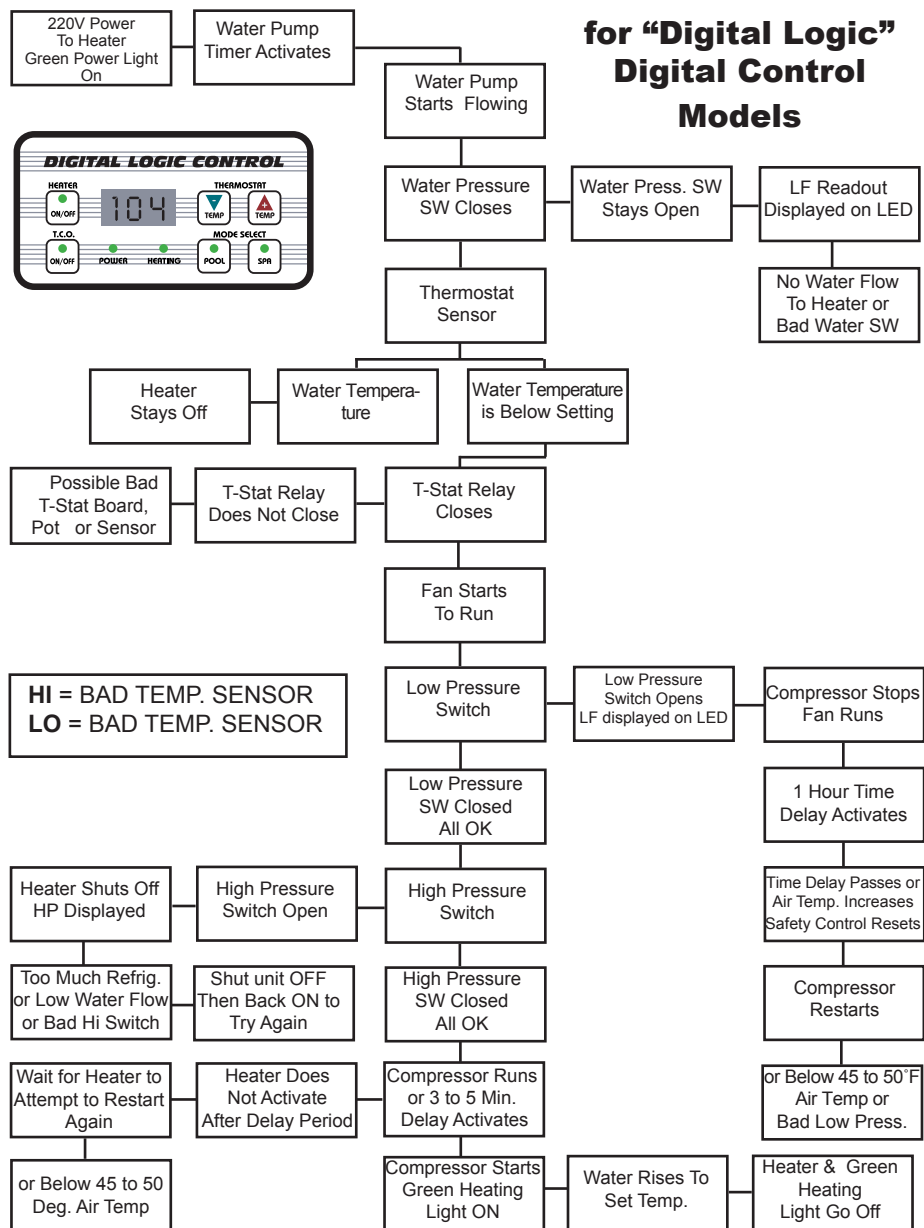


G. OPERATIONAL SEQUENCE & TROUBLESHOOTING FLOW CHART



TIME DELAYS:

3 minute compressor delay on break & power up.

30 second compressor delay when switching pool/spa modes.

5 minute compressor delay when T.C.O. enables in pool mode.

T.C.O. will shut off after a 5 minute delay when: switching from spa to pool mode, when temperature is reached in pool mode, or if LF (low water flow) is displayed on LED.

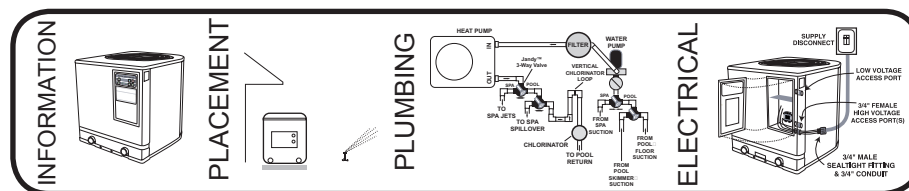
When HP is displayed unit must be turned off then back on to reset.



SWIMMING POOL & SPA HEAT PUMPS

INSTALLATION MANUAL

**Models AT105
AT115
AT130**
w/Titanium Heat Exchanger



NOTICE:
Specifications may change without notice.



HEAT PUMPS

a Division of Calorex USA L.L.C.
2213 Andrea Lane Ft. Myers FL 33912
888-297-3826 239-482-0606
www.aquathermheatpumps.com



TABLE OF CONTENTS

A. Unit Description	Page 3
B. Heat Pump Placement & Clearances	Page 4
C. Plumbing- Water Connections	Pages 5 - 7
1. Basic Plumbing	
2. Freeze Condition Plumbing	
3. Bypass for Flow Rates Over 70 GPM	
4. Multi Unit Water Connections	
5. Pool/Spa Combination Plumbing	
6. Pool/Spa Separate Plumbing	
7. Plumbing with Solar	
8. Plumbing Above or Below Water Level	
D. Winterizing Procedures	7 - 8
1. Light Freeze Conditions	
2. Hard Freeze Conditions	
E. Electrical Connections & Wiring	Pages 8 - 13
1. Supply Wiring 220V	
2. Optional Time Clock Override Wiring	
3. Optional Remote Key Pad	
4. Motor Valve Connections	
5. Interfacing with External Controls, Jandy & Compool	
F. Control Panel Information, Operation & Description	Page 14
G. Operational Notes	Page 15
H. Factory Specifications - Kw/Hr, Running Amps, Min. Circuit Ampacity	
I. Operational Sequence & Troubleshooting Flow Chart.....	Page 16



HEAT PUMPS

a Division of Calorex USA L.L.C.
 2213 Andrea Lane Ft. Myers FL 33912
 888-297-3826 239-482-0606 Fax 239-482-7737
www.aquathermheatpumps.com

F. OPERATIONAL NOTES

- The heater will operate two actuator motor valves with or without the remote key pad.
- The motor valves will turn when the pool/spa select buttons are pressed on either the heater's key pad or the remote key pad.
- The heater must have the factory installed T.C.O. option to utilize the remote key pad.
- The T.C.O. button must be pressed to start the water pump when spa mode is selected. The water pump will run continuously while in spa mode.
- There will be a 30 second compressor time delay when the pool/spa select buttons are pressed to allow the actuator motor valves to rotate completely.
- When switching from spa mode to pool mode, there will be a 5 minute delay before the T.C.O. will shut off the water pump. This will clear the heater of the hot spa water so the T.C.O. will operate correctly in pool mode.
- If the water pump loses prime while the motor valves are turning the heater will display the LF code. The heater will then shut off, the T.C.O. (if activated) will keep the water pump running for 5 minutes to allow it to re-prime. When the pump primes the heater will restart. If the pump does not re-prime the T.C.O. (if activated) will shut the water pump off and the heater will stay off.
- When T.C.O. activates in pool mode, there will be a 5 minute compressor only delay.
- If the T.C.O. activates the water pump and the thermostat senses that the water is at or above the thermostat set temperature, the T.C.O. will not attempt to reactivate the water pump until a 4 hour delay has passed. The 4 hour delay can be bypassed by pressing the T.C.O. button off then back on.
- When T.C.O. is enabled in pool mode and the set water temperature is reached, the T.C.O. will not shut off the water pump until a 5 minute delay has passed.

READOUT CODES

LF	WATER PRESSURE SWITCH OPEN
HP	HIGH REFRIGERANT PRESSURE SWITCH OPEN
DF	LOW REFRIGERANT PRESSURE SWITCH OPEN or AIR COIL TEMPERATURE SWITCH OPEN

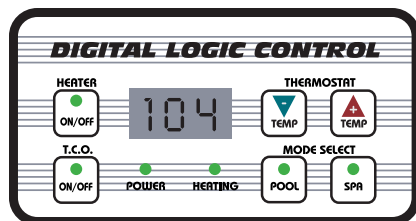
CONTINUOUS TEMPERATURE READOUT = CURRENT WATER TEMPERATURE

FLASHING TEMPERATURE READOUT = THERMOSTAT SETTING

FACTORY SPECIFICATIONS

	AT105	AT115	AT130
Kw/Hr.....	4.8	5.3	6.19
Typical Running Amps	24	25	27.7
Min. Circuit Ampacity	39	41.1	41.1

F. "DIGITAL LOGIC" CONTROL PANEL INFORMATION



LED READOUT:

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

2. HEATER ON/OFF BUTTON: Green light on POWER button is lit when heater is turned on.

3. MODE SELECT BUTTONS-POOL or SPA: The heater has two thermostat modes for two different desired temperature settings, one for pool mode and one for spa mode. If you do not have a spa, use the pool mode only. If you have a spa/pool combination, you have options available to automate pool and spa heating functions.

4. THERMOSTAT BUTTONS: Pressing the + button will raise the set temperature. Pressing the - button will lower the set temperature. When either button is pressed the LED display will begin to flash. The flashing numbers indicate the thermostat setting.

5. GREEN HEATING LIGHT: This light indicates that the unit is heating and the compressor is running. The compressor starts after a 3 to 5 minute time delay. NOTE: The water pump must be running in order for the heater to run.

6. OPTIONAL WATER PUMP TIME CLOCK OVERRIDE OPERATION When the T.C.O. button is set to the ON mode, the Time Clock Override feature is designed to start the water pump when the pool requires heat. Once the pool is up to the set temperature the heater will stop and then 5 minutes later the water pump will stop. When this button is set to the OFF mode, the heater will operate only when the water pump is running during the timed period set on the time clock. NOTE: The time clock override works best if used during cooler weather conditions where the pool is losing more than 8 to 10 degrees over night or when the pool is being heated from "dead cold". NOTE: If the time clock override starts the water pump and the thermostat does not continue to call for heat for at least 5 minutes, the control will shut the water pump and heater off. Thereafter, it will not re-attempt to start the water pump for 4 hours. This 4 hour delay can be bypassed by pressing the T.C.O. button off then back on. NOTE: When the T.C.O. button is activated while in "spa mode" the water pump will run the entire time you are in spa mode. When you switch back to pool mode there will be a 5 minute delay before the water pump shuts off.

LED STATUS CODE READOUTS:

LF This light indicates there is no water flow through the heater. The heater is designed to shut off when the water pump is not pumping water through the heater. If **LF** is on while the water pump is running, the water pump may not be supplying enough flow for the heater to operate properly.

DF This readout indicates that the internal defrost safety control has disabled the heater. During cold weather where the air temperature drops below approximately 45 to 50 degrees (depending on humidity), the defrost sensor is designed to disable the compressor only. When the air temperature has increased to the operational range the compressor will come on and start heating again.

HP This readout out indicates high refrigerant pressure. The high refrigerant pressure switch is designed to shut the compressor and fan off if a heat buildup occurs for whatever reason. Typically the high refrigerant pressure switch will trip if the water flow through the heater is restricted. It may also trip if the air flow is restricted through the heater. **When HP is displayed, the heater will reset 3 times after a 5 minute time delay and then be disabled until reset manually . To reset, turn the unit off then back on.**

A. UNIT DESCRIPTION

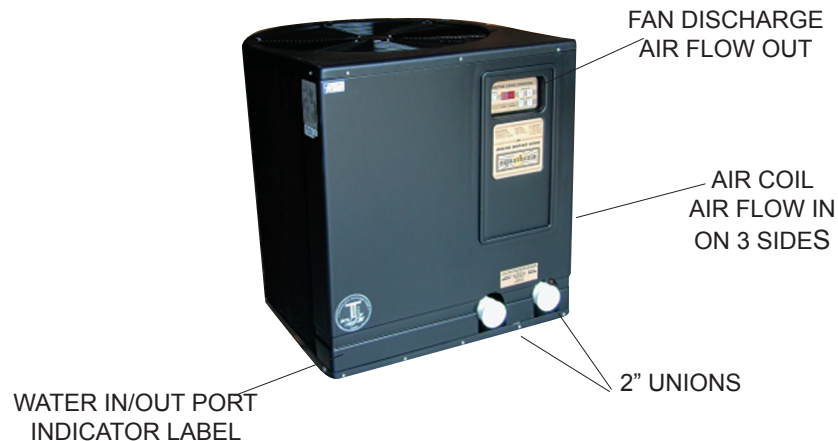


WARNING

**DANGER FROM ELECTRICAL SHOCK & ROTATING FAN !
SHUT OFF ALL POWER BEFORE SERVICING!**

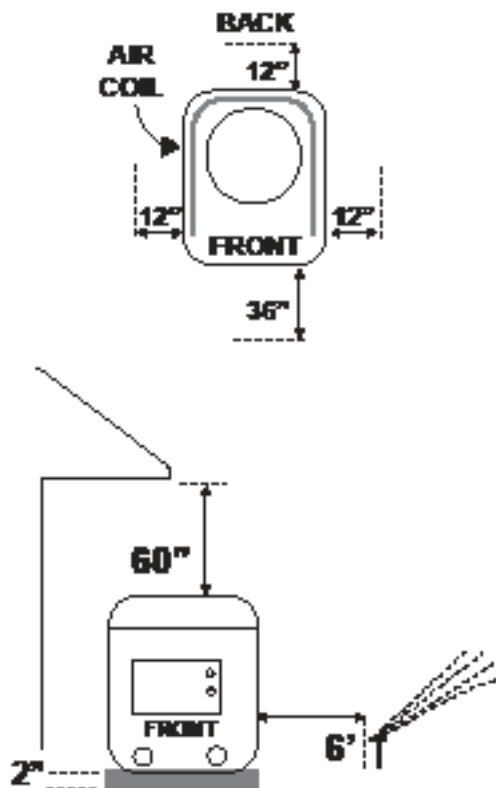
CAUTION:
MORE THAN ONE DISCONNECTION MAY BE REQUIRED TO ELIMINATE ALL POWER TO THIS UNIT INCLUDING POWER TO THE OPTIONAL TIME CLOCK OVERRIDE!

B. HEAT PUMP PLACEMENT & CLEARANCES



1. To allow for proper condensation drainage, use a level slab to elevate the heat pump to at least the same height as the pool filter system slab, or 2 to 3 inches minimum above grade.
2. Allow the minimum air flow clearances on top and the sides as shown here. Make sure the unit can "breathe" well. Do not install indoors or where the discharge air can accumulate and be drawn back through the heater. **Make sure the front is accessible for future service.**
3. Keep sprinkler heads at least 6 feet away from the heat pump. Do not allow the sprinkler to spray the unit in any way to prevent damage.
4. If the unit is installed under a roof overhang or under a roof valley, a gutter or diverter should be fitted to prevent excessive water from pouring into the unit.
5. Keep all plants and shrubs trimmed away from the heater to the minimum clearances shown here to prevent air coil damage.
6. If the heater is installed above or below the pool water level by more than 3 feet you may require an external water flow switch. See the top of section C8 for more information.

Minimum Air Flow & Access Clearances



E. ELECTRICAL CONNECTIONS AND WIRING

5. INTERFACING DIGITAL LOGIC CONTROL MODELS

with Jandy™ Aqualink RS & Compool

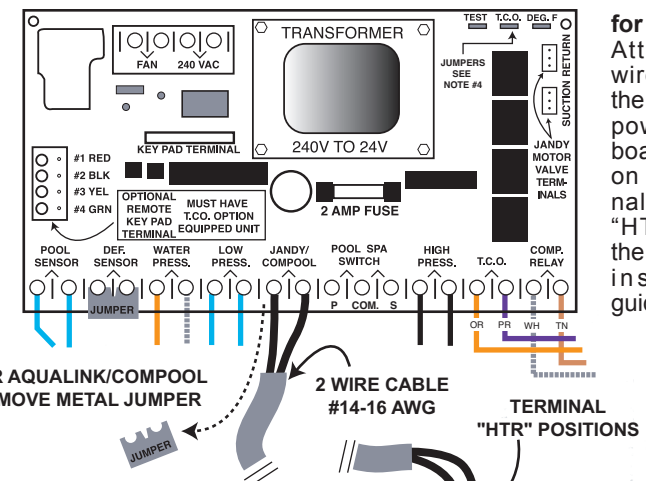
To interface the "Digital Logic" digital control heat pump models with the Jandy AquaLink RS series or Compool, run a 2 wire (16 A.W.G. or larger) insulated cable from the device to the heat pump.

Remove the 6 screws from the heaters front service access panel and open. Look for the heater's solid state circuit board located inside the top portion of the electrical compartment mounted on the rear wall. Locate, remove and discard the "METAL JUMPER TAB" attached to the bottom terminal bar and labeled "Jandy/Compool". Then, run a 2 wire cable from the 2 position terminal where the metal jumper tab was, through the heater's low voltage access port, then to the AquaLink RS or the Compool control.

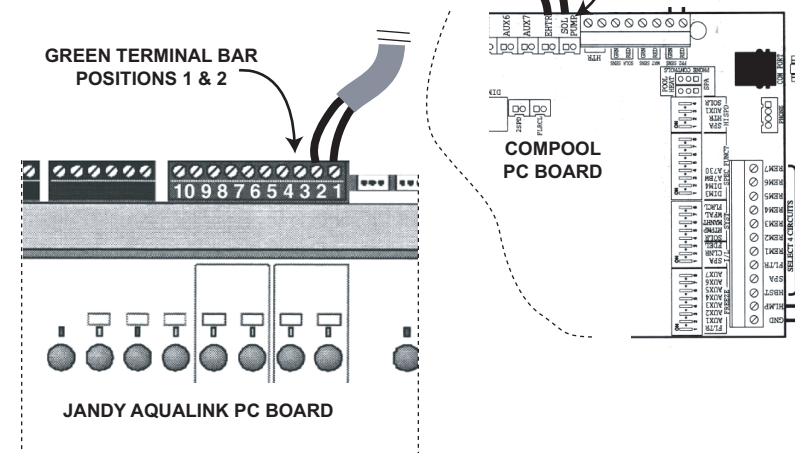
NOTE for AquaLink RS and Compool: Turn both heater thermostats all the way up and set the mode selector switch to pool and do not use the heater controls as the Jandy or Compool now has thermostatic control over the heater.

for AquaLink

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



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



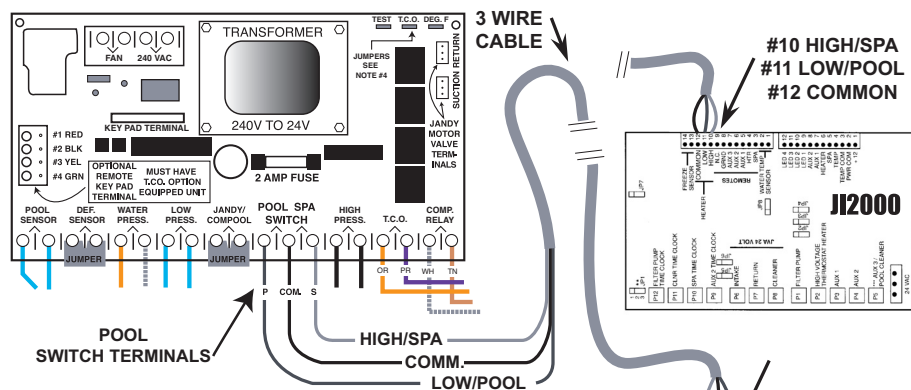
E. ELECTRICAL CONNECTIONS AND WIRING

5. INTERFACING DIGITAL LOGIC CONTROL MODELS

with Aquaswitch or JI2000

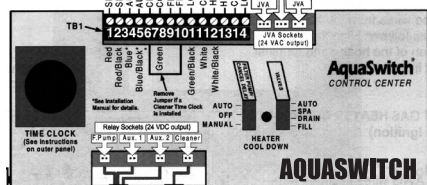
- If you are using a Jandy AquaSwitch or JI2000 control run a 3 wire cable from the control to the heater. Remove the 6 screws from the heaters front service access panel and open. Look for the heater's solid state circuit board located inside the top portion of the electrical compartment mounted on the rear wall. Locate the 3 terminals labeled POOL SPA SWITCH. Attach the 3 wire cable as shown below. Do not remove any jumpers. Run the wire through the heater's low voltage access port.

- Next, attach the 3 wire cable to the **HEATER** to the three terminal positions labeled POOL SPA SWITCH
LEFT POSITION= LOW/POOL
CENTER POSITION= COMMON
RIGHT POSITION= HIGH/SPA



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

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



6. COMPOOL Cp3800, Cp3600 & Cp3400 Series Equipment

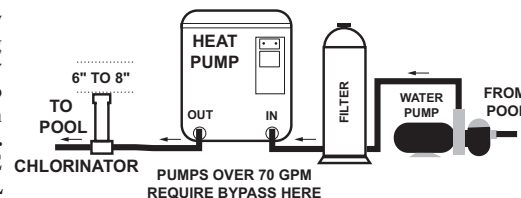
Heat pumps require a relay kit (Model RLY-LX) be added. The HTR connection used for gas heaters cannot be used.

To wire a heat pump:

- At the Power Center, install the relay into the high voltage compartment. Plug control wire into the EHTR relay socket on the Power Center circuit board.
- Run a 2-conductor cable from the heater to the Power Center,
- At the heater, remove jumper and connect 2-conductor cable to the terminals.
- At the Power Center, connect 2-conductor cable to LINE 1 and LOAD 1 of the relay terminal block.
- Turn thermostat settings all the way up on the heat pump.

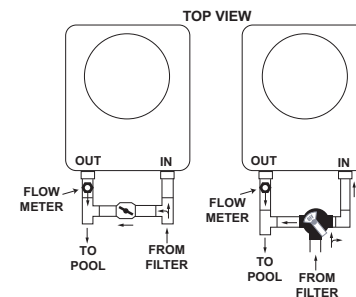
C. PLUMBING & WATER CONNECTIONS

1. BASIC PLUMBING. For a pool only or spa only, install the plumbing piping as shown. **Connections from factory are 2" unions. Hand tighten then 1/4 to 1/2 snug tight with pliers. Water IN on the RIGHT, Water OUT on the LEFT. PLUMB AFTER the FILTER & BEFORE any CHLORINATORS or CHEMICAL FEEDERS**



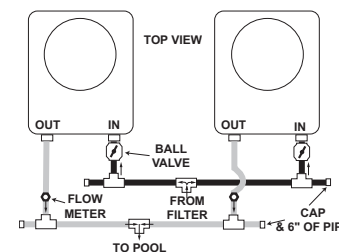
2. FREEZE CONDITION PLUMBING. See **WINTERIZING PROCEDURES** on page 7.

3. BYPASS FOR FLOW RATES OVER 70 G.P.M. Typically the automatic internal water bypass can handle up to a 1.5 H.P. water pump or 70 G.P.M. If the water pump exceeds 1.5 H.P. then install either of the optional bypasses as shown below. The installation of a flow meter on the WATER OUT line is suggested. Adjust the bypass to divert a minimum of 40 to 50 G.P.M. through the heater. Flow meters should be installed per the manufacturer's instructions.



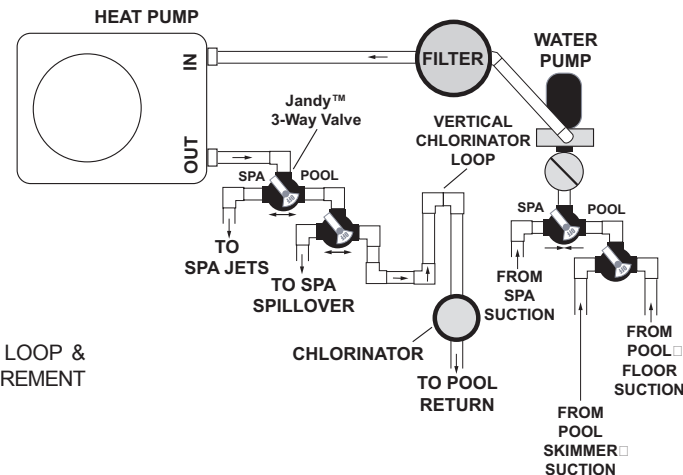
4. MULTI UNIT WATER CONNECTIONS

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



5. POOL/SPA COMBINATIONS W/SPILL-OVER

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

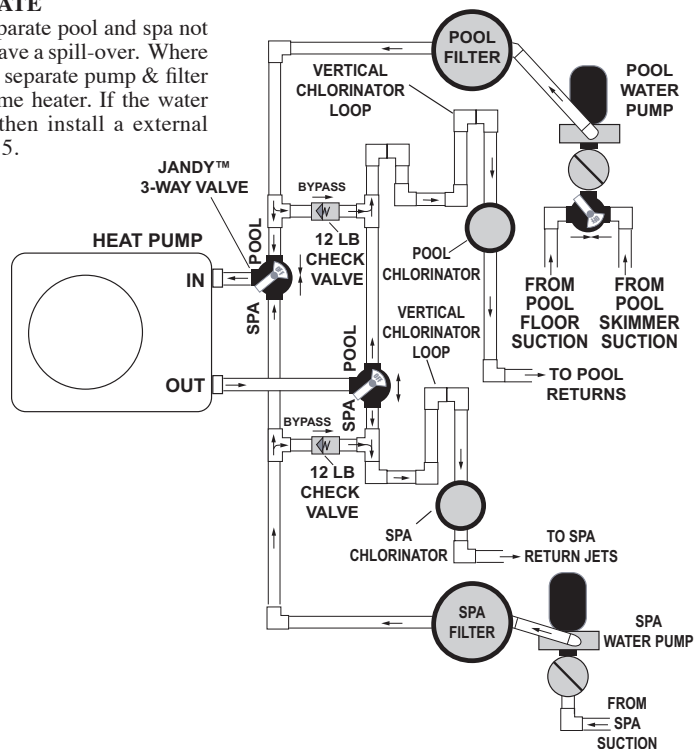


SEE CHLORINATOR LOOP & CHECK VALVE REQUIREMENT ON PAGE 5.

C. PLUMBING & WATER CONNECTIONS

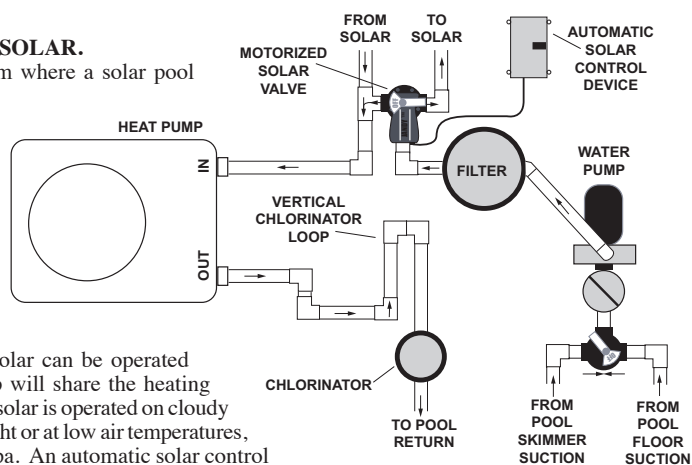
6.POOL & SPA SEPERATE

Use this diagram for a separate pool and spa not connected, and does not have a spill-over. Where the pool and the spa have separate pump & filter systems but using the same heater. If the water pump exceeds 1.5 H.P. then install a external bypass as shown on page 5.



7. PLUMBING WITH SOLAR.

Plumbing for a system where a solar pool heater is installed. It is strongly advised that an automatic solar control device be used when used with the heat pump. If the water pump exceeds 1.5 H.P. then install either of the optional bypasses as shown on page 5.



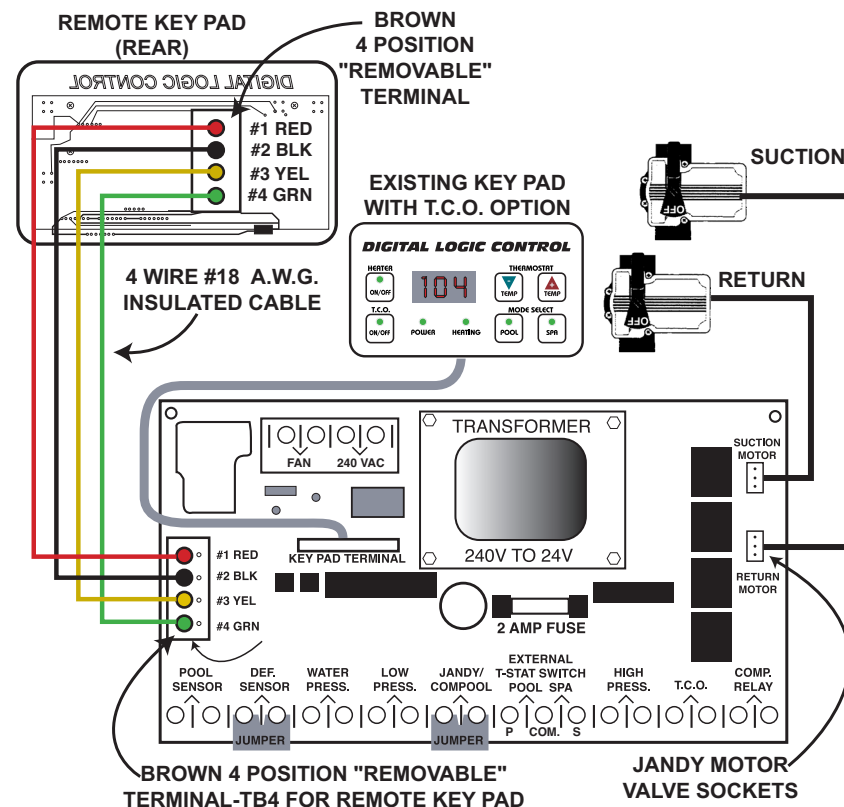
The heat pump and solar can be operated together. The heat pump will share the heating load with the solar. If the solar is operated on cloudy days, while raining, at night or at low air temperatures, it may cool the pool or spa. An automatic solar control will shut the solar off when there is no solar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

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

E. ELECTRICAL CONNECTIONS AND WIRING

OPTIONAL REMOTE KEYPAD WIRING DIAGRAM

for "Digital Logic" Digital Control Models with Time Clock Override Option Only



4. MOTORIZED ACTUATOR CONNECTION FOR POOL/SPA COMBINATION

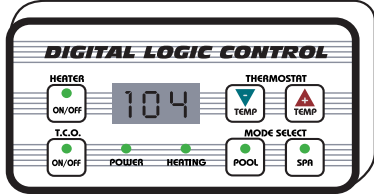
MAKE SURE TO TURN OFF ALL POWER TO UNIT INCLUDING POWER TO POOL PUMP TIMER PRIOR TO MAKING ANY ELECTRICAL CONNECTIONS.

- Install motorized actuators on proper valves in pool/spa plumbing. (see plumbing diagrams).
- Feed actuator wires through knockout in base of low voltage electric compartment.
- Plug in actuator wire lead to motor valve sockets located on the right side of the circuit board in unit. Make sure to plug in suction and return actuator wires to appropriate socket.
- Run the actuator wires through the slot provided on the right side of the unit's plastic front cover.
- Turn power to unit and timeclock on.

E. ELECTRICAL CONNECTIONS AND WIRING

3. OPTIONAL REMOTE KEYPAD WIRING

for Digital Logic Control Models with Time Clock Override Option Only



The Remote Key Pad will perform all the same functions as the heater's key pad:

- Heater on/off
- Pool temperature & status readouts
- Thermostat settings for pool & spa
- Timer override function
- Activation of two field-installed Jandy™ 2440 actuator motors via pool/spa select buttons.

NOTE: The water pump can be activated via the time clock override button. When T.C.O. is selected while in spa mode, the water pump will start and stay running constantly. When in the pool mode, the time clock override will run only the water pump when the heater's thermostat calls for heat.

MAKE SURE TO TURN OFF ALL POWER TO UNIT INCLUDING POWER TO POOL PUMP TIMER PRIOR TO MAKING ANY ELECTRICAL CONNECTIONS.

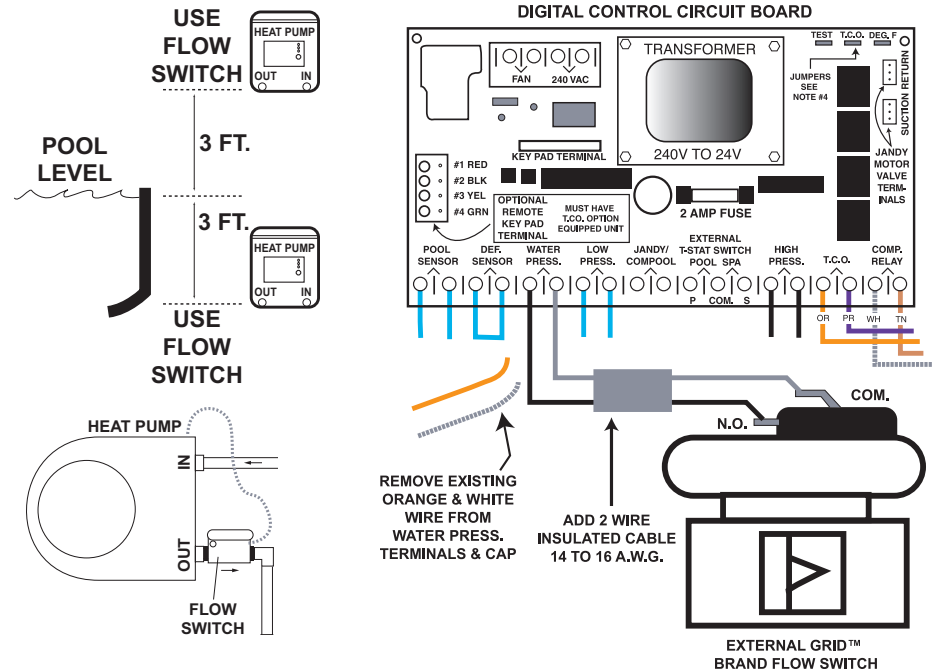
WARNING THE REMOTE KEYPAD MUST BE INSTALLED IN A DRY LOCATION.

- Remove low voltage electric box cover located on right side of electric box on the unit. The digital keypad is mounted on this cover.
- Attach a four wire #18 gauge insulated wire to the brown 4 position terminal on the left side of the circuit board. The plug can be removed to make the wiring connections. Attach color coded wires according to illustration on page 11. WARNING IMPROPER CONNECTION OF THESE WIRES WILL SHORT OUT THE CONTROL SYSTEM.
- Feed wire through knockout located in the base of the low voltage electric compartment. Run the wire through the slot provided on the right side of the unit's plastic front cover.
- Run the wire to the location of the remote keypad.
- Separate keypad from keypad housing and mount to wall with screws and anchors. The wire can be run through the back of the housing or up through the bottom.
- Attach the wires to the brown 4 position terminal on the back of the remote keypad. The plug can be removed to make the wiring connections. Attach color coded wires according to illustration on page 11. WARNING IMPROPER CONNECTION OF THESE WIRES WILL SHORT OUT THE CONTROL SYSTEM.
- Snap the keypad back into the housing.
- Turn power to unit and time clock on

C. PLUMBING & WATER CONNECTIONS

8. PLUMBING & WATER CONNECTIONS FOR ABOVE OR BELOW WATER LEVEL

If you install the heat pump above or below the pool or spa water level by more than 3 feet, the internal water pressure switch may be effected by the static pressure of the pool water. In some cases it may be necessary to eliminate the internal water "PRESSURE" switch and install a water "FLOW" switch. The water flow switch is not effected by changes in water pressure but only water movement. We suggest installing a 2", Grid Brand Model 20 flow switch and disabling the internal water pressure switch. Plumb in the flow switch as shown here. Then run a TWO wire insulated cable from the flow switch into the heater and attach to the existing water pressure switch leads located on the heater's logic board, behind the low voltage service panel and wire as shown below.



D. WINTERIZING PROCEDURES

1. LIGHT-FREEZE CONDITIONS

(Air temperature does not remain below 32°F for more than 4-hours)

In the event your heater will not be used for an extended period, it is recommended pool water be allowed to circulate through the heater during normally scheduled filtration cycles. If light freeze conditions are expected, adjust water pump controls for continuous operation throughout the light freeze episode. Moving water will not freeze under light-freeze conditions. Remain aware of abnormal climatic conditions; use "hard-freeze" instructions (Below) if freezing conditions will exceed 4-hours.

CAUTION !

FAILURE TO PROPERLY WINTERIZE HEAT PUMP MAY RESULT IN SERIOUS EQUIPMENT DAMAGE. FREEZE DAMAGE IS NOT COVERED UNDER THE HEAT PUMP WARRANTY. FAILURE TO HEED THE FOLLOWING CAN RESULT IN DAMAGE TO EQUIPMENT AND/OR PROPERTY.

D. WINTERIZING PROCEDURES

2. HARD-FREEZE CONDITIONS

(Air temperature remains below 32°F for more than 4-hours)

WARNING !

TO AVOID INJURY FROM ROTATING EQUIPMENT, DISCONNECT ELECTRICAL POWER FROM HEAT PUMP BEFORE PROCEEDING WITH INTERNAL DRAIN WINTERIZING PROCESS. FAILURE TO HEED THE FOLLOWING MAY RESULT IN PERMANENT INJURY OR DEATH.

1. **Disconnect all electrical power to the heater; turn off circulating pump.**
2. At the two (2) connection unions, disconnect the plumbing to the heater (removal is counterclockwise).
3. Locate the drain plug at outside, lower front of heater. (see figure 1)
If the unit does not have an external drain plug, remove the exterior front panel of the unit. The internal drain plug is located at the base of the heat exchanger (see figure 2). Follow the same procedure as with an external drain plug.
4. Using a 5/8", box-end wrench, remove the drain plug (removal is Counterclockwise).
5. Permit all water to drain from the condenser and then replace the plug: thread the plug in clockwise until just snug, then apply an additional 1/8 turn.
6. To prevent insects and vermin from entering the plumbing during the winterized period, partially reconnect the two (2) plumbing connection unions: couple each union one or two threads; this will permit condensation to drain, but will prevent most insects and animals from entering the plumbing circuit.
7. Next season: to ready the heat pump for use, simply retighten plumbing connection unions. Hand-tight is generally sufficient.

FIGURE 1

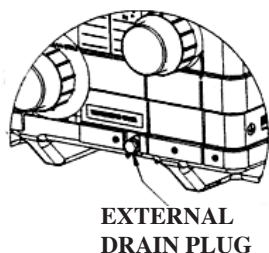
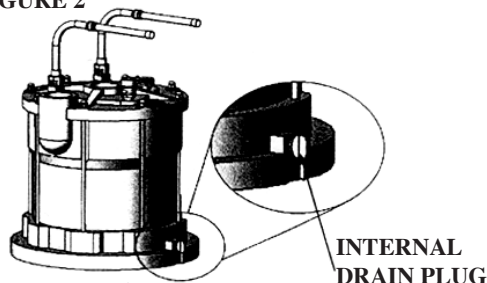


FIGURE 2



E. ELECTRICAL CONNECTIONS AND WIRING

MAKE SURE TO TURN OFF ALL POWER TO UNIT INCLUDING POWER TO POOL PUMP TIMER PRIOR TO MAKING ANY ELECTRICAL CONNECTIONS. SPECIFICATIONS ARE SUBJECT TO CHANGE. ALWAYS REFER TO WIRING DIAGRAM LOCATED ON THE BACK OF THE UNIT'S PLASTIC FRONT COVER AND DATA PLATE ON LEFT SIDE OF PLASTIC FRONT PANEL.

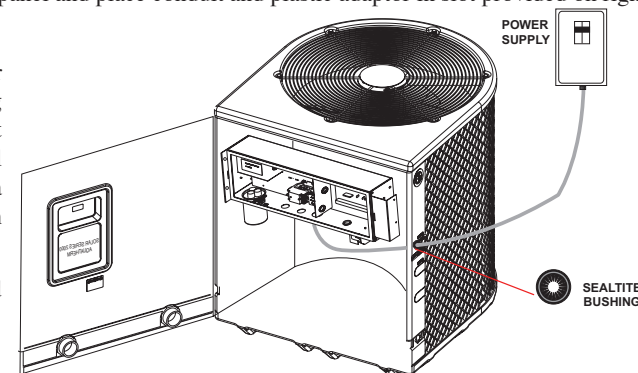
1. SUPPLY WIRING 220V

- Remove plastic front panel from unit.
- Locate and remove electric box high voltage cover located on left side of electric box.
- Determine sealtight length and slip plastic adaptor over conduit. Run conduit and proper

E. ELECTRICAL CONNECTIONS AND WIRING

size wire from power supply to the unit's main contactor located on the right side of high voltage compartment. The ground wire connection is located on the base of the box to the left of the contactor. A knock out is located on the bottom of the box just below the contactor. A sealtight fitting must be used to attach the conduit to the electric box. All other models require minimum #8 copper stranded wire. Model AT 1200 requires #6 wire.

- Replace electric box high voltage cover.
- Replace plastic front panel and place conduit and plastic adaptor in slot provided on right side of unit.
- Run a #8 solid copper wire from the bond lug located on the right side of unit to pool pump bond wire or a 7 ft. copper rod driven into the ground.
- Turn power to unit and timeclock on.



2. OPTIONAL TIME CLOCK OVERRIDE WIRING

The timeclock override is an option on the AT 30 and AT115 only, and the unit must be ordered with that feature. A unit with the timer override option will have an additional button on the lower left of the control keypad labeled Timer Override. The timeclock override contactor is located inside high voltage compartment to the left of the main contactor. There is a metal safety cover over the contactor.

- Remove timer override safety cover.
- Run conduit and wiring from timeclock to knockout located in base of high voltage compartment. Minimum #12 copper stranded wire or larger must be used.
- Attach wiring according to diagram on safety cover.
- Replace timeclock override safety cover and electric box high voltage box cover.
- A conduit slot is notched out on the left side of the plastic front cover in addition to the main power conduit slot. Use this slot to feed timer override wiring conduit out of unit.
- Replace plastic front panel.
- Turn power to unit and timeclock on.

