

Swimming pool heat pump

Directions for installation and maintenance

SHP-60P
SHP-80P
SHP-100P
SHP-120P
SHP-140P
SHP-170P
SHP-190P



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1- Introduction

We thank you for having chosen our Heat pump.

This installation and maintenance notice contains the necessary information to its installation (delivery control, the installation, the connections) and to its repair. It is a complementary document to the user's manual which describes its instructions for use.

We invite you to read it first.

2- Caution

This document is an integral part of the product and it must stay in the technical room.

This Heat pump is exclusively for heating swimming pools.

Any other use not in conformity and random will be considered as dangerous and unsuitable.

This appliance can be used by children aged from 8 years and above and persons with reduced physical, sensory or mental capabilities or lack of experience and knowledge if they have been given supervision or instruction concerning use of the appliance in a safe way and understand the hazards involved. Children shall not play with the appliance. Cleaning and user maintenances shall not be made by children without supervision.

If the appliance is fixed wiring, the appliance must be fitted with means for disconnection from the supply mains having a contact separation in all poles that provide full disconnection under over voltage category III conditions, and these means must be incorporated in the fixed wiring in accordance with the wiring rules.

If the supply cord is damaged, it must be replaced by the manufacturer, its service agent or similarly qualified persons in order to avoid a hazard.

The assembly, the electric connection and the start up must be carried out by specialized and professional person.

the appliance shall be installed in accordance with national wiring regulations.

It is essential to maintain the temperature in the swimming pool lower than the recommended value by the swimming pool's manufacturer.

Please make sure that minimum water flow speed is 7m³/h.

In a concern to a constant improvement, our products can be modified without notice; the present pictures in this note or the characteristics which are described are not contractual.

3- Delivery's control

At the delivery time, check the condition of packing; in case of damages, have reservation about them to the carrier, before 48 hours and by registered letter with acknowledged receipt.

Before any manipulation, check the complete state of the machine.

4- Technical description

Characteristics:

MODEL	SHP-60P	SHP-80P	SHP-100P	SHP-120P	SHP-140P	SHP-170P	SHP-190P
Power supply	230V~, 50Hz						
Heating consumption power * (kW)	1.1	1.5	1.9	2.2	2.6	3.1	3.4
Heating restored power *(kW)	6	8.3	10	12	14	17	19.5
Heating nominal intensity *(A)	5.3	7.2	9.0	10.8	12.8	15	19
Cooling absorptive power * (kW)	1.2	1.6	2.0	2.3	2.7	3.2	3.5
Cooling restored power *(kW)	4.3	5.8	7.2	8.1	9.7	11.5	14.5
Cooling nominal intensity *(A)	5.8	7.8	9.8	11.5	13.6	16	20.3
Air flow (m ³ /H)	1700	1700	2000	2000	3200	4000	4000
Noise level (d(B)A)	<48	<49	<50	<51	<52	<53	<54
Refrigerant gas	R410a						
Rate of average filling of gas (g)	620	850	950	1300	1450	1650	2100
Net weight of the unit (kg)	51	55	60	62	77	97	100
Overall sizes L x W x H (cm)	99x36x62	99x36x62	99x36x62	99x36x62	112x48x84	112x48x84	112x48x84

*** possible variations of value according to climatic conditions**

****Heating by max ambient temperature: 27°C**

*****Cooling by max ambient temperature: 43°C**

Outside:

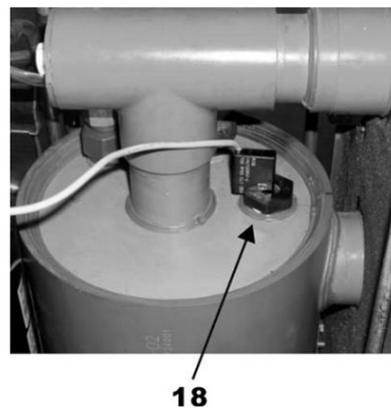
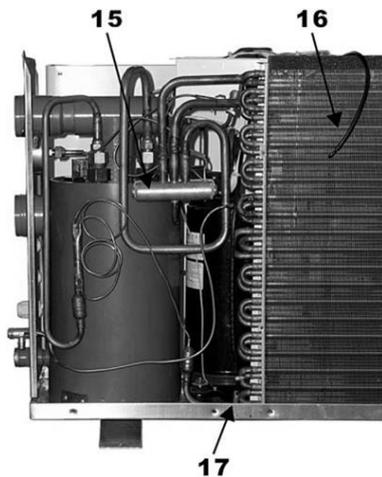
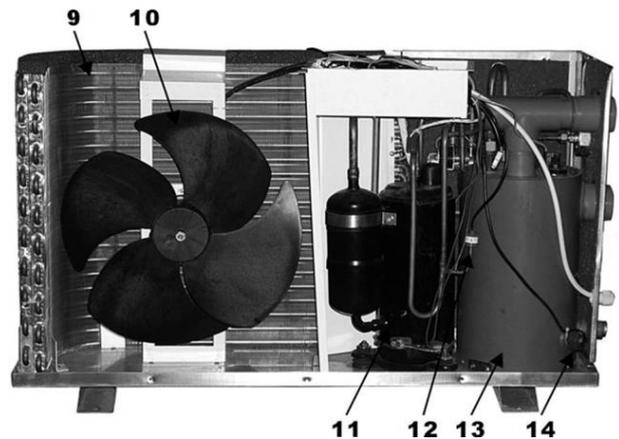


1	Fan protection net
2	Front panel
3	Control panel
4	Refrigerant pressure manometer
5	Connection for water outlet
6	Wire connection for power supply
7	Connection for water inlet
8	Rear net

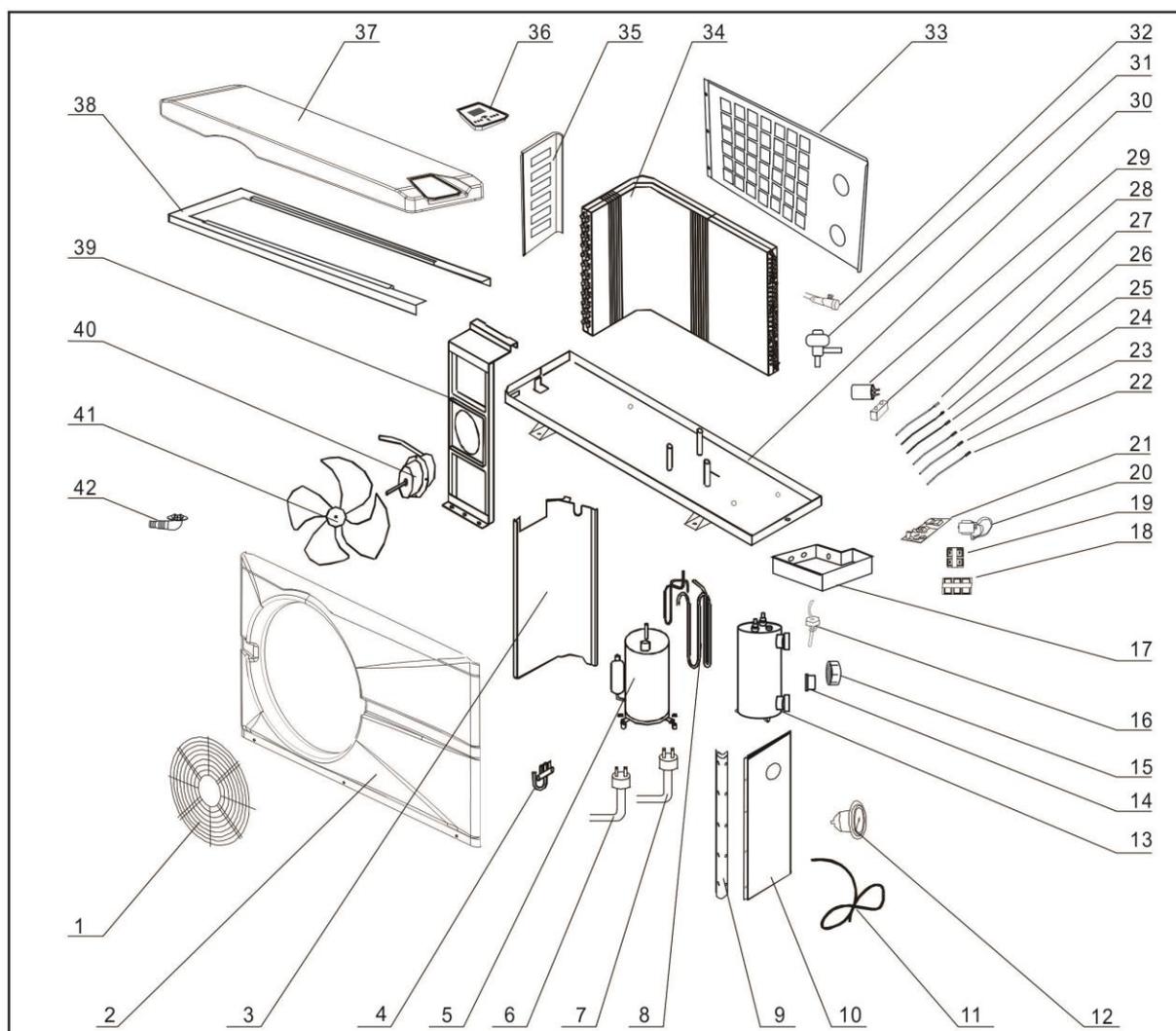
Inside:

(Front sheet cover and panel removed)

9	Evaporator
10	Fan
11	Compressor
12	High and low pressure interruptor
13	Titanium heat exchanger
14	Temperature sensor of swimming pool water
15	Four way valve
16	Ambient temperature sensor
17	Defrost sensor
18	Water flow switch



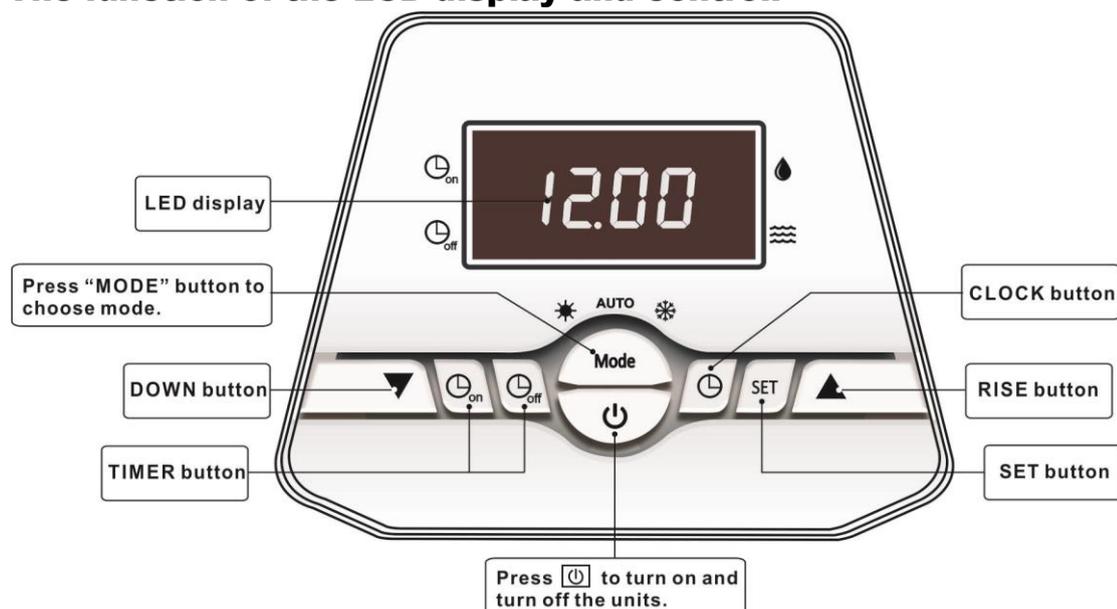
Explored view



1	Fan protection net	17	Electrical box	33	Rear board
2	Front panel	18	Terminal	34	Evaporator
3	Verge board	19	Public terminal	35	Left size board
4	Four way valve	20	Transformer	36	Wire controller
5	Compressor	21	Circuit board	37	Top cover
6	High pressure interruptor	22	Compressor sensor	38	Top bracket
7	Low pressure interruptor	23	Water inlet sensor	39	Motor bracket
8	Copper pipe	24	Copper sensor	40	Fan motor
9	Carriage	25	Ambient sensor	41	Fan
10	Right size board	26	Return gas sensor	42	Drain tube
11	Power cord	27	Cooling copper sensor		
12	Pressure manometer	28	Motor capacitor		
13	Titanium heat exchanger	29	Compressor capacitor		
14	Water connection kit	30	Frame		
15	Joint water connection kit	31	Electronic expansion valve		
16	Water flow switch	32	Mouth injecting gas		

Wire control operation

The function of the LCD display and control:



Set the operation parameter:

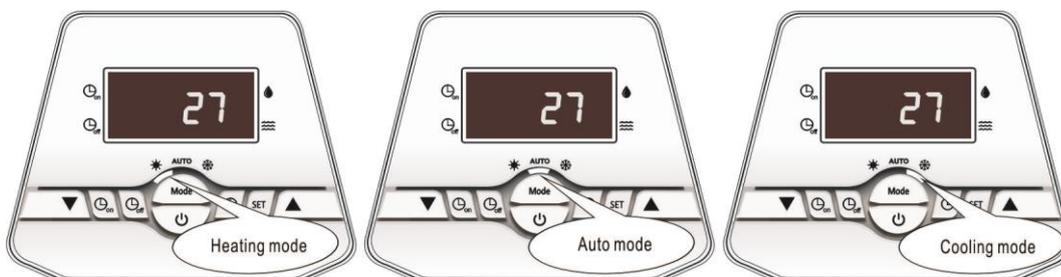
- ◎ Standby status-press "SET" button 5 seconds to enter operation parameter setting interface.
- ◎ Press " ▲ " or " ▼ " to check parameter(parameter from 0-P, see Operation Parameter Table).
- ◎ Under parameter, press " SET " to start setting(the parameter displayed blinks), press " ▲ " or " ▼ " to set data for parameter from 0-d, press " SET " again to exit the current parameter settings.
- ◎ No pressin 5s, the LED will display water temperature(under running) or current time(unit stops).
- ◎ Whilstrunning, you can press "SET" button 5 seconds check current parameter, but data can't be changed.

NO	Meaning	Range	Change	Factory setting
0	Cooling setting water temperature	10~27°C	YES	27
1	Heating setting water temperature	10~27°C	YES	27
2	Turnround of defrosting Under heat mode	30 ~ 90 min	YES	45 min
3	Defrosting start temperature	-30 ~ 0°C	YES	-7°C
4	Defrost exit temperature	2 ~ 30°C	YES	13°C
5	Time of exit defrost Under heat mode	1 ~ 12 min	YES	5 min
6	Mode (cool/coo & heat/electric heat/heat)	0/1/2/3	YES	1
7	Mode of electronic expansion valve (0 for 'MAN' and 1 for 'AUTO')	0/1	NO	1
8	Heating Target Superheat	-15~15°C	NO	3°C
9	Cooling Target Superheat	-15~15°C	NO	3°C
A	Auto mode setting water temperature	10~27°C	YES	27
b	Compressor protection Exhaust temperature	85~110°C	NO	95°C
c	Low ambient temperature protection	-20~10°C	YES	-7°C
d	Manual Control for EE valve	18~94	NO	70
E	Water temperature	-9~99°C	Measured value	
F	Compressor Exhaust temperature	-9 ~ 125°C	Measured value	
G	Heating coil temperature	-9 ~ 99°C	Measured value	
H	Return gas temperature	-9 ~ 99°C	Measured value	
L	Ambient temperature	-9 ~ 99°C	Measured value	
N	Cooling coil temperature	-9 ~ 99°C	Measured value	
P	Actual open steps of EE valve	N*5	Measured value	



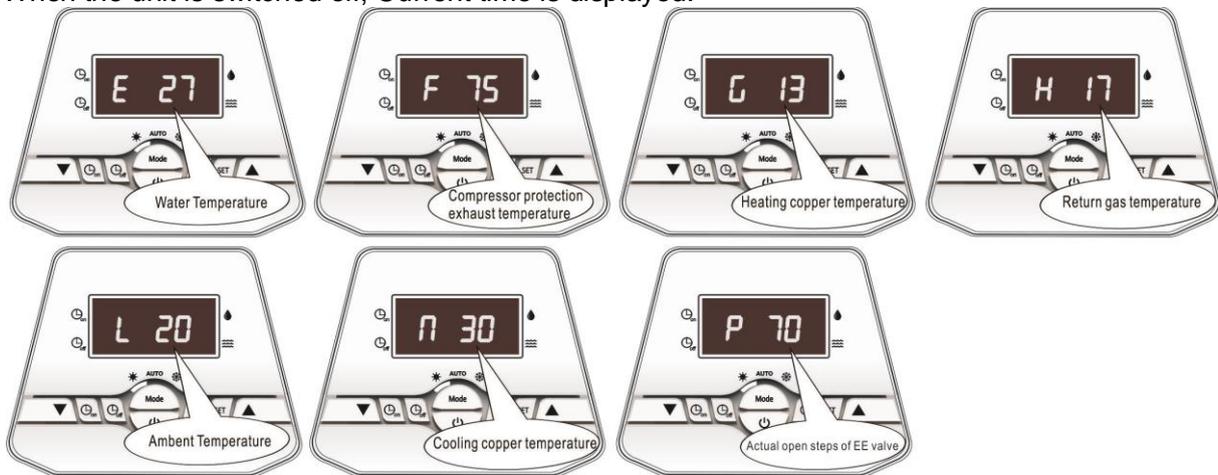
Choose the operation mode:

- ☉ Press “  ” to power on unit. Under running, the LED displays the water temperature.
- ☉ Press “  ” to choose mode(mode can be changed under running)
- ☉ Press “  ” to set temperature 1 °C higher, press “  ” to set temperature 1 °C lower.



Check current temperature:

© Under running, press “SET” button 5 seconds and “▲” or “▼” to check the current status of the unit. You can check Water Temp-/Compressor protection exhaust Temp-/Heat Copper Temp-/Return Gas Temp-/Ambient Temp-/Cooling Copper Temp-/ Actual open steps of EE valve. If no buttons are depressed within 5 seconds, the LED will display water temperature. When the unit is switched off, Current time is displayed.



Setting the time

press “⌚” button to set the time. The time displayed blinks, press “⌚” button again and then use the arrow “▲” and “▼” to change the hour setting. To change the minutes, press “⌚” button again. Once the correct time is set. press “⌚” button again the end. The display returns to normal.

Timer switch ON and Timer switch OFF:

Once the time has been set correctly, this function allows a machine start time and a machine stop time to be programmed during the day

Press “⌚_{on}” button the time displayed and “⌚_{on}” to blink. Change the hour using the “▲” and “▼” keys. Press “⌚_{on}” button again to change the minutes using the “▲” and “▼” keys. Press “⌚_{on}” button again the display returns to normal.

Press “⌚_{off}” button the time displayed and “⌚_{off}” to blink. Change the hour using the “▲” and “▼” keys. Press “⌚_{off}” button again to change the minutes using the “▲” and “▼” keys. Press “⌚_{off}” button again the display returns to normal.

The time setting is from 0 to 24 hours to recycle.

When the setting time for on and off is the same, the setting time is not available.

When the setting timer (displayed blinks), Press “⌚” to deactivate TIMER.

Coercive Defrosting:

1. press “⌚” button 5 seconds when the unit is heating mode, the unit go to defrost state.
2. When fulfilled defrost stop conditions, defrost is stopped.
3. After exiting the defrosting, the unit will stop 30 seconds, then it will heat mode again.

Key lock:

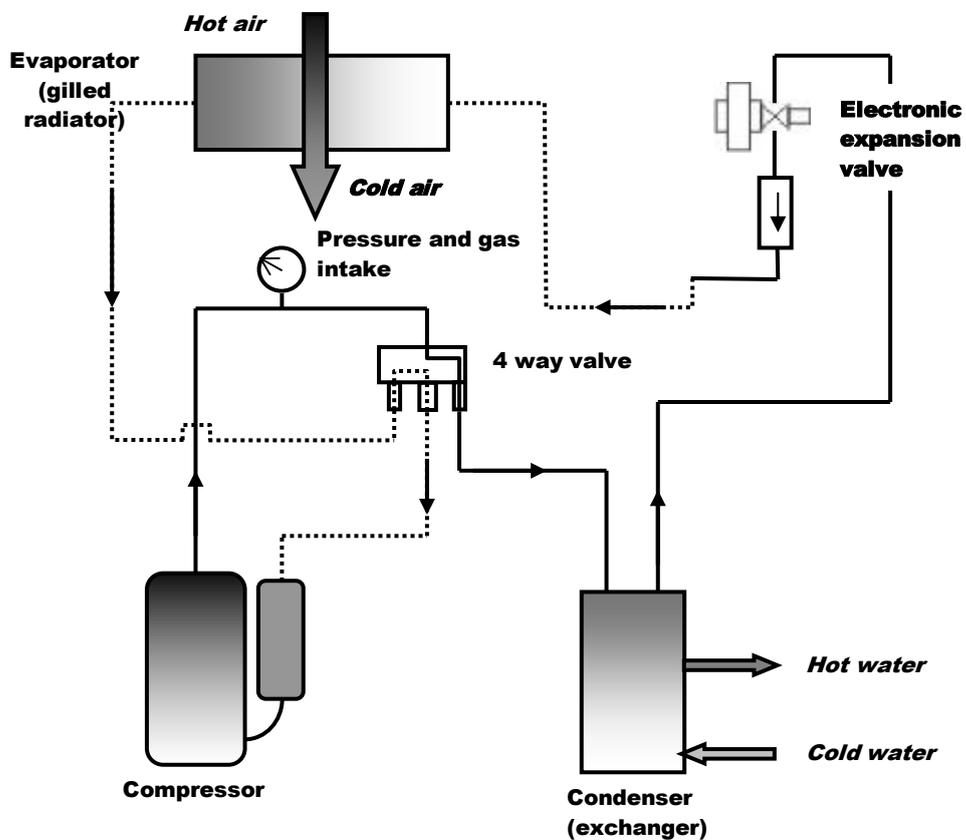
press “▲” and “▼” 3 seconds, To set keylock.
Press “▲” and “▼” 3 seconds again to release keylock.

General diagram of the refrigerating circuit

The heat pump is reversible allowing the swimming-pool's heating or cooling:

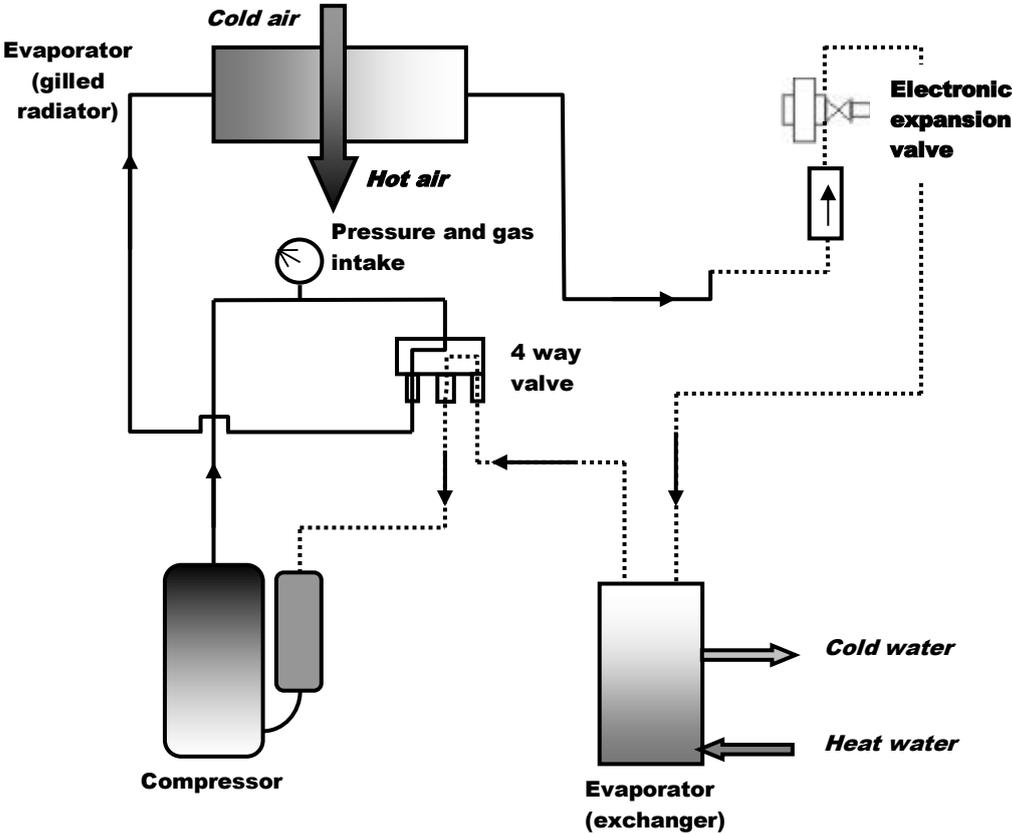
Swimming-pool water's heating mode:

The cold and liquid refrigerant fluid absorbs the heat contained in the air through the evaporator (gilled radiator), in which it is vaporizing; it is then put up in pressure and in temperature by the compressor which sends it in the condenser (exchanger) where it loses its heat (in giving it to the water of swimming pool) and comes back in liquid state; it loses its pressure and still cools in the expansion valve before turning back to the evaporator for a new cycle.



Swimming-pool water's cooling mode:

The 4 way valve reverses the circulation of the refrigerant fluid; the fluid vaporizes in the exchanger (evaporator) in getting the heat of the water, goes through in the compressor which reheats it and through in the gilled radiator (which becomes condenser) where it comes back to liquid state.



Safety and control systems

Heat pumps are equipped with the following standard protection systems:

1. Water flow switch

Thanks to this flow switch, the heat pump will not work when the filter pump is not working (and the water is not circulating). This system prevents the heat pump from heating only the water flow in the heat pump itself. The protection also stops the heat pump if water circulation is cut off or stopped.

2. Refrigerant gas high and low pressure protection

The high pressure protection makes sure the heat pump is not damaged in case of overpressurisation of the gas. The low pressure protection emits a signal when refrigerant is escaping from the conduits and the unit cannot be kept running.

3. Overheating protection on the compressor

This protection protects the compressor from overheating.

4. Automatic defrost control

When the air is very humid and cold, ice can form on the evaporator. In that event, a thin layer of ice appears that will grow increasingly bigger as long as the heat pump is running. When the temperature of the evaporator has become too low, automatic defrost control will be activated, which will reverse the heat pump cycle so that hot refrigerant gas is sent through the evaporator during a brief period of time to defrost it.

5. Anti-frost protection during winter

This protection can only be activated if the heat pump is in STAND-BY mode.

5.1 First anti-frost protection

If the filter pump is controlled by the heat pump (regardless of the value for parameter 9) and when the water temperature lies between 2 and 4 °C and the air temperature is lower than 0 °C, the filter pump will be automatically turned on to prevent the water from freezing in the piping. This protection is deactivated when the temperature rises again.

5.2 Second anti-frost protection

If the water temperature drops even more, that is, below 2 °C (during long frost periods), the heat pump will also start running to heat the water until its temperature approximates 3 °C. When this temperature is reached, the heat pump will stop, but anti-frost protection will remain active until conditions change.

6. 3-fase protection

If the phases are connected in the wrong order due to electrical miswiring, this protection will interrupt the power supply to prevent mechanical deformation. There will be an EE 4 error code on the display.

5- Installation

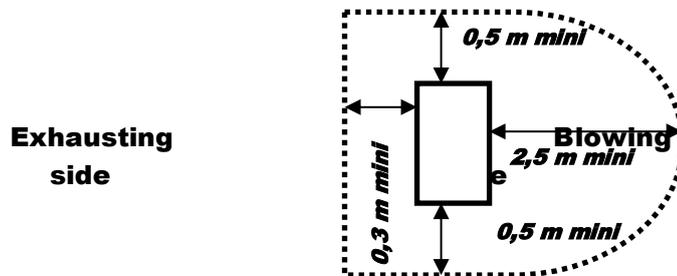
Rules of installation:

Electric and hydraulic connections must be carried out according to standards in effect (NF C 15 100, CE I 364).

The machine must be installed outside.

The machine must be posed on its ant vibratory studs, set and lying flat and on a massive base (concrete slab); this base must have a sufficient height to prevent any entry of water by the bottom of the machine. Height must be adjusted to fit the connector collecting the condensates.

The obstacles such as wall and vegetation must be separated from the machine as indicated on the diagram below.



Do not to install the Heat pump in a confined place (the fan would recycle its air and the Heat pump would be down performance).

The fan should not blow towards the windows or crossing point.

Safety distance between the swimming pool and the foot bath: the fitter must imperatively refer to the standard C15-100 section 702; the machine should not be installed in volume 1 surrounding the swimming pool but at least in volume 2 so at a distance of 3 m minimum of the swimming pool and foot bath.

Other precautions of installation:

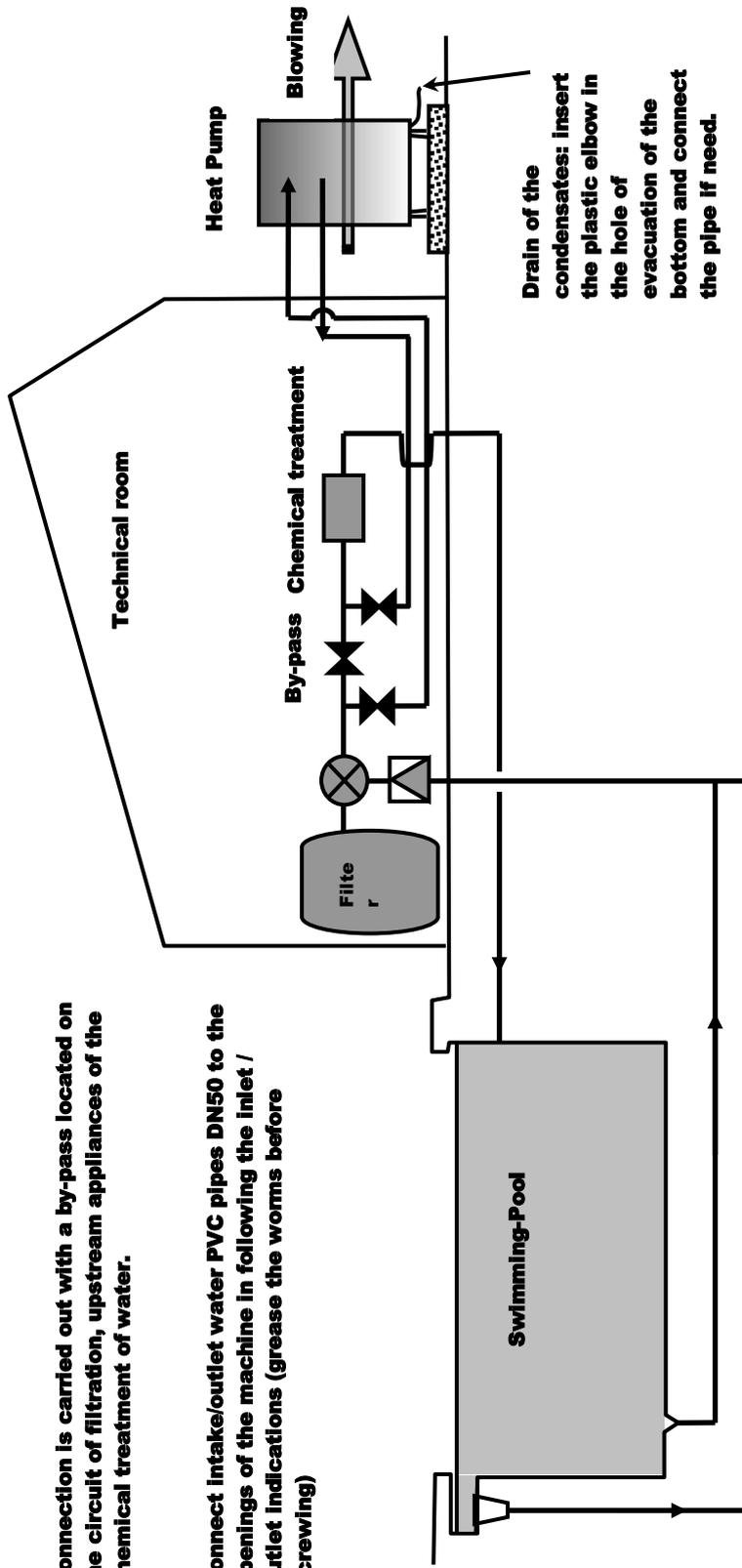
- Do not to install the machine near a way with circulation of car in order to avoid mud projections.
- Avoid directing blowing against dominant winds.
- If the machine is intended to be used in winter, put it in a place protected from the falls of snow.
- The machine must be able to be supervised in order that children do not play around

**Hydraulic connections:
respect imperatively**

To

Connection is carried out with a by-pass located on the circuit of filtration, upstream appliances of the chemical treatment of water.

Connect intake/outlet water PVC pipes DN50 to the openings of the machine in following the inlet / outlet indications (grease the worms before screwing)



Electric connections:

CAUTION: before connecting the machine, make sure that the feeder is disconnected to the electrical network.

The electric installation must be carried out by an experienced electrician and the supply must come from a severing equipment and differential protection; the whole must be carried out according to standards' in force in the country where the material is installed.

Characteristics of the electric supply:

- 230 V +/- 10%, single-phase current, or 380 V +/- 10%, three-phase current, 50 Hz
- Mode of neutral TT and TN.S; the circuit of heat pump must be connected to an earth circuit.

Characteristic minimum of the protection:

- Protection must be of 16 A, by circuit breaker or fuse; it must protect the Heat pump exclusively; the circuit breaker must be specified with curve D, the fuse must be specified Am.
- Differential protection : 30 mA (the length of cable between the connector block of the heat pump and the protection of should not exceed 12 m).

Control :

The heat pump is fitted out with a water flow detector which function is to apply the signal to the electronic card when the water flow is sufficient.

We recommend when it is possible to control the heat pump to the filtration pump (by contacting relay non supplied to insert in the feeding circuit of the heat pump).

The recommended water flow speed is 5m³/h.

Removed control panel:

An extension cord allows the removal of the panel in inserting it in a standard electric box into the technical local; the option is supplied with a cover allowing to seal the aperture let by the removal of the control panel.

6- Water Flow and refrigerating circuit pressure

After putting into service, do the settings of pressure of the refrigerant circuit for having an optimal operating of the heat pump, following:

Stage 1:

Before starting the Heat Pump, ambient temperature around 20°C, refrigerant meter shows pressure from 14 to 16kg/cm².



Stage 2:

Close completely the by pass valve and open large inlet and outlet valves of the Heat Pump; in these conditions the totality of the water flow goes by the Heat Pump.

Put into service the Heat Pump in heating mode, wait for the indicated pressure being stabilized; the correct setting of the pressure is from 21 to 35 kg/cm²;

In most of cases (pump of filtration given a flow until 9m³/h) you do not have to open the by pass valve.

If the stabilized pressure is under 21kg/cm², the progressive opening of the by pass valve will allow rising this pressure.

The adjustment of the by pass valve done, you have in principle no reason to modify it during the season. See the paragraph "Environment problem" too.

7 – Environment problem

Under certain external conditions the heat exchanges between the refrigerant and the water on one hand and between the fluid and the air on the other hand are insufficient; the consequence is that the refrigerating circuit runs up in pressure and the compressor consumes more electricity.

The temperature sensors compressor outlet and the magnetic circuit breaker on the compressor power supply protect the compressor from these extreme conditions; the error messages *EE 05* occur.

The condition causing this situation is as follows:

In heating mode:

- insufficient water flow:

close the by-pass valve for increasing the refrigerant exchange → water

In cooling mode:

- too important water flow: open the by pass valve for decreasing the water flow and so the exchange water → refrigerant

- insufficient air flow: be sure that the real net of condenser are not blocked.

Note: these error codes are likely to occur if temperature of swimming pool water is high and the ambient air is hot.

8. Maintenance and inspection

8.1 Maintenance

- Check the water inlet and drainage often. The water and air inflow into the system should be sufficient so that its performance and reliability does not get compromised. You should clean the pool filter regularly to avoid damage to the unit caused by clogging of the filter.
- The area around the unit should be spacious and well ventilated. Clean the sides of the heat pump regularly to maintain good heat exchange and to save energy.
- Check if all processes in the unit are operational and pay special attention to the operation pressure of the refrigerant system.
- Check the power supply and cable connections regularly. Should the unit begin to function abnormally or should you notice a smell from an electrical component, arrange for timely repair or replacement.
- Winterizing : make sure to purge all the water from the heat pump and other systems in order to prevent frost damage.
- You should also purge the water if the unit will not work for an extended period of time. You should check all parts of the unit thoroughly and completely fill the system with water before turning it on again afterwards.

8.2 Troubleshooting guide

Improper installation may result in an electrical discharge that could lead to death of – or serious injury to -pool users, installers or others due to electrical shock and may also cause damage to property.

DO NOT attempt to modify the internal configuration of the heat pump.

1. Keep your hands and hair clear of the fan blades to avoid injury.
2. If you are not familiar with your pool filtering system and heat pump:
 - a. **Do not** attempt to adjust or service without consulting your dealer or your professional pool or air conditioning contractor.
 - b. Read the entire installation and user manual before attempting to use, service or adjust the unit.
 - c. **Start the heat pump at least 24 hours after its installation in order to prevent damage to the compressor.**

Nota: Switch off the power prior to maintenance or repairs.

8.3 Overview of possible error codes displayed on the screen

Go back to chapter 4 “Protection systems” for more detailed information.

The heat pump screen displays one of the following codes:

Display	Problem	Cause	Solution
PP 1	“WATER IN” sensor out of order	Sensor open or short-circuited	Check or replace the sensor
PP 2	“Compressor exhaust” sensor out of order	Sensor open or short-circuited	Check or replace the sensor
PP 3	“EVAPORATOR PIPE” sensor out of order	Sensor open or short-circuited	Check or replace the sensor
PP 4	“Return Gas” sensor out of order	Sensor open or short-circuited	Check or replace the sensor
PP 5	“AIR” sensor out of order	Sensor open or short-circuited	Check or replace the sensor
PP 6	“Condenser PIPE” sensor out of order	Sensor open or short-circuited	Check or replace the sensor
PP7	Water temperature too low during cool-down	Insufficient water flow	Check the water flow
		Sensor “WATER OUT” displays an incorrect message	Check or replace the sensor
PP 7	First anti-frost protection active	Low temperatures for water and air	No action required
PP 7	Second anti-frost protection active	Low temperatures for water and air	No action required
PP 8	“CONDENSER” sensor out of order	Sensor open or short-circuited	Check or replace the sensor
PP 9	Low ambient temperature protection	Ambient temperature is too low or protection temperature setting set too high	Check and repair.
EE 1	High pressure protection	Insufficient water flow	Check the water flow
		Pressure switch out of order	Replace the pressure switch Have
		Too much refrigerant gas present	the heat pump checked by a refrigeration technician
EE 2	Low pressure protection	Not enough refrigerant gas	Have the heat pump checked by a refrigeration technician
		Leak in the cooling conduits	Have the heat pump checked by a refrigeration technician
EE 3	Insufficient water flow	Insufficient water flow	Check the water flow
		Water flow switch out of order	Replace the Water flow switch
EE 4	Phase Protection	Faulty phase wiring	Put phases in order
EE 5	compressor exhaust temperature is too high	Water temperature and environmental temperature is too high	Set to the safety of water temperature.
		Refrigerant leakage	Check and repair.
		Insufficient water flow	Check the water flow
EE 6	Communication failure	No communication between the digital display and the system controller	Check the connection between the screen and the controller. Replace screen and/or controller.
PE1	Emergency switch disconnect	Emergency switch disconnect	Check and repair.

9. Electrical diagrams

