



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.

Read Carefully !



ENGLISH Version

R15-11-10



“MAX5” instrument complies with the following European regulations:

EN60335-1 : 1995, EN55014, EN50081-1/2, EN50082-1/2, EN6055-2, EN60555,3

Based on directive CEE 73/23 c 93/68 (DBT Low voltage directive) and directive 89/336/ CEE (EMC Electromagnetic Compatibility)



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!

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

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. 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:

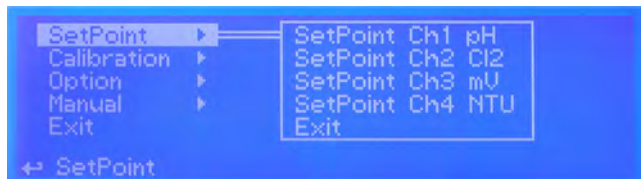
pH : from 0 to 14pH
ORP: from 0 to 1000mv
Chlorine: from 0 to 10 mg/l
Turbidity: from 0 to 9999 NTU
Temperature: from 0 to 200 °C
Conductivity: from 0 to 300.0 mS

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).

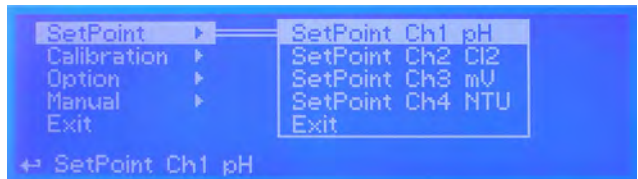
The wheel.

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.



In to 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.

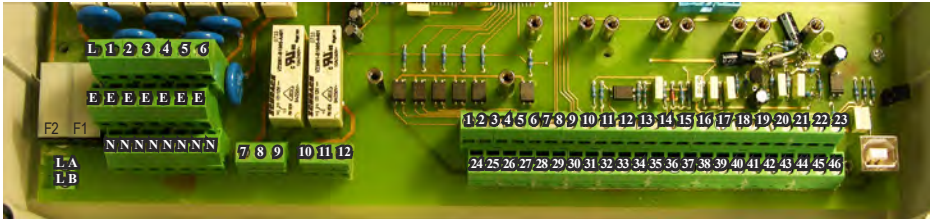
*configuration and screenshots may be different and not including some functions. A maximum of 5 channels can be set.

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: Circuit fuse (3.15AT)

F2: General fuse (6.3AT)

LA - LB: Relay Output Disable Jumper (remove wire to disable outputs)

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

Setpoint Outputs (VAC same on main power supply):

- 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

OPTIONAL OUTPUTS
 on demand

RS485:

20: GND
 21: + Signal RS485 (A)
 22: - Signal RS485 (B)
 23: n/c

GND is a shared ground

Tank Level inputs:

24 (-) ; 25 (+) Level 1
 26 (-) ; 27 (+) Level 2
 28 (-) ; 29 (+) Level 3
 30 (-) ; 31 (+) Level 4
 32 (-) ; 33 (+) Level 5

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

Proximity Sensor (mod. "SEPR") input:

34(+ Brown) ; 35(Black) ; 36(- Blue)
 36 shortcut with block n.32

Contact input:

34 ; 35
 36 shortcut with block 32
 set flow option from setup menu

(Hall effect) pulse sender water meter:

(Contact) Pulse sender water meter:

37(+12VDC) ; 38(INPUT) ; 39(GND)
 38(INPUT) ; 39(GND)

Temperature Probe input for mod. "PT100" only:

40(green) ; 41(brown) ; 42(white) ; 43(yellow)
 (remove resistance before to install probe)

Standby signal input:

44(+); 45(GND)

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



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)

Setup menu. (passcode protected area)

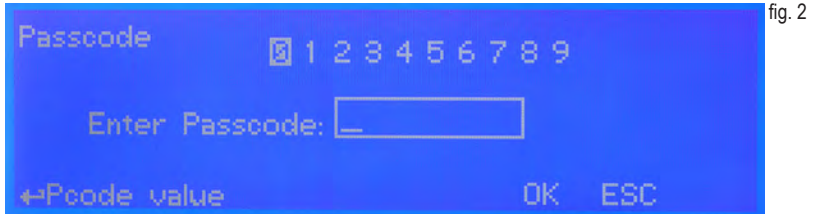
Off menu. Press here to turn off instrument

Alarm menu. Press here to stop alarms

Passcode.


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

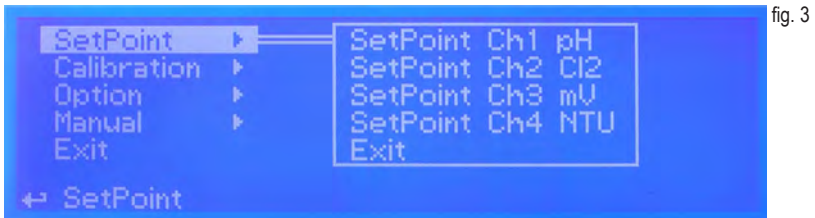
Note: This is a passcode protected area. For this reason every time this menu is reached, the instrument will ask for a passcode as shown.



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 - Cl₂ - mV - NTU.

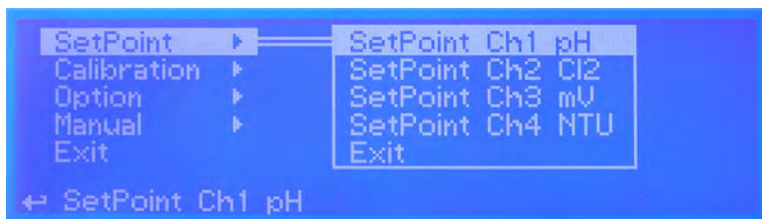


fig. 4

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.

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.**

*Channel is the related output of mainboard connections.

*Setpoint pH or Cl₂ 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)

RL: (choose within available "setpoint output" on mainboard. If an output is already used then it'll be hid from list.)

LEV: (choose within available "tank level inputs" on mainboard. If an output is already used then it'll be hid from list.)

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.)

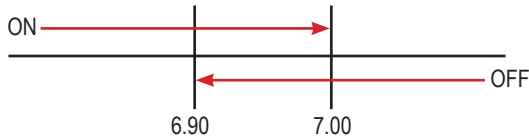
MSG: when flagged an SMS or EMAIL alarm message will be sent to destination edited in GSM menu.

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.

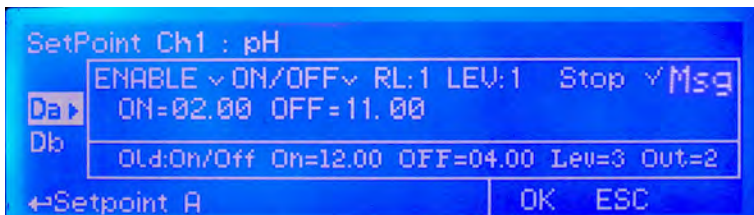
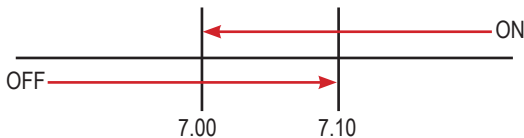


fig. 5

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.)

RL: (choose within available "setpoint output" on mainboard. If an output is already used then it'll be hided from list.)

LEV: (choose within available "tank level inputs" on mainboard. If an output is already used then it'll be hided from list.)

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 to 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.

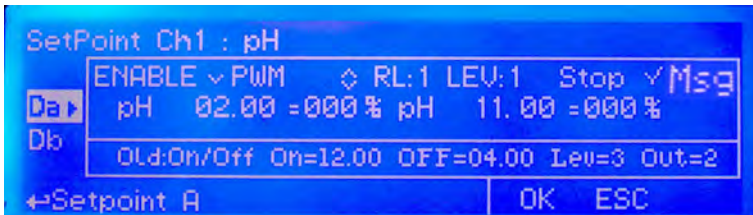


fig. 5

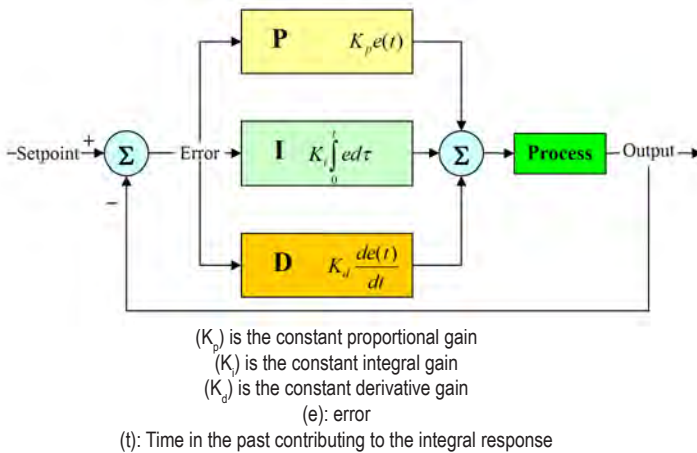
Notes: for values within 1% and 5% MAX5 will assume 5% as usable value.
for values within 95% and 99% MAX5 will assume 95% as usable value.

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



Parameters to set for this mode are:

RL: (choose within available “setpoint output” on mainboard. If an output is already used then it’ll be hid from list.)

LEV: (choose within available “tank level inputs” on mainboard. If an output is already used then it’ll be hid from list.)

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**.

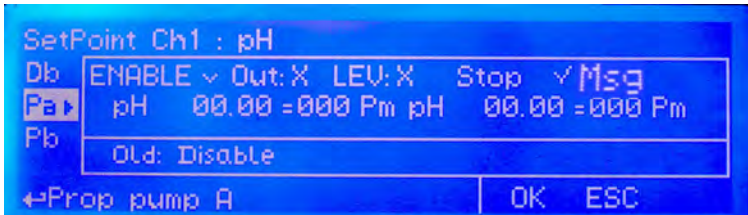


fig. 6

OUTOPTO.

Outopto is referred to "Proportional pump outputs" from "I/O Connections" of mainboard. Set this value between available outputs. If an output is already used then it'll be hid from list.

LEV: (choose within available "tank level inputs" on mainboard. If an output is already used then it'll be hid from list.)

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**.

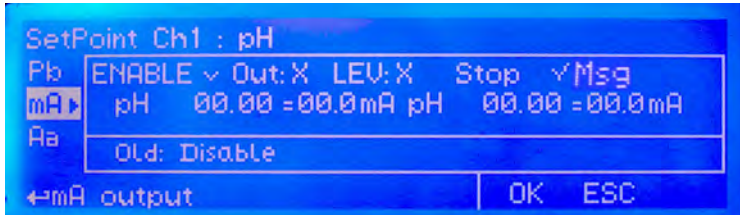


fig. 7

OUTmA.

OutmA 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 hid from list.

LEV: (choose within available "tank level inputs" on mainboard. If an output is already used then it'll be hid from list.)

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.

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.

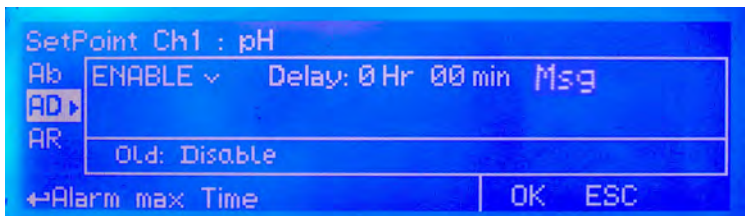


fig. 9

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.

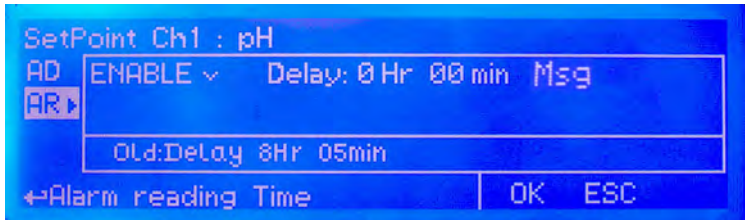


fig. 10

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.

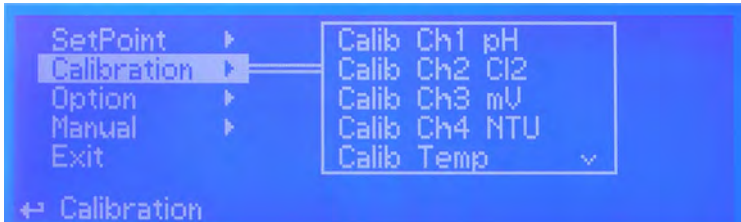


fig. 11

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.

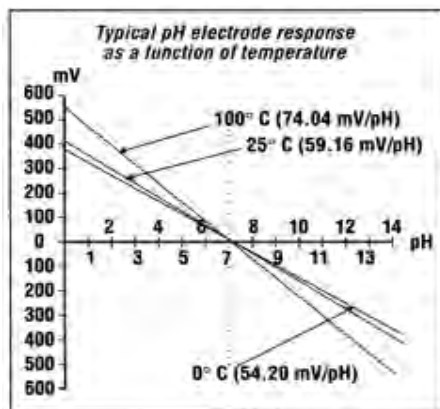


fig. 13

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.

Cl Calibration.

Cl 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 Cl" 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.

| 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.

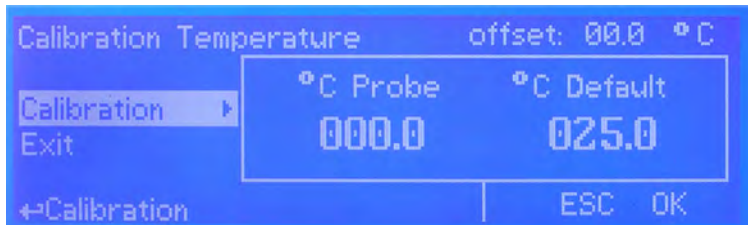


fig. 17

**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.

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.



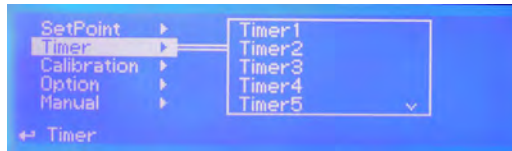
fig. 43

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).



main menu

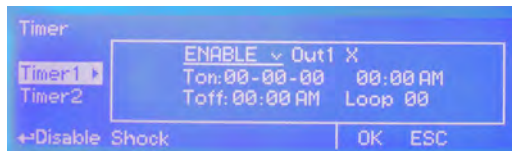


fig. 31

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.

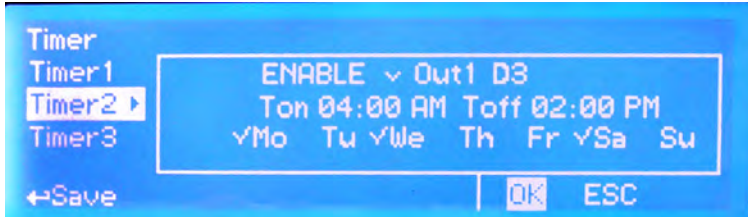


fig. 32

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:

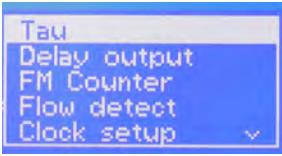


fig. A

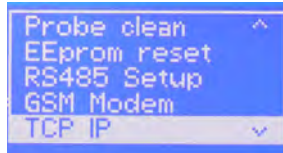


fig. B



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.

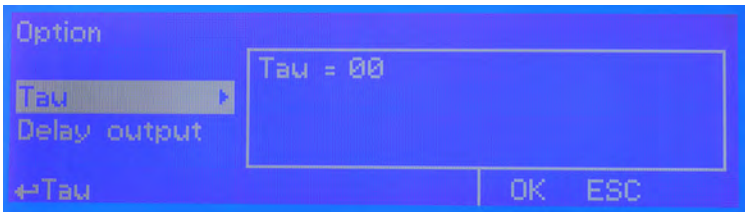



fig. 18

DELAY OUTPUT : 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".



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.

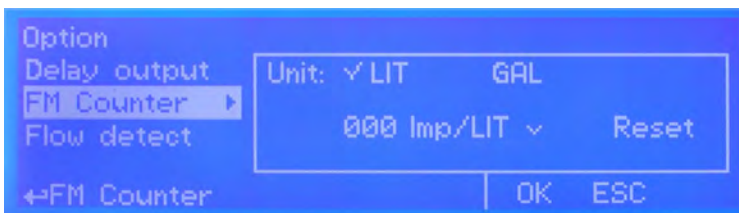


fig. 20

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.

SMS.

If flagged an SMS alarm message will be sent to sms numbers edited in GSM menu.



fig. 21

CLOCK SETUP

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

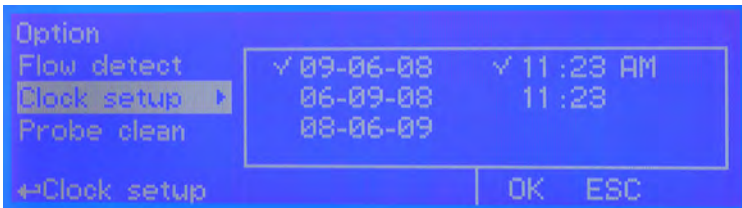


fig. 22

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.

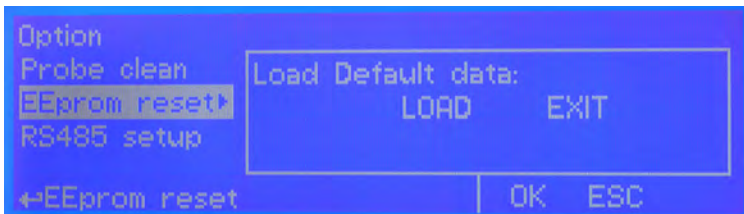


fig. 24

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.

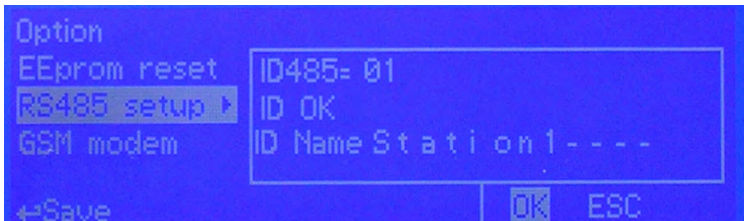


fig. 25

GSM MODEM

MAX5 may be 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.

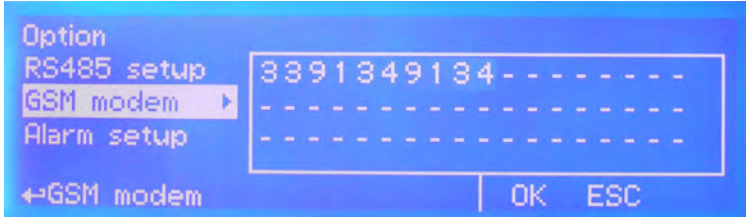
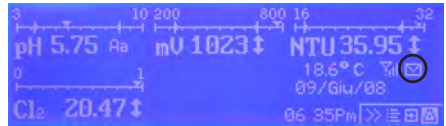


fig. 26

- 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 "MAX5 PC Communication Software" to use TCP/IP protocol and check connection by clicking on "TEST" (pc software). Furthermore, using router IP and port 1000 forwarding option, MAX5 can be controlled through the internet (see scheme).

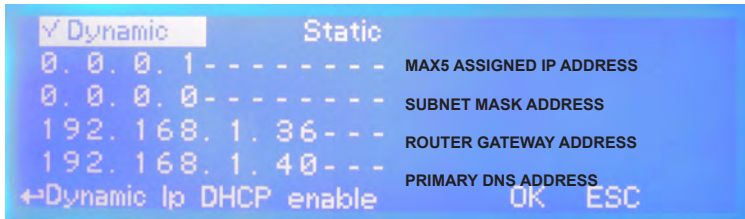


fig. 27

See "MAX5 PC Communication 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 to the "MAX5" unit is within cable length.
- 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.

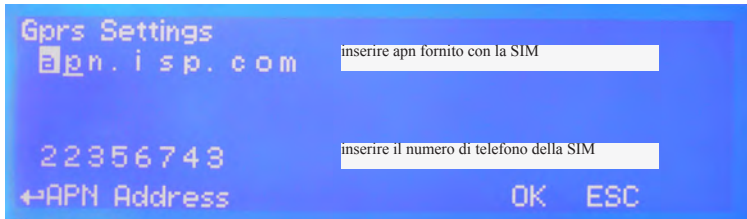


fig. 28

See "MAX5 PC Communication Software" manual for proper PC software configuration.

Based on your SIM data access configuration 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

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.
Continuous: alarm condition never stops until "ESC" is pressed.
Timered: alarm condition ends after set time.

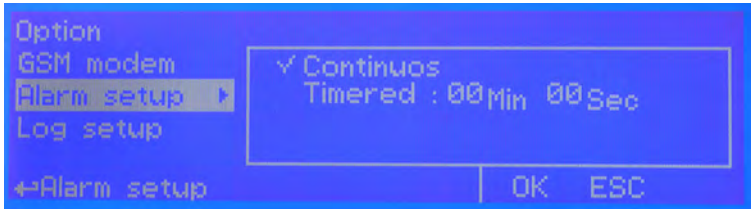


fig. 30

LOG SETUP

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



fig. 31

Activities can be printed by enabling "PRINT" option. **Printer** must be RS485 compatible to properly operate.

Data filter option set a delayed time between repeating alarms. This option may be useful to not fullfill memory with same alarm condition.

Data log example:

```
001 on 10/09/05 15:36 pH12.06 ClO2.00 D1a=on P1a=150 D1b=off P1b=075 D2=off P2=150 LP1a=Hi LP1b=Hi  
LP2=Hi AMD1=OFF AMD2=OFF FLOW=ON STBY=OFF CLEAN=OFF Liter=123456789
```

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).

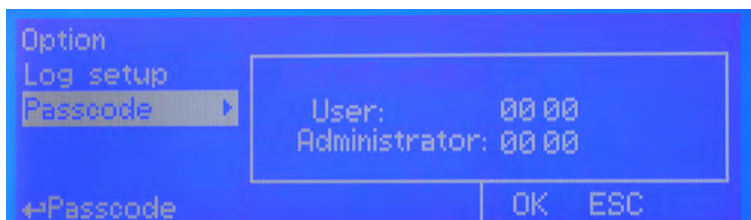


fig. 32

Manual.

Outputs may be activated manually for testing purposes.

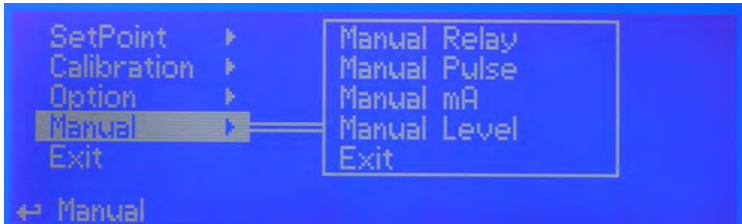


fig. 33

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

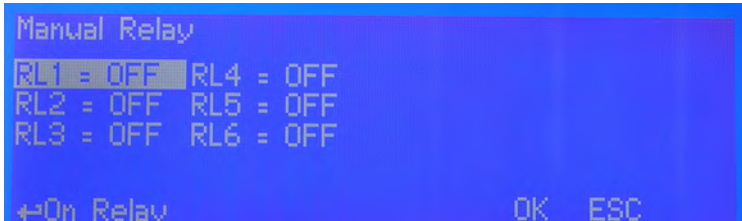


fig. 34

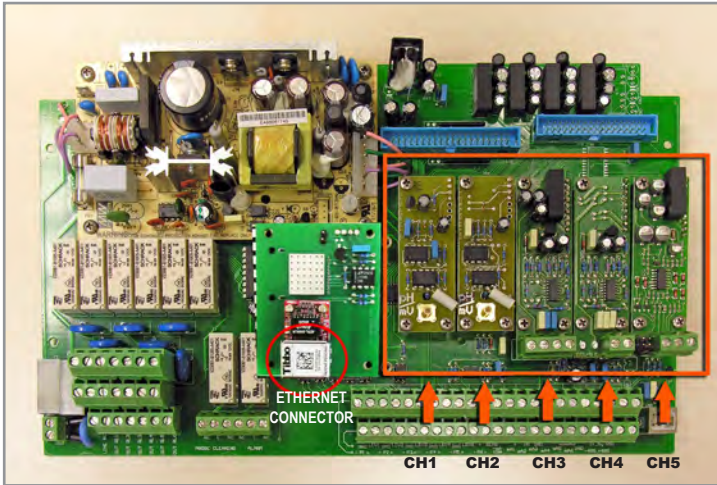
"Manual Pulse" will activate "Proportional pump outputs" (see page 5) with selectable pulses from 0 to 150 for each output. Exiting from manual mode will revert selected output to its original condition.



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.



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:

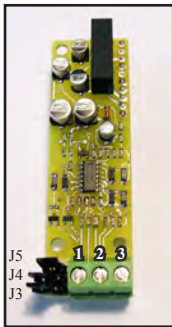
- ECL4
- ECL5
- ECL6
- ECL7

Connect probe as follows:

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

Appendix B - Probes Connections.

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.

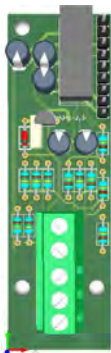


MDCD

| 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)



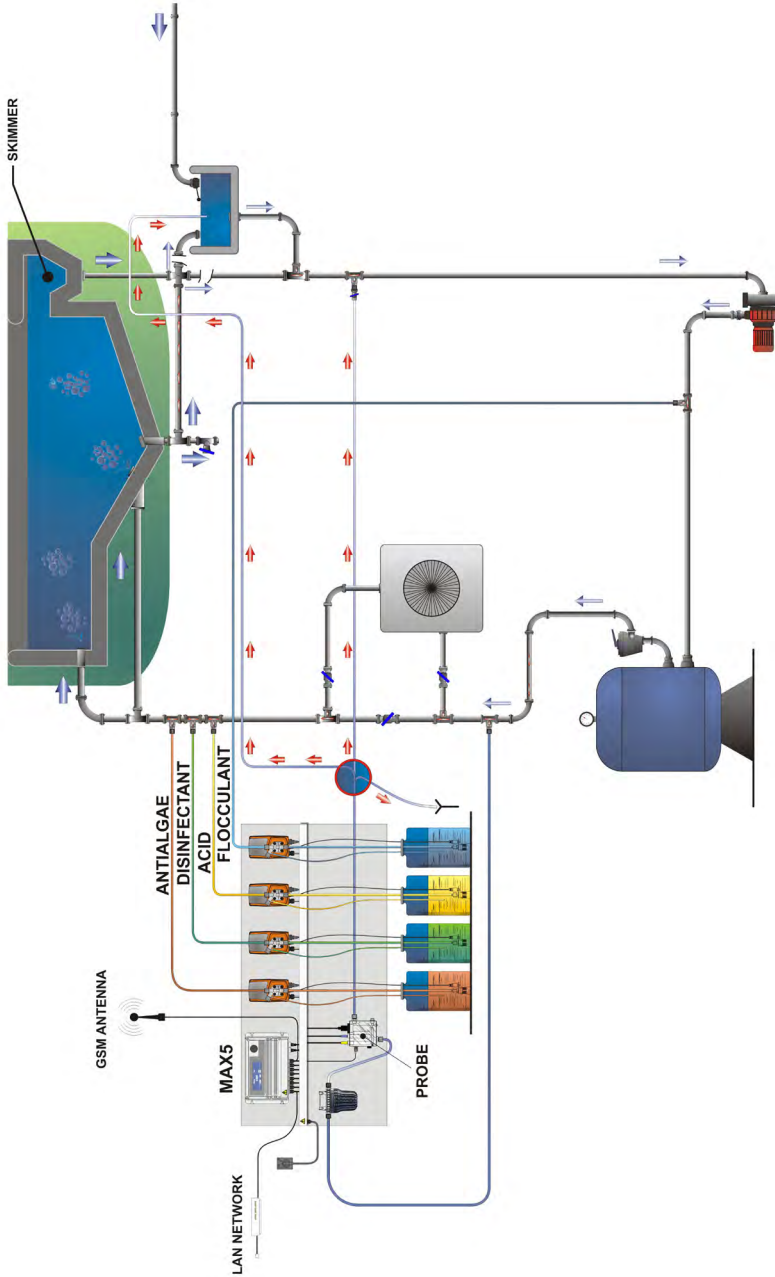
MDETORBH

Conenct "ETORBH" probe as follow:

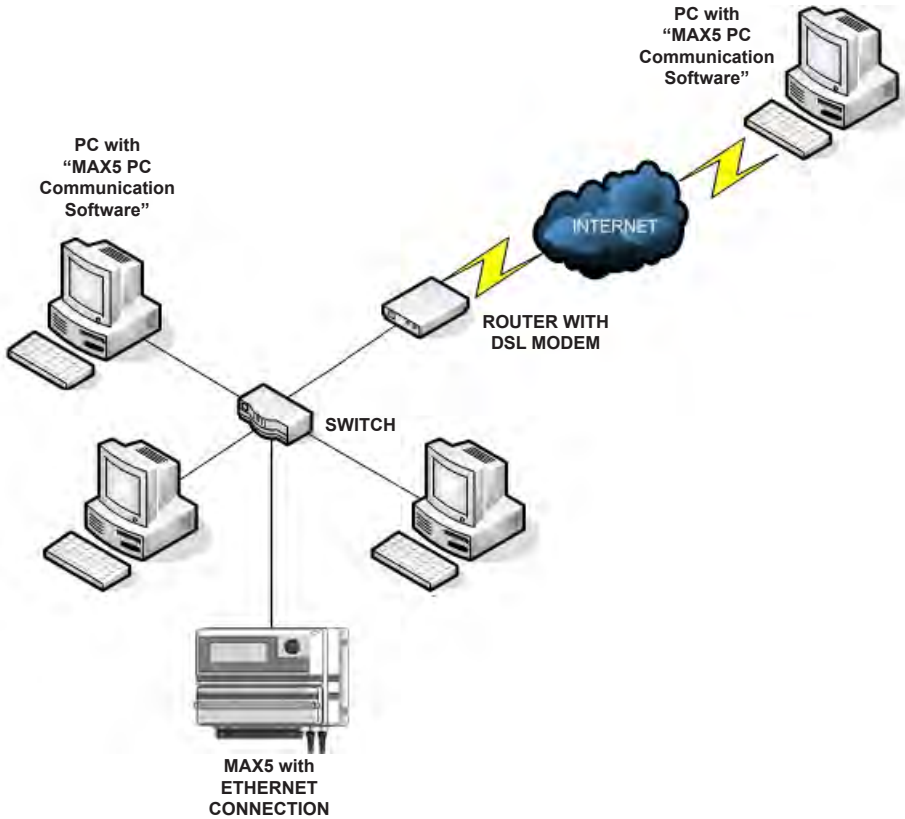
- 1 Green
- 2 Yellow
- 3 Black
- 4 White
- 5 Brown

Note: connect probe to labeled channel (CHx on probe's body) and follow board channels position (see page 37).

Appendix C - Installation draw



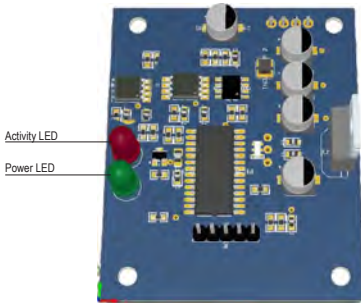
Appendix D - Network logical installation scheme



Appendix E - USB Module installation and setup

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

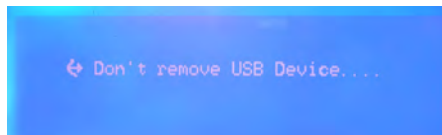
"USB data log module" records instrument activities. These information can be permanently stored into a standard USB pendrive. Pendrive can be connected to a PC using the communication software (sold with instrument) to review and print instrument's activities. **To obtain reliable results with this feature please set instrument ID from "OPTION/RS485 Setup" (see page 29) and activate log recording from "OPTION/LOG Setup" (see page 33). To see current ID see "SERVICE" menu (see page 6).**



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. Instrument will show a warning message: "Do not remove USB device". Wait until the message goes away to safely remove USB pendrive.



HOW TO REVIEW INSTRUMENT'S ACTIVITIES RECORDED INTO USB PENDRIVE ?

It's necessary to install the communication software to review USB pendrive info on a PC. Follow installation instructions during software setup to correctly complete this procedure. Once the software has been installed and in execution insert your USB pendrive into any available USB connector of PC. Instrument's log will be automatically uploaded into PC memory. See software manual for more info.

Index.

| | |
|---------------------------------------|----------------|
| Introduction..... | page 3 |
| The wheel..... | page 3 |
| | |
| Mainboard connections..... | page 4 |
| Power Connections..... | page 4 |
| I/O Connections..... | page 5 |
| | |
| Main Screen..... | page 6 |
| Passcode..... | page 7 |
| Setup..... | page 7 |
| | |
| Setpoint..... | page 8 |
| Da & Db..... | page 8 |
| Da & Db Working Modes..... | page 9 |
| PWM Mode..... | page 10 |
| PID Mode..... | page 11 |
| Pa & Pb..... | page 12 |
| mA..... | page 13 |
| Aa & Ab..... | page 14 |
| Ad..... | page 14 |
| Ar..... | page 15 |
| | |
| Calibration..... | page 16 |
| pH Calibration..... | page 16 |
| Cl Calibration..... | page 18 |
| mV Calibration..... | page 20 |
| Range (NTU) | page 21 |
| Temp Calibration..... | page 22 |
| uS Calibration..... | page 23 |
| | |
| Timer..... | page 25 |

Index.

| | |
|--|----------------|
| Options..... | page 27 |
| TAU..... | page 27 |
| Delay Output..... | page 27 |
| FM Counter..... | page 27 |
| Flow Detect..... | page 28 |
| Clock Setup..... | page 28 |
| Probe Clean..... | page 29 |
| EEprom Reset..... | page 29 |
| RS485..... | page 29 |
| GSM MODEM..... | page 30 |
| TCP/IP..... | page 31 |
| GPRS..... | page 32 |
| EMAIL..... | page 32 |
| Alarm Setup..... | page 33 |
| Log Setup..... | page 33 |
| Passcode Setup..... | page 33 |
| | |
| Manual..... | page 34 |
| Manual Relay..... | page 34 |
| Manual Pulse..... | page 34 |
| Manual mA..... | page 35 |
| Manual Level..... | page 35 |
| | |
| Appendix A Probes connection..... | page 36 |
| Appendix B Probes connection..... | page 37 |
| Appendix C Installation Draw..... | page 38 |
| Appendix D Network Draw..... | page 39 |
| | |
| Index..... | page 40 |



*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.*