

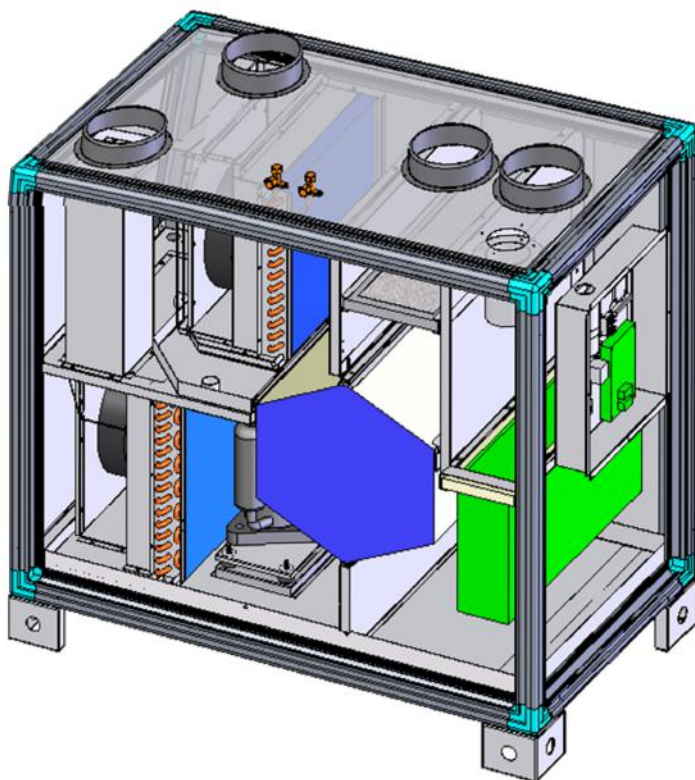


EarthSaveProducts
Renewable Energy Solutions



ECOCENT AIR MVHR L500

Mechanical Ventilation Heat Recovery
with Air to Air Heat Pump



Manual

CE

1. Introduction

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

This document is an integral part of operating the product and must be accessible to technicians.

HRVHP can be used as the ventilation system in a house without other ERV; it works independently.

HRVHP has the fan motor, air filter, heat recovery heat exchanger and heat pump built in.

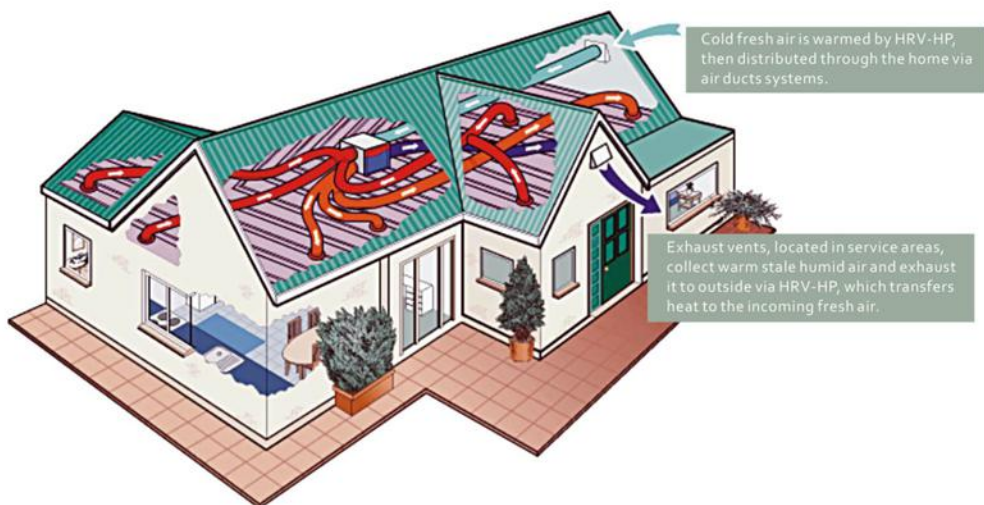
HRVHP can provide air heating combined with the ventilation system in the house. Fresh air coming from outside can be directly treated by the unit, and polluted indoor air can be exhausted. The heated polluted indoor air is recovered by this unit and recirculated indoors.

Any other usage that does not conform to the recommendations in this guide will be considered to be dangerous and unsuitable.

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

Before connecting plug to socket (power supply), please make sure that the live, neutral and earth wires are connected as illustrated in the wiring diagram.

In an endeavour for constant improvement, our products can be modified without notice. The current pictures and characteristics described in this guide are not contractual.



2. General information for installer

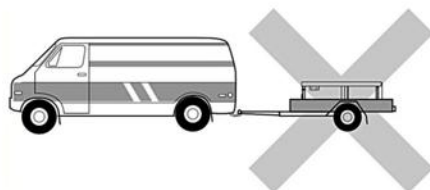
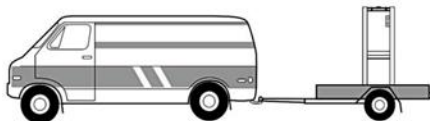
Installation, commissioning, repairs and maintenance must be carried out by a qualified installation contractor.

Any changes in the electrical installation must be undertaken by a qualified electrician.

Service work on the refrigerant circuit must be carried out by a qualified refrigeration technician.

2.1 Transport and storage :

Heat pump must be transported and stored upright and dry. It may however be carefully laid on its back when being moved into a building.

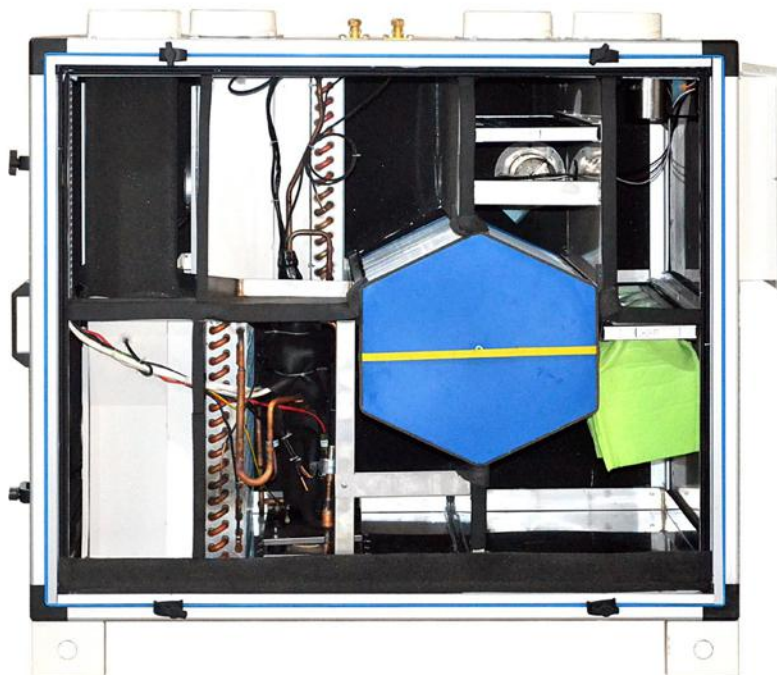


2.2 Inspection of installation:

Current regulations require the heating installation to be inspected before it is commissioned.

The inspection must be carried out by a suitable qualified person and should be documented.

The above applies to closed heating systems. If the heat pump is replaced, the installation must be inspected again.

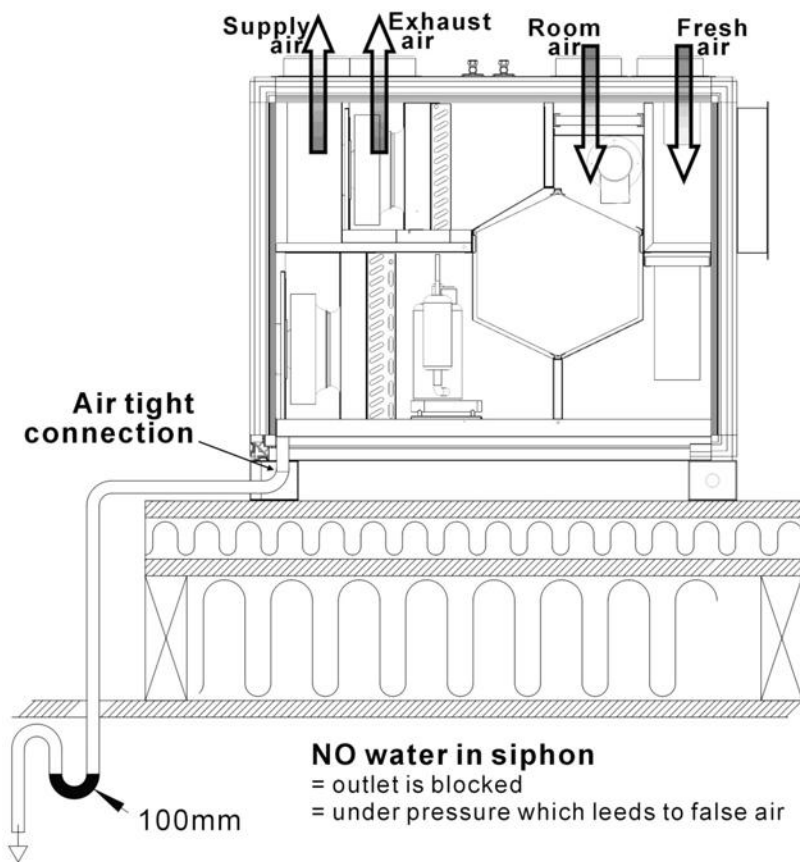


3. Installation

3.1 Before installation

When installing the machine, please follow these instructions:

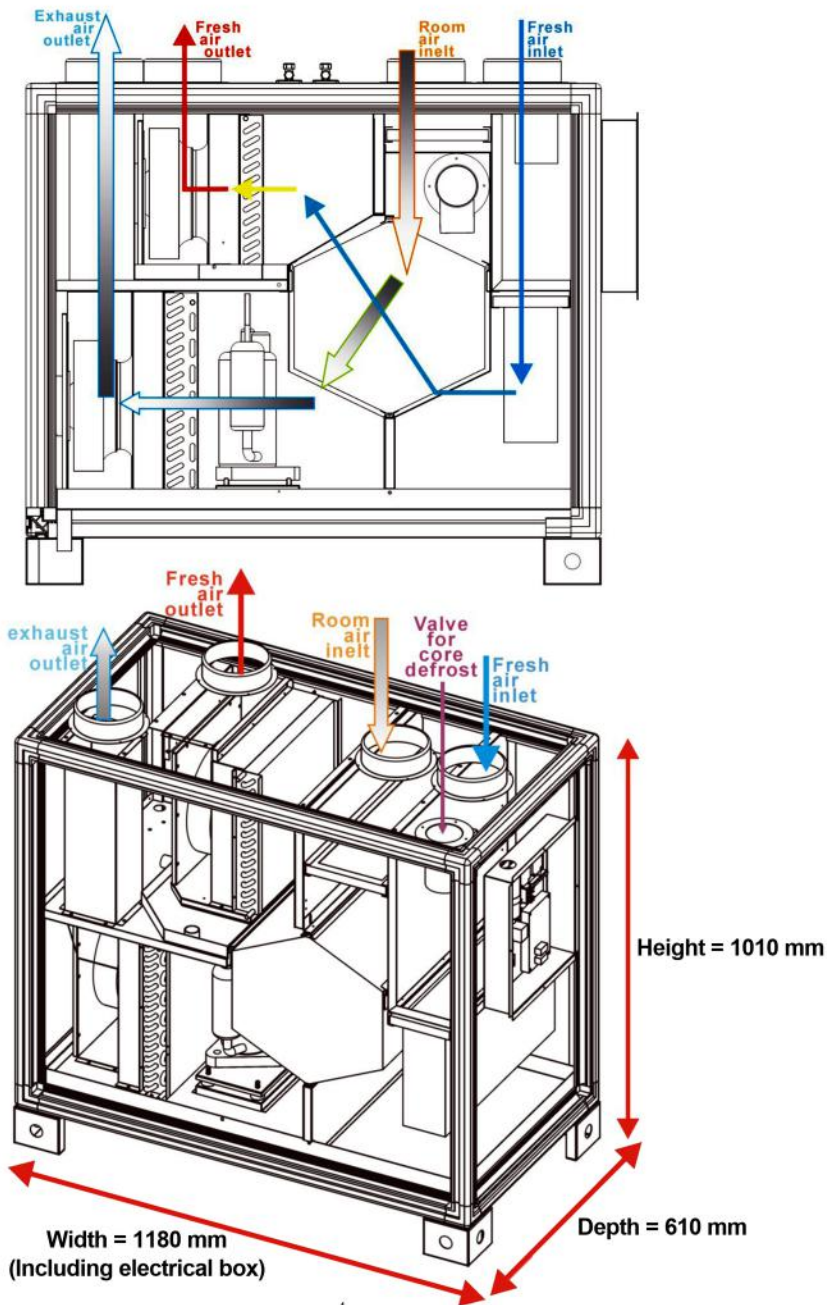
- 1) Make sure that the machine is in a vertical position.
- 2) Install an airtight water trap on a non-freezing location to compensate for fan pressure.
- 3) The height of the water trap must be at least 100 mm.
- 4) Make sure that the drain flows downwards all the way from the unit.
- 5) Pour some water into the drip tray of the unit to verify that it functions properly.
- 6) If freezing of the water trap may occur, it will be necessary to install a thermostat and an electrical heater to prevent freezing when the temperature drops below +2C°.
- 7) Air flow adjustments must be made on both the supply and exhaust side prior to normal use of the machine. It is important to have a balance between supply and exhaust air volumes.
- 8) It is recommended to keep the ducts closed until the unit is adjusted and working.
- 8) It is recommended to keep the ducts closed until the unit is adjusted and working.



3.2 Duct connection

At all duct connections there is a sticker indicating which ventilation duct to be connected.

- Connect the supply air inlet:** Duct from the unit to the supply outlet in the living room.
- Connect the room air inlet:** Duct from rooms to the unit.
- Connect the fresh air inlet:** Duct from fresh air to the unit.
- Connect the exhaust air outlet:** Duct from unit to the escaping roof cowls/external grills.



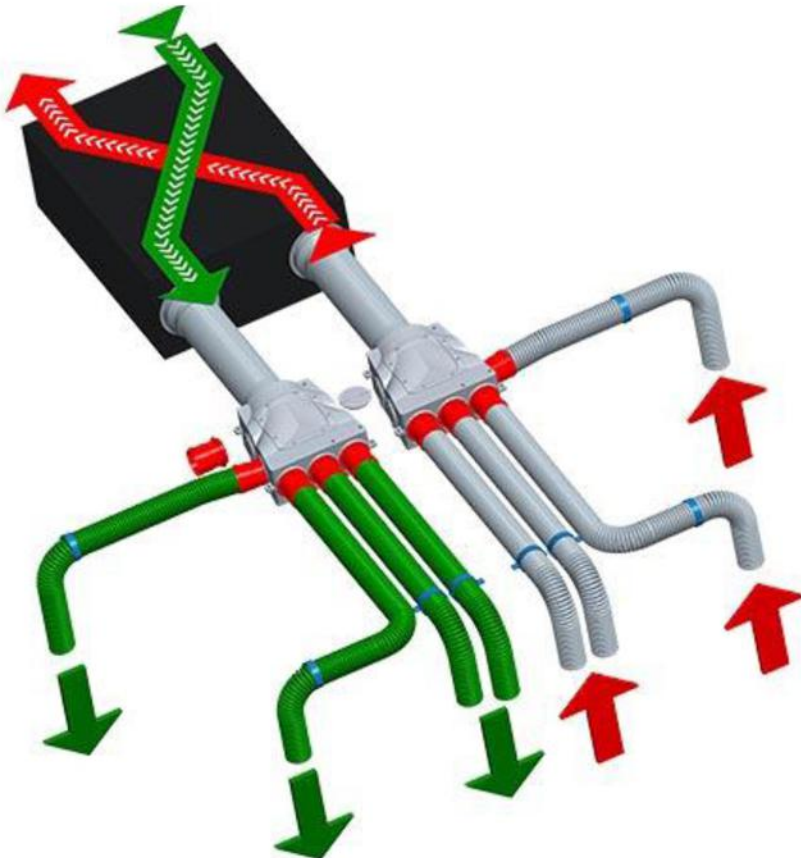
3.3 Duct system

It is recommended that the duct system is made using spiral ducting with rubber ring seal fittings in order to provide a tight and durable duct system. To achieve a satisfactory low sound level from the unit, silencers must always be fitted to the supply and extract air duct system between the unit and the first supply and extract valves.

It is recommended that the air speed in the ducts is calibrated at a sufficiently low level to prevent noise from the supply and extract valves.

When positioning fresh air and extract roof cowls/grills, make sure that the two air flows do not intercept causing escaping air to be drawn in again. It is recommended that grills are placed on the north or east side of the house to ensure optimum comfort.

In flats/houses where it is not possible to provide a sufficient distance between the fresh air and the exhaust air.



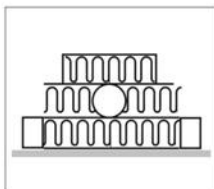


3.4 Insulation of ducts in cold loft spaces

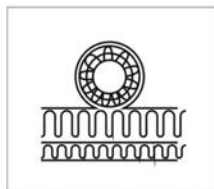
In order to high recovery rate of the unit, it is necessary to insulate the ducts correctly.

3.4.1 Supply and extract air duct:

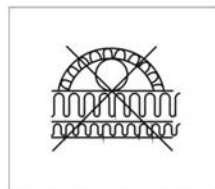
To minimize heat losses from the duct system in cold loft spaces, the supply and extract ducts must be insulated with a minimum 100 mm insulation mat. If insulation type A is chosen, it is recommended that it is done with two layers of 50 mm mats wrapped with paper or foil on the outside and with staggered joints between the two layers. If the ducts are positioned on the rafter foot, type B may be chosen. The insulation must always be tightly wrapped round the ducts.



Duct insulation, alt. B



Duct insulation, alt. A



faulty duct insulation

3.4.2 Fresh air and exhaust air ducts in cold spaces:

It is recommended that fresh air and exhaust air ducts are insulated with a minimum of 50 mm insulation. The fresh air duct is insulated to prevent warm air in the loft in summer from heating up the fresh air. Make sure to seal the termination where the escaping duct is led through the roof or through the gable end in order to avoid condensation damage.

3.5 Condensate drain

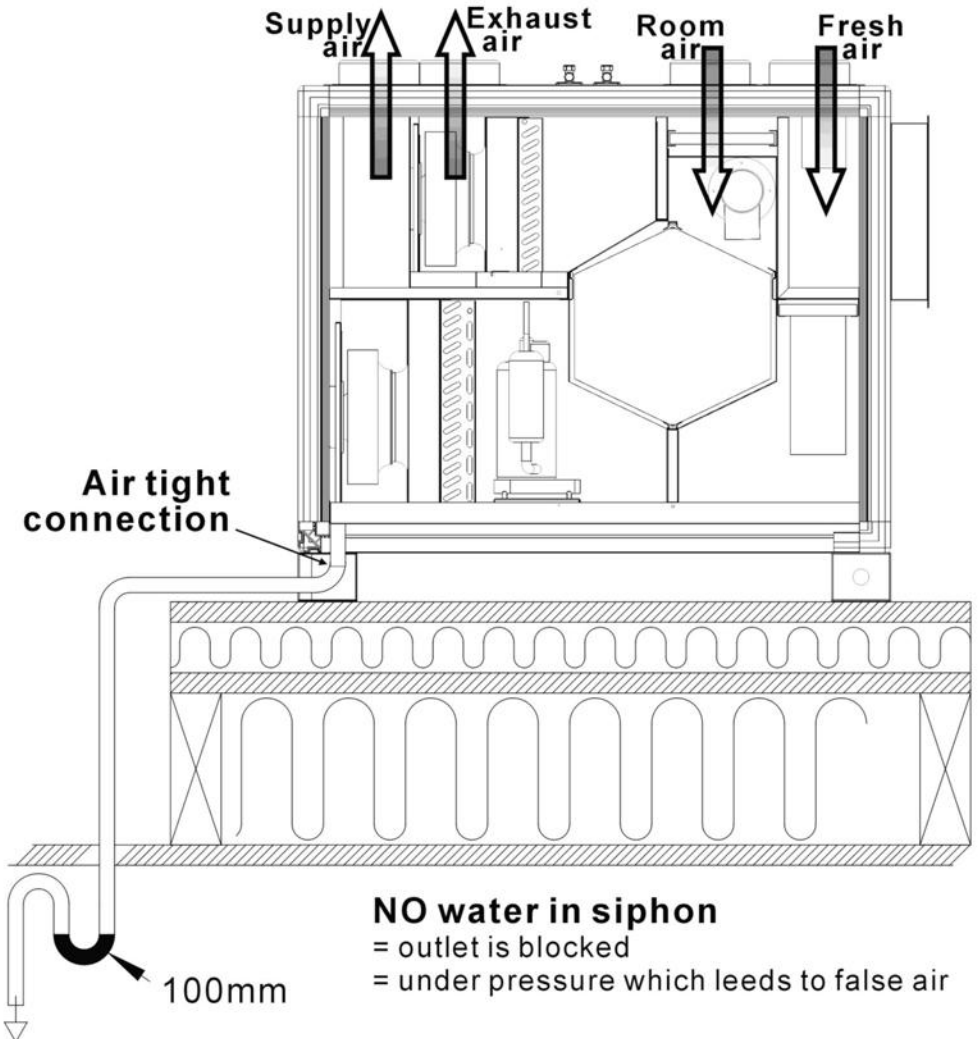
The unit produces up to 5-8 litres of condensate per day. It is therefore important that the condensate drain is correctly made.

The condensate drain pipe must be mounted with the necessary gradient and attached to an internal outlet.

If the unit is installed in a cold loft space, the condensate drain pipe must be insulated to prevent freezing of the condensate in the pipe.

However, it is recommended that the water trap is installed in a heated space to ensure that the water does not freeze.

If installation problems make it impossible to securely insulate the condensate drain pipe to prevent it from freezing, it will be necessary to mount a thermostat-controlled heating coil around the condensate drain pipe.



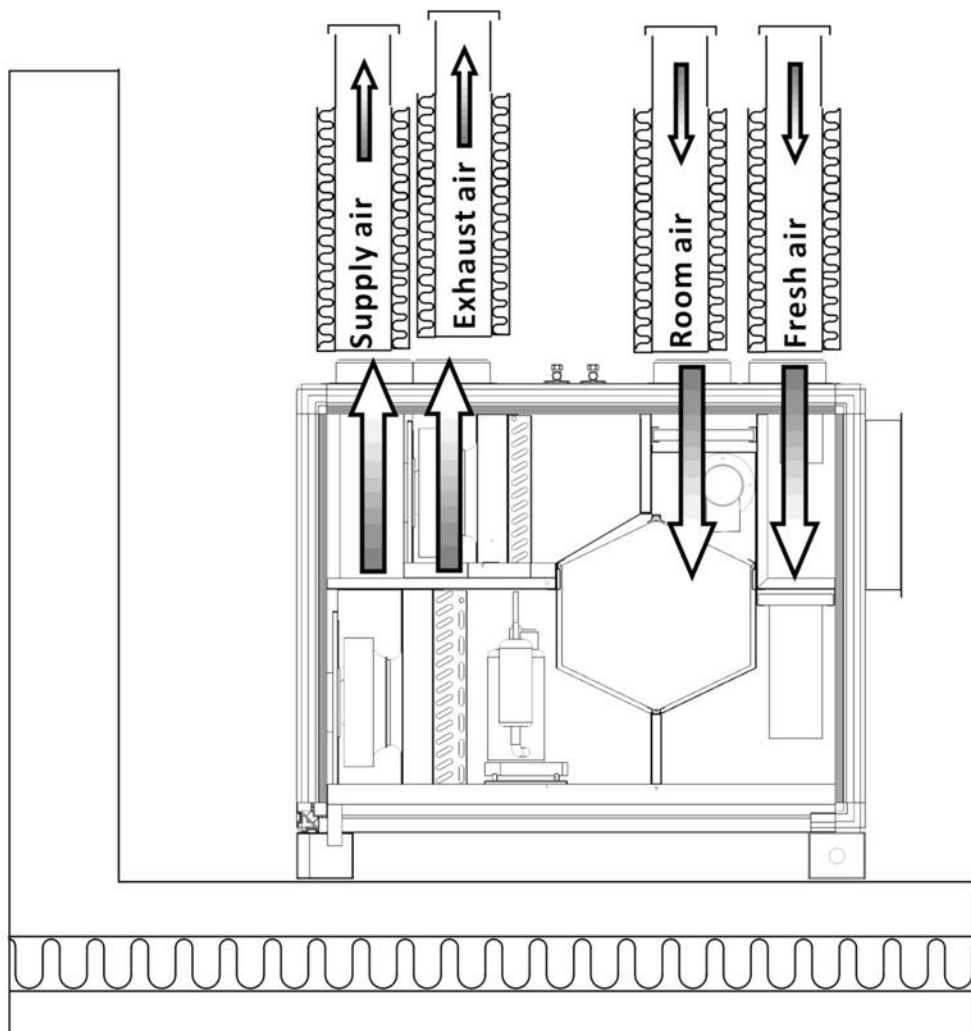
3.6 Insulation of ducts in warm spaces

Supply and extract air ducts:

In warm spaces the supply and extract channels must be insulated with 50 mm insulation. Supply and extract ducts in heated spaces do not require insulation.

Fresh air and exhaust air ducts:

In warm loft spaces and warm rooms the fresh and exhaust air ducts must be insulated with minimum 50 mm insulation. In addition, plastic or aluminum foil must be wrapped around the insulation in order to avoid condensate in the insulation.



4. Electrical connections

The electrical connection must be carried out by an authorized electrician.

See the electrical wiring diagram.

The cable between the unit and the wire controller is a 3 core 0.25 mm² cable with a maximum length of 20 M.

Before connecting the machine, make sure that the feeder is disconnected from the electrical network.

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 by 16 A circuit breaker or fuse; it must protect the Heat recovery ventilation with Heat pump exclusively; the circuit breaker must be specified with curve D and the fuse must be specified Am.

- Differential protection : 30 mA (the length of cable between the connector block of the heat pump should not exceed 12 M as a safety precaution).

4.1 Commissioning of the unit

4.1.1 To achieve optimal running of the unit it must be adjusted with air measuring equipment.

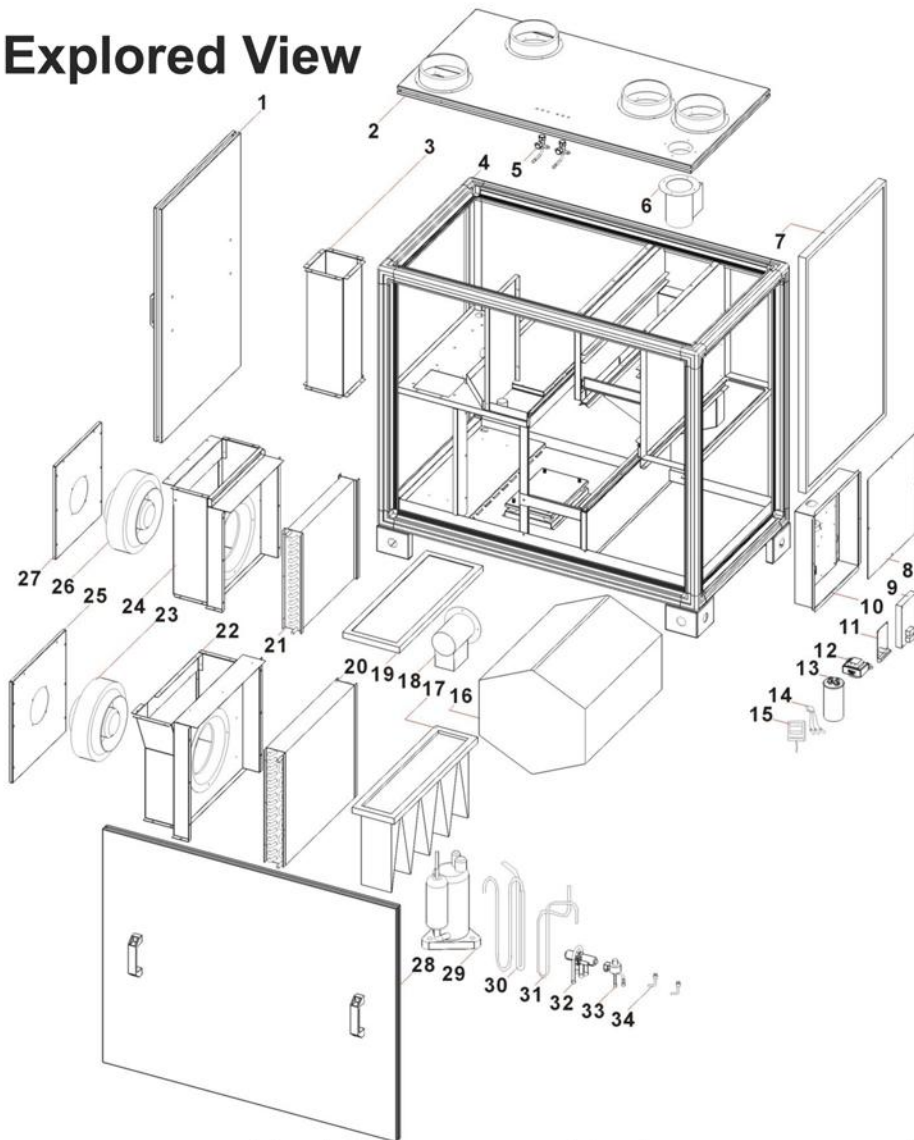
4.1.2 If you wish to start up the unit before adjustment, do as follows.

Before starting up the unit:

1. Make sure that the machine unit is correctly mounted and that all ducts are insulated as required.
2. Make sure that inspection doors can be opened so that service and maintenance of the unit can be carried out.
3. Make sure that filters are clean (may have become dirty from installation work).
4. Make sure that the condensate drain is correctly mounted with a water trap and is protected from freezing.
5. Pour 1 litre of water into the condensate tray and make sure that it can run through the condensate drain pipe without hindrance.
6. Made sure that all ducting is well sealed.

The unit can now be started up and run until adjustment with air measurement equipment has been carried out.

5. Exploded View



1	Left door	13	Compressor capacitor	25	Support for exhaust motor
2	Top board	14	Temperature sensor	26	Supply motor (outdoor)
3	Channel for exhaust air	15	Wire controller	27	Support for supply motor
4	frame	16	Plastic core	28	Front door
5	Service valve	17	Fresh air bag filter	29	Compressor
6	Valve for summer bypass	18	Valve for core defrost	30	Return copper pipe
7	Right board	19	Room air nylon filter	31	Exhaust copper pipe
8	Cover for electrical control box	20	evaporator	32	4-way-valve
9	Main PCB	21	condenser	33	Electronic expansion valve
10	Electrical control box	22	Support for exhaust motor	34	High/low pressure protection
11	EEV PCB	23	Exhaust motor (indoor)		
12	transformer	24	Support for supply motor		

5.1 main components:



compressor



Condenser (2 layer)
Evaporator (3 layer)



Electronic expansion valve



Pressure switch



4-way-valve



hexagon counter-flow plate



circuit board



Wire controller



Sensor



Nylon air filter



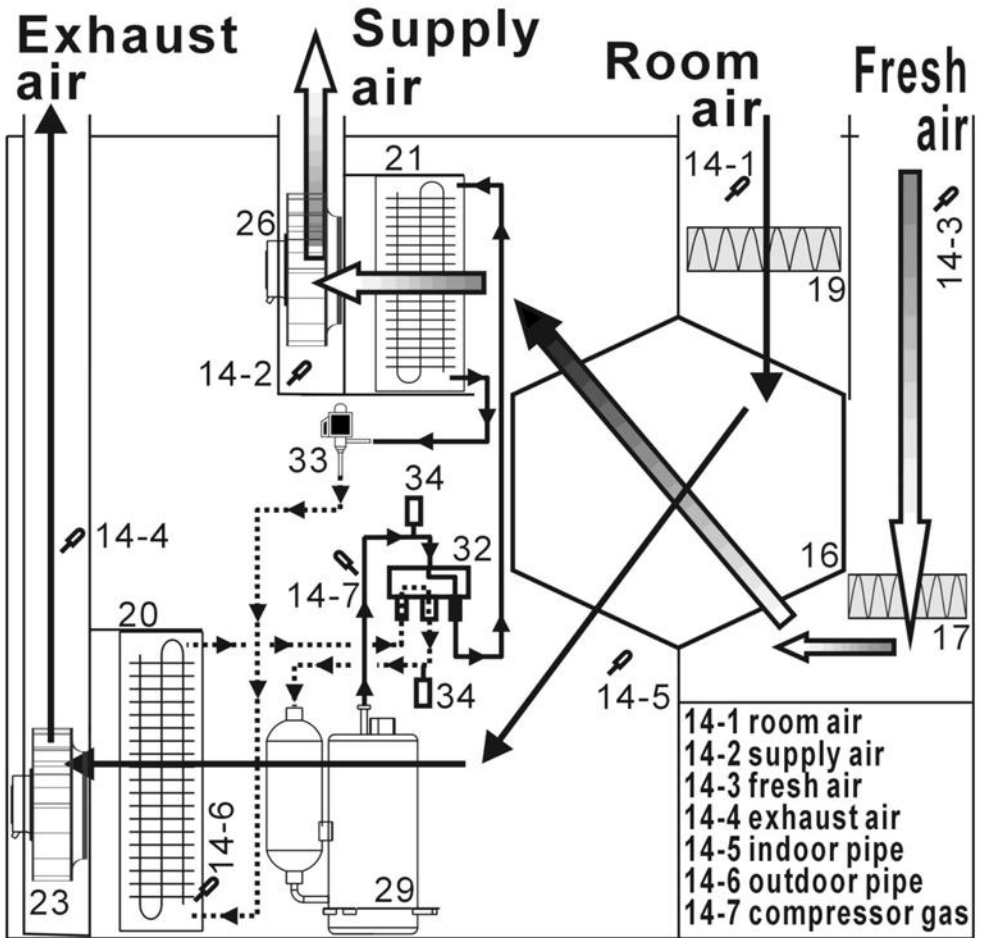
Bag air filter



Fan motor

6. Refrigerant system drawing

The following drawing is heating mode:

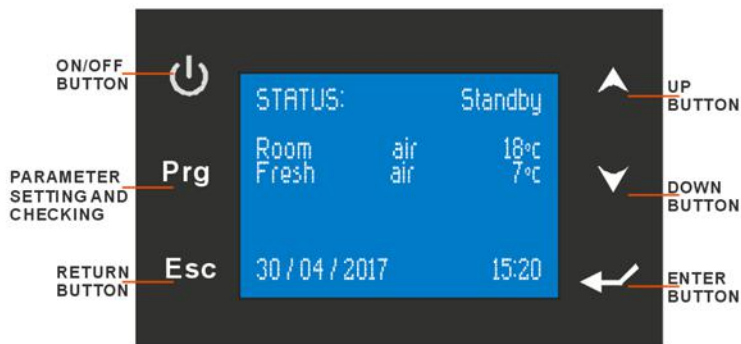


Working principle of a Heat Pump:

The working fluid (R410a), in its gaseous state, is pressurized and circulated through the system by a compressor. On the discharge side of the compressor, the hot and highly pressurized gas is cooled in a heat exchanger (called a condenser), until it condenses into a high pressure moderate temperature liquid. The condensed refrigerant then passes through a pressure-lowering device like an expansion valve, capillary tube, or possibly a work-extracting device such as a turbine. This device then passes the low pressure, (almost) liquid refrigerant to another heat exchanger (the evaporator), where the refrigerant evaporates into a gas via heat absorption. The refrigerant then returns to the compressor and the cycle is repeated .

7. Wire controller

7.1 panel



7.1.1 Functions

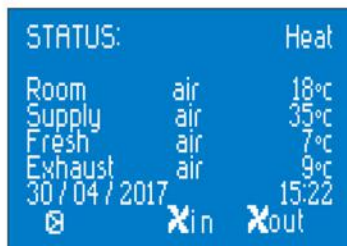
Select the desired menu and increase or reduce preset values using the six buttons.

- UP BUTTON
- DOWN BUTTON
- ENTER BUTTON: Open the desired menu
- RETURN BUTTON: Return to the previous menu
- PARAMETER SETTING AND CHECKING BUTTON
- ON/OFF: Press 3 seconds to switch on or off the unit

7.2 Menu Navigation

7.2.1 During normal operation, the following information will be displayed:

- Status: When the unit is on, it displays the current running mode (heat ,cool or fan). When the unit is off, it displays "Standby".
- Desired: (preset) Room air temperature, fresh air temperature, supply air temperature, and exhaust air temperature.
- Day and clock



Compressor



indoor fan motor (exhaust motor)



outdoor fan motor (supply motor)

7.3 Main Menu

7.3.1 Main Menu INFORMATION

To open the main menu MAIN MENU, press the **Prg** button.



To select the desired sub-menu use the up or down button .

Open the menu by pressing the enter button.

To return to the main menu, press the return button.

7.3.2 Sub-Menu MAIN MENU



• COOL / HEAT / FAN

This menu is used for the selection of operating mode. The control system allows for three different operating modes:

- cool mode
- heat mode
- fan1 mode: two motor run
- Fan2 mode: exhaust motor run, supply motor stop

• AUX HEATING (CANCEL)

• IN.FAN SPEED

Select 3 indoor fan speeds: high speed-----middle speed----- low speed

• OUT.FAN SPEED

Select 3 outdoor fan speeds: high speed-----middle speed----- low speed

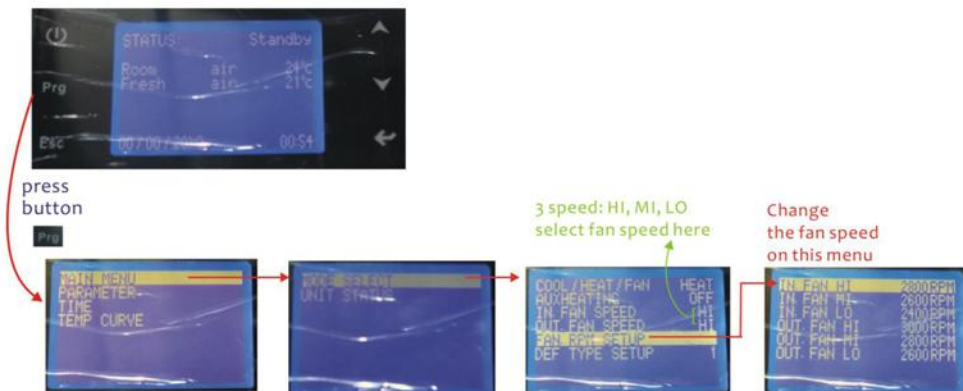
• FAN RPM SETUP:

select of indoor fan and outdoor fan speed

IN.FAN HI	2500 RPM
IN.FAN MI	2200 RPM
IN.FAN LO	1800 RPM
OUT.FAN HI	2500 RPM
OUT.FAN MI	2200 RPM
OUT.FAN LO	1800 RPM

Fan motor has 3 speed selections; rotary motor speed for each speed selection can be changed on wire controller.

Attach the air measuring equipment to the air outlet, start the machine and then adjust the air volume by changing the RPM.



• BY PASS MODE:

Selection of by-pass valve:

- 1: Activate by-pass valve (in COOL, when room air > fresh air, by-pass valve switch ON)
- 0: Cancel by-pass valve

7.3.3 Sub-Menu UNIT STATUS

This menu shows all of current temperature.

UNIT STATUS		
Room	air	18°C
Supply	air	35°C
Fresh	air	7°C
Exhaust	air	9°C
Indoor	pipe	9°C
Outdoor	pipe	0°C
Compressor	gas	55°C

Menu Text	Description
Room air	current temperature of room inlet air
Supply air	current temperature of room outlet air
Fresh air	current temperature of ambient air inlet
Exhaust air	current temperature of exhaust air outlet
Indoor pipe	current air temperature of after core
Outdoor pipe	current pipe temperature evaporator
Compressor gas	current compressor gas temperature

*** All the above temperature changes registered over the last 3 hours are stored in the control system and can be viewed in the shape of graphs.

7.4 PARAMETER

COOL TEMP	27°C	Outdoor fan	special
HEAT TEMP	20°C	Fan ahead	0M
DEF. CYC	30M	Swell valve	
DEF. IN	-1°C		
DEF. OUT	8°C		
DEF. TIME	8M		
SYSTEM	2°C		
SAVE	YES		

Table 1: PARAMETER

Menu Text	Description	Range	Factory setting
COOL TEMP	Setting temperature in cooling mode	16 – 30 °C	27°C
HEAT TEMP	Setting temperature In heating mode	16 – 30 °C	20°C
DEF. CYC	Cycle of defrosting under heat mode	10-150 MIN	30 MIN
DEF. IN	Defrosting start temperature	-30 ~ 0°C	-1°C
DEF. OUT	Defrosting exit temperature	3 ~ 15°C	8°C
DEF.TIME	Time of exit defrost Under heat mode	1-12Min	8 MIN
SYS TEM	Difference of compressor restart	1-10°C	2°C
SAVE	Automatic restart	YES/NO	YES
Outdoor fan	Normal: outdoor fan stop after 30 seconds of compressor stopping. Special: when the unit is on, outdoor fan never stop when	Normal/Special	Special
Fan ahead	The ahead time of fan	1-10Min	No use
Swell valve	adjust EEV step		

Adjust EEV step

Password is 0 0 0 0



SET STEP to adjust EEV step



Table of EEV step for HEAT

fresh	< -7'c	-.7~-0	-.0~10	10~25	> 25'c
Room < 20'c	EV1	EV2	EV3	EV4	EV5
Room > 20'c	EV6	EV7	EV8	EV9	EV10

Table of EEV step for COOL

fresh	< 15'c	.15~-20	.20~30	.30~35	> 35'c
Room < 25'c	EV11	EV12	EV13	EV14	EV15
Room > 25'c	EV16	EV17	EV18	EV19	EV20

EEV step for heat pump defrost is 470N

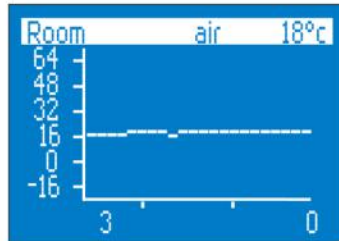
7.5 TIMER



Menu Text	Description
DATE	current date
CLOCK	current time
TIMER ON	TIMER for unit switch ON
TIMER OFF	TIMER for unit switch OFF

Timer OFF and Timer ON can be set at the same time.

7.6 TEMP CURVE



***All the above temperature changes registered over the last 3 hours are stored in the control system and can be viewed in the shape of graphs.

Press up and down button to the right item, and press enter button to open the curve.

7.7 TIMER for LOW speed

Adjust 4 sets of TIMER ON for LOW fan speed.

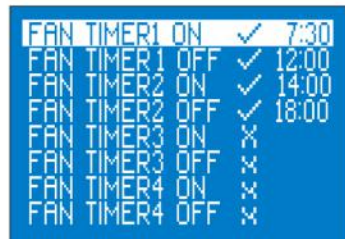
For example:

FAN speed is LOW from 7:30 to 12:00

Fan speed is pre-set from 12:00 to 14:00

Fan speed is LOW from 14:00 to 18:00

Fan speed is pre-set from 18:00 to 7:30



7.8 Error code

In the event of an alarm, the background light of LCD will flash and an alarm message will be displayed

COOL TEMP	27°C
HEAT TEMP	20°C
DEF. CYC	30M
DEF. IN	-4 °C
DEF. OUT	13°C
DEF. TIME	6M
SYSTEM	1°C
SAVE	YES

Check the alarm indicator regularly to make sure that the heat pump works properly. For more information, please refer to the following ALARM MESSAGE.

In the event of an alarm message, try to re-start the unit with the safety switch.

If this does not work, try to solve the problem with the help of the table below. Call your installation contractor if you need help.

Error code and text	Component	possible
PP1: Room air sensor	Room air sensor failure	Sensor disconnected, non supplied or defective
PP2: Supply air sensor	Supply air sensor failure	
PP3: Outdoor pipe sensor	Outdoor pipe sensor failure	
PP4: Exhaust air sensor	Exhaust air sensor failure	
PP5: Fresh air sensor	Fresh air sensor failure	
PP8: Indoor pipe sensor	Indoor pipe sensor failure	
PP9: Compressor gas sensor	Compressor gas sensor failure	
PP10: Indoor pipe over heat	Indoor pipe over heat	Indoor pipe over heat
EE1: High pressure protect	High pressure protect	protector is disconnected Room air temperature is too high Fresh temperature is too high EEV step too small Air volume is too small
EE2: Low pressure protect	Low pressure protect	protector is disconnected, or defective, or leakage of gas
EE3: Compressor gas too heat	Compressor over-heat protection	leakage of gas
E04: Phase failure	Power supply phase error	Power phase is not right
E06: Outdoor fan feedback	Outdoor fan no feedback	Fan motor no feedback, defective
E07: Indoor fan feedback	Indoor fan no feedback	Fan motor no feedback, defective
E08: communication failure	control communication error	Signal cable of Controller loose

8. Function

8.1 Temperature control:

Unit has following temperature sensor:

- Room air: room air inlet sensor to start / stop compressor
- Supply air
- Exhaust air
- Indoor pipe: sensor after core for core defrost
- Outdoor pipe: sensor at evaporator for heat pump defrost
- Compressor gas

UNIT STATUS		
Room	air	18°C
Supply	air	35°C
Fresh	air	7°C
Exhaust	air	9°C
Indoor	pipe	9°C
Outdoor	pipe	0°C
Compressor	gas	55°C

8.2 Heating operation:

4-way-valve switch ON

When **Room air** > **HEAT TEMP**, compressor stop.

When **Room air** ≤ **HEAT TEMP** + **SYSTEM**, compressor start.

COOL TEMP	27°C
HEAT TEMP	20°C
DEF. CYC	30M
DEF. IN	-1°C
DEF. OUT	6°C
DEF. TIME	8M
SYSTEM	2°C
SAVE	YES

8.3 Cooling operation:

4-way-valve switch OFF

When **Room air** < **COOL TEMP**, compressor stop.

When **Room air** ≥ **COOL TEMP** + **SYSTEM**, compressor start.

8.4 defrost

defrosting run in HEAT mode. C

- Start of defrost:

The defrosting will start when all following conditions are at the same time fulfilled:

- the evaporator sensor temperature goes down to -1°C (parameter DEF. IN)
- the compressor continue to runs 30 minutes (parameter DEF. CYC)

When the evaporator sensor fails (Error Code), heat pump enters into TIMER defrosting operation,

Each time for 8 minutes after running for 30 minutes (parameter DEF. CYC)

- Action of defrosting:

- The compressor stop, outdoor fan stop, indoor fan run.
- After 30 seconds, the 4 way valve switches OFF.
- 35 seconds later, compressor starts, and hot refrigerant will enter into evaporator, the ice on evaporator will be melt, that is generally with a steam.

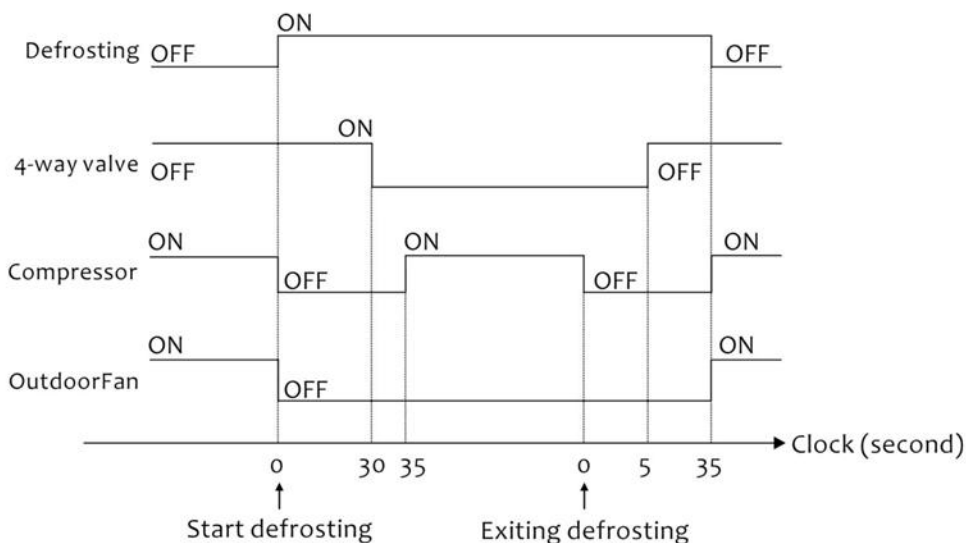
- Stop of defrosting:

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

- Evaporator sensor increase to 8°C (parameter DEF. IN)
- Compressor run totally 8 minutes (parameter DEF. TIMER)

- Action of exist defrosting:

- The compressor stops
- 4 way valve switch ON 5 seconds
- 30 seconds later, compressor and outdoor fan start for restarting in heating mode.



8.5 Protection:

8.5.1 Refrigerant high pressure protection:

During non-defrosting, circuit board check high pressure switch OFF 5 seconds. The unit stops and restarts 3 minutes later. If the unit checks 3 times within 30 minutes, the heat pump stops and wire controller displays EE1.

Unit has to disconnect power supply to resume.

8.5.2 Refrigerant low pressure protection:

During non-defrosting, circuit board check low pressure switch OFF 5 seconds. The unit stops and restarts 3 minutes later. If the unit checks 3 times within 30 minutes, the heat pump stops and wire controller displays EE2.

Unit has to disconnect power supply to resume.

8.5.3 Compressor over-heat protection:

Circuit board checks compressor exhaust temperature $> 115^{\circ}\text{C}$, compressor stops; when compressor exhaust temperature $< 90^{\circ}\text{C}$, compressor starts. If the unit checks 3 times within 30 minutes the heat pump stops and wire controller displays EE3.

8.5.4 Outdoor motor malfunction:

When outdoor motor receives no feedback signal to circuit board, the circuit board causes the outdoor fan to run at HI speed for 10 seconds. If there is still no signal from outdoor motor, the unit stops and wire controller displays EE6.

Unit has to disconnect power supply to resume.

8.5.5 Indoor motor malfunction:

When indoor motor no feedback signal to circuit board; circuit board let indoor fan run at HI speed 10 seconds, still no signal from indoor motor, unit stop, wire controller show EE6. Unit has to disconnect power supply to resume.

8.5.6 Communication malfunctions:

If the circuit board does not receive a signal from wire controller, the wire controller displays EE8.

8.5.7 Auto restart function:

All parameters are saved to the circuit board. When there is an abnormal power failure, the unit will stop. When the power supply resumes, the unit will run in the most recent operation mode.

9. Maintenance.

The following instructions must be following in order to ensure optimum operation of the unit:
When the unit has been installed for the first time, make sure the water drains are checked after a few days to make sure they are performing well.

9.1 CORE heat exchanger:

Inspect the CORE heat exchanger every year. If it is dirty, remove it and wash in warm soap water and then rinse, if possible in the bathroom using the shower head.



9.2 Fan:

Every year check the two fan motor for dirt. If they are dirty they may be cleaned with a brush, bottle washer etc.



9.3 air filter

Every 3 months check two air filters for dirty. If they are dirty, they may be cleaned by shaking it and by removing the worst dirt, or change a new one.

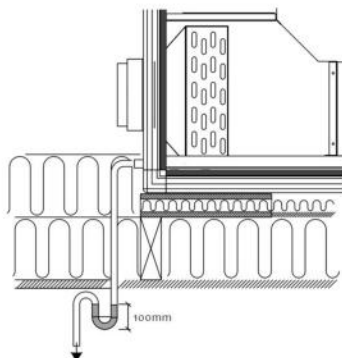
Do not vacuum or clean at high air pressure, it will damage the filter.



9.4 condensate drain:

Before outside temperatures fall to 5°C, measure that the condensate drain is not blocked by dirt and make sure that there is water in the water trap.

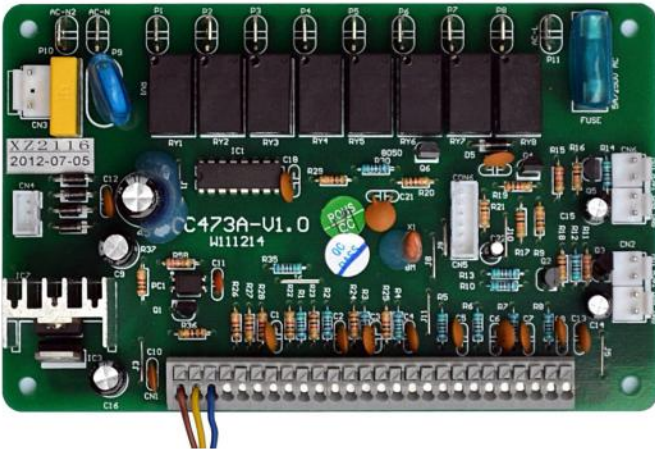
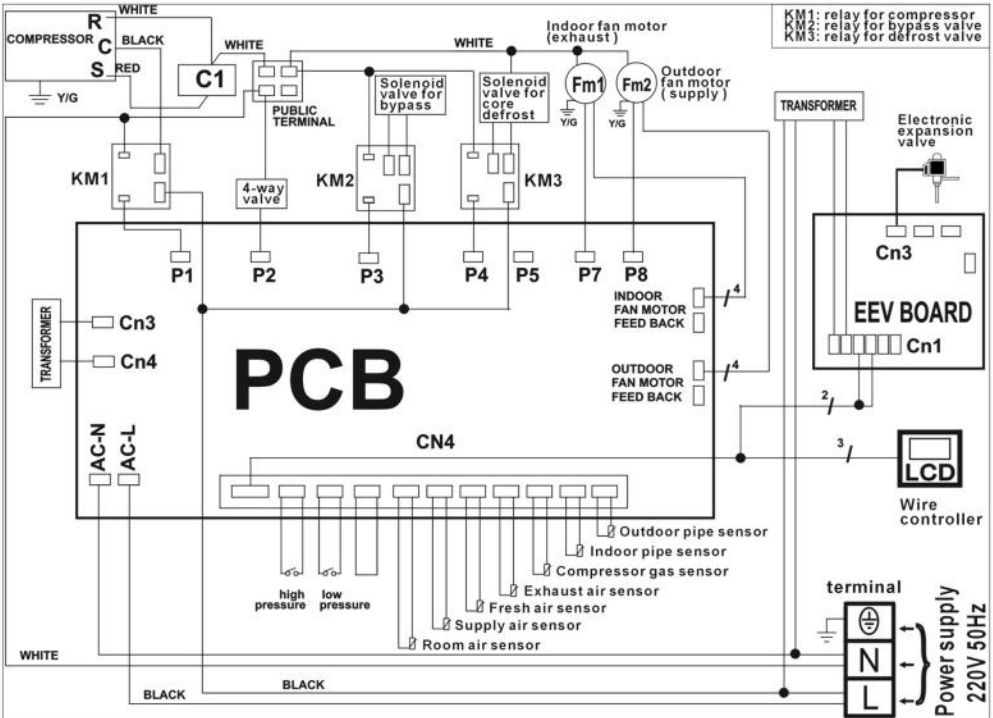
Pour 1 liter of water into the condensate tray and make sure it runs off without hindrance. If the condensate drain does not work, this could lead to water damage in the dwelling.



⚠ WARNING

Service: If you are unable to maintain your machine yourself, you can sign a service agreement with the installer. If any faults arise in the unit, contact the installer.

10. Electrical diagram:



Between the unit and the wire controller, a light current cable 3 x 0.25 mm² should be mounted. The maximum cable length is 20 metres.



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EarthSave Products Limited, Units 6 & 7, Henderson House, Wallingford, Oxfordshire OX10 9DG
 T: +44 (0) 1865 598158 E: infoesp@esavep.com W: earthsaveproducts.com