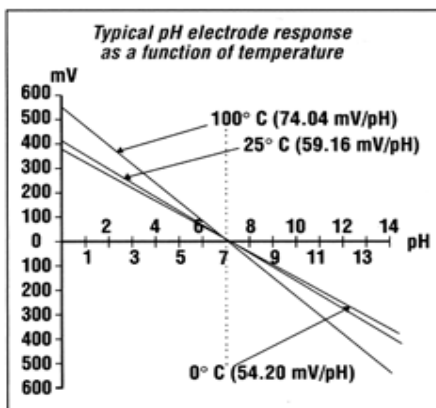


fig. 13

End procedure by moving cursor on "Exit" from "Calibration pH" main menu and press it. 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.

## CI Calibration.

CI calibration procedure involves probe's selection, Zero and 2nd Point calibration.



fig. 14

**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 occur.**

### Select Probe.

Once into "Calibration CI" menu move on "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. Note: SCLxx probes series don't require ZERO calibration and select probe.

Probe	Scale (mg/l)
ECL 1/2	2.000mg/l Cl2
ECL 1/5	5.00mg/l Cl2
ECL 1/20	20.00mg/l Cl2
ECL 1/200	200.0mg/l Cl2
ECL 2/2	2.000mg/l Cl2O2
ECL 2/20	20.00mg/l Cl2O2
ECL 3/2	2.000mg/l Cl2
ECL 3/10	10.00mg/l Cl2
ECL4,5,6,7	10.00mg/l Cl2 or Br
ECL 8/2	2.000 mg/l Cl2Tot
ECL 8/20	20.00 mg/l Cl2Tot
ECL 9/200	200.0mg/l H2O2
ECL9/2000	2000mg/l H2O2
ECL10/1	0.5mg/l O3
ECL 10/10	10.00mg/l O3
ECL11/200	200.0mg/l peracetic acid
ECL11/2000	2000mg/l peracetic acid
ECL 13	60.00mg/l O2
ECL 17/10	10.00mg/l Cl2O2
ECL 18/10	10.00 mg/l Cl2

### Calib Zero.

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

- 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 "OK").
- remove "activated carbon filter".



Carbon Filter System

### Calib 2nd point.

Once into "Calibration Cl" menu move on "Calib 2nd Pt" 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 the move cursor on "OK" then press wheel.



Photometer

End procedure by moving cursor on "Exit" from "Calibration Cl" main menu and press it. 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.

## mV Calibration.

ORP calibration procedure involves one calibration point and it requires one buffer solution. Default buffer solution is 650mV.



fig. 15

**This procedure assumes that instrument is correctly configured and a working ORP probe connected. Otherwise unattended results may occur.**

Once into "Calibration mV" menu move wheel on "Calibration" then press wheel to enter into calibration submenu. Prepare 650mV 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 ("mV default" field). Default value is 650mV. 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 "mV Default" must be changed.**

End procedure by moving cursor on "Exit" from "Calibration mV" main menu and press it. 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.



## Range (NTU).

Once into "Calibration NTU" menu move wheel on "Range" to see probe's scale.

"ETORBH" probe's reading range can be set within: 9,999NTU - 99,99NTU - 999,9NTU - 9999NTU.

For reset calibration procedure select "Redo calibration".



SONDA 'ETORBH'

## Temp Calibration.

Temperature calibration needs an external thermometer to match probe's reading value.

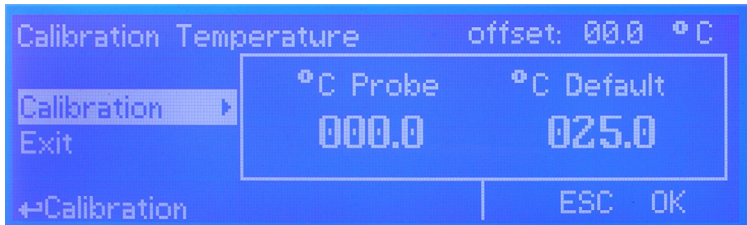


fig. 17

**This procedure assumes that instrument is correctly configured and a working temperature probe connected.  
Otherwise unattended results may occur.**

Once into "Calibration Temp" menu move wheel on "Calibration" then press wheel to enter system temperature obtained from a thermometer. Press wheel to confirm then move cursor on "OK" and press wheel to proceed "Calibration Temp" main menu. End procedure by moving cursor on "Exit" from "Calibration Temp" main menu and press it.

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.

## Conductivity (uS) Calibration.

Conductivity calibration involves the following steps:

### 1) Working scale setup



fig. 38

Move cursor on "Range" then press wheel. According to probe reading capacity select proper scale by rotating wheel. Once satisfied press wheel, move cursor on "OK" and press wheel again. See page 35 for proper scale settings. Also available TDS conductivity with 0-9999 scale.

2) Turn off MAX5. Remove cover and locate CD module jumper settings as shown on page 35. Set jumpers as required. Put cover back to MAX5.

3) Turn on MAX5. Once into conductivity menu choose Calib 1st Pt. Calibration.

Conductivity calibration procedure involves a zero calibration (1st point calib) and a 2nd calibration point that requires a buffer solution with value near working range. During this procedure probe must be dry and clean and not installed in plant. Once into "Calibration uS" menu move wheel on "Calib 1st Pt" then press wheel, move cursor on "OK" and press wheel again.

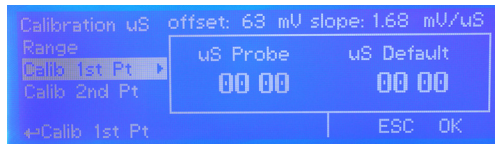


fig. 39

Move wheel on "Calib 2nd Pt" 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"



fig. 40

**This procedure assumes that instrument is correctly configured. Otherwise unattended results may occur.**

4) Move cursor on "Comp Auto" then press wheel. Rotate wheel to Enable or disable automatic temperature compensation. Enabling this option will override "Select Temp" setup then move cursor on "ESC" or "OK" and press wheel to confirm.



fig. 41

5) Move cursor on "Temp Coeff" then press wheel. This option set conductivity % variation based on temperature. To disable it enter 0.0 % as value. Move cursor on "ESC" or "OK" and press wheel to confirm.



fig. 42

6) Move cursor on "Select Temp" then press wheel. If a temperature probe is not connected, pool temperature must be set manually. Rotate wheel to set it and confirm by pressing wheel. Move cursor on "ESC" or "OK" and press wheel to confirm.



fig. 43

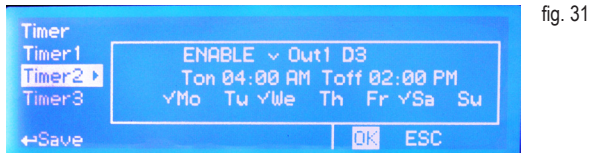
---

Measurement temperature has a significant influence on conductivity readings; but appropriate temperature compensation is a powerful tool to allow meaningful comparison of readings taken at different temperatures. The analyst must ensure that the type of temperature compensation utilized is appropriate for both the type of sample being analyzed and the required test accuracy. This is an essential factor for determining the suitability of a conductivity instrument for measurement applications. A conductivity measurement taken with the sample at the reference temperature will always be more accurate than a temperature compensated reading taken away from the reference temperature – this point is essential for critical applications requiring high accuracy of measurements.

# TIMER

Timers are usually used for activities such as a “shock chlorination”. Once the function is enabled (move wheel on disable, click and then rotate) there are five main parameters to set. Timer available may be up to 5.

Timer will start at a specified time of a set day (multiple days can be selected).



### Out

Choose one or both two related outputs (not previously assigned , chlorine output exception) that will be enabled during set time. Out1, Out2, ect. are referred to MAX5 channel.

### Ton

This is the activity starting time.

### Toff

This is the activity ending time.

**Mo (Monday), Tu (Tuesday), We (Wednesday), Th (Thursday), Fr (Friday), Sa (Saturday), Su (Sunday).**

These are the days in which activity will be enabled. Multiple days can be selected.

---

Shock chlorination is a process used in many swimming pools, water wells, springs, and other water sources to reduce the bacterial and algal residue in the water. Shock chlorination is performed by mixing a large amount of sodium hypochlorite, which can be in the form of a powder or a liquid such as chlorine bleach, into the water. Water that is being shock chlorinated should not be swum in or drunk until the sodium hypochlorite count in the water goes down to three ppm or less.

## TIMER 2 (to 5)

Timer2 is usually used for activities such as a "anti algae treatment". Once the function is enabled (move wheel on disable, click and then rotate) there are 6 main parameters to set.

Timer starts at a specified time of the year and can be repeated every xx days.

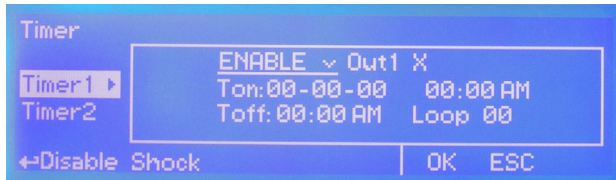


fig. 32

### Out1 and Out2.

Choose one or both two related outputs (not previously assigned , chlorine output exception) that will be enabled during set time.

### Ton

This is the activity starting date and time.

### Toff

This is the activity ending time.

### LOOP

These are the day-countdown in which activity will be repeated.

E.g.: LOOP 03 means that every three days activity will be repeated at specified time.

---

Anti algae treatment is a process used in many swimming pools, water wells, springs, and other water sources for killing and preventing all pool algae types.

# Options.

From setup menu (fig.3) rotate wheel to highlight "Options" then press wheel. Main options are:

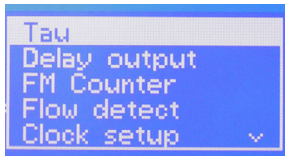


fig. A

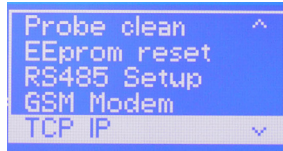


fig. B

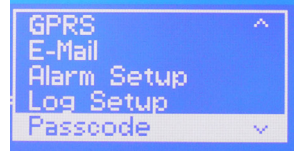


fig. C

**TAU** : It determines how quickly reading on display follows the reading of the probe. It can be changed between 0 and 30. The more close to 0 this value is set and the more quickly the reading on the display will change, take in consideration that quickly changes on the display will result in unstable readings.

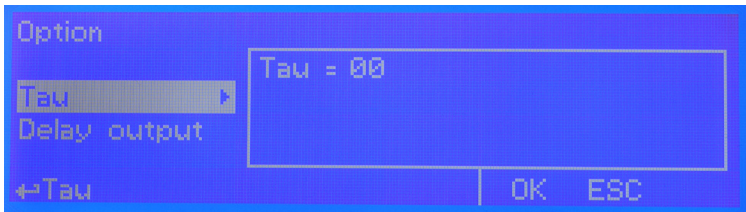


fig. 18

**DELAY** : it's the pump output activation delay. Can be set between 0 and 99 minutes and it takes effect on start up of the instrument, quitting from stand-by condition and after a "Flow Alarm". "Delay SMS": sends warning message if alarm condition persists after set time. Delay Init: countdown after instrument's initialization (booting) before to return operative.

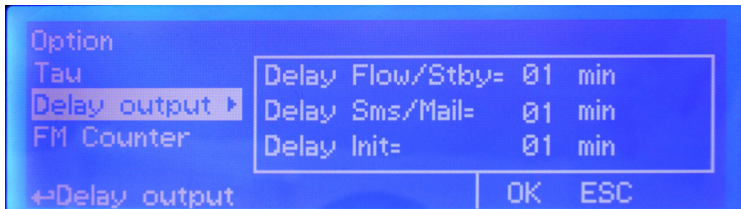



fig. 19

## FM Counter

Use this function to enable flow monitoring for connected pulse sender water meter (blocks 37 and 38). Set metering control unit to Liters (LIT) or gallons (GAL). Move on Imp/Lit to choose between Pulses per liter or Liters per pulses and counter value. Move on OK and press wheel to save parameters. To see counter status press  twice from main menu.

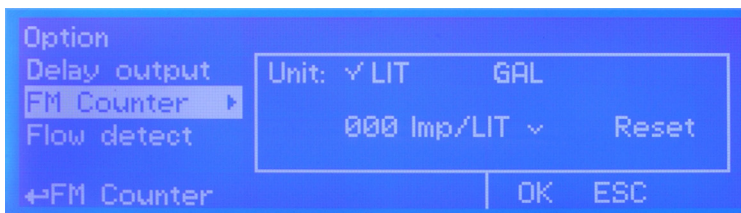


fig. 20

## FLOW DETECT

Choose the flow sensor input, set to **“Direct”** activates the standard flow sensor (“SEPR” proxy sensor). Set to **“Reverse”** the digital logic of the sensor is inverted. Set to **“Disable”** the flow sensor is not enabled.

### MSG.

If flagged an SMS / EMAIL alarm message will be sent to recipients added in communication menu.

### OUT mA.

If flagged and the mA module is properly installed, all current outputs will be disabled during a flow alarm.



fig. 21

## CLOCK SETUP

Change date and time according to local zone and international format. Move wheel to change between different configurations.

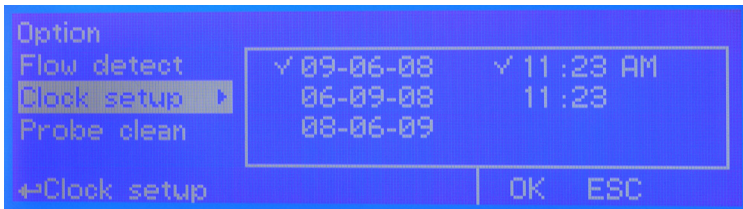


fig. 22



## PROBE CLEAN

Once into submenu, to enable probe clean, move wheel on "DISABLE", press it and change option to "ENABLE".



fig. 23

CYCLE: time until next probe clean. HH (hours) and MM (minutes).

CYCLE T: probe cleaning duration. MM (minutes) and SS (seconds).

RESTORE T: idle time after probe cleaning procedure. MM (minutes).

CLEAN A: Set "ON" to activate cleaning procedure when a setpoint alarm occurs.

Note: during cleaning and restoring procedure all setpoint outputs are disabled.

## EEPROM RESET

To restore instrument to its original settings press "LOAD" and wait until "busy" message disappears.

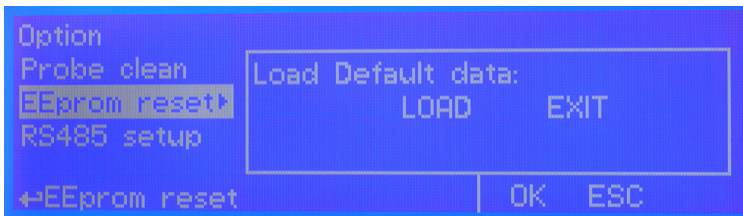


fig. 24

## RS485 SETUP

Prior to install the instrument into an RS485 local system a unique ID NUMBER and ID NAME (station name) must be configured. Rotate wheel and edit fields. If ID number has already assigned an error message will follow. In this event try using another number.

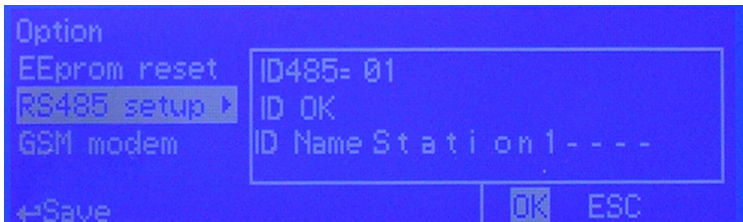


fig. 25

## GSM MODEM

MAX5 may remotely send SMS alarm messages using its own modem (where available). Options can be configured as follows:

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

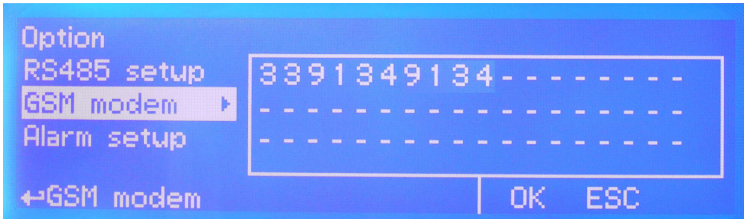
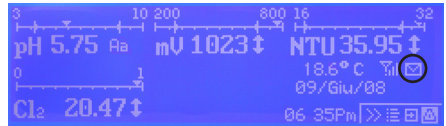
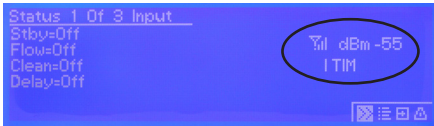


fig. 26

- 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 !



## GSM SIGNAL STATUS

Before to configure SMS phone number ensure that internal gsm modem has enough signal to operate correctly.

To check this press  twice from main menu and verify signal strength as following:

0 or 1 bar (-113dBm to -103dBm)	no signal or very low signal	re-orient antenna
1 or 2 bars (-103dBm to -95dBm)	low signal	slow conn.
2 or 3 bars (-95dBm to -85dBm)	good signal	ok
3 or 4 bars (-85dBm to -51dBm or more)	optimum signal	ok

## MAX GSM MODEM VERSION

**Antenna icon on MAX5 display means that modem is correctly installed.**

**Blinking envelope** means that MAX5 is trying to send an alert message to preferred numbers (SMS1 and/or SMS2 and/or SMS3). If this condition stays for more that 1 minute it could be an error while sending message. Check modem status or instrument condition.

**Fixed envelope** means that MAX5 has successfully sent an alert message to preferred numbers.

## TCP/IP

MAX5 may be remotely operated using a standard ethernet connection (on demand). 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 "SEND" to store parameters then move on "OK" and press wheel to save and activate configuration. **From RS485 menu assign a unique ID number to the MAX5 (page 29 - fig. 25).** Configure "ERMES Software" to use TCP/IP protocol and check connection by clicking on "TEST" (pc software). Furthermore, using router IP and port 2020 forwarding option, MAX5 can be controlled through the internet (see scheme).

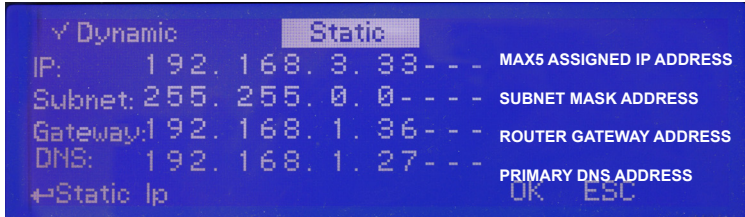


fig. 27

See "ERMES Software" manual for proper PC software configuration.

Based on your network configuration choose "Dynamic" (automatically MAX5 will receive network parameters) or "Static" (enter manually data) configuration type.

Move wheel on "OK" to save and move on "ESC" to go back to main menu.

---

### 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 IP 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 IP 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 IP 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 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 IP address is the next-best thing to having a static IP.

## GPRS

MAX5 may be remotely operated using an embedded standard GPRS modem. 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 and the "MAX5" or its accessories is of a minimum of 1meter (3.28ft).
- Do not route the cable where it could be pinched in doors, windows etc.
- Ensure that SIM into "MAX5" modem is correctly inserted, activated and within operator range.



fig. 28

IF REQUIRED ENTER APN MANUALLY

**SIM PIN CODE (4 DIGITS):** enter pin code if "error pin" message appears on main screen. PIN can't be edited.

**ERMES-SERVER:** enable or disable ERMES communication through SIM CARD\*

**APN SIM SERVICE PROVIDER:** enter SIM INTERNET PROVIDER ACCESS manually if required.

**USERNAME / PASSWORD FOR SIM INTERNET ACCESS:** enter these information only if required.

Please locate CODE NUMBER in SERVICE MENU for using to gain access to ERMES WEB SERVICES

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

## EMAIL

MAX5 may send alarm email messages if properly configured through ETHERNET connection. In order to activate this option enter the following information:



fig. 29

---

Access point name (APN) identifies an IP 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 (WAP) 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).

## ALARM SETUP

When an alarm condition is displayed and general alarm output is possible to choose between two working modes.  
Continuos: alarm condition never stops until "ESC" is pressed.  
Timered: alarm condition ends after set time.

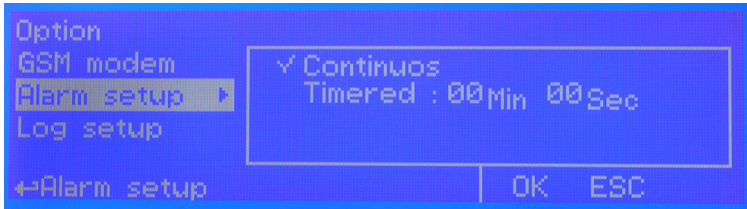


fig. 30

## LOG SETUP

Log setup stores instrument activities when an alarm (flow, level, general) occurs or after a set **time**.



fig. 31

**ENABLE:** enable or disable log function

**TIME:** log starting time (format 23h 59min)

**EVERY:** frequency of recording (format 23h 59min)

**OUTPUT ON:** Enable / disable Log For Outputs

**DATA FILTER:** filter that allows you to avoid repeating for the same alarm (max 59 minutes). If the same alarm is repeated during set time the instrument won't send any SMS.

SET DATE & TIME BEFORE TO ENABLE LOG. IF NOT POWERED FOR ABOUT 30 DAYS THE INSTRUMENT WILL LOOSE DATE/TIME

## PASSCODE

Change default passcode ("00 00") by rotating wheel on each of two-digits groups. Press "OK" to confirm or "ESC" to exit without saving. Administrator can also set passcode for "User" with limited access (no instrument reset / mA setpoint unavailable).

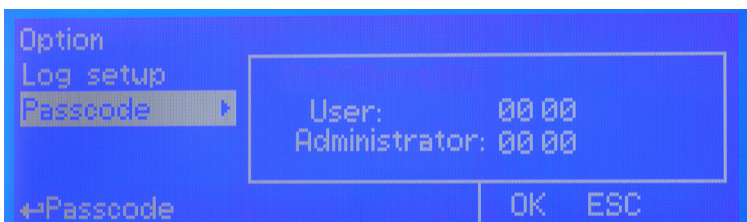


fig. 32



# Manual.

Outputs may be activated manually for testing purposes.

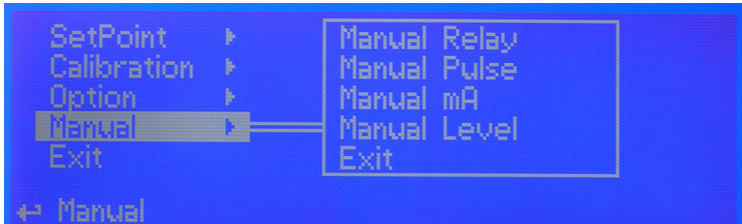


fig. 33

"Manual Relay" will activate "setpoints outputs" (see page 4). Exiting from manual mode will revert selected output to its original condition.

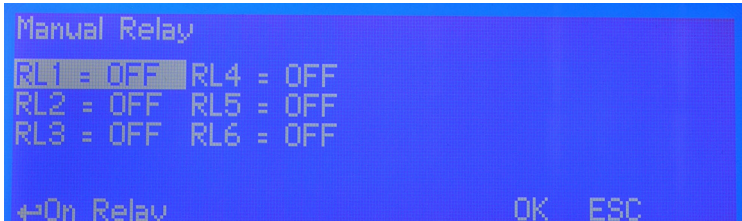


fig. 34

"Manual Pulse" will activate "Proportional pump outputs" (see page 5) with selectable pulses from 0 to 150 for each output. Exiting from manual mode will revert selected output to its original condition.



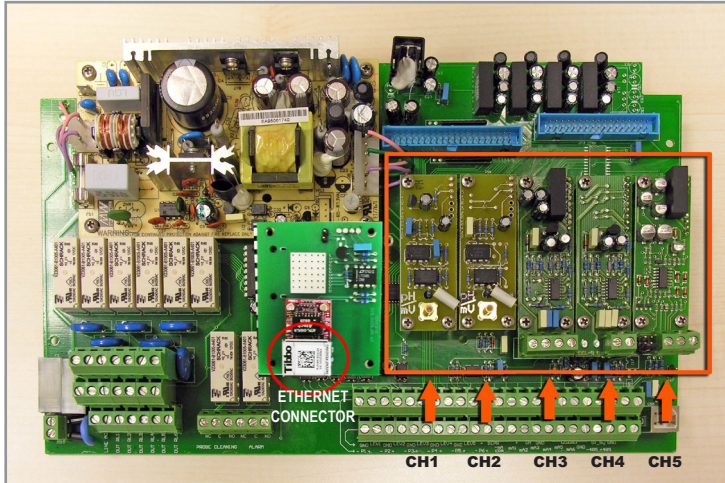
fig. 35



# Appendix A - Probes Connections.

Located in **upside of mainboard** there are four 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. For Ethernet version a standard ethernet cable (RJ45) is required.

## CHLORINE module



**MDCL-1**

Module suitable for:

- ECL1
- ECL2
- ECL3
- ECL8
- ECL9
- ECL10
- ECL11
- ECL17
- ECL18

Connect probe as follows:

- Block n.1 : Brown(+) wire
- Block n.2 : White(-) wire
- Block n.3 : Green(IN) wire
- Block n.4 : Yellow(GND) wire



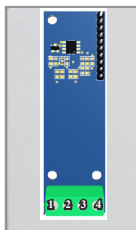
**MDCL-6**

Module suitable for:

- ECL4
- ECL5
- ECL6
- ECL7

Connect probe as follows:

- Block n.1 : Black(-) wire
- Block n.2 : Red (+) wire



**MDSCL**

Module suitable for:

SCLxx probes

Connect probe as follows:

- 1 (-485) green wire
- 2 (+485) white wire
- 3 (GND) black wire
- 4 (+5VDC) red wire



**TEMP1**

Module suitable for:

Temperature probe  
**Temp1 ( "MAX5 PH CL PH CL double flow" model only)**

Connect as follows:

- Block n.1 : Red wire
- Block n.2 : White wire
- Block n.3 : Black wire

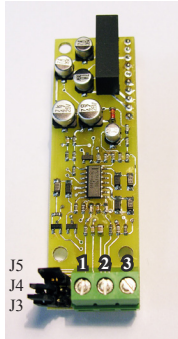
**Probes configuration for "MAX5 PH CL PH CL double FLOW" model only**

- Ch1: PH1
- Ch2: CL1
- Ch3: PH2
- Ch4: CL2
- Ch5: Temp1

Temp1 is related to PH1 / CL1  
 Temp2 is related to PH2 / CL2



## CONDUCTIVITY modules



**MDCD**

MAX5 Probe Scale	PROBE TYPE				JUMPERS SETTINGS		
	K	Platinum	Graphite	Inox	J3	J4	J5
0 - 300.0 uS	0.1	ECDHL/01	x	ECDI/01	OPEN	CLOSED	CLOSED
0 - 3000 uS	1	ECDHL/1	ECDC/1	ECDI/1	OPEN	CLOSED	OPEN
0 - 30.00 mS	1	ECDHL/1	ECDC/1	x	CLOSED	OPEN	OPEN
0 - 30.00 mS	10	ECDHL/10	ECDC/10	x	OPEN	OPEN	OPEN
0 - 300.0 mS	10	ECDHL/10	ECDC/10	x	CLOSED	OPEN	OPEN

Connect probe as follows:

- Block n.1 :Shield
- Block n.2 : Black (probe)
- Block n.3 : Red (probe)



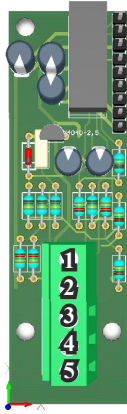
**MDCDT**

MAX5 Probe Scale	PROBE TYPE				JUMPERS SETTINGS		
	K	Platinum	Graphite	Inox	J3	J4	J5
0 - 300.0 uS	0.1	ECDHL/01	x	ECDI/01	OPEN	CLOSED	CLOSED
0 - 3000 uS	1	ECDHL/1	ECDC/1	ECDI/1	OPEN	CLOSED	OPEN
0 - 30.00 mS	1	ECDHL/1	ECDC/1	x	CLOSED	OPEN	OPEN
0 - 30.00 mS	10	ECDHL/10	ECDC/10	x	OPEN	OPEN	OPEN
0 - 300.0 mS	10	ECDHL/10	ECDC/10	x	CLOSED	OPEN	OPEN

Connect probe as follows:

- Block n.1 : Conductivity Probe (red)
- Block n.2 : Conductivity Probe (hot-black)
- Block n.3 : GND (Shield-blue)
- Block n.4 : NTC 10Kohm 25°C Temperature Probe (white)
- Block n.5 : NTC 10Kohm 25°C Temperature Probe (green)

## TURBIDITY module (ETORBH / ETORB40 probe)



**MDETORBH**

Connect turbidity probe as follow:

**mod. ETORBH**

- 1 Green
- 2 Yellow
- 3 Black
- 4 White
- 5 Brown

**mod. ETORB40\***

- 1 Blue
- 2 Brown
- 3 Black
- 4 White
- 5 Green

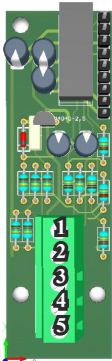
If ETORBH pobe is supplied with extra cable connect wires as follows:

- 1 Green
- 2 Yellow
- 3 Black+ White
- 4 Blu
- 5 Brown+Red

**Note:** If probe has been purchased with the instrument then is already configured to work properly on its own channel. Otherwise, you must assign an ID / CHANNEL to the probe using the OPTIONS menu and choosing Turbidity INDEX.

\*terminals for the ETORB40 are horizontal 

## DISSOLVED OXYGEN module (EOLUM probe)



**MDEOLUM**

Connect "EOLUM" probe as follow:

- 1 Pink
- 2 Blue
- 3 Brown
- 4 Grey
- 5 Yellow

**Note:** probe has a built in temperature sensor.

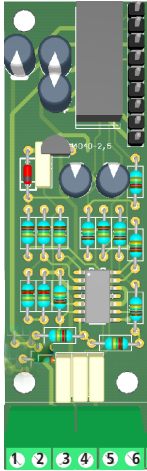
If pobe is supplied with extra cable connect wires as follows:

- 1 Pink
- 2 White
- 3 Brown
- 4 Grey and Black
- 5 Yellow
- Not connected blu wire (shield)

**Note:** If probe has been purchased with the instrument then is already configured to work properly on its own channel. Otherwise, you must assign an ID / CHANNEL to the probe using the OPTIONS menu and choosing EOLUM INDEX.

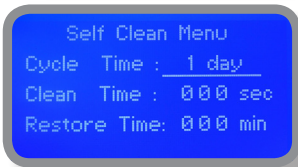
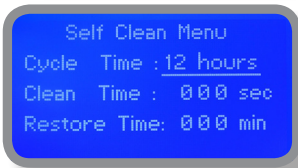
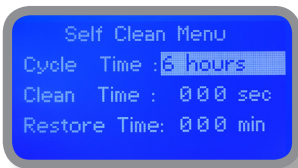
# MDPS potentiostat probe series module

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.



<b>TYPE 1</b>	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	Probe Black on Block n.8 mainboard (N)
	Block n. 6	Probe Red on Block n.9 mainboard (N.O.)
<b>TYPE 2</b>	Block n. 1	Probe Wire Black
	Block n. 2	Probe Wire Shield
	Block n. 3	Probe Wire Grey / Transparent

## Self Clean Menu



To ensure reliable results probe's head must be cleaned on regular basis. This menu enable the embedded wiper to clean probe's head.

**Cycle Time:** time until next cleaning procedure (from 6hours up to 10 days)

**Clean Time:** overall time required to perform cleaning procedure (from 0 to 999 seconds)

**Restore Time:** time that probe needs to return reliable after cleaning procedure (from 0 to 999 minutes)

## pH & Temperature compensation

Within calibration menu enable or disable pH & temperature compensation. For proper probe's calibration please refer to CI channel

## INDUCTIVE CONDUCTIVITY module (ECDIND probe)



**MDIND**

8 WIRES CABLE:  
4 PROBE WIRES  
4 PT100 WIRES

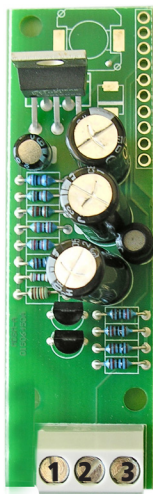
Connect 4 probe wires to MDIND module as follows:

Block n.1 : blue  
Block n.2 : black  
Block n.3 : grey  
Block n.4 : red

**When using two probes the scale settings  
must be the same for both!**

Connect 4 PT100 wires to mainboard (ref. p. 5) as follows:

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



**MDECDIND**

ECDS IND PT PROBE

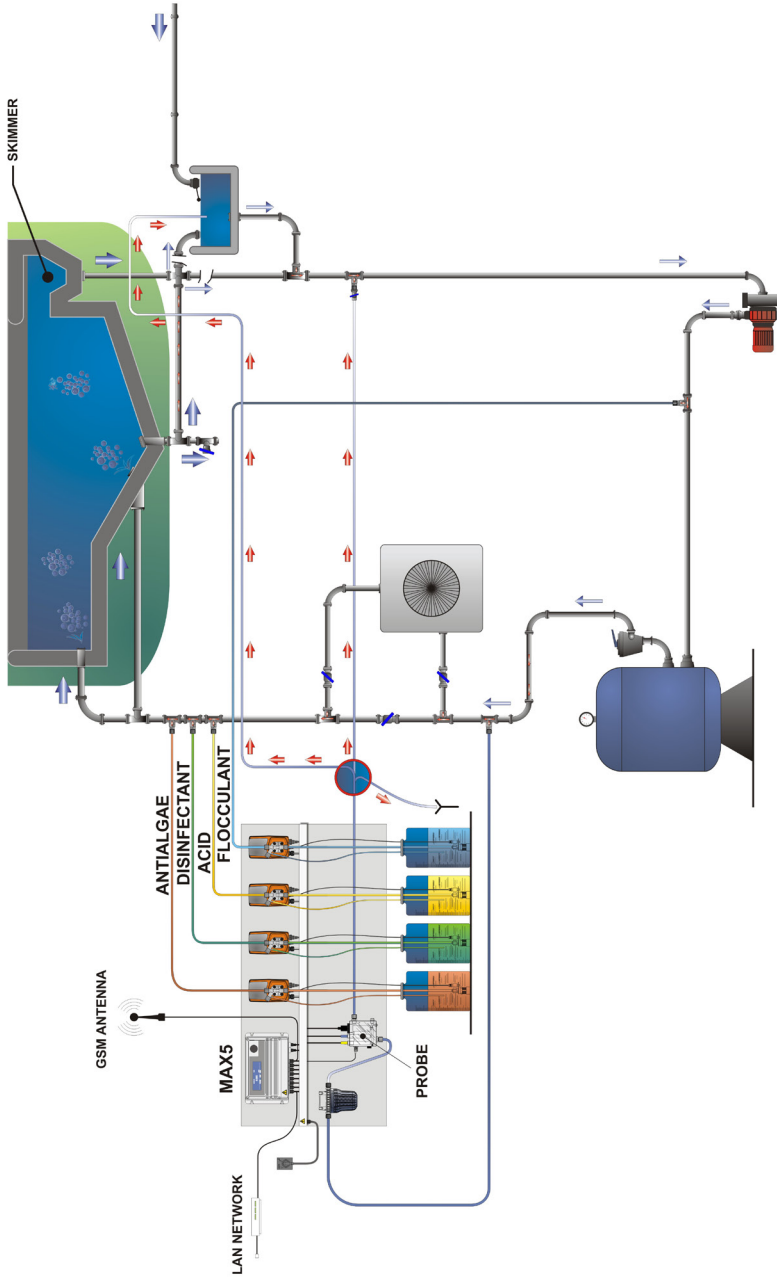
Connect 4 probe wires to MDIND module as follow:

Block n.1 : blue  
Block n.2 : green  
Block n.3 : red

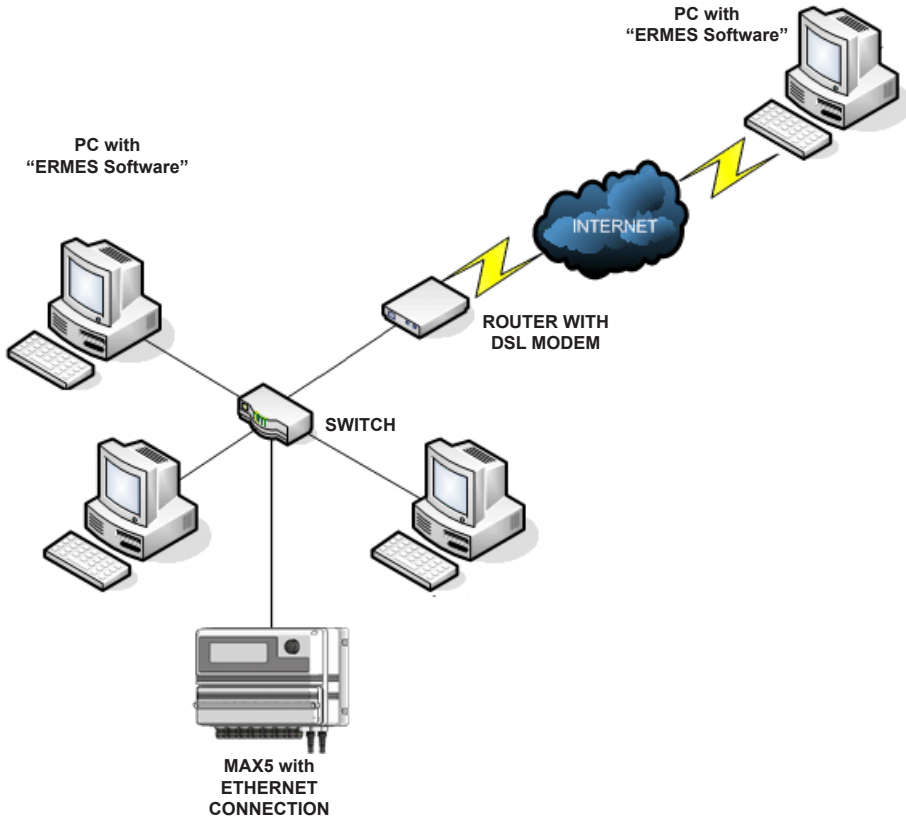
Connect 4 PT100 wires to mainboard (ref. p. 5)  
as follow:

Block n. 40 + 41: white  
Block n. 42 + 43 : black

# Appendix B - Installation draw



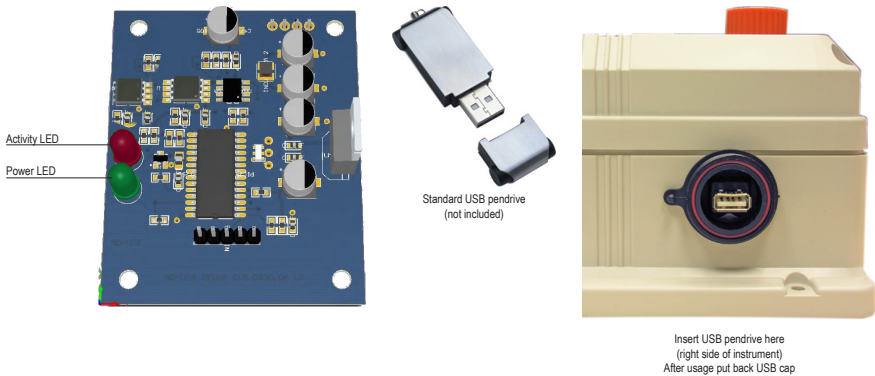
# Appendix C - Network logical installation scheme



## Appendix D - "LOG USB" Module

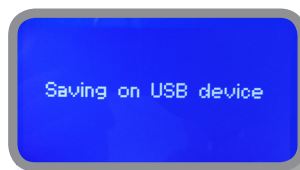
Located under mainboard cover there is a four pins connector that can be used to install "USB data log module" or "SMS module". Modules come pre-installed upon request and may appear different as shown (different configurations).

"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](http://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.



### 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](http://www.ermes-server.com) to review USB pendrive info on a PC.

# Appendix E - EOLUM Probe Setup and calibration

To correctly use the dissolved oxygen (fluorescence membrane) probe perform calibration as described.



At first start-up, sensor calibration is required in order to the measuring system to be able to generate accurate measuring values. The slope calibration of the oxygen sensor can be performed in air, saturated water or using a reference solution.



## Calibration in AIR.

Calibration in air is only possible if air temperature is  $\geq -5$  °C ( $\geq 23$  °F). From calibration menu choose "Calib Chxx LDO". Choose "RANGE" to setup reading scale. Choose "AIR" as calibration method. Remove sensor from the medium and dry completely. Leave it in air. Start calibration by clicking on "START". Reading value is real time displayed on upper screen side. 600s means how many seconds are left until the end of procedure. Move cursor on "OK" when "CALIBRATION OK" message appears. If an error message appears repeat procedure.

## Calibration in air saturated WATER.

From calibration menu choose "Calib Chxx LDO". Choose "RANGE" to setup visualization scale. Choose "WATER" as calibration method. Dip head's probe into water. Start calibration by clicking on "START". Reading value is real time displayed on upper screen side. Time shown is how many seconds are left to the end of procedure. Move cursor on "OK" when "CALIBRATION OK" message appears. If an error message appears repeat procedure.

## Calibration using a REFERENCE solution.

From calibration menu choose "Calib Chxx LDO". Choose "RANGE" to setup visualization scale. Choose "REF" as calibration method. Dip sensor's probe into reference solution. Start calibration by clicking on "START". Reading value is real time displayed on upper screen side. Time shown is how many seconds are left to the end of procedure. Move cursor on "OK" when "CALIBRATION OK" message appears. If an error message appears repeat procedure.

## Probe's temperature sensor calibration.

Temperature calibration needs an external thermometer to match probe's reading value.

From "Calib Chxx LDO" menu, move wheel on "Temp", press wheel to enter system temperature obtained from a thermometer. Press wheel to confirm then move cursor on "OK" and press wheel. End procedure by moving cursor on "Exit" from "Temp" main menu and press it. 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.

To restore probe's calibration parameters to factory values select "FACTORY DEFAULT" within "Default" menu.

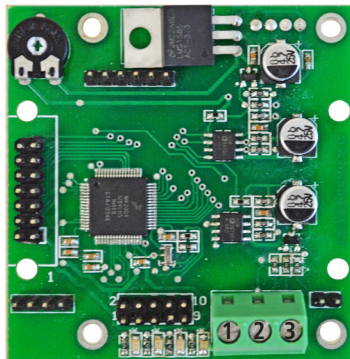
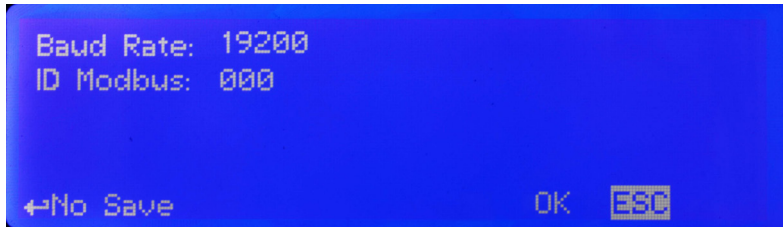
**Power cycling off then on the instrument to properly save probe new calibration values.**



# Appendix F - 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 COMMUNICATION 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.



- 1: GND
- 2: A-RS485 (+)
- 3: B-RS485 (-)

## Appendix G - SETPOINT Temperature

Set values to enable (ON) or disable (OFF) the temperature relay output. The instrument will proceed to the ON/OFF working mode.

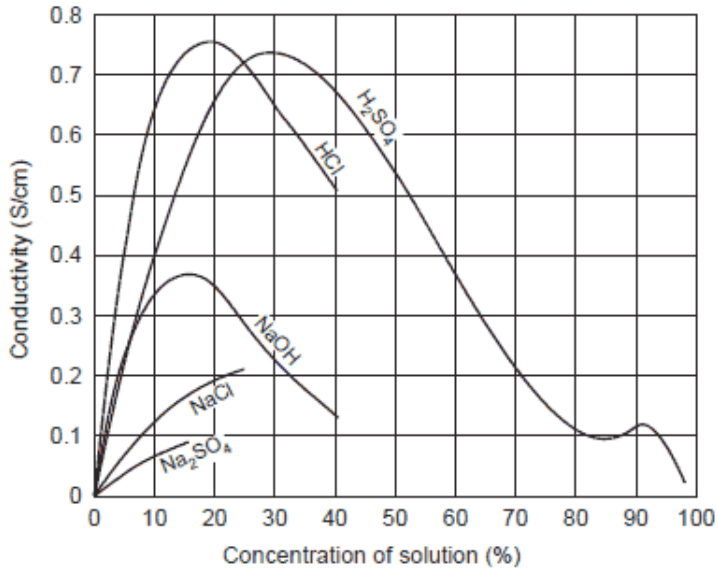
Example: set ON at 30 °C and OFF at 25 °C

The output will be active for values lower than 30 °C and it will switch off for values greater than 30 °C, then it'll reactivate for values lower than 25 °C. The difference between these two values (30 °C and 25 °C) is called hysteresis. In order to avoid that the relay is switched on and off repeatedly avoid setting hysteresis values below 2 °C.



# Appendix H - Water salinity for CD module

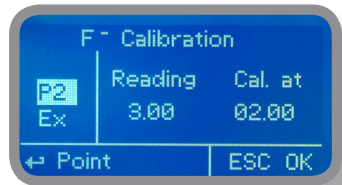
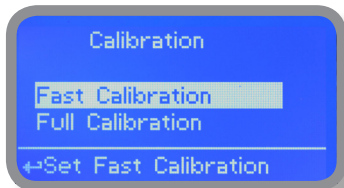
For “%” version this is NaCl based on conductivity. See graphic below for comparison and relationship between concentration of Solutions and Conductivity (at 18°C).



Relationship between Concentration of Solutions and Conductivity (at 18°C)

# Appendix I - Fluorine probe module & calibration

In the upper part of the motherboard there are two connectors for the installation of the probe modules. On request, these modules are installed by the manufacturer. For the form of fluoride probe simply connect the probe's BNC connector. The probe must be calibrated for properly operate. Chosoe FULL calibration for two points calibration involving zero point (P1) and the second point (P2).



The FAST Calibration is performed by a single point from the value closest to work

Warning: This procedure assumes that instrument is correctly configured, it is connected to the probe running and installed on your system. The measurement must be performed using the system water. Otherwise, the results may not be reliable.

Zero point calibration (P1).

In the probe's calibration menu move the cursor to "P1" and select it to enter in the calibration procedure. For a correct calibration, proceed as follows:

- Install an "activated carbon filter" in the filter holder.
- Flow water inside the filter-holder for about 30 minutes.
- Press the knob with the cursor positioned on "Cal.at". Remove the filter.



Carbon Filter System

2nd calibration point (P2).

Move the cursor on "P2" and select to enter the calibration procedure. For a correct calibration using a photometer or a DPD system to read the mg / l (F) in the plant. Enter the value read in the "Cal. at".



Photometer

To complete the procedure, move the cursor to "OK" and press the wheel for saving. If during calibration an error occurs, the instrument will signal with a message and ask for a new calibration. Clear current settings or restore the default values.

# Appendix L - Chlorine Index / Chlorine S/N

For proper SCLxx probe installation channel assignment is required. Within "OPTIONS" menu, select "Chlorine Index" and assign a free channel to the probe. To check probe's serial number see "Chlorine S/N". This index is related to physical slot installation on mainboard. By default slot 3 is assigned to the chlorine probe. Please remove chlorine probe prior to assign it to the controller.



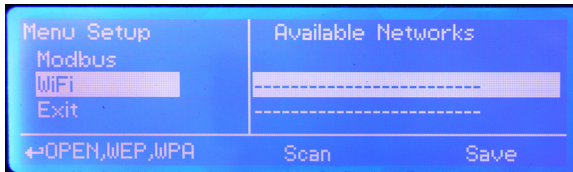
Chlorine Index Menu



Chlorine S/N Menu

## Appendix - WIFI Connection

Within Communication Menu choose "WIFI" to bring wireless sub-menu. To manually enter the WiFi Network highlight and click on first line to the right side of the menu and choose cryptography type (WPA, WEP or OPEN). Otherwise move cursor below to choose within an existing network. If network doesn't appear move cursor on SCAN and click on it. Wait until desired wireless network appears, then move wheel on it then click. Enter WEP / WPA / WPA2 password (if required) and wait until connection has been established 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.

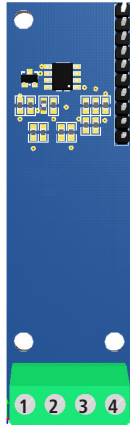


WiFi signal strength

Note: if an existing network doesn't appear at first scan please repeat scanning procedure after a while.

## Appendix - ETORB2 probe module

Located under mainboard cover there are connectors that are used to install the probe module. Module come pre-installed upon request. Identify installed module to correctly connect probe. To assign a probe to a slot between the two available connecting the probe module to the required slot and repeating procedure for each module. To change probe's scale please refer to SELECT PROBE MENU within SETTINGS menu. (Options are: 40.00 - 400.0 - 4000.0 NTU). For probe cleaning menu see page 39.

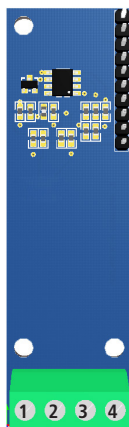


Connect probe as follows:

- 1 (-485) WHITE wire
- 2 (+485) YELLOW wire
- 3 (GND) BLACK + BLUE wire
- 4 (+5VDC) RED wire

**Note:** If probe has been purchased with the instrument then is already configured to work properly on its own channel. Otherwise, you must assign an ID / CHANNEL to the probe using the OPTIONS menu and choosing Turbidity INDEX.

## Appendix - MDPT100 module (double SEPR / TEMP version only)



Connect the probe wires as follows:

- 1 GREEN PT100 wire
- 2 BROWN PT100 wire
- 3 WHITE wire PT100
- 4 YELLOW PT100 wire

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*When dismantling this instrument 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.*