Installation and Maintenance Manual

Delta Star Heat Pump®
In-Line Water Heat Pump



Use Quick Install page for easy setup.

Aqua Logic®, Inc.
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Thank you for selecting an Aqua Logic Delta Star Heat pump. We have endeavored to manufacture the most reliable and efficient water Heat Pump available. Our highly trained technicians use premium quality components to assemble equipment that will operate faithfully for years. You can call us or visit us on the web for technical assistance before and after the sale. We are committed to making sure that you are satisfied with your Aqua Logic Heat Pump now—and in the future.

Please take some time to familiarize yourself with the information in this manual so that you can get the most from your Heat Pump. Don't hesitate to contact us if we can assist you further.

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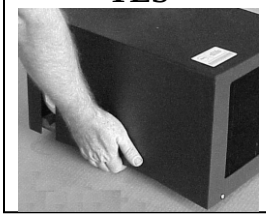
Quick Install for your Aqua Logic Delta Star Heat Pump

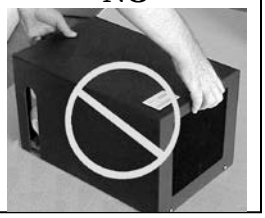
Unpack your Delta Star Heat Pump:

- Carefully remove the Heat Pump from the box by reaching underneath the Heat Pump and lifting it by its base. NEVER lift the Heat Pump by its cover to avoid personal injury or damage to the Heat Pump (See illustration).
- Use a Phillips head screwdriver to remove the two screws on opposite ends of the cover.
- Lift the cover from the unit.
- Remove the cardboard collar from the top of the compressor.
- Make sure that the fan assembly does not contact condenser (radiator).
- Inspect the unit for possible shipping damage. (If damaged, refer to the damage claims instructions on the shipping container.)
- Unwrap the power cord and extend it through side notch in cover.
- Replace the cover and use the Phillips screwdriver to reattach the four cover screws.

How to lift your Aqua Logic Heat Pump

YES **NO**





Place your Aqua Logic water Heat Pump:

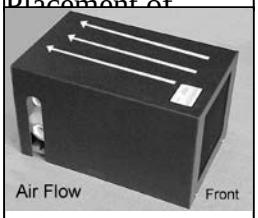
- Place the water Heat Pump on a sturdy flat surface.
- Make sure that the unit is resting on its base to avoid damage.
- Place the unit so that it has good ventilation through the unit. For best results, allow at least 6 inches of free space in front of the unit and 12 inches behind it. Do not mount the unit so that heat from the Heat Pump and other equipment (such as a pump) is drawn through the Heat Pump.
- If you place the Heat Pump in a cabinet, allow at least 2" of space between the Heat Pump and the walls of the cabinet to avoid vibration and noise.
- Do not install the Heat Pump in a closed closet or cabinet.
  Note: Minimum entering air temperature is 55°F. Maximum 95°F.



Delta Star Interior



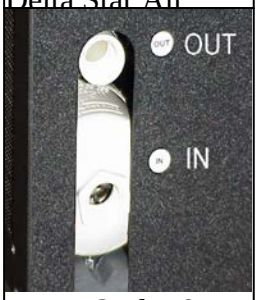
Placement of



Delta Star Air

Delta Star Plumbing:

- Your Aqua Logic flow-through Heat Pump requires an external water pump (not supplied) for proper operation.
- The Heat Pump should be the last piece of equipment in the plumbing before the water is returned to the tank or sump (after pump and filters).
- Use male-pipe-thread (mpt) fittings of the diameter below to connect your Heat Pump to your system. Use the same or larger diameter pipe or hose for your plumbing for best water flow.
- We suggest installing unions and ball valves (not included) on the inlet and outlet of the Heat Pump for easier installation and removal of the Heat Pump from the system for maintenance or repair (if necessary).
- Be sure that the water flow through your Aqua Logic Heat Pump goes into the water inlet (bottom) and out the top to prevent potential damage (see illustration).
- If you use flexible hose to plumb your system or connect your Heat Pump, make sure that the hose is not kinked to prevent restricted flow and potential damage to your Heat Pump.
- Avoid elbows in your plumbing to minimize flow loss through your system.
- For most efficient operation, we recommend the minimum and maximum flow rates listed below for each model.
- Do **NOT** operate the Heat Pump without adequate water flow.



Water Outlet &

Electrical Hookup:

- We suggest using a dedicated power circuit for best operation and longest life of the Heat Pump. The circuit must be rated to handle the maximum load of the Heat Pump.
- We highly recommend that you use a ground-fault interrupter (GFI) to avoid electrical shock. You can obtain an inline GFI from Aqua Logic, a local tropical fish store, pond shop or hardware store if the outlet in the wall does not have a GFI installed.
- Avoid using an extension cord on your Heat Pump.
- Using a controller:
  - If you use a controller on your Aqua Logic Heat Pump, follow the instructions included with the controller to install it.
  - Make sure that the controller is rated to handle the maximum current load of the Heat Pump.
  - Install the sensor for the controller "upstream" (ahead) of Heat Pump.
  - Make sure the controller is unplugged from the wall outlet.
  - Plug the Heat Pump into the controller.
  - Plug the controller into the wall outlet.
  - Program or adjust the controller to your desired temperature.

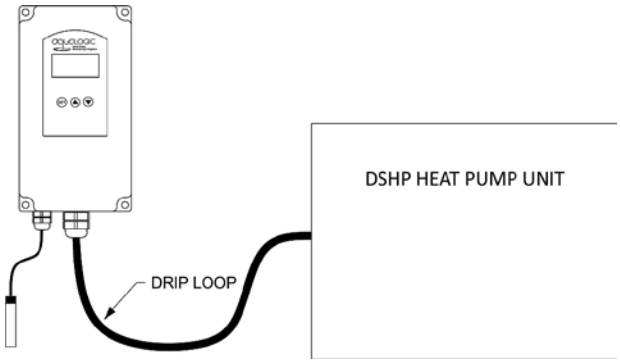
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DC SERIES DUAL STAGE DIGITAL TEMPERATURE CONTROL INSTRUCTION MANUAL FOR ALL DSHP HEAT PUMPS

Model No. DC-DSHP

Installation.

1. Mount control on a wall or any vertical surface that water can't splash on it.
2. Install the titanium temperature sensor in your tank or sump. Careful not to submerse beyond the warning label.



Note: For your safety, you must plug the HEAT PUMP into a dedicated 15 or 20 Amp. GFIC (Ground Fault Interruption Circuit) circuit. When installing the control in a wet area make sure to have the power cords with drip loops so water does not collect around the electrical connections.

Temperature Controller Set-up

This digital controller has been pre-programmed with all the necessary parameters to ensure reliable service and operation. The controller is pre-set from the factory with a temperature range from 30 °F to 100 °F with a display resolution of 1 degree °F and with a 1 °F temperature differential.

Temperature Controller Setpoint Set-up

Note: Always turn on the compressor bypass switch to the "ON" position before adjusting the controller set points. Set point cooling mode (Out1) equal or higher than heating mode (Out2) set point. DO NOT OVERLAP THESE SET POINTS

To modify the Set Points SP1 and SP2.

1. Switch the compressor bypass switch to the **"ON"** position.
2. Press the "SET" button. OUT1 LED and out1 set value will flash on the display.
3. Modify the out1 set point value using up arrow ▲ to increase or the down arrow ▼ to decrease the set point.
4. Press the SET button to store the out1 set point value and advance to out2 set point value.
5. Modify the out2 set point value using up arrow ▲ to increase or the down arrow ▼ to decrease the set point.
6. Press the SET button to store the value and return to home screen.
7. Switch the compressor bypass switch to the "OFF" position.

   OUT1 Indicates that the chiller and the OUT2 is the heater is energized.



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Operation Modes

When in the cooling mode (Out1) the water temperature needs to go above the set point by one degree for it to activate the chiller. It will turn off once the water temperature has reached set point.
In the heating mode (Out2) the water temperature has to go down below the set point by one degree to activate the heater. It will turn off once the water temperature has reached the set point.

Temperature Differential:

When the water has reached the set point temperature, the chiller or heater will switch off and will not switch back on until the water temperature has changed by 1 °F. This value is known as the temperature differential between on and off cycles. Refer to the temperature control parameters table to change the settings.

Display Calibration and Program Parameters

If the displayed water temperature on the control is different from the system water temperature, than an adjustment to the control can be done. The easiest way to calibrate the control is to press and hold the "Set" button for 8 seconds. The parameter “O” will be displayed. Wait 4 seconds. Then press the “SET” button and the “SP1” will be displayed. Use the down ▼ or up ▲ arrow until you see the menu parameter "P1". Then press the “SET” button one time. The display will show “0”. Press the up or down arrows to adjust to the temperature offset. Once you have set the correct temperature offset, press "SET" button one more time and then wait 1 minute or press the “SET” and the “DOWN” ▼ arrow buttons at the same time to quit the programming. The display should return to the water temperature. The display should read correct water temperature readout.

See next page for “TEMPERATURE CONTROL PROGRAMMABLE PARAMETERS TABLE” to change other settings

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Parr	Description	Units	Range	Factory Set (°F)	Celsius Set °C
SP1	Set Point 1 out1 (CHILLER)	Degrees	r4 to r6	75	25
SP2	Set Point 2 out2 (HEATER)	Degrees	r5 to r7	75	25
r0	Dependency SP1 – SP2	Range	ind / dep	ind	ind
r1	Differential for SP1	Degrees	0.1 to 20	1	.5
r2	Differential for SP2	Degrees	0.1 to 20	1	.5
r3	Band differential	Degrees	0.1 to 20	1	.5
r4	Lower value for SP1	Degrees	-99 to r6	30	0
r5	Lower value for SP2	Degrees	-99 to r7	30	0
r6	Higher value for SP1	Degrees	r4 to 302	100	40
r7	Higher value for SP2	Degrees	r5 to 302	100	40
r8	Regulation or operating mode	Range	On1/On2/nEU	On1	On1
A0	Alarm differential	Degrees	0.1 to 20	1	1
A1	Maximum alarm probe 1	Degrees	0.1 to 99	100	40
A2	Maximum alarm probe 2	Degrees	0.1 to 99	-	-
A3	Minimum alarm probe 1	Degrees	0.1 to 99	35	0
A5	Alarm verification time	h-m	0.0 to 18	1	1
A4	Minimum alarm probe 2	Degrees	0.1 to 99	-	-
A6	Alarm probe 1 selection	Range	AHL/Ano/AH/AL	Ano	Ano
A7	Alarm probe 2 selection	Range	AHL/Ano/AH/AL	Ano	Ano
c0	Minimum relay stop time	Minutes	0 to 240	1	1
c1	Operation relay 1	Range	dir/inv	Dir	Dir
c2	Operation relay 2	Range	dir/inv	inv	Inv
c3	Default relay 1	Range	Opn/Clo	Opn	Opn
c4	Default relay 2	Range	Opn/Clo	Opn	Opn
P0	Temperature scale selection	Range	°C / °F	F	C
P1	Calibration water probe 1	Degrees	-20 to 20	0	0
P2	Calibration water probe 2	Degrees	-20 to 20	0	0
P3	Decimal Point	Option	no / yes	yes	Yes
P4	Probe displayed	Option	sd1/sd2	sd1	Sd1
P5	Number of probes	Option	1 / 2	1	1
H0	Factory reset values	Option	0	0	0
H1	Keyboard protection	Option	no / yes	no	No
H2	Operation led OUT1	Option	dir/inv	dir	dir
H3	Operation led OUT2	Option	dir/inv	dir	Dir
H4	Address for serial communicate	Range	0 to 999	0	0
H5	Access code to parameters	Range	0 to 999	0	0
H6	Probe Type	Option	PTC / NTC	NTC	NTC

TEMPERATURE CONTROL PROGRAMMABLE PARAMETERS TABLE

Error Messages

In normal operation, the probe temperature will be shown. In case of alarm press the “SET” and the “DOWN” ▼ arrow buttons at the same time to quit the alarm. An error messages will be shown:

- **Err** – Memory error.
- **Erp** – Error of probe not shown on display.
- **AH1** – Maximum temperature alarm.
- **AL**1 – Minimum temperature alarm.
- **--** Shorted –circuited probe error
- **oo-** Open probe

OPERATION IN CASE OF ERROR

If the probe or thermostat memory should fail, the chiller and heater will turn off.

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When Disaster Strikes

You may have a lot of money invested in your aquarium at home or in the office. Or you may have valuable dollars invested in seafood for your store or restaurant. Unfortunately, equipment or electricity may fail at the most inopportune time. What can you do to minimize the risk in such an event? Based upon our years of experience in the aquatic life support industry, we recommend the following:

- Always have ALL of the electrical equipment connected to ground fault interrupt (GFI) circuits.
- Do not overload electrical circuits.
- Add the aquarium system and livestock to your homeowner's or renter's insurance policy if allowable.
- Monitor your system closely during the first few weeks of operation. Make sure that everything is working correctly. Call it a shakedown cruise.
- Check the condition of your equipment regularly. Keep it clean. You don't take your car on a long trip without first changing the oil, checking the tires, etc. Why would you ignore maintaining the equipment on your aquarium?
- Keep blue ice or bags of ice in the freezer. If you use ice to help maintain water temperature, leave the ice in the bag so that the water from the melting ice doesn't dilute the water solution in your aquarium.
- Turn off aquarium lights if the Heat Pump fails. Livestock in the wild have periods of several days when they do not get intense light. There ARE typhoons that can cover an area for days at a time. Limited use of VHO and halide lamps to avoid heat build-up in the tank is far less harmful than extremely high water temperatures.
- Put a temperature controller on the lights to shut them off and to sound off an alarm if water temperature rises more than 5°F above the Heat Pump set point.
- Keep a spare pump on hand in case your primary pump fails.
- Maintain a supply of ammonia-neutralizing chemicals such as Amquel®. You can use them to control ammonia in your system during a prolonged power outage. Be sure to follow manufacturer's dosage recommendations and compatibility with organisms in your tank.
- Stock your aquarium sparingly. Then when disaster strikes (and it usually will sooner or later), you have more time to fix the problem before you lose livestock.
- Oversize your filtration system. Water quality is the most critical element for maintaining healthy fish. On a reef tank, it is easy to invest thousands of dollars for livestock (not including how sentimental you may be attached to your livestock). Why not spend a little more up front for more life support reserve in case of a disaster?
- Have a battery-powered air pump on hand for extended power outages. It will provide aeration and move water in the absence of power.
- In most areas of the country, our electrical grid is subjected to surges, spikes, brownouts and blackouts caused by high peak usage, snowstorms, hurricanes, thunderstorms and more. A surge protector can help with the surges and spikes but they are not effective in brownouts. Furthermore, even the best surge protector can't protect against direct strikes of lightning. It takes an uninterruptible power supply (UPS) or backup generators to protect against low voltage and blackouts. And it takes a backup generator to adequately power a Heat Pump—especially a ½-HP unit needed on a 300-gallon tank.

It is very unfortunate when equipment fails. However, a prudent aquarist should have a disaster plan and follow the motto, "Be prepared."

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Maintenance and Cleaning

Your Aqua Logic Heat Pump should provide years of efficient and reliable service with a minimum amount of maintenance. There is no scheduled maintenance and there are only two procedures that can be performed by the user.

Cleaning:

The condenser (radiator) should be cleaned occasionally to remove accumulated dust and lint. To test whether the condenser needs to be cleaned, shine a flashlight through your Heat Pump. If you cannot see light from the other side or it is indistinct, it's time to clean it. To clean the condenser:

- Remove power from the Heat Pump.
- Wear protective eyewear.
- Typically, use a vacuum cleaner with brush accessory to remove the accumulated dust from the condenser.
- If the condenser is extremely matted with dust and lint, you may use a soft nylon brush to dislodge the dust. Be sure to stroke the brush in the same direction as the condenser vanes (up and down) to avoid damage to the vanes.

You may also need to remove accumulated organic material or minerals from the coil (heat exchanger). Organic material may be removed by using a mild chlorine bleach solution while minerals may be removed by using a dilute muriatic acid solution, Lime-A-Way® or other hard water deposit remover.

Warning:

- Do **NOT** perform both procedures at the same time since the combination of chlorine and acid may cause serious injury or death.
- Be sure to wear appropriate protective gear.
- Use extreme caution when using caustic chemicals around your system.

To remove accumulated organics (slime):

- Remove power from the Heat Pump.
- Wear protective eyewear, clothing and gloves.
- Mix a solution of 1 part unscented chlorine bleach to 4 parts water.
- For a Delta Star Heat Pump, use a small pump, pail and hoses to run the solution through the heat exchanger for about 10 minutes to flush the organic materials out.
- For a Cyclone Heat Pump, dip the coil into the solution and use a bottle brush to remove accumulated organic materials.
- Rinse the heat exchanger with clear unchlorinated water until you can no longer smell chlorine.
- Allow the heat exchanger to dry and then return the Heat Pump to service.

To remove accumulated minerals:

- Remove power from the Heat Pump.
- Wear protective eyewear, clothing and gloves.
- Prepare a solution according to cleaning product instructions.
- For a Delta Star Heat Pump, use a small pump, pail and hoses to run the solution through the heat exchanger for about 10 minutes to flush the minerals out.
- For a Cyclone Heat Pump, dip the coil into the solution and use a bottle brush to remove accumulated minerals.
- Rinse the heat exchanger with clear unchlorinated water for at least 30 minutes.
- Allow the heat exchanger to dry and then return the Heat Pump to service.

NOTES:

If you have any questions or concerns about maintaining your Aqua Logic Heat Pump, please call us at (858) 292-4773.

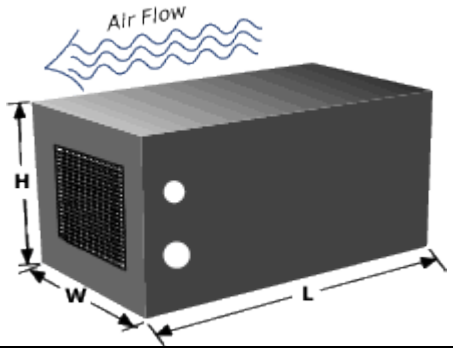
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Specifications

Aqua Logic Delta Star Heat Pump features:

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



Model	HP	BTU	Volts	AMP	Refrigerant	Flow (gpm)	I/O FIPT	Dimensions (LxWxH inches)	Weight (lbs)
DSHP-4	*1/3*	*4050*	*115*	*7.2*	*R-134A*	*10-20*	*¾"*	*23 x 14 x 14*	*75*
DSHP-5	*1/2*	*6000*	*115*	*9.5*	*R-134A*	*12-25*	*1½"*	*24 x 16 x 16*	*125*
DSHP-6	*1/2*	*6000*	*230*	*4.8*	*R-134A*	*12-25*	*1½"*	*24 x 16 x 16*	*125*
DSHP-7	*3/4*	*9500*	*115*	*13.0*	*R-134A*	*15-30*	*1½"*	*25 x 21 x 15*	*155*
DSHP-8	*3/4*	*9500*	*230*	*7.0*	*R-134A*	*15-30*	*1½"*	*25 x 21 x 15*	*155*
DSHP-9	*1*	*12000*	*230*	*7.2*	*R-134A*	*20-35*	*1½"*	*27 x 24 x 15*	*165*
DSHP-10	*1.5*	*21000*	*230*	*10.5*	*R-422B*	*25-40*	*1½"*	*31 x 26 x 19*	*225*

Note:
Minimum entering air temperature is 55°F. Maximum 95°F.
Heat pump operational water temperature range is from 55°F to 85°F.

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Troubleshooting Your Heat Pump



While your Aqua Logic Heat Pump has been designed and manufactured to provide years of reliable service, there may be an occasion where the unit does not operate correctly. The following chart provides guidelines to restore the unit to service or to provide information in helping us to diagnose and repair the Heat Pump.

Items marked with an asterisk (*) should be performed only by Aqua Logic or a qualified electrical or refrigeration technician upon authorization from Aqua Logic. Call Aqua Logic **BEFORE** calling in a technician (See notes on the next page).

Heat Pump doesn't run.

Heat Pump is not connected to power.	Connect Heat Pump to electrical supply.
There is no power to the Heat Pump.	Reset circuit breaker or replace fuse.
Neither fan nor compressor operates.	Repair any loose wiring in Heat Pump.*
Possible controller failure.	Go to next section.

Heat Pump doesn't run with controller but runs if plugged directly into the outlet.

Sensor not properly immersed in water.	Place sensor in water according to controller instructions.
Controller not properly programmed	Program controller according to controller instructions.
Defective controller or sensor	Troubleshoot controller using controller instructions.

Heat Pump runs but doesn't shut off and water temperature drops below setpoint.

Sensor not properly immersed in water.	Place sensor in water according to controller instructions.
Controller not properly programmed	Program controller according to controller instructions.
Defective controller or sensor	Troubleshoot controller using controller instructions.

Heat Pump appears to be running properly but water is not chilled adequately.

Poor ventilation.	Review instructions adequate air flow around Heat Pump.
Dirty condenser (radiator).	Clean condenser per instructions on page 4.
Inadequate water flow.	Make sure any filters ahead of Heat Pump are clean. Make sure pump is rated to provide proper flow. Make sure there are no kinks in the flexible tubing. Make sure there are no obstructions in the plumbing. Make sure that ice hasn't built up in heat exchanger or

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	coil.
Excessive organic (slime) accumulation in heat exchanger or coil.	Remove accumulated organics using procedure on page 5.

(Continued next page)

Excessive mineral accumulation in heat exchanger or coil.	Remove accumulated minerals using procedure on page 5.
Refrigerant levels may be low.	Have refrigeration technician take pressure readings and inspect for leaks and recharge system in necessary.*
Other	Call Aqua Logic, Inc. for assistance.*

Heat Pump runs for a few minutes and shuts off (short cycles).

Controller indicator shows that controller is cycling Heat Pump on and off.	Make sure controller sensor is installed 'upstream' from the heat exchanger. If the sensor is installed 'downstream," the cold water from the Heat Pump will fool the sensor into thinking that proper water temperature has been achieved.

Controller indicates Heat Pump is "ON" but Heat Pump is shutting off (short cycles)**.**

Water temperature too high.	Use blue or ice packs to lower water temperature within normal range.
Defective compressor overload relay.	Replace compressor high-temp overload relay.*
Compressor clunks and doesn't run.	Replace defective compressor.*
Refrigerant levels may be low or gone.	Have refrigeration technician take pressure readings and inspect for leaks and recharge system in necessary.*
Compressor very noisy.	Have technician inspect for correct refrigerant pressures.*

Fan operates but compressor does not.

	Repair wiring to compressor.* Replace compressor start relay, overload or start capacitor.*

Compressor operates but fan does not.

	Repair wiring to fan.* Replace defective fan.*

Notes:

We recommend that you call Aqua Logic **(858) 292-4773** for technical assistance **BEFORE** attempting any repairs on your Heat Pump.

In accordance with our published warranty, Aqua Logic will not pay for repairs or service on any of our Heat Pumps (in or out of warranty) without prior approval in writing or a verbal Repair Authorization (RA) issued by Aqua Logic, Inc.

Aqua Logic may or may not authorize you to return your unit for inspection and service. You must pay all shipping charges unless Aqua Logic has made prior arrangements.

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ONE YEAR LIMITED WARRANTY

All Aqua Logic Delta Star Heat Pumps are warranted against defects in parts and workmanship for a period of one year from the date of original end user purchase. The limited warranty covers only parts and labor based upon Aqua Logic service cost and Aqua Logic is not liable for field repair work without prior written or verbal agreement with 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 include the following:

- Damage caused by freezing, inadequate 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.

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

- Provide user-replaceable parts to restore the unit to proper operation.
- Provide a Repair Authorization (RMA) number with a specified dollar limit for a qualified technician to provide a field repair.
- Provide a Return Authorization (RMA) number to return the Heat Pump 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 RMA number. COD shipments will be refused.

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