

AQUARIUS

SERIES

DI WATER HEATING SYSTEM

INSTRUCTION MANUAL

INDEX

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SECTION I

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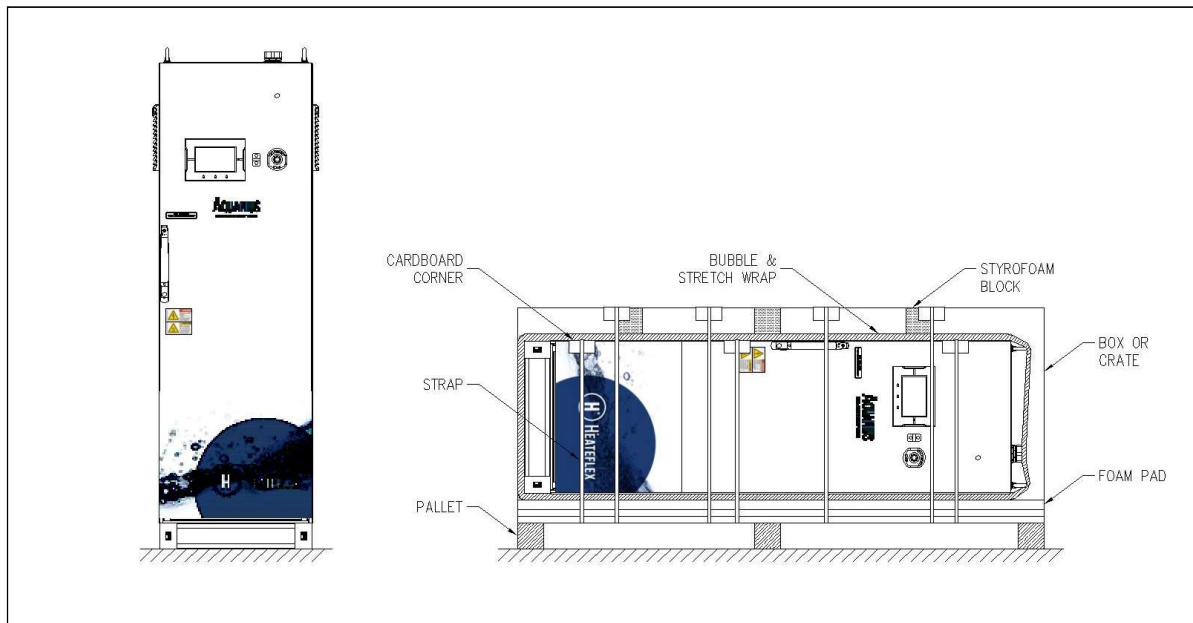


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Shipping and Unpackaging Procedures

The proper shipping procedure for the Aquarius® Deionized (D.I.) Water Heating Systems includes shipping the unit in a horizontal position as shown and described in the illustration below.

The Aquarius® D.I. Water Heating Systems are factory tested to ensure that you receive an operational unit. The Aquarius® D.I. Water Heating Systems are packaged and shipped in the horizontal position along its side. The unit is wrapped in bubble pack, plastic wrapped and then placed onto a pallet with a 2 1/2" thick impact absorbing foam pad. The unit is strapped down to the pallet then covered with a corrugated box or crating material, taped and then re-strapped.



Once the Aquarius® D.I. Water Heating System has thoroughly been inspected for damage that may have occurred during shipping (if any damage has occurred refer to the Receiving Inspection Procedure of this Instruction Manual), the unit will need to be moved from its horizontal shipping position to its normal functional vertical position. Remove any packaging materials such as the box or crate, Styrofoam block, straps, etc. Once the unit is free and ready to be moved, verify that the plinth base and/or eyebolts are in position. The unit can be transported using either the supplied eyebolts or by fork-lift truck. Using the eyebolts, systematically distribute the load using the following parameters. For cable angle 45°, use a max load of 1080 pounds. For cable angle 60°, use a max load of 1440 pounds. For cable angle 90°, use a max load of 3060 pounds. Using a fork-lift truck, ensure that the unit is under 3150 pounds. Carefully lift the top part of the unit (opposite of the plinth base) and tilt the unit from its horizontal shipping position to its operational vertical position. Remove the stretch and bubble wrap.

All Aquarius® D.I. Water Heating Systems are equipped with a plinth base to maneuver the Aquarius® D.I. Water Heating System vertically, in its functional orientation.

Receiving Inspection Procedure

This shipment was carefully inspected, checked, and properly packaged at Heateflex Corporation and delivered to the shipping carrier in good condition. We fully expect your merchandise to arrive in your hands in excellent operational condition.

ALL PRODUCTS ARE SHIPPED F.O.B. FACTORY; THEREFORE, WHEN IT IS DELIVERED TO THE SHIPPING CARRIER, IT BECOMES YOUR PROPERTY. THUS, IT IS IMPORTANT THAT YOU TAKE NOTE OF ANY DAMAGE, WHETHER OBVIOUS OR HIDDEN. REPORT THIS INFORMATION TO THE TRANSPORTATION COMPANY WITHIN 5 DAYS OF RECEIPT OF THE SHIPMENT AT YOUR PREMISES TO AVOID FORFEITING CLAIMS FOR DAMAGE.

WHAT TO DO IF SHIPMENT IS DAMAGED:

- Leave the items, packing material and carton “as is”. Notify your carrier’s local office and ask for immediate inspection of the carton and contents.
- After the shipping carrier has made inspection, and you have received acknowledgment in writing as to the damage, please contact our Customer Service Department for return authorization at:
(626) 599-8566
If writing for return authorization, please indicate your purchase order number.
- We will either repair or replace the merchandise depending upon the extent of the damage.
- It is your responsibility to follow the above instructions, or the shipping carrier will not honor any claims for damage. If there are any shortages or questions regarding this shipment, please notify us within 10 days.

Introduction

While the official language of the “Original Instructions” is in English, any interpretation of this Instruction Manual in other Community languages will be discussed by the manufacturer (Heateflex Corporation) and the customer on an as required basis.

Your new Aquarius® D.I. Water Heating System is engineered to offer a safe, reliable, and effective solution to de-ionized heating needs by providing at temperature ultra-pure D.I. water. These systems are designed to reduce water usage as well as maintain high purity requirements. This has been achieved using our patented HEATEFLEX® heaters and Power-to-Flow® Control system.

Heateflex’s patented Power-to-Flow® Control system eliminates undesirable overshoots or drops in temperature, which are commonly the result of inadequate PID temperature controllers. The Aquarius® D.I. Water Heating Systems are designed to maintain accurate user-specified temperature even with process flow rate variations and during recirculation (Systems equipped the recirculation option only). The Power-to-Flow® Control system compensates for changes in the process flow rate by measuring the flow rate of the fluid as it enters the heaters, measuring the temperature at various stages in the heating process, and adjusting the proportion of power applied to each heating zone based on those measurements. This integrated control method is advancement to previous methods of temperature control that reacts quickly and robustly to any variations in flow, providing a steady supply of ultra-pure D.I. water at a stable temperature.

High purity is maintained throughout the heating process due to the use of PVDF, FEP, and PFA wetted surfaces. The Aquarius® D.I. Water Heating Systems are equipped with many safeties and components such as thermocouples, a liquid level sensor, a flow sensor, a pressure transducer, high limit sensors, and thermal cut-off sensors to protect the heater modules from unnecessary damage due to overheating. All Aquarius® D.I. Water Heating Systems come standard with a pressure by-pass protect against over pressurization of the unit. Shorted SCR sensing has been incorporated in the Aquarius® for added heater protection. A Safety Relay, Safety PLC and GFCI are standard on the Aquarius® which provides added protection to the unit and for operators. To monitor the purity level of the exiting heated D.I. water, a resistivity sensor is available as an option on the Aquarius® D.I. Water Heating Systems. The Power-to-Flow® Control system also incorporates the use of a visual touch screen user interface which is straightforward and easy to operate with only a few adjustments needed after initial settings are entered.

Our Aquarius® systems satisfy all CE and SEMI'S Safety Standards and they are equipped with safety devices to protect the users as well as the products that they are processing. These safety devices include

- 1) **Emergency Off (EMO) button** - An Emergency Off (EMO) button located on the front of the unit (and remotely if option is selected) is utilized by the user in the event of an emergency condition to shut power to the unit (and other devices if option is selected). It is a SEMI S2 compliant device with a direct opening action mechanism, and safe break action.
- 2) **Door Interlock Switch** - A door interlock switch mounted to the front cabinet door is used to indicate if the door is open or closed. If the front door is open, the power will be cut to the unit. This safety device features force guided contacts and a tamper resistant mechanism.
- 3) **Safety Relay** – The Safety Relay monitors both the Emergency Off button and the Door Interlock Switch. The Safety Relay incorporates redundant relays in conjunction with the emergency off button switch and the safety open-door interlock to achieve safety category 3. The Safety Relay determines whether or not to provide power to the unit.
- 4) **Ground Fault Circuit Interrupter (GFCI)** – The Ground Fault Circuit Interrupter (GFCI) monitors the heater amperage and any circuits containing 120 volts or more if a suspicious current leak is detected in the circuitry.
- 5) **Thermal Cut-Off Sensor** – The thermal cut-off sensor is a thermal sensor which opens once it's breaking temperature is exceeded. It is used to shut down the heater when a runaway heating condition occurs.
- 6) **Safety PLC (Programmable Logic Controller)** - Safety PLC monitors the high limit thermocouples, the GFCI and Thermal Cut-off Sensor status using redundant force guided relays, and controls the Heater Master Relay (which controls the heater contactor) and the Heater Safety Relay (which controls the SCR output signals to the heater).
- 7) **Water Leak Deluxe (Optional)** – The water leak deluxe option consists of monitoring for system leaks via water leak sensor and isolation valves which shut off the incoming process fluid and the heaters as well. This option allows the user to isolate and reduce a pressurized system to a zero-energy state prior to maintenance or service work. The system uses two pneumatically or manually operated 2/2-way diaphragm valves to isolate the system. The valves are located at the input and output. (Optional).
- 8) **Lockout/Tagout (Optional)** - Lockout/Tagout is optional for the Aquarius D.I. Water Heating System. This provides a fusible disconnect switch on the unit and conforms to SEMI S2-0715 to isolate the unit electrically for maintenance and service work. The handle is lockable. If the lockout/tagout option is not included, the main disconnect is customer supplied. (Optional)

We are confident in the quality and reliability of our products and offer technical support if needed.

Factory Performance Test

The following tests are performed on all Aquarius® D.I. Water Heating Systems after assembly and before shipping. The units are tested with D.I. water supplied to the unit and discharged to drain.

1. A high potentiometer test procedure is performed on the heaters used in the Aquarius D.I. Water Heating System. The test procedure includes a leak, thermocouple, and resistance test. For detail, reference document number 1201.
2. Voltage, Flow, and Pressure readings on the controller are calibrated as follows:
 - a. The incoming voltage is measured on the input side of the contactor by a voltmeter. If the measured voltage reading does not match the voltmeter reading on the screen, the voltage value is adjusted accordingly by adjusting the voltage calibration parameter which is located on the **System Calibration** screen of the **System Set Up Menu**.
 - b. An external flow meter is plumbed in-line with the D.I. water heater. The flow reading on the touch screen should match the reading indicated on the external flow sensor. If an adjustment is required the flow meter value is adjusted accordingly by adjusting the flow calibration parameter which is located on the **System Calibration** screen of the **System Set Up Menu**.
 - c. An external pressure meter is plumbed in-line with the D.I. water heater. The pressure reading on the touch screen should match the reading indicated on the external sensor. If an adjustment is required the pressure value is adjusted accordingly by adjusting the pressure calibration parameter which is located on the **System Calibration** screen of the **System Set Up Menu**.

For more detailed information on the Aquarius® control system and operation screens please refer to the PF2000 Controller manual.

3. The Aquarius® control system is monitored and controlled by a PLC (Programmable Logic Controller) and related hardware of the Aquarius® and checked for functionality.
 - a. The inputs and outputs of the Safety PLC are checked and verified.
 - b. All components and sensors are checked and tested.
 - c. Control system functionality are checked and tested.
4. The Aquarius® D.I. Water Heating Systems are tested to operate with the **“Process Temperature Set Point”** parameter set to the maximum temperature possible according to the equation below. This test will insure that all heater modules are operating and full heater power is available.
 - a. The proper flow rate is first calculated using the following formula:

$$\text{GPM} = \frac{\text{KW} \times 3.79}{95^{\circ}\text{C} - \text{TEMP INPUT D.I. } (^{\circ}\text{C})}$$

- b. The calculated flow rate is introduced to the D.I. water heater and the unit is turned on. The D.I. water heater is allowed to reach the process temperature set point.
 - c. At 95°C, the unit may trigger the **High Temperature Alarm**. The **High Temperature Alarm** indicates that adjustments are possibly required. Make adjustments as indicated on the TROUBLE-SHOOTING GUIDE.
5. The Aquarius® D.I. Water Heating Systems are tested at “**Process Temperature Set Point**” parameter set below the maximum temperature possible and 1 GPM D.I. water flow. This will test the performance of the controller.
 - a. The unit is allowed to operate with the controller “**Process Temperature Set Point**” set to a value below the maximum temperature possible and flow set to 1 GPM.
 - b. If the temperature is not stable, confirm that the controller’s parameters are set to factory settings shown in the user’s manual. If further controller tuning is required, see the TROUBLESHOOTING GUIDE.
6. The Aquarius® D.I. Water Heating Systems are tested for the correct operation of the following safety interlocks or alarms:
 - a. **Components:** The components of the Aquarius® is thoroughly checked for functionality, which includes the Safety Relay(CON2), Door Interlock, EMO (Emergency Off), SCR (Silicon Controlled Rectifier), Safety PLC, High Limit T/C Monitoring, Liquid Level, Thermal Cut-Off Sensor, Leak Sensors (Optional), GFCI, and Current Transformer.
 - b. **Flow Sensor:** The system flow rate is indicated by the FLOW RATE value readout on the **System Status** screen. Modify the current “**Low Flow Alarm Set Point**” located on the **System Set Up ► Alarm Set Points** screen. Set the “**Low Flow Alarm Set Point**” value to just above the **FLOW RATE** reading on the **System Status** screen. The **Low Flow Alarm** will trigger and the controller will disable the heaters and send the unit into **STANDBY** mode. Return the “**Low Flow Alarm Set Point**” to the original setting.
 - c. **Pressure Sensor:** The system pressure is indicated by the PRESSURE value readout on the **System Status** screen. Modify the current “**High Pressure Alarm Set Point**” located on the **System Set Up ► Alarm Set Points** screen. Set the “**High Pressure Alarm Set Point**” value to just below the **PRESSURE** reading on the **System Status** screen. The **High Pressure Alarm** will trigger and the controller should disable the heaters and send the unit into **STANDBY** mode. Return the “**High Pressure Alarm Set Point**” to the original setting.

- d. **Output Thermocouple:** The process (output) temperature is indicated by the **PROCESS TEMPERATURE** value readout on the **System Status** screen. Modify the current “**High Temperature Alarm Set Point**” located on the **System Set Up ► Alarm Set Points** screen. Set the “**High Temperature Alarm Set Point**” value to just below the **PROCESS TEMPERATURE** reading on the **System Status** screen. The **High Temperature Alarm** will trigger and the controller will disable the heaters and send the unit into **STANDBY** mode. Return the “**High Temperature Alarm Set Point**” to the original setting.
7. The Aquarius® D.I. Water Heating System with Recirculation Option is tested to ensure optimum functionality and performance during recirculation.
 - a. The inputs and outputs of the pump and pump controller are checked and verified.
 - b. Communication between the pump, pump controller, and Aquarius® control system are verified and checked for functionality.
 - c. The pump safeties and/or alarms are tested. This includes the Water Leaks Alarm, which is standard on the Aquarius® D.I. Water Heating System, to ensure that the supply of D.I. Water to the unit is shut off in the case that a critical leak condition is present.
 - d. The unit is allowed to operate with the controller “**Process Temperature Set Point**” set to a value below the maximum temperature possible with the unit in Recirculation to ensure optimal temperature performance during Recirculation.
 - e. All external signals to the Aquarius® D.I. Water Heating System are tested.
 - f. The Aquarius® D.I. Water Heating System Pump Air Cooling System is tested to ensure optimal pump performance.

Basic Safety Precautions

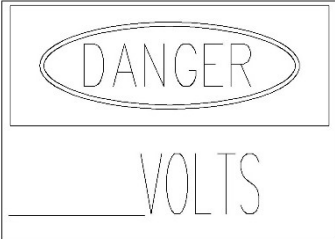


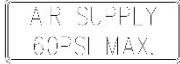
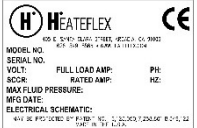





Every effort has been made to ensure that this unit will run with a minimum of user input or maintenance. However, there are still precautions to be taken whenever operating, performing maintenance, or servicing this unit. This unit makes use of heating elements and electrical components, both of which pose inherent burn, fire, and electrical shock hazards. These hazards can result in injury to personnel, the plant, and/or the process. Please note the following to aid in the operation of your unit and to decrease the risk of the above-mentioned hazards.

Precautions:

- Carefully and completely read through this and all accompanying literature completely to verify that you understand the functionality and features of this system. Please become familiar with the integral safeties and controls within this system, and know their functions.
- Always disconnect all electrical power prior to installing, servicing, or replacing electric heating elements and/or assemblies. The means for disconnection must be incorporated in the fixed wiring in accordance with the wiring rule.
- Electrical termination enclosures should be selected to match the application's environment and be able to withstand worst-case failures, especially in hazardous locations.
- Avoid fire hazards. Electric heaters and their components can develop temperatures that produce an auto-ignition source. Avoid mounting heaters in atmospheres containing combustible gases, vapor, or dust. Article 501 of the National Electrical Code (NEC) requires that the maximum sheath temperature when the heater is continually energized not exceed 80 percent of the surrounding atmosphere's auto-ignition temperature.
- Avoid having heaters come in contact with combustible materials. Keep heaters far enough away from combustible materials to prevent ignition.
- Be aware of the labeling on the unit, such as a lightning-bolt warning symbol, which alerts you to a safety hazard that could harm you or the unit.
- While servicing or operating this unit it is advisable to remove all metal from the individual working on the unit. This includes metal bracelets, rings and jewelry, as well as metal rim glasses and wristwatches.
- Keep your clothing, hands, and feet dry at all times whenever working with electrical equipment.
- Pull the fuses, open the circuit breakers, or disconnect the circuits from their source of power to protect yourself, the test equipment and the equipment under test.
- Do not troubleshoot or service a circuit with the primary power applied.

- If it becomes necessary to work on the unit with the power applied, keep one hand free at all times (behind you).
- Be sure that there is no power applied to a circuit when making continuity or resistance checks.
- Use the correct tools (i.e. screwdriver, alignment tool, etc.) for the job.
- Do not use metal tools around the connectors when there is power to the unit, as they may cause arcing.
- Turn off power before connecting alligator clips to any circuit.
- Do not take anything for granted when working with inexperienced help. Check every operation before they perform it.
- The operation of this unit creates large amounts of heated process fluid. This fluid is likely to be heated to temperatures above the threshold of safety for human contact. Please be advised of this and take the necessary precautions whenever connecting or disconnecting any plumbing from the system. If you are ever in doubt, turn the unit off, and wait an appropriate amount of time before performing any operations or service involving the plumbing.
- The process fluid within this system may also become pressurized from outside flow sources. It is the user's responsibility to verify that pressure within the system has been relieved externally; in order to prevent exposure to hazardous fluid such as heated de-ionized water, or heated chemicals and/or acids.
- This unit has several safety interlocks integrated within the system. However, it is the user's responsibility to verify that incoming power has been disconnected from a remote source prior to opening or servicing the unit. This is advised to prevent user exposure to high voltage and current, and reduce the risk of electric shock.
- The function of this unit is to heat process fluid for use in ultra-pure operations. Therefore during normal operation the unit will accumulate heat within the plumbing and the heater compartment. It is our recommendation that the unit is allowed a sufficient amount of time to cool before any maintenance or inspections are made to the unit in order to prevent user exposure to heated surfaces or air.
- The processes in which this unit is intended involve heated fluids. Whenever heated fluids are involved, certain precautions must be taken in order to avoid user injury. This is especially important since it is most likely that this unit will be used with aggressive fluids that can further harm or injure an individual, such as de-ionized water and process acids. User exposure to these types of materials can result in burning, scalding, and in some cases deep tissue damage. To avoid injury it is the user's responsibility to take the appropriate precautions as outlined above, and in all cases dealing with heated or aggressive materials, to use the appropriate safety equipment, such as but not limited to safety goggles and glasses, and chemically resistant gloves and garments.
- This heater is not intended for use with any liquid other than deionized (D.I.) water.

- The heater is not intended for use with flammable liquids. Use of this equipment with flammable liquids will greatly increase the fire risks of the system.
- Whenever servicing this unit, at least 300 lumens of light is required; otherwise use portable lighting that does not have to be held.

Warning Labels		
Label Name	Label	Description
1. Danger Label		Danger label for high voltage.
2. Warning Burn Hazard		Warning label for high temperature fluid. Release pressure, drain, and cool fluid before opening.
3. Danger Electrical Arc Flash		Danger label for electric arc flash hazard. Wear protective equipment when diagnosing an energized system.
4. Air Supply (with option 01)		Label for maximum air supply pressure.
5. Serial Number Plate		Plate with system model, serial, electrical, and pressure information.
6. Incoming Power Label		Label for incoming power information for voltage, amps, phase, and frequency.
7. Fuse Rating		Label for fuse type and amperage.
8. Door Interlocked		Label for door interlock instructions.
9. Caution Hot Surface		Caution label for hot surface.
10. High Power		Label for high power.

Pre-Installation Preparation

Before actually installing the Aquarius® D.I. Water Heating System, careful attention must be paid to the requirements of the system. As shown in the drawing section of this manual, the system has electrical, plumbing and physical properties that govern how it is to be installed. Input and output connections are clearly marked on the back of each system as well as the incoming voltage. The SCCR is indicated in the QC and name plate. These connections may vary for different models due to the optional features that may have been added or for particular customer needs. These connections must not be connected to any tap or fitting other than that specified for the respective model (please refer to the drawing section of this manual to better understand the configuration of your system).

Other energy sources such as pneumatic (CDA) power may be required for optional features such as the Water Leaks Alarm, Auto Purge (Aquarius® D.I. Water Heating System only), as well as for the recirculation feature and pump air cooling system of the Aquarius® D.I. Water Heating System. These requirements will be detailed on respective drawings and be clearly visible and marked on the back of each Aquarius® D.I. Water Heating System.

It is the responsibility of the user to provide these types of energy sources, i.e. pneumatic (CDA) and D.I. water and appropriate isolation of all energy sources, including electrical power, if not provided as an option.

To further ease the installation process, lifting lugs have been mounted on each system, which greatly aid in maneuvering the unit to its final destination.

WARNING!

The heater module must be mounted and installed in the vertical position with the plumbing connected as described in the drawing section of this manual. This FEP immersion type heater should always be under liquid when operating. Operating the heater in air or in a crystalline or precipitate, that may coat the heater, will result in heater burn out and may cause severe damage to your equipment and pose severe risks for a fire.

Units in contact with corrosive or caustic fumes should have the electrical enclosure purged with positive pressure nitrogen to prevent deterioration of controller and electrical components. To prevent heater from generating bubbles, there should be a minimum of 20PSI pressure from the output.

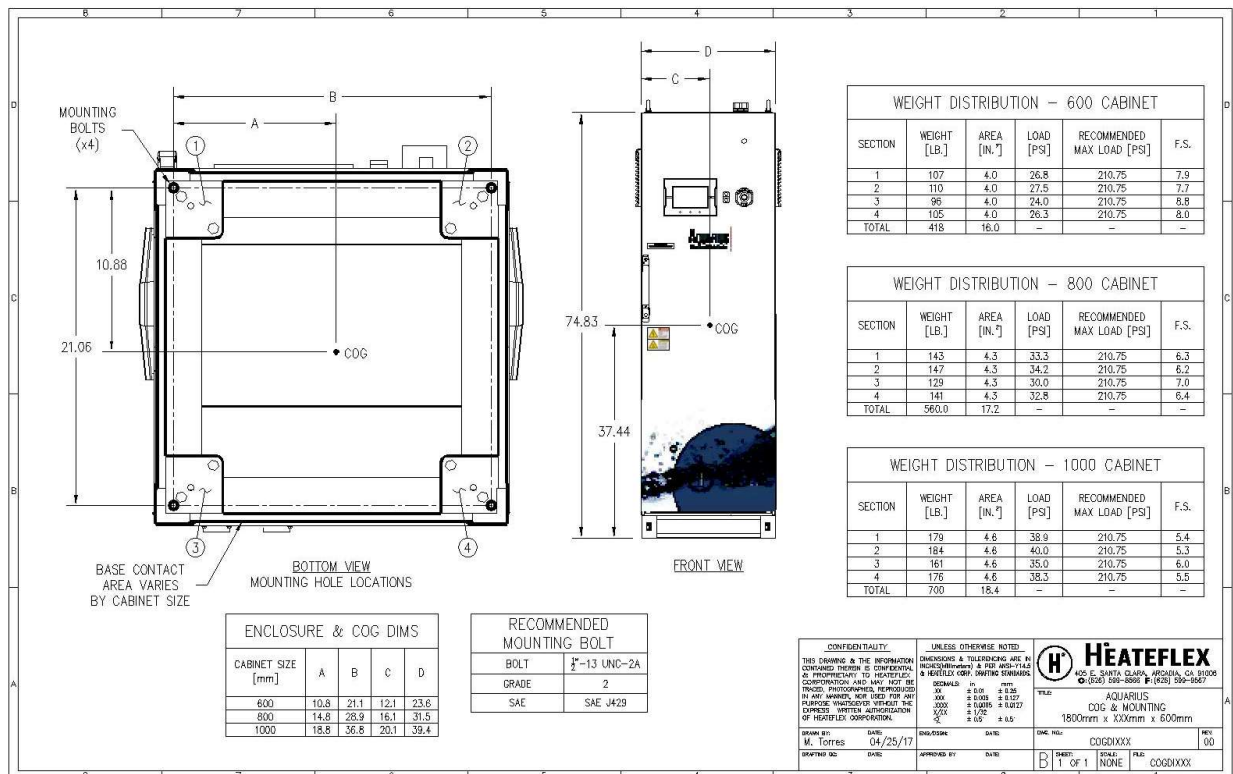
Failure to conform to this warning will cause severe damage!

Heateflex Corporation assumes no risk for noncompliance. Heateflex Corporation does not warranty any Heateflex Corporation equipment that does not use Heateflex Corporation interlock safety devices.

Installation Instructions

Your new Aquarius® DI Water Heating System has been pre-wired and tested prior to shipment. After proper installation, the unit will supply your heated de-ionized water needs for years to come.

1. Verify that the minimum operating requirements are available. (See the Facility Diagram and the Electrical Schematic drawings in **SECTION II** for more information.)
2. Install the unit in its permanent location. Please ensure that the recommended space requirements required for servicing of the system has been met, as detailed in the Aquarius Space Requirement drawings. Please provide adequate space to allow the door to open fully or open to 90°.
3. The unit must be secured using the included plinth base mounting brackets to be compliant with SEMI S2-0715. It must be secured to the floor to minimize possible tip over during a seismic event. See the figure below for more information regarding unit attachment.



4. Connect the incoming and outgoing water lines. Use only the connection types provided with the unit. (Refer to the drawing section of this manual to for system connections.)

5. Connect the air supply lines and the purge or relief/vent water lines if necessary.
6. Install incoming electrical power from main fusible disconnect (customer supplied) to electrical compartment prior to being powered on. For point-to-point connections see the electrical schematic drawings in SECTION II of this manual. All switches must remain in the OFF position. See the equipment specifications section on the Quality Control Documentation for current rating, operating voltage, and type rating.
 - a. Customer Supplied main fusible disconnect switch must utilize Type J low peak fuses. Consult Equipment Specifications in the Quality Control Documentation for recommended amperage rating.
 - b. If Lockout/Tagout option is selected, Fusible Disconnect is provided. Refer to drawing section of this manual for more information.
 - c. If a stationary appliance is not fitted with a supply cord and a plug, or with other means for disconnection from the supply mains having a contact separation in all poles that provide full disconnection under overvoltage category II conditions, means for disconnection must be incorporated in the fixed wiring in accordance with the wiring rules. Compliance is checked by inspection.
7. Supply the unit with process fluid (and air if necessary). (Refer to the Facility Diagram in **SECTION II** for more information.)
8. Start-up-procedure
 - a. Be sure all electrical switches and/or circuit protectors are in the OFF position.
 - b. The Customer is responsible for connecting the **Remote EMO** button (optional) according to the schematic diagram provided, or using a jumper if no **Remote EMO** is to be used. (Maximum input resistance is 600 Ohms)
 - c. Establish the minimum flow for your system; for information, see the specifications sheet.
 - d. Turn-on Customer supplied Fusible Electrical Disconnect. Heater power is available but the unit will not turn on.
 - e. Verify that the compact fused disconnect switch(s) are set to the ON position. If light is detected on the compact fused disconnect switch, the fuse(s) may be open and need replacing.
 - f. Turn on the unit (by pressing the “**ON**” button on the front of the unit). The controller will load into the “**STANDBY**” mode. Please note that the door must be completely closed in order for the unit to turn ON.

- g. The **ALARM MENU** key will be flashing to indicate unfulfilled alarm conditions, which include but are not limited to the “**High Limit**,” “**Low Flow**” and “**Low Level**” alarms. To clear these alarm conditions, fill the unit with the process liquid until full. This will satisfy “**Low Flow**” and “**Low Level**” alarm conditions. Press the **ALARM RESET** key located on the **Alarm Menu** screen to clear the alarms. The **High Limit** alarm will always be present upon power up.
- h. The customer needs to enter the “**Process Temperature Set Point**” located in the **Control Settings** screen before the unit can process. All the necessary controller parameters have been Factory preset and can be modified if desired. The customer needs to enter and/or review the desired “**Process Temperature Set point**”, “**Low**” & “**High**” set points for **Temperature, Flow Rate, Pressure, and Resistivity** (if the option is available). These values can be found on the **Alarm Set Points** screen. To modify these parameters simply press the data display key to the right of the parameter description to be changed. If key is grayed out, the user will need to log in with appropriate log in credentials to modify these parameters. Select the Login Window Key located on the upper right hand corner. Enter the password into the keyboard and press the **Return** key. Next, select the Process Temperature Set Point window, enter the desired set point value, and press the **Enter** key. The set point value entered will now be displayed.
- i. Once all parameters have been changed to your specifications, go to the **System Status** screen by pressing the **SYSTEM STATUS** key located at the top right of the touch screen. The **System Status** screen will allow the user to activate or “Run and/or Stop” the heater. At this point the unit is ready to process. Press the **RUN** key to start heating. The “**STANDBY**” label will switch to “**ACTIVE**” and a green indicating light will illuminate green if all safety devices are in a safe condition and no critical alarms are present. The “**HEATING**” mode green indicating light will turn on and flicker ON and OFF when heating is present.
- Please note that for the Aquarius® DI Water Heating Systems, the unit will be defaulted in “**DEMAND**” mode. Please refer to the Aquarius® DI Water Heating System with Recirculation section of this instruction manual for more information.
- j. This unit will now supply D.I. water at the process temperature set point that you have selected.

For more detailed information on the Aquarius® control system and operation screens please refer to the **PF2000 Controller Manual**.

System Shut Down Procedure

Before shutting down the Aquarius® DI Water Heating System verify that doing so will not adversely affect other equipment, machinery, and/or processes and that it is safe to do so. Prior to powering down the system, place the Aquarius® control system into Standby mode. (Refer to the **PF2000 Controller Manual** for more detailed information.) Once the unit is in Standby mode, power down the system by pressing the OFF button which is located on the front of the Aquarius® DI Water Heating System. The indicating lamp on the ON button will de-energize and the touchscreen will turn off. Please note that electrical power will remain present within the system until the Aquarius® DI Water Heating System has been disconnected from the electrical energy source. To turn on the unit, simply press the ON button located next to the OFF button. The Aquarius® DI Water Heating System will always power up in the Standby mode.

It is ultimately the responsibility of the user to verify and provide adequate isolation of all energy sources, i.e. electrical power, pneumatic air (CDA) and D.I. water. The process fluid within this system may become pressurized from outside flow sources. It is the user's responsibility to verify that pressure within the system has been relieved externally prior to servicing, in order to prevent exposure to hazardous fluid, in this case, heated de-ionized water.

Certain energy isolation devices may be provided with the Aquarius® DI Water Heating System as an option, such as an electrical disconnect switch and/or pneumatic AOV valves for process fluids. If provided, the electrical disconnect switch will be mounted in an enclosure located on the back of the Aquarius® DI Water Heating System. If provided, the pneumatic AOV valves will be located inside the enclosure in the heater/plumbing section. While energy isolation devices may be provided with the Aquarius® DI Water Heating System, it is the responsibility of the user to determine if these options are sufficient and safe based on their requirements.

If the unit is to remain powered off for an extended length of time, it is recommended to disconnect and isolate all energy sources to the Aquarius® DI Water Heating System, such as electrical power, pneumatic air (CDA) and DI water.

Suggested Operational Inspection

To reduce the possibility of unanticipated problems, the Aquarius® D.I. Water Heating System should be thoroughly checked every 6 months. A thorough inspection should consist of a check for leaks, confirm correct operation of the safety interlocks, and verify calibration.

1. Leak Check

- Open door or remove side panels (left or right)
- Pressurize the unit (65psi. MAX)
- Check all plumbing connectors. If there is a leak, fix or replace the components.

The HEATEFLEX® Aquarius® D.I. Water Heating Systems are controlled by the **PF2000**, a PLC-based controller. The controller's basic function is to control the discharge temperature of the water. Additionally, it monitors temperature, flow, voltage, pressure, and resistivity (optional) and provides safety interlocks for the unit.

2. Safety Check

- To check Safety PLC's safety circuits, open the controller panel; disconnect one sensor lead wire from the Safety PLC (flow sensor, liquid level sensor, pressure sensor or thermocouple). (Note: Opening the cabinet will cause the Door Interlock to trigger shutting down all power to the unit and preventing the unit from starting up. Contact the factory for additional information.) The controller should sound an alarm signal indicating an open analog sensor or open thermocouple. Reconnect the sensor to the correct terminal after testing. Test the sensors one at a time. If no alarm sounds, the controller may be defective, contact the factory or replace the controller.

3. Check Safety PLC's Calibration

- Input Thermocouple
- Process Thermocouple
- Flow Sensor
- Pressure Sensor
- Voltage Transducer
- Resistivity (Optional)

Calibration can be adjusted in the **System Set Up ► System Calibration**. A user password is required to modify these values.

Decontamination and Decommissioning

Heateflex Corporation recommends that user follows proper decontamination and decommissioning procedures when removing the Aquarius® D.I. Water Heating Systems from service. Please contact Heateflex Corporation for recommendations on proper disposal and/or a qualified dismantler in your area.

ITEM	MATERIAL OF CONSTRUCTION
Cabinet	Carbon Steel Powder Coated
Drip Pan	Polypropylene (PP)
Wire Insulation	Polyvinyl Chloride (PVC) Tetrafluoroethylene (TFE)
Plumbing	Fluorinated Ethylene Propylene (FEP) Perfluoro-alkoxy Alkanes (PFA) Polyvinylidene Fluoride (PVDF) Polytetrafluoroethylene (PTFE)

Aquarius® with Optional Auto Purge Feature

The Aquarius® D.I. Water Heating Systems features an Auto Purge option that reduces the potential of bacteria growth in the D.I. water or process fluid and Aquarius® plumbing system. The purge feature of the Aquarius® can be activated or used three different ways:

1. Automated using the PF2000 control logic.
2. Manually through the use of the HMI/Touch screen interface.
3. Remotely through a communications interface.

Heating of the D.I. water or process fluid is not permitted while the system is actively purging. Please refer to the PF2000 Controller Manual for more information on the operation of the Auto Purge feature and HMI/Touch screen operation of the Aquarius® D.I. Water Heating System. The Auto Purge feature is not available on Aquarius® D.I. Water Heating Systems with the recirculation feature.

Aquarius® with Optional Recirculation Feature

The Aquarius® D.I. Water Heating Systems with the optional recirculation feature has a built-in recirculation system and is equipped with an ultra-pure PFA-PTFE bearing-less pump, pump air cooling system and safety interlocks. The pump is controlled through the use of a PLC (Programmable Logic Controller). The Aquarius® recirculation feature has been optimized for precise D.I. water temperature control even during recirculation, and as a result provide hot D.I. water at temperature, on-demand. The recirculation feature reduces heat up time by implementing controlled heating at instances when demand is not required and when demand is needed the Aquarius® D.I. Water Heating System returns to single pass mode and ready to provide D.I. water at the specified temperature.

In addition to saving process time, the Aquarius® recirculation feature also reduces D.I. water usage which is an added cost savings for waste water and energy. The ability of the Aquarius® to provide an instant supply of heated D.I. water negates the requirement for a trickle flow, which is commonly used by D.I. water heaters to maintain pre-demand water temperature. Furthermore, the Aquarius® recirculation feature will also discourage bacteria growth from forming in the process fluid and Aquarius® plumbing, which is essential in maintaining high purity requirements.

Recirculation Operation:

The status of the Aquarius® D.I. Water Heating System with Recirculation is indicated on the System Status screen of the user interface. To access the Recirculation sub-menu, press the Recirculation key (∞). The Recirculation key is located at the bottom left of the System Status screen. The three different modes of the Recirculation System are illustrated by a series of labels and/or illuminated green indicating lights. These three modes are:

1. Demand: -This is the default mode of the system. The Recirculation System is not active and the fluid is being sent to process.
2. Venting: -The Recirculation System is preparing to initiate and is either filling the pump and plumbing with fluid and/or evacuating any air/bubbles from the plumbing. Please note that this mode will activate anytime excessive air/bubbles are detected within the recirculation plumbing.
3. Recirculation: -The Recirculation System is active and no fluid is being diverted to process. An external signal is required in order to initiate this mode.

The Aquarius® D.I. Water Heating System has been configured to default to the “**Demand**” mode. In order to place the Aquarius® into Recirculation mode several conditions must occur:

1. The Recirculation System must be enabled.
2. A customer provided “Recirculation Signal” is required to send the system into the Recirculation mode.
3. The Venting mode cannot be active.

If the above conditions are not met the Aquarius® will fail to enter the “**Recirculation**” mode and remain in the “**Demand**” mode. Please note that the presence of any “critical” alarms will abort recirculation by shutting off the pump and deactivating the heaters. Once the “critical” alarms have been resolved, recirculation will automatically resume but the Aquarius® will be in “**Standby**” mode and the heaters will remain OFF until the system is placed back into the “**Active**” mode.

Please follow all Pre-Installation Preparation, Installation, Suggested Operational Inspection procedures and the Pump Air Cooling System Set Up and Calibration prior to activating recirculation. This includes the connection of an external maintain switch/signal to the Aquarius® “Recirculation Signal”. The Recirculation Signal is available for Discrete and Ethernet communication connections. Please refer to the specific Electrical Component Layout drawing and the Electrical Schematic drawing for more information.

To initiate the Recirculation mode from Demand mode:

- 1) The Recirculation System **DISABLED / ENABLED** key located on the **System Status** screen is used to enable/disable the Recirculation System. To enable the Recirculation System press the **DISABLED** key. The “**Disabled**” label will change to “**Enabled**” which will be illuminated yellow.
- 2) Provide a closed “Recirculation Signal” the Aquarius® system to initiate the Recirculation mode.

To return back to the Demand mode from the Recirculation mode:

- 1) Provide an open “Recirculation Signal” to the Aquarius® system to initiate the “**Demand**” mode.

Please note that the “Recirculation Signal” has no affect on the recirculation feature if the Recirculation System is disabled.

Aquarius® Recirculation Pump Air Cooling System

The Aquarius® D.I. Water Heating Systems feature a pump air cooling system that optimizes the pump life and protects the pump motor from over-temperature conditions. The temperature of the pump motor is continuously monitored and during recirculation should the temperature of the pump rise above the Factory defined “Pump Motor Temperature Set Point” the pump air cooling system will initiate. The pump air cooling system will lower or maintain the pump motor temperature and keep it at a safe operational temperature. The pump air cooling system will disengage or shut off once the temperature of the motor is below the Factory defined “Pump Motor Temperature Set Point”. It is recommended that the pump air cooling system be utilized for optimum performance. Please follow the Pump Air Cooling System Set Up and Calibration procedures prior to operation of the Recirculation feature.

The Pump Air Cooling System Specifications are listed below.

Pump Air Cooling System Specifications	
The pump air cooling system equipment MUST only be used within the range of the environmental conditions or requirements listed below:	
<u>Air Supply Port:</u>	1/2” FNPT
<u>Required Air Supply Tube:</u>	
Minimum	3/8” Tube
Maximum	1/2” Tube
<u>Incoming Air Supply Pressure:</u>	
Maximum	60 psi
<u>Regulated Air Pressure:</u>	
Minimum	20 psi (See plumbing schematic for factory setting)
<u>Pump Motor Temperature Set Point:</u>	55 °C

Pump Air Cooling System Set Up:

It is recommended that the pump air cooling system be utilized for optimum performance. Please follow the Pump Air Cooling System Set Up and Calibration procedures prior to operation of the Recirculation feature.

Provide a steady air supply source for the pump air cooling system as detailed below. It is highly recommended that this air supply source be independent from other system requirements for air.

- 1) Locate the 1/2" FNPT air supply port for the pump air cooling system at the back of the Aquarius® D.I. Water Heating System. Please refer to the Facility Diagram in **SECTION II** for its specific location.
- 2) Install a tube connector to the 1/2" FNPT air supply port. It is recommended that a 1/2" MNPT tube connector with a minimum tube size of 3/8" to a maximum tube size of 1/2" be used.
- 3) Connect the appropriate air supply tube to the respective 1/2" MNPT tube connector.
- 4) Provide 60 psi maximum of steady air supply pressure. Minimum needed should be equivalent to or greater than the air regulator setting. See plumbing schematic for setting.
- 5) Proceed with the Pump Air Cooling System Calibration procedure.

Pump Air Cooling System Calibration:

Calibration of the pump air cooling system is necessary once the air supply connection for the pump air cooling system has been completed. This is achieved by regulating the air pressure of the pump air cooling system when it is active. To perform this calibration procedure access to the interior enclosure of the Aquarius® D.I. Water Heating System with the system powered ON is required. Please refer to the PF2000 Controller Manual for more information on the HMI/Touch screen operation of the Aquarius® D.I. Water Heating System.

Please take extreme cautionary measures as live voltage will be present in Aquarius® D.I. Water Heating System during the Pump Air Cooling System Calibration procedure.

- 1) Take the appropriate steps necessary to have the Aquarius® D.I. Water Heating System powered ON with the enclosure door open. Please note that the Door Interlock switch will prevent the unit from powering ON when the enclosure door is open.
- 2) Verify that an adequate steady supply of air is being supplied to the pump air cooling system (60 psi maximum).
- 3) Locate the pump air cooling system pressure regulator/gauge in the heater compartment of the Aquarius® D.I. Water Heating System and take note of the air pressure reading on the pressure gauge. Please refer to the Mechanical Layout Drawing in **SECTION II** for its specific location.
- 4) Turn the Aquarius® D.I. Water Heating System ON, once again with the enclosure door open.
- 5) Verify that the Recirculation System is enabled which is indicated by an illuminated yellow **“Enabled”** key on the **System Status** screen. If the Recirculation System is not enabled press the **DISABLED** key.
- 6) Send the unit into Recirculation mode by providing a closed “Recirculation Signal”.
- 7) Once the unit is in Recirculation mode, activate the pump air cooling system temporarily by pressing the **“Pump Air Cooling System Calibration ON/OFF”** key located on the **System Calibration screen**.
- 8) The pump air cooling system will activate for approximately 60 seconds and then shut off. Please note that the air pressure reading on the pressure gauge may drop when the pump air cooling system is actively cooling.

- 9) With the pump air cooling system active, check the air pressure reading on the pressure gauge and regulate the air pressure of the pump air cooling system to a minimum of 20 psi by adjusting the air pressure regulator accordingly.

Please note that the regulated air pressure of the pump air cooling system is dependent on the air supply source pressure. Please provide a stable supply of air to the pump air cooling system.

Trouble Shooting for the Aquarius DI Water Heating System

Problem	Solution
Aquarius® D.I. Water Heating System will not power ON	A) Verify factory power is provided to system. B) If option is selected, verify that the fused disconnect switch is set to the ON position. i) If disconnect switch is set to OFF, check continuity of the disconnect switch fuses. C) Verify that the EMO (Emergency Off) Switch is not engaged. D) Verify that the compact fused disconnect switch is set to the ON position. i) If disconnect switch is set to OFF and a light is present, check continuity of the disconnect switch fuses. E) Check system fuses. F) Call the factory for assistance.
Nuisance Hi-Limit Alarm	A. Call the factory for assistance.
The controller returns to “ STANDBY ” mode, from “ ACTIVE ” mode after ALARM RESET key has been pressed and no alarm is indicated.	A. The Auto Reset function is ON (enabled). If undesired, disable the Auto Reset function. (Note: The Auto Reset function affects only the Low Flow Alarm by disabling it.) B. Minimum flow set at 0.5 GPM and actual flow is 0.5 GPM or less. Increase the actual flow to more than 0.5 GPM to switch back to “ ACTIVE ” mode and to initiate the heaters.
Nuisance Low Level Alarm (from ACTIVE mode).	A. Hot water or fluid has the potential to trap air bubbles. Increase the pressure of the water supply, or restrict the output to increase the backpressure. B. Check the Liquid Level Sensor.
Low Level Alarm (from STANDBY mode)	A. No process flow. Verify that the process fluid supply valve is open allow the process fluid flow through the system heaters.





Problem	Solution
High Temperature Alarm	A. The process temperature has exceeded the “ High Temperature Alarm Set Point ”. If the “ High Temperature Alarm Set Point ” is set correctly, then make an adjustment in the Control Settings screen to the “ Power Adjust ” parameter. Reset this parameter to –5 counts. See if this solves the issue. If not, continue reducing the count by five until the issue is resolved.
Low Flow Alarm	A. The flow rate has dropped below the “ Low Flow Alarm Set Point ” or the minimum required flow rate of 0.5gpm. Increasing the flow rate or decreasing “ Low Flow Alarm Set Point ” may resolve this problem. Please note that a minimum flow rate of 0.5gpm is required for the heaters to turn ON.
High Pressure Alarm	A. Danger – The system exceeds “ High Pressure Alarm Set Point ”. It is recommended that the system pressure be less than 65 psi. Reduce the pressure in the system by shutting off the water supply and opening the output valve.
Discharge Temperature is not stable	A. Check all parameters in the Control Settings screen and compare them to the Factory Settings. B. Calibrating the Heater Amperage may be needed if the incoming voltage is fa
The “manual” Purge feature is not functioning (Optional on Aquarius® D.I. Water Heating Systems only)	A. Verify that an adequate supply of air is present. B. Verify that the solenoid valves are operational. C. Verify that the air operated valves (AOV) are operational.

Problem	Solution
<p>The Auto Purge feature is not functioning (Optional on Aquarius® D.I. Water Heating Systems only)</p>	<ul style="list-style-type: none"> A. Verify that the Auto Purge feature has been enabled. B. Check the Auto Purge settings. C. The unit is “ACTIVE”. The Auto Purge feature can only be activated when the unit is in “STANDBY” mode, the “Auto Reset” is set to ON and there is no flow through the unit. D. Verify that an adequate supply of air is present to the solenoid valves. E. Verify that the solenoid valves are operational. F. Verify that the air operated valves (AOV) are operational.
<p>Pump Alarm (Aquarius® D.I. Water Heating Systems only)</p>	<p>Please note that this alarm is only active when the Recirculation is “active”.</p> <ul style="list-style-type: none"> A. Verify that the circuit breaker is set to the ON position. B. Check for any loose wiring connections. C. Pump Controller may not be powered ON or the voltage supplied to the pump controller is out of range. Check the pump power supply and the incoming power to the pump controller. D. Check the motor power cable. E. Check the motor sensor cable. F. Check the Safety PLC interface cable. G. The pump motor temperature is over 100°C. H. The pump motor temperature was higher than 90°C for more than 10 minutes. I. The pump controller temperature was higher than 70°C for more than 10 minutes. J. The pump controller temperature is over 80°C. K. The pump controller has an over current issue or the power channel has been interrupted.

Problem	Solution
<p>The system will not enter Recirculation mode. (Aquarius® D.I. Water Heating Systems only)</p>	<ul style="list-style-type: none"> A. Verify that the Recirculation feature is enabled. B. Verify that the “Recirculation” signal is being sent to the system. C. Vent/Relief is active. Wait until this mode clears. D. Check for any loose wiring connections. E. Verify that an adequate supply of air is present. F. Verify that the solenoid valves are operational. G. Verify that the air operated valves (AOV) are operational. H. The Pump and/or Pump Controller are defective.
<p>The system is continuously Venting. (Aquarius® D.I. Water Heating Systems only)</p>	<ul style="list-style-type: none"> A. There is air in the water lines. Wait for the air to vent from the water lines. B. Check the position of the recirculation liquid level (L/L #2) sensor. C. Check for any loose wiring connections. D. Check to see that the recirculation liquid level (L/L #2) sensor cable is connected. E. Verify that the recirculation liquid level (L/L #2) sensor is functional.

For more Troubleshooting Information please refer to the PF2000 Controller Instruction Manual.

Environmental Specifications

 	High Voltage Electrical Equipment
 WARNING	<p>This equipment MUST only be used within the range of the environmental conditions listed below</p> <p>Operational usage: INDOOR USE ONLY</p> <p>Maximum operating pressure: 65PSI @ 90°C.</p> <p>Maximum fluid temperature: 90°C.</p> <p>Temperature resolution: +/-1°C.</p> <p>Maximum operating altitude: 6,600 feet (2,000 meters)</p> <p>Ambient temperature range: 5°C. ~ 40°C. (operating) -40°C. ~ 60°C. (storage)</p> <p>Maximum relative humidity: 80% up to 31°C. 76.7% @ 32°C. 73.3% @ 33°C. 70.0% @ 34°C. 66.7% @ 35°C. 63.3% @ 36°C. 60.0% @ 37°C. 56.7% @ 38°C. 53.3% @ 39°C. 50.0% @ 40°C and above.</p>
 WARNING	<p>This equipment MUST be installed with customer supplied external switch or circuit breaker. Switch or circuit breaker must be:</p> <ol style="list-style-type: none"> 1. In close proximity to the equipment 2. Within reach of the operator. 3. Marked as the disconnecting device for the equipment. 4. Disconnect Switch Lockout Tagout Option is available

Noise level Test Information

Test Method(s):

The evaluator observed the sound levels from various locations around the equipment and from a location representing the typical operator location. The equipment was operated and cycled in its worst-case laboratory condition. Measurements were taken 20 inches away from the front and right side of the equipment at a height of 45 inches from the floor. Measurements at the left and rear of the equipment were restricted due to proximity with the location of the equipment relative to the walls.

Acceptable results: Maximum sound pressure level does not exceed 80dB(A).

Test Results: **PASS**

Ambient – 68.8dB(A) –

Note: Operation of the system adds no measurable sound pressure to the local environment.

Location:

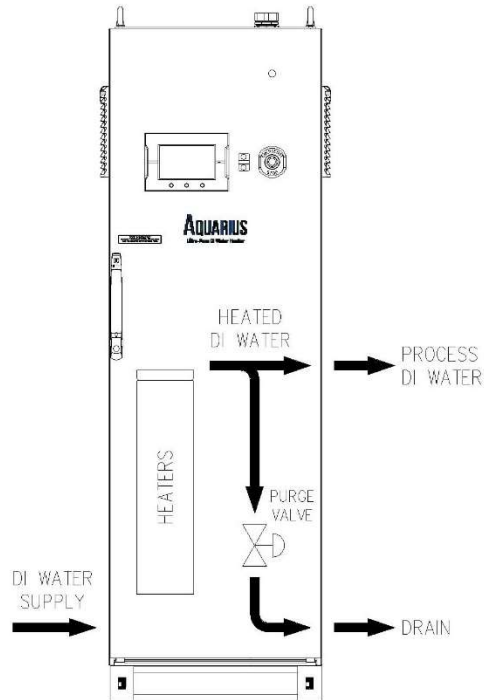
Front:	68.6dB(A)
Left Side:	68.8dB(A)
Right Side:	68.7dB(A)
Rear:	68.8dB(A)

The energy consumption for idle, average, and peak conditions varies from system to system and depends on how the customer uses the system. For daily energy consumption information, reference the Quality Control documentation.

Aquarius® Available Options

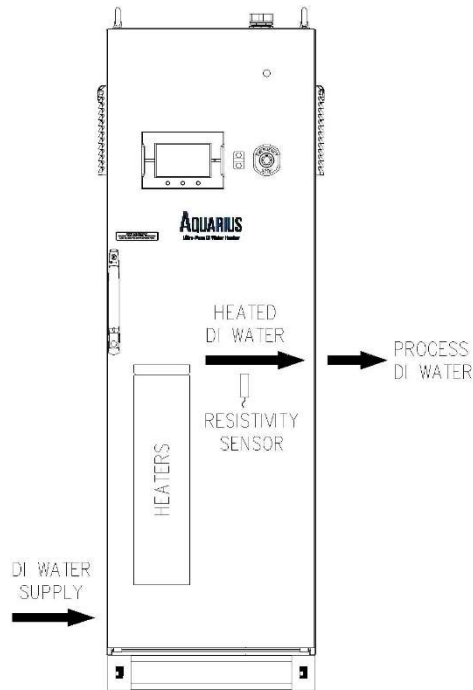
Aquarius® Auto Purge (Option)

The Auto Purge option provides a method for automatic or manual flushing or purging of the Aquarius® D.I. Water Heating System, which eliminates stagnant fluid in the system.



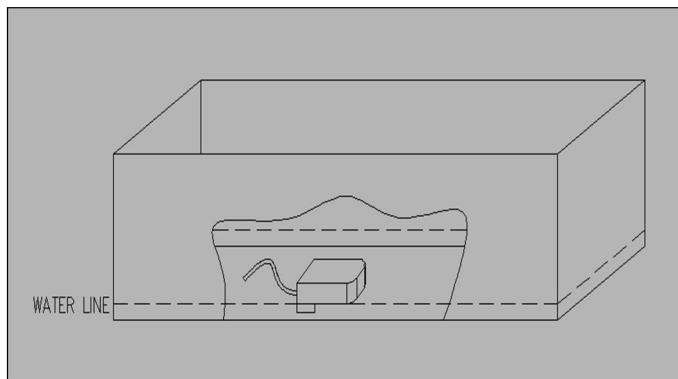
Resistivity Sensor (Option)

This optional feature allows the user to monitor the purity level of the heated process fluid. In addition a non-critical **Low Resistivity Alarm** is provided.



Water Leak Sensor with Auto Shut OFF (Option)

This optional feature uses a leak sensor to detect fluid in the Aquarius® D.I. Water Heating System drip pan, which indicates possible plumbing failure or an excessive leak condition. Once the leak sensor detects fluid as shown below a user selected non-critical or critical alarm is triggered. If the shutoff option is available and the water leaks is set to a critical alarm, the system automatically shuts off any fluid entering the system, disables the heaters and shuts off the pump if applicable.



Analog Interface Package (Option)

This option gives the user the ability to remotely enter the “**Process Temperature Set Point**” and to monitor the temperature and flow rate of the Aquarius® D.I. Water Heating System.

This interface package provides the following 4-20 mA analog signals:

- **Remote Temperature Set Point** – 0.0 to 95.0°C
- **Temperature Retransmit** – 0.0 to 100.0°C
- **Flow Rate Retransmit** – 0.0 to 13.0 gpm (Standard ¾” Tube or 25mm plumbing) , 0.0 to 18.0 gpm (32mm plumbing), or 0.0 to 32.0 gpm (40mm plumbing)

Discrete Interface Package (Option)

This optional interface package includes:

- **Remote Purge** – allows the user to monitor and control the purge function of the unit (provided that the **Auto Purge** option is selected).
- **Remote Emergency Off (EMO)** – allows the user to shut off the system from a remote location and/or from other equipment associated with the Aquarius® D.I. Water Heating System.
- **Alarm Status signal for Critical Alarms** – provides a signal to a remote location should a critical alarm be triggered.
- **Alarm Status signal for Non-critical Alarms** – provides a signal to a remote location should a non- critical alarm be triggered.
- **Temperature Ready Dead Band Signal** - This feature provides a dry contact signal to notify the user that the Process Fluid Temperature is within a specified dead band range. The “Temperature Ready Dead Band Signal Set Point” can be modified according to the customer’s requirements.
- **Remote Alarm Reset** – allows the user to reset the alarm from a remote location. Note that the **GFCI Alarm** may not be reset using this option.
- **Remote Stop (Standby)** – allows the user to remotely “Stop” the system (Standby mode) disabling the heaters from a remote location. The **RUN** key must be pressed first in order to utilize the “**Remote Stop**” function.

Dry contact Interface Package (Option)

This optional interface package provides the following dry contact relays:

- **Active Mode**
- **Temperature Ready Dead Band Signal**
- **Main Alarm**
- **Open Sensor Alarm** (analog sensors, Process T/C and High Limit T/C)
- **Low Level Alarm**
- **Door Open**
- **High Temperature Alarm**
- **Low Temperature Alarm**
- **High Flow Alarm**
- **Low Flow Alarm**
- **High Pressure Alarm**
- **Low Pressure Alarm**
- **EPO Signal**
- **Drip Leak Alarm**
- **Open Thermal Cut-Off Alarm**
- **GFCI Alarm**
- **Water Leak Alarm**
- **High Limit Alarm**

Aquarius® Available Communications

To provide data connection to the Aquarius® D.I. Water Heating System the following communication types are available:

- Ethernet (Standard)
- Discrete Interface (Optional)
- Analog Interface (Optional)
- Dry Contact Interface (Optional)

Aquarius® Cable Assemblies (Option)

To provide easy connectivity to the Aquarius® D.I. Water Heating System cable assemblies are available for:

- Discrete Interface
- Analog Interface
- Dry Contact Interface
- Ethernet

Secondary Process Temperature Set Point (Option)

This feature allows the Aquarius® D.I. Water Heating Systems to quickly change between a primary process temperature set point to a different or secondary process temperature set point and vice versa using a remote digital signal.

Aquarius® Recirculation

This feature is available only on Aquarius® D.I. Water Heating Systems and provides a built-in recirculation system that has been optimized for precise D.I. water temperature control during recirculation and provides hot D.I. water at temperature on-demand. In addition, the recirculation system reduces D.I. water usage and reinforces high purity requirements by discouraging bacteria growth from forming in the process fluid and Aquarius® plumbing.

Aquarius® Options

DESCRIPTION
160mm Heater Modules
Auto Purge (pump not included)
Resistivity Sensor
Water Leaks Alarm – Critical alarm with Auto Shut Off of Supply Water
Water Leaks Alarm Only
Discrete Interface Package [Includes 1) Remote Auto Purge; 2) EMO Interface Package – Aquarius external tool shutdown; 3) Alarm Status Signal – Critical; 4) Alarm Status Signal – Non-Critical; 5) Remote Alarm Reset; 6) Remote Run/Stop (Active/Standby), 7) Water at Temperature Dead Band (DB) Alarm Signal] Includes 25' or 50' Cable.
Analog Interface Package [1) Remote Temp. S.P.; 4-20mA; 2) Retransmit Temp; 4-20 mA; 3) Retransmit Flow; 4-20 mA] Includes 25' or 50' Cable
Dry Contact Interface Package (Communications) – Dry Relays Includes 25' or 50' Cable
Dry Signal for Secondary Process Set Point
32mm Internal Plumbing Size (Flow Range = 1.0-18.0GPM)
40mm Internal Plumbing Size (Flow Range = 1.0-32.0GPM)
¾" FNPT Input/Output
1" FNPT Input/Output
¾" Flare Input/Output
1" Flare Input/Output
25mm BFC Input/Output
32mm BCF Input/Output
40mm BCF Input/Output
Manifold for Multiple Units
Recirculation
Power Supply from Bottom of Unit
Lockout Tag Out Box, Disconnect Switch Box on the Back of Unit
Incoming Power Conduit Size increase to next size up
Embedded Ground Wire (1 Per Heating Coil)
¾" Flare Drain

Additional System Options/Configurations

The Aquarius® D.I. Water Heating Systems can be customized to meet specific customer requirements. Please contact Heateflex Corporation® for Aquarius® D.I. Water Heating Systems options and/or configurations that are not specified.

January 03, 2017

Heateflex Corporation's Material Warranty

Heateflex Corporation warrants the equipment offered to be free from defects in material and workmanship, under normal handling and proper usage, for a period of one year from the date of shipment. All products purchased from manufacturers by Heateflex Corporation will carry that manufacturer's warranty period. This expressed warranty is in lieu of, and excludes all other representations made by advertisements or by agents. There are no implied warranties for the equipment.

Heateflex Corporation agrees to correct any defect in workmanship or material which may develop under normal handling and proper usage during a period of one year from the date of shipment or, by its option, to repair or replace the defective equipment F.O.B. Arcadia, California, USA. Purchaser's remedies shall be limited exclusively to the right of repair or replacement. Heateflex Corporation shall not be liable for any expenses incurred by the purchaser or any other person by reason of the use, misuse, sale, or fabrication of the equipment regardless of whether the equipment conforms to the specifications.

Items returned for warranty repair must be prepaid and insured for shipment. Warranty claims are processed on the condition that prompt notification of a defect is given within the warranty period. Heateflex Corporation shall have the sole right to determine whether, in fact, a warranty situation exists.

Declaration of Conformity

A Declaration of Conformity is optional for Aquarius® D.I. Water Heating Systems and will be provided as requested and/or as necessary.

Manual Revisions

<u>Revision</u>	<u>Description</u>	<u>Date</u>
00	Original Version	4/13/17
01		4/17/17
02		8/21/17

Section II
QUALITY CONTROL
&
EQUIPMENT
SPECIFICATIONS



405 E. Santa Clara St., Arcadia, CA 91006-7218
O: (626) 599-8566 • F: (626) 599-9567

Section III

DRAWINGS



405 E. Santa Clara St., Arcadia, CA 91006-7218
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Section IV

PF2000

CONTROLLER MANUAL



405 E. Santa Clara St., Arcadia, CA 91006-7218
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