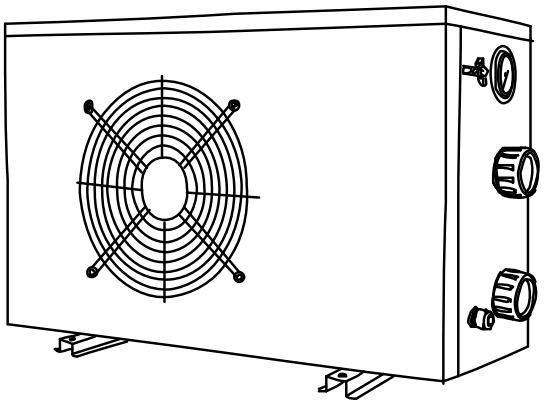
Swimming pool heat pump

Directions for installation and maintenance



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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.

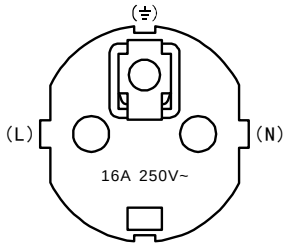
2- Caution

This document is an integral part of the product and it must stays 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.

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

When connect plug to socket (power supply), please make sure that live wire, neutral wire, earth wire to plug should be connected as right drawing.



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 3m^3/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.

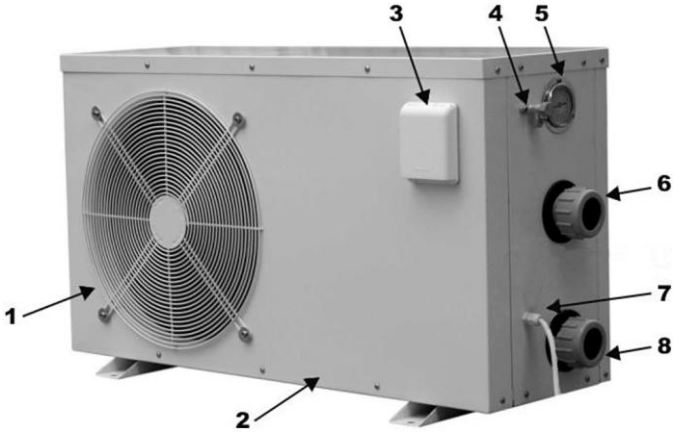
4- Technical description

Characteristics:

MODEL	**KP-50HS**
Power supply	*230V~, 50Hz*
Heating consumption power * (kW)	*1.2*
Heating restored power *(kW)	*5.0*
Heating nominal intensity *(A)	*5.8*
Cooling absorptive power * (kW)	*1.2*
Cooling restored power *(kW)	*4.3*
Cooling nominal intensity *(A)	*5.8*
Air flow (m^3/H)	*1600*
Noise level (d(B)A)	*<51*
Refrigerant gas	*R410a*
Rate of average filling of gas (g)	*800*
Net weight of the unit (kg)	*51*
Overall sizes L x W x H (cm)	*96 x 31 x 56*

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

Outside:

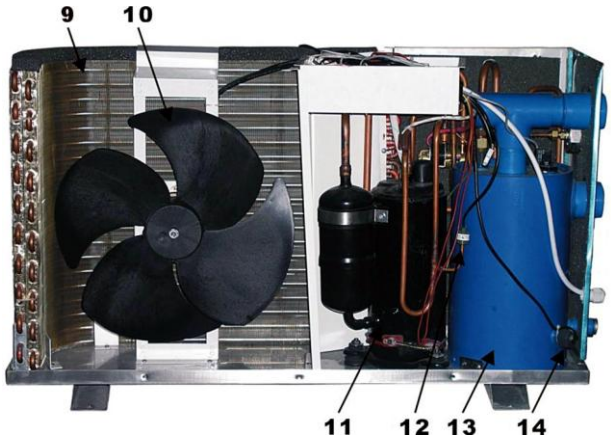


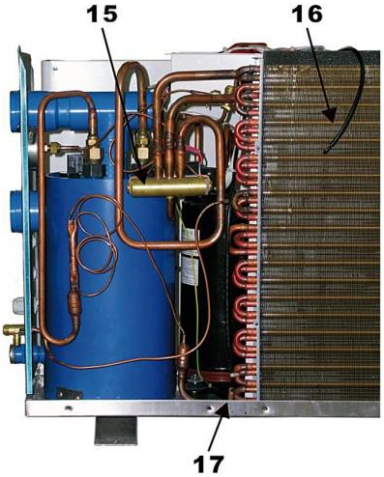
1	Fan protection grid (blow side)
2	Metal cabinet
3	Control panel
4	Refrigerant charge valve
5	Refrigerant pressure manometer
6	Fast connection for water outlet
7	Wire connection for power supply
8	Fast connection for water intlet

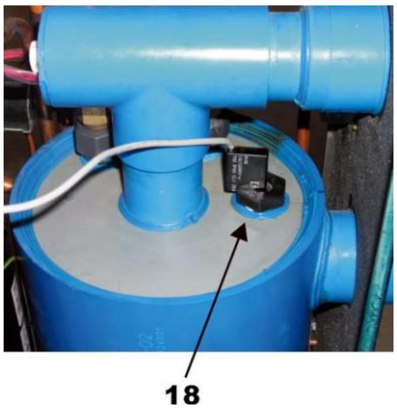
Inside:

(Front sheet cover and panel removed)

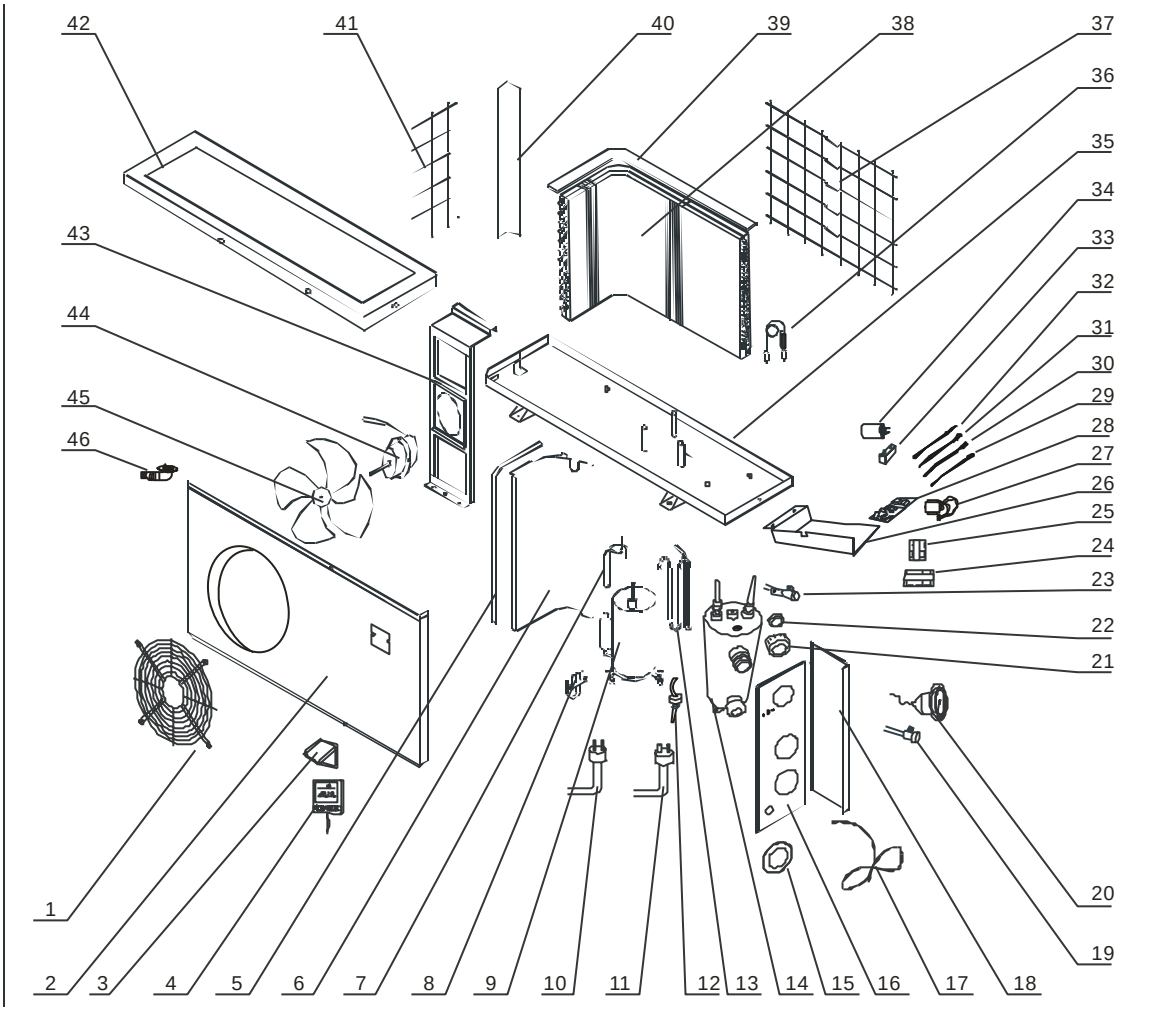
9	Evaporator
10	Fan
11	Compressor
12	High and low pressure interruptor
13	Titanium heat exchanger
14	Temperature sensor of swimming pool water
15	Four way valve
16	Ambient temperature sensor
17	Defrost sensor
18	Water flow switch







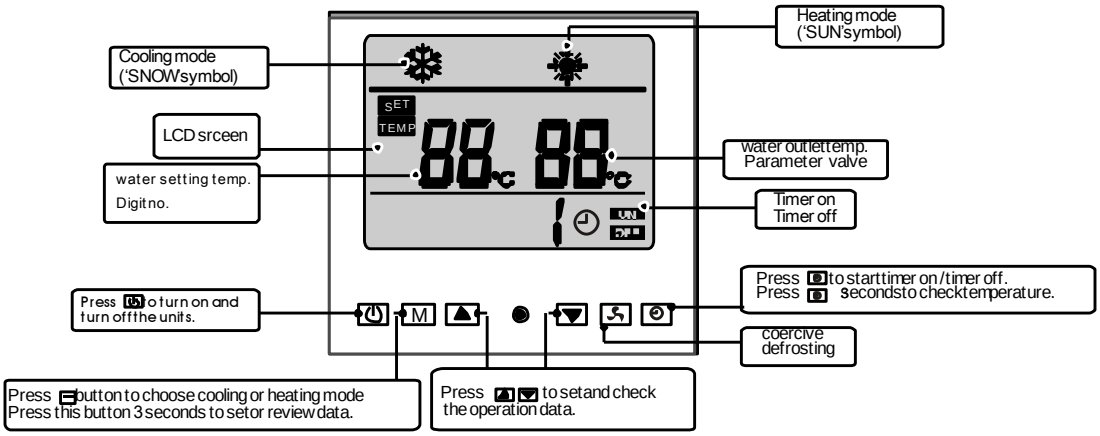
KP-50HS Explored view



1	Fan protection net	17	Power cord	33	Motor capacitor
2	Front panel	18	Right rear board	34	Compressor capacitor
3	Control panel cover	19	Refrigerant charge valve	35	Frame
4	Wire controller	20	Pressure manometer	36	Capillary
5	Verge board polyfoam	21	Water fast connection	37	Rear net
6	Verge board	22	Gasket	38	Condenser
7	Exhaust pipe	23	Mouth injecting gas	39	Condenser top polyfoam
8	Four way valve	24	Terminal	40	Left carriage
9	Compressor	25	Public terminal	41	Left net
10	High pressure interruptor	26	Electrical box	42	Top cover
11	Low pressure interruptor	27	Transformer	43	Motor bracket
12	Water flow switch	28	Circuit board	44	Fan motor
13	Gas returning pipe	29	Copper sensor	45	Fan
14	Titanium heat exchanger	30	Water sensor	46	Drain tube
15	Rubber water fender	31	Ambient sensor		
16	Right size board	32	Compressor sensor		

Wire control operation

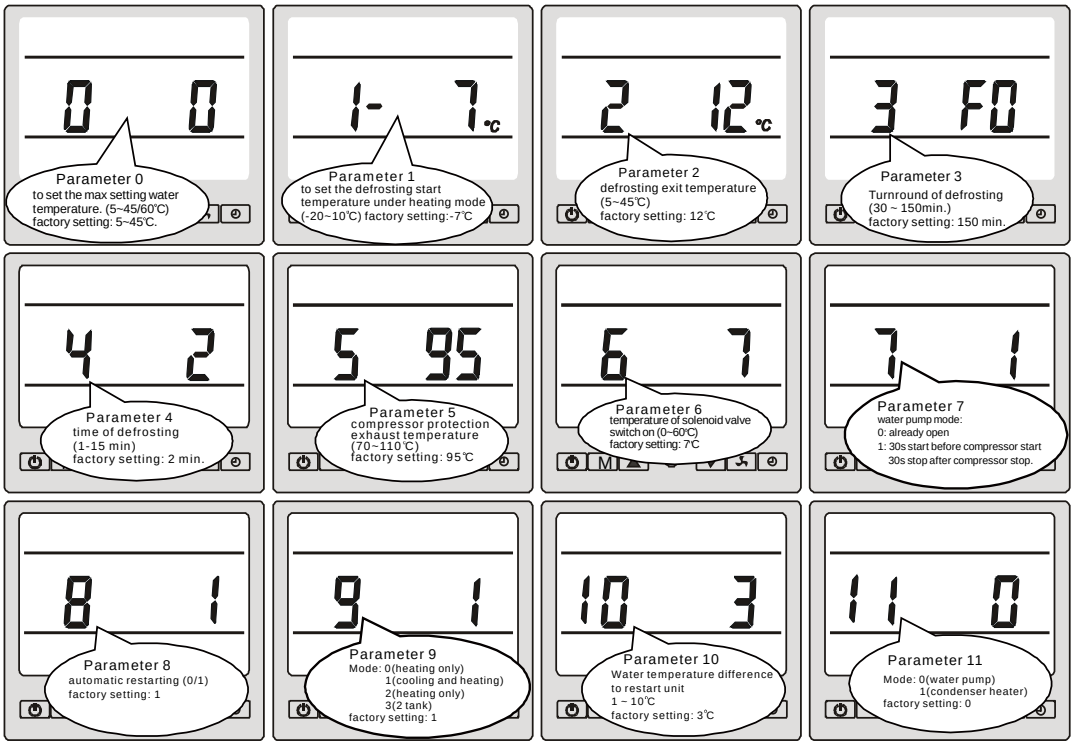
The function of the LCD display and control:



Set the operation parameter:

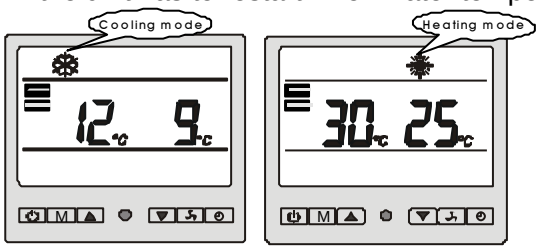
When the unit stops, press" M "button 3 seconds to enter operation parameter setting interface.
◎ Press" M "again to start setting(parameter from 0-11, see Operation Parameter Table).
◎ Under parameter setting, press " ▲ " or " ▼ " to set data for parameter from 0-11.
◎ No press in 10s, it will exit the setting interface.

NO	Meaning	Range	Change	Factory setting
0	Max. setting water temperature	0/1 (5 ~ 45/60°C)	Not change	0 (5 ~ 45°C)
1	Defrosting start temperature	-20 ~ 10°C	Can change	-7°C
2	Defrost exit temperature	5 ~ 45°C	Can change	12°C
3	Turnround of defrosting Under heat mode	30 ~ 150 min	Can change	F0 (150 min)
4	Time of exit defrost Under heat mode	1 ~ 15 min	Can change	2 min
5	Compressor protection Exhaust temperature	70 ~ 110°C	Can change	95°C
6	Temperature of electrical valve switch on	0 ~ 60°C	No use	7°C
7	Water pump mode	0/1	No use	1
8	Automatic restart	0/1	Not change	1
9	Mode (heat/coo & heat/cool/two tank)	0/1/2/3	Suggest not change	1
10	Water temperature difference to restart	1 ~ 10°C	Can change	3°C
11	Water pump/Condenser heater	0/1	Not change	0



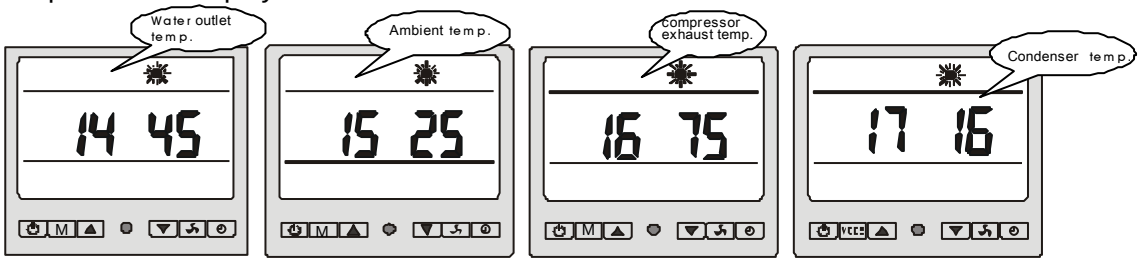
Choose the operation mode:

◎ Press " ⏻ " to power on unit. Under running, the LCD displays the water setting temp, water temperature and current mode.
◎ Press " M " to choose mode(mode can be changed under running)
◎ Press " ▲ " to set temperature 1 °C higher, press " ▼ " to set temperature 1 °C lower.
◎ The temperature setting range of water heating is 5 °C ~ 45°C.
The temperature setting range of water cooling is 5 °C ~ 40°C.
When water temperature reaches to setting temperature, the unit will stop;
the unit has to restart when water temperature drop 3°C on HEATING mode.
the unit has to restart when water temperature increase 3°C on COOLING mode.



Check current temperature:

◎Under running, press "⏲" 3 seconds to check the current status of the unit. You can check water/ambient/compressor/condenser temperature. If no buttons are depressed within 10 seconds, the LCD will display water-setting/water temperature. When the unit is switched off, current water temperature is displayed.

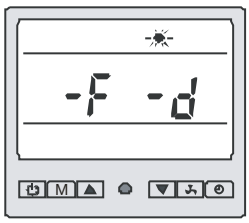


Stop the unit in low ambient temperature:

◎when the unit is OFF mode, press " ⏻ " button 3 seconds to enter ambient temperature setting interface.

◎the range of stop temperature is from -15°C to 97°C,the range of restart temperature is from -13°C to 99°C.

◎ –F on left panle means -15°C (stop temperature), -d on the right panel means -13°C (restart temperature). The unit will stop when ambient temperature is -15°C, and the unit will restart when ambient temperature increase to -13°C.
the display panel show " EE C " when ambient temperature drop down to -15°C.



Timer switch ON:

1. When the unit stops, press " ⏲ " botton to set time for TIMER ON, press the botton again once to cancel the TIMER ON.
   Press " ▲ " and " ▼ " to set the time interval of 1 hour in a cycle manner : 1,2…24
2. When it reaches the switch-ON time, the unit will operate in the pre-set modes.
3. Press " ⏻ " botton under TIMER ON setting, then the unit will start immediately, and the TIMER setting is cancelled.

Timer switch OFF:

1. When the unit is running, press " ⏲ " botton to set time for TIMER OFF, press the botton again once to cancel the TIMER OFF.
   Press " ▲ " and " ▼ " to set the time interval of 1 hour in a cycle manner: 1,2…24
2. When it reaches the switch-OFF time, the unit will automatically stop.
3. Press " ⏻ " botton under TIMER OFF setting, then the unit will stop immediately, and the TIMER setting is cancelled.

Timer OFF and Timer ON can not be set at the same time.

Coercive Defrosting (only on water HEATING mode):

1. press " ♨ " botton 5 seconds when the unit is running, the unit go to defrost state.
2. When the defrost time reaches 2 minutes, defrost is stopped.
3. After exiting the defrosting, the unit will stop 1 minute, then it will heat water again.

Key lock:

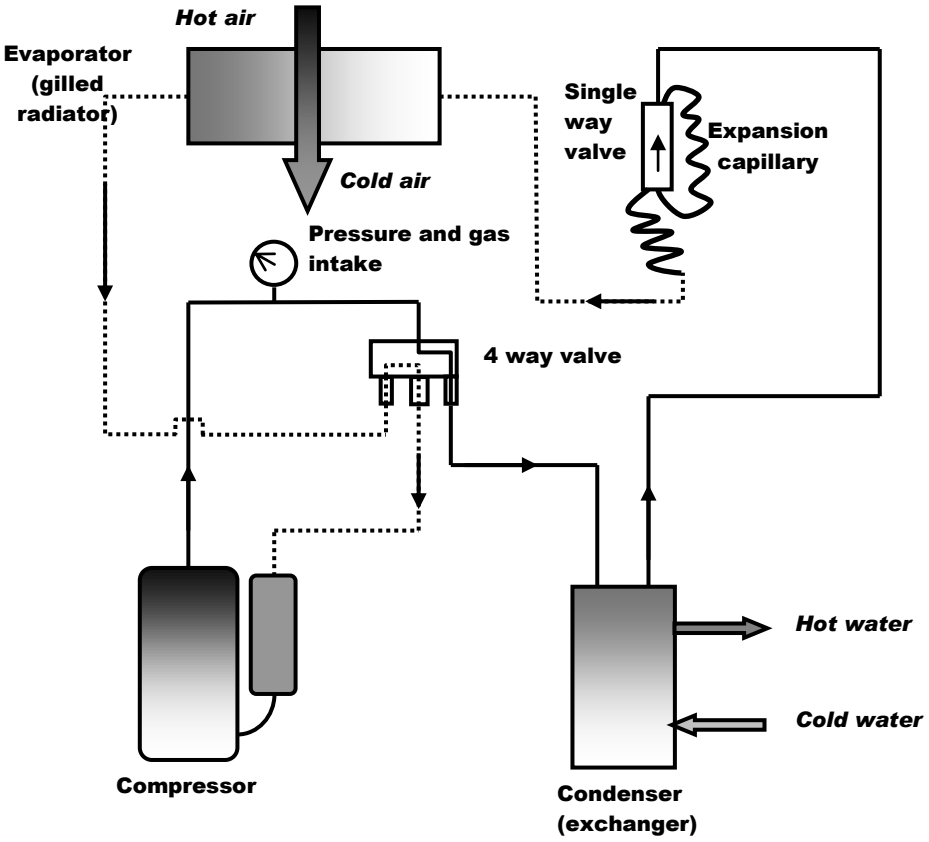
Press " ▲ " and " ▼ " 5 seconds, to set keylock.
Press " ▲ " and " ▼ " 5 seconds again to release keylock.

General diagram of the refrigerating circuit

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

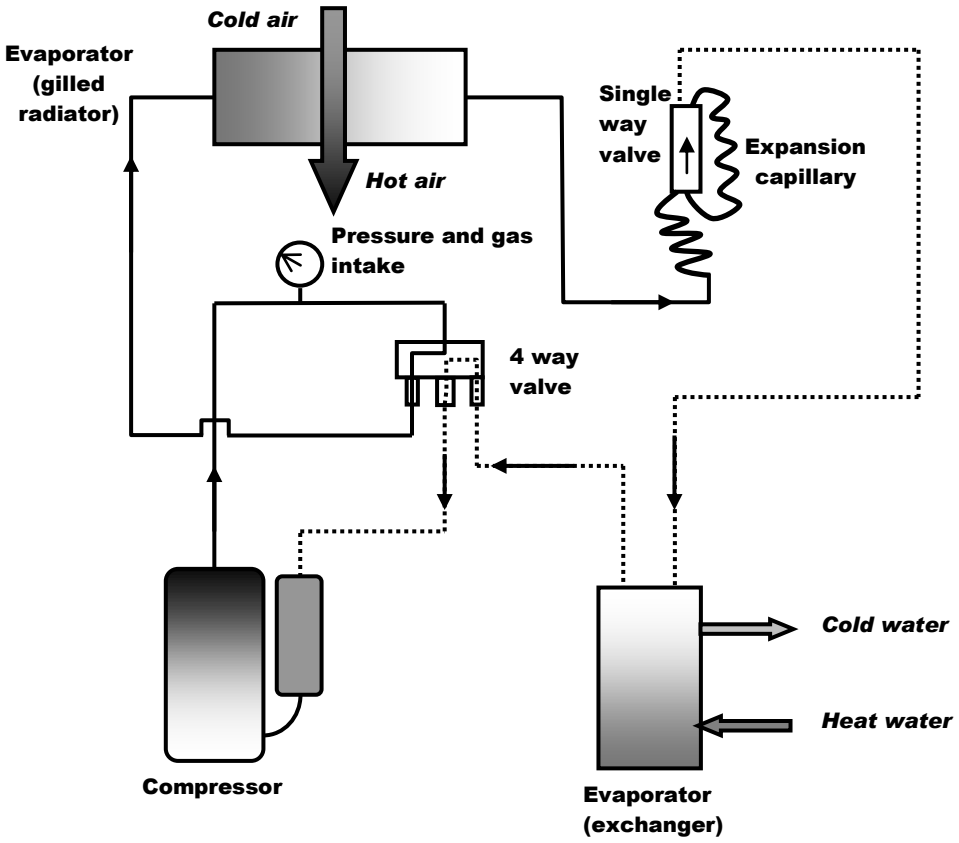
Swimming-pool water's heating mode:

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 capillaries 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

The heat pump is fitted out:

Temperature control:

- **A temperature sensor of the evaporator, starting the defrosting operation.**
- **An ambient temperature sensor ensuring the cut of the heat pump when the temperature of the external air goes down under -15°C (factory settings). The normal cycle restarts when the outside temperature goes up to -13°C (factory settings).**
- **A temperature sensor placed on the exchanger, ensuring the cut of the heat pump when the temperature of the water reaches the required temperature. The normal cycle restarts when the temperature in the exchanger goes down to a temperature lower of 3°C (factory settings) than this required.**

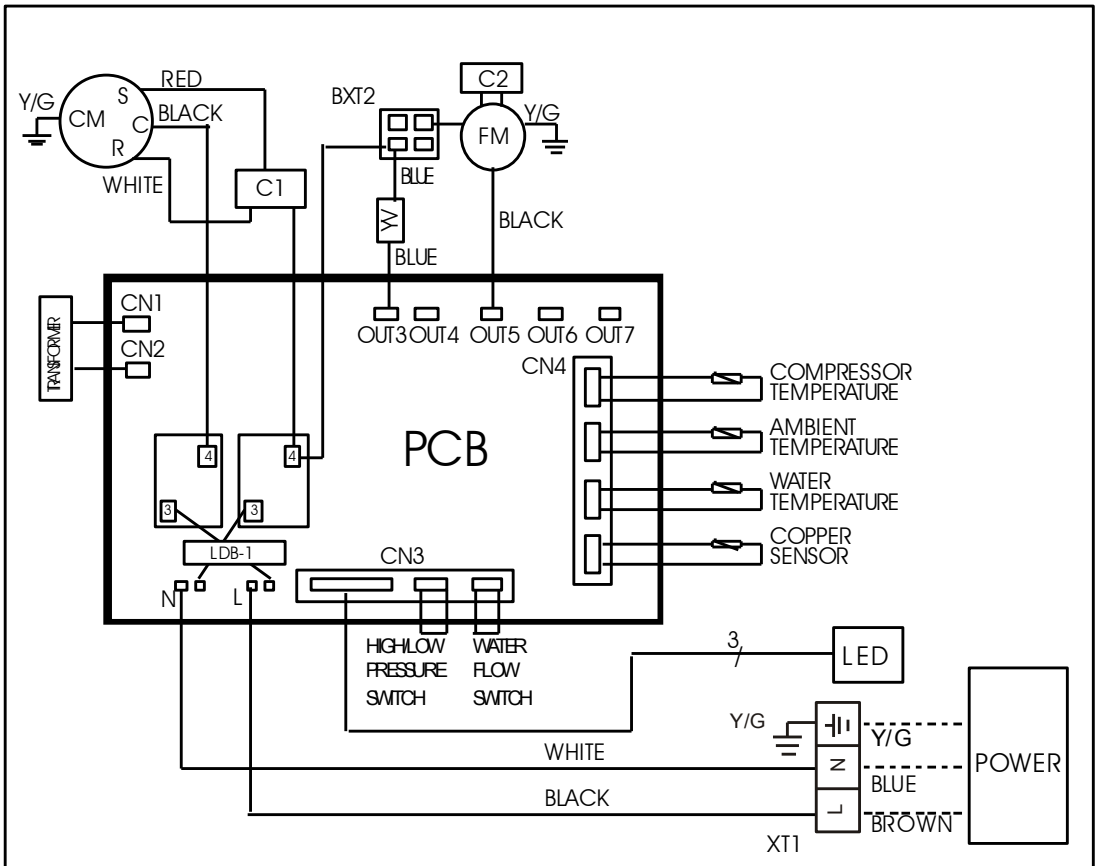
With 4 safety systems:

- **A water flow detector placed at the exit of the exchanger**
- **A high pressure gas circuit breaker, a low pressure gas circuit breaker**
- **An outlet compressor temperature sensor**

If a defect occurs on one of these systems (defective system, off-line or abnormal measured value) a message of defect appears on the display screen; see the paragraph "Error codes and what to do" of this note.

Caution: the removal or the shunt of one of the control or safety systems involves the cancellation of the guarantee.

Electric diagram



YV	FOUR WAY VALVE	LDB-1	CREEPAGE EXAMINE	XT1	TERMINAL	C1	COMPRESSOR CAPACITOR 1
FM	FAN MOTOR	PCB	CONTROL BOARD	XT2	PUBLIC TERMINAL	C2	FAN MOTOR CAPACITOR 2
CM	COMPRESSOR						

5- Installation

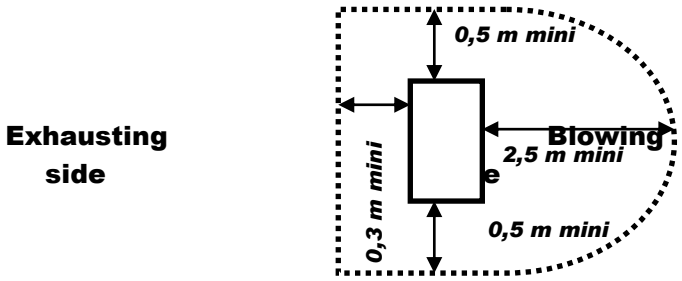
Rules of installation:

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.

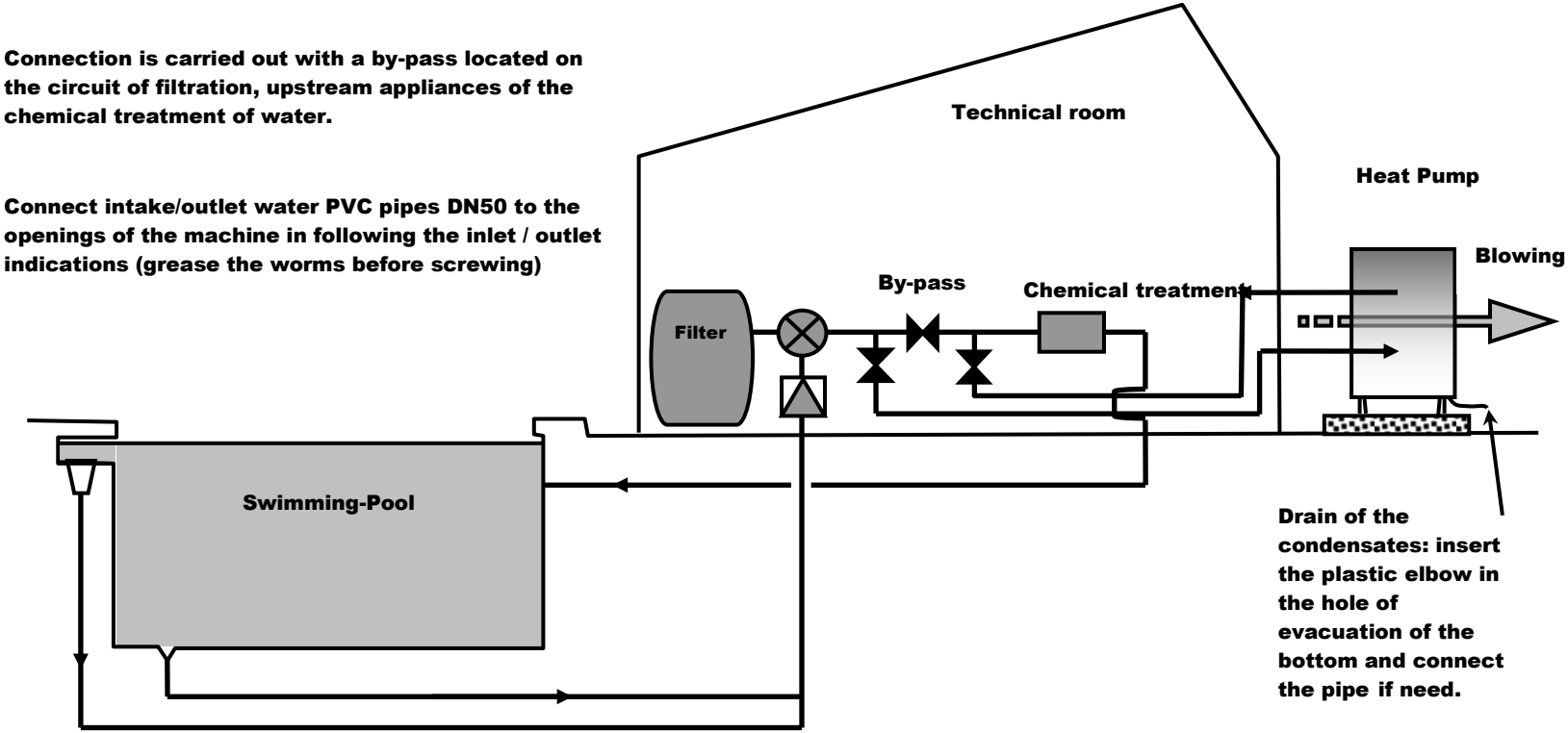
Other precautions of installation:

- 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: To respect imperatively

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, 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.

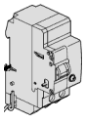
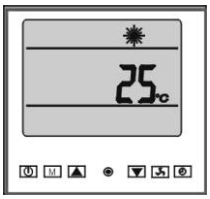
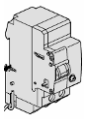
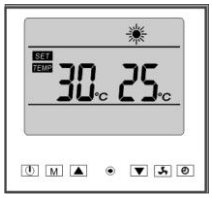
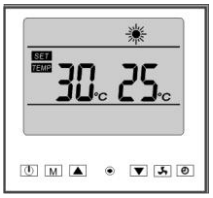
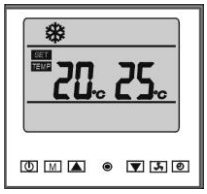
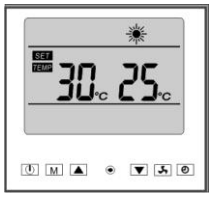
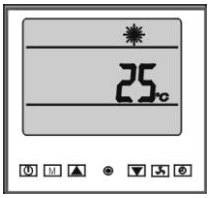
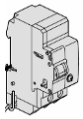
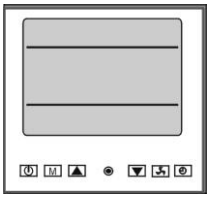
We recommend when it is possible to control the heat pump to the filtration pump (by contacting relay non supplied to insert in the feeding circuit of the heat pump).

The remmonded water flow speed is 3m^3/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.

Procedure of use

Action	External Appliance or Button of heat pump	Display	Heat pump answer
Put the heat pump under tension	Engage the circuit breaker of the heat pump 		Display current water temperature
Put in circulation the swimming pool water into the pipes	Engage the circuit breaker of pump of filtration 		
Start	Press the button 		Start between 1 second and 3 minutes in the previous operation mode (heating or cooling)
Go from heating mode to cooling mode or inversely from cooling to heating	Press the button 	 	Stop for 3 minutes, reverse of cycle and restart in a new mode
Set the water temperature into the swimming pool	 adjustable from 5°C to 45°C		The heat pump heats or cools until the required temperature
Stop	Press the button 		Immediate stop and wait
Switch off	Use the circuit breaker of pump of filtration, and heat pump 		Complete stop

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 20m³/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- Defrosting

The defrosting is necessary only in heating mode.

Sequences of the defrosting:

1- Start

The defrosting is engaged if the following conditions are at the same time fulfilled:

- the defrosting sensor temperature goes down to -7°C

- the compressor runs without stopping for 5 minutes

- the compressor had run totally 150 minutes

2- The compressor and the fan stop

3- After 20 seconds, the 4 way valve shifts

4- One minute after its stop, the compressor starts alone and the accumulated freeze on the gills becomes melting, what is generally with a steam cloud

5- Stop:

The defrosting stops if one of the following conditions is fulfilled:

- the defrosting operates 20 seconds and the detected temperature by the defrost sensor goes up to 12°C.

- the compressor had run totally 3 minutes

6- The compressor stops

7- After 1 minute the 4 way valve shifts

8- Two minutes after its stop the compressor and the fan start for restarting in heating mode.

8 – 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 E*E 6* 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.

9 – Error codes and what to do:

This table explains the error codes caused by a defective regulating component or by a security operation.

Screen and state of the heat water pump	Component	Possible	Intervention	Second reason if the intervention is without effect
EE 1 **Compressor and fan stop**	**Water temperature sensor**	**Sensor disconnected, non supplied or defective**	**Check the connections, the wires, change it or replace the electronic card**	
EE 2 **Compressor and fan stop**	**Ambient air temperature sensor**	**Sensor disconnected, non supplied or defective**	**Check the connections, the wires, change it or replace the electronic card**	
EE 3 **The heat pump continues running**	**Oultlet compressor temperature sensor**	**Sensor disconnected, non supplied or defective**	**Check the connections, the wires, change it or replace the electronic card**	
EE 4 **The heat pump continues running**	**Defrost sensor**	**The defrosting is incomplete and the automatism decides to stop the heat pump**	**Increase lightly the water flow going into the heat pump; the effect is to increase the temperature of the refrigerant in the evaporator.**	
EE 6 **Compressor and fan stop**	**Oultlet compressor temperature sensor**	**Outlet compressor temperature detected up to 105°C more than 3 times in 24h**	**Environment problem Refrigerant leakage Capillary is half blocked**	
EE 7 **Compressor and fan stop**	**Magnetic circuit breaker**	**Electric current leak from the compressor, the fan or an electrical valve; electric safety system of the heat pump**	**Switch off the current and call an electrician for repairing or replacing the defective component**	
EE8	**Wire control Communication error**	**Signal cable of wire Control is loose**	**Check the connection of signal cable**	
EE 9	**High pressure, Low pressure protection**	**protector is disconnected, or defective**	**Water temperature is too high Ambient temperature is too high Capillary is blocked Call a refrigerating engineer who will do the necessary controls of the circuit pressure**	
EE b	**Flow switch**	**Flow switch disconnected, non supplied or defective**	**Check the connections, the wires, change it or replace the electronic card**	
EE C	**Ambient temperature sensor**	**Ambient temperature low than minimum temperature**		