

User Manual

Heat Pro Inverter Series

Vertical



Swimming Pool Heat Pump

User and Service Manual

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Thank you for using Theratherm swimming pool heat pump for your pool heating, it will heat your pool water and keep the constant temperature when the air ambient temperature is at -12 to 43°C

 **ATTENTION: This manual includes all the necessary information with the use and the installation of your heat pump.**

The installer must read the manual and follow the instructions in implementation and maintenance. The installer is responsible for the installation of the product and should follow all the instructions of the manufacturer and the regulations in application. Incorrect installation against the manual implies the exclusion of the entire guarantee.

The manufacturer declines any responsibility for the damage caused by an incorrect installation that do not follow the manual guidelines.

WARNING:

1. Please always keep the heat pump in a well ventilated place and away from anything which could cause fire.
2. Don't weld the pipe if there is refrigerant inside the unit. Please keep the heat pump out of a confined space when re-gassing.
3. Please always empty the water out of the heat pump during winter time, or when the ambient temperature drops below 0°C. Or the Titanium exchanger will be damaged because of being frozen, in such case, your warranty will be lost.
4. Please always cut the power supply if you want to open the cabinet to reach inside the heat pump, because there is high voltage electricity inside.
5. Please keep the display controller in a dry area, or close to the insulation cover, to protect the display controller from being damaged by humidity.

1. Specifications

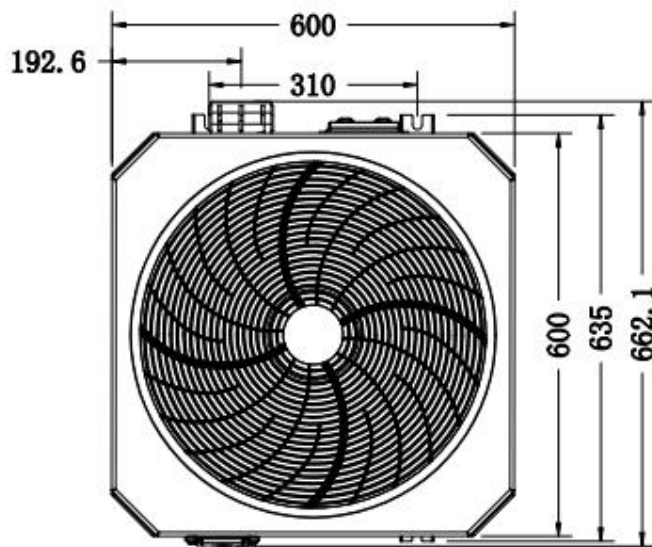
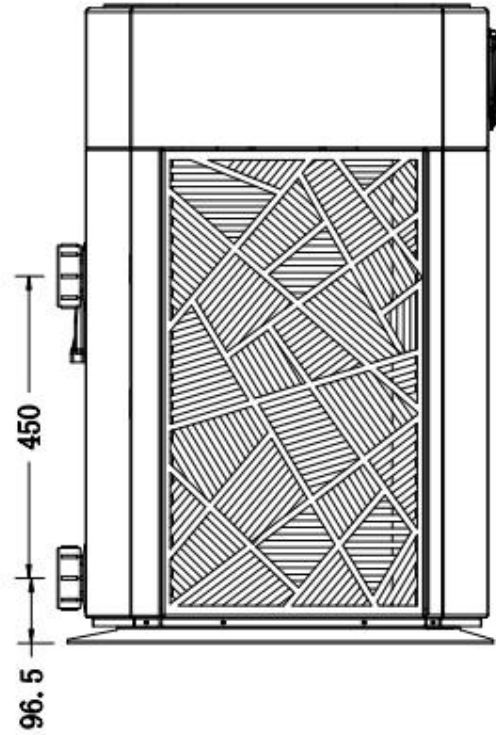
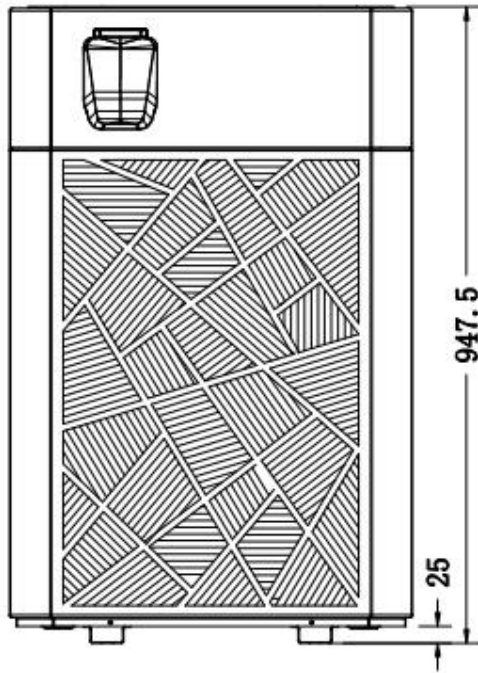
1.1 Technical data

Model		Theratherm 17iv	Theratherm 30iv
* Performance at Air 28°C, Water 28°C, Humidity 80%			
Heating capacity	kW	16-3.8	28.5-6.8
Power consumption	kW	2.67-0.23	4.75-0.43
C.O.P.		16-6	16-6
* Performance at Air 15°C, Water 26°C, Humidity 70%			
Heating capacity	kW	11.2-3	19.6-5.6
Power consumption	kW	2.43-0.42	4.26-0.78
C.O.P.		7.2-4.6	7.2-4.6
Compressor type		Inverter Compressor	
Voltage		220~240V / 50Hz or 60Hz /1PH	
Rated current	A	11.8	21.0
Minimum fuse	A	18	34
Advised pool volume (with pool cover)	m ³	25-85	75-180
Advised water flow	lpm	76.7	166.7
Water pressure drop	Kpa	15	25
Heat exchanger		Twist-titanium tube in PVC	
Water connection		48.3mm	
Fan quantity		1	1
Ventilation type		Horizontal	
Fan speed		550-850	450-600
Power input of Fan	W	10-120	
Noise level(10m)	dB(A)	/	/
Noise level(1m)	dB(A)	41-54	42-60
Refrigerant		R410A	
Net weight	kg	98	130
Gross weight	kg	113	148
Net dimension	mm	600*663*948	700*750*1152
Packing dimension	mm	650*715*1095	810*750*1295

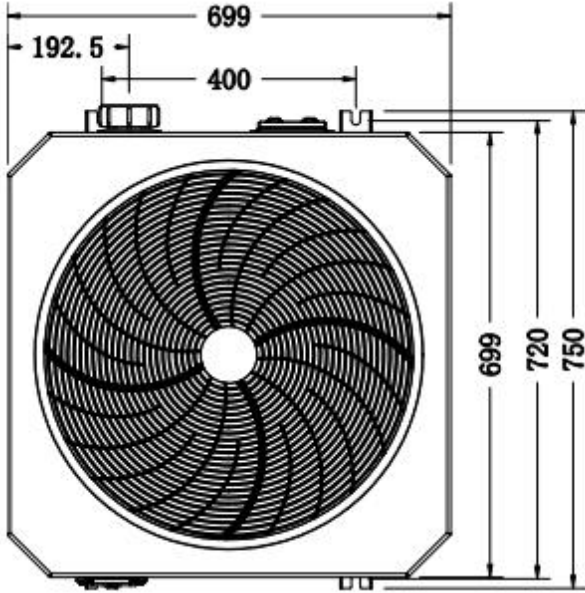
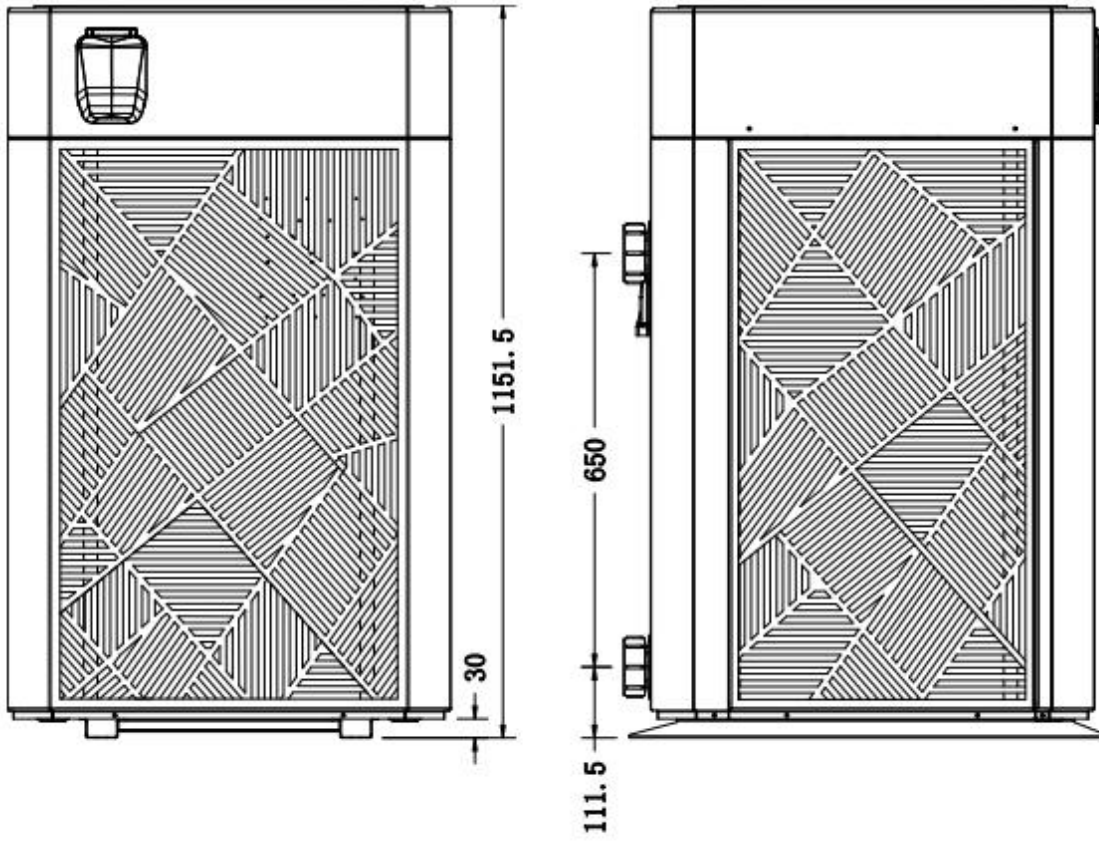
* Above data are subjects to modification without notice.

2. Dimension (mm)

Model Theratherm 17iv



Model Theratherm 30iv



3. Installation and connection

3.1 Notes

Theralux supplies only the heat pump itself. All other components, including a bypass if necessary, must be provided by the user or the installer.

Attention:

Please observe the following rules when installing the heat pump:

1. Any dosing of chemicals must take place in the piping located **downstream** from the heat pump.
2. Install a bypass in all installations.
3. Always place the heat pump on a solid foundation and use the included rubber mounts to avoid vibration and noise.
4. Always keep the heat pump upright. If the unit has been held at an angle, wait at least 24 hours before starting the heat pump.

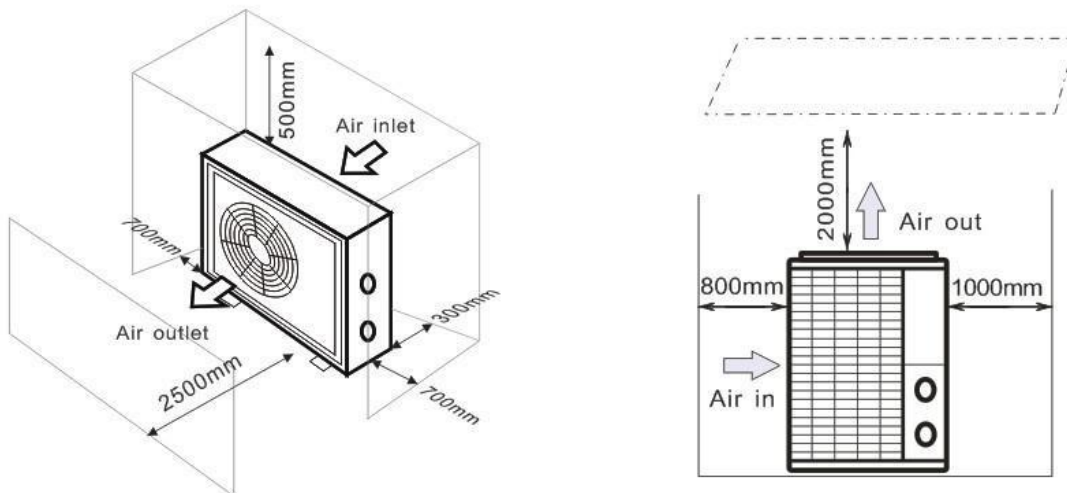
3.2 Heat pump location

The unit will work properly in any desired location as long as the following three items are present:

- 1. Fresh air** – **2. Electricity** – **3. Swimming pool filters**

The unit may be installed in virtually any **outdoor** location as long as the specified minimum distances to other objects are maintained (see drawing below). Please consult your installer for installation with an indoor pool. Installation in a windy location does not present any problem at all, unlike the situation with a gas heater (including pilot flame problems).

ATTENTION: Never install the unit in a closed room with a limited air volume in which the air expelled from the unit will be reused, or close to shrubbery that could block the air inlet. Such locations impair the continuous supply of fresh air, resulting in reduced efficiency and possibly preventing sufficient heat output. See the drawing below for minimum dimensions.



3.3 Distance from your swimming pool

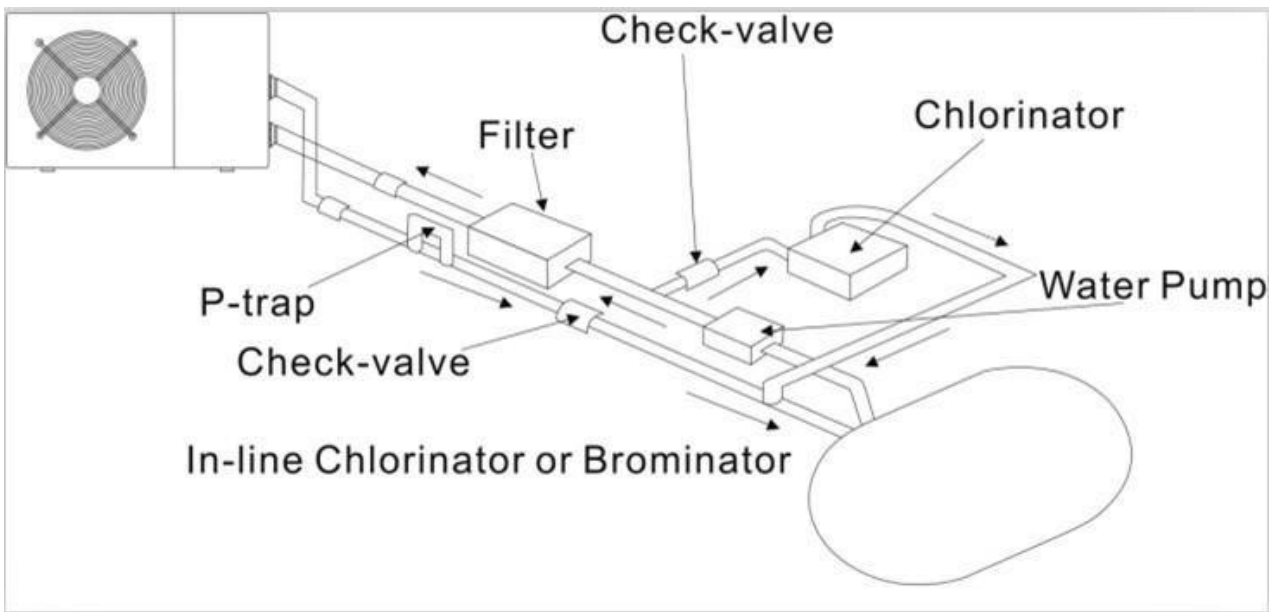
The heat pump is normally installed within a perimeter area extending 7.5 m from the swimming pool. The greater the distance from the pool, the greater the heat loss in the pipes. As the pipes are mostly underground, the heat loss is low for distances up to 30 m (15 m from and to the pump; 30 m in total) unless the ground is wet or the groundwater level is high. A rough estimate of the heat loss per 30 m is 0.6 kWh (2,000 BTU) for every 5 °C

difference between the water temperature in the pool and the temperature of the soil surrounding the pipe. This increases the operating time by 3% to 5%.

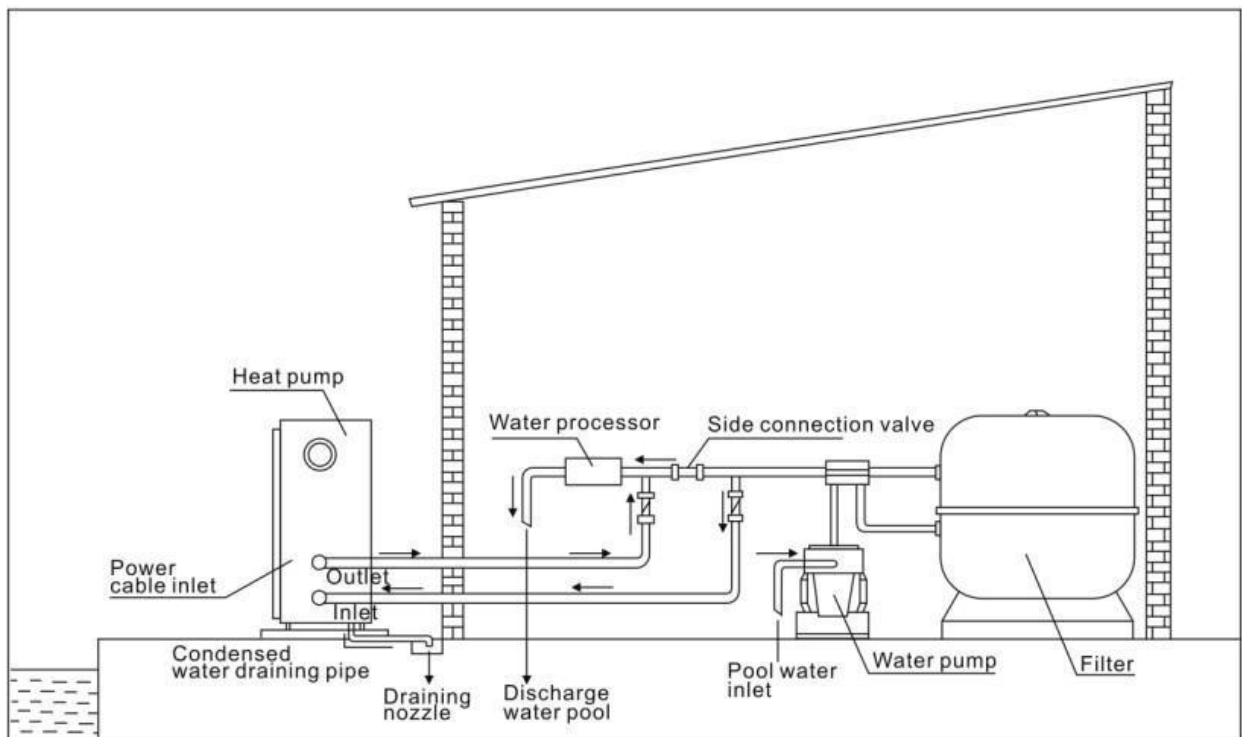
3.4 Check-valve installation

Note: If automatic dosing equipment for chlorine and acidity (pH) is used, it is essential to protect the heat pump against excessively high chemical concentrations which may corrode the heat exchanger. For this reason, equipment of this sort must always be fitted in the piping on the **downstream** side of the heat pump, and it is recommended to install a check-valve to prevent reverse flow in the absence of water circulation.

Damage to the heat pump caused by failure to observe this instruction is not covered by the warranty.

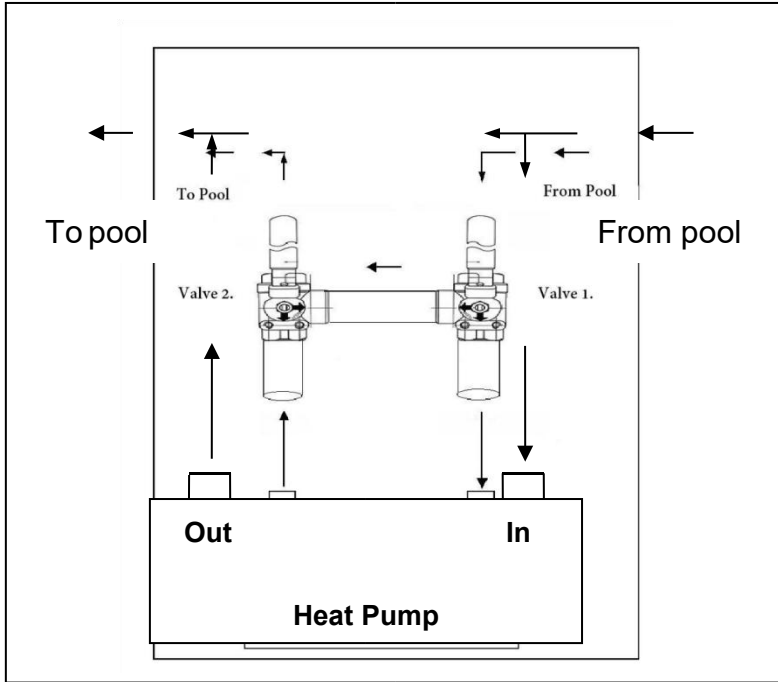


3.5 Typical arrangement



Note: This arrangement is only an illustrative example.

3.6 Adjusting the bypass



Use the following procedure to adjust the bypass:

1. Open Valve 1 & 2 half way.
2. Close valve 2 until control shows NO Or EE3 screen.
3. Slowly open Valve 2 until pool Temp shows on screen.
4. If it shows 'ON' or 'EE3' on display, it means the water flow into heat pump is not enough, then you need adjust the valves to increase the water flow through the heat pump.

Must not have Valves open Full.

How to get the optimum water flow:

Please turn on the heat pump under heating function, firstly close the by-pass then open it slowly to start the heat pump (the heat pump can't start running when the water flow is insufficient).

Continue to adjust the by-pass, at the meantime to check the Inlet water temp. & Outlet water temp, it will be optimum when the difference is around 2 degrees.

3.7 Electrical connection

Note: Although the heat pump is electrically isolated from the rest of the swimming pool system, this only prevents the flow of electrical current to, or from the water in the pool. Earthing is still required for protection against short-circuits inside the unit. Always provide a good earth connection.

Before connecting the unit, verify that the supply voltage matches the operating voltage of the heat pump. It is recommended to connect the heat pump to a circuit with its own fuse or circuit breaker and to use the appropriate wiring.


Connect the electrical wires to the terminal block marked 'POWER SUPPLY'.

A second terminal block marked 'WATER PUMP' is located next to the first one. The filter pump (max. 5 A / 240 V) can be connected to the second terminal block here. This allows the filter pump operation to be controlled by the heat pump.

3.8 Initial operation

Note: In order to heat the water in the pool (or hot tub), the filter pump must be running to cause the water to circulate through the heat pump. The heat pump will not start up if the water is not circulating.

After all connections have been made and checked, carry out the following procedure:

1. Switch on the filter pump. Check for leaks and verify that water is flowing from and to the swimming pool.
2. Connect power to the heat pump and press the On/Off button  on the electronic control panel. The unit will start up after the time delay.
3. After a few minutes, check whether the air blowing out of the unit is cooler.

4. When the filter pump is turned off, the unit should also turn off automatically, if not, then adjust the flow switch.

Depending on the initial temperature of the water in the swimming pool and the air temperature, it may take several days to heat the water to the desired temperature. A good swimming pool cover can dramatically reduce the required length of time.

Water Flow Switch:

It is equipped with a flow switch for protecting the HP unit running with adequate water flow rate. It will turn on when the pool pump runs and shut it off when the pump shuts off. If the pool water level is higher than 1 m above or below the heat pump's automatic adjustment knob, your dealer may need to adjust its initial start-up.

Time delay - The heat pump has a built-in 3-minute start-up delay to protect the circuitry and avoid excessive contact wear. The unit will restart automatically after this time delay expires. Even a brief power interruption will trigger this time delay and prevent the unit from restarting immediately. Additional power interruptions during this delay period do not affect the 3-minute duration of the delay.

3.9 Condensation

The air drawn into the heat pump is cooled by the operation of the heat pump to heat the pool water, which may cause condensation on the fins of the evaporator. The amount of condensation may be as much as several litres per hour at high relative humidity. This is sometimes mistakenly regarded as a water leak.

3.10 Operating modes for optimal use

POWER: Used primarily at the beginning of the season because this mode allows for very rapid temperature rise.

SMART: The heat pump has completed its primary task, in this mode; the heat pump is in a position to maintain the pool water in an energy efficient manner. By automatically adjusting speed of compressor and fan the heat pump delivers a higher efficiency.


SILENT: In the summer months when the heat output is minimal required, the heat pump in this mode is even more economic. Added benefit; when the heat pump heats. It does so with minimal noise.

4. Accessories

4.1 Accessories list

 <p>Anti-vibration base, 4 pcs</p>	 <p>Draining jet, 2 pcs</p>
 <p>Winter Cover, 1 pc</p>	 <p>Water drainage pipes, 2 pcs</p>

4.2 Accessories Installation

	<p>Anti-vibration bases</p> <ol style="list-style-type: none">1. Take out 4 Anti-vibration bases2. Put them one by one on the bottom of machine like the picture.
 	<p>Draining jet</p> <ol style="list-style-type: none">1. Install the draining jet under the bottom panel2. Connect with a water pipe to drain out the water. <p>Note: Lift the heat pump to install the jet. Never overturn the heat pump, it could damage the compressor.</p>



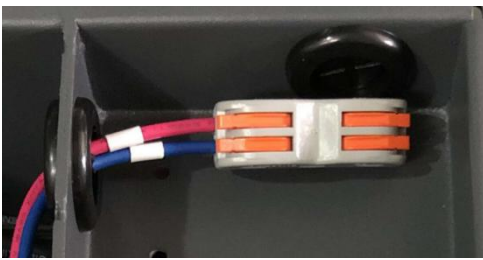
Water Inlet & outlet junction

1. Use the pipe tape to connect the water Inlet & outlet junction onto the heat pump
2. Install the two joints like the picture shows
3. Screw them onto the water Inlet & outlet junction



Mains Cable wiring

1. Open the cover of the electric box inside the machine
2. Connect the cables in the correct terminal according to electric diagram.

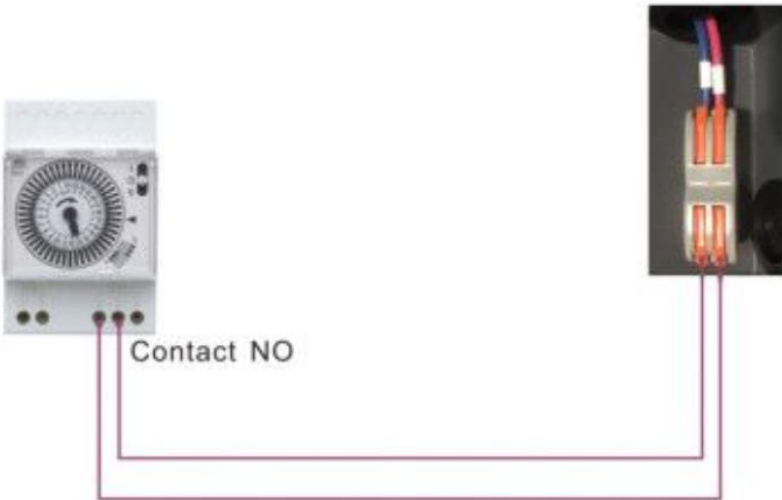


Filtration pump wiring (Dry contact)

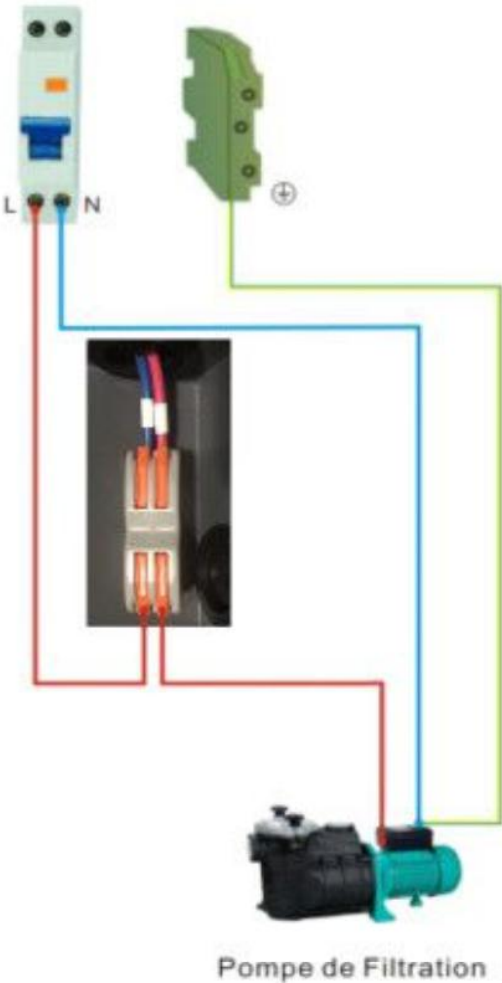
1. Open the cover of the electric box inside the machine
2. Connect the cables in the correct terminal according to electric diagram.

Dry contact timer connection

Timer



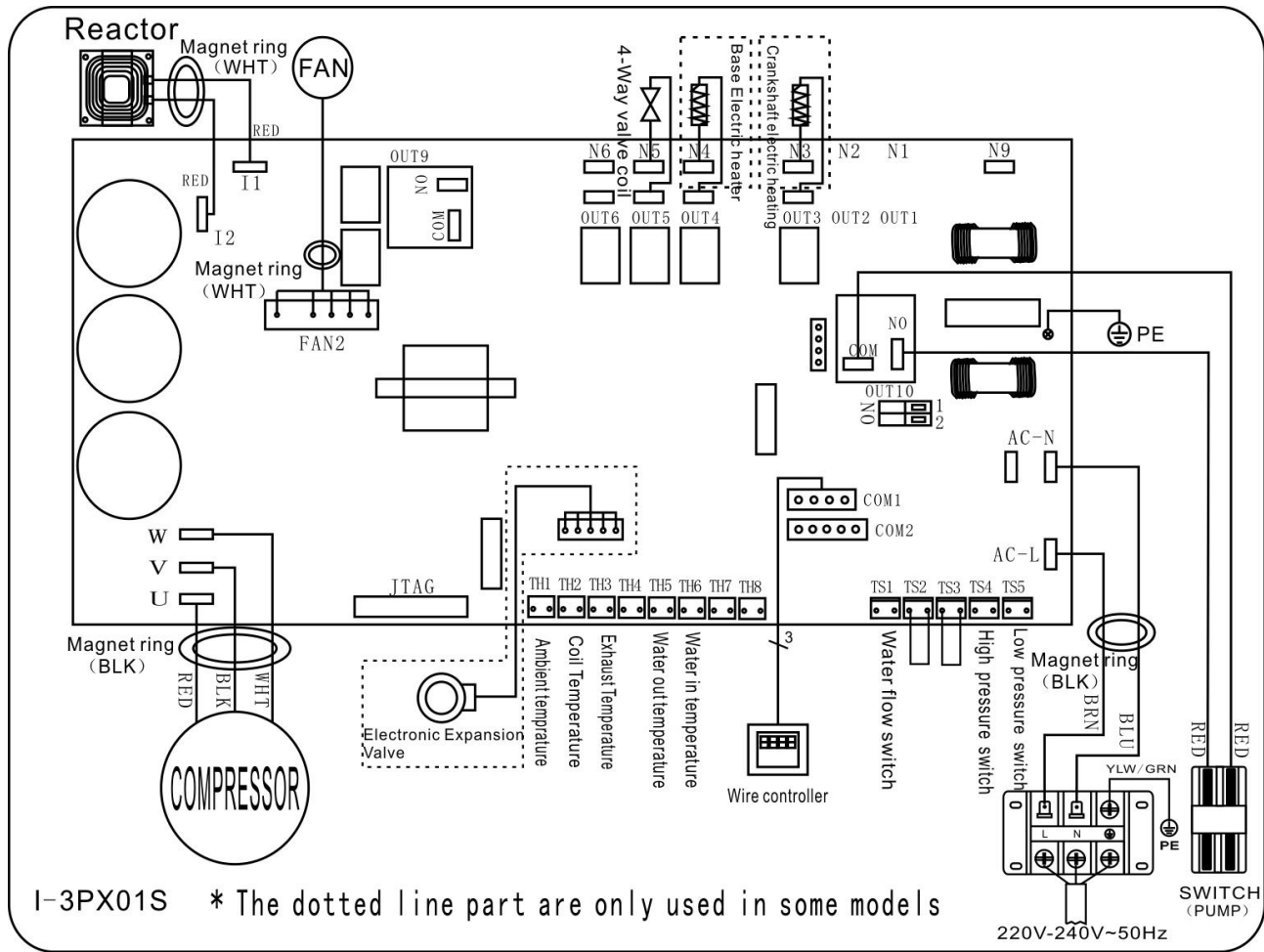
Dry contact pump connection



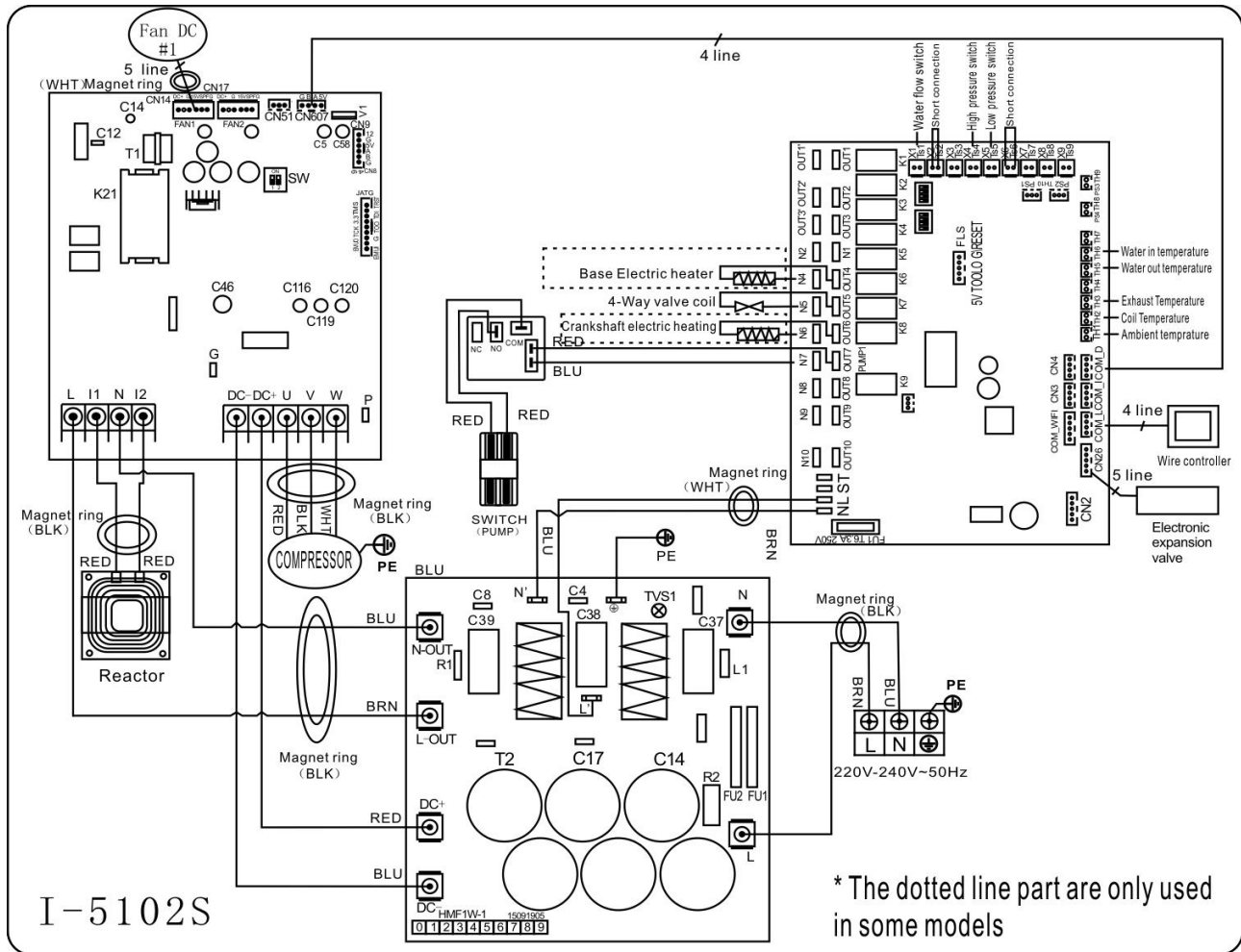
5. Electrical Wiring

5.1 SWIMMING POOL HEAT PUMP WIRING DIADRAM

Theratherm 17iv



Theratherm 30iv



NOTE:

- (1) Above electrical wiring diagram for your reference.
- (2) The swimming pool heat pump must be connected earthed, although the unit heat exchanger is electrically isolated from the rest of the unit. Grounding the unit is still required to protect against short circuits inside the unit. Bonding is also required.
- (3) It is recommended that your pool filtration pump and your heat pump are wired independently.

Disconnect: A disconnect means (circuit breaker, fused or un-fused switch) should be located within sight of and readily accessible from the unit. This is common practice on commercial and residential heat pumps. It prevents remotely-energizing unattended equipment and permits turning off power at the unit, while the unit is being serviced.

5.2 Installation of the display

Photo(1)



Photo(2)



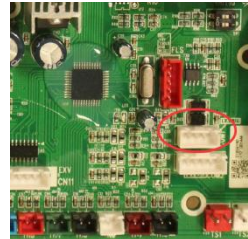
Photo(3)



Photo(4)



Photo(5)



- The side with plug connects with the control panel (photo 1)
- The other side of the signal wire. (photo 2)
- Open the wiring panel and put the side without plug through the electrical box. (photo 3, 4)
- Insert the wiring into the designated position (code:COM 1 or COM-L) on the PC board. (photo 5)


6. Display Controller Operation


6.1 Guide for operation



6.2 The keys and their operations



6.2.1 button



Press  to start the heat pump unit.

Press  to stop the heat pump unit.

6.2.2 and button (Screen will be locked when 30 seconds without operation.)


Water temperature setting:

Press  or  to set the water temperature directly.


Short press  and  at the same time to check water in temperature, water out temperature and set temperature.




* Long press  and  for 5 seconds at the same time to unlock the screen.

6.2.3 button

Press  to change the working mode, Powerful, silent and smart. The default mode is smart mode.






6.2.4 button

Press  for 2 seconds to enter secondary page.

Press  and  to select the functions and press  to enter.



6.2.5 Heating/Cooling/Auto mode

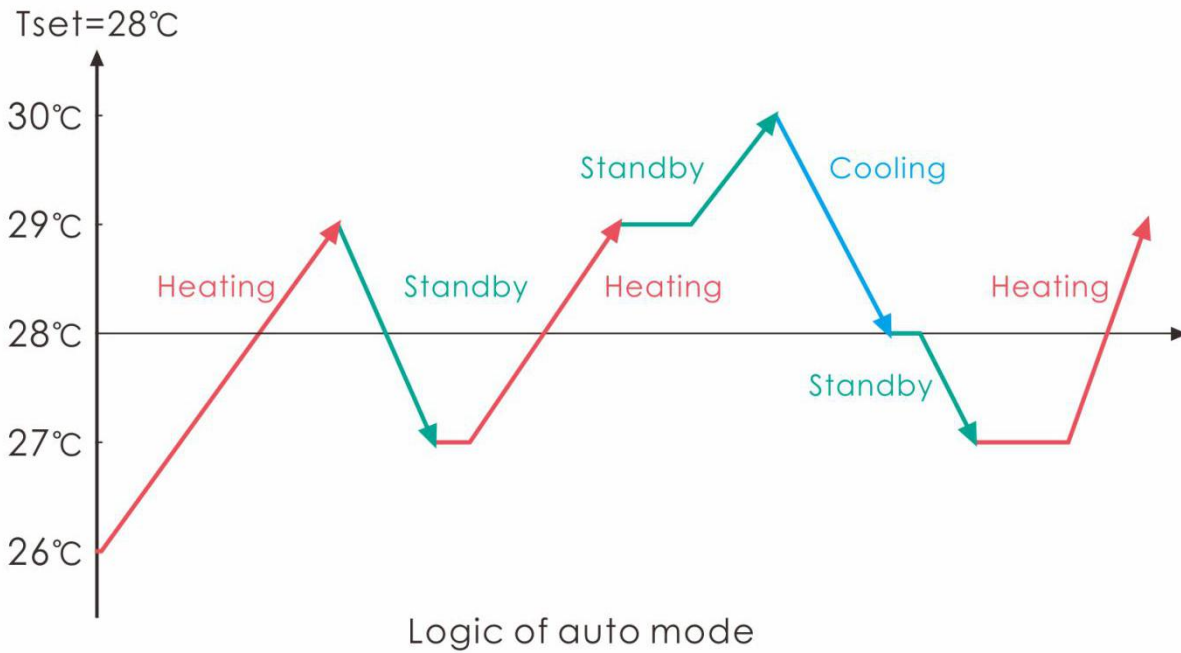
Select  and press  to enter, press  and  to choose Heating/ Cooling/ Auto mode, press  again to exit. The default mode is Heating mode.

Working mode	Set temperature range
Heating/Auto	6-41°C
Cooling	6-35°C

Logic of auto mode

T_1 =Water inlet temperature / T_{set} = set temperature=28°C

NO	Condition	Current working Status	Water inlet Temperature	Working mode
1	When the heat pump starts	Startup	$T_1 \leq 27^\circ\text{C}$	Heating mode
		Heating mode	$T_1 \geq 29^\circ\text{C}$, last for 3 minutes	Standby
	When the heat pump is running	Standby	$T_1 \geq 30^\circ\text{C}$	It switches to cooling mode
		Cooling mode	$T_1 = 28^\circ\text{C}$, last for 3 minutes	Standby
2	When the heat pump starts	Startup	$27^\circ\text{C} < T_1 \leq 29^\circ\text{C}$	Heating mode
		Heating mode	$T_1 \geq 29^\circ\text{C}$, last for 3 minutes	Standby
	When the heat pump is running	Standby	$T_1 \geq 30^\circ\text{C}$	It switches to cooling mode
		Cooling mode	$T_1 = 28^\circ\text{C}$, last for 3 minutes	Standby
		Standby	$T_1 \leq 27^\circ\text{C}$, last for 3 minutes	It switches to heating mode



6.2.6 Parameter checking

Select  and press  to enter, press  and  to check d0-d11 value.

Code	Condition	Scope	Remark
d0	IPM mould temperature	0-120°C	Real testing value
d1	Inlet water temp.	-9°C~99°C	Real testing value
d2	Outlet water temp.	-9°C~99°C	Real testing value
d3	Ambient temp.	-30°C~70°C	flash if Real value<-9
d4	Frequency limitation code	0,1,2,4,8,16	Real testing value
d5	Piping temp.	-30°C~70°C	flash if Real value<-9
d6	Gas exhaust temperature	0°C~C5°C (125°C)	Real testing value
d7	Step of EEV	0~99	N*5
d8	Compressor running frequency	0~99Hz	Real testing value
d9	Compressor current	0~30A	Real testing value
d10	Current fan speed	0-1200 (rpm)	Real testing value
d11	Error code for last time	All error code	

Remark:

d4: Frequency limitation code,

0: No frequency limit;

2: Overheating or overcooling frequency limit;

8: Drive voltage frequency limit;

1: Coil pipe temperature limit;

4: Drive Current frequency limit;

16: Drive high temperature frequency limit




6.2.7 Parameter setting

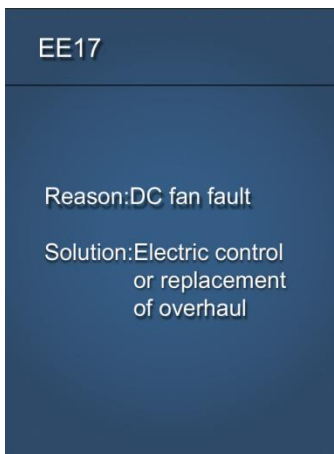
Select  and press  to enter, press  and  to choose P0-P18 value and press  to set.

Note: Long press  for 15s to set P12, P13, P14, P1.

Code	Name	Scope	Default	Remark
P0	Mandatory defrosting	0-1	0	0: Default normal operation 1: mandatory defrosting.
P3	Water pump	0-1	0	1:Always running; 0:Depends on the running of compressor
P7	Water temp. calibration	-9~9	0	Default setting: 0
P12	MODBUS COM	0 - 5	0	Modbus Only (default value after reset)
P13	MODBUS ID Address	1 - 88	9	Modbus Only (default value after reset)
P14	Restore to factory settings	0-1	0	1-Restore to factory settings, 0- default (restore P0、 P3、 P7、 P8、 P9、 P10、 P11 to factory setting)
P15	P value	/	/	Depend on the machine
P16	Start code	/	/	Depend on the machine

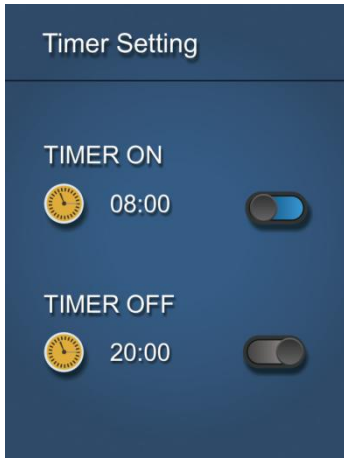
6.2.8 Error code

Select  and press  to check the error code. If the HP is normal,  button is invalid. For example,



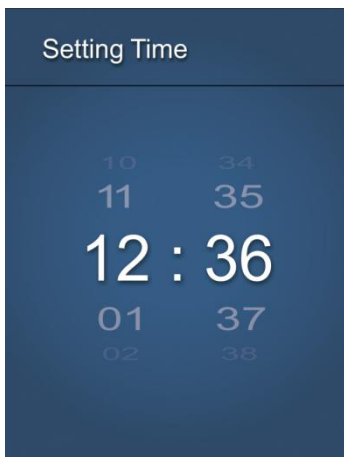
6.2.9 Time setting/Timer setting


Select  and press  to enter, press  again to Timer on/Timer off setting.



Press  to enter and  and  to select Timer on or Timer off.

Press  to select on/off and press  or  to set the time. Press  to save the setting.



Long press  for 5 seconds to set the current time.

Water pump logic:

Option 1: Water pump is related to compressor's operation to start or stop. (Parameter P3=0)

When heat pump turns on, filtration pump will start first and then fan motor and compressor.

	Condition	Example	Water pump working logic
Heating mode	$T1 \geq T_{set} - 0.5 \text{ } ^\circ\text{C}$, last for 30 minutes	$T1 \geq 27.5 \text{ } ^\circ\text{C}$, last for 30 minutes	Filtration pump will enter standby mode for 1 hours (old version: 2 hours) and will not start except after manual power off and restart. Compressor and fan motor stops first and filtration pump will stop after 5 mins.
Cooling mode	$T1 \leq T_{set} + 0.5 \text{ } ^\circ\text{C}$, last for 30 minutes	$T1 \leq 28.5 \text{ } ^\circ\text{C}$, last for 30 minutes	

1 hour later	Condition	Example $T_{set} = 28 \text{ } ^\circ\text{C}$	Water pump working logic
Filtration pump will start to run for 5 mins to detect the water in temp.	$T1 > T_{set} - 1 \text{ } ^\circ\text{C}$	$T1 > 27 \text{ } ^\circ\text{C}$	Filtration pump will enter standby mode for another 1 hours and will not start except after turning off the hp and restart.
	$T1 \leq T_{set} - 1 \text{ } ^\circ\text{C}$	$T1 \leq 27 \text{ } ^\circ\text{C}$	Heat pump will start again until it meets the condition of standby.
	$T1 < T_{set} + 1 \text{ } ^\circ\text{C}$	$T1 < 29 \text{ } ^\circ\text{C}$	Filtration pump will enter standby mode for another 1 hours and will not start except after turning off the hp and restart.
	$T1 \geq T_{set} + 1 \text{ } ^\circ\text{C}$	$T1 \geq 29 \text{ } ^\circ\text{C}$	Heat pump will start again until it meets the condition of standby.

Note: If the water volume of the swimming pool is small, water temp reaches $T1 \geq T_{set} + 1 \text{ } ^\circ\text{C}$ and last for 5 mins, heat pump will stop first and then filtration pump stops, but it will not entry standby mode for 1 hour. If water temp drops to $T1 \leq T_{set} - 1$, heat pump will start again.

Option 2: When the heat pump is on (running or standby), filtration pump will always be on. (Parameter P3=1)

When turn on heat pump, filtration pump starts first and then fan motor and compressor start. When reaches to the condition $T1 \geq T_{set} + 1$ and last for 3 mins, compressor and fan motor will stop, filtration pump will always be on.

It will run for 1 minute after turning off the hp.

NOTE :

T_{set} = Tseting water temperature

For example : $T_{set} = 28 \text{ } ^\circ\text{C}$ Tseting water temperature in your pool heat pump

$T_{set} - 1$ = less $1 \text{ } ^\circ\text{C}$ than Tseting temperature

$T_{set} - 1 = 28 - 1 = 27 \text{ } ^\circ\text{C}$

$T_{set} + 1$ = more $1 \text{ } ^\circ\text{C}$ than Tseting temperature

$T_{set} + 1 = 28 + 1 = 29 \text{ } ^\circ\text{C}$

6.3 Heating operation logic

Working status		Working mode	Water in temperature-T1	For example , Tset=28°C, water in temperature-T1	Heat pump working level
1	Start-up of heat pump	When you select the "Smart working mode "	$T1 < Tset-1$	$T1 < 27^{\circ}\text{C}$	Powerful mode-frequency F9
2			$Tset-1 \cong T1 < Tset$	$27^{\circ}\text{C} \cong T1 < 28^{\circ}\text{C}$	Frequency: F9 -F8-F7,...,-F2
3			$Tset \cong T1 < Tset+ 1$	$28^{\circ}\text{C} \cong T1 < 29^{\circ}\text{C}$	Silent mode-frequency F2
4			$T1 \cong Tset+1$	$T1 \cong 29^{\circ}\text{C}$	HP will be in Standby, stop working until the water temperature drops to less 28°C.
5		When you select the "Silent working mode".	$T1 < Tset$	$T1 < 28^{\circ}\text{C}$	Smart mode -frequency F5.
6			$Tset \cong T1 < Tset+1$	$28^{\circ}\text{C} \cong T1 < 29^{\circ}\text{C}$	Silent mode-frequency F2/F1.
7			$T1 \cong Tset+1$	$T1 \cong 29^{\circ}\text{C}$	HP will be in Standby, stop working until the water temperature drops to less 28°C.
8		When you select the "Powerful working mode."	$T1 < Tset+1$	$T1 < 29^{\circ}\text{C}$	Powerful mode-frequency F10/F9
9			$T1 \cong Tset+1$	$T1 \cong 29^{\circ}\text{C}$	HP will be in Standby, stop working until the water temperature drops to less 28°C.
10	Re-start to heat water in standby status	When HP is working at " Smart mode"	$T1 \cong Tset$	$T1 \cong 28^{\circ}\text{C}$	Standby
11			$Tset > T1 \cong Tset-1$	$28^{\circ}\text{C} > T1 \cong 27^{\circ}\text{C}$	Silent-frequency F2
12			$Tset-1 > T1 \cong Tset-2$	$27^{\circ}\text{C} > T1 \cong 26^{\circ}\text{C}$	Frequency: F2 -F3-F4,...,-F9
13			$< Tset-2$	$< 26^{\circ}\text{C}$	Powerful-frequency F9
14		When HP is working at " Silent mode"	$\cong Tset$	$\cong 28^{\circ}\text{C}$	Standby
15			$Tset > T1 \cong Tset-1$	$28^{\circ}\text{C} > T1 \cong 27^{\circ}\text{C}$	Silent mode-frequency F2/F1
16			$T1 < Tset-1$	$T1 < 27^{\circ}\text{C}$	Smart -frequency F5
17	When HP is working at " Powerful mode"	$T1 < Tset-1$	$T1 < 27^{\circ}\text{C}$	Powerful -frequency F10/F9	

6.4 Cooling operation logic

Working status		Working mode	Water in temperature-T1	For example , Tset=28°C, water in temperature-T1	Heat pump working level
1		When you select the "Smart working mode "	$T1 \cong Tset-1$	$T1 \cong 27^{\circ}\text{C}$	Standby.
2			$Tset-1 < T1 \cong Tset$	$27^{\circ}\text{C} < T1 \cong 28^{\circ}\text{C}$	Silent mode-frequency F2
3			$Tset < T1 \cong Tset+1$	$28 < T1 \cong 29^{\circ}\text{C}$	frequency: F9 -F8-F7,...,- F2
4			$T1 \cong Tset+1$	$T1 \cong 29^{\circ}\text{C}$	Powerful mode-F9
5	Start-up of heat pump	When you select the "Silent working mode".	$T1 \cong Tset-1$	$\cong 27^{\circ}\text{C}$	Standby
6			$Tset-1 < T1 \cong Tset$	$27^{\circ}\text{C} < T1 \cong 28^{\circ}\text{C}$	Silent mode - frequency F2/F1
7			$T1 > Tset$	$T1 > 28^{\circ}\text{C}$	Smart mode -frequency F5
8		When you select the "Powerful working mode."	$T1 > Tset-1$	$T1 > 27^{\circ}\text{C}$	Powerful mode-frequency F10/F9
9			$T1 \cong Tset-1$	$T1 \cong 27^{\circ}\text{C}$	Standby
10	Re-start to cool water in standby status	Smart	$T1 \cong Tset-1$	$T1 \cong 27^{\circ}\text{C}$	Standby
11			$Tset \cong T1 < Tset+1$	$28 \cong T1 < 29^{\circ}\text{C}$	Silent- frequency F2
12			$Tset+1 \cong T1 < Tset+2$	$29 \cong T1 < 30^{\circ}\text{C}$	Frequency: F2 -F3-F4,...,- F9
13			$T1 \cong Tset+2$	$T1 \cong 30^{\circ}\text{C}$	Powerful mode -frequency F9
14		Silent	$Tset < T1 \cong Tset+1$	$28 < T1 \cong 29^{\circ}\text{C}$	Silent mode-frequency F2/F1
15			$T1 > Tset+1$	$T1 > 29^{\circ}\text{C}$	Smart mode-frequency F5
16		Powerful	$T1 > Tset+1$	$T1 > 29^{\circ}\text{C}$	Powerful mode-frequency F10/F9
17		$T1 \cong Tset-1$	$T1 \cong 27^{\circ}\text{C}$	Standby	

7. Troubleshooting

7.1 Error code display on LED wire controller

Error Code	Malfunction	Reason	Solution
EE 01	High pressure failure	<ol style="list-style-type: none"> 1. High pressure switch in bad connection or failure 2. Ambient temperature is too high 3. Water temperature is too high 4. Water flow is too low 5. Fan motor speed is abnormal or fan motor has damaged 	<ol style="list-style-type: none"> 1. Check the wiring for high pressure switch or change a new one 2. Check the water flow or water pump 3. Check the fan motor 4. Check and repair the piping system
EE 02	Low pressure failure	<ol style="list-style-type: none"> 1. Low pressure switch in bad connection or failure 1. EEV has blocked or pipe system is jammed 2. Motor speed is abnormal or motor has damaged 3. Gas leakage 	<ol style="list-style-type: none"> 1. Check the wiring for low pressure switch or change a new one 2. Check the EEV and piping system Check the motor 3. Through the high pressure gauge to check the pressure value
'ON' or EE03	Water flow failure	<ol style="list-style-type: none"> 1. Water flow switch is in bad connection 2. Water flow switch is damaged 3. No/ Insufficient water flow. 	<ol style="list-style-type: none"> 1. Check the wiring for water flow switch 2. Change the water flow switch 3. Check the water pump or the waterway system
EE 04	Over heating protection for water temperature (T2) in heating mode	<ol style="list-style-type: none"> 1. Low water flow 2. Water flow switch is stuck and the water supply is cut off 3. T2 sensor is abnormal 	<ol style="list-style-type: none"> 1. Check the water way system 2. Check the water pump or water flow switch 3. Check T2 sensor or change another one
EE 05	Exhaust temperature (T6) too high protection	<ol style="list-style-type: none"> 1. Lack of gas 2. Low water flow 3. Piping system has been blocked 4. Exhaust temp. Sensor failure 	<ol style="list-style-type: none"> 1. Check the high pressure gauge, if too low, fill with some gas 2. Check the waterway system and water pump 3. Check the piping system if there was any block 4. Change a new exhaust temp. sensor
EE 06	Controller malfunction	<ol style="list-style-type: none"> 1. Wire connection is not good or damaged signal wire 2. Controller failure 	<ol style="list-style-type: none"> 1. Check and re-connect the signal wire 2. Change a new signal wire 3. Turn off electricity supply and restart machine 4. Change a new controller

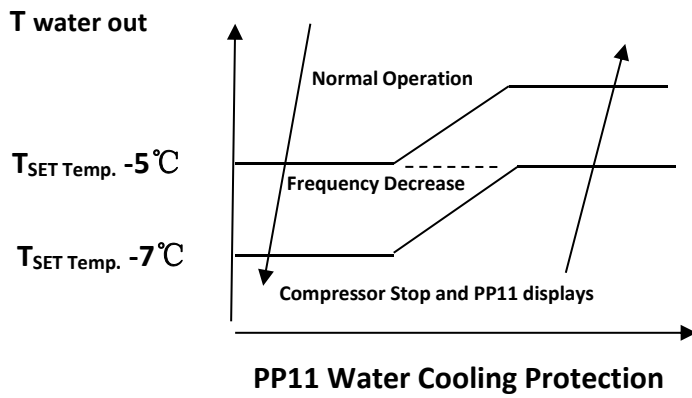
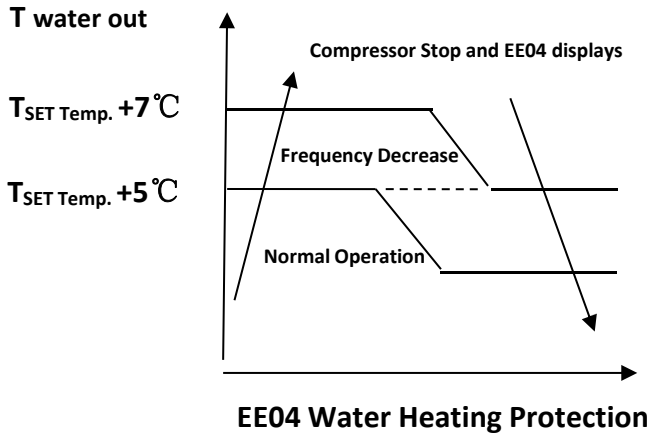
EE 07	Compressor current protection	<ol style="list-style-type: none"> 1. The compressor current is too large momentary 2. Wrong connection for compressor phase sequence 3. Compressor accumulations of liquid and oil lead to the current becomes larger 4. Compressor or driver board damaged 5. The water flow is abnormal 6. Power fluctuations within a short time 	<ol style="list-style-type: none"> 1. Check the compressor 2. Check the waterway system 3. Check if the power in the normal range 4. Check the phase sequence connection
EE 08	Communication failure between the controller and the main board	<ol style="list-style-type: none"> 1. Poor signal wire connection or damaged signal wire 2. Controller malfunction 	<ol style="list-style-type: none"> 1. Check and re-connect the signal wire 2. Change a new signal wire 3. Turn off electricity supply and restart machine 4. Change a new controller
EE 09	Communication failure between Main board and driver board	<ol style="list-style-type: none"> 1. Poor connection of communication wire 2. The wire is damaged 	<ol style="list-style-type: none"> 1. Check the wire connection 2. Change a new wire
EE 10	VDC voltage too high protection	<ol style="list-style-type: none"> 1. Mother line voltage is too high 2. Driver board is damaged. 	<ol style="list-style-type: none"> 1. Check if the power is in the normal range 2. Change driver board or main board
EE 11	IPM module protection	<ol style="list-style-type: none"> 1. Data mistake 2. Wrong compressor phase connection 3. Compressor liquid and oil accumulation lead to the current becomes larger 4. Compressor or driver board damaged 	<ol style="list-style-type: none"> 1. Program error, turn off electricity supply and restart after 3 minutes 2. Change driver board 3. Check compressor sequence connection
EE 12	VDC voltage too low protection	<ol style="list-style-type: none"> 1. Mother line voltage is too low 2. Driver board is damaged. 	<ol style="list-style-type: none"> 1. Check if the power is in the normal range 2. Change driver board
EE 13	Input current over high protection.	<ol style="list-style-type: none"> 1. The compressor current is too large momentary 2. The water flow is abnormal 3. Power fluctuations within a short time 4. Wrong PFC inductor 	<ol style="list-style-type: none"> 1. Check the compressor 2. Check the waterway system 3. Check if the power is in the normal range 4. Check if the correct PFC inductor is used
EE 14	IPM module thermal circuit is abnormal	<ol style="list-style-type: none"> 1. Output abnormality of IPM module thermal circuit 2. Fan motor is abnormal or damaged 3. Fan blade is broken 	<ol style="list-style-type: none"> 1. Change a driver board 2. Check if the motor speed is too low or fan motor damaged, change another one 3. Change another fan blade
EE 15	Temperature of IPM module is too high	<ol style="list-style-type: none"> 1. Output exception of IPM module thermal circuit 2. Motor is abnormal or damaged 3. Fan blade is broken 	<ol style="list-style-type: none"> 1. Change a driver board 2. Check if the fan motor speed is too low or fan motor damaged, change another one 3. Change another fan blade

EE 16	PFC module protection	<ol style="list-style-type: none"> 1. Output exception of PFC module 2. Motor is abnormal or damaged 3. Fan blade is broken 4. Input voltage leap, input power is abnormal 	<ol style="list-style-type: none"> 1. Change a driver board 2. Check if the motor speed is too low or fan motor damaged, change another one 3. Change another fan blade 4. Check the input voltage
EE 17	DC fan motor failure	<ol style="list-style-type: none"> 1. DC motor is damaged 2. Main board is damaged 3. The fan blade is stuck 	<ol style="list-style-type: none"> 1. Detect DC motor, replace with a new one 2. Change a new main board 3. Find out the barrier and work it out
EE 18	PFC module thermal circuit is abnormal	The driver board is damaged	<ol style="list-style-type: none"> 1. Change a new driver board 2. Check if the fan motor speed is too low or fan motor damaged, change another one
EE 19	PFC module high temperature protection	<ol style="list-style-type: none"> 1. PFC module thermal circuit output abnormal 2. Motor is abnormal or damaged 3. Fan blade is broken 4. The screw in the driver board is not tight 	<ol style="list-style-type: none"> 1. Change a new driver board 2. Check if the motor speed is too low or fan motor damaged, change another one 3. Change another fan blade 4. Check if the screw is loose
EE 20	The input power failure	Power supply voltage fluctuates too much	Check whether the voltage is stable
EE 21	Software control exception	<ol style="list-style-type: none"> 1. Compressor run out of step 2. Wrong program 3. Impurity inside compressor causes the unstable rotate speed 	<ol style="list-style-type: none"> 1. Check the main board or change a new one 2. Enter correct program
EE 22	Current detection circuit failure	<ol style="list-style-type: none"> 1. Voltage signal abnormal 2. Driver board is damaged 	<ol style="list-style-type: none"> 1. Check the main board or change a new one 2. Change a new driver board
EE 23	Compressor startup failed	<ol style="list-style-type: none"> 1. Main board is damaged 2. Compressor wiring error or poor contact or unconnected 3. Liquid accumulation inside 4. Wrong phase connection for compressor 	<ol style="list-style-type: none"> 1. Check the main board or change a new one 2. Check the compressor wiring according to the circuit diagram <p>Check the compressor or change a new one</p>
EE 24	Ambient Temperature device failure on Driver board	Ambient Temperature device failure	Change driver board or main board
EE 25	Compressor phase failure	Compressors U, V, W are connected to one phase or two phases	Check the actual wiring according to the circuit diagram
EE 26	Four-way valve reversal failure	<ol style="list-style-type: none"> 1. Four-way valve reversal failure 2. Lack of refrigerant (no detect when T3 or T5 malfunction) 	<ol style="list-style-type: none"> 1. Switch to Cooling mode to check the 4-way valve if it has been reversed correctly 2. Change a new 4-way valve 3. Fill with gas

EE27	EEPROM data read malfunction	1. Wrong EEPROM data in the program or failed input of EEPROM data 2. Main board failure	1. Re-enter correct EEPROM data 2. Change a new main board
EE28	The inter-chip communication failure on the main control board	Main board failure	1. Turn off electricity supply and restart it 2. Change a new main board
PP 01	Inlet water temperature sensor failure	1. The sensor failure or short circuit 2. The wiring of sensor is loose	1. Re-fix the wiring of the sensors 2. Change the sensor
PP 02	Outlet water temperature sensor failure	1. The sensor failure or short circuit 2. The wiring of sensor is loose	1. Re-fix the wiring of the sensors 2. Change the sensor
PP 03	Heating piping sensor failure	1. The sensor failure or short circuit 2. The wiring of sensor is loose	1. Re-fix the wiring of the sensors 2. Change the sensor
PP 04	Gas return sensor failure	1. The sensor failure or short circuit 2. The wiring of sensor is loose	1. Re-fix the wiring of the sensors 2. Change the sensor
PP 05	Ambient temperature sensor failure	1. The sensor failure or short circuit 2. The wiring of sensor is loose	1. Re-fix the wiring of the sensors 2. Change the sensor
PP 06	Exhaust piping sensor failure	1. The sensor failure or short circuit 2. The wiring of sensor is loose	1. Re-fix the wiring of the sensors 2. Change the sensor
PP 07	Antifreeze protection in Winter	Ambient temperature or water inlet temperature is too low	Normal protection
PP 08	Low ambient temperature protection	1. Beyond the scope of using environment 2. Sensor abnormality	1. Stop using, beyond the scope of using 2. Change the sensor
PP 10	Piping temperature too high protection under cooling mode	1. Ambient temperature is too high or the water temperature is too high in cooling mode 2. Refrigeration system is abnormal	1. Check the scope of using 2. Check refrigeration system
PP 11	Water temperature (T2) too low protection under cooling mode	1. Low water flow 2. T2 temperature sensor abnormal	1. Check water pump and waterway system 2. Change T2 temperature sensor

Remarks:

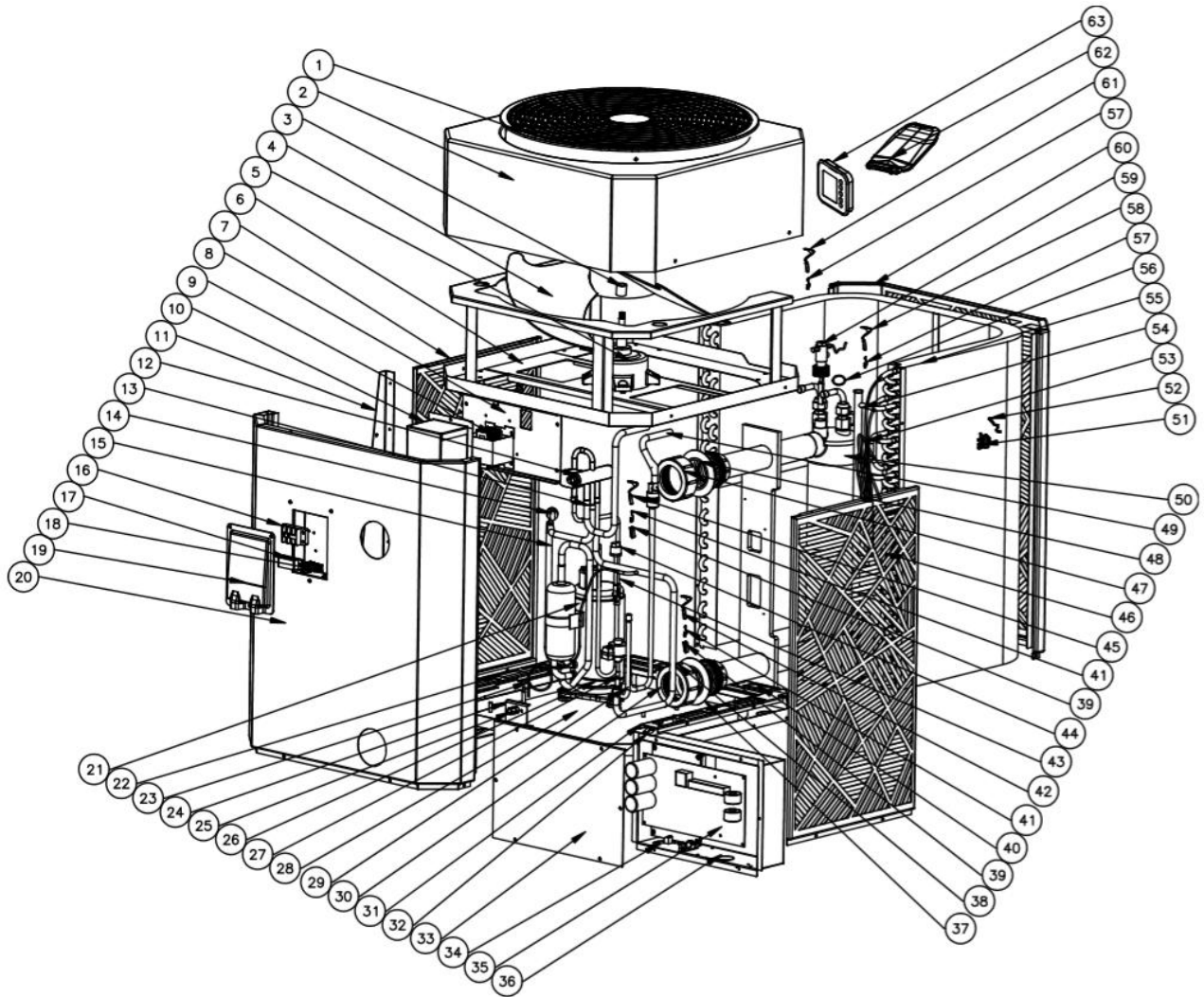
1. In heating mode, if the water out temperature is higher than the set temperature over 7°C , LED controller displays EE04 for water over-heating protection.
2. In cooling mode, if the water out temperature is lower than the set temperature over 7°C , LED controller displays PP11 for water over-cooling protection.



7.2 Other Malfunctions and Solutions (No display on LED wire controller)

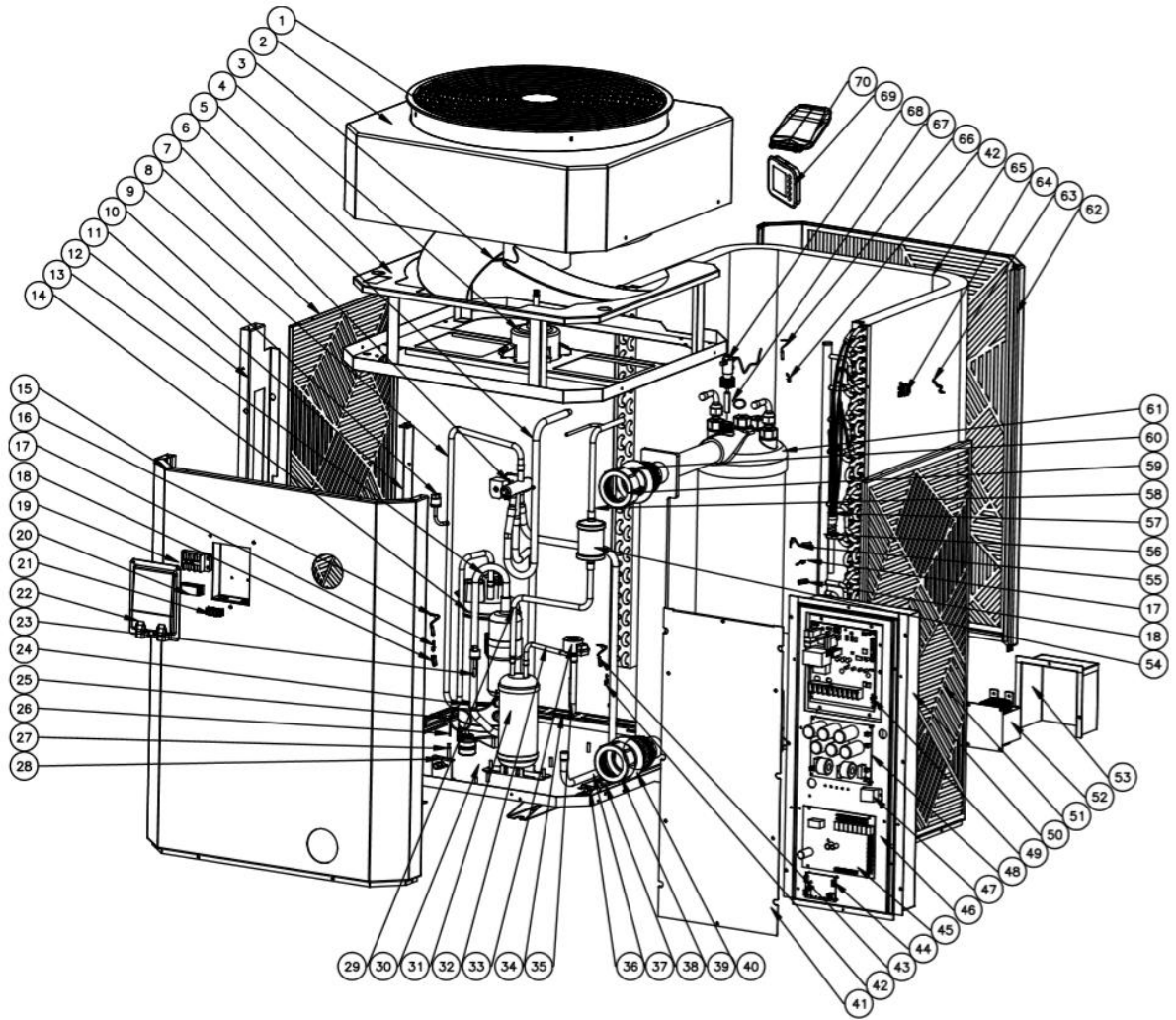
Malfunctions	Observing	Reasons	Solution
Heat pump is not running	LED wire controller no display.	No power supply	Check cable and circuit breaker if it is connected
	LED wire controller displays the actual time.	Heat pump under standby status	Startup heat pump to run.
	LED wire controller displays the actual water temperature.	<ol style="list-style-type: none"> 1. Water temperature is reaching to setting value, HP under constant temperature status. 2. Heat pump just starts to run. 3. Under defrosting. 	<ol style="list-style-type: none"> 1. Verify water temperature setting. 2. Startup heat pump after a few minutes. 3. LED wire controller should display "Defrosting".
Water temperature is cooling when HP runs under heating mode	LED wire controller displays actual water temperature and no error code displays.	<ol style="list-style-type: none"> 1. Choose the wrong mode. 2. Figures show defects. 3. Controller defect. 	<ol style="list-style-type: none"> 1. Adjust the mode to proper running 2. Replace the defect LED wire controller, and then check the status after changing the running mode, verifying the water inlet and outlet temperature. 3. Replace or repair the heat pump unit
Short running	LED displays actual water temperature, no error code displays.	<ol style="list-style-type: none"> 1. Fan NO running. 2. Air ventilation is not enough. 3. Refrigerant is not enough. 	<ol style="list-style-type: none"> 1. Check the cable connections between the motor and fan, if necessary, it should be replaced. 2. Check the location of heat pump unit, and eliminate all obstacles to make good air ventilation. 3 Replace or repair the heat pump unit.
Water stains	Water stains on heat pump unit.	<ol style="list-style-type: none"> 1. Concreting. 2. Water leakage. 	<ol style="list-style-type: none"> 1. No action. 2. Check the titanium heat exchanger carefully if it is any defect.
Too much ice on evaporator	Too much ice on evaporator.		<ol style="list-style-type: none"> 1. Check the location of heat pump unit, and eliminate all obstacles to make good air ventilation. 2. Replace or repair the heat pump unit.

8. Exploded Diagram Model Theratherm 17iv



NO	Spare parts	NO	Spare parts
1	Fan grill	33	Electric box cover
2	Top cover	34	N/A
3	Fan motor component	35	PCB
4	Fan blade	36	Control box
5	Fan motor	37	Blue rubber ring
6	Fan motor support	38	Copper pipe
7	Side panel	39	Sensor casing pipe
8	Reactor support	40	Evaporator support
9	Reator	41	Clip
10	Reator box	42	Coil temp. sensor TH2
11	Electric box support	43	Exhaust pipe
12	4 way valve	44	High pressure switch
13	Pipe	45	Exhaust pipe temp. sensor TH3
14	Low pressure switch	46	Side panel
15	Gas return pipe	47	Water connection sets
16	3 seat terminal	48	Red rubber ring
17	Clip	49	Transition pipe
18	2 seat terminal	50	Titanium heat exchanger
19	Wiring cover	51	Ambient temp. sensor clip
20	Service panel	52	Ambient temp. sensor TH1
21	Compressor	53	Distributor assembly
22	Evaporator support	54	Collective piping assembly
23	Capillary	55	Evaporator
24	Needle valve support	56	O shape seal ring
25	Needle valve	57	Exchanger temp. sensor clip
26	Compressor heating belt	58	Water out temp. sensor TH5
27	EEV	59	Water flow switch
28	Base tray	60	Back panel
29	Transition pipe	61	Water in temp. sensor TH6
30	Water connection sets	62	Controller cover
31	Evaporator support	63	Controller
	Evaporator heating belt		

Model Theratherm 30iv



NO	Spare parts	NO	Spare parts
1	Fan grill	36	Evaporator heating belt
2	Top cover	37	Copper pipe
3	Fan blade	38	Evaporator support
4	Fan motor	39	Water connection sets
5	Fan motor support	40	Blue rubber ring
6	Pipe	41	Electric box cover
7	4 way valve	42	Exchanger temp. sensor clip
8	Side panel	43	Water in temp. sensor TH6
9	Exhaust pipe	44	N/A
10	High pressure switch	45	PCB
11	Electric box support	46	Scale panel
12	Electric box support	47	Relay
13	Gas return pipe	48	Filter board
14	Compressor	49	Driver board
15	Service panel	50	Control box
16	Exhaust pipe temp. sensor	51	Side panel
17	Clip	52	Reator
18	Sensor casing pipe	53	Reator box
19	3 seat terminal	54	Filter
20	Clip	55	Coil temp. sensor TH2
21	2 seat terminal	56	Collective piping assembly
22	Wiring cover	57	Distributor assembly
23	Low pressure switch	58	Pipe
24	Compressor heating belt	59	Water connection sets
25	Evaporator support	60	Red rubber ring
26	Capillary	61	Titanium heat exchanger
27	Needle valve	62	Back panel
28	Needle valve support	63	Ambient temp. sensor TH1
29	Pipe	64	Ambient temp. sensor clip
30	Base tray	65	Evaporator
31	Liquid storage tank	66	Water out temp. sensor TH5
32	Pipe	67	O shape seal ring
33	EEV	68	Water flow switch
34	Evaporator support	69	Controller
	Transition pipe	70	Controller cover

9. Maintenance

- (1) You should check the water supply system regularly to avoid the air entering the system and occurrence of low water flow, because it would reduce the performance and reliability of HP unit.
- (2) Clean your pools and filtration system regularly to avoid the damage of the unit as a result of the dirty or clogged filter.
- (3) You should discharge the water from bottom of water pump if HP unit will stop running for a long time (specially during the winter season).
- (4) In another way, you should check the unit is water fully before the unit start to run again.
- (5) After the unit is conditioned for the winter season, it is recommended to cover the heat pump with special winter heat pump.
- (6) When the unit is running, there is all the time a little water discharge under the unit.
- (7) Mandatory defrost function will activate when system is in standby mode (OFF). This means that the Heat pump will activate when in the Off function to run gas into the system, to stop the unit from seizing up. (If you want to cover up the unit please turn off at the power to avoid freezing.)

10. Warranty

Theratherm Heat Pump warranty is a structured warranty. It particularly covers manufacturing faults & is set out as below:

7 years on Titanium Heat Exchanger

7 years on scroll compressor

2 years on all other parts

Any faults with the Heat Pump resulting from incorrect installation, incorrect sizing, incorrect usage, neglect of water chemistry or any other misuse will void the above stated warranty.



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