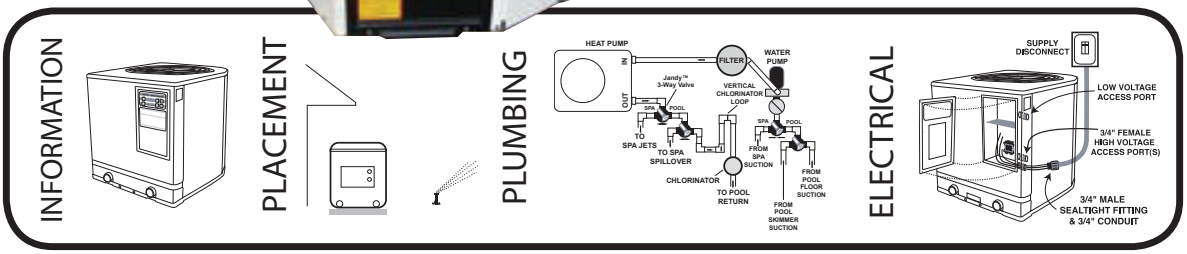
SWIMMING POOL & SPA HEAT PUMPS

INSTALLATION & OPERATION MANUAL

Model AT500



NOTICE:
Specifications may change without notice.

CALOREX USA, LLC

A Division of Aquatherm Heat Pumps

2213 Andrea Lane Ft. Myers FL 33912
888-297-3826 239-482-0606
www.aquathermheatpumps.com

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TABLE OF CONTENTS

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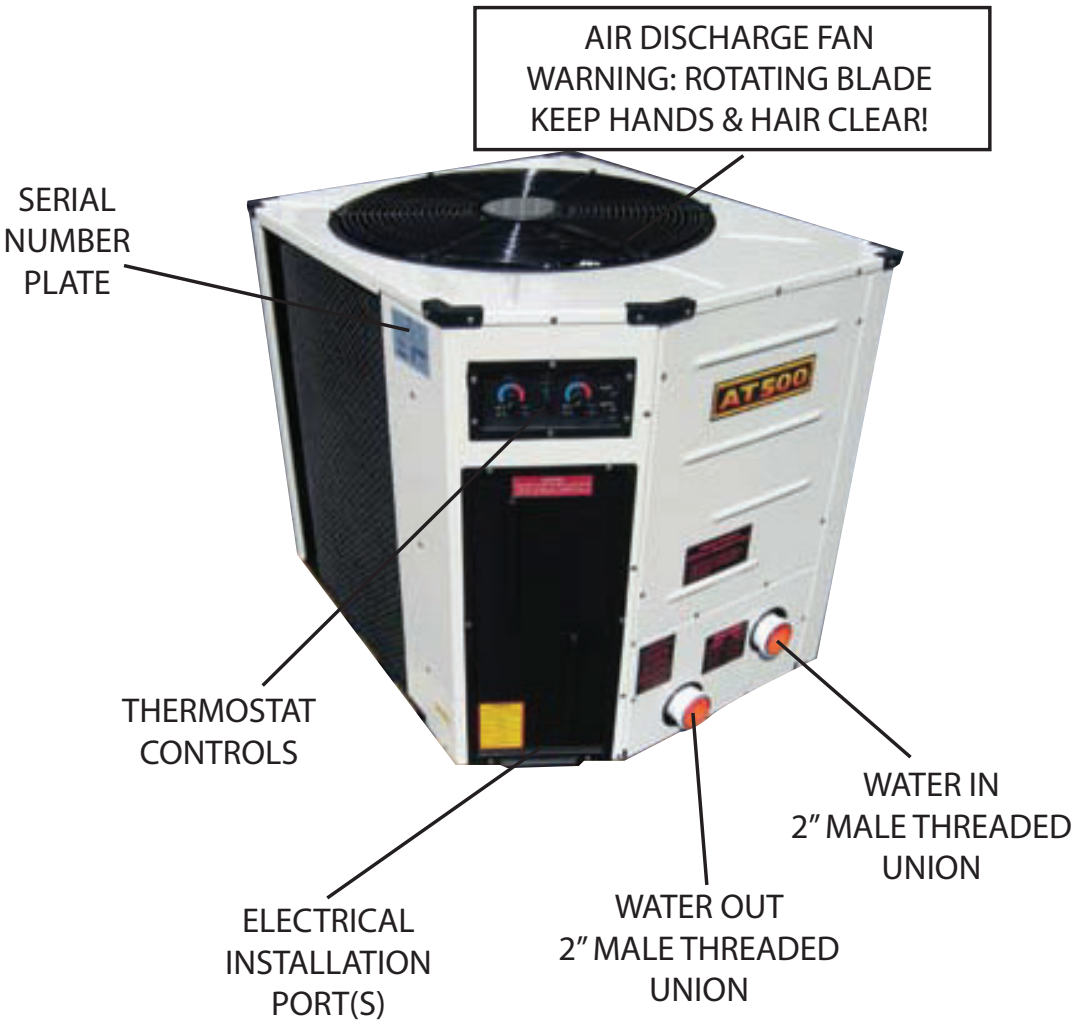
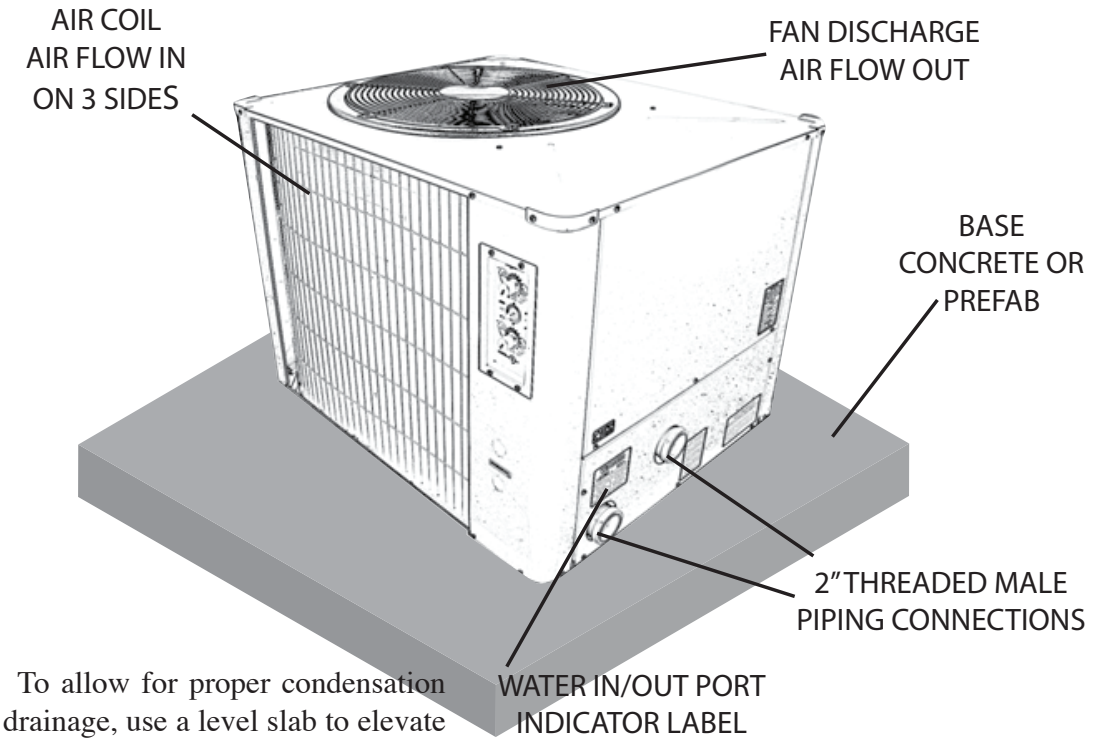
A. UNIT DESCRIPTION



TECHNICAL SPECIFICATIONS

HEAT OUTPUT	102,000 BTU/HR*
COEFFICIENT OF PERFORMANCE	4.6*
VOLTAGE/HZ/PHASE	1 PH
MIN/MAX BREAKER	50/70
MIN/MAX WATER FLOW	20/70
DIMENSIONS	32"H X 34"W X 33"L
SHIPPING WEIGHT	295 LBS

B. HEAT PUMP PLACEMENT & CLEARANCES



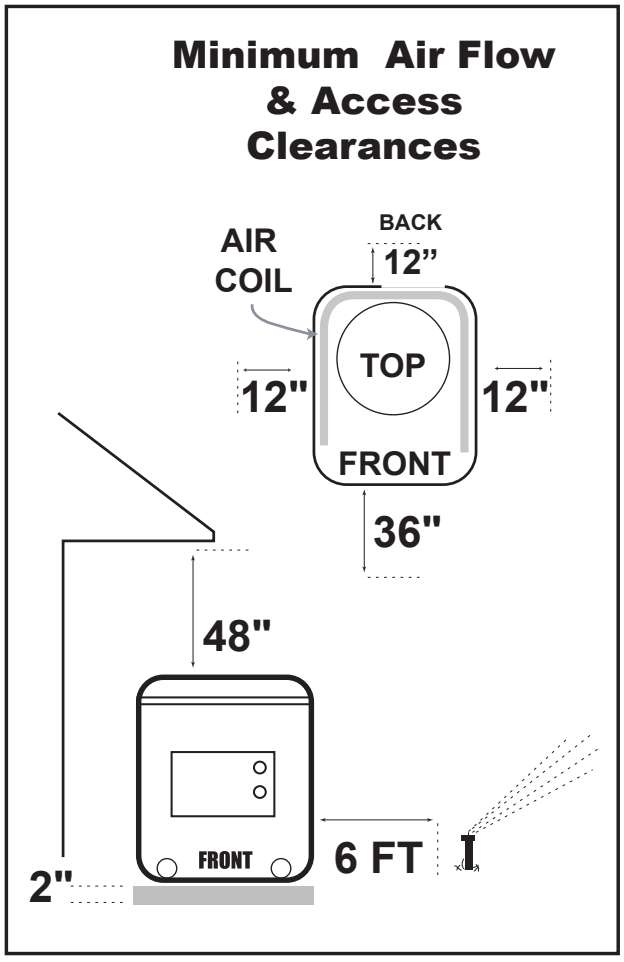
1. To allow for proper condensation drainage, use a level slab to elevate the heat pump to at least the same height as the pool filter system slab, or 2 to 3 inches minimum above grade.

2. Allow the minimum air flow clearances on top and the sides as shown here. 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.

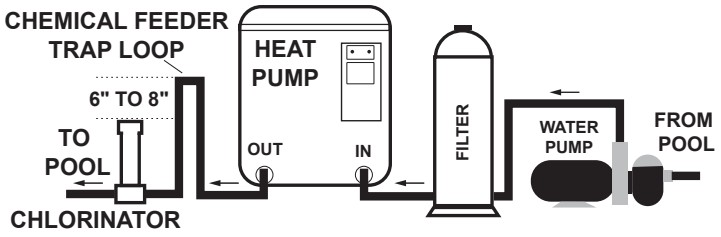
4. If the unit is installed under a roof overhang or under a roof valley, a gutter or diverter should be fitted to prevent excessive water from pouring through the unit.

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



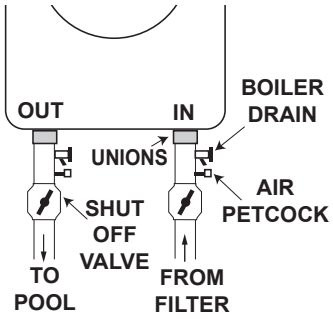
C. PLUMBING & WATER CONNECTIONS

1. BASIC PLUMBING. For a pool only or spa only, install the plumbing piping as shown:
Connections from factory are 2" unions (included). Water **IN** on the **RIGHT**, Water **OUT** on the **LEFT.**
PLUMB AFTER the **FILTER** & **BEFORE** any **CHLORINATORS** or **CHEMICAL FEEDERS**

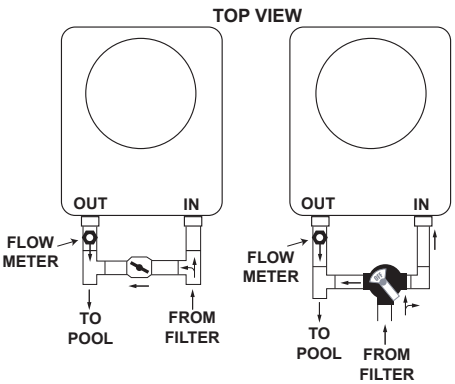


2. CHOLORINATOR. Be sure to install a **CHEMICAL TRAP LOOP** as shown. The loop should be at least 6 to 8 inches above the chlorinator/feeder top to prevent chlorine backup into the heater when the water pump is off. All feeders should be installed at the **same or below the heater piping elevation** 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 warranty.

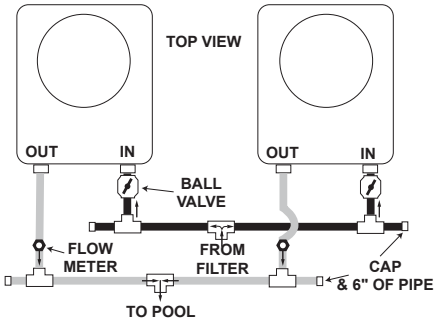
3. FREEZING CONDITION PLUMBING. In areas where extended freezing conditions exist, the heater must be plumbed as shown so it can be winterized. Water left inside the heater will freeze and cause damage. Plumb in a union, shut off valve, a boiler drain and a air petcock valve on the water in and water 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.



4. 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 manufacturer's instructions.



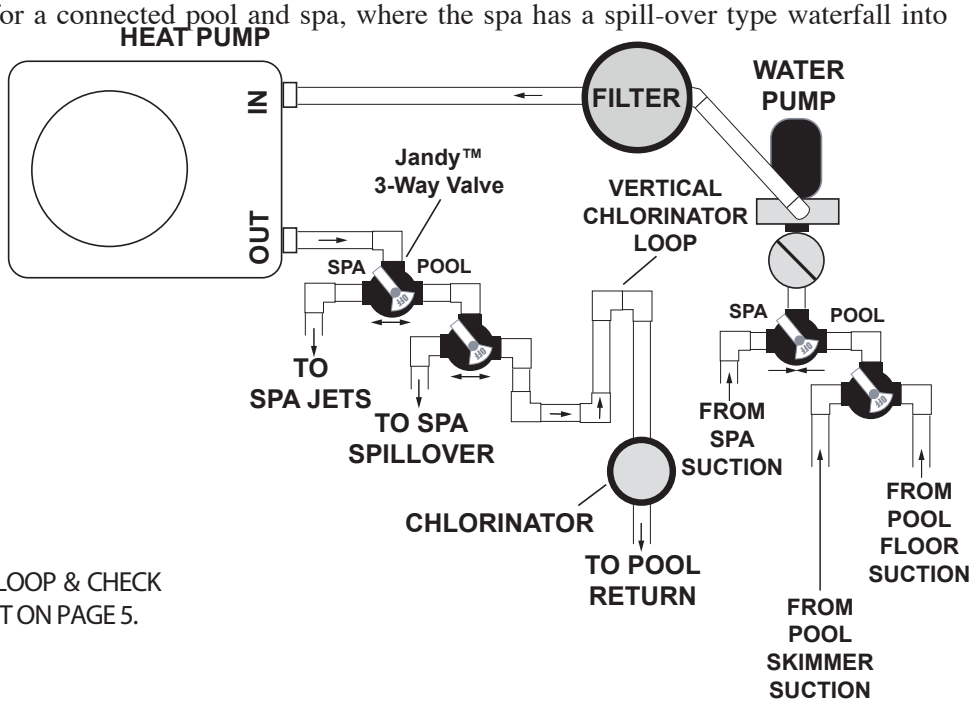
5. MULTI UNIT WATER CONNECTIONS
Plumb multiple units as shown below. Use flow meters on each WATER OUT line if two or more units are plumbed together. Use ball valves to balance the water flow through each unit. Using T's, caps and a minimum 6 inch pipe extension on the plumbing manifold will help equalize the water flow better than 90°'s. Flow meters should be installed per the manufacturer's instructions.



C. PLUMBING & WATER CONNECTIONS

6. POOL/SPA COMBINATIONS W/SPILL-OVER

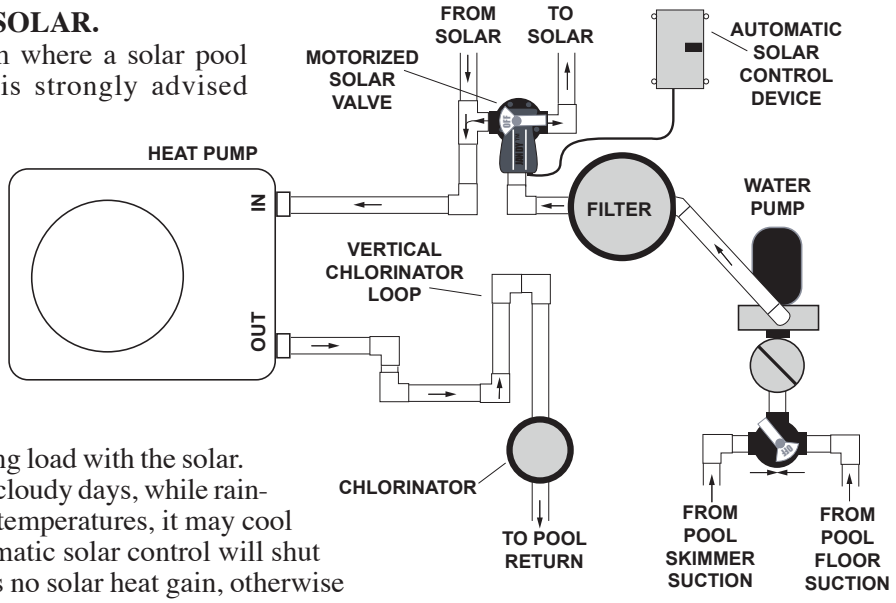
Use this diagram for a connected pool and spa, where the spa has a spill-over type waterfall into the pool. Where one pump and one heater are used for both the pool and spa. If the water pump exceeds 1.5 H.P. then install a external bypass as shown on page 5.



SEE CHLORINATOR LOOP & CHECK VALVE REQUIREMENT ON PAGE 5.

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



The heat pump and solar can be operated together. The heat pump will share the heating load with the solar. If the solar is operated on cloudy days, while raining, at night or at low air temperatures, it may cool the pool or spa. An automatic solar control will shut the solar off when there is no solar heat gain, otherwise it should be shut off manually during these times.

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.

8. PLUMBING ABOVE OR BELOW POOL WATER LEVEL

D. ELECTRICAL CONNECTIONS

(Refer to wiring schematic on inside of access panel.)

MODEL NAME
BTU/KW OUTPUT C.O.P.
MODEL NO. SERIAL NO.
ELECTRICAL SERVICE:
VOLTS HERTZ PHASE
MINIMUM CIRCUIT AMPACITY
MAXIMUM TIME DELAY FUSE OR HACR BREAKER
COMPRESSOR VOLTS R.L.A. L.R.A.
FAN MOTOR VOLTS H.P. F.L.A.
WATER PUMP VOLTS H.P. F.L.A.
REFRIGERANT: (Factory charged) R22 ONLY oz.
Tested to 400 psig High side / 150 psig Low side

E. CONTROL PANEL INFORMATION

1. ON/OFF TOGGLE SWITCH

In the OFF (O) position, the heater will be prevented from operating; however, there is power to the unit. With the switch in the ON (I) position, the unit will run anytime the water temperature drops below the thermostat setting and the pool or spa pump is circulating.

NOTE: If the thermostat is turned all the way down and the ON/OFF switch is in the ON position, the heater will run anytime water temperatures drop below 60° F. You must position the toggle switch in the middle (OFF) position to keep the unit from operating when water temperatures fall below 60° and heating is not desired.

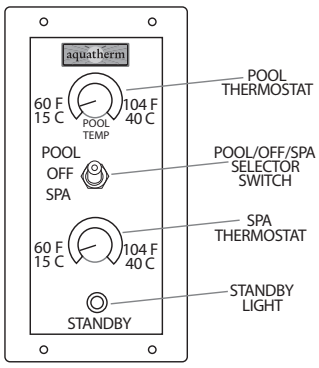
2. STANDBY LIGHT ON:

This indicates that there is power to the unit. The heat pump will turn on if the the toggle on/off switch is on, the thermostat calls for heat and there is proper water flow to the heater.

3. STANDBY LIGHT OFF:

This indicates power is not getting to the unit. Check any disconnect switches or circuit breakers.

AT500 CONTROL PANEL



F. HOW TO OPERATE YOUR HEAT PUMP

Consult the diagrams on page 6 for the control panel on your heat pump.

1. Turn both the thermostat knobs counterclockwise to their lowest settings. Using the thermostat selector switch, select either the pool or spa thermostat.

2. Next, position the ON/OFF switch to the ON position.

3. Make sure that your pool or spa pump is running for a few minutes to clear any air that might be in the lines. The heat pump will not start without water flowing through it. The power light should be on.

4. Turn the selected pool or spa thermostat dial clockwise to its highest setting. As soon as the thermostat setting is above the temperature of the water, the heat pump will begin to run.

NOTE: If you do not have a spa, this switch gives you a backup thermostat. This secondary thermostat can be used as a fall back setting for short periods when you don't want to maintain full temperature. For example, if you like to swim at 82° on weekends, you may opt to keep the pool temperature at 78° during the week. This will significantly reduce your heating bills. On Friday, simply flip the switch to the higher setting and your pool should be ready for you on Saturday. (You may have to increase the filter run time on Friday).

If you turn the thermostat back and below the water temperature, the heat pump will shut off. It will not start for approximately five (5) minutes, no matter how far you turn the thermostat up. The time delay prevents damage to the compressor if the heat pump was to repeatedly cycle on and off.

5. Allow your pool or spa filter pump to run continuously until the desired temperature is reached. (This may take several days.) This may require resetting (or removing completely) the trippers on the time clock to allow it to run continuously.

6. To set the thermostat, allow the heat pump to heat the water until it reaches the temperature you desire. Then, turn the thermostat slowly counterclockwise until the unit shuts off. The heater will maintain your pool or spa at this temperature automatically.

7. **CONDENSATE DRAINAGE**

Condensation is a very normal function of your heat pump. When warm, moisture laden air passes over the cooler evaporator coil (finned air coil), the temperature is lowered and moisture is condensed from the air. A typical heat pump can produce 6 to 8 gallons of condensate per hour.

If you are not sure whether the water draining from your heat pump is condensation or a water leak, you can easily test for the presence of a sanitizer with your pool test kit. If you detect chlorine or bromine in the water draining from your heat pump, it is not condensation. In this case, call Aquatherm for service. If no chlorine or bromine is detected, the water draining from your heat pump is condensate. If a water sample cannot be obtained from the heat pump, there is another quick test you can perform. Simply turn the heat pump off, still allowing the pool or spa pump to circulate water through the heater. With the heater off and the pump continuing to circulate, allow the

heater to remain off for a few hours. If the water draining from the heater has slowed considerably, this would indicate that the water present was from normal condensation. If the water has not slowed, this would indicate a leak.

It is important to keep the drain holes located around the bottom of the unit clean and free of debris that might accumulate. Keep plants from growing near or next to your heater. Shrubs, especially, block air from entering the machine and reduce the efficiency of the heater. Eventually, this can cause damage to the unit if left uncorrected, Keep all shrubs at least 1 foot away from the outer coil of the heater.

8. **SURROUNDINGS**

While the heat pumps are made for an outdoor environment, they are not designed to have sprinkler water constantly spraying them. Water used to irrigate can contain iron and other minerals that can coat the heat collectors, causing poor heat transfer or eventually damaging the air coils and other internal components. Premature rusting of components is a frequent symptom of the sprinkler system striking the unit and is not covered by the warranty.

9. **POOL BLANKETS**

A pool blanket will significantly reduce your heating bills. You should check with the installing dealer to see if your heat pump was sized to be used in conjunction with a solar blanket or without one. Blanketed pools will typically lose only 2-4° of heat per night versus 8 - 10° overnight in unblanketed pools. Reductions of 40-60% on heating bills can be achieved by using solar blankets.

10. **SEASONAL SHUT DOWNS**

During the swim season, even if the pool or spa is not in use, allow water to flow through the unit. This eliminates the possibility of chlorine gas from your chlorinator accumulating inside the heat exchanger.

See page 4 - C3

11. **WATER TREATMENT**

AT500 Aquatherm Heat Pump is equipped with an internal bypass that allows only the proper amount of water to flow through the heat exchanger. A Hartford Loop MUST be installed between any chlorinator and the heat pump (see drawing on page 4).

Chlorinators must be installed downstream of the heat pump. The proper sequence of installation is: pool pump - filter - heat pump - chlorinator (or other chemical feeder device). Locating a chlorinator in any other manner may compromise the warranty of your heat pump. Adding chemicals such as sanitizers or pH controllers through the skimmer of your pool should be avoided. Not only can they damage the heat pump, but other pool or spa equipment such as pumps and filters as well.

Suction type sanitizers that utilize the vacuum created in the pool pump strainer to pull chemicals into the water are safe to use when installed in accordance with the manufacturer's instructions. The chemicals injected into the pool water before the pool pump are well dispersed by the time they go through the heat pump and will not cause harm when operated as per the manufacturer's instructions.

Skimmer feeding of sanitizers and pH adjusting chemicals should always be avoided, and will your warranty.

The acceptable water chemical levels are outlined on page 4 - C2. If you have questions concerning how to check for these levels, consult your installer for instructions. Pool and spa water should be checked at least once a week andmeet NSPI/ANSI Standard 5 Appendix A specifications. A few key levels are outlined below. For additional information, contact the National Pool and Spa Institute (NSPI) at 703-838-0083.

CHEMICAL LEVELS (PPM)

	MINIMUM	IDEAL	MAXIMUM
Free Chlorine	1.0	1.0-3.0	3.0
Bromine	2.0	2.0-4.0	4.0
pH	7.2	7.4-7.6	7.8
Total Alkalinity	60	80-100	100-180*

**Recommended maximum levels will vary with the tye of pool surface. Check with builder, installer or manufacturer. Fiberglas pools, for example, require slightly different chemical levels than those listed.*

Failure to maintain your pool or spa water chemistry within the above specifications will shorten the life of your heat pump and may void the warranty. Chemical damage to the heat exchanger is detectable and preventable. The heat exhcanger has been designed for many years of continual use providing its integrity has not been compromised by improper water chemistry.

12. **MAINTENANCE OF AREA**

It is important to keep the surrounding area adjacent to your heat pump clear of items such as shrubs and bushes, lawn furniture, chemicals, stc. These items can prevent air from circulating properly and result in in inefficient operation or damge to components inside the heat pump. Do not place ojects on top of the heat pump that will block air from exiting the heater, Damage to the compressor and fan motor may occur.

13. **BACKWASHING OF FILTER**

It is important to keep your filter within the manufacturer's operating specifications. As a filter gets dirty, the flow to the heat pump is reduced. The higher the pressure on the filter gauge, the lower the flow rate. If left long enough, the flow can be reduced to such an extent that the heta pump will cycle on and off every five minutes. Before calling your dealer or Aquatherm for service, backwash or clean the filter. Finally, check for improper valve settings. A partially closed valve after the filter will cause the same conditions to occur. If the problem persists, call for service.

Note: During pool refinishing or acid washing, the pool heater must be bypassed until the process is completed and the pool chemistry is balanced once again.

14. **DEFROST CYCLE**
When air temperatures are below 50° F, your pool may go into a defrost cycle. The defrost cycle is initiated by a sensor on the evaporator (air coil). When the evaporator temperatures fall to a point where they start to form ice on the fins, the heat pump will shut down. The heat pump will remain in the defrost mode until the evaporator coil temperature rises above 40° F. In the event the air temperature is below 40° F, the heat pump will remain in the defrost mode until the temperature rises above 40° F. The lenght of time the heat pump is in the defrost mode is dependent on the air temperature. The warmer the air temperature, the shorter the defrost cycle; the colder the air, the longer the defrost cycle. This is another reason why you should operate your heat pump only during the warmest part of the day. Late night and early morning is usually the coolest time of the day and least efficient for heat pumps.

G. MAINTENANCE

All Aquatherm heat pumps are designed for outdoor use, but some maintenance is required to maintain your warranty. In coastal areas where salt-laden air or salt water spray can come in contact with the heat pump, or where blowing sand can accumulate inside a heat pump, regularly scheduled planned maintenance by a certified Aquatherm technician is required. If your heat pump is situated where falling leaves can accumulate on the inside of the machine, annual maintenance is recommended.

It is recommended that annual planned maintenance be performed on your heat pump by a certified Aquatherm Service Contractor. Call Aquatherm at 888-297-3826 to schedule service.

H. TROUBLESHOOTING

2. IS MY HEAT PUMP HEATING?

After the heater has been running for a few minutes, you can do a simple test to see if it is heating.

a. Feel the air exiting the top of the cabinet. It should be 8-12° cooler than the surrounding air.

b. Place your hand, or better yet, a thermometer in the pool water away from the pool returns. Leave your hand or thermometer there for at least one minute, then move your hand slowly towards one of the returns. You should be able to detect a slight rise in temperature, or see a 2-4° rise on your thermometer.

c. When the heat pump has been running for approximately 15 minutes, you should be able to see water starting to drain around the base of the unit. This is not water from your pool or spa. This is condensation, which is produced naturally by removing heat from the air. The cool air cannot hold as much moisture as the warm air and condensate is produced. A heat pump can produce 6 - 8 gallons of water per hour, depending on the outside humidity. The higher the humidity, the greater the amount of condensate produced. Running the heat pump during periods of low humidity may produce little or no condensate.

2. POOL AND SPA COMBINATION HEATING

Everything stated for pool heating applies to heating a spa; only the volume of water

being heated is less. The AT500 Aquatherm heat pump comes equipped with two thermostats. One thermostat is for the pool and the other one is for the spa. Select the appropriate thermostat (pool or spa), whichever you are heating, using the Pool/Spa selctor switch on your heater control panel. Set your valves in the appropriate position.

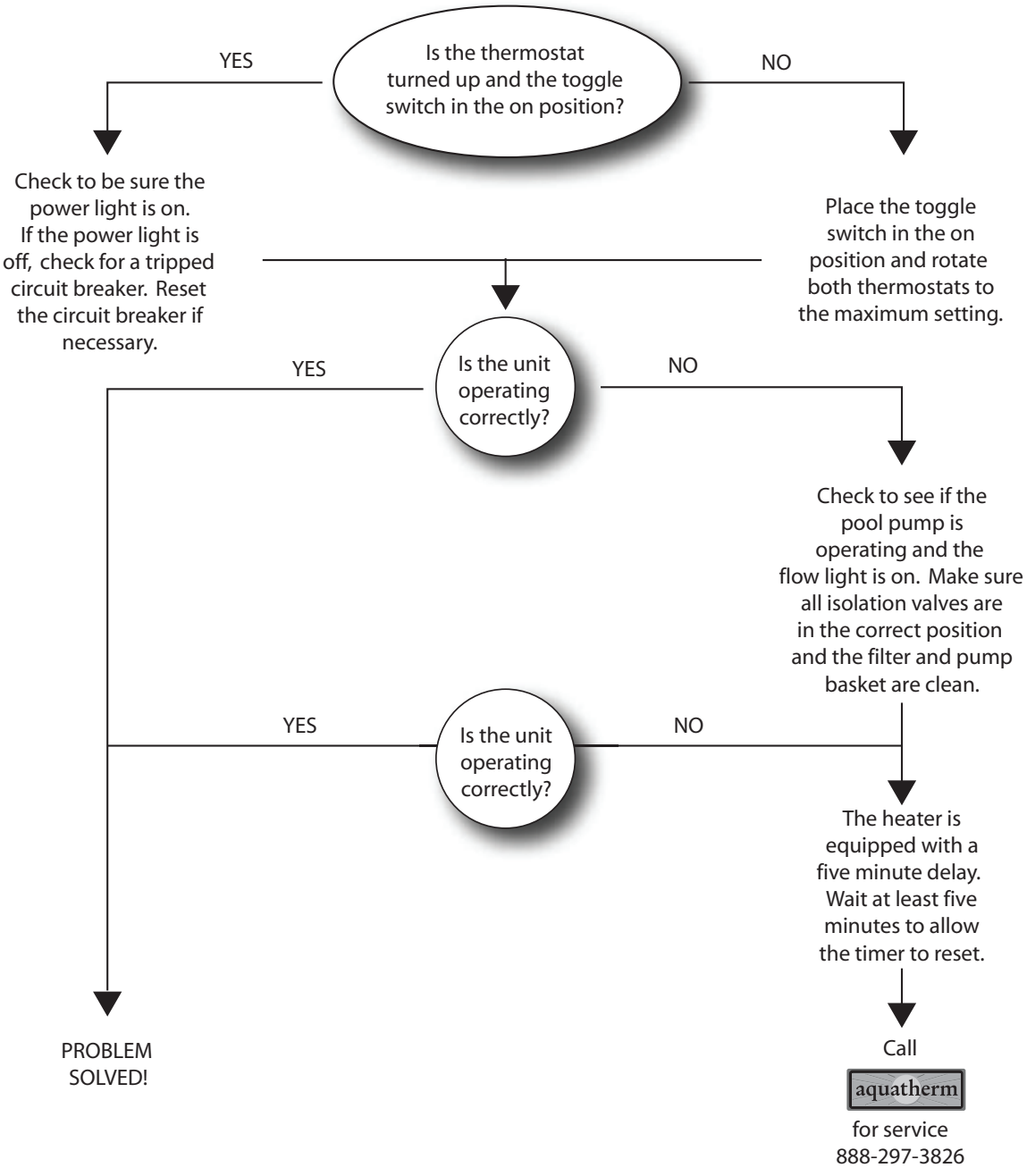
Your sytem can be automated with the addition of an Automatic Thermostat Module. This will save you from having to change the thermostat switch each time you change from pool to spa and back again. You can also automate your pool and spa isolation valves with a motorized valve module. For details, contact your installing dealer.

3. SPA HEATING TIPS

When heating a spa, be sure to turn off the air blower. Air induced through spa jets should also be eliminated, if possible. Air blowing into your spa while it is being heated will very often neutralize or reduce the heat being put into the spa by the heater, which means increased run time to heat your spa.

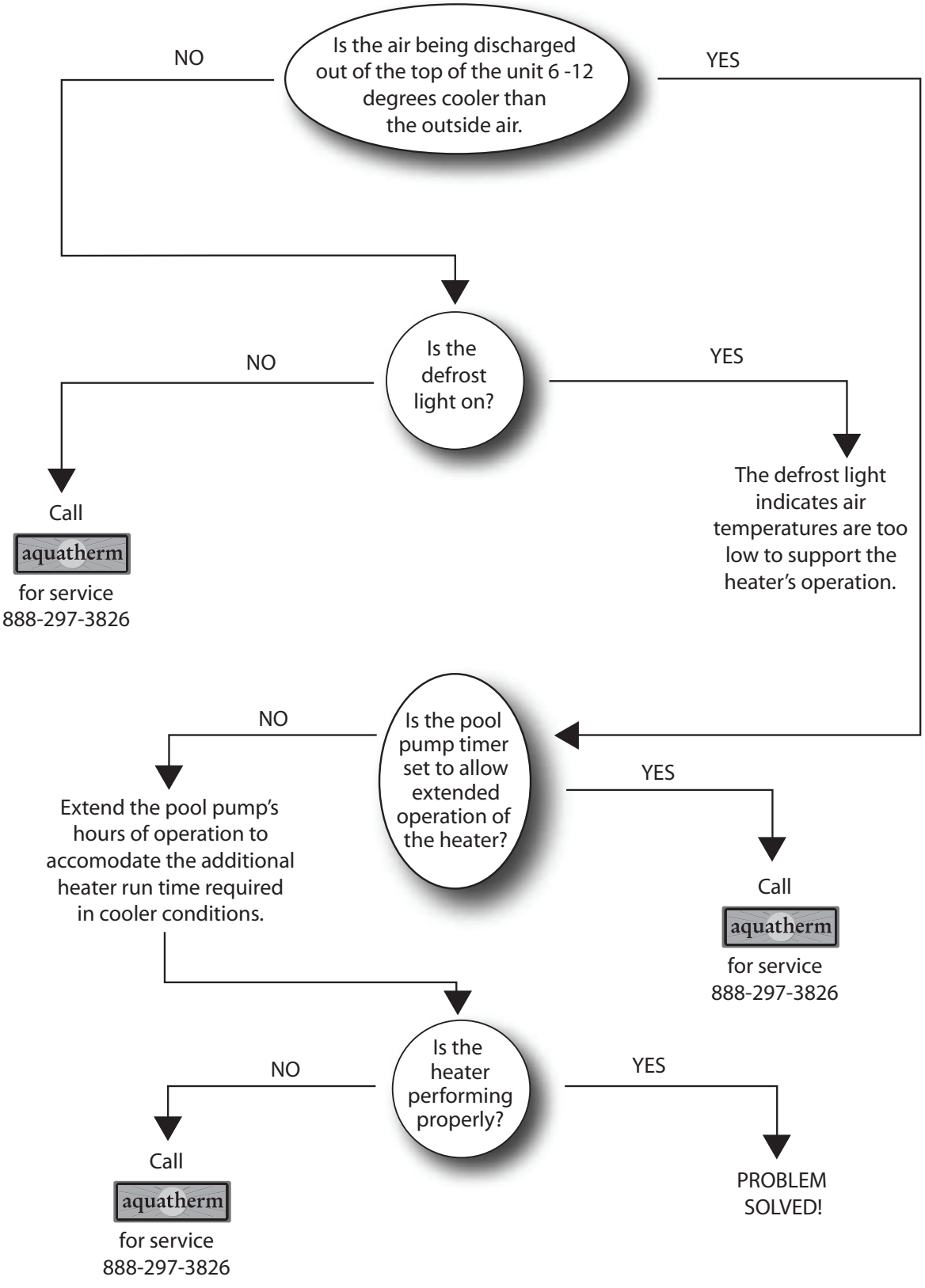
H. TROUBLE SHOOTING

UNIT FAILS TO OPERATE



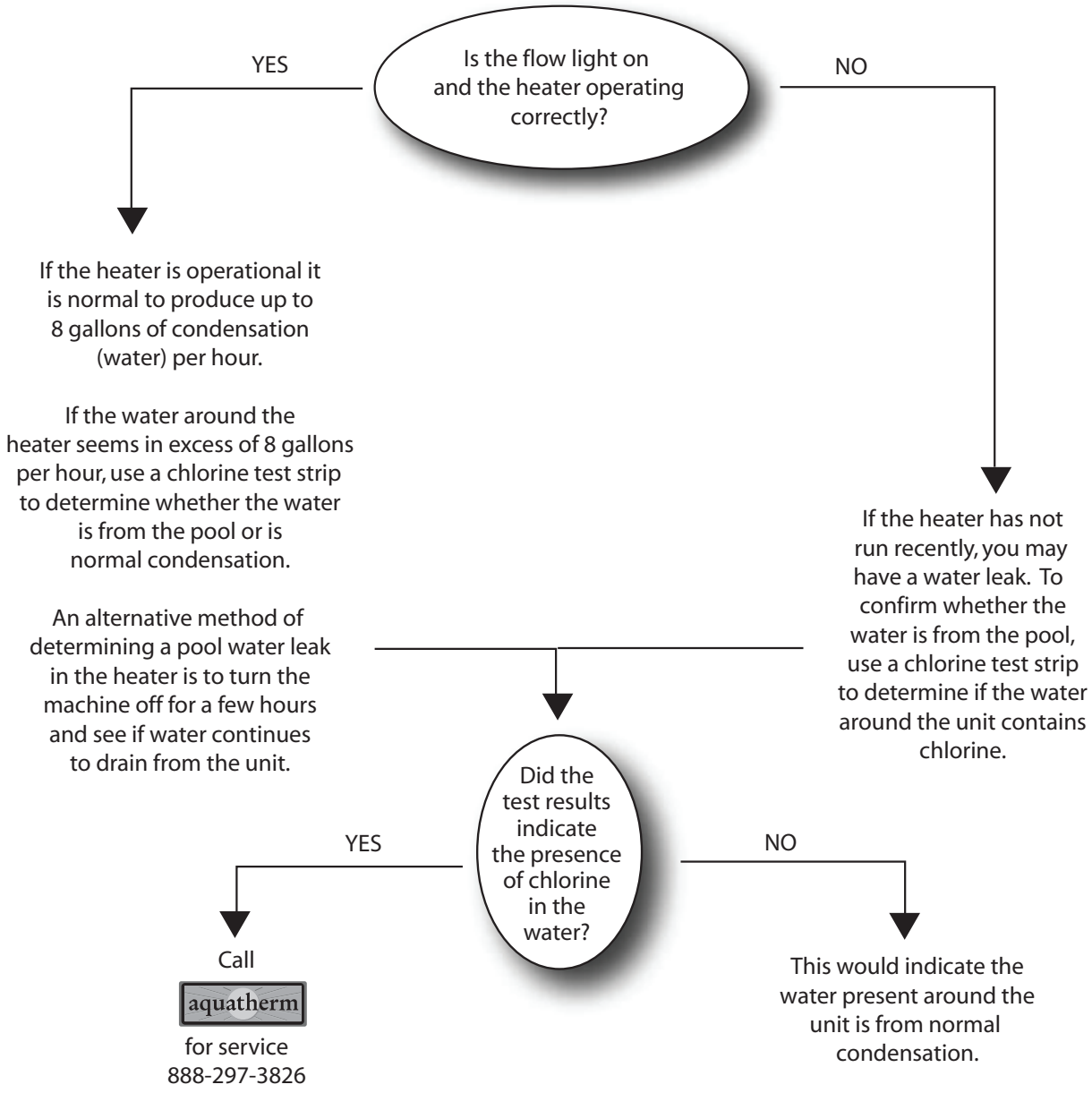
H. TROUBLE SHOOTING

HEATER RUNNING BUT NOT HEATING



H. TROUBLE SHOOTING

WATER LEAK OR CONDENSATION?



NOTE: The method of testing above is valid only for pools using chlorine as the sanitizing agent. For pools using a sanitizing method other than chlorine, refer to the following procedure for determining a pool water leak. Turn the heater off with the pool pump still circulating. If after a few hours the water draining from the heater has not slowed down, this would indicate a pool water leak. For service call Aquatherm at 888-297-3826.

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