Recreational Water Heaters™

MADE IN USA

HEAT SIPHON®

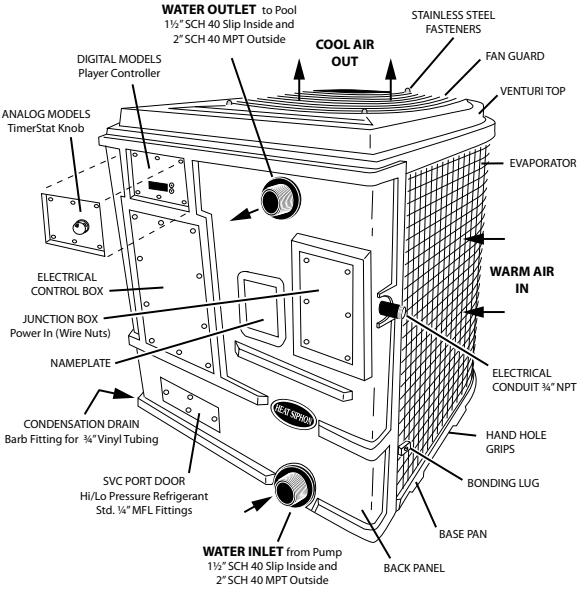
SINCE 1983

"WE PERFORM TO KEEP YOU WARM!" ™

Owner's Manual

with Installation & Troubleshooting Instructions

July 2026



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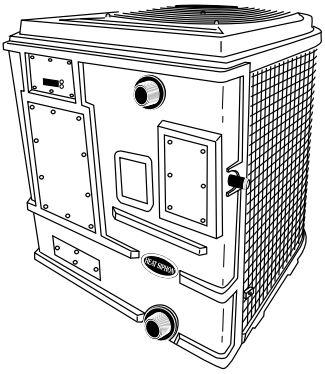

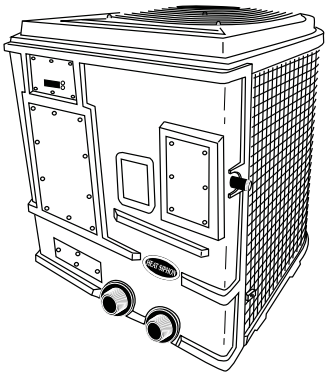

For Heat Siphon® Swimming Pool Heat Pumps

All Z & C Series Heat Siphon Models including

220Volt -1 Ph-60 Hz ONLY: C200HP, C250HP, C375HP, C575HP, Z200HP, Z375HP , Z575HP,
220Volt -1 Ph-50 Hz ONLY: C200HP50, C200HP50, C375HP50, C575HP50, Z200HP50, Z375HP50 , Z575HP50
220Volt -3 Ph-50/60 Hz: C200HP3, C375HP3, C575HP3, Z200HP3, Z375HP3 , Z575HP3,
380/460 Volt - 3 Phase - 50/60 Hz - C200HPX, C200HPX, C375HPX, C575HPX, Z250HPX, Z375HPX, Z575HPX,
440 Volt - 3 Phase - 60Hz - C575HP4, Z575HP4, Z575CP4,

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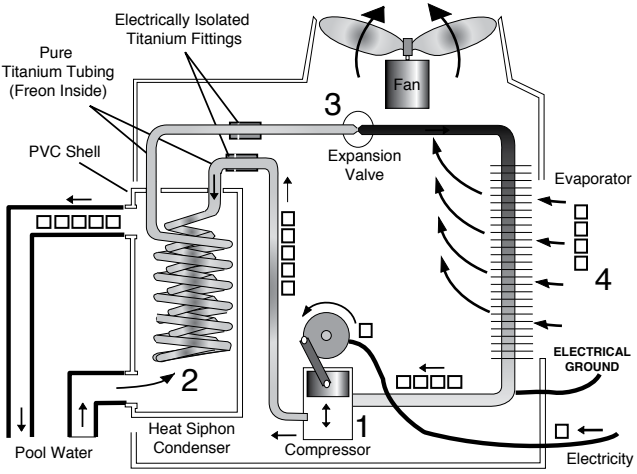
Owners Section

The Owner Section is written specifically for you, the pool owner. It explains proper operation and maintenance of your Heat Siphon.

1 Heat Siphon® Overview

1.1 How Heat Siphon® Works



Heat Siphon® is a heat pump designed specifically for recreational water heating (pools and spas).

If you have an air conditioner, dehumidifier, water cooler or a refrigerator, you already own a heat pump. All these appliances use the same dependable technology to move heat from one place to another using electric power and a sealed refrigerant compression system. Just like a room air conditioner moves 2 to 3 units of heat from your home for every unit of electricity it consumes, Heat Siphon® uses 1 unit of electric energy to move 4 units of heat from the air and thus it provides 5 units of heat to your pool.

Referring to the diagram above - A unit of electrical energy (you pay for) goes into the compressor motor (1) . The compressor turns this into mechanical energy and sucks cool gas from a gas-liquid refrigerant mixture in the evaporator tubes. As the refrigerant evaporates it absorbs four units of "free" heat from the warmer air that the fan pulls over the outside of the evaporator tubes.

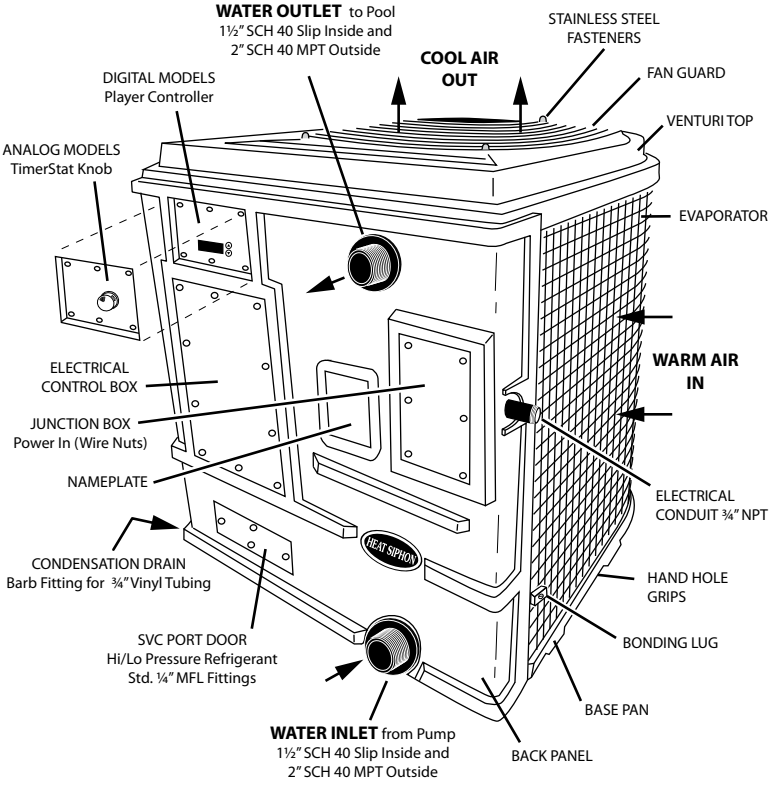
The compressor squeezes this gas causing its temperature to climb above 200° F and adds the electrical/ mechanical energy as another unit of heat. This hot high pressure gas then enters the condenser coil (2) and heats the colder (80° F) pool water being circulated over the outside of the coils.

As it cools, the refrigerant gas condenses back to a liquid at high pressure then rapidly expands thru a valve (3) back to the lower evaporating pressure.

This rapid pressure drop super cools the liquid refrigerant as it enters the evaporator (4) where it repeats the cycle. SO YOU PAY FOR ONE UNIT OF HEAT AND GET FOUR FREE!! . . . And with the NEW models you get FIVE to SIX units FREE!!

1.2 Heat Siphon® Exterior Parts

The following Illustration identifies the basic exterior components and parts of your Heat Siphon.



Heat Siphon® Exterior Parts

2 Don't Void Your Warranty!

This section contains all the information you will need to ensure that your Heat Siphon® has been properly installed. Read this section before allowing a new dealer to install your unit. If your installer is not an Authorized Heat Siphon® Dealer make sure they are licensed by your county, trained and have experience installing pool plumbing, wiring and pool heating equipment.

2.1 Use a Qualified Installer

Although your Heat Siphon® Swimming Pool Heat Pump has the strongest manufacturer's warranty of any pool heater made, there are things your installer could do incorrectly to cause you problems and expenses which will not be covered by the factory under this warranty. (See the Appendix for your Heat Siphon® Factory Warranty.) As the owner you should be aware that your Heat Siphon installer is totally responsible for performing the following key installation steps.

2.2 Pre-Installation Requirements

You and your Dealer / Installer must be responsible for the following

- *Picking the Proper Size Heat Siphon® for Your Pool*
- *Selecting the Proper Location*
- *Providing Proper Air / Service Clearance Around the Unit*
- *Correctly Plumbing for FULL PUMP FLOW - NO BYPASS*

NOTE: FAILURE TO DO SO MAY VOID YOUR WARRANTY!!

2.2.1 Picking The Proper Size Heat Siphon®

Your dealer should provide you with a Heat Siphon® that is large enough to heat your pool under normal conditions within 8-12 hours of run time each day. Under-sizing will result in long run times and possibly a pool which isn't always as warm as you want it to be.

Normally a Z375HP Heat Siphon® will be more than adequate to heat most in ground residential pools to over 82° F. Most established Heat Siphon® dealers, can tell from experience what size will work on your pool. If there is a doubt about sizing, or if you have a larger pool , abnormal wind or shade or you wish to keep your pool uncovered 24 hours a day, then make sure your dealer has taken this into account.

TIP: Anyone can request our free factory computer pool heating analysis. It very accurately determines the proper size (and number) of Heat Siphon(s) for your pool as well as the expected heating cost. You specify your location (for climate data), the pool temperature you desire, the months it will be open, the hours per day covered, the wind condition, the pool pump hours and your local fuel costs. It will be emailed or FAXED back SAME DAY.

This four page printout also provides graphics showing pay back period, monthly operating cost and much more and it's FREE. (See the sampleon our website www.HEATSIPHON.com)

2.2.2 Locating Your Heat Siphon®

As long as you provide plenty of fresh air and give it adequate clearance space all around, Heat Siphon can be installed virtually anywhere outdoors. Unlike gas heaters whose pilot lights can be blown out, Wind has

no effect on Heat Siphon® other than possibly helping the fan and increasing the heat output. Do not place your Heat Siphon® under a deck, in a pump house or under a roof overhang. These locations do not provide "fresh air", instead they cause air recirculation, reduce efficiency and compressor life and void your warranty.

It's solid PVC cabinet , stainless steel hardware , vinyl coated fan guard and evaporator screen will remain unaffected by the elements. The plastic basepan has a drain fitting to carry rain water as well as condensation away from the unit. A 3/4" diameter clear vinyl tube will slip right over this barb type fitting to plumb the water away.

As far as direct sunlight is concerned, Heat Siphon's UV stabilized, flame retardant PVC plastic cabinet material is far superior to any type of galvanized or painted sheet metal cabinet. It won't rust, fade, chip or peel.

If the air temperature drops below about 42°F while the Heat Siphon® is running then any water in the air will begin to freeze and form frost or ice on Heat Siphon's large horseshoe shaped evaporator fins. This is because Heat Siphon®'s refrigerant must be colder than the air to remove heat from it and dips below freezing at about this air temperature.

Although this will cause no structural damage, it may take as much as 24 hours to melt and it will drastically reduce efficiency. Over a long period this can reduce the life of your compressor.

To prevent this icing your Heat Siphon® is equipped with a freeze protection switch that automatically turns the Heat Siphon® off if the refrigerant temperatures goes below freezing. It will automatically restart and continue heating the pool as soon as there is no icing danger at about 48°F.

2.2.3 Provide Full Flow - No Bypass

WARNING - Any damage due to incorrectly plumbing your Heat Siphon installation is not covered by the warranty.

DO NOT INSTALL A BYPASS.

Heat Siphon® requires FULL PUMP FLOW with at least 25 to 30 GPM. Heat Siphon®'s full flow heat exchanger will accept up to 80 GPM with very minimal pressure drop.

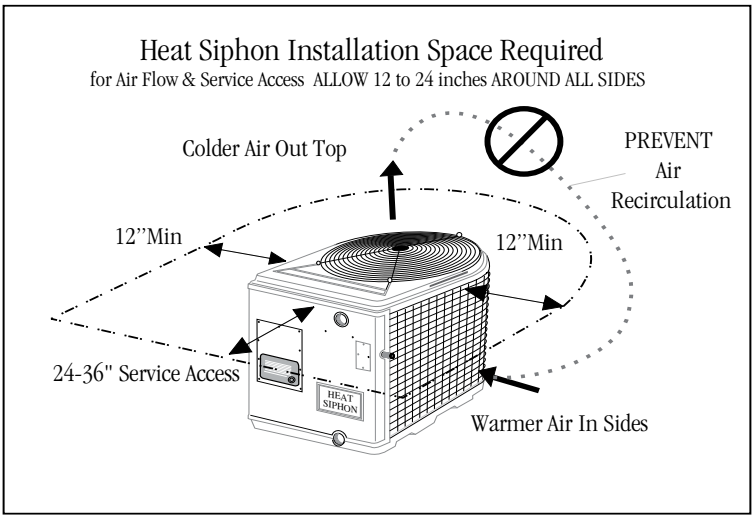
Installing a bypass can reduce flow below the minimum required and overheat the condenser causing the unit to cycle on and off every 5 minutes. If allowed to continue, cycling can shorten the unit's life and damage the compressor which is not covered by the warranty.

DO NOT INSTALL SHUTOFF VALVES DOWNSTREAM. (dead heading the pool pump)

Plumbing shut off valves downstream of the Heat Siphon® in a way that results in the pool pump pressurizing the Heat Siphon® with no water flow can also cause short cycling damage.

2.2.4 Provide Proper Clearance & Fresh Air

Heat Siphon® can not be installed where the cooler exhaust air (flowing straight up out of the unit) is recirculated back into the intake (sides) of the unit. This will reduce efficiency as well as heat output.



At least two feet of clearance must be provided around the unit as well as unrestricted air flow overhead.

Installing a Heat Siphon® under a deck or in a pool equipment shed or enclosed area or too close to shrubs will result in air recirculation, poor performance and short cycling which can shorten the unit's life and damage the compressor AND WILL VOID THE WARRANTY.

3 Pool Heating Considerations

Heat Siphon® is equipped with a flow sensing switch which turns it on and off automatically when the pool pump is turned on or off. However, you must still run the pool pump long enough each day to allow Heat Siphon® to maintain the pool water temperature.

Make sure that your dealer provides you with a Heat Siphon® that is large enough to heat your pool under normal conditions with 8-12 hours of pump operation each day

If the pool pump is off during the night and the pool loses heat then it may take several hours or more in the morning to restore the pool to temperature. If your pool pump is sized to run 8 hours per day for filtration, during a cold spell or other high heat loss period such as when the pool is uncovered for an extended windy period, the Heat Siphon® may require longer pump operation to maintain temperature. This will not require excessive pool pump operation and will ensure a reserve heat output capacity to cover any temporary

high heat loss conditions.

A properly sized Heat Siphon® and a smaller pool pump are the most cost effective combination to ensure proper pool heating and filtration. If in doubt call the factory and we will be glad to furnish a free computerized pool or spa heat loss analysis that will show recommended pump operating times and operating costs for each month Including extra pool pump electric costs if you do choose to oversize.

Tip: Visit our website WWW.HEATSIPHON.COM for a sample print out or DOWNLOAD our iPhone/iPad Pool Designer app MYPOOL at the App Store.

Pool Pump Run Time

Just like other pool heaters, Heat Siphon® can add heat to the pool only when the filter pump is running. So the question is how many hours a day do you run your pool pump- 24, 16, 12 or 8 hours per day?

> *NOTE: In ANY given pool or spa piping system, if you DOUBLE the flow rate, you QUADRUPLE the WATTS needed to pump water thru it. Put another way - pumping 1000 GALLONS IN ONE HOUR through your pool filter TAKES 4 TIME THE WATTS as pumping 1000 GALLONS IN TWO HOURS!!*

How long to run your pool pump each day?

You must run the pool pump long enough to FILTER OUT ANY DIRT AND DEBRIS.
You must run the pool pump long enough to allow the HEATER to REPLACE THE DAILY HEAT LOSS.
If you use a feeder, chlorinator, ionizer etc., the manufacturer's recommendations must be followed.

Picking a pump too small OR running a variable speed pump on low speed will result in inadequate filtration time. Using a pump that is too large OR running a variable speed pump on high speed will increase both system back pressure and electric cost.

The most efficient and lowest cost pool pump system is one where the pool pump has a flow rate just large enough to pump (turn over) your entire pool volume through your filter in 8 to 12 hours. This means running the pump continuously to get the recommended 2 to 3 turnovers per day for proper filtration while pumping against the lowest back pressure possible.

3.1 Filtration Considerations

The number of bathers, amount of chemicals added as well as the temperature and weather all vary the actual filtration required to maintain a clear clean pool.

In most commercial pools, state laws usually require 3 turnovers per day with the pump running 24 hours per day (one turnover every 8 hours). Thus a 80,000 gallon pool would need a pump flow rate of 10,000 gallons per hour or 167 gallons per minute (GPM) to pump the entire volume through the filter in 8 hours. 60 GPM equals 1 Gallon per Hour (GPH).

Pool Turnover Time in Hours = Pool Gallons/ Pump GPH

On residential pools 1.5 to 2 turnovers per day is usually considered the minimum. The size (horsepower) of your pool pump will determine the flow rate in your pool filter system and thus how many turnovers per day can be achieved.

Bigger pumps are not necessarily better. Some dealers put in a smaller pool pump sized to run 24 hours a day because the operating cost is much less per day than running a larger pump for 8-10 hours to get the same number of turnovers. Back pressure increases as the square of the flow rate. Thus, if you cut the flow rate in half in a given pool piping system, you decrease the back pressure that must be overcome to pump the pool water by 75%. In addition they claim 24 hour run time saves chemical costs by eliminating shock treatments and by keeping turbidity and suspended solids to an absolute minimum.

On the other hand are dealers who advocate using large 1. 5 or 2 horsepower filter pumps which turn over the entire pool volume in 4 to 6 hours and thus they claim need only be run 8-12 hours daily to achieve effective filtration. If you have different electric rates for day versus night usage, running your pool pump for a shorter time during "off peak" rates may actually save pump costs overall even though you use more electricity. Ask your dealer if in doubt or call your electric utility.

The pump flow rate requirements are also affected by the size and type of filter you use. Cartridge filters usually require 1 GPM (gallons per minute) per square foot while diatomaceous earth may require 2 GPM per square foot and sand 3 GPM / sq ft. or more. Thus a lower flow rate pump which runs longer can use a smaller but not undersized filter as long as it will not load up too quickly. If a large filter is used with the smaller pump, back pressure will also be reduced significantly thus further reducing pump electric costs.

In conclusion, in most cases using a longer run time with a smaller pump and a properly sized or even oversized filter clearly provides the best results from an economic as well as a filtration standpoint.

4 Owner Troubleshooting

The purpose of this section of the manual is to provide some GUIDANCE FOR HEAT SIPHON® OWNERS with little or no technical background who have a problem with their Heat Siphon®.

If our guidance here doesn't solve the problem CALL YOUR INSTALLER and refer him to the Installer Section of this manual. He will contact the factory service center for additional service if required.

When you apply power to your Heat Siphon® through the disconnect and circuit breaker, usually one of four things will happen

- *IT DOES NOTHING*
- *IT TRIES TO START THEN SHUTS OFF*
- *IT STARTS & RUNS but doesn't heat*
- *IT RUNS & HEATS & sometimes leaks water*

In any case you are probably reading this because your pool is not heating to the desired temperature, so follow the appropriate steps below BEFORE CALLING YOUR DEALER:

4.1 Unit Does Nothing

Here is a step by step troubleshooting procedure if your unit does not start

Is power on?

Thermostat set too low? (turn fully clockwise-unit should come on)

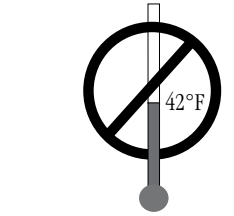
Pool pump on and valves properly set?

Water flow confirmed from pool through heater and back to pool?

Air too cold? - Air temperature below approx. 42°F will shut unit off automatically to prevent icing. (Wait for air temperature to reach 45° F to 48° F - unit should automatically reset and turn itself on)

Time delay activated by brief power interruption? (Wait 5 minutes - unit should restart)

Is breaker tripped? You may have a bad breaker or faulty wiring, loose wires or poor connection in the junction box . Have your installer check the wiring and breaker.



Heat Siphon Shuts Down Below 42°F to Prevent Evaporator Icing and Automatically Restarts at 48°F

NOTE: Some brands of GFI type breakers are extremely sensitive and are susceptible to false tripping. Have your installer check all wiring between the unit and the breaker and make sure the breaker is wired right . (see installer section)

Call your dealer. - His first step should be to check & adjust the water flow switch

4.2 Unit Tries to Start then Does Nothing

Has the Time delay been activated by brief power on/off? (Wait 5 minutes - unit should restart)

NOTE. The combination of a cold pool (below about 50°F) and a low air temperature (below about 45°F) MAY cause temporary on off cycling of the Heat Siphon. A pool cover and /or 50°F air temperature will eliminate this cycling and allow normal heating operation to resume.

Is the air below 45°F to 48°F and the pool water cold? (Wait for air temperature and/or pool to reach 50°F - unit should restart automatically and resume normal heating)

Is the pool filter clean and pool water flow stable? A clogged filter or air leak in the pool pump return line can cause erratic water flow and air in the lines which in turn can cause Heat Siphon® to cycle- restore the correct water flow.

Is the fan running when the unit is running? - (if not call dealer)

4.3 Unit Runs But Doesn't Heat

Check these before calling your dealer:

Air leaving colder? If not call dealer

NOTE: If Heat Siphon®'s air outlet is noticeably (5 to 10°F) cooler

than the inlet air, then the unit is providing heat to pool. The unit may not have been running long enough to heat the pool (see next step), or the unit may be undersized. (See proper sizing section above)

Pool pump running long enough each day? Normally 12-14 hours/day is sufficient if Heat Siphon ® is sized properly (let pool pump run continuously for 24 hours to find time required-if not heating call dealer)

Is there abnormally high heat loss? No cover on extremely windy day? (Cover pool and run pool pump 24 hours. If still not heating call dealer)

4.4 Unit Runs & Heats But Leaks Water

Water leaking from INSIDE your Heat Siphon is due to one of two conditions

- *NORMAL CONDENSATION as it cools off warm humid air*
- *WATER LEAK in the Heat Exchanger Housing or Internal Hose or Piping.*

The most common cause of a water leak is CONDENSATION. The second is a CRACKED HEAT EXCHANGER CAP DUE TO FREEZING. If you have not properly winterized (See next section) this will not be covered under your warranty. Before calling your dealer, here are some tests you should perform:

TURN OFF YOUR HEAT SIPHON, KEEP YOUR POOL PUMP ON and wait until basepan empties. If the Water Leak Stops IT IS NORMAL CONDENSATION

If the Basepan does not empty BUT THE leaking stops it's still condensation but your drain is blocked so unclog the barb drain fitting and/or replace the vinyl drain tubing.

TEST THE LEAKING WATER for Chlorine - If it tests NEGATIVE it's Condensation.

If the water has chlorine and the leak continues, call your dealer

5 Maintenance & Winterizing

As well as being virtually corrosion-free, your Heat Siphon® has been designed and built using strictly high quality, proven reliable components. As a result, you can expect your Heat Siphon® to outlive other heaters and to require only minimal maintenance over its lifetime. No regular scheduled maintenance is required and only minimal cleaning and minor lubrication as noted below

5.1 Lubrication

Your Heat Siphon® has only two rotating parts subject to wear and thus requiring lubrication: the compressor and the fan motor.

Since the refrigeration system compressor is hermetically sealed which eliminates all air and water vapor contamination, it requires no lubrication or maintenance. The refrigerant inside is extremely stable, has a special lubricating oil added which lubricates the compressor bearing. The oil and refrigerant are so stable that under normal conditions they will easily last more than 30 years without breaking down.

The fan motor which is totally enclosed type motor (sealed from rain and dirt) is equipped with a rain slinger on its shaft to prevent rain water from washing the lubrication out of its sleeve bearings. This should also require no lubrication for years, however, after several years of service in a hotter climate or if the motor has set idle in a hot dry environment for many months, the lubrication may begin to dry out and may cause the fan motor bearing to make noise. If left uncorrected this will eventually slow down and freeze up the fan motor causing short cycling and may burn it out.

WARNING: Before removing the fan guard , TURN OFF ALL POWER TO THE UNIT. ACCIDENTAL STARTING OF THE FAN MOTOR WHILE THE GUARD IS OFF CAN RESULT IN SEVERE INJURY.

You can re-lubricate the bearings using the oil fittings on the side of the fan motor. Remove the two plastic seal plugs (one at the top and bottom of the motor housing) and squirt in light machine oil.

5.2 Cleaning

WARNING: Before cleaning TURN OFF ALL POWER TO THE UNIT. Although each unit is production tested for any ground faults and the electrical supply hookup is in a gasketed rain tight housing, a faulty field electrical hookup or hidden damage to the unit CAN PRODUCE A FATAL SHOCK HAZARD. Don't take a chance- DISCONNECT AND LOCKOUT THE BREAKER BEFORE CLEANING
CAUTION - DO NOT SPRAY WATER DIRECTLY INTO THE HEAT SIPHON WITH A HOSE OR OTHER HIGH PRESSURE WATER. Although the Heat Siphon® Is Rain tight it is NOT WATERPROOF and high pressure water can be directed in a manner that could cause shorting and even ELECTRIC SHOCK HAZARD.

Heat Siphon's solid PVC cabinet may be cleaned using any of the automotive vinyl cleaners, or soap and water. An abrasive cleaner or bathtub porcelain cleanser will remove most stubborn stains. Dirt and leaves should be swept from the finned horse shoe shaped evaporator if build up occurs. Spraying water is not necessary to clean Heat Siphon® and normal dirt accumulation will not have any effect on the unit's performance.

5.3 Winterizing

Warning: If pool or spa water is allowed to freeze in the heat exchanger, it will expand and may crack the heat exchanger housing requiring heat exchanger replacement which is not covered by the warranty.

Your Heat Siphon can stand the coldest of winter weather with no problems. The only precaution necessary is to make sure that the heat exchanger is drained of all pool water.

If in doubt add antifreeze to the outlet (top) until it comes out of the inlet (bottom) of the unit.

In freezing weather the plastic cabinet material does become brittle and should be protected from any impact but can withstand normal moving and handling.

NOTE: It is totally unnecessary that your Heat Siphon be moved from its installed location for the winter, and in fact it is recommended that you leave it intact to avoid damage during moving.

Installer Section

This Section of the manual applies to the installer.

1 Receiving Shipment

NOTICE: ALL Shipments by the factory are made F.O.B.. Latrobe, PA. As such, the buyer (dealer) takes possession of the Heat Siphon® the minute it leaves the factory loading dock.

United States ThermoAmp, Inc. is NOT responsible for any shipping damage occurring in transit. THE FREIGHT HAULER IS RESPONSIBLE FOR ALL FREIGHT DAMAGE AND ALL DAMAGE CLAIMS MUST BE SETTLED DIRECTLY WITH THE FREIGHT HAULER. The factory will assist you in settling claims wherever possible but YOU MUST DEAL DIRECTLY WITH THE SHIPPER TO RESOLVE ALL FREIGHT DAMAGE.
IMPORTANT.- IF YOU RECEIVE A DAMAGED HEAT SIPHON® NOTIFY THE CARRIER IMMEDIATELY (THAT MEANS THE CARRIER'S OFFICE, NOT THE DRIVER)
CAUTION: A unit which has been dropped will have internal damage which is not apparent from the outside of the carton. If in doubt unpack the unit in presence of the shipper at the time of delivery. Puncture marks and oil stains on the box are indicative of a ruptured and leaking sealed refrigeration system. AND SHIPMENT SHOULD BE REFUSED.

Heat Siphon® is designed and packaged to ensure safe arrival even with individual shipments, however, if Heat Siphon® is tailgated or dropped, the damage may not be visible from outside the box and if you accept shipment from the trucking company, any subsequent claims of concealed damage will be refused by the freight hauler.

Although unattractive, minor dents in the aluminum evaporator fins won't adversely affect Heat Siphon® performance, we suggest that you make note of ANY damages on the Bill of Lading BEFORE signing for receipt. Damaged fins can be "combed" straight, if not severely smashed, with a "fin comb" commonly carried by most refrigeration repairmen. Black acrylic enamel spray paint can also be used to repair any cosmetic damage.

1.1 Moving & Handling Precautions

If only a few simple handling rules are followed, Heat Siphon® can be moved virtually anywhere with no problems:

DO NOT DROP OR TAILGATE THE HEAT SIPHON .
DO NOT LAY THE UNIT ON ITS SIDE OR UPSIDE DOWN.
DO NO LIFT THE HEAT SIPHON® BY ITS TOP / VENTURI - USE HAND HOLES IN BASE.

Use a fork truck, roller conveyor or an inclined plane to unload the Heat Siphon® carton. Although the special PVC plastic used in the HEAT SIPHON® cabinet is extremely tough and more than adequate for shipment even in cold weather, it will probably break or crack if dropped from a truck tailgate.

Usually damage will be in one of three places:

Where the 25 pound control panel attaches to the base pan;
Where the 20 pound fan motor attaches to the top;
Where the 75 to 120 pound compressor fastens to the base pan.

Cracked plastic cabinet parts may or may not need to be replaced but can be expensive to replace if all the components need to be removed and remounted on a new cabinet part.

Other freight damage - bending of the fan motor mounting bracket that causes the fan blade to rub or rupturing of a copper refrigerant tube. Usually this can be repaired by a local refrigeration service center with minimal difficulty.

If tilted too far from the vertical position, the weight of the compressor can bend or break tubing or even break or crack the plastic base pan at the compressor mount.

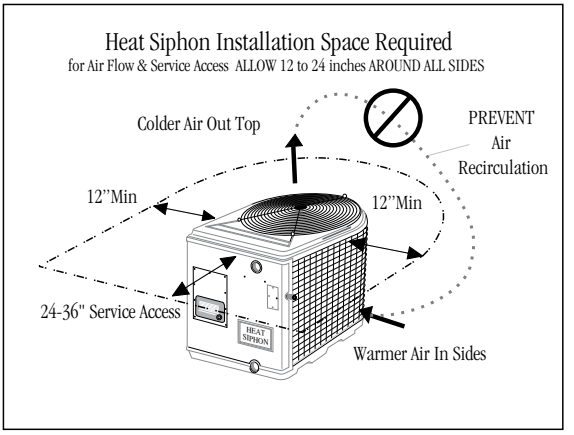
The top venturi/fan assembly is fastened to the unit using three stainless steel screws which are anchored to sheet metal flanges. This is more than adequate for ensuring a firm vibration-free assembly to the Heat Siphon® body, but these mounting screws are not designed to support the entire weight of the unit. Once out of the box, the Heat Siphon® should be lifted by the base pan only. Hand holes have been molded into the basepan for easier handling.

2 Planning Installation

IMPORTANT - READ THIS ENTIRE SECTION COMPLETELY THRU BEFORE YOU BEGIN TO INSTALL HEAT SIPHON®

The efficiency of your Heat Siphon® is dependent on its location. Picking the wrong place will not only reduce the efficiency by causing the cooler air coming out of the top to recirculate back into the air inlet, it may void your warranty. Please read through this section before you decide where to place your Heat Siphon®

2.1 Physical Location



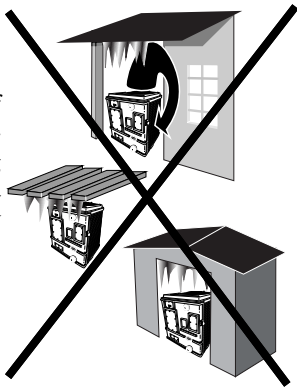
Normally, the pool piping layout and the electrical supply will dictate the general location of the Heat Siphon®. In addition, the following guideline should be adhered to when picking the location:

Allow 24 to 36 inches of open area all around the Heat Siphon® for good air circulation and service access. Avoid any overhangs or structures which could cause exhaust air to recirculate from the top of the unit back into the sides.

Ensure the Heat Siphon® will be level when in place to aid in condensation and rain water drainage. Sand or a cement slab will provide and inexpensive attractive easy to level mounting base with good drainage.

Heat Siphon's noise dampened plastic base pan ensures extremely quiet operation. To further minimize noise, point the flat side of the unit with Heat Siphon® trademark toward areas people will frequent. The plastic front panel reduces the already low operating sound level even further in that direction by absorbing compressor noise which the evaporator side does less effectively.

2.2 Prohibited Locations



DO NOT locate your Heat Siphon in any of the following places, as the air will be recirculated back to the inlet and cooled down cycling repeatedly until the efficiency is degraded and the compressor is overworked. Location in any of these places will void your warranty:

Under a roof overhang
Under a deck
In a Pool Pump house

2.3 Distance From The Pool

Normally, the pool pump and Heat Siphon® are installed close together and within 25 feet of the pool.

The longer the distance from the pool, the more heat loss from the piping. Since most of the time the piping is buried, the heat loss is minimal for runs of up to 50 feet (50 feet to and from the pump = 100 feet total) unless the ground is wet or the water table is high.

A very rough estimate of heat loss per 100 feet of piping is 2500 BTU/Hr. for every 10°F difference in temperature between the pool water and the ground surrounding the pipe, which translates to about a 3% to 5% increase in run time.

2.4 Distance from The Spa

CAUTION: Special consideration must be given to using any heater with a spa or hot tub. SEE APPENDIX D

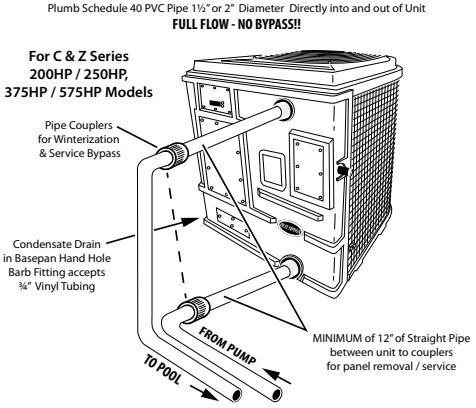
2.5 Pool Piping Required.

The Dual-Fitting water ports allow you to glue either 1.5 inch or 2 inch (with a standard 2" PVC coupling) schedule 40 PVC pipe directly into the heat exchanger. No metal heat sink piping is required.

IMPORTANT: Allow At Least 12 Inches Of Straight Pipe Between The Heat Exchanger And Any Coupling Unions Or Elbows To Allow Backpanel Removal For Servicing .

CAUTION: DO NOT USE ANY BYPASS PIPING. Heat Siphon® Requires Full Flow From 25 TO 80 GPM. Installing A Bypass May Cause Short Cycling Damage and Will Void Your Warranty.

Heat Siphon® Plumbing Installation



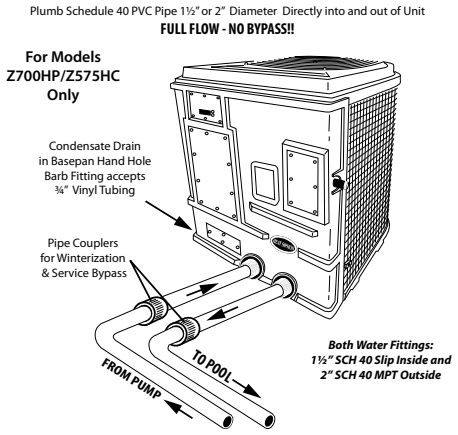
The following graphic applies to all C & Z 200, 250,375 & 575 series heating only and cooling only models:

Heat Siphon's exclusive FULL FLOW Titanium heat exchanger has a minimal pressure drop and requires NO SPECIAL PLUMBING arrangement. It should be considered as just another length of PVC pipe in your pool filtration system.

LOCATION: Connect Heat Siphon® in the pool pump discharge (return) line DOWNSTREAM of all filters and pool pumps, and UPSTREAM of any electronic chlorinators or chemical pumps.

SIZE: All Heat Siphon®'s have 1.5 " x 2" fittings for connection to the pool or spa filtration piping which will

Heat Siphon® Plumbing Installation



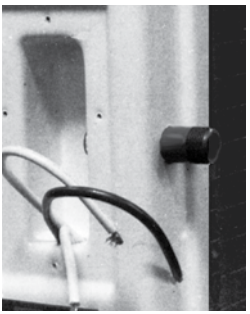
accept 1.5" schedule 40 PVC pipe directly or 2" SCH 40 PVC pipe with a 2" PVC coupling. The in-line water pressure drop produced by Heat Siphon is less than 1.5 psi at 30 GPM.

The following graphic applies to all 575 series Heat/Cool models and all 700 series Models

2.6 Electrical Power Required.

WARNING: DO NOT ATTEMPT TO COMPLETE ANY ELECTRICAL INSTALLATION OR SUPPLY CIRCUIT WIRING UNLESS YOU ARE QUALIFIED AND EXPERIENCED IN THE FIELD. Heat Siphon® Requires High Voltage Power Wiring Which Should Be Installed In Accordance With All Electrical Codes By A Licensed Electrician With Proper Training.

3 Wiring Heat Siphon®



Connect the proper size wire (including grounding) by electrical conduit, UF cable or other suitable means (as permitted by local electrical codes) to a dedicated AC power supply branch circuit equipped with the proper circuit breaker, disconnect or time delay fuse protection.

3.1 Electrical Hookup on Unit

Heat Siphon® has a separate molded-in junction box on the right side of the back panel with a standard electrical conduit nipple already in place. Just remove four screws and the small cover, feed your supply lines in through the conduit nipple and wire-nut the electric supply wires to the three pigtails already in the junction box. (Four or five wires if three phase).

No other pool heater is as easy to wire.

3.2 Code Requirements

The following are National Electrical Code (Article 339-3 and 680-10) requirements regarding burial of the electric supply wires, and are provided here FOR GUIDANCE ONLY

NOTE: LOCAL CODES SUPERCEDE AND MAY VARY FROM THESE REQUIREMENTS

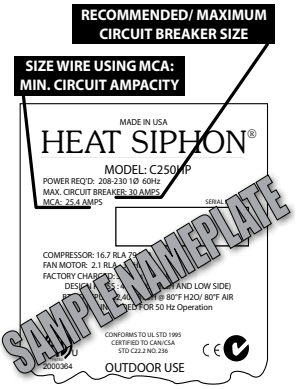
All supply cable should be at least 5 feet horizontally from the pool wall unless it is in a corrosion resistant metallic, or nonmetallic raceway system and must be buried at least the following minimum depth:

Wiring System	*Min. Burial Depth*
Direct Burial Cable	*24 inches*
Rigid Nonmetallic Conduit	*18 inches (approved for direct burial w/o concrete encasement)*
Rigid Metal Conduit	*6 inches*
Other Approved Raceways	*18 inches*

UF cable (approved for direct burial) is permitted for supply runs from the circuit breaker to the Heat Siphon®.

UF cable must be protected from damage where it is exposed (not buried) between the ground and the breaker box or Heat Siphon® junction box using suitable means.

Use copper conductors (wire) only. Aluminum is unsuitable for pool equipment service.



3.3 Circuit Breaker Size

Warning: Heat Siphon® Requires a DEDICATED BREAKER with NO other load on the same breaker (such as a pool pump)

The supply circuit breaker or fuse should be AT LEAST the AMPERAGE rating of the HEAT SIPHON® MCA (minimum circuit ampacity) BUT NOT EXCEED the Maximum Circuit Breaker Size on the NAMEPLATE.

3.4 Supply Circuit Wire Size

Caution - Have a LICENSED ELECTRICIAN size and install your wiring BASED ON THE NAMEPLATE MCA and in accordance with the NEC.

The following table suggests supply circuit wire size for type UF or TW conductors assuming a maximum 3 volt line loss is desired for the basic Heat Siphon® models noted.

The wire sizes are SUGGESTED ONLY based on the National Electrical Code Standards UNDER NORMAL CONDITIONS ONLY and are NOT intended to supersede local codes or other restrictions that may apply. All local electrical and building codes as well as the National Electrical Code (Articles 300 & 310) should be consulted for additional guidance.

SUGGESTED WIRE SIZES (buried / in air) *For Length of Run*

Model (Volts/Hz/Phase)	*50 ft.*		
75 ft.	*100 ft.*		
250 HP (208-230v /60/1)	*#14 / #14*		
#12 / #12	*#10 / #10*		
375 HP (208-230 v/60/1)	*#12 / #10*	*#10 / #10*	*#8 / #8*
575 HP (208-230v/60/1)	*#8 / #6 **	*#8/#6.*	*#6 / #6*
700 HP (208-230v/60/1)	*#8 / #6 **	*#8/#6.*	*#6 / #6*
375 HPX(440V/50-60/3)	*#14 / #14*	*#14 / #14*	*#14 / #14*

***NOTE: if THWN or TWN conductors are used in conduit and length of run is 50 feet or less, #10 AWG size is suggested if buried and #8 is suggested if conduit is in free air. If your model is not listed see nameplate MCA and consult an electrician.*

3.5 GFCI Protection

Where possible Ground Fault Circuit Interruption (GFCI) circuit breakers are strongly recommended at the main power supply for electrical equipment in the pool system. This is one low cost insurance policy which virtually eliminates shock hazard as well as equipment damage due to ground fault. Standard plug-in circuit breakers with GFIC protection are readily available. Provide your electrician with these instructions.

3.5.1 Wiring GFIC Breaker

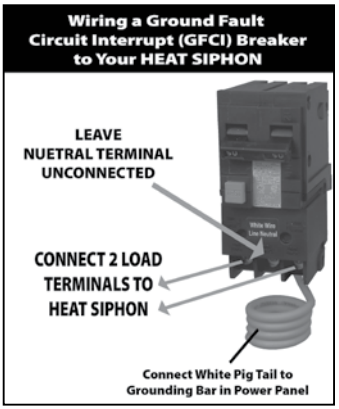
In a 220 volt single phase supply circuit to your Heat Siphon there are 3 wires:

- *Two HOT wires (both white or black) which come from the two poles of a 220 volt breaker*
- *One GREEN GROUND wire which comes from the GROUNDING BAR in the Breaker Box*
- *THERE IS NO NEUTRAL WIRE going to the Heat Siphon*
- *EACH HOT WIRE will measure 120 VOLTS between it and GROUND*

- *BOTH HOT WIRES will measure 220 VOLTS between themselves*

A GFIC TWO POLE 220/240 Volt Breaker has the following connections:

- *ONE WHITE PIGTAIL wire that must be connected to the power panel grounding bar*
- *TWO LOAD TERMINALS that are connected to the two Heat Siphon Power Wires*
- *ONE NUETRAL TERMINAL which you SHOULD LEAVER UNCONNECTED*



The graphic shows proper GFCI Breaker connection to avoid false tripping using a Seimens 50 Amps GFCI breaker. According to Siemens product sheet:

Note: A load neutral is not required on the circuit. However, the white line neutral (pigtail) must be connected to the panel neutral for the device to function.

3.6 Electrical Disconnect Switch

Article 440-14 of the National Electrical Code, which applies to Air Conditioning and Refrigerating equipment, requires that a disconnect means (circuit breaker, fused or unfused switch) "be located within sight and readily accessible from " the subject equipment. This means that if the circuit breaker box which supplies the Heat Siphon® is not within sight of the Heat Siphon®, you may be required to install a waterproof disconnect switch/box at or near (within sight of) the installed unit to meet the National Electrical Code.

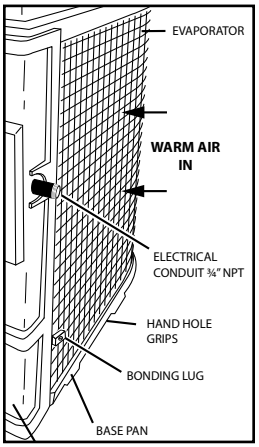
This is a common practice on commercial and residential air conditioners and heat pumps. It prevents someone from remotely energizing unattended equipment or turning on power to a unit while the unit is being serviced, which can SAVE LIVES. It also saves a serviceman time by eliminating walking to and from a remote breaker.

3.7 Electrical Bonding Requirements

Just like all other electrical pool equipment, Heat Siphon® must be bonded (local earth grounding) and usually can simply be tied into the existing bonding circuit with the pool pump etc..

NOTE: Electrical Bonding to a local earth ground (separate from power supply grounding) through a copper conductor and to any other pool or spa system electrical equipment is required by Article 680 of the National Electrical Code.

Size - A solid copper conductor, insulated, covered, or bare, not smaller



than No. 8 (8.4 mm sq.) - 1981 Nat'l. Electric Code Art. 680-22(b)

Location - Heat Siphon® has a standard copper bonding lug located on the right side of the unit facing the back panel. (See illustration at the beginning of this Installer Section) This set screw type lug accepts standard #8 solid copper wire . The copper wire should be connected to the bonding circuit of your other pool equipment.

See the lower left corner of the graphic

4 Special Installations

4.1 Indoor Pools

Heating an Indoor pool creates three problems:

The pool water must be heated,
The humidity is increased and the room must be dehumidified,
In winter the room air must be heated.

Most of the heat lost from an indoor pool is a result of evaporation where the room temperature is not increased but rather the room air becomes more humid, creating a condensation problem.

A dehumidifier cools the air down to condense the moisture out, and then reheats the air back to room temperature. The heat it extracts from the air is equal to the heat it puts back into the air except for a small amount of excess heat converted from the electricity it consumes thus there is not enough heat to also reheat the pool water.

Gas pool heaters will heat the pool but provide no dehumidification and still require the room to be heated separately.

Indoor installations of Heat Siphon® not only heat the pool, but provide the added benefit of dehumidification of the pool room. When the Heat Siphon® cools down the room air to extract heat out of it, the moisture in the air condenses on the cold evaporator, thus drying the air. But this requires the room air to be reheated and if the room is small the Heat Siphon® may over cool the air and not operate very efficiently or it may require a fairly large space heater.

If the room is large relative to the pool, there is usually sufficient heat in the air to keep the pool heated, BUT a separate heat source must still be installed for the room air.

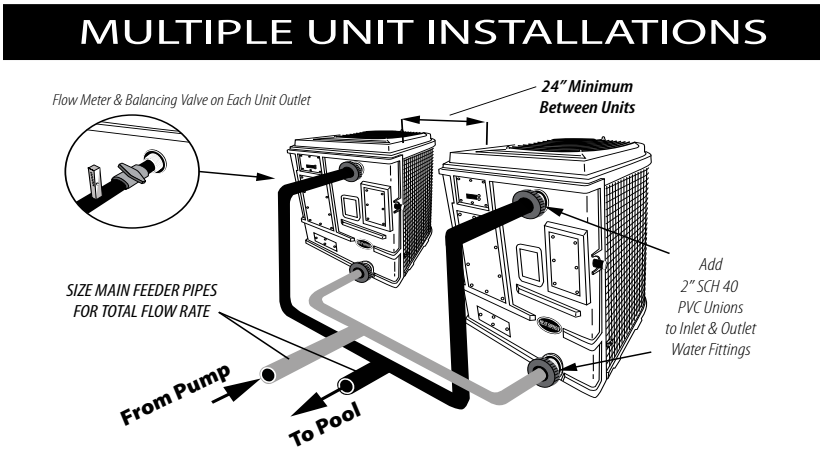
Since there is no wind the heat loss from the pool is significantly less than an outdoor pool. If a cover is used on the pool, both the humidity and the heat loss will be greatly reduced to the point where run times of only a few hours per day will maintain pool temperature.

NOTE - In any case your dealer should consult the Factory before planning any indoor pool Heat Siphon® Installation and make sure there is enough air volume and an adequate source of space heat to overcome the cooling effect.

4.2 Multiple Units

If connecting more than one Heat Siphon® on larger pools, the following applies in addition to the SPACE requirements for single units:

- *Feed all Heat Siphon's from the same line (PUT THEM IN PARALLEL) and tie all of their water outlets together. ENSURE EACH UNIT RECEIVES AT LEAST 25-30 GPM*
- *If piping (number of elbows and bends) are not identical to each unit then install a flow meter, PVC couplings and shut off valves in each Heat Siphon® 's water line to permit balancing the flow equally between units and to facilitate service and removal if required without shutdown of*



Plumbing Must Be In Parallel - use same number of elbows with flow meter and balancing valve at each unit

the pool pumps.

CAUTION: In A Multiple Unit Installation Do Not Connect The Water Outlet Of One Heat Siphon® To The Water Inlet Of The Next Heat Siphon®

This will create two problems:

FIRST - Series plumbing makes it impossible to correctly set the 2nd unit's thermostat. The water leaving the first unit will be several degrees warmer than the pool. Thus the second unit's thermostat will need to be set several degrees higher than the desired pool temperature before it will turn on and it will cause cycling as the first unit turns off and on. If both thermostats are set the same then the second unit will only run when the pool is colder than the heat rise produced by the first Heat Siphon®.

SECOND - Series plumbing reduces efficiency of each Heat Siphon® downstream. - Warmer water removes less heat from the Heat Siphon's heat exchanger and requires the compressor to work harder. The highest efficiency is achieved by feeding the coldest water to each unit (parallel piping does just that)

4.3 SPA Heating Issues - See APPENDIX D

SAFETY CONCERNS require special considerations when Heating a Spa or Hot Tub

Completing Installation

Assuming you have picked the best location and orientation and the necessary amperage electrical power supply and bonding circuits are in place, the only work remaining is final wiring and plumbing of the Heat Siphon®.

4.4 Tools / Materials Required

The following is a suggested list of tools and materials normally required for Heat Siphon® installation. Additional tools and materials may also be required by unique or extraordinary pool sites:

- *PVC pipe & fittings*
- *PVC cement & primer*
- *Hacksaw*
- *Wire cutter/stripper*
- *Pliers*
- *Screwdriver (phillips and flat blade)*
- *Circuit breaker with GFI*
- *Wire nuts*
- *Wire of size length and insulation required to meet local code*

Normally the existing breaker box in the home electrical service or in the pool equipment panel has an available breaker space. If not then you will need to install a new electrical breaker panel or fuse box.

4.5 Optional Recommended Materials

- *3/4 " vinyl tubing for hose-barb condensation drain fitting in base pan*
- *Disconnect switch box if breaker not within site of the unit and/or local codes require it.*
- *PVC Unions or flexible couplings*

4.6 Helpful Hints

IMPORTANT: ALLOW AT LEAST 12 INCHES OF STRAIGHT PVC PIPE GOING INTO AND OUT OF THE HEAT EXCHANGER. Otherwise elbows or pvc couplings will prevent back panel removal and stop service access inside the unit .This will also make repair of any plumbing problems very difficult and may require unnecessary heat exchanger replacement since these are permanent glue joint fittings.

The following is a short list of suggestions which may prove time and money saving to the installer not only during installation but throughout the life of the Heat Siphon®:

Installation of PVC unions or hose clamp type flexible couplings at the Heat Siphon® water inlet

and outlet lines is recommended to permit easy removal of the front panel if necessary for future service. ALLOW AT LEAST 12 INCHES OF STRAIGHT PIPE IN AND OUT OF THE UNIT BEFORE INSTALLING UNIONS.

Rigid PVC piping entering and leaving the Heat Siphon® SHOULD NOT BE IN A STRAINED OR BOWED POSITION. Higher temperatures of the heated water can soften the PVC where solvent was applied (until it is completely cured) and over time may cause glue joints to break open or leak.

Provide a means of draining the pool or spa water for winterizing. Unions are an excellent way to provide drainage as well as easy service access. Draining the Heat Siphon® is recommend any time freezing temperatures are expected while the pool pump is off and no water is circulating.

Cut and fit all PVC pipe before any gluing is started. Use generous amounts of PVC cement and twist each glue joint at assembly to ensure freedom from leaks. Don't disturb a joint while the solvent is setting up.

If hard conduit is used to provide the electrical supply wiring , then terminate it with several feet of flexible weatherproof conduit (such as sealtite) before entry to the Heat Siphon® junction box . This will allow back panel removal without un-wiring the unit in the event future service is required.

Minimize the number of elbows used as this increases the pressure drop and pump back pressure.

Avoid installing the unit in locations where fences, decks or other structures that can cause air recirculation may be added later and caution the pool owner to avoid such additions in the future.

Take the time to explain your installation to the pool owner and help fill out and send in the warranty card . A little consumer education goes a long way to eliminate unnecessary service calls after you've done a proper installation.

5 Final Power Line Wiring

Wiring to the TO COMPLETE WIRING remove the small gasketed Heat Siphon® junction box cover in the upper right corner of the front panel. Feed the wires into the junction box, complete splicing with wire nuts and replace the cover.

CAUTION: Make sure the incoming ground wire is spliced to the Heat Siphon® lead wire marked with the green tape or green insulation and that the unit is bonded to a local earth ground.

6 Final Plumbing into Pool or Spa

IMPORTANT: Allow at least 12 inches of straight pipe between the heat exchanger and any couplings or elbows to allow backpanel removal for servicing .

NOTE. If the VERTICAL DISTANCE between the pool water level and the Heat Siphon® is excessive (below or above 2 to 3 feet) your Heat Siphon® may require adjustment of the water flow switch at installation (see initial start up section).

Because of Heat Siphon's exclusive FULL FLOW Titanium heat exchanger, it requires NO SPECIAL PLUMBING arrangement and should be considered as just another length of PVC pipe in your pool filtration system.

The dual socket water ports allow you to glue either 1.5 inch or 2 inch (with a PVC 2" coupling) schedule 40 PVC pipe directly into the heat exchanger.

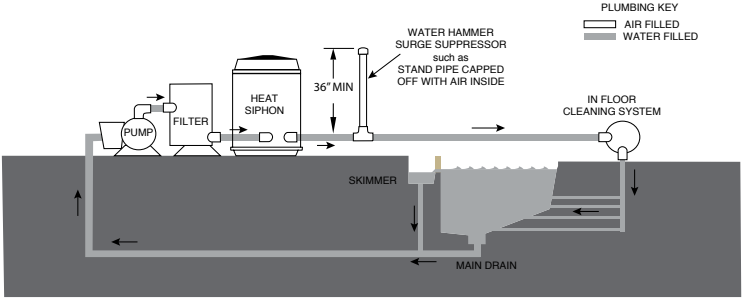
LOCATION: Connect Heat Siphon® in the pool pump discharge (return) line DOWNSTREAM of all filters and pool pumps, and UPSTREAM of any electronic chlorinators or chemical pumps.

SIZE: All Heat Siphons have 1.5 " x 2" fittings for connection to the pool or spa filtration piping. The in-line water pressure drop produced by Heat Siphon is so low (less than 11/2 psi at 30 GPM) that as far as the pool pump is concerned the Heat Siphon® can be considered equivalent to a few more feet of PVC pipe.

NOTE: THE HEAT SIPHON® REQUIRE NO BYPASS PIPING and NO SPECIAL Setting of FLOW RATES as long as a minimum of at least 25-30 GPM is maintained during heating. Only on larger systems where 2" PVC and 2.5 HP and larger pumps are used should a bypass be considered.

6.1 In Floor Cleaning Systems

Heat Siphon Plumbing Required for In Floor Cleaning Systems



A special consideration must be given to in floor cleaning systems which can create water hammer as the multi-port valves open and close. Water hammer damage is not covered by your warranty. It is up to the pool builder to install the necessary plumbing features to protect your equipment from water hammer damage.

In these cases a vertical standpipe is recommended to reduce water hammer . Adding this plumbing feature is simple and may prevent damage to the heat exchanger housing., however, it is not a guarantee against damage. More effective and costly surge protection is available if the pool builder considers it necessary.

6.2 Pool Spa Combo Plumbing

The following pages shows several pool spa combination plumbing schematics. The first two pages show a

single pump and filter on a pool/spa combo with spillover feature and the last two show a two pump system.

Basically a Pool Spa combo is an installation where the two bodies of water have common plumbing allowing the spa water to be dumped & diluted back into the pool or mixed with it for both filtration and heating considerations. Since the spa water is taken from and mixed with the pool water it will normally be at the pool temperature as a starting point so it needs to only be heated from say 82°F to 102°F instead of the normal unheated water temperature which can be much lower.

Single Pump Systems are simpler to plumb and only require two three way valves. They save energy (only one pump needs to run) and thus are more common. The heating / filtering modes are limited to the pool, or the spa or both pool and spa together.

Two pump systems require a second pump and filter, a third three-way valve and four check valves. They add the ability to filter the unheated body of water while heating and filtering the other.

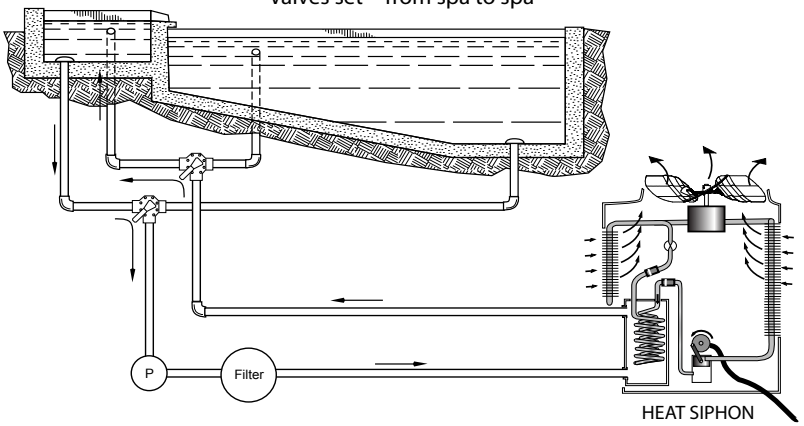
1 Pump- Heating Pool or Spa

POOL SPA COMBO

One Pump & Filter with Two 3-way Valves

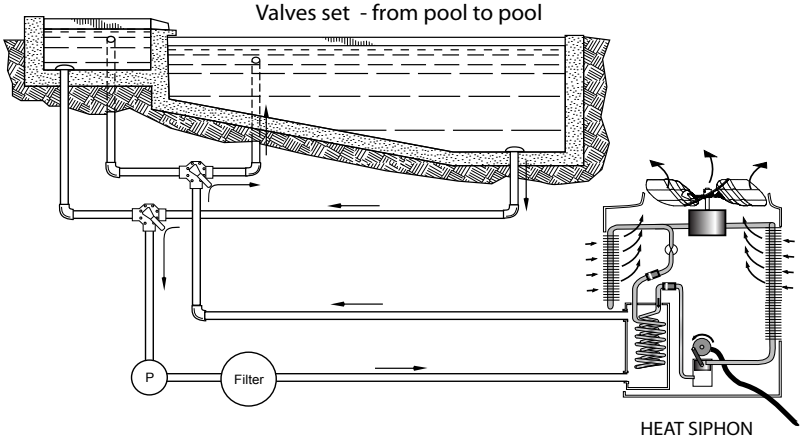
Heating & Filtering Spa Only

Valves set - from spa to spa



Heating & Filtering Pool Only

Valves set - from pool to pool



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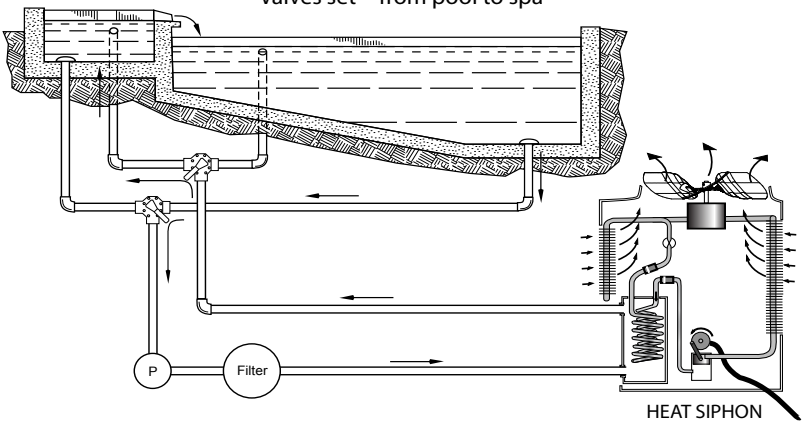
1 Pump- Spillover Mode

POOL SPA COMBO

One Pump & Filter with Two 3-way Valves

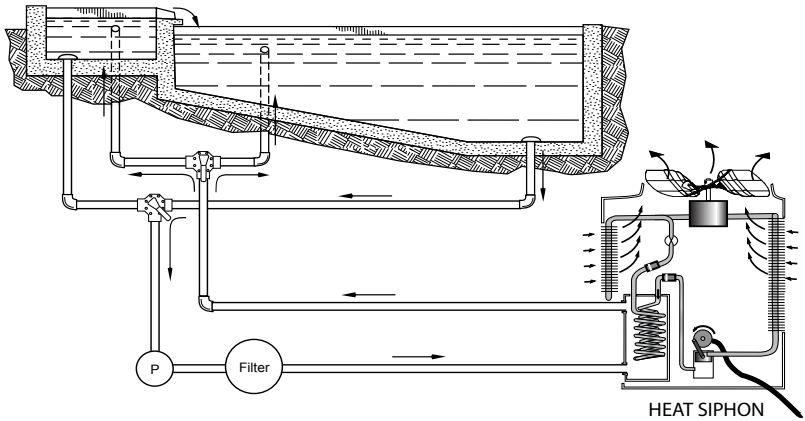
Spill Over Mode

Valves set - from pool to spa



Spill Over Mode

Valves set - from pool to pool & spa



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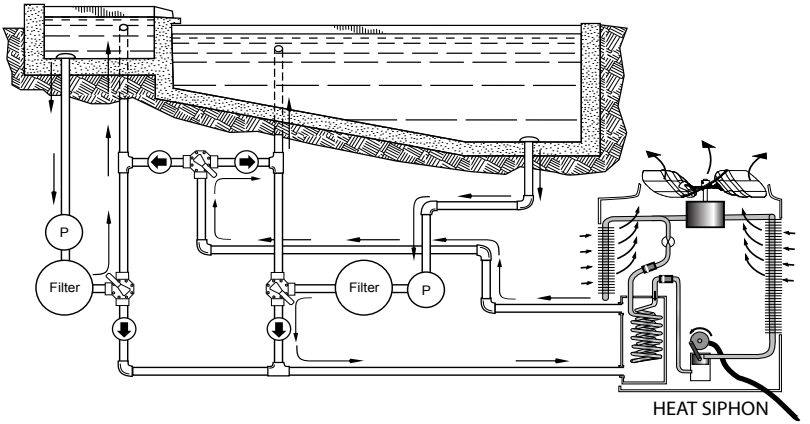
2 Pump- Heating Pool or Spa Only

POOL SPA COMBO

Two Pumps & Two Filters with
Three 3-way Valves & Four Check Valves

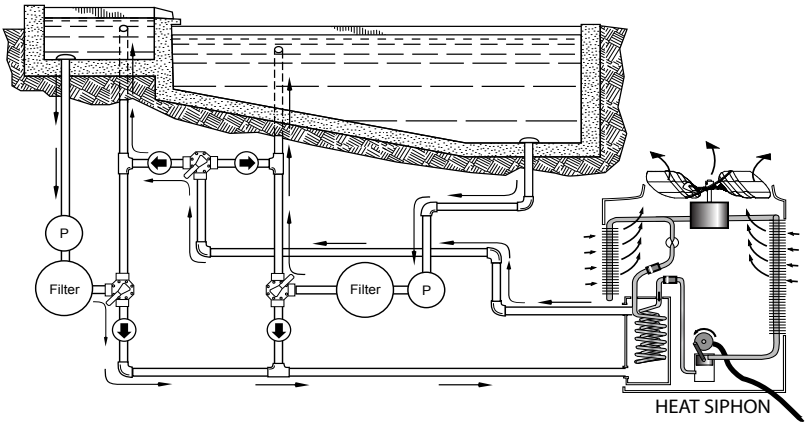
Heating & Filtering Pool / Filtering Spa

Valves set from pool to heater to pool / from spa to spa



Heating & Filtering Pool / Filtering Spa

Valves set from spa to heater to spa/ from pool to pool



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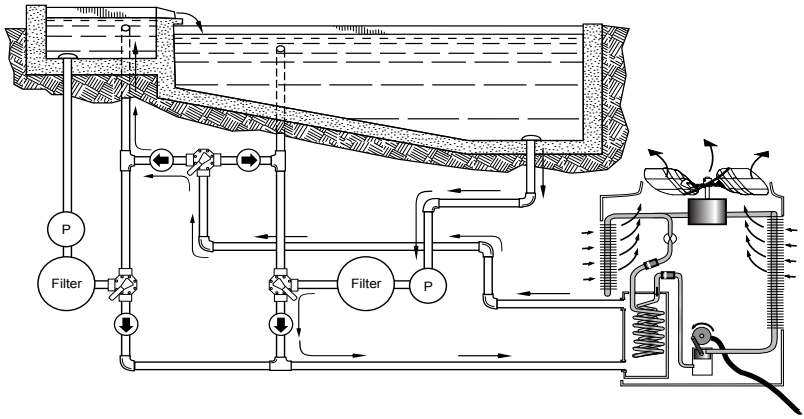
2 Pump- Spillover Mode

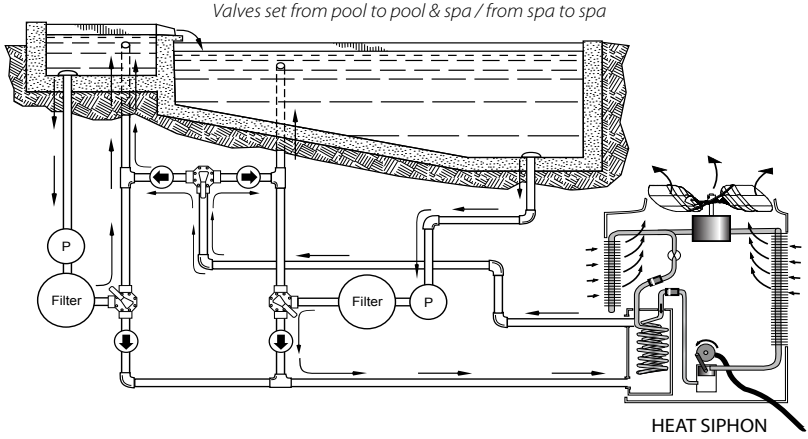
POOL SPA COMBO

Two Pumps & Two Filters with
Three 3-way Valves & Four Check Valves

Spill Over Mode - Pool Pump Only
Heating & Filtering Pool & Spa
Valves set from pool to spa



Spill Over Mode - Both Pumps On
Heating & Filtering Pool & Spa
Valves set from pool to pool & spa / from spa to spa



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Initial Start-up

Please read completely through this section BEFORE STARTING UNIT.

IMPORTANT: Heat Siphon® is equipped with a five minute built in solid state restart delay included to protect control circuit components and to eliminate restart cycling and contactor chatter. This time delay will automatically restart the unit approximately 5 minutes after each control circuit interruption.

1 Initial Performance Checks

After installation is completed and the unit is ready to start, TURN OFF POOL PUMP and follow these steps:

1.1 First Startup of Analog Models

- *Turn the Heat Siphon ® thermostat knob completely clockwise*
- *Turn on your filter pump, check for leaks and verify flow to and from the pool.*
- *Turn on the electrical power supply to the Heat Siphon® . The unit should start immediately.*
- *Note : Even a brief power interruption will activate the solid state 5 minute restart delay and prevent your Heat Siphon from starting until the count down is completed. A power interruption during the delay period will have no effect on the 5 minute countdown.*
- *After running a few minutes make sure the air leaving the unit is between 5 to 10 degree F cooler than ambient air - if not call dealer*
- *With Heat Siphon® operating, turn the filter pump off. Heat Siphon® should also turn off automatically - if not readjustment of flow switch is Req'd. (See below)*
- *Restart the pump/filter. The Heat Siphon ® should start right up - if not readjustment of flow switch req'd. (See below)*
- *Allow the Heat Siphon® and pool pump to run 24 hours per day until desired pool water temperature is reached. At this point, slowly turn the thermostat knob counter clockwise until the unit just shuts off and note the number on the dial. Your Heat Siphon& will now automatically restart (as long as your pool pump is running) when the pool temperature drops more than 1.5 °F below the set temperature.*

In other words "SET IT AND FORGET IT."

1.2 First Startup of Digital Models

- *Turn on the electrical power supply to the Heat Siphon®*
- *Display will read soft 1.xxx (the software version), then display flow & start delay countdowns.*
- *Press the Player "Up" or "Down" key until the desired water temperature is displayed*
- *Turn on your filter pump*
- *If the pool water temperature is below the Player set point, the unit should start immediately.*
- *The Player will display: "POOL" and the water temperature, then the "SET" and your desired water temperature - if it is lower raise the set point above the water temperature.*

- *Check for leaks and verify flow to and from the pool.*
- *Note : Even a brief power interruption will activate the solid state 5 minute restart delay and prevent your Heat Siphon from starting until the count down is completed. A power interruption during the delay period will have no effect on the 5 minute countdown.*
- *After running a few minutes make sure the air leaving the unit is between 5 to 10 degree F cooler than ambient air - if not call dealer*
- *With Heat Siphon® operating, turn the filter pump off. Heat Siphon® should also turn off automatically - if not readjustment of flow switch is Req'd. (See below)*
- *Restart the pump/filter. The Heat Siphon ® should start right up - if not readjustment of flow switch req'd. (See below)*
- *Allow the Heat Siphon® and pool pump to run 24 hours per day until desired pool water temperature is reached. Your Heat Siphon will shut off and the POOL LED will be on solid Green.*
- *Your Heat Siphon will now automatically restart (as long as your pool pump is running) when the pool temperature drops more than 1.5 °F below the set temperature.*

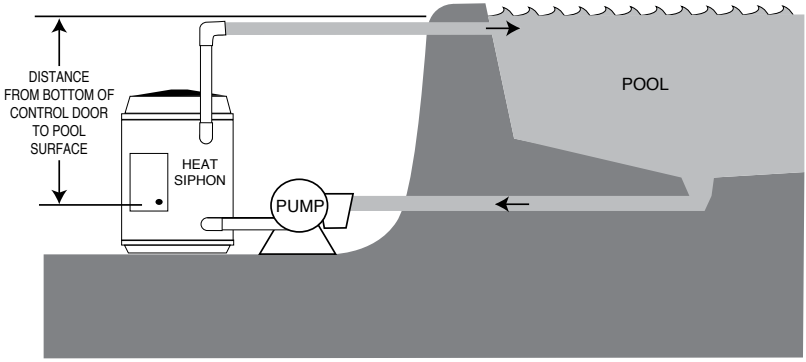
1.3 Adjusting the Water Pressure Switch

Only one Heat Siphon® adjustment may be required at installation.

On some models of the Heat Siphon® a gas heater type water pressure sensing switch is used to detect flow rather than direct flow measurement. The switch prevents Heat Siphon® operation with no water flow. Adjustment is required when the vertical distance from the pool surface to the Heat Siphon® thermostat knob is more than a few feet above or below pool level .

To correct this condition, DISCONNECT ALL ELECTRICAL POWER, remove the cover to the control box and adjust the switch as follows.

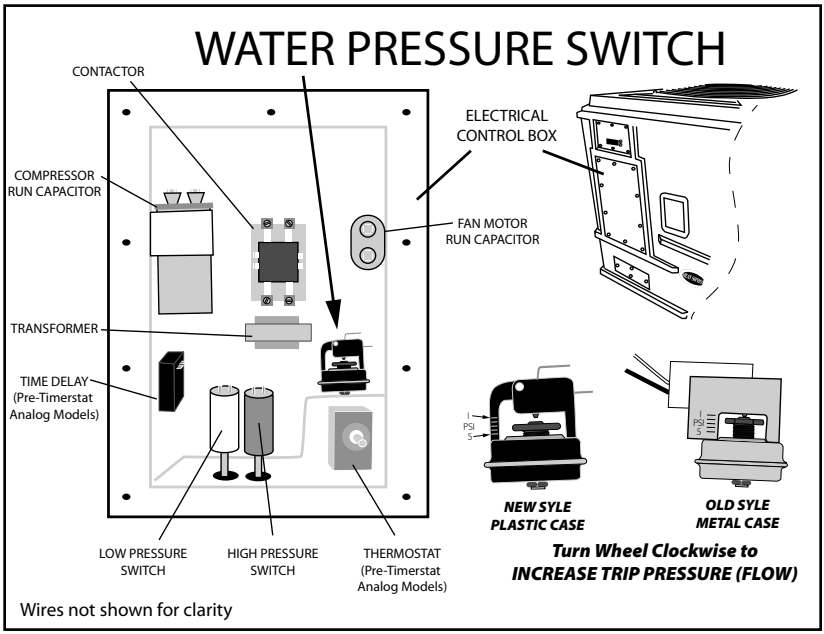
If the pool is BELOW the unit and the Heat Siphon® won't turn on with the pool pump, turn the pressure switch adjustment thumb wheel to the right until the top of the switch is at the MINIMUM SETTING (1 psi).



If the unit still doesn't start and it is more than 2 feet from the water surface to the thermostat

knob then the height difference may be creating a siphoning effect as the pool water returns to the pool, which in turn lowers the pool return line pressure below the minimum trip pressure of this switch. In this case you may need to create sufficient

Water Pressure Switch Location:



Digital Player Section

This section of this Manual applies to all digital models and specifically details the operation of the Digital Player Controller that is built into all Digital Models including Heating Only, Cooling Only and Heat/Cool Models.

1 READING the PLAYER DISPLAY

The Display is a 7 segment 4 digit LED which is easy to see in daylight as well as at night.

However, this does limit the words that can be displayed. Only capital letters "O, A, E L,C, S, F and U" and small letters "b, d, o, l, i" are easy to represent & clearly understood. We also chose to use a representation of the letters small "t, v, i and o" to broaden the number of words the Player can display but they are not as easily recognizable.

Here are the more confusing ones:

Heat .....

Set .....

Cool .....

Volt .....

On In .....

Soft *(software version)* .....

1.1 The Player Display Info

Normally the Player continuously displays three bits of information - the MODE , the water temperature and the set point. For example, if your pool is 78°F and you have set the pool temperature to 88°F and you are in POOL mode, then following message is displayed:

Screen Message	Duration
POOL	(2 second)
78°F	(2 second)
HEAT	(1 second)
SET	(1 second)
88°F	(2 second)

If errors occur or event timers are active they take precedent. All common Error codes are listed on the decal along with their meaning.

One of the timers that you will see is the Off timer. This is a 240 second (4 minute) countdown that will occur anytime the Heat Siphon turns off either in the background or shown directly on the display. This is a safety feature that allows the internal pressures to equalize before restarting. You will see it as, OFF, 239, 238, 237, 236, OFF, 234, 233 etc.

Another timer you will see is the FLO timer. This is a 15 second timer that begins when the water pump turns on. This is to give the water pump time to push all the bubbles through the system and achieve good water flow before the Heat Siphon turns on. You will see it as, FLO, 14, 13, 12, 11, FLO, 9, 8, 7, 6 etc. Modes: (POOL, SPA, AUTO PIC, OFF)

1.2 LED STATUS Lights

The Player has 4 LED lights located just above the top of the 4 digit display window which are labeled from left to right :

BLUE LED - Wireless PumpJump™ flutters blue when a wireless accessory is attached and communicating to a PassPort OR is solid ON when timeclock over-ride is activated using a hardwired T type or S-Type POD (Pool Operating Device)

RED LED - Service blinks when an error is detected and service call is required or an error /warning requiring user intervention has been detected

GREEN LED - Signifies the Player is in POOL MODE or in AUTO-PIC Mode with POOL Selected and is heating your water to the POOL set point

YELLOW LED - signifies the Player is in SPA MODE or in AUTO-PIC Mode with SPA Selected and is heating your water to the SPA set point

The ***GREEN*** (pool) and ***YELLOW*** (spa) LED's also signifies what "state" the Player is in based on what they are doing:

LED ON SOLID that means the pool or spa is at temperature and READY to use.

LED IS BLINKING SLOWLY (1 second on/off) indicates that the Player is heating your pool or spa but has not yet reached temperature.

LED IS FLASHING RAPIDLY (1/2 second on 1/2 second off) indicates the Player is waiting to change state such as when a countdown timer is active but your Heat Siphon has not yet turned on.

One special case which also displays the message "no FLo" (no water flow detected) which is technically an "error "or "warning" if the flow is unintentionally interrupted. Normally your Heat Siphon is simply waiting to detect flow when the pool pump turns on so we have chosen to rapidly flash the POOL or the SPA LED while displaying this message.

The industry standard water pressure switch that is used by all heaters to detect whether the pump is on, cannot necessarily distinguish between no flow (waiting for flow) and low flow (pump or filter troubles) which is an error. In this case, low flow will result in a High Refrigerant pressure which trips that switch it will appear as a Hi P error and the red LED will flash.

2 Changing Pool Temperature

Press the UP or DOWN arrow key at any time and you will instantly see the current water temperature set point displayed and it will begin blinking. Any additional key presses while it is blinking (within 3 seconds) will raise (up arrow key) or lower (down arrow key) the set point.

Simply change the set point by pressing the keys until the temperature you want is displayed

No key press for three seconds will store the displayed temperature as the new set point with a confirming "BEEP" If you made no changes then there will be no "BEEP" and after three seconds the display will continue to scroll through its normal messages

2.1 Changing Units (°F / °C)

Press and hold BOTH keys at the same time for THREE SECONDS you will hear a rapid beep-beep-beep etc.

Continue pressing until the right most digit displays "F" or "C" then IMMEDIATELY RELEASE BOTH KEYS and press up or down to change units. No key press for three seconds will change to the displayed units, "F" or "C" and the Player will BEEP confirming that it has accepted your change.

3 Player Operating Modes

The Player has FOUR MODES: POOL, SPA, EC and OFF. Pool and Spa modes automatically HEAT (or COOL with Chiller models) a Pool or Spa to a set temperature and will turn on only when water flow is available and turn off when the desired water temperature is reached.

No matter what MODE your Player is in, it will not allow your Heat Siphon to run if there are any safety switches tripped or errors. That means there must also be at least 30 GPM of water flow and air above 45°F to 50°F. Switching between any mode is normally not necessary or recommended unless you have a pool/spa combo and are using manual 3 way valves to switch from pool to spa or spill over mode.

3.1 POOL Mode

POOL and SPA modes are basically identical except that each has a separate temperature range and set point.

In POOL mode uses the ***GREEN*** LED light to indicate status (SEE LED Status Lights above) and the use of the word POOL in the water temperature display, example - "POOL ". . . "78F" . . "HEAT". . SET" . . "80F"

- *POOL mode will heat to the desired POOL set point then shut off your Heat Siphon.*
- *Switching between POOL and SPA does not erase the other mode's set point.*
- *POOL can be set from 50°F(10°C) to 98°F(36°C)*

3.2 SPA Mode

In Spa mode, the ***YELLOW*** LED light to indicate status (SEE LED Status Lights above) and the use of the word SPA in the water temperature display, example - "SPA ". . . "98F" . . "HEAT". . SET" . . "102F"

- *SPA mode will heat to the desired POOL set point then shut off your Heat Siphon.*
- *Switching between SPA and POOL does not erase the other mode's set point.*
- *SPA mode will heat to the desired SPA set point then shut off your Heat Siphon.*
- *SPA can be set from 50°F(10°C) to 104°F(40°C)*

3.3 OFF Mode

The OFF mode is just that - your Heat Siphon will remain OFF no matter what the water temperature or set point and will not display anything other than "OFF" . Once any key is pressed, the Player will restart into the last known mode before OFF was chosen. And the 240 second Off timer will begin.

3.4 EC Mode (External Control)

If you elect NOT to use Heat Siphon Brand Digital / Wireless Pool/Spa Controller Accessories, using the EC mode, you can still interface your Heat Siphon's Player Control Board with any other 3rd party pool/spa control systems.

For more information on how to install and wire 3rd party controller interfaces into the Player, see the EC MODE Instruction Sheet

EC mode which stands for EXTERNAL CONTROL will ONLY TURN ON your Heat Siphon IF there is water flow AND your 3rd party controller's dry contacts are closed AND the MAX set point of the Player has not been exceeded. It will stay on until either the MAXIMUM EC set-point is reached or your controller shuts it off.

ALL ERROR MESSAGES WILL STILL BE DISPLAYED. You set the MAX EC set-point on your Player with up/down keys.

Once you place the Player in EC mode it will continuously display "EC" and the water temperature or "OFF" if your Heat Siphon is not running.

3.5 TEST Mode

WARNING - DO NOT ENTER TEST MODE.

TEST mode is for factory authorized service personnel use only.

Factory Service phone support may ask you to enter test mode to diagnose a problem and guide you through the process including exiting test mode. Without this support you should NEVER use or enter Test Mode since it can override safety controls.

If you accidentally enter test mode you should exit immediately by doing the following:

Repeatedly pressing and releasing EITHER the up or down arrow key until the word TEST (tESt) reappears in the display.
Then press and release both keys at the same time.
This will result in the Player rebooting to normal operation using the last selected MODE.

NOTE: IF YOU CAN NOT EXIT TEST MODE CALL THE FACTORY IMMEDIATELY

4 Switching Modes

4.1 Pool/Spa/Auto/Off

Press both keys WHEN THE MODE IS DISPLAYED (POOL/SPA/OFF) which will cause the current mode to blink for 3 seconds.
Press and release EITHER up or down key while blinking to cycle to the next mode including OFF.
You now have 3 seconds to press the up (or down) arrow.
Press and release the up (or down) arrow to scroll through the four different modes.
The modes are: POOL, SPA and OFF.
Three seconds after your last keypress, the displayed mode will be accepted with an audible beep.
Notice that the lights will change to match the mode.

NOTE: EC Mode is not displayed in the normal MODE scrolling list. Entering EC mode requires additional steps - see next below for details.

4.2 Entering EC Mode

The following procedure is used to allow a 3rd party controller to turn your Heat Siphon on and off. First, you must put your Player in the OFF mode using the "Switching Modes" instructions above.

NOTE: In "EC" mode, the thermostat will still turn your Heat Siphon off when its set point is reached. If you do not want to use the built in Thermostat set point you must raise the set point above the 3rd party controller temperature range. The thermostat then becomes a safety switch and it's set point is now referred to as "MAX EC" set point

From the OFF mode, press and release BOTH keys, which will cause "OFF" to blink for 3 seconds.
WHILE "OFF" IS BLINKING , press any key to display "On" then press BOTH keys to get "EC" to display.

You should then see "EC" followed by the current water temperature constantly repeated.

4.2.1 Changing MAX EC set point

In EC Mode, if the water temperature reaches the MAX EC set point it will shut off your Heat Siphon and ignore the 3rd party controller until the water temperature goes back down below the MAX EC set point.

To display/change the MAX EC set point, press any key while in EC mode, which will cause the MAX EC set point to blink for 3 seconds.
Any additional key presses while it is blinking will change the MAX EC set point by pressing up or down key
After any key has been pressed in EC mode , the MAX EC set point will be added to the display message using the words "HEAT" "SET" and the MAX EC set temperature.
This will continue for message three cycles, after which it will revert back to simply displaying "EC" and the current water temperature.

4.2.2 Manual OFF in EC Mode

You can turn your Heat Siphon "OFF" manually while it is in EC mode so it will remain off and ignore any 3rd party controller by using the "Switching Modes" instructions above:

While in EC Mode - Press and release BOTH keys causing "EC" to display & blink
Within 3 seconds press either key to display "OFF".
When Blinking stops it is in EC Manual - OFF.
To turn EC mode back on from this "manual off" EC state, simply repeat the process
Press and release BOTH keys causing "OFF" to start blinking
Within 3 seconds press either key to display "EC".

4.2.3 Exiting EC Mode

If you have either accidentally entered EC Mode or wish to return to your regular Heat Siphon Player Controller mode, you must EXIT EC Mode by performing the same sequence of key presses as used to enter EC mode:

First, you must put your Player in the OFF mode by Pressing & releasing BOTH keys to make "EC" blink then press either key to display "OFF" - wait until it stops blinking before proceeding.

From the OFF mode, press and release BOTH keys, which will cause "OFF" to blink for 3 seconds.
WHILE "OFF" IS BLINKING , press any key to display "EC" then press BOTH keys to get "On" to display. .

You should then see the PLAYER REBOOT and go through a normal startup sequence.

4.3 Locking the Player

To lock the Player, press and hold both arrow keys until you see LOC on the display (six seconds), then release both keys. Three seconds after you release, LOC will be accepted with an audible beep.

Your keys are now locked. The display will continue to show the current Temperature/set point loop and

continue to heat your pool or spa as needed, however any keypress will show LOC on the display. To unlock the Player, simply press and hold both arrow keys for six seconds until you hear a beep, then release both buttons

The Player is now unlocked

5 Special Settings in TEST mode

For some special cases the Heat Siphon Player has two Spa settings. These are in the Test Mode They are listed below and should only be enabled by the dealer:

C-SPA setting - In the case of a remotely heated spa where the plumbing run is long ands thus the spa water temperature drops a few degrees before it gets to the Heat Siphon the set point may need to be reduced to prevent overheating due to a phenomenon called THERMOSTAT SET POINT DEPRESSION - SEE APPENDIX D of this manual for details.

H-SPA setting - The default maximum spa set point from the factory is 102°F. You may change this to 103 or 104°F using this setting HOWEVER, be sure to read the SPA HEATING cautions in Appendix D of this manual before using this option.

To enable these features ask your DEALER or CALL THE FACTORY.

6 Commercial Player Spa Modes

6.1 S-SPA Menu

For spas in condominium/home owners associations, rental houses, hotels and other commercial applications, Heat Siphon Player provides an additional feature to help a non-resident or absentee owner with the ability to manage energy use when heating a stand alone spa. This is the S-SPA menu for Stop Spa Mode which includes Timed Spa Heating Mode or "tSPA" as it appears on the 7 segment 4 digit LED.

S-SPA Menu is designed to limit the amount of time the Heat Siphon will stay in the SPA Mode (heating to the SPA set point), after which Heat Siphon will revert back to the POOL Mode and heat to its set point.

6.1.1 STOP SPA Option

The hours chosen in the STOP SPA or S-SPA menu (0 , 2, 4, 6 or 8 Hours and Timed SPA or "tSPA"). You can choose S-SPA menu is accessed as

1. *holding down both keys until SSPA is displayed.*
2. *Release both keys and use the up or down arrow keys to scroll through the options*
3. *Options are as follows:*

"0" - Stop SPA Off - Normal Switching between POOL and SPA required
"2" - After 2 Hours Heat Siphon will switch back to POOL MODE and set point
"4" - After 4 Hours Heat Siphon will switch back to POOL MODE and set point
"6" - After 6 Hours Heat Siphon will switch back to POOL MODE and set point
"8" - After 8 Hours Heat Siphon will switch back to POOL MODE and set point

"tSPA" - this choice will put the Heat Siphon in Timed SPA Mode - see below for details

4. *Three(3) seconds with no key-press will accept the option displayed and return you to normal display.*

6.1.2 T-SPA - Timed SPA Mode

T-SPA mode limits the user interface to only two functions - (1) setting the spa temperature in the heat-up period then (2) setting the spa heating time in 15 minutes increments up to 90 minutes in the count down period. No other features are accessible when the Player is in T-SPA mode and it must be "unlocked" to revert back to normal Player behavior.

There are only three states in the T-SPA mode: HEAT-UP, COUNTDOWN and IDLE.

Here is how the Player works when in T-SPA mode assuming it is in the IDLE state:

The first button press (up or down keys) will change the spa temperature (after 3 seconds with no key press)

1. *If the water temperature is below the spa set point, the Heat Siphon will turn on and begin heating to the set point. This is the HEAT-UP state*
2. *While it is heating AND before it reaches the set point temperature the user may change the set point up or down. If it is set down below the water temperature, the Heat Siphon will shut off and return to IDLE t-spa state. if it is set higher, it will continue heating.*
3. *Once the spa water reaches the set point, the Heat Siphon will shut off and enter the COUNTDOWN state, where it will count down from 15 minutes to zero. and display the time left. Any button presses in the count down period will only change the time remaining in the countdown. Each button press will add (up arrow key) or subtract (down arrow key)15 minutes to/from the timer.*
4. *If the water temperature falls below the set point in COUNTDOWN state the Heat Siphon will turn back on and heat up to the existing set point.*
5. *When timer stops, the T-SPA enters the IDLE state and it will maintain the "POOL" set point which was last set before entering the T-SPA mode.*

Thus SPA heating will be limited by time and will automatically drop back to the pool temperature set point such as 82°F . For example , if the pool set point is 82°F, only a 20°F rise is needed to get to 102°F instead of starting from cold water. In addition, users can't forget to turn off the Heat Siphon when they are done using the spa, since it is always timed to go idle.

Call Factory for T-SPA mode unlocking instructions.

7 Error and Warning Codes

When the red "Service' LED flashes (or the Green LED flashes only in the case of NO FLOW), an error or warning message appears on the 4 digit, 7 segment LED display.

Most of the following error codes are listed on the left side of the Player Control decal. Some may be added

in later software updates and may not be on your decal. See our website for latest error codes.

There are three different types of error codes displayed by the Digital Player Controller. Below is a more detailed description of these error code:

WARNING CODE - The Warning Code is displayed for the duration the error exists, takes no actions and is self-correcting which means it disappears when the condition that caused it does. This error is not counted or stored in memory.

ALERT CODE - SELF-CORRECTING ERRORS - The ALERT CODE is displayed while the error condition exists same as a warning except the Player shuts down the contactor which turns off the Heat Siphon until the condition disappears. This error is counted and stored.

SERVICE CODE - ERRORS REQUIRING USER INTERVENTION - These are Service Codes that turn off the Heat Siphon until either the UP or DOWN arrow key is pressed. Then the Player restarts the unit and the error code goes away. This error is counted and stored.

NOTE: In the case of SERVICE CODES, a four digit number is displayed following the error code which indicates the total number of times that error has occurred on your Heat Siphon since it was installed.

7.1 Low Pressure Warnings:

7.1.1 Low Pressure (Lo P) - self-correcting

ALERT CODE - Heat Siphon is equipped with a low pressure switch within the refrigeration system, which is designed to detect a refrigerant leak or a fan motor failure or air blockage by (low air flow) or prevent operation when icing can occur in low air temperature.

- *If the pressure goes below a set value it opens and the Player will shuts off the Heat Siphon.*
- *This switch will auto-reset at a slightly higher pressure.*

Possible Causes

- *If there is a refrigerant leak the pressure will drop until the switch stays open preventing the unit from starting*
- *If the leak is very small the pressure may stay above the trip point and allow the compressor to start but as it sucks the low side down below the switch trip point it will then shut down.*
- *If the fan motor is not turning or moving slowly this will also lower the pressure tripping the switch and shut down the unit. In this case turn unit on to see if fan motor is hesitating or making noise, or not turning.*
- *If fan motor is turning slow or making noise it will need replaced.*
- *If the fan motor is not starting at all it may just need a fan capacitor replacement.*

7.1.2 Cycle Low Pressure (Cy Lo)

SERVICE ERROR - If the Lo P error occurs 3 times in 60 minutes the error becomes a Cycle Low Pressure error and the unit shuts down until a key is pressed. Any time during the hour if a key is pressed the count is reset to zero.

7.2 Low Air Errors (Lo/FLO)

7.2.1 Low Air Temperature (Lo A)

ALERT CODE - As the air temperature drops the suction pressure will drop at some point below the Low Pressure switch trip point and the Player will shut the unit down.

- *If the Outside Air Temperature is Below 50°F when the low pressure switch trips, it is a Low Air Error and the Player will display Lo A instead of Lo P*
- *When the pressure switch resets the Heat Siphon will restart on its own (if your pool pump on) This may occur at up to 55°F*
- *After the air temperature rises 2 °F above its trip temperature the Player will allow the unit to restart°F for 10 seconds when the Low Pressure switch has reset due to pressure increase from air temp rise.*
- *If the switch does not reset, the Heat Siphon will shut down and will display Low Air (Lo A)*

7.2.2 Cycle Low Air (Cy A)

ALERT CODE / SERVICE ERROR - If the Lo A error occurs 3 times in 60 minutes the error becomes a Cycle A Error, however, unlike the Cycle Lo P error it may reset if the temperature rises.

- *If any button is pressed at any time during the Cy A period, the Player will reset the count to zero and begin again.*

7.3 High Pressure (Hi P)

ALERT CODE - Heat Siphon is equipped with a refrigeration high pressure switch to detect low water flow.

- *If the pressure goes above a set value it opens and shuts off the Heat Siphon. This switch will auto-reset at a slightly lower pressure.*
- *If this error occurs 3 times in 30 minutes the error becomes a type 3 error Cycle High Pressure and the unit shuts down until a key is pressed.*

Possible Causes

- ***WATER FLOW RESTRICTION*** *could causing the Heat Siphon to shut down on high refrigerant pressure because the water is not removing enough heat.*
- *Check to make sure you do not have any bypass valve or any valves are in an incorrect position which is causing flow restriction*
- *Check pool filter pressure gauge -Rule of thumb Sand filter low than 25 psi, Cartridge filter lower than 15 psi , Earth Filter lower than 18 psi*
- *In Floor cleaning system valves not working properly*

- ***PUMP DEADHEAD CONDITION*** *- would "fool the water pressure switch" and the Player would allow unit to run with no water flow thus tripping the high pressure switch*
- ***WATER PRESSURE SWITCH MALFUNCTION*** *- Check the water flow line inside the Heat Siphon (clear or black hose leading from the component control panel to the bottom of the Heat exchanger)by taking off end of hose connected to the water flow switch to verify it is free of debris*
- *If Water flow checks out OK, then the high pressure switch could be out of calibration and need replaced.*
- ***TXV (expansion valve) FAILURE*** *-Refrigeration part and Air conditioning company is required for the replacement due to Refrigerant*
- ***WATER VAPOR IN SYSTEM*** *- If unit was recharged with R410A in the field and possible water vapor contamination occurred, the TXV will be blocked by the water if it turns to ice (at low air temperatures and it will unblock as the ice melts. Unit must be recharged.*

7.4 Low Water (Lo / FLO)

ALERT CODE - Water flow is either restricted or low enough to cause the water pressure switch or flow sensor to trip open.

- *To verify the problem is water flow in the case of the water pressure switch, try creating some back pressure to decrease flow by closing off one of your return lines.*
- *Check your pool pump basket make sure it is clean*
- *Clean, Bump, Etc your pool Filter*
- *Make sure your skimmer basket is clear*
- *Water pressure switch hose has become disconnected from the back panel control box or bottom of heat exchanger*

7.5 Water Sensor Open (SH o)

ALERT CODE - The Thermistor used to measure water temperature in the heat exchanger thermostat well has an open circuit meaning a break in the wires somewhere between the Player and the sensor.

- *Usually this requires the sensor to be replaced.*
- *Check connection in control panel make sure the terminals are connected tightly*

7.6 Water Sensor Short (SH S)

ALERT CODE - The Thermistor used to measure water temperature in the heat exchanger thermostat well has a short circuit somewhere between the Player and the sensor or possibly water has permeated the sensor.

- *Usually this requires the sensor to be replaced.*
- *Check connection in control panel and the wire cable for crimps and make sure the terminals are not touching bare wires or other metal which might cause a short.*

7.7 High Volts (H i / UoLt)

ALERT CODE - High voltage from the transformer greater than 31.2 VAC to the Player Board for more than 4 seconds will cause this error message to appear

- *Verify correct power connection to Heat Siphon and the transformer*
- *Voltage surges may cause this temporarily*

7.7.1 Cycle High Volts

SERVICE ERROR - If Hi Volts error occur 3 times in 30 minutes the error becomes a type 3 error - cycle voltage and the unit shuts down until a key is pressed. This is usually caused by improper power supply installation wiring

7.8 Low Volts (Lo / UoLt)

ALERT CODE - Low voltage from the transformer less than 19.2 VAC to the Player Board for more than 4 seconds.

- *Verify correct 220 Volt power connection to Heat Siphon and the transformer*
- *Check for corrosion of quick connects*
- *Voltage brownouts may cause this temporarily*

7.8.1 Cycle Low Volts

SERVICE ERROR - if they occur 3 times in 30 minutes the error becomes a type 3 error - cycle voltage and the unit shuts down until a key is pressed. This is usually caused by improper power supply installation wiring

7.9 Main Contactor Short (HS S)

ALERT CODE - The two wires going from the Player to the Heat Siphon's 24 volt AC main contactor coil has a short circuit.

- *Possible burnt wire to contactor or other wires shorting out*
- *Rodent infestation in control box*

7.10 Main Contactor Open Circuit (HS o)

ALERT CODE - The two wires going from the Player to the Heat Siphon's 24 volt AC main contactor coil are open, no coil resistance is detected.

- *Possible burnt wire to contactor*
- *contactor not making connection to start the compressor*
- *Rodent infestation in control box - wires gnawed through*

7.11 Can't Heat (CAnt / HEAt)

WARNING CODE - occurs when Heat Siphon has been running for 24 Straight hours with no water temperature gain or a temperature loss and is usually due to one of the following reasons:

- *Your pool is to large for the Heat Siphon model installed*
- *You are adding water to pool causing water temperature to drop*
- *Air temperature is too cool, to much heat loss, add a solar blanket*
- *This error is self-correcting, does not shut down the unit and will disappear when the water*

temperature rises. Its main purpose is to alert the pool owner of an abnormal heat loss or a sizing error.

7.12 Air Temp Sensor Open (SA o)

WARNING CODE - applies to the earlier version of the player board which used a thermistor held by two screw-down terminals to detect air temperature. It was to make sure the sensor wire are not touching or loose from screw down terminal.

- *All boards made after August 2006 use surface mount thermistors which virtually eliminates this error.*
- *If you can't correct this error by replacing the thermistor, a new Player is required*

7.13 Air Temp Sensor Short (SA S)

WARNING CODE - See Air Temp Sensor Open Error above.

7.14 No POD (no / Pod)

SERVICE ERROR - No Pod Service Code means the Heat Siphon is looking for an external hardwired add on Pod (See Accessories - J-POD, T-POD, S-POD) and it is shutting the Heat Siphon down because it has been controlling a pump and no longer can detect or control the pump so to be on the safe side it shuts the heater and POD terminals down and waits for user interaction.

The error without a POD attached is rare but usually due to a power surge from storm, etc.. This is easy to reset. Hold both Up and Down arrow keys at the same time. As soon as they blink-hit the up or down key to scroll thru, Pool- Spa -Auto Pic. Then you will see OFF. Stop at OFF and let the Heat Siphon shut OFF. Then Hit the up key 2 times to On. Heat Siphon will restart, go thru count down and NO POD error will be gone. The display will now go into its normal startup display and will show soft and software version number then flow count down, then go into its time delay count before restarting.

7.15 PumpJump Coil Short (PJ S)

ALERT CODE - The two wires going from the Player POD screw down terminals to a J-POD have a short circuit.

- *You must have a J-POD for this Error to Occur.*
- *Check wiring and crimped wire connections for a short*

7.16 No Flow w/ Pump Jump(Lo F / Pod)

ALERT CODE - Flow has NOT been detected with the J-POD, T-POD or S-POD connected while the Player is sending the POD a 24 volt signal to turn the pool pump on

- *Check connection on back of Player - wires should be connected to the "O" and "D" screw down terminals.*
- *POD Toggle switch could be set to OFF which overrides Player signal keeping pump off*

7.17 Flow w/ Pump Jump (FLO / Pod)

ALERT CODE - Flow has been detected with the J-POD, T-POD or S-POD connected while the Player is NOT sending the POD a 24 volt signal to turn the pool pump on

- *Check connection to Player - wires should be connected to the "O" and "D" screw down terminals*
- *POD Toggle switch could be set to ON which overrides Player signal and keeps pump on*

7.18 Pod Coil Open (no / Pod)

ALERT CODE - An open circuit has been detected with a J-POD, T-POD or S-POD connected to the Player

- *check connection on back of board*
- *wires should be connected to the "O" and "D" screw down ports.*

7.19 High Air Temperature (Air / Hi)

ALERT CODE - Temperature inside of player pocket is too warm. Heat pump remains functional.

- *This error code has been deleted from the latest Player software. - Software update required*

7.20 Low Air Temperature (COLD / xxF)

ALERT CODE - Air Temperature (biased on thermistor inside of player pocket) is too cold

- *air temp < 41 and unit ran for 15 minutes*
- *self correcting when air temp >= 43*

7.21 Easy Pic/Clock No Board (no / EASy)

ALERT CODE - An Easy Pic or clock board is required to be plugged into the Player for a T-POD or S-POD to function properly but no board is not detected

7.22 Circuit Board Errors

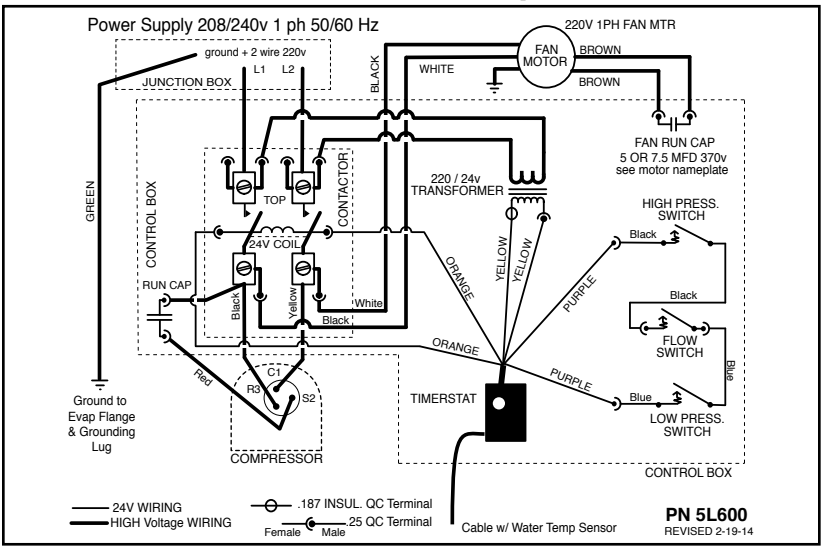
The following are hardware errors detected by the software and most likely require that the Player board be replaced

- *Board OPEN - Heat Siphon - (Brd1)*
- *Board OPEN - Reversing Valve - (Brd2)*
- *Board OPEN - POD - (Brd3)*
- *Board SHORT - Heat Siphon - (Brd4)*
- *Check controls in control panel for loose wires*
- *Board SHORT - Reversing Valve - (Brd5)*
- *Board SHORT - POD - (Brd6) - Check back of board for loose connection at POD screw down connection.*

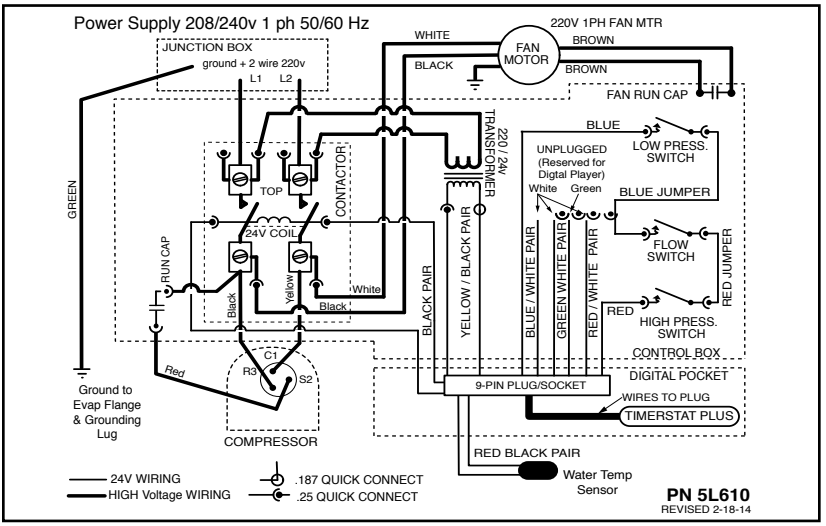
Appendix A

1 Analog Model Wiring Diagrams

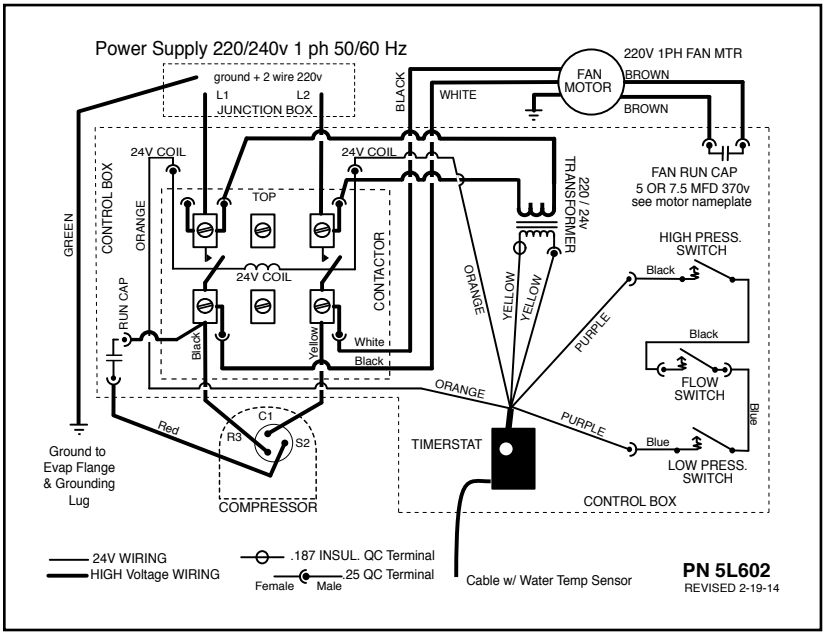
TimerStat Models 220 volt-1 ph-50/60Hz



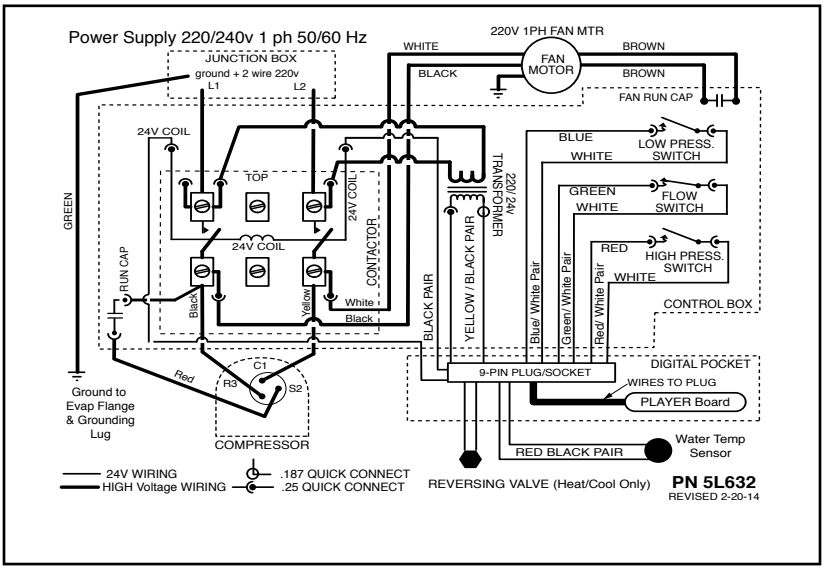
TimerStat Plus 220 volt-1 ph-50/60Hz



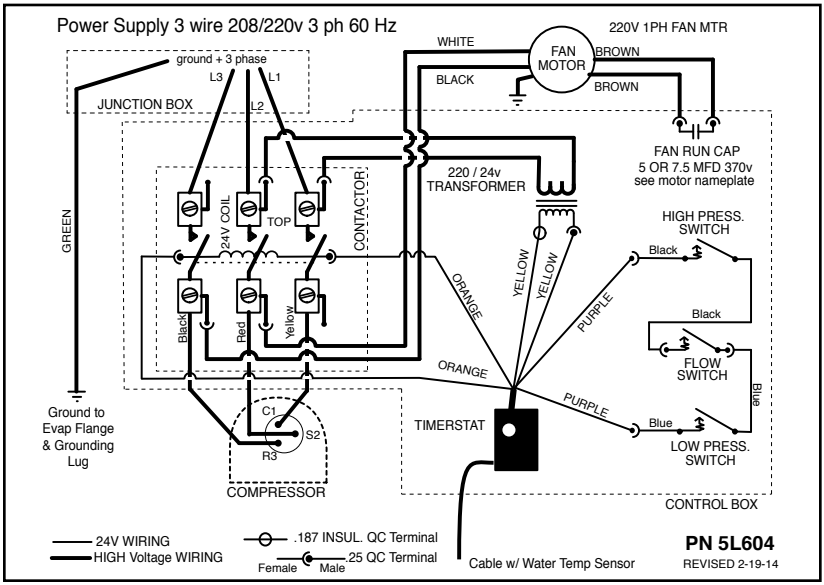
TimerStat Models 220 volt-1 ph-50/60Hz-3 Pole Contactor



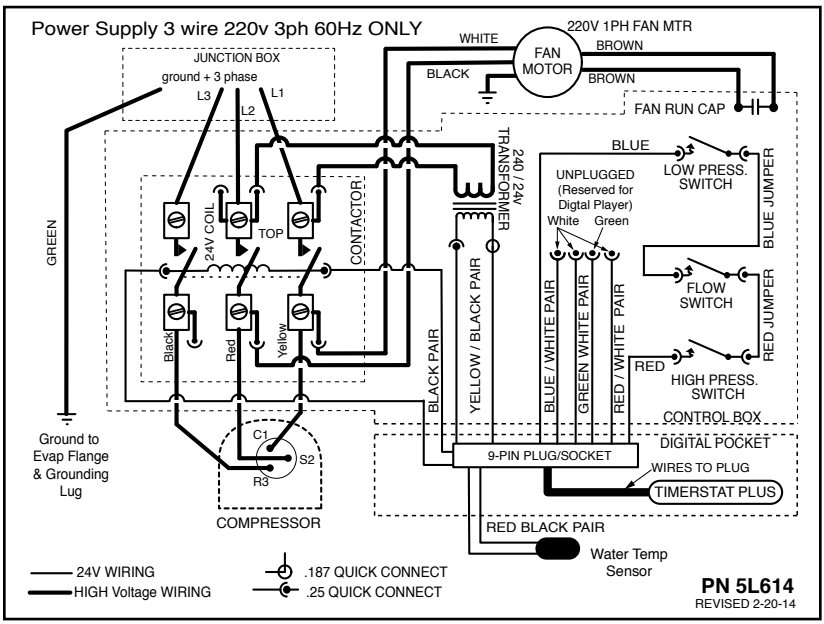
TimerStat Plus 220 volt-1 ph-50/60Hz-3 Pole Contactor



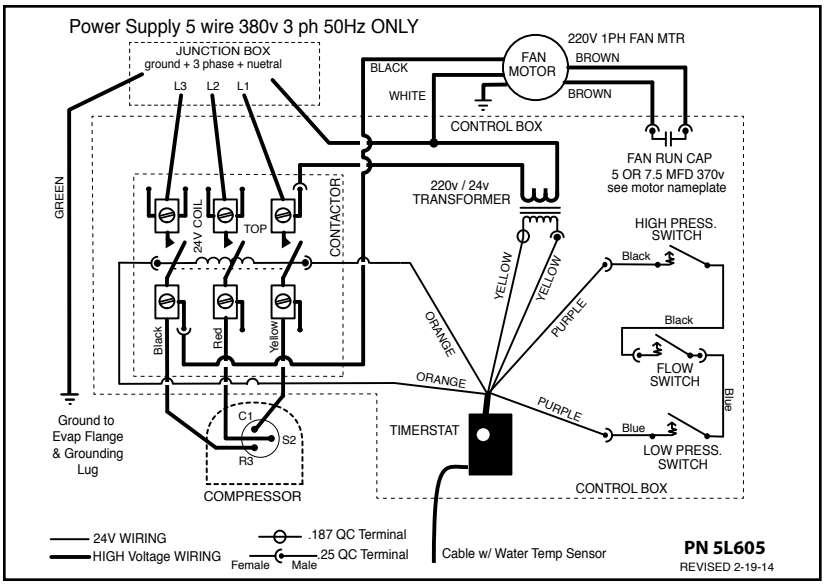
TimerStat Models 220 volt-3 ph-60Hz



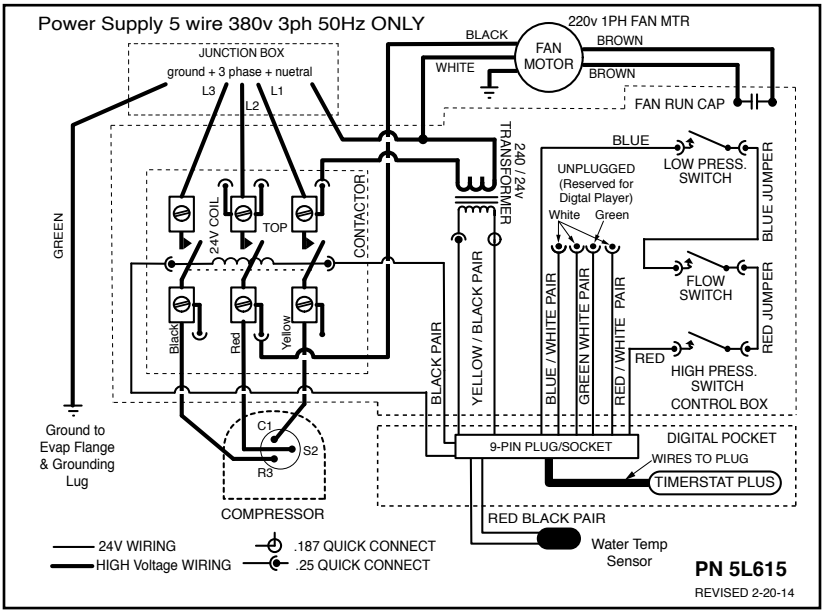
TimerStat Plus Models 220 volt-3 ph-60Hz



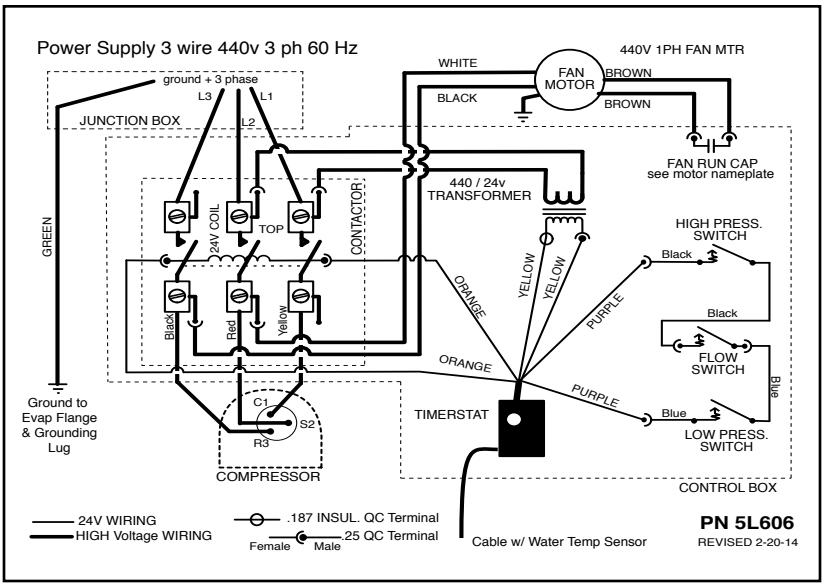
TimerStat Models 380 volt-3 ph-50Hz



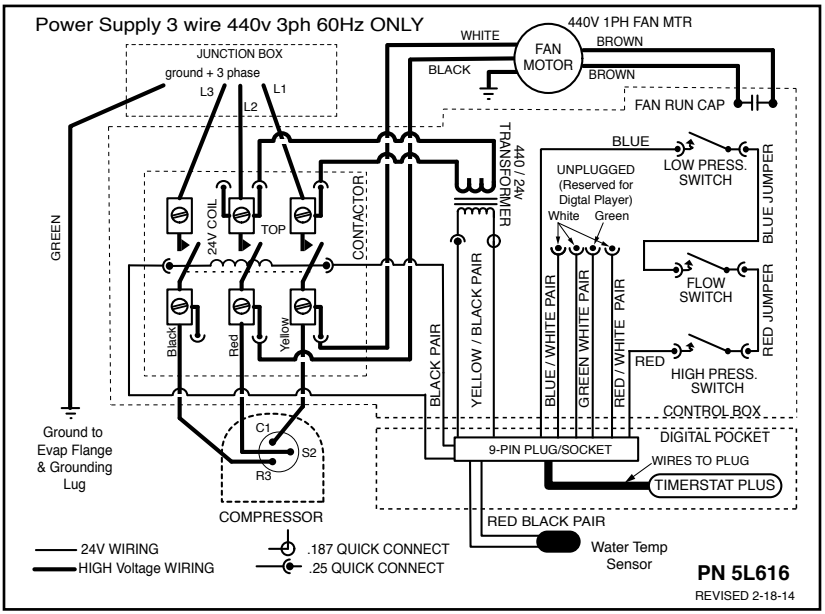
TimerStat Plus Models 380 volt-3 ph-50Hz



TimerStat Models 440 volt-3 ph-60Hz

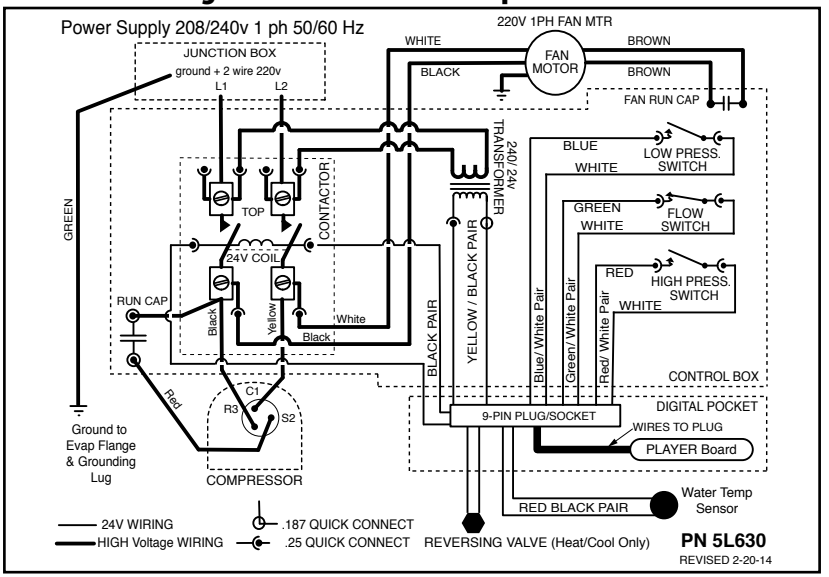


TimerStat Plus Models 440 volt-3 ph-60Hz

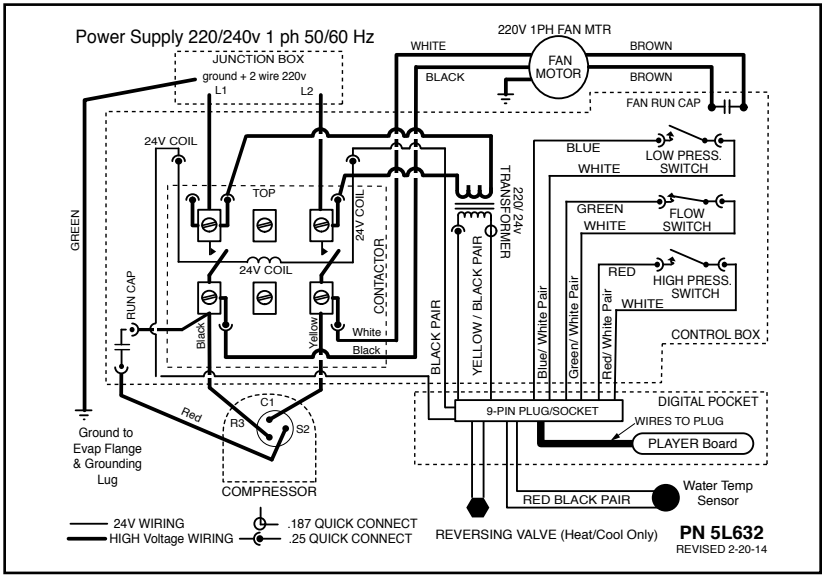


2 Digital Model Wiring Diagrams

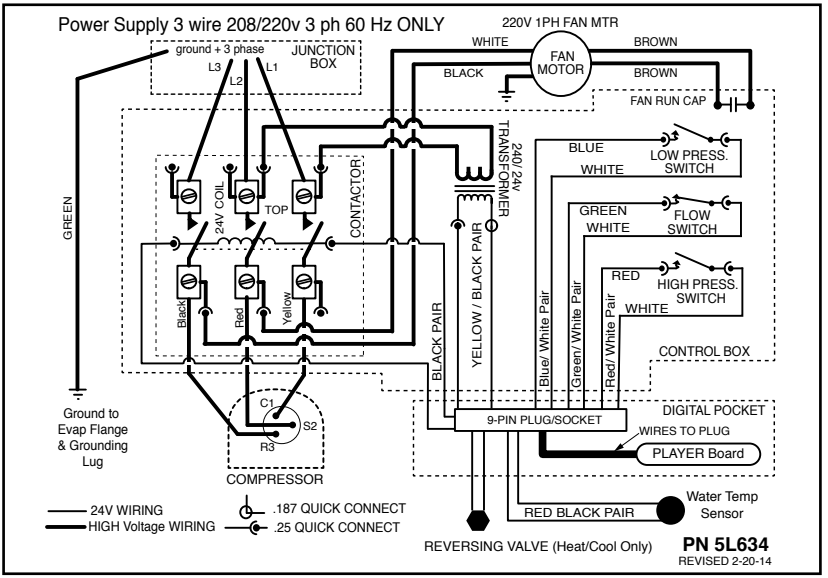
Digital Models 220 volt-1 ph-50/60Hz



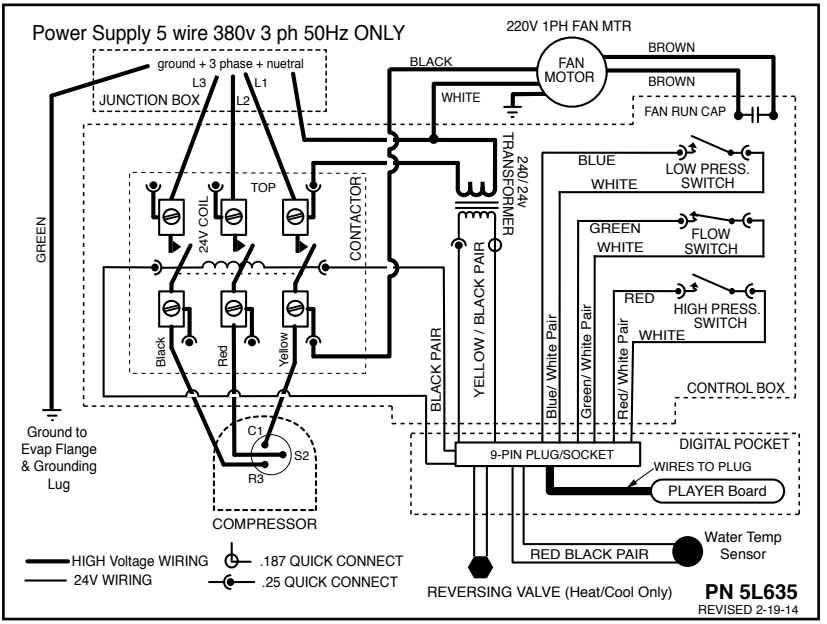
Digital Models 220 volt-1 ph-50/60Hz-3 Pole Contactor



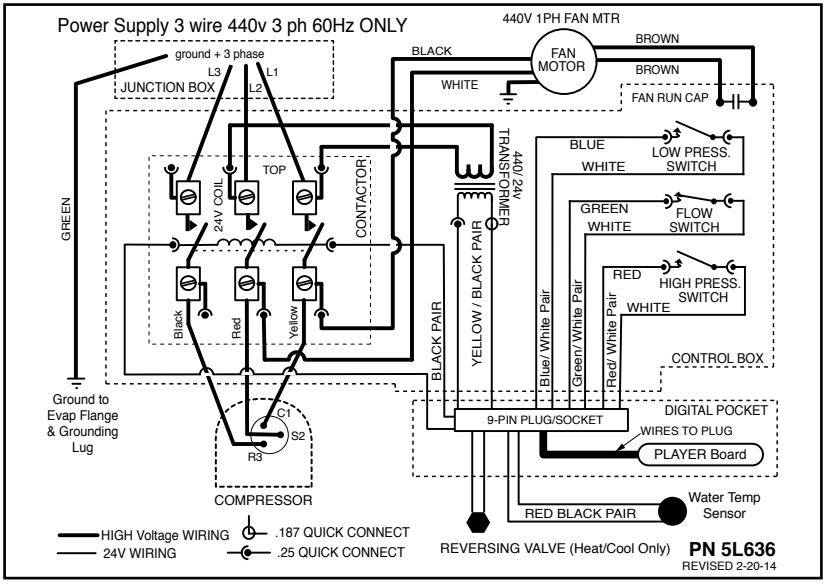
Digital Models 220 volt-3 ph-60Hz



Digital Models 380 volt-3 ph-50Hz



Digital Models 440 volt-3 ph-60Hz



Appendix B

Specifications by Model

Heat Siphon Model No.	Compressor Mfr Model Number	Power Supply Req'd Voltage	HZ	PH	@60 Hz BTUh-COP	@50 Hz BTUh-COP	Run Cap.	Wire MCA	Breaker Amps	Lbs R410A	LRA
Classic "C" Series (TimerStat Equipped)											
C200HP Heating Only Models											
C200HP	ZP25K5E-PFV	208-230	60	1	45K - 5.6	NA - NA	40/370	19.8	30	3.10	73
C200HP50	ZP25K5E-PFJ	220-240	50	1	NA - NA	37K - 5.6	40/370	16.1	25	3.10	60
C200HPX	ZP25K5E-TFD	380-440	50/60	3	45K - 5.6	37K - 5.6	NA/NA	7.0	15	3.10	28
C250HP Heating Only Models											
C250HP	ZP31K5E-PFV	208-230	60	1	52.4K - 5.01	NA - NA	45/370	25.4	30	3.35	79
C250HP50	ZP31K5E-PFJ	220-240	50	1	NA - NA	43.7K - 5.01	60/370	20.9	30	3.35	67
C250HPX	ZP31K5E-TFD	380/440	50/60	3	50K - 6.20	42K - 6.25	NA	9.7	10	3.35	38
C375HP Heating Only Models											
C375HP	ZP54K5E-PFV	208-230	60	1	89K - 6.24	74.2K - 6.24	80/440	38.7	40	5.85	140
C375HP50	ZP54K5E-PFJ	220-240	50	1	NA - NA	74.2K - 624	80/440	30.2	40	5.85	128
C375HPX	ZP54K5E-TFD	380/440	50/60	1	89K - 6.24	74.2K - 6.24	NA	12.9	20	5.85	51.5
C575HP Heating Only Models											
C575HP	ZP70KWE-PFV	208-230	60	1	117.5K - 6.20	NA - NA	80/440	46.7	50	6.75	148
C575HP50	ZP70KWE-PFJ	220-240	50	1	NA - NA	97.8K - 6.20	80/440	43.2	50	6.75	176
C575HP3	ZP72KCE-TF5	208-230	60	3	120.8K - 6.20	NA - NA	NA	34.5	40	6.75	164
C575HP4	ZP72KCE-TFD	414-506	60	3	120.8K - 6.20	NA - NA	NA	17.7	20	6.75	75
C575HPX	ZP72KCE-TFD	380/440	50/60	3	120.8K - 6.20	97.8K - 6.20	NA	17.7	20	6.75	134
Digital "Z" Series (Player Equipped)											
Z200HP Heating Only Model											
Z200HP	ZP25K5E-PFV	208-230	60	1	45K - 5.6	NA - NA	40/370	19.8	30	3.10	73
Z200HP50	ZP25K5E-PFJ	220-240	50	1	NA - NA	37K - 5.6	40/370	16.1	25	3.10	60
Z200HPX	ZP25K5E-TFD	380-440	50/60	3	45K - 5.6	37K - 5.6	NA/NA	7.0	15	3.10	28
Z250HP Heating Only Models											
Z250HP	ZP31K5E-PFV	208-230	60	1	52.4K - 5.01	NA - NA	45/370	25.4	30	3.35	79
Z250HP50	ZP31K5E-PFJ	220-240	50	1	NA - NA	43.7K - 5.01	60/370	20.9	30	3.35	67
Z250HPX	ZP31K5E-TFD	380/440	50/60	3	50K - 6.20	42K - 6.25	NA	9.7	10	3.35	38
Z350HP Heating Only Models											
Z350HP	ZP49K5E-PFV	208-230	60	1	78K - 6.1	NA - NA	70/370	33.4	40	4.5	134
Z375HP Heating Only Models											
Z375HP	ZP54K5E-PFV	208-230	60	1	89K - 6.24	74.2K - 6.24	80/440	38.7	40	5.85	140
Z375HP50	ZP54K5E-PFJ	220-240	50	1	NA - NA	74.2K - 624	80/440	30.2	40	5.85	128
Z375HPX	ZP54K5E-TFD	380/440	50/60	1	89K - 6.24	74.2K - 6.24	NA	12.9	20	5.85	51.5

Heat Siphon Model No.	Compressor Mfr Model Number	Power Supply Req'd Voltage	HZ	PH	@60 Hz BTUh-COP	@50 Hz BTUh-COP	Run Cap.	Wire MCA	Breaker Amps	Lbs R410A	LRA
					Z575HP Heating Only Models						
Z575HP	ZP70KWE-PFV	208-230	60	1	117.5K- 6.20	NA - NA	80/440	46.7	50	6.75	148
Z575HP50	ZP70KWE-PFJ	220-240	50	1	NA - NA	97.8K - 6.20	80/440	43.2	50	6.75	176
Z575HP3	ZP72KCE-TF5	208-230	60	3	120.8K- 6.20	NA - NA	NA	34.5	40	6.75	164
Z575HP4	ZP72KCE-TFD	414-506	60	3	120.8K- 6.20	NA - NA	NA	17.7	20	6.75	75
Z575HPX	ZP72KCE-TFD	380/440	50/60	3	120.8K- 6.20	97.8K - 6.20	NA	17.7	20	6.75	134
					Z700HP Heating Only Models						
Z700HP	ZP83KWE-PFV	208-230	60	1	135K- 6.0	NA - NA	80/440	46.7	50	8.5	185
Z700HP3	ZP83KCE-TF5	208-230	60	3	135K- 6.0	NA - NA	NA	37.0	40	8.5	164
Z700HP4	ZP83KCE-TFD	414-506	60	3	135K- 6.0	NA - NA	NA	19.1	20	8.5	100
Z700HPX	ZP83KCE-TFD	380/440	50/60	3	135K- 6.0	112K - 6.0	NA	19.1	20	8.5	101
					Z575HC HEAT-COOL Models						
Z575HC	ZP70KWE-PFV	208-230	60	1	115K- 6.14	NA - NA	80/440	46.7	50	9.2	148
Z575HC50	ZP70KWE-PFJ	220-240	50	1	NA - NA	97.8K - 6.20	80/440	43.2	50	9.2	176
Z575HC3	ZP72KCE-TF5	208-230	60	3	115k- 6.14	NA - NA	NA	34.5	40	9.2	164
Z575HCX	ZP72KCE-TFD	380/440	50/60	3	115K- 6.14	96K - 6.14	NA	17.7	20	9.2	134
					Z575CP COOLING ONLY Models						
Z575CP	ZP70KWE-PFV	208-230	60	1	98K- NA	NA - NA	80/440	46.7	50	6.75	148
Z575CP3	ZP72KCE-TF5	208-230	60	3	98K- NA	NA - NA	NA	34.5	40	6.75	164
Z575CP4	ZP72KCE-TFD	414-506	60	3	98K- NA	NA - NA	NA	17.7	20	6.75	75
Z575CPX	ZP72KCE-TFD	380/440	50/60	3	98K- NA	82KK - NA	NA	17.7	20	6.75	134

Classic "CF" Flow Sensing Series

(TimerStat Pro Equipped) - Fall 2014

					CF200HP Heating Only Models						
CF200HP	ZP25K5E-PFV	208-230	60	1	45K- 5.6	NA - NA	40/370	19.8	30	3.10	73
CF200HP50	ZP25K5E-PFJ	220-240	50	1	NA - NA	37K - 5.6	40/370	16.1	25	3.10	60
CF200HPX	ZP25K5E-TFD	380-440	50/60	3	45K- 5.6	37K - 5.6	NA/NA	7.0	15	3.10	28
					CF250HP Heating Only Models						
CF250HP	ZP31K5E-PFV	208-230	60	1	52.4K- 5.01	NA - NA	45/370	25.4	30	3.35	79
CF250HP50	ZP31K5E-PFJ	220-240	50	1	NA - NA	43.7K - 5.01	60/370	20.9	30	3.35	67
CF250HPX	ZP31K5E-TFD	380/440	50/60	3	50K- 6.20	42K - 6.25	NA	9.7	10	3.35	38
					CF375HP Heating Only Models						
CF375HP	ZP54K5E-PFV	208-230	60	1	89K- 6.24	74.2K - 6.24	80/440	38.7	40	5.85	140
CF375HP50	ZP54K5E-PFJ	220-240	50	1	NA - NA	74.2K - 624	80/440	30.2	40	5.85	128
CF375HPX	ZP54K5E-TFD	380/440	50/60	1	89K- 6.24	74.2K - 6.24	NA	12.9	20	5.85	51.5
					CF575HP Heating Only Models						
CF575HP	ZP70KWE-PFV	208-230	60	1	117.5K- 6.20	NA - NA	80/440	46.7	50	6.75	148
CF575HP50	ZP70KWE-PFJ	220-240	50	1	NA - NA	97.8K - 6.20	80/440	43.2	50	6.75	176
CF575HP3	ZP72KCE-TF5	208-230	60	3	120.8K- 6.20	NA - NA	NA	34.5	40	6.75	164
CF575HP4	ZP72KCE-TFD	414-506	60	3	120.8K- 6.20	NA - NA	NA	17.7	20	6.75	75
CF575HPX	ZP72KCE-TFD	380/440	50/60	3	120.8K- 6.20	97.8K - 6.20	NA	17.7	20	6.75	134

Specification by Model

Heat Siphon Model No.	Compressor Mfr Model Number	Power Supply Req'd Voltage	HZ	PH	@60 Hz BTUh-COP	@50 Hz BTUh-COP	Run Cap.	Wire MCA	Breaker Amps	Lbs R410A	LRA
Digital "ZF" Flow Sensing Series (Player Pro Equipped) - Fall 2014											
ZF200HP Heating Only Models											
ZF200HP	ZP25K5E-PFV	208-230	60	1	45K - 5.6	NA - NA	40/370	19.8	30	3.10	73
ZF200HP50	ZP25K5E-PFJ	220-240	50	1	NA - NA	37K - 5.6	40/370	16.1	25	3.10	60
ZF200HPX	ZP25K5E-TFD	380-440	50/60	3	45K - 5.6	37K - 5.6	NA/NA	7.0	15	3.10	28
ZF250HP Heating Only Models											
ZF250HP	ZP31K5E-PFV	208-230	60	1	52.4K - 5.01	NA - NA	45/370	25.4	30	3.35	79
ZF250HP50	ZP31K5E-PFJ	220-240	50	1	NA - NA	43.7K - 5.01	60/370	20.9	30	3.35	67
ZF250HPX	ZP31K5E-TFD	380/440	50/60	3	50K - 6.20	42K - 6.25	NA	9.7	10	3.35	38
ZF375HP Heating Only Models											
ZF375HP	ZP54K5E-PFV	208-230	60	1	89K - 6.24	74.2K - 6.24	80/440	38.7	40	5.85	140
ZF375HP50	ZP54K5E-PFJ	220-240	50	1	NA - NA	74.2K - 624	80/440	30.2	40	5.85	128
ZF375HPX	ZP54K5E-TFD	380/440	50/60	1	89K - 6.24	74.2K - 6.24	NA	12.9	20	5.85	51.5
ZF575HP Heating Only Models											
ZF575HP	ZP70KWE-PFV	208-230	60	1	117.5K - 6.20	NA - NA	80/440	46.7	50	6.75	148
ZF575HP50	ZP70KWE-PFJ	220-240	50	1	NA - NA	97.8K - 6.20	80/440	43.2	50	6.75	176
ZF575HP3	ZP72KCE-TF5	208-230	60	3	120.8K - 6.20	NA - NA	NA	34.5	40	6.75	164
ZF575HP4	ZP72KCE-TFD	414-506	60	3	120.8K - 6.20	NA - NA	NA	17.7	20	6.75	75
ZF575HPX	ZP72KCE-TFD	380/440	50/60	3	120.8K - 6.20	97.8K - 6.20	NA	17.7	20	6.75	134
ZF700HP Heating Only Models											
ZF700HP	ZP83KWE-PFV	208-230	60	1	135K - 6.0	NA - NA	80/440	46.7	50	8.5	185
ZF700HP3	ZP83KCE-TF5	208-230	60	3	135K - 6.0	NA - NA	NA	37.0	40	8.5	164
ZF700HP4	ZP83KCE-TFD	414-506	60	3	135K - 6.0	NA - NA	NA	19.1	20	8.5	100
ZF700HPX	ZP83KCE-TFD	380/440	50/60	3	135K - 6.0	112K - 6.0	NA	19.1	20	8.5	101
ZF575 HEAT-COOL Models											
ZF575HC	ZP70KWE-PFV	208-230	60	1	115K - 6.14	NA - NA	80/440	46.7	50	9.2	148
ZF575HC50	ZP70KWE-PFJ	220-240	50	1	NA - NA	97.8K - 6.20	80/440	43.2	50	9.2	176
ZF575HC3	ZP72KCE-TF5	208-230	60	3	115k - 6.14	NA - NA	NA	34.5	40	9.2	164
ZF575HCX	ZP72KCE-TFD	380/440	50/60	3	115K - 6.14	96K - 6.14	NA	17.7	20	9.2	134
ZF575 COOLING ONLY Models											
ZF575CP	ZP70KWE-PFV	208-230	60	1	98K - NA	NA - NA	80/440	46.7	50	6.75	148
ZF575CP3	ZP72KCE-TF5	208-230	60	3	98K - NA	NA - NA	NA	34.5	40	6.75	164
ZF575CP4	ZP72KCE-TFD	414-506	60	3	98K - NA	NA - NA	NA	17.7	20	6.75	75
ZF575CPX	ZP72KCE-TFD	380/440	50/60	3	98K - NA	82KK - NA	NA	17.7	20	6.75	134

Appendix C

Accessories Available

The following accessories are available for your Heat Siphon"- for details visit our website www.HEATSIPHON.com or call the factory

1.1 Hardwired Add-Ons

Hardwired Add-Ons allow Heat Siphon to provide pump override, Pump timer control, and enable use of Heat Siphon with 3rd party controllers:

1.1.1 EasyPic

A daughter board plug in which provides screw down connections for pool spa combo owners so they can use 3rd party controllers to switch between Heat Siphons pool and spa set points as well as turning Heat Siphon on and off

1.1.2 EasyClock

An EasyPic card with a real time clock - which allows you to use your Player as a pool pump time clock which can turn the pool pump off and on twice a day . Requires a T-Pod or S-Pod to operate.

1.1.3 J-Pod

Provides Using software and hardware ALREADY BUILT INTO your DIGITAL HEAT SIPHON's PLAYER CONTROL BOARD, your J-POD Accessory Kit adds PUMPJUMP™ off cycle heating to maintain your pool at temperature 24 hours/day - 7 days/week - EVEN WHEN YOUR POOL PUMP TIME CLOCK HAS THE PUMP OFF.

J-POD is designed to enable the "PumpJump™" feature built into your Heat Siphon Player Control to ensure that your pool temperature will be maintained even when you scheduled your pump to be off. It does this by turning your pool pump on every 30 minutes and briefly running it long enough to clear the plumbing lines and check the temperature. If the water is still warm, the pump is shut off. If the pool water is more than 1.5° F below set-point, the pool pump will continue to run and your Heat Siphon will turn on and run until the pool reaches temperature. Then both Heat Siphon and pump will shut off. override so you can maintain your pool at temperature even if the pool pump timer is off .

1.1.4 T-Pod

Using software and hardware ALREADY BUILT INTO DIGITAL HEAT SIPHON's PLAYER CONTROL BOARD, your T-POD Accessory Kit minimizes your pump operating cost by providing a one-event-per-day pump timer with off cycle heating (PumpJump™) to maintain your pool at temperature 24 hours/day - 7 days/week. T-POD is designed to let you control your pool or spa pump's daily start-up and run times in 6 minute increments from ALWAYS OFF to 24 hrs ON. It does this using just the TWO(2) buttons on your Digital Heat Siphon Player. Once it is successfully installed your Digital Heat Siphon Player will automatically turn your pump on and off in the background. - used in conjunction with and requires an EasyClock card to work

1.2 Wireless Add-Ons

1.2.1 Coach Wireless Controller

The Wireless Heat Siphon Coach® System is an FCC approved wireless commercial swimming pool controller designed to work with all Digital Heat Siphon® Swimming Pool Heat Pumps. It monitors and controls all Heat Siphons in the system while providing load management and reporting the operating status to the pool manager on the Heat Siphon Coach® console.

It controls the temperature and schedules on and off times for up to 24 individual Heat Siphons in up to three "banks" or groups. Each Bank must be plumbed into and dedicated to one body of water (main pool, kiddie pool wading pool etc.). The Heat Siphon Coach® Control System will accommodate one or three bodies of water, each with its own pool water temperature set point.

In addition to controlling multiple Heat Siphons heating up to three pools, it also is capable of controlling scheduling and up to three Auxiliary Pool Operating Devices or A-PODs, each of which can turn on or off, a single phase inductive or resistance load up to 2 horsepower.

1.2.2 Football Wireless Controller

For pool spa combo multiple Heat Siphon control using wireless PassPort and portable plugin Football Controller.

1.3 Other Accessories

1.3.1 Noise blankets

to reduce compressor noise

Appendix D

SPA / HOT TUB Heating Issues

WARNING! Water Temperature Safety

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

Prolonged immersion in water warmer than normal body temperature may cause a condition known as HYPERTHERMIA. The symptoms of hyperthermia include: unawareness of impending hazard, failure to perceive heat, failure to recognize the need to exit the spa, and unconsciousness. The use of alcohol, drugs, or medication can greatly increase the risk of fatal hyperthermia. In addition, persons having an adverse medical history, or pregnant women, should consult a physician before using a hot tub or spa. Children and the extreme elderly should be supervised by a responsible adult.

Here are few RULES posted by Home Owners & Condominium Associations across the country which should be followed by everyone who owns or uses a Spa or Hot Tub:

1. Do not use, or allow the hot tub to be used, alone.

2. Persons suffering from heart disease, high blood pressure, diabetes, or other health problems should not enter the spa without prior medical consultation and permission from your doctor

3. Do not permit children under the age of eighteen (18) to use the hot tub unless they are closely supervised at all times.

4. Unsupervised use by children is strictly prohibited. In no case should children under the age of eight (8) be permitted in the hot tub. Never leave children unattended in the vicinity of the hot tub.

5. Pregnant women and individuals under medical care (for such problems as heart disease, diabetes, high blood pressure, skin sensitivities, cardiac or circulatory problems) should consult their physician prior to using the hot tub.

6. Never use the hot tub when taking anticoagulants, antihistamines, vasoconstrictors, vasodilators, stimulants, narcotics or tranquilizers. In all cases, if you are not thoroughly familiar with the medication(s) that you are taking, please consult with your physician prior to using the hot tub.

7. Soaking for too long at high water temperatures can elevate body temperature and the

temperature of internal organs beyond safe limits. Observe reasonable time limits to avoid nausea, dizziness and fainting. Should you experience any of these symptoms, carefully exit the hot tub immediately.

8. Alcoholic beverages should not be consumed before or during hot tub use. The temperature of the water may intensify the effects of alcohol and cause drowsiness, dizziness and/or unconsciousness.

9. Always use caution when entering and exiting the hot tub. Wet surfaces can be slippery.

The following guidance is found on the Consumer Product Safety Commission website:

1. Before entering the hot tub, users should check the water temperature with an accurate thermometer; hot tub thermostats may err in regulating water temperatures by as much as four degrees.

2. Hot tub water temperatures should never exceed 104 degrees Fahrenheit. A temperature of 100 degrees is considered safe for a healthy adult. Special caution is suggested for young children.

3. Excessive drinking during hot tub use can cause drowsiness which could lead to unconsciousness and subsequently result in drowning.

4. Pregnant women beware! Soaking in water above 102 degrees Fahrenheit can cause fetal damage during the first three months of pregnancy (resulting in the birth of a brain damaged or deformed child). Pregnant women should stick to the 100-degree maximum rule.

5. Persons with medical history of heart disease, circulatory problems, diabetes or blood pressure problems should obtain their physician's advice before using hot tubs.

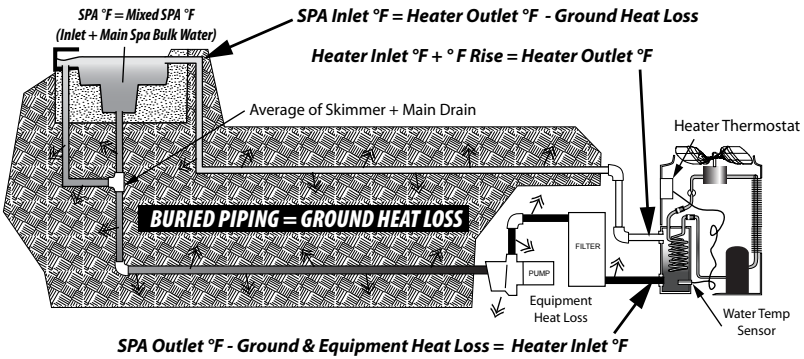
6. Persons taking medications which induce drowsiness, such as tranquilizers, anti-histamines or anti-coagulants, should not use hot tub

Thermostat Set Point Depression

WARNING - To avoid Thermostat Set point Depression, which could lead to an unsafe spa temperature, INSULATE THE PIPING IF AT ALL POSSIBLE TO AND FROM THE SPA AND OPERATE THE PUMP AT HIGH SPEED WHEN HEATING YOUR SPA.

Following all local electrical codes restricting placement in proximity to the pool or spa as well as the use of ground fault circuit breakers, bonding and other wiring requirements, locate your Heat Siphon as close as SAFELY possible to the Spa.

Spa/Hot Tub Thermostat Setpoint Depression



SPA TEMPERATURE will ALWAYS be HIGHER than the HEATER SETPOINT because of Ground Heat Loss & Equipment Heat Loss

In addition to all of the installation requirements found in the Heat Siphon Owners Manual for pools and pool/spa combo's, the following important issues must be addressed when installing and operating a Spa or Hot Tub.

Most Spas which are heated separately or as "stand alone" spas using a Heat Siphon or other Spa Heaters especially fossil fuel types tend to be located out of sight of the spa to prevent bathers from tampering with the thermostat as well as to keep the public away from hot surfaces and fumes.

In many cases the heater is 15 to 25 feet away and more from the Spa, and most have the pipes buried at least a foot or more under ground.

In these cases, the hot water leaving the spa to be reheated, must travel inside pipes surrounded by sand, clay or even wet soil which will be 20 to 30°F or more below the spa water. By the time the water reaches the heaters inlet it can be 5 to 10 °F colder than the spa. If this heat loss is excessive it may even prevent the heater from reaching its set point altogether.

Virtually all pool and spa heaters' thermostat sensors are located at the inlet port of the heater. It is under control of the manufacturer and is the safest secure place to measure the water temperature to determine if the water is still below the set point of the heater's thermostat. If it is the heater continues to run.

The heaters outlet temperature or degree rise above the inlet temperature, depends on the heater's BTUH output and the flow rate of the water going through it. The outlet water may be 5 to 10°F or more above the inlet temperature and well above the heat loss it will undergo as it returns to the spa.

So even though the heater inlet temperature is below the actual spa temperature, the water temperature returning to the spa can still be above the spa bulk water temperature.

Thus, all heaters will "overheat the water" by the same number of °F the water has lost (say X degrees)

getting to them, because they will keep heating until they reach the heater's set point.

SPA	Heatup Rate °F /Minute		
SIZE	Z200HP	Z375HP	Z575HP
Gallons	50,000 BTUH	80,000 BTUH	110,000 BTUH
200	0.500	0.799	1.099
300	0.333	0.533	0.733
400	0.250	0.400	0.550
500	0.200	0.320	0.440
600	0.167	0.266	0.366
700	0.143	0.228	0.314
800	0.125	0.200	0.275
900	0.111	0.178	0.244
1000	0.100	0.160	0.220
1100	0.091	0.145	0.200
1200	0.083	0.133	0.183

As shown in the table, an 80,000 BTUH size heater with 15 GPM going thru it, will have a throughput degree rise of 10.7°F (outlet minus inlet temperature).

If, for example, this heater's thermostat is set to 104°F and the water in the spa is 104°F and it loses 4°F in the piping to the heater, it will be 100°F at the heater inlet and the heater will continue heating the water. The outlet temperature will be 100°F plus 10.7° rise = 110.7°F and if it loses 4°F returning to the spa it will be 106.7°F when it returns, mixing and raising the spa temperature even further.

The heater will continue to heat the water until the inlet temperature is 104°F and the return water just before it shuts off will be 104°F plus 10.7°F rise minus 4 degree return loss = 110.7°F and the spa will reach 108°F or 4 degrees above the thermostat set point when it shuts off.

So you can see where the statement made by the Consumer Product Safety Commission that " HOT TUB THERMOSTATS MAY ERR IN REGULATING WATER TEMPERATURES BY AS MUCH AS FOUR DEGREES" - is a case of Thermostat Set Point Depression caused by excessive heat loss from long piping runs plus excessive heater degree rise caused by low flow.

If the flow rate is tripled to 45 GPM then the degree rise is cut by 66% to 3.6°F (see table) and the heat loss will be cut to 1.3°F in the piping because every gallon will spend 1/3 of the time exposed to the cold ground. The net result is

- *Inlet temp = spa temp -1.3°F.*
- *Return temp = Inlet temp + 3.6°F rise -1.3°F loss =inlet temp+2.3°F*
- *At a 104°F set point the spa temp will be 105.3°F*

Spa Temperature Sensor Calibration

As of Player software revision 1.253 (heating only models) and 1.309 (Heat/Cool models) Heat Siphon's

DIGITAL Z series Player Controller provides a way to calibrate the spa temperature sensor by increasing the inlet temperature reading to match the actual spa temperature. The temperature may be increased from 1 to 5°F in 1°F steps. This will not eliminate the differential due to ground loss which only insulating the supply and return lines can mitigate. High flow rates reduce ground loss and mix the spa return water better raising the bulk average spa water temperature which in turn raises the heater inlet temp.

Call us or ask your installing dealer to perform this calibration

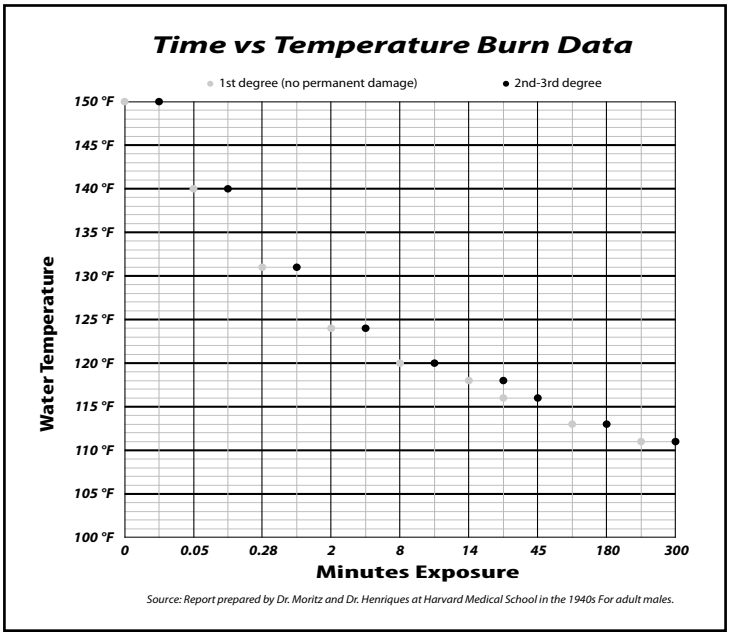
HOWEVER MAKE SURE YOU ALWAYS

- *RUN THE PUMP ON THE SAME RPM/FLOW RATE WHEN HEATING AS YOU USED DURING CALIBRATION.*
- *ALWAYS RUN ON HIGHEST PUMP SPEED WHEN HEATING.*

Spa Thermostat Set Points above 102°F

In the 1940s a study was conducted by two doctors at Harvard to determine the time versus temperature required for a normal adult to suffer 1st and 2nd-3rd degree burns. The following graph shows their findings .

Although it is not conclusive for all people or at lower temperatures, it is clear that exposure above 110°F will eventually cause burns after a given exposure time. As shown above, spa temperatures can and usually are above the set point of the spa heater ESPECIALLY where long uninsulated piping separates the two and a lower flow rate is used.



The Consumer Product Safety Commission (CPSC) states that a Spa temperature of 100°F is considered safe for a healthy adult. Pregnant women should avoid soaking in water above 102°F as it can cause fetal damage and should stick to the 100°F maximum rule. Spa owners should take special precautions with children and the elderly.

Based on CPSC Guidelines it appears unnecessary or at least unwise to heat above 102°F,. and even though the UL standard for spa heaters allows a maximum thermostat set point of 104°F , Heat Siphon has chosen to set the default maximum spa set point temperature of 102°F.

If you still feel it is necessary to have a higher set point than Heat Siphon's maximum default 102°F , then your dealer can increase it in 1°F steps to 104°F, HOWEVER, YOU MUST ASSUME TOTAL RESPONSIBILITY FOR OPERATING THE SPA AT THESE TEMPERATURES.

You must sign and return the hold harmless agreement on our website before we will authorize the dealer to perform this change.

USA Warranty Certificate

HEAT SIPHON®

Serial Number:

USA Limited Factory Warranty

United States ThermoAmp Inc. warrants to the original owner that the Heat Siphon to be free of defects in material and workmanship for a period of two (2) years from date of purchase or shipment, whichever occurs first, unless proof of installation is provided, except for the water side heat exchanger internal titanium which is warranted to be corrosion free for the LIFE OF THE HEAT SIPHON REGARDLESS OF POOL WATER CHEMISTRY, and except for the compressor which is warranted for five (5) years PARTS. This warranty does not include the repair of damage due to negligence, abuse, improper installation, use with in floor cleaning systems, improper operation, environment, accident, failure to drain and winterize the heat exchanger, corrosion of any parts external to the heat exchanger or other conditions beyond the normal intended use of the unit. This warranty does not include the furnishing of refrigerant or other expendable material. This warranty does not cover labor, service, or installation costs under any circumstances . This Warranty is void if product is modified, repaired, or serviced by unauthorized personnel. This warranty is in lieu of all other warranties, expressed or implied, written or oral. This warranty applies only to Heat Siphons installed within the United States of America. There are no implied warranties of merchantability of fitness for a particular purpose that apply to this product. United States ThermoAmp Inc. will replace or repair at its option, any of our parts that prove defective if such parts or the complete unit are returned to our plant with all costs of shipping defective parts or unit to the factory paid for by the customer, within the applicable warranty period specified herein. It is agreed that such replacement or repair is the exclusive remedy available from United States ThermoAmp Inc. Unless authorized by United States ThermoAmp Inc. and performed by a Factory Authorized Service Center, United States ThermoAmp Inc. is not liable for any labor involved in the removal of defective parts or the installation of replacement parts.. United States ThermoAmp Inc. is not liable for any damages of any sort whatsoever, including incidental and consequential damages. Parts or units returned under terms of this warranty will be repaired or replaced and returned transportation charges prepaid within the United States by best and most economical means. In all cases, liability is limited to the original purchase price of the product.

IMPORTANT - Complete & Save For Your Records

Model: _____ *Date Installed:* _____

Installed By: _____

W.P. Bernardi, President , United States ThermoAmp Inc.