



GROUND SOURCE HEAT PUMP

--- Water to water



INSTALLATION AND USER MANUAL



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General

In order to get the greatest benefit from the heat pump unit you should read through the For Home Owners section in this Installation and Maintenance Instruction .

ESE ground source heat pump is for residential buildings , both heating and cooling are available .The ground , bedrock or lakes can be used as the heat source .

ESE heat pump is a Canadian technology and made in China quality product offering a long life span and reliable operation .

Information sheet filled by installation people

Model Name : _____ Model series No. : _____

Installation date : _____ Installation engineers : _____

Accessories :

Electrical addition Hot water control Room control Others

Active drilling depth / collector length

Commissioning checks

Temperature water (flow / return) ___ / ___ Pump setting ___

(Nominal temperature diff 2-5°C)

Temperature heat medium (In / out) ___ / ___ Pump setting ___

(Nominal temperature diff 5-10 °C)

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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 .

Note ! Children should be supervised to ensure that they do not play with the appliance

System description

Principle of operation

ESE water to water unit consists of a heat pump module and a control system with a display for operating the heat pump , soft start relay (8-12kw) and additional heating are optional . And the built-in circulation pumps is optional also , which making it easy to connect to the heating medium and collector circuits .

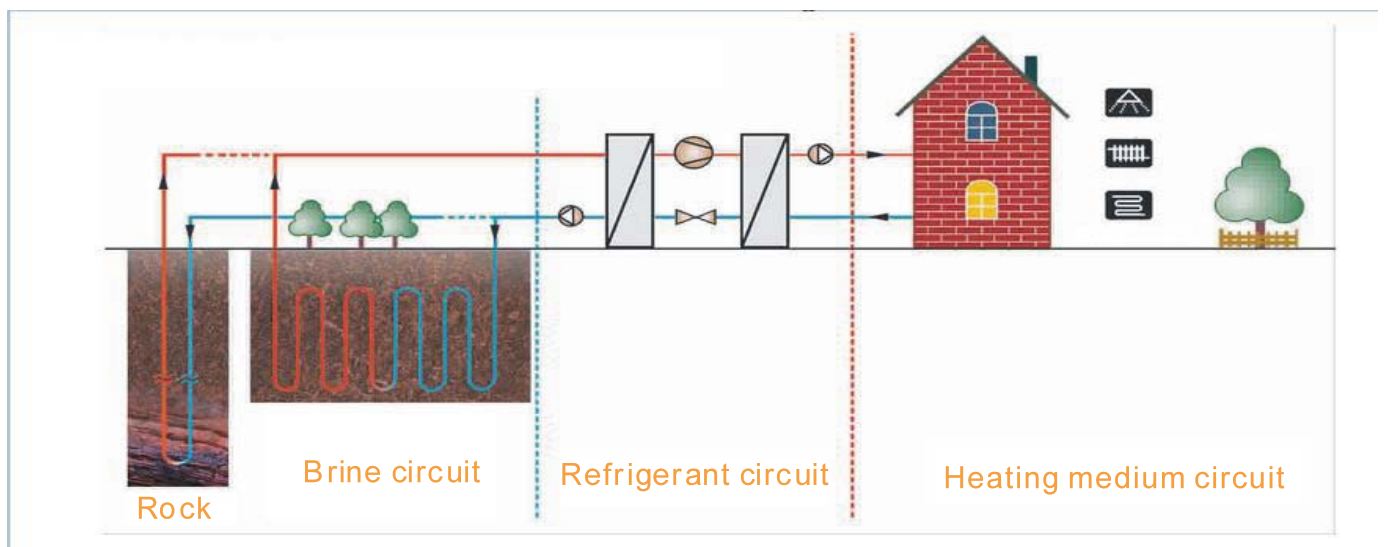
The absorption of heat from the heat source (rock , ground or lake) is through a closed collector system containing water mixed with antifreeze ,

Ground water can also be used as a heat source , This requires an intermediate heat exchanger . The water emits its heat t the refrigerant in the heat pump's evaporator , It then vaporize and is compressed in the compressor . The refrigerant with its increased temperature , is led into the condenser where it emits its energy to the heating medium circuit .

In the event of cooling , the direction of flow changes in the refrigerant system . Even the external systems (brine and heating medium I change direction by the external pumps starting for opposite circulation , The heat energy is now emitted to the heat source (via the collector) which is recharged .

System Drawing

How does ESE models work ?



Installation

General points for the installation engineer

Transport and storage

The unit should be transported and stored vertically in a dry place .

Assembly

The unit is placed on a firm base , preferable on a concrete floor or foundation , It should be set up with its rear against an outer wall in a scullery or similar type of room to eliminate noise problems , If this is not possible , avoid placing it against a wall behind a bedroom or other room where noise may be a problem , Wherever should be fitted with sound insulation , Route pipes so they are not fixed to an internal wall that backs on to a bedroom or living room .

Pipe connections

General

Pipe installation must be carried out in accordance with current norms and directives , The heat pump can only operate up to a return temperature of about 50°C and outgoing temperature of about 60°C from the heat pump . When the heat pump is not equipped with shut off valves ; these must be installed outside the heat pump to facilitate any future servicing

Note !

The pipe work must be flushed before the heat pump is connected , so that any contaminants do not damage the components parts

Pipe connection (cooling medium)

When dimensioning the collector , consideration must be given to the geographical location , type of rock and ground and the degree of coverage provided by the heat pump .

When installing the collector hose ensure it rises constantly towards the heat pump to avoid air pockets , If this is not possible , install high points to vent the air

All water pipes in heated rooms must be insulated against condensation , The expansion tank is located on the incoming pipe before the water pump .

The expansion tank must be marked to show the type of antifreeze used .

Shut-off valves should be installed as close to the heat pump as possible , Fit a particle filter to the incoming pipe .

In the case of connection to an open groundwater system , an intermediate frost-protected circuit must be provided , because of the risk of dirt and freezing in the evaporator , This requires an extra heat exchanger .

Pipe connection (heating medium)

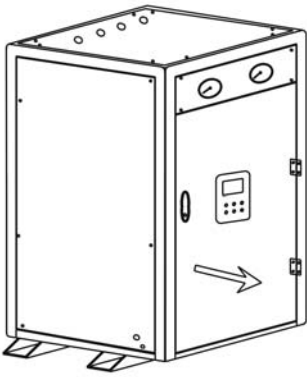
Pipe connections for the heat medium side are made at the top , All required safety devices , shut – off valves (as close to the heat pump as possible) , and particle filter (supplied) are fitted .

You should fit either an overflow valve or remove some of the thermostats when connecting to systems with thermostats on all the radiators (coils) .

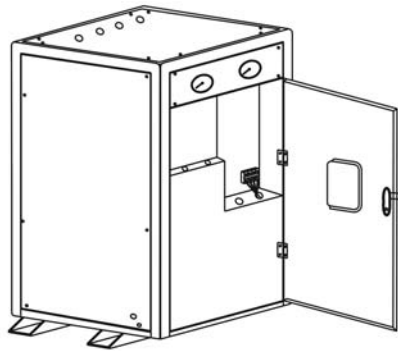
All heating medium pipes in heated rooms must be insulated against condensation

Installation diagram

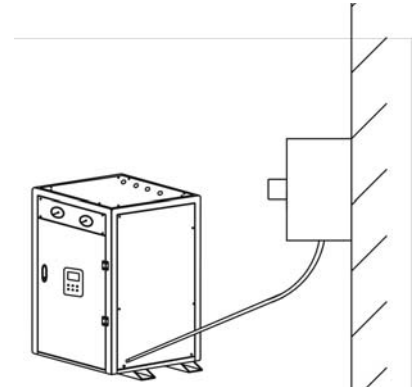
Top water connection type



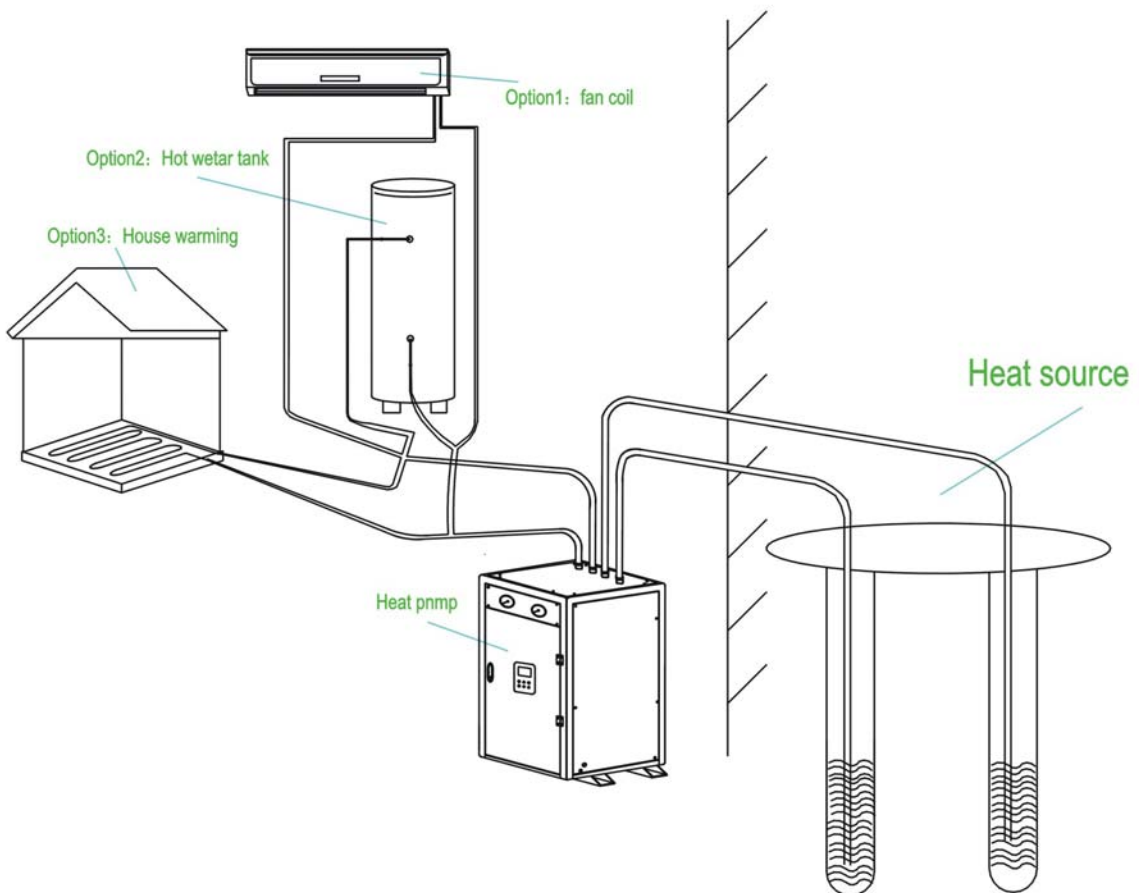
I



II

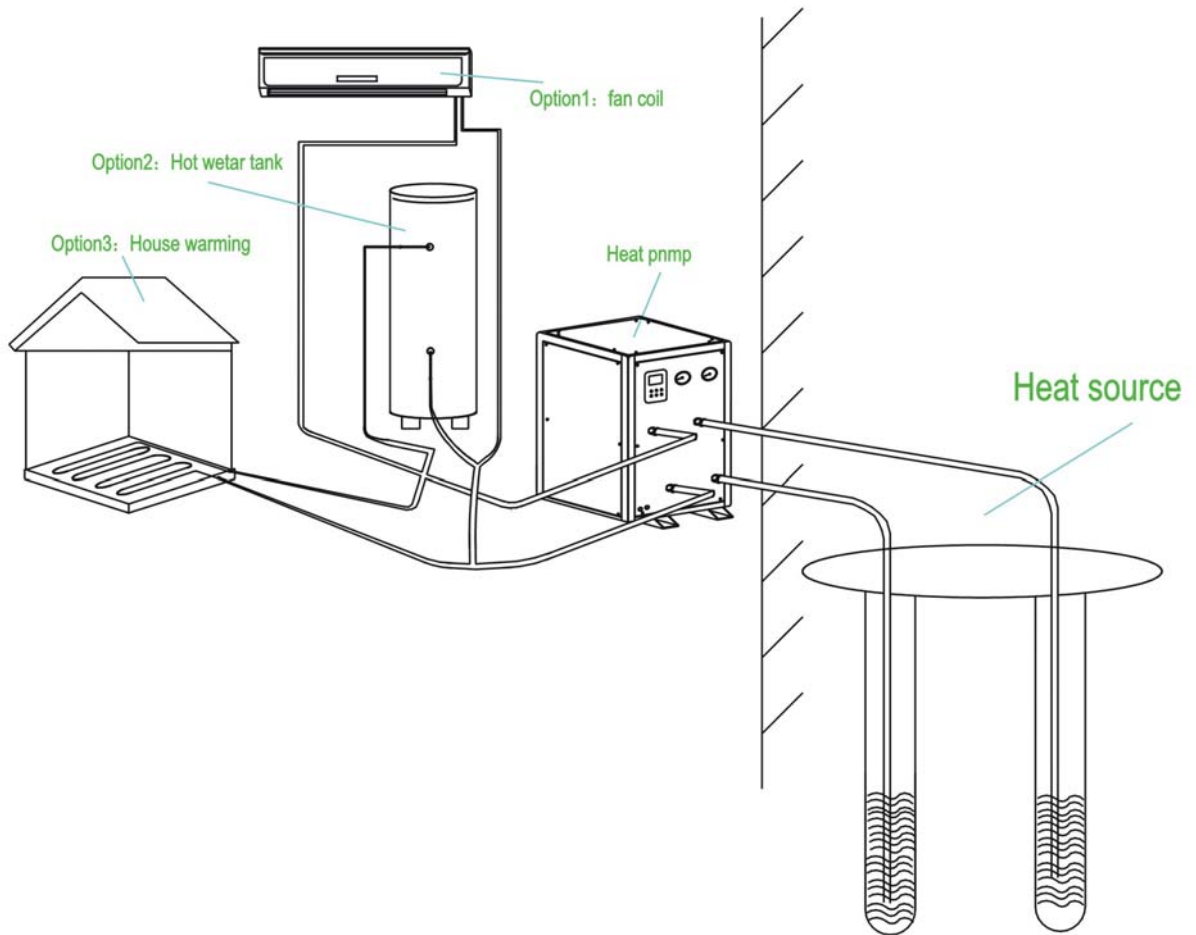
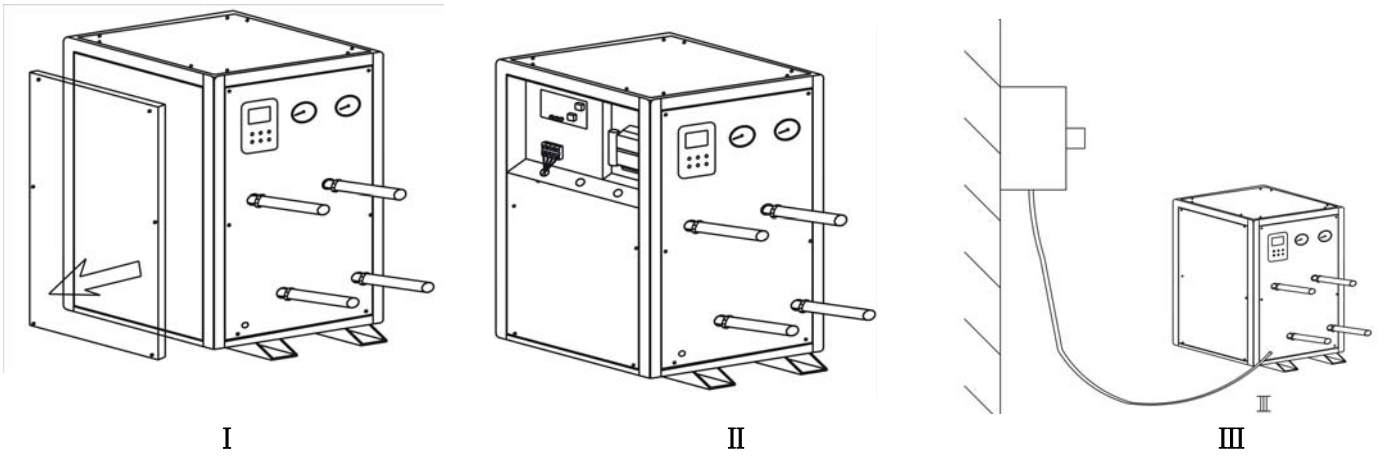


III



IV
P5

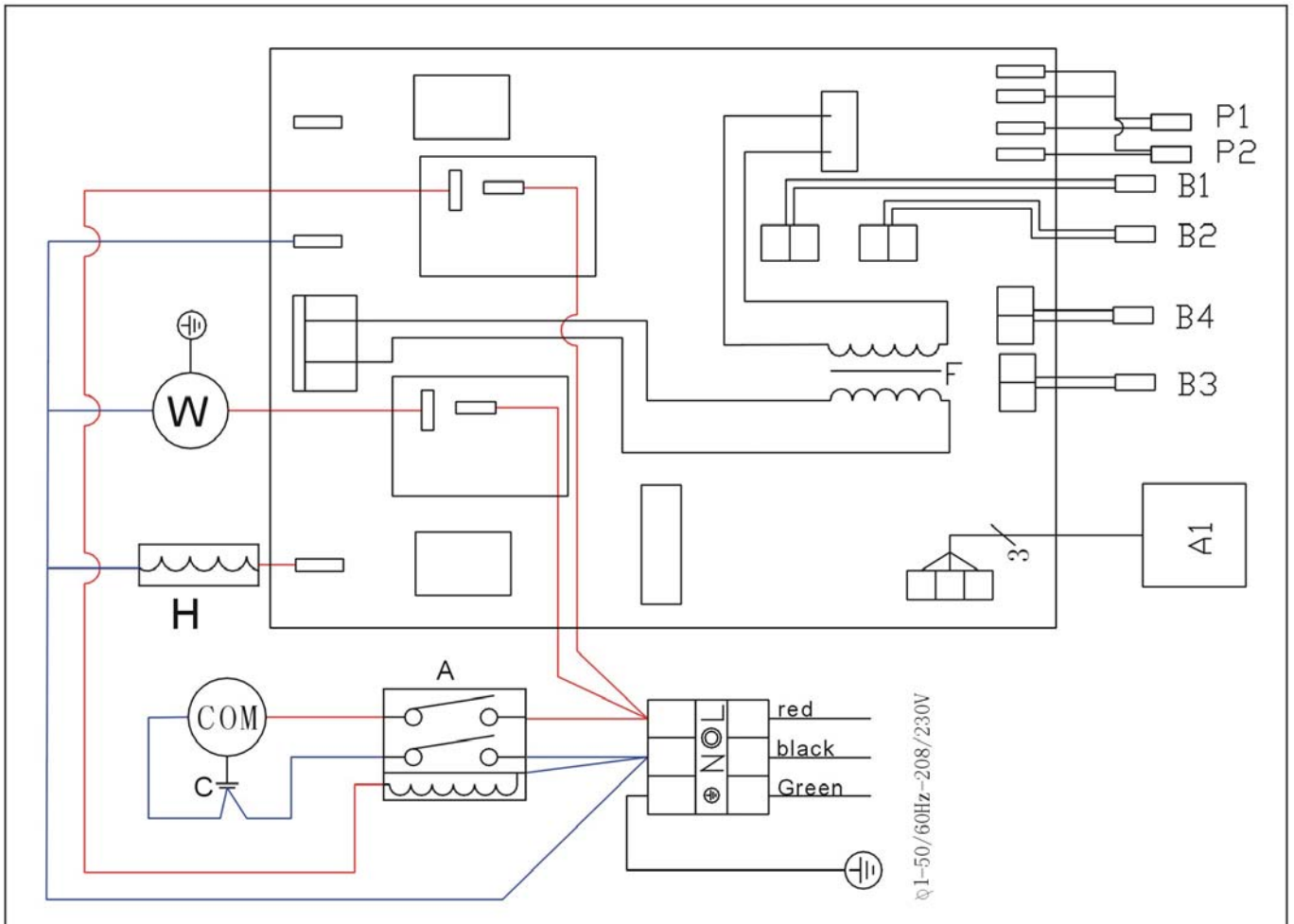
Side water connection type



IV

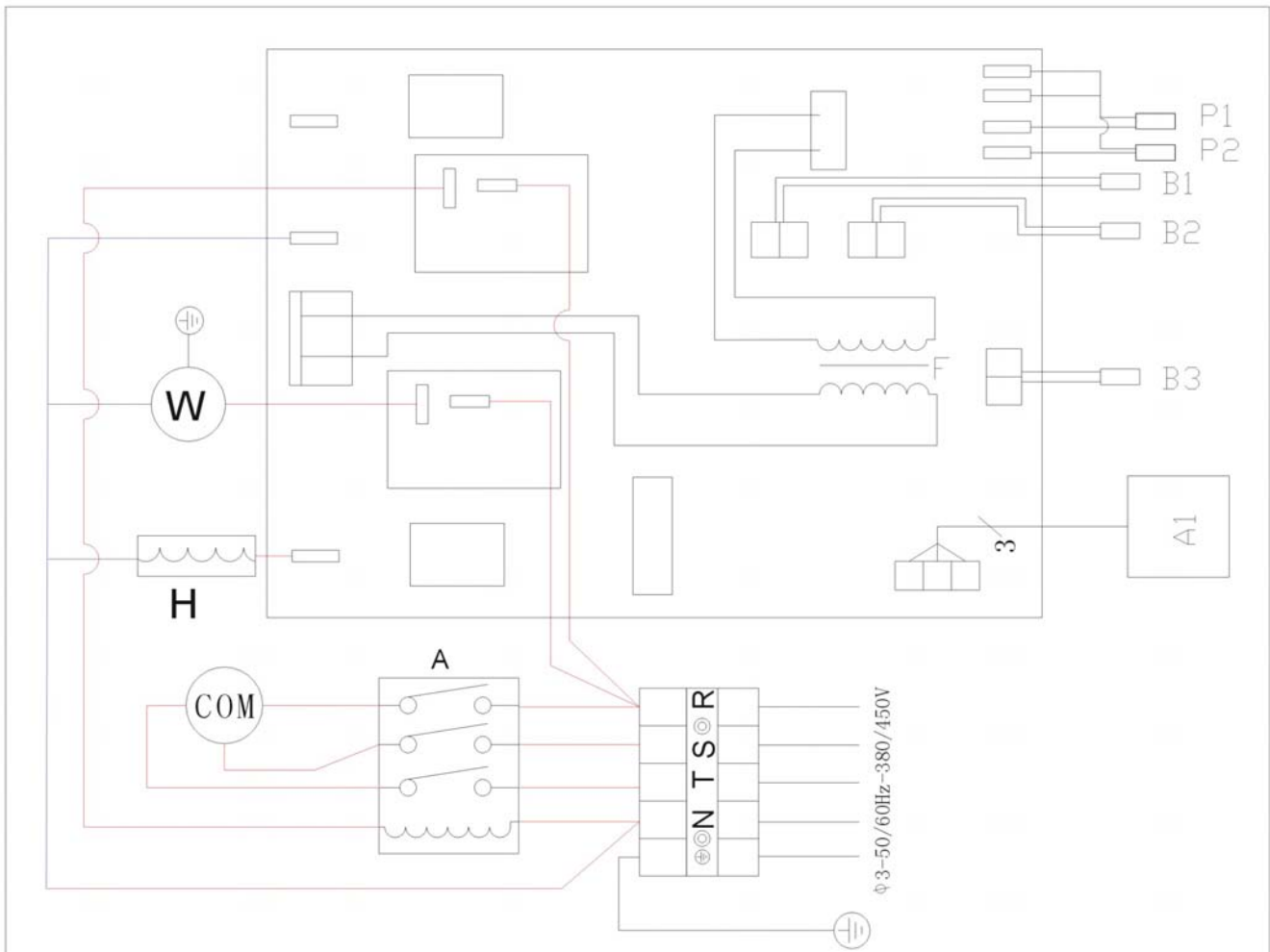
Wiring diagram

220V – 1Phase – 50 / 60 Hz



| | | | |
|-----|----------------------|----|--------------------------|
| W | water pump | P2 | water pressure switch |
| H | four-way valve | B1 | water outlet temperature |
| C | compressor capacitor | B2 | water inlet temperature |
| COM | compressor | B3 | exhaust temperature |
| A | AC contactor | B4 | back temperature |
| P1 | low pressure switch | A1 | wire controller |

380v – 3 Phase -- 50 / 60 Hz

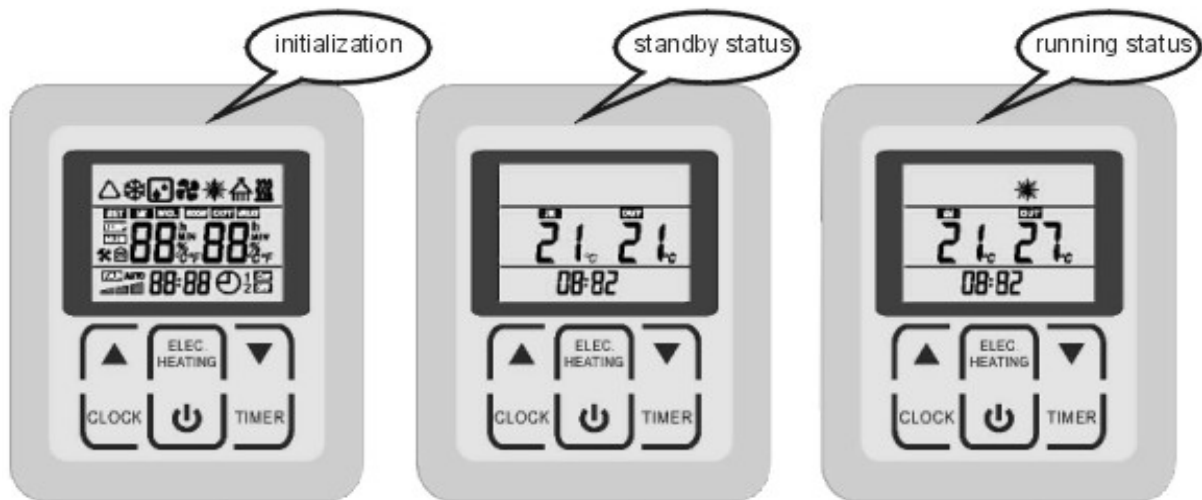


| | | | |
|-----|----------------------|----|--------------------------|
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Controller manual

General

The indoor temperature depends on several factors , Sunlight and the heat emissions from people and household machines are normally sufficient to keep the house warm during the warmed parts of the year , When it gets hot , ESE heat pump can be used to cool , When it gets colder outside , the heating system must be started , This adjustment is done automatically by a control system , Before the system can do this , some basic settings are required .



1. Overview

1-1 Mode: Both Heating and Cooling are available .

1-2 A query function for the water temperature and the setting temperature display .

1-3 Timer function , time setting for ON-OFF , with battery (which can be automatically charging) ;

1-4 Temperature setting range : cooling 5°C ~ 30 °C ; heating 20°C ~ 60 °C .

1-5 Liquid crystal display screen .

2 . Button

2-1. Power on (connect / plug in the electric wire or turn on the power switch) .

The screen display the versions No. for two seconds, and after two seconds again , the full-screen display, Then enter into the normal working status .

2-2. ON -OFF

In the running state, push this button to TURN OFF the unit , and it show the water temperature, timer state and the clock. In OFF status, push this button to TURN ON the unit, and show the running mode, setting temperature, water temperature, timer status and clock.

2-3. "▲", "▼"

Push the button for parameter settings, parameters enquiries, clock and timer adjustment, and so on.

In the clock settings status, Push the button to adjust clock hours and minutes;

In the timer on / off status , Push the button to adjust timer ON / OFF hours and minutes setting ;

In the normal status (not clock, timer set state), Push the button for water temperature settings.

Push the both button "▲", "▼" at the same time for five seconds to enter into the keyboard

lock, Push it time again for 5 seconds to quit the keyboard lock status .

2-4. "CLOCK"

Click here to enter clock settings, when it display flashing hours, according to "▲", "▼" button to adjust hours, and then push "CLOCK" to confirm hours setting and enter into minutes setting status , flashing minutes displayed, click "▲", "▼ " to adjust minutes, and then click "CLOCK " to confirm minutes setting and then quit from clock setting status .

In the ON / OFF timer status, push the key to cancel the timer setting .

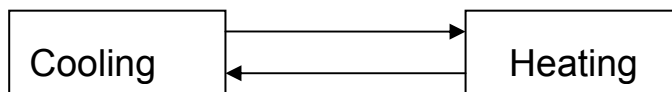
2-5. "TIMER"

Push the button to enter into ON / OFF timer settings.

In the Non-clock settings state, push this button to enter into the ON/OFF timer settings status, push "▲", "▼" to select ON or OFF timer , and push the "TIMER" button tp confirm the mode of choiced , Flashing of hours at this moment , according to "▲", "▼" button to adjust hours, and then click "TIMER" button to confirm timer hour setting . And then the flashing minutes, according to "▲", "▼" adjustable minutes, Click "TIMER" button to confirm the setting and quit from the TIMER setting status .

2-6. "ELEC. " button

Push the button to enter into the reverse cycle *(It's only for cooling and heating system models)*



3 . Parameters query and setting

3-1 Parameters query

Press both the "ELEC.HEATING" and "▼" button for more than five seconds to enter into the parameters query status. Temperature setting region show the parameters query serial number, the clock region shows the content of parameters.

Push "▲", "▼" to change the parameters serial number, Press the "ELEC.HEATING" button or no any action for more than 10 seconds , it will quit from query status .

3-2. Parameters settings

Press both the "ELEC.HEATING" and "⏻" button at the same time for more than five seconds to enter into the management of parameters setting . Temperature

6

setting parameters region show the parameters settings serial number , The clock region show the setting parameters content. Press "▲", "▼" to change the display setting parameters serial number, Press "TIMER" button to enter into the setting parameters change state , and push "▲", "▼" again can change the parameters set, then press "TIMER" button Save settings parameters, If the operation is successful there will be double-ring buzzer sound. Press "ELEC.HEATING" button or no any action for more than 10 seconds , it will quit from parameters setting status .

4 . Failure show

| Protection, fault | controller | control board running signal lights |
|------------------------------|------------|-------------------------------------|
| Standby | | ☆ (flash always) |
| Running | | lighting |
| Water outlet temp. sensor | P1 | ☆ ● |
| Exhaust temperature sensor | P5 | ☆ ☆ ☆ ☆ ☆ ● |
| High pressure protection | E1 | ☆ ☆ ☆ ☆ ☆ ☆ ☆ ● |
| Low pressure protection | E2 | ☆ ☆ ☆ ☆ ☆ ☆ ☆ ☆ ● |
| Water flow switch protection | E3 | ☆ ☆ ☆ ☆ ☆ ☆ ☆ ☆ ☆ ● |
| Exhaust temp. protection | E4 | ☆ ☆ ☆ ☆ ☆ ☆ ☆ ☆ ☆ ☆ ● |
| Communications failures | E0 | |

[**Note:** temperature failure protection can be automatically restored, other fault protection are required press "⏻" to reboot]

Water to water specification

| Model | EWW08 | EWW10 | EWW12 | EWW15 | EWW18 | EWW22 | EWW30 | EWW40 | EWW50 | EWW60 | EWW70 | | |
|---|--------|--------------------------------------|-----------|-----------|----------|-------------|----------|-----------------|---------------|-----------|-----------|-------------------|--|
| Installation location | Indoor | | | | | | | | | | | | |
| Operating temperature limits | | | | | | | | | | | | | |
| Heating water flow | ℃ | Up to 58 | | | | | | | | | | | |
| Cold water (heat source) | ℃ | +7 to +25 | | | | | | | | | | | |
| Performance data | | | | | | | | | | | | | |
| Rated Cooling capacity | kW | 8 | 10 | 12 | 15 | 18 | 22 | 30 | 40 | 50 | 60 | 70 | |
| | BTU/H | 27000 | 36000 | 42000 | 51000 | 62000 | 72000 | 110000 | 145000 | 170000 | 208000 | 240000 | |
| Rated Heating capacity | kW | 8.5 | 10.4 | 13 | 16.8 | 20.3 | 23 | 33 | 43 | 55 | 65 | 75 | |
| | BTU/H | 29000 | 38000 | 45000 | 55000 | 64000 | 80000 | 115000 | 153000 | 190000 | 220000 | 260000 | |
| Rated power input (cooling) | kw | 2.0 | 2.5 | 3 | 3.9 | 4.6 | 5.7 | 7.7 | 11 | 11.5 | 14.6 | 18 | |
| Power input (heating) | kw | 2.2 | 2.6 | 4.1 | 4.2 | 4.8 | 5.5 | 10 | 10.4 | 15.5 | 20 | 24 | |
| Running current(cooling/heating) | A | 9.1/10 | 11.2/12.0 | 5.6/7.4 | 5.0/5.3 | 5.7/5.9 | 7.4/7.8 | 13.3/17.8 | 14.2/15 | 20.9/28.0 | 26.5/35.7 | 32.4/43.6 | |
| Power supply (V / Ph / Hz) | | 220/1/50 | | | | | 380/3/50 | | | | | | |
| Heat output / COP at w7 / w55 | | 5.2/2.6 | 7.1 / 2.6 | 9.2 / 2.7 | 11.5/2.5 | 15/2.9 | 19.3/3.3 | 22 / 2.9 | 28/3.1 | 36/3.0 | 42/3.1 | 51/3.1 | |
| at w10 / w50 | | 6.1/3.5 | 7.8/3.6 | 10.2/3.7 | 12.4/3.5 | 16.1/3.6 | 21/3.9 | 25.5/3.6 | 33.8/3.5 | 43/3.6 | 51/3.5 | 59.2/3.6 | |
| at w10 / w45 | | 6.3/4.3 | 7.9/4.2 | 10.6/4.1 | 13.1/4.2 | 16.3/4.1 | 21.2/4.0 | 26.4/3.9 | 35/4.0 | 44/4.2 | 52 / 4.3 | 61/4.2 | |
| at w10/w35 | | 6.5/5.2 | 8.2/5.1 | 11.2/5.2 | 13.5/5.2 | 16.8/5.3 | 22.5/5.4 | 27/5.3 | 37 /5.4 | 45/5.3 | 54/5.3 | 63/5.4 | |
| Compressor Qty. | pc | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 3 | 4 | 4 | |
| Compressor Type | | scroll | scroll | scroll | scroll | scroll | scroll | scroll | scroll | scroll | scroll | scroll | |
| Evaporator Type | | Plate & Tube in shell & Tube in tube | | | | | | | | | | | |
| Water flow volume | m3/h | 1.5 | 1.9 | 2.3 | 2.7 | 3.2 | 4.3 | 5.9 | 7.2 | 9.86 | 10.53 | 13.07 | |
| Water pressure drop | kPa | 34 | 34 | 34 | 34 | 35 | 35 | 36 | 36 | 36 | 38 | 38 | |
| Condenser Type | | Plate & Tube in shell & Tube in tube | | | | | | | | | | | |
| Water flow volume | m3/h | 1.8 | 2.1 | 2.6 | 3.25 | 3.8 | 4.9 | 6.5 | 8.4 | 11.32 | 12.56 | 15.5 | |
| Water pressure drop | kPa | 35 | 36 | 36 | 36 | 36 | 36 | 37 | 37 | 38 | 42 | 42 | |
| Noise | dB(A) | 39 | 39 | 40 | 45 | 45 | 45 | 48 | 48 | 50 | 50 | 50 | |
| Dimension & Weight & Connections | | | | | | | | | | | | | |
| Water connection | Inch | 1 | 1 | 1 | 1 | 1 | 1 | 1.5 | 1.5 | 2 | 2.5 | 2.5 | |
| Side water connector type | | | | | | | | | | | | | |
| Unit dimension(L/W/H) | mm | 610x610x920 | | | | 610x610x788 | | 700x700 x800 | 1500x900x1200 | | | 1900x900x 1000 | |
| Packing dimension (L/W/H) | mm | 660x660x970 | | | | 660x660x838 | | 750x750 x850 | 1550x950x1250 | | | 1950x950x 1050 | |
| Net weight | kg | 98 | 115 | 125 | 134 | 157 | 220 | 300 | 370 | 420 | 525 | 558 | |

| | | | | | | | | | | | | |
|---------------------------------|----|-----|-------------|-----|-----|-------------|-----|------------------|---------------|-----|-----|-------------------|
| Gross weight | kg | 103 | 120 | 135 | 144 | 167 | 235 | 320 | 390 | 440 | 560 | 615 |
| Top water connector type | | | | | | | | | | | | |
| Unit dimension(L/W/H) | mm | | 610x610x788 | | | 610x610x920 | | 850x650 x970 | 1600x850x1300 | | | 1900x900x 1100 |
| Packing dimension (L/W/H) | mm | | 660x660x838 | | | 660x660x970 | | 900x700 x1020 | 1650x900x1650 | | | 1950x950x 1150 |
| Net weight | kg | 100 | 116 | 127 | 137 | 160 | 225 | 310 | 380 | 430 | 540 | 568 |
| Gross weight | kg | 105 | 121 | 137 | 147 | 170 | 240 | 330 | 400 | 450 | 600 | 625 |

| (Rated) Measurement conditions | cooling | | heating | |
|------------------------------------|---|--|---|-----------------------------------|
| | cooling side inlet /outlet water temp. | water source inlet /outlet water temp. | Heating side inlet/outlet water temp. | water source inlet water temp. |
| Ground loop | 12°C / 7°C | 25°C/30°C | 50°C / 55 °C | 20°C |