

Regulus

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EcoAir 406 | 408 | 410

Installation and Operation Manual
AIR-TO-WATER HEAT PUMP
Regulus CTC EcoAir 406 | 408 | 410

EN

EcoAir 406 | 408 | 410

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Congratulations on buying your new EcoAir Heat Pump



The complete outdoor 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 system of the building. The CTC EcoAir 400 works with outside air temperatures down to -22°C .

The CTC EcoAir 400 has been designed to operate with high efficiency. The heat pump features integrated hot gas defrosting which keeps the evaporator coil free from ice to maintain high efficiency.

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

Important to remember!

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

- The CTC EcoAir must be transported and stored in an upright position
- 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.
- The CTC EcoAir has a factory-fitted condensation water tray where the condensation water is conducted to a stone curb, surface water gully, down pipe or other drainage. You should therefore consider the position of the product.
- If the condensation water pipe is not used, the foundation must be such that condensing water and melted snow can drain into the ground. Make a 'stone curb' under the heat pump. Remove 70-100 cm and fill up with crushed stones to obtain the best possible drainage.
- The outdoor unit must stand level – check with spirit level. For more information about the placement of the product, see sections 6 and 7.
- Remember to leave a service area of at least 2 m in front of the product.
- Flexible hoses should be installed closest to the heat pump. Outdoor pipes should be thoroughly insulated with weather-proof insulation.
- Ensure that pipes used between the heat pump and the heating system are of adequate dimensions.
- Ensure that the circulation pump has sufficient capacity.

Safety Instructions

The following safety instructions must be observed when handling, installing and using the heat pump:

- Close the safety switch before doing any work on the product.
- The product must not be flushed with water.
- When handling the product with a hoist ring or similar device, make sure that the lifting equipment, eyebolts etc. are not damaged. Never stand under the hoisted product.
- Never jeopardize safety by removing bolted covers, hoods or similar.
- Never jeopardize safety by deactivating safety equipment.
- Any work done on the product's electric or cooling system should be done by a competent engineer.



Failure to follow the instructions in this Manual may void the Warranty.

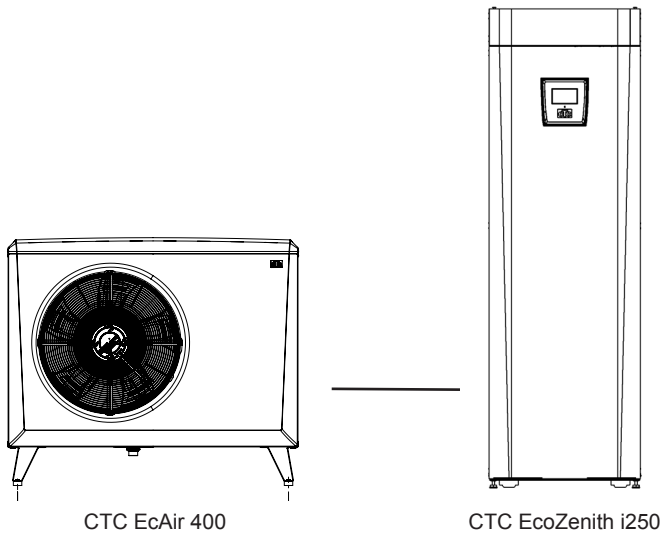
1. Connection alternatives

CTC EcoAir 400

Možnosti instalace CTC EcoAir 400 jsou zobrazeny níže.

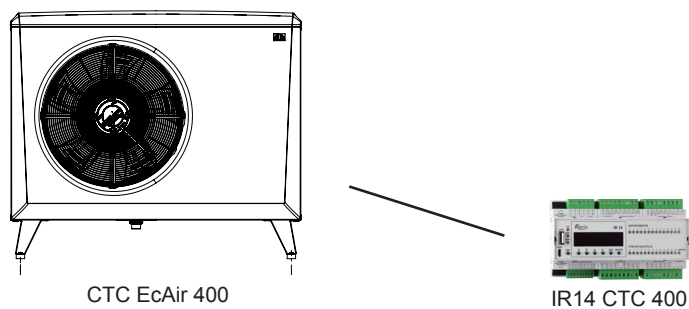
CTC EcoAir 400 can be connected to the products below:

Alternative A



! CTC EcoZenith i250 can be connected to heat pumps of an output up to 11 kW.

Alternative B



2. Technical data

2.1 Data sheets for 3-phase models

Regulus CTC EcoAir 406 Heat Pump

Technical features		
Compressor type	Scroll	
Refrigerant	R 407C	
Refrigerant quantity	2.2 kg	
Max. flow temperature	65 °C	
Heating water volume	1.9 l	
Power supply	3/PE~400 V, 50 Hz V	
Min. main circuit breaker incl. characteristics	B10A 3-phase	
Rated current*	4 A	
Air flow rate	2500 m ³ /h	
Max. working pressure	3.0 bar	
Break value pressure switches	31 bar	
Fan speed	463 ot/min	
Sound power level	56.2 dB(A)	
Sound pressure level at	1 m	48.2 dB(A)
	5 m	34.2 dB(A)
	10 m	28.2 dB(A)

Dimension and weight	
Height	1080 mm
Width	1245 mm
Depth	545 mm
Weight	120 kg

Output parameters**				
Air temperature °C	Flow temperature °C	Output kW	Power input kW	COP
7 °C	35 °C	6.22	1.30	4.78
	45 °C	5.96	1.61	3.71
	55 °C	5.67	1.86	3.04
2 °C	35 °C	4.69	1.28	3.66
	45 °C	4.34	1.50	2.89
	55 °C	4.25	1.75	2.43
-7 °C	35 °C	3.87	1.25	3.10
	45 °C	3.63	1.47	2.47
	55 °C	3.43	1.73	1.99
-15 °C	35 °C	2.84	1.17	2.42
	45 °C	2.65	1.40	1.90
	55 °C	2.49	1.62	1.54

*) Incl. a secondary circulation pump, Stratos Tec 25/7 nebo Grundfos UPM GEO 25-85

***) Values measured by the manufacturer in compliance with EN 14511 incl. defrosting



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

Regulus CTC EcoAir 408 Heat Pump

Technical features		
Compressor type	Scroll	
Refrigerant	R 407C	
Refrigerant quantity	2.2 kg	
Max. flow temperature	65°C	
Heating water volume	2.4 l	
Power supply	3/PE~400 V, 50 Hz V	
Min. main circuit breaker incl. characteristics	B10A 3-phase	
Rated current*	3.0 A	
Air flow rate	2800 m ³ /h	
Max. working pressure	2.5 bar	
Break value pressure switches	31 bar	
Fan speed	527 ot/min	
Sound power level	58.3 dB(A)	
Sound pressure level at	1 m	50.3 dB(A)
	5 m	36.3 dB(A)
	10 m	30.3 dB(A)

Dimension and weight	
Height	1080 mm
Width	1245 mm
Depth	545 mm
Weight	126 kg

Output parameters**				
Air temperature °C	Flow temperature °C	Output kW	Power input kW	COP
7 °C	35 °C	7,83	1.62	4.83
	45 °C	7.44	1.97	3.78
	55 °C	7.08	2.28	3.11
	65 °C	6.61	2.67	2.98
2 °C	35 °C	6.02	1.60	3.76
	45 °C	5.51	1.89	2.93
	55 °C	5.88	2.22	2.65
-7 °C	35 °C	4.73	1.57	3.02
	45 °C	4.62	1.85	2.50
	55 °C	4.39	2.11	2.08
-15 °C	35 °C	3.63	1.50	2.42
	45 °C	3.50	1.76	1.99
	55 °C	3.27	2.01	1.63

*) Incl. a secondary circulation pump, Stratos Tec 25/7 or Grundfos UPM GEO 25-85

***) Values measured by the manufacturer in compliance with EN 14511 incl. defrosting



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

Regulus CTC EcoAir 410 Heat Pump

Technical features		
Compressor type	Scroll	
Refrigerant	R 407C	
Refrigerant quantity	2.7 kg	
Max. flow temperature	65°C	
Heating water volume	2.8 l	
Power supply	3/PE~400 V, 50 Hz V	
Min. main circuit breaker incl. characteristics	B16A 3-phase	
Rated current*	7.5 A	
Air flow rate	4100 m ³ /h	
Max. working pressure	3.0 bar	
Break value pressure switches	31 bar	
Fan speed	489 ot/min	
Sound power level	57.3 dB(A)	
Sound pressure level at	1 m	50 dB(A)
	5 m	36 dB(A)
	10 m	30 dB(A)

Dimension and weight	
Height	1080 mm
Width	1375 mm
Depth	645 mm
Weight	180 kg

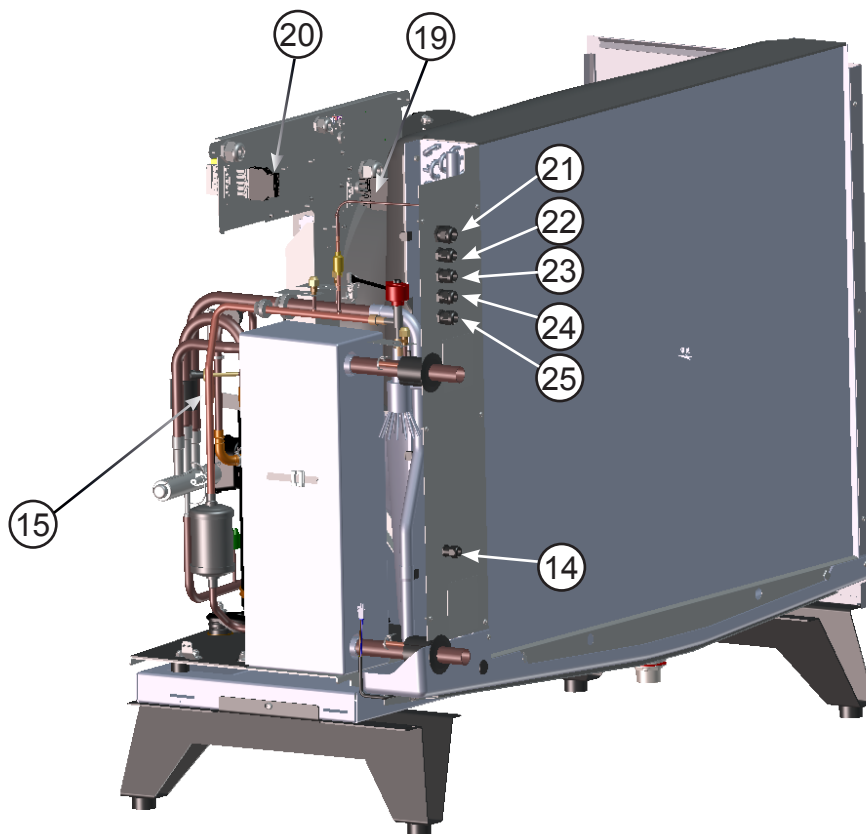
Output parameters**				
Air temperature °C	Flow temperature °C	Output kW	Power input kW	COP
12 °C	35 °C	13.60	2.44	5.57
	45 °C	12.91	2.95	4.38
	55 °C	10.06	3.31	3.64
	65 °C	11.35	3.87	2.93
7 °C	35 °C	11.45	2.36	4.86
	45 °C	10.89	2.86	3.81
	55 °C	10.48	3.30	3.18
	65 °C	9.71	3.77	2.57
2 °C	35 °C	8.80	2.30	3.83
	45 °C	8.58	2.79	3.07
	55 °C	8.01	3.06	2.62
	65 °C	8.22	3.69	2.23
-7 °C	35 °C	7.32	2.29	3.19
	45 °C	6.90	2.64	2.61
	55 °C	6.63	3.04	2.18
-15 °C	35 °C	5.63	2.13	2.65
	45 °C	5.22	2.51	2.08
	55 °C	4.93	2.09	1.76

*) Incl. a secondary circulation pump, Stratos Tec 25/7 or Grundfos UPM GEO 25-85

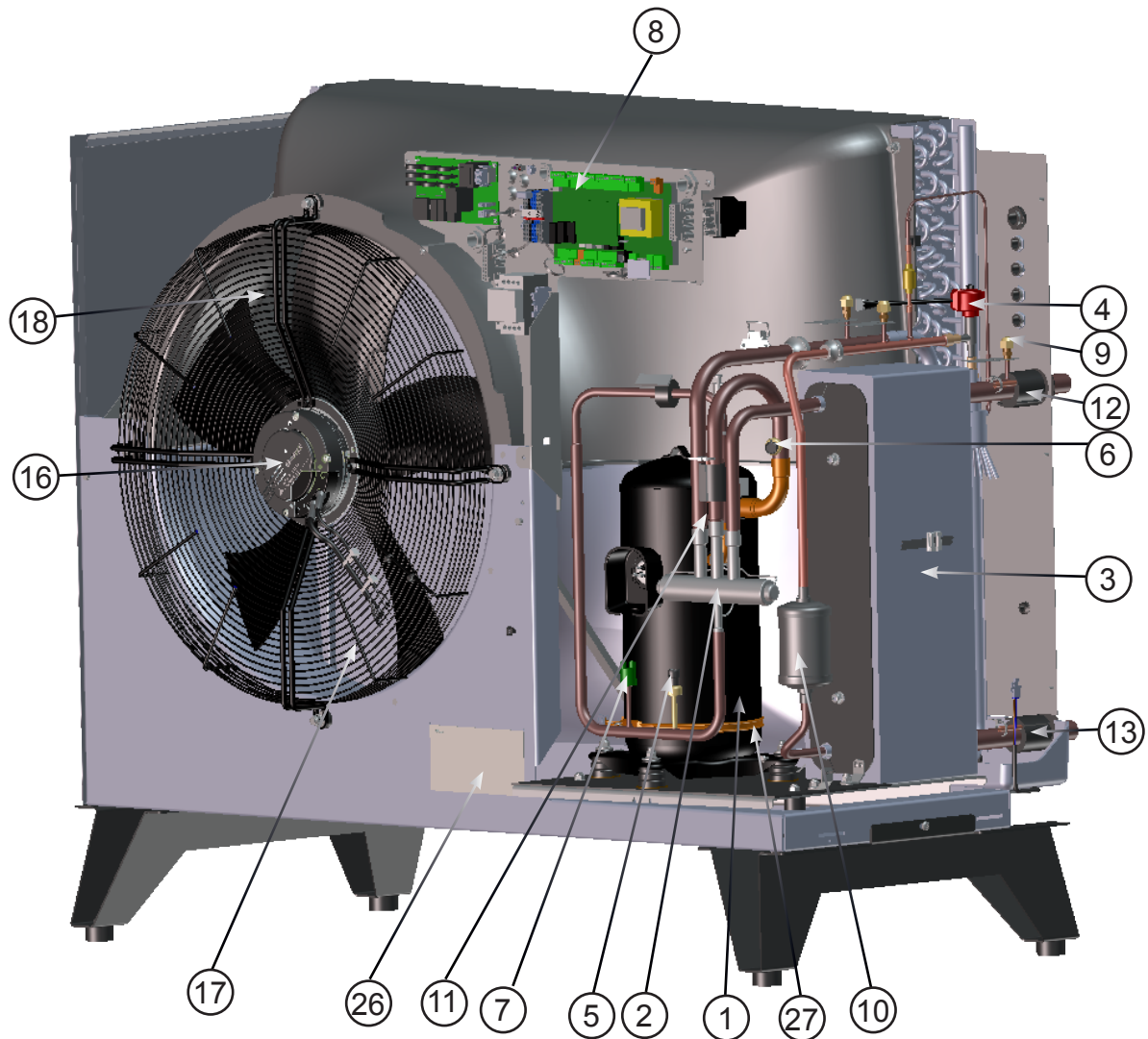
***) Values measured by the manufacturer in compliance with EN 14511 incl. defrosting

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

2.2 Component location



- | | |
|-------------------------|--------------------------------|
| 1. Compressor | 8. Connection box |
| 2. 4-way valve | 9. Drain valve - water |
| 3. Condenser | 10. Drying filter |
| 4. Expansion valve | 11. Suction gas sensor |
| 5. High pressure sensor | 12. Primary flow sensor |
| 6. Low pressure sensor | 13. Return sensor |
| 7. High pressure switch | 14. Outdoor temperature sensor |

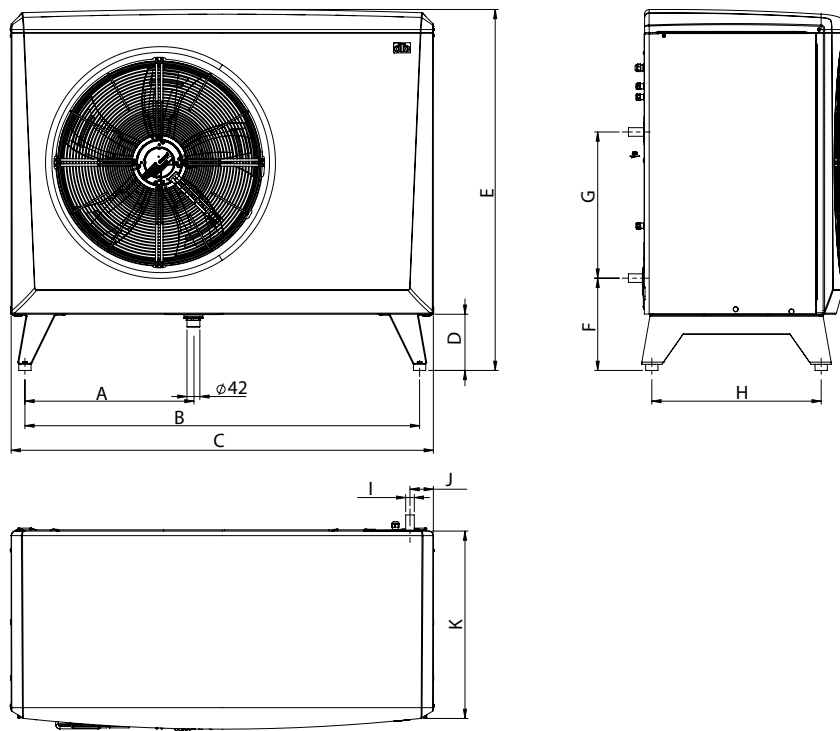


- 15. Hot gas sensor
- 16. Fan
- 17. Defrosting sensor in evaporator
- 18. Sensor on fan
- 19. Power supply terminal
- 20. Communication terminal
- 21. Power supply grommet

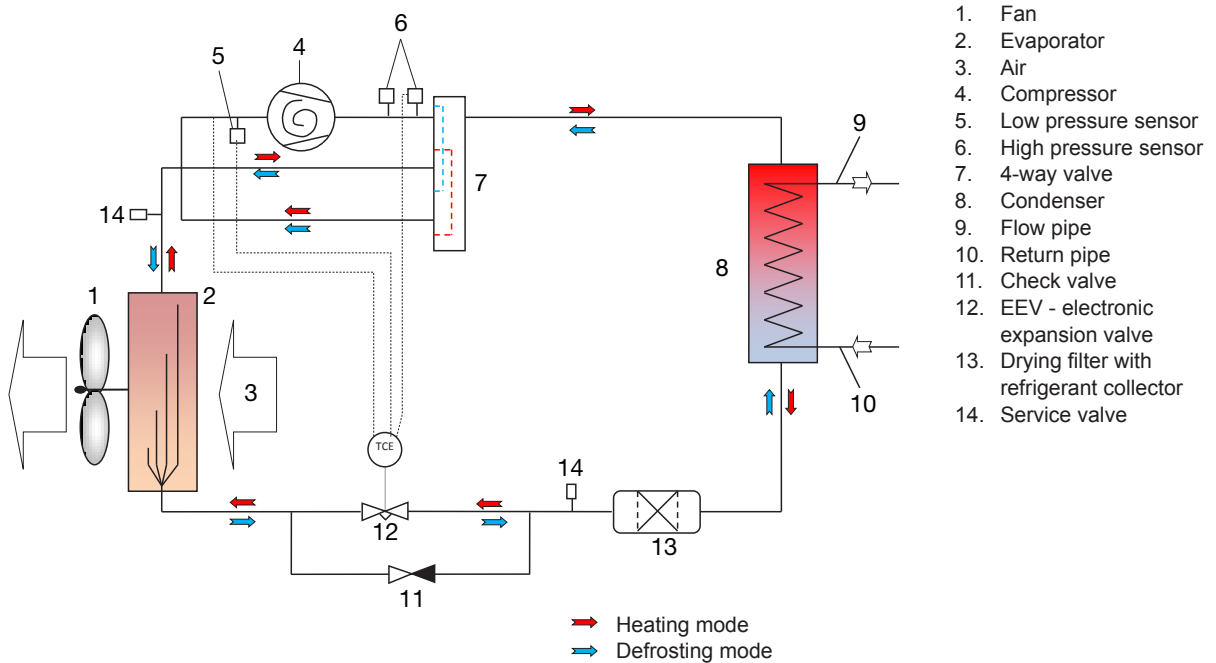
- 22. HP communication cable grommet
- 23. Communication cable grommet, series connection
- 24. Power supply cable grommet, circulation pump
- 25. Communication cable grommet, circulation pump
- 26. Type plate with serial number etc.
- 27. Heating cable

2.3 Dimensional drawing

	406,408	410
A	486	550
B	1155	1285
C	1245	1375
D	183	183
E	1080	1175
F	301	301
G	476	476
H	451	551
I	∅ 28	∅ 28
J	85	80
K	545	645



2.4 Refrigerant system



1. Fan
2. Evaporator
3. Air
4. Compressor
5. Low pressure sensor
6. High pressure sensor
7. 4-way valve
8. Condenser
9. Flow pipe
10. Return pipe
11. Check valve
12. EEV - electronic expansion valve
13. Drying filter with refrigerant collector
14. Service valve

3. Operation and Maintenance

When the installer has installed your new heat pump, you should check together 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.

3.1 Maintenance

A large amount of air passes through the evaporator in the EcoAir 400 Heat Pump. 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.

3.2 Periodic maintenance

After three weeks' operation and then every three months during the first year. Then 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

3.3 Shut-down

The heat pump is shut down using the operating switch. If there is a risk of the water freezing, all the water shall be drained out from the heat pump!

3.4 Condensate tray

The condensate tray collects water formed on the CTC EcoAir evaporator during operation and defrosting. The condensate tray is equipped with an electric heating cable which keeps the tray free of ice when it is freezing outside. The condensate tray is located at the bottom on the back of the heat pump. It can be easily cleaned and checked by lifting the handle and pulling it out. A heating cable can be connected to the EcoAir 400 to heat the drain pipe. The cable is installed in the drain pipe from the condensation tray to a frost-free drain. See chapter 7.

4. Troubleshooting/measures

The EcoAir Heat Pump 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 material or design fault, then they will contact the supplier to check and rectify the issue. Always provide the product's serial number.

4.1 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.

4.2 Alarms

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 controller.

4.3 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/undersized circulation pump
- air in the pipes
- other 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 vapor 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 which gives less heat power when outdoor temperatures fall, while the heating needs of the house increase. When temperatures fall quickly, this means that in rare cases you may experience a lack of heating power.

5. Installation

This chapter 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 valid rules. The product must be connected to an expansion vessel in an open or closed system. **Do not forget to flush the radiator system clean before connection.**

The heat pump operates with a primary flow temperature of up to 65 °C and return temperature of up to 58 °C.


Transport

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

- Forklift
- Lifting band around the pallet. **Note:** 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.

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

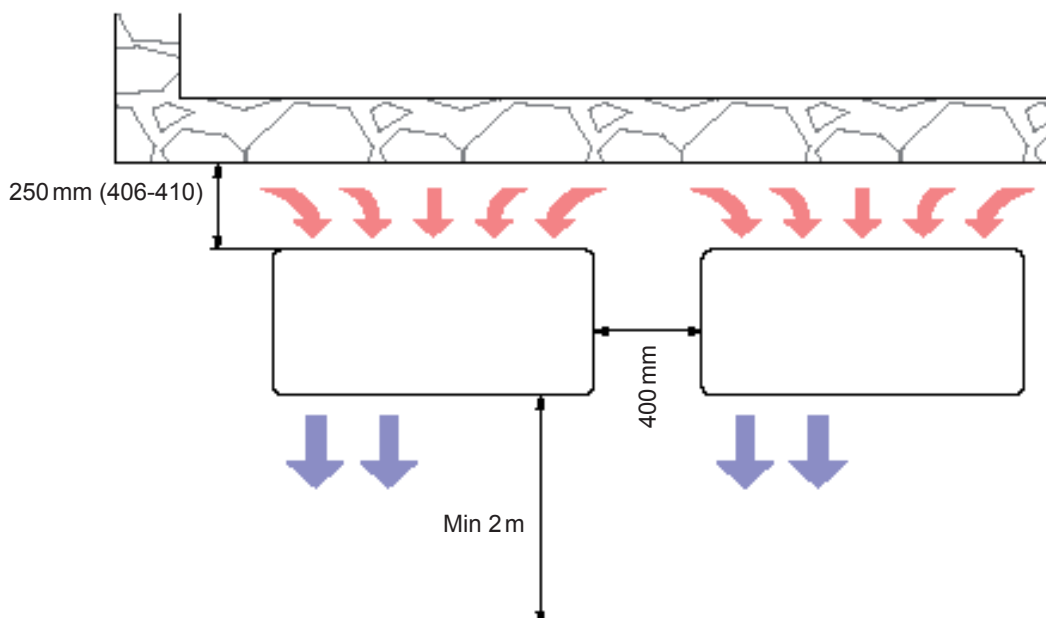
6. Placement of the heat pump

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 300 mm between the heat pump and the wall so that outdoor air can pass freely in through the evaporator
- if the heat pump is placed in a corner, there should be a space of at least 250 mm between the side of the heat pump and the wall.
- allow a space of at least 2 metres between the heat pump and any bushes etc.
- take the distance to the nearest neighbour into account by checking the noise data in the “noise data” chapter
- the recommended distance between units is 400 mm
- the legs of the 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

Installing the heat pump in a sheltered spot is inadvisable, and so is placing it in an outhouse or car port, because the air should flow as freely as possible through the heat pump and used air should not be sucked into the inlet on the back. This can cause abnormal ice formation in the evaporator and deterioration of the heat pump performance, thus also reducing the intended saving. If the product is in an exposed location, with extra harsh weather conditions, then a suitable covering or sheltered location is justified.

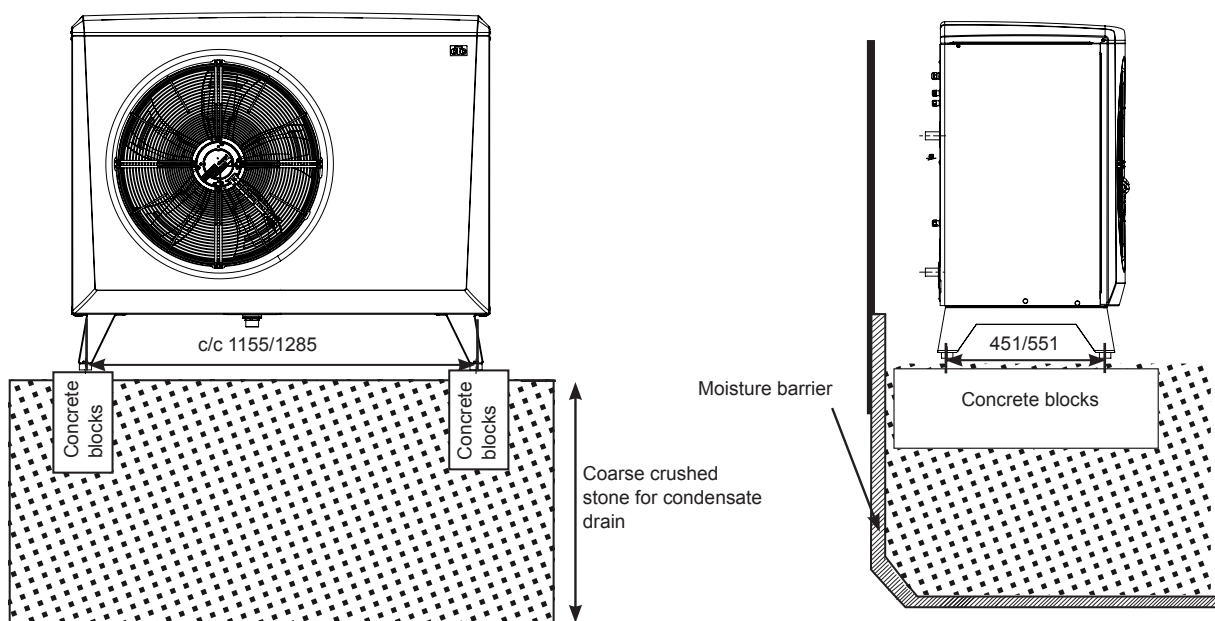
! These guidelines must be followed in order for your CTC EcoAir 400 to give the best performance.



7. Preparation and drainage

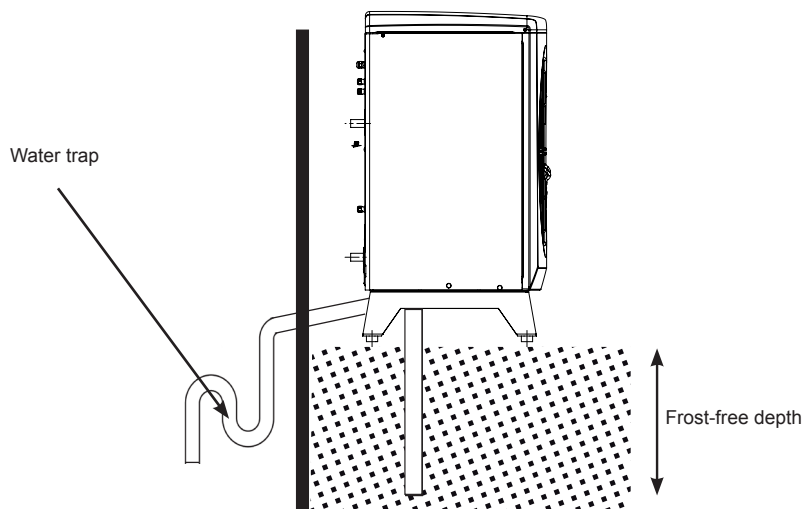
The heat pump should be positioned so that the house cannot be damaged and the condensation water can easily drain into the ground. The foundation should be of concrete blocks or similar, resting on crushed stones or gravel.

- 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.
- make a 70 – 100 cm deep hole
- 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 up the c/c dimension (1285mm) between the blocks to match the span of the heat pump stand
- use a spirit level to ensure that the blocks are level
- place crushed stones around the blocks to achieve the best drainage



7.1 Condensate

- The condensate 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: 42mm.
- A heating cable should be placed in the pipe to prevent refreezing. The heating cable is connected to the electrical wiring box 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 condensate 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 condensate pipe can be lead directly into the ground into 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.



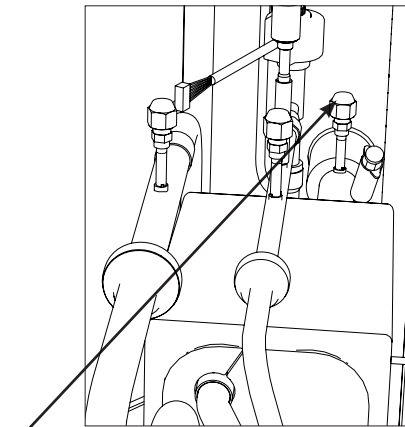
8. Pipe installation

The installation must be carried out in accordance with current standards. The boiler must be connected to an expansion vessel in an open or closed system. Do not forget to flush the radiator system clean before connection.

8.1 Pipe connection

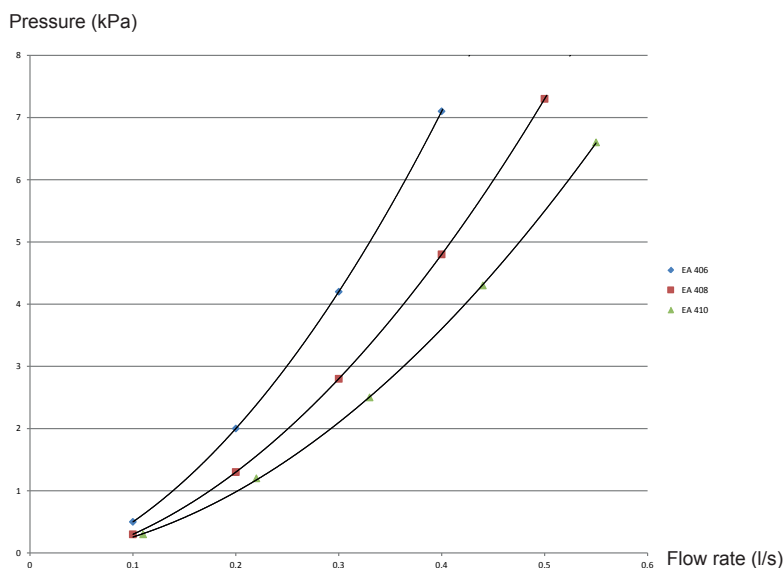
- Primary and return lines of at least 28 mm diam. copper pipe are connected to the heat pump. For longer pipes, the installer should calculate the pump and pipe dimensions needed to handle the minimum recommended flow for the CTC EcoAir 400 concerned.
- Route the pipes between the heat pump and the boiler without any highest points. If this cannot be done, provide this highest point with an automatic air separator or and in line aerator.
- The connection to the heat pump should be made with a wire-reinforced diffusion-tight hose for hot water, min. 1" diameter. Recommended hose length 1000 mm, to prevent noise from the heat pump spreading into the house and to take up any movement of the heat pump.
- Pipes installed outside should be insulated with at least 19 mm thick 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 as far as the boiler with at least 13 mm thick insulation. This is to enable the heat pump to deliver the highest possible temperature to the boiler or tank without any losses.
- The heat pump can be air-bled via the air vent valve inside the unit, at the condenser outlet.

! Do not forget to flush the radiator system clean before connection.



! NOTE! Bleed only on this valve. The others are for the cooling system, if these are opened, refrigerant can leak and you risk burns!

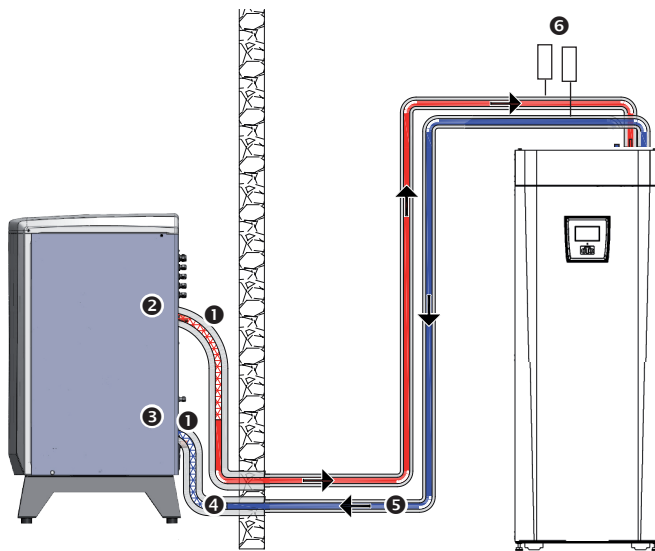
Pressure drop diagram for CTC EcoAir 400



8.2 Example of pipe connection

EcoAir/EcoZenith i250

CTC EcoZenith i250 is fitted with pipes to connect to a heat pump located on its right rear. The lower heat pump outlet connects to the right pipe when looking from the front. The upper heat pump outlet connects to the left pipe.



1. Wire-reinforced diffusion-tight hose for hot water, min. 1". Hose length 1000 mm from the unit.
2. Outgoing (heated) water 28 mm diam. connection.
3. Incoming (cold) water 28 mm diam. connection.
4. Minimum 28 mm diam. copper pipe insulated outside with at least 19 mm thick insulation.
5. Inside piping is insulated with at least 13 mm thick insulation.
6. Air vent valve



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

9. Circulation pump

The choice of circulation pump depends on the type of system. Ensure that the circulation pump is powerful 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 controller.

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.

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.

Outdoor temp. (°C)		-10	-5	0	+5	+7	+10
CTC EcoAir 406	Primary flow 35 °C Flow rate = 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 rate = 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 rate = 0.39 l/s	4°C	5°C	6°C	6.5°C	7 °C	8°C

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

CTC EcoAir 406: 760 l/h

CTC EcoAir 408: 960 l/h

CTC EcoAir 410: 1400 l/h

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

9.1 Control/supply

IR 14 CTC 400

Up to 10 heat pumps can be connected to an IR14 CTC 400 controller. The circulation pump in heat pump 1 can be then connected to the IR14 CTC 400 controller. The circulation pumps for heat pumps 2-10 are switched directly by the control unit of the respective heat pump.

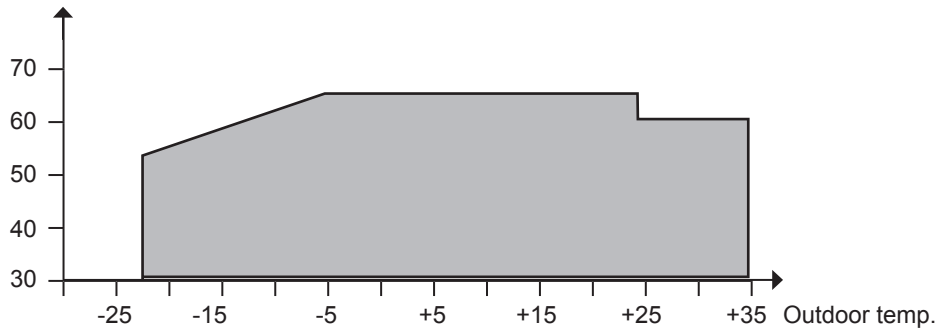
CTC EcoZenith i250

A circulation pump is factory installed in CTC EcoZenith i250. It is controlled and power supplied directly from CTC EcoZenith i250. For more info, consult the respective Instruction Manual.

9.2 Operating range

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

HP flow temp.



10. General function description

10.1 Defrosting

The CTC EcoAir 400 is fitted with hot gas defrosting. The heat pump checks constantly whether defrosting is needed and, if so, defrosting starts, the fan stops, the four-way valve changes direction and the hot gas 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 hot gas goes into the condenser instead, and the heat pump returns to normal operation.

10.2 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.

10.3 Charge pump/Circulation pump

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

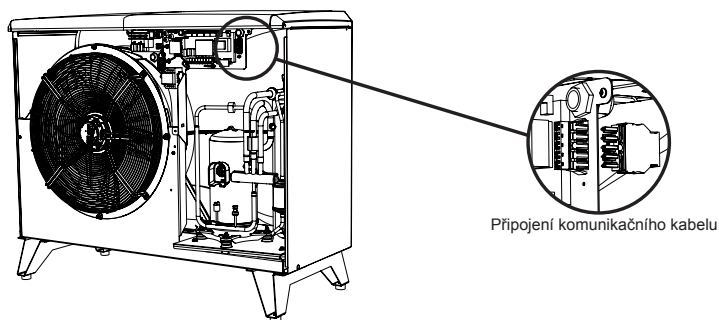
If the product is installed at a facility where power outages can occur, then it is advisable to supplement it with a backup power supply (UPS) for the charge pump, or to install mechanical frost protection.

11. Electrical installation

The installation and heat pump connection must be done by an authorised electrician. All wiring must be installed according to valid standards.

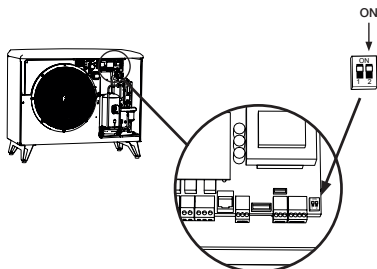
The communication cable used is an LiYCY (TP) which is 4-conductor shielded cable, where the communication-bearing conductors are of twisted pair type.

Use of any other cable will mean that the conductor colours may not match, necessitating a check that the colours of the conductors from unit 1 are connected to the same colours in unit 2. The machine may also be more sensitive to faults if a wrong cable is used.



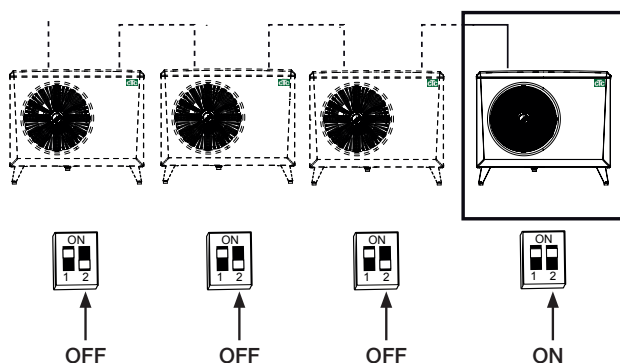
11.1 Connection of single heat pump

When a single heat pump is installed, the DIP switch 2 should be in position ON.



11.2 Series connection of heat pumps

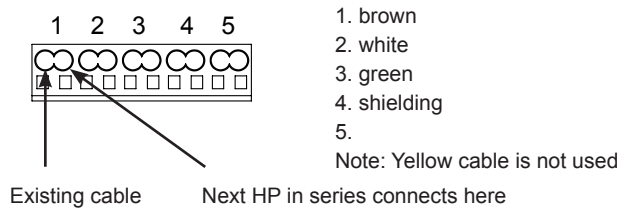
When connected in series, the shielding of the communication cable on the last heat pump must be connected to earth (see shielded communication) and the heat pump itself must be terminated (see terminated position).



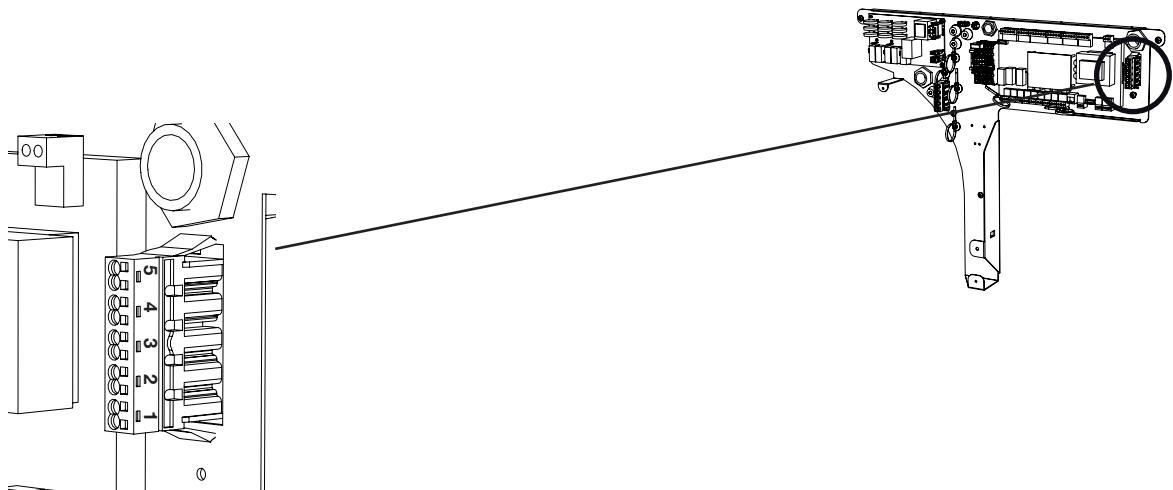
Communication connection in heat pump series (grey connector)

The communication cable used is LiYCY (TP) type. In the grey connector, the heat pumps are connected in series.

1. Connection of another heat pump in series into a grey connector



2. Remove the cover of the wiring compartment inside the heat pump

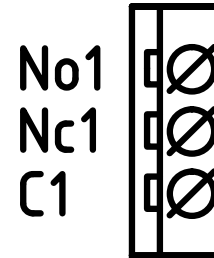


3. Re-connect the PE cable from pos. 4 to pos. 5 in all heat pumps in the cascade except for the last one in the series.

11.3 Output relay for joint alarms

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 250 V AC. An external fuse should also be used. Cable approved for 230 V AC must be used for connecting this output, irrespective of the load that is connected. For connection information, see the wiring diagram.

Alarm terminal in detail



11.4 Electrical installation 400 VAC 3 phase

Power supply, black terminal

The CTC EcoAir 400 shall be connected to 400V 3N~ 50 Hz and protective earth. The minimum group fuse size is specified in Technical data. Recommended cable 400V 3N~ CYKY 5x 1.5.

Safety circuit breaker

A four-pole circuit breaker should be installed that will ensure disconnection from all electric power sources.

11.5 Connection of subsequent terminals

- We recommend pulling the cable through the cable clip before you connect the wires. (See Fig. 1)
- a. Strip outer sleeve to 55mm
- b. Strip wires insulation to 9mm
- c. Strip protective earth wire insulation to 7mm
- Open the terminal block by pushing a screwdriver (blade width 2.5mm) into the block. Connect the stripped wires in the specified positions. Check that only the stripped parts are clamped to the terminals, NO INSULATION! (See Fig. 2, 3)
- Fix the cable clip to the connector. The word TOP should be visible on the terminal and the cable clip (see Fig. 4).
- Push the cable clip onto the connector. Then tighten the screw to obtain the desired tension (see Fig. 5).



Fig. 1



Fig. 2



Fig. 3



Fig. 4

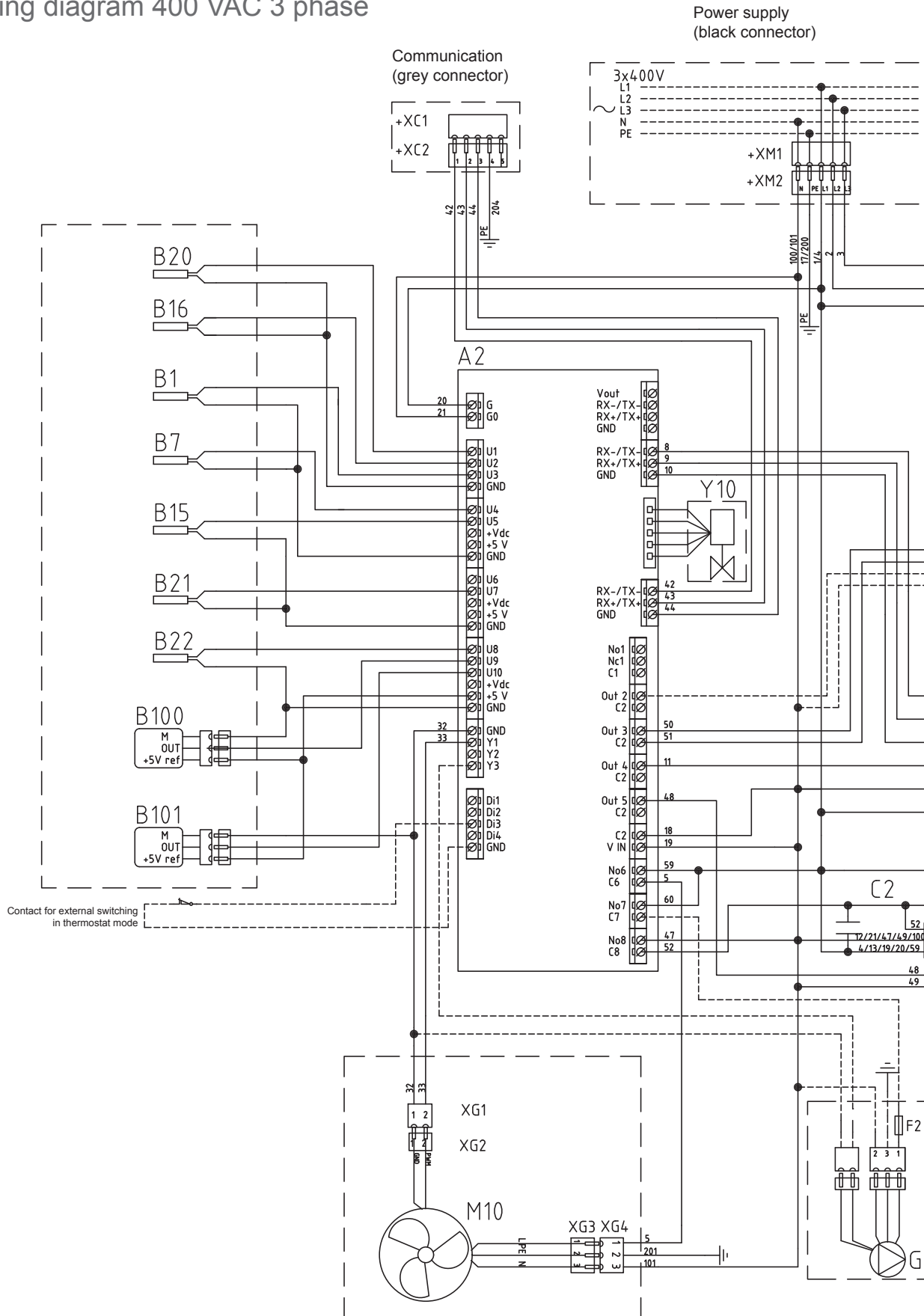


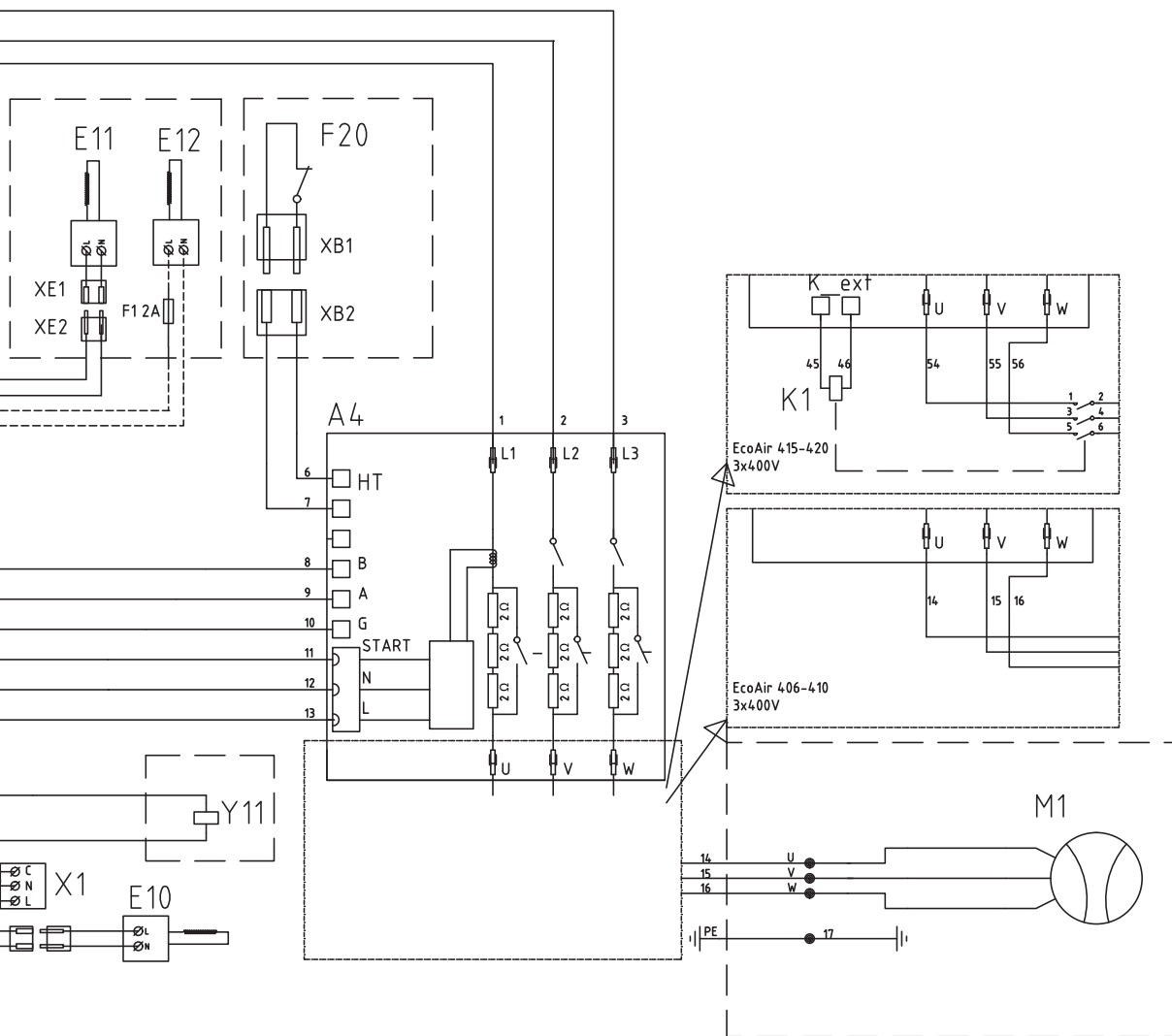
Fig. 5

11.6 Parts list

A2	Main PCB
A4	PCB with softstarter, motorprotection and contactor function
B1	Primary flow temperature sensor
B7	Return temperature sensor
B15	Outdoor temperature sensor
B16	Defrost sensor
B20	Fan air sensor
B21	Hot gas sensor
B22	Compressor suction gas sensor
B100	High pressure sensor
B101	Low pressure sensor
C2	Condenser
E10	Compressor heater
E11	Evaporator heater
E12	Heating cable (option)
F1	Fuse (option)
F20	High pressure switch
G11	HP charging pump (option)
K1	Contactor (EA415-420)
M1	Compressor
M10	Fan
X1	Terminal
XM1	Supply connector Male
XM2	Supply connector Female
XC1	Communication connector Male
XC2	Communication connector Female
Y10	Expansion valve
Y11	Solenoid valve

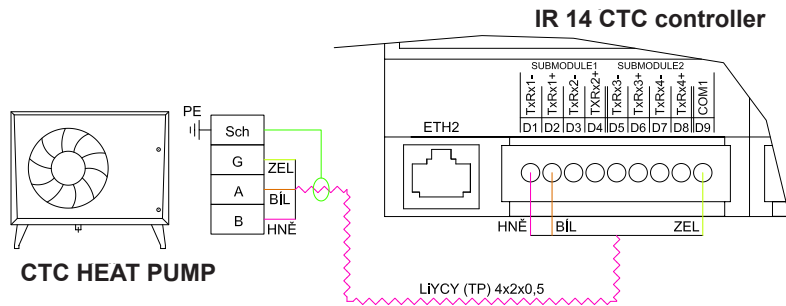
11.7 Wiring diagram 400 VAC 3 phase





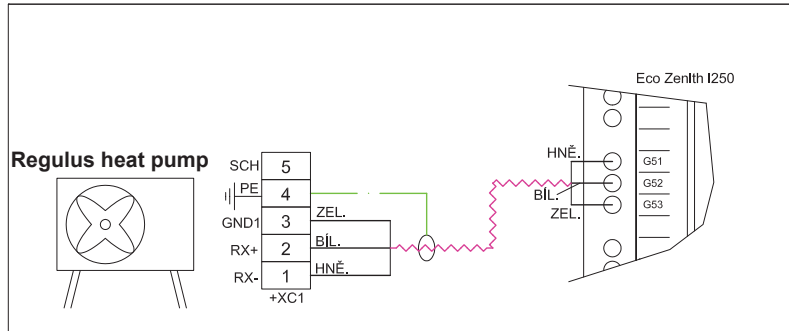
12. Wiring a controller

Connection of communication with IR14 CTC400 controller



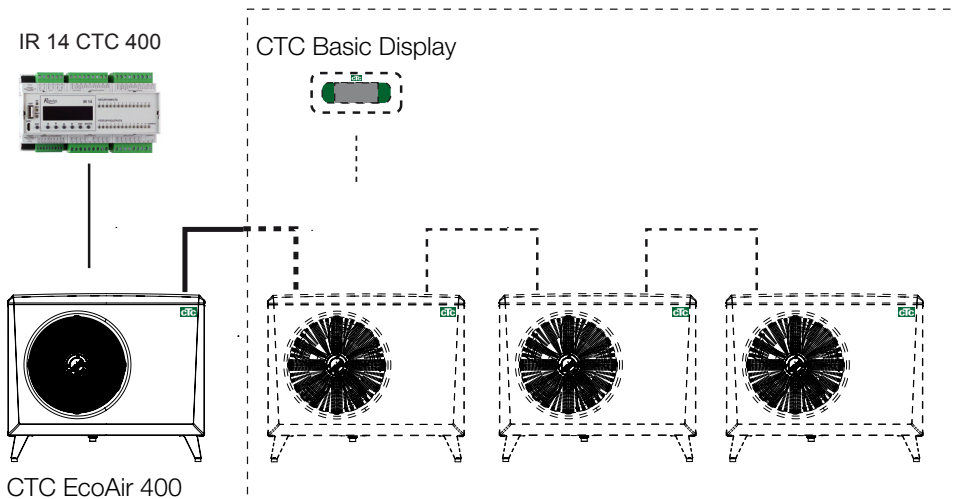
! When connected in series, the last heat pump must be set to the terminated position. Read more under the chapter 11.2 Series connection of heat pumps.

Connection of communication with EcoZenith multi-energy thermal store



When connecting more than one heat pump to an IR12 CTC 400 or IR14 CTC 400 controller, the CTC Basic Display accessory must be used to address the various heat pumps A2, A3, etc. All CTC EcoAir 400 units are factory-set addressed to A1. For connection, see the manual for the CTC Basic Display.

Recommended cable between the products is LiYCY (TP).



13. First start

1. Check that the heat pump, thermal store and system are full of water and have been air bled.
2. Check that all connections are tight.
3. Check that sensors and the charge pump are connected to the power source.
4. Turn on the heat pump by switching on the main switch.

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

14. Noise data

STANDARD			
Model	Noise level	Noise pressure at 5 m*	Noise pressure at 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)

* The given noise pressure should be taken as an indication as the level is affected by the surroundings.

The upper value corresponds to 100% reflecting ground and walls (smooth concrete). Values according to EN12102.

14.1 Sensor data

Temperature °C	Hot gas sensor Resistance Ohm	Sensor for: Primary flow, Return flow, Fan, Outdoor temp., Defrost Resistance Ohm
130	1449	800
125	1650	906
120	1882	1027
115	2156	1167
110	2477	1330
105	2849	1522
100	3297	1746
95	3831	2010
90	4465	2320
85	5209	2690
80	6115	3130
75	7212	3650
70	8560	4280
65	10142	5045
60	12125	5960
55	14564	7080
50	17585	8450
45	21338	10130
40	25986	12200
35	32079	14770
30	39611	18000
25	48527	22000
20	60852	27100
15	76496	33540
10	98322	41800
5	125779	52400

Temperature °C	Compressor suction gas sensor Resistance Ohm
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