



POOL HEAT PUMP

**OWNER'S MANUAL
INSTALLATION MANUAL
No : 2004.1**



GENERATION MODEL



ECLIPSE MODEL

**READ THESE INSTRUCTIONS CAREFULLY BEFORE INSTALLING OR
USING YOUR NEW POOL HEAT PUMP.**

TABLE OF CONTENTS

Introduction.....	p.3
A Cost-Efficient Heater	
How Does It Work?	
Low Maintenance	
Selecting the location.....	p.4
Supply and Accessibility	
Other Recommendations for Spas	
Water Inlet and Outlet Connections.....	p.5
Basic Connection	
Chlorinators, Brominators and Other Automatic Systems	
Pressure-Type Chlorinator or brominator	
In-line Chlorinator or Brominator	
Salt Chlorinator	
Dual Units Connection	
Pool and Spa Connection.....	p.8
Using One Pump and One Filter for the Pool and the Spa	
Using Independent Pumps and Filters for the Pool and the Spa	
Electrical Connection.....	p.9
Maintenance.....	p.10
Cleaning	
Winterizing	
Seasonal Start-up	
Water Deviation	
Water Maintenance.....	p.13
Why Perform Water Maintenance?	
Water Chemistry	
Sanitizers	
What to Do?	
Swimming Pool Heat Pump Control.....	p.18
Solving Problems.....	p.24
Questions and Answers.....	p.25
Warranty.....	p.26

INTRODUCTION

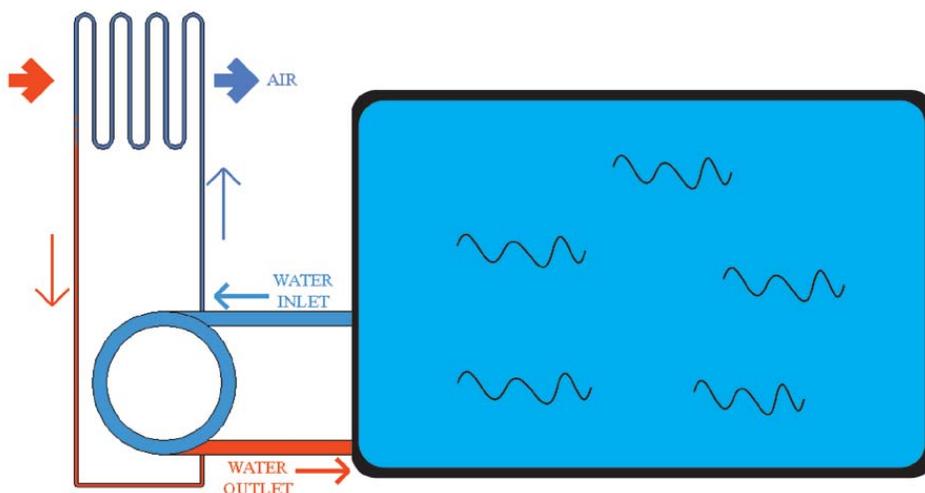
A Cost-efficient Heater

Your new pool heat pump will help you save money compared to other types of pool heaters.

In fact, even if your pool heat pump has a lower heat capacity which makes it run for 24 hours a day, the pool heat pump remains the most economic system, because of the use of state of the art technics in thermodynamics.

How Does It Work?

Your pool heat pump works just as a water pump does. Whereas a water pump is transferring water from one place to another, your pool heat pump is transferring heat between the surrounding air and your pool water. Moreover, your pool heat pump is not producing heat with the energy it is consuming just as a water pump is not producing water. It is because of this principle that your pool heat pump may attain efficiency ratios going up to 600% or 700% in the best climatic conditions. This means that for each kilowatt your pool heater consumes, it is transferring 6 or 7 kilowatts from the surrounding air to the pool water. The difference is astronomical compared to oil, gas or electric resistance heaters yielding only 80 to 95% output. But it is true to say that the output of traditional pool heaters stays constant at any outdoor climatic conditions whereas the output of a pool heat pump varies. However, even when temperatures are cooler the pool heat pump continues to transfer heat between air and water and it stays the best choice for temperatures down to 5 Celcius (41 Fahrenheit) overnight.



Low Maintenance

Your pool heat pump is designed for lower maintenance at a lower cost. But if you want your pool to be heated efficiently, you must follow the advice supplied in this manual.

SELECTING THE LOCATION

The area you choose for your pool heat pump is very important. You must consider the following.

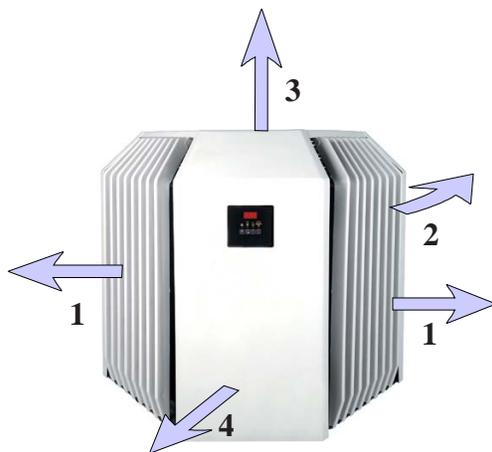
Air Supply and Accessibility

Your heat pump uses the surrounding air to work. It is very important that you make sure there is enough air circulation around the heat pump. Do not install the heat pump in a closed space like a garden shed, a garage, or a basement.

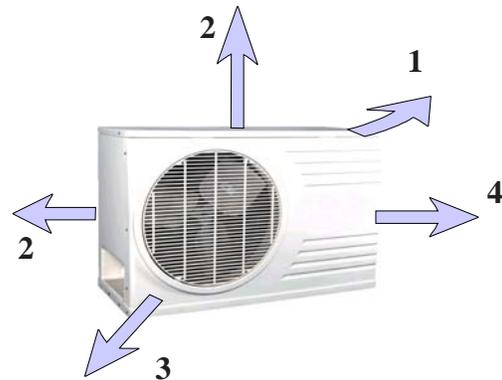
The table below indicates the minimum distance from the heat pump that any object should be located.

	Generation (CP)	Eclipse (MP)
(1) facing the coil surfaces	2 feet = 61 cm	2 feet = 61 cm
(2) facing other surfaces	10 inch = 25.4 cm	14 inch = 35.5 cm
(3) facing fan *	4 feet = 122 cm	4 feet = 122 cm
(4) facing service panel	2 feet = 61 cm or accessible	2 feet = 61 cm or accessible

* Objects should be placed as far as possible from where the air is discharged.



CP Model



MP Model

Other Recommendations

Do not install the heat pump under a roof. Doing this will protect the heat pump from being buried by snow or receiving heavy rainfall from the roof that does not have gutters.

Also, make sure that the digital control does not face the sun. The control will not break but its digital display will be more difficult to read.

If you have an automated sprinkler system for your lawn, make sure that the heat pump is not showered by a sprinkler.

The pool heat pump should be installed on a firm and leveled surface, preferably on a concrete slab or something equivalent.

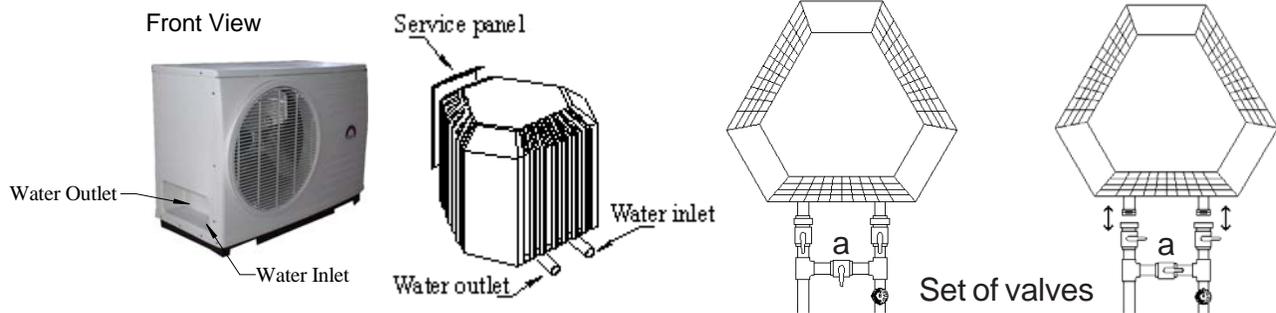
Keep in mind that the heat pump will cause condensation. Therefore water will be dripping from the heat pump.

WATER INLET AND OUTLET CONNECTIONS



For your own security, and to ensure proper operation of the unit, the water connection must be performed by a qualified person as per all applicable national, provincial, state or local codes.

For all Eclipse (MP) models, connection pipes are 1 1/2 inches in diameter. For all Generation (CP) models, the connection pipes are 2 inches in diameter. For all the pool heaters, we recommend (obligatory for the Eclipse series) the installation of a set of valves allowing to isolate the pool heater from the filtration system when necessary. (See the drawing below.) Moreover, you have to make sure that your pool heat pump may be disconnected from the pool pipes without having to stop the water pump or without losing great quantities of water.



To adjust the water flow going through the pool heater, please adjust the by-pass valve (a) in the following way:

MP30 - MP50 : 3/4 opened

MP70 : 1/2 opened

All CP's : Closed - the internal calibrated valve regulates the water flow, exception for those who have a water pump of 2hp or greater, adjust the valve to obtain the flows listed below.

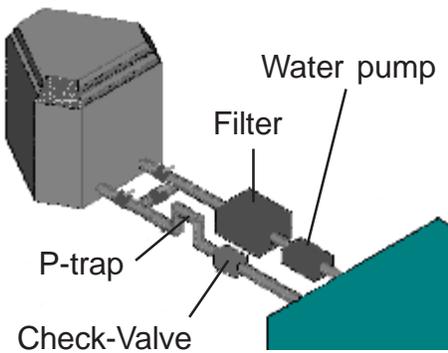
If the previous settings are not respected, the pump or the pool heater may be over-charged and result in failure of your equipment.

Your water pump must provide the quantity of water indicated in the table below. These numbers must be used for each pool heat pump installed. A flow meter must be installed on the water inlet of the pool heater to know the exact water flow. **Caution** : many flow meters require a long distance of straight tubing on the inlet side to offer an adequate measurement.

	Minimum	Ideal	Maximum
Eclipse	15 GPM(US)	20-30 GPM(US)	50 GPM(US)
Generation	25 GPM(US)	40-50 GPM(US)	65 GPM(US)

GMP(US) : American gallons (3,78l) per minute

Basic Connection



This connection method is strongly recommended to enhance the life-span of your pool heat pump.

If you connect the unit this way, you have to pour chemicals directly into the pool or the spa, as far as possible from the water supply point.



Do not pour chemicals in the skimmer or at the bottom of the pool, if you have a drain, because of the possibility of migration of the chemicals to the heater.

Chlorinators, Brominators and Other Automatic Systems

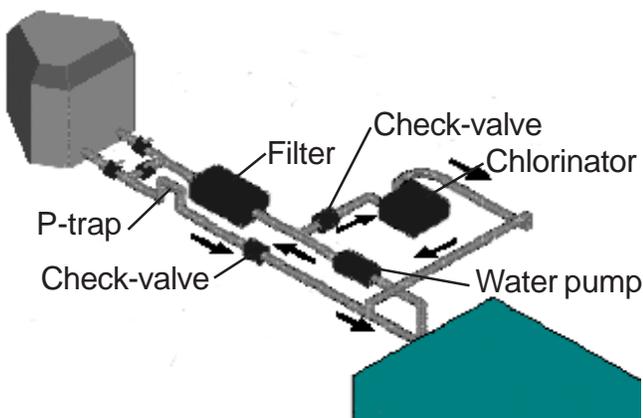


Any automatic distribution system of chemical products, chlorine, bromine or others, must be installed after the outlet of water from the heat pump. **The warranty of the heat pump will be voided for any installation that is not in accordance with this rule.**



The use of a brominator or a chlorinator tends to lower pH and total alkalinity because of the chemicals in it. If you use such a product, you must check the quality of the water regularly. (Addition of sodium bicarbonate is recommended to restore the balance.) (See the section Water Maintenance on p.12.)

Pressure-type Chlorinator or Brominator

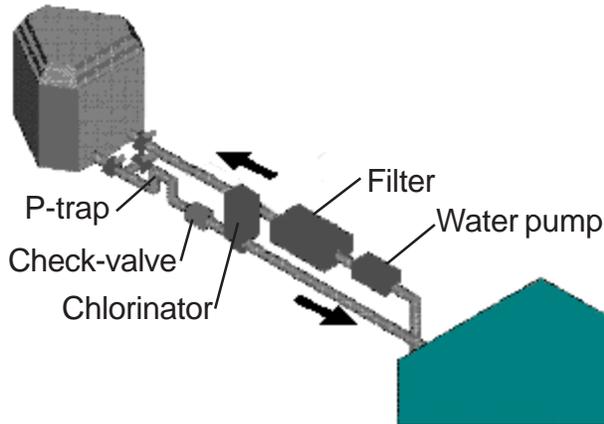


The pressure-type chlorinator or brominator takes a small amount of water from the outlet side of the filter, adds chemicals to it and returns this highly concentrated solution to the pool. The check valves must be highly resistant to corrosion. Use only a check-valve either supplied or recommended by the chlorinator (brominator) manufacturer.



The p-trap should be installed higher than the top of the chlorinator (brominator) to prevent migration.

In-line Chlorinator or Brominator



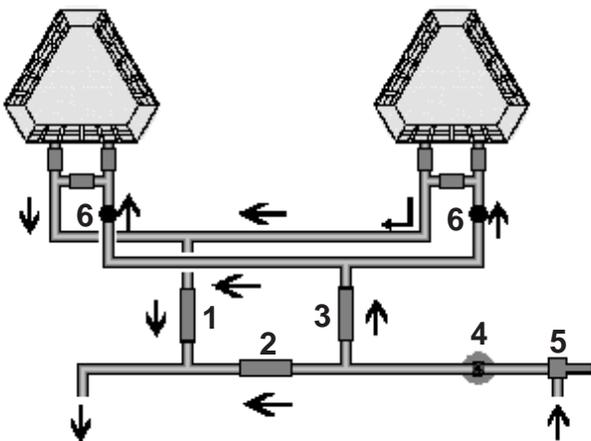
The in-line chlorinator or brominator should be installed on the pool water return line, between the heat pump and the pool. This type of chlorinator (brominator) should be installed as far as possible from the heat pump. Install a check-valve between the heat pump and the chlorinator (brominator).

 The p-trap should be installed higher than the top of the chlorinator (brominator) to prevent migration.

Salt Chlorinator

Salt chlorinators are made to be installed like in-line chlorinators. **Therefore, they must be installed in accordance with the “In-line Chlorinator or Brominator” connection directives, else the warranty of the heat pump will be voided.** (See the section “Water Maintenance” on p.12 and the section «Salt Generated Chlorine» on p.15 for more information on operating salt chlorinators.)

Dual Unit Connection



For some larger pools, it may be necessary to install two units in parallel. In this case, double the distances recommended in the table 1 of the page 5. Never place two MP models coil against coil, fan against fan or coil against fan.

- 1,2 and 3 : calibrated valves
- 4 : filter
- 5 : water pump
- 6 : flow meters



When the access to a heat pump is shut off, the water flow passing through this heat pump will be redistributed among all others. Therefore, the valves must be re-adjusted to meet the water flow requirements.

POOL AND SPA CONNECTION

Using One Pump and One Filter for the Pool and the Spa

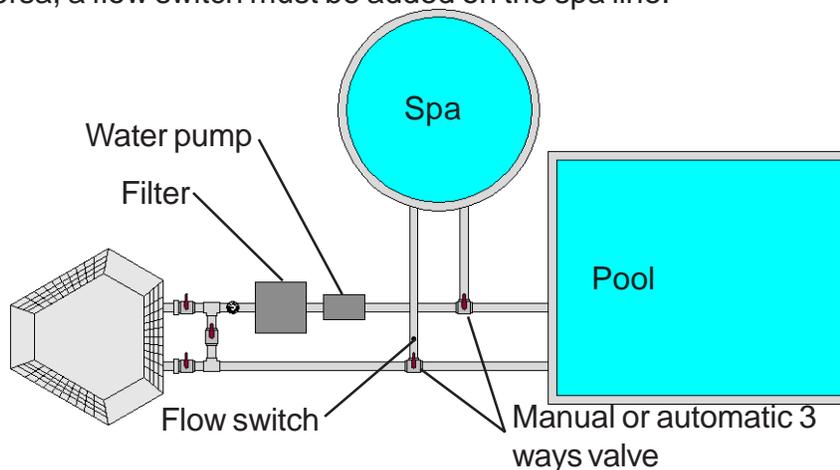
An installation featuring a single pump and a single filter for the pool and the spa is easier and more economical. Using home automation, it is possible to always keep the pool and the spa to the desired temperature. Otherwise, it is always possible to have only the desired system functioning by positioning the valves to have the water circulating in the pool or in the spa.



1) It is more difficult to maintain ideal levels of chemicals in the water when using a single filter because this type of installation prevents the pool or the spa from being filtered. An independent home automation system with automatic valves can reduce this problem, or you must be very assiduous in maintenance.



2) For the pool heat pump to automatically detect the switch over from pool to spa and vice versa, a flow switch must be added on the spa line.

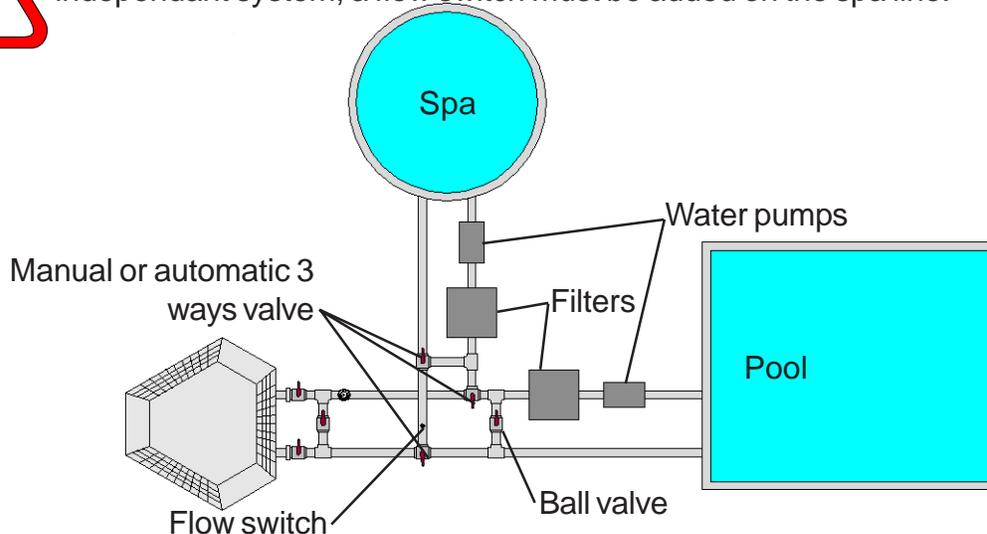


Using Independent Pumps and Filters for the Pool and the Spa

An installation featuring independent pumps and filters for the pool and the spa is a little more complicated and expensive. However, it is more advantageous because the pool or the spa is never left without filtration. Water is therefore easier to maintain.



1) For the pool heat pump to detect the change made either manually or by an independent system, a flow switch must be added on the spa line.



ELECTRICAL CONNECTION



For your own safety, and to ensure proper operation of the unit, the electrical connections must be performed by a qualified electrician as per all applicable national, provincial, state or local electrical codes.



A breaker must be installed near the heat pump in an accessible area.



Never open the electrical box without shutting off all power sources to the heat pump. If your heat pump features a water pump control option, do not forget to shut off the breaker to this water pump.



The identification plate on the heat pump identifies all voltage requirements.



If the supply cord is damaged, it must be replaced by the manufacturer or its service agent or a qualified electrician to avoid electrical shock.

MAINTENANCE



Before performing any maintenance on the heat pump you must turn off the breaker of the electrical supply line.

Cleaning

To ensure optimum performance of the heat pump, follow these recommendations:

- Backwash the filter of the pool on a regular basis in order to ensure proper flow rate through the pool heater;
- Keep the surfaces of the coil clean and free of any obstruction such as papers, leaves or other debris;
- Carefully clean the unit using a soft, non abrasive and bleach free cleaner, and rinse using a garden hose without the nozzle;
- Check the drainage holes of the base of the unit to make sure that they are clean and unobstructed. (This prevents water from accumulating in the heat pump.)

Winterizing (Cupro-nickel heat exchanger)

If you close the swimming pool during the winter season, it is essential to drain the unit in order to prevent the formation of ice in the condenser (water section). To winterize the heat pump, you must :

1. Stop the unit;
2. Shut off the breaker of the heat pump electrical supply line;
3. Disconnect the water inlet and outlet connections (See “Water Deviation” for details.);
4. Freely flush the condenser with tap water. Completely drain the system using air pressure or vacuum system. We do not recommend putting anti-freeze into the heat pump pipes, but if you chose to put some, make sure it is compatible with copper, otherwise, it would do more damage to the condenser than small quantity of ice would;
5. If the heat pump is left outside during winter, protect it with a waterproof cover.

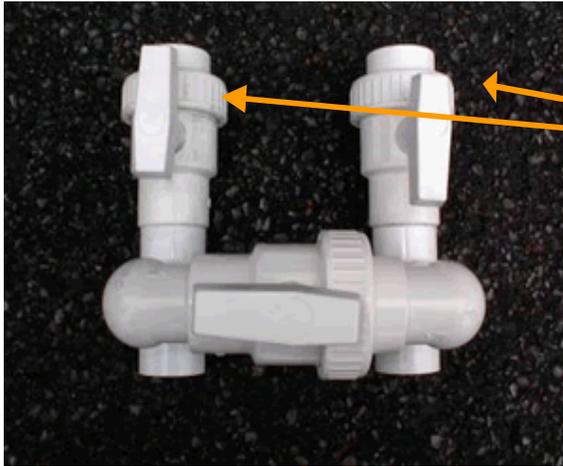
Winterizing (Titanium heat exchanger)

If you close the swimming pool during the winter season, it is essential to drain the unit in order to prevent the formation of ice in the condenser (water section). To winterize the heat pump, you must :

1. Stop the unit;
2. Shut off the breaker of the heat pump electrical supply line;
3. Loosen the bypass valves (photo A) and let the water drain out (See “Water Derivation” for details.);
4. Unscrew the small cap (photo B) with the help of two wrenches (photo C) and freely flush the condenser with tap water. Completely drain the system using air pressure or vacuum system. Store the small cap during winter.
5. Block the opening of either the water inlet or outlet pipe (photo D) with your hand and blow air into the pipe not covered by your hand to flush out the water completely. If the heat pump is left outside during winter, cover it with a waterproof cover.

Winterizing (Titanium heat exchanger)

A.



Loosen bypass valves

B.



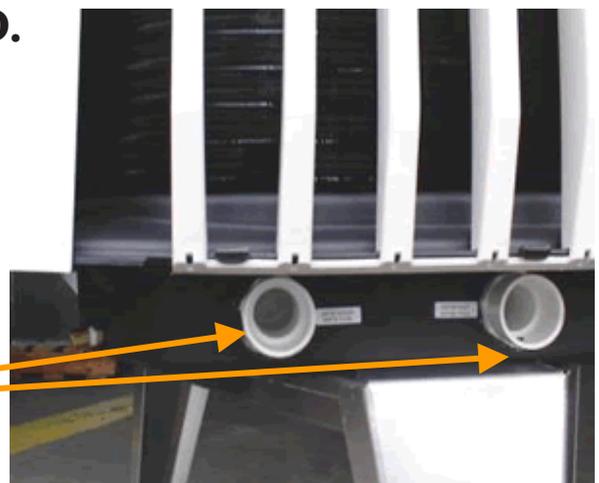
Brass cap

C.



Unscrew brass cap

D.



Water inlet and outlet pipes

Seasonal Start-up

Before starting the pool heat pump for the first time of the season, you must :

1. Verify and adjust the quality of the pool water (see chapter "Water Maintenance" to find out about the amount of chemicals to be used in your swimming pool);
2. Make sure that the electrical breaker of the pool heat pump is in the off position;
3. Connect the heat pump to the water circuit;
4. Clean the pool filter and make sure that the water is flowing adequately through the pool return line;
5. Switch on the breaker of the heat pump electrical supply line.

Water Deviation

Some maintenance operations(System Shock) require that the pool heat pump be isolated from the filtration system to keep the heat exchanger from suffering damage over time. By using the method of deviation, you will be able to block access of pool water from entering the pool heat pump. To derive the water, you must :

1. Stop the unit.
2. Open the by-pass valve and close the water inlet and outlet valves (Photo 1.)

After a longer period of inactivity (1 week or more):

3. At the beginning of spring, when you prepare your swimming pool, make sure that the water is stable by checking the pH, alcalinity and chlor level before starting your pool heat pump. (To find out about the amount of chemical products to use in your swimming pool, consult the chapter on "Water Maintenance" in the manual.)
4. When the water is stable, you can close the by-pass valve and open the water inlet and outlet valves (Photo 2) to end the deviation process.

Photo 1



Photo 2



WATER MAINTENANCE

Why Perform Water Maintenance?

Contrary to traditional heat pumps that treat air only, pool heat pumps deal with water and are much more sensitive. This is mainly caused by water chemistry. Only you, the owner of the heat pump, can control the chemistry of your swimming pool water to avoid premature degradation of your pool heat pump.

Water Chemistry

Many chemicals are used to control the quality of swimming pool water. We use different types of chlorine or bromine to control microorganisms and algae. We also use various products to regulate pH and other aspects of the water chemistry. Every product added produces an effect on water chemistry that must often be balanced with other chemical products. For example, trichlor addition induces a diminution of pH and of total alkalinity (TA). We must balance those effects by adding sodium bicarbonate (baking soda).

Some organizations, like the NSPI (National Spa & Pool Institute), publish standards on pool water chemistry. Those standards are made to protect swimmers and swimming pool equipments, particularly their metal parts, copper, steel and even stainless steel, that will corrode under the effect of bad chemistry. Generally, if the equipment can be damaged by bad chemistry, this can also be a health hazard. (See the following table for the standards.)

Table 1: Chemical Products Concentration in Pool Water Standard

	Minimum	Ideal	Maximum
Free chlorine*	1.0	pool 1.0-3.0 spa 3.0-5.0	pool 3.0 spa 10.0
Combined chlorine*	None	None	0.2
Bromine*	2.0	pool 2.0-4.0 spa 3.0-5.0	pool 4.0 spa 10.0
pH	7.2	7.4 - 7.6	7.8
Total alkalinity*	80	80-120	150
Total dissolved solids*	300	1000-2000	3000
Calcium hardness*	150	200-400	500-1000
Cyanuric acid*	10	30-50	150
Salt* (salt chlorinator)	None	None	3000

*Ppm: parts per million

Your heat pump, just as any type of pool heater (gas, oil, electric, etc.), features some metal parts that can be damaged by bad chemistry. The condenser of your pool heat pump is made of a copper alloy that, as resistant as it is, is sensitive to pH. That is why we strongly recommend testing the quality of the pool water regularly. These controls must be made on a weekly basis and must at least feature the following: chlorine or bromine, pH and TA. Moreover,

we suggest having the pool water tested by a professional (often free of charge) once a month.

The water of the pool or spa must be maintained within the standards included in this manual. **Any negligence to do so, will void the warranty.** These standards are from the NSPI and are common throughout the swimming pool industry; they are not particular to Turcotte heat pumps.

The most important factor for the durability of the pool heat pump is the pH because the capability of the water to cause the degradation of metal is directly related to it. Let's also mention that TA is the measure of the capacity of water to resist to pH variation; therefore it is as important. Taylor, an important manufacturer of pool water test kit for professionals states:

“Corrosive water will dissolve copper piping and heat exchangers and leave stain on pool walls.” [Taylor, A Testing & Treatment Guide part #2004B, p.35]

“The result is a highly unbalanced water condition resulting in damage to copper heat exchangers, light rings, stainless steel ladders an concrete pool surface.” (Talking about acidity and low TA) [Taylor, A Testing & Treatment Guide part #2004B, p.11]

Below is a chart presenting pH associated to concentrated solutions of various chemical products for pools.

Table 2: pH of Various Chemical Products for Pools

Chemical	pH
Chlorine	
Trichlor (pucks)	2.5-3.0
Sodium Dichlor	6.8-7.0
Lithium Hypochlorite (powder)	10.7
Calcium Hypochlorite (cylinder)	11.8
Liquid Chlorine	13
Bromine (tabs)	3.6
pH Regulating Products	
Muriatic Acid	0.1
Dry Acid	1.4
Cyanuric Acid	3
Sodium Bicarbonate	8.3
Sodium Sesquicarbonate	10.1
Soda Ash	13

Sanitizers

Sanitizers are products used to purify water, to relieve it from microbes and algae. They are chlorine, in its different forms, and bromine in the case of the pools. Each of them has its advantages and inconveniences. They are sometimes basic, sometimes acid. They can have different impacts on water chemistry and can necessitate various chemical products to counter-balance those impacts or to stabilize them. Warm water is more difficult to maintain, it necessitates greater quantities of sanitizers and, therefore, greater quantities of other chemical products.



Never pour any sanitizer directly into the water intake (skimmer) without having deviated the water from the pool heat pump previously. (See the section "Water Deviation", p.11.)

NOTE: The use of a floating distributor is recommended as an alternative to pouring chlorine directly into the skimmer. Maintaining the chlorine level using this method can however be more difficult because the water flow dissolving the chlorine is less important on the top of the pool than in the water pump system.



Shock Treatment

Before performing any shock treatment, deviate water from the pool heat pump to prevent chemical products from damaging it

1) Trichloro-s-triazinetrione (TCCA or trichlor or pucks)

Trichlor is a very common and practical sanitizer because it dissolves into hypochlorous acid, a powerful sanitizer, and into cyanuric acid, a stabilizer improving the duration of its efficiency. However, it produces 2 acids that contribute to lowering pH and AT of the pool water. This can cause severe damage to the pool and to its system because of corrosion:

"...having a strongly acidic pH, TCCA tablets will reduce total alkalinity and, if not monitored, low total alkalinity will cause corrosive damage to the pool." [Taylor, A Testing & Treatment Guide part #2004B, p.26]

Usage of trichlor requires the addition of sodium bicarbonate to higher the pH and TA level. **Warning:** many users testing only pH will be tempted to use sodium carbonate, or pH+, however this product does not increase TA level and pH will decrease back rapidly. As acidic water is also most of the time very clear because it is free of microorganisms, T.T.I. wants to remind you to test water regularly to avoid problems caused by acid water. Clear water is not a synonym of good quality water.



NOTE: With trichlor, it is possible to use what is called a chlorinator. A chlorinator is an automatic chlorine distribution system, but in no case it is controlling pH and TA of water. Thinking their system is completely automatic, users of those systems often neglect to test their water. Moreover, make sure that your heat pump installer has modified the circuit of your chlorinator in a manner to prevent it from pouring out its concentrated solution of chlorine into the pool heat pump. (See p.7)

2) Bromine

Bromine is a very good sanitizer. It is safe and practical. It does not require any stabilizer and it does not cause irritation nor has any odor. Furthermore, its efficiency is independent from pH of water. However, it is acid and it destroys TA. Water that is acid and low in TA becomes corrosive and disintegrates metallic pieces of the pool system, including the heat exchanger of your pool heat pump. Therefore, it is imperative to test water frequently, even if water is very clear, to avoid problems caused by water acidity. Acid water is often very clear because it is free of microorganisms, but it is damageable and of bad quality.



NOTE: with bromine, it is possible to use what is called a brominator. A brominator is an automatic bromine distribution system, but in no case it is controlling pH and TA of water. Thinking their system is completely automatic, users of those systems often neglect to test their water. Moreover, make sure that your heat pump installer has modified the circuit of your brominator in a manner to prevent it from pouring out its concentrated solution of bromine into the pool heat pump. (See p.7)

3) Sodium hypochlorite (liquid chlorine)

Liquid chlorine is completely soluble in water and does not leave any residue in pool water, but it decomposes rapidly, even when stored, and require usage of a stabilizer like cyanuric acid. As it is alkaline, it contributes to raise pH and TA. High pH and TA can contribute to the formation of a deposit of limestone on the condenser of the heat pump, creating an isolating layer on the heat exchanger and reducing the heat pump efficiency.

4) Calcium Hypochlorite (granular or stick chlorine)

Granular chlorine is easy to use and dissolves rapidly. On the other hand, it increases pH, TA and calcium hardness significantly. Like with liquid chlorine, high calcium hardness, pH and TA can contribute to the formation of an isolating layer on the heat exchanger reducing the heat pump efficiency.

5) Salt Generated Chlorine

A salt chlorinator produces bleach and other components through the electrolysis of salted water. The process does not affect pH nor TA. However, **users of those systems must test their pool water on a regular basis** since pH and TA may vary because of other factors.

Salt concentration must also be tested because a salted solution contains ions that may corrode the cupro-nickel heat exchanger. **Do not put more salt in your system than the quantity recommended by the manufacturer of the salt chlorinator and do not exceed the recommended concentration.** Usually, if the water tastes salted, it contains too much salt and can damage the heat exchanger of the pool heat pump.



NOTE: Other types of sanitizers exist; all of them have their advantages and inconveniences. What is truly important to keep in mind is that pool water is something that should be maintained regularly and that should be balanced according to standards established throughout the pool and spa industry.

What to do?

The purpose of maintaining the water of your pool is not only to protect the swimmers, but also to improve the working conditions of your pool equipment, particularly of your pool heat pump to increase its durability and its efficiency. To achieve this goal, the user must:

1. Test pool water regularly (chlorine or bromine, pH and total alkalinity);
2. Balance the pool chemistry within the level of the standards using the appropriate products;
3. Protect the pool heat pump whenever the water should be beyond the standards.

1) Testing

We highly recommend checking the level of chlorine or bromine, and the level of pH and TA at least once a week. Moreover, we suggest that you have your water tested professionally once a month, particularly the following variables:

- Calcium hardness: a low calcium hardness level implies corrosive water that can damage your pool heat pump. A high level of calcium hardness contributes to the formation of deposits on the surface of the heat exchanger reducing the efficiency of the pool heat pump;
- Total dissolved solids: a high total implies a tendency of the water to corrode, therefore gradually destroys the pool equipment;
- Copper level: a high copper level can indicate a degradation of the cupro-nickel heat exchanger of the pool heat pump. So this can be considered as a warning urging you to verify the pool water more often. For the users of copper algaecides, a higher level of copper is normal; but verify if there is no gray-black stain deposit indicating the saturation of the water in copper and a possible degradation of the heat exchanger;
- Stabilizer (cyanuric acid): a high level of cyanuric acid can damage the equipments and, especially, is toxic for the swimmers.

2) Balancing

According to the levels given by the test results and according to the volume of water of your pool, always balance the pool water in a manner that meets the standards. Your swimming pool service company can help you choose the proper chemical products and the appropriate quantities. Always carefully follow the instructions given by the chemical products suppliers. Never pour more into the water than prescribed.



Warning: any chemical product, acid or basic, is susceptible of provoking the degradation of the heat exchanger of your pool heat pump. Never pour any chemical product into the water intake (skimmer) of your pool to prevent the product from damaging your pool heat pump.

3) Protecting the Pool Heat Pump

If you observe that your pool water is beyond the established standards, we urge you to shut down your pool heat pump, to divert the water from it and to disconnect it from the plumbing, as described in the section "Maintenance", p11. After, wash the heat exchanger using tap water.

**HP706
SWIMMING POOL HEATPUMP CONTROL**



USER GUIDE MANUAL

1. INSTRUMENT IDENTIFICATION



2. DESCRIPTION OF FRONT PANEL:

DIGITAL DISPLAY: **Display normally shows the actual water temperature.**

HEAT ON LED: **Indicates that the heat pump is heating the pool or the spa.**

°F LED: **Indicates that the temperature is being displayed in °F.**

°C LED: **Indicates that the temperature is being displayed in °C.**

SET MODE LED: **Indicates the setup or adjustment mode.**

ON/OFF KEY [%]: **Turns the heat pump ON or OFF.**

BACKWASH KEY [BACKWASH]: **Hold for 3 seconds to activate the backwash mode.**

SET KEY [SET]: **Hold for 3 seconds to activate the setup mode.**

INCREASE KEY [^]: **Increases the desired or setpoint temperature.**

DECREASE KEY [v]: **Decreases the desired or setpoint temperature.**

NOTE: The display may be changed in steps by pushing the [^] or [v] keys briefly, or automatically by holding down the same key.

3. OPERATION:

The control is first shipped in the OFF mode. The digital display will show « - - » , indicating the OFF mode. THE CONTROL MUST BE IN THE ON MODE IN ORDER TO CHANGE THE SETPOINT (THE DESIRED WATER TEMPERATURE) OR HAVE ACCESS TO THE OTHER FEATURES! The setpoint is factory set at 70 °F.

a. SWITCHING THE HEATPUMP ON:

Hold the [SET] key for 3 seconds. The set mode LED will come on to indicate the set mode. Now touch the [%] key. The display will now show the actual water temperature. If there is a demand for heat, that is if the actual water temperature is lower than the desired or setpoint temperature, the Heat On LED, the compressor and fan will come on. Note that each time the compressor turns off there will be a 5 minute delay before it can be turned on. After 8 seconds the set mode LED will go off.

b. SWITCHING THE HEATPUMP OFF:

Hold the [SET] key for 3 seconds. The set mode LED will come on to indicate the set mode. Now touch the [%] key. The display will now show « - - ». After 8 seconds the set mode LED will go off.

c. TO VIEW THE SETPOINT OR DESIRED TEMPERATURE:

Hold the [^] key to display the setpoint or desired temperature.

d. TO VIEW THE DEFROST TEMPERATURE:

Hold the [v] key to display the defrost temperature.

e. TO CHANGE THE SETPOINT TEMPERATURE:

Hold the [SET] key for 3 seconds. The set mode LED will come on to indicate the set mode. Now touch the [^] key to increase the value or the [v] key to decrease the value. The adjustment range is from 70 °F to 105 °F (21 °C to 41 °C in Celsius mode). You have 8 seconds from the time that the last key was touched to make the adjustment. After 8 seconds the set mode LED will go off.

f. BACKWASH OPERATION:

Hold the [BACKWASH] key for 3 seconds. The display will show [bac] to indicate the backwash mode. In this mode the heatpump is turned off for 20 minutes in order to allow time for backwash. The heatpump will turn on automatically at the end of the 20 minutes. If you would like to turn on the heatpump before the 20 minute delay, simply press the [BACKWASH] key for 3 seconds (when the circulation pump is returned to the filter position).

g. SWITCHING BETWEEN °F AND °C:

Hold the [SET] key for 3 seconds. The set mode LED will come on to indicate the set mode. Touch the [^] key and the [BACKWASH] simultaneously to select the °F mode. Touch the [v] key and the [BACKWASH] simultaneously to select the °C mode. After 8 seconds the set mode LED will go off.

4. CALIBRATION:

Other features are available on the control which aid for both installation and servicing.

a. TO VIEW DEFROST TEMPERATURE:

To view the defrost temperature, push the [v] keys.

b. TO CANCEL THE 5 MINUTE ANTI-SHORT CYCLE DELAY:

For a quick restart, push both the [BACKWASH] and [%] keys for 3 seconds. Ensure that the high and low pressures are equalized.

Another mode exists which permits the service technician to modify the calibration of the sensors as well as different control parameters.

TO ENTER THE SERVICE MODE:

To access the service mode hold the [SET] key for 3 seconds. The set mode LED will come on to indicate the set mode. Now hold both the [^] and the [v] key simultaneously for 3 seconds. The service mode LED will come on to indicate the service mode. In the service mode, unlike the set mode, the control does not return automatically to the normal mode 8 seconds after the last key was touched. To exit the service mode you must step through the parameters until you come to the setpoint adjustment mode (see i. on page 9). The first parameter is the water sensor calibration.

c. WATER SENSOR CALIBRATION:

The digital display will show [CXX]. «C» represents the water sensor calibration mode. «XX» is the actual water temperature in °F. If water sensor calibration is necessary, measure the water temperature with a precise digital thermometer and adjust the digital display to show the same value using the [^] and the [v] key. To view or step to the next parameter (defrost sensor calibration), touch the [SET] key.

d. DEFROST SENSOR CALIBRATION:

The digital display will show [cXX]. «c» represents the defrost sensor calibration mode. «XX» is the actual defrost temperature in °F. If defrost sensor calibration is necessary, measure the temperature of the defrost sensor, installed on the side of the evaporator, with a precise digital thermometer and adjust the digital display to show the same value using the [^] and the [v] key. To view or step to the next parameter (defrost cut-in temperature), touch the [SET] key.

e. DEFROST CUT-IN TEMPERATURE ADJUSTMENT:

The digital display will show [LXX]. «L» represents the defrost cut-in temperature adjustment mode. The defrost cut-in temperature is the temperature of the evaporator at which the defrost sequence is initiated. «XX» is the defrost cut-in temperature in °F. This adjustment is factory set at 30 °F. If it is necessary to change this adjustment, adjust the digital display to show the desired value using the [^] and the [v] key. The range of this adjustment is from 10 °F to 60 °F. To view or step to the next parameter (defrost cut-out temperature), touch the [SET] key.

f. DEFROST CUT-OUT TEMPERATURE ADJUSTMENT:

The digital display will show [HXX]. «H» represents the defrost cut-out temperature adjustment mode. The defrost cut-out temperature is the temperature of the evaporator at which the defrost sequence is terminated. «XX» is the defrost cut-out temperature in °F. This adjustment is factory set at 48 °F. If it is necessary to change this adjustment, adjust the digital display to show the desired value using the [^] and the [v] key. The range of this adjustment is from 10 °F to 60 °F. To view or step to the next parameter (deadband adjustment), touch the [SET] key.

g. DEADBAND OR TEMPERATURE DIFFERENTIAL ADJUSTMENT:

The digital display will show [bXX]. «b» represents the deadband adjustment mode. The deadband is the differential between the cut-in and cut-out water temperatures. «XX» is the differential in °F. This adjustment is factory set at ±0.4 °F ([b0.4] on the display). If it is necessary to change this adjustment, adjust the digital display to show the desired value using the [^] and the [v] key. The range of this adjustment is from ± 0.1 °F to ± 1.0 °F. To view or step to the next parameter (compressor defrost delay-off time adjustment), touch the [SET] key.

h. COMPRESSOR DEFROST DELAY-OFF TIME ADJUSTMENT:

The digital display will show [dX.X]. «d» represents the compressor defrost delay-off time adjustment. The compressor defrost delay-off time adjustment is the time that the compressor continues to operate after the defrost temperature falls below the defrost cut-in temperature (ie. 30 °F) «X.X» is the delay time expressed in hours and fractions of hours. This adjustment is factory set at 1.0 hour ([d1.0] on the display). If it is necessary to change this adjustment, adjust the digital display to show the desired value using the [^] and the [v] key. The range of this adjustment is from 0.1 hours to 1.5 hours. To view or step to the next parameter or to exit the service mode (setpoint adjustment), touch the [SET] key.

i. TO CHANGE THE SETPOINT TEMPERATURE OR TO EXIT THE SERVICE MODE:

Touch the [^] key to increase the setpoint or the [v] key to decrease the setpoint. The adjustment range is from 70 °F to 105 °F (21 °C to 41 °C in the °C mode). You have 8 seconds from the time that the last key was touched to make the adjustment. After 8 seconds the set mode LED will go off and the control will exit the service mode and return to the normal mode.

ERROR CODE LIST

CODE	SYMPTOM	PROBABLE CAUSE	SOLUTION
DSO	Open-Circuit in evaporator temperature sensor Heat pump stopped	The evaporator temperature sensor is incorrectly plugged in or defective	Reset the heat pump from the breaker Call an authorized technician
SO	Open-Circuit in water temperature sensor Heat pump stopped	The water temperature sensor is incorrectly plugged or defective	Reset the heat pump from the breaker Call an authorized technician
DSc	Short circuit in evaporator temperature sensor Heat pump stopped	The evaporator temperature sensor is incorrectly plugged in or defective	Reset the heat pump from the breaker Call an authorized technician
Sc	Short circuit in water temperature sensor Heat pump stopped	The water temperature sensor is incorrectly plugged or defective	Reset the heat pump from the breaker Call an authorized technician
LP	Low pressure detected in circuits Heat pump stopped	Loss of refrigerant Defective captor or cable Defective fan Dirty evaporator Defrosting captor is defective	Reset the heat pump from the breaker Call an authorized technician Call an authorized technician Call an authorized technician Clean the evaporator Call an authorized technician
HP	High pressure detected in circuits Working resumption when the pressure becomes normal again	Water flow either slow or blocked by an obstruction Defective captor or cable	Reset the heat pump from the breaker Adjust the water flow Call an authorized technician
HP4	4 high pressures detected in circuits Heat pump stopped	Water flow either slow or blocked by an obstruction Defective captor	Adjust the water flow Clean pool filter Reset the heat pump from the breaker Call an authorized technician

CODE	SYMPTOM	PROBABLE CAUSE	SOLUTION
PE	Loss of memory in the control Resumption of default parameters	Power failure Power output variation. The control accepts a voltage range between 20VAC and 30VAC	Reset the heat pump from the breaker. The control is back to factory settings, call an authorized technician to recover personalized settings (not covered by warranty) Call an authorized technician if there are still problems
CO	Error of communication between the control and the remote control	Cables are incorrectly plugged in or defective Defective control or remote control	Reset the heat pump from the breaker. Check connections. Call an authorized technician
DF	For the hot-gas defrosting option. The defrosting operation has not finished in the predefined time. Heat pump stopped. Unplug the heat pump and then plug it back in to restart the control. If the problem persists, consider the following options.	Reversing valve blocked Defrosting captor is defective Compressor is inactive in defrosting mode	Reset the heat pump from the breaker. Call an authorized technician
FF	No water flow when pump operated by the control (swimming pool pump control option only) Resumption of activities if water flow is detected	The valves of the heat pump are closed The pump is disconnected The pipes are obstructed The water flow detector is defective: the water circulates in the heat pump but is not detected	Reset the heat pump from the breaker. Open the valves of the heat pump Connect back the heat pump Unblock the pipes Call an authorized technician
CF	Configuration of invalid option		Reset the heat pump from the breaker.
PF	Loss of power Disappear 10 sec.	Heat pump was disconnected There was a power failure	Reset the heat pump from the breaker. Wait

SOLVING PROBLEMS

Error	Possible Causes	Possible Solutions
Unit does not run.	<ol style="list-style-type: none"> 1. Power is not supplied to the heat pump. 2. No demand for heat. 3. Anti cycle delay (5 minutes). 	<ol style="list-style-type: none"> 1. Make sure that the heat pump electrical supply line breaker is ON. 2. Make sure that the temperature control is set at a proper level. Adjust as required. 3. Whenever the compressor is stopped, the digital control imposes a minimal time delay of 5 minutes before restarting it to allow gases to calibrate.
The actual water temperature increases when the compressor starts.	Water is not circulating in the right direction.	Check connections.
The heat pump runs but does not generate enough heat.	<ol style="list-style-type: none"> 1. Water is not circulating in the right direction. 2. The heat loss of the pool exceeds the heating capacity of the heat pump. 3. The pool size exceeds the specified capacity of the model selected. 	<ol style="list-style-type: none"> 1. Check connections. 2. See "Heat Pump Sizing" section on page 4. 3. Use a more powerful model or use more than one heat pump.
The heater seems to have a water leak.	<ol style="list-style-type: none"> 1. Normal - water caused by condensation. 2. Water leak. 	<ol style="list-style-type: none"> 1. No action required. (Install a derivation drain if necessary.) 2. To verify if it is a leak, you need to stop the pool heat pump until all the condensation has disappeared. Verify if there is water remaining around the machine after 24 to 48 hours. (See p. 18 Q2)
The defrost sensor temperature decreases when the compressor starts.	Normal.	No action required.
The digital control displays "888".	The digital display is exposed to the sunlight.	Make shade on the display to distinguish lights that are ON from those that are OFF.
Only the fan is running.	<ol style="list-style-type: none"> 1. Defrost mode. 2. Anti cycle delay (5 minutes). 3. Defective compressor. 	<ol style="list-style-type: none"> 1. No action required. 2. No action required. 3. Call an authorized service technician.

QUESTIONS AND ANSWERS

1) Is it possible that my pool is losing water since my pool heater was installed?

-Your pool is not losing water, but because the pool water is at a higher temperature, there is more evaporation. When the difference of temperature between the pool water and the surrounding air is increased, more evaporation happens.

2) Some water drops beside my pool heater, does my pool heater have a leak?

-It probably does not. The water dropping from your pool heater must come from condensation of the humidity on the evaporator of your pool heater, just as condensation forms on a cold water glass for example. But, if you really think a leak could be present in your pool heater and want to be sure, you can stop the filter pump and the pool heater, or stop the pool heater and use the by-pass set of valve to prevent water from accessing your pool heater. Wait until the water evaporates beside the pool heater and have the water circulates again into the pool heater without putting the pool heater on. If water drops, it comes from a leak, not from condensation.

3) My pool heat pump indicates a temperature that is different from the temperature indicated on my pool thermometer. Does my pool heat pump have a problem?

-Chances are that it does not. Your pool heat pump features calibrated digital control and sensors. Most of the time, the problem comes from the pool thermometer. Even though the mercury thermometer is precise, its box is not and the thermometer is often not in line with the graduations written on the box. In this condition, the thermometer reads a temperature higher or lower than the real pool temperature. To measure the temperature of water, you can use a mouth thermometer on which the graduations are written directly.

-When the pool features a bottom drain, it is possible that the pool heater shows a temperature 1 or 2 degrees lower than what is measured on surface. This situation is normal since the water at the bottom of a pool is always cooler than on surface.

4) Since the installation of my pool heat pump, the pressure in my filter pump has risen, is it normal?

-Yes. The new heat pump, as well as the new tubing, is an added resistance to the water flow. Therefore, it is normal to have a rise of the pressure of 5 to 7 psi after the installation of a new pool heat pump.

5) Why isn't the pool water heating as my pool heat pump is working?

-3 cases exist as the pool heat pump is functioning:

The heat pump provides more energy than the pool is losing, the temperature rises.

The heat pump provides as much energy as the pool is losing, the temperature is stable.

The heat pump provides less energy than the pool is losing, the temperature lowers.

We should not forget that the pool heat pump efficiency varies with the operation conditions and that the energy losses of the pool are relative to the outdoor temperature, to the wind, to the size of the pool and to many other factors.

WARRANTY

POOL HEAT PUMPS

EXCLUSIVE LIMITED WARRANTY

**5 YEAR - WARRANTY ON ALL PARTS INCLUDING ELECTRONICS FOR
RESIDENTIAL SECTOR ONLY**

2 YEAR - WARRANTY ON ALL SERVICE LABOR

(ASK YOUR RETAILER FOR ADDITIONAL WARRANTY INFORMATION)

5 YEAR - WARRANTY ON TURCOTTE CUPRO-NICKEL HEAT EXCHANGER

(5 YEARS PARTS; 2 YEAR LABOR / NO WARRANTY IF USED WITH SALT CHLORINATOR)

20 YEAR - WARRANTY ON TURCOTTE EXCLUSIVE RESIN CABINET

**LIFETIME LIMITED WARRANTY ON TITANIUM HEAT EXCHANGER
PARTS ONLY**

POOL HEAT PUMPS LIMITED WARRANTY

5YEARS PARTS & 2 YEARS LABOR STARTING FROM THE INSTALLATION DATE

Available only for brand new products purchased

Parts: As described in this agreement, we will replace all parts judged defective or having a fabrication flaw if they were used under normal conditions for all TURCOTTE pool heat pumps for the duration of this agreement. Pool Heat Pumps are warranted for (5) Five Years Parts (2) years labor. **The cupro-nickel heat exchanger is not under warranty if used with a salt chlorinator.** Also, the titanium tube portion only, of the heat exchanger, has a lifetime warranty for as long as the heat pump is installed at the original address of the original owner or purchaser. On the other hand, the heat exchanger reservoir carries a 5 year warranty.

Labor: We will be responsible for labor in relation to the service required to replace defective parts. On the other hand, we will not be responsible for the labor related to the installation of a replacement unit if the present one cannot be repaired. Replacement of defective parts, as per this agreement, must be performed during normal work hours. We will not be responsible for labor charges under this agreement if there were no defective part, as per this agreement.

Owner: The warranty service agreement remains in effect until the expiration date of the here said agreement and as long as the product remains at the original installation address and was installed according to manufacturer's recommendations located in the owner's manual. This agreement may be transferred to a second owner of the same address by sending a written request to T.T.I. accompanied by a copy of a notarized transfer of ownership document and a check or money order of \$70.00 covering transfer and administrative fees within 60 days.

Limited Responsibility: We will repair the heat pump under warranty as long as the cost of repairs does not exceed the cost of the heat pump. If the cost of repairs exceeds the cost of the machine, the machine will be replaced by an equivalent unit according to availability.

Termination: All our obligations cease at the anniversary date of the said agreement which starts on the installation date.

Exclusion: This warranty agreement does not cover products or parts which may have been subject to alteration, abuse, abusive usage, accident, omission or stability of the installation, excessive voltage, acts of God, corrosion, commercial use, or any other usage not approved by T.T.I. This warranty does not cover the following items:

- All equipments not approved by T.T.I.
- Base and Support
- Paint, finishing or rust
- Cost for shipping parts directly
- All applicable taxes on parts and labor when required
- Decorations and borders
- Fuses and breakers other than the product's
- All electrical services required beyond the warranted equipment
- Adjustments

- **Chemical damage due to improper maintenance of pool water as described in the owner's manual (excluding pool heat pumps containing a titanium heat exchanger) (See chapter "Water Maintenance" in the owner's manual)**

Consumer's Responsibility: The warranty card included with the purchase of a TURCOTTE pool heat pump must be sent back to T.T.I. within 30 days following receipt. You are responsible for the cost of all service calls made in regards to instructing you on how to operate your system or to correct an improper installation of the system not approved or not described in the manufacturer's instruction manual. This agreement does not cover the cost of preventive maintenance, we suggest that you contact an authorized TURCOTTE service center for your annual inspection, it is the owner's responsibility to have an annual inspection and preventive maintenance of the equipment. This agreement does not cover cleaning, lubrication and adjustment of items such as evaporators, condensers, or air exchangers. You must provide reasonable access to the unit(s) for servicing at all times. Any work required to restore the property after servicing, is solely the consumer's responsibility. Also, it is the owner's responsibility to have proper bonding of the equipment to avoid heat exchanger corrosion.

Overtime: Overtime is not covered under this agreement, you will be invoiced for all overtime if you decide to have the service performed outside regular business hours.

Responsibility: Our responsibility is strictly limited to the terms and conditions of this agreement. All servicing will be done according to the standards of the trade. T.T.I. can not be held responsible for any incidents or damages resulting of services rendered.

Application of the law: This agreement submits to all the conditions and laws in the state or province in which it is in effect.

Model and serial number: The model and serial number of the equipment(s) covered by this agreement must be clearly written on the registration card. You must verify the numbers on the equipment label correspond with the numbers on the registration card. You must inform us in writing of all errors, omissions or divergences in the identification numbers appearing on the registration card.

Documentation: Always keep your invoice with the installation date as well as your model and serial number on hand for all verbal or written communications with T.T.I. in regards to services rendered under this agreement.

Service: Only T.T.I. or an authorized T.T.I. agent are permitted to service the equipment covered under this agreement. If you choose not to use T.T.I. or an authorized T.T.I. agent for the servicing of the equipment covered under this agreement, you will be responsible for the cost of repair.

Reference: All references to T.T.I. are in reference to the manufacturer of the product. All references to TURCOTTE are in reference to the product itself.