

# Swimming pool heat pump

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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 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 is not intended for use by persons (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction concerning use of the appliance by a person responsible for their safety.**

**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 8m<sup>3</sup>/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

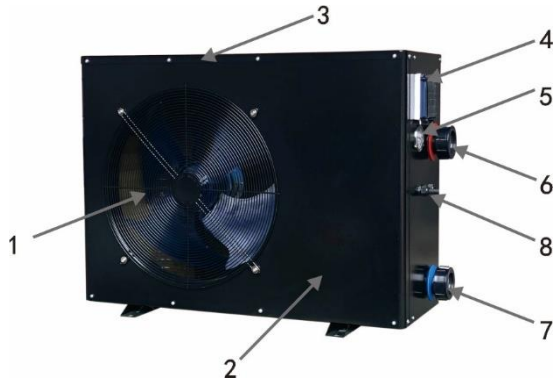
#### Characteristics:

MODEL	BP-100HS-A
Power supply	230V~, 50Hz
Heating consumption power * (kW)	1.85
Heating restored power *(kW)	11
Heating nominal intensity *(A)	8.8
Heating consumption power ** (kW)	1.75
Heating restored power **(kW)	8.2
Heating nominal intensity **(A)	8
Air flow (m <sup>3</sup> /H)	2600
Noise level (d(B)A)	<54
Refrigerant gas	R32
Rate of average filling of gas (g)	750
CO2 equivalent [T]	0.51
Net weight of the unit (kg)	54
Overall sizes L x W x H (cm)	90 x 31 x 62

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

**\*: A26W26    \*\*: A15W26**

**Outside:**

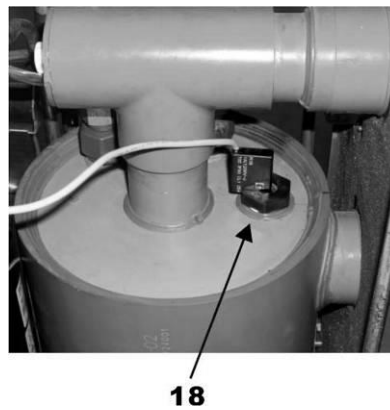
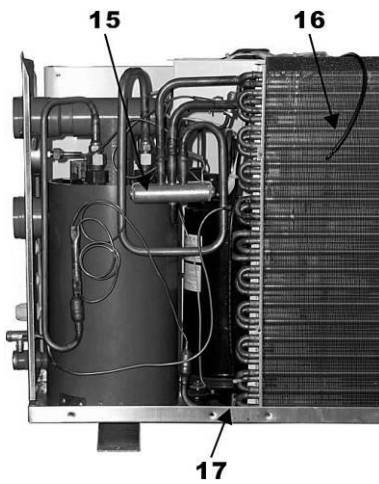
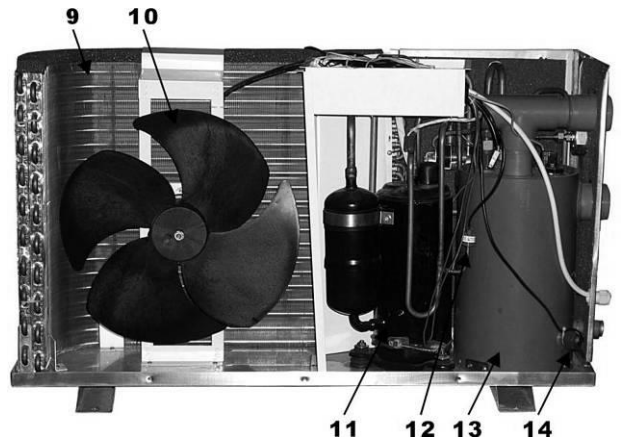


1	Fan protection grid
2	Front panel
3	Top cover
4	Control panel
5	Refrigerant pressure manometer
6	Fast connection for water outlet
7	Fast connection for water inlet
8	Wire connection for power supply

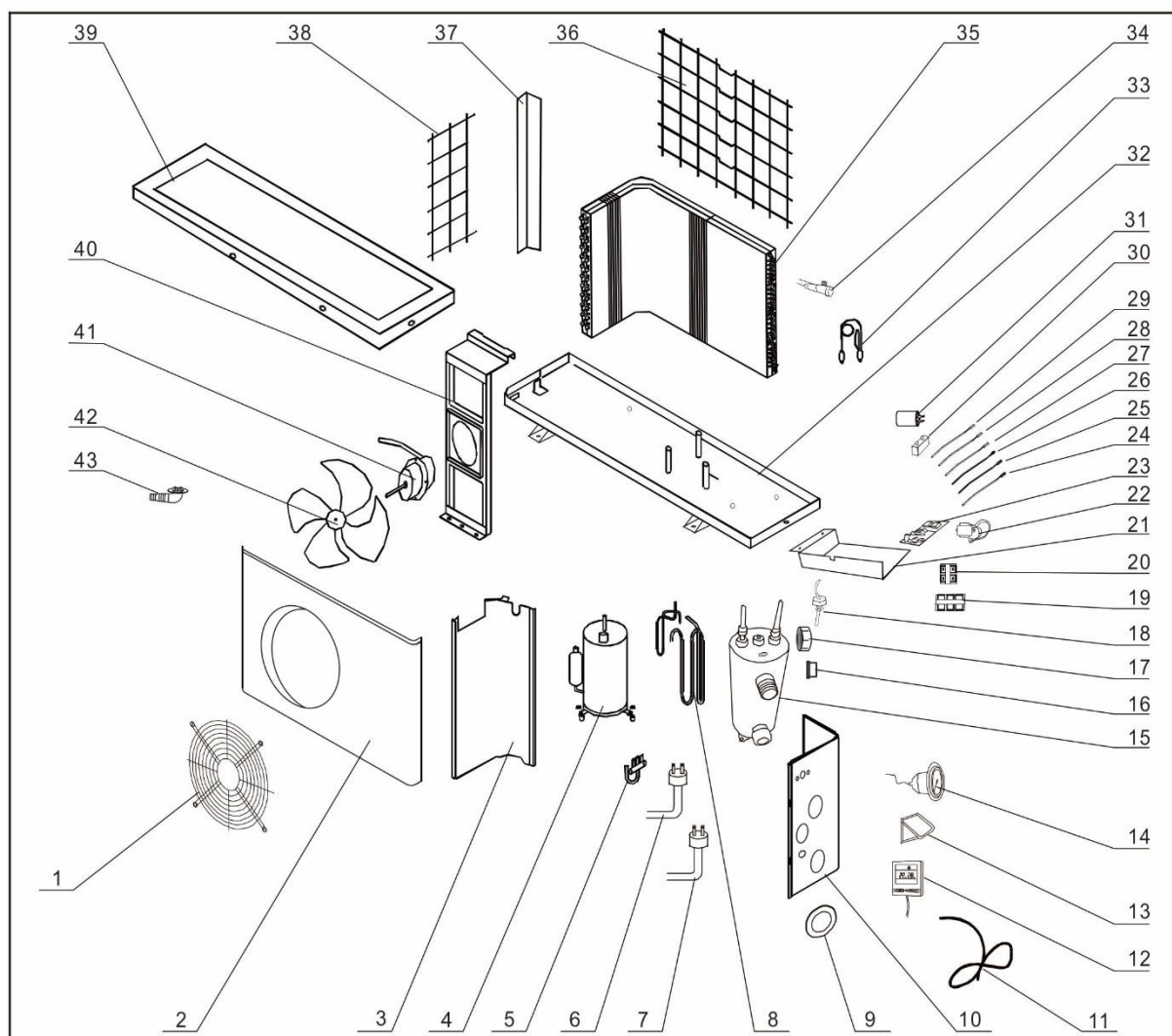
**Inside:**

**(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



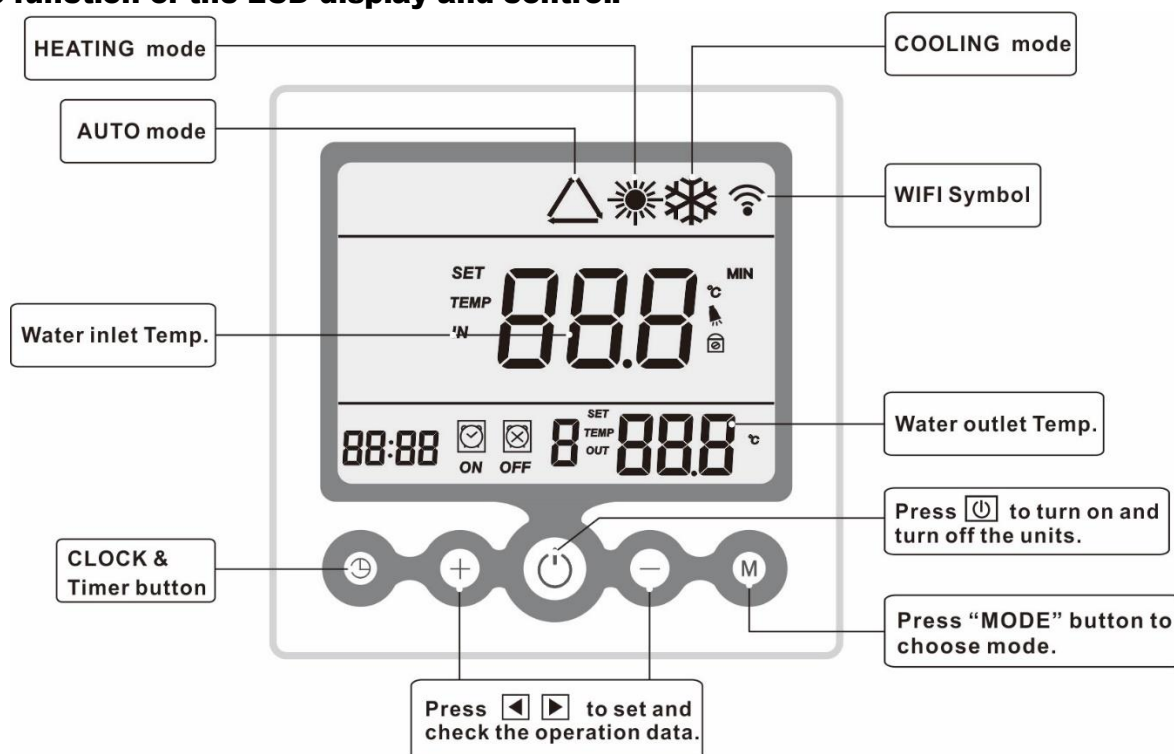
# Explored view



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

# Wire control operation

The function of the LCD display and control:

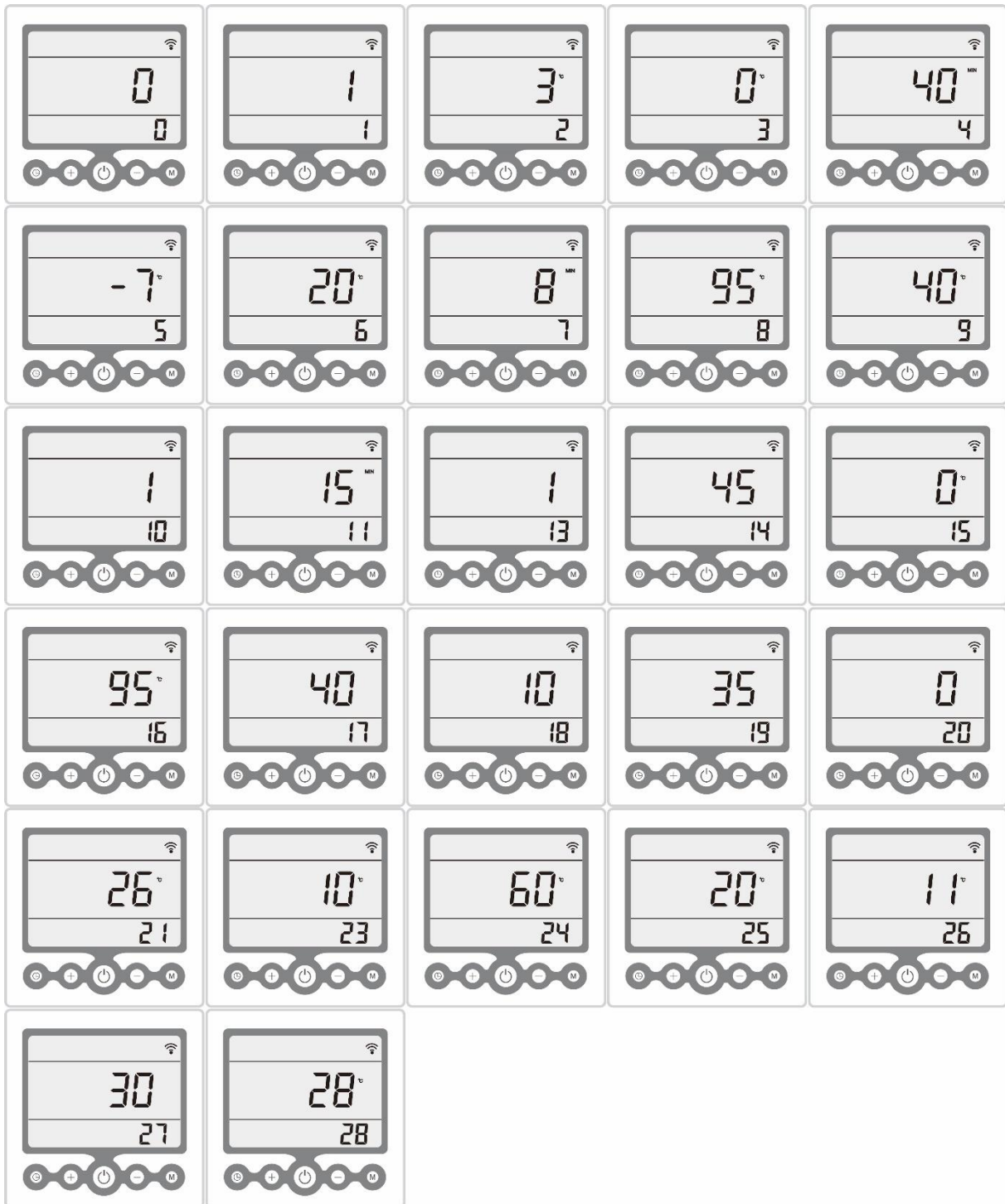


## Set the operation parameter:

- ⊙ Long Press "M" button to enter operation parameter setting interface.
- ⊙ Press "⌚" to check parameter(parameter from 0-28, see Operation Parameter Table).
- ⊙ Under parameter, press "M" to start setting(the parameter displayed blinks), press "+" or "-" to set data for parameter from 0-28, press "M" again to exit the current parameter settings.
- ⊙ In operation parameter setting interface, press "+" or "-" button exit to man interface, No operation is maintained in the parameter interface.



NO	Meaning	Range	Change	Factory setting
0	Automatic restart	0/1	YES	1
1	Daily cycle mark	0/1	YES	1
2	Water temperature difference to restart	2~10°C	YES	2
3	Water temperature difference to restart Y	0~3°C	YES	0
4	Turnround of defrosting Under heat mode	30~90 min	YES	40 min
5	Defrosting start temperature	-30~0°C	YES	-7°C
6	Defrost exit temperature	2~30°C	YES	20°C
7	Time of exit defrost Under heat mode	1~12 min	YES	8 min
8	Compressor protection Exhaust temperature	95~120°C	NO	95°C
9	Max set water temperature	40~65	YES	40°C
10	Water pump mode	0/1	YES	1
11	Constant temperature water pump stop time	3~20 min	YES	15
13	Mode (cool/cool & heat/ heat)	0/1/2	YES	1
14	EEV action cycle	20~90s	NO	40
15	Heating Target Superheat	-5~10°C	NO	0°C
16	Acceptable exhaust temperature when EEV adjustment	80~110°C	NO	95°C
17	Defrosting EEV aperture setting	20~450	NO	400


18	Min. EEV aperture setting	50~200	NO	100
19	EEV manual step number	20~450	NO	350
20	EEV manual/automatic	0/1	NO	1
21	Water inlet temperature	-9~99°C	Measured value	
23	Heating coil temperature	-9 ~ 99°C	Measured value	
24	Compressor Exhaust temperature	-9 ~ 125°C	Measured value	
25	Ambient temperature	-9 ~ 99°C	Measured value	
26	Return gas temperature	-9 ~ 99°C	Measured value	
27	Actual open steps of EE valve	100~500	Measured value	
28	Cooling coil temperature	-9 ~ 99°C	Measured value	







## Real-time clock setting

Press “” button to set clock,  
“” symbol will flash during this setting,  
Press “**M**” button, it will enter hour setting,  
press “**+**” or “**—**” buttons to change the value.

Press “**M**” button once more, it will enter minute setting.  
Also press “**+**” or “**—**” buttons to change the value.  
After setting, press “” button to back to default screen.

## Timer setting

Press “” button to set clock, if the clock without setting,

Press “” button again to first group timer setting,

Press and hold “**M**” to shift the timer On/OFF,

While the timer is ON, “ ” symbol will flash,


Once the timer ON, press “**M**” to set the hour for Timer switch ON,

Press “**+**” or “**—**” buttons to change the value.


Press “**M**” button once more to set the minute for Timer switch ON.

Press “**M**” button again, it will enter Timer switch OFF setting.


Same as the Timer switch ON.


During timer setting, press “” button, it will enter next group timer setting.

There are 3 group of timer Settings.

Long press “**M**” to cancel the group setting when the group “ ” symbol flashes.

## Key lock:

Long press “” button 5 seconds, To set keylock.

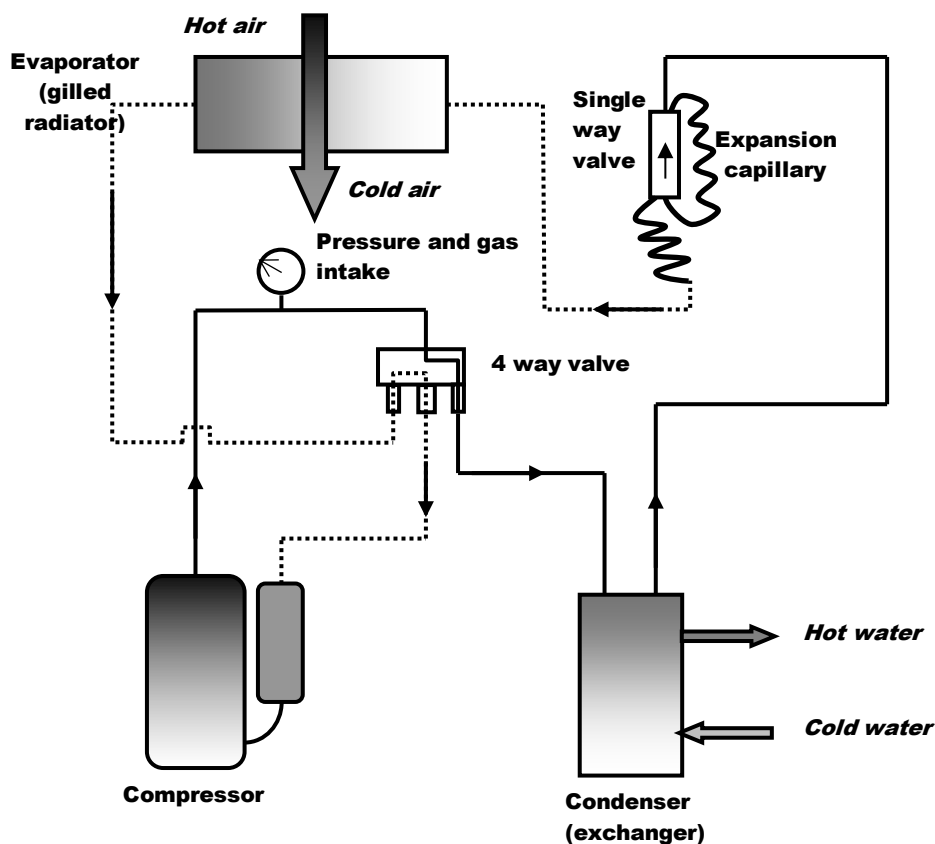
Long press “” button 5 seconds again to release keylock.

# General diagram of the refrigerating circuit

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

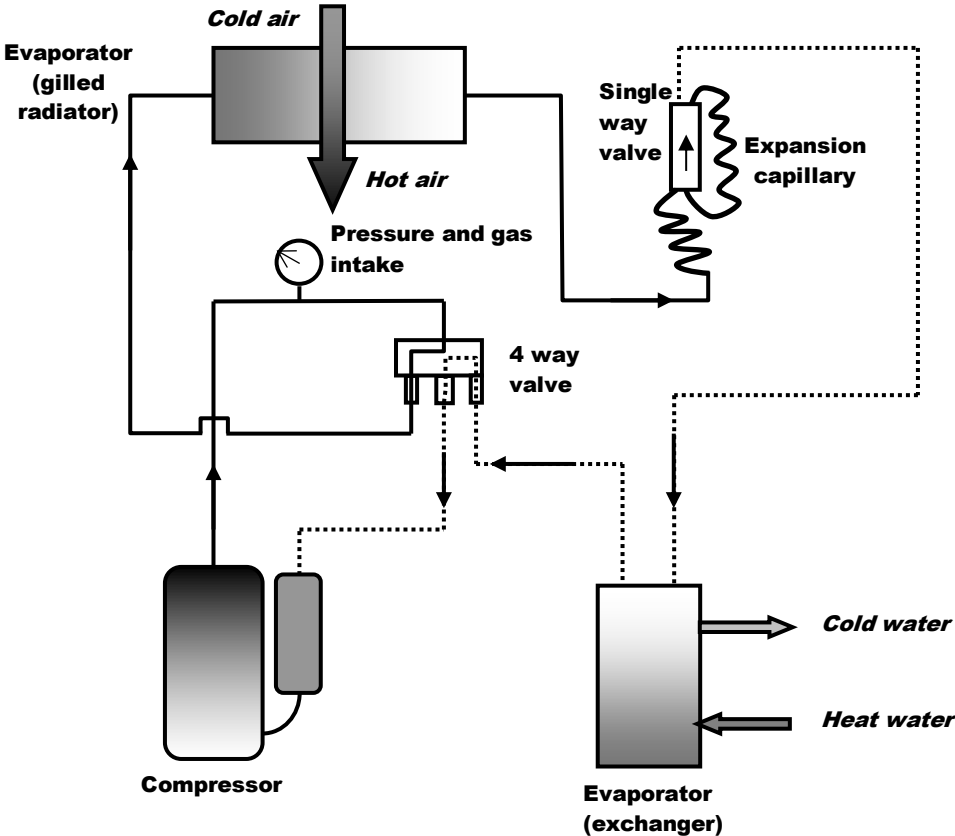
## Swimming-pool water's heating mode:

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**

**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 over pressurisation 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 5 °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 mis-wiring, this protection will interrupt the power supply to prevent mechanical deformation. There will be an EE 4 error code on the display.**

## 5- Installation

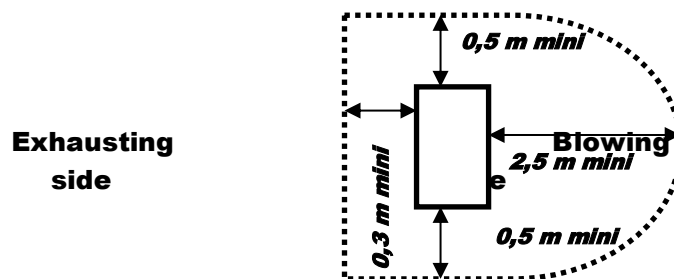
### Rules of installation:

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 anti-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:

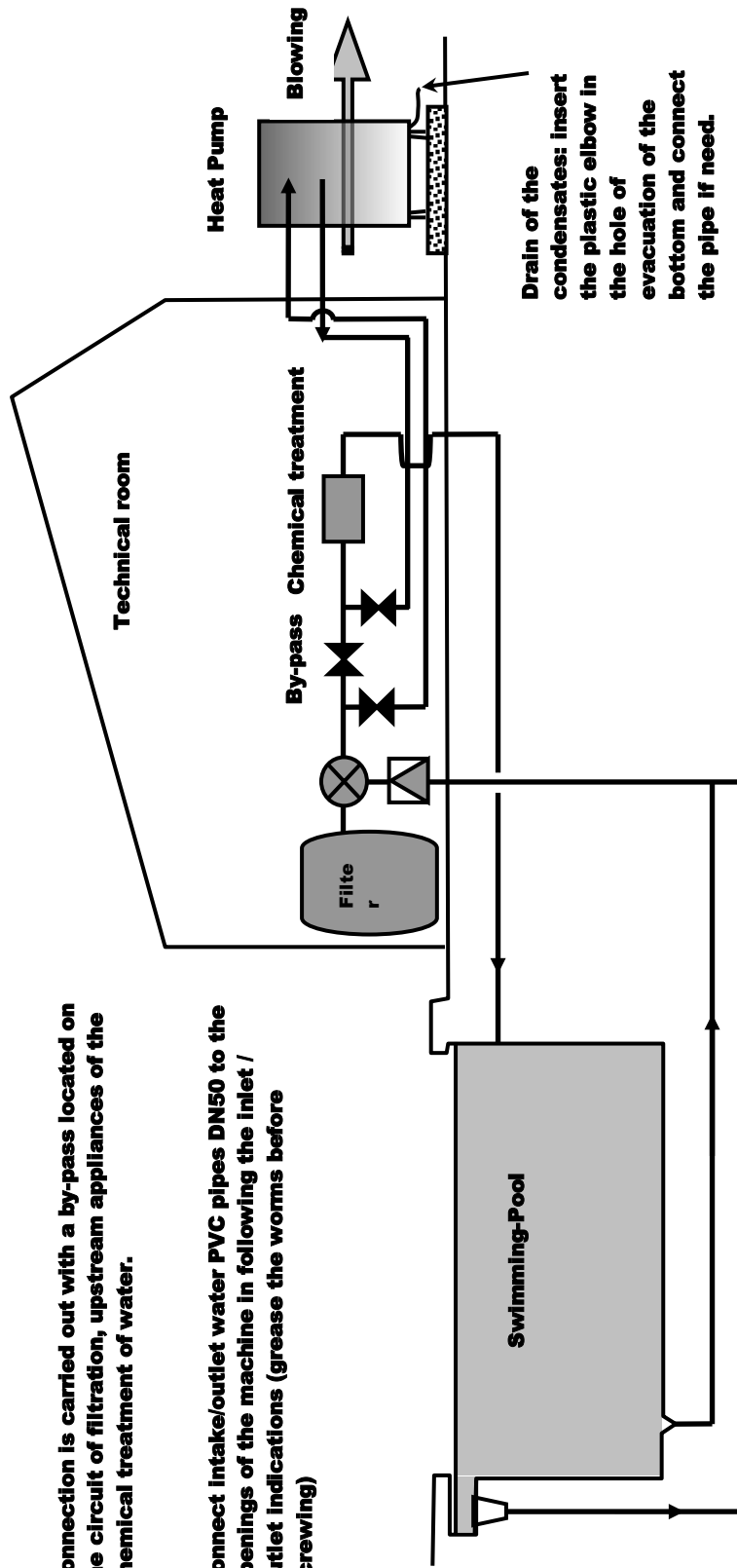
- Do not to install the machine near a way with circulation of car in order to avoid mud projections.
- Avoid directing blowing against dominant winds.
- If the machine is intended to be used in winter, put it in a place protected from the falls of snow.
- The machine must be able to be supervised in 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, 60 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 8m<sup>3</sup>/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 left 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, as following:**

### **Stage 1:**

**Before starting the Heat Pump, ambient temperature around 20°C, refrigerant meter shows pressure from 14 to 16kg/cm<sup>2</sup>.**



### **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/cm<sup>2</sup>;**

**In most of cases (pump of filtration given a flow until 9m<sup>3</sup>/h) you do not have to open the by-pass valve.**

**If the stabilized pressure is under 21kg/cm<sup>2</sup>, 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 *E 3* 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 heavy 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.**

**Note:** Switch off the power prior to maintenance or repairs.

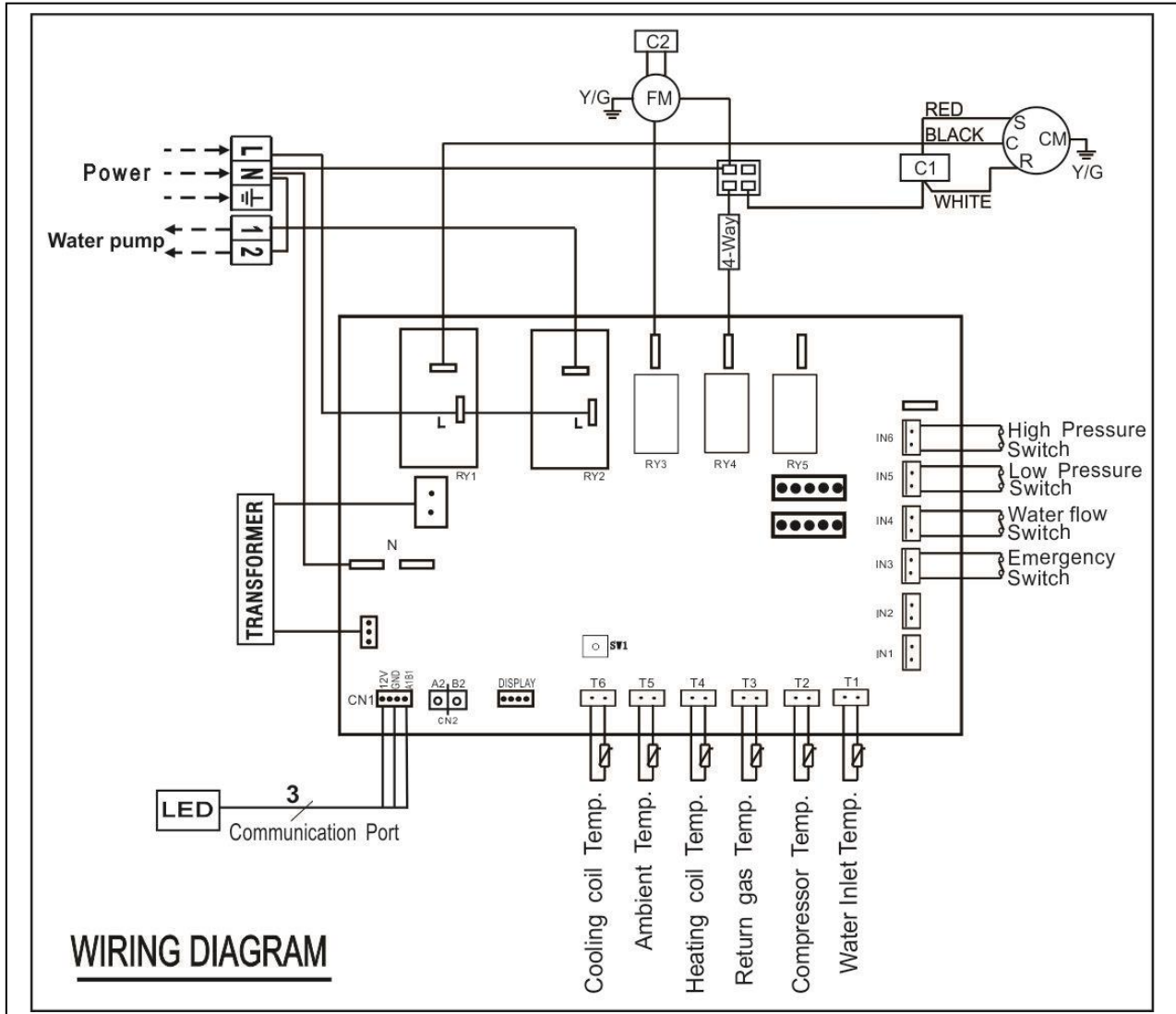
### 8.3 Overview of possible error codes displayed on the screen

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
P1	“HEATING COIL PIPE” sensor out of order	Sensor open or short-circuited	Check or replace the sensor
P2	“Compressor exhaust” sensor out of order	Sensor open or short-circuited	Check or replace the sensor
P3	“WATER IN” sensor out of order	Sensor open or short-circuited	Check or replace the sensor
P5	“Return Gas” sensor out of order	Sensor open or short-circuited	Check or replace the sensor
P7	“AIR” sensor out of order	Sensor open or short-circuited	Check or replace the sensor
P9	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
Pb	“COOLING COIL PIPE” sensor out of order	Sensor open or short-circuited	Check or replace the sensor
PC	First anti-frost protection active	Low temperatures for water and air	No action required
PC	Second anti-frost protection active	Low temperatures for water and air	No action required
PL	Insufficient water flow	Insufficient water flow	Check the water flow
		Water flow switch out of order	Replace the Water flow switch
E3	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
E4	High pressure protection	Insufficient water flow	Check the water flow
		Pressure switch out of order	Replace the pressure switch Have
E8		Too much refrigerant gas present	the heat pump checked by a refrigeration technician

## 9. Electrical diagrams



## Correct disposal of this product

This heat pump should not be put into the domestic waste at the end of its useful life, but must be disposed at a central point for recycling of electrical and electronic domestic applications. By doing this you will help to preserve the environment.

