



POOL & SPA HEAT PUMP OWNER'S MANUAL

Models AT75, AT115 & AT140



POOL & SPA HEAT PUMPS

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www.aquathermheatpumps.com



MODEL _____

SERIAL _____

PURCHASE DATE _____

INSTALLING CONTRACTOR _____

Water Coming from the Heat Pump...

Is it a leak or just condensation from normal operation?

Here's how to find out.

Test the water draining out the heater base for the presence of the sanitizer being used in the pool or spa. Using a water test kit, or a test strip, check a sample of the water for chlorine or bromine. If the sample tests positive for sanitizer, call Aquatherm for service at: 239-482-0606. If the test is negative, the water is probably harmless condensation.

Or, as an alternate method, shut the heat pump off, leaving the circulation pump running. Within a few hours, there should be a marked reduction in the amount of water seen around the bottom of the heat pump. If the water appears to be drying up, the water is probably harmless condensation, indicative of normal operation.

NOTE: The water test method will not be effective if an ionizer or ozone generator is being used to produce the sanitizing agent.

CAUTION! If after testing, a water leak is suspected, **immediately** shut OFF the water pump and contact Aquatherm Customer Support: 239-482-0606.

SAFETY INFORMATION

Used and maintained properly, your heat pump will provide years of safe and economical service. However, as with any mechanical or electrical device, to get the most from your heat pump—while insuring personal safety for you and others—certain operational and maintenance factors must be observed.

Except for a few minor owner-capable maintenance items (explained later in this manual), repair and service of your heat pump must be performed only by licensed service personnel. If you suspect your heat pump is not performing properly, refer to the Troubleshooting section in this manual to determine if service is required. Your installer can be one source of service, or you can call Aquatherm at (239) 482-0606 or 888-297-3826. For questions concerning installation, modifications, operation, service and upkeep, please contact your installer or Aquatherm Customer Support.

WARRANTY MAY BE VOIDED IF THE HEATER HAS BEEN USED, MAINTAINED, OR REPAIRED IMPROPERLY.

In addition to voiding the manufacturer's warranty, unapproved installation methods, nonstandard modifications, poor or incorrect maintenance, service by unqualified personnel, or improper use of the heater may result in personal injury and/or property damage. For personal safety, and to avoid damage to equipment, follow all safety instructions displayed on the heat pump and within this manual.

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HEAT PUMP OPTIONS

ThermoLink® Heat Exchanger (AT110 Model only)

The heart of your heat pump is the patented ThermoLink® heat exchanger. One of the primary causes of premature heat pump demise is the failure of the heat exchanger. Ordinary heat exchangers are made from a cupronickel alloy. This cupronickel material is susceptible to attack from the sanitizers used in pools and spas and from other related water chemistry conditions. Once the heat exchanger fails, the heat pump is ruined. The ThermoLink® heat exchanger tube is made from titanium, and is virtually impervious to water chemistry damage.

Microprocessor Controller

Digitally-based microprocessor controls water temperature to within 1° Fahrenheit of set point. Controller also permits user to predefine different pool and spa water temperatures, and to prevent tampering by locking out controls via a pass code. The microprosster controller also provides superior defrost control, and self diagnostics.

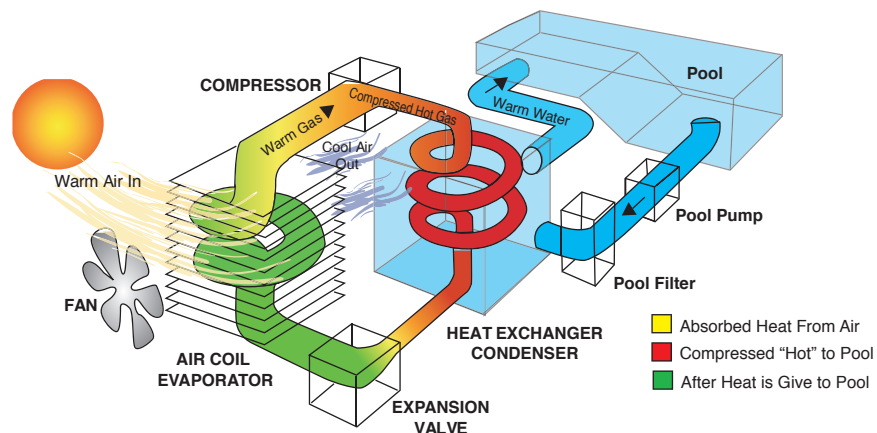
Scroll Compressor

50% fewer moving parts than standard piston-type compressors. This equates to much improved reliability and improved efficiency. Scroll compressors are also much quieter in operation than their piston-type counterparts.

Corrosion-Proof Cabinet

The cabinet, being made from resilient, UV-Protected ABS material, has superior fade resistance and can never rust or corrode. You can expect the cabinet to retain a like-new appearance with only an occasional wash down and—if so desired—a quick waxing.

HOW A HEAT PUMP WORKS



TROUBLESHOOTING

(Also see page 5 for Program Codes)

Heat Pump Fails to Operate:

Is the display illuminated?

If not, ensure the main breaker (located at the power supply panel) and the disconnect switch (located near the heat pump) are both turned ON.

Is the code “FLO” displayed?

If so, check to be sure that the circulating pump is operating and the filter is clean. There may also be a valve positioned incorrectly allowing water to bypass the heat pump. Be sure water is flowing through the heater.

Is the Pool or Spa thermostat selected for the correct body of water to be heated, have you tried selecting a higher temperature setting, and have you chosen the correct “Mode” of operation?

If not, the actual water temperature may be above that of the selected thermostat. Raise the desired water temperature above the actual water temperature; the fan should start, and after approximately four (4) minutes, the “Heating” light should illuminate. If the heat pump still fails to start, and the unit is not in defrost (heat-only unit defrost display code is: “FS”), contact Aquatherm Customer Support: 239-482-0606.

Heat Pump Running... but is it Heating?

Is the air blowing out of the top of the unit noticeably cooler than the surrounding air?

(With heating indicator light illuminated, a 9°F to 12°F difference is typical.) If not, contact Aquatherm for service at: 239-482-0606. But first, be sure all air coil surfaces are free from obstructions—low roof overhangs, landscaping, walls, fences, etc., can restrict air flow. The heat pump needs good airflow to operate at peak efficiency.

How many hours/day does the circulating pump operate?

Cooler weather conditions, or heating to a higher than normal temperature, may necessitate running the heat pump for a longer period of time. Was the heater sized considering the use of a pool blanket (check with installing dealer)? A blanket can be useful in permitting shorter run times, in turn leading to substantial energy cost savings.

What is the outside air temperature?

The heat pump may be in the defrost mode if air temperatures are below 50°F. With Heat-Only models, if the heater is in defrost, the code: "FS" will be displayed. If air temperatures are not cold, but the heater remains in defrost, contact Aquatherm at 239-482-0606.

5. Replace the winterizing plug; thread the plug in clockwise until just snug, then apply an additional 1/8 turn. To prevent insects and critters from entering the plumbing during the winterized period, partially reconnect the two (2) plumbing connection unions: couple each union one or two threads; this will permit condensation to drain, but will prevent most insects and animals from entering the plumbing circuit.
6. Next Season: To ready the heat pump for use, simply retighten plumbing connection unions. Hand-tight is generally sufficient.

RECOMMENDED ANNUAL MAINTENANCE TO INCLUDE:

- ✓ Clean all drains
- ✓ Oil fan motor (if needed)
- ✓ Inspect and clean coil
- ✓ Check all electrical components
- ✓ Check all relays for proper operation
- ✓ Check and adjust water flow
- ✓ Check water pressure controls
- ✓ Check operation of thermal expansion valve
- ✓ Check refrigerant levels
- ✓ Check all incoming voltages
- ✓ Check compressor starting and running amps
- ✓ Check fan motor running amps
- ✓ Check circulating pump running amps
- ✓ Check air temperature differential
- ✓ Check water temperature differential
- ✓ Check pool chemical levels
- ✓ Calibrate thermostat

Annual maintenance should be performed starting one year
after the installation of the heater.

Call Aquatherm Customer Service at 239-482-0606
for recommendation of service company in your area.

HEATING QUICK START AND STOP

1. Verify Electrical Power is Present at Heater:

- A. Ensure that the unit has electrical power connected; the heater controller display should be illuminated.
- B. If the display is blank, be certain the electrical breaker, and heater disconnect, are switched to "ON."
- C. For now, leave the water circulation pump OFF.

2. Set the Heater Controls (Refer to Control Panel Layout, page 4)

If heater is connected to a Call-Flex controller, please reference installation manual for details.

- A. The user/owner settings can be made without water flowing. Once the heater has electrical power connected, with water not flowing, the display should read FLO.
- B. Press the MODE button until the HEAT (HEA) indication displays. This will enable the remaining programming keys.
- C. Using the POOL / SPA selector key, select the POOL mode. An illuminated POOL indicator light, located on the left side of the display, will confirm the POOL control has been selected. If heating only a spa, using the DOWN arrow key, lower the POOL temperature until OFF is displayed; then proceed to Step-"E."
- D. Use the UP / DOWN arrow keys to set the desired water temperature for the POOL water.
- E. If the heat pump will be used to heat a spa, use the POOL/SPA selector key to select SPA, then use the UP / DOWN arrow keys to set the desired water temperature for the SPA. An illuminated SPA indicator light, located on the left side of the display, will confirm the SPA control has been selected. If heating only a POOL, using the DOWN arrow key, lower the SPA temperature until OFF is displayed.
- F. The heat pump controls are now set to maintain the desired water temperature for the POOL and/or SPA.

3. To Begin Heating:

- A. Verify MODE is set to: HEAT (HEA); then, depending on which body of water is to be heated, use the POOL / SPA selector key to select POOL or SPA.
- B. Position water valves to flow water from the pool or spa, through the heater, and back to the pool or spa.
- C. Start the water pump; the fan will start, and after 4-minute time delay the unit will begin heating. The selected body of water will be brought to

temperature and maintained per the setting determined previously in:
“Set the Heater Controls.”

- D. In operation, whenever the actual (displayed) water temperature falls below the desired set point, after an initial time delay of 4-minutes, the unit will begin heating.

THE HEATER CONTROLLER HAS AN ANTI-SHORT CYCLE TIME DELAY. IF OPERATION IS INTERRUPTED, COMPRESSOR RESTART WILL BE DELAYED BY APPROXIMATELY 4 MINUTES.

4. Program Filter Pump Run Time:

Most pool/spa systems utilize a timer or multifunction controller to manage filter pump run times. If your system incorporates such a device, follow the instructions below:

- A. It will be necessary to allow the filter pump to run continuously until the water has reached the desired temperature. If a timer controls the pool filter pump, it will be necessary to override the timer to allow 24-hr. operation.
- B. Once the desired temperature has been obtained (1-4 days), reset the pump control device. Colder months require longer running times - generally eight to twelve hours/day.
- C. A heat pump can only operate when the filter pump is running. Therefore, it may be necessary—during cooler weather—to extend the water pump’s hours of daily operation. The increased run time is necessary in order to keep up with increased, weather-related heat losses.

5. Continuous Usage and Water Around Heater:

CONDENSATION

After the heat pump has been operating for some time, water may be observed surrounding the heater. The moisture seen is condensation produced as a normal by-product of transferring heat from the air into the pool or spa water. **Quantities of 6-8 gallons of water produced per hour are common** if the air humidity is high. Conversely, a low humidity condition may result in no condensation being produced. (If water around unit seems excessive, to troubleshoot, see page 13, “Water Coming from the Heat Pump.”)

6. To Stop the Heat Pump:

- A. Select: OFF via the MODE selector. This method of shut down preserves the controller settings.
- B. An interruption of water flow—such as when a pump timer is in control—will also halt heat pump operation.

OPERATIONAL & MAINTENANCE

RECOMMENDATIONS

The information in this section is primarily for the Home Owner, but may also apply to servicing dealers or HVAC service centers. This section contains information concerning planned maintenance, proper water flow, maintaining proper clearances, as well as other vital information.

Heat pumps should be inspected and maintained on an annual basis by a qualified swimming pool heat pump specialist. Additionally, if the heat pump is located near the beach or coastal area, where salt spray and sand can become detrimental factors, more frequent service may be necessary. For service plan information, please see: **Planned Maintenance Program**, later in this section, or contact Aquatherm Customer Support at: 239-482-0606

While annual maintenance is recommended to maintain your warranty, if you choose not to participate in the Planned Maintenance Program, rinsing the air coil regularly, and keeping the base of the unit clear of leaves and debris is a necessity.

Safety During Cleaning Operations

WARNING !

Failure to heed the following may result in permanent injury or death.

POSSIBLE ELECTRIC SHOCK HAZARD . . . Should you decide to wash the heat pump via water hose, disconnect all power to the pool equipment pad- including, but not limited to: The heat pump, water pump, and any and all other electrical equipment. Do NOT spray water directly into electrical components. Do NOT restore electrical power until such time as all water has dried completely.

CAUTION !

Failure to heed the following may result in damage to equipment.

Do not use a pressure cleaner to wash heat pump Damage to evaporator fins, as well as other components, will result.

HEATING TIPS

Heating in Cooler Weather...

Late night and early morning, generally being the coolest times of the day, are least efficient for heating. For most efficient heating operation, heat pumps should be timed to operate during the warmest, daylight portions of the day. Please set water pump and heat pump controls accordingly.

Pool/Spa Blankets

A “solar” blanket will significantly reduce your heating bills. Check with the installing dealer to see if your heat pump was sized to be used in conjunction with a blanket. Blanketed pools will typically lose only 3 - 4° of heat per night versus 8 - 10° overnight with an un-blanketed pool. Reductions of 40-60% on heating bills can be achieved by using blankets.

WARNING !

Failure to heed the following may result in permanent injury or death.

Improperly used, Pool-Spa blankets can become a drowning risk to people and pets. Blankets are not safety covers. They are not designed to support the weight of a person or pet. Never enter a pool until the blanket is completely removed (under no circumstances should anyone swim under the blanket). Follow all safety recommendations of the blanket manufacturer.

Pool and Spa Combination Heating...

Everything stated for heating a pool applies for heating a spa—only the volume of water being heated is different. Your heat pump comes equipped with two thermostats. One thermostat is for the pool and the other is for the spa. Simply position the pool and spa isolation valves as directed by your installer; select the appropriate thermostat (pool or spa), whichever you are heating, and with electrical power and water flow supplied to the heater, the water will be maintained at set point.

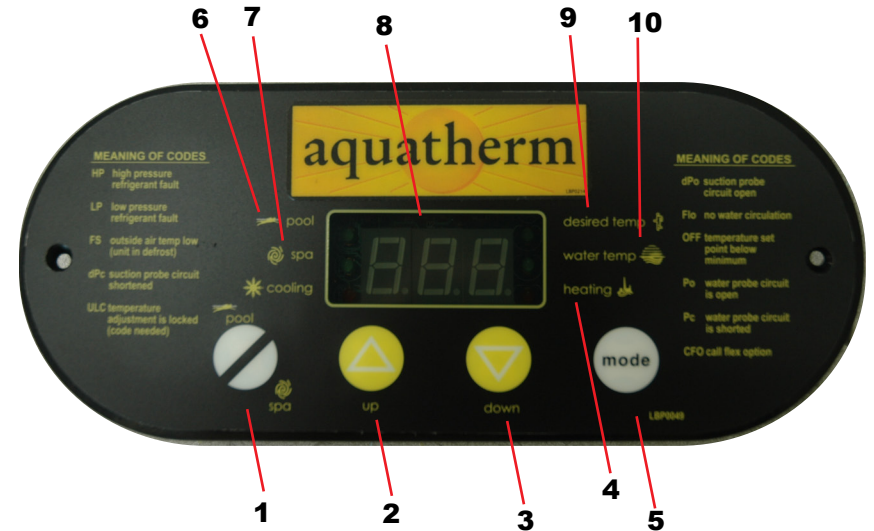
Spa Heating & Spa Setback Option

Air blowing into your spa, while it is being brought to temperature, will very often neutralize or partially counteract the heat being put into the spa by the heater; this added heat loss equates to increased time to bring your spa to desired temperature. When heating a spa, be sure to turn off the air blower. Air induced through the spa jets should also be eliminated, during warm-up, whenever possible.

If your heater is being used to only heat a spa, the POOL thermostat can be used as a setback control: simply set the pool control at a point 10-15° F below desired spa heat temperature and select the pool thermostat. This method allows the spa—when not in use—to be held at a heated temperature, but somewhat lower than normal spa-use temperature. One would want to blanket the spa if using this setback method. Using spa setback will result in reduced warm up periods over full, cold starts.

HEATER CONTROLS

Appearance may vary by model



- 1 **POOL / SPA SELECTOR** – Selects either pool or spa thermostat.
- 2 **UP ARROW** – Increases temperature setting. (Maximum setting is 104 °F)
- 3 **DOWN ARROW** – Decreases temperature setting. (Minimum setting is 45 °F)
- 4 **HEATING INDICATOR LIGHT** – Indicates unit is heating.
- 5 **MODE SELECTOR** – Used to select between Heating and Off.
- 6 **POOL INDICATOR LIGHT** – Indicates heater is referencing spa thermostat.
- 7 **SPA INDICATOR LIGHT** – Indicates heater is referencing pool thermostat.
- 8 **LED DISPLAY** – Displays water temperature when no keys are being pressed. Displays desired temperature when UP ARROW or DOWN ARROW is pressed. Also displays operational, programming, and fault codes as applicable.

Operational & Programming Codes

FLO No Water Flow Detected

This code appears whenever the circulating pump is off, or when the heater is not receiving correct water flow.

OFF System is Off

This code appears whenever heater has been turned off via the mode selector button, or when the temperature set point has been lowered below 45 °F.

CFI Celsius/Fahrenheit Selection

This is a programming entry point to select in which format the water temperature will be displayed.

ULC User Lock Code

This is a programming entry point; when activated, steps to the next menu level: ELC.

ELC Enter Lock Code

This is a programming entry point; permits end user to select a secret code, thereby limiting access to the owner settings.

CFO Call Flex Options

This is a programming entry point; when used in conjunction with a Call/Flex option kit, permits the use of CALL or FLEX options.

FS Heater in Defrost Mode

This code appears as a normal display during periods of lower air temperatures. Sequence follows:

Heat-Only Defrost Sequence: Fan continues to run and compressor is off. Compressor will restart when air coil temperature rises to approximately 38°F.

LOC This is a Service Entry point (not intended for use by the owner). The [LOC] code permits service personal to enter a factory code for access to adjustable calibration and site-dependant setup parameters. Service adjustments are available to authorized installation and service personnel, only.

CAUTION !

Failure to heed the following may result in equipment damage and voiding of manufacturer's warranty.

Heat pumps contain no owner-serviceable components. Owner-initiated adjustments, beyond the controller "LOC" code, must not be attempted. If adjustments are deemed necessary, the owner should contact installing dealer or Aquatherm Customer Support at 239-482-0606.

CAUTION- POOL/SPA REFINISHING OPERATIONS

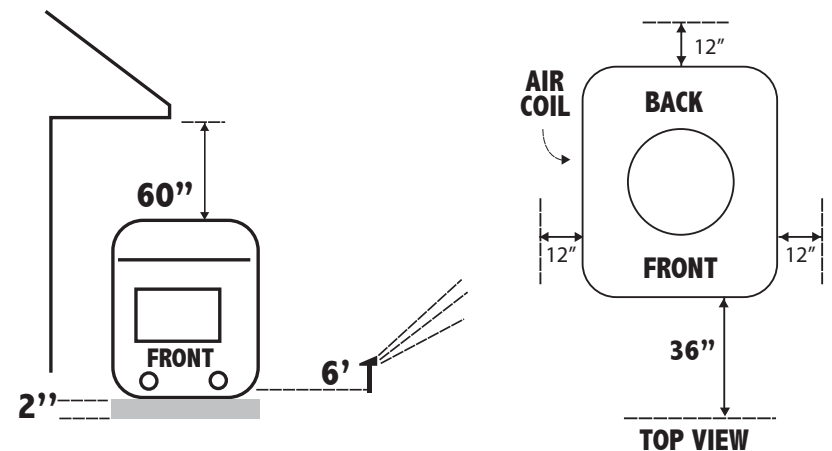
During pool refinishing or acid cleaning, the water flow through the heater must be shut off. Water flow to the heater must remain off until water chemistry is once again in balance and the water is clear in appearance. Failure to follow these instructions may void heater warranty.

CONTROL IRRIGATION AND STORM RUN OFF

- **Control Irrigation: Irrigation water spray can damage heater components. Regardless of water quality, it is important that irrigation be directed away from the heat pump.**
- Prevent rain water runoff from pouring directly into the heater. The heater is designed to withstand normal rainfall, but solid streams of water from roof drip-lines may eventually damage heat pump components.
- If the heat pump resides beneath a roof edge, to promote heat pump longevity, a rain leader (gutter), or rain shield, will be necessary.

MAINTAIN PROPER CLEARANCES AROUND HEATER

- For maximum efficiency, proper air flow clearances around heater must be maintained.
- It is important to keep the area immediately adjacent to the heat pump clear of items such as shrubs and bushes, lawn furniture, chemicals containers, etc. These items can prevent air from circulating fully through the heater, and will result in inefficient operation or damage to the heat pump.
- In addition, do not place objects on top of the heat pump; doing so will block the air from exiting the heater, and will result in damage to the compressor and fan motor.
- Proper clearances are also necessary in order to access the heater for service.



MAINTENANCE AND OPERATION

MAINTAIN PROPER WATER FLOW

- It is important to operate and maintain the filter according to the manufacturer's specifications. As a filter gets dirty, the water flow to the heat pump is reduced. The higher the pressure on the filter gauge, the lower the flow rate.
- Similar to a dirty filter, large amounts of debris in the pump and skimmer baskets can reduce water flow. Keep baskets free of debris.
- Check for improper valve settings. A partially closed valve after the filter, or a full-open bypass around the heater, will cause insufficient water flow through heater.
- If the conditions listed above remain unresolved, the water flow through the heater may be reduced to a point where internal safety devices (i.e.: "HP" or "HP5") shut the heater off.
- Before calling for service, always check the filter, the pump basket, and water valve positions. If the problem persists, please call Aquatherm at: 239-482-0606

MAINTAIN PROPER WATER CHEMISTRY

- **IMPORTANT!** Your heat pump is engineered for exceptional durability and reliability. This unit's heat exchanger—being equipped with titanium tubing—will be nearly impervious to water chemistry damage. However, other components of the heater, and the remainder of the pool/spa equipment in general, may be susceptible to damage from prolonged exposure to unbalanced water chemistry. There can also be health risks involved with improper water chemistry
- For the longevity of the entire pool/spa installation, and for the safety of users, it is strongly recommended that the water chemistry be checked regularly and maintained within proper norms. The table below lists recommended water chemistry levels.

RECOMMENDED WATER CHEMISTRY STANDARDS*

Chlorine	1.0 - 3.0 ppm in pools, 1.5 - 3.0 ppm in spas
Bromine	2.0 - 4.0 ppm in pools, 3.0 - 5.0 ppm in spas
pH	7.4 - 7.6 ppm in pools, 7.2 - 7.8 ppm in spas
Total Alkalinity	80 - 140 ppm in pools, 80 - 120 ppm in spas
Calcium Hardness	200 - 400 ppm in pools and spas
Total Dissolved Solids.....	1,000 - 2,000 ppm in pools, 1,500 ppm above start-up TDS in spas

*Standards for commercial applications may vary.

USER LOCK CODE OPTION [ULC]:

Heat pumps are shipped from the factory with the [ULC] option disabled. Enabling the [ULC] function permits the heat pump owner to restrict access to the unit's controls. With the [ULC] function enabled, unless the correct ULC code number is entered, changes to Level-1 programming are not possible. (I.e.: Altering temperature set points, Pool/Spa selection, C/F display changes, etc., will not be possible). The [ULC] option can be thought of as an electronic lockable cover for the controls.

A. SELECTING ULC OPTION:

- 1) Press either the UP or DOWN ARROW keys; if "LOC" is momentarily displayed followed by "0", the ULC feature is enabled. If "0" displays proceed to "6)" of this section; otherwise, see number "2," below.
- 2) Simultaneously press and hold both the [UP ARROW] and [DOWN ARROW] keys until [CF1] (Celsius / Fahrenheit) code appears.
- 3) Press the [POOL/SPA] key once to display [ULC].
- 4) With [ULC] displayed, pressing either the Up or Down Arrow key will display either "1" or "0". Selecting "0" will allow the keypad to remain unlocked. Selecting "1" will enable the User Lock Code option. Then, to enter a lock code number, press the [POOL/SPA] key once to display [ELC] (Enter Lock Code).
- 5) With [ELC] displayed, use the Up or Down arrow keys to select a lock code. The code can be any number from "00" to "99". The factory set lock code is "0". Not pressing any buttons for 15-seconds will allow the controller to save the selection and return to the normal operating mode. Pressing the {POOL/SPA} key will also save the selection, and will step the controller to the next menu parameter: [CFO] (Call Flex Options).
- 6) Once the ULC option has been enabled, pressing any key will momentarily display "LOC" followed by "0" (prompting the entry of the correct lock code number). To gain access to the controller:
 - a. Using the [UP ARROW] key, scroll to the correct lock code number, then;
 - b. Press the [POOL/SPA] key... Current water temperature will be displayed... Control setting can now be viewed or changed as desired.
 - c. After a period of approximately four (4) minutes, during which time no buttons have been pressed, the controller will automatically return to the locked mode. Provided ULC selection is set to "1," the controller will always fail-safe in the locked mode.

- d. Without knowledge of the correct lock code, and with the ULC enabled, control adjustments will not be possible. Be certain to record your lock code in a safe place. The lock code may be changed any number of times by following the instructions detailed in this section.

B. DE-ACTIVATING THE USER LOCK CODE [ULC] FUNCTION:

- 1) Following the instructions detailed previously at: “8, 6)”, press any key and enter the user lock code number; then press the [POOL/SPA] key.
- 2) Immediately following the entry of the user lock code, simultaneously press and hold the [UP ARROW] and [DOWN ARROW] keys until the code [CF1] appears on the display.
- 3) Then, use the [POOL/SPA] key to scroll to the [ULC] message; press the [DOWN ARROW] key to change the display to “0”. This will disable the User lock function.

C. USER LOCK CODE IS ACTIVATED, BUT PASS NUMBER IS NOT KNOWN (“BACK DOOR ENTRY”):

Note: Should the ULC option be enabled, and a lock code number other than the factory default (0) be installed but is unknown, the following procedure may be followed to regain controller programming access:

- 1) Simultaneously press and hold the [POOL/SPA] and [UP ARROW] keys until the display shows “888”. This operation will reset the controller to the factory default settings.
- 2) When reset to the factory default settings the user lock code [ULC] is deactivated and the user lock code number [ELC] is reset to “0.”
- 3) In addition, all other settings are returned to the factory defaults. If an external controller is in use, contact Aquatherm Heat Pumps (888-297-3826); ask for assistance with re-configuring the controller for use with an external controller.

AT START UP: CONTINUOUS CIRCULATION

PUMP OPERATION REQUIRED

When starting a heat pump for the first time, it must be permitted to operate, continuously, until the desired water temperature is attained. This may take several hours, to several days, depending upon the size of the pool or spa and weather conditions.

If a time clock or similar device controls the operating times of the water circulation pump, temporarily override the water pump controller, allowing for 24-hour, continuous water pump operation.

Once the body of water has reached the desired temperature, the water pump controller can be reset.

Seasonal Use & Shut Down

During Swim Season

- During the swim season, even if the pool or spa is not in use, allow water to flow through the heater. Doing so eliminates the need to reposition valves when you do wish to heat the pool or spa.
- During periods when heating or cooling is not desired, leave heater controls in the OFF position.

Freeze Protection & Extended Shut Down

In areas where freezing conditions are a rare occurrence, allow the filtration system to run continuously throughout the freeze period. Typically, during light freeze conditions, circulating (moving) water will not freeze.

In areas where freezing conditions are prevalent and sustained, the heat pump MUST be winterized; please refer to winterizing instructions, below, and on the following pages. Failure to properly winterize your heat pump could result in permanent damage to the unit.

1. Disconnect all electrical power to the heater; turn OFF circulating pump.
2. At the two (2) connection unions, disconnect the plumbing to the heater (removal is counter- clockwise).
3. If your unit has an external drain plug, remove plug. This plug would be located at lower, front corner of heater. (position may vary between models). Allow water to drain out of the condensor. DO NOT replace plug until final winterizing step.
4. If no external drain plug is found, it will be necessary to open access panel and see if heat exchanger has an internal drain plug. If so, remove plug, and allow water to drain out of the condensor.