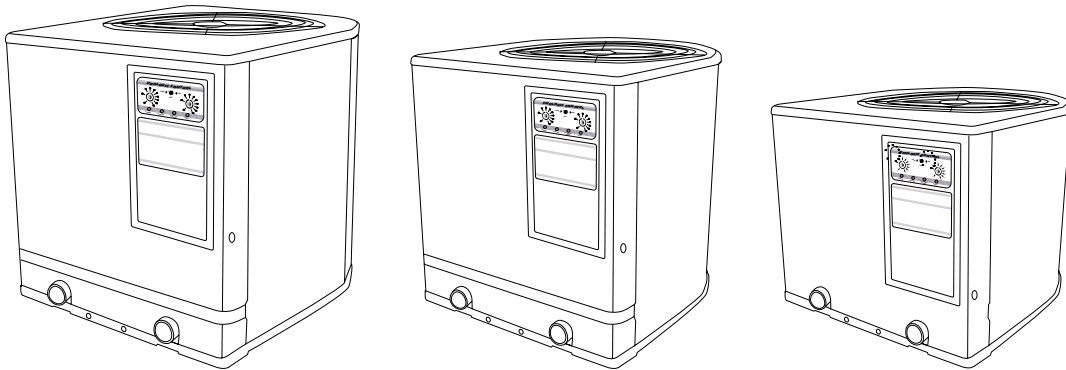


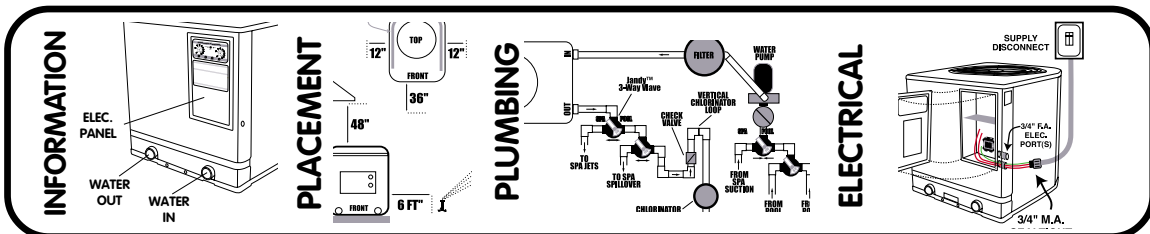
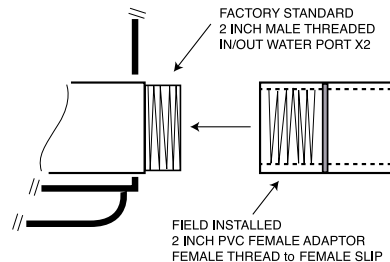
SWIMMING POOL & SPA HEAT PUMPS

INSTALLATION MANUAL

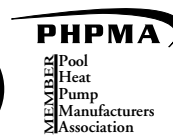


Model AT800 AT600 & AT400 "BLACK CABINET" with ANALOG PROLOGIC CONTROL SERIES ONLY

**NOTICE: UNIT REQUIRES TWO,
2 INCH FEMALE ADAPTORS
FOR PLUMBING CONNECTIONS !**



WARNING: Specifications may change without notice. Intended for licensed factory authorized installers only! Users should review separate owners operational manual.



WARNING: Specifications may change without notice.

V6.0-AT-A © 2001 Aquatherm Heat Pumps a division of Calorex U.S.A. LLC

Table of Contents

A. Introduction	Page 3
1. Unit Description	
2. Explanation of Heat Pump Heat Transfer	
3. Efficiency Comparisons	
B. Unit Placement	Pages 4
1. Placement Requirements	
2. Air Flow Clearances & Service Access	
3. Gutters, Overhangs & Sprinklers	
C. Plumbing- Water Connections	Pages 5 - 7
1. Basic Plumbing	
2. Chlorinator & Chemical Feeder Requirements	
3. Freezing Condition Plumbing Requirements	
4. External Bypass Requirements Over 70 G.P.M.	
5. Pool/Spa Combination Plumbing	
6. Plumbing with Solar	
7. Plumbing Above or Below Water Level	
8. Optional Flow Switch Installation	
D. Electrical Connections	Page 8 - 13
1. Supply Wiring, Single Phase, 240V	
2. Wire & Breaker Size Requirements	
3. Bonding Requirements	
4. 208 Supply Voltage Transformer Wiring Change	
5. Factory Specification Chart	
6. Wiring Diagrams - Single & 3 Phase	
7. Interfacing with External Controls, Jandy & Compool	
E. Control Panel Information & Operation & Description	Page 14 - 15
1. Heater Controls	
2. Indicator Light Explanations	
3. Operation Sequence & Troubleshooting Flow Chart	

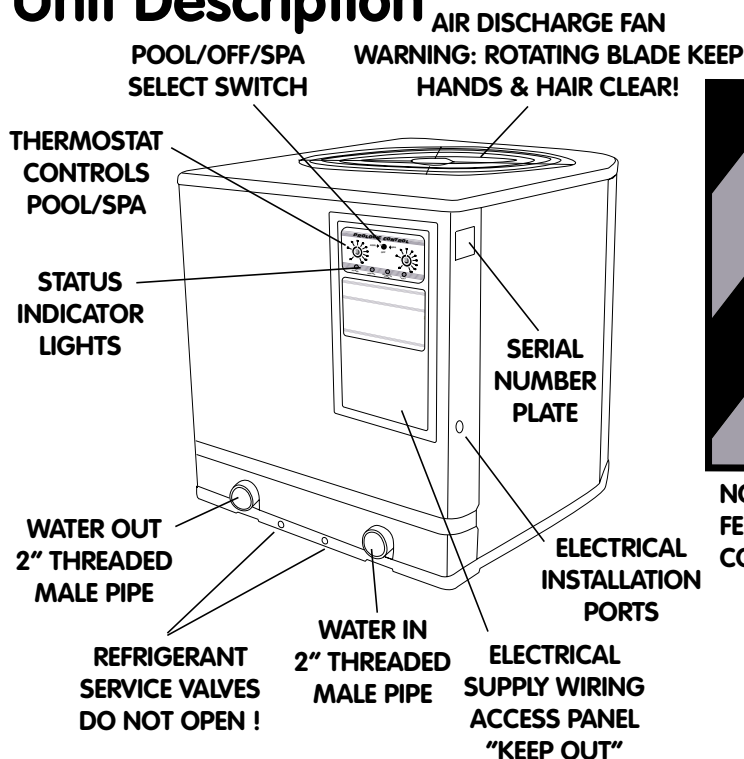


HEAT PUMPS

a Division of Calorex USA L.L.C.
2213 Andrea Lane Ft. Myers FL 33912
888-297-3826 941-482-0606
www.aquathermheatpumps.com
www.calorexusa.com

Written & Illustrated by Michael Glore

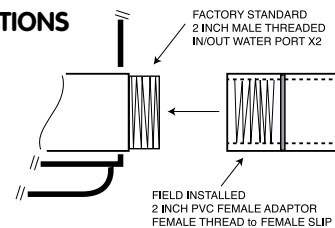
Unit Description



WARNING

DANGER FROM ELECTRICAL SHOCK & ROTATING FAN !
SHUT OFF ALL POWER BEFORE SERVICING !
CAUTION: MORE THAN ONE DISCONNECTION MAY BE REQUIRED TO ELIMINATE ALL POWER TO THIS UNIT INCLUDING POWER TO THE OPTIONAL TIME CLOCK OVERRIDE !

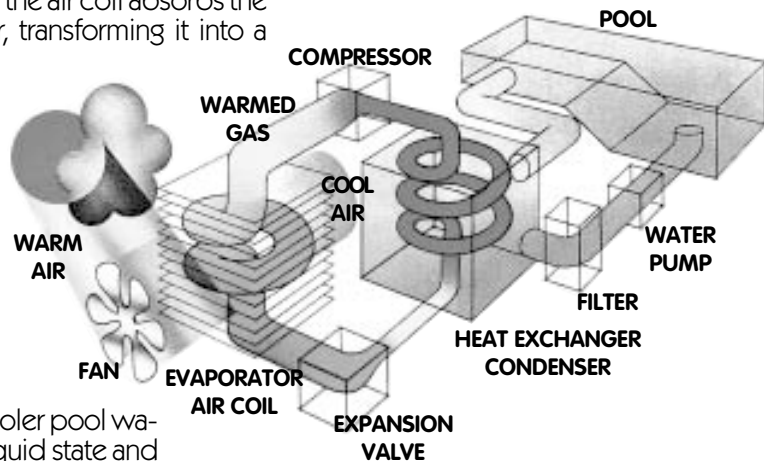
NOTICE: UNIT REQUIRES TWO, 2 INCH FEMALE ADAPTORS FOR PLUMBING CONNECTIONS



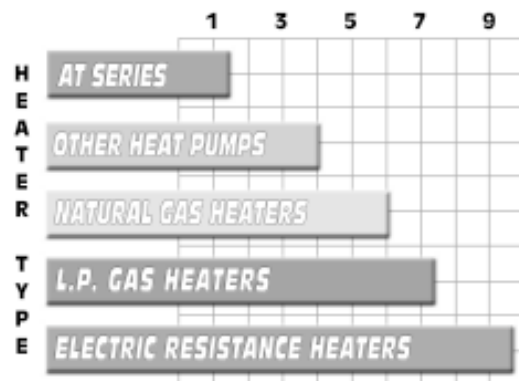
How Does A Heat Pump Warm My Pool ?

A swimming pool & spa pump utilizes proven refrigerant technology to capture the heat in the outside air and transfers it to the pool water. Refrigerant is used because of its ability to absorb and transfer heat energy. The **fan** circulates air through the outer **evaporator air coil** that acts as a heat collector. The liquid refrigerant in the air coil absorbs the available heat in the ambient air, transforming it into a gas. The refrigerant gas is then pumped into the **compressor**. When this warmed gas is compressed, it intensifies or concentrates the heat, like a magnifying glass in the sun.

This intensely hot gas is then pumped into the **heat exchanger condenser**, where the actual heat transfer takes place. As the pool water passes through the heat exchanger, the hot gas gives up its heat to the cooler pool water. The refrigerant returns to a liquid state and is pumped through the **expansion valve** then into the evaporator air coil to start the process all over again.



RELATIVE POOL HEATING COST COMPARISON

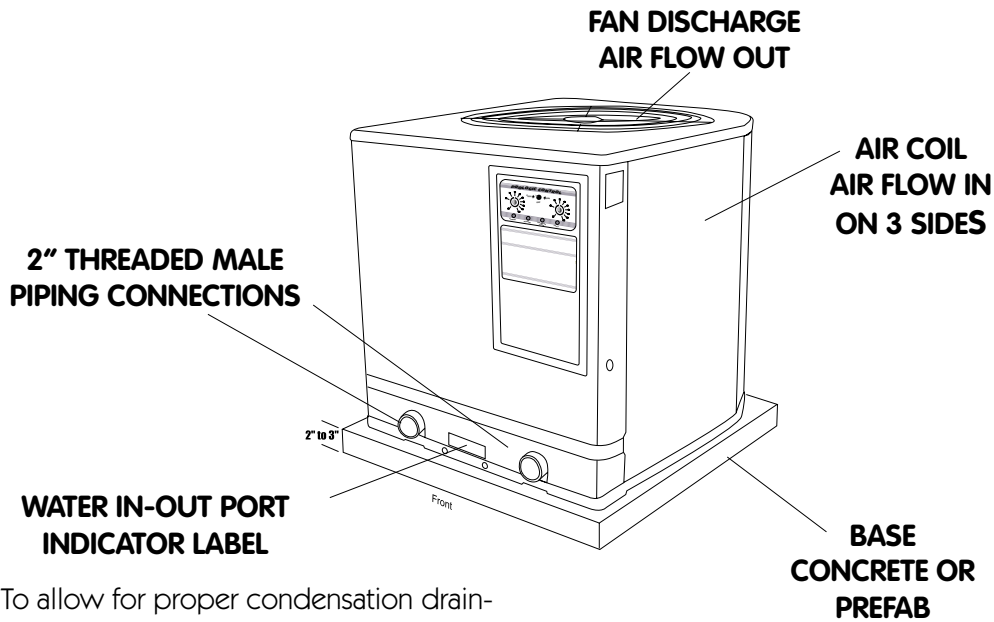


How Efficient Is It ?

This graph is a operational cost comparison for equal amounts of pool heat. As you can see heat pump is the most efficient way to heat your pool.

Compared to L.P. gas heaters, a heat pump produces 5 to 6 times more heat for every \$1.00 you spend on operation.

Heat Pump Placement & Clearances



1. To allow for proper condensation drainage, use a level slab to elevate the heat pump to at least the same height as the pool filter system slab or 2 to 3 inches "minimum" above grade.

2. Allow the minimum air flow clearances on top and the sides as shown here. Make sure the unit can "breathe" well. Do not install indoors or where the discharge air can accumulate and be drawn back through the heater. **Make sure the front is accessible for future service.**

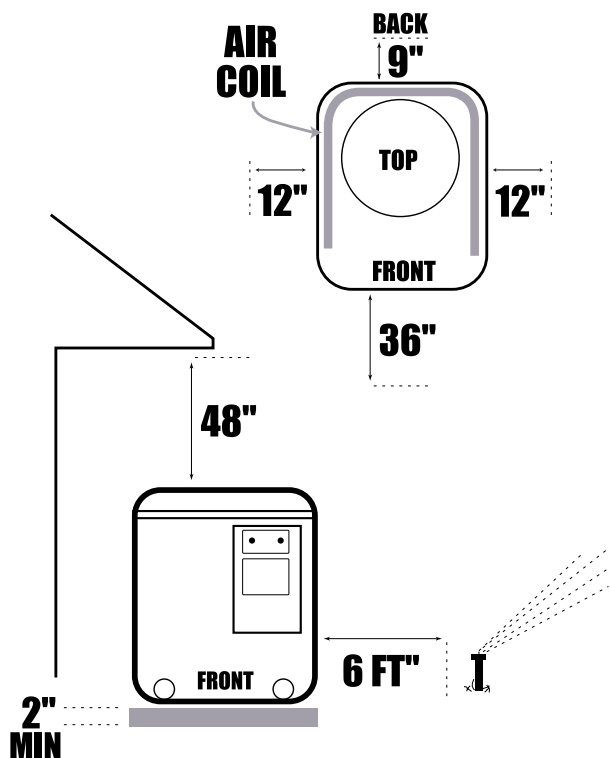
3. Keep sprinkler heads at least 6 feet away from the heat pump. Do not allow the sprinkler to spray the unit in any way to prevent damage.

4. If the unit is installed under a sharp roof pitch or under a roof valley without a gutter, a gutter or diverter should be fitted to prevent excessive water from rushing through the unit.

5. Keep all plants and shrubs trimmed away from the heater to the minimum clearances shown here to prevent air coil damage.

6. If the heater is installed above or below the pool water level by more than 3 feet you may require an external water flow switch. See the bottom of page 7 for more information.

Minimum Air Flow & Access Clearances



Plumbing & Water Connections - 2" Threaded Male

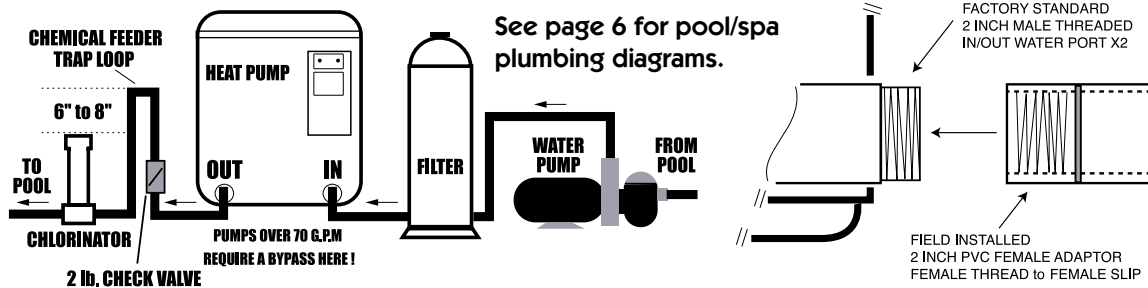
For a simple pool only or spa only, install the plumbing piping as shown:

Connections from factory are 2" threaded male pipe, requiring 2 inch female adaptors, see diagram.

Use teflon tape and pipe sealer. Tighten hand tight plus 1/2 snug tight with pliers.

Water **IN** on the **RIGHT**, Water **OUT** on the **LEFT**,

PLUMB AFTER the FILTER & BEFORE any CHLORINATORS or CHEMICAL FEEDERS



Be sure to install a **CHECK VALVE & CHEMICAL TRAP LOOP** as shown. The loop should be at least 6 to 8 inches above the chlorinator/feeder top to prevent chlorine backup into the heater when the water pump is off. Install a 2# check valve on the heater side of the loop as shown above to prevent chlorine from damaging it. All feeders should be installed at the **same or below the heater piping elevation** to prevent chemical back up into the heater.

DO NOT : Install the heater down stream from any chemical feeders.

DO NOT : Allow chemical feeders on the suction side of the water pump.

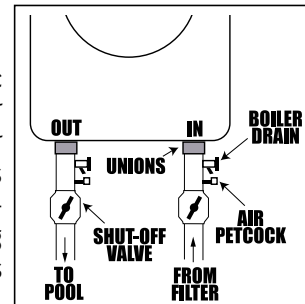
DO NOT : Allow any chemicals or chlorine to be fed through the skimmer.

DO NOT : Allow the pool water pH to go below 7.4. **DO NOT** allow the alkalinity to go below 90 p.p.m.

DO NOT : Allow the chlorine to go above 5 p.p.m. for extended periods. Chemical damage is not covered by and may void warranty.

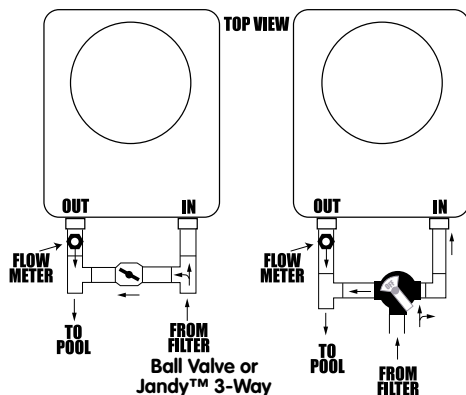
Freezing Condition Plumbing

In areas where extended freezing conditions exist, the heater must be plumbed as shown so it can be winterized. Water left inside the heater will freeze and cause damage. Plumb in a union, shut off valve, a boiler drain and a air petcock valve on the water in and water out lines as shown here. Isolate the heater with the shut off valves and use pressurized air to clear the heat exchanger of all water. In areas where freezing conditions are temporary, the water pump should be set to run 24 hours to prevent freezing. Freeze damage will void warranty.



Bypass for Flow Rates Over 70 G.P.M.

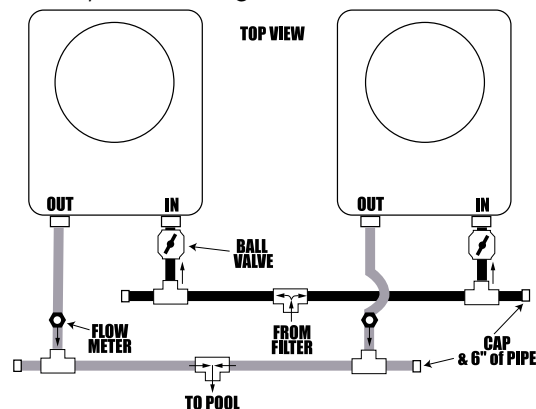
Typically the automatic internal water bypass can handle up to a 1.5 H.P. water pump or 70 G.P.M. If the water pump exceeds 1.5 H.P. then install either of the optional bypasses as shown below.



The installation of a flow meter on the WATER OUT line is suggested. Adjust the bypass to divert a minimum of 40 to 50 G.P. M. through the heater. Flow meters should be installed per the manufacturers instructions.

Multi Unit Water Connections

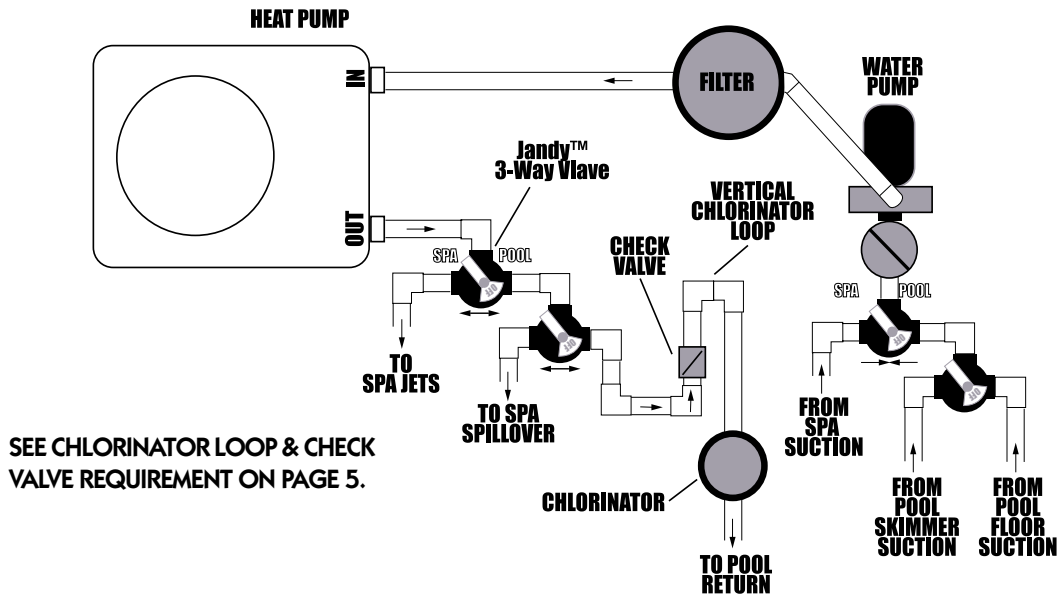
Plumb multiple units as shown below. Use flow meters on each WATER OUT line if two or more units are plumbed together.



Use ball valves to balance the water flow through each unit. Using T's, caps and a minimum 6 inch pipe extension on the plumbing manifold will help equalize the water flow better than 90's. Flow meters should be installed per the manufacturers instructions.

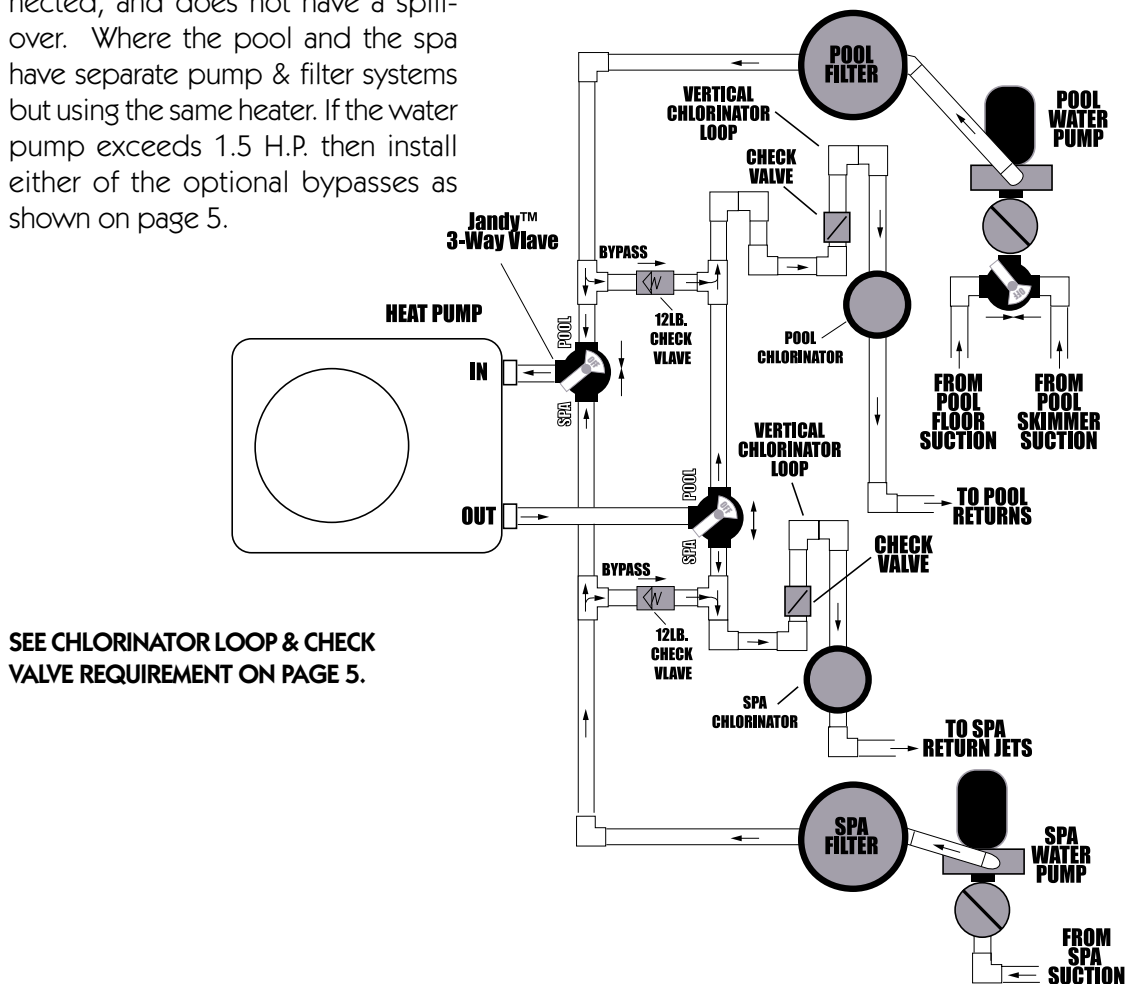
Plumbing & Water Connections for Pool/Spa Combinations

For a connected pool and spa, where the spa has a spill over type waterfall into the pool. Where one pump and one heater is used for either the pool or the spa. If the water pump exceeds 1.5 H.P. then install either of the optional bypasses as shown on page 5.



Plumbing & Water Connections for Separate Pool & Spa

For a separate pool and spa not connected, and does not have a spill-over. Where the pool and the spa have separate pump & filter systems but using the same heater. If the water pump exceeds 1.5 H.P. then install either of the optional bypasses as shown on page 5.



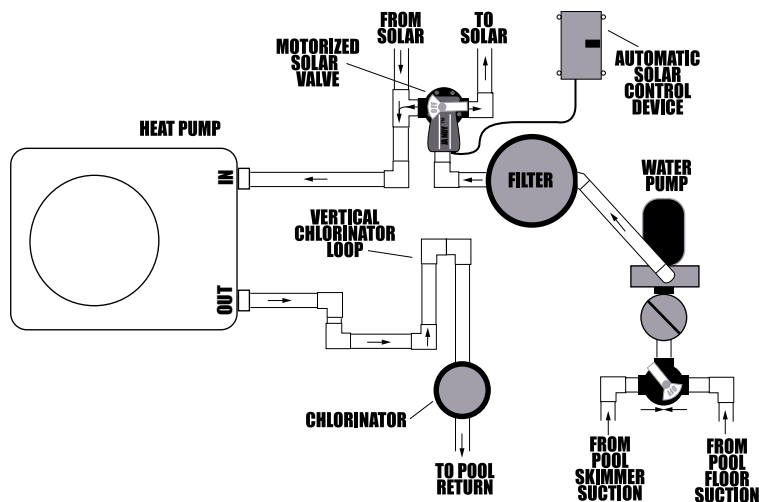
Plumbing & Water Connections with Solar

Plumbing for a system where a solar pool heater is installed. It is strongly advised that an automatic solar control device be used when used with the heat pump.

The heat pump and solar can be operated together. The heat pump will share the heating load with the solar. If there is no heat coming from the solar panels, the solar control device will turn off the solar by rotating the motor valve, otherwise it should be turned off manually. The heat pump will then maintain the pool/spa temperature.

To use the heat pump as a backup to the solar, set the heat pump thermostat 2 to 4 degrees below the solar's target temperature setting. Therefore, if the solar is not maintaining water temperature, the heat pump will come on to assist the solar. Some thermostat fine tuning may be required by the user.

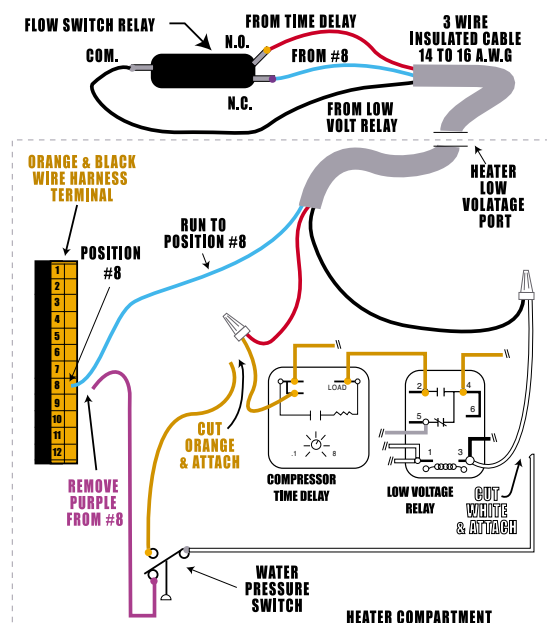
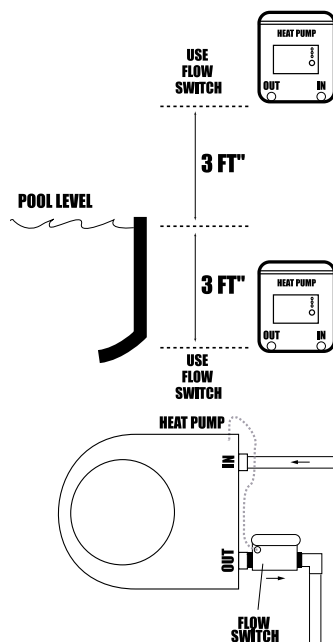
If the water pump exceeds 1.5 H.P. then install either of the optional bypasses as shown on page 5.



NOTE: If the solar is operated on cloudy days, while raining, at night or at low air temperatures, it may cool the pool or spa. A automatic solar control will shut the solar off when there is no solar activity, otherwise it should be shut off manually during these times.

Plumbing & Water Connections for Above or Below Water Level

If you install the heat pump above or below the pool or spa water level by more than 3 feet, the internal water pressure switch may be effected by the static pressure of the pool water. In some cases it may be necessary to install a water FLOW switch. The water flow switch is not effected by changes in water pressure but only water movement. We suggest installing the Grid Brand Model 20 or 25, external flow switch and disabling the internal water pressure switch. Plumb in the flow switch as shown here. Then run a THREE wire insulated cable from the flow switch into the heater and attach to the existing water pressure switch leads located behind the large service panel and wire as shown below. **REVIEW PAGE 8 FOR SIMILAR ACCESS TO LARGE ELECTRICAL SERVICE COMPARTMENT BEFORE CONTINUING. REVIEW UNIT WIRING DIAGRAM ON PAGE 10 & 11 ALSO !**



Electrical Connections & Wiring for Analog Control Models

The AT800, AT600 & AT400 require a **MINIMUM** of #8 A.W.G. copper stranded wire, (or larger if needed.)

You must increase the wire size under low voltage, high amp draw, and/or long-run conditions as required by National Electrical Code.

You must bond the heater externally to the pool/spa steel as required by local codes. A bonding lug is located on the bottom front exterior of the unit.
NOTE : See wiring diagrams on pages 10 & 11

See page 9 for factory specification listings also.

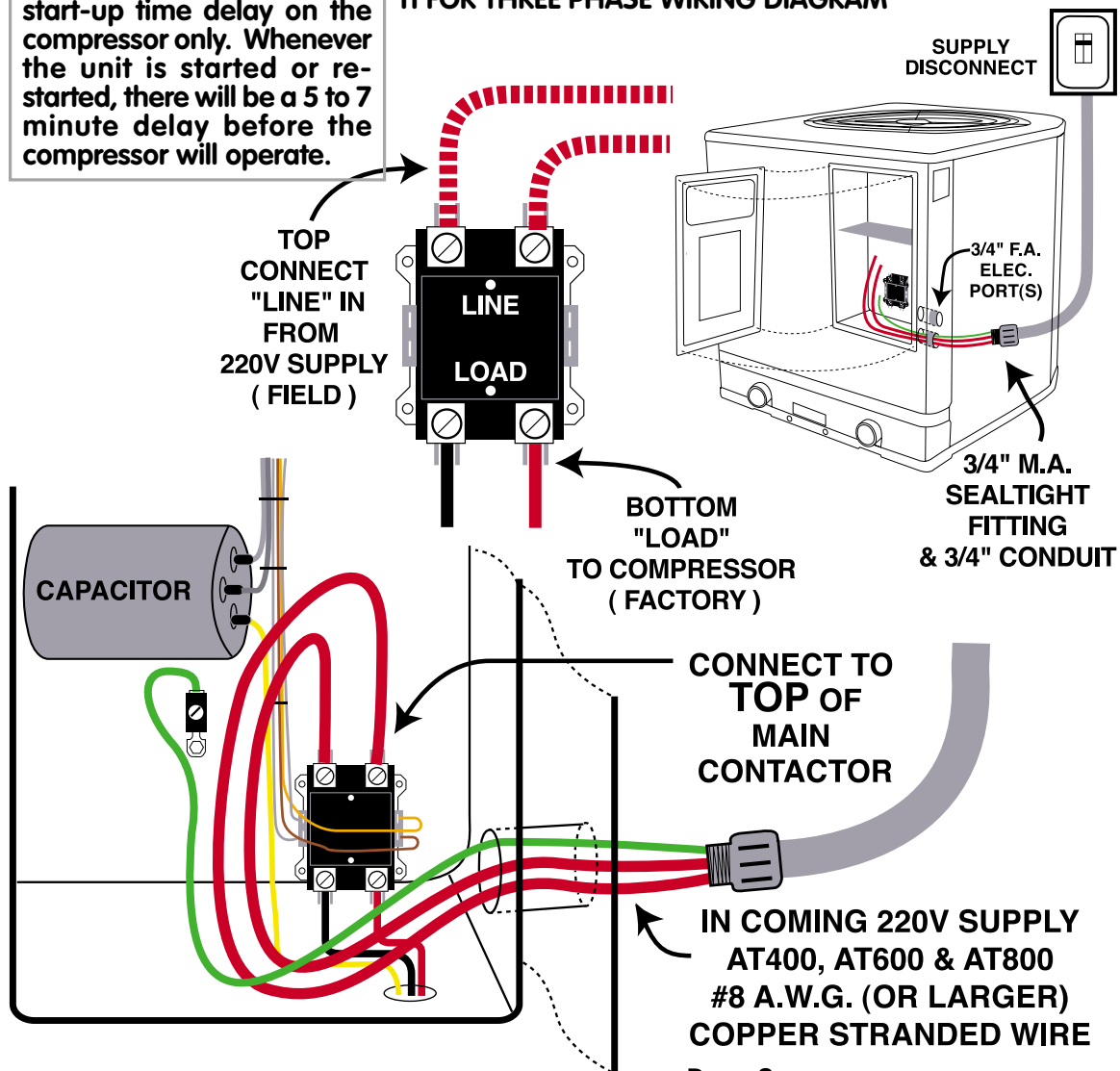
This unit is equipped with a start-up time delay on the compressor only. Whenever the unit is started or re-started, there will be a 5 to 7 minute delay before the compressor will operate.

DANGER FROM ELECTRICAL SHOCK & ROTATING FAN !
SHUT OFF ALL POWER BEFORE REMOVING ANY PANELS !
CAUTION: MORE THAN ONE DISCONNECTION MAY BE REQUIRED TO ELIMINATE ALL POWER TO UNIT INCLUDING POWER TO THE OPTIONAL TIME CLOCK OVERRIDE !

BREAKER SIZE RECOMMENDATION
MODEL AT800 & A T600: 50 AMPS
MODEL AT400: 40 AMPS
MINIMUM WIRE SIZE for ALL MODELS
#8 A.W.G. COPPER STRANDED OR LARGER

TRANSFORMER WIRING CHANGE FOR 208 VOLTAGE
NOTE: If the power supply is 208 and not 220 volts, you must make a simple wiring change to the low voltage side of the transformer. See diagram on transformer.

WARNING ! 3 Phase Compressor Models Are Rotation Sensitive! Use Refrigerant Gages! Do Not Go By Fan Rotation Since It Will Always Be Single Phase! *SEE PAGE 11 FOR THREE PHASE WIRING DIAGRAM*



Factory Specifications

Model Number	AT600	AT400
BTU Output	108,000*/102,000**	92,000*/84,000**
Coefficient of Performance	6.0*/4.9**	6.4*/5.5**
Copeland Scroll™ Compressor	ZR67 w/ Receiver Tank	ZR54 w/ Receiver Tank
Heat Exchanger Condenser	Cupronickel Alloy-Water / Copper-Exterior	
Air Coil Evaporator	Oversized: Copper Tube w Lanced Fin	
Fan Motor	1/4 H.P. @ 1.6 Amps	
Air Flow	4000 C.F.M. w/ Cowling Venturi	
Kilowatt Input	5.8 Kw/Hour	4.4 Kw/Hour
Electrical (208/240v/60Hz)	Single Phase	Single Phase
Typical Running Amps	27.4 Amps	20.4 Amps
Minimum Circuit Ampacity	37 Amps	35 Amps
Min/Max Breaker Size	40/50 Amps	35/40 Amps
Min. Copper Stranded Wire Size	#8 A.W.G. or Larger	#8 A.W.G. or Larger
Min/Max Water Flow	20/70 GPM, Over 70 G.P.M. or 1.5 H.P. Add External Bypass	
Water Plumbing	2" Full Flow w Internal Automatic Bypass	
Refrigerant Charge	R22	R22
Cabinet Construction	Corrosion Proof Molded ABS	
Ship Weight	305 Lbs.	279 Lbs.
Dimensions	35H x 31W x 34L	29H x 31W x 34L
Model Number	AT800	
BTU Output	112,000*/104,000**	
Coefficient of Performance	6.3*/5.3**	
Compressor	Copeland Scroll™ ZR67 w/ Receiver Tank	
Heat Exchanger Condenser	Cupronickel Alloy-Water / Copper-Exterior	
Air Coil Evaporator	Oversized Mt. Holly Gold™ Polyester Clad	
Fan Motor	1/4 H.P. @ 1.6 Amps	
Air Flow	4200 C.F.M. with Built In Cowling Venturi	
Kilowatt Input	5.5 Kw/Hour	
Electrical (208/240v/60Hz)	Single & Three Phase	
Typical Running Amps	26.1 Amps / (18.5 Amps @ 3 Phase)	
Minimum Circuit Ampacity	37.8 Amps / (25.4 Amps @ 3 Phase)	
Min/Max Breaker Size	40/50 Amps / (25/35 Amps @ 3 Phase)	
Min. Copper Stranded Wire Size	#8 A.W.G. or Larger	
Min/Max Water Flow	20/70 GPM Over 70 G.P.M. or 1.5 H.P. Add External Bypass	
Water Plumbing	2" Full Flow w Internal Automatic Bypass	
Refrigerant Charge	R22	
Cabinet Construction	Corrosion Proof Molded ABS	
Ship Weight	324 Lbs.	
Dimensions	37H x 31W x 36L	

WARNING: THREE PHASE MODELS:

3 Phase Compressor Is Rogation Sensitive! Use Refrigerant Gages!
Do Not Go By Fan Rotation Since It Will Always Be Single Phase!



HEAT PUMPS

a Division of Calorex USA L.L.C.
2213 Andrea Lane Ft. Myers FL 33912
888-297-3826 941-482-0606
www.aquathermheatpumps.com
www.calorexusa.com

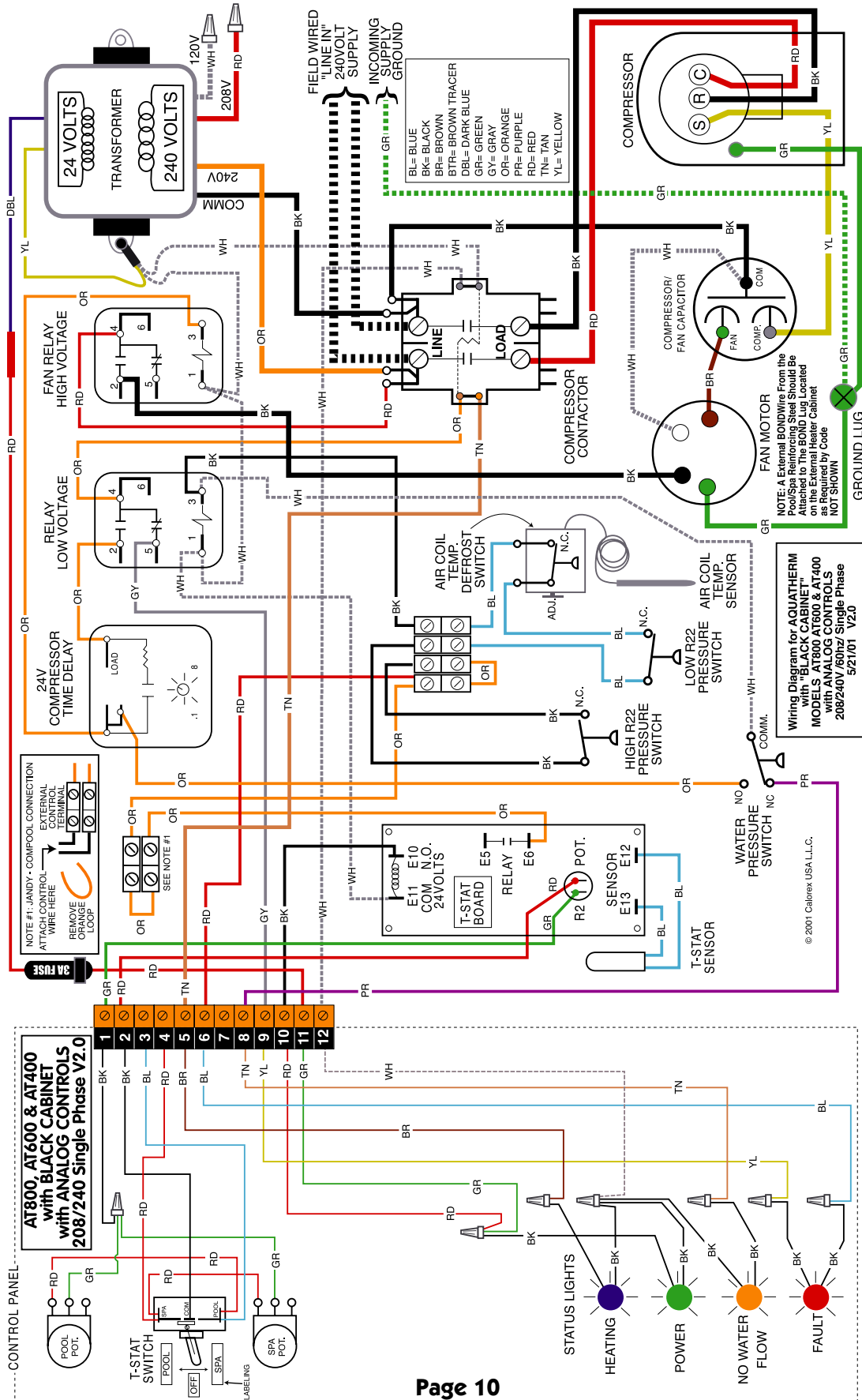
* Optimum output & efficiency typical of Florida conditions. Ratings outside the scope of P.H.P.M.A. heat pump pool heater certification program. ** Rated and certified in accordance with A.S.H.R.A.E. standard 146-1998 and P.H.P.M.A. addendum test procedure.



Specifications may change without notice.

© 2001 Aquatherm Heat Pumps

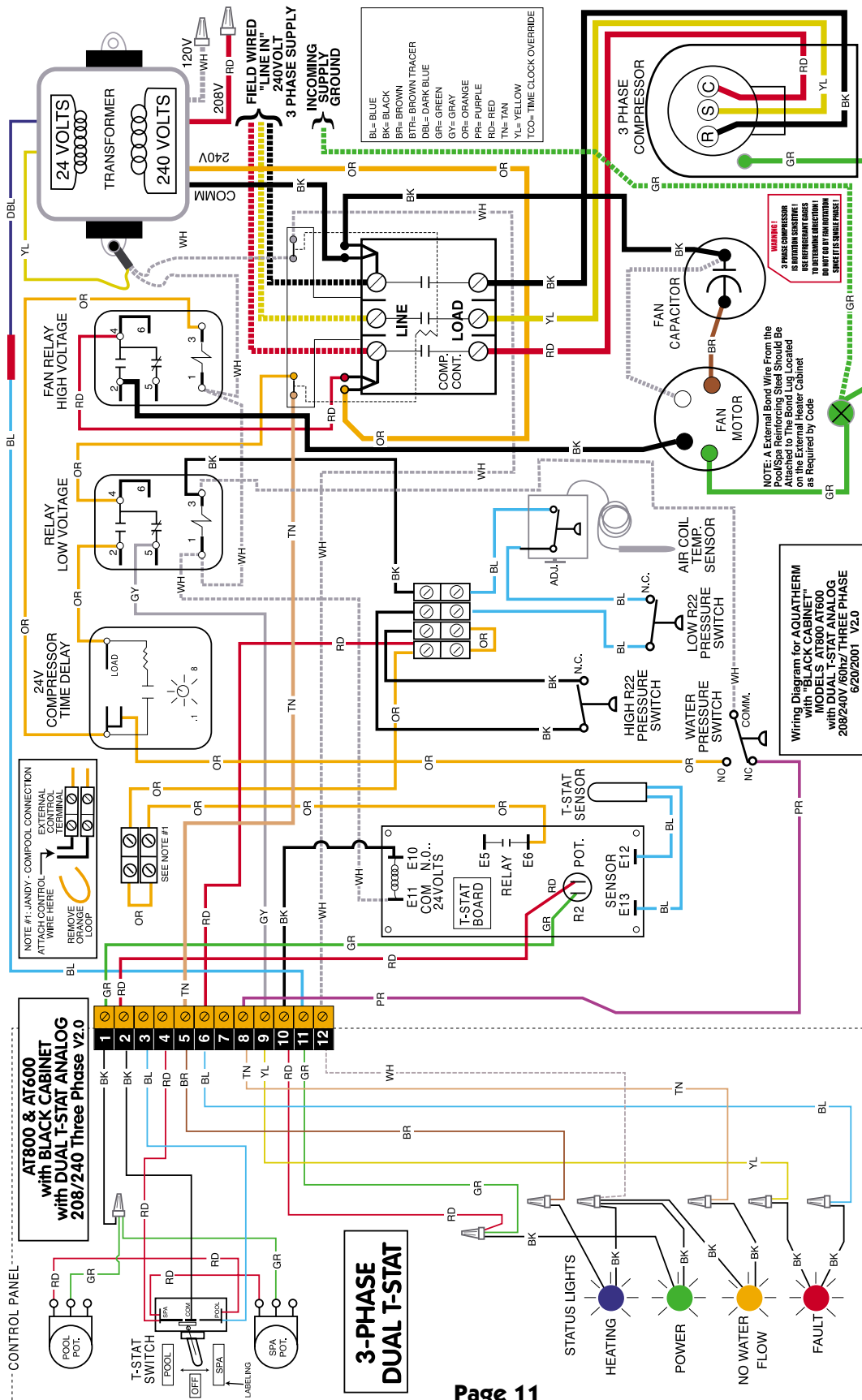
Wiring Diagram AT800, AT600 & AT400 "Prologic" Analog Control Models Single Phase, 208/240 Volts, 60 Hz.



Wiring diagrams may change without notice.

Wiring Diagram for "3-Phase" Model AT800 & AT600, 208/240 Volts, 60 Hz, with "Prologic" Analog Control

WARNING: THREE PHASE MODELS: 3 Phase Compressor Is Rotation Sensitive! Use Refrigerant Gages! Do Not Go By Fan Rotation Since It Will Always Be Single Phase!



Wiring diagrams may change without notice.

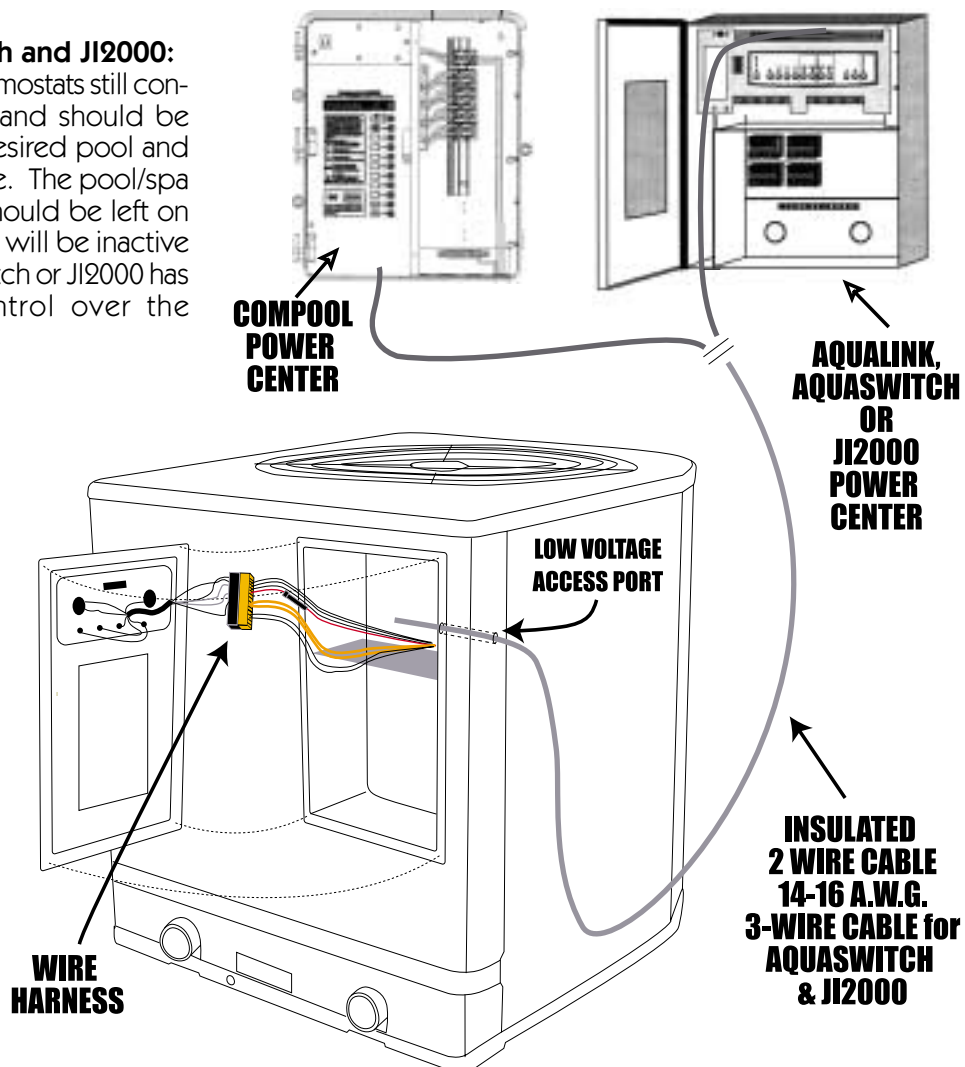
Interfacing "Prologic" Analog Control Models with: Jandy™ AquaLink RS, AquaSwitch, JI 2000 & Compool™

To interface the "Prologic" analog control heat pump models with the Jandy™ AquaLink RS series or Compool, run a 2 wire (16 A.W.G. or larger) insulated cable from the device to the heat pump. If you are using a Jandy AquaSwitch or JI2000 control use a 3 wire cable. Review wiring diagram on page 10.

Remove the 6 screws from the heaters front service access panel and open. Look for a white, two position wire terminal located inside the top portion of the electrical compartment and is mounted on the rear wall. **(Do not confuse it with the 4 position, white terminal block above it !)** Locate, remove and discard the orange wire loop attached at the bottom end of this terminal. Then, attach the 2 wire cable coming from the AquaLink RS or the Compool control to the 2 position terminal where the orange loop was prior, see page 13.

NOTE for AquaLink RS and Compool: Turn both heater thermostats all the way up and set the mode selector switch to pool and do not use the heater controls as the Jandy or Compool now has thermostat control over the heater.

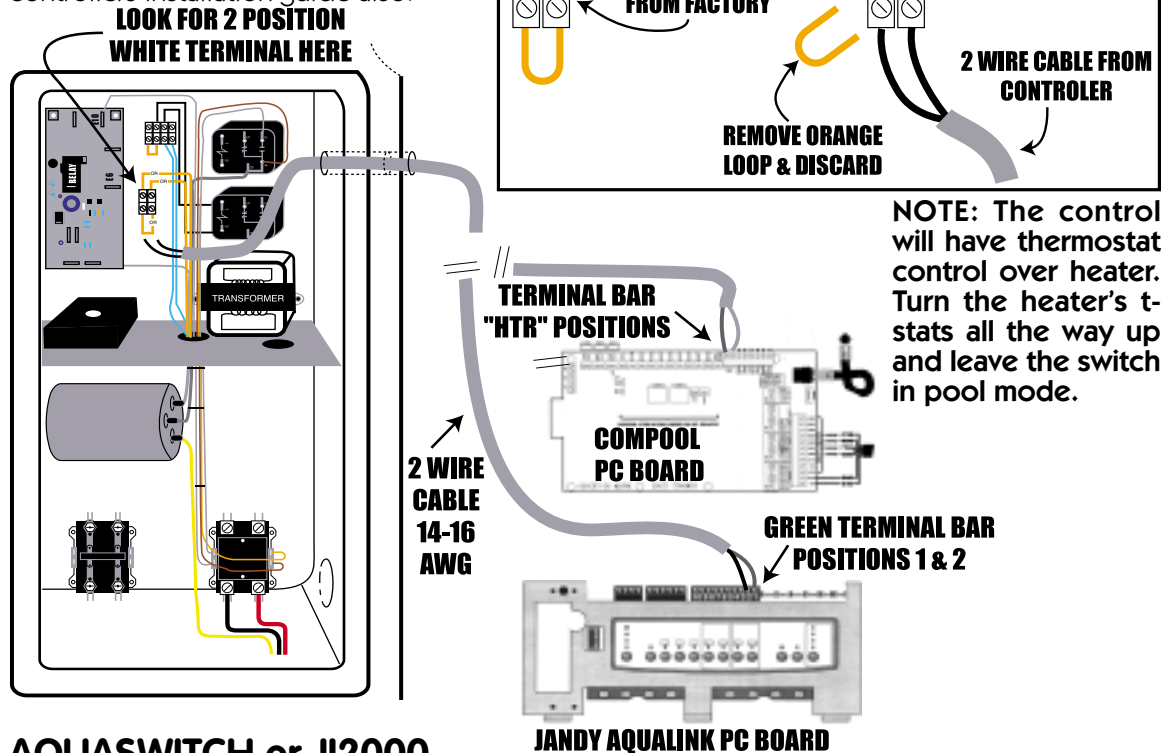
For AquaSwitch and JI2000: The heater's thermostats still control the heater and should be preset to the desired pool and spa temperature. The pool/spa select switch should be left on pool mode and will be inactive as the AquaSwitch or JI2000 has switching control over the heater.



Jandy™ & Compool™ Connections for "Prologic" Analog Control Models for Compool

Attach the 2 wire cable to the Compool's power center board located on the terminals labeled "HTR" *See the controllers installation guide also.

for AquaLink RS Attach the 2 wire cable to positions #1 and position #2 on the 10 slot, green terminal bar inside the AquaLink's power center. *See the controllers installation guide also.



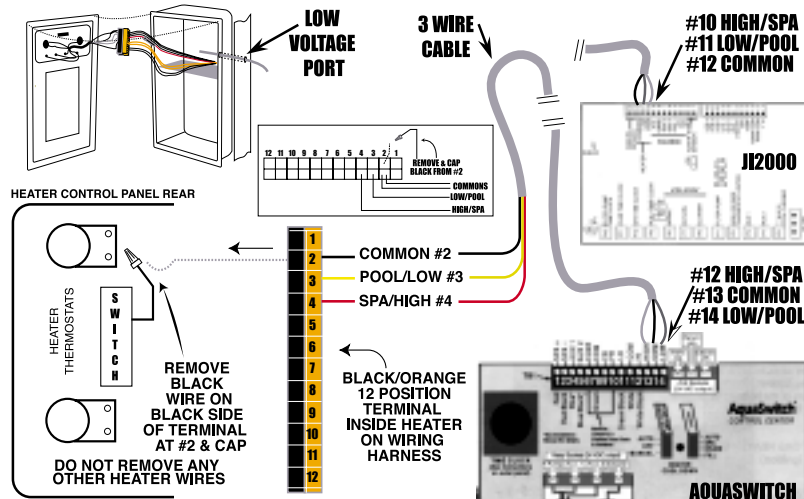
AQUASWITCH or JI2000

First, remove the black wire located in position #2 on the black terminal bar and cap. Do not remove any other factory wires that may share the same positions as the 3 wire cable.

NOTE: Other non thermostat type of controls hook up the same way shown here.

The control will utilize the heaters t-stats, the control will switch between pool and spa t-stat.

Leave the heater's switch in pool mode.



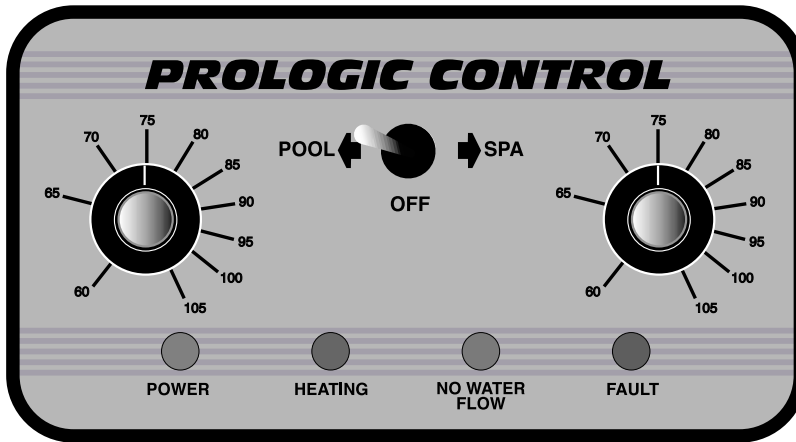
Next, attach the 3 wire cable to the **HEATER** on the black terminal bar as follows:
#2 COMMON
#3 LOW/POOL
#4 HIGH/SPA

Attach the other end of the 3 wire cable to the **JI2000** as follows:
#10 For the HIGH/SPA
#11 For the LOW/POOL
#12 For the COMMON

Attach the other end of the 3 wire cable to the **AquaSwitch** as follows:
#12 For the HIGH/SPA
#13 For the COMMON
#14 For the LOW/POOL

*See the controller's installation guide also.

"Prologic" Analog Control Panel Information



TEMPERATURE CONTROLS: The top Thermostat controls the pool temperature. The bottom Thermostat controls the spa temperature. If you do not have a spa you can use the two thermostats as a high and low temperature preset.

THERMOSTAT/OFF SWITCH- POOL/OFF/SPA: The Thermostat/Off Switch determines which thermostat is active, up for pool, down for spa. You can disable the heater by placing the selector switch in the center "OFF" position.

GREEN POWER LIGHT: This light indicates that the heater has control power. **WARNING:** This is not a line power indicator and caution should be used since more than one power disconnection may be required to isolate the heater electrically. **WARNING:** If the optional Time Clock Override is installed, you must shut off the water pumps main power disconnect as well.

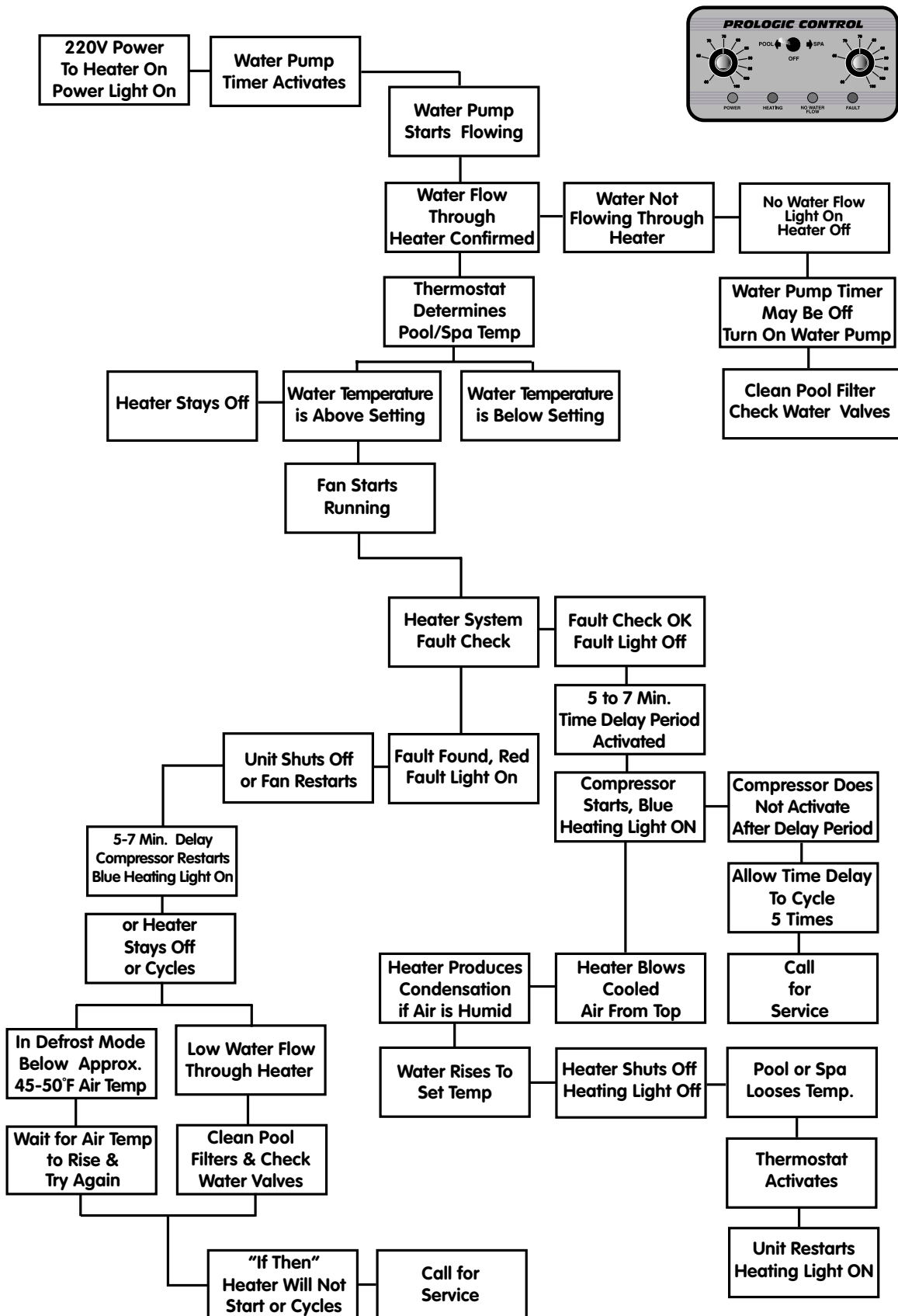
BLUE HEATING LIGHT: This light indicates that the unit is heating and the compressor is running. The compressor starts after a 5 to 7 minute time delay. **NOTE:** The water pump must be running at the same time in order for the heater to run.

AMBER NO WATER FLOW LIGHT: This light indicates there is no water flow through the heater. The heater is designed to shut off whenever the water pump is not pumping water through the heater. If this light is on while the water pump is running, the water pump may not be supplying enough flow for the heater to operate properly. During normal operation the heater turns off and on with the water pump, (as long as the thermostat is calling for heat).

RED FAULT LIGHT: This light indicates that the internal safety control system has disabled the heater. If either the high or low refrigerant pressure switch has tripped this light will come on. **NOTE: During cold weather where the air temperature drops below approximately 45 to 50 degrees (depending on humidity), the low refrigerant pressure switch (or defrost control), is designed to disable the heater. In this "defrost mode" the fan and compressor will shut off. When the defrost switch resets for whatever reason the fan will restart, then after a 5 to 7 minute time delay the compressor will attempt to restart. In some case where the air temperature are in a borderline range, the heater may cycle on & off in an attempt to reset. The heater should be shut off when the air temperature is expected to drop below the operational range for an extended period.** The high refrigerant pressure switch is designed to shut the compressor and fan off if a heat buildup occurs for what ever reason. Typically the high refrigerant pressure switch will trip if the water flow through the heater is restricted. It may also trip if the air flow is restricted through the heater.

NOTES: The heater will never run without water running through it from the filter pump. The heater will not heat faster if you turn the thermostat knob up higher.

Operational Sequence & Troubleshooting Flow Chart for "Prologic" Analog Control Models





HEAT PUMPS

a Division of Calorex USA L.L.C.
2213 Andrea Lane Ft. Myers FL 33912
888-297-3826 941-482-0606
www.aquathermheatpumps.com
www.calorexusa.com



Specifications may change without notice.

© 2001 Aquatherm Heat Pumps a Division of Calorex USA L.L.C.