Aquarius Technologies Pty. Ltd.
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5-May-09

Ecolab Water Care
6 Hudson Avenue
Castle Hill NSW 2154

Attention: Mr Jack Clark

Re: **Supply of 100 Water Treatment Controllers as per tender request document received 1/5/2009 via email**.

Scope: Aquarius Technologies Pty Ltd will commit to delivery of the controllers in the following stages as requested in the invitation to tender document supplied, which will include.

1. Delivery of 20 x CH133330 controllers to your selected eastern state locations as advised prior to 1 June 2009.
2. Delivery of 25 x CH133330 controllers to your selected eastern state locations as advised prior to 15 June 2009.
3. Delivery of 55 x CH133330 controllers to your selected eastern state locations as advised over the proceeding three months from 15 June 2009.

We can commit to the construction and shipping of 5 controllers a day to Ecolab Water Care and consideration should be given to shipping times of between one to three days once construction and testing is completed to the various eastern states. It would be advised that based on the above requirements that Aquarius Technologies Pty Ltd receive advice by way of a purchase order at least 12 working days prior to your deadlines for 20 and 25 packages and approximately 20 working days notice by way of order on the balance of 55 or similar based on your role out requirements for that balance.

Items to be supplied:

- **Each control packages (CH133330, CCRACK2) will include the following specified components and or outputs:**
  - Conductivity measure and control via a 15mm solenoid.
  - ORP measure and control via 3ltr/hr peristaltic pump suitable for dosage of Sodium Hypochlorite.
  - pH measure and control via 3ltr/hr peristaltic pump suitable for dosage of 73% Sulphuric Acid.
  - Inhibitor control module via 3ltr/hr peristaltic pump.
  - Secondary biocide control module with pre-bleed and bleed lockout via 3ltr/hr peristaltic pump.
  - ATSM compliant 2 pass corrosion coupon rack with control/isolation valves.

- **Each control package will also include:**
  - 20mm PVC sampling and dosing manifold
  - 20mm PVC isolation valves to inlet and outlet
  - Sample point
  - PVC non return valve with quick release barrel union
  - Combined, flow, Conductivity and temperature sensor
  - Combined, ORP, pH and ground reference sensor
  - 4 x dose pump injectors and pump discharge tube fitted
  - 4 x dose pump suction tubes with drum weight fitted
  - PVC backboard mounting of control box manifold and pumps
  - Data logger with internal RS232 port
  - General no-volt contact alarm
  - Impulse make up water meter input
  - Low level tank input
  - Safety lockout and alarm on ORP and pH dosage with high or low level alarm
  - High or low Conductivity alarm
  - 15 year access key for local or remote use using Aquaguard2 with chart and reporting software (supplied on disc)

- **Spare parts and 12 months supply of consumables for the above control packages**
  - Aquarius Technologies Pty Ltd warrants all of the product and its supplied components including consumables for a period of twelve months. In the event of premature failure, goods would be forwarded at no charge to your specified locations based on our warranty terms.
  - At 12 months it is advisable however to change the following consumable parts to ensure optimum service from the control package pumps. Each control package would require:
    - 4 x AP_PERI_SKIT which includes in each:
      - 1 x Squeeze Tube (AP_TUBE_4824)
      - 1 x 2m length suction tubing (2 x TUBESUCTION)
      - 1 X 2m length discharge tubing (2 x TUBEDISCHARGE)
      - 1 x injection valve (AP_INJECT)
      - **Price per service kit = $38.40 + GST**

Optional communication and water usage hardware and software

- Communication package options available for the control packages have been priced. The price provided is for factory fitting prior to delivery. Retrofitting if required at a later stage would incur additional supply and site charges which would need to be determined based on each location and the option required. These options include:
  - 4-20mA PCB output card to provide a connection to most building management systems. This card will provide ORP, pH, Temperature and Conductivity in converted 4-20mA signal and relay status. (See detail attached)
  - GSM modem for remote communication and control providing off site monitoring and control with SMS alarming on all measures. (see detail attached)
  - Water Usage metering card for provision and termination of suitable impulse water meters for online data logging of Make up, bleed and backwash water usage at site (See detail attached)

Note: These items will be quoted as add on components with special pricing based on your requirement for 100 control packages but may be supplied in flexible quantities according to your actual requirements at each particular site.

Supply pricing is based on your requirement for 100 packages:

CH133330, (4 pump controller as specified)	=	$1868.75 + GST each
CCRACK2, (2 pass ATSM coupon rack)	=	$ 200.00 + GST each
Freight based on 28kg per package	=	$ 25.00 + GST each
Total supply price per specified package	**=**	**$2093.75 + GST each**

Additional supply option pricing for inclusion at time of order each controller
Note: some, none or all options may be selected at Ecolab's discretion

COMMS_BUNDLE, GSM remote control package	=	$ 690.00 + GST each
BMS_4, PCB analogue output card fitted	=	$ 620.00 + GST each
OPT_WUM, water meter usage card	=	$ 210.00 + GST each

Controller packages will be supplied on our normal 30 day trading terms to Ecolab Water Care.

Aquarius Technologies Pty Ltd respects the privacy of their customers and will ensure that this arrangement with Ecolab Water care is kept strictly confidential.

Aquarius Technologies Pty Ltd is introducing new pricing on our controller packages with subsequent increases due on 1 July 2009. This agreement will not be affected by our planned price increases even though the roll out of the third stage is planned for during and after 1 July 2009. We consider that this supply proposal if accepted would not extend beyond 1 September 2009 as indicated in the supply tender invitation and therefore agree to hold our pricing until this date. However if for some reason delivery of some or all of the balance controllers (55) surpass this date we reserve the right to renegotiate a supply price at or before this time.

Please check the submission document and if required contact the writer for clarification and or amendment.

We look forward to working with Ecolab Water Care to provide our market leading control equipment for the benefit of you and your client.

Yours sincerely

David Venamore
Sales Manager

Specifications Sheet – CH series Controllers

Our range of CH controllers are designed for liquid chlorine applications using Aquarius Technologies peristaltic pumps or other brands via supply of power to the designated output which is labelled in the control box. Weather proof GPO sockets can also be used (see CO10000).

Please see the chart of available solenoid kits containing various sizes.

Note: For solenoid sizes over 20mm a separate take off may be required and designated to the erosion feeder to ensure adequate flow.

Models where Oxidising Sodium Hypochlorite is used with optional pH control				
Detail Specification	**N/A**	**CH111300**	**CH111330**	**CH111331**
Dose – Inhibitor	N/A	1.0 ltr/hr	1.0 ltr/hr	1.0 ltr/hr
Dose – pH	N/A	1.0 ltr/hr	1.0 ltr/hr	1.0 ltr/hr
Dose – Sodium Hypo	N/A	3.0 ltr/hr	3.0 ltr/hr	3.0 ltr/hr
Dose – Sec. Biocide	N/A	-	3.0 ltr/hr	3.0 ltr/hr
Dose – Dispersant	N/A	-	-	1.0 ltr/hr
Dose – BCDMH	N/A	See CO	See CO	See CO
Dose – LBR	N/A	See CL	See CL	See CL
Sensors Fitted	Flow/Conductivity/Temperature & pH/ORP/Ground Reference Probes			
Shipping Dim. & Weight	52cm x 62cm x 23cm and cubic weight is 18kgs			
Communications Port	Interfaced to any RS232 device via the DB9 plug on the circuit board located internally			
Electrical Supply	220 – 250Vac 50 or 60 Hz, 10Amp continuously powered "clean" mains supply – 7Amp output relays			
Alarms - User Defined **Alarms - No-volt Contact**	All defined set points are able to be associated with alarm outputs as +, -, or +/- ranges. The alarm signals may be directed to various output destinations. A standard common no-volt alarm is incorporated in all controllers for DDC operation.			
Data Logging	Data logging of analogue readings and the relay ON times is standard – Log can be set from 1 min to 240 min intervals. At 30 min intervals, the log can contain more than 30 days of data, downloaded either locally to a laptop or remotely via a GSM modem.			
Manifold Ratings **Press. & Temp. rating** **Flow rate required** **Plumbing**	 Manifolds are designed from uPVC and rated to 700 kPa at 50 °C. A minimum flow rate of 12 ltr/min is required to activate the flow sensor Plumbing inlet & outlets are 20mm BSP fem. Threads or can be fitted with 19mm hosetails			
Non-Oxidising & Oxidising: **Bio. Programs & Timer Control**	ORP (when selected) & Bio B – are controlled by two independent timers, microprocessor controlled to operate on an individual day, or Mon to Fri, Mon + Wed + Fri, or everyday basis. Pre-bleed & bleed lockout facilities can be programmed for each timer to operate in conjunction with biocide dosing. Activation is to 12.5% of conductivity set-point - below for pre-bleed & above for bleed lockout Timer on ORP models can be used to control ORP output in TMR mode.			
Inhibitor Dosing	Inhibitor can be dosed according to impulse from water metering. Water Meter is an add-on based on the size required. Other modes include Bleed, Continuous or against Flow.			

Pumps Models	
Peristaltic	Available in 1 & 3 ltr/hr @ 350kPa. These pumps are specially designed to be used with APL control and recommended to be used at 50% duty cycle
Peristaltic - Variable	Available in 1 & 3 ltr/hr @ 350kPa. These pumps are specially designed to be used with APL control and recommended to be used at 50% duty cycle
High Pressure Pumps	Available in 1, 2, 5, 10 & 20 ltr/hr with variable control.

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Module Designation	pH - values	ORP - mV	Conductivity – mS/cm	Temperature °C
Operating Range	0 – 14 pH	0 – 999 mV	0 – 9.99 mS/cm	0 – 100 °C
Resolution	0.01 pH	1 mV	0.01 mS/cm	0.1 °C
Accuracy	+/- 0.02 pH	+/- 1 mV	+/- 0.02 mS/cm	+/- 0.2 °C
Repeatability	+/- 0.02 pH	+/- 2 mV	+/- 0.01 mS/cm	+/- 0.2 °C
Alarm Range	+/- 0 – 3.5pH	+/- 0 – 400mV	+/- 0 – 2.0 mS/cm	N/A
Dead Band	N/A	N/A	0.05 mS/cm	N/A
Control Type	APL	APL	On/Off	N/A
Sensor Press. Rating	700 kPa	700 kPa	700 kPa	700 kPa
Sensor Temp. Rating	50 °C	50 °C	50 °C	50 °C

Accessories to Complete and Maintain the System	
Bleed Solenoid	Standard Bleed Solenoid 15mm comes standard with controller. Options of 20mm, 25mm, 40mm & 50mm are available
Weatherproof Socket	10 Amp weatherproof power sockets with relay activation
Extended Solenoid Cable	240 Vac extension cable of 5m or longer for remote bleed solenoids
Water Meter	An impulse water meter that provides pulses proportional to flow. This is to allow Inhibitor dosage in proportion to system make-up rate
Water Usage Metering (WUM)	By adding a WUM card, water usage readings will be reflected on the controller and can also be data logged. Readings will show month-to-date and year-to-date figures of make-up, bleed and backwash
Tank Alarm	To provide warning when chemical tank is near empty. Alarm can also be sent via SMS when Communications Bundle is installed

Optional Communications Package to Enhance the System	
Communications Bundle	GSM modem with AquaGuard 2 software can be added to enable remote access and downloading of data from the controller. User will also be able to receive controller alarm via SMS
AquaGuard 2	AquaGuard 2 software for local access/downloading of data from controller into computer spreadsheet and graph format
4-20mA Analogue Input	Accepts a 4-20mA signal from a stand-alone meter. Data are displayed on the Aquarius Controller and data logged. Alarm can also be activated via SMS.
BMS Card	A plug-on card that provides 4 analogue signals as 4 - 20 mA + 4 events as contact only signals – means of data transfer to BMS system
Modbus	Modbus 485 card to enhance digital data communications (2 way) between BCMS and controller

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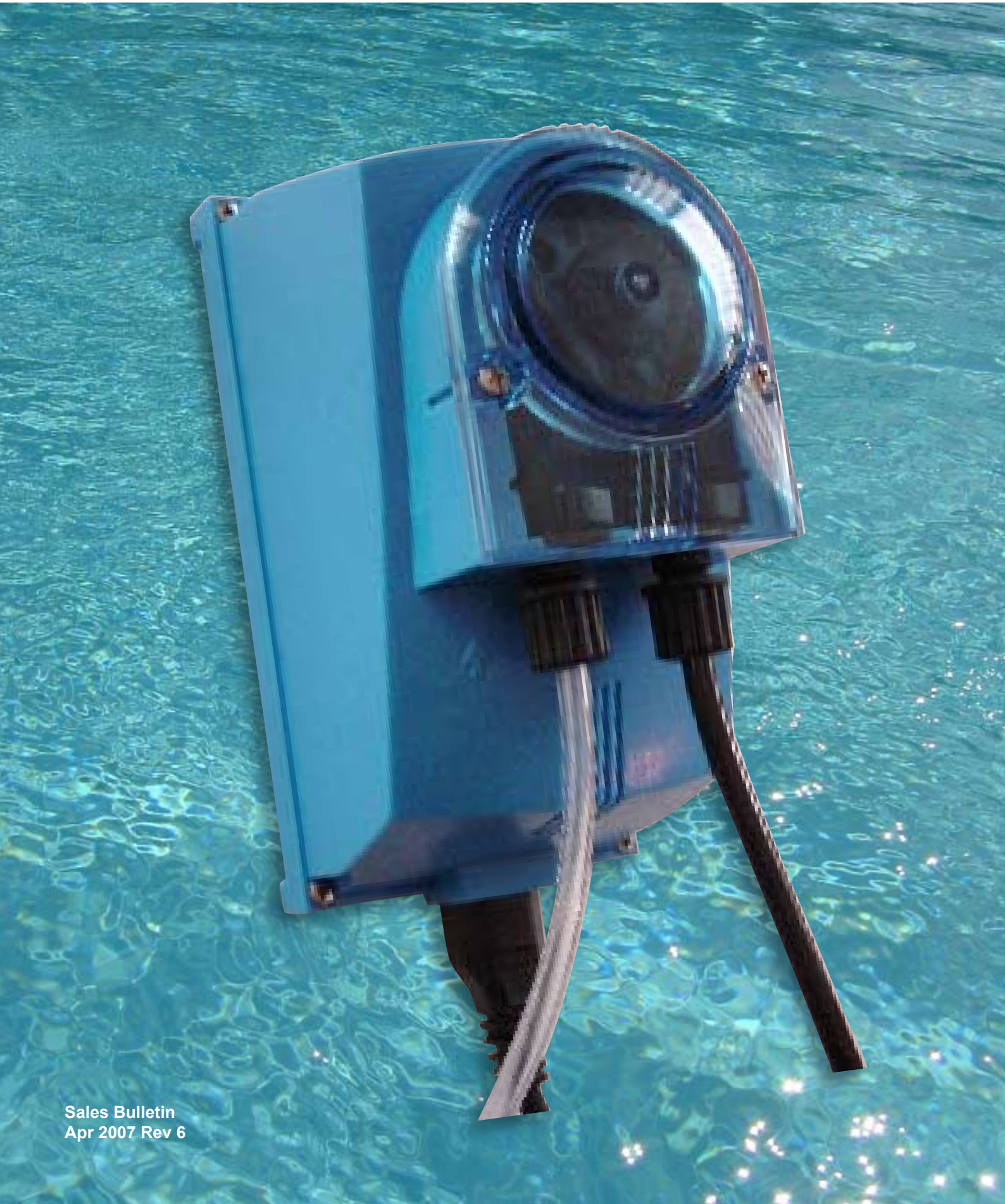
AQUARIUS TECHNOLOGIES PTY LTD

Peristaltic Dosage Pumps



Sales Bulletin
Apr 2007 Rev 6

Peristaltic Dosage Pumps

The BEST in their class

Aquarius Peristaltic Pumps are the BEST in their Class, more powerful, more robust, more reliable.

The new motors and gearbox are virtually indestructable, and will continue to deliver vital dosing on mission critical installations even when others succumb to problems of pressure build-up. You will rest easy in the knowledge that your chemical dosing is in good hands.

Aquarius Peristaltic Pumps have a performance specification that is equal to the most demanding task.

Full delivery of dosage chemicals at rated pressures as high as 350 kPa. (50 psi) means that you get much more for less cost than comparable pumps.

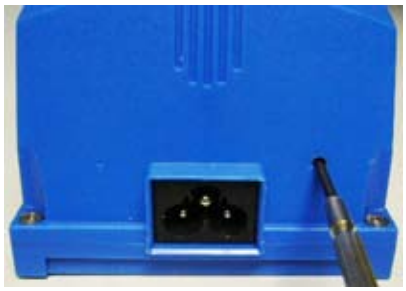
Why would you trust anything else?

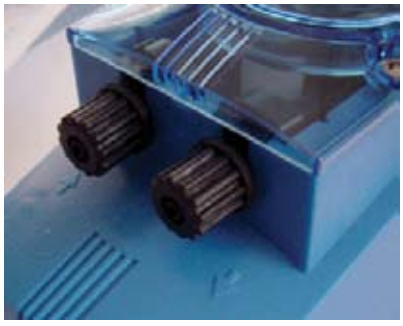
Aquarius Peristaltic Pumps have been designed with ease of service as a top priority.

Our pumps now feature an appliance type electrical lead that is pluggable which means you no longer need an electrician to disconnect 'hard wired' installations.

Even though we have extended capabilities, all wear parts are easily accessible for ease of maintenance.

We also offer a variable control option with our peristaltic pumps. A simple adjustment will allow a duty cycle of between 10% to 100% (based on 1 min) of dosage.





- **Variable Control**

  Adjustable control for variable output

- **Service friendly**

  Improved access to wear parts, no hard electrical wiring to service.

- **Powerful design**

  Powerful 16 watt motor, indestructable gearbox and drive train.

- **Performance plus**

  High performance components and materials make this one of the best performing pumps in its class

- **Exceptional durability**

  Manufactured from materials that will handle all common

Introducing the ALL NEW family of **Peristaltic Dosage Pumps** ***with variable control*** for applications in water treatment programs

Applications

- Cooling Water Treatment
- Swimming Pool Disinfection
- Post Harvest Disinfection
- Hydroponics Nutrients Dosage
- Chlorination Applications
- Trade Waste or Effluent
- Process Disinfection
- Washdown Water Disinfection
- Boiler Water Treatment
- Potable Water Treatment
- Electroplating Applications
- Phosphating Applications
- Dosage of Enzymes

Chemicals

- Scale and Corrosion Inhibitors
- Non - Oxidising Biocides
- Sodium Hypochlorite
- Sodium Bromide Solutions
- Hydrogen Peroxide - 50%
- Hydrochloric Acid - 33%
- Ferric Chloride Solutions
- Peracetic Acid Solutions
- Neutralizing Amines
- Boiler Water Chemicals
- Tannin Solutions
- Sodium Hydroxide - 50%
- Phosphoric Acid - 85%

These pumps are designed to meet "dosage on demand requirements" using APL logic & where the duty cycle is varied to the system demand. These pumps are not recommended for 100% duty, and running for extended hours.

ON/OFF Control		
Specification	AP_PERI1	AP_PERI3
Output	1 LPH	3 LPH
Rated Pressure	350 kPa.	350 kPa.
Motor Size	16 W, 220 - 240 VAC	
Motor Speed	10 RPM	30 RPM
Squeeze Tube	NORPRENE	
Casing Materials	Glass Filled Polypropylene	
Tubing	6 x 4 mm PVC tubing	
Non-Return Valve	Viton sleeve on PVC	
Roller Block	Tri-Roller	
Power Lead	Plug-on appliance lead	
Wall Mounting	Snap On - Snap Off	

Variable Control		
Specification	AP_PERI1_VAR	AP_PERI3_VAR
Output (Duty Cycle)	10-100% based on 1 min	
Rated Pressure	350 kPa	
Motor Size	16 W, 220 - 240 VAC	
Motor Speed	10 RPM	30 RPM
Squeeze Tube	NORPRENE	
Casing Materials	Glass Filled Polypropylene	
Tubing	6 x 4 mm PVC tubing	
Non-Return Valve	Viton sleeve on PVC	
Roller Block	Tri-Roller	
Power Lead	Plug-on appliance lead	
Wall Mounting	Snap On - Snap Off	

Other Sales Bulletins from Aquarius

KPI Intelligent Water Treatment Controllers
Cooling Water Treatment Controllers
Swimming Pool Disinfection Controllers
Trade Waste or Effluent Controllers
Potable Water Disinfection Controllers
AquaGuard 2 Water Management Software
for remote control interface from a PC

Distributed By

AQUARIUS
TECHNOLOGIES PTY LTD
WATER QUALITY CONTROL

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AQUARIUS
TECHNOLOGIES PTY LTD
WATER QUALITY CONTROL

Quality System
Quality Endorsed Company ISO 9001 Lic. No. 5403

AQUARIUS
Corrosion Coupon Racks

Corrosion Coupon Racks for the determination of Corrosivity of Water by evaluation of Pitting and by Weight Loss on Flat Metal Specimens

For "Best Practice" Cooling Water Treatment Programs

- √ For 80 x 13 x 1.6 mm Flat Specimens
- √ Rated to 1000 kPa. @ 50 ^{0}C Max. in PVC or
- √ Rated to 1000 kPa. @ 100 ^{0}C Max. in MS
- √ Models for 4 Coupons
- √ Models for 2 Coupons
- √ Velocities of 0.5 - 2.00 m/s.
- √ Similar to ASTM rack
- √ PVC Backing Board
- √ With or Without Isolation Valves

CCRACK_2

TECHNOLOGY FOR WATER QUALITY CONTROL

AQUARIUS TECHNOLOGIES PTY LTD ABN 94010 393 254
P.O. BOX 71, COOPERS PLAINS, Q. 4108
UNIT 1, 23 RICHLAND AVENUE, COOPERS PLAINS, Q. 4108
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Aquarius Corrosion Coupon Racks

The ***Aquarius Corrosion coupon exposure racks*** are designed to retain the coupons in the laminar flow region and away from the turbulent flow areas around the Tee sections. The velocity across the coupons can be controlled via the isolation valves to represent flow conditions and velocities in heat exchangers.

Properly prepared and pre-weighted coupons or specimens of the metal of interest and approx. 75 - 80 mm in length and 13 mm width, and 1 - 2 mm thick are attached to the coupon holder via plastic screws and retaining nuts and the coupon holder screwed into the pipe rack, the specimen being held in the centre of the flowing stream and free from all but flowing debris.

As the pipe internal diameter is 22.5 mm the velocity across the specimens can be calculated by measuring the litres per minute flow through the rig with the coupons fitted.

Flow Rate Lts./min.	***Velocity m/sec***
5.92	0.25
11.84	0.50
23.68	1.00
35.52	1.50

or ***Its/min. Flow / 23.68 = Metres/second velocity***

Changes in thickness from the 2 mm thick specimens in the calculations above, to 1.0 mm thick, reduce the velocity by only 2.5% and in most cases can be ignored, or the flow rate readjusted.

System pressure should remain constant to maintain the desired velocity, or if velocity is set similar to the heat exchanger velocity then any variance in pressure and change in velocity is experienced by both and is indicative of corrosion rates under actual operating conditions.

For more information refer to ***ASTM D2688 - Standard Test Methods for Corrosivity of Water in the Absence of Heat Transfer (Weight Loss Methods)***

Units are supplied WITHOUT the actual metal specimens.

Guidelines for Installation of CCRACKS to comply with the requirements of ASTM D2688

ASTM D2688 – Standard Test Methods for Corrosivity of Water in the absence of Heat Transfer (Weight Loss Methods) is the recognised standard for corrosion monitoring by exposure of metallic coupons and measuring the weight loss over a period of time.

ASTM D2688 states in paragraph 15.6 as follows:-

"Adjust the flow of water in the test piping to a rate that gives a flow velocity that corresponds to the normal flow in those parts of the system under prime consideration. Normally the flow velocity will be in the range 0.6 m/sec to 1.8 m/sec (2 – 6 ft/sec). Check and adjust the flow as necessary to maintain the desired rate"

The Aquarius CCRACK corrosion racks are designed to comply with ASTM D2688 and require flow rates of 14.21 lts/min to provide 0.6 m/sec velocity up to 42.62 lts/min to give 1.8 m/sec flow velocity.

It is strongly recommended that CCRACK's be installed **on an entirely separate 20 mm take off point (with isolation valve) from the condenser water header,** and NOT plumbed in series or in parallel with the Water Treatment Controller manifold, as the ON/OFF operation of bleed solenoids or BCD solenoids are very likely to cause variation in flow rates in CCRACK.

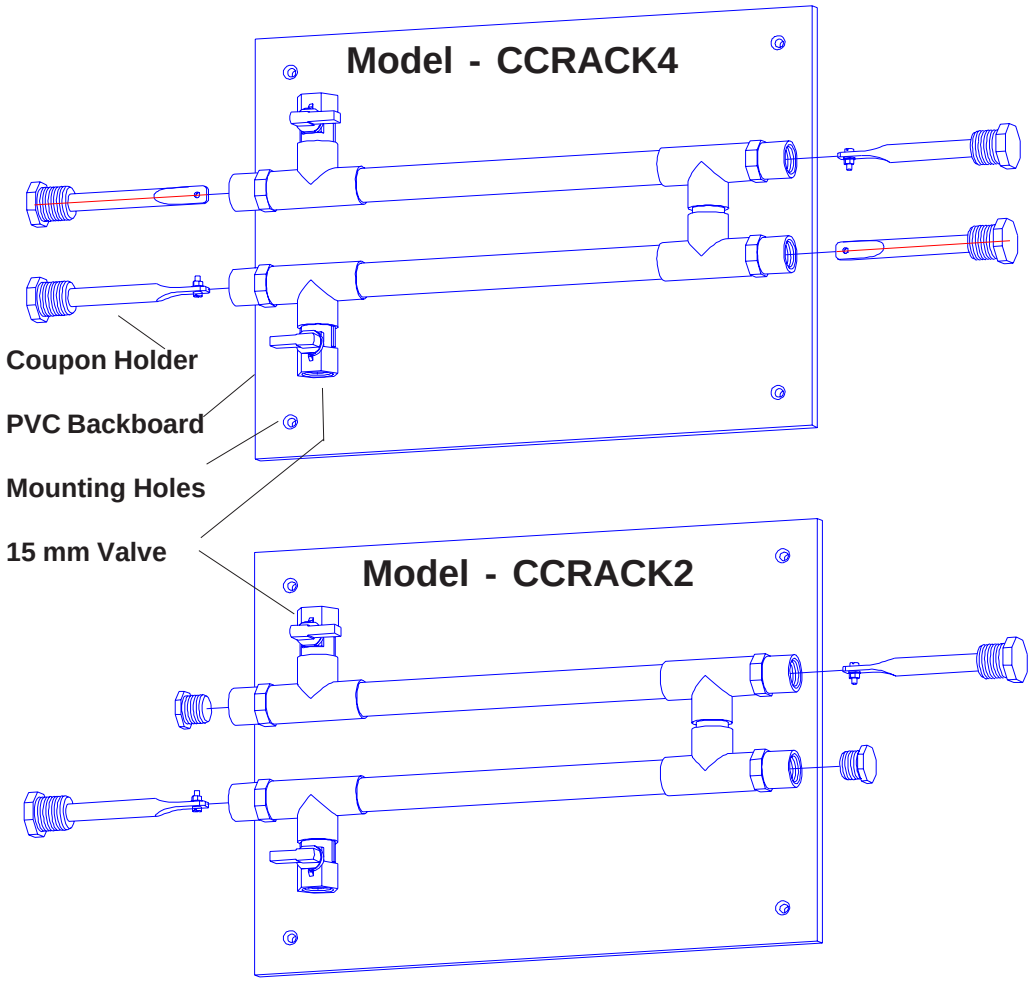
Where high velocities and flow rates are required e.g. 35.52 lts/min at 1.5 m/sec or where low pressure exists in the condenser header it will be necessary to install a booster pump to ensure the required flow and velocity is maintained.

Where a suitable circulation pump is installed and with a pressure regulator – the 25 mm discharge should be Tee'd off at 20 mm each to provide a separate water supply to each of the CCRACK and the Water Treatment controller, and with separate returns back to the cooling system.

The KPI v3 is provided with an automatic control valve to ensure a constant set velocity across the corrosion specimens but again sufficient pressure and flow are required to meet the set flow velocity.

A full copy of ASTM D2688 can be purchased from Standards Australia.

Aquarius Corrosion Coupon Racks



MODELS AVAILABLE

Model - CCRACK2 = With 2 coupon holders and two 15 mm plugs + inlet & outlet valves. Rated to 1000kPa pressure and 50^{0}C. Manufactured using PVC pipe and fittings. Coupon holders constructed from PVC rod.

Model - CCRACK4 = With Four Coupon Holders + inlet and outlet valves. Rated to 1000kPa pressure and 50^{0}C. Manufactured using PVC pipe and fittings. Coupon holders constructed from PVC rod.

Model - CCRACK2_HT = With 2 coupon holders and two 15 mm plugs + inlet & outlet valves. Rated to 1000kPa pressure and 100^{0}C. Manufactured using Galvanised steel pipe and fittings. Coupon holders constructed from Glass filled Teflon rod.

Model - CCRACK4_HT = With 4 coupon holders and two 15 mm plugs + inlet & outlet valves. Rated to 1000kPa pressure and 100^{0}C. Manufactured using Galvanised steel pipe and fittings. Coupon holders constructed from Glass filled Teflon rod.

MANUFACTURER'S PRODUCT WARRANTY

AQUARIUS TECHNOLOGIES PTY LTD. manufactures a range of equipment under a Quality Assurance system to ISO9001:1994 standards and warrants equipment of its manufacture to be free of defects in material or workmanship.

Liability under this policy extends for 12 months from the date of installation, or 24 months from the date of shipment from our factory, which ever occurs first. The manufacturer's liability is limited to repair or replacement of any failed equipment or part of, which is proven to be defective in material or workmanship upon the manufacturer's examination. This warranty does not include removal or installation costs and in no event shall the manufacturer's liability exceed its selling price of such equipment or part.

Aquarius Technologies Pty Ltd. disclaims all liability for damage to its products through improper installation, maintenance, use or attempts to operate such products beyond their functional capacity, intentionally or otherwise, or any unauthorised repair. Aquarius Technologies Pty Ltd. will not be responsible for any consequential or other damages, injuries, or expense incurred through use of its products.

This warranty is in lieu of any other warranty, either expressed or implied. Aquarius Technologies Pty Ltd. make no warranty of fitness or merchantability. No agent of ours is authorised to provide any warranty other that above.

This warranty does not exclude any condition or warranty implied by the Trade Practices Act 1974 or separate State Laws in Australia and is in addition to any other right that the original purchaser or any subsequent purchaser may have under Australian law.

Should a unit fail to function normally, please contact our Customer Service Department by phone or fax quoting, Model Number, and Serial Number, for initial discussion of the problems encountered, and if it is necessary to return the item to the factory, a Return Authorisation number will be given to facilitate return, and repair or replacement of the item.

The Item for return should be carefully packaged to prevent any damage in transit, contain the Return Authorisation identification number, customer identification, and return delivery details, and the freight prepaid to our factory. If in the opinion of our factory, after examination, the failure was due to materials or workmanship, repair or replacement will be made with out charge for parts, labour and return freight. A reasonable service charge will be made for diagnosis and/or repairs due to normal wear, abuse, tampering or damage in transit.

AQUARIUS TECHNOLOGIES PTY Ltd. reserve the right to continue development and improvement of the entire range of our equipment, and therefore minor changes may occur due to these improvements and the continuing development.

NEW RELEASE SOFTWARE AND HARDWARE FOR "C SERIES" AND "KPI3"

Water is as we are well aware the hot political topic of the decade. Attitudes in government, business and industry have changed for the better as we all strive to conserve this precious life source.

To assist, Aquarius Technologies has designed and produced an additional module to our cooling tower controllers which we call our **WUM** option. This package, when used with any pulse head water meters, can track water flows into and out of the cooling system. Please read on for an explanation of how this is achieved.

Water Usage metering: was introduced to provide more relevant information in relation to water efficiency at site

What does it do?
If WUM is selected as an option (OPT_WUM) on our controllers a PCB is fitted to interface between the pulse water meters and the controller allowing monitoring:

- Make Up water meter input using a pulse head water meter (standard on all controllers)
- Bleed water meter input using pulse head water meter (OPT_WUM required)
- Backwash water meter input using a pulse head water meter (OPT_WUM required)

This new option:

- Allows the operator to select the quantity of water represented by 1 pulse of the water meter

- Data logs all information from each water meter allowing evaluation of efficiency
- Shows the actual usage values on the controller display using the read screen

This shows total water usage, can be reset in Calibration Menu

This shows Makeup water usage Month-to-Date & Year-to Date

This shows Bleed water usage Month-to-Date & Year-to Date

This shows Back Wash water usage Month-to-Date & Year-to Date

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Reporting using AquaGuard2:

- It will accumulate the data and provide usage totals from each meter
- It will provide charted reports comparing make up to bleed
- Provide full graphing of all associated water treatment measures

Please note!! A new version of AquaGuard 2 is imperative with the new firmware.

Other Modifications

While upgrading the cooling tower controller software our R & D department has integrated **other useful refinements** which our customers have indicated required incorporation. These include:

- **Water meter dosage control** of inhibitor and dispersant is now a selectable option and is standard in all new cooling tower controllers released. This allows the user to input the ppm required against make up flow

- **4-20mA input** is now available as an option (OPT_4_20_INPUT) and can be set up to suit your site specific requirements. This allows another measure to be introduced from a stand alone meter. The controller can then be adapted to reflect the input readings and SMS alarms can be programmed for high or low measures. AquaGuard2 has been upgraded also to accommodate the programming, recording and setup of this easy to use module.

- **SMS Alarming** has had a facelift and now activate SMS messaging on all active alarms when they occur. Previously, it would only indicate a second alarm condition when the repeat alarm was sent. This keeps the user well informed of the site conditions.

The part numbers and list prices for ordering are:

Part Number	**Description**	**List Price** ex GST
OPT_WUM	Water usage Meter option for cooling controllers	$500.00
OPT_4_20_INPUT	4-20MA Analogue input for controllers	$150.00

Aquarius Technologies stocks a range of suitable impulse water meters from 15mm to 50mm and can provide pricing and supply of water meters beyond the above sizes if required. Call us for a quote.

Note: Upgrades can occur to current site controllers if required. For pricing please contact sales at Aquarius Technologies.

Regards
The Aquarius Team

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AquaGuard 2

Water Management Software for Remote Control of Water Treatment Programs

USER MANUAL

Dec 2008 Version 6.0

AQUARIUS TECHNOLOGIES PTY LTD

WATER QUALITY CONTROL

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AquaGuard 2 Software

Congratulations

We know you will be happy with your decision to purchase a new Aquarius Technologies 2006 Generation Controller.

The AquaGuard 2 software extends the controller capabilities to allow for remote control of your controller from the comfort of your PC or latptop computer.

Once connected, the owner or manager can obtain system performance data such as Alarm status, modify the water treatment program settings, start a disinfection program remotely or download the controller data log for a full review of system performance.

An Excel spreadsheet with embedded macros swiftly imports the data downloaded to a database from where data summary, trend charts and graphs are automated to provide for rapid reporting and analysis of the data.

In this package are -

AquaGuard 2 Trial CD - software program, a fully functional version of AquaGuard 2 water management software on a 30 day trial period.

After this period, if you want to continue using the program you must purchase - **AquaGuard 2 Activation Key CD** and load this program to your AquaGuard 2 Trial software program to restore full functionality for a life span of 15 years. If the Activation Key was purchased together with the Controller, you will find the key already on the CD.

Monitor and Control the Cooling Water Treatment Program on remote sites

Real Time Monitoring of all functions associated with the controlling system

Security via AquaGuard 2 Activation Key

Graphical and Numeric Interpretation of System Operation

Internal Data Storage for Analysis Purposes

Download of stored data from the controller

Alarms output to mobile phones ensure 24/7 service

Section Contents

1 Installation Guidelines

2 System Configuration

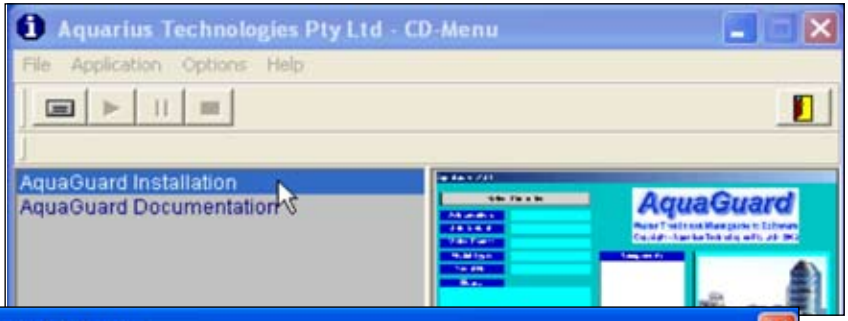
Installation

System Requirements Minimum
Microsoft Windows 2000 or NT running on an IBM PC or compatible.
Pentium II processor
128 MB of RAM
SVGA Display, 16 colour (800x600 res)
200MB of hard disk space
CD Drive + Excel 2003

Recommended
Pentium II processor
256MB of RAM
SVGA display, 256 colour
(1024 x 768 res)
2GB of hard disk space

Installing the Software

(It is advisable to close all applications and restart Windows prior to installing the software).



When you place the AquaGuard 2 CD in the CD drive, the installation screen will automatically appear. Follow the installation instructions from there.

1 Installation Guidelines

To run the installation process manually, select the RUN option in the Start menu. In the Run dialog box, type in the following:

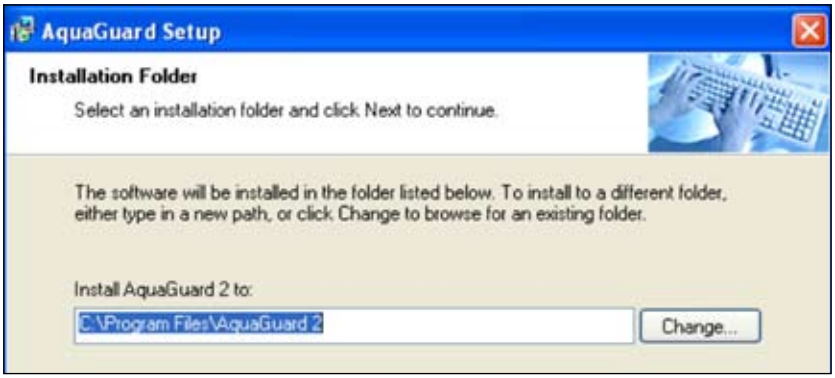
<drive_name>:\setup

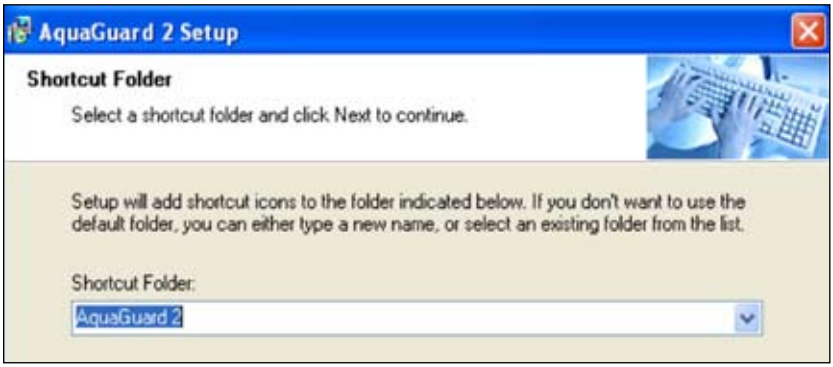
i.e. D:\setup

The setup program will load AquaGuard 2 program onto the PC and load typical Excel template programs, and load the shortcut icon onto the desktop.

CWT_GraphsSIWM.xlt for cooling water treatment or SP_graphsSI.xlt for swimming pools are Excel template spreadsheets which have been designed for easy importation & reporting of data for full analysis.

Trend Charts, Dosage Profiles, Corrosion Charts, and a Data Log Summary are automatically produced after the Setup sheet has been completed and data downloaded and imported.




AquaGuard 2 Setup
Shortcut Folder
Select a shortcut folder and click Next to continue.
Setup will add shortcut icons to the folder indicated below. If you don't want to use the default folder, you can either type a new name, or select an existing folder from the list.
Shortcut Folder:
AquaGuard 2

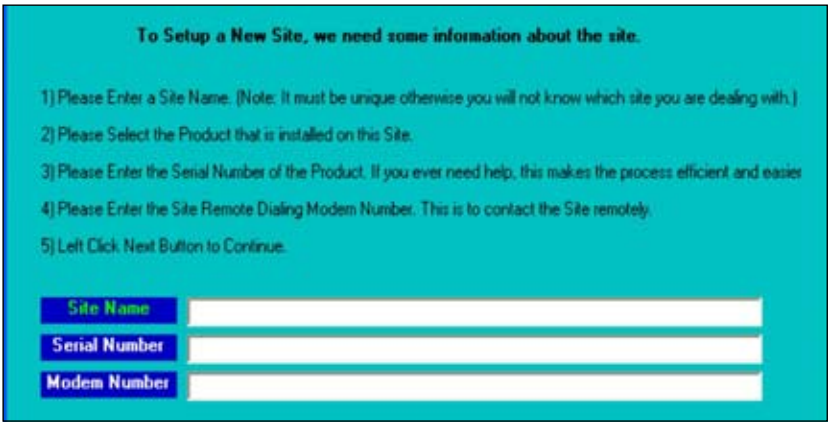

AquaGuard Setup
Ready to Install
You are now ready to install AquaGuard 2.
The installer now has enough information to install AquaGuard on your computer.
The following settings will be used:
Install folder: C:\Program Files\AquaGuard 2
Shortcut folder: AquaGuard
Please click Next to proceed with the installation.


AquaGuard Setup
AquaGuard Installed Successfully
Setup is complete and your software is now installed.
Thank you for choosing AquaGuard 2.
Please click Finish to exit this installer.

1 Installation Guidelines

Setting up AquaGuard 2

Double Click on the AquaGuard2 Icon from the desktop.



Add Sites

A software wizard exists to enter the data required to add a site to the AquaGuard 2 software. The information required includes site details, site contacts, and telephone data number of the modem associated with the controller

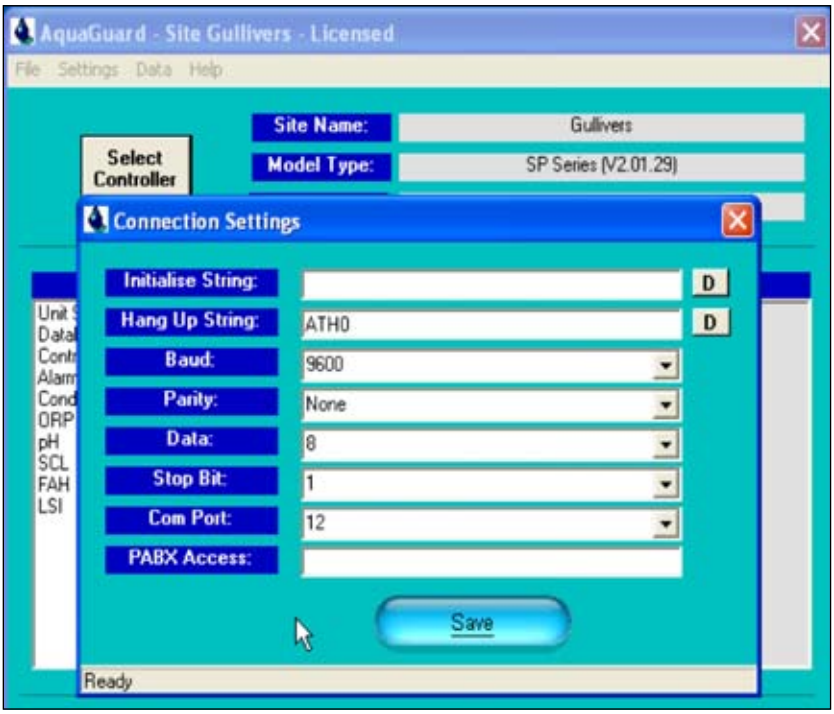
The telephone number of the modem connected to the particular site is exactly as would be manually dialled and must include area codes and international codes (if applicable). Note that it does not include the PABX access number which is set in modem settings. The information can be edited at any time from the Settings>Site menu bar.

To access the wizard, go to Settings press the Add Site control button on the AquaGuard 2 main screen.

Set Communication Settings

Before communications can commence to a site, the communication parameters of the modem need to be set. This information is set by the Settings>Modem Settings sub menu from the main menu bar.

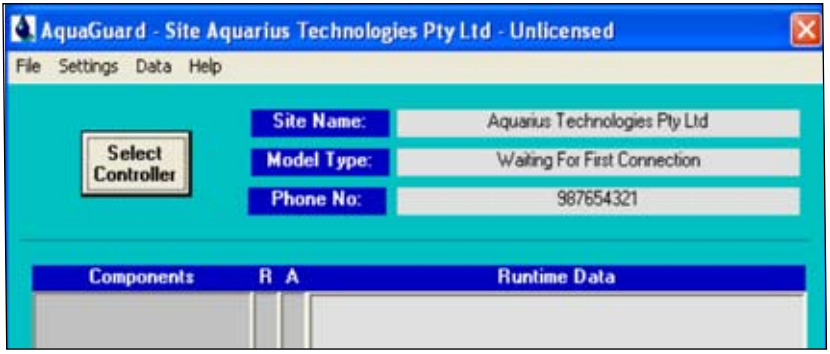
Aquarius has optimized settings for the Sony GSM modem and these settings should not need to be modified where a Sony GSM is installed. For other modems, consult an experienced technician for correct modem settings for the particular modem model.



1 Installation Guidelines

Connecting to Sites -

Double Click on the AquaGuard 2 Icon from the desktop.
Select the Site to be connected to via the Select Controller button.
Select whether the site is to be connected remotely or locally and depress the Connect button.
Refer to the screen display on page 10 for location of controls within the window.
If the connection is via modem, approximately 30 seconds will elapse as the remote site is being called and communication is being established. Status of the connection is displayed at the bottom left hand corner of the AquaGuard 2 window. Typical displays and their interpretation are as follows:



Modem Initializing -

AquaGuard 2 sends a modem initialization string to the modem to ascertain if the modem is ready and to place it into a defined mode. If the modem responds affirmatively, AquaGuard 2 will move onto the next phase otherwise an error message will be displayed alerting the operator that the modem could not be initialized.

Dialling the GSM Number -

The dialling number status message indicates that the number stored in the site communications settings has been dialled. If the modem at the controller cannot be contacted, a time out will occur with the operator being appropriately notified.

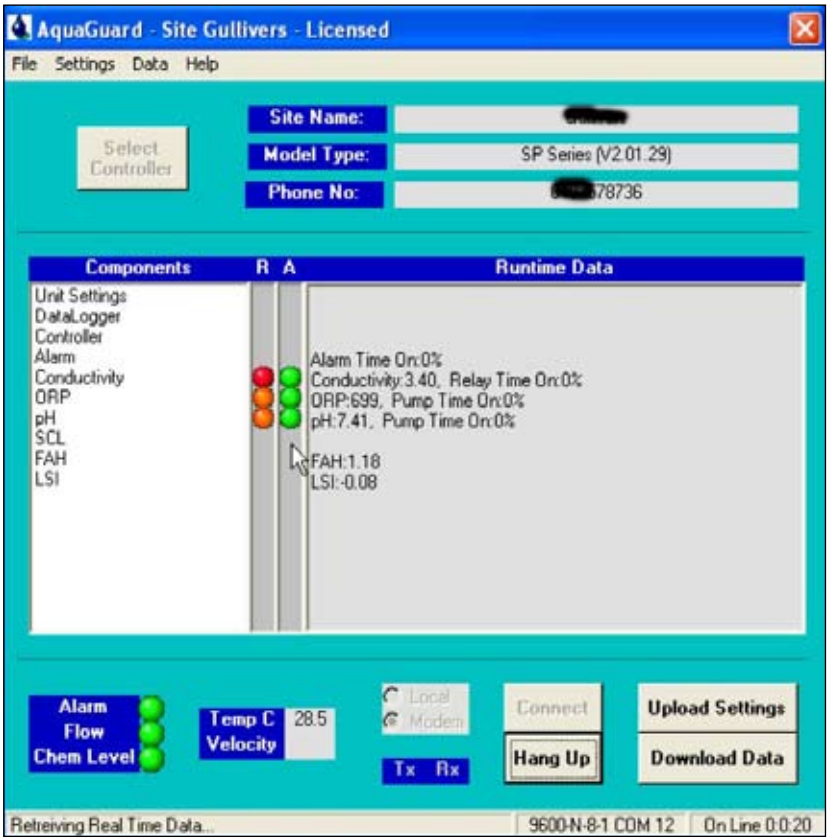
Dialling the Controller Number (Carrier Detected)

When the modem connected to the controller answers the incoming call, AquaGuard 2 senses this and reports that a carrier has been detected. This message will be present until communication at the required baud rate is detected. If a correct connection cannot be established, a time out will occur with the operator being appropriately notified.

Waiting Real Time Data -

When AquaGuard 2 is connected to the remote site, an interrogation will be made to retrieve settings data. While the interrogation is taking place this message will be displayed.

Ready - Successful connection to the site has been made.



Monitoring of Real Time Data

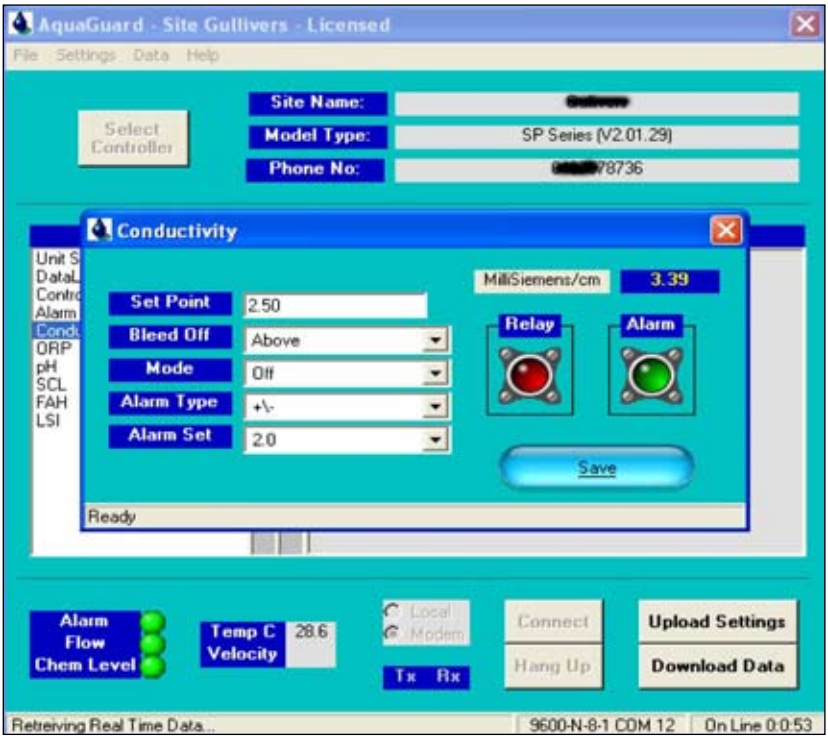
Once the connection has been made; flow, alarm, and tank status (if applicable) is displayed in the bottom left hand corner and indicated via green or red status boxes. Sensor data can be displayed by 'clicking' the particular parameter in the middle of the screen. The screen printout at the bottom of page 3 shows a typical presentation provided from an ORP and Conductivity Cooling Tower Controller. Note that the data for each sensor includes the settings data and the current readings from the sensor. This data is updated approximately every 5 seconds.

2 System Configuration

Changing Water Treatment Parameters

The list of available functions pertaining to the connected site are displayed in the middle of the AquaGuard 2 main window. Any of these water treatment parameters can be altered and uploaded to the connected site. To accomplish this, perform the following steps:

- Click on the particular function which requires changing (i.e. Conductivity)
- Change the setting or settings for the function which require changing (i.e. Change the set point and/or alarm values for Conductivity)
- Press the **SAVE** button within the function window, you will be asked to confirm your selection - if OK select YES if not OK select NO and redo. Wait until the software responds with a **"Save Complete"** message at the bottom left hand corner of the function window.

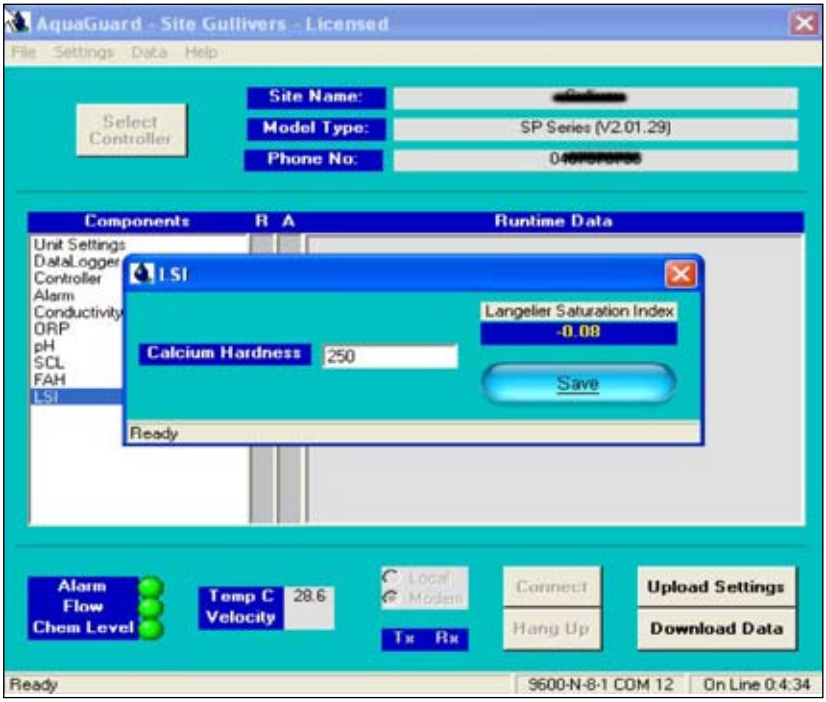


Repeat for other functions which require changing.

Pressing the **UPLOAD SETTINGS** control button will allow for multiple changes, and the new data will be transferred via the connection to the site controller.

Note 1:- To enable LSI to calculate accurately - current values for Calcium Hardness need to be frequently entered to the controller - see screen opposite

Note 2:- On Swimming Pool operation for FAH to calculate accurately - the level of cyanuric acid need to be added to FAH screen, similar to Calcium Hardness above.



2 System Configuration

Downloading Data

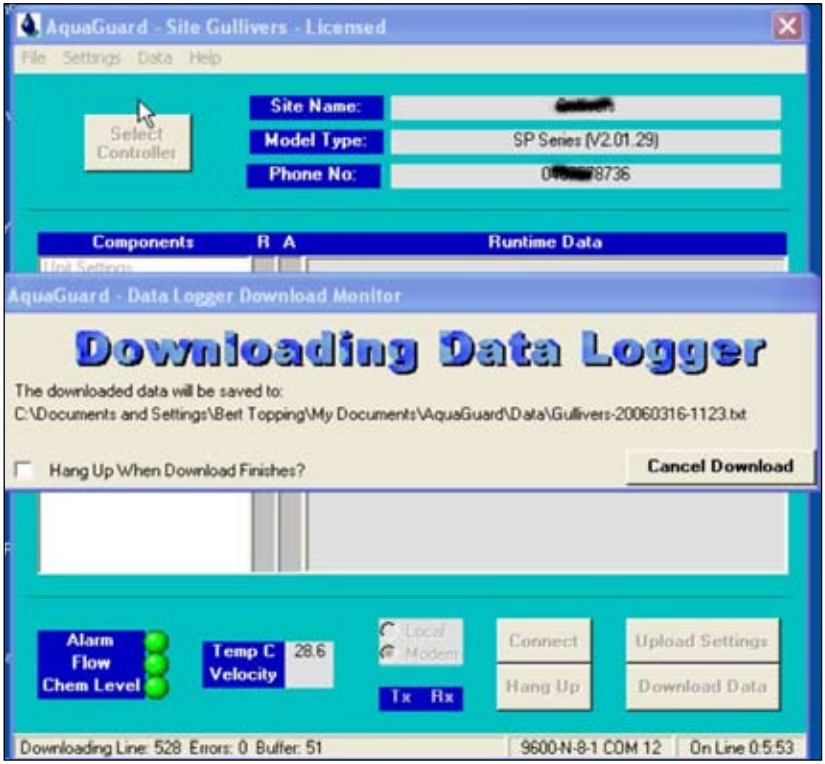
Internally logged data from the connected site controller can be downloaded at any time by pressing the **DOWNLOAD DATA** control button. Wait until download is completed. To complete the data transfer, perform the following steps:

The data downloaded is saved to a file for that controller ID automatically. At this time, messages in the bottom left hand corner of the AquaGuard 2 main screen will indicate the status of the download.

At the completion of the download, the status message will return to READY. The downloaded data will be stored in the file nominated and can be accessed via the appropriate Excel Template program to automatically produce the graphs and site summary reports.

The downloaded data is also appended to the sites internal database for future viewing and reporting as required.

Refer to the section on viewing and reports on the particular site database for details on these features.



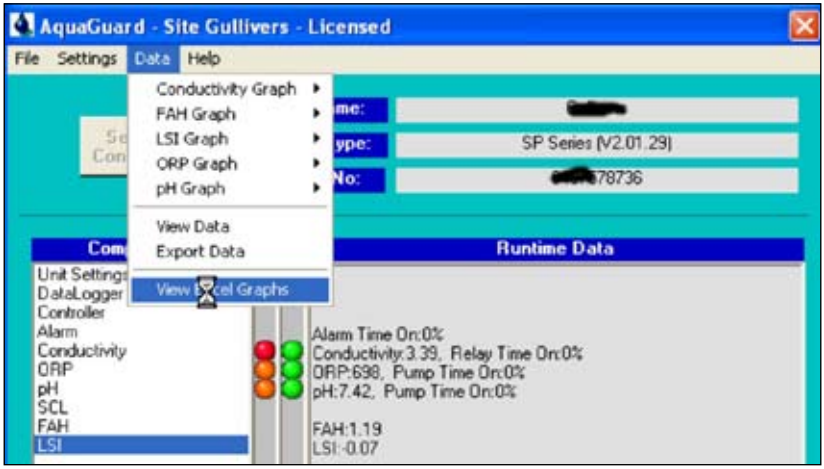
Using the Excel 2003 Templates for Reports of Data Summary, Trend Charts and Graphing

Aquaguard 2 has a suite of Excel Templates, with macros to import data log, and produce a Data Summary for 1 day, 1 week, and 1 month, plus Trend Charts or graphs of data logged also for 1 day, 1 week, and 1 month.

The Template contains a historical database of the data downloaded from a controller and history can be viewed by changing the date in **Data Summary sheet - Cell xxx**

Templates are set up for:-

1. **Cooling Water Treatment** as CWT_GraphsSI.xlt where SI units are used or CWT_GraphsUS.xlt where US units are used.
2. **Swimming Pool Disinfection** as SP_graphsSI.xlt for SI units or as SP_GraphsUS.xlt for US units.



2 System Configuration

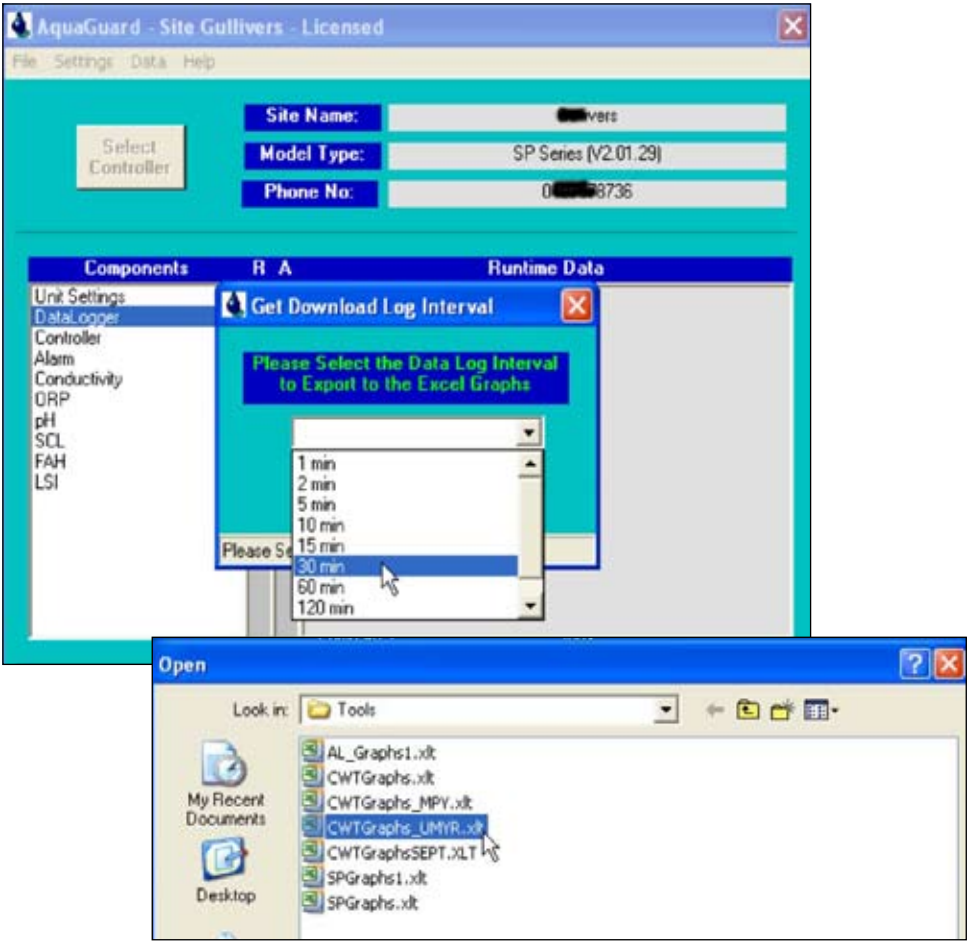
Procedure

After the data download has completed - select **View Excel Graphs -** then you will be asked to select the **Download Data Interval** required for the graphs, normally at 30 minute intervals as shown in the opposite screen.

The program selects only those lines of data for the time period selected to ensure time spacing harmony in trend charts.

Next you will be requested to select the most suitable graphs template from the Tools directory in AquaGuard 2.

Select **CWT_graphsSI.xlt** if your data is in SI units, Cooling Water Treatment and corrosion is also a measured and logged function.

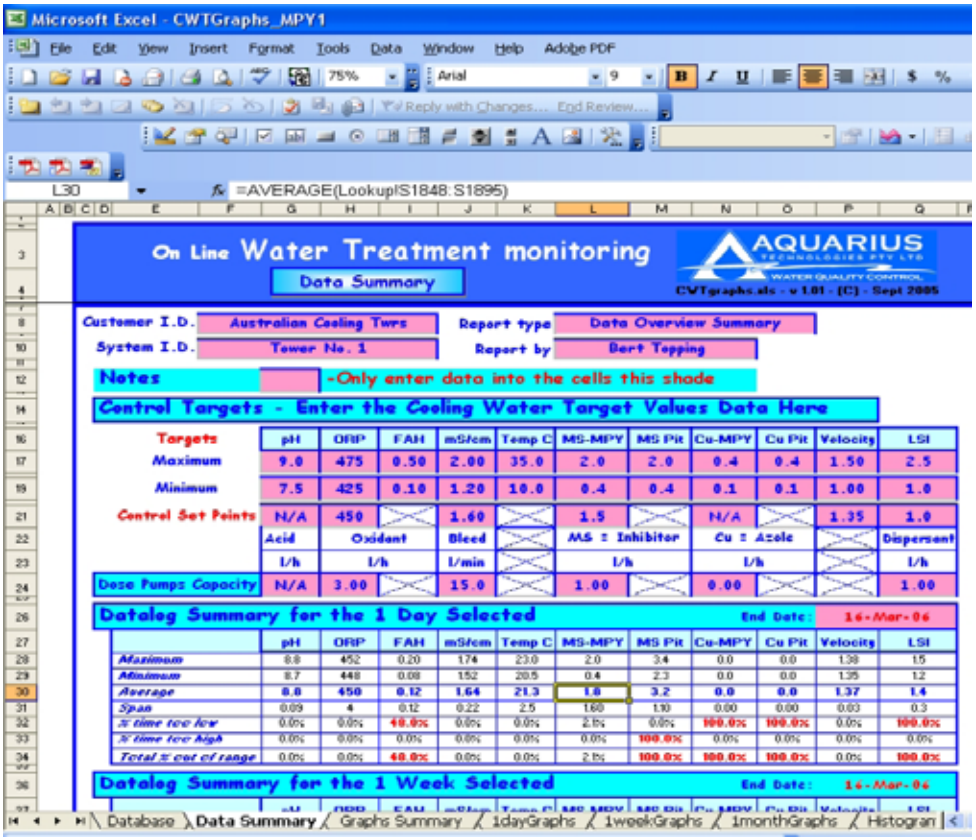


Using the Excel 2003 Templates for Reports of Data Summary, Trend Charts and Graphing

The program using macros loads the data into the selected Template e.g. CWT_GraphsSI.xlt. New templates can be created or modified templates can be saved for future use

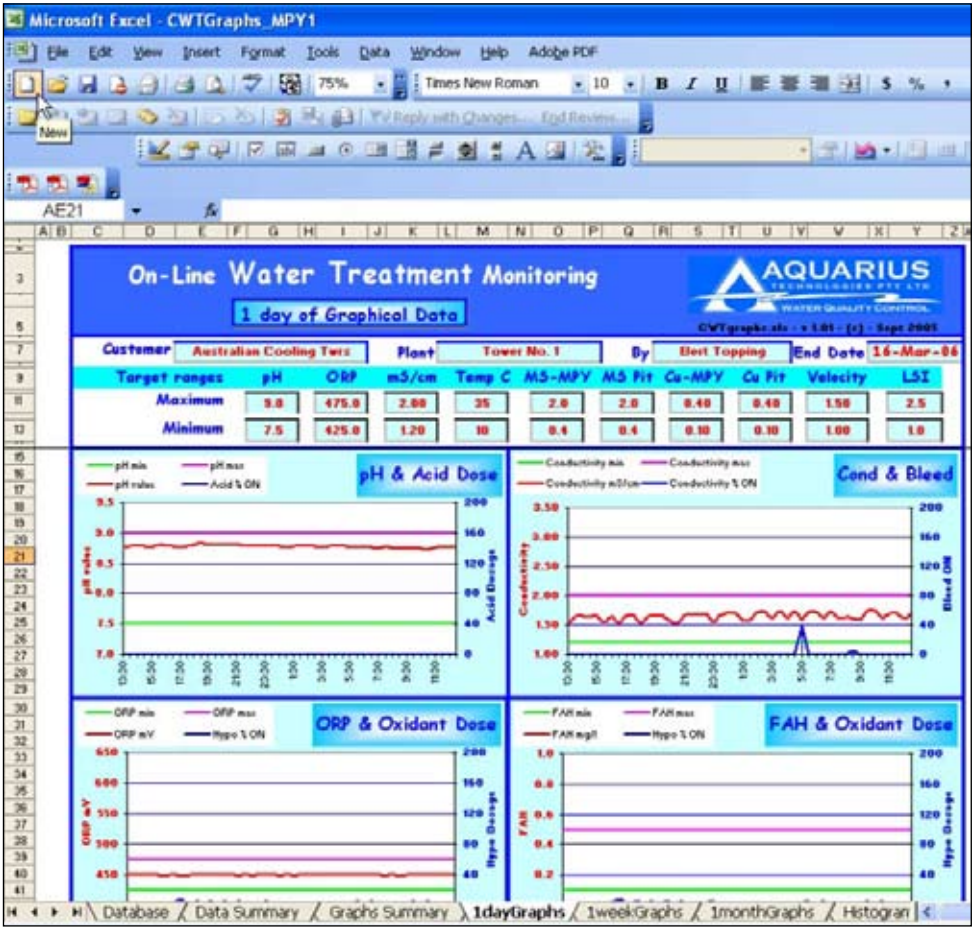
Next you are requested to fill in the site details - into the **Data Summary Sheet** to customise your report.

Example of the Data Summary Sheet - CWT_GraphsSI.xlt

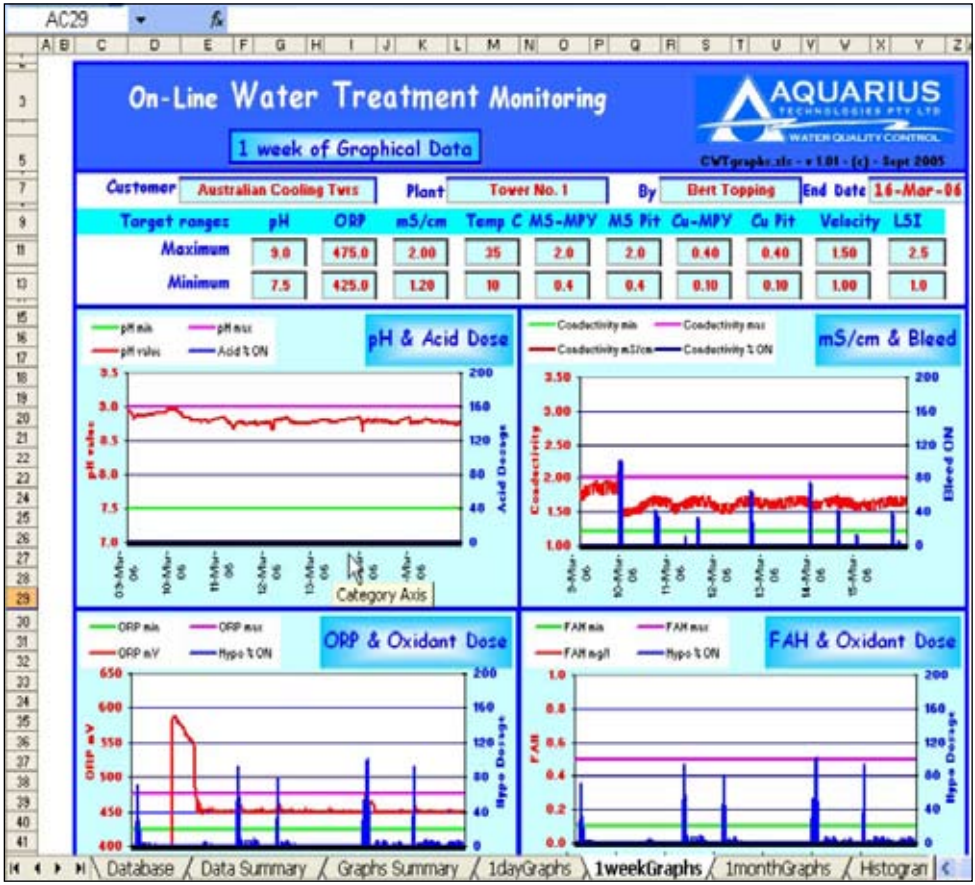


2 System Configuration

Example of the 1 Day Trend Charts - CWT_GraphsSI.xlt

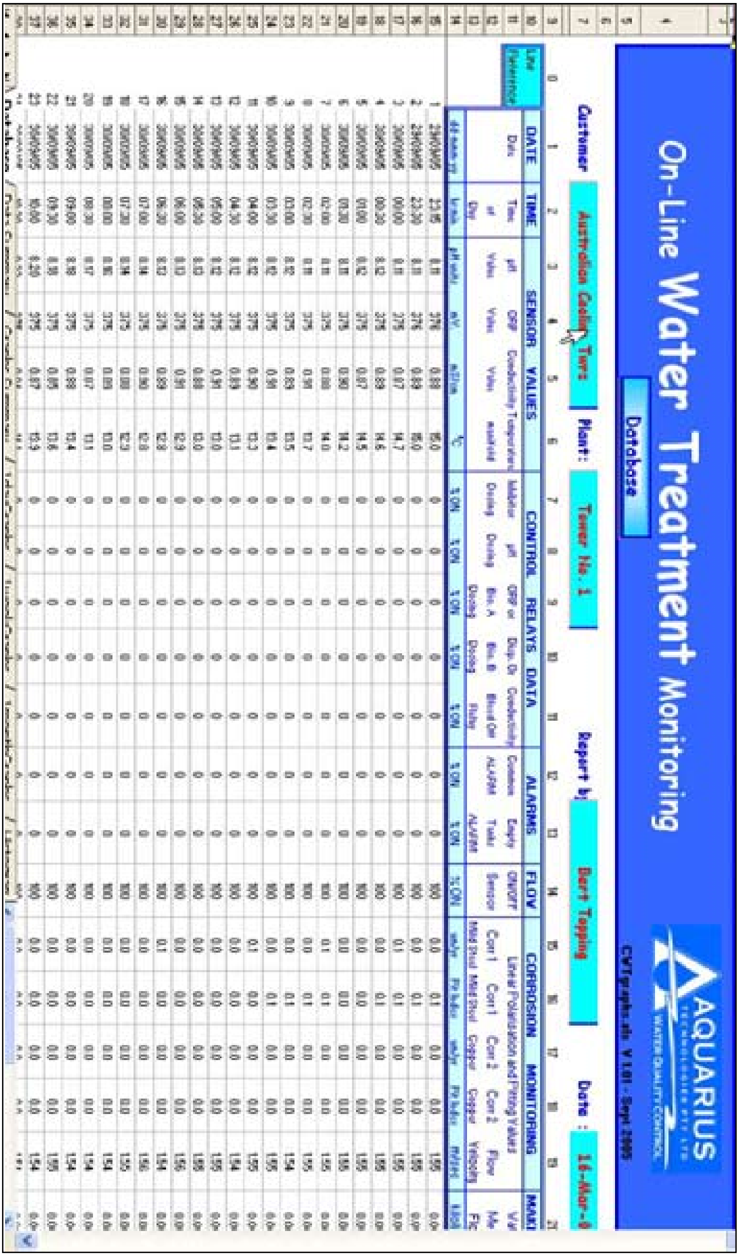


Example of the 1 Week Trend Charts - CWT_GraphsSI.xlt



2 System Configuration

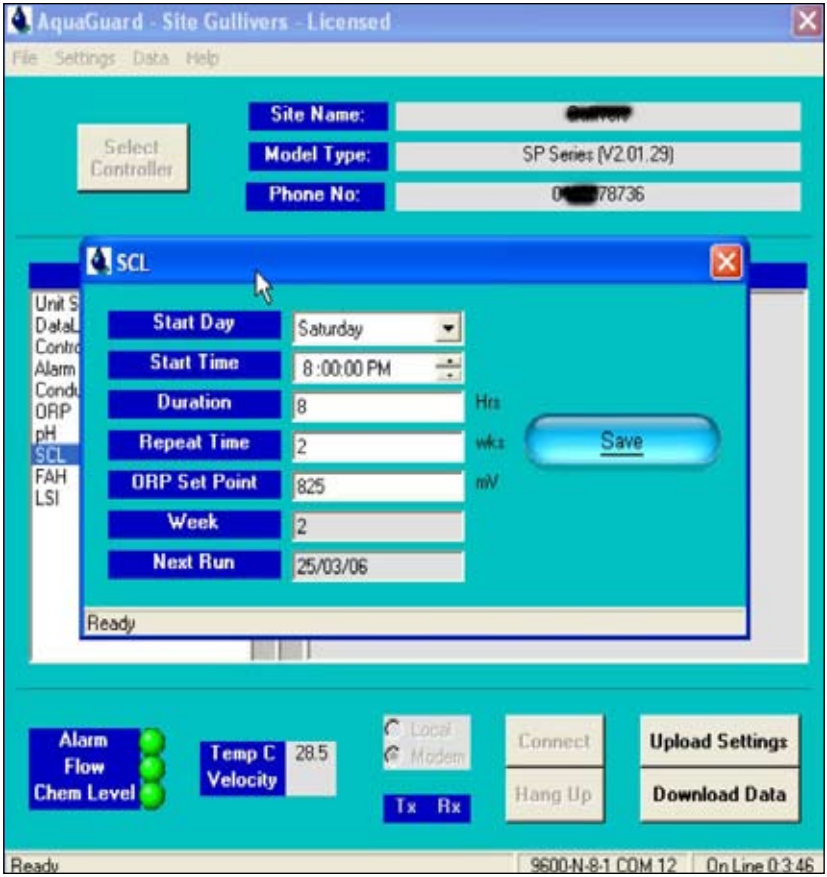
Example of the Database in Excel Template - CWT_GraphsSI.xlt



Remote start up of Superchlorination or Disinfection

A unique function is the ability to remotely start up and program a disinfection or superchlorination routine. Should a LDB detection be advised from Microbiological Laboratory then a remote disinfection start up can avoid drastic consequences on cooling systems.

For Swimming Pools, the Superchlorination is normally used as a monthly routine to rid the pool of chloramines which lead to odours, eye stinging, and poor disinfection.



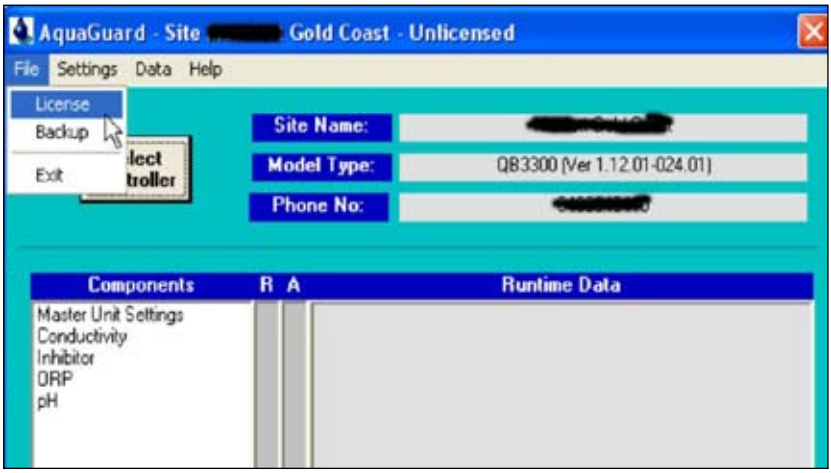
2 System Configuration

Add Or Delete an Activation Key (license)

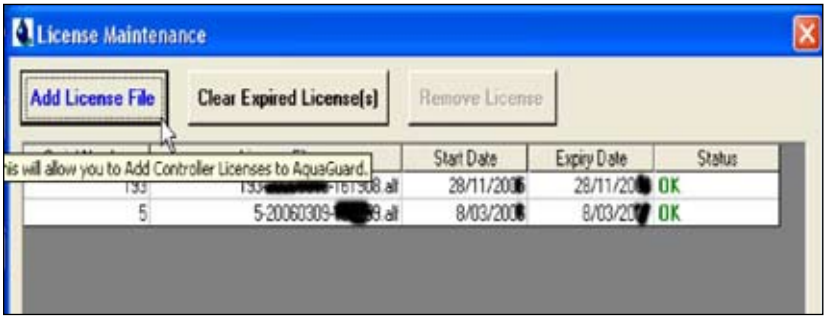
AquaGuard 2 allows for a 30-day Free Trial period. After this period, an Activation Key is required to be purchased to allow the program to continue functioning.

The Activation Key CD or program delivered by email needs to be loaded to the trial program as shown in the **Add Activation Key** opposite.

The Activation Key allows for security, as the key will only activate a particular controller. But the key can be installed into multiple computers within a company.



Delete Activation Key - The following routine allows for erasing or deleting Activation Keys from a particular computer as in the screenshot opposite.



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Useful Contact Information

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ABN 94 010 393 254

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Fax: + 617 3274 4736
email: techsupport@aquariustech.com.au

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Coopers Plains Q 4108
Australia

Delivery Address:
1/21 Richland Avenue
Coopers Plains Q 4108
Australia

Trading hours:
08:00 to 17:00 Monday - Friday
Australian EST

Record details of your controller here:

Controller:
Serial Number: .....

Date Installed: .....

Pumps:
1 - serial number .....

2 - serial number .....

3 - serial number .....

4 - serial number .....

5 - serial number .....

6 - serial number .....

AQUARIUS
TECHNOLOGIES PTY LTD
WATER QUALITY CONTROL

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REMOTE TECHNOLOGY

Aquarius Technologies has introduced remote technology to its range of controllers to provide the ultimate ability in 24/7 water treatment control. This breakthrough is providing market leading advances in issue detection and off-site monitoring to ensure that the treated system is always within specified treatment levels or if not you are aware and can react accordingly.

The package incorporates:

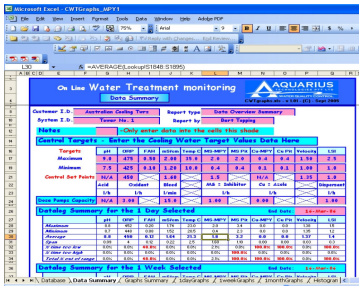
- ✓ GSM/GPRS modem and the latest Aquarius Technologies Proprietary software AquaGuard2 used for analysis and control remotely.
- ✓ Access key for your protection allowing only defined user access to the controller at site.
- ✓ SMS alarm output for up to 3 mobile phones providing specific site identification and related issue via user set defined fields on each measure.

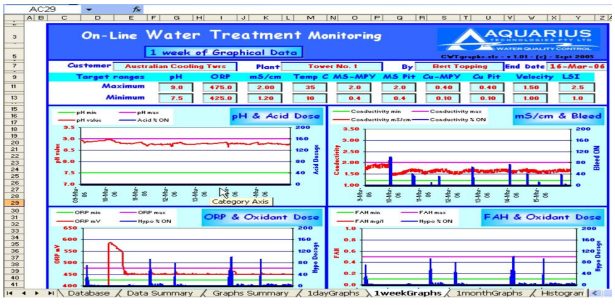
Measures and alarm deviation set-points

Measure	Alarm Type	Set deviation	Alarm delay
Conductivity	+/- ms/cm	.1, .2, .4, .8, 1	5 minutes
ORP	+/- mV	25, 50, 100, 150, 200	5 minutes
pH	+/- pH	.5, 1, 2	5 minute
Velocity (KPI3)	+/-	% of set point	5 minutes
LP Corrosion	+	Selected Metal	5 minutes
Lock Out	Lockout	Minutes set	5 minutes
Calibration	Factory set	12 weeks	5 minutes
4-20mA Input	User defined	User defined	5 minutes
Low Level Tank	Dry contact	Level Set	5 minutes

Remote capabilities include: (for further information refer to AquaGuard2 user manual)

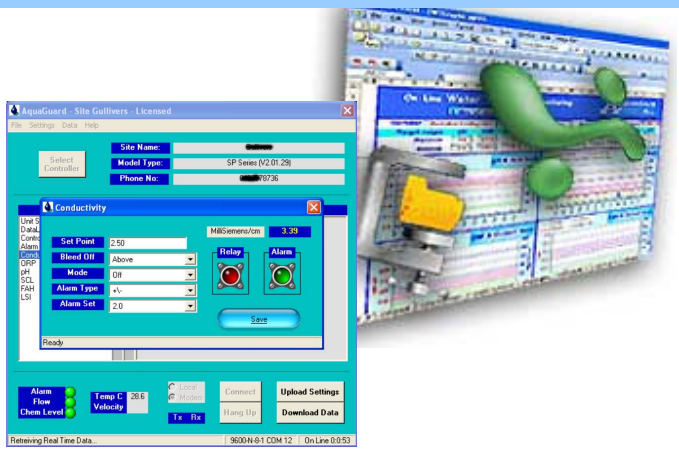
- ✓ Adjusting of set points on ORP, pH, Conductivity
- ✓ Activation or deactivation of outputs, pumps, solenoids, etc
- ✓ Download of controller stored data
- ✓ Analysis of data via charted performance of AquaGuard2
- ✓ Disinfection of system
- ✓ Lockout reset to ORP and pH outputs
- ✓ Reset and reprogramming of all set points and output capacities
- ✓ Water Meter readings and usage collection





The remote communication package requires a suitable SIM card to be fitted. The following offers a guide to ordering the correct SIM card to enable communication and SMS alarm capabilities.

As the controller SIM card will only be used for the transmission of SMS messages and accepting incoming data calls from a remote computer consideration should be made as too the available phone plan with generally the lowest cost plan suitable.



SIM Card setup request from Service Provider

1. Aquarius Technologies recommends using Telstra (in Australia) as a Service Provider for Data Communications between AquaGuard and the Water Treatment Controller (For overseas countries, please contact your local mobile phone company).

2. When requesting a new account from your Service Provider, the following information should be given to them in order to receive a SIM card that is data enabled and has the correct phone number.
   a. Advise the Service Provider that you require a Data enabled SIM Card
   b. The account should have no voice message service
   c. The account should be stripped of all auxiliary services
   d. Ask for the Data Telephone Number as well as the Voice Number of the account

3. Once you receive your new SIM card perform the following functions
   a. Remove all password protection from the SIM. i.e. no Pin Numbers to switch on. This can be done by inserting the SIM card into a telephone and removing the PIN activation on startup
   b. Insert SIM card into the modem by pushing the SIM card release button with a pointed instrument, sliding out the carrier, inserting the SIM card in the correct orientation and reinserting the carrier.
   c. Record the Data telephone number in a safe place. Aquarius Technologies recommends placing a sticker with the number on the modem itself.
   d. Non-Transparent CSD data number

4. All messaging and other features can now be setup via AquaGuard.

5. Should there be any further problems in accessing data or receiving SMS messages from the SIM card, Please contact the Telstra Help Desk on **1800 010 253** Option 2 or your local provider. Request for Data Accounts customer service.

6. Should there still be problems with Remote Communications, please contact Aquarius Technologies on 07 3274 4750

BMS Output Interface

Introduction

The Building Management System output option for your controller provides a local BMS/PLC/SCADA system with 4-20mA signals proportional to measured values along with ON/OFF, clean contact relays for Alarm, Flow and the status of all output relays.

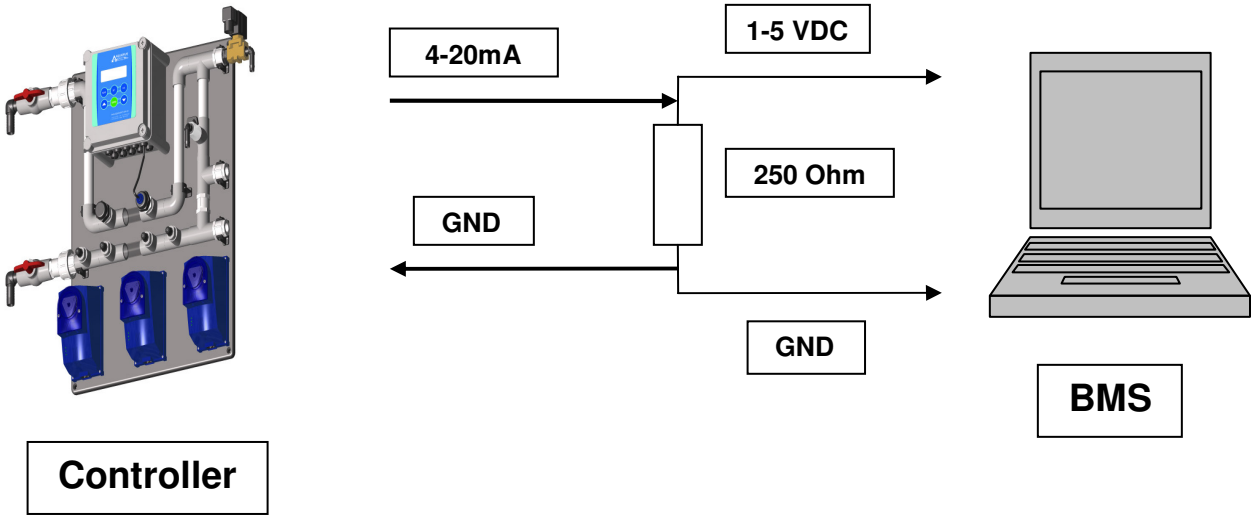
Connections

All connections for BMS outputs are made via the BMS Connector Board, cabled through spare glands in the base of the enclosure. The BMS Connector Board provides clear labeling of all 4-20mA and relay status outputs. The configuration of the event outputs is discussed below.

4-20mA Outputs

The BMS output option is available in 4 or 8 channel configurations (8 channel KPI only), with 4-20mA signals proportional to Temperature, Conductivity, pH and ORP, along with umPY + PIT on two metals for KPI series controllers.

It is recommended that a **250 Ohm** sense resistor is used at the BMS end of the connection for each 4-20mA input – providing the BMS a **1- 5 volt DC input** across the range of measurement.



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Web: www.aquariustech.com.au Email: info@aquariustech.com.au

Note: In cases where the BMS requires a 2-10 volt analog input (500 Ohm sense resistor), the 4-20mA output may only be accurate up 95% of the maximum scale.

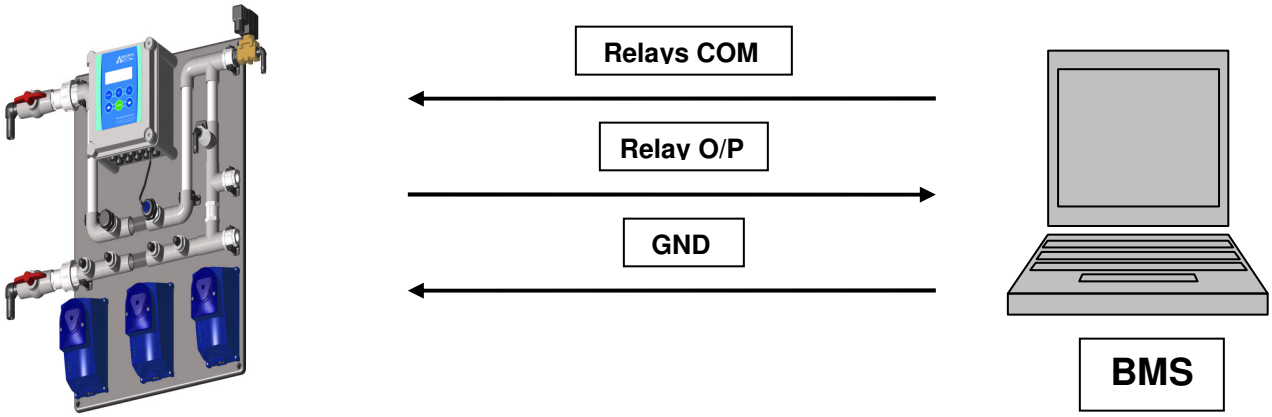
Event Outputs

Both the 4 and 8 channel BMS options provide for ON/OFF, clean contact switching for the current status of Alarm, Flow and all available relay outputs. Relay numbering is consistent within each family of controllers, but dynamic across the full range, so relay numbers may change depending on your software configuration.

The relay numbering for each software configuration is easily obtained by running the **Test Outputs** routine. To enter the Test Outputs routine, press and hold the **READ** key for 5 seconds. Now press the **ENTER** key to move the cursor to the MAN/AUTO selection. Press the **DOWN** arrow key to select AUTO Test outputs operation. The controller will now cycle the output relays from REL1 through all available relays for 5 seconds each. As each output turns ON, the module and relay number are displayed in the Test Outputs window as follows:

Line 3: **RL1 – pH** **ON (5)**

Flow and Alarm relays are common across all controllers and are clearly labeled on the BMS Connector Board.



The COMMON of each Event Output relay can be supplied by a USER signal (+5, +12, etc, from BMS into RLY(S) COM) or use an internal +12 volt DC signal from the controller(for isolated inputs). This selection is made by placing the jumper on **JP2** to either **+12V** or **RLYS COMM**.

The jumpers on JP1 are connecting each Event Output relay COMMON to the supply selected with JP2 (to save on external wiring – in most cases a common supply is sufficient). By removing these

jumpers the user can choose to individually wire each relay, providing true clean contact switching for all outputs.

Conversions

Each 1 - 5 volt DC analog input will need to be converted back into its appropriate unit of measurement. Conversions for each input are as follows:

Parameter	**Conversion**	**Units**
Temperature (0 – 100)	= ((**value**) – 1) / 4 * 100	C
Conductivity (0 – 10)	= ((**value**) – 1) / 4 * 10	mS/cm
ORP (0 – 1000)	= ((**value**) – 1) / 4 * 1000	mV
pH (0 – 14)	= ((**value**) – 1) / 4 * 14	pH
Corrosion		
umPY1 (0 – 100)	= ((**value**) – 1) / 4 * 100	umPY
PIT1 (0 – 100)	= ((**value**) – 1) / 4 * 100	PIT
umPY2 (0 – 100)	= ((**value**) – 1) / 4 * 100	umPY
PIT2 (0 – 100)	= ((**value**) – 1) / 4 * 100	PIT

Note: (**value**) = DC volts @ input

Example: pH = ((**4**) – 1) / 4 * 14
= (3) / 4 * 14
= 0.75 * 14
= 10.50 pH

Testing

Once all connections have been made and all conversions entered into the BMS, the BMS interface must be verified.

For all analog inputs the reading on your BMS display should be within 1% of the reading displayed in the data display window on the controller. If the BMS allows, these readings can be calibrated to more accurately represent the controllers' reading.

If one or more readings is out of tolerance or cannot be calibrated check your conversions and record voltages at the input. If the voltage is OK the problem is most likely in the conversion. If the voltage is not OK, check the sense resistor value and all cabling. LED's L1 thru 8, on the 4-20 Interface Board, illuminate to highlight open circuit or high resistance current loops.

For testing of Event Outputs, run the Test Outputs routine whilst watching the BMS display. You should see each relay output cycle ON for 5 seconds them OFF. Turn Flow ON and OFF and watch for the flow indication at the BMS. Set an Alarm in the controller (remove sensor, alter SET point etc) and look for an Alarm indication at the BMS.

4 – 20 mA connection diagram and instruction

1. Introduction

The 4-20 mA interface for Aquarius controllers comes equipped with push terminal sockets for easy connection to cables. The interface offers both 4-20mA outputs for ORP, pH, Conductivity and Temperature for standard controller range and Corrosion for KPI range as well as alarm contacts.

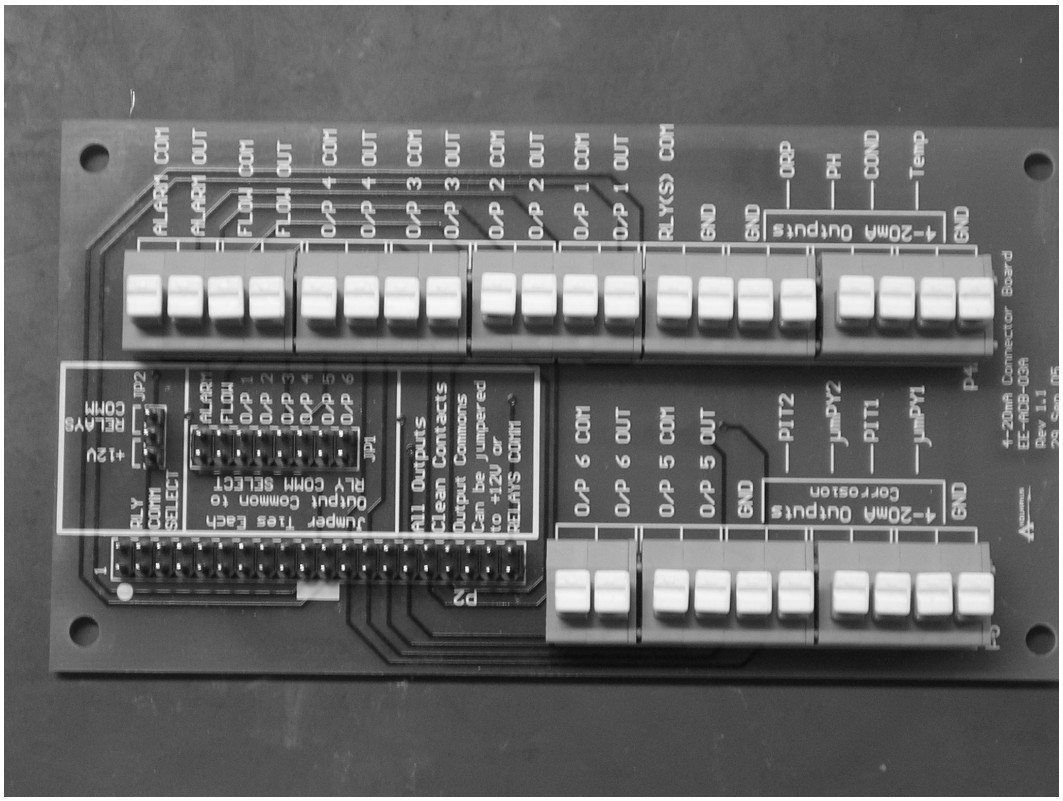
2. Connection diagram

Below is a diagram of connections for the interface. The 4-20mA connection return GND are either side of the signal output terminals and are common.

The relay alarm contacts can be configured in various ways. Each relay output can be independent, common ground or +12V signal. JP1 and JP2 configures these options as follows.

JP1 Jumper on – Common Ground (Default)
JP1 Jumper off – Isolated signal

JP2 Jumper on centre and relay common – Common relay signal from external source connected to RLY (S) COM (Default)
JP2 Jumper on centre and +12V – Connects 4-20mA +12Vdc to relay common.



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