AIR SOURCE HEAT PUMPS

Service Manual

Installation, commissioning & service guide

Siting, plumbing, electrical work, controller parameters, protection functions and the full fault tree.

FOR INSTALLERS AND THE SERVICE DEPARTMENT

Read this manual before installing or operating the unit. It applies to every machine in the Sunniva range — swimming pool, commercial and high-temperature series. Where a limit differs by series the text says so. Keep this manual with the unit for future reference.



Need service?
Scan to chat with the Sunniva service department on WhatsApp

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This manual carries no model number. It is common to the whole Sunniva range, so the same document serves every machine. For the ratings, dimensions, electrical data and performance of a particular unit, see that model's technical data sheet at **www.sunnivaencon.com**.

01 Important safety precautions

Notices, consumer safety and energy-saving guidance

Important notice

This guide provides installation and operation instructions for the heat pump. Consult the seller with any questions regarding this equipment.

ATTENTION INSTALLER

This guide contains important information about the installation, operation and safe use of this product. This information should be given to the owner and/or operator of this equipment after installation or left on or near the heat pump.

ATTENTION USER

This manual contains important information that will help you in operating and maintaining this heat pump. Please retain it for future reference.

WARNING

Before installing this product, read and follow all warning notices and instructions which are included. Failure to follow safety warnings and instructions can result in severe injury, death, or property damage.

Codes and standards

Heat pump must be installed in accordance with the local building and installation codes as per the utility or authority having jurisdiction. All local codes take precedence over national codes. In the absence of local codes, refer to the latest edition of the National Electric Code (NEC) in the local government Electric Code (CEC) for installation.

DANGER — RISK OF ELECTRICAL SHOCK OR ELECTROCUTION

The electrical supply to this product must be installed by a licensed or certified electrician in accordance with the National Electrical Code and all applicable local codes and ordinances. Improper installation will create an electrical hazard which could result in death or serious injury to pool or spa users, installers, or others due to electrical shock, and may also cause damage to property. Read and follow the specific instructions inside this guide.

WARNING

To reduce the risk of injury, do not permit children to use this product unless they are closely supervised at all times.

Consumer information and safety

The heat pumps are designed and manufactured to provide years of safe and reliable service when installed, operated and maintained according to the information in this manual and the installation codes referred to in later sections. Throughout the manual, safety warnings and cautions are identified by a warning symbol. Be sure to read and comply with all of the warnings and cautions.

QUALIFIED PERSONNEL ONLY

Installation and service must be performed by a qualified installer or service agent, and must conform to all national, state, and local codes and/or safety regulations.

Energy saving tips

It is important to note that a heat pump will not heat water as fast as a large gas or electric water heater. If the pool water is allowed to cool significantly, it may take several days to return to the desired swimming temperature. For weekend use, it is more economical to maintain the pool water temperature at or near your desired swimming temperature. If you do not plan to use your pool for a prolonged period, then you might choose to turn the heat pump off or decrease the temperature setting of the control several degrees to minimize energy consumption.

These are the recommendations to help conserve energy and minimize the cost of operating your heat pump without sacrificing comfort.

1. A maximum water temperature of **30 °C** is recommended for swimming pool (SE-SP-XX), **55 °C** for commercial and mono block series (SE-AH-XX), and **80 °C** for the high-temperature series (SE-HT-XX).
2. It is recommended to turn off the heat pump when ambient air temperature is less than 0 °C or if on vacation for longer than a week.
3. To save energy, it is recommended that the heat pump is operated during daytime when the ambient temperature is higher.

02 Pre-installation recommendations

Power supply, space, water quality and siting

1. Power supply

- Single-phase, 220–240 V (AC supply 50 Hz) / three-phase, 380–440 V.
- Separate body grounding, protection against leakage current is a must.
- Installation of MCB or ELCB is a must for the electric safety of components.

2. Space requirement

- Weather shed overheats pump.
- At least 500 mm (1.65 ft) space should be left on each side for fresh air circulation.
- Protection from direct sunlight, dust and water particles.
- Keep a clean & dust-free atmosphere around the heat pump.
- Proper drainage of sweating water must require.

3. Precautions

- Do not use it in a polluted atmosphere.
- Do not use near explosive gases.
- Proper connection of power supply, live, neutral and earth wires must be connected at right place.
- Place main switch location as easy to operate.

4. Piping

Please refer to the tank drawings and installation guidelines.

5. Water quality

PROJECT	UNIT	REFERENCE VALUE	CORROSION	SCALING
Basic items				
PH value (25 °C)	—	7–8	•	•
Electrical conductivity	s/cm	<800	•	•
Chloridion Cl^-	mg(Cl^-)/L	<200	•	
Sulphate ion SO^{42-}	mg(SO^{42-})/L	<200	•	
Acid consumption (pH = 4.8)	mg($CaCO_3$)/L	<100		•
Full hardness	mg($CaCO_3$)/L	<50		•
Ferrum Fe	mg(Fe)/L	<1	•	•
Sulphur ions S^{2-}	mg(S^{2-})/L	Not allowed	•	
Ammonium ion NH_4^+	mg(NH_4^+)/L	<1	•	
Silicon chloride SiO_2	mg(SiO_2)/L	<50		•
TDS	ppm	<250		•

Water specification. A bullet marks the corrosion or scaling tendency of the relevant factor.

03 How a heat pump works

Product overview

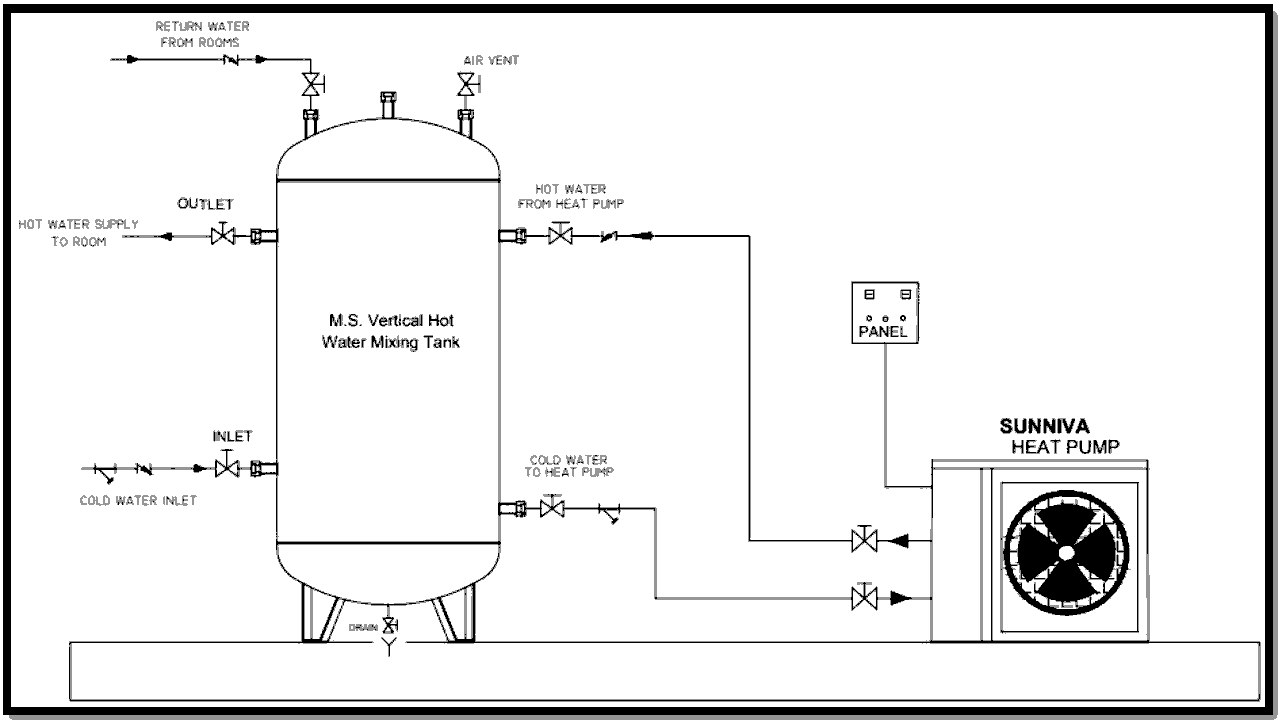
Heat pumps transfer heat from the ambient air to your water, providing the most energy efficient swimming pool and sanitary heating available. Compared to gas, oil, or electric heaters, operation cost of heat pumps is up to 60–80% less, saving your expenses in energy costs each year. Our heat pumps are not only highly efficient, but also easy and safe to operate. Our heat pumps are EN14511, AHRI and CE approved, using R410A / R407C / R134a refrigerant which is environmental-friendly and energy efficient.

General features

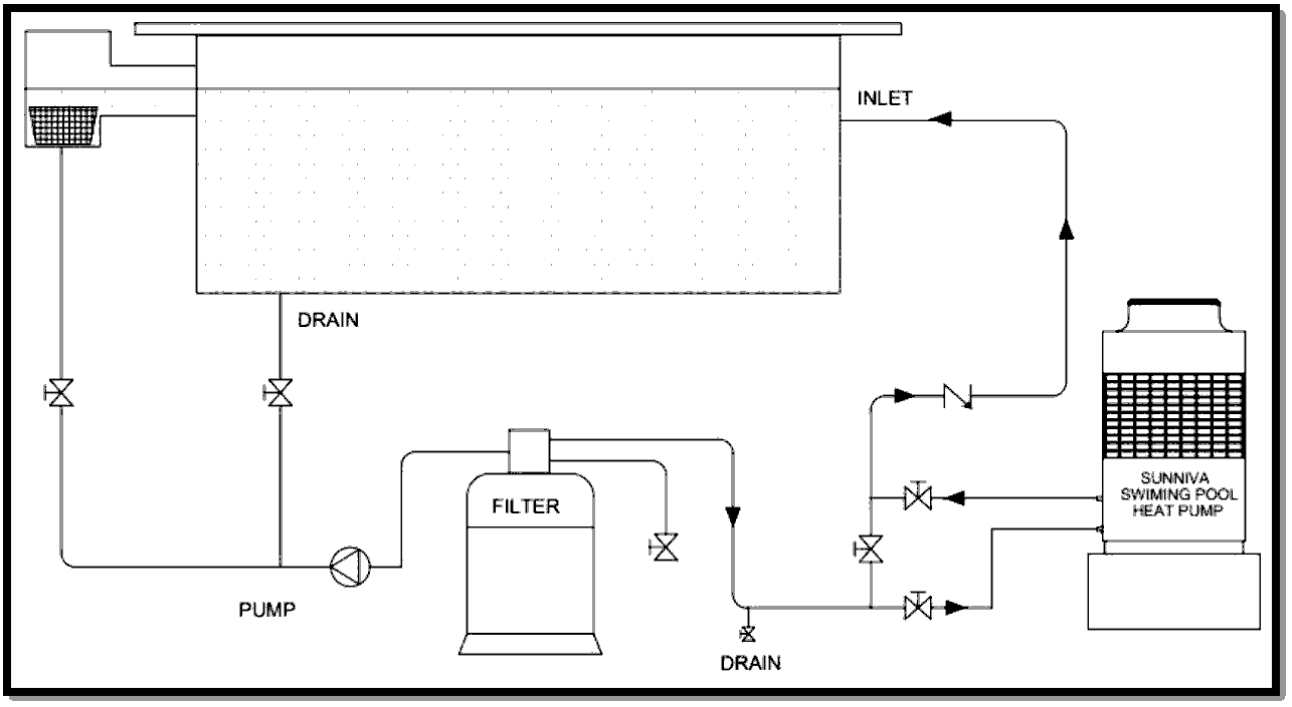
1. Using heat energy from ambient air and reproduces more heat energy, saving 60–80% energy compared to traditional heaters.
2. Providing heating in winter in domestic and commercial applications.
3. No potential danger of any inflammable, gas poisoning, explosion, fire, electrical shock which are associated with other heating systems.
4. A digital controller is incorporated to maintain the desired water temperature.
5. Long-life and corrosion resistant composite cabinet stands up to severe climates and pool chemicals.
6. American Copeland or Japanese Panasonic scroll compressor ensures outstanding performance, ultra energy efficiency, durability and quiet operation.
7. Self-diagnostic control panel monitors and troubleshoots heat pump operations to ensure safe and reliable operation.
8. Intelligent digital controller with friendly user interface and blue LED back light.
9. Separate isolated electrical compartment prevents internal corrosion and extends heat pump life.

04 P&ID diagram

Refrigeration circuit and water connections



Hot-water installation — vertical mixing tank, heat pump and control panel.



Swimming-pool installation — skimmer, pump, filter and heat pump.

05 Water connection precautions

Inlet, outlet, drain and tank connection rules

1. Cold water inlet connection

- At the lower level on the tank
- With NRV
- With water strainer / filter
- Supply of water from a pressure booster pump

2. Hot water inlet connection

- At the upper level on the tank
- Stop valve / ball valve is recommended

3. Drain connection

- At the bottom level on the tank
- Stop valve / ball valve is recommended

4. Supply to heat pump

- At the lower level on the tank
- Near to water inlet or return water connection
- Stop valve / ball valve is recommended

5. Return to tank from heat pump

- At the upper level on the tank
- Near to water outlet water connection
- Stop valve / ball valve is recommended

6. Return water connection from building

- At the lower level on the tank
- Near to water inlet or return water connection
- Stop valve / ball valve / gate valve is recommended

06 Installation

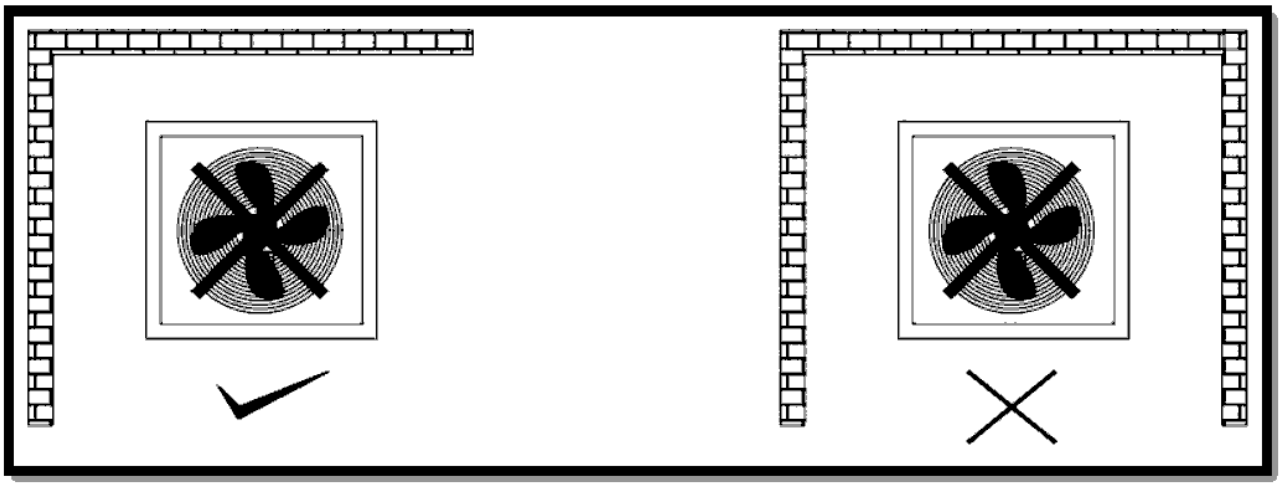
Location, transport, clearances, plumbing and electrical

6.1 Location

CAUTION

Do not install the heat pump near hazardous materials and places. Do not install the heat pump under deep sloping roofs without gutters which will allow rainwater, mixed with debris, to be forced through the unit.

- The heat pump module must be level (horizontal).
- The main wind direction must not be towards the fan.
- When selecting the installation site, remember that the appliance generates noise during operation.
- Keep at least two sides open to the heat pump as shown in the figures below.
- Maintain as small a clearance as possible between the heat pump module and the hydraulic module to keep line losses to a minimum.
- The appliance must be firmly attached to the mounting rail, which in turn must be secured to the foundation.
- When placing the heat pump, observe the air intake and discharge direction and place the unit accordingly.

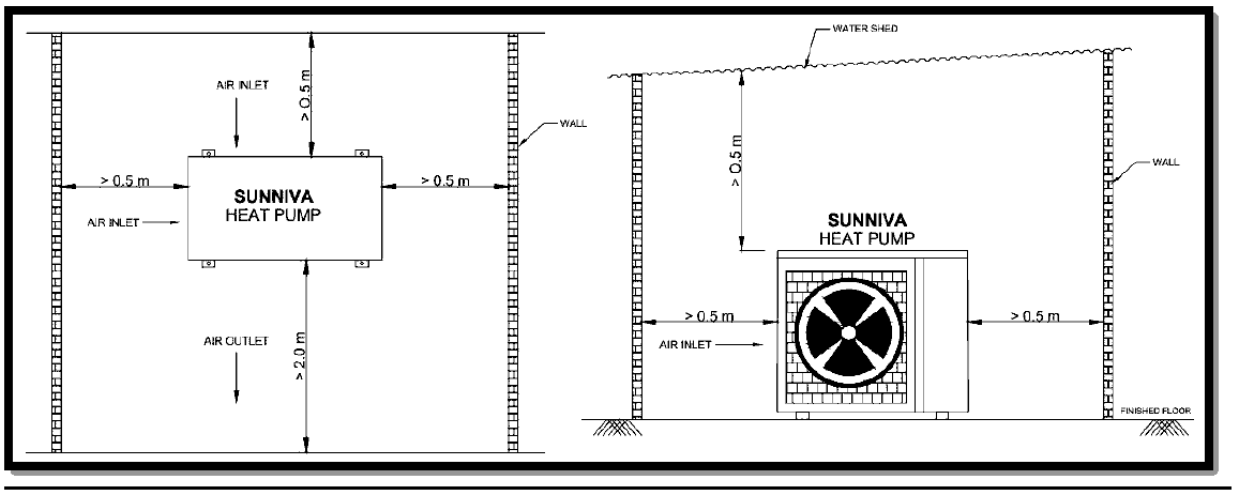


Acceptable and unacceptable siting.

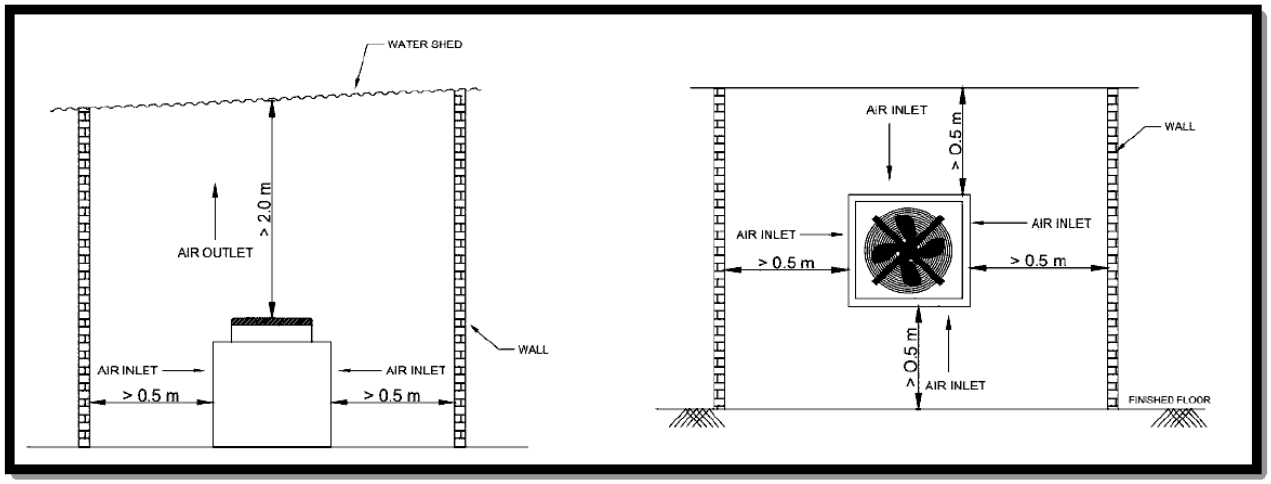
6.2 Transport

- When carrying, hold on to the narrow sides (transverse sides) under the base plate.
- If the appliance needs to be tilted during transport only do so for a short time on one of its longitudinal sides. The longer the appliance is tilted, the greater the distribution of refrigerant oil in the system.
- Wait approximately 30 minutes before starting the appliance after it has been tilted.

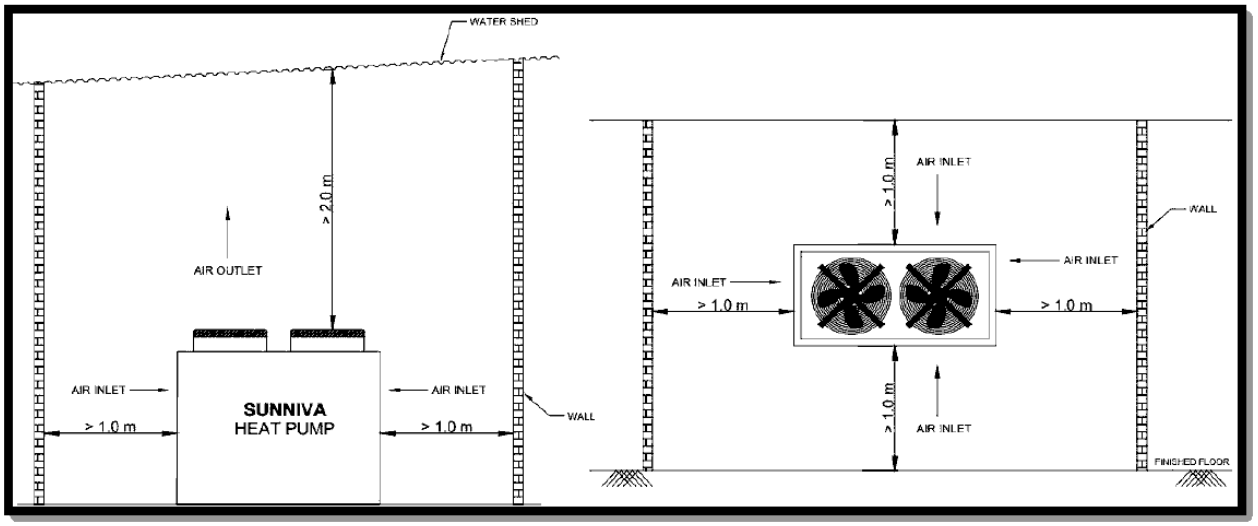
6.3 Minimum space requirement layout



For Monoblock series (SE-AH-M).



For Commercial, Swimming Pool & High-Temperature series, single fan (SE-AH-XX, SE-SP-XX & SE-HT-XX).



For Commercial, Swimming Pool & High-Temperature series, double fan (SE-AH-XX, SE-SP-XX & SE-HT-XX).

6.4 Installation instructions

All criteria given in the following sections reflect minimum clearances. However, each installation must also be evaluated, taking into account the prevailing local conditions such as proximity and height of walls, and proximity to public access areas. The heat pump must be placed to provide clearances on all sides for maintenance and inspection.

1. The installation area must have good ventilation and the air inlet/outlet must not be hindered.
2. The installation area must have good drainage and be built on a solid foundation.
3. Do not install the unit in areas accumulated with pollutions like aggressive gas (chlorine or acidic), dust, sand and leaves, etc.
4. For easier and better maintenance and troubleshooting, no obstacles around the unit should be closer than 500 mm. And no obstructions within 2 m, vertically, from the unit for air ventilation.
5. The heat pump must be installed with shockproof bushes to prevent vibration and/or imbalance.
6. Even though the controller is not waterproof, care should be taken to avoid direct sunlight and high temperature. In addition, the heat pump should be placed to ensure quality viewing of the controller.
7. The plumbing pipes must be installed with proper support to prevent possible damage due to vibration.
8. The acceptable operating voltage range should be within ±10% of the rated voltage. When heat pump units are installed in parallel, ensure that the voltage differences, between these units, are within ±2%.
9. The heat pump unit must be grounded / earthed for safety purposes.

Drainage and condensation

Condensation will occur from the evaporator when the unit is running and drain at a steady rate, depending upon ambient air temperature and humidity. The more humid the ambient conditions, the more condensation will occur. The bottom of the unit acts as a tray to catch rainwater and condensation. Keep the drain holes, located on the bottom pan of the unit base, clear from debris at all times.

6.5 Plumbing requirements

1. The max pressure of inlet water for the heat pumps should be no more than 0.6 MPa.

2. Each part connected to the unit needs to be connected with the method of loose joint and installed with an intermediate valve.
3. Ensure that all plumbing has been properly completed and then proceed to do a water leakage and pressure test.
4. All the pipelines and pipe fittings must be insulated to prevent heat loss.
5. Install a drain valve at the lowest point of the system to enable the system to be drained during freezing conditions (winterizing).
6. Install a check valve on the water outlet connection to prevent back siphoning when water pump stops.
7. To reduce the backpressure, the pipes should be installed horizontally.
8. And minimize the elbows (90 degrees connections).

Electrical connections

WARNING — RISK OF ELECTRICAL SHOCK OR ELECTROCUTION

Ensure that all high voltage circuits are disconnected before commencing heat pump installation. Contact with these circuits could result in death or serious injury to users, installers or others, due to electrical shock and may also cause property damage.

CAUTION

Label all wires before disconnection when servicing the heat pump. Wiring errors can cause improper and dangerous operations. Check and ensure proper operation after servicing.

Power supply

1. If the supply voltage is too low or too high, it can cause damage and/or result in unstable operation of the heat pump unit, due to high inrush currents on startup.
2. The minimum starting voltage should be above 90% of the rated voltage. The acceptable operating voltage range should be within ±10% of the rated voltage. The voltage difference between phases of a three-phase power supply should be within ±2%.
3. Ensure the cable specifications meet the correct requirements for the specific installation. The distance between the installation site and mains power supply will affect the cable thickness. Follow the local electrical standards to select the cables, circuit breakers and isolator breakers.
4. Do not interrupt the voltage supply to the heat pump frequently as this may result in a shorter life expectance of the heat pump.
5. When installing over current protection, ensure that the correct current rating is met for this specific installation.

07 Operating the heat pump

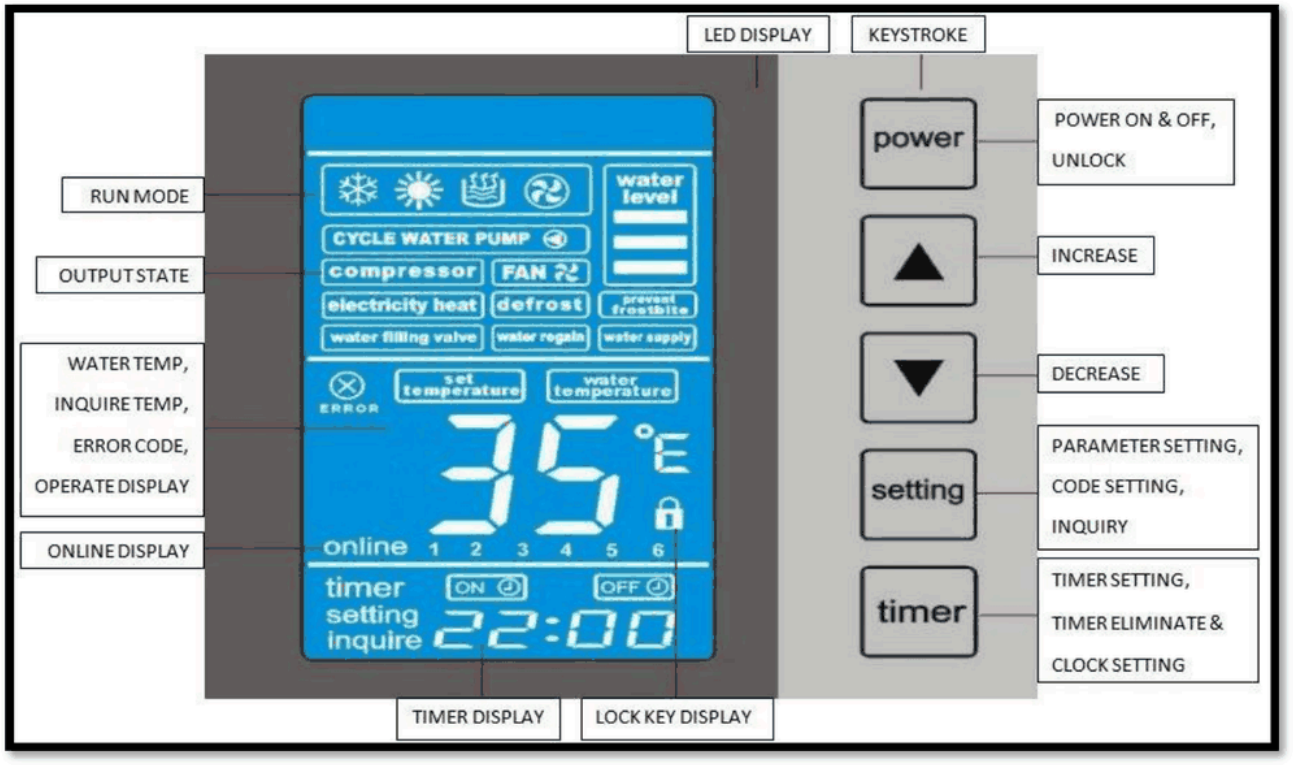
General instructions, controller panel, set-up and timers

7.1 General instructions

The control panel applies to a single system or dual systems heat pump. The operation panel features:

1. Capacitive touching keys for higher operating sensitivity and unlimited key operations.
2. Minimal electromagnetic susceptibility and interference.
3. Stylish appearance for easy viewing purposes.
4. Dust and water proof.
5. Installed on the unit for easy operation.
6. Automatic Key Lock function (AKL).

7.2 Controller panel



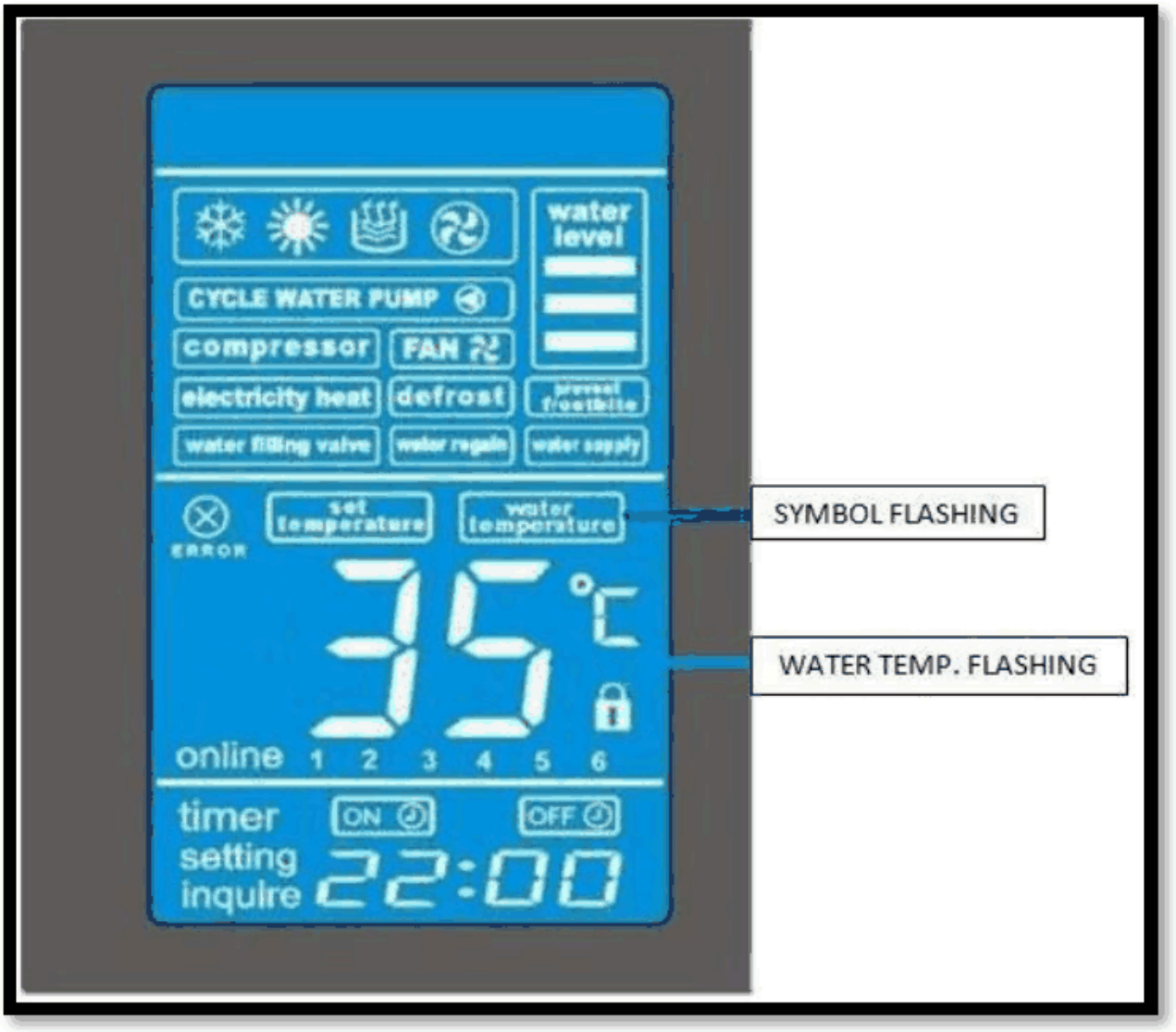
Operating controller — display areas and keystrokes.

Operation guide

When the power supply to the heat pump is switched on for the first time, an audible tone is heard from the controller. The LCD will be displayed in a dimming mode (no backlight). At this time the touch keys are locked (see “lock key display” symbol).

Keys explanation

Unlocking keys	Press the “power” key for 3 seconds until you hear an audible tone, then release the key. The backlight of the LCD will turn on and the keypad is unlocked with no “lock key display” symbol. The keypad will automatically lock after 60 seconds, displaying the “lock key display” symbol.
“power” key	By pressing the “power” key, the unit can be switched ON or OFF.
“▲” and “▼” keys	Press to increase and decrease values.
“setting” key	Press for inquiry, parameter and password setting.
“timer” key	Press for timer setting, timer eliminate and clock setting.



ON/OFF flashing and water-temperature flashing.

7.3 Controller setup

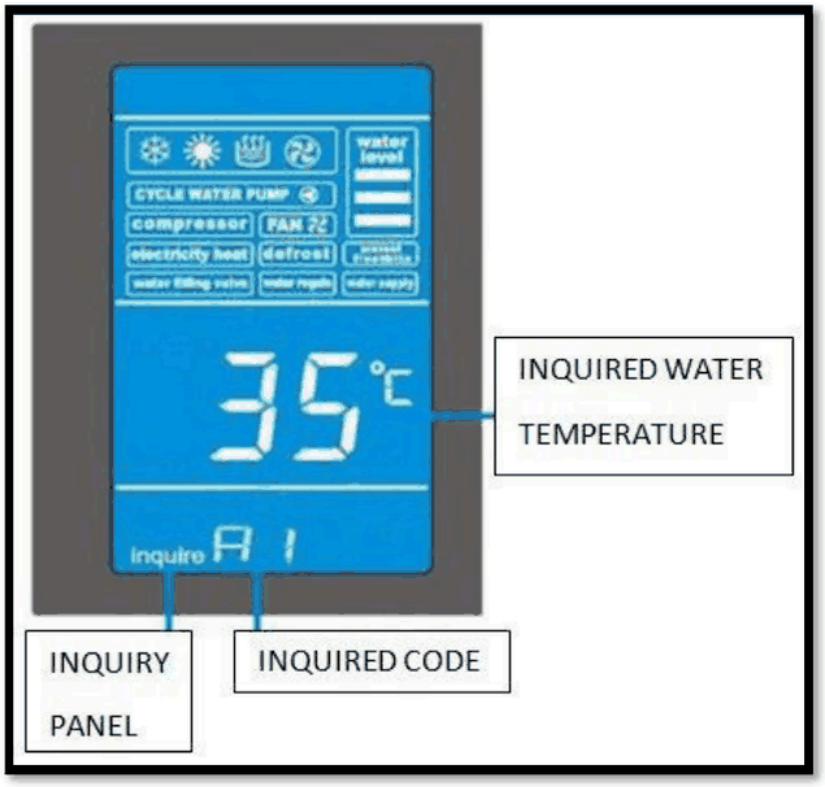
1. Temperature setting

Make sure the keypad is unlocked. Press the “▲” key, “temperature setting” symbol is flashing and the set temperature is displayed. Press the “▲” key again, the displayed temperature will increase. Press the “▼” key, “temperature setting” symbol is flashing and the set temperature is displayed. Press the “▼” key again, the displayed temperature will decrease. The range of water temperature can be set from 20 °C to 45 °C (default = 27 °C).

> **NOTE — RECOMMENDED MAXIMUM SETTING BY SERIES**
>
> For Commercial (SE-AH-XX) use, it is recommended that the maximum setting temperature be 60 °C. For a Swimming pool (SE-SP-XX) use, it is recommended that the maximum setting temperature be 45 °C. For a High Temperature (SE-HT-XX) use, it is recommended that the maximum setting temperature be 80 °C.

2. System status display values

Make sure keypad is unlocked. Press the “setting” key and enter into inquiry panel with the “inquire” symbol on display.



Inquiry panel, inquired code and inquired water temperature.

For a single heat pump system, the inquiry codes are from A1 to A9 and for a dual heat pump system, the inquiry codes are from A1 to A9 for System A and b1 to b9 for System B. By pressing the “setting” key sequentially, the desired inquiry code will be selected and the value displayed. To exit the inquiry panel, press the “setting” key once after the last inquiry code (Er) is reached. Details are shown as follows:

SYSTEM A	READING	SYSTEM B	READING
A1	Coil pipe temp. (1)	B1	Coil pipe temp. (2)
A2	Compressor suction temp. (1)	B2	Compressor suction temp. (2)
A3	Compressor discharging temp. (1)	B3	Compressor discharging temp. (2)
A4	Ambient temp.	B4	Ambient temp.
A5	Water outlet temp.	B5	Water outlet temp.
A6	Spare	B6	Spare
A7	00	B7	00
A8	Compressor current (1)	B8	Compressor current (2)
A9	Electrical expansion valve opening degree (1)	B9	Electrical expansion valve opening degree (2)
Er	Error code		

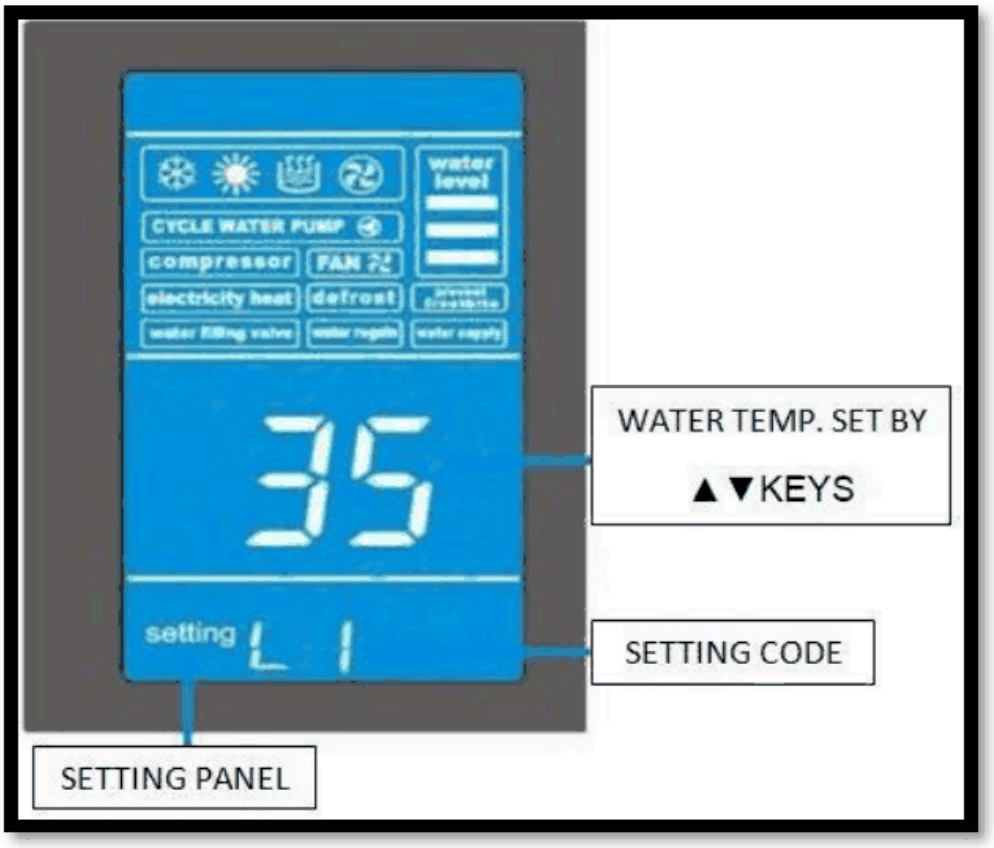
Inquiry codes.

3. Parameter setting

DO NOT CHANGE THESE SETTINGS

These settings are pre-set according to the manufacturer’s specification for safe heat pump operations. Do not change these settings as it will influence the safe operation of the heat pump.

Press the “setting” key for more than 3 seconds, until an audible tone is heard and enter into the setting panel with the “setting” symbol on display.



Setting panel, setting code and water temperature set by keys.

By pressing the “setting” key sequentially, the desired setting code will be selected. The value of each setting can be adjusted by pressing the “▲” and “▼” keys. To exit the setting panel, press the “setting” key once after the last setting code (P6) is reached. Details are shown as follows:

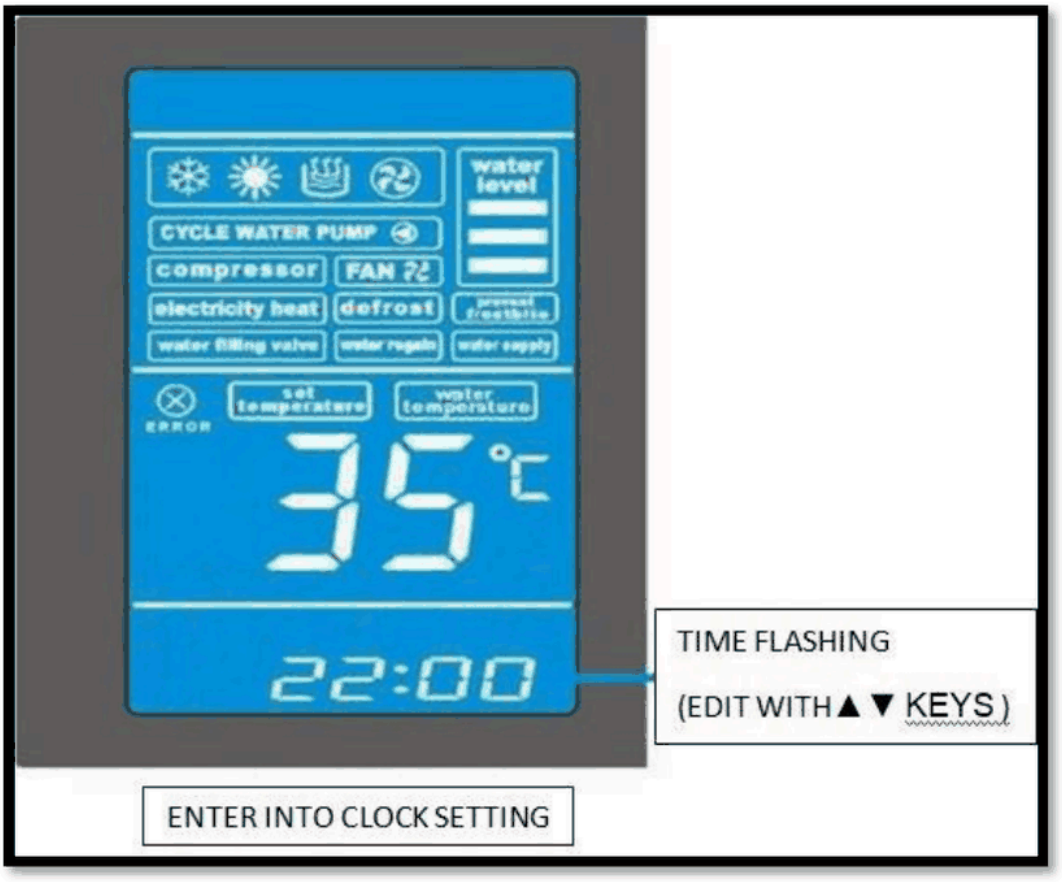
CODE	PARAMETER	RANGE AND DEFAULT
L1	Setting is used to compensate/calibrate for the difference between displayed water temperature and the actual measured swimming pool/spa water temperature (use a good quality thermometer).	0–15 °C, default 0 °C
L2	Minimum outlet water temperature deviation. This value setting is set to indicate to the compressor when to re-start until the desired temperature is reached. For example, set pool/spa temp. = 27 °C, L2 = 3 °C, the compressor will stop at 27 °C and re-start at 24 °C.	3–18 °C, default 3 °C
L3	Outlet water temperature setting — *not applicable*.	35–99 °C, default 45 °C
L4	Desired swimming pool/spa water temperature limit.	30–60 °C, default 45 °C
L5	Allowed electric heating ambient temperature, where 0 °C means no electric heating.	0–35 °C, default 0 °C
L6	Return water temperature — *not applicable*.	30–65 °C, default 45 °C
L7	Allowed water supplement temperature — *not applicable*.	20–60 °C

CODE	PARAMETER	RANGE AND DEFAULT
L8	Compressor current, where 0 means no current inspection.	0–33 A, default 0
L9	Evaporator coil temp. for fan motor stops — *not applicable*.	10–45 °C, default 45 °C
H1	Defrosting period.	20–99 minutes, default 35 minutes
H2	Defrosting start temperature.	0 to −15 °C, default −1 °C
H3	Defrosting time.	5–20 minutes, default 10 minutes
H4	Defrosting exiting temperature.	1–40 °C, default 15 °C
P1	Electronic expansion valve regulation cycle.	20–180 seconds, default 60 seconds
P2	Degree of superheat.	−8 to 15 °C, default 0 °C
P3	Allowed discharge temperature.	70–135 °C, default 92 °C
P4	Expansion valve opening as the four-way valve is defrosting.	6–55°, default 32°
P5	Expansion valve minimum opening.	6–30°, default 15°
P6	Superheat compensation.	0–12, default 4

Parameter settings. Factory-set — do not alter.

4. Clock setting

Press the “timer” key for more than 8 seconds until an audible tone is heard and the “timer” symbol disappears. The hour value is flashing and can be adjusted by pressing the “▲” and “▼” keys. Press the “timer” key for minute adjustment and repeat as previous. Press the “timer” key to exit.



Entering clock setting; the time flashes while editable.

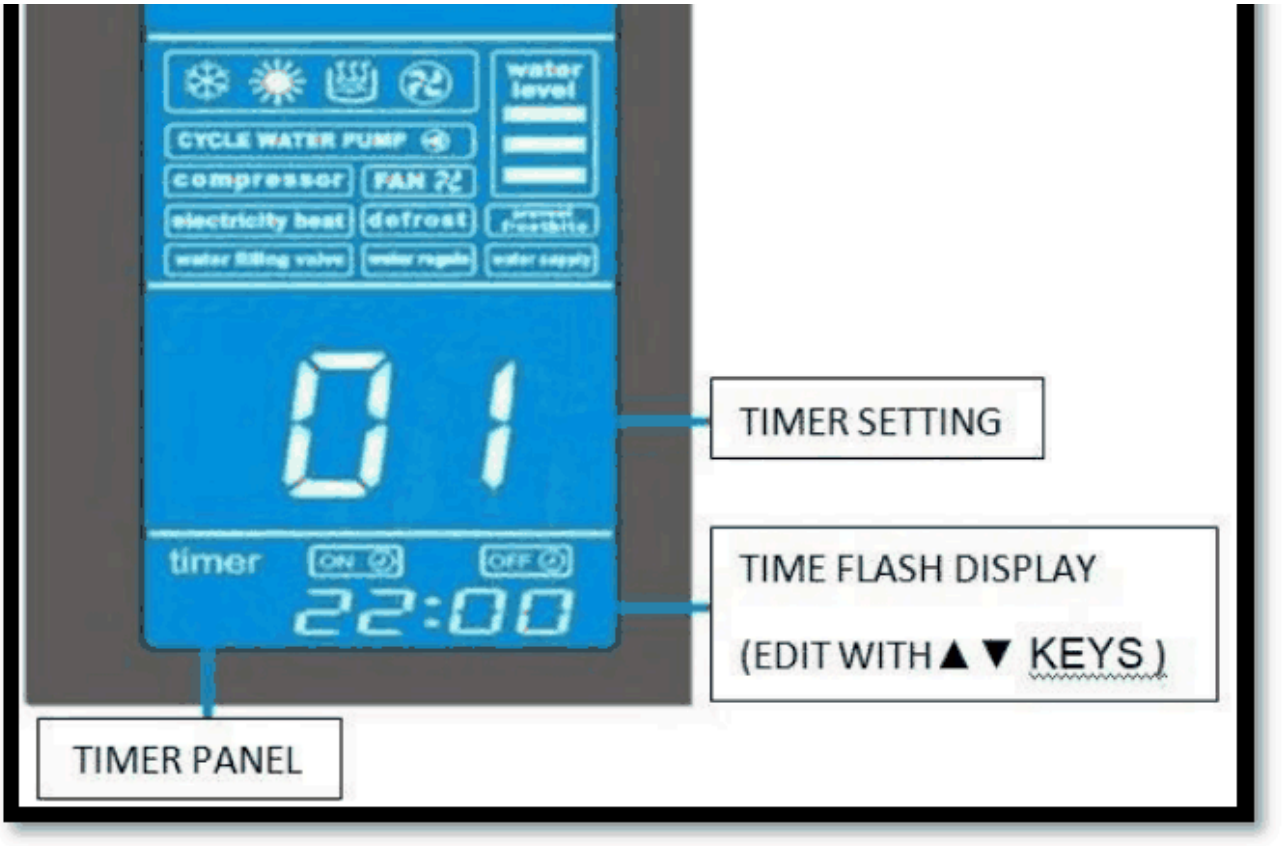
5. Timer setting

The heat pump consists of two separate timing functions. Timer 01 and 02 are used to set the ON/OFF times of the heat pump within a 24 hour period. Timer 03 and 04 are used to set the ON/OFF times of an external water pump within a 24 hour period (Timer 03 and 04 — not applicable).

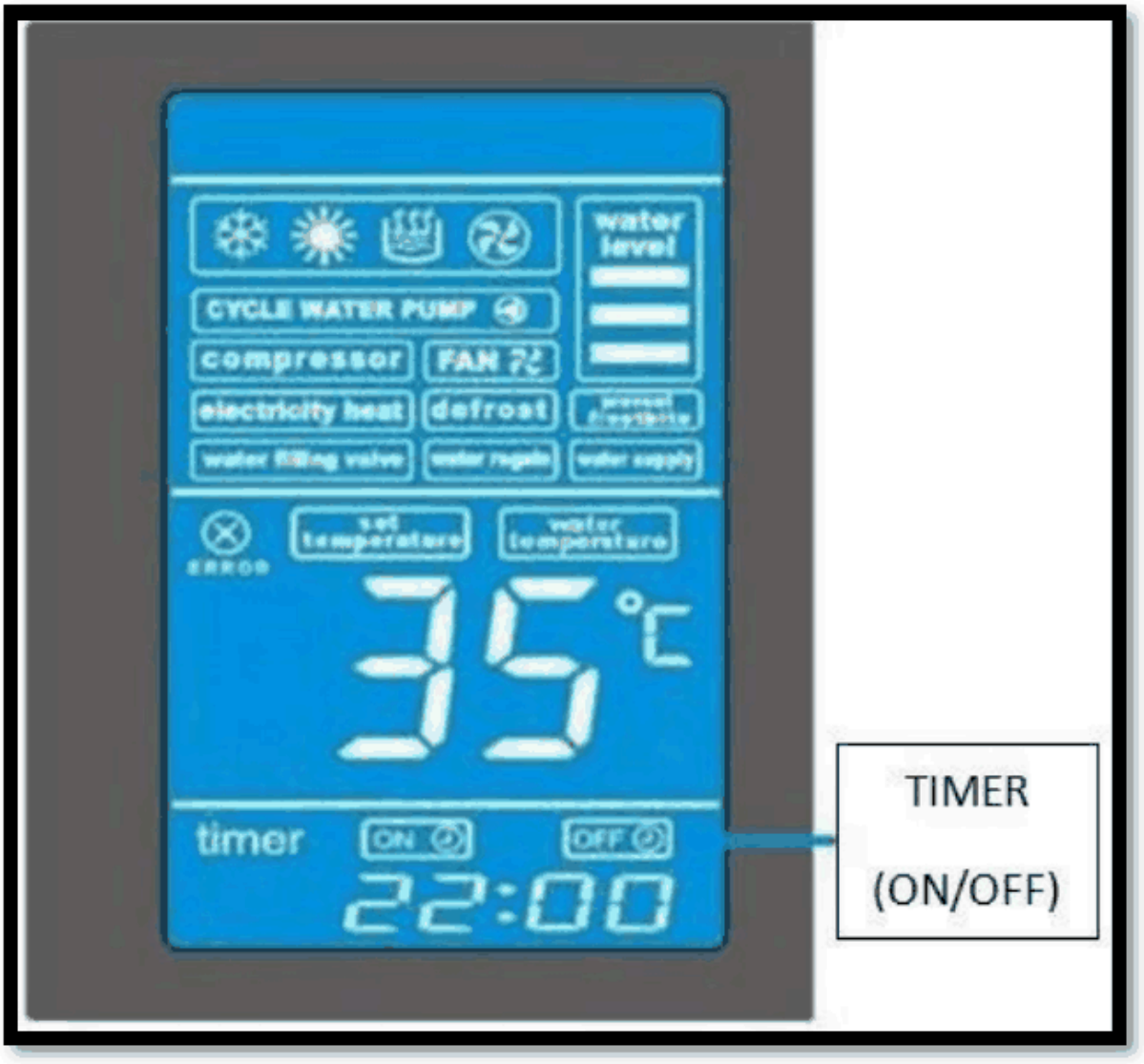
Heat pump ON/OFF timers: **01** — ON/OFF timing; **02** — ON/OFF timing.

Press the “timer” key and enter timer 01 ON time. Set the ON time as in the Clock Setting section. Press the “timer” key again to set timer 01 OFF time. Set the OFF time as in the Clock Setting section. Repeat the sequence until all timer settings are completed.

If, however, a timer is not used, set ON and OFF times to 00:00. The timer setting can be randomly selected. For example, Timer 01 ON, Timer 02 OFF, Timer 03 OFF and Timer 04 OFF.



Timer panel and timer setting.



Controller display after all timer settings are complete.

To cancel the timer feature, press the “timer” key for more than 3 seconds until an audible tone is heard, then release a key, the timer is now canceled.

08 Commissioning and product protection

First-start checks and every protection function

7.4 General operating guide

Initial start-up precautions

> **CAUTION**
>
> Refrain from using this heat pump if any electrical components have been in contact with water. Immediately call a qualified service technician to inspect the heat pump.

> **CAUTION**
>
> Keep all objects clear above the heat pump. Blocking airflow could damage the unit and may void the warranty.

First boot-strap and running state checks

1. To ensure the power same as the product nameplate required power.
2. Unit electrical connections: check if the power supply wire track and connection are ok; if the ground wire is properly connected.
3. Water pipe and pipe: water pipe and pipe must be washed two and three times, ensure clean and no any pollution.
4. Check water system: if the water is enough and no air, ensure no leakage.
5. Running checks. After unit normal running, check the following item: (a) input and output water temperature; (b) running electric current of the compressor.

7.5 Product protection

1. Compressor time delay protection	To ensure the compressor is protected, a time delay of 3 minutes is needed to restart the compressor.
2. Water flow switch protection 03E	To ensure that the heat pump will not operate during no water flow conditions and the error code will be displayed. For example, the water pump is not running or burst water pipes or the external swimming pool pump not running.
3. Compressor high discharge temperature protection 12E 13E	If a high compressor discharge temperature (≥115 °C) is detected for 30 seconds, all heating and chilling functions will be disabled and the error code will be displayed. The heat pump will resume operating automatically after 3 minutes.
4. Compressor high-pressure protection 05E 07E	If high pressure is detected on the compressor, all heating and chilling functions will be suspended, the error code will be displayed and the alarm will sound. The heat pump unit will resume operation 3 minutes after the high-pressure switch was reset. If the same error code appears 3 consecutive times within an hour, all heating and chilling functions will be permanently disabled, the error code will be displayed and the alarm will sound. Please consult an authorized service technician.

5. Compressor low-pressure protection 06E 08E	If low pressure is detected on the compressor, all heating and chilling functions will be suspended, the error code will be displayed and the alarm will sound. Please consult an authorized service technician. **Note:** low pressure will not be detected under 2 circumstances, during the defrosting period and/or during the first 5 minutes after the compressor has started.
6. Sensor (any) faults 15E 16E 18E 21E 22E 27E 29E	When any sensor appears to be faulty, all heating and chilling functions will be suspended and the corresponding error code will be displayed. The heat pump will resume operation when the fault has been corrected.
7. Three phase protection 01E 02E	Only applies to 3 phase voltage heat pumps. For this function to operate, ensure that the pin selectable toggle switches are set to the correct positions. When the heat pump unit is connected with the power supply, this protection will function. In the event of phase rotation fault or missing phase, all heating and chilling functions will be suspended and the error code will be displayed. The heat pump will resume operation when the fault has been corrected.
8. Frost (winterizing) protection	If the ambient temperature is below 5 °C (41 °F) and the compressor does not operate for 30 minutes, the water pump output will be activated (will only function when a water pump is connected to the heat pump). This sequence will be repeated every 30 minutes until the ambient temperature is greater than 5 °C (41 °F).
9. Water pressure switch protection 31E	Not applicable to swimming pool heat pump.
10. Compressor over current protection 35E	This function will only activate 6 seconds after the compressor has started. When the current is equal to or higher than the set current, L8, for a consecutive period of 6 seconds, all heating and chilling functions will be suspended and the error code (35E) will be displayed. The heat pump will resume operation when the fault has been corrected. **Note:** if over current occurs due to an absent phase, error code 02E will be displayed.

09 Controller error codes

What each code on the display means

The following common error codes for the heat pump units will be displayed on the controller panel.

CODE	ERROR TYPE
01 E	Phase rotation
02 E	Absent phase
03 E	Water flow switch
05 E	Compressor high pressure and/or faulty switch 1
06 E	Compressor low pressure and/or faulty switch 1
07 E	Compressor high pressure and/or faulty switch 2
08 E	Compressor low pressure and/or faulty switch 2
09 E	Controller communication
11 E	PCB communication error
12 E	Compressor high discharge temperature 1
13 E	Compressor high discharge temperature 2
15 E	Faulty inlet swimming pool temperature sensor
16 E	Coil pipe sensor 1 faulty

CODE	ERROR TYPE
17 E	Coil pipe sensor 2 faulty
18 E	Compressor discharge temperature sensor 1 broken
19 E	Compressor discharge temperature sensor 2 broken
21 E	Ambient temperature sensor broken
22 E	Return water sensor broken
25 E	Faulty water level switch and/or water level low
27 E	Faulty water outlet temperature sensor
28 E	Faulty compressor suction temperature sensor (K60)
29 E	Faulty compressor suction temperature sensor 1
30 E	Faulty compressor suction temperature sensor 2
31 E	Faulty water pressure switch
35 E	Compressor 1 over current
36 E	Compressor 2 over current

10 Inspection and owner checks

Periodic inspection and the checks the owner should make

8.2 Inspection and service

Heat pumps are designed and built to provide long life performance when installed and operated properly under normal conditions. Periodic inspections are important to keep your heat pump running safely and efficiently.

8.3 Owner inspection

We recommend that inspections on heat pumps are done frequently, especially after abnormal weather conditions. The following basic guidelines are suggested for your inspection:

1. Make sure the front of the unit is accessible for future service.
2. Keep the top and surrounding areas of the heat pump clear of all debris.
3. Keep all plants and shrubs trimmed and away from the heat pump especially the area above the fan.
4. Keep lawn sprinklers from spraying on the heat pump to prevent corrosion and damage.
5. Ensure that the ground wire is always properly connected.
6. The swimming pool filter must be maintained regularly to ensure clean and healthy water to protect the heat pump from damage.
7. Keep inspecting power and electrical components' wiring to make sure their normal operation.
8. All the safety protection devices have been set up; please refrain from changing these settings. If any changes are needed, please contact the authorized installer/agent.
9. If the heat pump is installed under the roof without a gutter, ensure that all measures are taken to prevent excessive water from flooding the unit.
10. Do not use this heat pump if any electrical part has been in contact with water. Contact an authorized installer/agent.
11. If the increase in power consumption is not due to colder weather, please consult with the local authorized installer/agent.
12. Please turn off the heat pump and disconnect it from the mains power supply, when not in use for a prolonged time. In winter, please discharge the water into the heat pump before turning it off.

11 Troubleshooting

Safety rules before investigating a fault

Use the following troubleshooting information to resolve issues/problems with your heat pump.

WARNING — RISK OF ELECTRICAL SHOCK OR ELECTROCUTION

Ensure that all high voltage circuits are disconnected before commencing heat pump installation. Contact with these circuits could result in death or serious injury to users, installers or others, due to electrical shock and may also cause property damage. Do not open any part of the heat pump as this may result in electrocution.

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 heater: (a) do not attempt to adjust or service the unit without consulting your authorized installer/agent; (b) please read the complete installation and/or user’s guide before attempting to operate the service or adjust the heater or pool filtering system.

IMPORTANT

Turn off the main power supply to the heat pump before attempting service or repair.

12 Problems and corrective action

Fault, probable cause and the action to take

Work down the table to the error code or symptom on the controller, then work across: each probable cause has the action that clears it. Where a cause is split into lettered checks, each check has its own action.

NO.	ERROR CODE / PROBLEM	POSSIBLE CAUSE	CORRECTIVE ACTION
1	**01E or 02E**	Absent phase or phase rotation or voltage imbalance among the 3 phases occurred to the mains power supply	1. Ensure that incoming phase rotation is correct. If faulty, use a phase rotation meter or check incoming phase coding to assist. 2. Test to check for absent phase, make sure that the circuit breakers are switched ON or check the cable connection. 3. Test for Voltage imbalance, if not balanced, check cabling and connections.
		Controller or PC Board Faulty (Phase rotation Protection damaged)	Replace the PC Board and/or Controller
2	**03E**	Water Flow Switch Faulty	Replace Water Flow Switch
		Connection cable damaged or disconnected.	Replace the connection cable or reconnect the cable.
		Controller or PC Board Faulty	Replace the PC Board and/or the Controller.
3	**05E/07E**	Measured Pool Temp < Actual Pool Temp	The pool water temperature sensor and PC Board are not compatible. — **Use the correct sensor.** The pool temperature sensor is not in the correct position. — **Position the sensor correctly.**
		The Y-shaped filter is blocked or jammed resulting in lower water flow.	Clean the filter.
		No water in the pool or is lower than the water inlet (Weir).	Fill the pool with water.
		The plumbing is blocked or the valves are damaged or closed.	Repair or replace the plumbing and/or valves.
		Too much air in the plumbing result in a reduction in flow rate.	1. Remove the airlock from the system. 2. Make sure that the circulation pump is working correctly.
		Circulation pump faulty	Circulation pump damaged. — **Repair or replace the circulation pump.** Circulation pump is too small or the distance from the heat pump is too far. — **Install correct circulation pump for a specific application or shorten the distance between circulation pump and/or the heat pump and/or other equipment.**
		Excessive refrigerant charge volume.	Charge the correct volume of refrigerant specified on the label.
		Control cable of the high-pressure switch damaged or disconnected.	Replace the damaged cable or reconnect.
		High-pressure switch can not be reset.	Replace high-pressure switch.
		Input of the high-pressure sensor is shorted with common, error code 05E is still displaying.	Replace the PC Board.

NO.	ERROR CODE / PROBLEM	POSSIBLE CAUSE	CORRECTIVE ACTION
		The refrigeration system is blocked (by ice or dirt).	Find the cause of the blockage and replace the filter and/or re-vacuum the system.
4	**06E/08E**	Refrigerant leakage.	Detect leakage and repair. Vacuum, charge refrigerant, and start heat pump.
		Control cable of the high-pressure switch damaged or disconnected.	Replace the damaged cable or reconnect.
		Low-pressure switch cannot be reset.	Replace low-pressure switch.
		Input of the high-pressure sensor is shorted with common, error code 05E is still displaying.	Replace the PC Board.
		The refrigeration system is blocked (by ice or dirt).	Find the cause of a blockage and replace the filter and/or re-vacuum the system.
5	**09E**	The controller cable is damaged or disconnected.	Replace damaged controller cable or reconnect.
6	**11E**	PCB Communication Error	Check for any loose or cut Cable Contact technical personnel
7	**12E/13E**	Insufficient refrigerant charge volume.	Charge the correct volume of refrigerant specified on the label.
		Compressor discharge temperature sensor faulty or damaged.	Replace the compressor discharge temperature sensor
		PC Board damaged.	Replace the PC Board.
8	**15E**	Pool temperature sensor damaged.	Replace pool temperature sensor.
		Pool temperature sensor connector (plug) disconnected and/or oxidized due to dampness or water.	Reconnect or clean the pool temperature sensor and wrap it with insulation tape.
		The controller and/or PC Board is faulty or damaged.	Replace the controller or PC Board.
9	**16E/17E**	Defrost temperature sensor faulty or damaged.	Replace the defrost temperature sensor.
		Defrost temperature sensor connector (plug) disconnected and/or oxidized due to damp or water.	Reconnect or clean defrost temperature sensor and wrap it with insulation tape.
		The controller and/or PC Board is faulty or damaged.	Replace the controller or PC Board.
10	**18E/19E**	Compressor discharge temperature sensor faulty or damaged.	Replace the compressor discharge temperature sensor.
		Compressor discharge temperature sensor connector (plug) disconnected and/or oxidized due to damp or water.	Reconnect or clean compressor discharge temperature sensor and wrap it with insulation tape.
		The controller and/or PC Board faulty or damaged.	Replace the controller or PC Board
11	**21E**	Ambient temperature sensor faulty or damaged.	Replace the Ambient temperature sensor.

NO.	ERROR CODE / PROBLEM	POSSIBLE CAUSE	CORRECTIVE ACTION
		Ambient temperature sensor connector (plug) disconnected and/or oxidized due to damp or water.	Reconnect or clean the ambient temperature sensor and wrap it with insulation tape.
		The controller and/or PC Board is faulty or damaged.	Replace the controller or PC Board.
12	**22E**	Return water temperature sensor faulty or damaged.	Replace the Return water temperature sensor.
		Return water temperature sensor connector (plug) disconnected and/or oxidized due to damp or water.	Reconnect or clean Return water temperature sensor and wrap it with insulation tape.
		The controller and/or PC Board is faulty or damaged.	Replace the controller or PC Board.
13	**25E**	Water Level switch connector (plug) disconnected and/or oxidized due to damp or water.	Reconnect or clean water level cable connection to PC Board.
		Water level switch Cable Damaged.	Replace the cable.
		The controller and/or PC Board is faulty or damaged.	Replace the controller or PC Board.
14	**27E**	Outlet water temperature sensor faulty or damaged.	Replace the Outlet water temperature sensor.
		Outlet water temperature sensor connector (plug) disconnected and/or oxidized due to damp or water.	Reconnect or clean outlet water temperature sensor and wrap it with insulation tape.
		The controller and/or PC Board is faulty or damaged.	Replace the controller or PC Board.
15	**29E/30E /28E**	Compressor suction temperature sensor faulty or damaged.	Replace the Compressor suction temperature sensor.
		Compressor suction temperature sensor connector (plug) disconnected and/or oxidized due to damp or water.	Reconnect or clean the Compressor suction temperature sensor and wrap it with insulation tape.
		The controller and/or PC Board is faulty or damaged.	Replace the controller or PC Board.
16	**31E**	Water pressure switch connector (plug) disconnected and/or oxidized due to damp or water.	Reconnect or clean water pressure cable connection to PC Board.
		Water pressure switch Cable Damaged.	Replace the cable
		The controller and/or PC Board is faulty or damaged.	Replace the controller or PC Board.
17	**35E/36E**	Compressor over current	1. Check if the incoming voltage supply is too low, if so, repair. 2. Check if the compressor is overloaded and repair. 3. Check whether the thermal relay is damaged, if so, replace it.

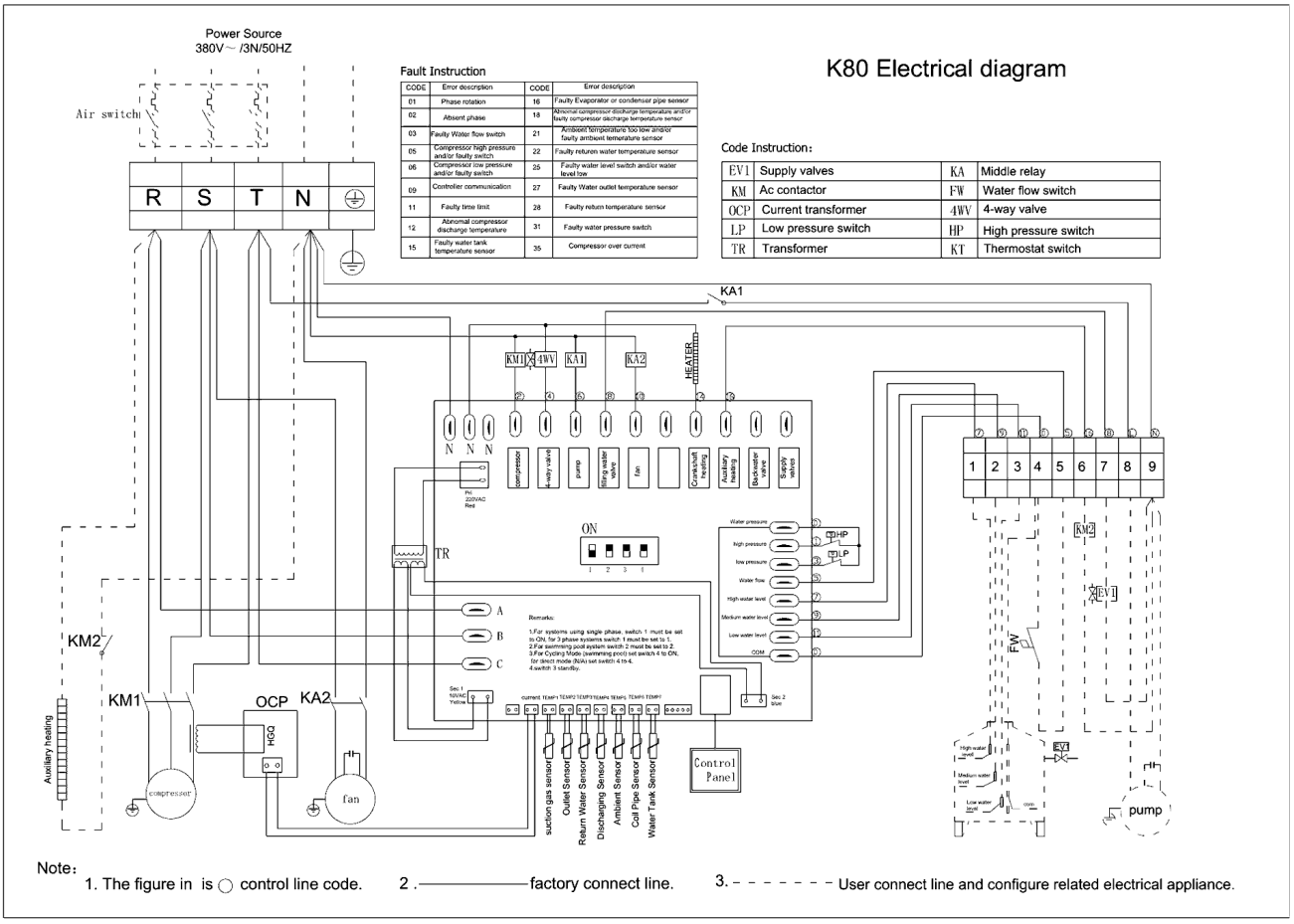
NO.	ERROR CODE / PROBLEM	POSSIBLE CAUSE	CORRECTIVE ACTION	
18	**The heat pump is not heating water**	User's incorrect operation and/or parameter settings.	The pool temperature setting is set too low and the desired temperature cannot be reached.	**Re-set the pool water temperature to the correct range.**
			The difference between the required pool temperature and the heat pump restart temperature (L2) is too big.	**Re-set by reducing the value of L2.**
			Timer function has been set to a specific ON and OFF time, which does not allow sufficient time for the heat pump to operate.	**Re-set the timer.**
			No electrical power supply to the heat pump (no display on the controller).	**1. Check and ensure that circuit breakers are ON.** **2. Test voltage on the PC Board L/N/G Connectors.** **3. If power is not restored, replace cable.**
		Problem with controller or PC Board.	The temperature displayed is more than 45 °C.	**Check the pool water temperature sensor, replace it if faulty.**
			PC Board is damaged due to burnt relays.	**Check and find out the cause, find faulty relay(s) and replace.**
			PC Board microcontroller chip faulty.	**Replace the PC Board.**
19	**The slow increase of pool water temperature**	Insufficient refrigerant.	1. Check for leakages, if found, repair and re-charge refrigerant as per volume specification on the label. 2. If no leakage was found, re-charge refrigerant as per volume specification on the label.	
		The heating capacity of the heat pump is insufficient for the size of the pool.	Increase the size or number of heat pump units.	
		Serious residues/dirt occurred on the heat exchanger.	Clean the heat exchangers.	
		The evaporator coil is dirty or jammed and this will affect the heat exchange efficiency.	Clean the evaporator coil.	
		Poor design of insulation for the pool.	It is recommended to use a pool insulation cover.	
		The length of the pipes is too long and/or improperly insulated.	1. If the length of the pipes cannot be done, ensure well-insulated piping. 2. Increase the size and number of heat pump units.	
20	**The controller displays "00"**	The controller cable is damaged or disconnected.	Reconnect or replace the controller cable and wrap it with insulation tape.	
		PC board damaged.	Replace PC Board.	
		Pool temperature sensor and/or cable disconnected or damaged.	Reconnect or replace the pool temperature sensor and wrap it with insulation tape.	
21	**No display on the controller**	Mains power supply is abnormal.	The main power supply cables are disconnected or damaged.	**Reconnect or replace the mains power supply cable.**

NO.	ERROR CODE / PROBLEM	POSSIBLE CAUSE	CORRECTIVE ACTION	
			The main power supply voltage is lower than 175V.	**Check and ensure that the mains power supply cable's length and thickness, is within the specifications, if not replace with a thicker cable to ensure less voltage drop.**
		PC board power cable is disconnected or the fuse is burnt.	Reconnect the PC Board cable or replace the fuse.	
		PC Board transformer is damaged.	Replace the PC Board transformer.	
		The controller cable is damaged or disconnected.	Reconnect or replace the controller cable and wrap it with insulation tape.	
		PC Board damaged.	Replace the PC board.	
22	**The fan does not operate**	Fan motor capacitor damaged (under this circumstance the fan motor will overheat).	Replace fan motor capacitor.	
		The motor windings have been burnt.	Repair or replace the fan motor.	
		The display is ON but the heat pump unit is not in running mode/ON.	Press the power button and turn On the heat pump unit.	
		Fan motor relay damaged.	Check and replace if damaged.	
		No fan motor output from PC Board.	Replace PC board.	
		Fan motor cable damaged.	Reconnect or replace the fan motor cable.	
23	**The compressor does not operate while the fan is working**	Compressor damaged (under this circumstance the compressor motor will overheat).	Replace compressor capacitor.	
		Compressor connecting cable is burnt.	Replace compressor connecting cable.	
		The compressor windings have been burnt.	Repair or replace the compressor.	
		The compressor is jammed or blocked.	Repair or replace the compressor.	
		AC contactor does not work.	The AC contactor is damaged	**Replace the AC contactor.**
			The main power supply voltage is lower than 175V.	**Check and ensure that the mains power supply cable's, length and thickness, is within the specifications.**
			No compressor relay output from the PC Board.	**Check and/or replace compressor relay or PC Board.**
24	**Frost or ice**	Fan is not working.	Refer to "problem description #22".	
		Insufficient refrigerant or the refrigeration system is blocked.	1. Find the cause of a blockage and replace the filter and/or re-vacuum the system. 2. Check for leakages, if found, repair and re-charge refrigerant as per volume specification on the label. 3. If no leakage was found, re-charge refrigerant as per volume specification on the label.	
		The defrost parameter is not set correctly.	Re-set the defrost parameter to the correct value.	

NO.	ERROR CODE / PROBLEM	POSSIBLE CAUSE	CORRECTIVE ACTION
		The defrost sensor is not placed correctly.	Replace the defrost sensor with the correct position.
		The 4-way valve cannot be reversed (The winding is damaged or the valve cannot be correctly reversed).	Check the 4-way valve to find the cause to replace the winding or the 4-way valve.
		Controller is damaged.	Replace the controller.
		The refrigeration system has a problem.	Check and repair the refrigeration system.

13 Wiring connection diagram

Electrical diagram, fault instruction and code key



K80 electrical diagram, 380 V / 3N / 50 Hz. Solid lines are factory connections; dashed lines are connections made on site.

QUALIFIED ELECTRICIAN ONLY

All electrical work must be carried out by a licensed electrician with the supply isolated. Label every wire before disconnection.

14 Service and support

How to reach the Sunniva service department

Scan the code below with a phone camera to start a WhatsApp chat with the Sunniva service department. Have the machine's model number and any error code showing on the controller ready — it gives the service department the fastest route to helping you.

Need service?

Scan to chat with the Sunniva service department on WhatsApp

Sunniva Encon LLP

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ONE MANUAL, EVERY MODEL

This manual carries no model number — it is common to the whole Sunniva range. For the ratings, dimensions, electrical data and performance of a particular unit, see that model's technical data sheet at www.sunnivaencon.com.