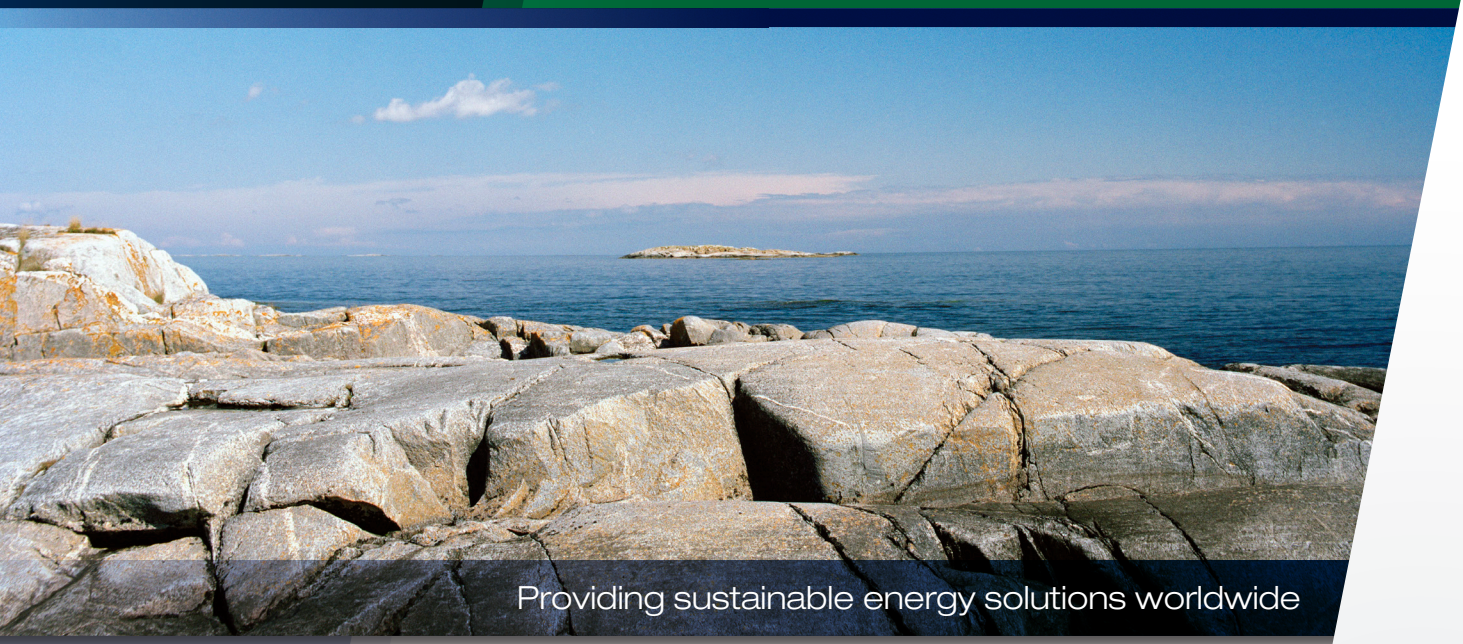
162 105 38-1 2014-08-14



Installation and Maintenance Manual

CTC EcoPart i425-i435 Pro
CTC EcoPart 425-435

Enertech Group

Removing the cooling module

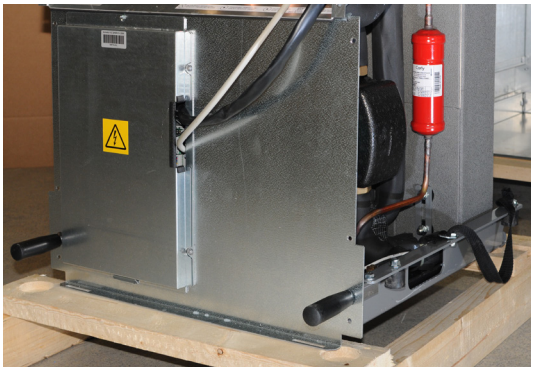
1. Disconnect the cooling module's power cable connector and hoses.

2. Attach the two carrying handles to the bottom of the cooling module.

3. Unscrew the cooling module's screws.

4. Pull the cooling module by first lifting the front edge slightly with the carrying handles.

5. Lift the cooling module using the carrying handles and shoulder straps.



6. Lift the cooling module into the product using the carrying handles and shoulder straps. Remove the carrying handles and reconnect the power cable, hoses and screws.

Installation and Maintenance Manual

162 105 38-1 2014-08-14

CTC EcoPart i425-i435 Pro
CTC EcoPart 425-435

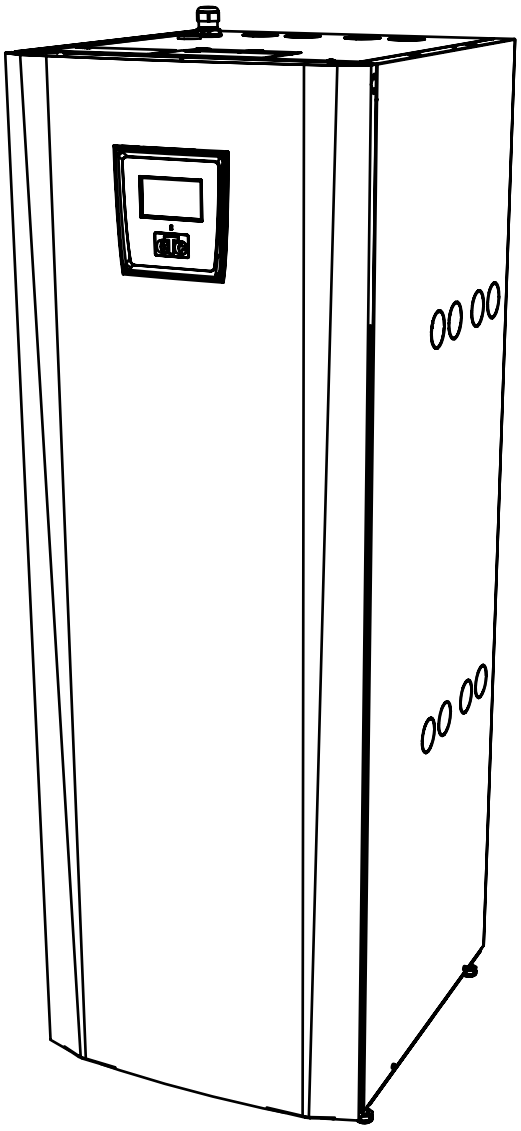


Table of Contents

GENERAL INFORMATION

Check list 6
Important to remember! 7
Safety Instructions 7
1. Introduction 8
2. Technical data 10
2.1 Table 400 V 3N~ 10
2.2 Table 230 V 1N~ 12
2.3 Component location 13
2.4 Dimensional drawing 14
2.5 Refrigerant system 15
2.6 Operating range 15
3. Operation and Maintenance 16
3.1 Periodic maintenance 16
3.2 Shut-down 16
3.3 Service position 16
4. Troubleshooting/appropriate measures 17
4.1 Air problems 17
4.2 Alarms 17
4.3 Noise/vibrations 17
4.4 CTC Basic Display 17
4.5 Safety risk 17
4.6 Display “Lockout” 17
5. Installation 18
5.1 Delivery includes 18
5.2 Connection 19
5.3 Heat medium side 20
5.4 Circulation pumps, heat medium side 21
5.4.1 Yonos Para pump curve 21
5.4.2 UPMGEO pump curve 21
5.5 Brine system 22
5.5.1 Brine pump curves 25
6. Electrical installation 26
6.1 Alarm output 26
7. Connecting the control system 27
7.1 CTC EcoPart i425-i435 Pro 27
7.2 CTC EcoPart 425-435 28
7.3 Series connection of heat pumps 29
7.3.1 Terminated position 29
7.3.2 Shielded communication 30
7.3.3 Example of series connection 31
7.4 Wiring diagram for CTC i425-i435 Pro 400 V 3N~32
7.5 Wiring diagram for CTC i425-i435 Pro 230 V 1N~34
7.6 Cooling module CTC EcoPart 425-435 400V 3N~36
7.7 Cooling module CTC EcoPart 425-430 230V 1N~37
8. First start 38
Declaration of Conformity 39

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.:

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 controls for CTC EcoLogic Pro or CTC Basic Display; we refer you instead 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
- ☐ Guarantee and insurance
- ☐ Installation certificate registered online at ctc.se or filled in and posted. To benefit from our warranty and CTC guarantee, the installation certificate must be registered online at ctc.se or sent off within 6 months of the installation date.
- ☐ 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.

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 jeopardise safety by removing bolted covers, hoods or similar.
- Never jeopardise safety by deactivating safety equipment.
- Any work done on the product's cooling system should be done by a competent F Gas engineer.
- This product is intended for indoor installation only.
- This product is intended for commercial use.

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

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

1. Introduction

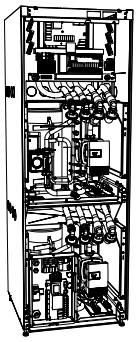
This heat pump is available in many different versions depending on how you intend to control it.

- 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 instead.

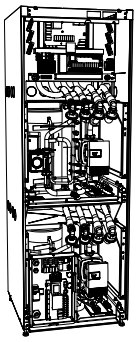
The heat pump consists of two heat pump modules on top of each other. The structure of the different sizes is shown below.

3 x 400 V 3N~

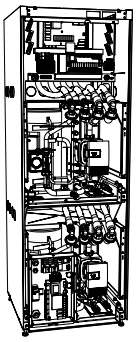
CTC EcoPart 425 &
CTC EcoPart i425 Pro



CTC EcoPart 430 &
CTC EcoPart i430 Pro

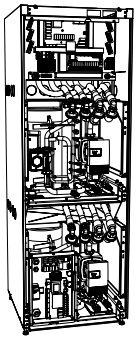


CTC EcoPart 435 &
CTC EcoPart i435 Pro



1 x 230 V 1N~

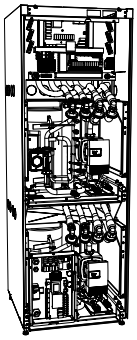
CTC EcoPart 425 &
CTC EcoPart i425 Pro



10 kW

14 kW

CTC EcoPart 430 &
CTC EcoPart i430 Pro



14 kW

14 kW

2. Technical data

2.1 Table 400 V 3N~

Electrical data					
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

Operational data for heat pump					
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	24.95 | 24.01 | 23.42		28.51 | 27.38 | 26.84	
Output from compressor [1] @ 0/35 0/45 0/55	kW	16.76 | 16.14 |15.87	8.19 | 7.87 | 7.55	16.76 | 16.14 | 15.87	11.75 | 11.24 | 10.97
COP [1] @ 0/35 0/45 0/55		4.52 | 3.61 | 3.07	4.58 | 3.64 | 2.99	4.52 | 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					
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					
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		LEP (Low Energy Pump)			
Brine system pump speed		Adjust to Δt = 2-4 K			
Pump capacity		See diagram in the Pipe installation chapter			

Other data					
Refrigerant quantity (R407C)	l	2.9	2.1	2.9	2.5
Compressor oil		Polyolester (POE)			
Pressure switch cut-off HT	MPa	3.1 (31 bar)			
Sound power EN 12102	dB(A)	45.6		45.4	
Weight net	kg	334		354	
Width x Height x Depth	mm	596 x 1760 x 680			

Electrical data			
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	11.5

Operational data for heat pump			
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	33.52 | 32.28 | 31.74	
Output from compressor [1] @ 0/35 0/45 0/55	kW	16.76 | 16.14 |15.87	16.76 | 16.14 |15.87
COP [1] @ 0/35 0/45 0/55		4.52 | 3.61 | 3.07	4.52 | 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			
Max temperature heating medium (TS)	°C	110	
Heating system min flow [2]	l/s	0.40	0.40
Kvs value Δt = 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] Δt = 10 K och 0/35 °C heat pump operation.
[3] Δt = 5 K och 0/35 °C heat pump operation.

Brine system			
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 Δt = 5 K	l/s	0.63	0.63
Brine system nominal flow Δt = 3 K	l/s	1.05	1.05
Kvs value Δt = 3 K at nominal flow		8.9	8.9
Brine system pump		LEP (Low Energy Pump)	
Brine system pump speed		Adjust to Δt = 2-4 K	
Pump capacity		See diagram in the Pipe installation chapter	

Other data			
Refrigerant quantity (R407C)	l	2.9	2.9
Compressor oil		Polyolester (POE)	
Pressure switch cut-off HT	MPa	3.1 (31 bar)	
Sound power EN 12102	dB(A)	45.6	
Weight net	kg	359	
Width x Height x Depth	mm	596 x 1760 x 680	

2.2 Table 230 V 1N~

Electrical data					
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		KM417EP 2xLEP	KM408EP 2xLEP	KM417EP 2xLEP	KM412EP 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

Operational data for heat pump					
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

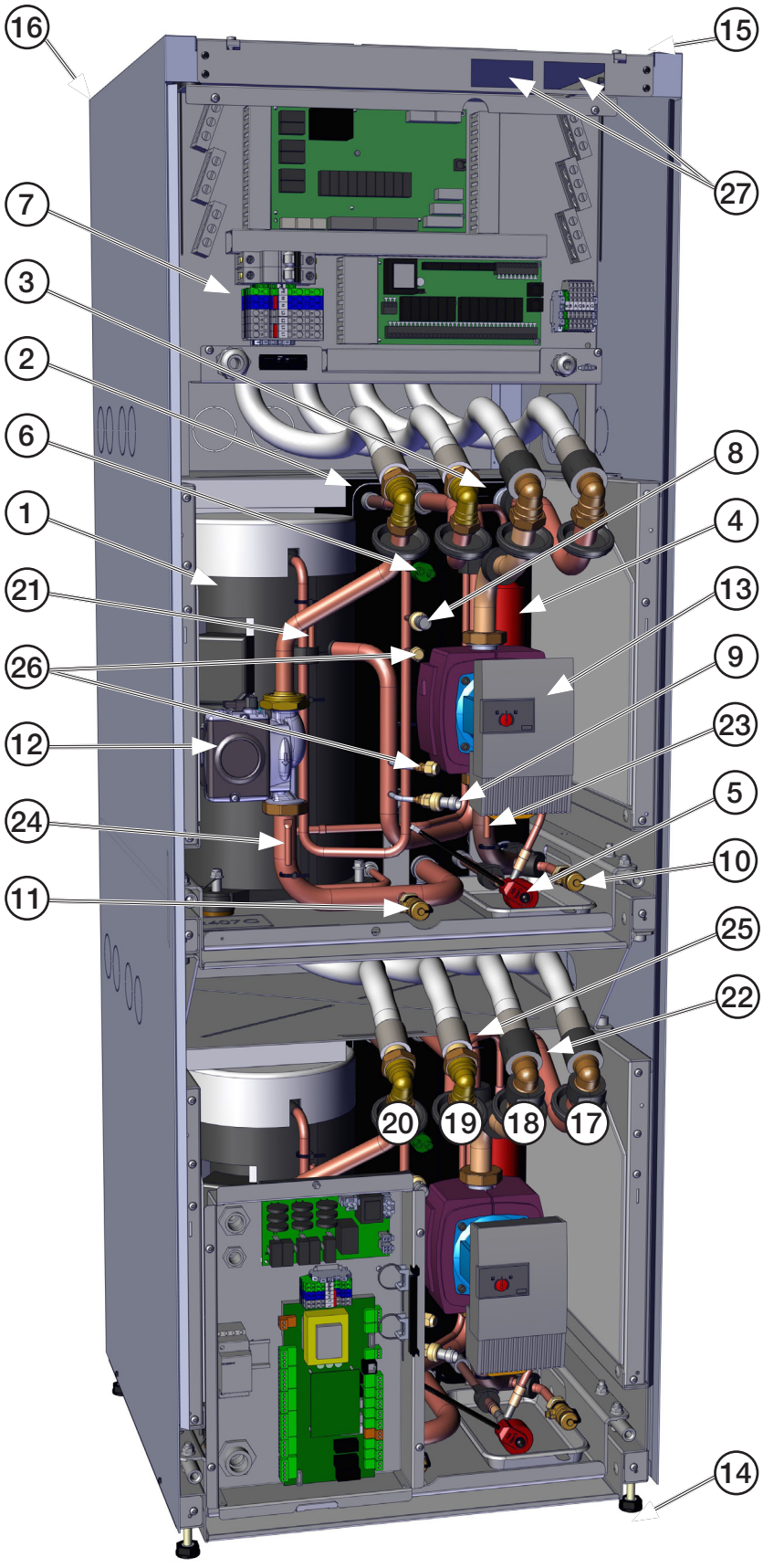
Heating system					
Max temperature heating medium (TS)	°C	110			
Heating system min flow [2]	l/s	0.34	0.24	0.34	0.34
Kvs value Δt = 10 K, at min flow		8.6	4.3	8.6	8.6
Heating system nominal flow [3]	l/s	0.68	0.48	0.68	0.68
Heating medium pump		LEP (Low Energy Pump)			

[2] Δt = 10 K och 0/35 °C heat pump operation.
[3] Δt = 5 K och 0/35 °C heat pump operation.

Brine system					
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		LEP (Low Energy Pump)			
Brine system pump speed		Adjust to Δt = 2-4 K			
Pump capacity		See diagram in the Pipe installation chapter			

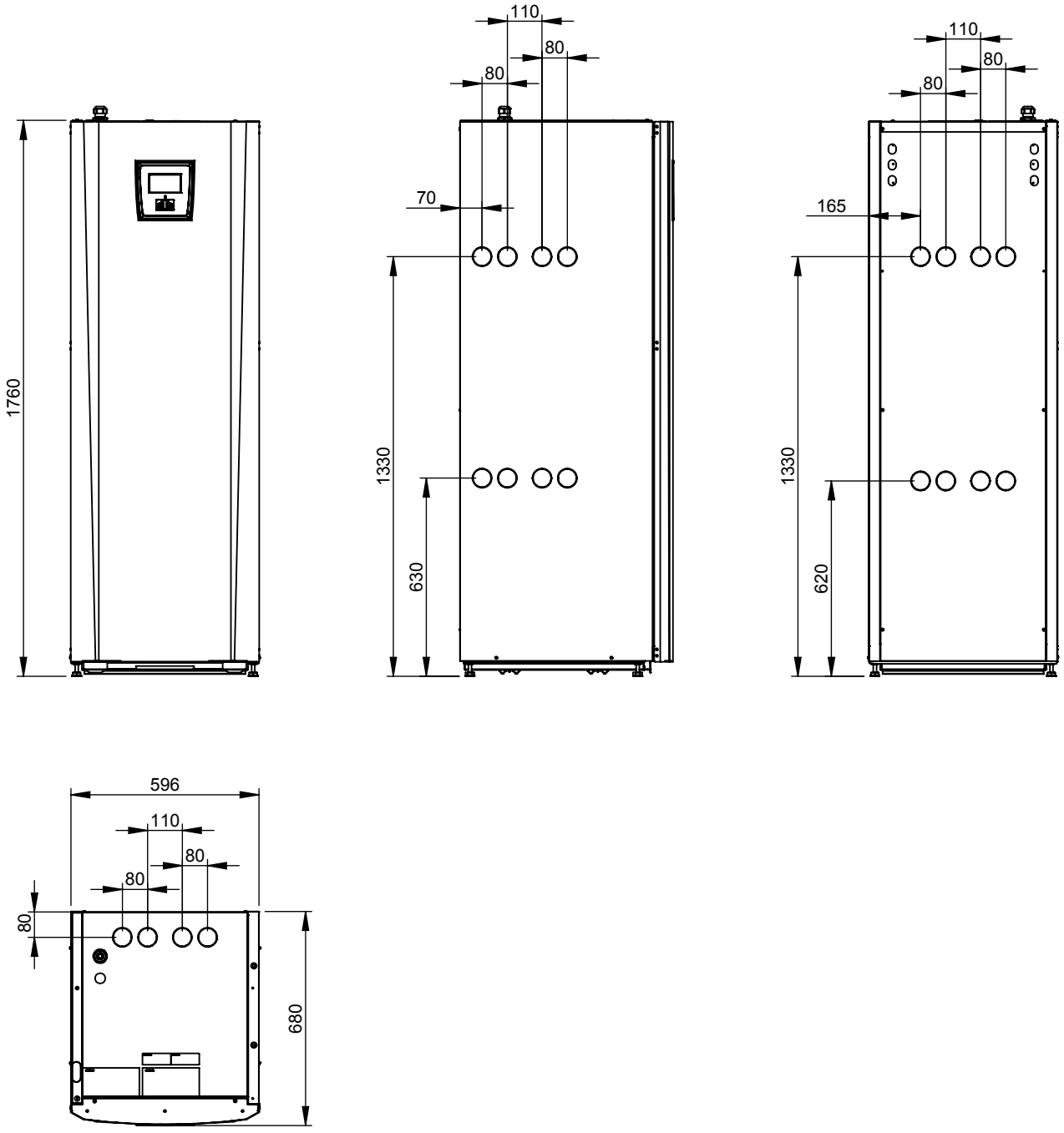
Other data					
Refrigerant quantity (R407C)	l	2.9	2.1	2.9	2.9
Compressor oil		Polyolester (POE)			
Pressure switch cut-off HT	MPa	3.1 (31 bar)			
Sound power EN 12102	dB(A)	45.6		45.4	
Weight net	kg	334		354	
Width x Height x Depth	mm	596 x 1760 x 680			

2.3 Component location



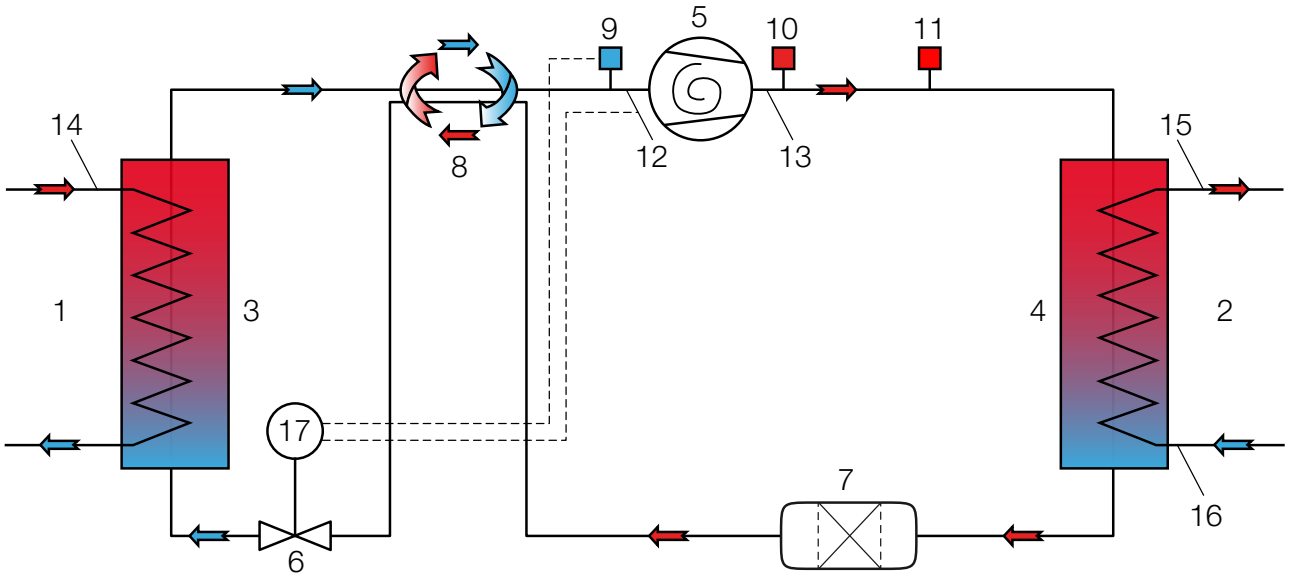
1. Compressor
2. Evaporator
3. Condenser
4. Drying filter
5. Expansion valve
6. High pressure switch
7. Terminal board
8. High pressure sensor
9. Low pressure sensor
10. Drain valve cold side/Brine
11. Drain valve warm side/Water
12. Low energy heat medium pump
13. Low energy brine pump
14. Adjustable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

2.4 Dimensional drawing



2.5 Refrigerant system

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



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

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. 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 Periodic maintenance

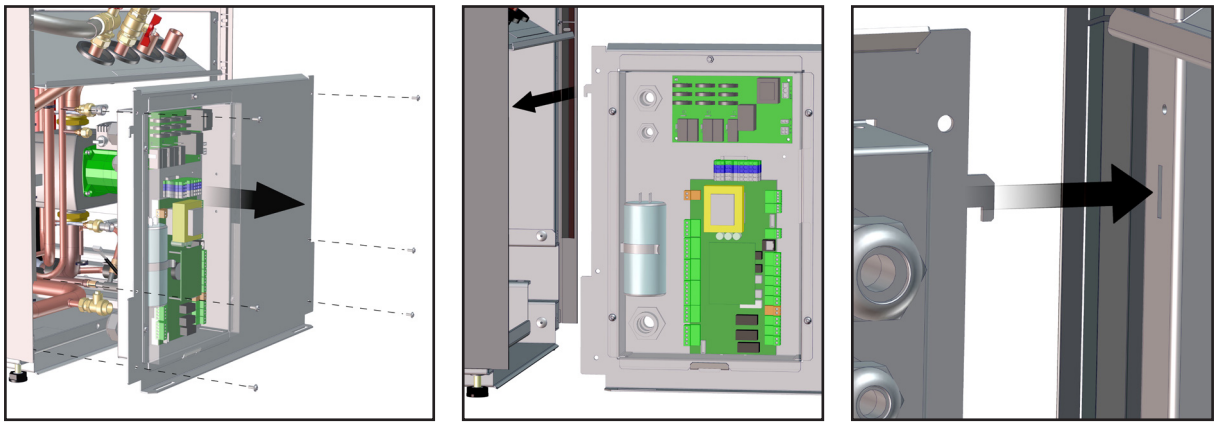
After three weeks' operation and then every three months during the first year. Then once a year:

- 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.

3.2 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.

3.3 Service position



4. 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.

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 heat pump are displayed in the product which is used to control it or CTC Basic Display; you should therefore consult the manual for that product to identify the alarm codes.

4.3 Noise/vibrations

When starting up the compressor a loud noise and vibrations may occur. This lasts for a few seconds and should then subside. If the noise does not disappear, contact your installer.

4.4 CTC Basic Display

If a fault occurs with the EcoLogic display, values from the modules can be read using the CTC Basic Display. Basic Display can also be activated as a controlling unit. See the manual for the CTC Basic Display.

4.5 Safety risk

CTC EcoPart must never be used as a shelf. Nothing should be placed on top of or next to it, leaning against the product/pipes.

4.6 Display "Lockout"

Occurs if the EcoLogic Display has frozen in some way and does not respond to the buttons being pressed. Wait a moment and try again; if you do not get any response you can cut the power via the switch as a first measure. Wait approx. 10 seconds and turn the power back on. If the phenomenon does not disappear, contact your installer.

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 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.

5.1 Delivery includes

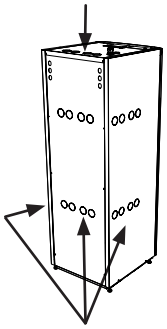
CTC EcoPart i425-i435 Pro (with CTC EcoLogic Pro Display):

- 1 x Safety valve ½" 3 bar
- 1 x Room sensor
- 3 x 22K sensor L=2500 mm
- 1 x Outdoor sensor
- 4 x Non-return valve 1¼"
- 4 x Dirt filter 1¼"
- 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 ½" 3 bar
- 4 x Non-return valve 1¼"
- 4 x Dirt filter 1¼"
- 4 x Rubber grommet D=60
- 4 x Edge moulding 186 mm
- 2 x Edge moulding 700 mm
- CTC Basic Display manual

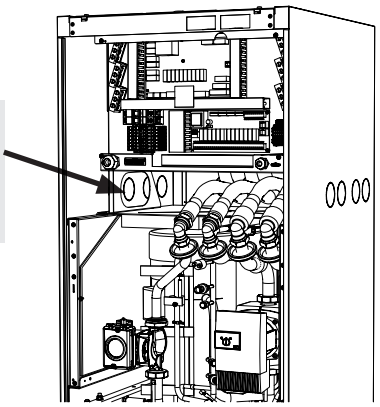
5.2 Connection



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.



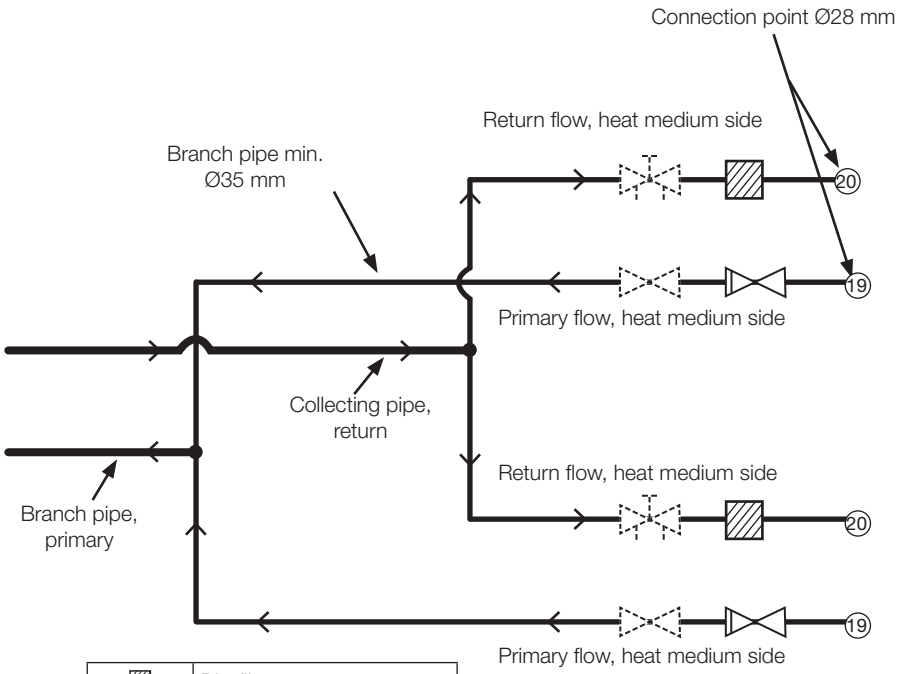
! If a cooling module is connected on the side, the opening must be lined with the edge moulding provided to prevent abrasion against the hose.

5.3 Heat medium side

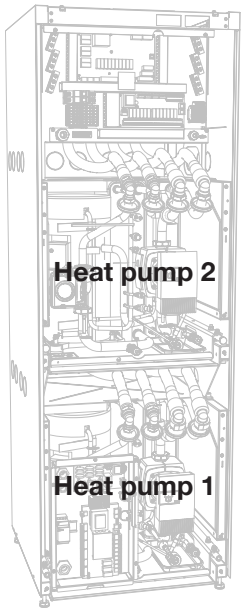
Connect the heat pump with a dimension of at least Ø35 mm so it can then be joined to a collecting pipe. The non-return valve and dirt filter are 1¼". The dimension of the collecting pipe depends on the installation.

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.

! 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

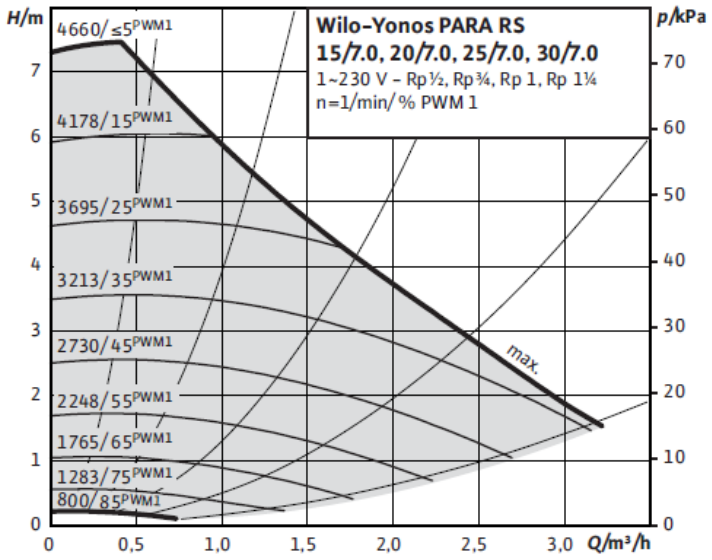


5.4 Circulation pumps, heat medium side

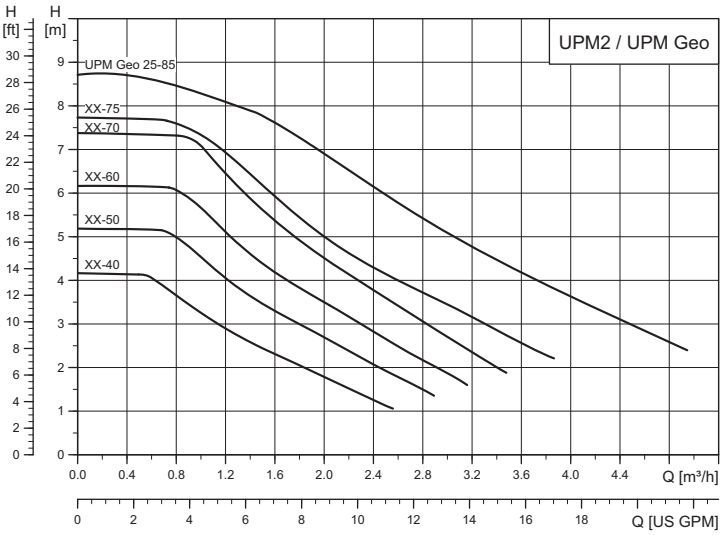
The heat pump is supplied with two LEPs (Low Energy Pump), which are low energy charge pumps installed at the factory.

Heat pump module	8 kW	10 kW	12 kW	14 kW	17 kW
Heat medium pump	Yonos Para PWM 7.0	Yonos Para PWM 7.5		UPMGEO 25-85 130	

5.4.1 Yonos Para pump curve



5.4.2 UPMGEO pump curve



5.5 Brine system

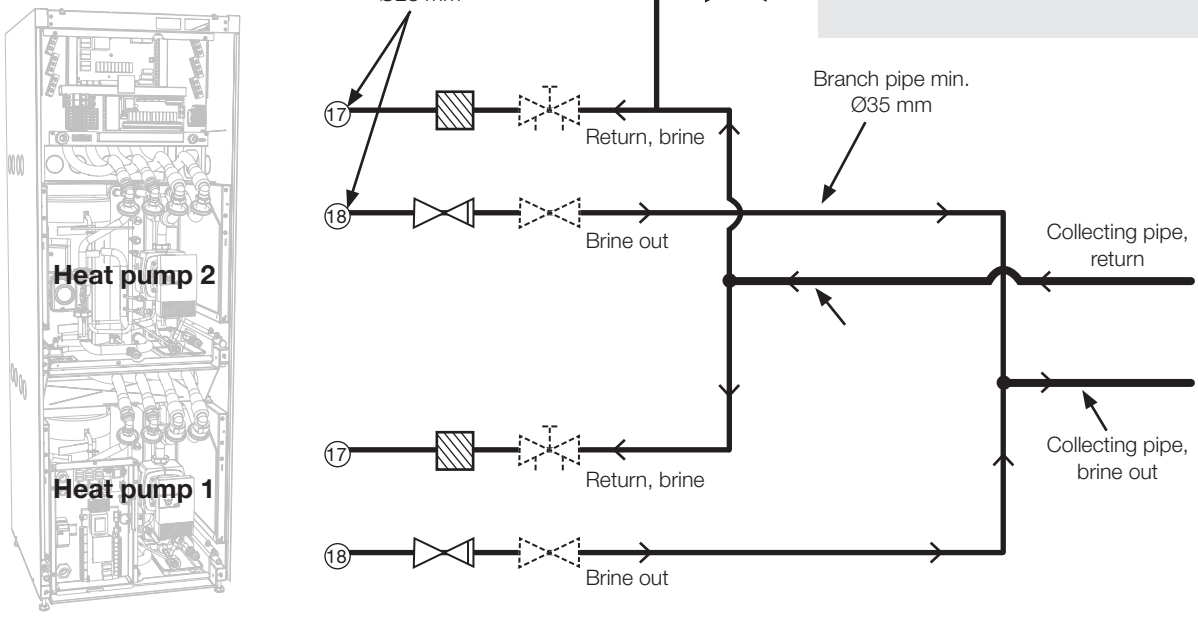
The brine system, i.e. the ground collector loop, must be assembled and connected by a qualified tradesman in accordance with current regulations and design guidelines.

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.

! 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.).

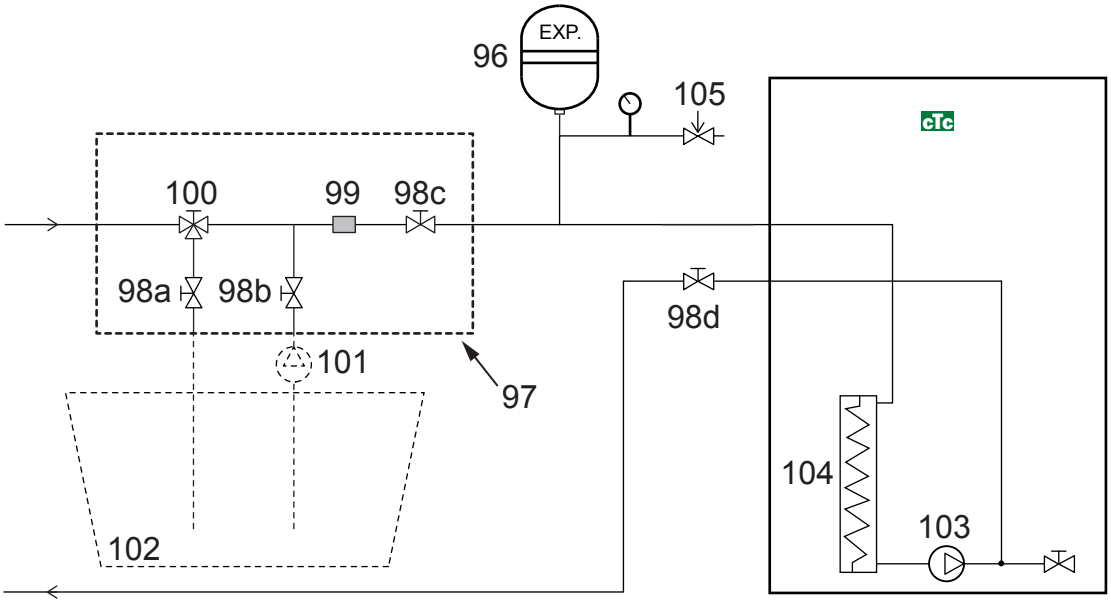


	Dirt filter
	Control valve
	Non-return valve
	Shut-off valve

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.

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



96	Expansion vessel/Level vessel	101	External filling pump
97	Filling kit	102	Mixing vessel
98	Shut-off valve	103	Brine pump
99	CTC filter	104	Evaporator
100	3-way valve	105	Safety valve 3 bar

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.

! Check the dirt filter after bleeding has been completed.

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.

! 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.

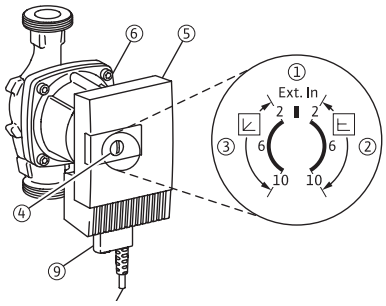
The alarm factory setting is 7°C, but 9°C is permitted for the first 72 hours while the compressor is running, as microbubbles in the system can reduce brine flow.

Brine pump – low energy pump (LEP)

The brine pump can be set to two different control settings, pressure-regulated speed or constant speed.

As the brine system has a fixed pressure drop, it must generally be set to the position for constant speed; see the illustration for how this is done.

To obtain good system performance, the brine pump speed needs to be adjusted for every single installation. Set the red button to setting option 2 and adjust so that a 2–4 degree temperature difference is obtained between the incoming and outgoing brine.



Begin by setting the knob to Max. flow by turning it to the right and full position (10). Then see if the system allows reduction in flow in order to minimise the pump's power consumption.

5.5.1 Brine pump curves

Heat pump module	8 kW	10 kW	12 kW	14 kW	17 kW
Brine pump	Stratos Para 25/1-8	Stratos Para 25/1-12			

6. 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.

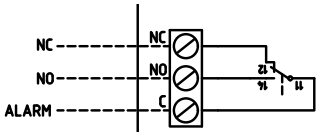
Use the cable provided to connect to the power supply. The product is already wired inside.

Safety switch

The installation should be preceded by a dual pole isolating safety switch which ensures disconnection from all electric power sources.

6.1 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.



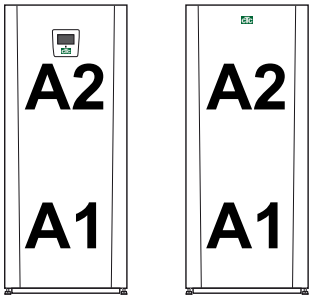
Detailed illustration from wiring diagram

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

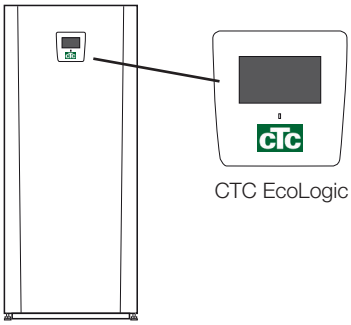
All heat pumps are factory-set addressed to A1 – bottom cooling module and A2 – top cooling module. To change the address (e.g. A2 to A3), see the manual for the CTC Basic Display.



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

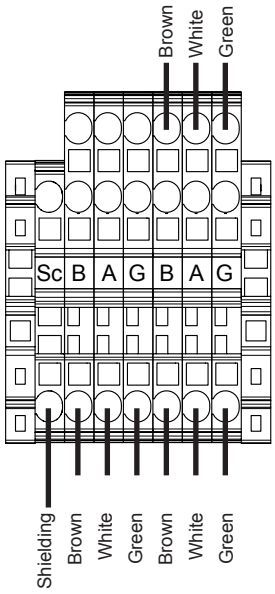
7.1 CTC EcoPart i425-i435 Pro

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



CTC EcoLogic Pro

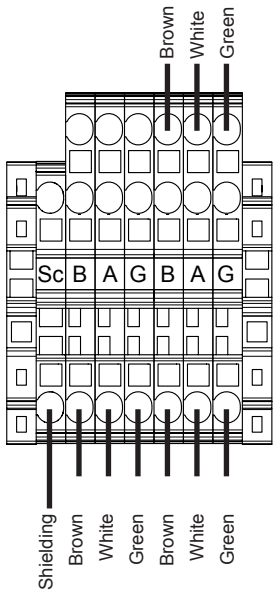
CTC EcoPart i425-i435 Pro

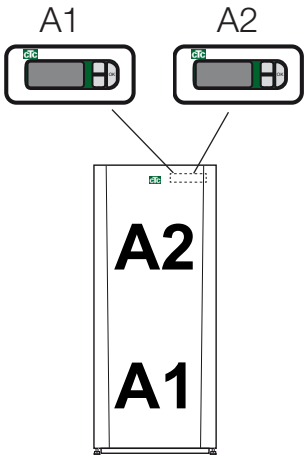


Communication terminal block on the Pro version.

7.2 CTC EcoPart 425-435

The CTC EcoPart 425-435 has two CTC Basic Display units mounted behind the front panel. These help the heat pump to run without external control (standalone). The heat pump is then controlled with a fixed return temperature or using thermostatic control. 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.

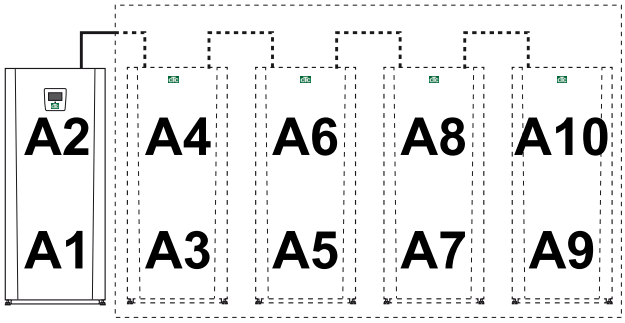




The left-hand display is connected to the bottom cooling module (A1) while the right-hand display is connected to the top cooling module (A2).

7.3 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.



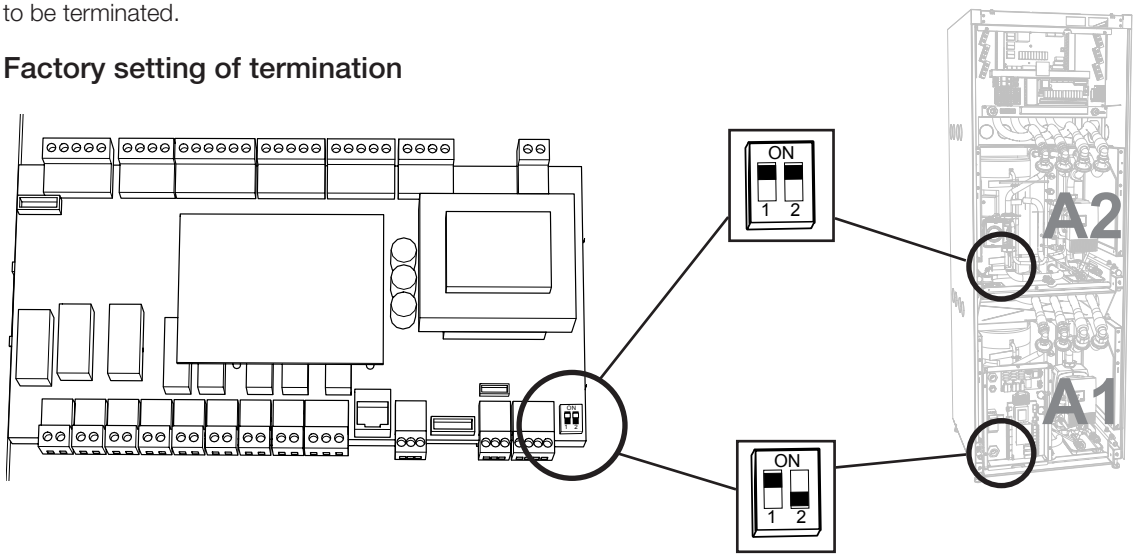
The last heat pump (the cooling module) connected in series must be partly terminated and the shielding in the communication cable must be connected to earth. See below.

7.3.1 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.

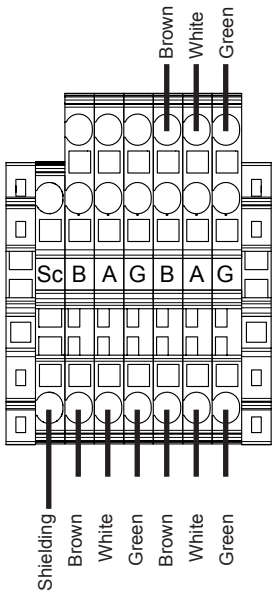
Factory setting of termination



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.

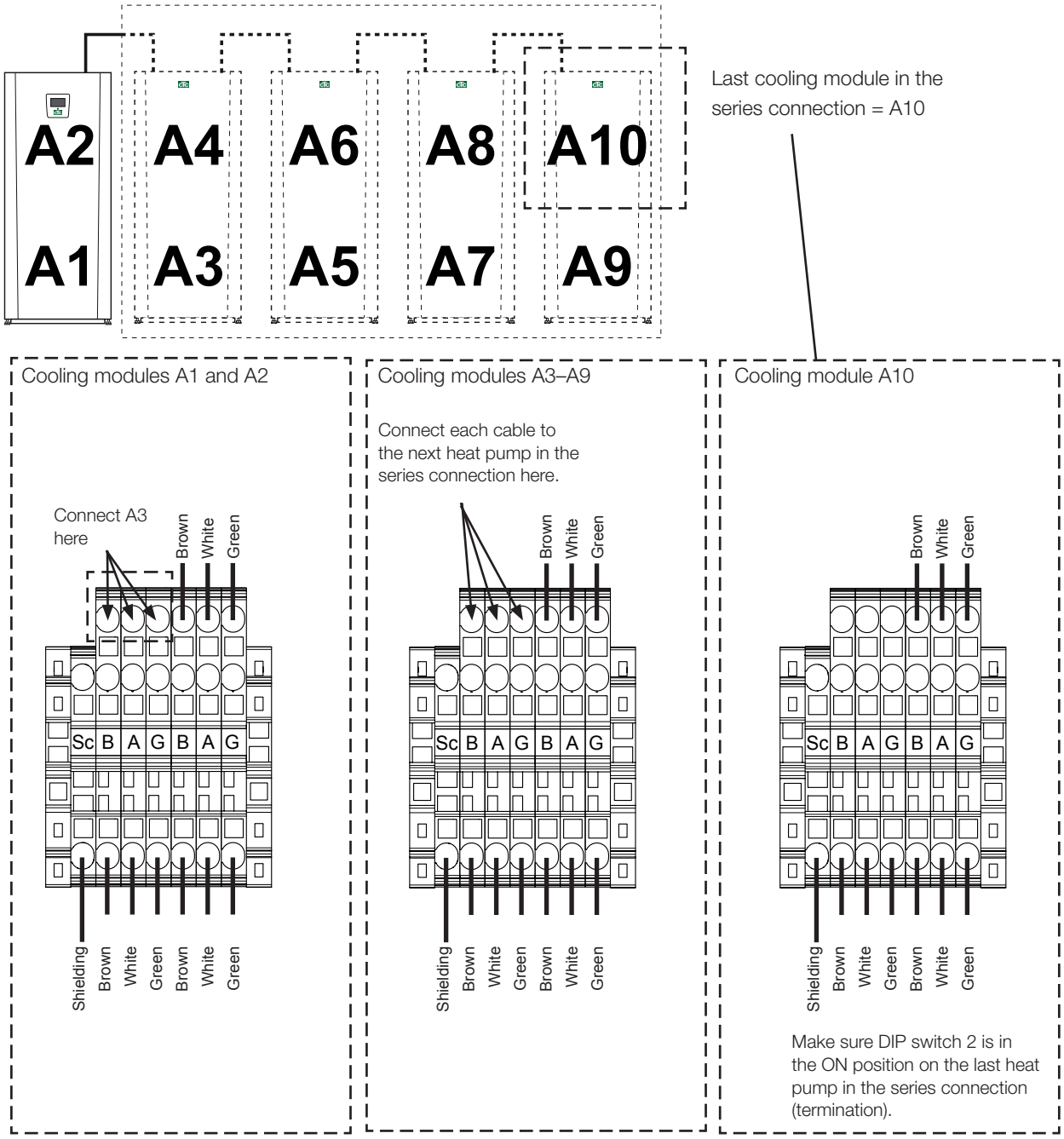
7.3.2 Shielded communication

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.



7.3.3 Example of series connection

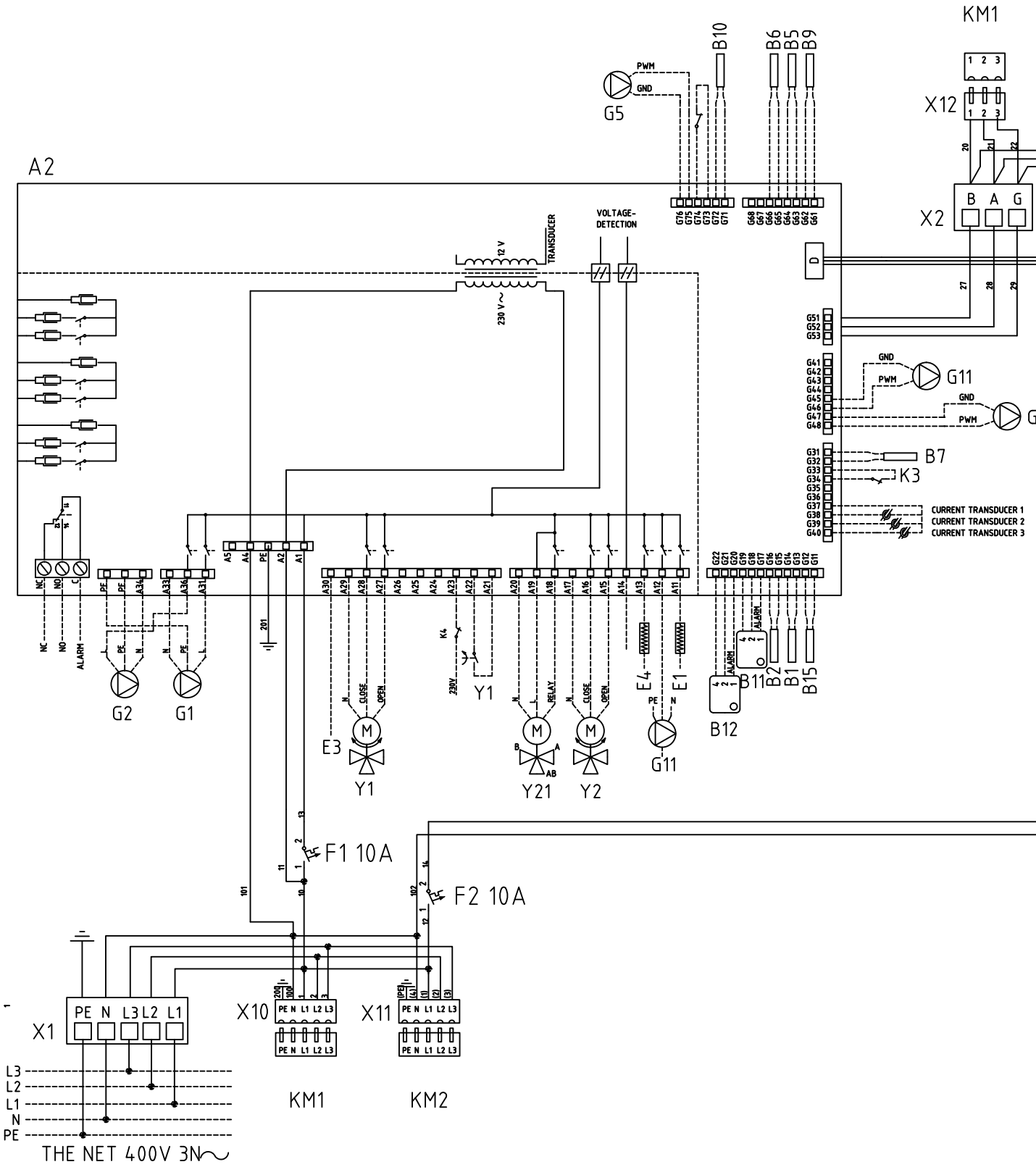
Heat pumps in series connection



Positions of the DIP switches in the example

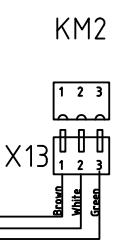
Cooling module	A1	A2	A3	A4	A5	A6	A7	A8	A9	A10
DIP switch 1 Termination	Off	Off	Off	Off	Off	Off	Off	Off	Off	On
DIP switch 2 Activates Basic Display	Off	Off	On	On	On	On	On	On	On	On

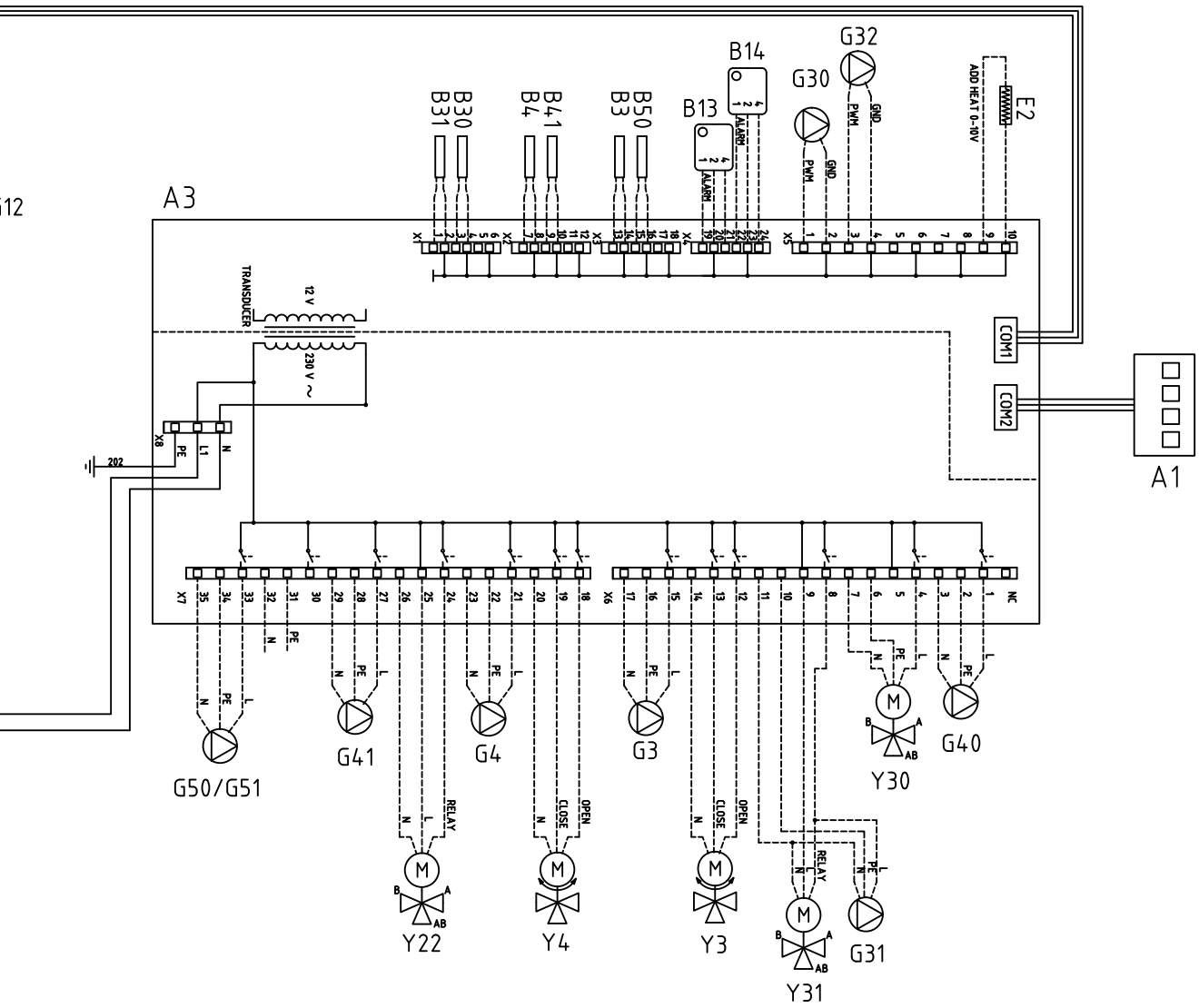
7.4 Wiring diagram for CTC i425-i435 Pro 400 V 3N~



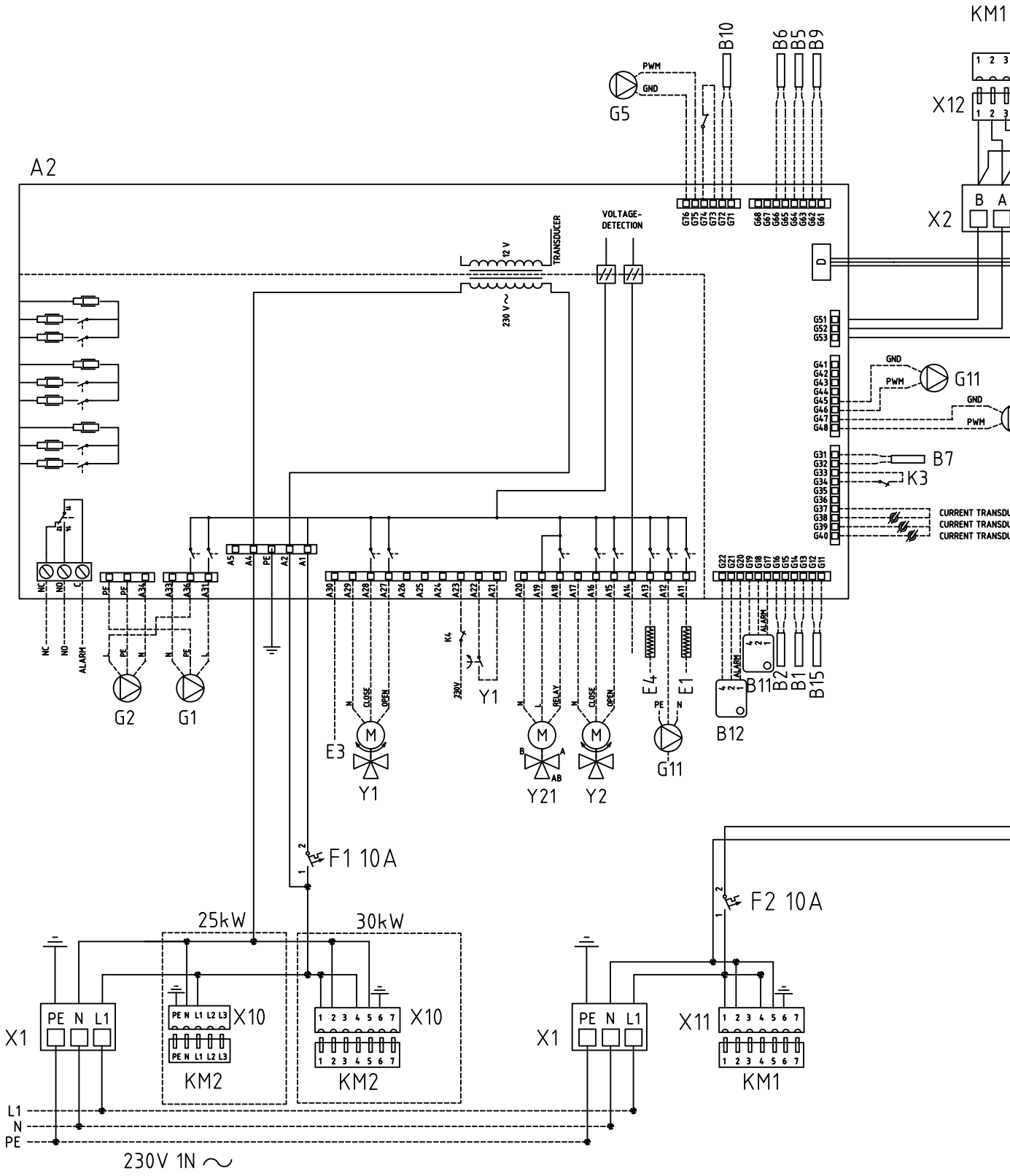
Parts list

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



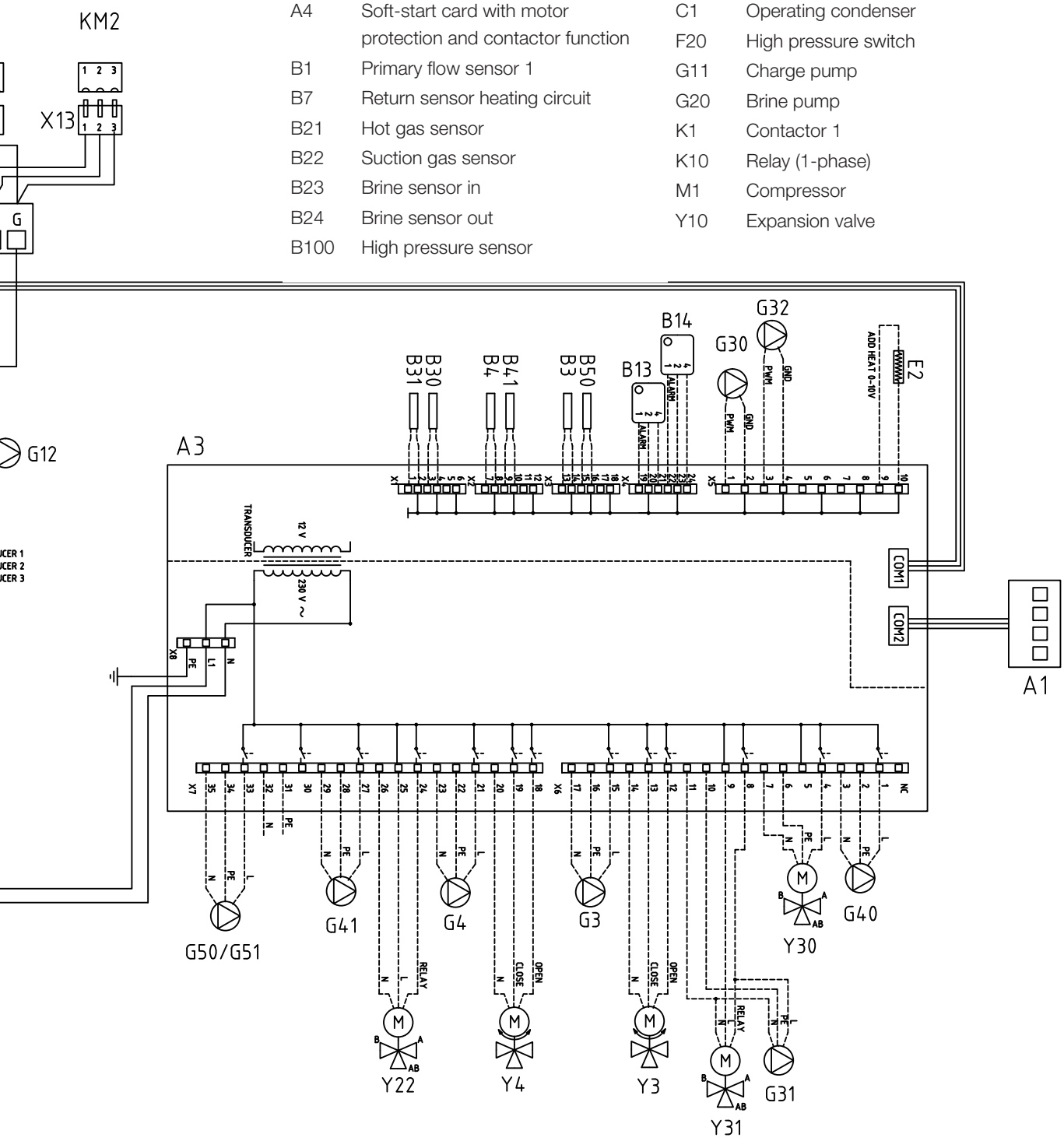


7.5 Wiring diagram for CTC i425-i435 Pro 230 V 1N~

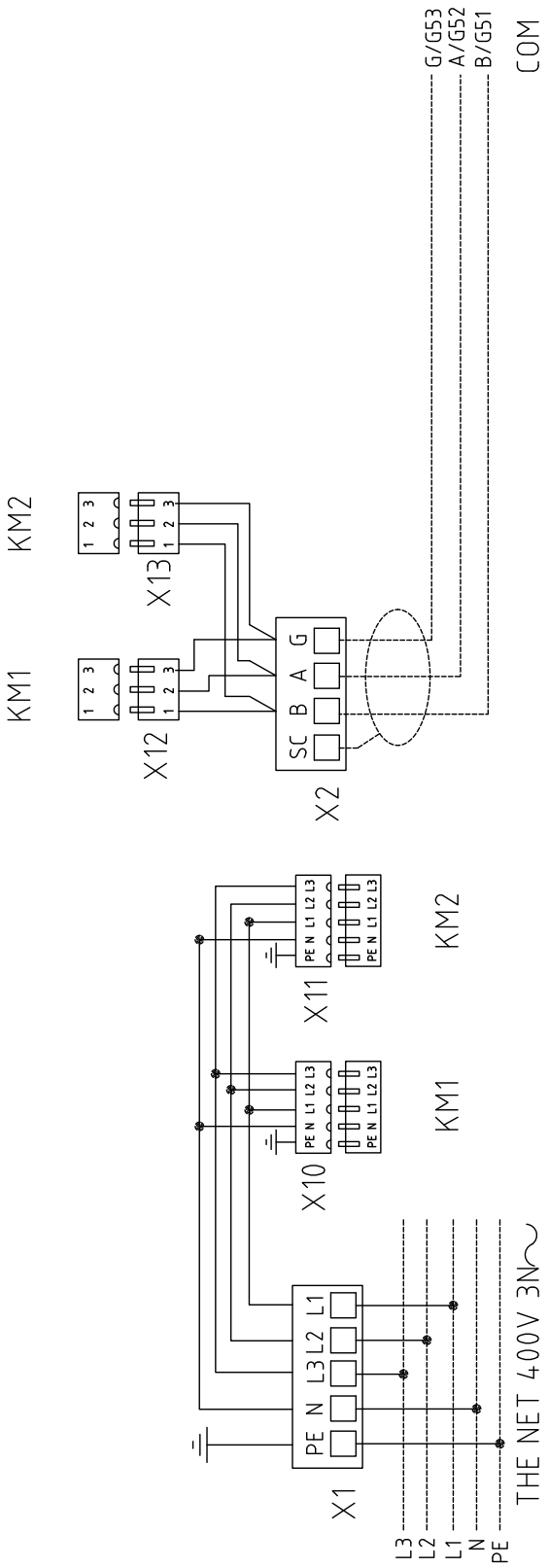


Parts list

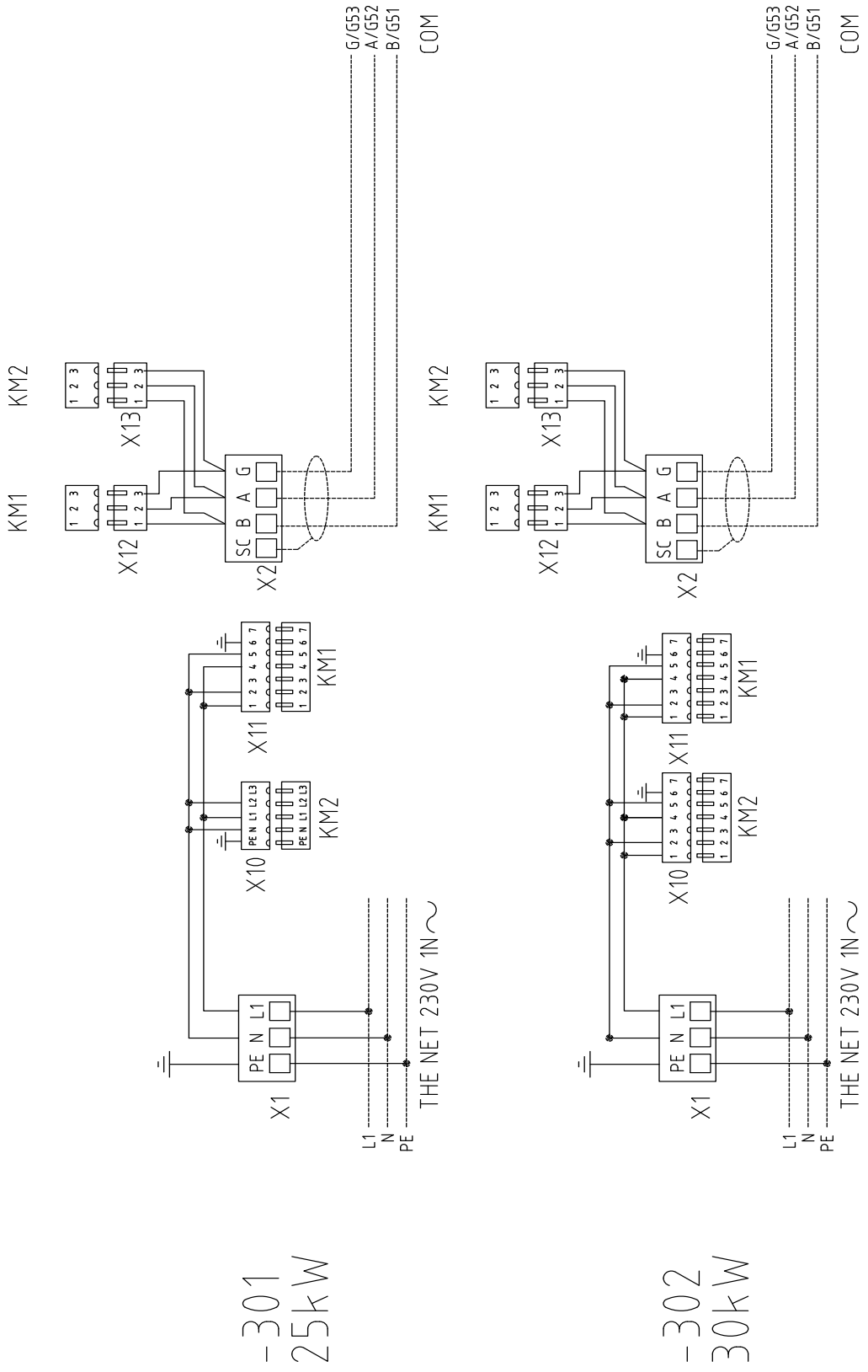
A2	Relay/main card
A4	Soft-start card with motor protection and contactor function
B1	Primary flow sensor 1
B7	Return sensor heating circuit
B21	Hot gas sensor
B22	Suction gas sensor
B23	Brine sensor in
B24	Brine sensor out
B100	High pressure sensor
B101	Low pressure sensor
C1	Operating condenser
F20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



7.6 Cooling module CTC EcoPart 425-435 400V 3N~



7.7 Cooling module CTC EcoPart 425-430 230V 1N~



8. 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.

Enertech Group

Försäkran om överensstämmelse
Déclaration de conformité
Declaration of conformity
Konformitätserklärung

Enertech AB

Box 313

S-341 26 LJUNGBY

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

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
Immunity: EN55014-2:1997 -A1:2001 -A2:2008 EN61000-4-3 -4 -5 -6 -11*)
***) Maximum permissible system impedance : Zsys1 (dmax) = 0.349Ω**

PED EN 378-1-2:2008

Ljungby 2014-08-13

Joachim Carlsson
Technical Manager

161 421 50 10-01

Enertech AB. P.O Box 309 SE-341 26 Ljungby Sweden.
www.ctc.se, www.ctc-heating.com

Enertech Group