

User Manual

ULTIMA

Potable Water Treatment Controller



UPF – UPFO series

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Warnings

Refer to AS/NZS 3000 WIRING RULES when installing electrical equipment in and around the pool zone. The power cover is to be removed by Aquarius Technologies Pty Ltd, an authorized service agent or a licensed electrician only, and must be replaced before the controller is connected to the power supply. Do not open the controller enclosure except as required for maintenance purposes. Once maintenance is complete, the enclosure is to be closed and resealed. If the supply cord is damaged, it shall be replaced by Aquarius Technologies Pty Ltd or an authorized service agent to avoid a hazard. This appliance is not intended for use by young children or infirm persons unless they have been adequately supervised by a responsible person to ensure they can use the appliance safely. Young children should be supervised to ensure they do not play with the appliance.



This marking indicates that this product should not be disposed of with other household wastes throughout the EU. To prevent possible harm to the environment or human health from uncontrolled waste disposal, recycle it responsibly to promote the sustainable reuse of material resources. To return your used device, please use the return and collection systems or contact the retailer where the product was purchased. They can take this product for environmental safe recycling.

Chemicals used as part of the treatment program may be hazardous. Refer to the Material Safety Data Sheets provided by your chemical supplier and ensure all personnel involved are aware of the handling and safety procedures.

It is a requirement to provide protection for accidental spills of chemicals, including any leaks that could develop from pump pressure lines.

Please read and understand all safety warnings on chemical containers before servicing any dosing equipment.

Wear as a minimum - safety goggles and gloves when servicing the dosing equipment. Do not mix concentrated acids and oxidising agents as explosion, and/or toxic and lethal gas may be evolved, and/or fire result. Keep all chemical containers sealed and free from contamination.

Salt water chlorinators draw high currents when operated. The controller is fitted with a Normally Open, Normally Closed Relay for activating the chlorinator. This relay is suitable to a max of 6.3A. Please consult the chlorinator specs to determine current draw. If greater than 6.3A, the relay may only be used to activate a contactor which in turn controls the chlorinator.

INTRODUCTION

Ultima advanced water treatment controller (1) model incorporates the following key features:

- pH Control
- ORP Control
- FAC Control - optional
- TDS/Conductivity Control
- Temperature Monitoring
- Comprehensive timer options
- Accessory timers for improved performance of each individual timer
- On Board Data logging with USB drive Export options
- Options for USB drive Export/Import of Settings
- High and Low alarms for FAC, pH, ORP & TDS
- Extensive Internet Communication choice (Modem, Wi-Fi, Ethernet)

(1) Australian Patent Pending

Where to find the serial number



Serial Identification Label

All Aquarius Technologies Controllers are manufactured with a Serial Identification Label (SIL). This will be affixed to the wall of the controller, on the outside face on the right side.

The label is the best reference for making enquiries for service or Technical Assistance.

Any controller that does not show evidence of the SIL may have the warranty voided.

Key data being:

Model: e.g. ULTIMA. This is the actual Controller model and indicates the configuration.

Build: e.g. Mar-15. Indicate this controller was manufactured in March 2015

Serial No: e.g. 1503ULT000694 is the specific serial number for this Controller

Installation Guidelines

Please refer to this section for typical installation guidelines, typical layout and Housing Installation diagrams.

Before you start

Select a suitable location for installation - preferably in close proximity to the main system, protected from the public and environmental factors such as direct sunlight. *The suitable location must not be on top of a source producing large amounts of heat (e.g. metal fence or shed) and ideally not be in direct sunlight.* The Ultima LCD screen must be covered by the flap lid for UV protection on all outdoor installation. A wall area of approx. 0.75 m. wide by 1.0 m. high is ideal for mounting your controller. Mount the unit at eye-level to allow good navigation of the controller. A minimum floor area of approx. 1.5 m x 0.6 m below the controller is required for the chemical tanks. This will vary according to the number and type of chemicals being used for dosing.

It is important to consider environmental elements when installing. It is a requirement to provide protection for accidental spills of chemicals and that includes any leaks that can develop from pump pressure lines. Some chemicals will damage materials used in construction of buildings, particularly roofing. Never assume that the equipment will not leak, under certain conditions that will occur. *It is the responsibility of the installer to ensure that such events do not create damage that should have been avoided by correct site selection and the provision of adequate bunding at the time of installation.*

System requirements

There are several minimum requirements that should be established BEFORE the controller is installed;

- Minimum 19mm hose or 20 mm pipe (3/4) take-off and in line to supply sample water to the system,
- Minimum 12 litres/minute supply flow to ensure proper operation of sample readings, dosage and bleed off rates.
- Adequate bunding is provided for the system and chemical drums to prevent spills causing damage.
- Availability of approved connection to power. A 'clean' 220 - 250 VAC 50 Hz @10 amps supply (some options may need more than one outlet, or increased current capability).

Users of the Ultima are prevented from contact with hazardous voltages by the protection cover (Picture 1 and Picture 2). *Only a certified electrician or Aquarius Approved Service Technician may remove the protection cover to access the hazardous voltage area. It is required to disconnect the controller from the supply before removing the cover or performing any electrical work, including unplugging and/or replacing all circuit boards.*



Picture 1. Protection cover



Picture 2. Warning on the protection cover

To install

Unpack the equipment and check for any damage. Ensure all parts are accounted for.

Assemble the inlet and outlet PVC valves on the sensor manifold. Remove the protective cap and fit the probes into the manifold.

Connect a 20 mm pressure pipe line from the circulating pump discharge line, or system common discharge header, to the inlet of the manifold. Connect a return line from the manifold outlet valve, preferably in PVC pressure pipe to the pool return pipe work.

If installing a BCD Feeder, assemble the BCD feeder as per its separate instructions and floor mount in the vicinity of the system. Plumb from the BCD control solenoid to the inlet of the BCD feeder and from feeder to the system.

Install chemical tanks as required, and ensure each dose pump's discharge tubing is connected to the manifold injection points provided.

Run a flow of water through the system under normal operating pressures. Check for, and repair any leaks. The Ultima Controller is now ready for use.

Liaise with your chemical specialist for advice regarding any bunding requirements, floor drainage requirements and fresh water supply in the vicinity of chemical tanks. In addition check on local authority regulations for discharge of trade waste, chemical storage and hazards control etc.

Maintenance and Care of Sensors

Foulants can lead to inaccurate sensor readings. Sensors should be cleaned and calibrated regularly using the following procedures.

Cleaning of Flow/Conductivity/Temp Sensor

Isolate the water flow to the manifold. Remove the locking nut from the Flow/Conductivity/Temp sensor.

Abrade the sensor surface with 300–400 grit wet-and-dry paper until the surface is clean, the two carbon electrode surfaces are clearly visible, and the surface wets out freely.

Ensure flow paddle is free from debris. Rinse the sensor in fresh water and replace it in the manifold.

Cleaning of pH/ORP sensor

Isolate water flow to the manifold. Remove the sensors from the manifold by loosening the lock nut and withdrawing the sensor from the manifold.

Rinse the sensors in fresh tap water and remove any visible fouling. This should be done carefully by lightly scrubbing with a soft tooth brush or similar.

Place the sensors in the Electrode Cleaner solution (AS9500) for about 5 minutes to completely dissolve any trace of inorganic foulants.

Remove and rinse thoroughly in fresh water before replacing it in the manifold. Proceed to calibration or verification of sensors.

Cleaning of FAC sensor

It is recommended that the FAC sensor is cleaned, as a minimum, once a month. Isolate water flow to the manifold. Remove the sensor from the manifold by loosening the lock nut and withdrawing the sensor from the manifold.

Rinse the sensors in fresh tap water and remove any visible fouling. This should be done carefully by lightly scrubbing with a soft tooth brush or similar.

Place the sensors in a concentrated chlorine solution for about 5 minutes to completely dissolve any trace of inorganic foulants.

Replace the sensor in the manifold. After flow has returned to normal, allow a minimum of 5 minutes before calibrating the FAC sensor.

Accessories and Spare Parts

Reagents

AS1413 - 1413 uS/cm conductivity solution

AS7004 - pH 4 buffer solution AS7007 - pH 7 buffer solution

AS5250 - 250 mV ORP solution

AS5475 - 475 mV ORP solution

Sensors

PR_FCT – Combination Conductivity, Flow and Temperature Sensor.

PR_pHRG – Combination pH, ORP and Ground reference Sensor

PR_pHRG_AU – Combination pH, ORP and Ground reference Sensor for use with Chlorinators

Peristaltic Pumps

AP_PERI_S_KIT – AP PERI SERVICE KIT (Maximum service interval - 12 months). Included in this Kit are the following

- AP_TUBE4824 (1)
- AP_INJECT (1)
- TUBESUCTION (2 mt)
- TUBEDISCHARGE (2 mt)

AP_PERI_O_KIT – AP PERI OVERHAUL KIT (Maximum service interval - 2 years)

Included in this Kit are the following

- AP_TUBE4824 (1)
- AP_INJECT (1)
- AP_ROLLBLOCK (1)
- AP_DWEIGHT (1)
- AP_LID (1)
- TUBESUCTION (2 mt)
- TUBEDISCHARGE (2 mt)

Test Meters required

Portable pH/Conductivity meter

Portable pH/ORP meter

Routine Testing

The use of an Aquarius control system will automatically vary the dosages and maintain good conductivity, pH, ORP and disinfection control, even where there are wide fluctuations in system load or demand. The principles of “Best Practice” and “Duty of Care” that are the responsibility of the system owner dictate that all systems should be routinely serviced and tested chemically and the results logged.

Regular Inspections and Maintenance

For optimum results and continued accuracy, the complete operation of the controller system should be verified at least on a monthly service basis.

All sensors should be inspected, cleaned and calibrated as necessary every month.

All sensors age with time and temperature, and have a typical life span of 12-36 months depending on the application in which they are operating and should be replaced accordingly.

Where fitted, flow sensors and wire strainers should be checked for correct operation and cleaned of any debris every month so they work efficiently.

Injection non-return valves and pumps should be cleaned and checked at least annually.

Sodium Hypochlorite being highly alkaline may lead to scale formation on its dose injector and this may require acid cleaning on a frequent basis.

On the peristaltic dose pumps, the squeeze tubes and roller block should be checked at least annually and should be replaced every 12-24 months.

More regular maintenance may be required for the larger 3.0 l/hr pumps, due to increased pumping rates.

Chemical suction and discharge tubes should be inspected monthly and replaced as necessary

Maintenance schedule	1 month	3 months	6 months	12 months
Clean and Calibrate FCT Probe	√			
Verify Flow ON/OFF	√			
Clean FAC Probe	√			
Clean pH/ORP Probe	√			
Verify / Calibrate ORP	√			
Test Outputs	√			
Test Pumps/Solenoid Operation	√			
Calibrate pH Probe	√			
Check/Clean Injectors	√			
Inspect Suction/Discharge Tubing	√			
Check/Clean Solenoids		√		
Peri. Pump - AP Service Kit			√	
Peri. Pump - AP Overhaul Kit				√

Electrical Wiring

Refer to AS/NZS 3000 WIRING RULES when installing electrical equipment in and around the pool zone.

The hazardous voltage area of this controller is under the protection cover (see Pictures 1 and 2). Only Safety Extra Low Voltage (SELV) is supplied to the accessible circuit boards inside the enclosure. Sensors may be maintained while the controller is powered.

CAUTION: *Only a certified electrician or Aquarius Approved Service Technician may remove the protection cover to access the hazardous voltage area. It is required to disconnect the controller from the supply before removing the cover or performing any electrical work, including unplugging and/or replacing SELV circuit boards such as the Motherboard or Probeboard.*

Fuses are easily accessible:

Equipment fuse F1: Output fuse: 5A/250VAC 20 x 5mm

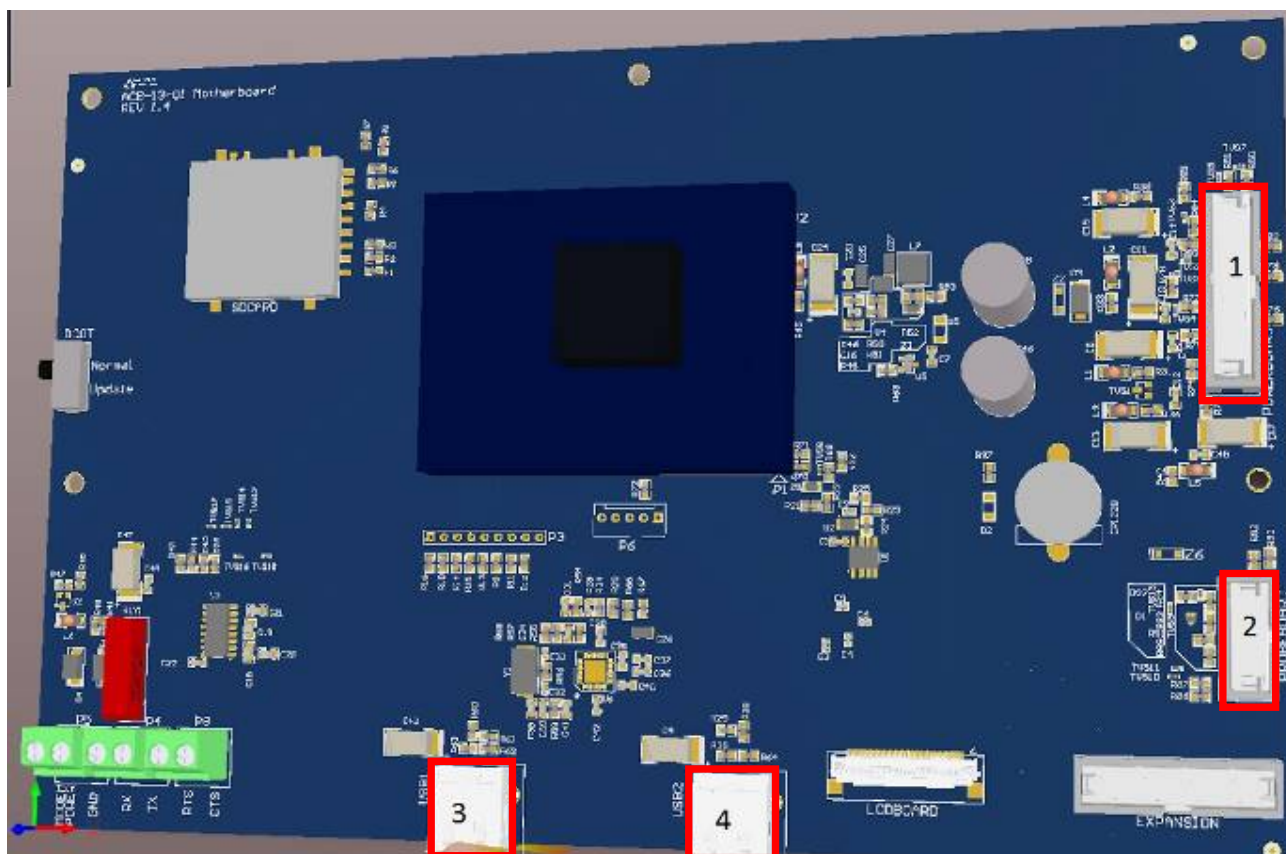
Relay fuse F2: - Only if additional relay for output 8 is installed.

Control fuse F3: 0.125A/250VAC Time-delay 20 x 5mm

Connections

The motherboard is located on the internal side of the front controller lid.

The diagrams below show the connections to the Ultima controller motherboard circuitry:



- 1 – Power cable connector
- 2 – Probe board power cable connector
- 3 – USB connector
- 4 – USB connector

CAUTION: When front controller door is open it sits on two hinges on the left hand side of the controller. (Picture 3) Please take extra care when operating with an open front door. Do not push the door upwards without holding onto it, as this could detach the door from the support hinges. Always close the front door on completion of maintenance work and fasten the screws.

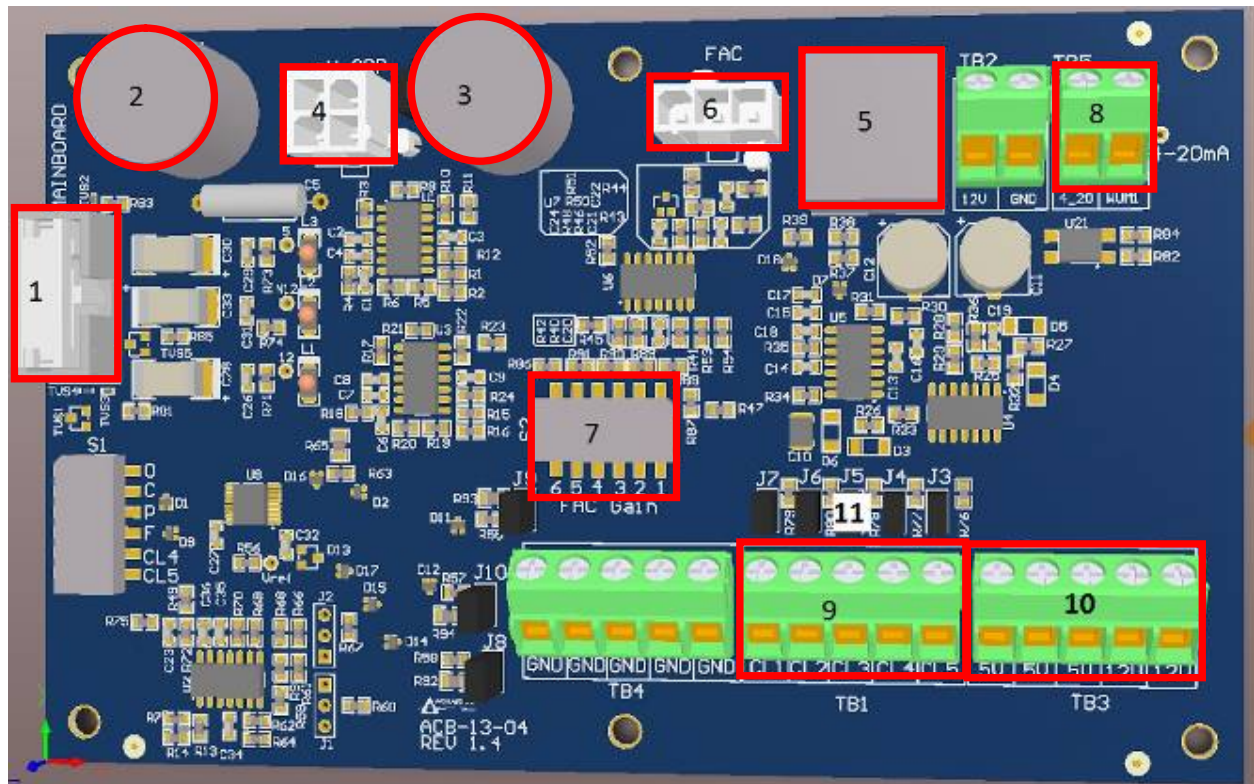
Note: Please ensure the door seal is in good condition and seated properly within the groove.



Picture 3. Left-side support hinges

The Probe board is located above the protection cover on the bottom left hand corner of the controller.

The diagrams below show the connections to the Ultima Probe board circuitry:



- 1 – Power cable connector between Probe board and Motherboard
- 2 – BNC pH connector (if fitted)
- 3 – BNC ORP connector (if fitted)
- 4 – Combination Probe (PR_pHRG) connector
- 5 – FCT probe (PR_FCT) connector
- 6 – FAC probe (PR_FAC) connector
- 7 – Dip switches for FAC Probe Gain regulation
- 8 – 4-20mA connector and Water meter connector
- 9 – 5 x Analogue inputs
- 10 – 3 x 5V DC and 2 x 12V DC power supply connectors
- 11 – 5 x jumpers for tank alarm sensors connected to the analogue inputs

System configuration

The ULTIMA controller has a 7" touch screen and navigation is similar to that of any smart phone, PC monitor, GPRS navigators or other modern device. Operating the controller is done by touching the screen and navigating using your finger. The ULTIMA controller screen is covered with a protective film. **CAUTION:** Do not operate the controller with dirty or wet fingers. Do not touch the controller screen with metal or sharp object. Always close the screen flap cover down on completion.

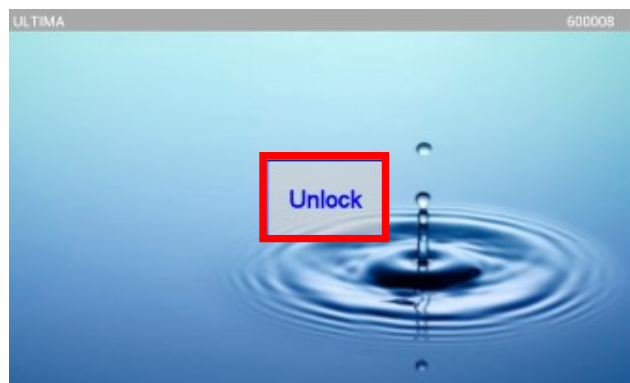
All Aquarius controllers come loaded with preset default values for all of the treatment program parameters. On start up the controller will operate according to those defaults. However, every application should have a planned treatment program developed. Decisions should be made on what values are most appropriate for ORP, pH, FAC, TDS/Conductivity dosing requirements.

Once the customized program has been determined, it may be set in the Aquarius controller, as described in the following sections.

Turning the ULTIMA controller ON

When you plug the controller into 240 VAC supply it turns ON. It takes about 30 seconds for the controller to open its program. During this time an AQUARIUS animation logo will appear on the screen.

When the program is fully loaded the front lock screen will appear (Picture 4). To start using the controller, press UNLOCK .



Picture 4. UNLOCK Screen

Main Screen

The Main Screen display (Picture 5):



Picture 5. MAIN Screen

- Top bar with USB/SIGNAL, Date, Time, Flow ON/OFF parameters
- Menu with icons on the left side of the screen. Icons are SYSTEM, LOCK SCREEN and NEXT
- Six main parameters with Component information. Component information displayed is as follows: Name, Current Value and Set point. If the relay is ON, the POWER icon turns blue in the left top corner of each component box. If the Component is in LOCK OUT, a RED PADLOCK sign will be active on the left top corner. If the Component is in ALARM, the top part of the component box will flash RED. Some Component boxes display icons for easy identification of the Component.

Setting System Preferences

To set system preferences press the SYSTEM icon on the left-side Menu of the main screen. The SYSTEM screen will appear (Picture 6). This is the original ANDROID screen. It displays the controller's details and user preferences.

The user can choose communication options to be used, depending on your hardware configuration: NONE, ETHERNET, WI-FI or MODEM by activating appropriate circles on the screen.



Picture 6. SYSTEM Screen

The left-side Menu has the following icon boxes: ADVANCED, SAVE, IMPORT/EXPORT, RETURN. There are a further two icon boxes on the bottom right hand corner of the SYSTEM SCREEN: RESTORE DEFAULTS and REBOOT.

ADVANCED icon is used for setting Date and Time, Language and Wi-Fi preferences. *Date and Time should only be adjusted if the controller is not connected to the server. Otherwise Date and Time settings should be made by changing the time zone of the controller via the webpage. The controller may need to reconnect to the server for the time zone change to take effect. If the date and time is changed through advanced settings, the screen lock may be automatically activated and "Exit" will have to be pressed to resume normal operation.*

SAVE icon is used to save preferences after editing.

IMPORT/EXPORT icon is used for downloading data and settings from the controller to a USB drive or for uploading previously exported settings from a USB drive to the controller.

RESTORE DEFAULT icon is used for restoring all settings and preferences to factory settings.

REBOOT icon is used for restarting the controller without unplugging it from the 240 VAC power supply.

The SYSTEM SCREEN displays an option for a Screen Lock Password. If the checkbox next to it is ticked, a new checkbox SET PASSWORD will appear together with a Read Only Login checkbox. When this option is checked the controller screen can be unlocked in Read Only mode by pressing SKIP on the pop-up screen. This will give users access to the controller without the ability to change settings. Read Only users may calibrate the controller. If this option is not ticked, the user can unlock the controller ONLY by using the password.

To set up a password, press SET PASSWORD. The pop-up screen will appear (Picture 7). Input 4 digits and repeat to confirm. To clear, press CLR button on the pop-up screen. If user does not wish to proceed, press CANCEL. If this is the case, the pop-up screen will disappear and the Screen Lock Password checkbox on the SYSTEM SCREEN will remain un-ticked. The same will occur if the user does not enter a matching 4 digit number when creating passwords.



Picture 7. SET PASSWORD Screen

Advanced Setting

When pressing the ADVANCED icon on the SYSTEM screen, an ADVANCED screen will appear (Picture 8). This screen has standard ANDROID options for setting Date and Time, Language and communication preferences. These preferences are to be set in accordance with standard procedures for ANDROID operating systems. Press EXIT on the top right hand side of the screen, when all preferences have been set. *Date and Time should only be adjusted if the controller is not connected to the server. Otherwise Date and Time settings should be made by changing the time zone of the controller via the webpage. The controller may need to reconnect to the server for the time zone change to take effect. If the date and time is changed through advanced settings, the screen lock may be automatically activated and "Exit" will have to be pressed to resume normal operation.*



Picture 8. ADVANCED Screen.

Importing/Exporting Settings and Exporting Data

When pressing IMPORT/EXPORT on the SYSTEM screen, the pop-up screen IMPORT/EXPORT will appear (Picture 9). Before Exporting/Importing, secure the front panel with one hand and insert the USB drive into one of the USB drive connectors on the Motherboard (refer to item 3 and 4 of the Motherboard circuitry diagram).



Picture 9. IMPORT/EXPORT Screen

Once the Import or Export operation is complete, a confirmation message will appear. Press EJECT USB before Ejecting the USB drive from the USB drive connector on the Motherboard. To return to SYSTEM screen, press CLOSE.

Component settings

pH Configuration

On the main screen, touch the pH parameter box. The pH screen will appear (Picture 10).

Using an Acid pump and dosing an acid to your water will decrease your pH, as this screen is set to Acid dosing by default. **Note: When using both Acid and Base pumps to control pH, always set the pH Acid set point higher than the pH Base set point.**



Picture 10. pH screen

pH B Configuration

On the main screen, touch the pH B parameter box. The pH screen will appear (Picture 11).

Connecting a Base pump and dosing a Base to your water will increase your pH, as this screen is set to Base dosing by default. **Note: When using both Acid and Base pumps to control pH, always set the pH Base set point lower than the pH Acid set point.**



Picture 11. pH B screen

Most component screens have a similar structure: the left hand-side menu, Current value and Output active/inactive icon, the performance Chart in the middle of screen and Settings values on the right-hand side.

The following icons are situated on the left hand-side menu: SYSTEM, CALIBRATION, SAVE, RETURN.

SYSTEM icon is for System Configuration.

CALIBRATION icon allows the option of: QUICK and PRECISE calibration (Picture 12).



Picture 12. pH CALIBRATION Screen

Choose between QUICK calibration using a known pre-measured value or PRECISE calibration using calibration solutions. Follow the instructions on the screen to complete the calibration. It is recommended to perform PRECISE calibrations on commissioning, every month and when a new probe is installed.

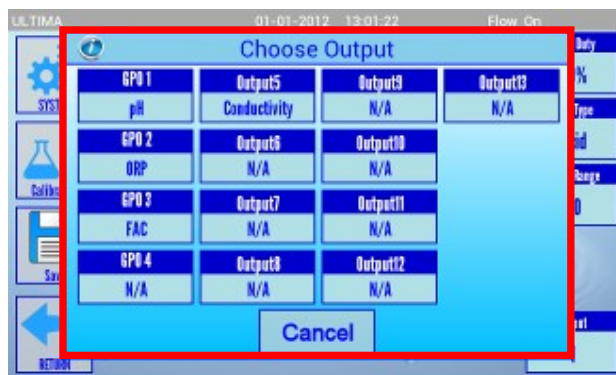
Part Number: AS7004 - pH 4.01

Part Number: AS7007 - pH 7.01

Press the SAVE icon for saving new settings after editing. A pop-up screen with confirmation of savings of new settings will appear. New settings will also be saved when pressing the RETURN icon and returning to the MAIN screen.

The performance Chart has historical values on the current date; week or month (Double click on chart area to load the desired component). Also shown on the graph are indications of dosing duty values for those periods.

Setting values include SETPOINT, PUMP DUTY, MODE, DOSE TYPE, ALARM MODE, ALARM RANGE, LOCKOUT DELAY and OUTPUT. Press each parameter to input a value or chose pre-determined options. OUTPUT box shows the CHOOSE OUTPUT screen (Picture 13).



Picture 13. CHOSE OUTPUT Screen

Press your chosen output and use this output instead of the currently assigned one if required.

CAUTION: Please use only outputs 1 to 4 as they are wired to the GPO plugs 1 to 4 labelled on the protection cover inside the controller (please refer to Picture 1. Protection cover) Outputs 5-8 should be used only if they are wired according to the purchase order. Outputs 9 to 13 are low voltage (can switch up to 50V/0.5A/10W peak) signal relays for use with switching dosing pumps or similar applications.

Advanced Settings

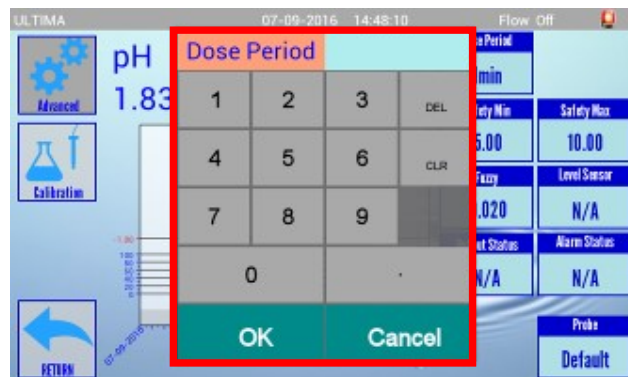
pH:

When looking at the pH parameter screen, on the top left hand side there is an **'Advanced'** tab. Push the tab to bring up the advanced settings screen seen in Picture 14. To exit the advanced settings press the **'Advanced'** tab again.



Picture 14. pH ADVANCED settings

Push on the **'Dose Period'** tab to change how long the systems dose cycle is for. A keypad will come up when choosing Dose period as seen in Picture 15. Enter the period required in minutes and press **'OK'**.



Picture 15. KEYPAD pop up screen

Safety Min and Max

'**Safety Min**' and '**Safety Max**' are safety limits for use with the **Accessory Timers ONLY** when used in conjunction with the timer settings. If no timers are being used there is no need to set the Safety Min or Safety Max settings.

General Principle

1. If an accessory timer is causing a components value to increase, and the value is above the safety maximum, the component will control the output, not the accessory timer.
2. If an accessory timer is causing a components value to decrease, and the value is below the safety minimum, the component will control the output, not the accessory timer.

When the '**Safety Min**' or '**Safety Max**' tabs are pressed a keypad the same as in pic 2 will open. Enter required settings and press '**OK**'.

Fuzzy

The '**Fuzzy**' tab setting is used to set when the proportional dosing starts. For instance if the '**Fuzzy**' is set for 0.020 like in Pic 1, and if the pH is 7.60 with a set point of 7.40, the acid pump will dose at 100% until the pH reaches 7.42 and then the acid pump will dose less and less until the closer it gets to its set point until it reaches its set point. By increasing the distance the '**Fuzzy**' is set from the set point, the earlier the proportional dosing will start. By decreasing the distance the '**Fuzzy**' is set from the set point later the proportional dosing will start.

Level Sensor

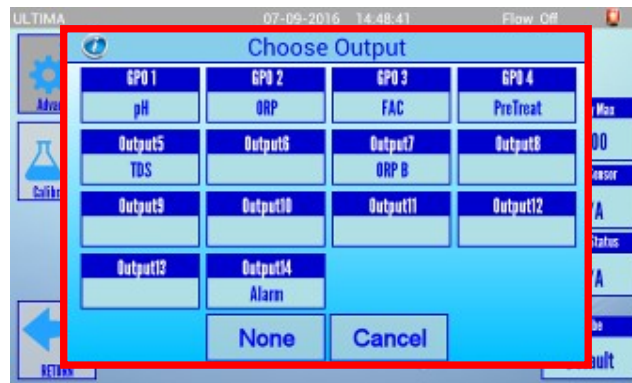
The '**Level Sensor**' tab is used to activate a minimum level when using a level sensor to monitor Acid/Base tank levels. Enter the parameter and press OK to set.

A scale can be used to work as a level sensor and give indications of how much chemical remains in the tank.

Note - a level sensor will turn off the applicable dose pump if it reads the tank is empty, it will not show how much chemical remains in the tank.

Output Status

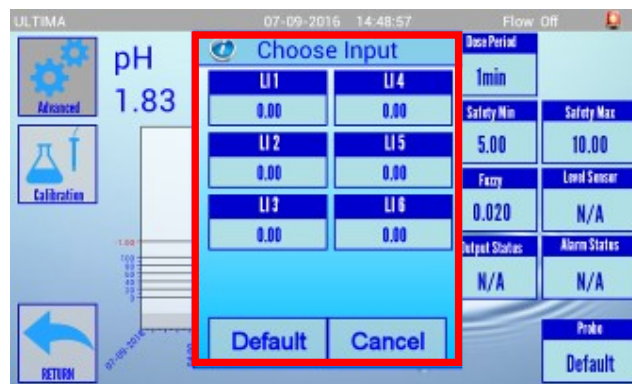
'Output Status' is used to connect a particular output to the chosen parameter. When the '**Output Status**' tab is pressed a screen is shown the same as in Picture 16. In Picture 16 it shows the pH parameter is linked to GPO 1, which means when the pH level is in dosing range, GPO 1 will switch on to activate the dose pump. If connecting the dose pump to a different GPO or output, choose the associated pump output the dose pump is attached to for the parameter.



Picture 16. OUTPUT pop up screen

Probe

To use a different 4-20ma and not use the standard probe, press the '**Probe**' tab. A screen will appear the same as in Picture 17. Choose which input the other probe is connected to inside the box. If wanting to use the standard probe, select the '**Default**' setting.



Picture 17. INPUT pop up screen

ORP Configuration

On the main screen touch the ORP parameter box. The ORP screen will appear (Picture 18).



Picture 18. ORP screen

The ORP screen has a similar layout to the pH screen. For PRECISE calibration please use the following calibration solutions:

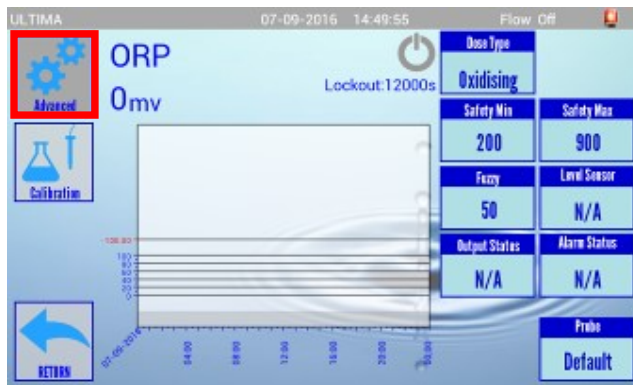
Part Number: AS4250 - 250 mV

Part Number: AS5475 - 475 mV (**Note:** after using this calibration solution please allow 15-30 minutes for pH reading to stabilise on Sensors PR_pHRG or PR_pHRG_AU)

Advanced Settings

ORP:

When looking at the ORP parameter screen, on the top left hand side there is an '**Advanced**' tab. Push the tab to bring up the advanced settings screen seen in Picture 19. To exit the advanced settings press the '**Advanced**' tab again.

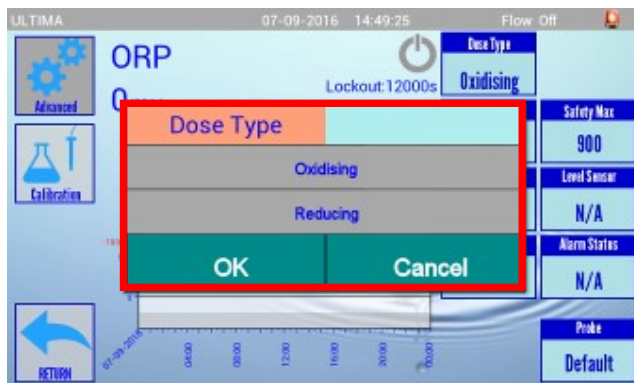


Picture 19. ORP ADVANCED settings

Note: The ORP Safety Min, Safety Max, Fuzzy, Level Sensor Output, Output Status, Alarm Status and Probe tabs work the same as previously described for the pH.

ORP Dose Type

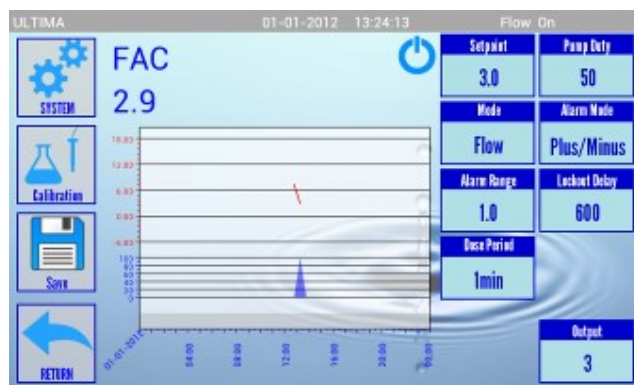
Pressing on the '**Dose Type**' tab will allow you to change the type from Oxidising to Reducing depending on your needs seen in Picture 20. Press '**OK**' to confirm your selection.



Picture 20. ORP DOSE TYPE pop up screen

FAC Configuration

On the main screen touch the FAC parameter box. The FAC screen will appear (Picture 21). The FAC screen has a similar layout to the pH screen. However all settings are active only for FAC enabled models. For non-FAC models, the FAC screen will have no current values. FAC sensor part number is PR_FAC.



Picture 21. FAC Screen

DOSE PERIOD - determines the length of period (between 1 and 60 minutes) when dosing is considered as one cycle. For granular and liquid Chlorine dosing it is recommended to use 1 minute settings for best performance. For Chlorinators, a longer Period should be chosen depending on the size of Chlorinator, Volume of water and other parameters.

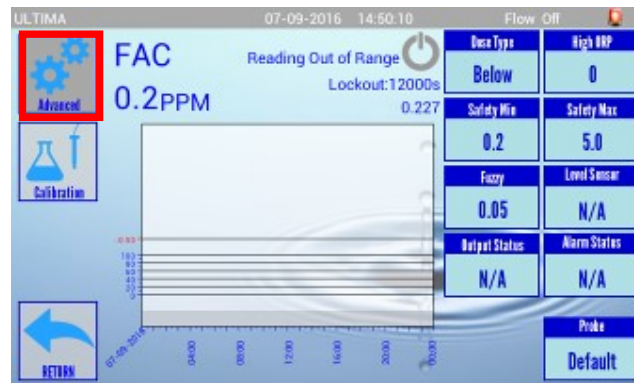
Calibration of the FAC probe is always performed using a pre-measured DPD1 value while the FAC probe is in its normal operating state (i.e. in the manifold, with normal flow ON). It is highly recommended to use a calibrated DPD1 test to obtain FAC values. After a pH calibration has been performed, FAC should be re-calibrated as well. The FAC probe requires at least 5 minutes to "settle" to its nominal value after re-insertion into the manifold after cleaning.

The FAC gain can be increased by adjusting the Probe board's dip switch "FAC Gain" and sequentially turning switches 1-6 OFF, or decreased by sequentially turning switches 6-1 ON. After each switch is adjusted please wait approximately 30 seconds for the sensor to settle to the new value. (Picture 15a)

Advanced Settings

FAC

When looking at the FAC parameter screen, on the top left hand side there is an '**Advanced**' tab. Push the tab to bring up the advanced settings screen seen in Picture 22. To exit the advanced settings press the '**Advanced**' tab again.

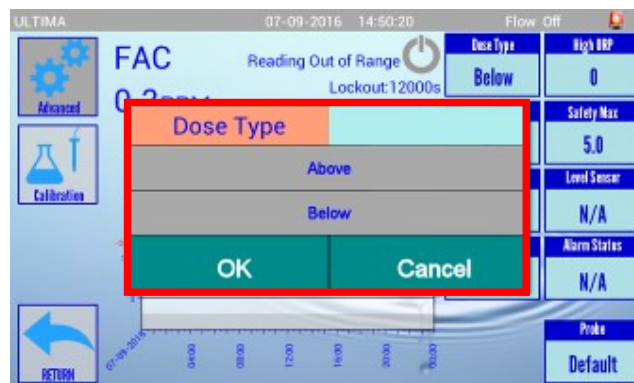


Picture 22. FAC ADVANCED Settings

Note: The FAC Safety Min, Safety Max, Fuzzy, Level Sensor Output, Output Status, Alarm Status and Probe tabs work the same as previously described for the pH.

FAC Dose Type

When the '**Dose Type**' tab is pressed the options of above or below are available as seen in Picture 23. '**Above**' will dose when the current reading is above the set point, '**Below**' will dose when the current reading is below the set point Choose the option you need and press '**OK**'.



Picture 23. FAC DOSE TYPE pop up screen

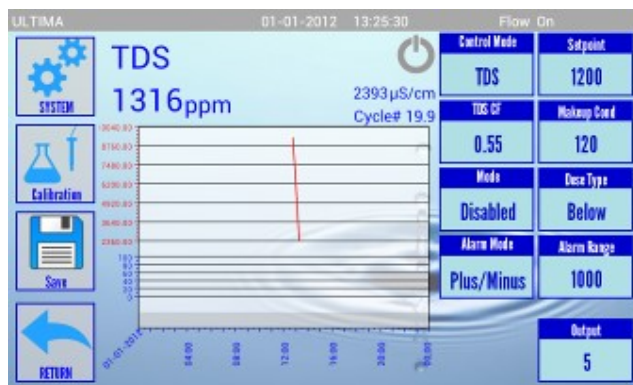
High ORP

Pressing the '**High ORP**' tab allows you to set a secondary safety to help prevent overdosing. Enter a high level ORP that you do not wish to dose over as a safety. When controlling chlorine levels by using the FAC mode, if the FAC probe is not cleaned or calibrated properly, a false reading could cause the system to continue to dose chlorine and result in an overdose. Once the ORP reaches the High ORP level, chlorine dosing will stop even if the FAC controller reading is under the FAC set point and prevent overdosing.

Picture 24. FAC dipswitches

TDS/Conductivity Configuration

On the main screen touch the TDS parameter box. The TDS/Conductivity screen will appear (Picture 25). this screen has a similar layout to the pH screen. An option is provided to use TDS or Conductivity mode for control.

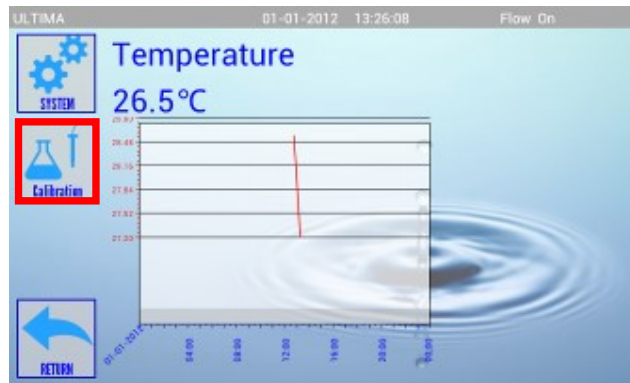


Picture 25. TDS/CONDUCTIVITY Screen

Calibration of TDS sensor is always performed using a pre-measured value. It is highly recommended to use calibrated tester or certified solution to obtain Conductivity values.

Part Number: AS1413 -1413 uS/cm conductivity calibration solution

Before performing conductivity calibrations please calibrate Temperature component (Picture 26).



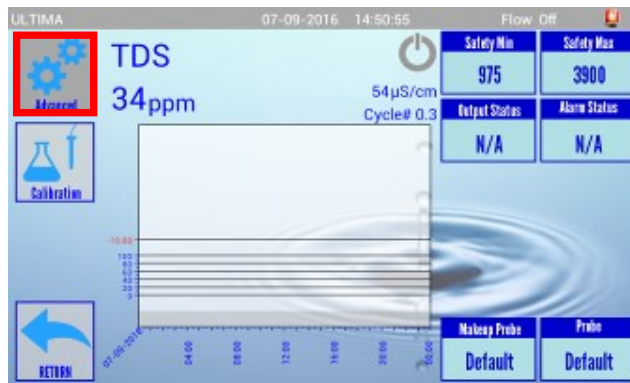
Picture 26. TEMPERATURE Screen

The Temperature component has no setting values as it is not controlled.

Advanced Settings

TDS

When looking at the TDS parameter screen, on the top left hand side there is an Advanced tab. Push the tab to bring up the advanced settings screen seen in Picture 27. To exit the advanced settings press the advanced tab again.



Picture 27. TDS ADVANCED Settings

Note: The TDS Safety Min, Safety Max, Output Status, Alarm Status and Probe tabs work the same as previously described for the pH.

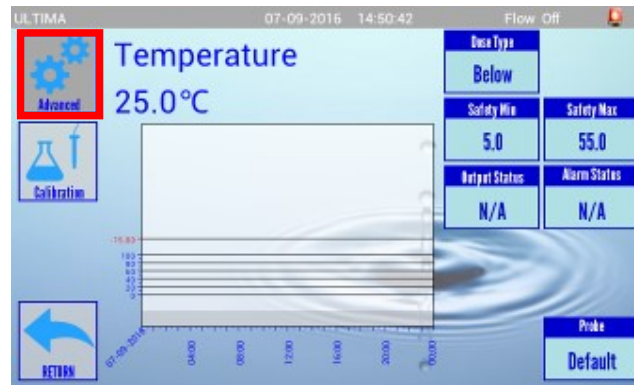
Makeup Probe

The TDS parameter has the ability to use 2 probes. One probe for the Make up water (or top up water) and one for the circulating water. This gives the ability to monitor and compare the TDS of the make up water versus the circulation water. Both probes can be either standard Aquarius probes or aftermarket 4-20ma probes, or a combination of each.

Advanced Settings

Temperature

When looking at the Temperature parameter screen, on the top left hand side there is an Advanced tab. Push the tab to bring up the advanced settings screen seen in Picture 28. To exit the advanced settings press the advanced tab again.



Picture 28. TEMPERATURE screen

Note: The Temperature Safety Min, Safety Max, Output Status, Alarm Status and Probe tabs work the same as previously described for the pH. The Dose Type tab chooses between above (power on to bring temperature down) and below (power on to bring temperature up) settings.

Timers Configuration

On the main screen touch the TIMERS icon box. The TIMERS screen will appear (Picture 29). There are six timers available.



Picture 29. TIMERS Screen

Timers are used to run an output at a chosen time. Press one of the six TIMERS (Picture 29).



Picture 30. TIMER Screen

TIMER NAME: press this button and select a name for this timer.

OUTPUT: Select the output which you would like to run under this timer. Outputs linked to other components such as pH or ORP will be labelled.

MODE: Select one of the following modes:

- Disable: Disables the timer
- Timer: The output will work when the timer is on regardless of flow or measurements
- Timer and Flow: The output works when timer and flow are ON simultaneously
- Timer and Probe: This is for components that use a probe (pH, ORP, FAC, TDS). The selected component will be controlled in "Continuous" mode while the timer is active. When the timer is inactive, the component will control the output using it's displayed mode.
- Timer, Probe and Flow: This is for components that use a probe (pH, ORP, FAC, TDS). The selected component will be controlled in "Flow" mode while the timer is active. When the timer is inactive, the component will control the output using it's displayed mode.

WEEKS: The year is divided into 4 week cycles. The current week is shown as a highlighted box. Select which weeks this timer will be active for, by pressing one, two, three or all four buttons. Active weeks are highlighted in Blue, inactive weeks are grey.

Use Accessory Timers if you wish to control more than one output using the same timer.

Select Day of the week. Pop-up screen will appear (Picture 31).



Picture 31. SET TIMER Screen

Tick the ENABLE checkbox to activate the timer for this day. Select Start Time as hours and minutes. Then select Duration period as hours, minutes and seconds. To copy the selected start time and duration to all days press APPLY TO ALL. **Note:** For extra day timers to activate, press the day box required and tick the ENABLE checkbox to activate the timer with the same settings as the other days.

Press OK to return to SET TIMER screen. Press SAVE or RETURN, to save all changes to this timer. The next active time for a timer is displayed on that timer's button.

Outputs Configuration

On the main screen touch the Outputs parameter box. The OUTPUTS screen will appear (Picture 32). There are thirteen output buttons on this screen. An illuminated blue power icon shows if this relay is ON. Grey is off.



Picture 32. OUTPUTS screen

Outputs 1 to 4 are wired to GPO's 1 to 4 by default. These are available for use by any component.

Outputs 5 to 7 will be used only on special orders hard wired to external relays or components.

Output 8 will be used only on special orders hard-wired to an inbuilt relay, for the use of directly switching chlorinators etc.

Outputs 9 to 13 are low voltage (can switch up to 50V/0.5A/10W peak) signal relays for use with switching dosing pumps or similar applications. Please refer to items 9, 10 and 11 on Probe board circuitry diagram.

Press any output for setting or editing this output. A pop up screen will appear (Picture 33).



Picture 33. OUTPUT SETTINGS pop-up screen

Press TITLE box to name or edit the name of this output.

Press OUTPUT MODE to choose the required mode of this output. Using this function you can temporarily or permanently change the output mode. The following options are available:

- **Component:** The output can be controlled normally by a component or timer, if linked. If no component or timer uses this output it will always be OFF.
- **Forced OFF:** The output is always off regardless of any linked components or timers. The output will only be activated by manual dosing, or changing the output mode.
- **Forced ON:** The output is always on regardless of any linked components or timers. The output will only be de-activated by changing the output mode.

Note: You need to be very careful when selecting Forced ON or Forced OFF options as this will force that particular output to be perpetually ON or OFF.

Press MANUAL dosing to temporarily override all other settings and turn the output on for the selected duration in minutes and seconds. This may be useful for priming a pump or testing outputs.

ATTACHMENTS:

Installation Diagrams - This diagram is for swimming pool controllers which similarly can be used for waste water treatment systems as well.

