AquaLyse®

Patented Secondary Water Treatment Ion Generator Technology

Operations Manual

Model No: AquaLyse-E2/E2M & E2CS (In-Line Cascading)

E1FS, E1FM, E1CS (One Cell)

Doc. 12712-4

Manufactured by:
ProCare Water Treatment Inc.
Toll Free: 1-888-988-4667 | Fax: 1-866-420-2596 | www.aqualyse.ca

Also for AquaLyse® model No.: E1FM, E1FS & E1CS (1 cell per controller)

WARNING: Under no circumstances should an AquaLyse® unit be used without proper installation, inspection and calibration. All AquaLyse® units must be calibrated prior to utilization by a certified ProCare Water Treatment Inc. technician in accordant to each particular installation.

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Table of Content

AquaLyse®

General Terms of Sale, Limitations of Liabilities and Warranty

All ""PROCARE WATER TREATMENT INC." products are guaranteed to be free from manufacturer's defects for a period of (60) sixty months from the date of shipment, providing the product has not been worn out or damaged due to severe service, i.e. extreme temperatures, corrosives and/or abrasive conditions, etc.

Where "PROCARE WATER TREATMENT INC.", products contain components that are covered under the warranty of another manufacturer; warranty coverage will then be limited to the time period provided by that manufacturer, including the limitation and remedies contained in or by such warranty.

This warranty is in lieu of any other warranties, expressed or implied, including, but not limited to any implied warranty of merchantability or fitness for a particular purpose or application.

"PROCARE WATER TREATMENT INC." shall not be liable for any special, consequential, incidental, direct or indirect damages, nor shall "PROCARE WATER TREATMENT INC." be liable for any loss of profit, loss by reason of plant shutdown, non-operation or increased expense in operation, for loss of products and/or materials with respect to the sale of the products or anything done in connection therewith whether based on contract, tort (including negligence), strict liability, statutory liability or otherwise.

All warranty claims MUST be in writing and must be mailed or delivered by the purchaser within (30) thirty days after purchaser first learns of the essential facts on which the claim is based. Any claim NOT made in writing, not postmarked or received within the allotted time period specified herein shall be deemed null and void.

Warranty claims made by the return of products shall be made by prepaid shipping arrangement to our facility in Dieppe, New Brunswick, CANADA.

The purchaser's sole and exclusive remedy, and "PROCARE WATER TREATMENT INC.", maximum liability for any claim, including negligence, shall be limited to either the repair or replacement of the defective item, or at "PROCARE WATER TREATMENT INC.", sole discretion a refund of the maximum amount of the purchase price. In no event, including negligence, shall "PROCARE WATER TREATMENT INC.", be responsible for any incidental or consequential damages.

Prices, sales terms, and conditions are presented in the current quotation or price pages, and are subject to review or changes without notice. All orders are subject to the acceptance of "PROCARE WATER TREATMENT INC.", at its headquarters in Dieppe, New Brunswick, CANADA. NO assignment of the purchaser's rights may be made without the prior written permission of "PROCARE WATER TREATMENT INC.".

No person, including any representative, employee, or agent of "PROCARE WATER TREATMENT INC..", is authorized to assume for "PROCARE WATER TREATMENT INC.", any liabilities or responsibilities in addition to, or different from those contained in the present provisions. Any and all representations, promises, statements or warranties that are made in addition to those contained in the present provisions are of no force or effect.

Shipment dates are NOT part of this warranty. "PROCARE WATER TREATMENT INC.", shall NOT be liable for delayed or non-delivery for any reason. Where a shipment or installation is deferred at the purchaser's request for more than (30) thirty days beyond the original scheduled date of shipment, the order will be subject to invoicing and payment in full with all storage charges from the original scheduled date of shipment.

This document, including the specifications and pricing, agreement and general terms of sale attached hereto, constitute all the terms of this quotation and is a complete and exclusive statement of those terms. Issuance of a Purchase Order/Purchase Order Number to "PROCARE WATER TREATMENT INC." implies the purchaser's acceptance of the terms listed herein.

This document (i.e. text, overall presentation structure, proposals, quotation, any drawings and/or any parts of the manuals, brochures submitted and pertaining thereto), is the sole property of "PROCARE WATER TREATMENT INC." in CANADA. It contains confidential information and is delivered to the end user, evaluator, researcher, vendor, distributor or any other person under the condition that they, by receiving same, agree not to reproduce, copy or delineate in whole or in part, or furnish information from it to others, or make any use of it that is, or may be, injurious to "PROCARE WATER TREATMENT INC.", and the receiving party agrees to return this information or destroy it upon request by "PROCARE WATER TREATMENT INC.".

1.0 - Installation:

1.1 - Introduction:

There are many possible locations where the AquaLyse® ion generator can be installed. Before you attempt to install any AquaLyse® unit, a certified ProCare Water Treatment Inc. representative must advise you on the possible locations where you should install the AquaLyse® SMX computer control and AquaLyse® ICX ion chamber cell(s). The AquaLyse® technology should be easily accessible for routine maintenance and periodical changing of the SMX ion chamber cell(s). The AquaLyse® SMX (System Management Controller) should also be in an easily accessible and dry area where air temperature is less than 45°C.

1.2 - Before you Begin:

There are a number of steps that you must follow before any instillation is attempted. These steps are:

1.2.1 - Ventilation: Some units have ventilation areas key to the proper functioning of the units. These areas should not be blocked or incased into any additional casing given that the units will require proper ventilation in order to cool down while they are in operation.

1.2.2 - Direct sunlight in high temperature should be avoided. The AquaLyse® SMX can operate in air temperatures of between 32 ºF to 113ºF (0 ºC to 45ºC)

1.2.3 - When ICX ionic chamber cells are mounted in areas where freezing is a possibility, all precautions should be taken in order to not let the water found within the ICX freeze (and expand). ICXs (Ion Chamber Cells) are absolutely not covered for damage due to freezing.

1.2.4 - Proper inspection to ensure that the ICX(s) are properly mounted into the water system with all appropriate supports.

1.2.5 - Ensure that a licensed person(s) (both electrician and plumber) install the unit in accordance with local, national and any other safety guidelines or standards.

1.2.6 - Ensure that the unit is only in operation when water is flowing through the ICX.

1.2.7 - Ensure that the SMX and ICX are installed on the appropriate water circulation system.

1.2.8 – With AquaLyse® systems where water only passes within the ICX ion chamber cell(s) once, a flow meter must be installed within the water distribution system and interlinked to the AquaLyse® SMX computer control system in order to control the ion generation process.

1.2.9 - When multiple AquaLyse® ICX ion chamber cells are installed, the chambers and pump (when fitted) should be installed in parallel and using Victaulic® unions (or flanges) for ease of chamber removal when required.

1.2.10 - Ensure that the correct AquaLyse® Ion Generator is used based on the type of installation, water volume usage and water quality.

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1.3 - Installation in a Domestic Hot Water Loop:

When compared to other technologies, The AquaLyse® series have proven to be the best choice in treating domestic hot water loops for the control and prevention of Legionella growth by introducing controlled amounts of ionic copper and silver ions.

AquaLyse® industrial ion generators are ideal for domestic hot water distribution networks found in healthcare facilities, nursing homes, condominiums, office buildings, hotels, recreational centers, residential buildings, cruise chips and many other locations.

AquaLyse® ion generators are highly effective in the prevention and control of Legionella bacteria growth commonly found in recalculated water systems. Many other water born microorganisms such as pseudomonas, E. coli, viruses and algae are also susceptible to the water ionization process. The water affected includes the actual water, the biofilm, distal low flow points and with time will also treat water ways leading to possible dead-legs.

Note: Before you install any system, please consult with a certified AquaLyse® ion generator representative or engineer in order to determine the best location for installation. Depending on your water system architecture and the volume of water you will be using on a daily basis, the AquaLyse® ion generator should be installed in one of the following locations:

1.3.1 - E2-Type "A": Main Water Supply Installation

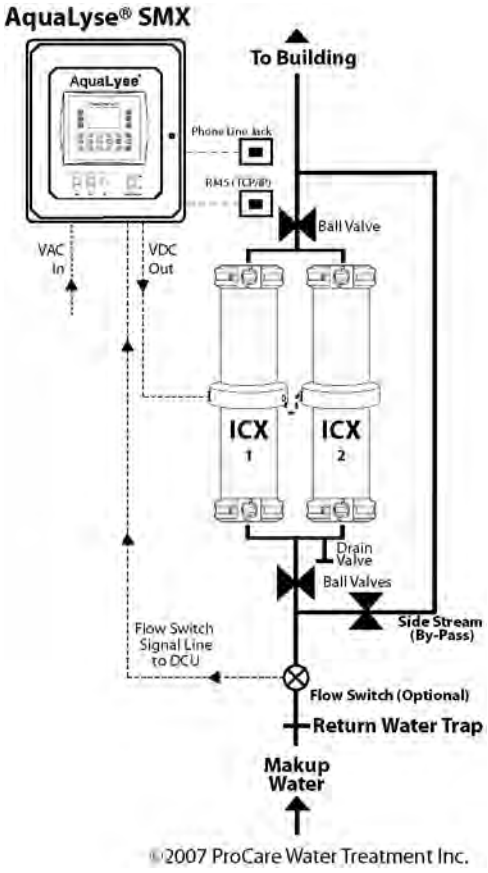
Fore AquaLyse® "E2" models only: When water usage is high or if no water storage is available (instant heat transfer systems), we suggest that the units be installed on the water supply line with SMX activation controlled by a flow switch or flow meter system.

In this type of installation, a side stream (By-Pass) loop with appropriate valves are used in order to offer as much flexibility required when maintenance is done ion the ICX without any water flow interruption.

Whenever possible to reduce scaling, the ICX (Ion Chamber Cell), units should be installed vertically with water flowing upwards.

During normal operation, the main valves must be opened in order for the water to flow through the ICX in order to get ionized. The side stream valve must be closed. When maintenance is required, open the "Side Stream" valve and close the two (2) valves under and on top of the ICX. See maintenance section for details on maintaining your system and proper operation.

WARNING! Never operate an AquaLyse® Ion Generator when the ICX is dry or if no water is flowing within the ICX. An optional flow switch or meter can determine the on/off activity of the SMX when properly configured.



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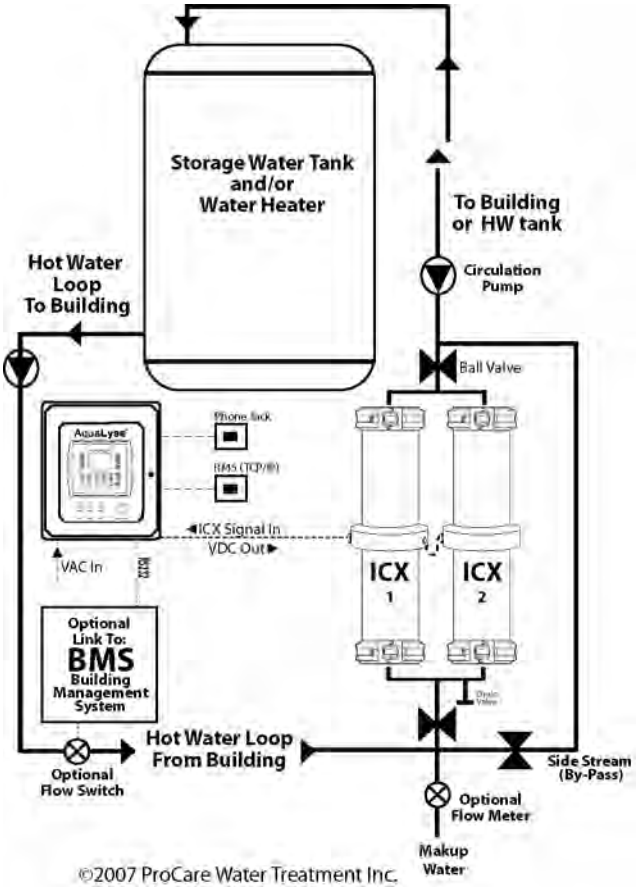
1.3.2 - E2-Type "B": Water Loop Installation

Given the nature of the low water usage, normally found in smaller office buildings and nursing homes, we suggest that the ICX (Ion Chamber Cell) be installed on the water loop just before the water heater / tank with proper on-going water circulation flow. For additional control in order to reduce un-necessary usage or the system, a timer can be used in order to compensate for peek water usage periods.

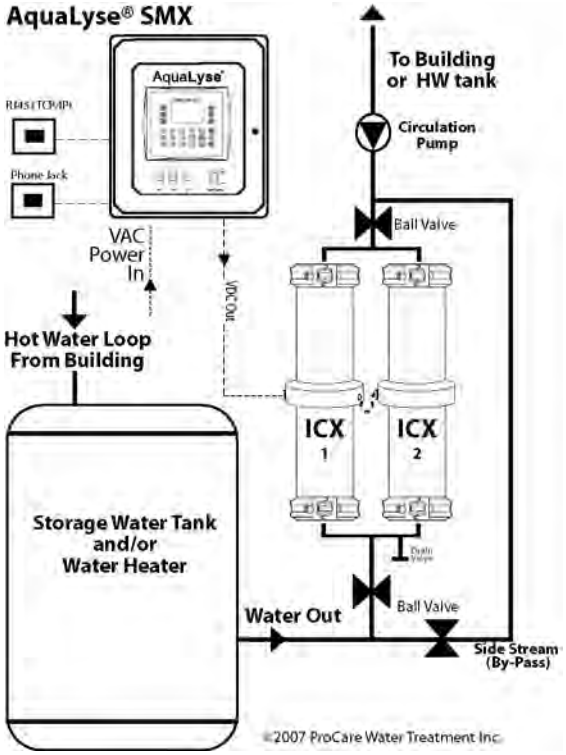
In this type of installation, a side stream (By-Pass) loop with appropriate valves are used in order to offer as much flexibility required when maintenance is done ion the ICX without any water flow interruption.

In order to eliminate any possibility of air getting trapped within the ICX (Ion Chamber Cell), units should be installed vertically with water flowing upwards.

During normal operation, the main valves must be opened in order for the water to flow through the ICX in order to get ionized. The side stream valve must be closed. When maintenance is required, open the "Side Stream" valve and close the two (2) valves under and on top of the ICX. See maintenance section for details on maintaining your system and proper operation.



OR



WARNING!

Never operate an AquaLyse® Ion Generator when the ICX is dry or if no water is flowing within the ICX. An optional flow switch or meter can determine the on/off activity of the SMX when properly configured.

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1.3.3 – E2M-Type "C" (Optional)
Proximity Multiple Water Loop Installation Configurations

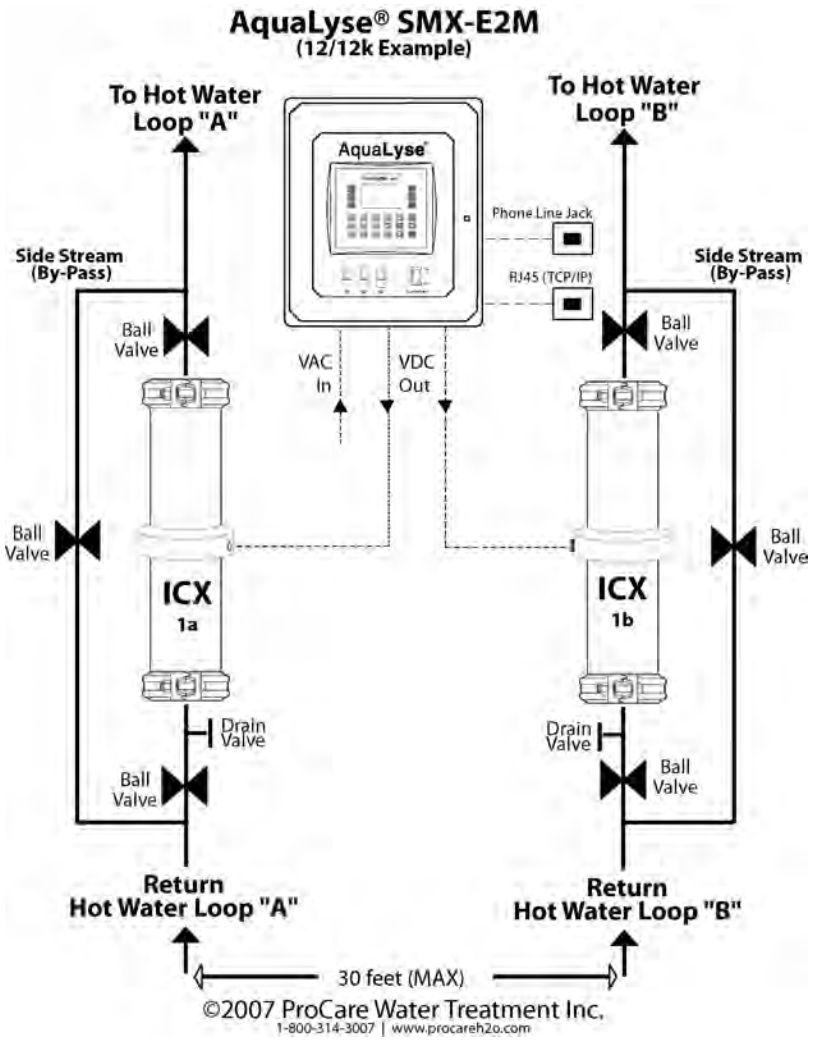
In the event that two (2) separate domestic hot water loops return to a common mechanical room, it is possible to use one larger properly programmed AquaLyse® SMX controller to treat both loops independently with the appropriate number of ICX ion chamber cells. In this Example, one (1) AquaLyse® E2M controller can replace two (2) AquaLyse® A1/A1s controllers. The overall advantage is a more affordable solution and smaller controller footprint.

In order to eliminate any possibility of air getting trapped within the ICX (Ion Chamber Cell), units should be installed vertically with water flowing upwards.

During normal operation, the main valves must be opened in order for the water to flow through the ICX in order to get ionized. The side stream valve must be closed. When maintenance is required, open the "Side Stream" valve and close the two (2) valves under and on top of the ICX fro each hot water loop. See maintenance section for details on maintaining your system and proper operation.

The AquaLyse® E2M can accommodate the following type of "proximity" domestic hot water loop configuration.

ICX Example Configuration "C1" (12/12k):
Loop 1 = 12,500 GPD (Max) with 1 ICX,
Loop 2 = 12,500 GPD (Max) with 1 ICX.



WARNING!

The AquaLyse® SMX-E2M controller MUST be factory pre-programmed in relation to the appropriate dual hot water loop applicable plumbing configurations.

Never operate an AquaLyse® Ion Generator when the ICX is dry or if no water is flowing within the ICX. An optional flow switch or meter can determine the on/off activity of the SMX when properly configured.

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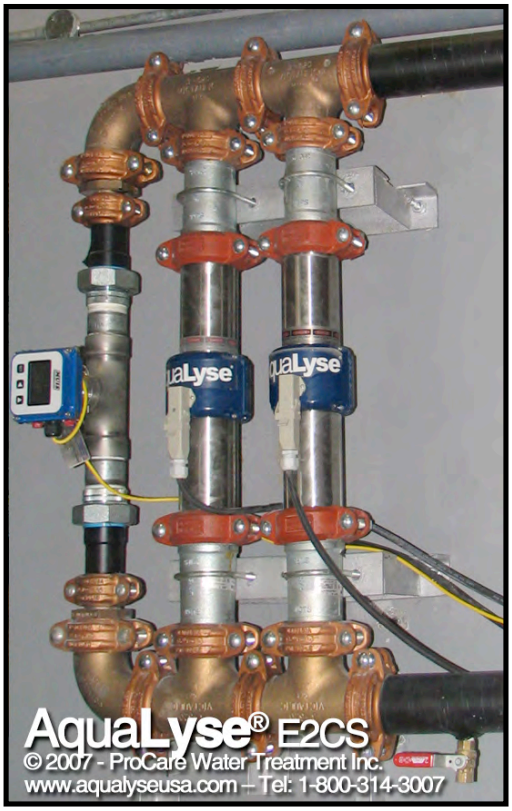
1.3.4 – E2FM-Type "Cascading" (Optional)

In-Line Water Distribution (No Loop)

Patented AquaLyse® Ion Generator Technology for Total Incoming Water Treatment or Hot water systems with no loop. Installed into the in-line incoming water source.



AquaLyse® SMX-CS controllers are unique in the industry for this type of application. A properly calibrated AquaLyse® SMX-CS controller that is interlinked to an analogue flow meter (4 to 20ma) will treat the incoming water in real time and within operational parameters.

With the use of a carefully calibrated analogue flow meter to monitor the domestic water consumption, data is transmitted to the AquaLyse® SMX-CS controller for real time ion generating activation. The number of ion chamber sections activated is proportional to the monitored water flow. The AquaLyse® controller also uses a patented application called "Cascading" to activate and deactivates the number of ion chamber cell sections in relation to monitored real time water usage and inter electrode efficacy. This "Cascading" process maintains an even wearing of the electrodes between the individual chamber cells.

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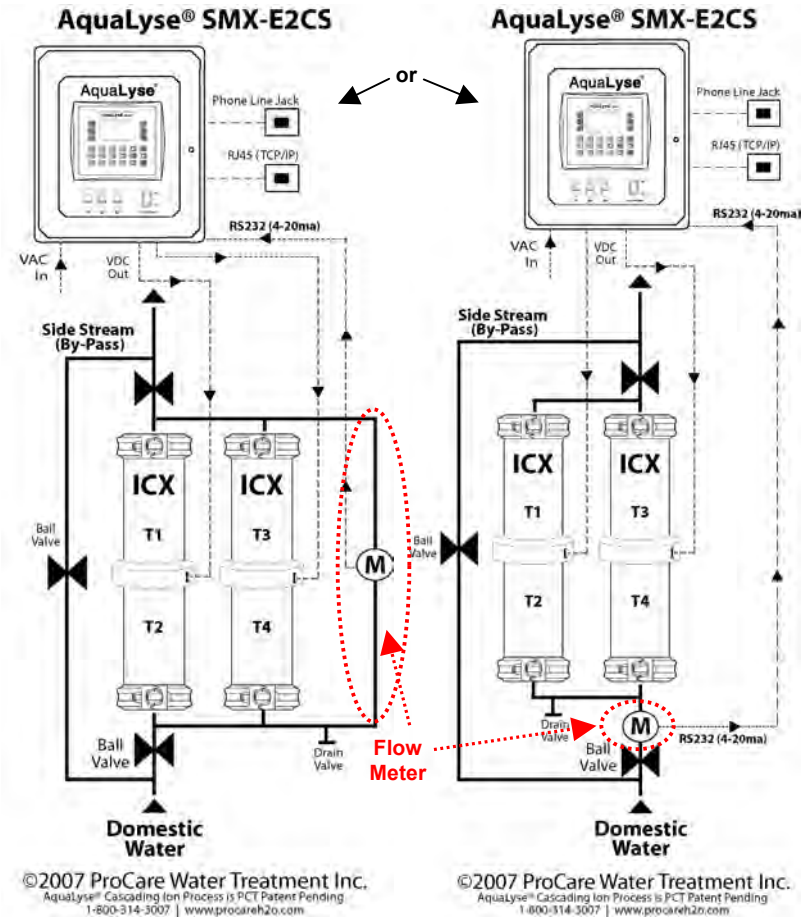
WARNING!

The AquaLyse® E2FM controller MUST be factory pre-programmed in relation to the appropriate flow meter applicable plumbing configurations.

Never operate an AquaLyse® Ion Generator when the ICX is dry or if no water is flowing within the ICX. An optional flow switch or meter can determine the on/off activity of the SMX when properly configured.

NOTE: See shop drawings for latest AquaLyse® E1FM and E2FM installation diagrams.



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2.0 - ICX- Ion Chamber Cell:

Aqua**Lyse**® **ICX** Ion Chamber Cells are constructed of cut grooved **(1)** schedule 40 Stainless Steel **(2)** and to use industry known and accepted Victaulic® quick release unions.

Industrial grade electrical connectors **(3)**, link the chamber cells to the SMX automated management system for instant action/reaction and precise independent copper and silver water ion generation. All external/internal electrical interfaces with the electrodes are isolated in a safety-approved enclosure **(4)**.

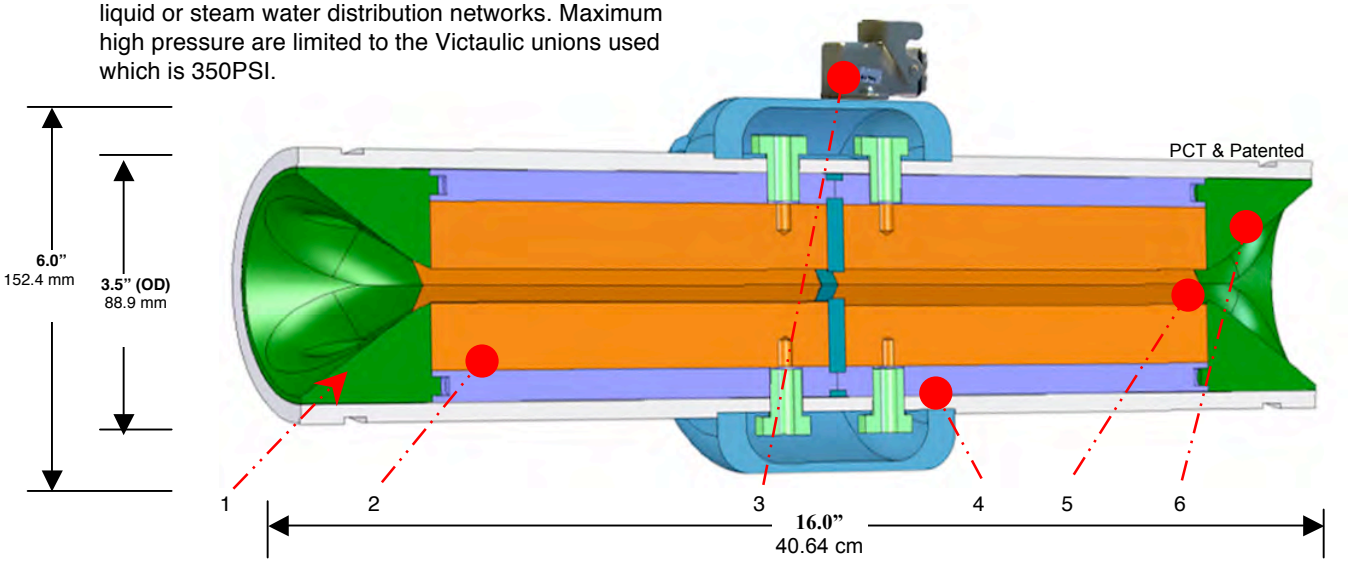
Patent pending internal components and configurations offer a high surface "Cross section" contact area **(5)** between the water and the electrodes to maximize ionic performance. Additional unique internal laminar flow hydro
dynamic features **(6)** eliminate internal water turbulence to minimize possible sedimentation and electrode scaling due to obstructions and water eddies.

ICX industrial grade stainless steel Chamber Cells meet all commercial and industrial building plumbing and fire safety codes. All internal components are pre assembled and then mounted within the stainless steel enclosure using a 250 tone press.

The internal ionization electrodes (not shown) are composed of certified high quality copper and silver alloys. The ionic metals can be independently controlled, graphically displayed and monitored by using the Aqua**Lyse**® SMX management system.

Unlike PVC or CPVC, the AquaLyse® ICX chamber cells have no high temperature limitations associated to liquid or steam water distribution networks. Maximum high pressure are limited to the Victaulic unions used which is 350PSI.

Exterior Cell Enclosure:	Schedule 40 Stainless Steel
Dimension:	89mm OD x 40cm **(3.5"OD x 16")**
Supplied Ion Chambers:	2 Installed (E1- 1 Cell)
Union Type:	Victaulic® (optional)
Maximum ICX pressure:	103 bar (1500 PSI)
Max Union Pressure:	24 bar (350 PSI)
Maximum ICX Temp.:	135°C / 280°F
Maximum Union Temp.:	110°C / 230°F
AquaLyse® E4/E4M Flow Capacity:	900 lpm (50 GPM ea.)
Copper Silver Chamber Cell	22 lbs ea.
Water Pipe Fittings Sizes:	Available based on requirements



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2.1 – Victaulic® Unions (Optional)

Victaulic® unions or flanges are required to properly install the AquaLyse® ICX ion chamber cells within a water distribution system.

Designed to provide a rugged mechanical joint for grooved end piping systems, Victaulic® couplings are available in 20 - 450 mm (3/4- 18") sizes for working pressures up to 750 psi/5175 kPa depending on pipe size and wall thickness.

"A"- 3" #75 Victaulic® flex CPLGs
"B"- 3" 606 Victaulic® Copper Grv. Coupling

2.2 - Victaulic® Fittings (Optional)

(Transition Fittings, Elbows and Tees)

Victaulic® fittings are required to assemble the Aqua**Lyse**® ICX ion chamber cells within the water distribution network.

Victaulic offers a wide variety of fittings in sizes up to 12" (300 mm) (for larger sizes contact Victaulic). Configurations include:

"C"- 3" #47GG GRV CTS Transition Fitting
"D"- 3" #610 COP GRV 90° Elbow
"E"- 3" #620 Victaulic® COP GRV Tee

Victaulic® fitting pressure ratings are equivalent to the pressure ratings of the coupling when installed on pipe of equivalent schedule or wall thickness.

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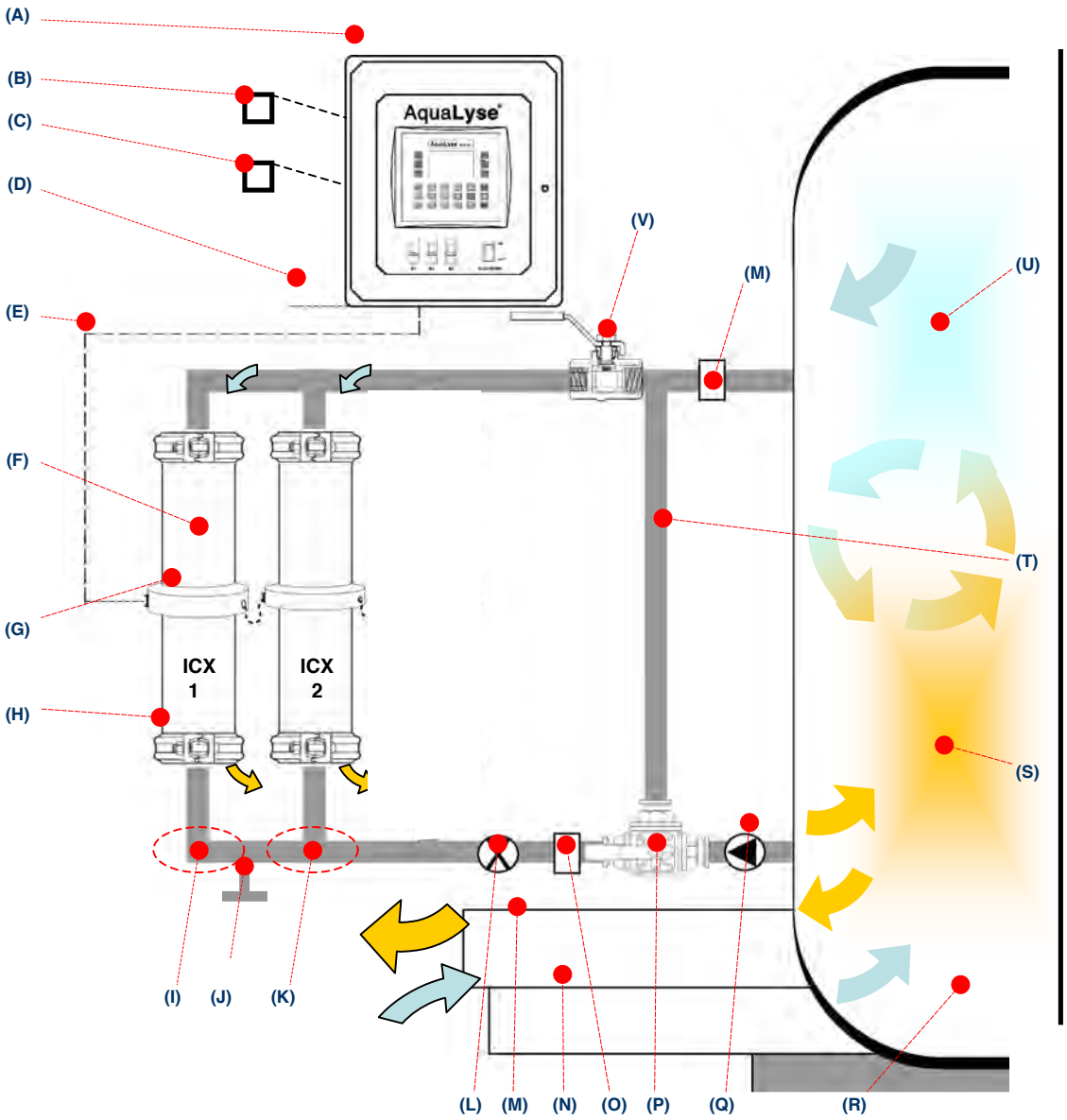
2.3 - Installation Example (Hot Water Tank)



(A) SMX-E2 Management System
(B) Phone Jack
(C) RJ45 (TCP/IP)
(D) AC Power In
(E) DC Power Out & Monitoring
(F) SS Ion Chamber Cells (2)
(G) Industrial Connector Chamber
(H) Victaulic® Unions
(I) Victaulic® Elbows in SS
(J) Drain Valve
(K) Victaulic® Tees in SS
(L) Flow Switch (optional)
(M) Hot Water Loop to Facility
(N) Hot Water Loop from Facility
(O) RS232 Signal (optional)
(P) Ball Valve
(Q) Tank Circulation Pump
(R) Hot Water Tank / Reservoir
(S) Higher ionic CuAg
(T) Bypass to from ICX
(U) Lower ionic CuAg
(V) Ball Valve

SS = Stainless Steel

Note: ICX chamber cell bypass installations can easily be installed in the primary facility domestic hot water loop instead of a tank loop. ICX are also fully compatible with facilities using instant heat systems and no reservoirs. Number of ICX Chamber Cells and type of AquaLyse® SMX Computer management system will vary based on overall water flow and consumption. Consult a ProCare Water Treatment Inc. representative for specifics in relation to your particular installations.

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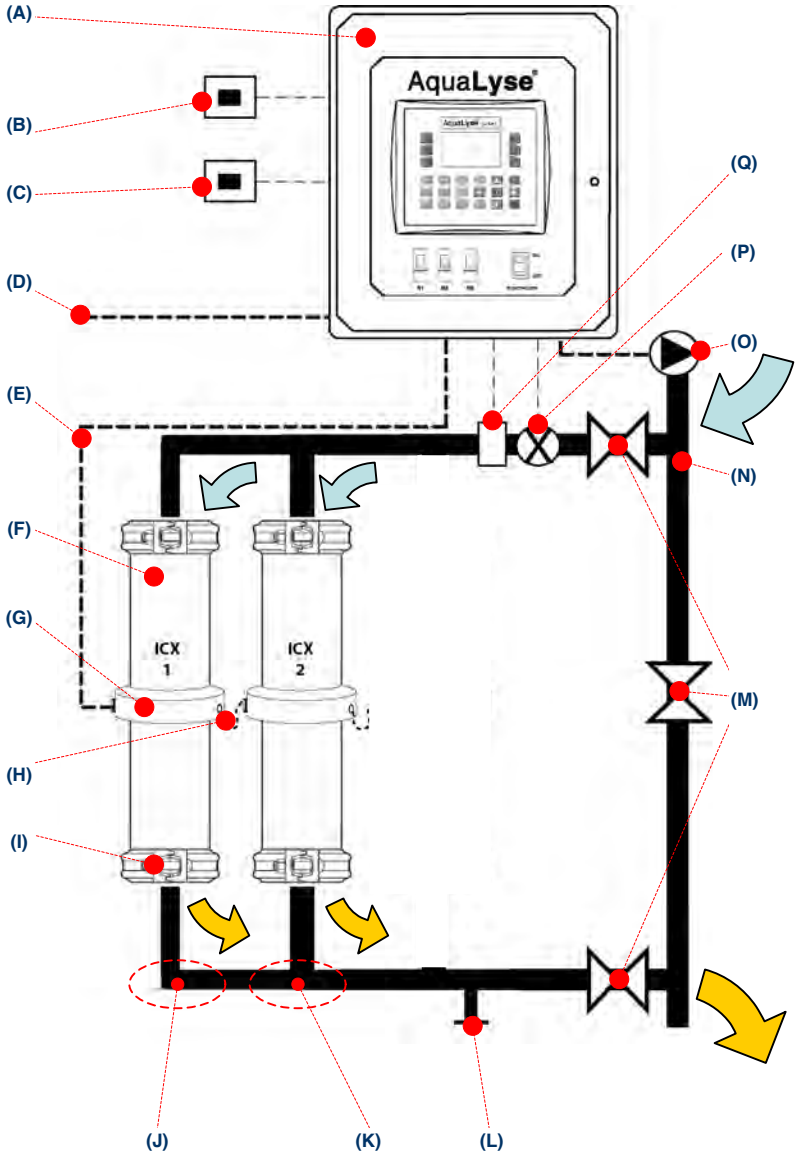
2.3 - Installation Example (Hot Water Loop)



(A) SMX-E2 Management System
(B) Phone Jack
(C) RJ45 (TCP/IP)
(D) AC Power In
(E) DC Power Out & Monitoring
(F) S.S. Ion Chamber Cells (2)
(G) Industrial Connector Chamber
(H) Inter ICX Industrial connections
(I) Victaulic® unions
(J) Victaulic® Elbows in SS
(K) Victaulic® Tees in SS
(L) Drain Valve (manual)
(M) Ball Valves for Bypass (3)
(N) Domestic Hot Water Loop
(O) Flow Meter (Optional)
(P) Circulation Pump(Optional)
(Q) Flow Switch (Optional)

Note: ICX chamber cell bypass installations can easily be installed in the primary facility domestic hot water loop instead of a tank loop. ICX are also fully compatible with facilities using instant heat systems and no reservoirs. Number of ICX Chamber Cells and type of AquaLyse® SMX Computer management system will vary based on overall water flow and consumption. Consult a ProCare Water Treatment Inc. representative for specifics in relation to your particular installations.

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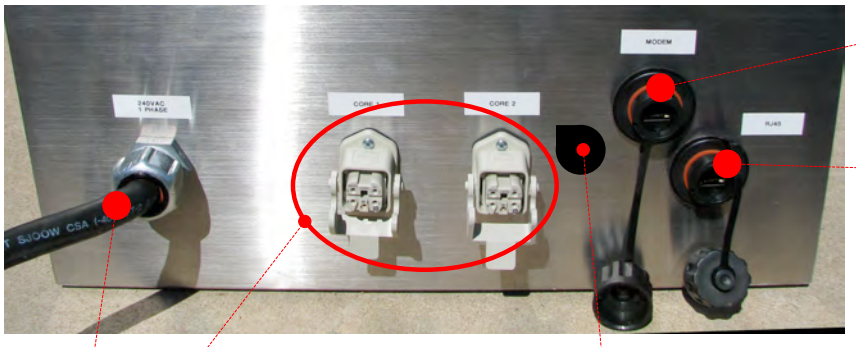
3.0 - Control Panel Features

Front Panel View

(A) Nema 4/4X Enclosure
(B) Corrosion Proof Panel
(C) Password Protected Key Pad
(D) LED Status (Green / Yellow / Red)
(E) Computer Breakers / Power
(F) Primary Computer Core Panel
(G) Illuminated LCD Panel Display
(H) Software Navigation Arrows
(I) Information Software Key
(J) Software Enter Key
(K) ICX Chamber Cell Breakers / Power
(L) Fix Power "In" 220 VAC single phase
(M) Fix Power "Out" to ICX 1, 2, 3 & 4
(N) RS232 Port (Optional)
(O) Modem Phone Jack
(P) RJ45 (TCP/IP)



Bottom Enclosure View

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4.0 - Industrial Electrical Quick Connects with Remote Monitoring:

(Industrial Automation Electrical Connectors)

The bidirectional “plug and play” connectors supplied with all Aqua**Lyse**® ICX ionization flow cells use industrial grade wiring and internal circuitry specifically manufactured for Aqua**Lyse**® SMX computer management systems. All certified watertight connectors deliver a safe environment to the internal sacrificial metallic electrodes.

4.1 – Assembly of the cable connector(s) to the SMX computer control module:

Fig. 4.1.1 - AquaLyse® industrial electrical connectors are clearly identified and correspond to each of required ion chamber cells specific to each model.

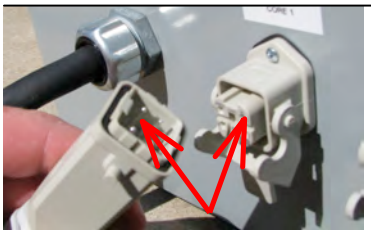

Fig. 4.1.2 - Each of the supplied cable connectors has a grooved guide designed to line up with each of the SMX connectors.

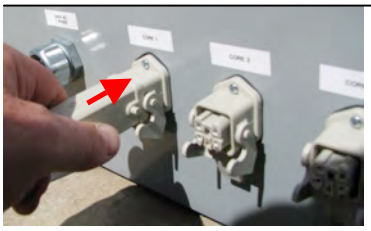

Fig. 4.1.3 - Cable connector can be pushed into the SMX connector once both connectors have been lined up properly. These two components are designed to fit together without great force.

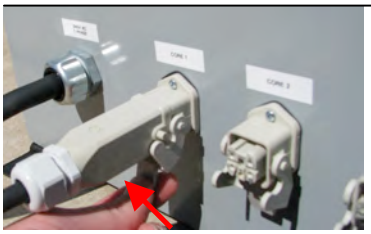

Fig. 4.1.4 - Once both connectors properly inter-connected, the anchor clamp must be used to fasten the cable connector to the SMX connector.

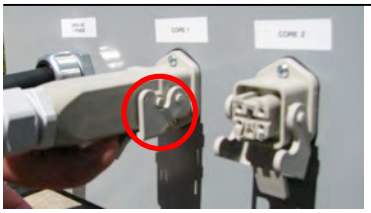

Fig. 4.1.5 - The two connector counterparts are now properly fastened together. To disconnect, simply reverse the order of steps on this page.

WARNING: Before dismantling any of the required SMX to ICX electrical cables, the **SMX computer control system must be turned “OFF”** and the PLC without activity.

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4.2 – Assembly of the cable connector(s) to the ICX ion chamber cells:

Fig. 4.2.1 - AquaLyse® industrial electrical connectors are clearly identified and correspond to each of required ion chamber cells specific to each model.

Fig. 4.1.3 - Cable connector can be pushed into the ICX connector once both connectors have been lined up properly. These two components are designed to fit together without great force.

Fig. 4.1.4 - Once both connectors properly inter-connected, the anchor clamp must be used to fasten the cable connector to the ICX chamber cell connector.

Fig. 4.1.5 - The two connector counterparts are now properly fastened together. To disconnect, simply reverse the order of steps on this page.

WARNING: Before dismantling any of the ICX to SMX electrical cables, the **SMX computer control system must be turned "OFF"** and the PLC without activity.

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5.0 - Copper Water Test Procedure

Basic Pre and Post Calibration Water Copper Test Procedure: (Example with a LaMotte 1200)

5.0.1 - Open a faucet where you can draw water directly from the domestic hot water loop. Mixing valves must not be present. Let water flow for a minimum of 3 minutes or until you reach a stable water temperature using a thermometer.

5.0.2 - Once water temperature has stabilized, record the value on the supplied chart (see back of this manual). Fill the sample glass vile until the water level is equal to the white horizontal printed line. Do not over or under fill.

5.0.3 – Tighten the plastic cover and cool down the water sample to between 10°C and 22°C. Insert the glass vile into the LaMotte 1200 colorimeter unit and press read. This will activate the unit and give you a falls copper value reading. You must set the unit to a “0” value by following the next step.

5.0.4 - Press down on the “ZERO” button until you see the letters “BLA” appear. Release the button and wait until you see a 0.00 value, proceed to the next step. If you do not get a 0.00 value, repeat this step.

Note: *Refer to the official LaMotte 1200 operations manual supplied with the unit for full details.*

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5.0.5 - Remove the water sample from the colorimeter and carefully add 5 drops of the supplied copper reagent. (Be certain that the reagent has not expired)

5.0.6 - Gently shake the sample to get proper reaction. The color of the sample will change in relation to the overall copper concentration within the water sample.

Pre Calibration Value:

5.0.7 - Insert the sample water vile into the colorimeter and close the plastic lid. Press the read button and record the digital results. The value you will read is classified as “Background Copper”. This is the amount of existing copper found within the water distribution system.

Post Calibration Value:

5.0.8 - Insert the sample water vile into the colorimeter and close the plastic lid. Press the read button and record the digital results.

Note: The post calibration value displayed is 0.72 ppm. The background copper value in Step 7 is 0.07 ppm. When you subtract the 0.07 from 0.72 the resulting value (0.65) This is the amount of copper introduced into the water distribution system using the AquaLyse Ion generator. Always take note of the amount of time to reach these values. This will be helpful in the calibration process.

Note: *Refer to the official LaMotte 1200 operations manual supplied with the unit for full details.*

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6.0 - System Start-up and Operation

The following is a step-by-step instructional section with check boxes for you to follow. You will be able to go through this list once you have installed both the SMX (Dissipation Control Unit) and the ICX (Ion Chamber Cell).

Start-Up Caution: Before any start-up protocols are attempted, **you must start the water flow in the ICX** by opening the "Gate Valves" or "Ball Valves" at each end of the ICX and close off the side stream "By-pass" loop. This step is critical in detecting any possible faulty plumbing.

It is a certified plumber's responsibility to be certain that the ICX and all additional needed hardware are properly mounted and with proper seals to withstand both high temperatures and exiting water pressures. This is especially important if the facility engineer will periodically conduct high temperature microbiological thermal eradication protocols within the domestic hot water system. If leaks are detected, immediately open the side stream "by-pass" valve and close off the two (2) valves at each end of the ICX.

6.1 - Basic Start-up Steps:

1- Before switching "ON" the SMX the following should be verified:

a. Visual inspection of all plumbing ☐
b. ICX valves are open at both ends ☐
c. Main By-Pass valve is closed (or partially closed) ☐
d. VAC electrical connections to SMX ☐
e. VDC electrical connection to from SMX controller to ICX chamber cells ☐
f. All external controls (if present) such as flow switch are "OFF" ☐

Some AquaLyse® Ion Generators come with a copper "Cu" test kit. This kit can be either chemical or digital. By following the test kit's manufacturers instructions, test the domestic hot water in three (3) different locations for background copper levels. Once the result in hand, calculate the average of the values. Adding the 3 values and dividing the result by 3 will give you the average.

Example:
Test No.1 = 0.354 ppm
Test No.2 = 0.284 ppm
Test No.3 = 0.314 ppm

Average Calculation Example:
(No.1 + No.2 + No.3) / 3 = Average
(0.354 + 0.284 + 0.314) / 3 = Average
(0.952) / 3 = 0.317 ppm

Result: The average background copper "Cu" level in ppm (parts per million) for the three (3) example water samples is 0.317 ppm

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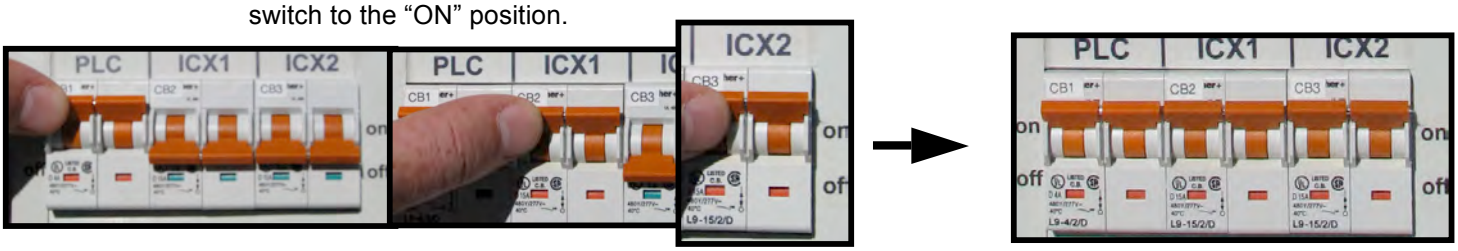
6.1 - Basic Startup Steps: (Continued)

(Warning: The AquaLyse® SMX controller to ICX Ionization chamber cell wire(s) must be inter-connected at both ends before proceeding with the following steps)

6.1.1 **Action:** While water is flowing through the ICX, turn the PLC and ICX1 and ICX2 power switch to the "ON" position.



6.1.2 **Action:** Press **F1** and input the user password supplied to you by the vendor.

6.1.3 **Observation:** Startup percentage (%) output values should be 0%VDC and 0%Amp prior to calibration. If you observe any activity at this stage of calibration, turn off the unit and contact your qualified vendor.

Required Startup Values

Cu		Ag	
Volts	Amps	Volts	Amps
0%	0%	0%	0%

Unacceptable Startup Values

Cu		Ag	
Volts	Amps	Volts	Amps
28%	100%	12%	100%

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6.2 - Date and Time Setup

Using the Navigational Arrows, push the **F2 key** to access the Time & Date sub menu. Press the "Enter" key to access the value panel, enter the required values and re-press the Enter key to record the values. Time and date formats are in international 24h standards. Time: 00:00 to 23:39, Date: DD-MM-YY

6.3 - Cycling Times Controller Configuration

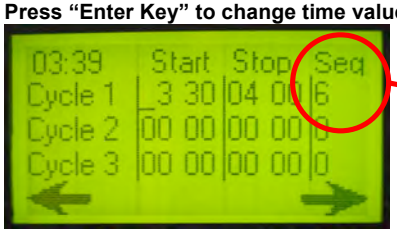
6.3.1 - Press the F1 key to access the configuration level 2 sub-menu.

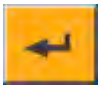
6.3.2 -Press the F4 key for "Cycle Settings"

6.3.3a - Press the F1 key for primary control copper "Cycle Times"

6.3.3b - Press the F2 key to access the secondary "Silver" cycle percentage times in relation to the primary "Copper" cycle times.
Ex: If Cu = 10 min activation in the primary cycling times and Ag percentage is set at 20%, then activation of Ag will automatically be calculated by the computer system and deliver 2 minutes activation of Ag.

Press "Enter Key" to change time values

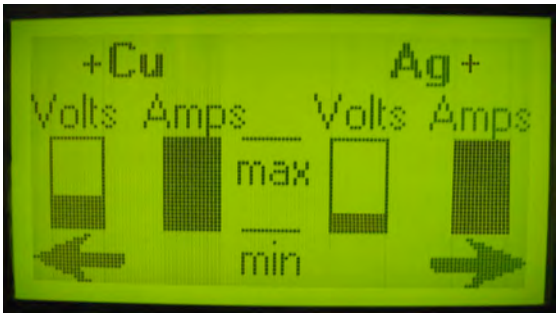


6.3.4 - Cycle times: Press the "Enter"  key to access and change the time values displayed in international 24h times. Press the Enter key to navigate and record the time values within the time cycle period. Time and date formats are in international 24h standards. Time: 00:01 to 23:39 (Note: 00:00 is a deactivation value). Other cycle periods can be modified by proceeding with the same actions and pressing the corresponding "F" key to proceed onto the following Cycling Time Menus.

The "Seq" value represents the number of Ag segments to be applied during each cycle. Consult a qualified AquaLyse® representative for elaboration of this feature.

6.4 - Display Panel Output levels

On the primary display panel, controller activity will be shown in both %VDC and %Amp for both the copper and silver at independent intervals. The AquaLyse® computer system will automatically determine the amount of power to apply on the electrodes in order to maintain a constant electrical current between the electrodes.



Note: The Cu and Ag activation are not always "ON" at the same time. Do not be concerned if you only see one activation cycle in operation.

6.5 - Calibration Steps

Depending on the size of the facility, the domestic hot water loop ionization process can take as little as a few minute to a few hours before reaching appropriate ionic copper concentrations. The calibration period should be undertaken at time of the day when water consumption is at its lowest. (Ex. 23:00 to 06:00)

6.5.1 – (Step 1): Turn on the AquaLyse® automated controller cycle by time input (C1)
6.5.2 – (Step 2): Take a water sample every 10 minutes until appropriate ionic values are reached
6.5.3 – (Step 3): Let the unit operate until you reach 0.6 ppm over background value (never exceeding 1.3 ppm)
6.5.4 – (Step 4): Turn off the controller
6.5.5 – (Step 5): Take copper samples every 30 minutes after step 4 until you reach +0.40 ppm
6.5.6 – (Step 6): Calculate the average degradation rate of copper for the time of day.
6.5.7 – (Step 7): Calculate both the "ON" and "OFF" periods require in relation to your facility.
6.5.8 – (Step 8): Program each cycle of the AquaLyse® controller to coincide with your calculations.
6.5.9 – (Step 9): Water sampling on an hourly basis during "ON" and "OFF" periods and record the results
6.5.10 – (Step 10): If required, adjust "On" and "Off" values of the AquaLyse® controller to deliver proper ionic values.

6.6 - Output level adjustments

During the start-up phase of the installation, you will need to make routine test of the water in order to get proper levels of copper in the system. The results of the copper test will dictate your output level course of action. **Remember that adjusting your output level will not result in an immediate change in copper concentration.** Additionally, you should conduct your copper test in 3 different key locations and at the end of a specific cycle when possible. You want to conduct your copper test when the maximum available value of copper will be present. Testing the water for copper concentration right after heavy peak usage will not deliver proper results. Please contact a AquaLyse® representative if you have any questions on domestic hot water copper testing and output adjustment levels.

Copper output controls should be set in order to obtain a copper value between 0.4ppm to 0.8ppm (Cu) over the actual average background copper value.

For example, if you have a residual background value of 0.3, you will want to achieve a minimum total average value of 0.7 ppm.

Once the output level adjusted and all visual inspection verified, you should continually monitor the system on a daily basis for the first week and then on a weekly basis with copper results recorded on a log sheet. An example log sheet is included in this manual and can be amended to meet your particular needs.

We strongly recommend you send water samples out to be tested in a laboratory for both ionic copper (Cu) and ionic silver (Ag) content at least once a year to validate both of these elements at the water treatment site.

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6.7 - Calibration Calculation Example

Taking into account that for this document example, the facility background copper (B-Cu) discovered in the water system is = 0.10 ppm. The required minimum ionic copper (I-Cu) value to properly treat a facility is 0.40 ppm over the B-Cu. In this specific example, the total copper levels (T-Cu) will be = 0.50 ppm (i.e. 0.10 + 0.40) Therefore the formula (B-Cu) + (I-Cu) = (T-Cu) should always be implemented. When calibrating the units based on "time", the technician will need to evaluate both the saturation and de-saturation times associated to each individual loops and at specific times of the day.

C1 ON: 13:00
Off: 14:00

Background Copper	13:00 - Cu value = 0.10 ppm	(C1 cycle turned "ON")
1st water sample	@ 13:10 - Cu value = 0.30 ppm	
2nd water sample	@ 13:20 - Cu value = 0.50 ppm	
3rd water sample	@ 13:30 - Cu value = 0.70 ppm	(C1 cycle turned "OFF")
4th water sample	@ 14:00 - Cu value = 0.65 ppm	
5th water sample	@ 14:30 - Cu value = 0.60 ppm	
6th water sample	@ 15:00 - Cu value = 0.55 ppm	(C2 cycle turned "ON")
7th water sample	@ 15:10 - Cu value = 0.75 ppm	(C2 cycle turned "OFF")
8th water sample	@ 15:40 - Cu value = 0.70 ppm	
9th water sample	@ 16:10 - Cu value = 0.65 ppm	
10th water sample	@ 16:40 - Cu value = 0.60 ppm	
11th water sample	@ 17:10 - Cu value = 0.55 ppm	(C3 cycle turned "ON")

6.7.1 - Conclusion based on observational data:

1- The ionization rate for this example location is = (+) 0.20 ppm per 10 minutes
2- Degradation rate = (-) 0.05 ppm per 30 minute

6.7.2 - Programming sequence:

C1	ON	13:00	Background Value:	0.10 ppm
	OFF	13:30	Calculated Value:	0.70 ppm
C2	ON	15:00	Calculated Value:	0.55 ppm
	OFF	15:10	Calculated Value:	0.75 ppm
C3	ON	19:10	Calculated Value:	0.55 ppm
	OFF	19:20	Calculated Value:	0.75 ppm
C4	ON	23:10	Calculated Value:	0.55 ppm
	OFF	23:20	Calculated Value:	0.75 ppm
C5	ON	03:10	Calculated Value:	0.55 ppm
	OFF	03:20	Calculated Value:	0.75 ppm
C6	ON	07:10	Calculated Value:	0.55 ppm
	OFF	07:20	Calculated Value:	0.75 ppm

Recorded Cu Values

0.68 ppm
0.56 ppm
0.77 ppm
0.53 ppm
0.75 ppm
0.54 ppm
0.76 ppm
0.56 ppm
0.74 ppm
0.53 ppm
0.78 ppm

Note: Recoded water test results are over the minimum required values of 0.50 ppm and under EPA maximum value of 1.3 ppm. As a result, the calculated time values are acceptable and do not require modification. Weekly water test are require to validate the efficacy of the ionization process.

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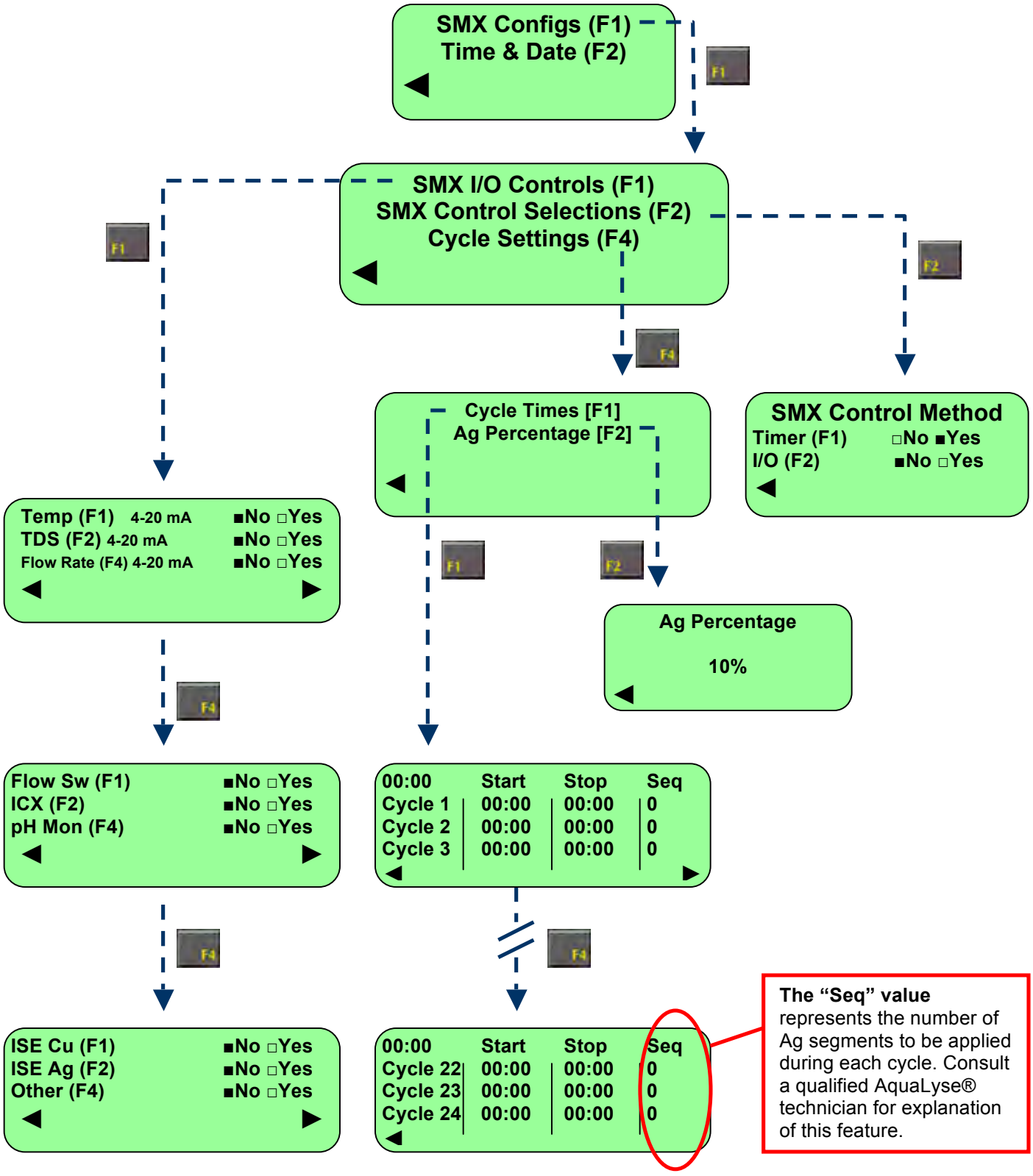
6.8 - AquaLyse® E2 SMX Configuration Software Levels



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7.0 - On-going Maintenance:

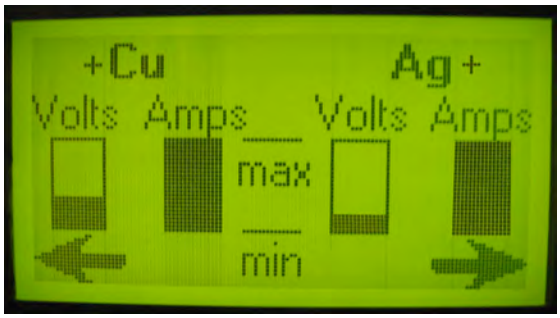
As part of your on-going water treatment program, you will be required to monitor copper levels and the system's performance in order to deliver proper ionic concentrations. (0.4ppm Cu over background levels) You will also be require to perform monthly cleaning maintenance on the electrodes every 3 to 5 weeks depending on water conditions.

Warning! The AquaLyse® electrodes are sized to perform within a properly sized water distribution system for between 6 to 12 months. Regular maintenance of the electrodes can extend the life of the ionization chamber cell(s). Monthly maintenance must be performed in order to maintain appropriate ionic copper values.

7.1 – Controller Output Power

This is the value visually observes on the control panel when the SMX is in operation. Please note that the unit must be working in order to obtain a proper value (Power % values above 0% when activated). The range of values is set in both voltage % and amperage %.

Controller not in Operation



Controller in Operation

7.1.1 - Voltage percentage (%VDC): The %VDC is the percentage display of the output voltage applied to the electrodes. This automatically condoled voltage is determined by the AquaLyse® management system that monitors, in real time, the inter-electrode currents during the ionization process. This automated variable voltage process is required to maintain a constant amperage set-point value determined at the time of calibration. The voltage values are shown in percentage (%VDC) while the ionization system is in operation. In the event that the %VDC is above 80% maintenance and/or replacement of the chamber cell is required.

7.1.2 - Amperage percentage (%Amp): The %Amp is a set-point determined at the time of calibration and cannot be modified by the user account. This value is shown in percentage on the user account while the controller is in operation. The controller is designed to automatically adjust the output voltage levels in order to maintain constant amperage (current) between the electrodes. In the event that the %Amp drops bellow 90% and that the voltage %VDC is above 80%, maintenance and/or replacement of the chamber cell is required.

WARNING! The AquaLyse® ionization unit will shut down automatically if cleaning maintenance is not regularly performed or if the chamber cells are not replaced when required.

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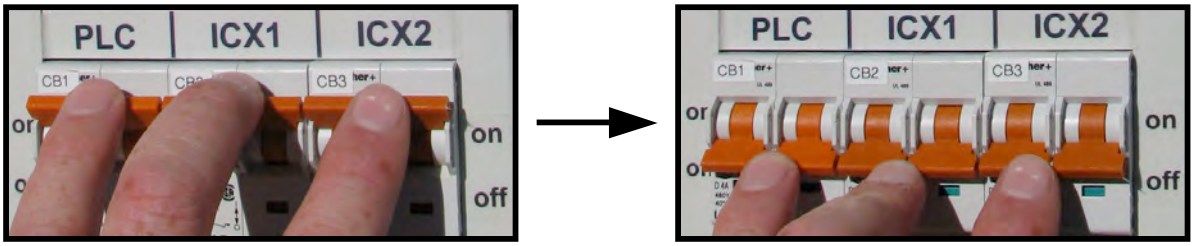
7.2 - Chamber Cell Removal

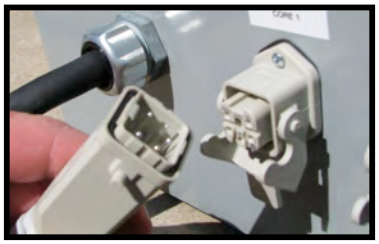
WARNING! ProCare Water Treatment Inc. will not be held liable for any individual or corporation performing self-maintenance or calibration. Please contact ProCare Water Treatment Inc. for maintenance and/or calibration education sessions and/or personnel. **Sever shock may occur** if the following procedures are not followed: Only ProCare Water Treatment Inc. qualified and certified personnel should perform maintenance on AquaLyse® ionic chamber cells.

7.2.1 - Turn all breakers "OFF" and unplug controller from AC electrical power source.



7.2.2 - Disassemble all of the power cords attached to the ICX chamber cell(s) and SMX.

ICX Electrical Cable



SMX Electrical Cable

7.2.3 - Open Main bypass valve for continual water circulation within the facility's water loop system.

7.2.4 - Close water valves immediately before and after the ICX (Ionization Chamber Cell) to isolate it from the facility water distribution system.

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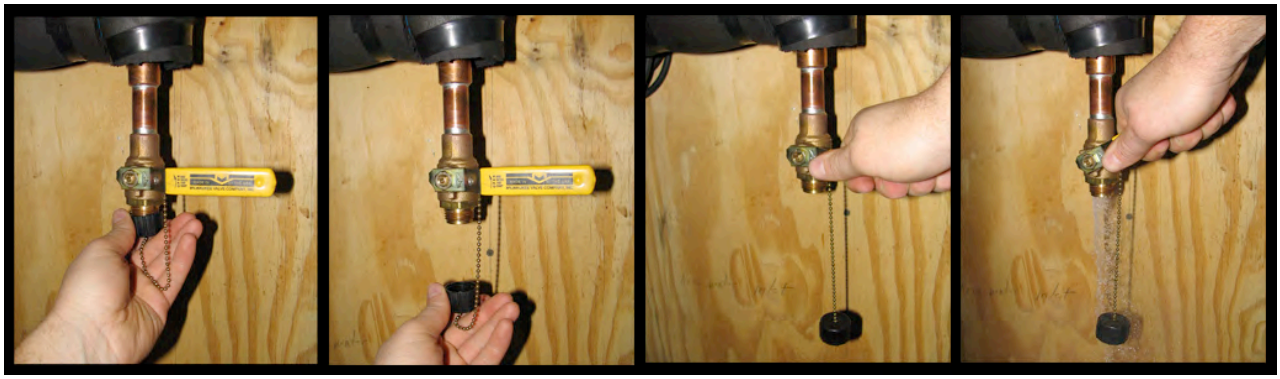
7.2.5 - Carefully open water bypass drain valve and completely drain the water from the chamber cells.



Note: If no floor drains are present, and to avoid unnecessary spillage of water on the floor, use an empty 5 gal. (22 L.) bucket or run a water hose from the evacuations drain valve to a sink.

7.3 - Chamber Cell Removal from Water Loop

7.3.1 - Carefully loosen, un-couple and remove the top and lower Victaulic® unions.	7.3.2 - Carefully slide upwards the top Victaulic® gasket. (Air can siphon in)	7.3.3 - Carefully slide downwards the lower Victaulic® ® gasket.	7.3.4 - Gently slide sideways and remove the ICX chamber cell from the bypass system.
			

7.3.5 - Visually inspect the internal electrodes for abnormalities, cracking, scaling or signs of deterioration.

7.3.6 - In the event that scaling or bio-fouling is present, scrub the electrodes with liquid dishwashing liquid and a bottle brush. Once cleaned, fill chamber cell with a phosphate free de-scaling solution as instructed by your qualified vendor.

Note: If the electrodes are scale free and the power levels are not appropriate, contact your AquaLyse® representative for further instructions. If the electrodes are worn-out or eroded, immediately order replacement electrodes by calling: 1-800-314-3007

Re-Installation: Before installing the Victaulic® union covers, reapply grease to the outside of the rubber gasket in order to get proper water seal. Reverse the ICX removal steps for Re-Installation protocol.

7.4 - Electrode Maintenance

WARNING! In the event that a strong scale removal acid product is used such as hydrochloric acid (HCl), AKA: Muriatic Acid, it must always be used with EXTREME CAUTION!! Contact with the eyes can cause permanent blindness and irreversible damage. Contact with the skin can cause severe burns. ProCare Water Treatment Inc. will not be held liable under any circumstance for maintenance related accidents. It is the maintenance provider's responsibility to follow all safety precautions without exception as per indicated on the product labeling or by following OSHA standards. Always perform cleaning maintenance in an extremely well ventilated area or outdoors.

7.4.1 - Activate the AquaLyse® SMX computer controller and record the pre-maintenance output values.

7.4.2 - Remove the Chamber Cell(s) as per described in section 7.2 of this manual.

7.4.3 - Visually inspect the insides of the chamber cell with a light being present at the opposite end of the chamber opening.

7.4.4 - Placing the chamber cell in a sink with running water, use a bottle brush to remove any lose materials lodged within the chamber cell,

7.4.5 - With the use of a plastic Victaulic® end-cap, gasket and union, isolate one end of the chamber cell and fill with de-scaling solution, (Acetic acid for 120 minutes per application or Muriatic Acid at between 25% to 50% dilution and for up to 40 minutes)

7.4.6 - Carefully empty the chamber cell and completely rinse repeatedly the insides with clean and cold running water,

7.4.7 - Remove plastic Victaulic® end-cap for visual interception and let light shine at one end.

7.4.8 - Visually inspect the insides of the chamber cell for loose scaling. Remove any loose scaling with bottle brush.

7.4.9 - Re-inspect the inside of the chamber cell. If electrodes still have scaling that cannot be removed physically with a bottle brush, re-clean them starting with Step 3 of this section.

7.4.10 - If electrodes are clean, re-install the cell into the water distribution system.

7.4.11 - Re-activate the AquaLyse® SMX computer controller and record the post maintenance output values.

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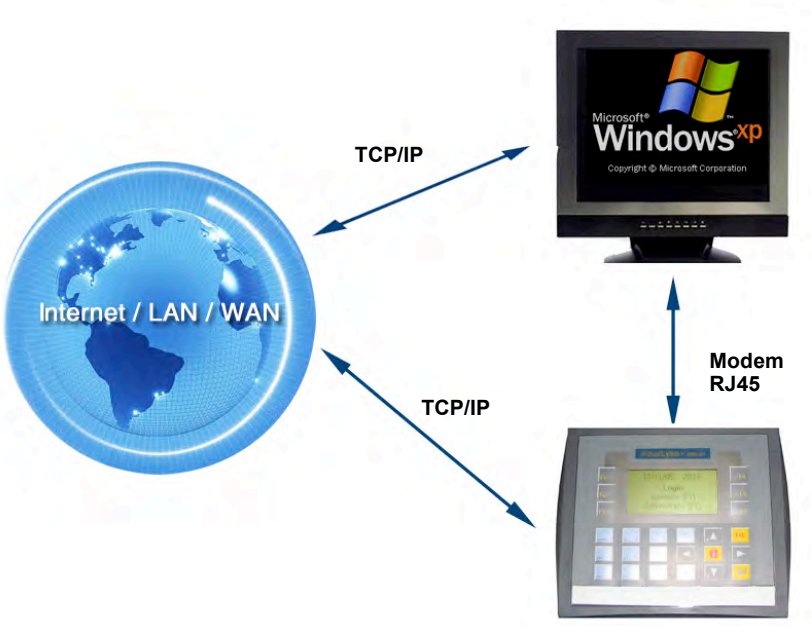
8.0 - Remote Access via Windows XP® based software

All AquaLyse® computer condole systems come with standard phone and secured RJ45 (Ethernet) ports for easy access of the controller via a dialup modem or TCP/IP communications via the Internet and an IP address. Additional "optional" remote protocols also include but are not limited to RS232, CanBUS, Serial Connections and GPRS communications.



8.1 - Security Policy effective November 22nd, 2005:

For security and liability reasons, only an end operator client, (i.e. the end owner of the unit were the technology is in operations), can receive, and upon request, the Windows XP® based remote access software designed for the AquaLyse® "E" series. Furthermore, in the event that a distributor or certified vendor requests remote access to an AquaLyse® unit for monitoring reasons related to maintenance, they are required to get proper written authorization by the end user and present it to ProCare Water Treatment Inc. Under no circumstance will ProCare Water Treatment Inc. offer security codes, change security codes, offer software, divulge phone numbers or IP addresses to a vendor unless said vendor is: 1- a certified ProCare Water Treatment Inc. technician and 2- that the vendor has a legally binding maintenance contract with the end user. By default, a vendor is not authorized to access any AquaLyse® units unless proper training and certification has been completed with success. Official and qualified distributors may have access their end user client systems as per the individual security and access clauses found in their respective contracts.

8.2 - Remote Dialup Connection Steps:

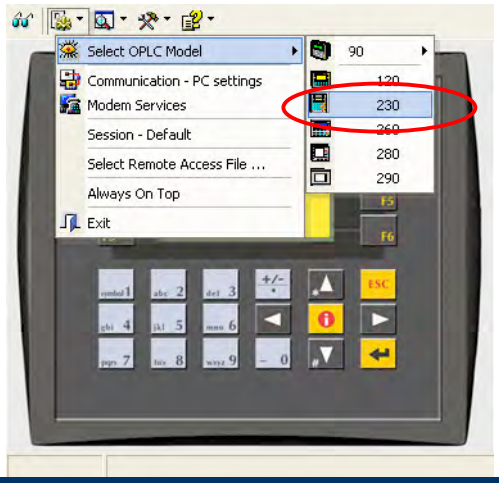
Note: Before you attempt to follow the dialup connection steps, it will be required that you install the AquaLyse® Windows XP® based remote access software onto your computer. Additionally, your computer will have to be connected to the Internet with an active connection or have access to a dialup modem and an active phone line.

8.2.1 - Launch the “Remote Access” program from the Windows® start menu.

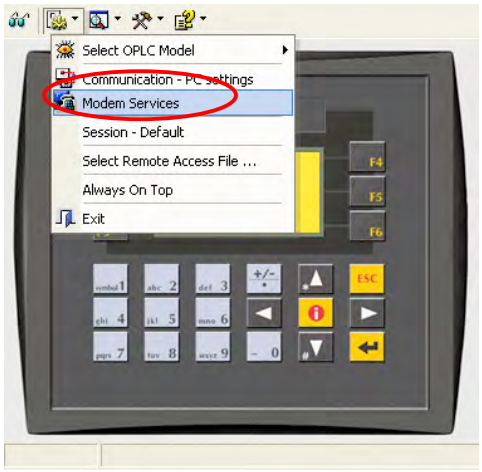
8.2.2 - Under “Configuration”, scroll in the “Select OPLC Model: and verify that the software model configuration interface is the “230” model and not another model number.

If you use the wrong model number to access your AquaLyse® system, your communications interface will not permit you to manage the AquaLyse® unit remotely.

AquaLyse® A1 = 90
AquaLyse® E2 = 230
AquaLyse® E2 = 230
AquaLyse® E3 = 280
AquaLyse® E2 = 280

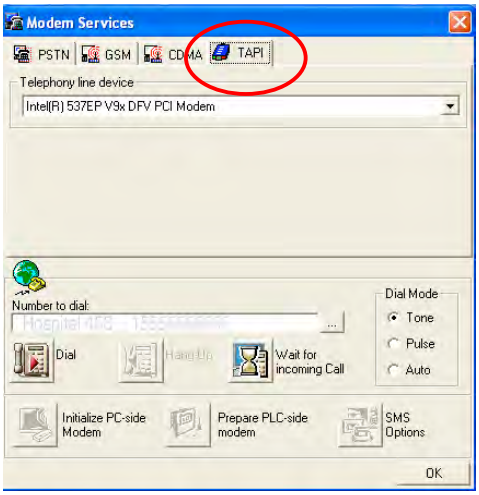


8.2.3 - In the “Configuration” tab, chose “Modem Services” from the drop menu.

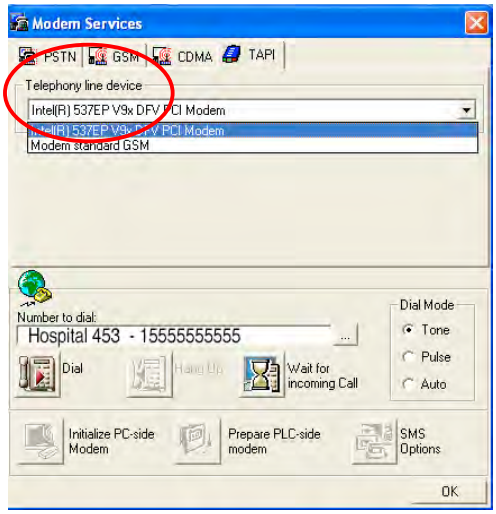


8.2.4 - Chose the “TAPI” tab to check to be certain that you have the appropriate modem setup

selection.

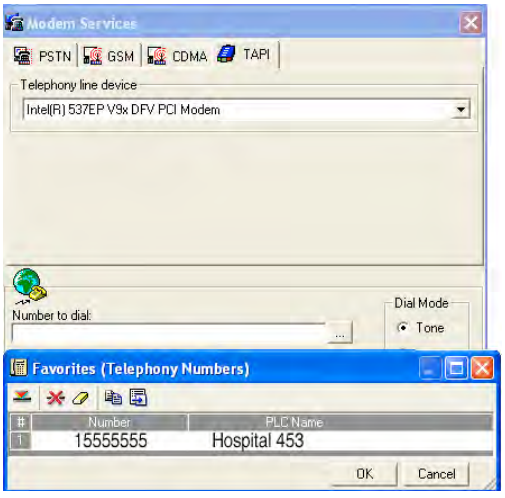


8.2.5 - To change the Telephony line device, simply click on the box and other options available o your computer will appear. Do not change this setting unless you are having problems with the original default setting.



8.2.6 - To add a phone number in the software protocols, click on the "Number to dial" field. A 3rd window will open were you will be able to input a new phone number and description by clicking on "Append Row".

Remember to include "9*" if your phone system requires you to do so. If you are calling internal, simply input the proper extension number.



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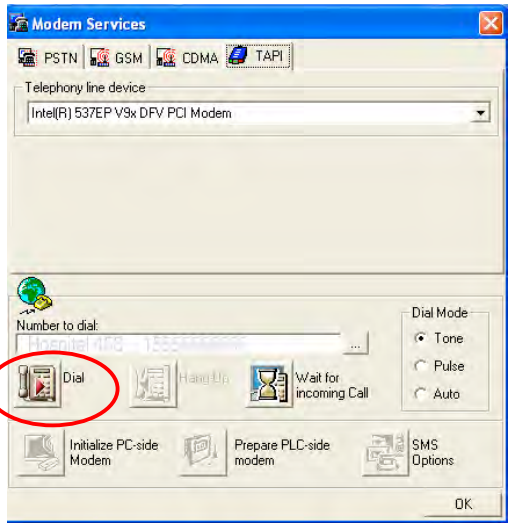
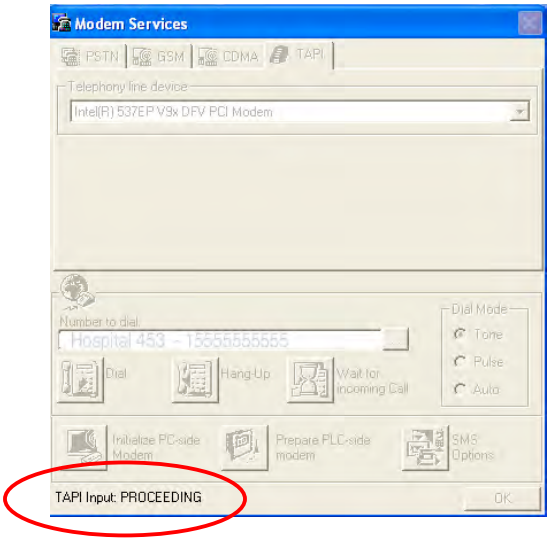
8.2.7 - Once you have chosen the access phone number, click on “Dial” to connect with the remote AquaLyse® model.



8.2.8 - You will have to wait a few moments in order to get a handshake between your computer modem and the AquaLyse® remote modem. You will observe in the lower left side of the window “TAPI Input PROCEEDING”

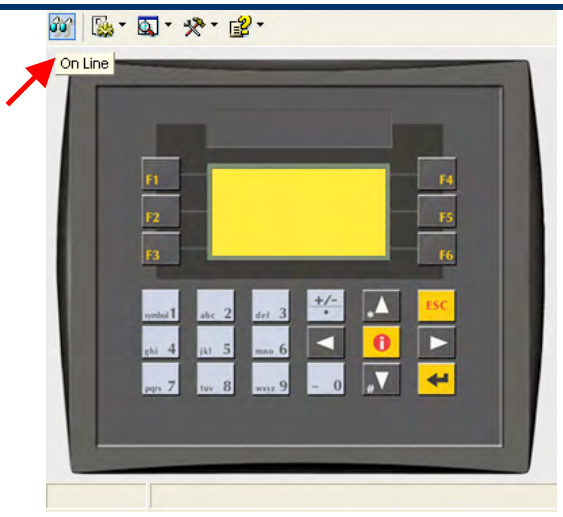
The software will automatically attempt communications with the destination phone number you entered in the software. All features in the pop-up window will be deactivated until the software competes communications with the destination AquaLyse® unit.

You will know that the handshake has been successful when the “Modem Service” window disappears and you are automatically returned to the main computer control software reproduction of your AquaLyse® model. (Step 8)



8.2.9 - To access the remote unit and get the data reproduction, click on “On-Line” and the display panel will come to life as if you where standing in front of the real unit. Enter your access password and precede as if you where physically in front of the unit.

Remote access users can enter data values or operate the technology in one of the following two methods: 1- With the use of a mouse and by clicking on the alpha numeric keys or 2- enter values directly using your computer keyboard.



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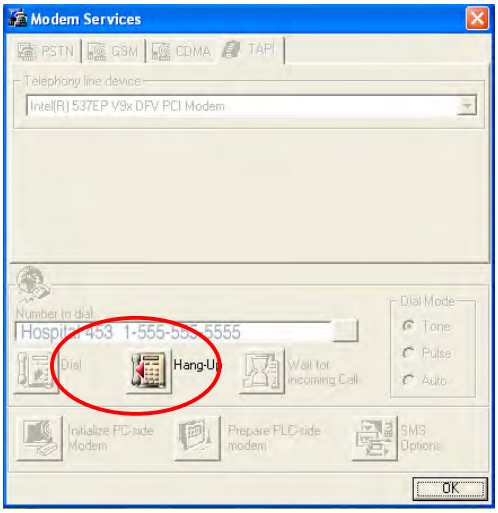
9.0 - Remote Data Disconnection Steps:

Once you have finished using the remote access software, you will have to disconnect the software communications between your computer and the remote AquaLyse® unit. Follow these easy steps to hang-up communications and exit the software.

9.1.1 - Click on the “On-Line” icon to stop the refresh display feature and then click on “Configuration”. Scroll down and click on “Modem Services”

9.1.2 - Once the “Modem Services” dialogue box has appeared, click on the “Hang Up” icon.



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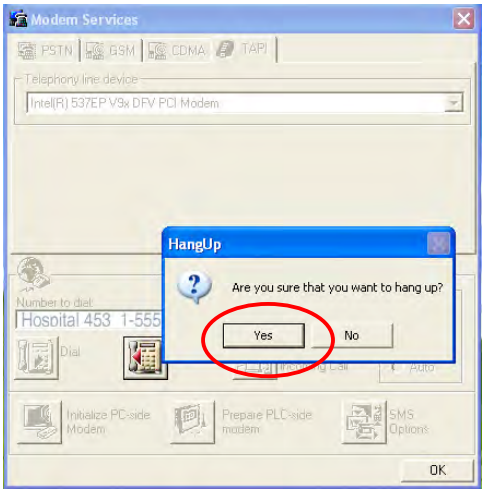
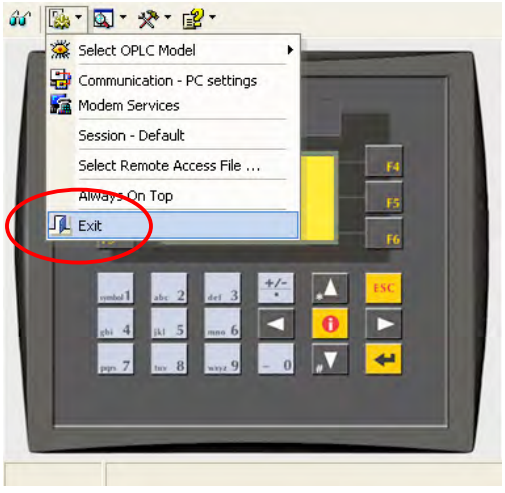


9.1.3 - A popup dialogue box will appear to confirm your actions. Click on “Yes” to hang up the phone line and stop communications between your computer and the AquaLyse® system.

9.1.4 - Once disconnected, you will be re-directed to the primary software display.



9.1.5 - To close the software simply click on the “Configurations” icon, scroll down and click on “Exit”

For detailed information on the AquaLyse® remote access software and additional features please contact ProCare Water Treatment Inc. at 1-800-314-3007.

AquaLyse®

10.0 - Quality Control Program:

When communication first started with ProCare Water Treatment Inc., you probably observed our concerns for the quality of water to be ionized. Water chemistry and composition is very important when installing a AquaLyse® Ion Generator. We also understand that in many cases, you are subject to the quality of water supplied to your by your local municipality. This variable alone can be cause for concern in the water quality being ionized. In areas where extremely hard water is present, water softeners can be used. Where a high solid content is present, filtration devices can also me used. If pH values are over 8.5, a pH sensor and acid pump should be installed in order to lower the alkalinity levels when required. Additional variable to consider in order to have a properly functioning AquaLyse® Ion Generator:

- Amounts of water stored should be sufficient to meet the building requirements and not to big in order to avoid stagnant water volumes.
- Comply with environmental laws and conditions with the operation of your domestic hot water system.
- Fit insect traps to all waste and overflow pipes
- Visually monitor the scale condition of your water pipes and the electrodes. This is especially important in your clarifiers.

Note: When using water mixing valves (for scalding prevention), the ion concentration at the point of discharge will be diluted due to the added cold water. The more you add cold water to the ionized hot water, the more you will dilute ions in the domestic hot water. The introduction of untreated cold water can be source of microbiological contamination in a water system. If cold water systems are also treated, with our AquaLyse® Ion generator, the ionic concentrations will remain the same.

10.1 - About Ionic silver (Ag^+) and chlorine (Cl_2):

Although copper is considered a stable element with few interactive compounds, silver must be considered as being much more complex in the interaction of chlorides in water systems. The resulting silver chlorides will decrease in solubility and eventually deposit at the base of structures such as storage tanks and clarifiers. The resulting benefit, according to scientific studies, is that most microorganisms will no longer be able to proliferate in these normally contaminated areas.

10.2 - Stay Informed:

Water treatment is all about education. The more you can get on different techniques and protocols, the better armed you will be against waterborne microorganisms. We strongly suggest that you routinely visit our interactive and informative website for any updates on our products and additional industry related news and information.

10.3 - Websites by Country:

USA:	www.aqualyseusa.com	*(English)*
CANADA:	www.aqualyse.ca	*(English)*
UK:	www.aqualyse.co.uk	*(English)*
FRANCE:	www.aqualyse.info	*(French)*