



Providing sustainable energy solutions worldwide

Installation and Maintenance Manual

CTC EcoPart i425-i435 Pro **CTC EcoPart 425-435**

IMPORTANT

READ CAREFULLY BEFORE USE
KEEP FOR FUTURE REFERENCE



Reinventing the modal logic of alethic



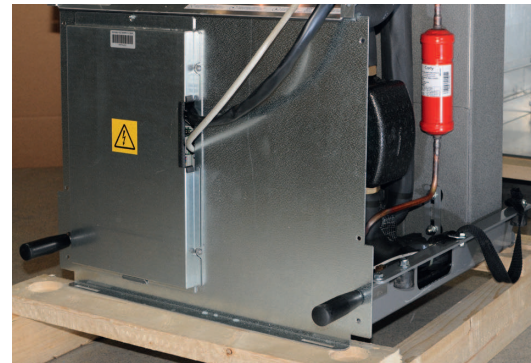
1. Długość przewidywanego czasu pracy przewidywanego czasu pracy.

2. Przykleć dwa przewody do górnej części chłodniczego modułu chłodzącego.



3. Odkręć śruby enodalingładoidego's. screws.

4.. Podciągnięciu modułów chłodzących występną część przód edge
shikleya with the retaining handles.



5. ~~Pettines~~ **modelling** ~~hobnails~~ **using** ~~the~~ **the** ~~bar~~ **to** ~~ing~~ **gras** ~~handles~~ **and** ~~shoulder~~ **straps**.

6. Aby włożyć moduł, trzymaj go za uchwyty i podnieś go, używając narzędzi. Następnie wsuń go do gniazda. Po włożeniu odwróć moduł i podłącz przewody złączy do kłopotliwych śrub. **Dość trudne**

CTC EcoPart i425-i435 Pro

CTC EcoPart 425-435

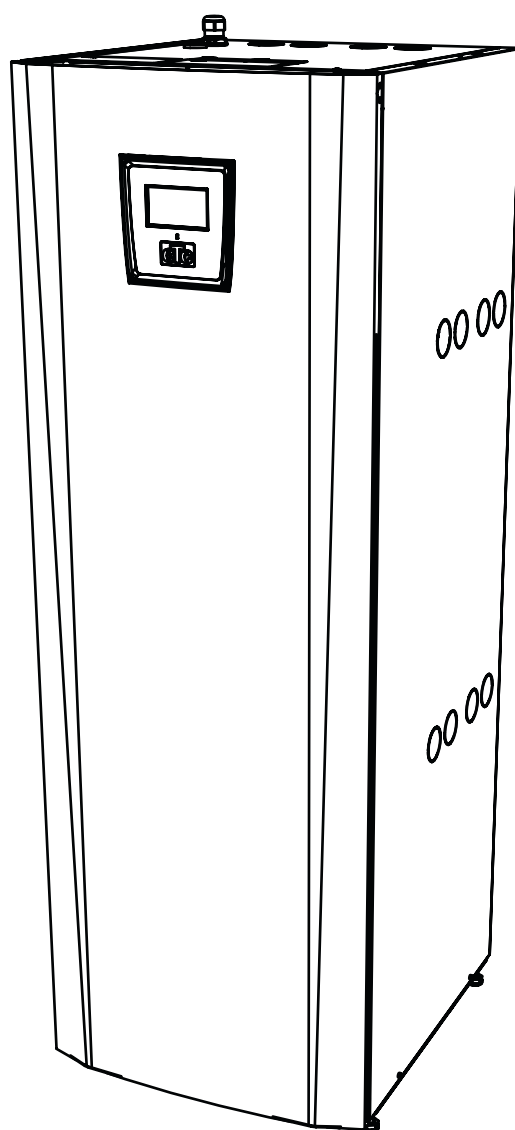
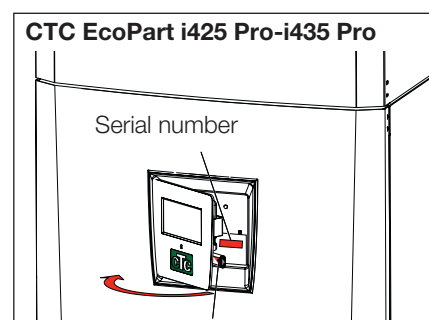


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CTC EcoPart 425-435

The 12-digit serial number is found on a sticker affixed to the top cover of 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.:

No liability is accepted for any misprints. We reserve the right to make design changes.

Congratulations on buying your new product



The complete heat pump for rock, ground or lake

The CTC EcoPart i425-i435 is a heat pump which takes heat from rock, ground or lake and supplies it to the existing heating system in the house.

The heat pump is intended for commercial use and can be connected to the property's heating and hot water system according to the system example in CTC EcoLogic Pro.

CTC EcoPart has been designed to operate with high efficiency and low noise levels.

■ This manual does not describe the CTC EcoLogic Pro or CTC Basic Display; we refer to the relevant manuals for these products.

Check list

The check list must be completed by the installer.

- If service is needed, you may be required to provide this document.
- Installation must always be in accordance with the installation and maintenance instructions.
- Installation must always be carried out by an MCS accredited installer.

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.
- ☐ Heat pump positioned so that it can be serviced.
- ☐ Capacity of the charge/heating circ 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.
- ☐ Requisite waste pipes connected to the floor drain (depending on type of system).

Electrical installation

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

Information for the customer (adapted to current installation)

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

Date / Customer

Date / Installer

Important to remember!

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

- The product 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, preferably made of concrete.
If the product needs to be placed on a soft carpet, base plates must be placed under the adjustable feet.
- Remember to leave a service area of at least 1 m in front of the product.
- The product must not be placed below floor level either.
- Avoid placing the product in rooms where the walls are of lightweight design, as people in the adjoining room may be disturbed by noise and vibrations.
- Ensure that pipes used between the heat pump and the heating circuit are of adequate dimensions.

No liability is accepted for any misprints. We reserve the right to make design changes.

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 IPX1. The product must not be rinsed with water.



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.



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.



Safety valve check:
-Safety valve for boiler/system to be checked regularly.



The product must not be started if it is not filled with water; instructions are in the "Pipe installation" section.



WARNING: Do not switch on the product if there is a possibility that the water in the heater is frozen.



This device can be used by children from the age of three 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.



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.

1. Introduction

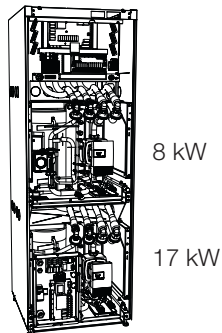
This heat pump is available in many different versions depending on how you intend to control it.

- The CTC EcoPart i425-i435 Pro has an integrated CTC EcoLogic Pro unit that controls the heat pumps and the property's heating system.
- The CTC EcoPart 425-435 has two CTC Basic Display units as standard.

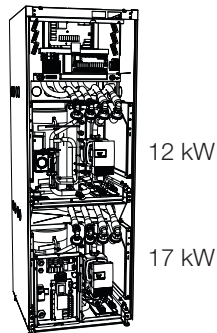
The heat pump consists of two heat pump modules on top of each other. The structure of the different sizes is shown below.

3 x 400 V 3N~

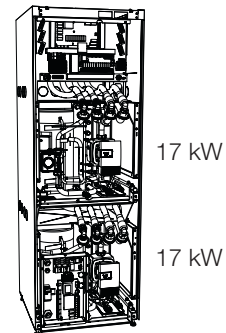
**CTC EcoPart 425 &
CTC EcoPart i425 Pro**



**CTC EcoPart 430 &
CTC EcoPart i430 Pro**

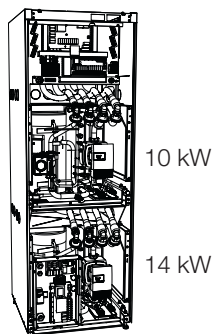


**CTC EcoPart 435 &
CTC EcoPart i435 Pro**

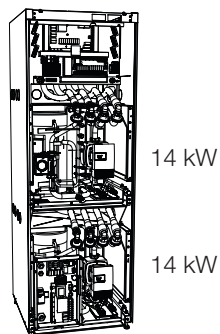


1 x 230 V 1N~

**CTC EcoPart 425 &
CTC EcoPart i425 Pro**



**CTC EcoPart 430 &
CTC EcoPart i430 Pro**



2. Technical data

2.1 Table 400 V 3N~

Electrical data		400V 3N~			
Name		CTC EcoPart i425 Pro		CTC EcoPart i430 Pro	
Type		KM417EP 2xLEP	KM408EP 2xLEP	KM417EP 2xLEP	KM412EP 2xLEP
Operating system		CTC EcoLogic Pro		CTC EcoLogic Pro	
Rated power	kW	15.4		17.0	
Rated current	A	22.2		24.6	
IP class		IPX1		IPX1	
Max. operating current Compressors	A	16.7		19.7	
Max. operating current Compressor	A	11.5	5.2	11.5	8.2
Name		CTC EcoPart 425		CTC EcoPart 430	
Type		KM417EP 2xLEP	KM408EP 2xLEP	KM417EP 2xLEP	KM412EP 2xLEP
Operating system		CTC Basic display		CTC Basic display	
Rated power	kW	10.8		12.4	
Rated current	A	15.6		17.9	
IP class		IPX1		IPX1	
Max. operating current Compressors	A	16.7		19.7	
Max. operating current Compressor	A	11.5	5.2	11.5	8.2
Max starting current	A	32.0	17.7	32.0	23.5
Operational data for heat pump		400V 3N~			
Output from compressor ¹⁾ @ -5/45	kW	20.89		23.93	
Output from compressor ¹⁾ @ -5/45	kW	14.05	6.84	14.05	9.88
COP ¹⁾ @ -5/45		3.19	3.34	3.19	3.30
Output from compressor ¹⁾ @ 0/35 0/45 0/55	kW	24.43 24.01 23.42		27.99 27.38 26.84	
Output from compressor ¹⁾ @ 0/35 0/45 0/55	kW	16.24 16.14 15.87	8.19 7.87 7.55	16.24 16.14 15.87	11.75 11.24 10.97
COP ¹⁾ @ 0/35 0/45 0/55		4.36 3.61 3.07	4.58 3.64 2.99	4.36 3.61 3.07	4.60 3.66 2.96
Output from compressor ¹⁾ @ 5/35 5/45 5/55	kW	28.69 27.47 26.81		32.78 31.37 30.73	
Output from compressor ¹⁾ @ 5/35 5/45 5/55	kW	19.25 18.42 18.16	9.44 9.05 8.65	19.25 18.42 18.16	13.53 12.95 12.57
COP ¹⁾ @ 5/35 5/45 5/55		5.02 4.05 3.38	5.02 4.04 3.30	5.02 4.05 3.38	5.11 4.11 3.35
¹⁾ EN14511:2007, inclusive circulation pumps					
Heating system		400V 3N~			
Max temperature heating medium (TS)	°C	110			
Heating system min flow ²⁾	l/s	0.40	0.20	0.40	0.28
Kvs value Δt = 10 K, at min flow		5.9 (6 kPa)	4.1 (3 kPa)	5.9 (6 kPa)	5.5 (3.5 kPa)
Heating system nominal flow ³⁾	l/s	0.81	0.39	0.81	0.56
Heating medium pump		LEP (Low Energy Pump)			
²⁾ Δt = 10 K och 0/35 °C heat pump operation. ³⁾ Δt = 5 K och 0/35 °C heat pump operation.					
Brine system		400V 3N~			
Water volume (V)	l	4.07	2.90	4.07	3.40
Brine system min/max temp. (TS)	°C	-5 / 20			
Brine system min/max pressure (PS)	bar	0.2 / 3.0		0.2 / 3.0	
Brine system min flow Δt = 5 K	l/s	0.63	0.31	0.63	0.44
Brine system nominal flow Δt = 3 K	l/s	1.05	0.51	1.05	0.73
Kvs value Δt = 3 K at nominal flow		8.9	5.8	8.9	7.2
Brine system pump		Class A circulation pump (LEP)			
Pump capacity		See diagram in the Pipe installation chapter			
Other data		400V 3N~			
Refrigerant quantity (R407C, fluorinated greenhouse gases GWP 1774)	kg	2.7	1.9	2.7	2.3
CO ₂ equivalent	ton	4.790	3.371	4.790	4.080
Compressor oil		Polyolester (POE)			
Pressure switch cut-off HT	MPa	3.1 (31 bar)			
Sound power EN 12102 +/-2 dB(A)	dB(A)	58.5		58.5	
Weight net	kg	334		354	
Width x Height x Depth	mm	596 x 1760 x 680			
No annual leakage control of the refrigerant is required					

Electrical data		400V 3N~	
Name		CTC EcoPart i435 Pro	
Type		KM417EP 2xLEP	KM417EP 2xLEP
Operating system		CTC EcoLogic Pro	
Rated power	kW	19.4	
Rated current	A	28.0	
IP class		IPX1	
Max. operating current Compressors	A	23.0	
Max. operating current Compressor	A	11.5	11.5

Name	CTC EcoPart 435	
Type	KM417EP 2xLEP	KM417EP 2xLEP
Operating system	CTC Basic display	
Rated power	kW	14.8
Rated current	A	21.4
IP class	IPX1	
Max. operating current Compressors	A	23.0
Max. operating current Compressor	A	11.5
Max starting current	A	32.0

Operational data for heat pump		400V 3N~	
Output from compressor ¹⁾ @ -5/45	kW	28.10	
Output from compressor ¹⁾ @ -5/45	kW	14.05	14.05
COP ¹⁾ @ -5/45		3.19	3.19
Output from compressor ¹⁾ @ 0/35 0/45 0/55	kW	32.48 32.28 31.74	
Output from compressor ¹⁾ @ 0/35 0/45 0/55	kW	16.24 16.14 15.87	16.24 16.14 15.87
COP ¹⁾ @ 0/35 0/45 0/55		4.36 3.61 3.07	4.36 3.61 3.07
Output from compressor ¹⁾ @ 5/35 5/45 5/55	kW	38.50 36.84 36.32	
Output from compressor ¹⁾ @ 5/35 5/45 5/55	kW	19.25 18.42 18.16	19.25 18.42 18.16
COP ¹⁾ @ 5/35 5/45 5/55		5.02 4.05 3.38	5.02 4.05 3.38

¹⁾ EN14511:2007, inclusive circulation pumps

Heating system		400V 3N~	
Max temperature heating medium (TS)	°C	110	
Heating system min flow ²⁾	l/s	0.40	0.40
Kvs value $\Delta t = 10$ K, at min flow		5.9 (6 kPa)	5.9 (6 kPa)
Heating system nominal flow ³⁾	l/s	0.81	0.81
Heating medium pump	LEP (Low Energy Pump)		

²⁾ $\Delta t = 10$ K och 0/35 °C heat pump operation.

³⁾ $\Delta t = 5$ K och 0/35 °C heat pump operation.

Brine system		400V 3N~	
Water volume (V)	l	4.07	4.07
Brine system min/max temp. (TS)	°C	-5 / 20	
Brine system min/max pressure (PS)	bar	0.2 / 3.0	
Brine system min flow $\Delta t = 5$ K	l/s	0.63	0.63
Brine system nominal flow $\Delta t = 3$ K	l/s	1.05	1.05
Kvs value $\Delta t = 3$ K at nominal flow		8.9	8.9
Brine system pump	Class A circulation pump (LEP)		
Pump capacity	See diagram in the Pipe installation chapter		

Other data		400V 3N~	
Refrigerant quantity (R407C, fluorinated greenhouse gases GWP 1774)	kg	2,7	2,7
CO ₂ equivalent	ton	4.790	4.790
Compressor oil	Polyolester (POE)		
Pressure switch cut-off HT	MPa	3.1 (31 bar)	
Sound power EN 12102 +/-2 dB(A)	dB(A)	58.5	
Weight net	kg	359	
Width x Height x Depth	mm	596 x 1760 x 680	

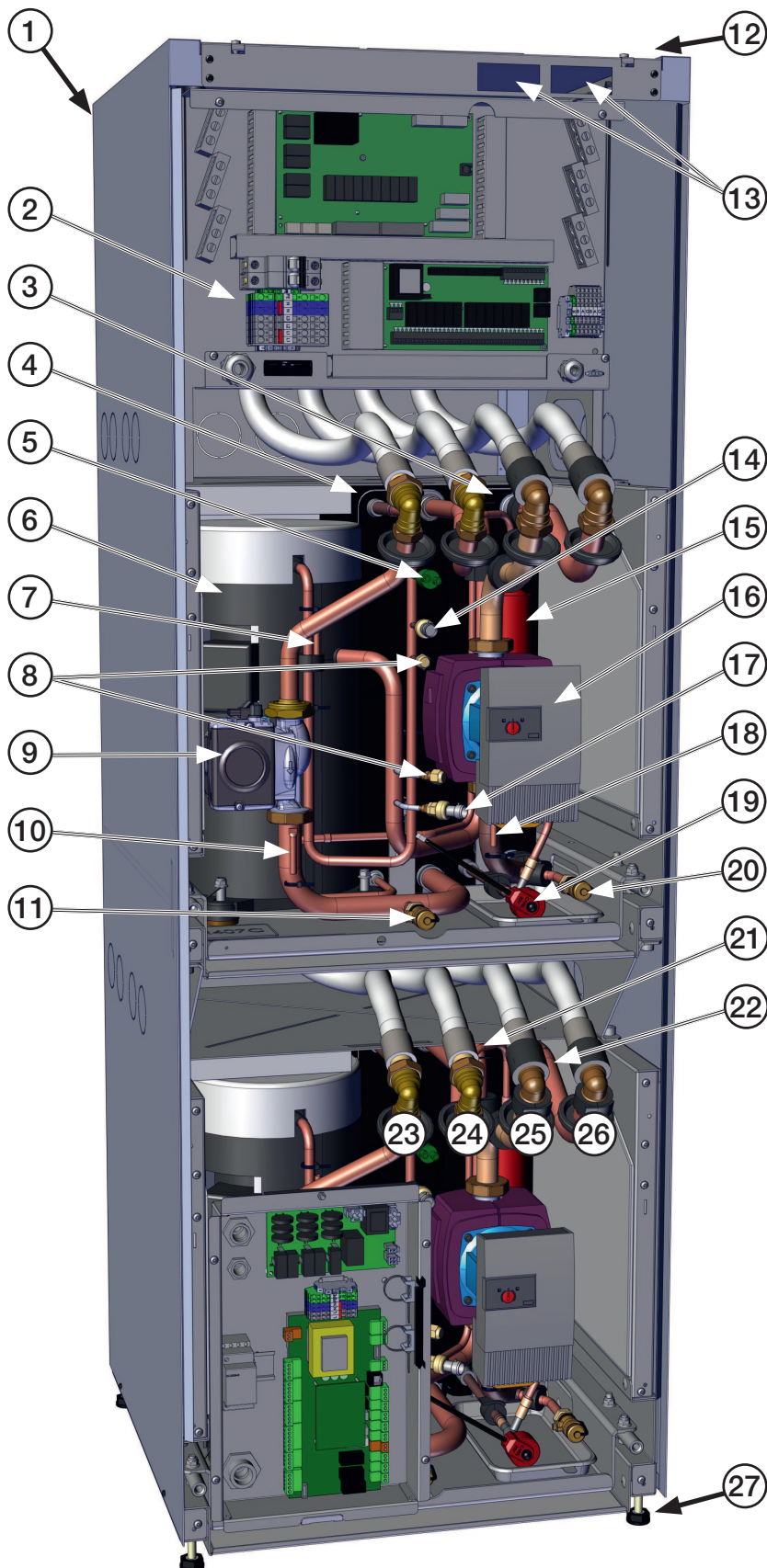
No annual leakage control of the refrigerant is required

2.2 Table 230 V 1N~

Electrical data		230V 1N~			
Name		CTC EcoPart i425 Pro		CTC EcoPart i430 Pro	
Type		KM414EP 2xLEP	KM410EP 2xLEP	KM14EP 2xLEP	KM414EP 2xLEP
Operating system		CTC EcoLogic Pro		CTC EcoLogic Pro	
Rated power	kW	15.3		17.2	
Rated current	A	33.5	33.5	38.0	38.0
IP class		IPX1		IPX1	
Max. operating current Compressors	A	47.7		54.2	
Max. operating current Compressor	A	27.1	20.6	27.1	27.1
Name		CTC EcoPart 425		CTC EcoPart 430	
Type		KM414EP 2xLEP	KM410EP 2xLEP	KM414EP 2xLEP	KM414EP 2xLEP
Operating system		CTC Basic display		CTC Basic display	
Rated power	kW	10.7		12.6	
Rated current	A	24.0	24.0	28.0	28.0
IP class		IPX1		IPX1	
Max. operating current Compressors	A	47.7		54.2	
Max. operating current Compressor	A	27.1	20.6	27.1	27.1
Max starting current	A	30.0	30.0	30.0	30.0
Operational data for heat pump		230V 1N~			
Output from compressor ¹⁾ @ -5/45	kW	20.42		24.18	
Output from compressor ¹⁾ @ -5/45	kW	12.09	8.33	12.09	12.09
COP ¹⁾ @ -5/45		3.24	3.30	3.24	3.24
Output from compressor ¹⁾ @ 0/35 0/45 0/55	kW	24.44 24.48 22.68		28.94 27.86 26.80	
Output from compressor ¹⁾ @ 0/35 0/45 0/55	kW	14.47 13.93 13.40	9.97 9.55 9.28	14.47 13.93 13.40	14.47 13.93 13.40
COP ¹⁾ @ 0/35 0/45 0/55		4.54 3.64 2.95	4.60 3.68 2.98	4.54 3.64 2.95	4.54 3.64 2.95
Output from compressor ¹⁾ @ 5/35 5/45 5/55	kW	27.90 26.97 25.86		32.96 31.96 30.56	
Output from compressor ¹⁾ @ 5/35 5/45 5/55	kW	16.48 15.98 15.28	11.42 10.99 10.58	16.48 15.98 15.28	16.48 15.98 15.28
COP ¹⁾ @ 5/35 5/45 5/55		5.13 4.11 3.28	5.20 4.16 3.28	5.13 4.11 3.28	5.13 4.11 3.28
¹⁾ EN14511:2007, inclusive circulation pumps					
Heating system		230V 1N~			
Max temperature heating medium (TS)	°C	110			
Heating system min flow ²⁾	l/s	0.34	0.24	0.34	0.34
Kvs value Δt = 10 K, at min flow		8.6	4.3	8.6	8.6
Heating system nominal flow ³⁾	l/s	0.68	0.48	0.68	0.68
Heating medium pump		LEP (Low Energy Pump)			
²⁾ Δt = 10 K och 0/35 °C heat pump operation. ³⁾ Δt = 5 K och 0/35 °C heat pump operation.					
Brine system		230V 1N~			
Water volume (V)	l	4.07	2.90	4.07	4.07
Brine system min/max temp. (TS)	°C	-5 / 20			
Brine system min/max pressure (PS)	bar	0.2 / 3.0		0.2 / 3.0	
Brine system min flow Δt = 5 K	l/s	0.53	0.38	0.53	0.53
Brine system nominal flow Δt = 3 K	l/s	0.88	0.64	0.88	0.88
Kvs value Δt = 3 K at nominal flow		8.7	8.1	8.7	8.7
Brine system pump		Class A circulation pump (LEP)			
Pump capacity		See diagram in the Pipe installation chapter			
Other data		230V 1N~			
Refrigerant quantity (R407C, fluorinated greenhouse gases GWP 1774)	kg	2.7	1.9	2.7	2.7
CO ₂ equivalent		4.790	3.371	4.790	4.790
Compressor oil		Polyolester (POE)			
Pressure switch cut-off HT	MPa	3.1 (31 bar)			
Sound power EN 12102 +/-2 dB(A)	dB(A)	45.6		45.4	
Weight net	kg	334		354	
Width x Height x Depth	mm	596 x 1760 x 680			

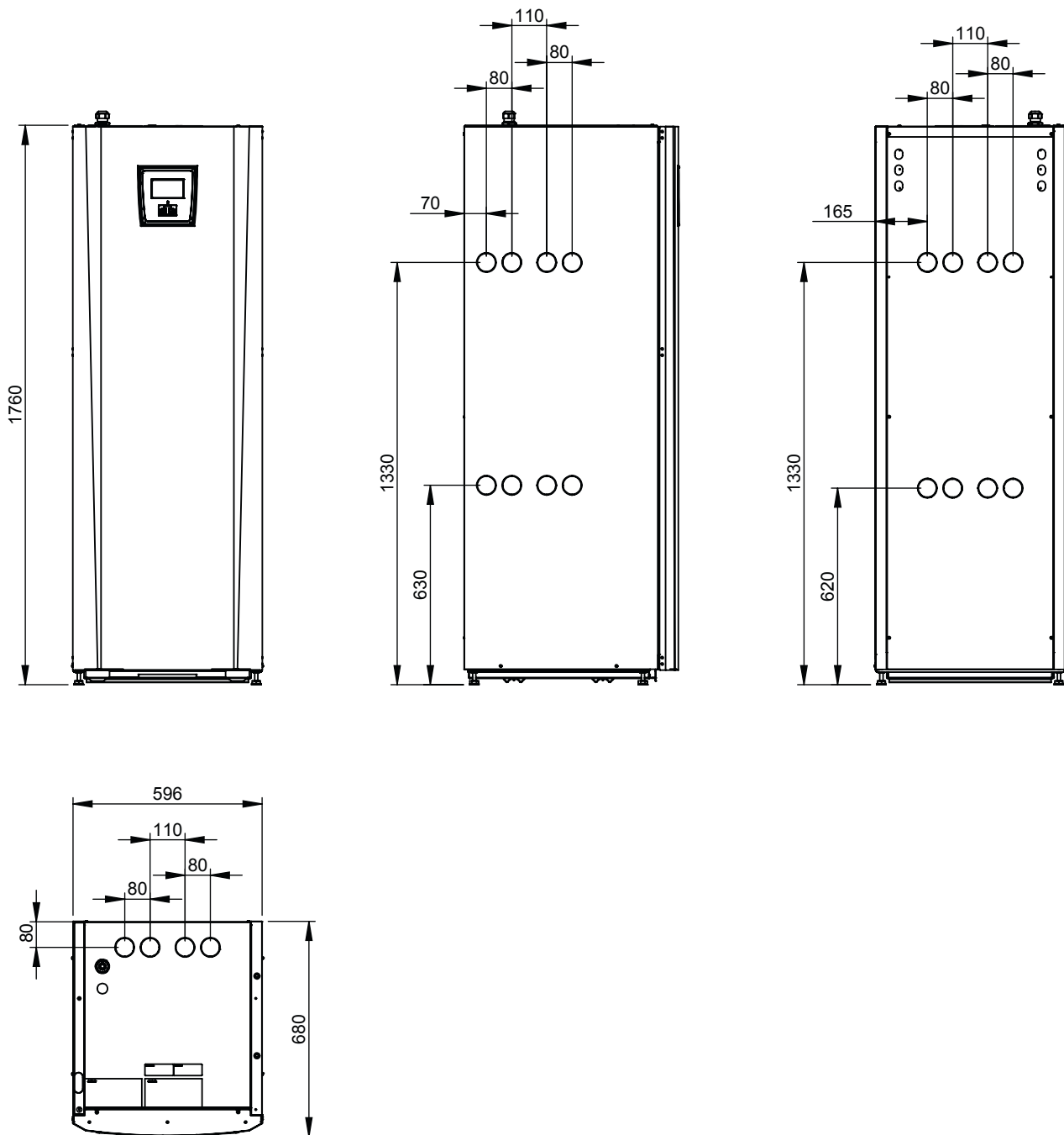
No annual leakage control of the refrigerant is required

2.3 Component location



1. Conduit for mains cable (concealed)
2. Terminal board
3. Condenser
4. Evaporator
5. High pressure switch
6. Compressor
7. Hot gas sensor
8. Service socket
9. Low energy heat medium pump
10. Condenser sensor in
11. Drain valve warm side/Water
12. Conduit for communication (concealed)
13. CTC Basic Display (only CTC EcoPart standard version)
14. High pressure sensor
15. Drying filter
16. Low energy brine pump
17. Low pressure sensor
18. Brine sensor out
19. Expansion valve
20. Drain valve cold side/Brine
21. Condenser sensor out
22. Brine sensor in
23. Heat medium in Ø28 (to HP)
24. Heat medium out Ø28 (from HP)
25. Brine out Ø28 mm (to rock)
26. Brine in Ø28 mm (from rock)
27. Adjustable feet

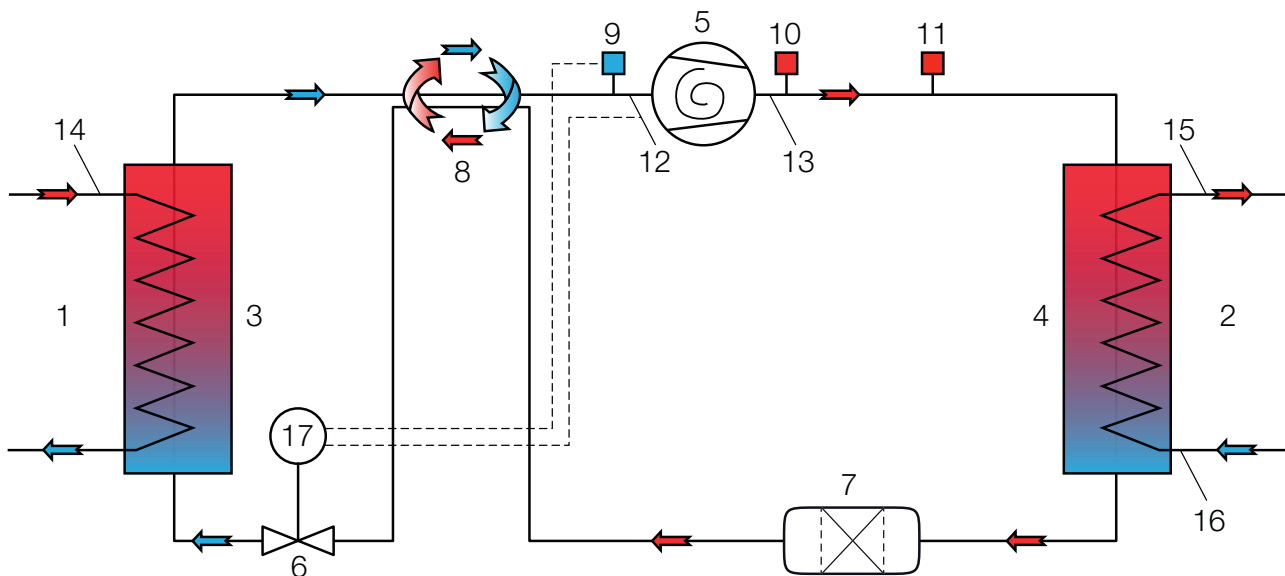
2.4 Dimensional drawing



Remember to leave a service area of at least 1 m in front of the product.

2.5 Refrigerant system

The schematic diagram shows the refrigerant system for each integrated heat pump module.



- | | | |
|---------------------------------|-----------------------------|-----------------------------------|
| 1. Brine (heat source) | 7. Drying filter | 13. Temperature hot gas discharge |
| 2. Water | 8. Refrigerant exchanger | 14. Temperature brine |
| 3. Evaporator | 9. Low pressure sensor | 15. Temperature water out |
| 4. Condenser | 10. High pressure sensor | 16. Temperature water in |
| 5. Compressor | 11. High pressure switch | 17. Control expansion valve |
| 6. Expansion valve (electronic) | 12. Temperature suction gas | |

2.6 Operating range

CTC EcoPart's pressure-controlled operations monitoring means that the brine temperature (B) and heat medium temperature (H) can automatically be increased where this is possible.

Operating condition:	B temp/H temp °C
1	-5 / 25
2	20 / 25
3	-5 / 61
4	20 / 64

Operating limits as per the table above are defined in accordance with EN 14511-4.


3. 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 current standards and regulations. 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 radiator system clean before connection.** Apply all the installation settings based on the description in the chapter on “First start”.

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

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

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.

3.1 Delivery includes

Feed cables:

3x400 = 1 st.

1x230 = 2 st.

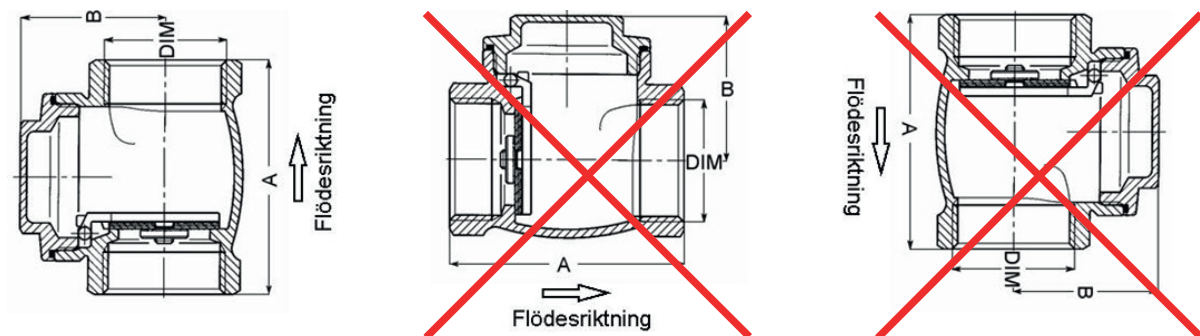
CTC EcoPart i425-i435 Pro (with CTC EcoLogic Pro):

- 1 x Safety valve $\frac{1}{2}$ " 3 bar
- 1 x Room sensor
- 3 x 22K sensor L=2500 mm
- 1 x Outdoor sensor
- 4 x Non-return valve $1\frac{1}{4}$ "
- 4 x Dirt filter $1\frac{1}{4}$ "
- 4 x Rubber grommet D=60
- 4 x Edge moulding 186 mm
- 2 x Edge moulding 700 mm
- CTC EcoLogic PRO/Family

CTC EcoPart 425-435 (with two CTC Basic Display units):

- 1 x Safety valve $\frac{1}{2}$ " 3 bar
- 4 x Non-return valve $1\frac{1}{4}$ "
- 4 x Dirt filter $1\frac{1}{4}$ "
- 4 x Rubber grommet D=60
- 4 x Edge moulding 186 mm
- 2 x Edge moulding 700 mm
- CTC Basic Display manual

3.1.1 Non-return valve $1\frac{1}{4}$ "



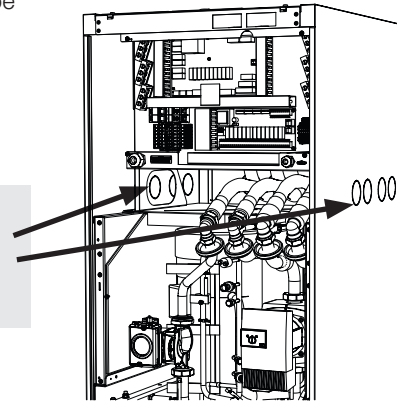
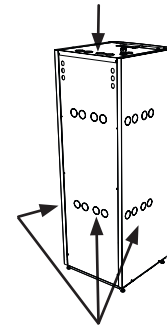
3.2 Connection

Connection can be made to the right, left or top or rear of the heat pump. Cut away the cover plate on the side where the hoses are to be connected. When the opening has been made through the cover plate, carry out the installation as follows:

1. In order to protect the hoses, fasten the protective edging provided around the edge of the opening in the insulation plate. Adjust the length of the protective edging to suit the opening as required.
2. Pass the hoses through the opening in the side cover plates and connect them. Ensure that the insulation covers all parts of the brine connection to prevent ice and condensation forming.
3. Then install the collector system.

You can also connect the primary flow on one side and the return on the other. See the chapter on Measurement details for measurements and dimensions. The pipe between the heat pump and brine loop should not be less than Ø35 mm in dimension.

! When a collector is connected on the side, the opening must be lined with the edge moulding provided to prevent abrasion of the hose.



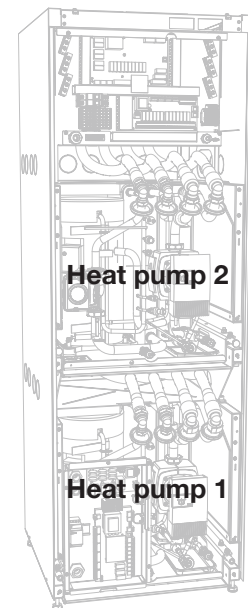
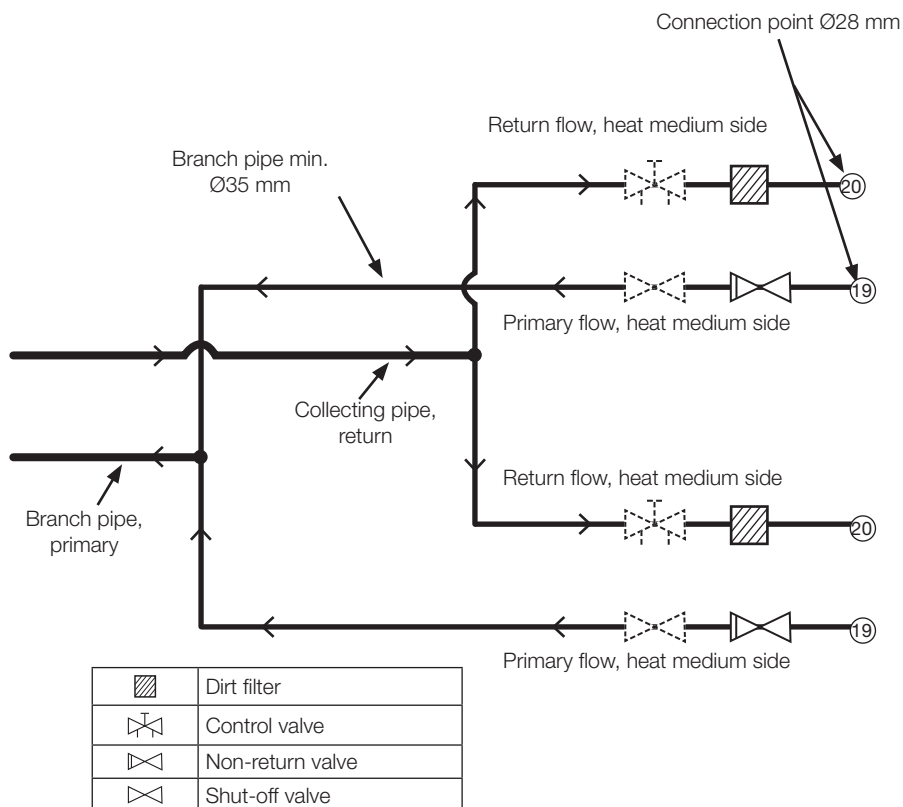
3.3 Heat medium side

Connect the heat pump with a dimension of at least Ø35 mm so it can then be joined to a collecting pipe. The non-return valve and dirt filter are 1 1/4". The dimension of the collecting pipe depends on the installation.

Route the pipes so that no other highest point is present where air can collect and obstruct circulation. If however this cannot be done, provide this highest point with an automatic bleeder.

NOTE! Only 1 heat pump/ cooling module are to be connected to the accessory Mixing valve.

It is very important that the branch pipes are the same design so that as equal a pressure drop as possible is achieved in both the sets of pipes (pipe dimensions, bends, etc.).

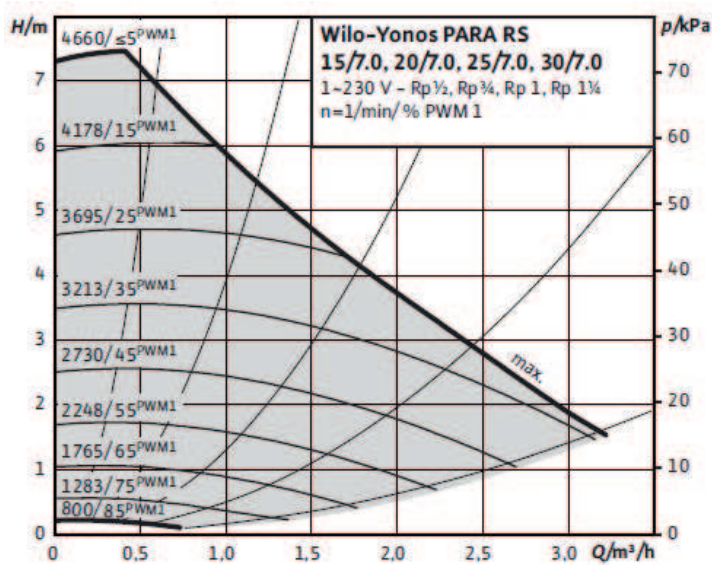


3.4 Circulation pumps, heat medium side

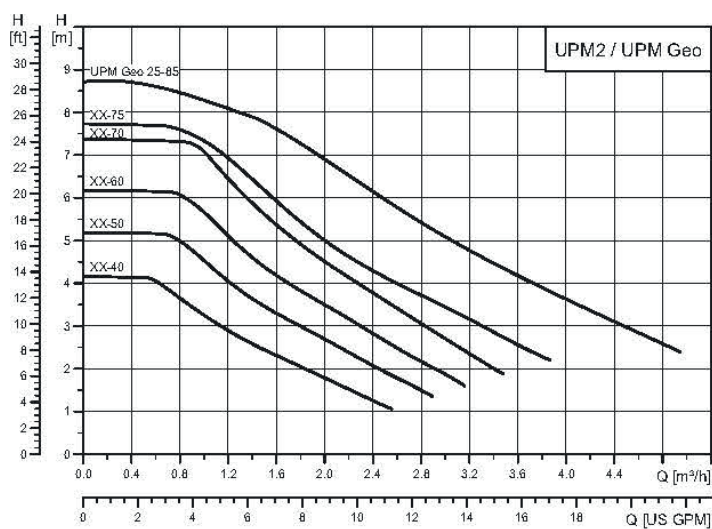
The heat pump is supplied with two LEPs (Low Energy Pump), which are low energy charge pumps installed at the factory.

Heat medium pump 8 kW	Yonos Para PWM 7.0	Item no 586396 303
Heat medium pump 10-12 kW	Yonos Para PWM 7.5	Item no 586396 302
Heat medium pump 14-17 kW	UPMGEO 25-85 130	Item no 586396 301

3.4.1 Yonos Para pump curve



3.4.2 UPMGEO pump curve



3.5 Brine system

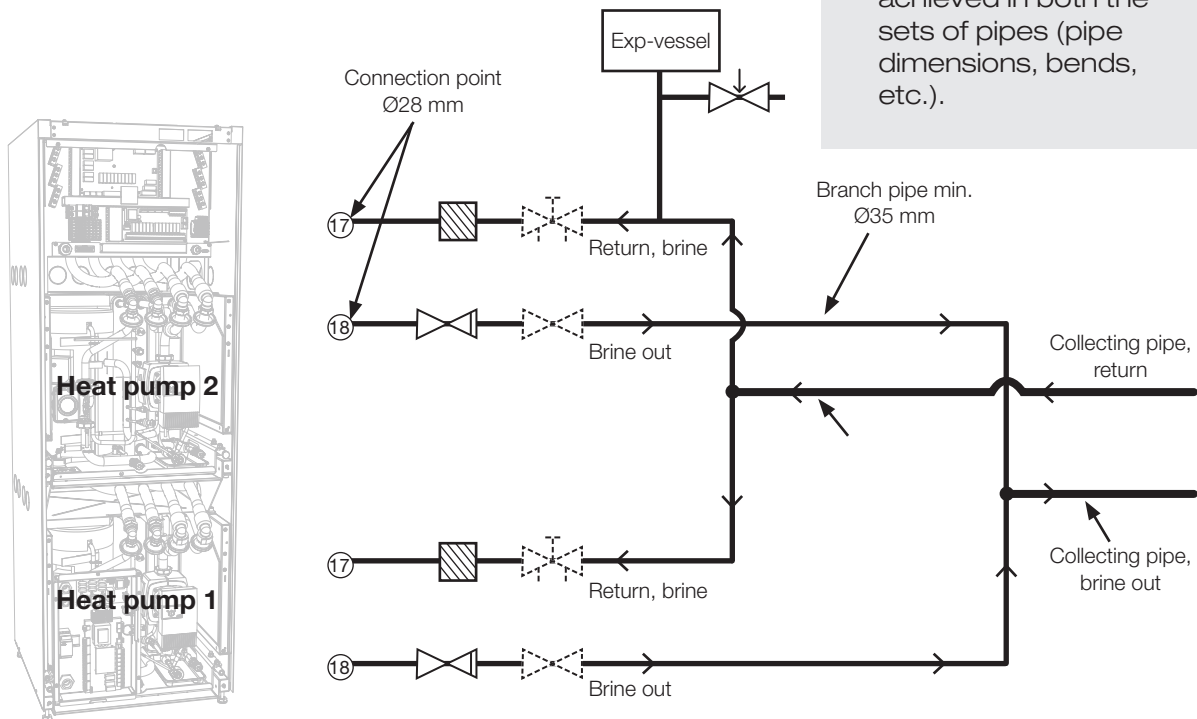
The brine system, i.e. the ground collector loop, must be assembled and connected by a qualified tradesman in accordance with current regulations and design guidelines.

Extreme care must be taken to ensure that no dirt gets on the collector hoses, which must be washed clean before being connected. The protective caps must remain in place at all times while work is in progress.

The temperature in the brine system can go below 0°C. This is why it is important not to use any water-based lubricant etc. during installation. It is also important that all the components are insulated against condensation to prevent the build-up of ice.

I We recommend that you follow the installation instructions from the local Heat Pump Association.

! It is very important that the branch pipes are the same design so that as equal a pressure drop as possible is achieved in both the sets of pipes (pipe dimensions, bends, etc.).

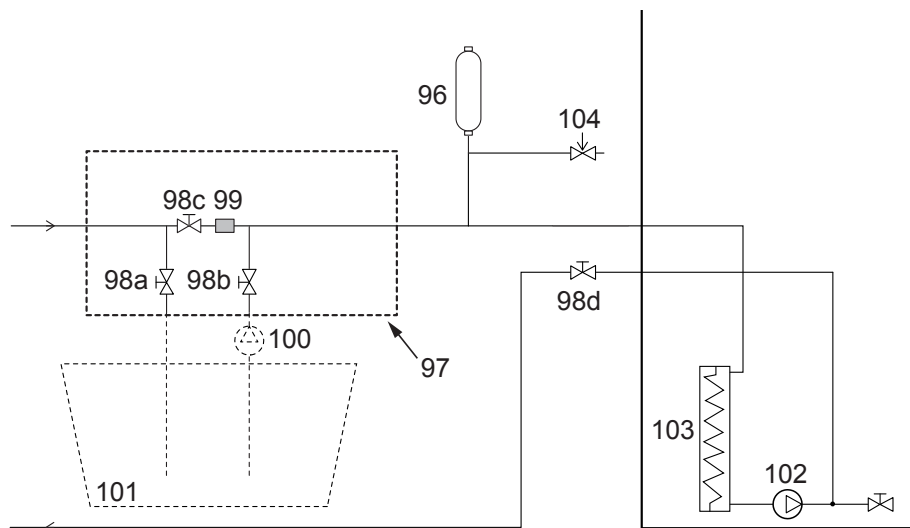


	Dirt filter
	Control valve
	Non-return valve
	Shut-off valve

Filling schematic diagram

The filling equipment is represented by the parts displayed with dashes. NB: Collector hoses must have a bleeding facility as air pockets can occur. Always check the filter (99) when filling and bleeding the brine system.

i The mixing vessel and pump must be of a good size.



96	Expansion vessel/Level vessel	101	Mixing vessel
97	Filling kit	102	Brine pump
98	Shut-off valve	103	Evaporator
99	CTC filter	104	Safety valve 3 bar
100	External filling pump		

Valves

To facilitate servicing of the cooling unit, shut-off valves should be fitted to both the incoming and outgoing connections. Fit bifurcated valves so that you can fill and bleed the collector circuit later on.

Bleeding

The collector circuit must not contain any air. Even the smallest amount of air can jeopardise the heat pump's operation. See the section Filling and venting below.

Insulation against condensation

All pipes in the brine system must be insulated against condensation to prevent the possibility of severe build-up of ice and condensation.

Filling and venting

Mix water and antifreeze solution in an open vessel. Connect hoses to the shut-off valves (98a and 98b) as shown in the figure. Connect a powerful external pump (101) for refilling and bleeding. Then reset the three-way valve (100) and open the valves (98a and 98b) so that the brine passes through the mixing container (102). Also make sure that the valve (98d) is open.

For start-up of the brine pump, see the relevant manual for the EcoPart's controller.

Allow the brine to circulate in the system for a long period of time until it is completely free of air. There could still be air in the system, even though no air accompanies the liquid out. Reset the 3-way valve (100) so that any remaining air can come out.

Bleed the level vessel (96) by loosening the plug on the top of the level vessel.

Now close the valve (98a) while the filling pump continues to run. The filling pump (101) now pressurises the system. Also close the valve (98b) and shut off the filling pump.

If the level in the level vessel is too low, close the valves (98c) and (98d).

Unscrew the plug and fill the vessel to around 2/3 full. Screw the plug back in and open the valves (98c) and (98d).

Post-installation check on brine system

After a few days, you must check the fluid level in the vessel. Fill if necessary and close the valves (98c and 98d) when filling.

Expansion vessel/level vessel

The vessel should be fitted to the incoming line from the borehole or ground loop, at the system's highest point. Bear in mind that the tank can produce condensate on its exterior. Fit the safety valve (105) as shown in the schematic diagram and fit a suitable plug to the top of the vessel.

If the vessel cannot be fitted at the highest point, a closed expansion vessel must be fitted.

Filling kit with dirt filter


Arrows on the valve housing indicate the flow direction. Close valves (98c and 100) when cleaning the filter. Unscrew the filter cap and flush the filter clean. When refitting, the pin under the filter holder should be fed into the designated hole in the filter housing. Top up with a little brine, if necessary, before fitting the cap.


The filter should be checked and cleaned after a short period of operation.

Brine

The brine circulates in a closed system. The fluid consists of water and antifreeze solution. Sentinel R500 & R500C are recommended for use in the brine circuit on all CTC EcoHeat/Part heat pumps. The glycol is mixed at a concentration of slightly less than 30%, which is equivalent to fire risk class 2b and a freezing point of around -15°C.

It is a CTC recommendation that around 1 litre of brine/glycol is required per metre of collector hose, i.e. around 0.3 litres of antifreeze solution will be needed per metre of hose, for a hose diameter of 40 mm.

 Check the dirt filter after bleeding has been completed.

 The fluid must be thoroughly mixed before the heat pump is started.

Air pockets

To avoid air pockets, make sure that the collector hoses constantly rise towards the heat pump. If this is not possible, it must be possible to bleed the system at the high points. The filling pump usually manages smaller local height discrepancies.

Checking brine difference

When the heat pump is running, regularly check that the temperature difference between incoming and outgoing brine temperatures is not too large. If there is a large difference, one of the causes may be due to air in the system or a blocked filter. If this is the case, the heat pump triggers the alarm.

The alarm factory setting is 7°C, but 9°C is permitted for the first 72 hours while the compressor is running, as microbubbles in the system can reduce brine flow.

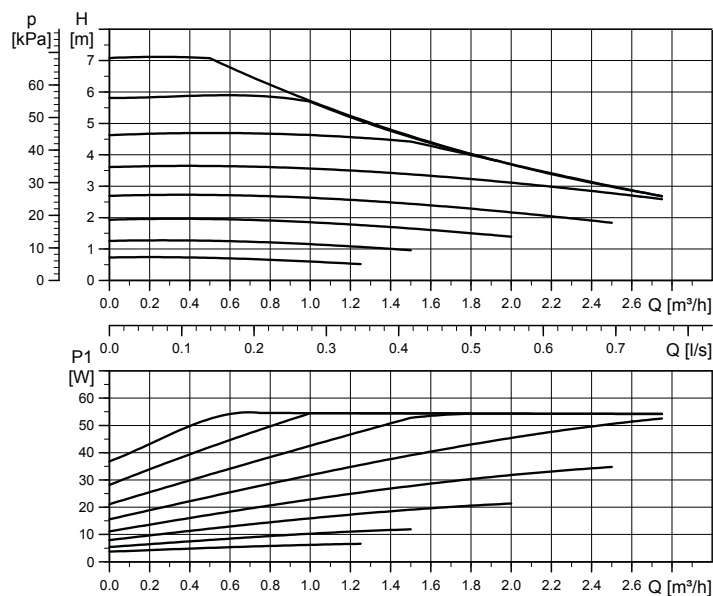
3.6 Brine pump

Heat pump module	8 kW	10 kW	12 kW	14 kW	17 kW
Brine pump	UPM2K 25-70 180	UPMXL GEO 25-125 180			

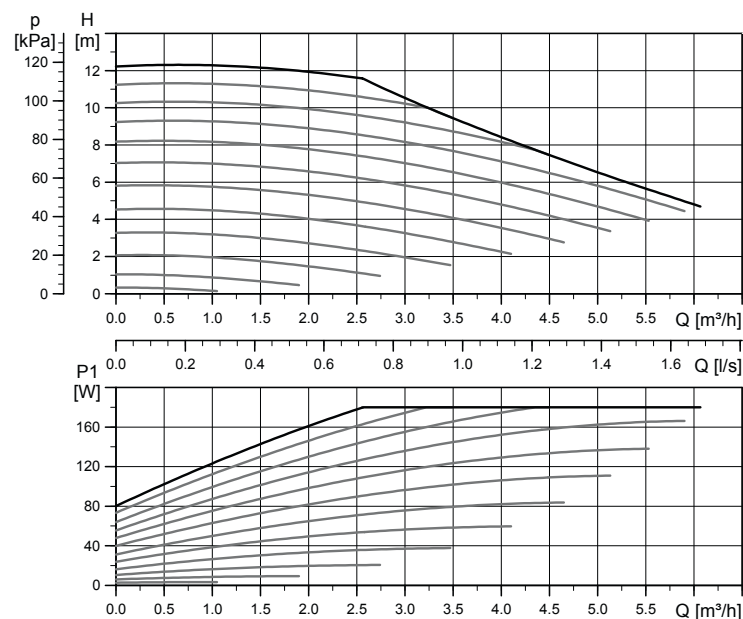
The circulation pumps in CTCs products are of the energy efficiency class A.

- CTC EcoHeat/EcoPart 406-408 has pump UPM2K 25-70 180.
- CTC EcoHeat/EcoPart 410-417 & CTC GSi 12 has pump UPMXL GEO 25-125 180.

UPM2K 25-70 180, 1 x 230 V, 50/60 Hz



UPMXL GEO 25-125 180 PWM, 1 x 230 V, 50/60 Hz



4. Electrical installation

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

- The CTC EcoPart 3 x 400 V must be connected to 400 V 3N~ 50 Hz and protective earth.
- The CTC EcoPart 1 x 230 V must be connected to 230 V 1N~ 50 Hz and protective earth.

The minimum group fuse size is indicated by the Rated current under Technical data.

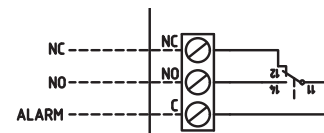
Use the cable provided to connect to the power supply. The product is already wired inside.

Safety switch

The installation should be preceded by a omnipolar safety switch (Category III), which ensures disconnection from all electric power sources.

4.1 Alarm output

The EcoPart is provided 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.



Detailed illustration from wiring diagram

4.2 Groundwater heating

Groundwater, too, can be used as a heat source for CTC's heat pumps. The groundwater is pumped up to an intermediate heat exchanger that transfers the energy to the brine liquid. It is important that an intermediate heat exchanger is installed in the system. The intermediate heat exchanger prevents the product evaporator from becoming damaged due to deposits from groundwater particles and minerals, which could otherwise involve expensive work on the product's refrigerant system. Water requirements analysis should always be undertaken for intermediary heat exchangers. Local regulations and permit requirements must be taken into account. The return water is discharged elsewhere, to a drilled return flow well or similar.

The brine pump and groundwater pump must be connected to run simultaneously in order to avoid risk of freezing.

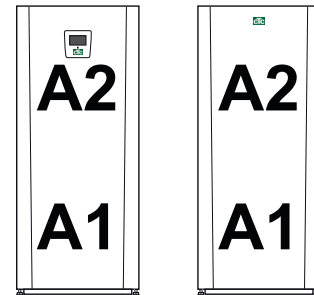
Also pay attention to the intermediary heat exchanger supplier's instructions.

5. Connecting the control system

The CTC EcoPart i425-i435 Pro is available in two versions.

- The CTC EcoPart i425-i435 Pro has an integrated CTC EcoLogic Pro control unit with touchscreen.
- The CTC EcoPart 425-435 has two CTC Basic Display units as standard. The left-hand display is connected to the lower cooling module (A1) while the right-hand display is connected to the upper cooling module (A2).

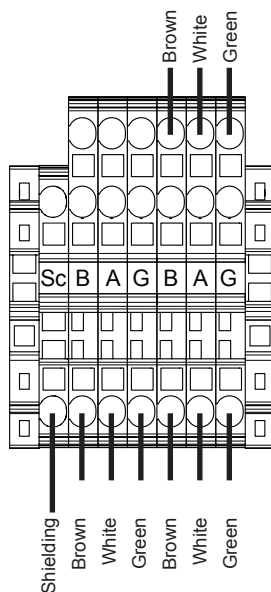
All heat pumps are factory-set addressed to A1 – bottom cooling module and A2 – top cooling module. To change the address (e.g. A2 to A3), see the manual for the CTC Basic Display.



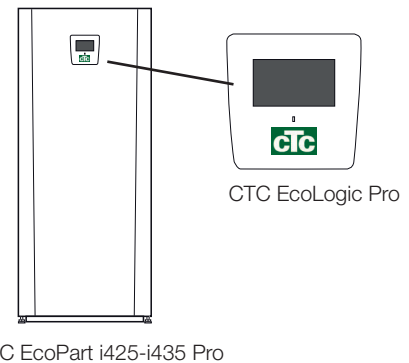
Both the models are factory-set addressed as shown above.

5.1 CTC EcoPart i425-i435 Pro

The Pro version is fitted with a CTC EcoLogic Pro. This can control up to five products (10 cooling modules).



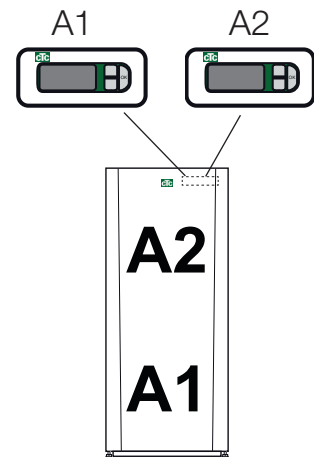
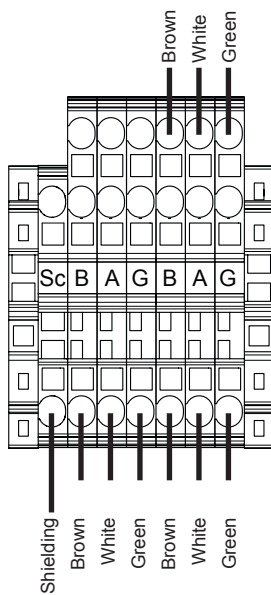
Communication terminal block on the Pro version.



CTC EcoPart i425-i435 Pro

5.2 CTC EcoPart 425-435

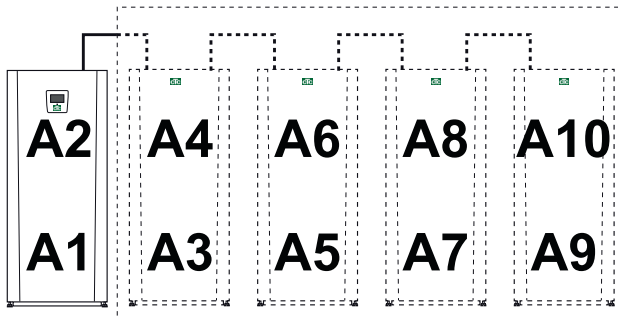
The CTC EcoPart 425-435 has two CTC Basic Display units mounted behind the front panel. The displays are also used to readdress the cooling modules if more than one product (two cooling modules) is connected in series, e.g. A2 to A4 and A1 to A3 and so on. For more information, see the manual for the CTC Basic Display.



The left-hand display is connected to the bottom cooling module (A1) while the right-hand display is connected to the top cooling module (A2).

5.3 Series connection of heat pumps

When more than one product (two cooling modules) is connected, the subsequent cooling modules must be addressed correctly. The CTC Basic Display on these products can be used to name these products as shown below; see the manual for the CTC Basic Display.



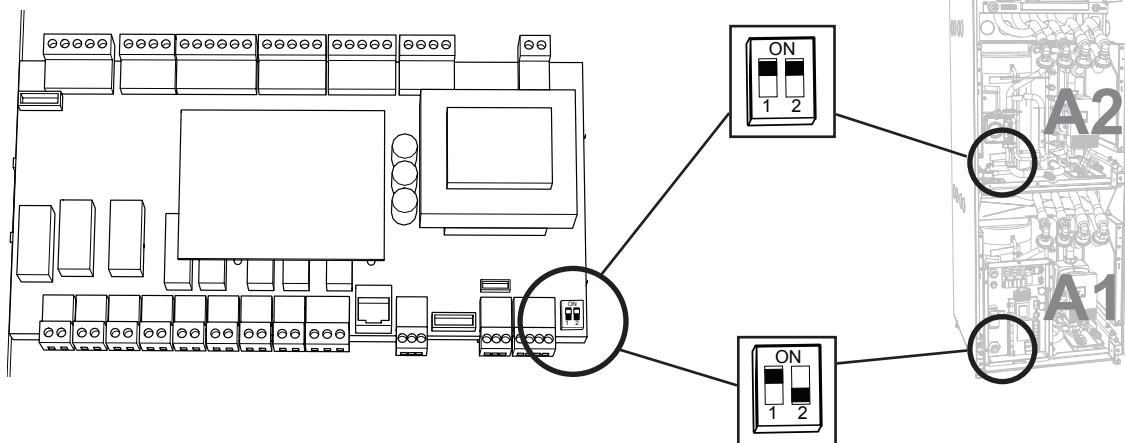
The last heat pump (the cooling module) connected in series must be partly terminated and the shielding in the communication cable must be connected to earth. See below.

5.3.1 Terminated position

The last heat pump connected in series must be terminated. This is achieved with a DIP switch located on the circuit board inside the electrical cabinet.

The top cooling module A2 is terminated at the factory, i.e. DIP switch 2 is in the ON position. In the bottom cooling module A1, DIP switch 2 is in the OFF position. Make sure DIP switch 2 is in the ON position on the module that is to be terminated.

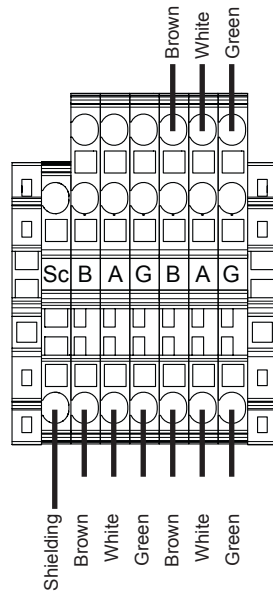
Factory setting of termination



DIP switch 1 is used to set whether a CTC Basic Display is connected. This is why it is set to OFF on the Pro version and ON on the standard version of the heat pump.

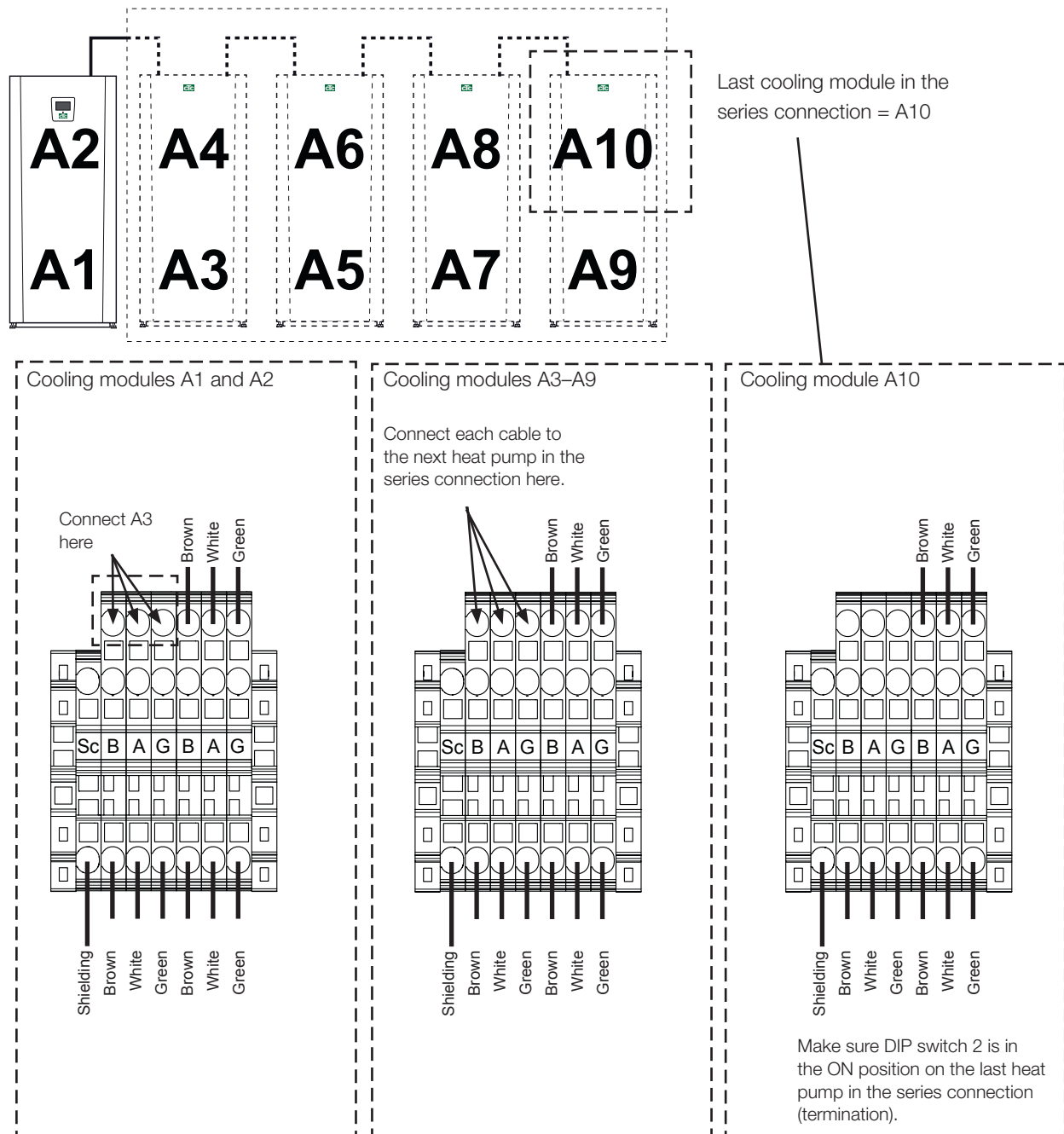
5.3.2 Shielded communication

When there is a series connection, the loop which connects position Sc of the control terminal block and PE on the mains terminal block must also be removed and replaced by the shielding, which is then connected up to the next heat pump (control terminal block position Sc). This must be done on all heat pumps except the last cooling module in the series connection.



5.3.3 Example of series connection

Heat pumps in series connection

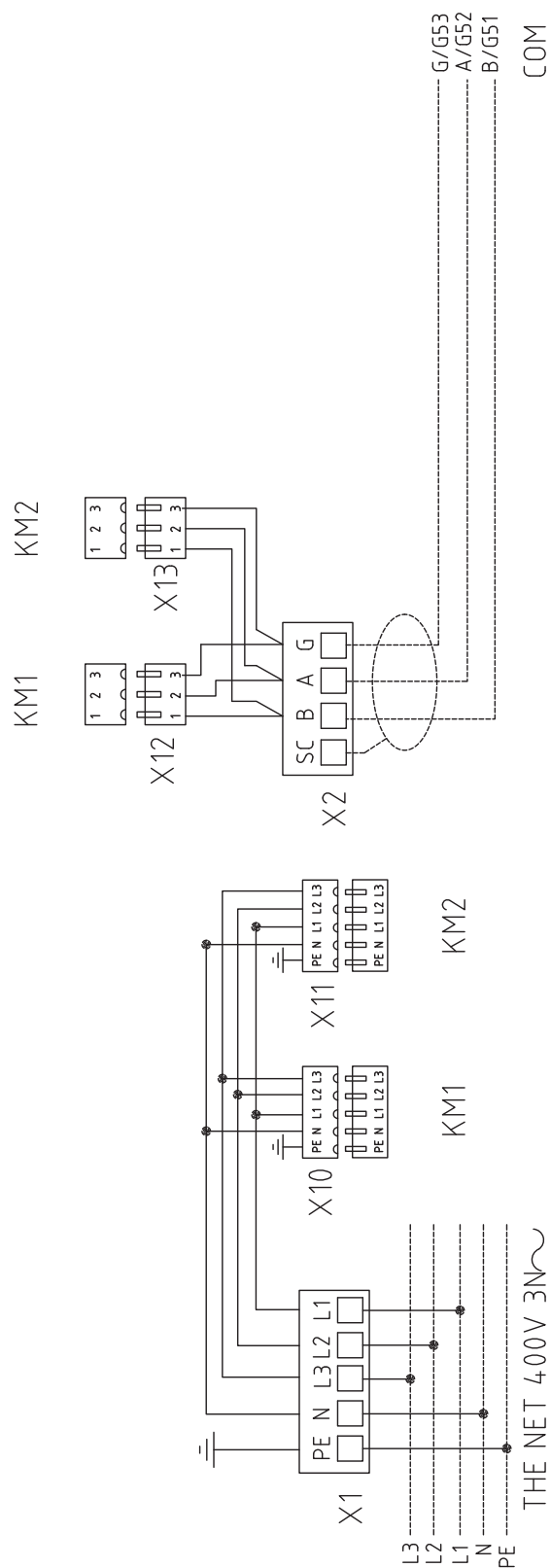


Positions of the DIP switches in the example

Cooling module	A1	A2	A3	A4	A5	A6	A7	A8	A9	A10
DIP switch 1 Termination	Off	Off	Off	Off	Off	Off	Off	Off	Off	On
DIP switch 2 Activates CTC Basic Display	Off	Off	On	On	On	On	On	On	On	On

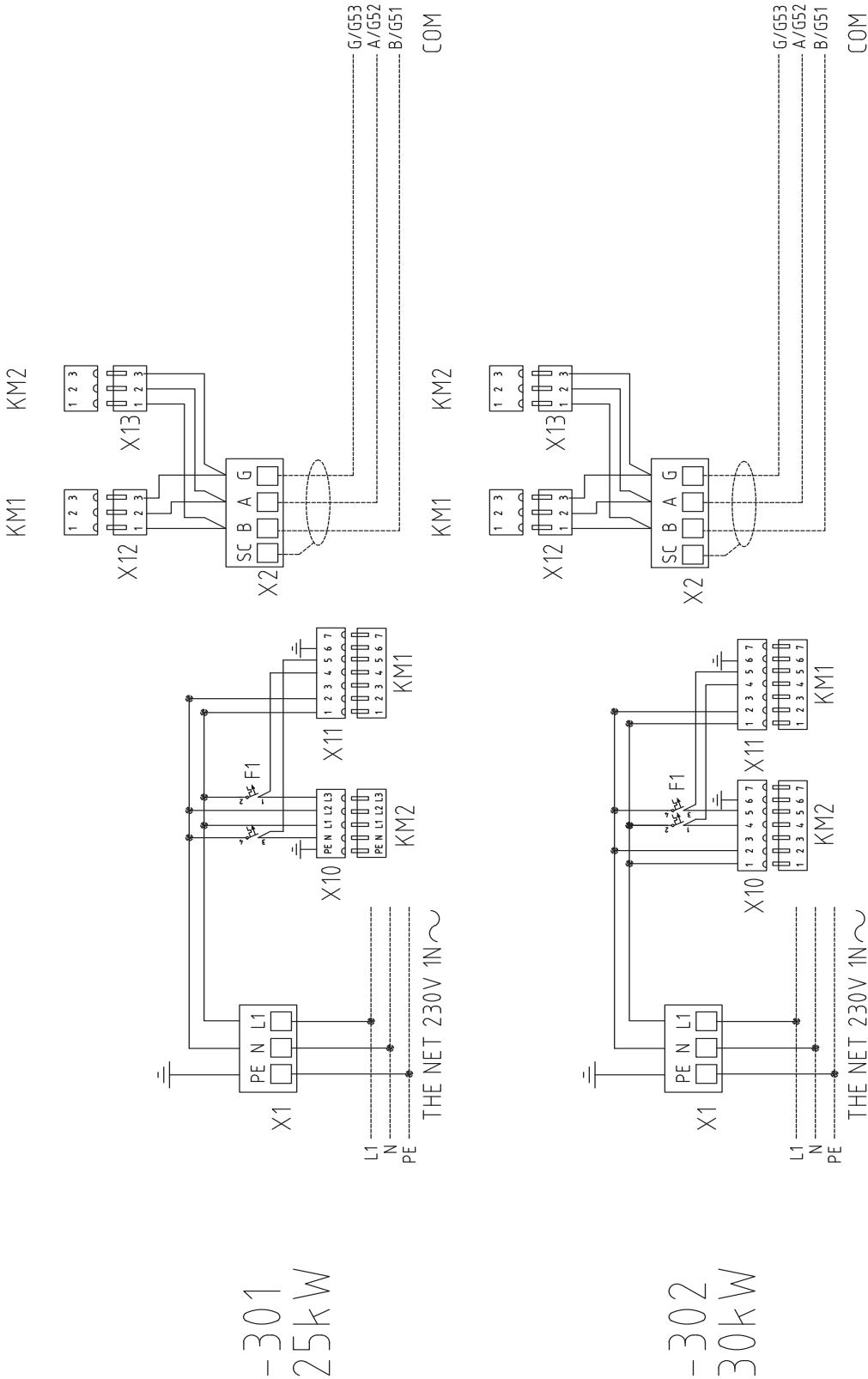
5.4 Power supply and communication 400V 3N~

CTC EcoPart 425-435

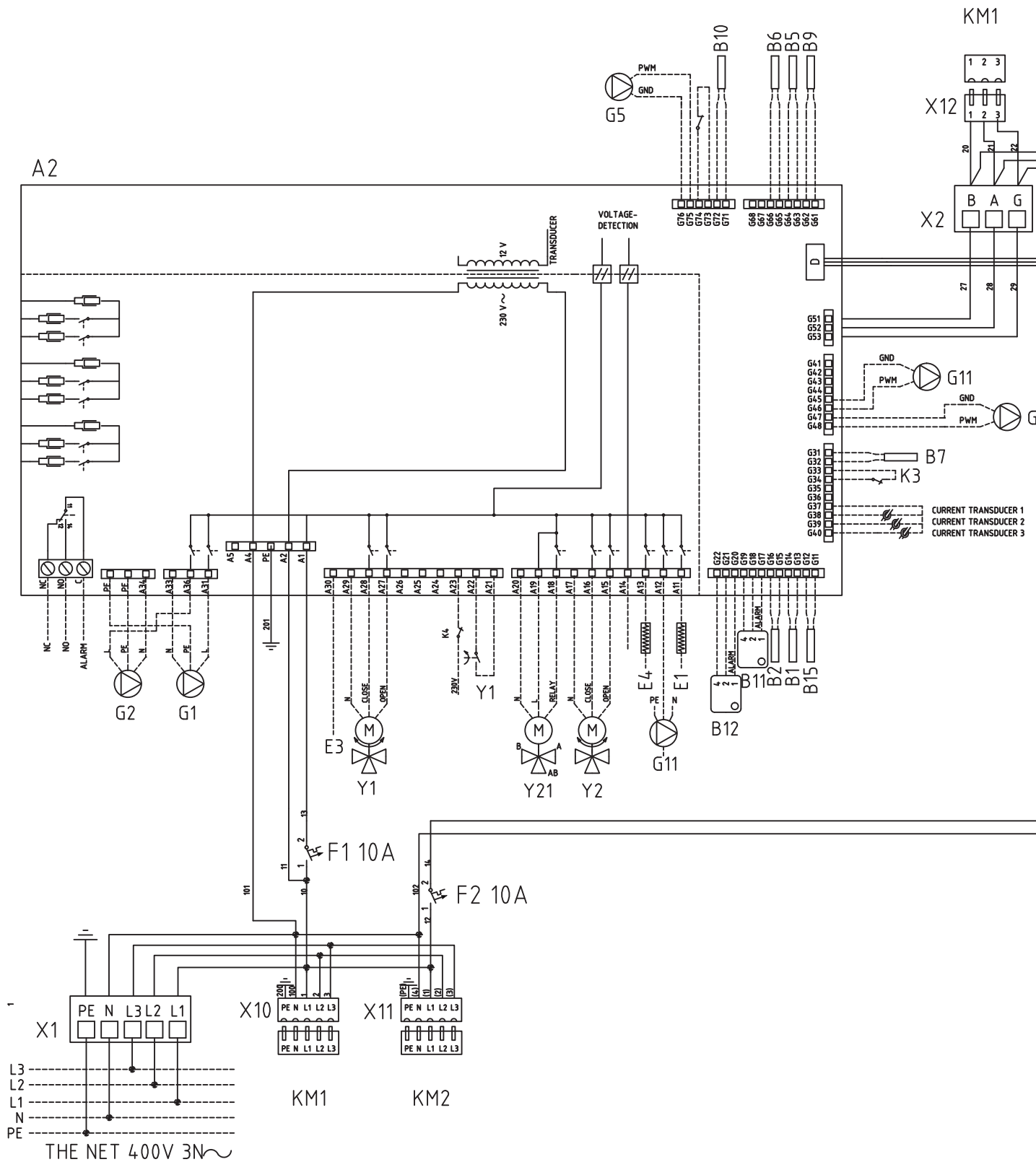


5.5 Power supply and communication 230V 1N~

CTC EcoPart 425-430

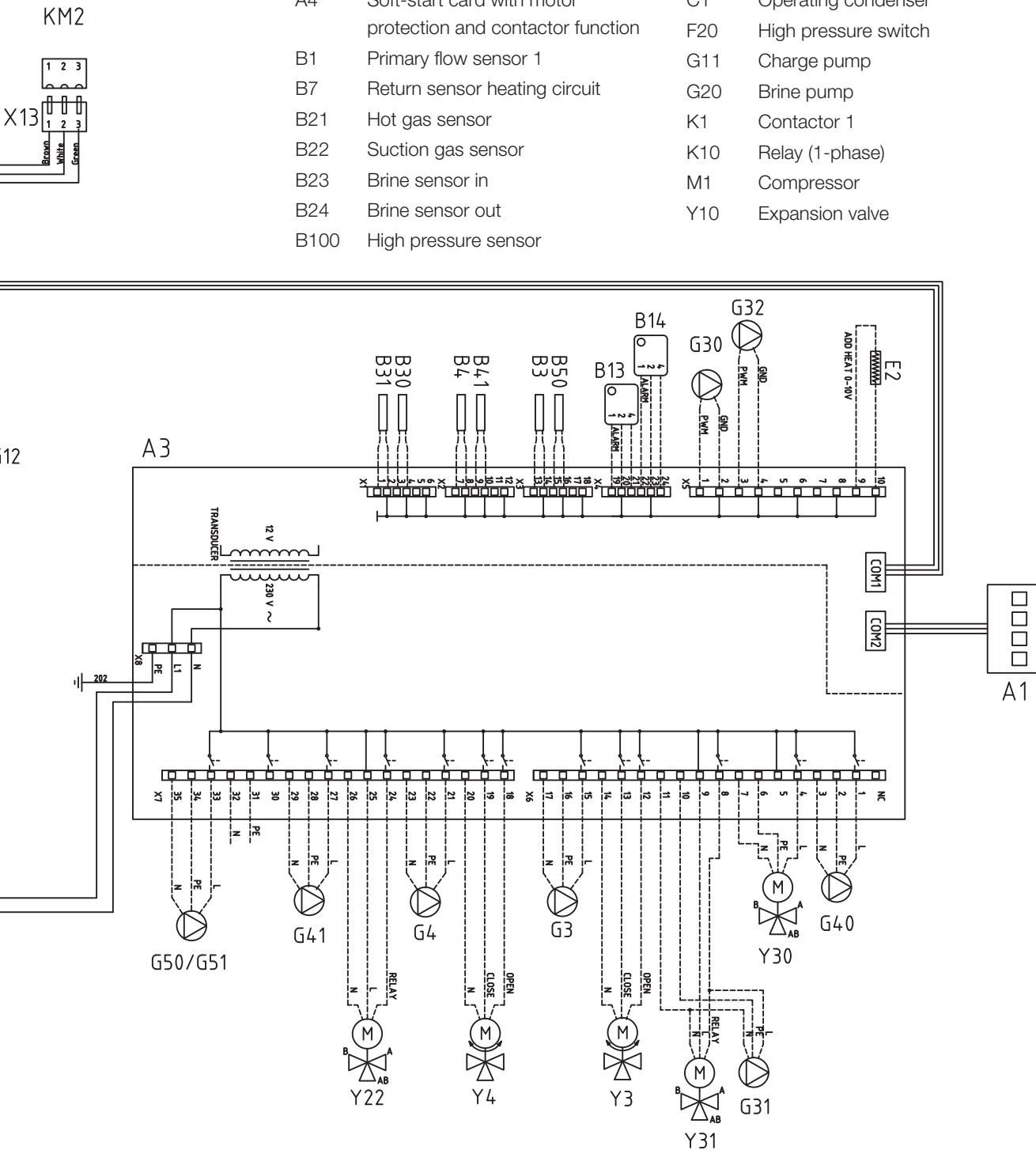


5.6 Wiring diagram CTC i425-i435 Pro 400 V 3N~

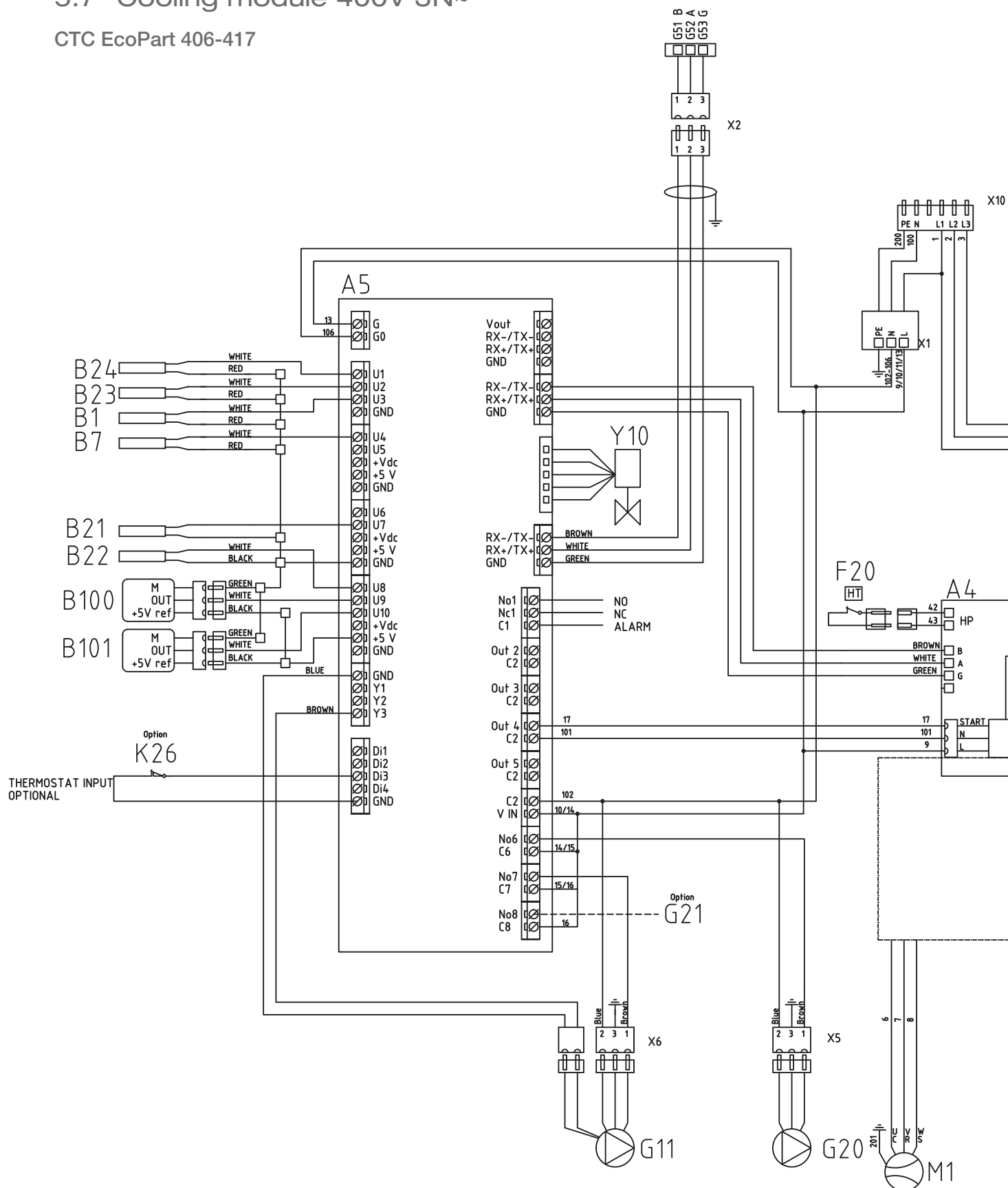


Parts list

A2	Relay/main card	B101	Low pressure sensor
A4	Soft-start card with motor protection and contactor function	C1	Operating condenser
B1	Primary flow sensor 1	F20	High pressure switch
B7	Return sensor heating circuit	G11	Charge pump
B21	Hot gas sensor	G20	Brine pump
B22	Suction gas sensor	K1	Contactor 1
B23	Brine sensor in	K10	Relay (1-phase)
B24	Brine sensor out	M1	Compressor
B100	High pressure sensor	Y10	Expansion valve

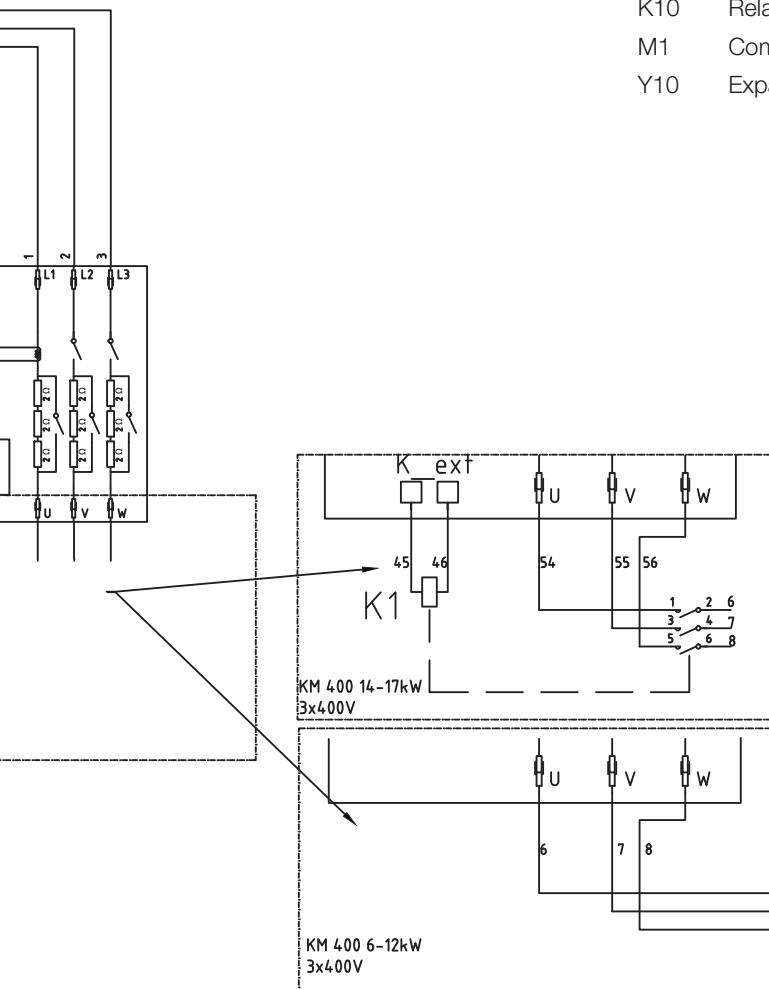


CTC EcoPart 406-417

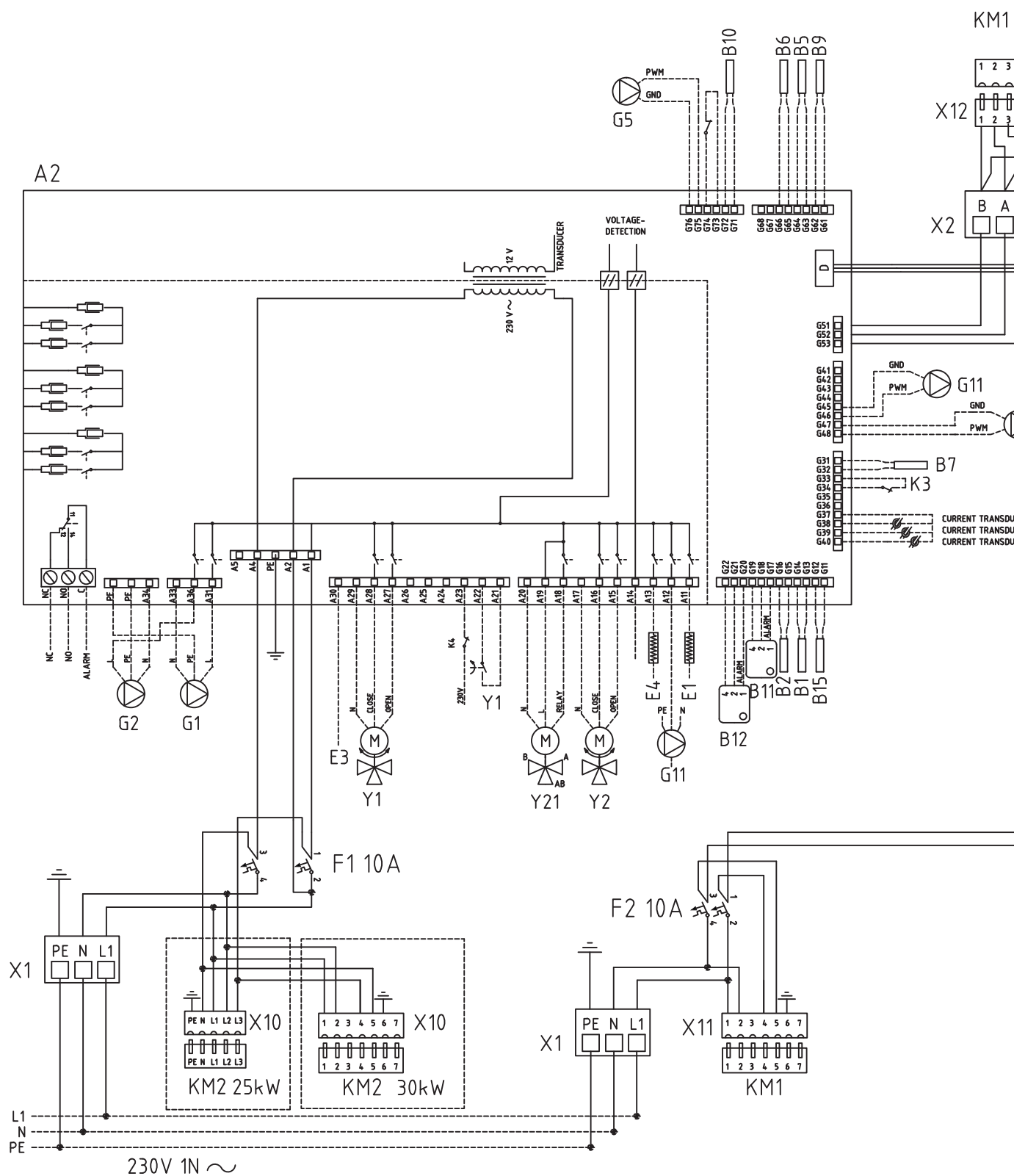


Components

A2	Relay/main PCB
A4	PCB white softstarter, motor protection and contactor function
B1	Primary flow sensor 1
B7	Return sensor
B21	Hotgas sensor
B22	Suctiongas sensor
B23	Brine sensor in
B24	Brine sensor out
B100	Highpressure sensor
B101	Lowpressure sensor
C1	Capacitator compressor (1-phase)
F20	Highpressure switch
G11	Charge pump (accessory)
G20	Brine pump
K1	Contactor 1
K10	Relay (1-phase)
M1	Compressor
Y10	Expansion valve

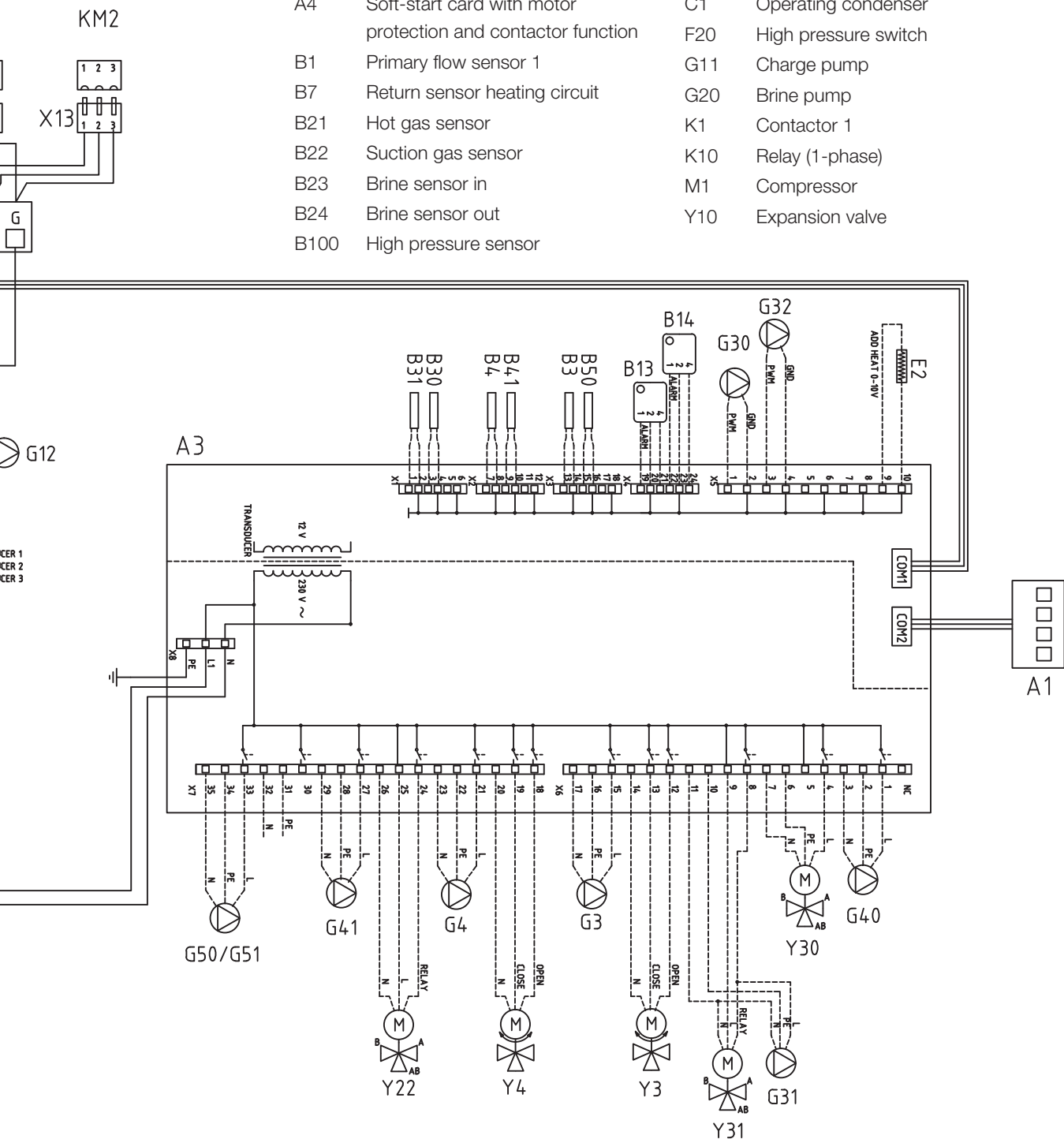


5.8 Wiring diagram CTC i425-i430 Pro 230 V 1N~

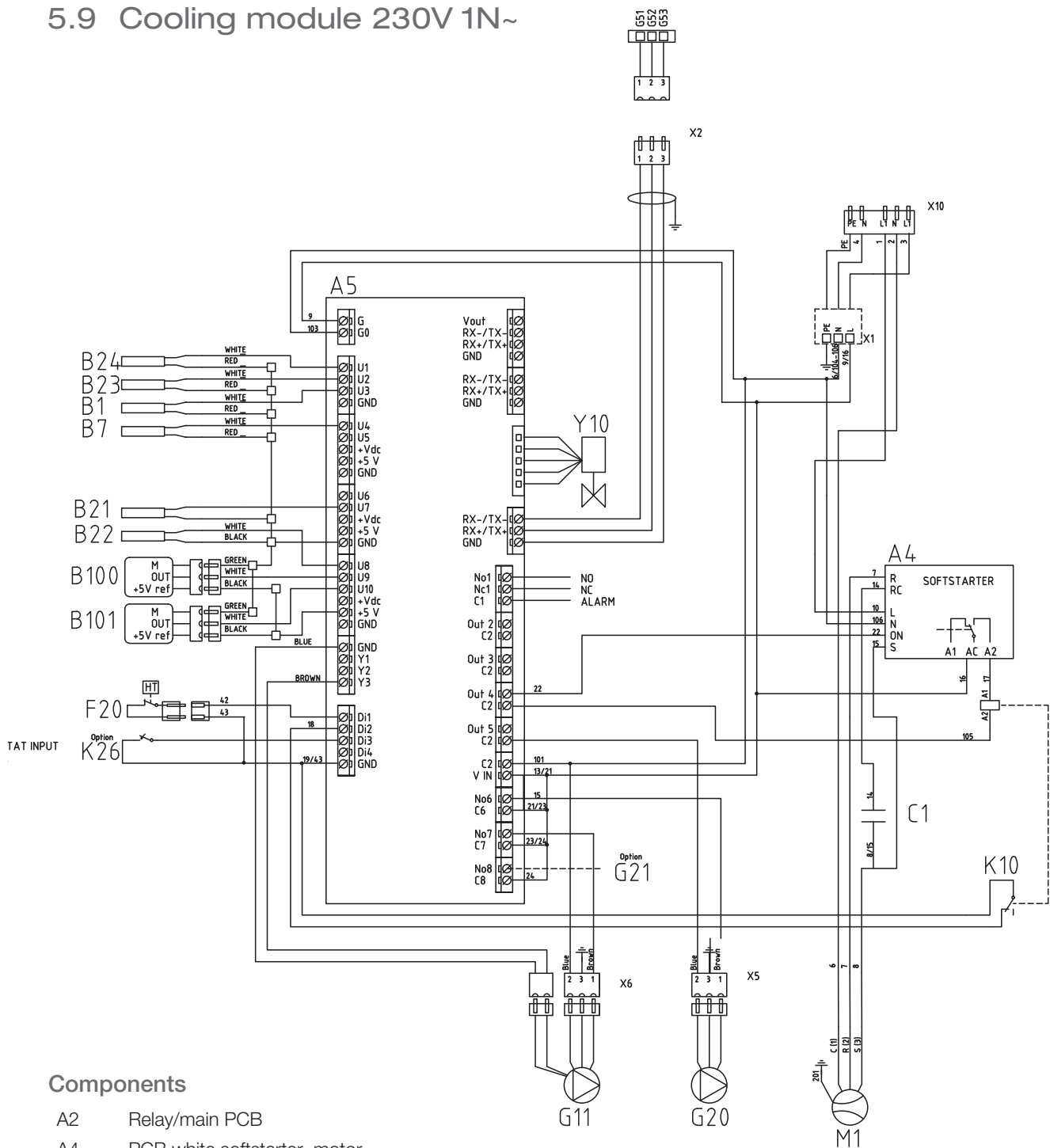


Parts list

A2	Relay/main card	B101	Low pressure sensor
A4	Soft-start card with motor protection and contactor function	C1	Operating condenser
B1	Primary flow sensor 1	F20	High pressure switch
B7	Return sensor heating circuit	G11	Charge pump
B21	Hot gas sensor	G20	Brine pump
B22	Suction gas sensor	K1	Contactor 1
B23	Brine sensor in	K10	Relay (1-phase)
B24	Brine sensor out	M1	Compressor
B100	High pressure sensor	Y10	Expansion valve



5.9 Cooling module 230V 1N~



Components

A2	Relay/main PCB	C1	Capacitor compressor (1-phase)
A4	PCB white softstarter, motor protection and contactor function	F20	Highpressure switch
B1	Primary flow sensor 1	G11	Charge pump (accessory)
B7	Return sensor	G20	Brine pump
B21	Hotgas sensor	K1	Contactor 1
B22	Suctiongas sensor	K10	Relay (1-phase)
B23	Brine sensor in	M1	Compressor
B24	Brine sensor out	Y10	Expansion valve
B100	Highpressure sensor		
B101	Lowpressure sensor		

6. First start

1. Check that the heating boiler and system are full of water and have been bled.
2. Check that all connections are tight.
3. Check that sensors and the heating circ 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 warm water is coming out at the tap locations.

7. 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.

7.1 Periodic maintenance

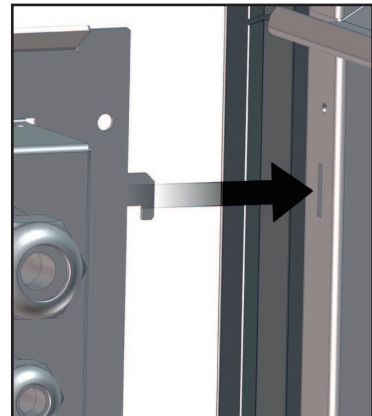
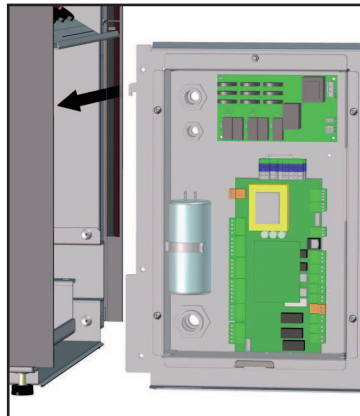
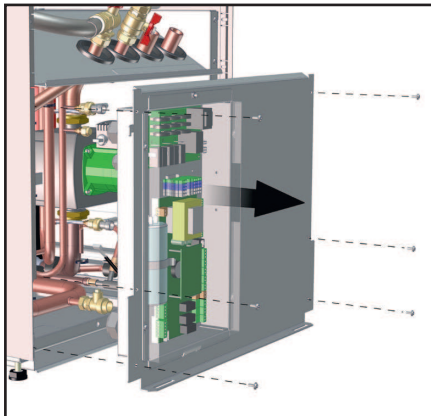
After three weeks' operation and then every three months during the first year. Then once a year:

- Check that the installation is free of leaks.
- Check that the product and system are free of air; bleed if needed – see the section Connecting the brine system.
- Check that the brine system is still pressurised and that the fluid level in the brine vessel is adequate/correct.
- No annual leakage control of the refrigerant is required.

7.2 Shut-down

The heat pump is shut down using the operating switch. If there is a risk of the water freezing, drain out all the water.

7.3 Service position



8. Troubleshooting/appropriate measures

The 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 CTC-UK to check and rectify the issue. Always provide the product's serial number.

8.1 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.



Enertech Group

Enertech AB
Box 313
S-341 26 LJUNGBY



Försäkran om överensstämmelse

Déclaration de conformité

Declaration of conformity

Konformitätserklärung

försäkrar under eget ansvar att produkten,
confirme sous sa responsabilité exclusive que le produit,
declare under our sole responsibility that the product,
erklären in alleiniger Verantwortung, dass das Produkt,

**CTC EcoPart i425 Pro, CTC EcoPart i430 Pro, CTC EcoPart i435 Pro,
CTC EcoPart 425, CTC EcoPart 430, CTC EcoPart 435,
CTC EcoPart i425 Pro 1x230V, CTC EcoPart i430 Pro 1x230V,
CTC EcoPart 425 1x230V, CTC EcoPart 430 1x230V**

som omfattas av denna försäkran är i överensstämmelse med följande direktiv,
auquel cette déclaration se rapporte est en conformité avec les exigences des normes suivantes,
to which this declaration relates is in conformity with requirements of the following directive,
auf das sich diese Erklärung bezieht, konform ist mit den Anforderungen der Richtlinie,

EC directive on:

Pressure Equipment Directive (PED) 97/23/EC, Modul A

Electromagnetic Compatibility (EMC) 2004/108/EC

MD 2006/42/EG

**Ecodesign Directive 2009/125/EC
(regulations (EU) 811/2013, 812/2013, 813/2013, 814/2013 where applicable)**

Överensstämmelsen är kontrollerad i enlighet med följande EN-standarder,
La conformité a été contrôlée conformément aux normes EN,
The conformity was checked in accordance with the following EN-standards,
Die Konformität wurde überprüft nach den EN-normen,

EMC

**Emission: EN55014-1:2007 EN61000-3-2:2006
-A1:2009 -A2:2009 EN61000-3-3:2008**

PED EN 378-1-2:2008

**Immunity: EN55014-2:1997 -A1:2001 -A2:2008
EN61000-4-3 -4 -5 -6 -11*)**

***) Maximum permissible system impedance :
Zsys1 (dmax) = 0.349Ω**

Detailed ecodesign information can be downloaded at: www.ctc.se/ecodesign

Ljungby 2015-09-02

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