162 605 32-2 2022-02-17

Installation and Maintenance Manual

CTC EcoAir 400

Model 406 I 408 I 410 I 415 I 420

Air/water heat pump

Important!

- Read carefully before use, keep for future reference.
- Translation of the original instructions.

Installation and Maintenance Manual

CTC EcoAir

Model 406 I 408 I 410 I 415 I 420

Air/water heat pump

Table of Contents

Congratulations on buying your new product!

The complete air source heat pump

The CTC EcoAir 400 is an outdoor air source heat pump which moves heat from the outside air and delivers it to the heating circuit of the building. The CTC EcoAir 400 works with outside air temperatures down to -22°C.

The heat pump can be connected to a CTC EcoZenith, CTC EcoVent i360F or to an existing boiler via the CTC EcoLogic control system.

The CTC EcoAir 400 has been designed to operate with high efficiency and low noise levels. The heat pump has integrated discharge defrosting which keeps the evaporator coil free from ice to maintain high efficiency.

Save this manual containing the installation and maintenance instructions. If properly maintained, you will be able to enjoy the use of your CTC EcoAir 400 for many years. This manual provides all the information you will need.

1. Important to remember!

Check the following points in particular at the time of delivery and installation:

1.1 Transportation

- Transport the heat pump to the installation location before removing the packaging. Move the product using one of the following means:
  - Forklift
  - Lifting band around the pallet. NB: Can only be used with the packaging on.
- The heat pump must be transported and stored upright.

1.2 Positioning

- The heat pump must be transported and stored upright.
- Remove the packaging and check before installation that the product has not been damaged in transit. Report any transport damage to the carrier.
- Place the product on a solid foundation, preferably concrete.
  If the heat pump needs to be placed on a soft carpet, base plates must be placed under the adjustable feet.
- Remember to leave an access and service area of at least 1 metre in front of the heat pump.
- The heat pump must not be placed below floor level.
- Avoid placing the heat pump in rooms where the walls are of lightweight design, as people in the adjoining room may be disturbed by the compressor and vibrations.

When contacting CTC, always mention the following:

- Serial number
- Model/Size
- the fault message shown in the display
- Phone number

1.3 Recycling

- The packaging must be deposited at a recycling station or with the installation engineer for correct waste management.
- Obsolete products must be disposed of correctly and transported to a waste station or distributor/ retailer offering this service.
  Disposal of the product as household waste is not permitted.
- It is very important that the product's refrigerant, compressor oil and electric/electronic components are disposed of correctly.

1.4 After commissioning

- The installation engineer advises the property owner on the design and servicing of the system.
- The installation engineer fills in a checklist and contact information – the customer and installation engineer sign the list, which the customer keeps.
- Make sure to register the product for warranty and insurance via the CTC website.
  https://www.ctc-heating.com/customer-service#warranty-registration

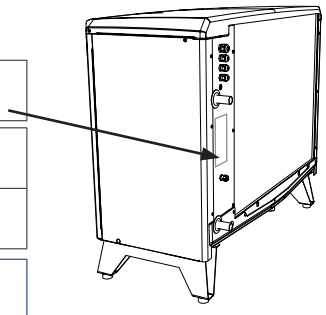
Information in this type of box [i] is intended to help ensure that the product functions optimally.

Information in this type of box [!] is particularly important for correctly installing and using the product.

For your own reference

Fill in the information below. It may come in useful if anything should happen.

Product:	Serial number:
Installer:	Name:
Date:	Tel. no.:
Electrical installer:	Name:
Date:	Tel. no.:



Safety instructions

Turn off the power with an omnipolar switch before doing any work on the product.

The product must be connected to protective earth.

The product is classified as IP X4.

When handling the product with a hoist ring or similar device, make sure that the lifting equipment, eyebolts and other parts are not damaged. Never stand under the hoisted product.

Never jeopardise safety by removing bolted covers, hoods or similar.

Never jeopardise safety by deactivating safety equipment.

Any work on the product's cooling system should be carried out by authorised personnel only.

The product's electrical systems should only be installed and serviced by a qualified electrician.

-If the supply cord is damaged, it must be replaced by the manufacturer, its service agent or similarly qualified persons in order to avoid a hazard.

This device can be used by children from the age of eight years and above and by people with reduced physical, sensory or mental ability or lack of experience or knowledge if they have been taught, either with supervision or with the instructions provided, how to use the device safely and understand the risks involved. Children should not play with the device. Cleaning and maintenance should not be carried out by children without supervision.

If these instructions are not followed when installing, operating and maintaining the system, Enertech's commitment under the applicable warranty terms is not binding.

Checklist

The checklist must always be completed by the installation engineer

- If service is needed, you may be required to provide this document.
- Installation must always be done according to the installation and maintenance instructions
- Installation must always be carried out in a professional manner

Following installation, the unit must be inspected and functional checks performed as indicated below:

Pipe installation

- ☐ Heat pump filled, positioned and adjusted in the correct manner according to the instructions.
- ☐ The heat pump is positioned so that it can be serviced
- ☐ Capacity of the charge/radiator pump (depending on type of system) for the flow required.
- ☐ Open radiator valves (depending on type of system) and other relevant valves.
- ☐ Tightness test
- ☐ Bleed the system
- ☐ Check proper operation of the requisite safety valves
- ☐ Action taken to deal with condensation water

Electrical installation

- ☐ Power switch
- ☐ Correct tight wiring
- ☐ Requisite sensors fitted
- ☐ Accessories

Customer information (adapted to the relevant installation)

- ☐ Start-up with customer/installer
- ☐ Menus/controls for selected system
- ☐ Installation and maintenance manual supplied to the customer
- ☐ Check and filling, heating circuit
- ☐ Information on fine adjustments
- ☐ Alarm information
- ☐ Functional test of safety valves fitted
- ☐ Register your Installation Certificate at ctc-heating.com.
- ☐ Information on procedures for fault registration

Date/Customer

Date/Installer

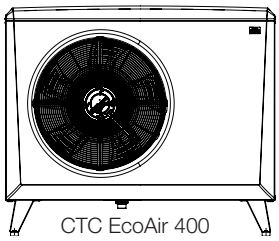
2. Connection alternative CTC EcoAir 400

The illustration below shows the different connection alternatives available for the CTC EcoAir 400 In some cases, a CTC Converter or CTC Basic display may be needed. See the chapter on Connecting the control system.

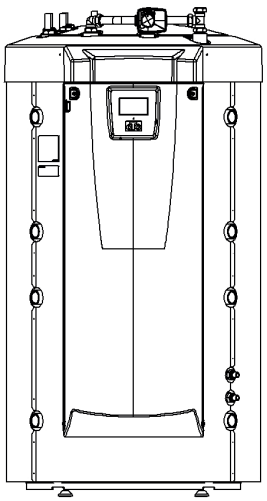
The CTC EcoAir 400 can be connected to the products below.

CTC EcoLogic Pro/Family

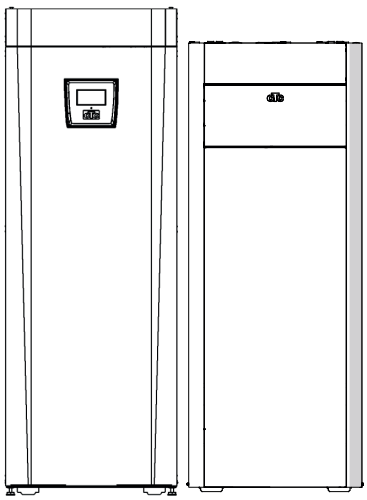
CTC EcoLogic S, M, L



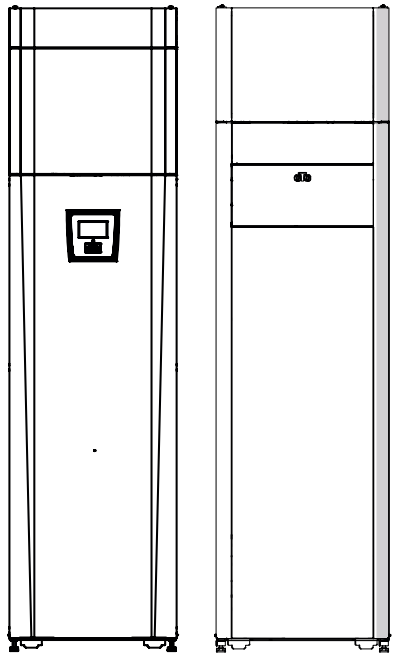
CTC EcoAir 400



CTC EcoZenith i555 Pro
CTC EcoZenith i550 Pro



CTC EcoZenith i255
CTC EcoZenith i360
CTC EcoZenith i250
CTC EcoZenith i350



CTC EcoVent i360F
CTC EcoVent i350F

> **!** CTC EcoZenith i250, i255, i350, i360 and CTC EcoVent i350F/i360F can be connected to products with an output of up to 11 kW.

> **!** Use the CTC Converter for docking with CTC EcoEl v3 and CTC EcoZenith v3.

3. Technical data

3.1 Table 400V 3N~

CTC EcoAir 400		406	408
Electrical data		400V 3N~ 50 Hz	
Output power [1]	kW	6.2/4.8/3.8	7.8/6.0/4.7
Input power [1]	kW	1.3/1.3/1.2	1.6/1.6/1.6
COP [1]		4.78/3.69/3.10	4.83/3.76/3.02
Rated current [2]	A	4.0	4.9
Max starting current [4]	A / ms	11.9 / 200	10.8 / 260
Water volume	liter	1.9	2.4
Refrigerant quantity (R407C, fluorinated greenhouse gases GWP 1774)	kg	2.2	2.2
CO_2 equivalent	ton	3.902	3.902
Break value pressure switches HT	bar	31	
Max. operating pressure water (PS)	bar	2.5	
Dimensions (Depth x Width x Height)	mm	545 x 1245 x 1080	
Compressor / Oil type		Scroll / PVE FV50S	
Air volume	m^3/h	2500	2800
Fan speed	rpm	463	527
Fan input power	W	25	37
Weight	kg	120	126
Heat pump Keymark Cert. No.		012-056	012-057

[1] at 35°C water temp. and +7/+2/-7 air temp.

[2] Incl. charge pump.

[4] Max starting current measured at 100 mΩ ground circuit impedance.

CTC EcoAir 400		410	415	420
Electrical data		400V 3N~ 50 Hz		
Output power [1]	kW	11.8/9.2/7.6	15.9/12.0/10.0	17.6/13.9/11.5
Input power [1]	kW	2.4/2.4/2.3	3.5/3.4/3.3	4.1/3.9/3.9
COP [1]		4.82/3.86/3.27	4.76/3.57/3.03	4.62/3.54/3.02
Rated current [2]	A	7.5	10.0	11.8
Max starting current [4]	A / ms	14.3 / 240	24.1 / 220	24.4 / 220
Water volume	liter	2.8	3.9	4.5
Refrigerant quantity (R407C, fluorinated greenhouse gases GWP 1774)	kg	2.7	3.4	3.5
CO_2 equivalent	ton	4.789	6.031 [3]	6.209 [3]
Break value pressure switches HT	bar	31		
Max. operating pressure water (PS)	bar	2.5		
Dimensions (Depth x Width x Height)	mm	610 x 1375 x 1180		
Compressor type / Oil type		Scroll / PVE FV50S		
Air volume (low / high speed)	m^3/h	4100	4000 / 5400	5400 / 6200
Fan speed (low / high speed)	rpm	489	480 / 650	650 / 715
Fan input power	W	60	140	170
Weight	kg	180	187	190
Heat pump Keymark Cert. No.		012-058	012-059	012-060

[1] at 35°C water temp. and +7/+2/-7 air temp.

[2] Incl. charge pump.

[3] hermetically sealed equipment.

[4] Max starting current measured at 100 mΩ ground circuit impedance.

No annual leakage control of the refrigerant is required.

3.2 Table 230V 1N~

CTC EcoAir 400		406	408	410
Electrical data		230V 1N~ 50 Hz		
Output power [1]	kW	6.2/4.7/3.7	7.7/6.0/4.8	11.8/9.2/7.6
Input power [1]	kW	1.3/1.3/1.3	1.7/1.6/1.6	2.4/2.4/2.3
COP [1]		4.59/3.53/2.87	4.64/3.62/2,97	4.82/3.86/3.27
Rated current [2]	A	10.3	12.4	18.8
Max starting current	A	22.8	23.2	23.5
Max. system impedance	Ohm	-	-	0.392
Water volume	liter	1.9	2.4	2.8
Refrigerant quantity (R407C, fluorinated greenhouse gases GWP 1774)	kg	2.2	2.2	2.7
CO^2 equivalent	ton	3,902	3,902	4,789
Break value pressure switches HT	bar	31		
Max. operating pressure water (PS)	bar	2.5		
Dimensions (Depth x Width x Height)	mm	545x1245x1080		610x1375x1180
Compressor / Oil type		Scroll / PVE FV50S		
Air volume	m^3/h	2500	2800	4100
Fan speed	rpm	463	527	493
Fan input power	W	25	37	60
Weight	kg	120	126	201/180
Heat pump Keymark Cert. No.		012-056	012-057	012-058

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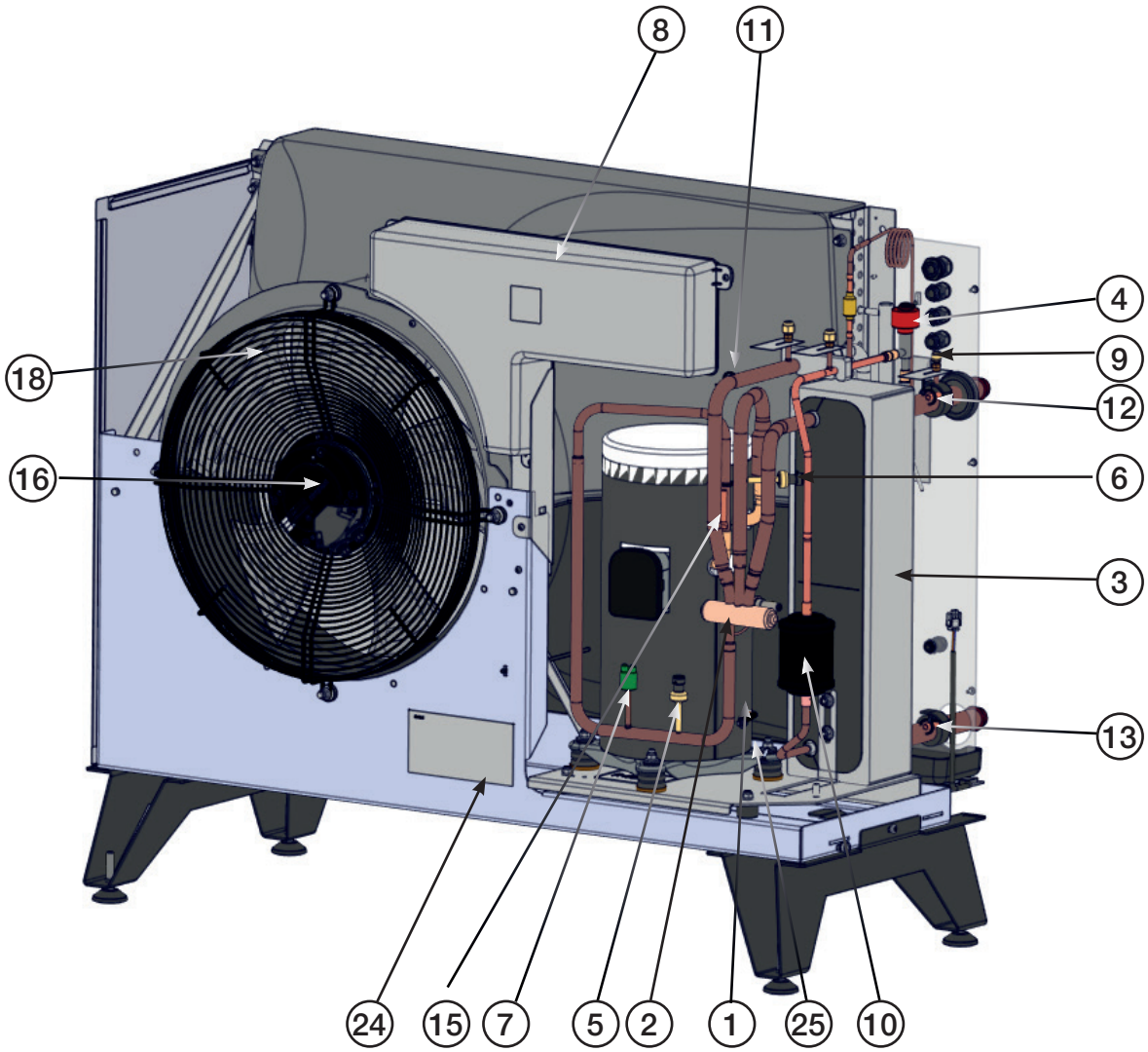
[1] at 35°C water temp. and +7/+2/-7 air temp.

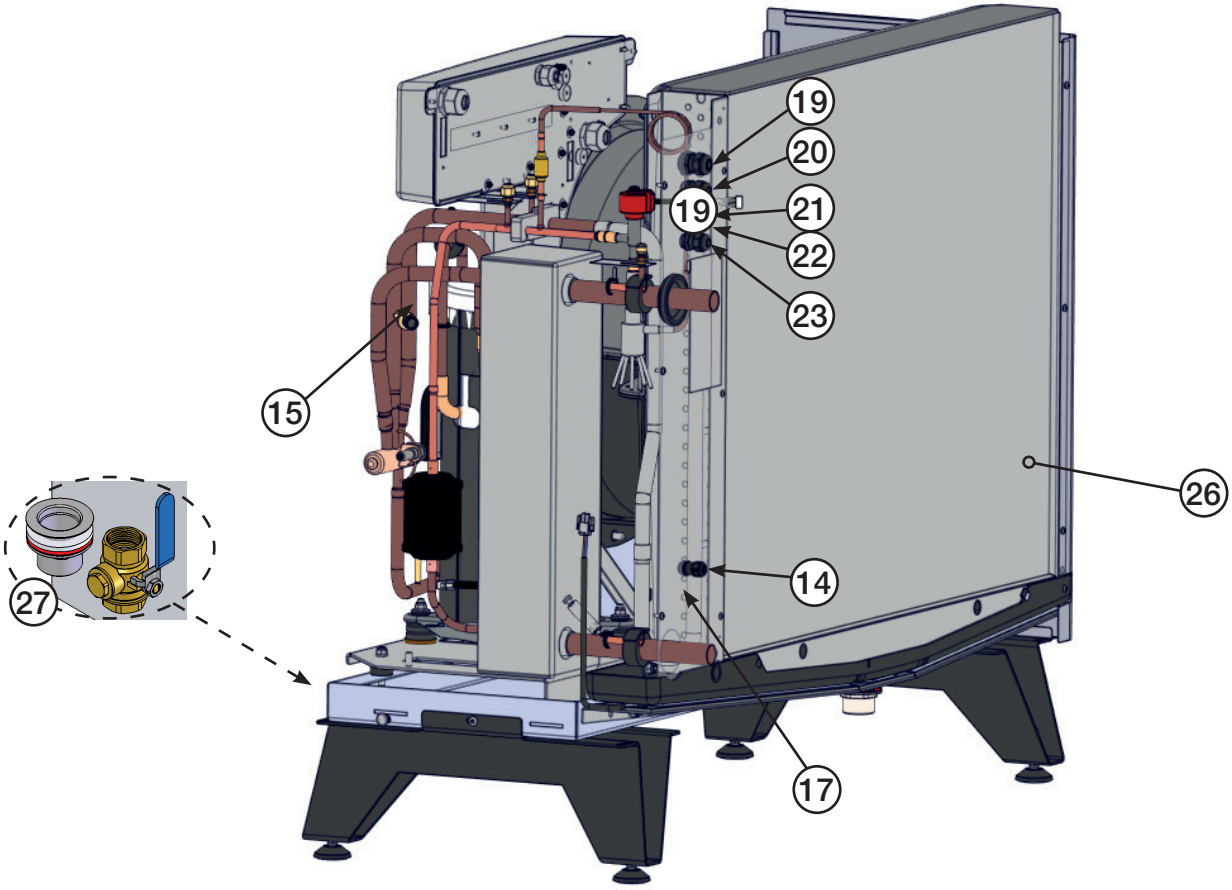
[2] incl. charge pump Stratos Tec 25/7 or Grundfos UPM GEO 25-85

No annual leakage control of the refrigerant is required.

> **!** Note: In case of deviations, the product's data plate applies. When servicing always check the product's data plate for correct refrigerant quantity.

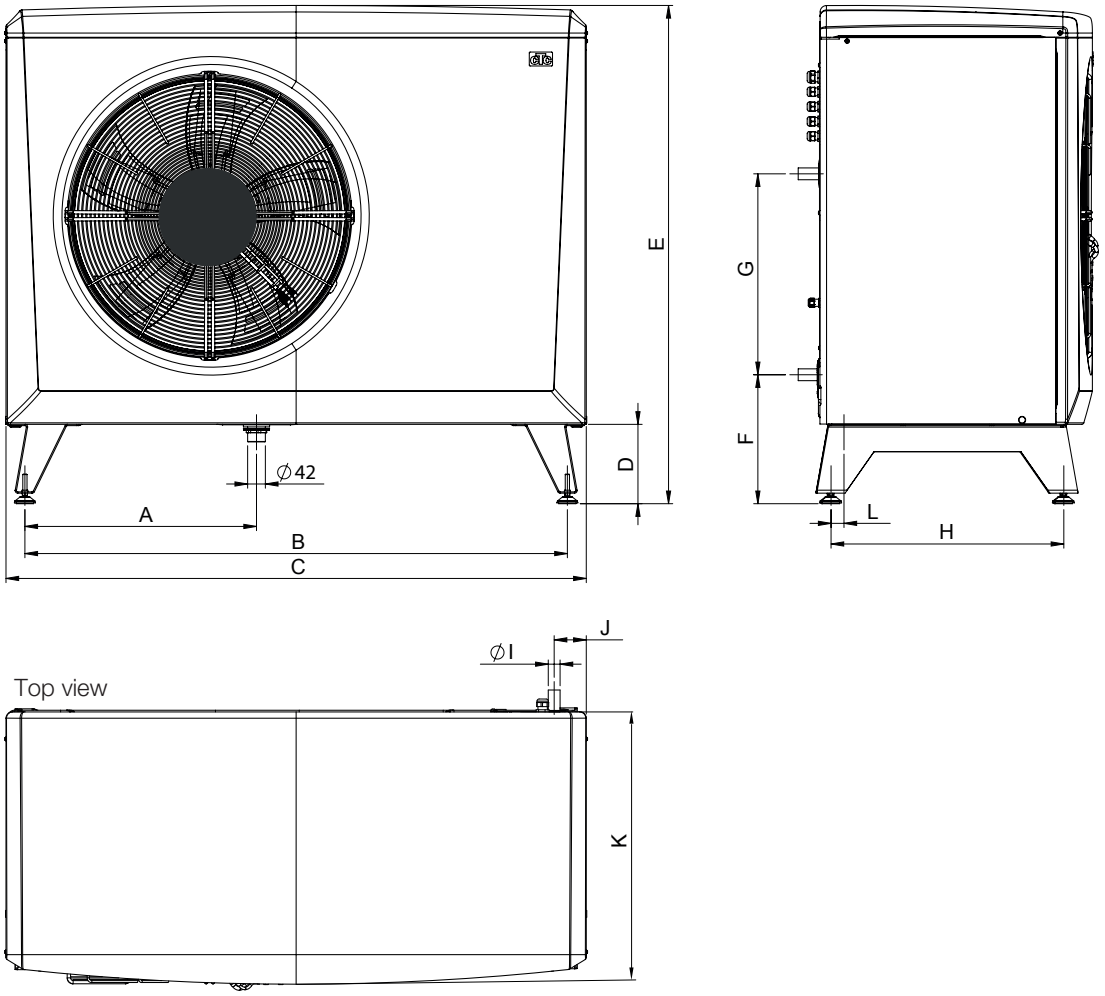
3.3 Component location





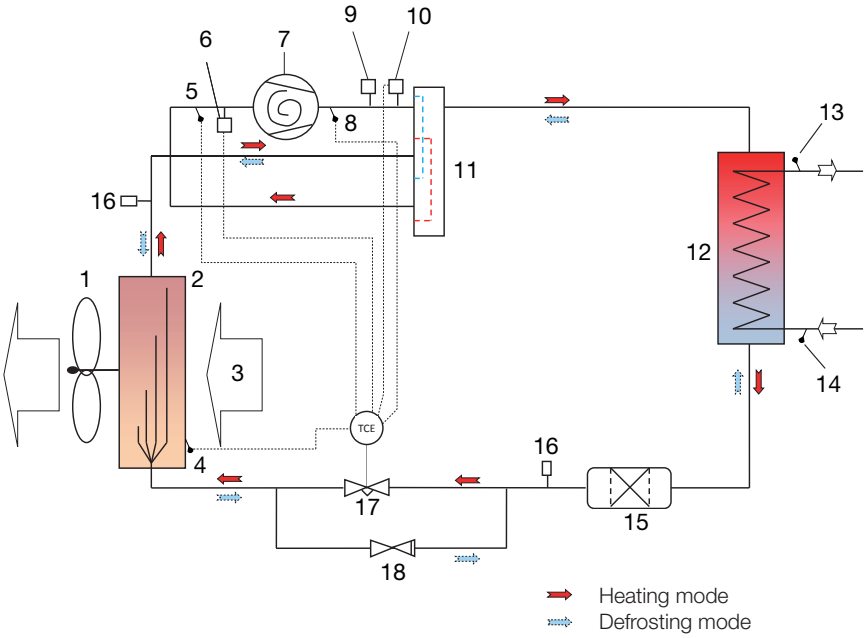
1. Compressor
2. 4-way valve
3. Condenser
4. Expansion valve
5. High pressure sensor
6. Low pressure sensor
7. High pressure switch
8. Connection box
9. Bleeding nipple/water
10. Drying filter
11. Suction gas sensor
12. Primary flow sensor
13. Return sensor
14. Outdoor sensor
15. Discharge sensor
16. Fan
17. Defrosting sensor in evaporator
18. Fan sensor
19. Feeding product
20. Communication product
21. Communication series connection
22. Feeding pump
23. Communication circulation pump
24. Type plate with serial number etc.
25. Compressor heater
26. Evaporator
27. Packaged components (filter ball valve and condensate drain) in box under product on pallet

3.4 Dimensions diagram



	CTC EcoAir 406, 408	CTC EcoAir 410-420
A	486	550
B	1155	1285
C	1245	1375
D	188	188
E	1080	1180
F	308	308
G	476	476
H	451	551
I	Ø28	Ø28
J	85	83
K	545	645
L	10	33

3.5 Refrigerant system



1. Fan
2. Evaporator
3. Air
4. Defrosting sensor (B16)
5. Suction gas sensor (B22)
6. Low pressure sensor (B101)
7. Compressor
8. Hot gas sensor (B21)
9. High pressure switch
10. High pressure sensor (B100)
11. 4-way valve
12. Condenser
13. Primary flow sensor (B1).
14. Return sensor (B7)
15. Drying filter
16. Schrader
17. Expansion valve
18. Non return valve

4. Installation

This section is aimed at anyone responsible for one or more of the installations required to ensure that the product works the way the property owner wants.

Take your time going through functions and settings with the property owner and answer any questions. Both you and the heat pump benefit from a user who has completely understood how the system operates and should be maintained.

The installation must be carried out in accordance with current MCS standards. Refer to MIS 3005 and associated building regs Part L,F & G. The product must be connected to an expansion vessel in an open or closed system. **Do not forget to flush the heating circuit clean before connection.**

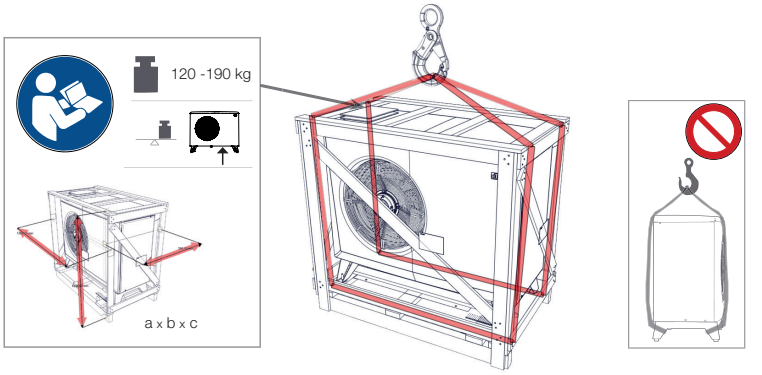
> **!** The product must be transported and stored in an upright position.

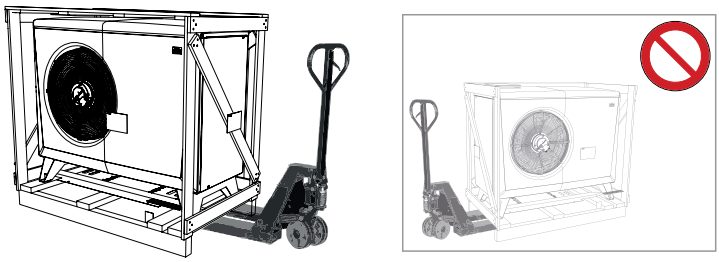
The heat pump operates with a primary flow/return temperature across the condenser of up to 65/58°C.

Transportation

Transport the unit to the installation site before removing the packaging. Handle the product in the following manner:

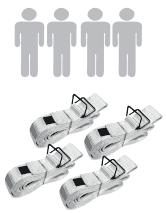
- Forklift
- Lifting band around the pallet.
  NB: Can only be used with the packaging on.

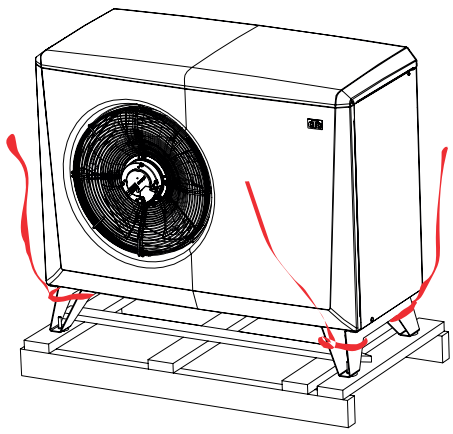




Unpacking

Unpack the heat pump when it is placed next to its installation site. Check that the product has not been damaged in transit. Report any transport damage to the carrier. Also check that the delivery is complete according to the list below.





Delivery includes:

- 1 x Heat pump CTC EcoAir 400
- Packaged component (see chapter titled 'Component Location')
  -filter ball valve: G1" (EcoAir 406-410), G1¼" (EcoAir 415-420)
  -condensate drain: G1¼"
- 15 m cable LiYCY (TP 2x2x0,75 mm²) with connector for communication, fitted
- 2 m power cable, fitted:

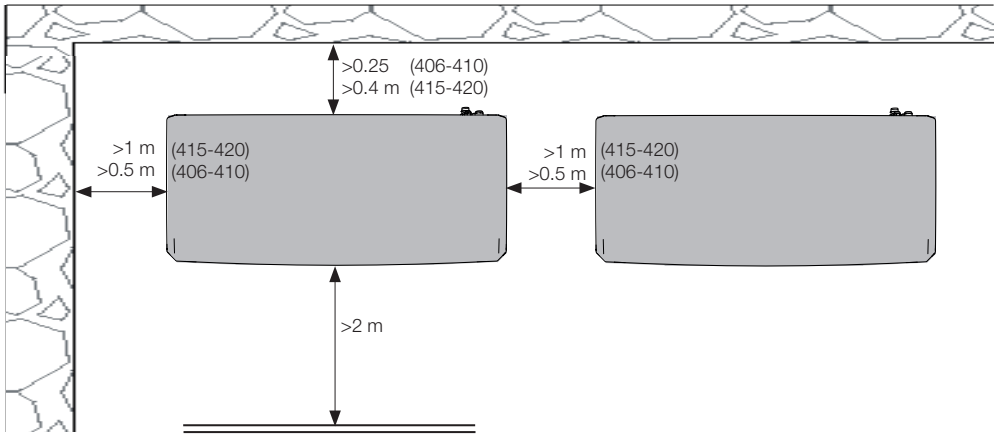
EcoAir 406-410	3x400V	5G x 2,5 mm²
EcoAir 415-420	3x400V	5G x 2,5 mm²
EcoAir 406-410	1x230V	3G x 4 mm²

5. Location of the heat pump

Place the heat pump so that noise from the compressor and fan does not disturb the surroundings. Do not place the heat pump right next to a bedroom window, patio or fence.

- CTC EcoAir 400 is normally placed on an outside wall.
- There should be a space of at least 250 mm (EcoAir 406-410) or 400 mm (EcoAir 415-420) between the product and the wall so that outdoor air can pass freely in through the evaporator.
- Allow a space of at least 2 metres between the heat pump and any bushes etc. Consider the distance to the nearest neighbour.
- The recommended distance between units is 400 mm.
- CTC EcoAir must stand stably on concrete blocks or similar.
- Use a spirit level to adjust the unit, so that it is completely level.
- Due to the design of the stand and the weight of the pump, it is not necessary to secure the unit to the ground or the wall.
- The heat pump must not be installed in a covered area, nor in an outbuilding or carport, because the air should flow as freely as possible through the heat pump and used air should not to be sucked into the inlet on the back. This can cause abnormal ice formation in the evaporator.
- If the product is located where it will be subjected to particularly harsh weather conditions, the product can be installed underneath a small awning.

! These guidelines must be followed to achieve optimal performance from your CTC EcoAir 400



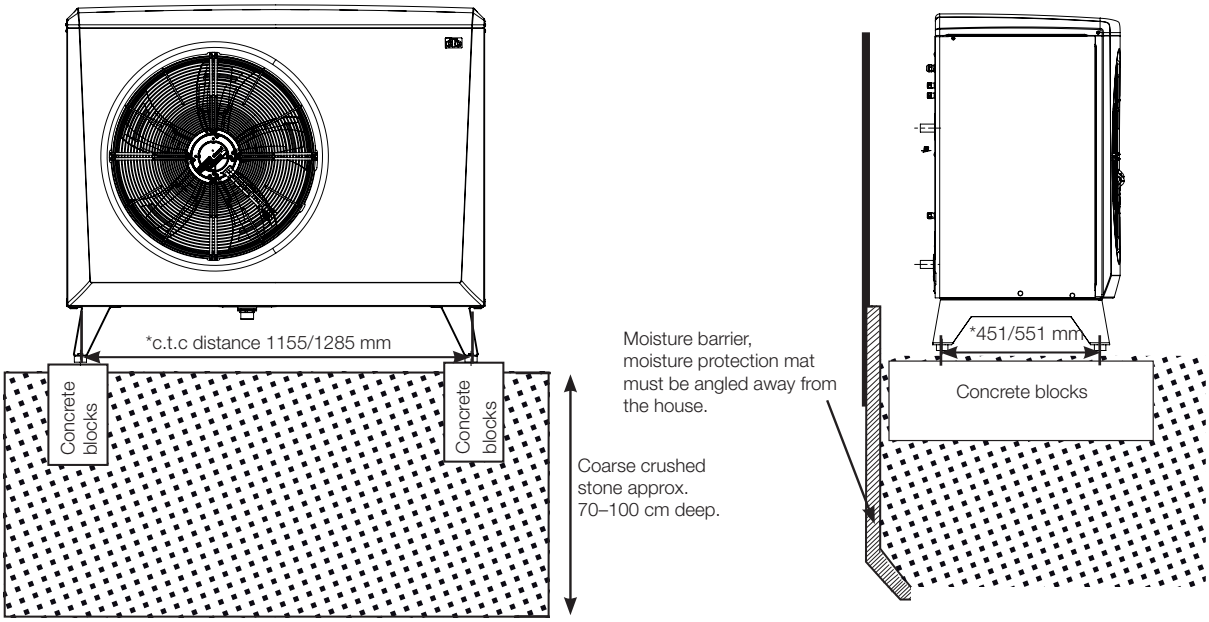
6. Preparation and drainage

The heat pump should be positioned so that the house cannot be damaged and the condensation water can easily drain into the ground. The base must be of concrete blocks or similar, resting on crushed stones or gravel.

- Make a 'stone curb' under the heat pump. Remember that there may be up to 70 litres of condensation water a day under some conditions, from the largest model.
- Dig a hole in the ground 70-100 cm deep.
- Place a moisture barrier in the hole on the side against the foundations of the building
- Half fill the hole with crushed stones and lay concrete blocks or similar.
- Mark the centre-to-centre (c.t.c) distances between the blocks correctly so that the heat pump legs fit in.

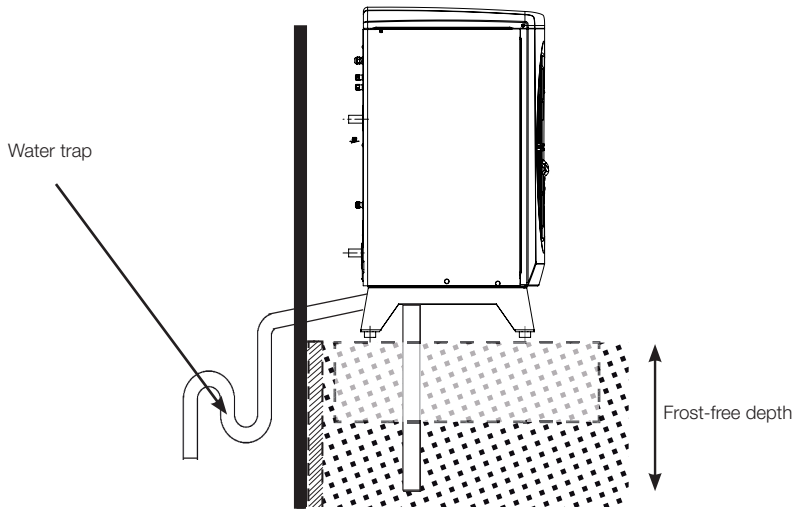
“c/c-measurement	CTC EcoAir 406-408	CTC EcoAir 410-420
length (depth) mm	1155 (451)	1285 (551)

- Use a spirit level to ensure that the blocks are level.
- Place crushed stones around the blocks in order to achieve optimal drainage.



6.1 Condensation water

- The condensation tray is built into the heat pump and is used to divert most of the condensation water. The tray can be connected to a suitable drain. Connection diameter: 42 mm.
- A heating cable (available as an accessory) should be placed in the pipe to prevent refreezing. The heating cable is connected to the electrical cabinet in the CTC EcoAir 400 (to be performed by an authorised electrician and according to applicable provisions.)
- If the house has a cellar, it is advisable to route the condensation water to a floor drain indoors (to be performed according to the applicable rules). The pipe should be installed with a slope towards the house and above the ground (so no other water can get into the cellar). Wall apertures should be sealed and insulated A water trap must be connected to the inside to prevent air from circulating in the pipe.
- If there is a stone curb, the outlet from the condensation water pipe should be placed at a frost-free depth.
- The condensation water may also be routed into the house drains, e.g. from the downpipes. Here a heating cable must be placed in the pipes that are not frost-free.



7. Pipe installation

The installation must be carried out in accordance with current MCS standards. Refer to MIS 3005 and associated building regs Part L,F & G. The boiler must be connected to an expansion vessel in an open or closed system. Do not forget to flush the heating circuit clean before connection.

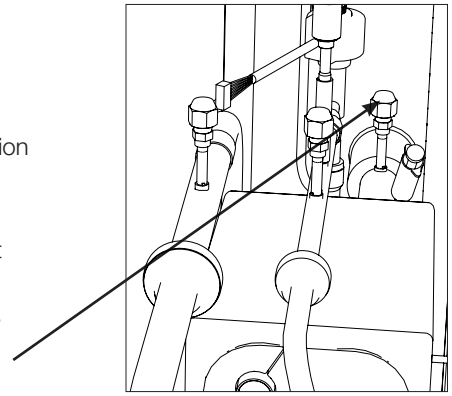
7.1 Pipe connection

- Return lines of at least 22 mm (for 406–410) and 28 mm (for 415–420) copper pipe are connected to the heat pump. For longer pipes, the installer should calculate the pump and pipe dimensions needed to handle the minimum recommended flow for the CTC EcoAir 400 concerned.
- Route the pipes between the heat pump and the boiler without any highest points. If this cannot be done, provide this highest point with an automatic air separator or an in line aerator.
- The connection to the heat pump should be made with a wire-reinforced diffusion-tight hose for DHW, min 1" diameter. Recommended hose length 1000 mm, to prevent noise transmission into the property and allow for movement of the heat pump.
- Pipes installed outside should be insulated with at least 13 mm thick pipe insulation which is not sensitive to water. Ensure that the insulation is sealed tightly everywhere and that joints are thoroughly taped or glued.
- Indoor pipes should be insulated all the way to the boiler with at least 9 mm thick insulation. This is to enable the heap pump to deliver the highest possible temperature to the boiler or tank without any losses.
- The product can be bled via the bleed valve inside the condenser.

! If necessary, flush the heating circuit clean before connection.

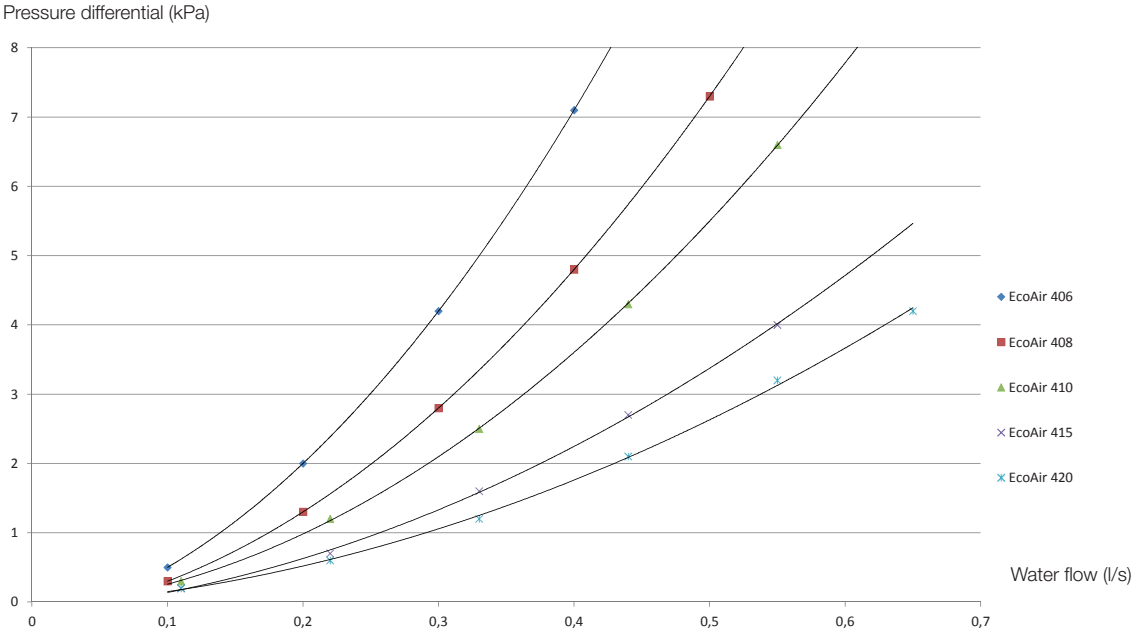
! Minimum water volume (L) in the heating circuit (>25 °C) for reliable defrosting functionality:

EcoAir 420	180 L
EcoAir 415	180 L
EcoAir 410	120 L
EcoAir 408	100 L
EcoAir 406	80 L



! NB: Only bleed this valve.
Other valves are for the cooling system! If these are opened, refrigerant may leak out!

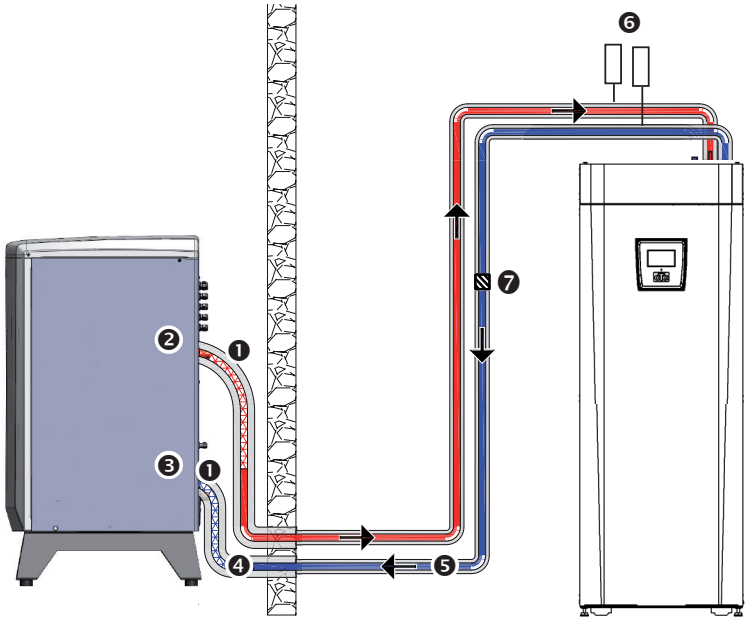
Pressure differential diagram for CTC EcoAir 400



7.2 Example pipe connection

EcoAir/EcoZenith i255 L

The CTC EcoZenith i255 L has pipes at the rear right edge for connection of the heat pump. The heat pump's lower connection is connected to the right connection when viewed from the front, so that water is pumped out to the heat pump. The heat pump's upper connection is thus connected to the right connection.



1. Wire-reinforced diffusion-tight hose for hot water, min 1". Hose length 1.000 mm from the unit.
2. Outgoing (heated) water Ø28 mm connection on the condenser.
3. Incoming (cold) water Ø28 mm connection on the condenser.
4. At least Ø22 mm copper pipe. Insulate externally with 13 mm thick insulation.
5. Insulate internally around pipes with 9 mm thick insulation.
6. Bleeder
7. Filter Ball Valve

EcoAir/EcoZenith i255 H

On the CTC EcoZenith i255 H, the heat pump is connected directly to the charge pump located under the tank. The heat pump's lower connection must be connected to the charge pump so that water is pumped out to the heat pump. The heat pump's upper connection is connected to the right 3-way valve by the charge pump.

! For optimum performance insulate outdoor and indoor piping as recommended in the instructions.

8. Circulation pump

The choice of circulation pump depends on the type of system. Ensure that the circulation pump is large enough, so that there is sufficient flow through the heat pump. The circulation pump may be connected either internally within the CTC EcoAir 400 or externally in the controlling unit.

The charge pump supplies the CTC EcoAir 400 with water. If the outdoor temperature is below + 2°C the charge pump runs constantly to eliminate any risk of freezing.

Internal connection.

With internal connection, the flow through the circulation pump is controlled by the controller in the CTC EcoAir 400. The control system for the CTC EcoAir 400 monitors and ensures that the unit is working within its operating range. For optimum performance, choose one of the A-class circulation pumps below.

CTC EcoAir 406-408	Prod. no. 587477 303
CTC EcoAir 410	Prod. no. 587477 302
CTC EcoAir 415-420	Prod. no. 587477 301

External connection

With external connection, a circulation pump is installed so that the right flow through the heat pump can be guaranteed.

Set the right temperature differential by adjusting the speed of the circulation pump. This is to ensure that the right differential for the current outdoor temperature is produced according to the table.

For outside temp (°C)		-10	-5	0	+5	+7	+10
CTC EcoAir 406	Primary flow 35 °C Flow = 0.21 l/s	4 °C	4.5 °C	5.5 °C	6.5 °C	7 °C	8 °C
CTC EcoAir 408	Primary flow 35 °C Flow = 0.27 l/s	4 °C	4.5 °C	5.5 °C	6.5 °C	7 °C	7.5 °C
CTC EcoAir 410	Primary flow 35°C Flow = 0.39 l/s	4 °C	5 °C	6 °C	6.5 °C	7°C	8 °C
CTC EcoAir 415	Primary flow 35 °C Flow = 0.55 l/s	4 °C	4.5 °C	5.5°C	6.5 °C	7°C	7.5 °C
CTC EcoAir 420	Primary flow 35 °C Flow = 0.64 l/s	4 °C	4.5 °C	5.5°C	6.5 °C	7°C	7.5 °C

In some systems with EcoLogic, the entire radiator flow must go through the heat pump, so the pump must be sized according to the flow of the whole system. For safe operation, the following flow must be maintained:

CTC EcoAir 406: 760 l/hr

CTC EcoAir 408: 960 l/hr

CTC EcoAir 410: 1,400 l/hr

CTC EcoAir 415: 2,000 l/hr

CTC EcoAir 420: 2,300 l/hr

This provides about: 7 °C temperature differential with an outside temperature of +7 °C and a primary flow temperature of 35 °C.

8.1 Control/supply

CTC EcoZenith i555 Pro
The circulation pump is controlled and powered by the CTC EcoZenith i550 Pro.
For more information, see the relevant product manual.

CTC EcoZenith i255, CTC EcoZenith i360, CTC EcoVent i360F
The circulation pump is factory-fitted in CTC EcoZenith i255, CTC EcoZenith i360, CTC EcoVent i360F. Control and supply take place from the product. For more information, see the relevant product manual.

CTC Ecologic M/L
Up to 10 heat pumps can be connected to CTC EcoLogic M/L. The circulation pumps in heat pumps 1 and 2 can then be connected to CTC EcoLogic M/L. The circulation pumps for heat pumps 3–10 should be connected to the CTC EcoAir 400.

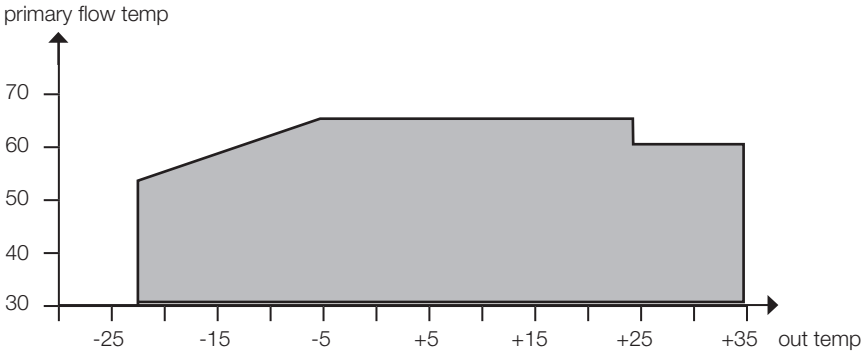
CTC EcoLogic v3
The circulation pump (not speed-controlled) must be connected to the CTC EcoAir 400.

CTC EcoZenith v3
The circulation pump (not speed-controlled) must be connected to the CTC EcoAir 400.

CTC EcoEl v3
The circulation pump (not speed-controlled) must be connected to the CTC EcoAir 400.

8.2 Operating range

The control system for the CTC EcoAir 400 monitors and ensures that the unit is working within its operating range.



9. Electrical installation

Installation and heat pump connection must be performed by an authorised electrician. All wiring must be installed according to applicable provisions.

9.1 Electric installation 400V 3N~

Supply, black connector

CTC EcoAir 400 must be connected to 400V 3N~ 50 Hz and protective earth. The minimum group fuse size is specified in “Technical data”.
The 2 m long power supply cable is pre-connected to the product.

Safety switch

The installation should be preceded by an omnipolar safety switch which ensures disconnection from all electric power sources.

9.2 Electrical installation 230V 1N~

Supply, black connector

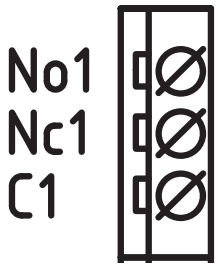
CTC EcoAir 400 must be connected to 230V 1N~ 50 Hz and protective earth. The minimum group fuse size is specified in “Technical data”.
The 2 m long power supply cable is pre-connected to the product.

Omnipolar safety switch

The installation should be preceded by an omnipolar safety switch according to overvoltage category III, which ensures disconnection from all electric power sources.

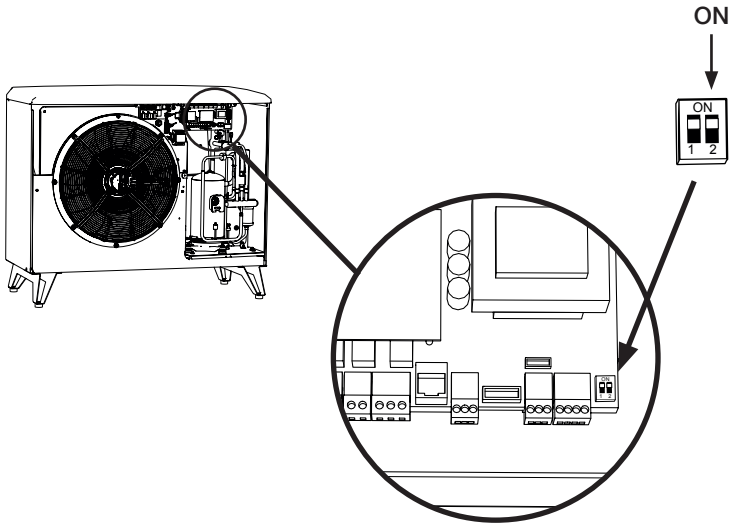
9.3 Alarm output

The CTC EcoAir 400 is fitted with a potential-free alarm output which is activated if any alarm is active in the heat pump. This output may be connected to a maximum load of 1 A 250V AC. An external fuse should also be used. A cable approved for 230V AC must be used for connecting this output, irrespective of the load that is connected. For connection information, see the wiring diagram.



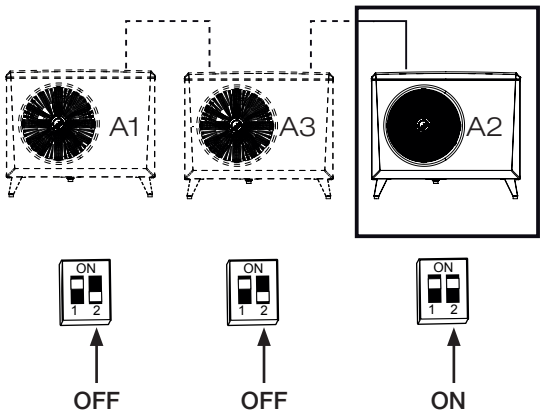
9.3.1 Heat pump connections

When installing a heat pump, dip-switch 2 should be set to the ON position.



9.3.2 Termination for connection of heat pumps in series

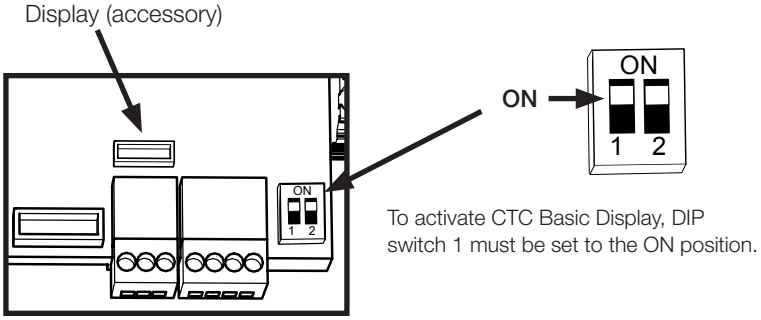
In a series connection, DIP switch 2 must be set to the OFF position on all the heat pumps except the last one, which should be in the ON position.



! When connected in series, the last heat pump must be set to terminated position.

9.3.3 Connecting the CTC Basic Display

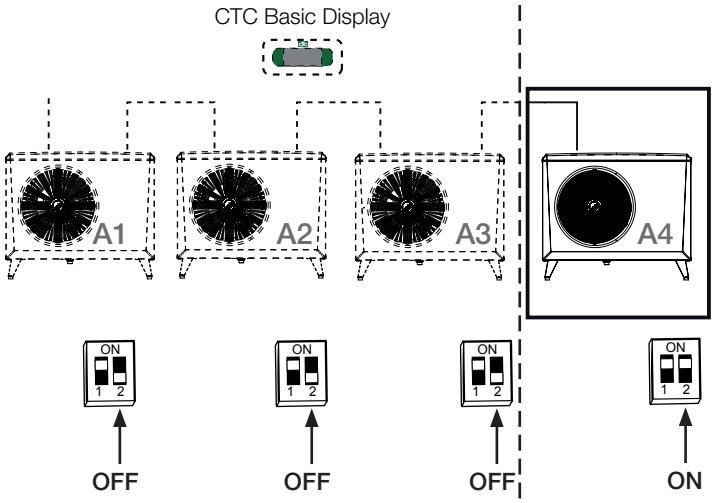
Connecting the CTC Basic Display (accessory)

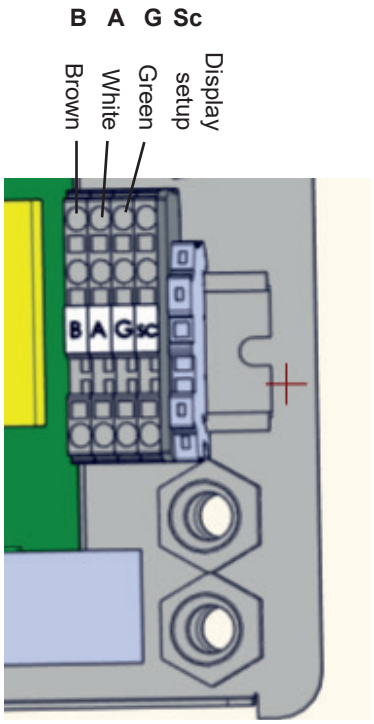


To activate CTC Basic Display, DIP switch 1 must be set to the ON position.

Heat pumps in series connection

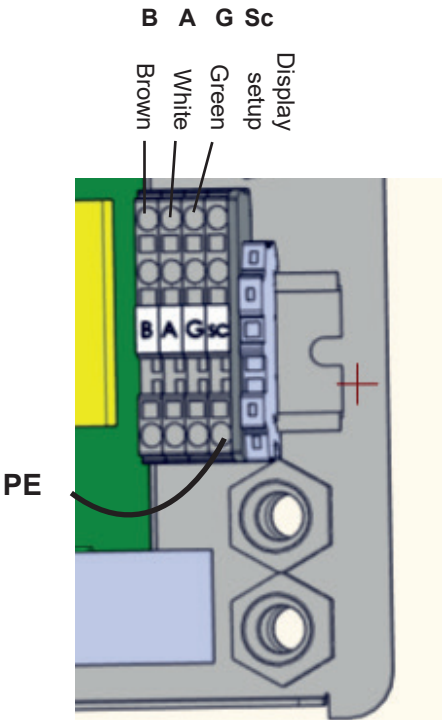
The last heat pump connected in series





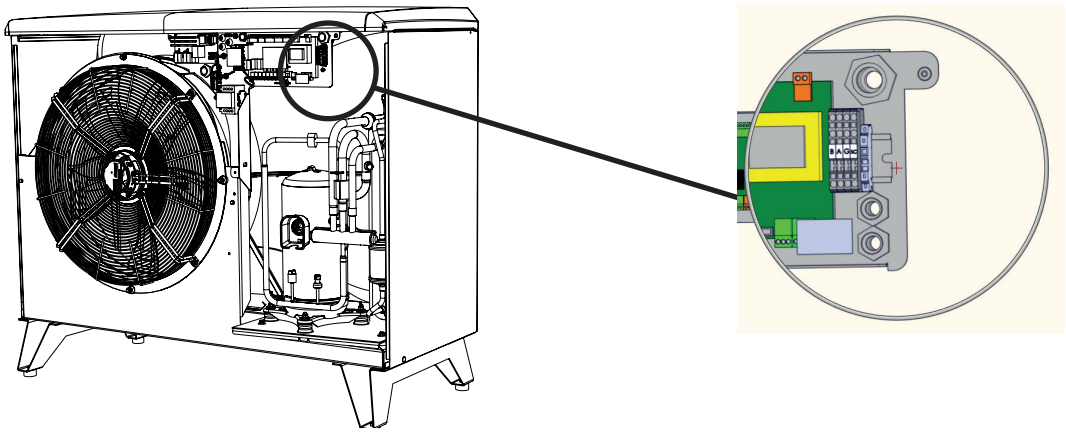
Connect each cable to the next heat pump in the series connection here.

Remove the jumper (PE); connect the shielding to the next heat pump here.



Make sure DIP switch 2 is in the ON position on the last heat pump in the series connection.

The jumper (PE) must be left in place.

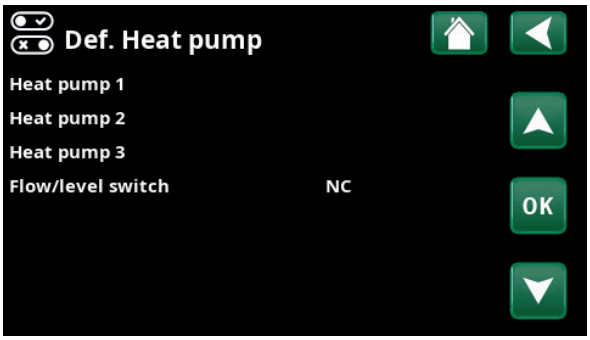


9.4 Connecting the control system

9.4.1 Define number of heat pumps

Define the heat pumps in the controlling product's display under: "Advanced/Define system/Heat pump".

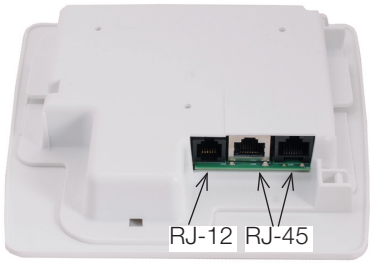
Set the heat pumps contained in the system to position "On".



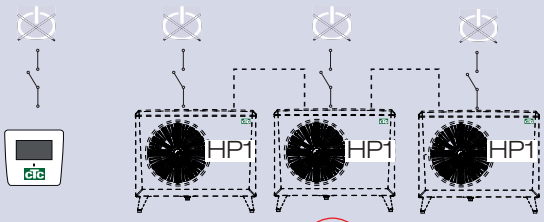
Example of a system with 3 heat pumps.

9.4.2 Numbering CTC EcoAir 400 as HP2

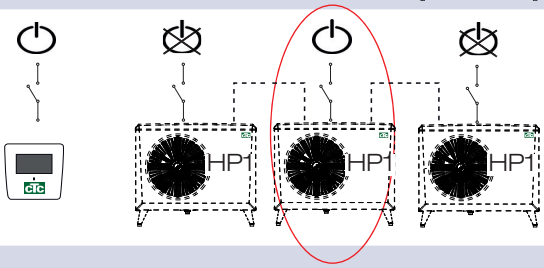
Applies to control launched in October 2020
with three connectors on the back of the display.
2 x RJ-45 and 1 x RJ-12.



1. System disconnected from power.



2. Power up the control (EcoLogic or EcoZenith i555 Pro) as well as CTC EcoAir 400 which will be numbered as Heat Pump 2 (HP2).



3. Wait for about 2 minutes.

4. Go to "Installer/Service/Set Address".

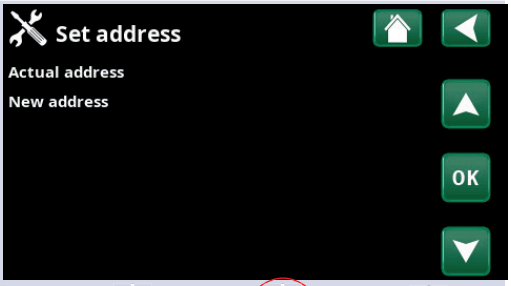
Select "Actual address", press OK and press the down arrow until the current heat pump appears (HP1) Press OK.

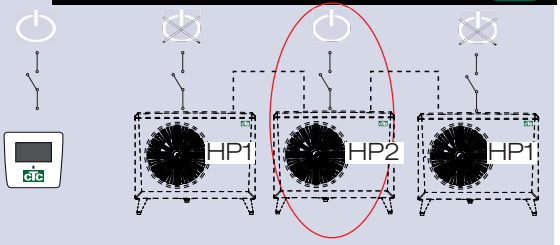
Select "New address", press OK and use the arrow to scroll up and down until the actual address of the heat pump is shown (HP2). Press OK.

5. The heat pump is now numbered (HP2).

When you press OK, (HP1 and HP3)* disappears and the row "Actual address/New Address" will go dark.

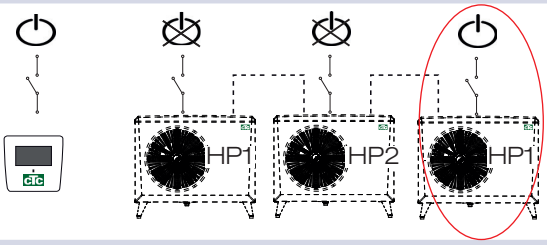
**In this example, we have assumed that the heat pump is called HP1, which is the factory default. If the heat pump has already been renumbered, then select this number instead.*





6. Number the other heat pumps:

Power up the next heat pump, which will be numbered heat pump 3 (HP3).



7. Wait 2 minutes.

8. Go to "Service/Set Address".

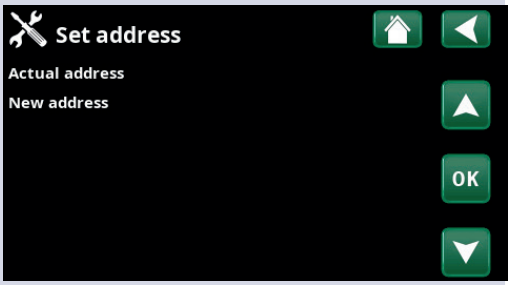
Select "Actual address", press OK and press the down arrow until the current heat pump appears (HP1) Press OK.

Select "New address", press OK and press the up arrow until the actual address of the heat pump is shown (HP3). Press OK.

9. The heat pump is now numbered (HP3).

When you press OK, (HP1 and HP3)* disappears and the row "Actual address/New address" will go dark.

**In this example, we have assumed that the heat pump is called HP1, which is the factory default. If the heat pump has already been renumbered, then select this number instead.*

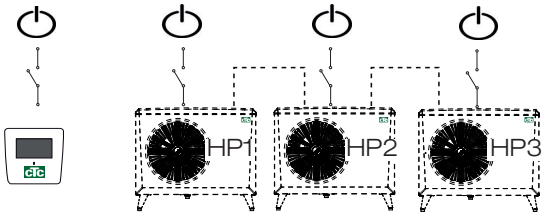


10. Redo the procedure according to the number of heat pumps to be numbered.

When all heat pumps are numbered and powered up, they should be displayed when you press the heat pump symbol in the menu "Operation data". If any heat pump does not appear in the menu (communication with the heat pump fails) It may be because it has not been numbered as described above.

If you do not know the name of the heat pump, you can reset the numbering by using the "Select/Rename Heat Pump" menu (refer to points 9 and 10 above) to indicate all possible names of the heat pump, i.e. you select and confirm HP1 and then HP2 up to HP10 to ensure that the correct name is given.

Finally test in the menu "Installer/Service/Function test/ Heat pump" that the respective heat pump starts.



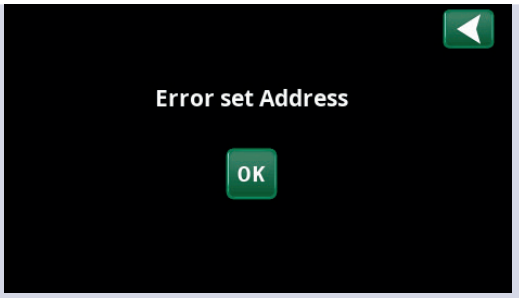
9.4.3 Good to know when setting an address

Error set Address
The heat pump could not be found and numbered.

The heat pump was not what it was supposed to be called.

No communication with the heat pump.

Check that the heat pump is powered up.



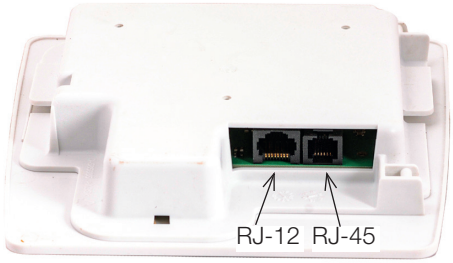
If the address setting fails, the latest heat pump addresses remain. In this example HP1 and HP2.

Make sure the heat pump is powered up.

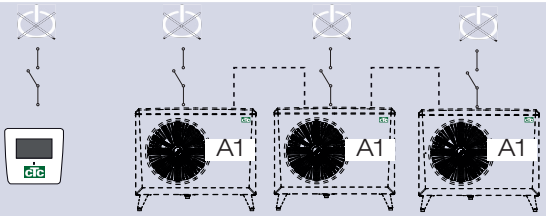
Try again with a new actual address.

9.4.4 Numbering CTC EcoAir 400 as A2

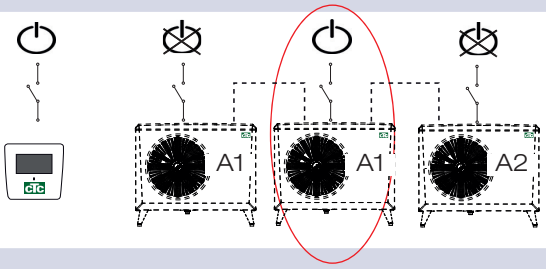
Applies to older controls with 2 connectors on the back of the display.
1 RJ-45 and 1 RJ-12 for the CTC EcoZenith i550 Pro and CTC EcoLogic Pro/Family



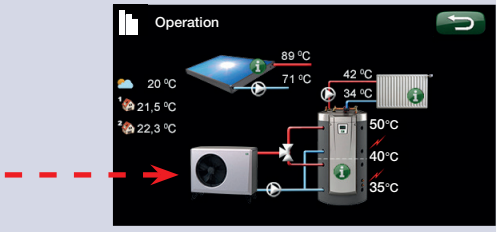
1. System disconnected from power.



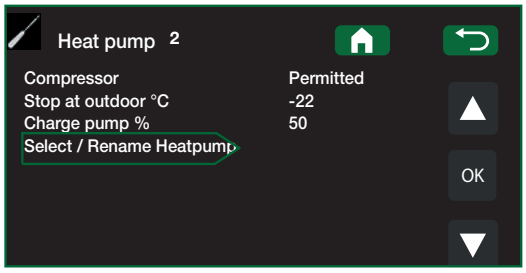
2. Power up the control (EcoLogic Pro or EcoZenith i550 Pro) as well as CTC EcoAir 400 to be numbered as Heat Pump 2 (A2).



3. Wait approx 2 minutes until the heat pump is visible in the Operational Info menu.



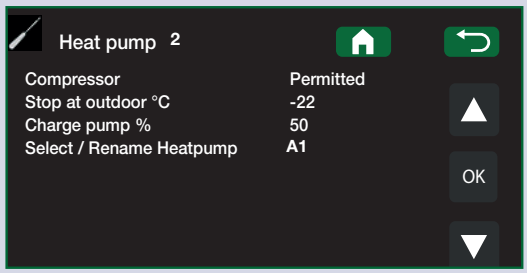
4. Go to "Installer/Settings/Heat pump 2" and the row "Select/Rename Heat pump". Press OK.



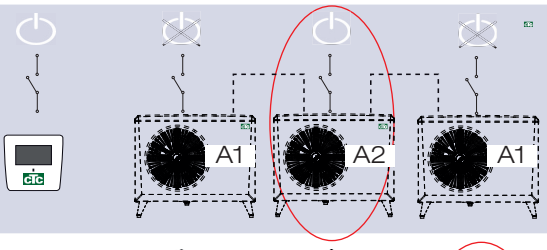
5. Press the arrow up until (A1)* is displayed. Press OK.

After pressing OK, (A1)* disappears and the "Select/ Rename Heat Pump" row will go dark.

**In this example, we have assumed that the heat pump is called A1, which is the factory default. If the heat pump has already been renumbered, then select this number instead.*

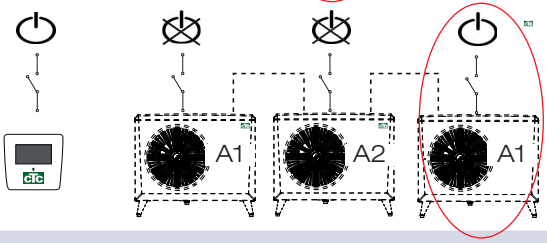


6. The heat pump is now numbered (A2).

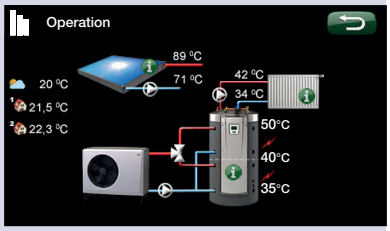


7. To number the other heat pumps:

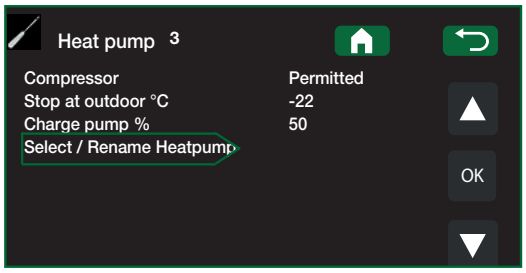
Energise the control and the next heat pump to be numbered to heat pump 3 (A3).



8. Wait approx 2 minutes until the heat pump is visible in the operational information.



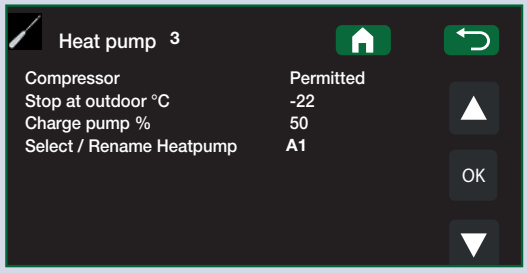
9. Go to "Installer/Settings/Heat pump 3" and the row "Select/Rename Heat pump". Press OK.



10. Press the arrow up until (A1)* is displayed. Press OK.

After pressing OK, (A1)* disappears and the "Select/ Rename Heat Pump" row will go dark. The heat pump is now numbered (A3).

**In this example, we have assumed that the heat pump is called A1, which is the factory default. If the heat pump has already been renumbered, then select this number instead.*

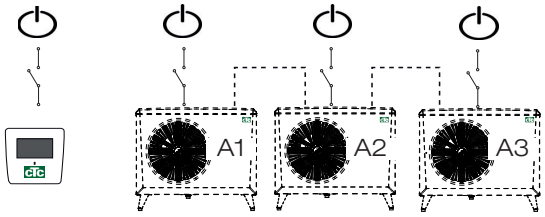


11. Redo the procedure according to the number of heat pumps to be numbered.

When all heat pumps are numbered and powered up, they should be displayed when you press the heat pump symbol in the menu "Operation data". If any heat pump does not appear in the menu (communication with the heat pump fails) It may be because it has not been numbered as described above.

If you do not know the name of the heat pump, you can reset the numbering by using the "Select/Rename Heat Pump" menu (refer to points 9 and 10 above) to indicate all possible names of the heat pump, i.e. you select and confirm A1 and then A2 up to A10 to ensure that the correct name is given.

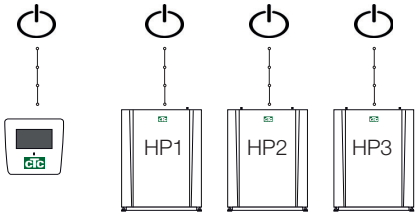
Finally test in the menu "Advanced/Service/Function test/Heat pump" that the respective heat pump starts.



When all heat pumps are numbered and powered up, they should be displayed when you press the heat pump symbol in the menu "Operation data". If any heat pump does not appear in the menu (communication with the heat pump fails) It may be because it has not been numbered as described above.

If you do not know the name of the heat pump, you can reset the numbering by using the "Select/Rename Heat Pump" menu (refer to points 9 and 10 above) to indicate all possible names of the heat pump, i.e. you select and confirm HP1 and then HP2 up to HP10 to ensure that the correct name is given.

Finally test in the menu "Installer/Service/Function test/Heat pump" that the respective heat pump starts.



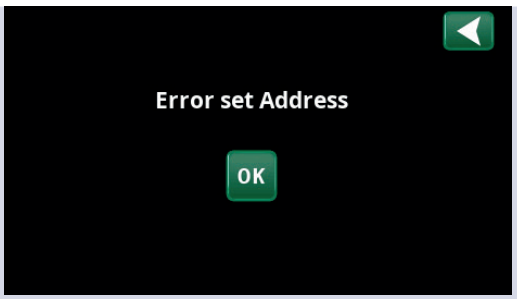
9.4.5 Worth knowing when addressing

Error set Address
The heat pump could not be found and numbered.

The heat pump was not what it was supposed to be called.

No communication with the heat pump.

Check that the heat pump is powered up.



If the address setting fails, the latest heat pump addresses remain. In this example HP1 and HP2.

Make sure the heat pump is powered up.

Try again with a new actual address.

10. Connecting the control system

10.1 General

When connecting the CTC EcoAir 400 to products with different control systems, accessories are sometimes needed to control the products. The various alternatives available are described in this section.

10.2 Connection option 1 one heat pump

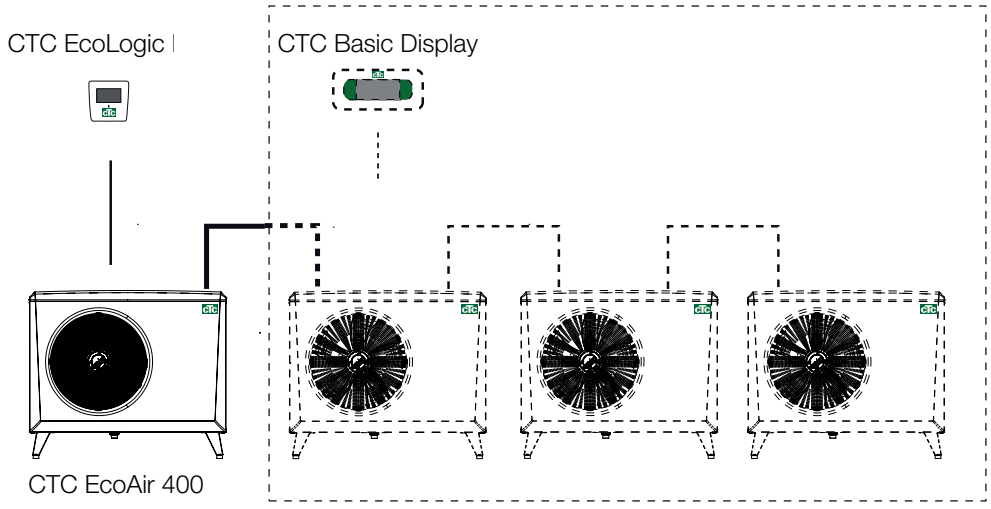
When connecting CTC EcoAir 400 to CTC EcoZenith i255, CTC EcoZenith i555 Pro, CTC EcoZenith i360, CTC EcoVent i360F and CTC EcoLogic M/L, the communication cable (LiYCY (TP)) must be connected directly to the respective products.

10.3 Connection option 2 multiple heat pumps

CTC Ecologic M/L or CTC EcoZenith i555 Pro

When connecting more than one heat pump to CTC EcoLogic M/L or CTC EcoZenith i555 Pro, the CTC Basic Display accessory can be used to address the various heat pumps A1, A2, A3, and so on. All CTC EcoAir 400 units are factory-set addressed to A1. For connection, refer to the CTC Basic Display manual. Recommended cable between products LiYCY (TP).

! When connected in series, the last heat pump must be set to terminated position.

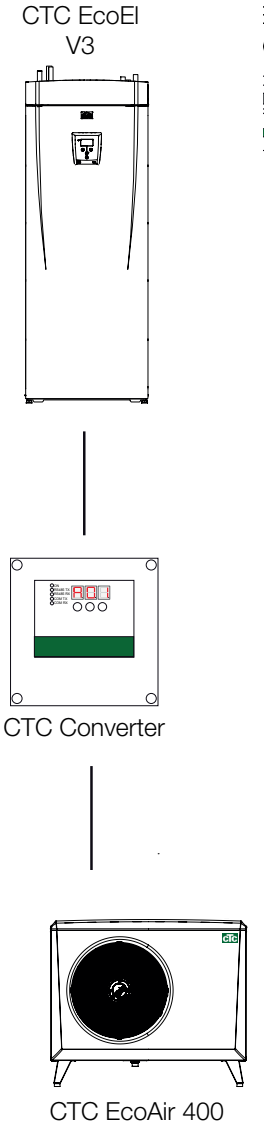


10.4 Connection option 3

CTC EcoEl v3

Because these products have an older control system of v3 type, the CTC Converter accessory must be used as an interpreter to control the CTC EcoAir 400. See the manual for the CTC Converter for connecting this.

> Version 3 (V3) relates to models manufactured from 2006 onwards.



10.5 Connection option 4

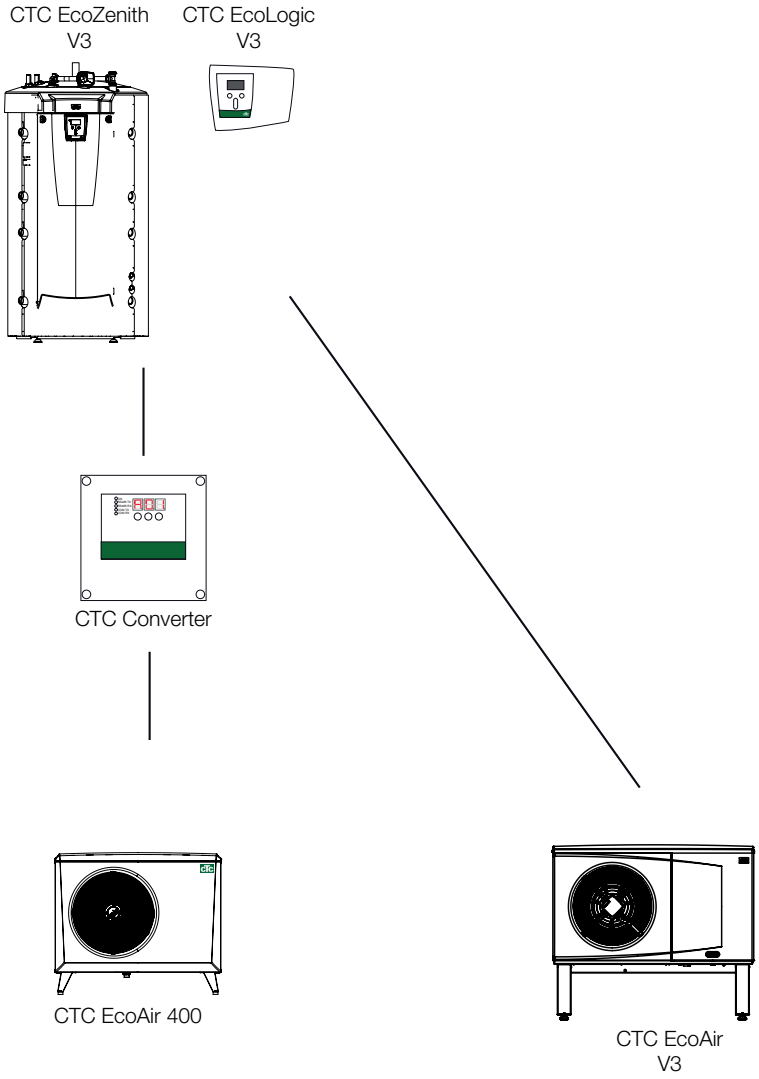
CTC EcoZenith v3 or CTC EcoLogic v3

Because these products have an older control system of v3 type, the CTC Converter accessory must be used as an interpreter to control the CTC EcoAir 400. See the manual for the CTC Converter for connecting this.

The CTC EcoZenith version 3 is available in two different variants. An earlier variant with only one communication port, and a later one with three such ports. The earlier one will have a serial number starting from:

Serial no.	Item no.	Model
7250-1222-0138	583700001	CTC EcoZenith I 550 3x400V
7250-1222-0168	584892001	CTC EcoZenith I 550 3x230V
7250-1222-0171	584890001	CTC EcoZenith I 550 BBR
7250-1222-0171	584893001	CTC EcoZenith I 550 1x230V

The earlier version needed a Converter to control the heat pump.



Version 3 (V3) relates to models manufactured from 2006 onwards.

If new (version 4) and old (version 3) heat pumps are combined in an installation, the new ones must be addressed A1.

When connected in series, the last CTC EcoAir 400 must be set to the terminated position.

10.6 Connection option 5

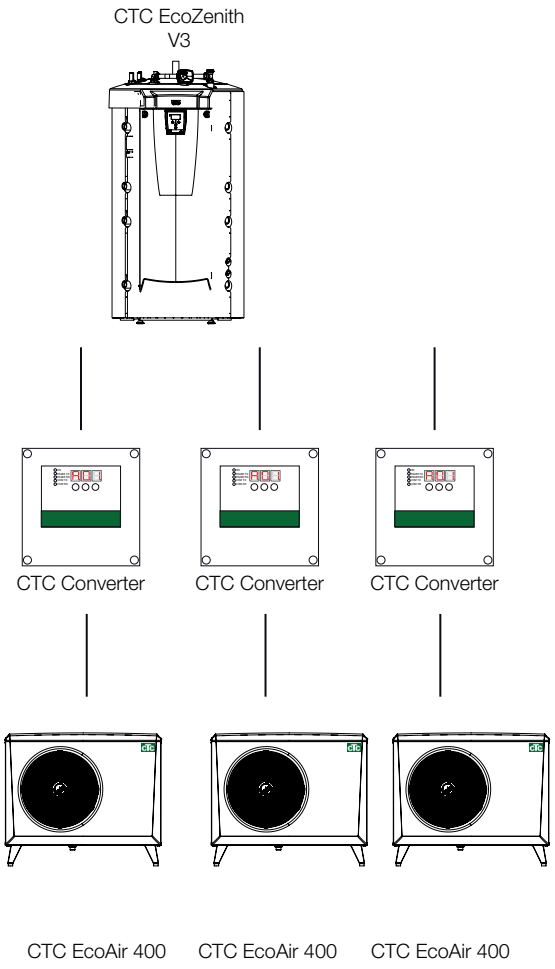
CTC EcoZenith I 550

The CTC EcoZenith version 3 is available in two different variants. An earlier variant with only one communication port, and a later one with three such ports. The later one will have a serial number starting from:

Serial no.	Item no.	Model
7250-1222-0139	583700001	CTC EcoZenith I 550 3x400V
7250-1222-0169	584892001	CTC EcoZenith I 550 3x230V
7250-1222-0172	584890001	CTC EcoZenith I 550 BBR
7250-1222-0172	584893001	CTC EcoZenith I 550 1x230V

For the later variant a CTC Converter is needed for each version 4 heat pump.

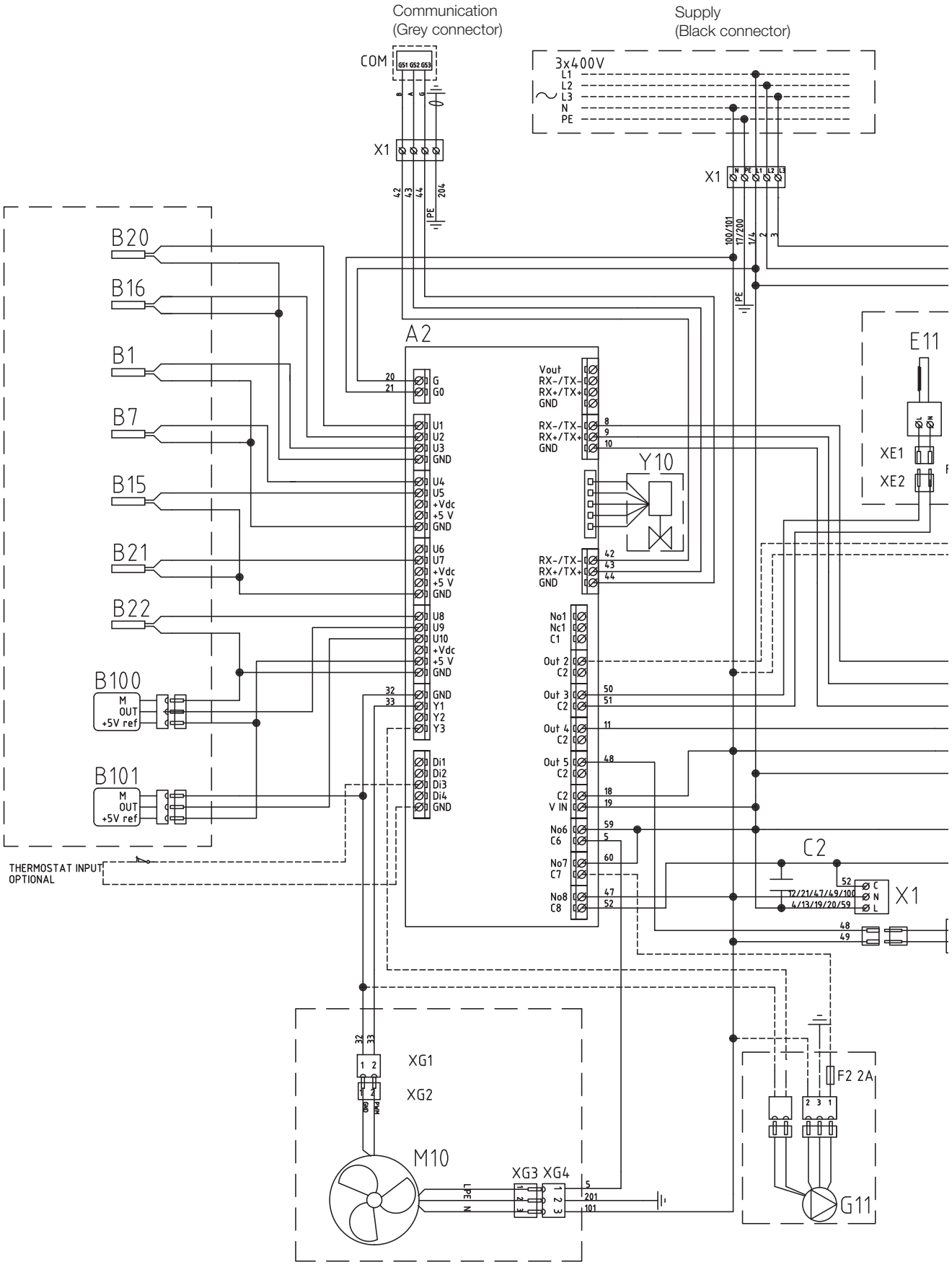
See the manual for the CTC Converter for connection.

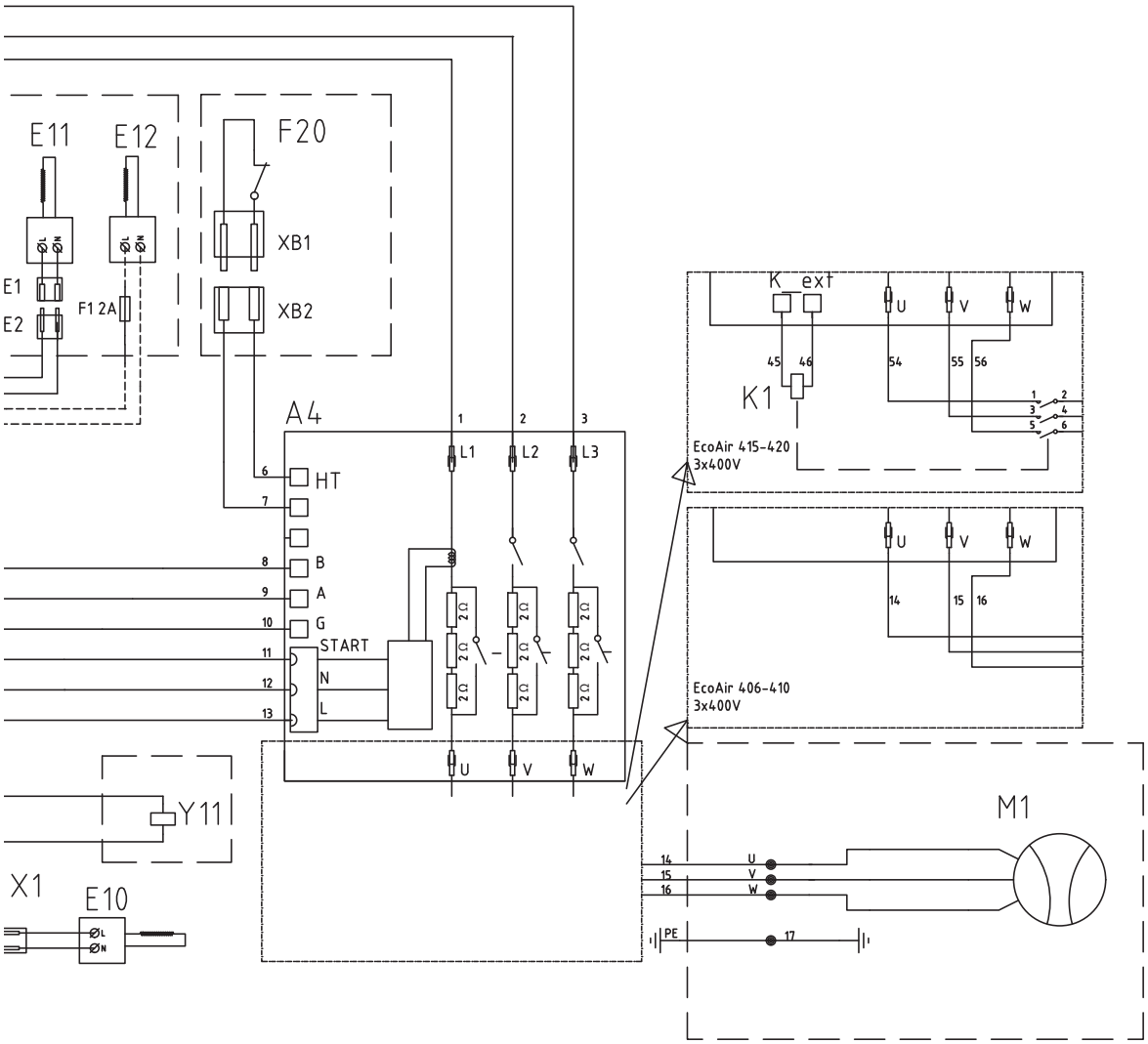


10.7 Parts list

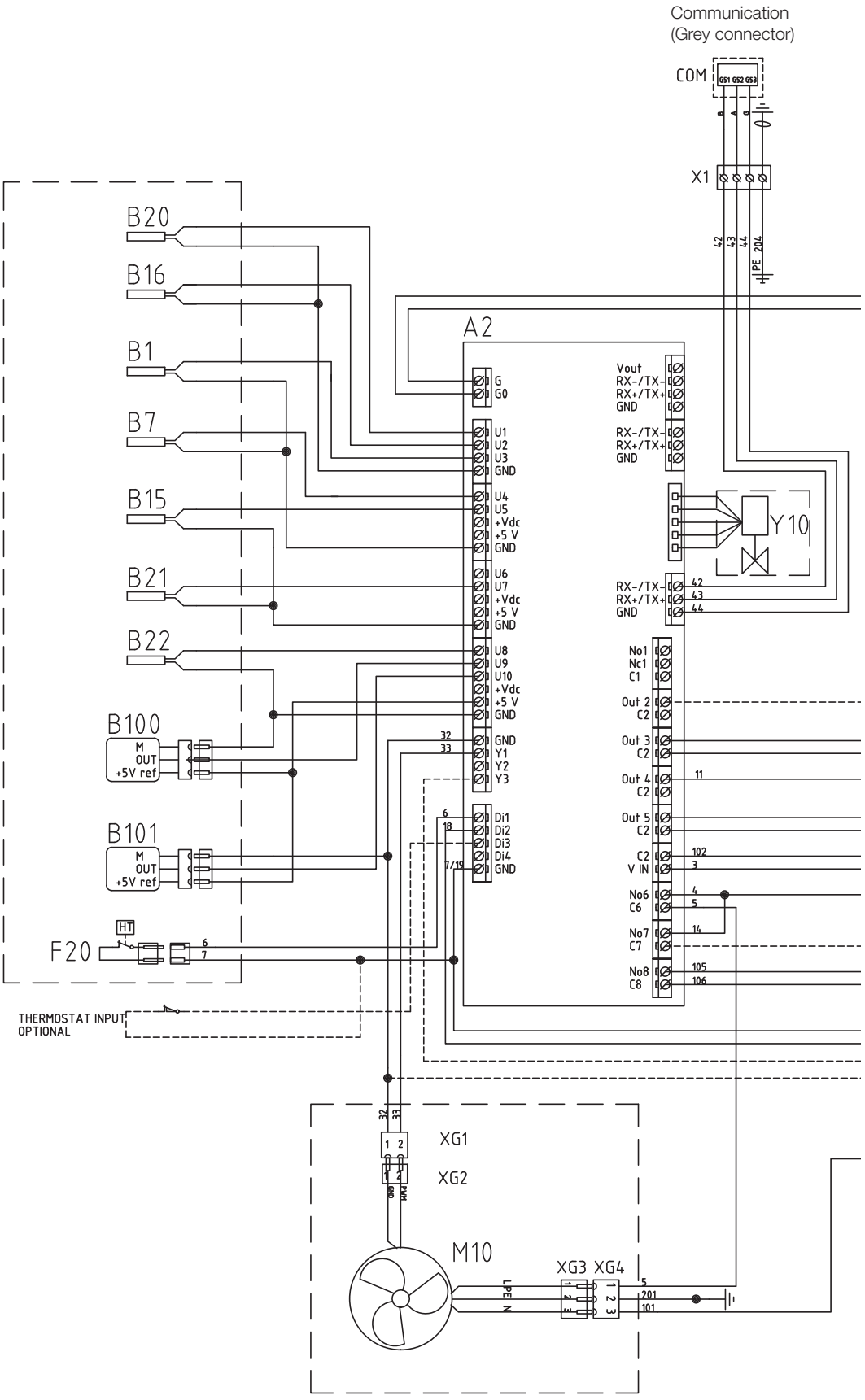
A2	Relay/main card	
A4	Soft-start card with motor protection and contactor function	
B1	Primary flow sensor	Type 2 NTC/NTC 22
B7	Return sensor	Type 2 NTC/NTC 22
B15	Outdoor sensor	Type 1 NTC/NTC 22
B16	Defrosting sensor	Type 1 NTC/NTC 22
B20	Fan sensor	Type 1 NTC/NTC 22
B21	Discharge sensor	Type 3 NTC/NTC 50
B22	Suction gas sensor	Type 1 NTC/NTC 015
B100	High pressure sensor	
B101	Low pressure sensor	
C1	Condenser compressor (1-phase)	
C2	Condenser	
E10	Compressor heater	
E11	Condenser tray heater	
E12	Heating cable (option)	
F1	Fuse (option)	
F20	High pressure switch	
G11	Charge pump (option)	
K1	Contactor (EA415-420)	
M1	Compressor	
M10	Fan	
X1	Terminal block	
XM1	Connector supply Male	
XM2	Connector supply Female	
XC1	Connector compressor Male	
XC2	Connector compressor Female	
Y10	Expansion valve	
Y11	Solenoid valve	

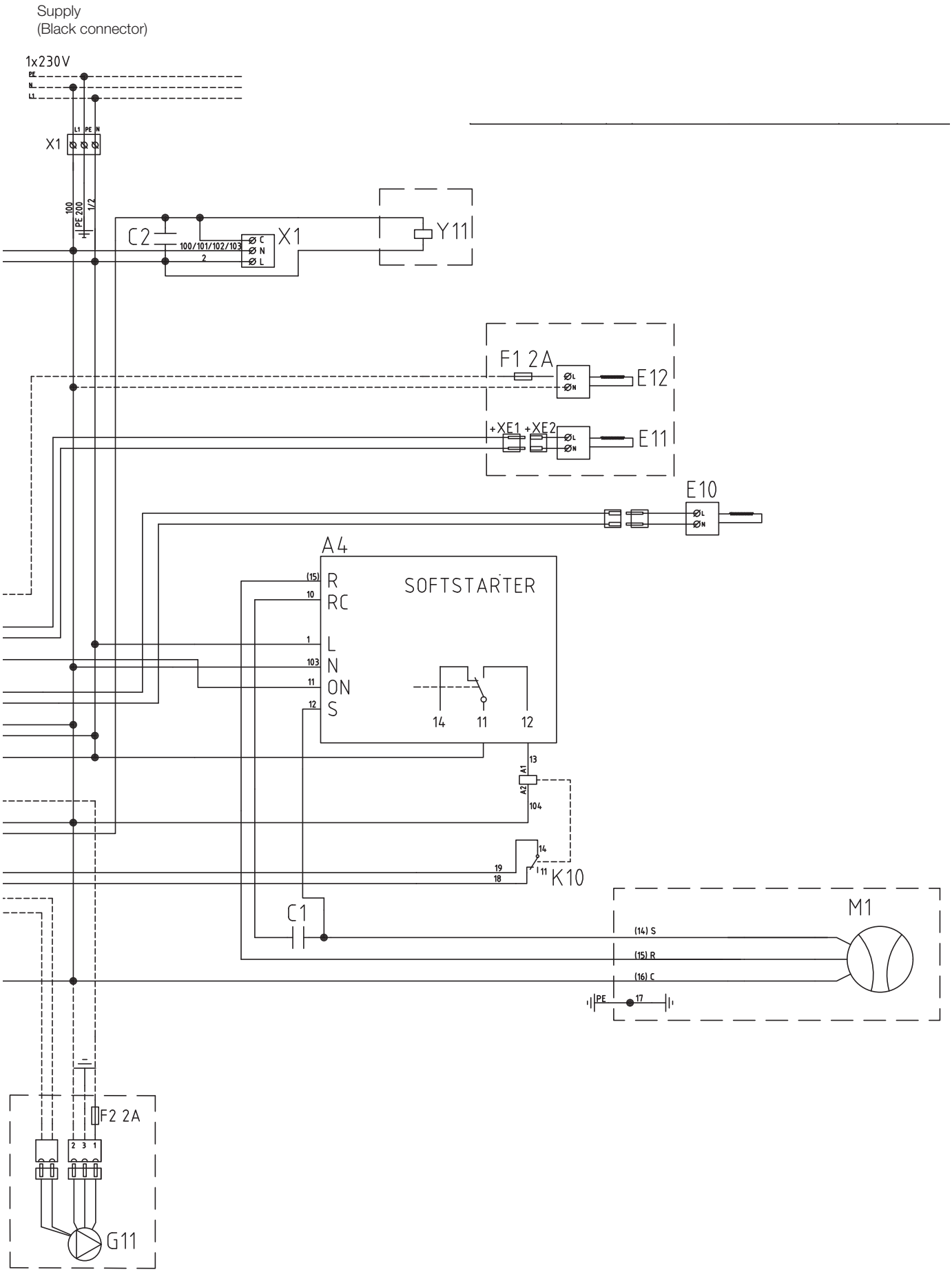
10.8 Wiring diagram 400V 3N~




E11
E12
F20
XB1
XB2
E1
E2
F1 2A
A4
HT
B
A
G
START
N
L
L1
L2
L3
U
V
W
2Ω
Y11
X1
E10
ØL
ØN
K_ext
K1
45
46
54
55
56
EcoAir 415-420
3x400V
14
15
16
EcoAir 406-410
3x400V
M1
PE
17

10.9 Wiring diagram 230V 1N~




Supply
(Black connector)
1x230V
PE
N
L
X1
L1 PE N
100
PE 200
1/2
C2
100/101/102/103
2
X1
C
N
L
Y11
F1 2A
E12
+XE1 +XE2
E11
E10
A4
SOFTSTARTER
(15)
R
10
RC
1
L
103
N
11
ON
12
S
14 11 12
13
A1
A2
104
14
19
18
11
K10
C1
M1
(14) S
(15) R
(16) C
PE
17
F2 2A
2 3 1
G11

11. First start

1. Check that the boiler and system are full of water and have been bled.
2. Check that all connections are tight.
3. Check that sensors and the charge pump are connected to the power source.
4. Energise the heat pump by switching on the safety switch (the main switch).

Once the system has heated up, check that all connections are tight, the various systems have been bled, heat is coming out into the system and DHW is coming out at the tap locations.

12. Noise data

Standard			
Model	**Noise level**	**Noise pressure 5 m***	**Noise pressure 10 m***
EcoAir 406	56 dB(A)	34-37 dB(A)	28-31 dB(A)
EcoAir 408	58 dB(A)	36-39 dB(A)	30-33 dB(A)
EcoAir 410	58 dB(A)	36-39 dB(A)	30-33 dB(A)
EcoAir 415	64 dB(A)	42-45 dB(A)	36-39 dB(A)
EcoAir 420	66 dB(A)	44-47 dB(A)	39-42 dB(A)

Silent mode			
Model	**Noise level**	**Noise pressure 5 m***	**Noise pressure 10 m***
EcoAir 415	61 dB(A)	39-42 dB(A)	33-36 dB(A)
EcoAir 420	64 dB(A)	42-45 dB(A)	36-39 dB(A)

* The stated sound pressure should be considered an indication only, as the level is affected by the surroundings. The upper value corresponds to 100% reflective ground and walls (smooth concrete). Values according to EN12102.

Silent mode

The CTC EcoAir 415 and 420 can be set to 'silent mode' by their respective control systems. In this position, the fan runs at a lower speed which means that the product makes less noise. The stated output will then be reduced by a few percent, depending on the operating situation.

Temperature °C	Sensor Type 1 NTC Resistance kΩ
100	0.22
95	0.25
90	0.28
85	0.32
80	0.37
75	0.42
70	0.49
65	0.57
60	0.7
55	0.8
50	0.9
45	1.1
40	1.3
35	1.5
30	1.8
25	2.2
20	2.6
15	3.2
10	4
5	5
0	6
-5	7
-10	9
-15	12
-20	15
-25	19
-30	25

Temperature °C	Sensor Type 2 NTC Resistance kΩ
100	0.67
95	0.78
90	0.908
85	1.06
80	1.25
75	1.47
70	1.74
65	2.07
60	2.5
55	3.0
50	3.6
45	4.4
40	5.3
35	6.5
30	8.1
25	10
20	12.5
15	15.8
10	20
5	26
0	33
-5	43
-10	56
-15	74
-20	99
-25	134
-30	183

Temperature °C	Sensor Type 3 NTC Resistance kΩ
130	5.37
125	6.18
120	7.13
115	8.26
110	9.59
105	11.17
100	13.06
95	15.33
90	18.1
85	21.4
80	25.4
75	30.3
70	36.3
65	43.6
60	52.8
55	64.1
50	78.3
45	96.1
40	119
35	147
30	184
25	232
20	293
15	373
10	479
5	619

Temperature °C	NTC 50 Resistance kΩ
150	0.89
145	1.00
140	1.14
135	1.29
130	1.47
125	1.67
120	1.91
115	2.19
110	2.5
105	2.9
100	3.4
95	3.9
90	4.6
85	5.4
80	6.3
75	7.4
70	8.8
65	10.4
60	12.5
55	15
50	18
45	22
40	27
35	33
30	40
25	50
20	62
15	78
10	99
5	126

Temperature °C	NTC 22 k Resistance Ω
130	800
125	906
120	1027
115	1167
110	1330
105	1522
100	1746
95	2010
90	2320
85	2690
80	3130
75	3650
70	4280
65	5045
60	5960
55	7080
50	8450
45	10130
40	12200
35	14770
30	18000
25	22000
20	27100
15	33540
10	41800
5	52400
0	66200
-5	84750
-10	108000
-15	139000
-20	181000
-25	238000

Temperature °C	NTC 015 Resistance Ω
40	5830
35	6940
30	8310
25	10000
20	12090
15	14690
10	17960
5	22050
0	27280
-5	33900
-10	42470
-15	53410
-20	67770
-25	86430

13. Operation and Maintenance

When the installer has installed your new heat pump, you should check along with the installer that the system is in perfect operating condition. Let the installer show you where the power switches, controls and fuses are so that you know how the system works and how it should be maintained. Bleed the radiators (depending on type of system) after around three days of operation and top up with water if required.

13.1 Defrost

The CTC EcoAir 400 is fitted with discharge defrosting. The heat pump checks constantly whether defrosting is needed and, if so, defrosting starts, the fan stops, the 4-way valve changes direction and the discharge goes to the evaporator instead. A hissing sound is heard as the water drains from the evaporator. When the product has defrosted, the fan starts and the discharge goes into the condenser instead, and the heat pump returns to normal operation.

13.2 The fan

The fan starts 15 seconds before the condenser and runs until the compressor stops. During defrosting the fan stops and restarts when defrosting is finished.

13.3 Maintenance

A large amount of water passes through the evaporator in the CTC EcoAir 400. Leaves and other debris can get stuck and restrict the air flow. At least once year the evaporator coil should be checked and cleared of particles that block the air flow. The evaporator and outer covering should be cleaned with a damp cloth or soft brush. No other periodic maintenance or inspection is necessary.

13.4 Periodic maintenance

After three weeks of operation and every three months of the first year, thereafter once a year:

- Check that the installation is free of leaks.
- Check that the product and system are free of air; bleed if needed.
- Check that the evaporator is clean.
- The products **do not** require annual inspection for refrigerant leakage

13.5 Operation stop

The heat pump is shut down using the operating switch. If there is a risk of the water freezing, ensure that there is circulation through the heat pump or drain out all the water from the CTC EcoAir 400.

13.6 Condensation water tray

The condensation tray collects water formed on the CTC EcoAir evaporator during operation and defrosting. The condensation water tray is equipped with an electric heating coil which keeps the tray free of ice when the outside temperature is below freezing. The condensation tray is located at the bottom on the back of CTC EcoAir 400. By lifting the handle and pulling it out, you can clean and inspect the condensation tray. You can buy a heating cable as an accessory and connect it to the EcoAir 400. The cable must be installed in the drain from the condensation tray to a frost-free drain.

14. Troubleshooting/Appropriate measures

The CTC EcoAir 400 is designed to provide reliable operation and high levels of comfort, and to have a long service life. Various tips are given below which may be helpful and guide you in the event of an operational malfunction. If a fault occurs, you should always contact the installer who installed your unit. If the installer believes the malfunction is due to a materials or design fault, then they will contact Enertech AB to check and rectify the issue. Always provide the product's serial number.

14.1 Air problems

If you hear a rasping sound from the heat pump, check that it is properly bled. Top up with water where required, so that the correct pressure is achieved. If this noise recurs, call a technician to check the cause.

14.2 Alarm

Any alarms and information texts from the CTC EcoAir 400 are displayed in the product which is used to control it; you should therefore consult the manual for that product.

14.3 Circulation and defrosting

If the circulation between the indoor and the outdoor unit is reduced or stops, the high pressure switch is triggered. Possible reasons for this:

- Defective circulating pump/Circulating pump too small
- Air in the pipes
- Condenser clogged
- Other intermediate obstructions to the water flow

During defrosting the fan stops but the compressor operates and the melted snow and ice flows into the condensation tray under the heat pump. When defrosting stops, the fan starts again and initially a vapour cloud, consisting of damp air which condenses in the cold outdoor air, is created. This is perfectly normal and stops after a few seconds. If the pump heats poorly, check that no unusual ice formation has occurred. Possible reasons for this:

- Defective defrosting automation
- Lack of refrigerant (leakage)
- Extreme weather conditions.

Remember that CTC EcoAir 400 is an air source heat pump that produces less heating when outdoor temperatures fall, while the heating needs of the house increase. When temperatures fall quickly, this means that you may experience a lack of heating power.

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www.ctc.se, www.ctc-heating.com

012