
AQUA LOGIC'S **DELTA STAR®** Series water-cooled chillers

INSTALLATION & OPERATING INSTRUCTIONS

Thank you for purchasing an Aqua Logic chiller. It has been designed and built to provide years of reliable, trouble-free service. It provides a precise water temperature control up to +/- 1.0°F (0.7°C) accuracy and features a continuous LCD display of the current fluid temperatures.



BEFORE INSTALLING THE CHILLER

READ BOTH WARRANTY AND INSTALLATION INSTRUCTIONS.

Important: Unpacking your chiller.

This chiller was properly packed and accepted by the transportation company for shipment. It is the responsibility of the transportation company to deliver it to you in perfect condition.

APPARENT DAMAGE OR LOSS

If, upon delivery, the shipping container or equipment indicates DAMAGE IN TRANSIT, such damaged goods should not be accepted until the transportation company's agent has noted on the freight bill, which he will give you, the nature and extent of the damage. If any part of this shipment is LOST IN TRANSIT, have the shortage noted on the freight bill by the agent.

CONCEALED DAMAGE

Remove cover to inspect the chiller for damage.

If, when this equipment is unpacked, shipping damage is discovered which was not apparent upon delivery, notify the transportation company IMMEDIATELY to inspect the damaged equipment. The inspector is REQUIRED to provide you with a DAMAGE INSPECTION report.

THIS INSPECTION MUST BE REQUESTED WITHIN FIFTEEN (15) DAYS OF DELIVERY. DO NOT MOVE DAMAGED SHIPMENTS FROM POINT OF DELIVERY. RETAIN ALL CONTAINERS AND PACKING FOR INSPECTION.

Protect yourself. File your claim immediately with the transportation company! Remember, Aqua Logic Inc. is not responsible for any damage after the carrier accepts a shipment. Claim for FULL VALUE REIMBURSEMENT should be made by you against the transportation company. Replacement of the damaged equipment should be requested by the purchaser as a new order.



WARNING!!!

**THIS DEVICE USES HIGH VOLTAGE ELECTRICAL POWER FOR OPERATION.
SAFETY PRECAUTIONS MUST BE OBSERVED.
CAREFULLY READ AND OBSERVE THE FOLLOWING TO AVOID ELECTRICAL SHOCK
OR SEVERE DAMAGE TO THE EQUIPMENT.**

- We recommend, as with all electrical equipment used in or around water, that you connect your electrical equipment to a ground-fault interrupt (GFIC) protection circuit.
- **ALWAYS** turn the power off for the equipment at the source (circuit breaker) if there is any electrical problem or if the electrical equipment or controller has been submerged in water.
- **ALWAYS** make sure that the electrical circuit you connect your electrical equipment to is rated at least 20% higher than the maximum current rating on the equipment.
- **ALWAYS** make sure that you operate the equipment at the correct voltage.
- Do **NOT** attempt to turn off the power at the chiller or controller if a problem occurs. Disconnect unit at the main power panel.
Do **NOT** attempt to repair equipment. Call Aqua Logic for instructions.

Very Important!

1. The standard target fluid temperature is limited to a range of 40° F to 80° F on all Delta Star Chillers. Without special factory installed equipment, possible damage to the unit can occur when attempting to access fluid temperatures outside this range. Aqua Logic, Inc.'s warranty does not apply to application temperatures under 40°F or above 80° F without special factory modifications.

Compressor crankcase heater must installed when ambient air temperature is 60°F and below.

2. Water going to the chiller should be protected by filters to keep debris from collecting in the evaporator and condenser shells. Clogged shells lead to heat exchange problems and will void the warranty.
3. Improperly installed or out of adjustment rapid sand filters can put sand into the stream of water flowing into the chiller. This condition is similar to "sand blasting" and may abrade holes in plumbing lines or the evaporator and condenser. Conditions like these would void the Aqua Logic, Inc. warranty.

40° F to 80° F Tank Temperature Applications

Wetted parts contain titanium, PVC plastic, rubber, and polymer. These materials are non-reactive with fresh and salt water. You must consult with Aqua Logic, Inc. if any other fluids are to be pumped through the chiller.

If humid or wet conditions exist where chiller is to be located, care must be taken to prevent water from getting on electrical components.

4. On some chiller models, allow only qualified licensed personnel to supply electric power to chiller. Installation must be done in accordance with local and national electrical code. Delta Star chillers need a fusible disconnect installed within five feet. The chiller needs a dedicated power supply. **Do not** share the power feed with any other peripheral devices such as pumps, ultraviolet light sterilizers, or filters. Install an interlock device such as a water flow switch which prevents the chiller from energizing without the pump being on.
5. Double check electrical specifications on unit's electrical access cover plate making sure of voltage, amperage, phase, and cps before energizing. (**Do not** remove any covers with electrical power on.)
6. **Fluid must flow through the chiller at all times.** See chiller specification sheet or product label for minimum and maximum flow rates. Flow rates less than specification may result in evaporator freeze-up and cracking of the evaporator shells. Also over heating of the chiller can occur due to lack of water flow to the condenser. Aqua Logic Inc. does not warranty evaporator shells operating under low flow conditions and compressor burn outs due to overheating.
7. Incoming water pressure to the evaporator must not exceed 50 psi and condenser must not exceed 100 psi. Over pressuring the evaporator and condenser may cause damage to the shells, which is **not** covered under warranty.

Installation Instructions:

1. Place the chiller on a level concrete or metal pad with at least two (2) feet of space around the unit to allow room for access to the unit and for maintenance. If the chiller is to be mounted outdoors, it must be placed in to a weather proof housing to protect from direct weather and rain.

2. Connect the plumbing from the building cold water supply to the condenser FPT copper pipe water fittings located on the back of chiller.

Make sure the building supply water is ample enough to allow the chiller to function correctly. (See the chiller specification sheet for water flow rates).



3. Connect the plumbing from the pool to the heat exchanger FPT PVC water fittings on the front of the chiller. Be careful not to over tighten the plastic fittings. See “Chiller By-pass Plumbing”
4. Install flow switch either on the water inlet or outlet side with at least 12 inches of straight pipe on the inlet side and 6 inches on the outlet side.



5. Submerge into tank the ½” titanium temperature sensor probe in the water.

Optional titanium dry sensor well: Install in the water inlet plumbing of the chiller.

6. Check for water leaks.
7. Plug-in the temperature controller to the flow switch (optional) and then to the chiller.

If hard wired, the installation must proceed in accordance with national building and electrical codes by qualified technicians only.

Initial Start-up: Read all of the instructions before energizing unit.

Caution: When the ambient air temperature is 60°F and below a compressor crankcase heater must be installed. It's important to allow the oil in the compressor to warm-up at least 8 hours before starting up the unit. If the ambient air temperature is below 60°F, apply power to the unit and set controller so the compressor does not energize or by-pass the heat exchanger water supply so the flow switch will not activate the unit.

1. Turn on tank water pump and set the correct water flow rate.
2. Open water valves to the condenser.
3. Apply power to the unit.
4. Adjust temperature controller set point to desired water temperature.
(See "Chiller Control Set-up")

When the temperature control calls for cooling, the chiller will turn on and pull the water temperature down to the desired set point and then shut off. When the water temperature rises above the differential setting, the chiller will repeat the cycle and cool down to temperature set point.

Chiller Control Set-up

<u>Step</u>	<u>Enunciator</u>	<u>Description</u>	<u>Display</u>
1	F or C	Fahrenheit or Celsius	F
2	S1 (Blinking)	Set point Temperature	S1 77
3	DIF (Blinking)	Differential Temperature	DIF 1
4	C1	Cooling	C1



Liquid Crystal Display (LCD)

The LCD display provides a constant readout of the sensor temperature and indicates if the output relay is energized. When the **S1** enunciator is constantly illuminated during operation, the relay is energized. The display is also used in conjunction with the keypad to allow the user to adjust the set point temperature and differential.

Programming Steps and Display

The control can be programmed in four simple steps using the LCD display and the three keys on the face of the control. (See photo for display and keys.)

1. To start programming, press the **SET** key once to access the Fahrenheit/Celsius mode. The display will show the current status, either **F** for degrees Fahrenheit or **C** for degrees Celsius. Then press either the up ↑ arrow or down ↓ arrow key to toggle between the **F** or **C** designation.
2. Press the **SET** key again to access the set point temperature. The LCD will display the current set point temperature and the set point enunciator will be blinking on and off to indicate that the control is in the set point mode. Then press either the up ↑ key to increase or down ↓ key to decrease the set point to the desired turn off temperature.
3. Press the SET key again to access the differential. The LCD will display the current differential and the **DIF** enunciator will be blinking on and off to indicate that the control is in the differential mode. Then press either up ↑ key to increase or the down ↓ key to decrease the differential to the desired setting (minimum 1°F, maximum 30°F).
4. Press the **SET** key again to access the cooling mode. The LCD will display the current mode, **C1** for cooling mode or **H1** is for heating mode. Then press either up ↑ key or the down ↓ key to set the **C1** mode. Controller **MUST** be in the **C1** mode for correct operation. Press the **SET** key once more and programming is complete.

Controller will automatically drop out of “program mode” and return to “operating mode” 30 seconds after last key press.

Troubleshooting Controller Error Messages:

Display Messages

E1 - Appears when the up ↑ or down ↓ key is pressed when not in the programming mode.

To correct: If the E1 message appears even when no keys are being pressed, replace the control.

E2 - Appears if the control settings are not properly stored in memory or appears if the EEPROM data has been corrupted.

To correct: Check all settings and correct if necessary. If this does not correct the problem then this condition cannot be field repaired. Replace the control

EP - Appears when the probe and or flow switch is open, shorted or sensing a temperature that is out of range.

To correct: Check to see if the sensed temperature is out of range. If not, check for probe damage by comparing it to a known ambient temperature. If the sensor is reading correct ambient temperature, than make sure the sensor is making good contact with the titanium sensor well. Replace the probe is if necessary.

CL - Appears if calibration mode has been entered.

To correct: Remove power to the control for least five seconds. Reapply power. If the **CL** message still appears, replace the control.

Safety Hi / Low refrigerant pressure cutout switch

This safety switch protects the compressor from burnout. The pressure switch serves as both a high and low refrigerant safety cutout to protect the chiller. If there is no water or low water flow through the condenser the refrigerant pressure will build-up and cause the switch to trip off. When there a refrigerant leak the switch will protect the chiller from functioning. (Model's DS-9 and 10-WC have dual Hi / Low pressure cutout switches. Model's DS-3 thru 8-WC have high pressure cutout only)

To reset the switch:

1. Remove black chiller cover and locate the Hi / Low pressure cutout.
2. Press the brass button to reset the chiller.

If the pressure switch will not reset call Aqua Logic for help.



Chiller Maintenance

Safety Precautions

1. Always wear safety eye wear and work gloves when installing and maintaining equipment.
2. Never assume electrical power is disconnected. Disconnect and check with voltage meter. Lock the circuit off.
3. Keep hands out of areas when power is connected to equipment.
4. Refrigerate escaping into the air can cause frost-bite burns.
5. Refrigerate is toxic when burned.

Pool Side Heat Exchanger Cleaning:

The pool side heat exchanger should be cleaned approximately every 12 months or as needed to allow proper performance.

WARNING:

When using bleach and acid special care should be observed.
Always wear hand, eye and body protection. Use rubber gloves.

DO NOT pour acid or bleach into the water. **DO** pour water into acid or bleach solution.
DO NOT perform acid and bleach flushing at the same time. The gas generated by the mixture is poisonous and can result in serious injury or death.

To remove organic deposits from titanium tube bundle:

1. Isolate the pool side heat exchanger. (see drawing next page)
2. Mix 1 part bleach to 3 parts distilled water in 20 gallon tank or larger container.
3. Circulate via pump the solution through heat exchanger for approximately one to two hours or as needed.
4. Thoroughly rinse heat exchanger with clean water.

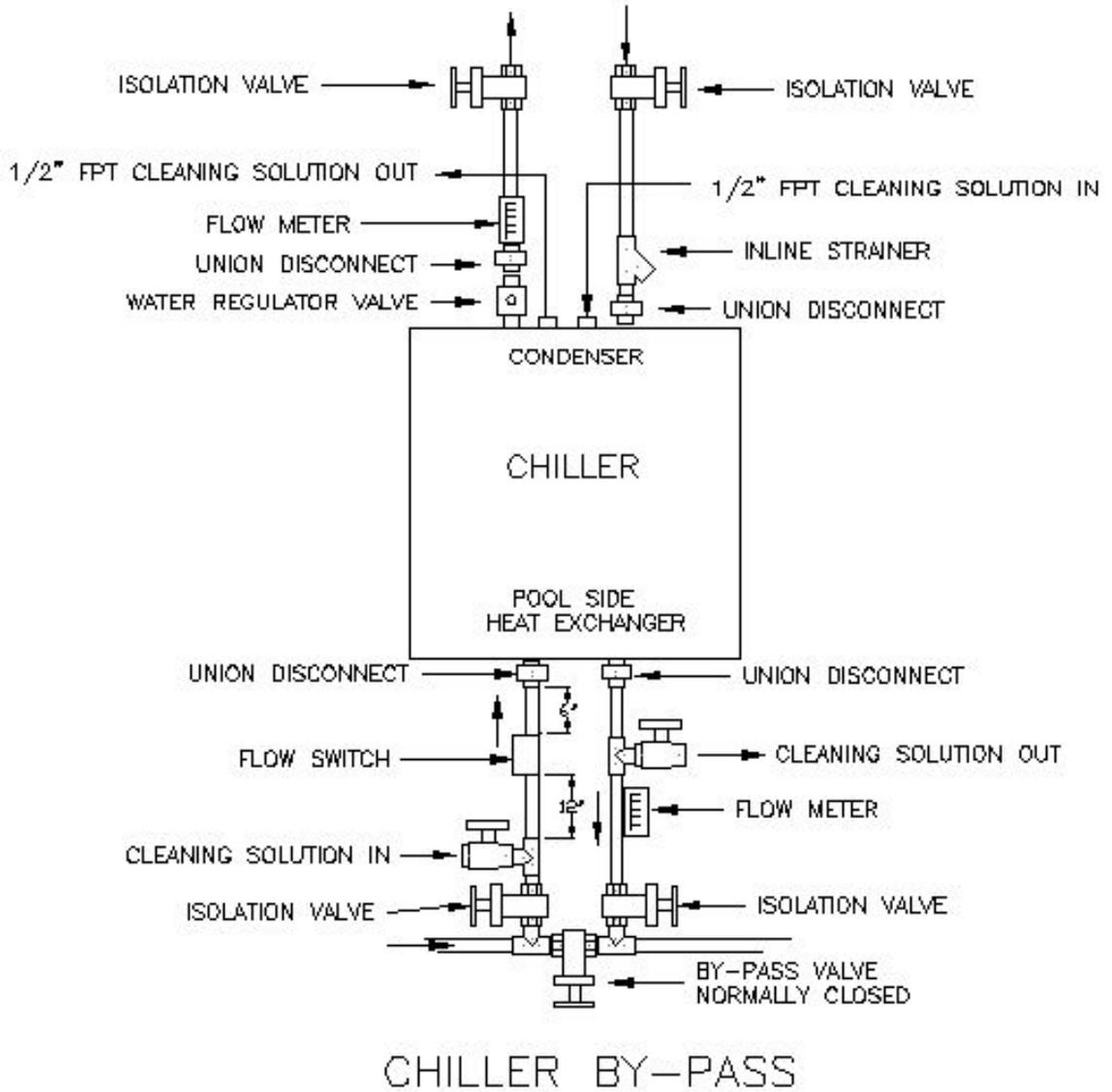
To remove mineral deposits from titanium tube bundle:

Use the same steps as above, but use muriatic acid instead of bleach. Be sure to follow the muriatic acid manufacturer's instructions for use and safety.

Condenser Cleaning:

The condenser should be cleaned approximately every 12 months or as needed to allow proper performance. Use the same steps as above, use muriatic acid to remove mineral deposits. Disconnect the electrical power. Isolate the condenser from the building water source. Use the clean-out ports on the condenser flush the system.

Chiller By-pass Plumbing



Chiller Trouble Shooting Chart

Symptoms		Check / Solution
Chiller not functioning	Fuses or circuit breaker	<ol style="list-style-type: none"> 1. OK > Temperature Control. 2. No power > Replace fuses
	Temperature Control	<ol style="list-style-type: none"> 1. OK > Pressure cutout switch 2. No display > Replace control 3. Check settings. 4. Error code > (see temperature controller page)
	Flow Switch	<ol style="list-style-type: none"> 1. Pool water flow. 2. Water flow OK > Wiring > Replace flow switch.
	Pressure Cutout Switch	<ol style="list-style-type: none"> 1. Check condenser entering water flow and water temperature. 2. Check for low refrigerant pressure > Check Refrigerant level. 3. Liquid gauge high pressure > Check water to condenser. 4. No water through condenser > Check water regulating valve. 5. Reset switch.
	Compressor	*Not running > Check start components > Replace compressor.
Chiller running but has low cooling		<ol style="list-style-type: none"> 1. Clean heat exchanger and or condenser. 2. * Check compressor. 3. * Check refrigerate running pressure levels. 4. Check tank system requirements. Call Aqua Logic for help.

Specifications

Aqua Logic Delta Star Water-cooled Chiller features:

- Titanium heat exchanger for use in fresh and saltwater applications.
- Included ABS Protective cover
- Made in the USA
- Limited 1-year warranty

Model	HP	Nominal BTUH	Volts / PH	AMP	Refrigerant	Evaporator Flow (GPM)	Condenser *Flow (GPM)	Evaporator I/O FIPT	* Condenser I/O FIPT	Dimensions (L x W x H inches)	Weight (lbs)
DS-4-WC	1/3	4050	115	7.2	R-134A	10-20	0.25-0.5	3/4"	3/8"	23 x 14 x 14	75
DS-5-WC	1/2	6000	115	9.5	R-134A	12-25	0.3-0.6	1-1/2"	3/8"	24 x 16 x 16	125
DS-6-WC	1/2	6000	230 / 1	4.8	R-134A	12-25	0.3-0.6	1-1/2"	3/8"	24 x 16 x 16	125
DS-7-WC	3/4	9500	115	13.0	R-134A	15-30	0.8-1.0	1-1/2"	3/8"	25 x 21 x 15	155
DS-8-WC	3/4	9500	230 / 1	7.0	R-134A	15-30	0.8-1.0	1-1/2"	3/8"	25 x 21 x 15	155
DS-9-WC	1	12000	230 / 1	7.2	R-134A	20-35	0.8-1.2	1-1/2"	3/8"	27 x 24 x 15	165
DS-10-WC	1.5	21000	230 / 1	10.5	R-417A	25-40	1.0-2	1-1/2"	1/2"	31 x 26 x 19	225

*** The condenser flow rate is based on 55-60 °F entering water temperature. The condenser head pressure is maintained by metering the water flow via gate valve.**

ONE YEAR LIMITED WARRANTY

All **Aqua Logic Delta Star Water-Cooled Chillers** are warranted against defects in parts and workmanship for a period of one (1) year from the date of original end user purchase. The limited warranty covers only parts and labor based upon Aqua Logic service cost. Aqua Logic is not liable for field repair work performed without prior written or verbal agreement and a Repair Authorization (RA) number with a fixed maximum charge.

- The warranty applies only to the original purchaser and is not transferable.
- The warranty covers only the repair or replacement of Aqua Logic products and is limited to Aqua Logic's cost of defective parts.
- Once Aqua Logic determines that the defect is due to parts or workmanship and that the product is under warranty, Aqua Logic will repair or replace the product solely at their discretion.

Our warranty does not cover the following:

- Damage caused by freezing, inadequate water flow, or no water flow.
- Damage caused by improper installation or maintenance by user or their agent.
- Damage caused due to misapplication of product.
- Damage caused by corrosion, abuse, accident, alteration or improper use.
- Damage caused by flood, fire, earthquake, tornado, or other acts of God.
- Damage caused by electrical spikes, surges, brownouts, or improper voltage or amperage.
- Damage caused by failure of any third party equipment (ie. controller, pump, etc.)
- Incidental damage to other equipment, property or livestock.
- Warranty will be voided if product labels are removed or defaced.

In the event of a defect or failure of the product please contact Aqua Logic immediately for assistance. Aqua Logic will at their discretion:

- Provide user with replaceable parts to restore their unit to proper operation.
- Provide a Repair Authorization (RA) number with a specified dollar limit so that a qualified Technician can provide a field repair.
- Provide a Return Authorization (RA) number to return the chiller with original packaging to Aqua Logic, Inc., 9558 Camino Ruiz, San Diego, CA 92126 by prepaid freight. You need to include the serial number as well as proof of purchase and/or a copy of the original bill of sale along with the RA number.

COD shipments will be refused. Aqua Logic shall not be responsible for shipping damage or loss.