

HEAT PUMP SWIMMING POOL HEATERS

Owners Manual

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WARNING

This equipment must be installed and serviced by a qualified technician. Improper installation can create electrical hazards which could result in property damage, serious injury or death. Improper installation will void the warranty.



Notice to Installer

This manual contains important information about the installation, operation and safe use of this product. Once the product has been installed **this manual must be given to the owner/ operator of this equipment.**

WATERCO

Waterco Limited ABN 62 002 070 733

Member
WATER
QUALITY
ASSOCIATION



WATERCO

Water, the Liquid of Life

www.waterco.com

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A NOTE TO YOU

Thank you for buying our Waterco Heat Pump Pool Heater

A heat pump pool heater is a highly efficient, cost effective method of pool heating. Intelligent operation and care will result in many years of enjoyment and pleasure.

The Waterco heat pump pool heater is a self contained unit designed specifically for pool heating. The unit operates on the proven principle of heat pump technology. Using the latest technology in heat collection available, the Earth and its atmosphere, the Waterco pool heater processes the sun's free energy extracting heat from the sun warmed air and transferring it efficiently to the pool water. Because the Waterco pool heater moves the free heat from the outside air to the pool water, rather than create heat, as a fossil fuel or electric resistance heater does, the Waterco pool heater can heat your swimming pool with up to 80% lower operating costs than other less efficient, while maintaining your water temperature at all times during the pool heating season.

In general, compared to other types of pool heaters such as gas or oil fired, the Waterco pool heater has a lower heating capacity on a kW/ hr basis. Therefore, it will be required to operate longer to accomplish the desired results. At certain times, it may be necessary to run the heat pump up to 24 hours per day. However, this should not be of concern to the owner because the heater is designed to operate continuously. Even though it may operate continuously for many hours, it will still heat the pool with far greater economy than other types of heaters.

As with all pool heaters, you are advised to use a pool cover at night and when the pool is not in use. This will keep evaporation, the greatest source of heat loss, to a minimum, greatly reducing the overall pool heating costs. During warmer weather, the pool cover may not be required.

Please complete and mail in the Ownership Registration Card provided at the end of this guide. The card helps us to notify you about any new information on your heater.

Record your model's information

Whenever you call to request service for your heater, you need to know your model number and serial number. You can find this information on the base of your heater.

Please also record the purchase date of your appliance and your dealer's name, address, and telephone number.

Model Number _____

Serial Number _____

Purchase Date _____

Dealer Name _____

Dealer Address _____

Dealer Phone _____

**Our Consumer
Assistance
Centre number is.
Tel.: 1-450-796-4333
Fax.: 1-450-796-4365**

Keep this book and the sales slip together in a safe place for future reference.

GENERAL SAFETY INSTRUCTIONS

We care for our customers

We have provided important safety messages in this manual and on your heater. Always read and obey all safety messages.

 WARNING

This is the safety alert symbol.
This symbol alerts you to hazards that can kill or hurt you and others.

 VITAL

This is a very important label.
This symbol alerts you of things that MUST be strictly adhered to in order to ensure that your warranty will not be voided.

 IMPORTANT

These are things that must be respected in order to protect the bathers health of the swimmers and to ensure that your warranty will not be voided.

To find detailed product information, the location of the nearest Waterco dealer or to register your heater online, please visit our website at www.waterco.com

⚠ WARNING

All electrical connections must be done by a qualified electrician, according to the local electrical codes. Always cut off the unit's main power whenever the access panel is open or removed. Always install the machine outdoors (unless approved by the manufacturer), while respecting the minimal clearances needed for proper operation and heating.

👉 IMPORTANT

PROPER POOL CHEMISTRY IS VITAL TO THE LIFE OF YOUR HEATER. PAY PARTICULAR ATTENTION TO THE **TOTAL ALKALINITY AND TOTAL DISSOLVED SOLIDS**. IT IS HIGHLY RECOMMENDED THAT YOU HAVE YOUR POOL CHEMISTRY CHECKED OFTEN BY AN OUTSIDE INDEPENDENT POOL STORE.

Water quality standards that must be strictly adhered to:

DESCRIPTION	NORMAL RANGE*	VERIFY
PH Level	7.4 to 7.8	1 / week
Chlorine Concentration	1.0 to 4.0 PPM	1 / 2-3 days
Total Alkalinity	100 to 120 PPM	1 / 2-3 weeks
Total Dissolved Solids	below 1800 PPM <i>Reg. Pool</i>	1 / month
	below 3500 PPM <i>Salt. Pool</i>	1 / month
Calcium Hardness	200 to 300 PPM	1 / month

⚠ VITAL

MAKE SURE THE INSTALLATION WAS DONE ACCORDING TO THE INSTRUCTIONS OF THIS MANUAL. SEE "INSTALLATION" SECTION.

MAKE SURE YOUR HEATER WAS PROPERLY GROUNDED AND BONDED. SEE "BONDING" AND "BONDING DIAGRAM" SECTIONS.

READ YOUR WARRANTY ON PAGE 23.

DO NOT DEPRIVE HEATER OF WATER FLOW FOR MORE THAN 24 HOURS WITHOUT DRAINING IT. Make sure you leave the bypass valves open as shown in figure 1.

At the beginning of each season you must properly balance your water according to the standards prescribed on the previous page **BEFORE** circulating water inside the heat pump.

At the end of each season, if the heater is no longer used, and proper pool water chemistry is not maintained, it should be disconnected from the water line and drained to prevent any possible corrosion.

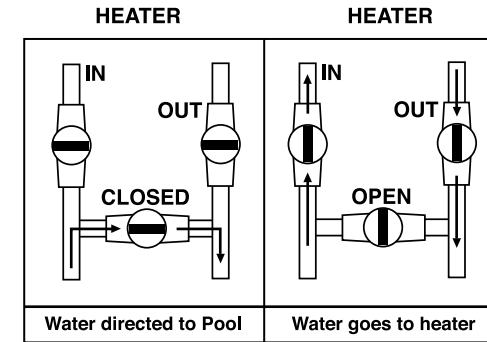


Figure 1

COMPONENTS DESCRIPTION

1. Heat Control
2. Evaporator
3. Cabinet
4. Fan and Motor
5. Heat Exchanger
6. Compressor



Inside the heater

Inside the heater

INSTALLATION INSTRUCTIONS

Location

The location of the pool heater is very important in keeping installation costs to a minimum, while providing for maximum efficiency of operation as well as allowing adequate service and maintenance access.

The unit is designed for outdoor installation and should not be installed in a totally enclosed area such as a shed, garage, etc. unless ventilation is provided to ensure adequate air exchange for proper operation. Re-circulation of cold discharged air back into the evaporator coil will greatly reduce unit heating capacity and efficiency.

The unit should be located as close as possible (3.0m is ideal) to the existing pool pump and filter to minimize water piping. The use of 90 degree bends and short radius elbows in the water piping should be kept to a minimum.

Mount the unit on a sturdy base, preferably a concrete slab or blocks. The base should be completely isolated from the building foundation or wall to prevent the possibility of sound or vibration transmission into the building. The size of the base should not be less than the base of the pool heater.

Contact your dealer to learn about our patio tile which ensures stability and reduces vibration.

IMPORTANT

Waterco models discharges air either from the top of the unit. Air is pulled through the evaporator coil and discharge through the grille. Clearance should be allowed in front and around the unit for unrestricted air discharge and service access. See Figure 1.

Vertical air discharge models

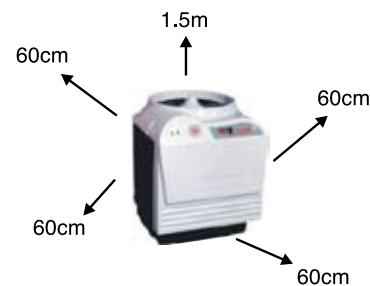


Figure.1

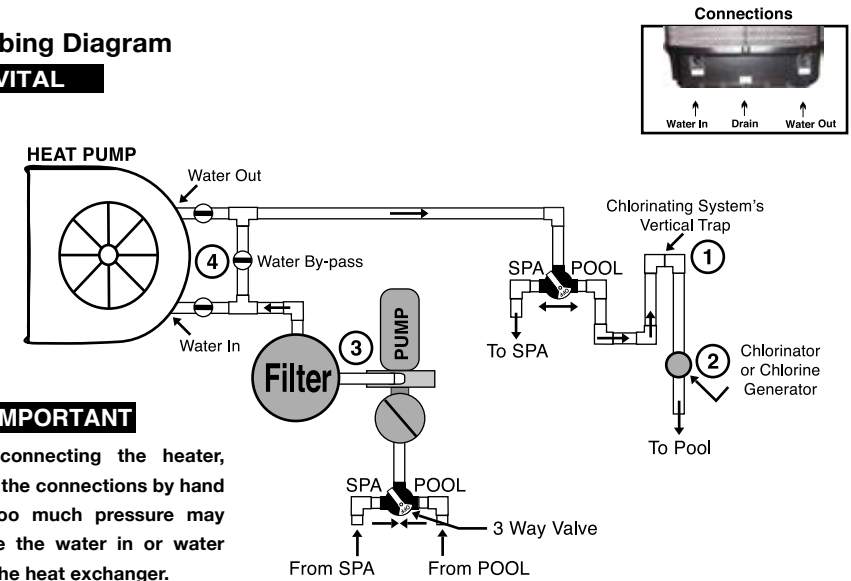
Water Piping

The piping sequence: pool pump / filter / heater / pool (inline chlorinators, if used, must be downstream (after the heater) to minimise harm to the pool equipment). See "Caring for your Pool Heater" section for more details on chlorination and chemical feeding. Rigid PVC piping is recommended, all joints should be glued with PVC glue. If rigid PVC is not available, you can use soft or flexible piping with stainless steel clamps. When the piping installation is complete, operate the pool pump and check the system for leaks. Then check the filter pressure gauge to see that excessive head pressure is not indicated.

NOTE: The installation of a bypass which isolate the heater from the water circuit is highly recommended. Make sure the heat exchanger is not deprived of water circulation for several days, high chlorine gas could cause excessive corrosion. If the disconnect switch is turned off, be sure the pool water is allowed to circulate through the unit, or is drained out of it.

Plumbing Diagram

VITAL



IMPORTANT

When connecting the heater, tighten the connections by hand only. Too much pressure may damage the water in or water out of the heat exchanger.

1. Any kind of Automatic Chlorination System MUST be installed after (downstream) of the Heat Pump.
2. Filter MUST be connected before (upstream) the Heat Pump.
3. A bypass should be installed on all systems for water flow adjustment and ease of service.

Piping

The piping and plumbing between the heat pump and other equipment should be minimised. During colder months, significant heat loss will occur through the piping.

Flow Check Valve

This is concerned with the installation of heat pumps below the pool water level. The heat pump operates on a pressure switch that activates the unit when the pool pump is switched on.

If the heat pump is installed more than 1.5 metres below the pool water level, the weight of the water keeps the pressure switch activated and the heat pump running - even when the pool pump is switched off.

In this situation, to prevent the heat pump running when the pool pump is switched off, a flow check valve must be installed in-line with the pressure switch.

The procedure on the following pages should be carried out: (This installation was carried out on a 105 three phase model, but the same procedure applies to all models)

Installation Above Water Level

For installations where the heat pump is installed above water level, installers must ensure that sufficient water flow is diverted to the heat pump. Flow is detected by the pressure switch. If the volume of water passing through the heat pump is insufficient, the pressure switch will not activate and will not turn on the unit.

Bypass

A bypass must be installed with all heat pumps. This will allow the user to control the water flow through the unit, as well disconnecting it easily for servicing.

Three Phase Connections

When installing the three phase heat pumps, the electrician must ensure at all times that the connections are done according to the tags placed on the wires. The wiring is tagged: L1, L2, L3, and N.

SUPPLY (AUS / NZ)		HEAT PUMP (US / CANADA)	
L1	Blue	L1	Orange
L2	Red	L2	Red
L3	White	L3	Black
N	Black	N	White

It is essential that the electrician installing three phase heat pumps is present when the units are started up for the first time.

Wrongly connected heat pumps are indicated by the compressor running backwards, and making excessive noise after the 3 minute time delay. This can damage the compressor if it is left to run.

If this occurs, the unit should be turned off immediately, and the wiring should be changed by swapping any two (2) phases to fix the problem - one phase needs to stay in the same position.

This is necessary as certain households/ properties may have three phase power supplies that are not wired to Australian standards.

Electrical

IMPORTANT

To ensure your safety and ensure the adequate functioning of your heat pump, **all electrical work should be performed by a fully qualified and licensed electrician in accordance with local electrical codes.**

An adequate and dedicated circuit breaker and copper wiring must be used. Refer to the electrical installation diagram found on the inside of the access panel. It may be necessary to install a ground circuit breaker.

WARNING

THE UNIT MUST BE DISCONNECTED BEFORE OPENING THE ACCESS PANEL.

Electrical Connection

Standard power supply	:	208/240 v - 60hz-1 phase
Optional power supply	:	208/240 v - 50hz-1 phase 380/420 v - 50/60 hz - 3 phase 200/230 v - 50/60hz - 3 phase

MODELS	POWER SUPPLY	BREAKER (Amps)	Running (Amps)	* ELECTRIC WIRE SIZE mm ² (A WG)
-	220 / 1	20	6.5	4 (12)
-	220 / 1	20	9.5	4 (12)
-	220 / 1	20	11	4 (12)
-	220 / 1 - 380 / 3	30 - 15	14 - 60	5,3 (10) - 2,1 (14)
-	220 / 1 - 380 / 3	30 - 15	16 - 7.5	6 (10) - 2,5 (14)
-	220 / 1 - 380 / 3	40 - 15	18 - 80	10 (8) - 4 (12)
-	220 / 1 - 380 / 3	40 - 20	27 - 13	10 (8) - 4 (12)
-	220 / 1 - 380 / 3	50 - 30	33 - 15	16 (6) - 6 (10)
-	220 / 1 - 380 / 3	50 - 30	34 - 19	16 (6) - 10 (8)

WARNING

The power cable ground must be connected to the electrical panel and to the ground lug of the heat pump. An improper incorrect installation may be a potential cause of fire, electrical shock or injury.

Bonding

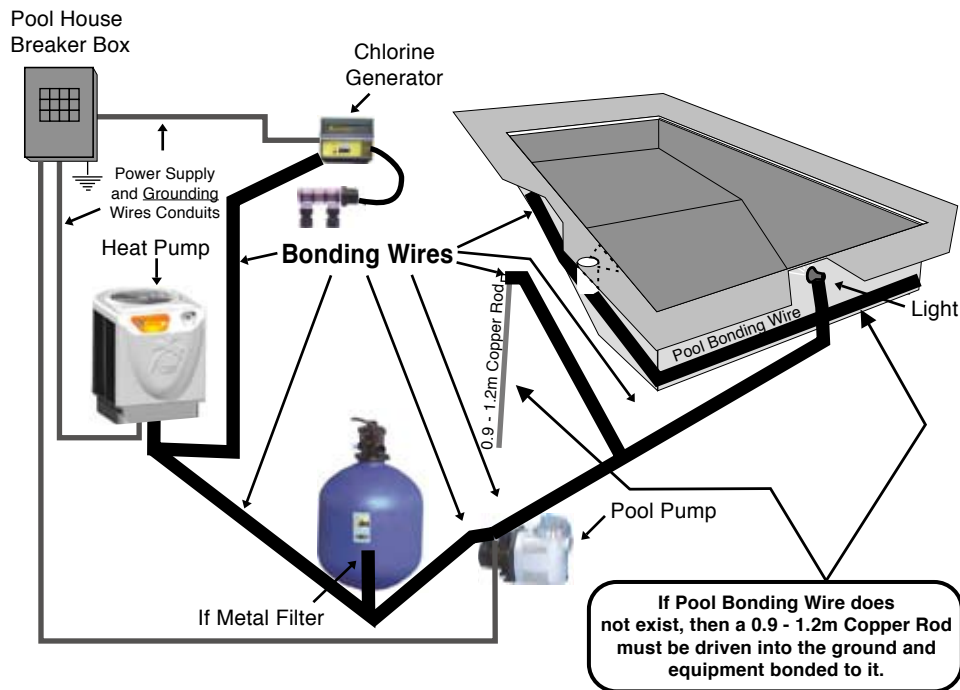
⚠ VITAL

Because all metals have different electrical potentials, ALL metal and electrical components of the pool system MUST be bonded together. This includes the metal framework of the pool, the light, the pump, the filter (if metal), the heater, any automatic chlorine generator, and any other metal or electrical equipment.

On some older pools, this substructure bond wire may not exist. In these cases, a 0.9 - 1.2m solid copper rod must be driven into the ground near the equipment, all electric equipment and metal components must be bonded to each other and to the copper rod. Warranty will be void if system is not properly bonded.

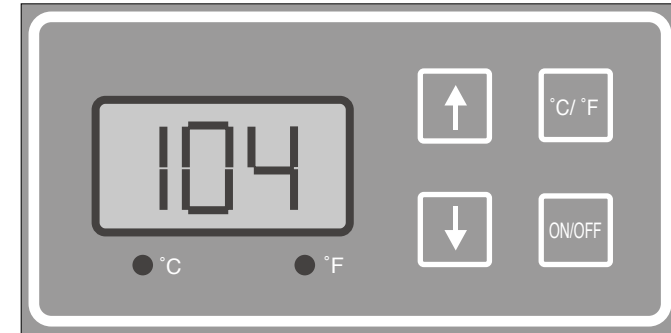
Bonding Diagram

⚠ VITAL



GETTING TO KNOW YOUR POOL HEATER

Operation of Square Electronic Control



Digital Control Panel

The digital display, electronic temperature control always displays the water temperature setting. To power on the temperature control, press the ON/OFF button.

To modify the desired water temperature, simultaneously press on the TEMP SET control arrows on the keypad for approximately 3 seconds, or until the temperature display flashes. The arrows will raise (up arrow) or lower (down arrow) the temperature setting. Once the display no longer flashes, the desired temperature is now set. To change the temperature display mode, press on the °C/°F button.

Temperature Differential

It is possible for a temperature variation to occur between the probe and the pool thermostat measurement, due to the quality of the pool thermostat .i.e., the value displayed is different from the temperature displayed on the pool thermometer. Example: if the water is at 26°C and the heat pump displays 24°C.

To calibrate this variation, perform the following procedure;

- Read the pool water temperature (ex: 26.6°C),
- Now read the temperature displayed on the heat pump thermostat (24°C),
- To determine the differential subtract the pool water temperature from the heat pump temperature, $26 (80) - 24 (76) = 2^{\circ}\text{C}$. Therefore we must compensate for 2°C.

To calibrate the probe perform the following procedure;

- Enter the digital programming mode by simultaneously pressing on the up and down arrows,
- Once the temperature displayed is flashing press on the ON/OFF button,
- The display will now show the calibration value, which varies -4°C,
- Using the up and down arrows, enter the calibration value, 2°C. The degree function will flash for negative values and will not flash for positive values.
- Once the calibration has been entered wait until the new temperature appears.

To Start-Up the unit

When the unit is turned on or after a power shut down, the panel lights up and either indicates OFF or the temperature of the pool water circulating inside the heater. Program in the desired pool water temperature.

Once programmed the fan starts and the compressor starts after a 3 to 5 minute delay.

NOTE: The fan motor and the compressor will start at the same time when the unit has been stopped for a long period.

To Start the unit

The unit can be stopped by switching off the electrical power supply or by programming the desired water temperature below the actual pool water temperature.

Initial Heating

The speed of heating is dependent upon five basic factors:

1. Size of the pool.
2. How many degrees the water is to be heated.
3. Ambient air temperature - the warmer the air the less time is required to heat.
4. Use of a solar blanket (see the following section).
5. The size of the heater.

To achieve initial heating your pool heater and pool pump may work up to 24 hours per day until desired temperature is achieved. The initial heating time may vary depending upon the above five factors. After initial heating, operating time may be reduced to match daily heat loss.

Pool Solar Blanket

A pool solar blanket should be used whenever possible. Blankets minimise heat loss and conserve heat in your pool. Like a jacket holds body heat in on a chilly day, or closed doors and windows hold heat in a home, the blanket controls heat losses. Un-blanketed pools lose 2-3 times more heat than blanketed pools.

Heater Running Time

Most units should be sized to operate during the pool filtering cycle time of 8-12 hours daily, providing an even, steady flow of warm water. On warmer days the heater will run less because the heat loss will be less. Heat pump pool heaters are able to operate 24 hours per day when necessary.

Defrost Cycle

When the ambient air temperature is between 3°C and 7°C, or if the evaporator is dirty or clearances are not respected, condensation water on the fins of the evaporator tends to frost. In such a case, the control will activate the defrost cycle until all the frost is gone. A normal defrost cycle (compressor stopped) lasts between 5 and 10 minutes. The pool heater won't be damaged if it is running at less than 7°C. In these conditions, the unit will have more frequent defrosting cycles.

Protection Devices

The integrity and performance of your pool heater and its components is protected by controls. In normal use, the Waterco unit should never reach the thermal protection level. However, should it happen, you should verify your operating conditions as described below.

The Waterco unit is designed to operate with a minimum water circulation of 113lpm. The high pressure switch will shut off the compressor if there is not sufficient water flow through the unit. Check for dirty filters, clogged skimmers or the bypass valve position. They are usually the cause of this condition.

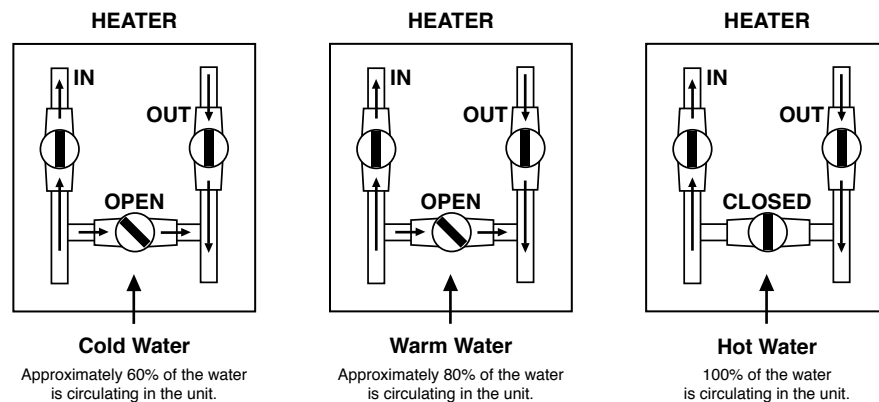
The Waterco unit also has a built-in water pressure switch that will interrupt the operation of your unit should water circulation through the unit stop. If there is still a demand for heat, turn on your pool pump and the heater will start up once the normal water flow is re-established.

Your heat pump pool heater features other protection devices that could stop the unit:

- High pressure cut-out switch,
- Low pressure cut-out switch,
- Thermal protection for the compressor and the fan motor

Adjustment of the bypass valves

The adjustment may vary according to the pool pump size and the climatic conditions.



CARING FOR YOUR POOL HEATER

The Waterco pool heater has been specifically engineered to give you many years of satisfaction. To clean the plastic surfaces use soapy water and a clean soft cloth. Never use solvents or abrasives.

The dirt collected in the evaporators can be removed with a gentle water spray and the use of a soft brush. Be careful not to damage the aluminum fins. Do not use a pressure washer to clean the evaporator as it can damage the fins.

Usage Of Chemical Products

IMPORTANT

Adequate water circulation and the proper use of chemical products is absolutely necessary to protect your family's health and your pool heater.

The following are essential water quality readings and must be maintained at all times.

DESCRIPTION	NORMAL RANGE*	VERIFY
PH Level	7.4 to 7.8	1 / week
Chlorine Concentration	1.0 to 4.0 PPM	1 / 2-3 days
Total Alkalinity	100 to 120 PPM	1 / 2-3 weeks
Total Dissolved Solids	below 1800 PPM <i>Reg. Pool</i>	1 / month
	below 3500 PPM <i>Salt. Pool</i>	1 / month
Calcium Hardness	200 to 300 PPM	1 / month

Winterising

VITAL

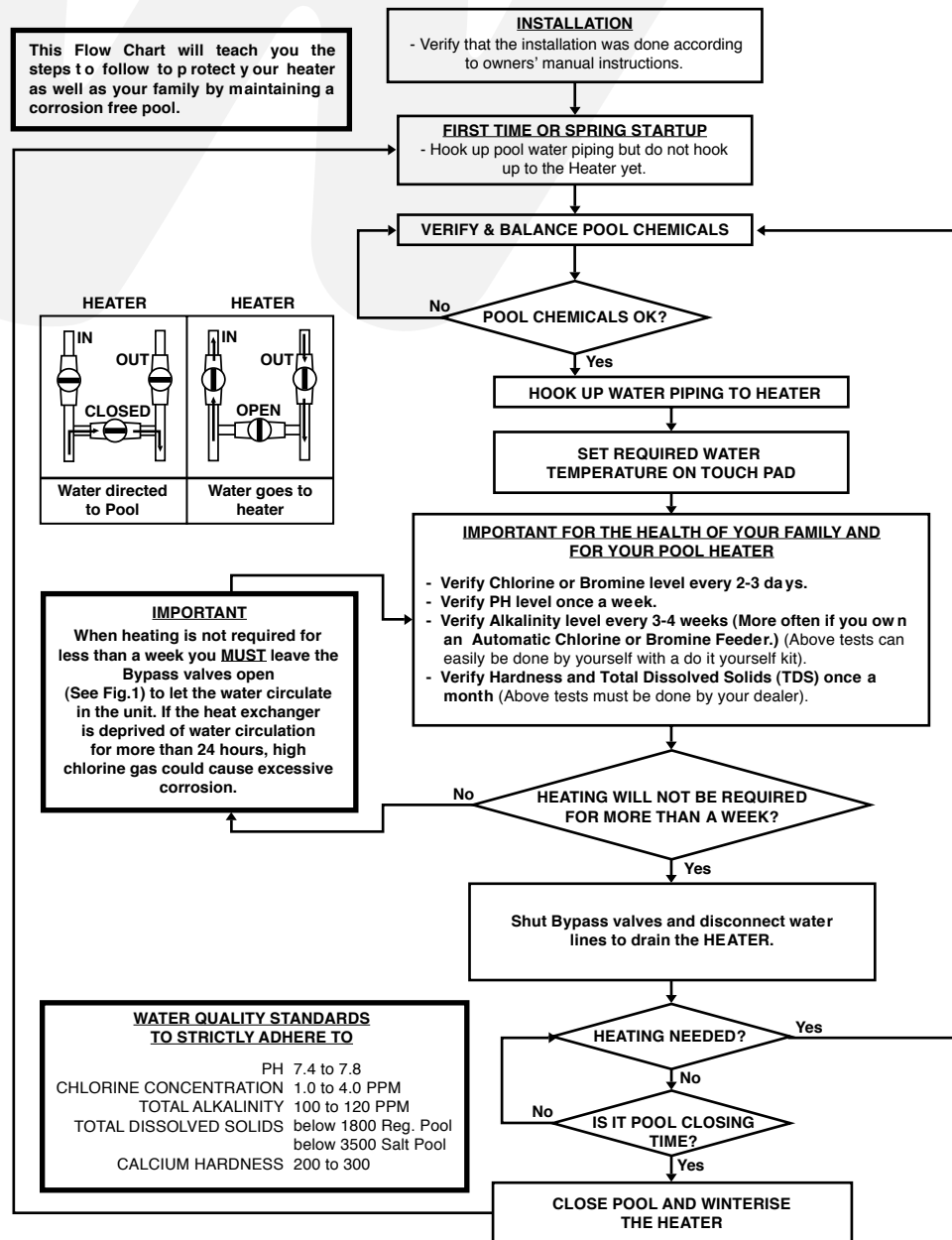
Set the water temperature setting to **OFF**. Turn the pool heater breaker OFF. If the unit is stored in a place where the temperature drops below the freezing point of 0°C, **it is mandatory that the water accumulated in the unit be drained completely before freezing weather prevails**. The water piping **MUST** be disconnected to drain the heat exchanger in preparation for winter. Once the piping is disconnected, the unit **MUST** be drained of all its water by tipping it (75°). It is recommended to flush the inside of the heat exchanger with the garden hose and to drain the unit again. Using 2 pool return caps, block the water in and water out to prevent any intrusion. **Do Not** leave the water piping connected to the heater over the winter.

DO NOT put anything under the water connections of the unit to lift it up. This can keep water inside the heater and cause freezing damages.

Unit may be covered for the winter. The use of a material that will allow air to go inside the heater is recommended.

It is also possible to fill the heat exchanger with pool anti-freeze only, but ensure that the anti-freeze contains an elevated pH to prevent corrosion. This is optional and requires appropriate hardware.

How To Protect Your Pool Heater



TROUBLESHOOTING

The Pool Heater Is Not Running Or Stops Less Than 2 Minutes After Starting Up

- Heat pump control set to low. Raise temperature set point.
- Desired water temperature is reached. Unit will automatically re-start when the water temperature goes below the set point.
- Main breaker is tripped. Reset it.
- Pool pump is not running. Turn the pool pump on.
- Filter is dirty restricting the water flow. Backwash and clean filter.

The Compressor Is Running But The Fan Is Not

- If the unit was just installed and the compressor starts before you have programmed the desired temperature, it is possible that the electrical hookup was made on the wrong side of the contactor (relay). Contact your electrician.
- The fan motor may be defective. Contact Waterco's service dept.

The Fan Is Running But Not The Compressor

- The unit is in its 3 or 5 minutes time delay protection mode.
- The unit is on defrost. The compressor will start again automatically a few minutes.

There Is Water Around The Unit

- While your Waterco pool heater is in the heating mode, a large quantity of warm and humid air passes over the evaporator and causes condensation.

It is normal to see condensation dripping under the heater.

To verify that the water is really a water leak you will need to stop the heater and leave the pool pump running for over 5 hours. If water is still coming out of your heater after this period you should call Waterco for service.

The Heater Is Running But Desired Water Temperature Cannot Be Reached

- Heat loss is too great for the heater; cover your pool as often as you can.
- Evaporator is dirty. Clean it.
- Evaporator restricted due to improper location.
- The bypass valves are not properly adjusted.

NOTE: *It your pool heater does not operate for reasons other than those mentioned above, see section on "Requesting Assistance or Service".*

REQUESTING ASSISTANCE OR SERVICE

IMPORTANT

All service will be handled by an Authorized Service Centre. Warranty may be voided if service is not done by an Authorized Service Representative. **DO NOT** return the heater to your dealer as they do not provide service.

Before calling for assistance or service, please check the "Troubleshooting" and "Warranty" sections or **call your dealer**. It may save you the cost of a service call. If you still need help, follow the instructions below.

Service can be obtained by calling us at **1-450-796-4333** or by Internet at **www.waterco.com**.

When asking for help or service, please provide a detailed description of the problem, your heater's model and **serial number**, and the purchase date. (See the "A Note to You" section.)

This information will help us to properly respond to your request.

KEEP A COPY OF THE SALES RECEIPT SHOWING THE DATE OF PURCHASE. PROOF OF PURCHASE WILL ASSURE YOU OF IN-WARRANTY SERVICE.

GENERAL INFORMATION AND TROUBLESHOOTING

Basic Troubleshooting Guide

FAULT	POSSIBLE CAUSE	ACTION
The heat pump does not run	The heat pump is not on.	Turn on the unit, verify that the circuit breaker is on.
The heat pump shuts off less than two minutes after start up	The heat pump fan is not running.	If the compressor is running, then the reply may be faulty, the fan run capacitor or the fan motor itself can be damaged.
The unit is running continuously but the desired temperature is not achieved	The unit is located in an enclosed area or where the airflow is restricted, either at the intake or the output of the energy collectors.	Remove obstacles or relocate the unit.
	The pool surface is too large for the heat pump capacity.	May need to install a larger unit, or multiple unit. Multiple units should be installed in parallel, based on the sizing guide.

HEAT PUMP TROUBLESHOOTING

Using a terminal block, connect the two stripped pressure switch wires into one end, and the blue and white wires of the flow check valve into the other end as shown (it makes no difference in which way the blue and white wires are plugged in)

Rubber Grommet

Cut and strip this pressure switch wire leaving two exposed ends.

Feed the flow check valve wire through the underside of the control box. A rubber grommet with some silicone sealant should be used in the entry point here to prevent any damage to the wire.

The front plastic shell can be pulled back, and the flow check wire can be fed through the underside of the control box.

The screws from the front of the unit need to be removed. This allows access to the underside of the power box, where the flow check valve wire will be fed through.

Pressure Switch

Soft metal cover that needs to be pushed open with a screwdriver.

Pressure switch wire that needs to be cut, this is where the flow check valve will be wired in series.

The valve must be installed horizontally, with the stem facing up.

During installation, it is best to use some form of ducting for the lead wire of the flow check valve, and have it running along the ground (or even underground), to prevent any trip hazards.

HEAT PUMP TROUBLESHOOTING

LENGTH OF WARRANTY	WATERCO INTERNATIONAL WILL PAY FOR
<p>Limited One to Five Years on parts and labour DEPENDING ON THE HEATER PUMP MODEL</p> <p>From date of Purchase</p>	<p>Parts and labour to correct defects in materials or workmanship during the period of warranty.</p> <p>Service must be provided by an Authorized service company.</p>

Focus Temp International WILL NOT PAY FOR

A. Service calls to:

1. Inspect and /or correct the installation of your pool heater.
2. Instruct you on how to use your pool heater.
3. Replace house fuses or correct electrical wiring.
4. Adjust or reestablish water flow to the heater.

B. Unnecessary service calls due to erroneous problem reported.

C. Damage to your pool heater caused by accident, misuse, fire, flood, acts of God, improper installation, harsh environment, chemical feeding before the heater or improper maintenance of water chemistry as described in this manual.

D. Damage to internal piping or components due to freezing conditions.

E. Repairs to parts or systems resulting from unauthorized modification made to the heater.

F. Repairs not previously authorized by our service department.

G. Parts or Heater transportation to our office.

Waterco International Inc. will replace or repair, at its choice, all defective part provided that this part is sent prepaid to our factory during the warranty period. Parts returned during the warranty period will be repaired or replaced and returned prepaid within Canada, Australia and New Zealand by the best and most economic means of transportation.

Waterco International Inc., is not responsible for direct or indirect damages resulting of defective components.

ELECTRICAL DIAGRAMS

Instruction on electrical connection of the manual model.

