

Installation and Maintenance Manual

CTC EcoAir

Model 105 | 107 | 110

Polar Edition 107 | 110

Air/Water Heat Pump

Installation and Maintenance Manual
CTC EcoAir 105 | 107 | 110
CTC EcoAir Polar Edition 107 | 110



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Checklist

NOTE! If these instructions are not followed during installation, operation and maintenance, Enertech's commitment regarding current guarantee conditions is not binding.

The checklist on pages 3 and 4 shall always be filled-in by the installation technician.

- In the event of a service, this information may be called for.
- Installation shall always be done according to the installation and maintenance instructions.
- Installation shall always be carried out in a professional manner, and to current regulations.
- Following installation, the unit shall be inspected and checked for functionality.
- The points below shall be checked off.

Placement of the heat pump – Preparation and drainage

- Placed and adjusted according to the instructions.
- Laid dampness protection against the foundations, drainage via crushed stone.
- Caisson.
- When a condensation tray is fitted, drained water is led to _____

Pipe installation.

- Correct pipe dimensions to the heat pump to ensure sufficient flow.
- Circulation pump capacity to ensure sufficient flow (min 6 m pressure head).
- Check for leaks.
- Flexible hose closest to the heat pump.
- Bleeding the system and heat pump.
- Radiator valves and other affected valves fully open.
- Safety valve function test.
- Residual water piping runs from the safety valve to the drainage.
- At least 15 mm pipe insulation outdoors.
- At least 10 mm pipe insulation indoors.

Control of heat pump performance

- Correct temperature differential adjusted according to the table.

Electrical installation

- Compressor, direction of rotation.
- Power switch.
- Cabling to CTC EcoAir cut to the correct length (not looped).
- Requisite sensors for applicable system.
- Outdoor sensor.
- Room sensor (optional).
- Condensation tray according to instructions (accessories).

Basic control settings:

Check/Program the control features on start-up to ensure that the system operates as intended (see the Installation instructions) and according to the customer's wishes. This installation operates in combination with:

- CTC EcoAir's built-in regulation
- CTC EcoEI
- CTC EcoLogic system _____
- CTC EcoFlex

Testing

- Function test completed.

Information for the customer (adapted to current installation)

- Menus/Control for the applicable system (built-in control, CTC EcoEI, CTC EcoLogic, CTC EcoFlex).
- Installation and maintenance instructions given to the customer.
- Check and filling, heating system.
- Alarm information.
- Mixing valve.
- Safety valve function test.
- Cleaning the dirt filter.
- Trimming information, heat curve.

For your own reference

Complete the boxes below. They can be handy if something should happen.

Product:	Manufacturing number:
----------	-----------------------

Pipe installation	Name
Date	Tel. no:

Electrical installation	Name
Date	Tel. no

Welcome



Congratulations! You have just acquired a CTC EcoAir, which we hope you will be very pleased with. The following pages contain directions for the maintenance of your heat pump. One section is intended for property owners and the other for installation technicians.

Keep this handbook with installation and maintenance instructions. If you look after your CTC EcoAir, it will serve you well for many years to come.

The Complete Air/Water Heat Pump

CTC EcoAir is an air/water heat pump which extracts heat from the air outside the building and transfers it to the building's existing heating system. CTC EcoAir works in conjunction with the existing heating system down to -15°C , **Polar Edition down to -20°C** , at this

point CTC EcoEI or the existing boiler takes over and provides the heat for the building. If CTC EcoAir's built-in control is used, CTC EcoAir switches off at an outside temperature of -10°C , **Polar Edition switches off at an outside temperature of -20°C** .

The heat pump can be connected to CTC EcoEI or to the existing boiler via the CTC EcoLogic control system. Cables for connecting the heat pump and the CTC EcoEI are included.

CTC EcoAir is designed to operate with high efficiency and low noise level. The heat pump has integrated hot gas defrosting which keeps the evaporator coil free from ice in order to maintain high efficiency.

For the installation technician

This section is intended for the technician responsible for one or more of the installations necessary for CTC EcoAir to perform according to the building owner's wishes. Take your time to go through functions, controls, knobs and

settings with the building owner and answer any questions. Both the heat pump and you benefit from the user being perfectly clear on how the system works and should be maintained.

Safety Instructions

The following safety instructions should be followed when handling, installing and using the heat pump:

- Close the safety switch before doing any work on the heat pump.
- When handling the heat pump with a crane or similar, ensure the lifting equipment, eye bolt and other parts are not damaged. Never stand under a hoisted heat pump.
- Never jeopardize safety by removing bolted covers, hoods or similar.
- Never jeopardize safety by deactivating safety equipment.
- Any work done on the product's cooling system should be done by authorised personnel only.

Transport and unpacking

- CTC EcoAir must be transported and stored in an upright position.
- Check that the product has not been damaged during transportation. Report any transportation damage to the carrier.
- Transport the heat pump to the installation site before removing the packaging.
- Handle CTC EcoAir with care in one of the following ways:
Forklift or lifting straps around the pallet.
NOTE! Can only be used while protected by packaging.
- Do not remove the packaging until the heat pump is at its installation site.

Standard delivery

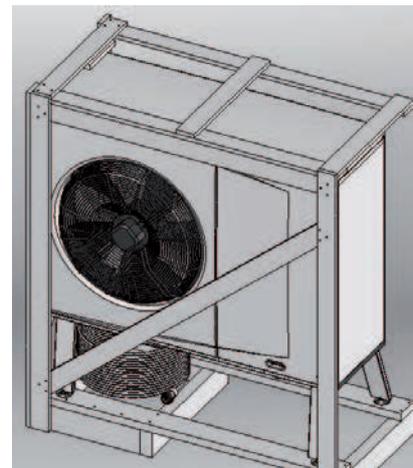
1 off. CTC EcoAir.

There is an additional package inside the service hatch.

1 off. Electrical connection cabling. 15 m for connection to CTC EcoEl.

1 off. Installation and Maintenance Manual.

1 off condensation tray (only Polar Edition)



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

1. Connection alternatives - CTC EcoAir

The illustration below shows the different connection alternatives available for CTC EcoAir:

- Options A & B: Both EcoEI and EcoFlex (Swedish model*) are prepared for EcoAir which ensures easy installation.
- Options C: By option C EcoAir is connected via EcoLogic, thereby providing the same high functionality as by option A..
- Options D & E: There are two ways of connecting EcoAir to an existing boiler (pellets, oil, wood, electricity or gas). By option D, EcoAir is connected via EcoLogic, thereby providing the same high functionality as by option A. By option E, when EcoAir's in-built regulation is used, EcoAir deactivates at -10°C outside temperature (Polar Edition - 20°C) and runs with limited functionality and energy saving.

See separate manual for EcoAir and EcoFlex (Swedish model)



2. Control panel

There is a control panel placed behind the service cover on CTC EcoAir. In cases where CTC EcoAir is connected to either CTC EcoEI, CTC EcoFlex or CTC EcoLogic, the heat pump settings are adjusted from the control panels on the respective products. The control panel on CTC EcoAir is then not used. See the instruction manuals for the respective products for more information.

When CTC EcoAir is connected to a boiler or tank (other than CTC EcoEI, CTC EcoFlex or CTC EcoLogic), the heat pump must be set from the control panel on CTC EcoAir. See below for a description of the control panel functions.

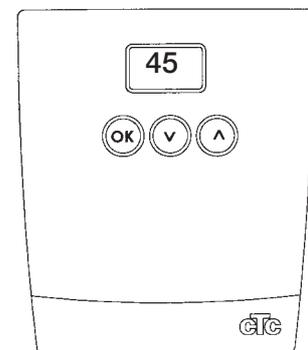
By using the arrow keys, you can browse through ten different menus. To access the menus, press and hold the OK button for three seconds. To open the next menu, press the OK button, and the next menu is shown. Menus 1-10 are shown for ten minutes, and then the display reverts to the standard display.

Standard Display: Automatic mode: 'A' flashes at the same time as the current return temperature which is shown with a steady light.

Menu 1: In cases of connection to CTC EcoEI, CTC EcoLogic or CTC EcoFlex, 'A' flashes and the return temperature is shown with a steady light (e.g. A45).

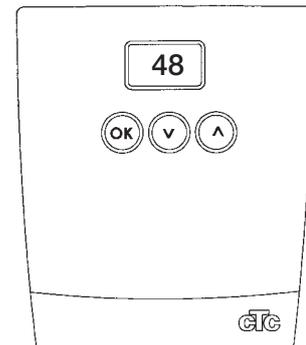
Automatic mode 'A':

If 'A' does not flash in the display, set it as follows: Press the OK button for about 3 seconds, causing menu 1 to appear. Press the 'up' arrow until 'A' is shown (step above 48)(Polar Edition step above 50). Press the OK button for about 3 seconds. 'A' now flashes in the display.



Control panel

- Standard Display: When CTC EcoAir built-in control is used, only the return temperature is shown with a steady light (e.g. 48) **NOTE! 'A' should not flash in the display**
- The desired return temperature, at which the heat pump stops, is set in menu 1; the range is 20-48°C (Polar Edition 20-50 °C). This is done by holding the OK button pressed for about 3 seconds, causing menu 1 to be shown. Then press the 'down' arrow until the desired return temperature shows(step under 'A'). Press the OK button, and the other menus are shown. After menu 10 the actual return temperature is shown in the display (standard display).
- Menu 2: Specifies how many degrees the return temperature shall be permitted to fall before the heat pump starts.
Setting range 5 - 10°C (Menu not available in Auto mode).
- Menu 3: Display hot gas temperature (°C).
- Menu 4: Display outdoor temperature (°C).
- Menu 5: Display latest fault message.
- Menu 8: Shows the primary flow temperature (°C).
- Menu 9: Temperature defrosting sensor 1, before the evaporator (°C)
- Menu 10: Temperature defrosting sensor 2, in the evaporator (°C).



3. Operation and Maintenance

When the technician has installed your new heat pump, you should check the system together with him. Let the technician show you the switches, controls and fuses, so that you know how the system works and should be managed. Bleed the radiators after approx. three days' operation, and fill up with water if needed.

3.1 Operation stop

The heat pump is turned off with the power switch. If there is a risk of the water freezing, maintain circulation through the heat pump or, alternatively, drain out all the water from CTC EcoAir.

3.2 Maintenance

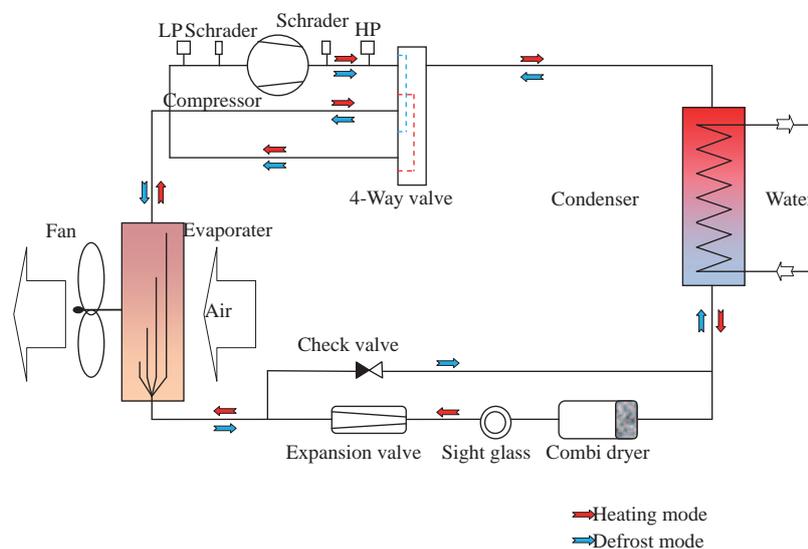
A large amount of air is running through the evaporator. Leaves and other scrap can get stuck on the evaporator and block the air. Minimum once a year the product shall be checked and cleaned from particles that can block the air through the evaporator. The cover plates of the CTC EcoAir can be cleaned with a wet scouring-cloth.

No other frequent maintenance or inspections are necessary.

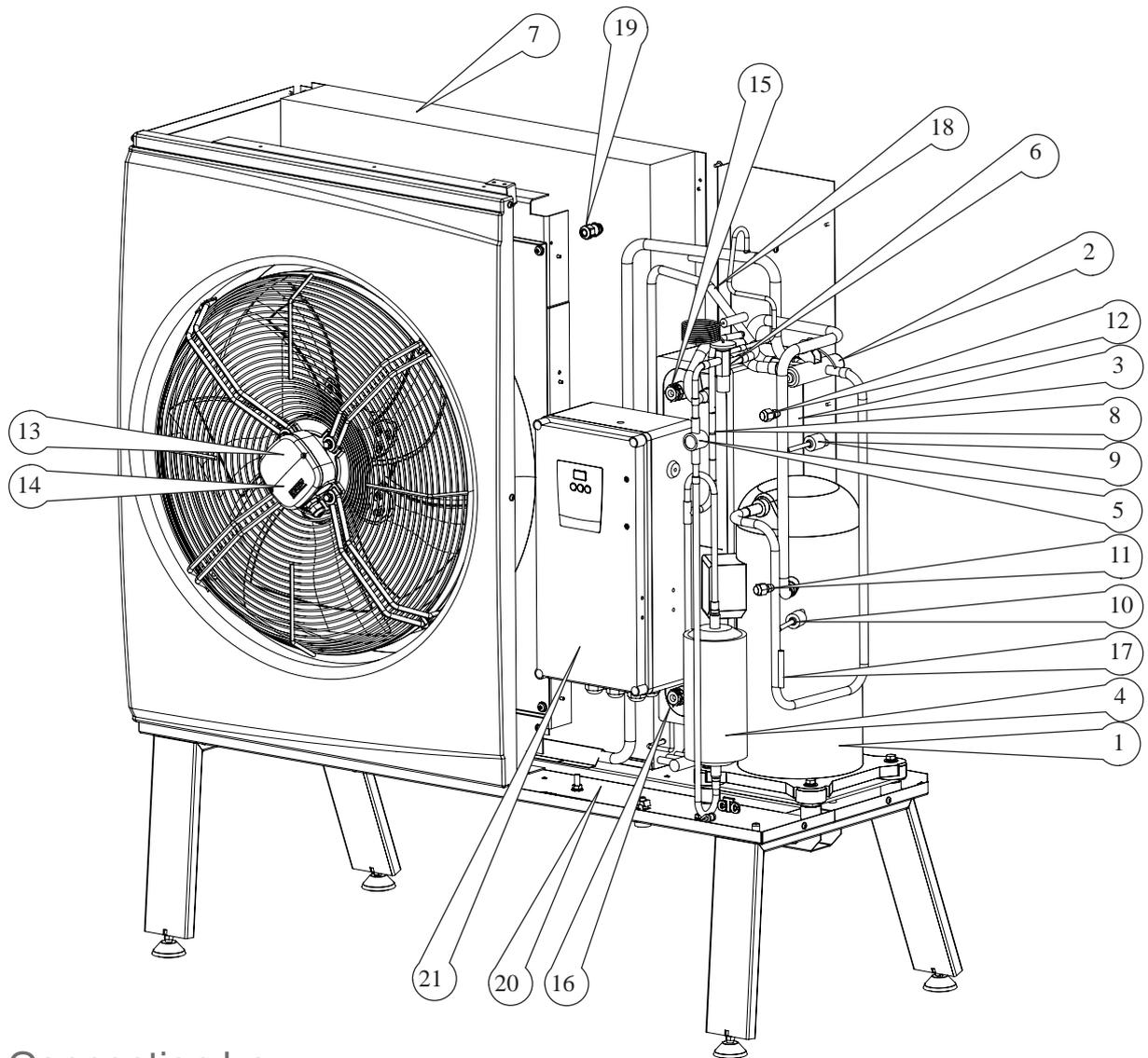
3.3 Component position CTC EcoAir

- | | | |
|--------------------------|--|--|
| 1. Compressor | 11. Schrader valve HP | 19. Defrosting sensor 2 in the evaporator |
| 2. 4-way valve | 12. Schrader valve LP | 20. (Data plate) with product number |
| 3. Condenser | 13. Fan | 21. Connection box/control panel |
| 4. Drying filter | 14. Capacitor to fan | 22. Terminal board |
| 5. Inspection glass | 15. Condensor sensor out/primary | 23. Combined soft-start card/ motor protection card and contactor function |
| 6. Expansion valve | 16. Condensor sensor in/return | 24. Relay/display card containing electronic defrosting function |
| 7. Evaporator | 17. Hot gas sensor | |
| 8. Non return valve | 18. Defrosting sensor 1 before evaporator (EcoAir 105,107) | |
| 9. Low pressure switch | Defrosting sensor 1 in the evaporator (EcoAir 110) | |
| 10. High pressure switch | | |

Refrigerant system CTC EcoAir 105-110



3.4 Component placement CTC EcoAir



Connection box



ellåda till polar



4. Placement of the heat pump

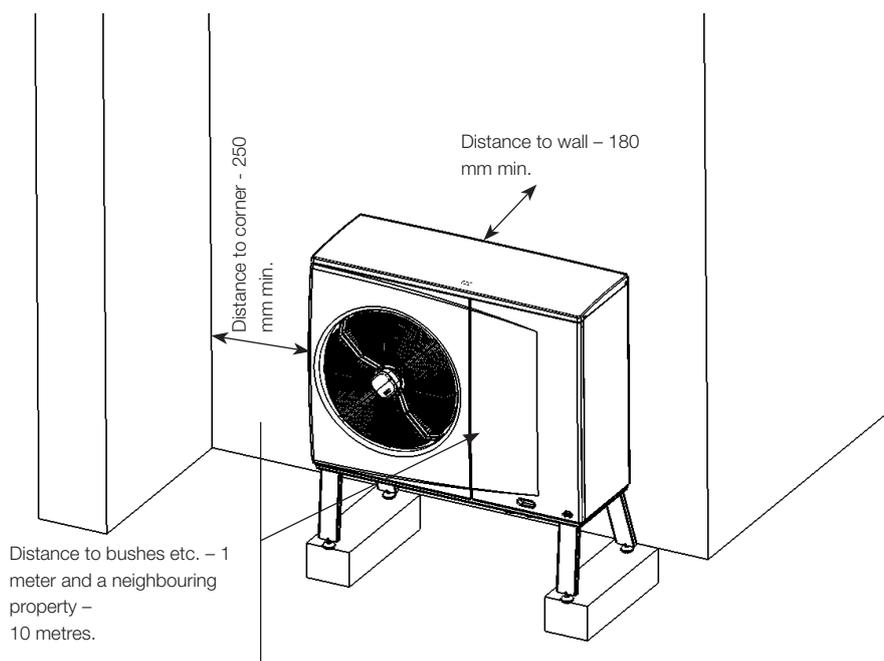
Placement of the heat pump must be accomplished in order to minimize disturbance from the compressor and fan. Do not place the heat pump close to a bedroom window, terrace or neighbouring property.

- CTC EcoAir is normally placed on an outside wall.
- There shall be a space of at least 180 mm between the heat pump and the wall so that air can pass freely in through the evaporator.
- If the heat pump is placed in a corner, there shall be a space of at least 250 mm between the side of the heat pump and the wall.
- Allow a space of at least 1 meter between the heat pump and any bushes etc.
- Allow a distance of 10 meters between the heat pump and the neighbours plot.
- CTC EcoAir must stand stably on concrete blocks or similar.
- Use a spirit level to adjust the unit, so that it is completely level.
- Due to the design of the stand and the weight of the pump, it is not necessary to secure the unit to the ground or the wall.

The heat pump should absolutely not be surrounded by a protective or concealing structure or placed in an outhouse or carport. Air should be able to flow in via the evaporator as freely as possible, and it should not be possible for the used air to be sucked into the inlet at the rear of the unit. This situation could result in abnormal ice formation on the evaporator.



These guidelines must be followed in order for your CTC EcoAir to operate optimally.

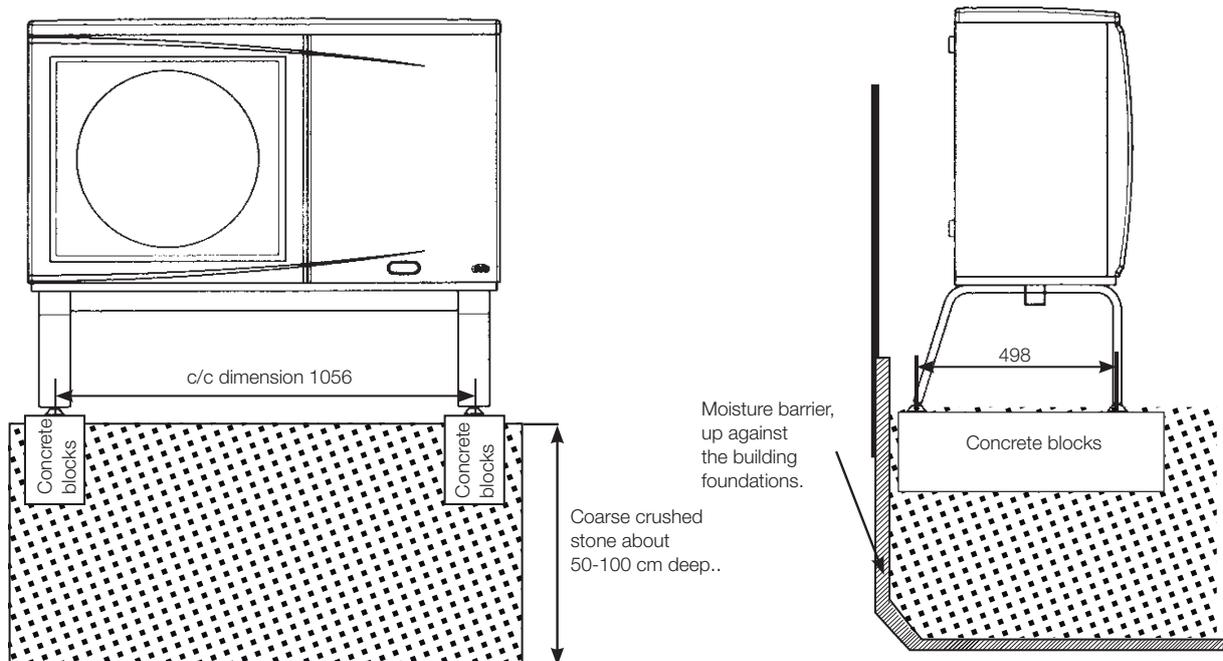


5. Preparation and drainage

Place the heat pump to ensure that no damage can be inflicted on the building and that condensation can easily drain into the ground. The base should be of concrete blocks or similar on crushed stone or shingle.

- Construct a caisson where the heat pump will stand. Bear in mind that the pump can release as much as 20 litres of condensation a day under certain conditions.
- Make a 50 – 100 cm deep hole.
- Place a moisture barrier in the hole on the side against the foundations of the building.
- Half fill the hole with crushed stones and position the concrete blocks or similar.
- Mark up the c/c dimension (1056 mm) between the blocks to match the span of the heat pump stand.
- Use a spirit level to ensure that the blocks are level.
- Place crushed stones around the blocks to achieve optimal drainage.

! Even when a condensation tray is fitted to CTC EcoAir, condensation leakage from the heat pump is not totally avoided. So it is important to ensure that any condensation is drained properly even with a tray fitted.



6. Pipe installation

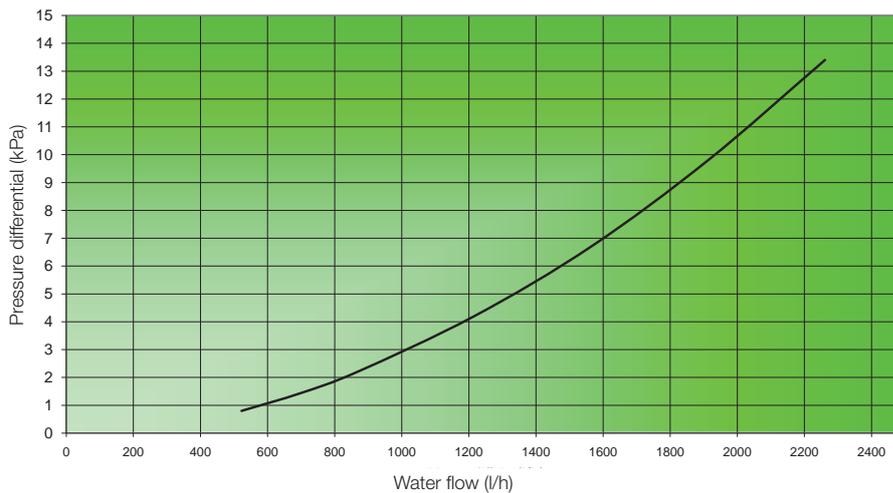
The installation should be carried out in accordance with applicable standards: refer to current building regulation. The boiler shall be connected to expansion vessels in an open or closed system. All installation settings should be as described in the section Initial Start.

The heat pump works with radiator return temperatures of up to approx. 48°C (Polar Edition 58 °C), and gives 55°C (Polar Edition 58 °C) at most. CTC EcoAir is not harmed by higher return temperatures, but the compressor is stopped and the desired savings are not made.

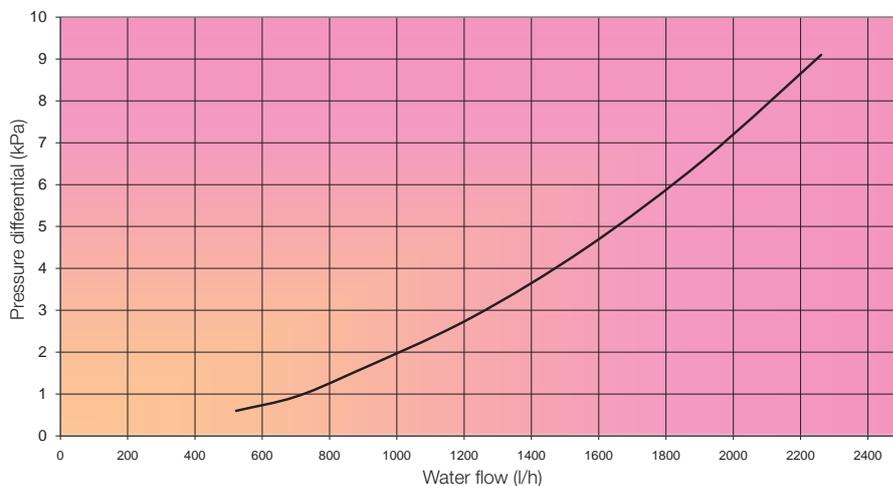


Remember to flush the radiator systems before connecting

Pressure differential diagram EcoAir 105/107



Pressure differential diagram EcoAir 110



7. Circulation Pump

Ensure that the circulation pump is large enough, so that there is sufficient flow through the heat pump. We recommend a pump with 6 metres head and with 3 fixed speeds, which is enough in most cases.

NOTE! The circulation pump shall not be pressure or rpm regulated.

The choice of pump capacity depends entirely on the pressure differential in the system, so the installation technician needs to check the flow in each system.

See 'Control of heat pump performance and flow'.

In some systems with CTC EcoLogic, the entire radiator flow must go through the heat pump, and then the pump must be sized according to the flow of the whole system. To ensure proper function, flow rates should not fall below the following:

CTC EcoAir 105: 800 l/hr

CTC EcoAir 107: 1000 l/hr

CTC EcoAir 110: 1400 l/hr

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

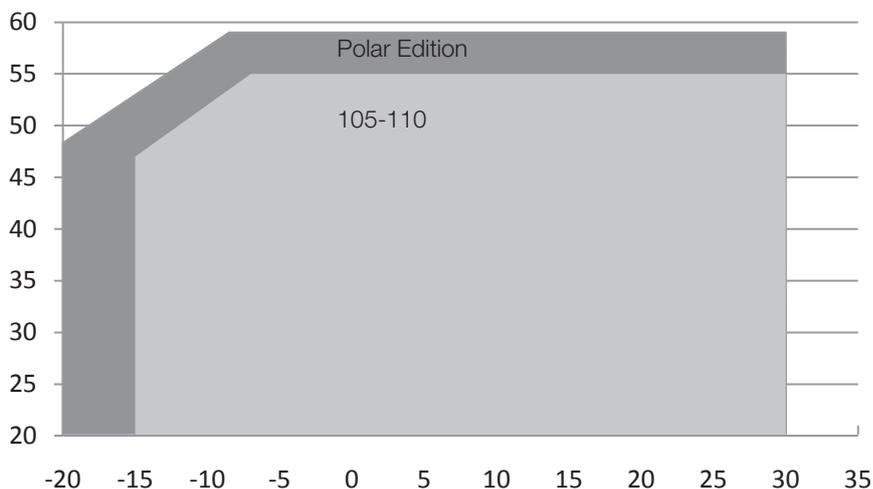
If the flow rate is too low, CTC EcoAir will stop running because the high pressure switch will trip. This can be avoided by ensuring that the building thermostat valves are always fully open apart from in a room or two, e.g. a bedroom which requires a cooler temperature. If there are no thermostat valves, the corresponding radiator valves must be open.



Circulating pump - minimum 6-metres head.

7.1 Operating range

The control system supervise the CTC EcoAir to assure that it is running within the operating range.



8. Pipe connection CTC EcoAir

- Primary and return lines of at least 22 mm copper pipe are connected to the heat pump. If the lines are excessively long, the technician must calculate the pipe diameter required to provide the minimum recommended flow for the particular CTC EcoAir model.
- The piping between the heat pump and the boiler should run as levelly as possible.
If inclines are unavoidable provide the highest point with an automatic bleeder.
- The connection to the heat pump should be made with wire-reinforced flexible hose for heating, minimum 1". Hose length 1000-1500 mm to prevent noise from the heat pump entering the building and to absorb any vibration in the heat pump.
- Piping outside the building shall be insulated with 15 mm thick armafex or the equivalent, which is water resistant. Ensure that there are no gaps in the insulation and that all joints are properly taped or glued.
- Inside the building, piping to the boiler shall be insulated with at least 10 mm pipe insulation to ensure that the heat pump transfers water to the boiler or tank at the highest possible temperature.

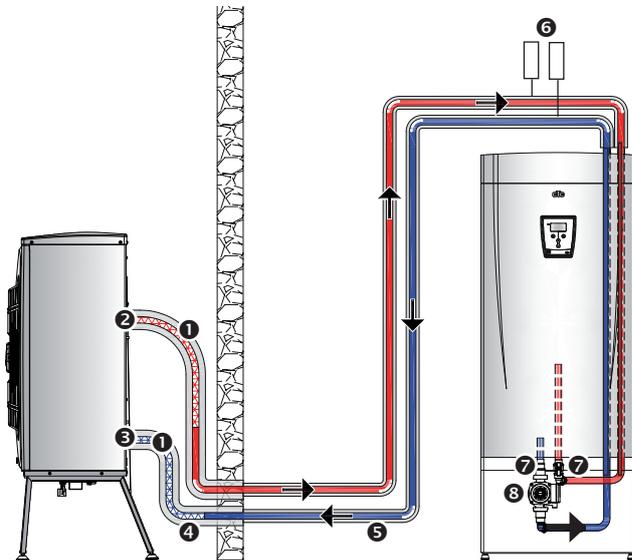


Remember to provide the possibility to drain off water under the CTC EcoEI.



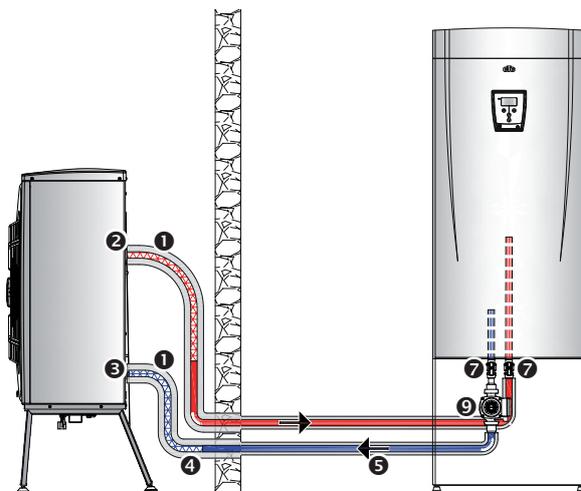
For optimal performance insulate outdoor and indoor piping as recommended in the instructions.

EcoAir/EcoEI low (1500)



1. Wire-reinforced flexible hose for heating, minimum 1". Hose length 1000-1500 mm from the condenser.
2. Outgoing (heated) water 1" connection on the condenser.
3. Incoming (cold) water 1" connection on the condenser.
4. Minimum $\varnothing 22$ copper pipe is insulated outside with 15 mm thick insulation.
5. Inside piping is insulated with 10 mm thick insulation
6. Bleeder
7. Ball valve
8. Charge pump preassembled on the CTC EcoEI low (1500). The pump pumps out to the lower connection on EcoAir.

EcoAir/EcoEI high (1800)



9. NOTE! The charge pump is not pre-assembled on CTC EcoEI high (1800). Ensure that a large enough charge pump is fitted: at least 6 metres head with 3 fixed speeds (not pressure or rpm controlled). Ensure also that the pump is mounted on the EcoEI boiler's left pipe, which pumps out to the EcoAir lower connection

- A recommended temperature differential across the heat pump on the warm side is between 5-10 °C at + 7 °C outside temperature.
- When the flow rate is too low (large difference), increase the speed of the circulation pump.
- When the flow rate is too high (small difference) decrease the speed of the circulation pump.

Bear in mind that the method of measurement is not accurate and inaccuracies of some degrees low or high can occur without there being anything wrong.



It is important to set the differential correctly in order to achieve maximum effect and economy.

Deviation can be caused by several factors:

- water flow through the heat pump
- ice in the evaporator
- temperature level of the water (the higher the temperature the lower the temperature differential)

10. General function description

10.1 Defrosting

CTC EcoAir is equipped with hot gas defrosting. Once every hour, two sensors read off the temperature of the refrigerant, if it is below 2 °C defrosting is started: the fan stops, the four-way valve changes direction and the hot gas flows out to the evaporator instead. A hissing sound is heard, and water runs off the evaporator. When the temperature recorded by both the sensors is above + 10°C, the fan starts, the hot gas flows into the condenser instead and the heat pump returns to normal operation.

10.2 The Fan

The fan starts 15 seconds before the compressor and runs until the compressor stops. During defrosting the fan stops and does not start again until defrosting is finished. When the outside temperature is above + 10 °C, the fan runs at low speed. When it is below + 10 °C, the fan runs at high speed.

10.3 Charge pump/Circulation pump

CTC EcoAir/CTC EcoEI

The charge pump that supplies the CTC EcoAir with water starts 5 seconds before the compressor and does not stop until the compressor stops. If the outside temperature is below + 2 °C, the charge pump runs continuously to guard against possible freezing.

CTC EcoAir/CTC EcoEI Heating off

When the outside temperature has been above +16 °C for 2 hours (it can be adjusted under `settings, house parameters`), the mixing valve closes completely and the building circulation pump (radiator pump) stops, i.e., the unit is set to 'summer mode'. The pump is run daily for a short period to avoid seizure. 'Heating off' flashes on the CTC EcoEI display for as long as the outside temperature is above + 16°C (set-point). When heating is required, the outside temperature must be below + 16°C for 3 hours for the circulation pump to start and the mixing valve to open. If a room sensor is fitted, the room temperature must fall below the room temperature set-point on the sensor for the unit to exit 'summer mode' and for 'Heating off' to stop flashing.

CTC EcoAir/CTC EcoLogicEXT:

In a mixing valve and non mixing valve system, the charge/circulation pump is connected with a constant, fixed voltage. In the tank system, the charge/circulation pump is connected to CTC EcoLogic. There is more information on charge/circulation pump regulation in CTC EcoLogicEXT 'Installation and operation instructions'.

CTC EcoAir built-in control:

Connect the charge pump with a constant, fixed voltage, so that it runs continuously.

11. Electrical installation

The installation and heat pump connection shall be done by an authorised electrician.

All wiring shall be installed according to current regulations.

The heat pump's internal wiring is installed at the factory.

11.1 Safety switch

An omni-polar safety switch, which ensures disconnection from all electrical power sources to all CTC products, shall be installed before the installation.

11.2 Supply and communication

Electrical connection to CTC EcoAir shall be carried out according to illustrations

1 - 4 to supply the heat pump with power for the compressor (400V 3N~) and fan (230V 1N~), electronic defroster, 4-way valve and control voltage.

The fuse size is given in the technical data. With connection of CTC EcoAir to CTC EcoEI, the effect of the electric boiler must be taken into account. The size of the main fuse must therefore match the total power drawn by the building.

The heat pump is supplied with 15 metres of cable for CTC EcoEI (cut to the correct length, do not **'loop'**)

A connection box is placed on the heat pump and contains:

- terminal block
- combined soft start card-motor protection and contactor function.
- relay/display card containing electronic defrosting function

11.3 Setting of main fuse and power limiting

Settings for connection to CTC EcoEI:

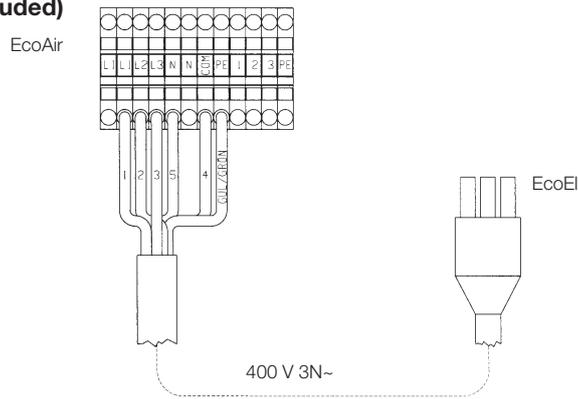
Should be carried out as per the instruction manual for CTC EcoEI.

Settings for connection to CTC EcoLogic:

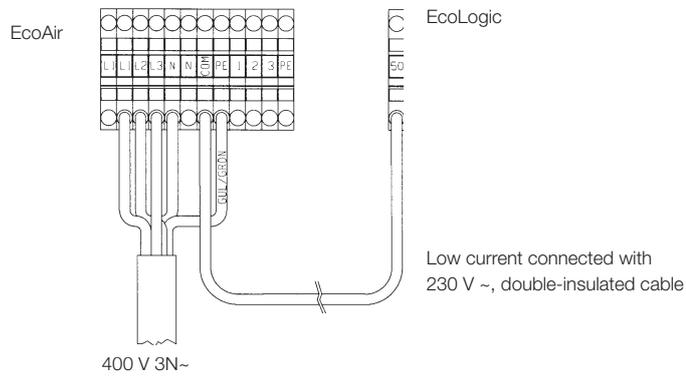
Should be carried out as per the instruction manual for CTC EcoLogic.

1. CTC EcoAir/CTC EcoEI: Electrical connection is done using the provided 6-pole cable (pole 6 is not used). The connection is made in the CTC EcoEI boiler connection box (from below). There is an internal panel mounted 10 A fuse in CTC EcoEI for CTC EcoAir.
2. CTC EcoAir/CTC EcoLogic: With connection to another boiler, power supply to the heat pump is via a separate 5-conductor cable. Low voltage communication is via a single conductor (230 V-double insulated cable), which is connected to the respective communication terminal block. **NOTE!** Supply to EcoLogic with 230 V L1 and earthed neutral must always be taken from the same point as CTC EcoAir supply L1 and earthed neutral, otherwise communication faults in the outdoor unit may occur.
3. CTC EcoAir/CTC EcoFlex: When CTC EcoAir is connected to CTC EcoFlex power supply is via a separate 5-conductor cable to the respective product. Control between CTC EcoAir and CTC EcoFlex is connected via a single conductor (230V-double insulated) cable.
4. CTC EcoAir with in-built control: Power supply to the heat pump is via a separate 5-conductor cable.

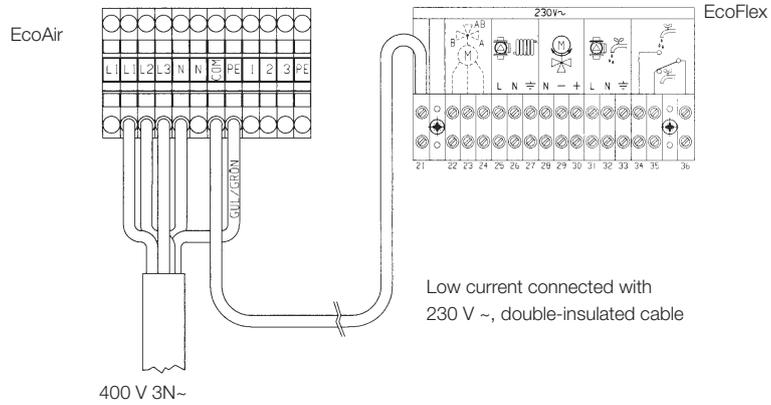
1: EcoAir + EcoEI (cable included)



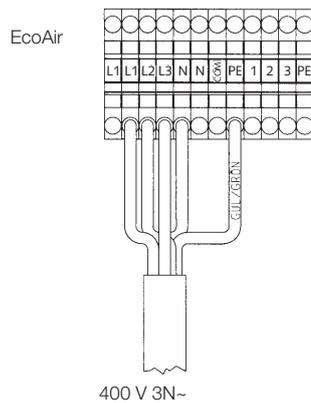
2: EcoAir + EcoLogic + other boiler



3: EcoAir + EcoFlex



4: EcoAir + other boiler



11.4 Connection Circulation pump/Charge pump

Circulation pump connected with: 230 V 1N~.

1. On EcoAir/CTC EcoEI 1800, the circulation pump is connected via a contact with cable marking 'Pump heat conductor' or 'Pump warm side'. If there is no connector on the pump, the contact on the cable can be cut off and the cables connected directly to the pump. The circulation pump, which circulates warm water between the boiler and the heat pump, shall be fitted onto the left ball valve under the boiler. The charge pump is preassembled in CTC EcoEI 1550.
2. CTC EcoAir/CTC EcoLogic: The normal radiator pump is used as the charge pump. **NOTE!** Ensure a sufficiently large circulation pump is fitted to provide adequate flow across the heat pump. A circulation pump with a 6-metre head and 3 speeds is recommended. In mixing valve and non mixing valve systems, the circulation pump is connected with a separate constant, fixed voltage. In the system 4-12, the charge/circulation pump is connected in CTC EcoLogic. (see Installation and operation instructions CTC EcoLogic EXT).
3. CTC EcoAir/CTC EcoFlex: The normal radiator pump is used as the charge pump. **NOTE!** Ensure a sufficiently large circulation pump is fitted to provide adequate flow across the heat pump. A circulation pump with a 6-metre head and 3 speeds is recommended. The circulation pump is to be as per the wiring diagram in the Installation and Maintenance Manual for CTC EcoFlex.
4. CTC EcoAir with self-control. The circulation pump is connected separately with constant voltage. **NOTE!** In this situation the circulation pump shall always be running..

11.5 Radiator pump connection

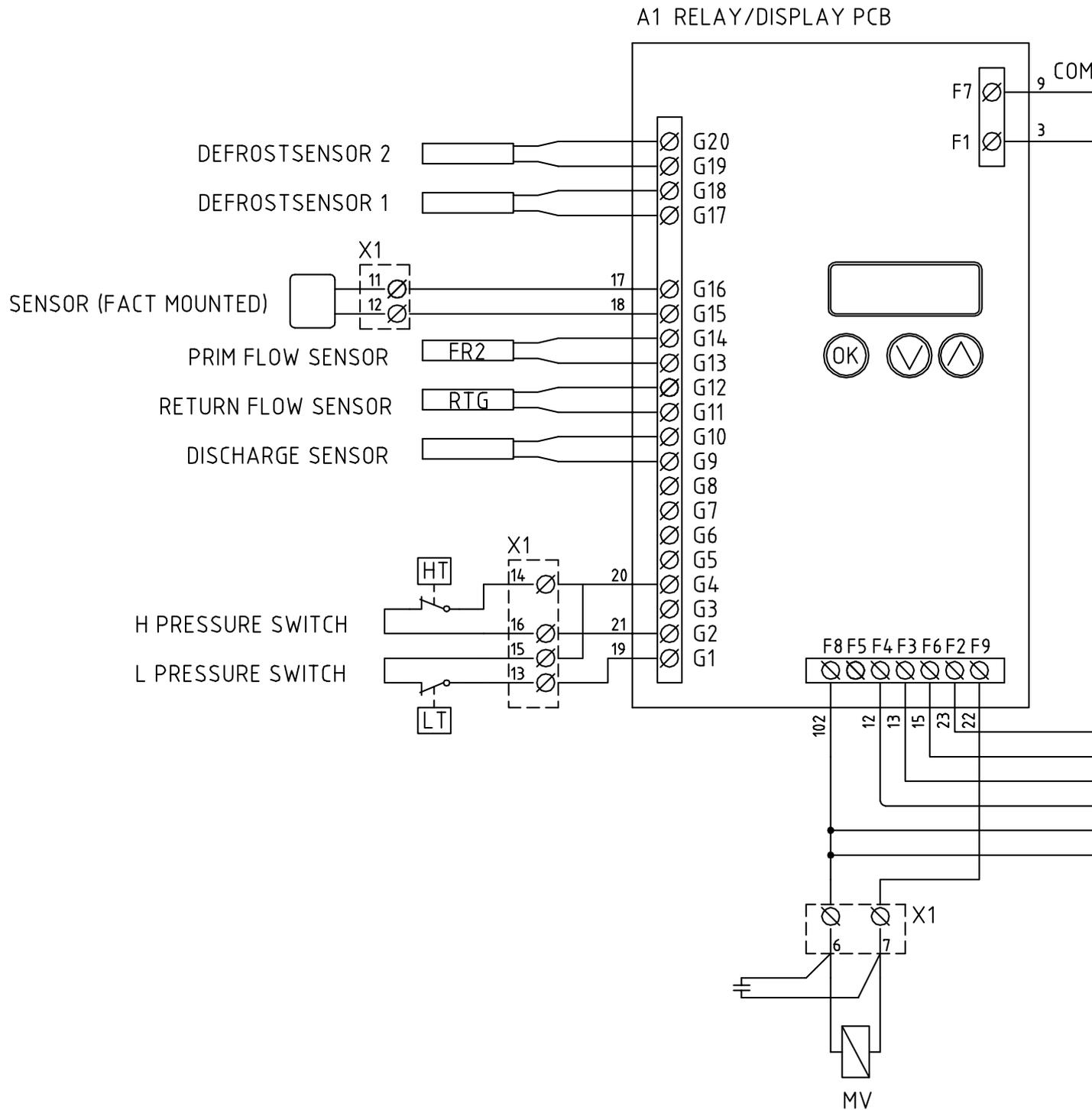
The radiator pump is connected with: 230 V 1N~. An internal, panel mounted fuse is fitted to CTC EcoEI and CTC EcoFlex.

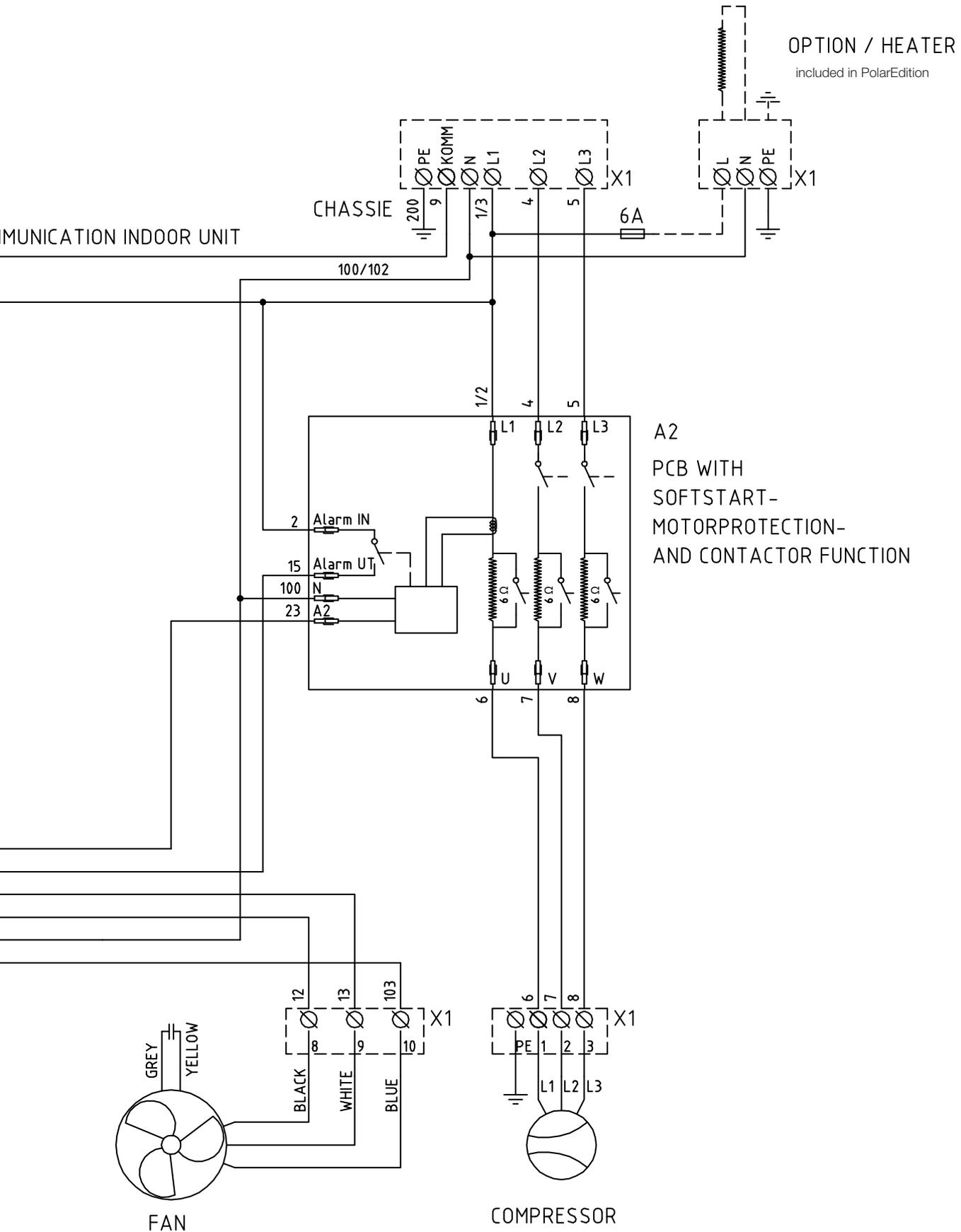
1. CTC EcoAir/CTC EcoEI: radiator pump connected to terminal blocks 1, 2 and 3 in CTC EcoEI.
2. CTC EcoAir/CTC EcoLogic: the radiator pump is connected with constant, fixed voltage in mixing valve and non mixing valve systems. The radiator pump is connected according to the system in the system 4-12 (see Installation and operation instructions CTC EcoLogic EXT).
3. CTC EcoAir/CTC EcoFlex: the building's normal circulation pump is used as the radiator pump according to point 3 above.
4. CTC EcoAir with self-control. The circulation pump is connected separately with constant voltage. **NOTE!** In this situation the circulation pump shall always be running

11.6 Data for sensor resistance - Ohms

Temperature °C	Hot gas sensor Resistance Ohm	Brine, Heatpump Elec. boiler, Primary flow, Room sensor Resistance Ohm	Temperature °C	Outdoor sensors Resistance Ohm
130	1449	800	70	32
125	1650	906	65	37
120	1882	1027	60	43
115	2156	1167	55	51
110	2477	1330	50	60
105	2849	1522	45	72
100	3297	1746	40	85
95	3831	2010	35	102
90	4465	2320	30	123
85	5209	2690	25	150
80	6115	3130	20	182
75	7212	3650	15	224
70	8560	4280	10	276
65	10142	5045	5	342
60	12125	5960	0	428
55	14564	7080	-5	538
50	17585	8450	-10	681
45	21338	10130	-15	868
40	25986	12200	-20	1115
35	32079	14770	-25	1443
30	39611	18000	-30	1883
25	48527	22000	-35	2478
20	60852	27100	-40	3289
15	76496	33540		
10	98322	41800		
5	125779	52400		

11.7 Electrical diagram





12. First start CTC EcoAir/CTC EcoEI

Checks

1. Check that the mixing valve and safety valve are mounted and that the overflow pipe leads to the drain.
2. Check that CTC EcoEI is filled with water and bled. Tip for bleeding: Go to function test and step to 'charge pump'. Set it to 'on'. Run the circulation pump for 5-10 minutes. All the air has now risen to the top of the electric boiler. Bleed using the boiler safety valve. Fill with water until the pressure is correct.
3. Check that all pipe connections are tight.
4. Ensure that the shut-off valves under the tank on CTC EcoEI and other valves in the system are fully open.
5. Check that fuse sizes and the cable capacities are adequate for the supply of both CTC EcoEI and CTC EcoAir.
6. A load monitor is included in the CTC EcoEI secondary package; this should always be fitted.
7. Check that the overload is fitted on the CTC EcoEI supply cable.
8. Check that the automatic circuit breakers on CTC EcoEI are switched on.
9. Check that the supply cables and all the sensors are firmly in place in the terminal blocks.

Initial start-up

1. Power supply - CTC EcoEI.
2. Go to 'Settings' in the CTC EcoEI menu. In order for the heat pump to start, two parameters have to be changed: change the product to CTC EcoAir and set the Heat pump at permitted. For other settings, see Installation and maintenance instructions for CTC EcoEI.
3. If the heat pump fails to start, go to 'operation data' in the CTC EcoEI menu; step to 'boiler lower'; this parameter always controls the start and stop of the compressor. Check to see what is written in the brackets, e.g. (45°C). The heat pump starts when the value outside the brackets is 5°C below the value inside the brackets. The temperature can decrease further if the start delay is in effect. It then takes about 10 minutes to start. Tip! To speed up temperature decrease, use the domestic hot water system.
4. Go out to CTC EcoAir and check that 'A' is flashing (Automatic mode) and that the return temperature is shown with a steady light in the display. If this is not the case, see the section covering the control panel, how to set automatic mode.
5. If incorrect phase positioning activates an alarm, change over two of the three incoming phases to the compressor. The alarm cannot be acknowledged and reset via the reset button. Instead, the electrical supply to CTC EcoEI must be interrupted.
NOTE! Do not start the compressor in function test initially as this can wrongly activate an incorrect phase positioning alarm.
6. If a CTC EcoEI alarm is activated, check the fault code and try to remedy it using **section 'Fault tracing/appropriate measures'** CTC EcoAir & CTC EcoEI.



incorrect phase positioning switch L2 and L3

13. First start CTC EcoAir/CTC EcoLogic

Checks

1. Check that CTC EcoAir and the whole of the heating system are filled with water and have been bled. CTC EcoAir is bled by slightly loosening the upper water connection on the back of the condenser.
2. Check that all pipe connections are tight, and that all valves are open throughout the system.
3. Ensure that the circulation pump is large enough, so that there is adequate flow through the heat pump. A circulation pump with a head of 6 metres and 3 speeds is recommended (not pressure or rpm regulated).
4. The circulation pump is connected with a constant, fixed voltage in a mixing valve and non mixing valve system. With the system 4-12, it is connected in CTC EcoLogic.
5. Ensure that a power switch is fitted to both CTC EcoAir and CTC EcoLogic.
6. Check that the supply to CTC EcoLogic with 230 V L1 and earthed neutral are taken from the same point as the CTC EcoAir supply, L1 and earthed neutral, otherwise communication faults on the outside may occur.
7. Check that all sensors are connected to CTC EcoLogic for the applicable system and properly secure in the terminal block.

Initial start-up

1. Supply power to CTC EcoAir and CTC EcoLogic.
2. Go to the top menu for CTC EcoLogic under 'Operation' and check that 'On' is set. Go to settings in the CTC EcoLogic's menu. Change the heat pump to permitted. Set the System type for the applicable system. For other settings, see 'Installation and operation instructions' for CTC EcoLogic.
3. The point at which the heat pump starts depends on the applicable system and the status of the parameters under Current operation data. The starting and stopping of the compressor is controlled by the return sensor, primary flow sensor and, during tank charging, the tank sensor. In most operation modes, the temperature must fall 5 °C below the value shown in brackets for the sensor that is regulating. E. g. if the return sensor is regulating and it shows (45 °C), the left side value must fall to 40 °C for the compressor to start. The temperature can fall more if the start delay is on. It then takes about 10 minutes to start.
4. Go out to CTC EcoAir and check that 'A' is flashing (Automatic mode) and that the return temperature is shown with a steady light in the display. If this is not the case, see the section covering the control panel, how to set automatic mode.
5. If incorrect phase positioning activates an alarm, change over two of the three incoming phases to the compressor. The alarm cannot be acknowledged and reset via the reset button. Instead, the electrical supply to CTC EcoLogic must be interrupted.

NOTE! Do not start the compressor in function test initially as this can wrongly activate an incorrect phase positioning alarm.
6. If a CTC EcoLogic alarm is activated, check the fault code and try to remedy it using **section 'Fault tracing/appropriate measures'** CTC EcoAir & CTC EcoLogic.



incorrect phase positioning
switch L2 and L3

14. First start CTC EcoAir's built-in regulation

Checks

1. Check that CTC EcoAir and the whole of the heating system are filled with water and have been bled. The heat pump is bled by slightly loosening the upper water connection on the back of the condenser.
2. Check that all pipe connections are tight, and that all valves are open throughout the system.
3. Ensure that the circulation pump is large enough, so that there is adequate flow through the heat pump. A circulation pump with a head of 6 metres and 3 speeds is recommended (not pressure or rpm regulated). The circulation pump is connected with a constant, fixed voltage.
4. Ensure that a power switch is fitted to CTC EcoAir and that the supply cables are properly secure in the CTC EcoAir terminal block.

Initial start-up

1. Switch on CTC EcoAir.
2. Go out to CTC EcoAir. Set the desired return temperature, at which the heat pump stops. This is done as follows: Hold in the OK button for about 3 seconds; menu 1 is shown. Press the down arrow until the desired return temperature is reached (20-48°C) (step under 'A'). Hold the OK button in for about 3 seconds; menu 2 is then shown. Set the number of degrees the return temperature is allowed to fall before the heat pump starts. Setting range is 5 - 10 °C. The other menus show the current temperatures. Menu 5 shows the most recent fault.
3. If incorrect phase positioning activates an alarm, change over two of the three incoming phases to the compressor. NOTE! The alarm cannot be acknowledged and reset via the reset button. Instead, the electrical supply to CTC EcoAir must be interrupted.
4. If the compressor do not start. Check the return temperature in the display. If the return temperature is set to e.g. 43°C, the temperature must fall 5°C before it starts at 38°C if no other differential is set in Menu 2.
5. If the heat pump fails to start and a red point flashes in the right corner of the display, the start delay is activated. It will take about 10 minutes before CTC EcoAir is permitted to start. Pressing arrows up and down at the same time deactivates start delay and the heat pump will start.
6. If a CTC EcoLogic alarm is activated, check the fault code and try to remedy it using **section 'Fault tracing/appropriate measures'** CTC EcoAir in-built control.

15. Fault messages/ suitable measures

CTC EcoAir is designed to give reliable service and high comfort and also to have a long service life. Here are some tips that could be helpful if a breakdown occur.

15.1 CTC EcoAir/CTC EcoEI

If a fault occurs a fault code is shown in CTC EcoEI's display. All alarms are acknowledged by pressing the red flashing warning triangle in the left corner of the CTC EcoEI control panel.

(NOTE! An alarm for incorrect phase positioning can only be acknowledged by interrupting the electricity supply to CTC EcoEI)

Fault messages

Outdoor unit communication fault	High pressure switch alarm
Indoor unit communication fault	Low pressure switch alarm
Electric boiler sensor alarm	Motor protection alarm
Heat pump sensor alarm	Incorrect phase positioning alarm
Room sensor alarm	Outside sensor alarm
VP supply sensor alarm	Primary flow sensor alarm
VP return sensor alarm	Hot gas sensor alarm
	Compr. temp alarm

Suggestions

If the below suggestion texts flash recurringly, the following tips and advice may help you cancel the text as well as improve the operation and economy of your heat pump.

<High electricity consumption>

If the electricity consumption for the whole building including CTC EcoEI and CTC EcoAir exceeds the ampere capacity of the main fuse, the load monitor reduces the supply to CTC EcoEI, which may result in decreased hot water capacity. This most often occurs when the main fuse is only 16A. *Tip!* Increase the size of the main fuse

<Start delay>

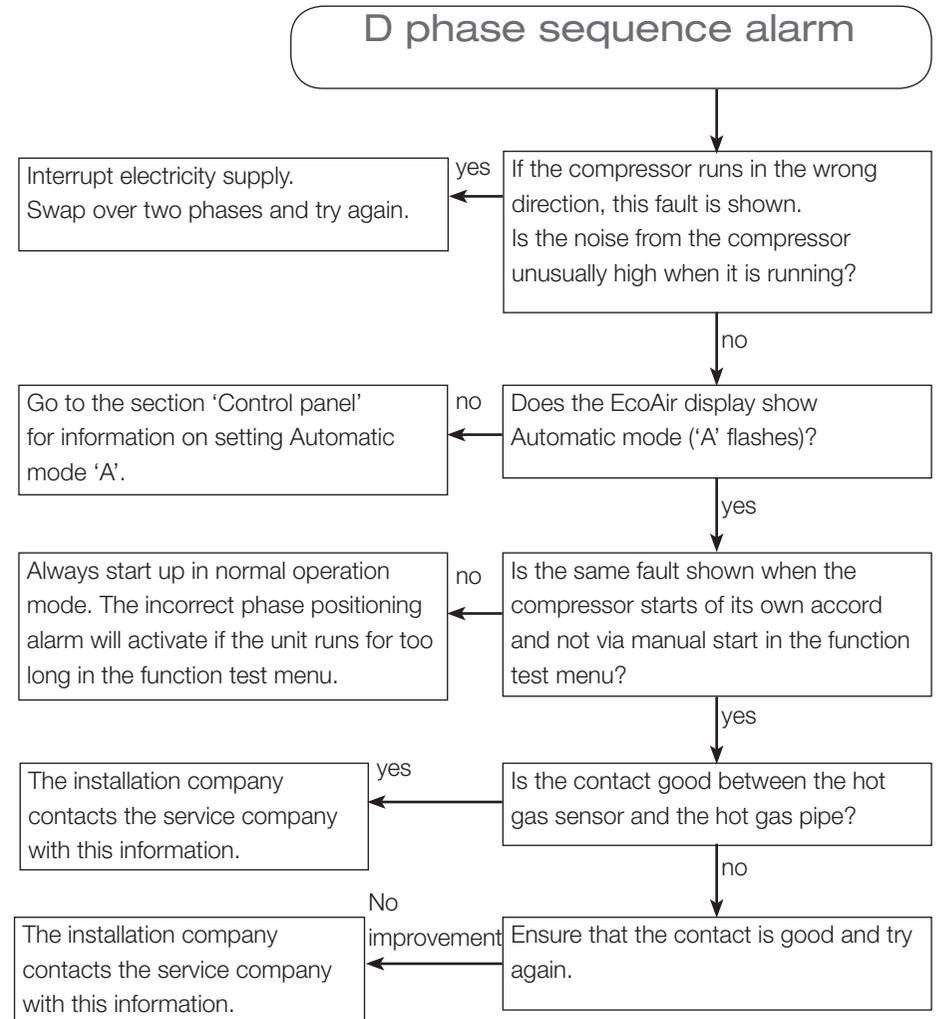
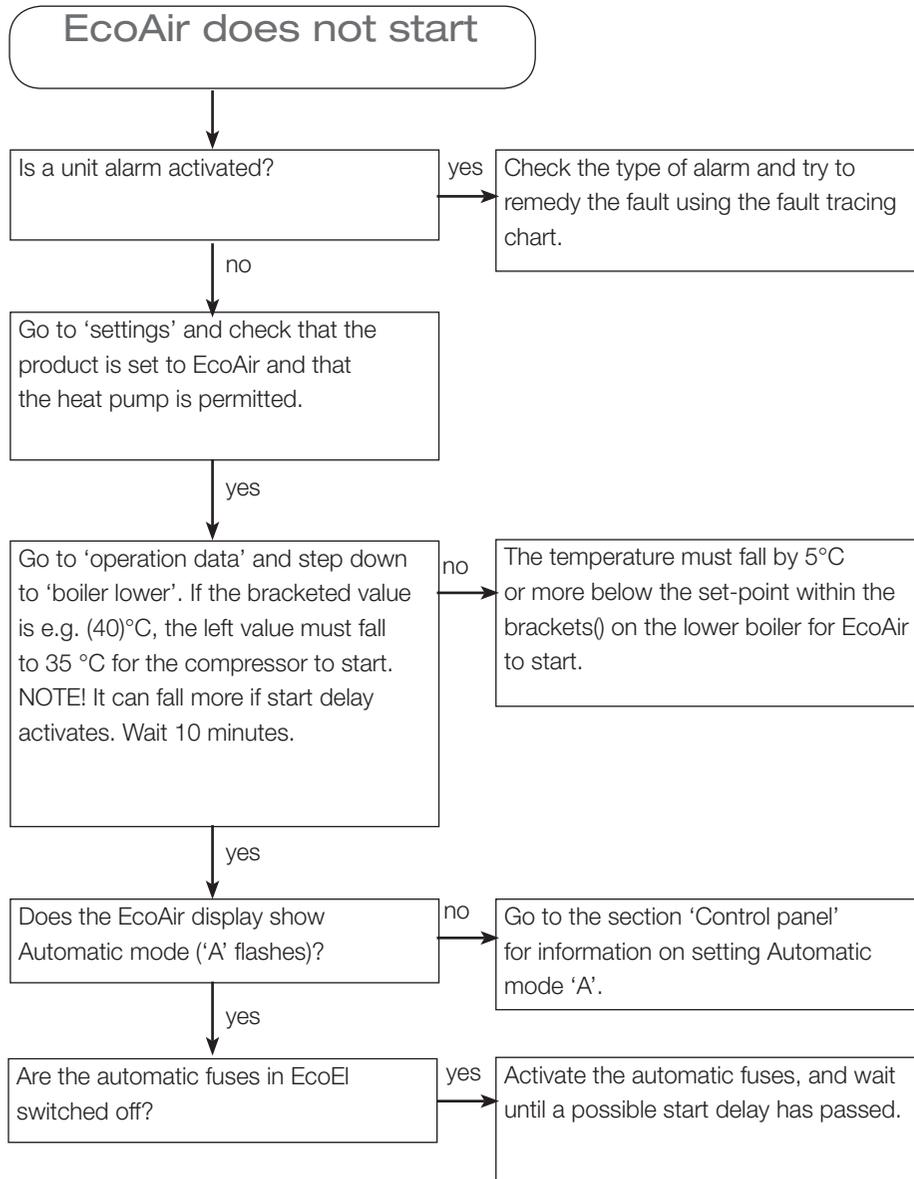
If Start delay recurs and there are many starts registered in "stored oper data" **Starts/24h st**, check that all the thermostat valves on the radiators are fully open. A thermostat can be closed in a room where a lower temperature is required, e.g. bedroom. All other room thermostat valves should be fully open.

Information texts

OBS! The following information texts do not refer to faults but to the current operational status of the heat pump.

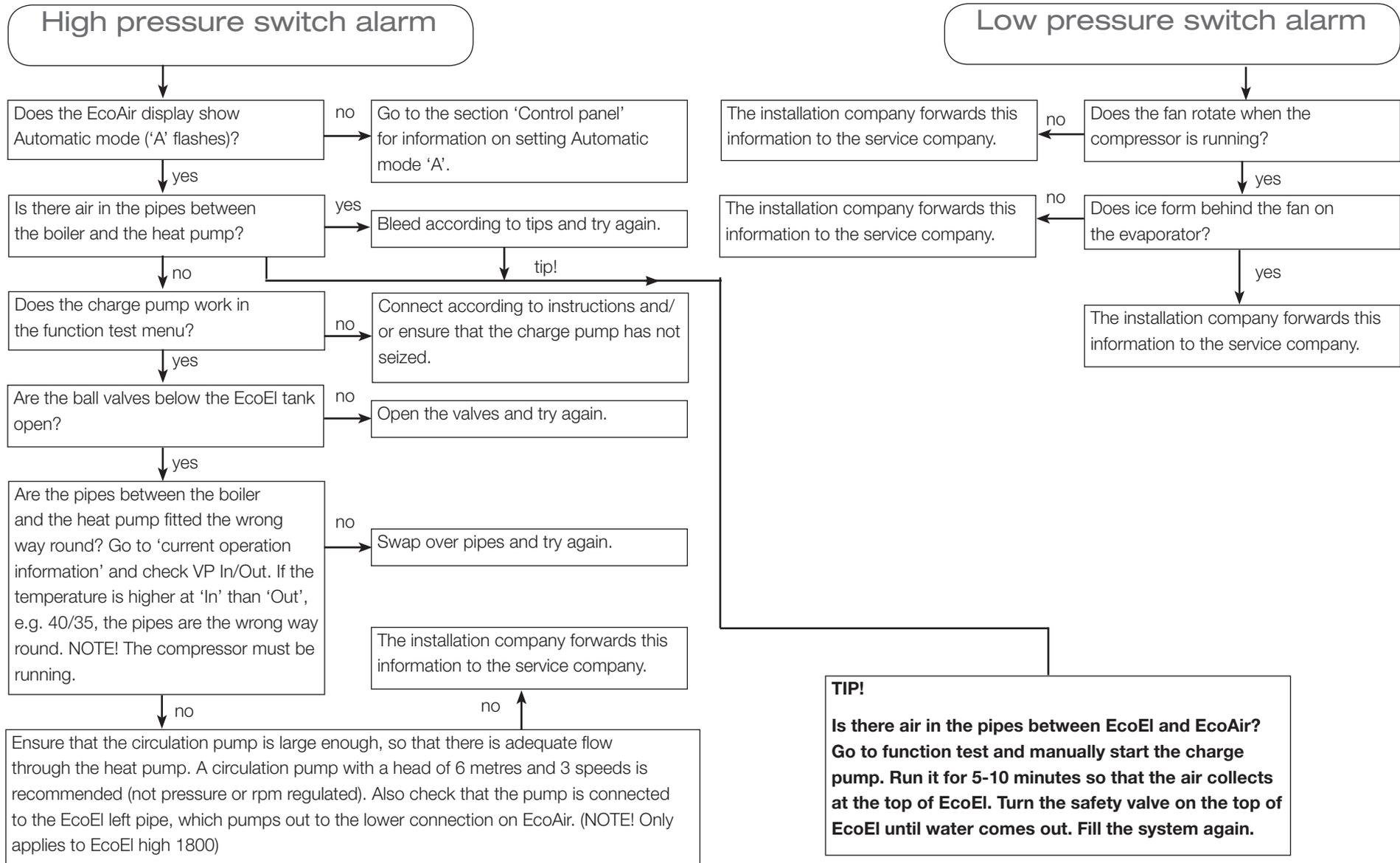
Heating from 16°C
 Holiday
 External control SO (shut off)
 Compressor blocked
 High Heat pump

Fault tracing procedure CTC EcoAir/CTC EcoEI



*** NOTE! Incorrect phase positioning alarm can only be acknowledged and reset by interrupting the electricity supply to EcoEI. Incorrect phase positioning is only detected through the hot gas temperature. If the hot gas temperature does not increase by 5°C or more during the first 50 seconds each time the compressor starts, the incorrect phase positioning alarm is activated.**

Fault tracing procedure CTC EcoAir/CTC EcoEI

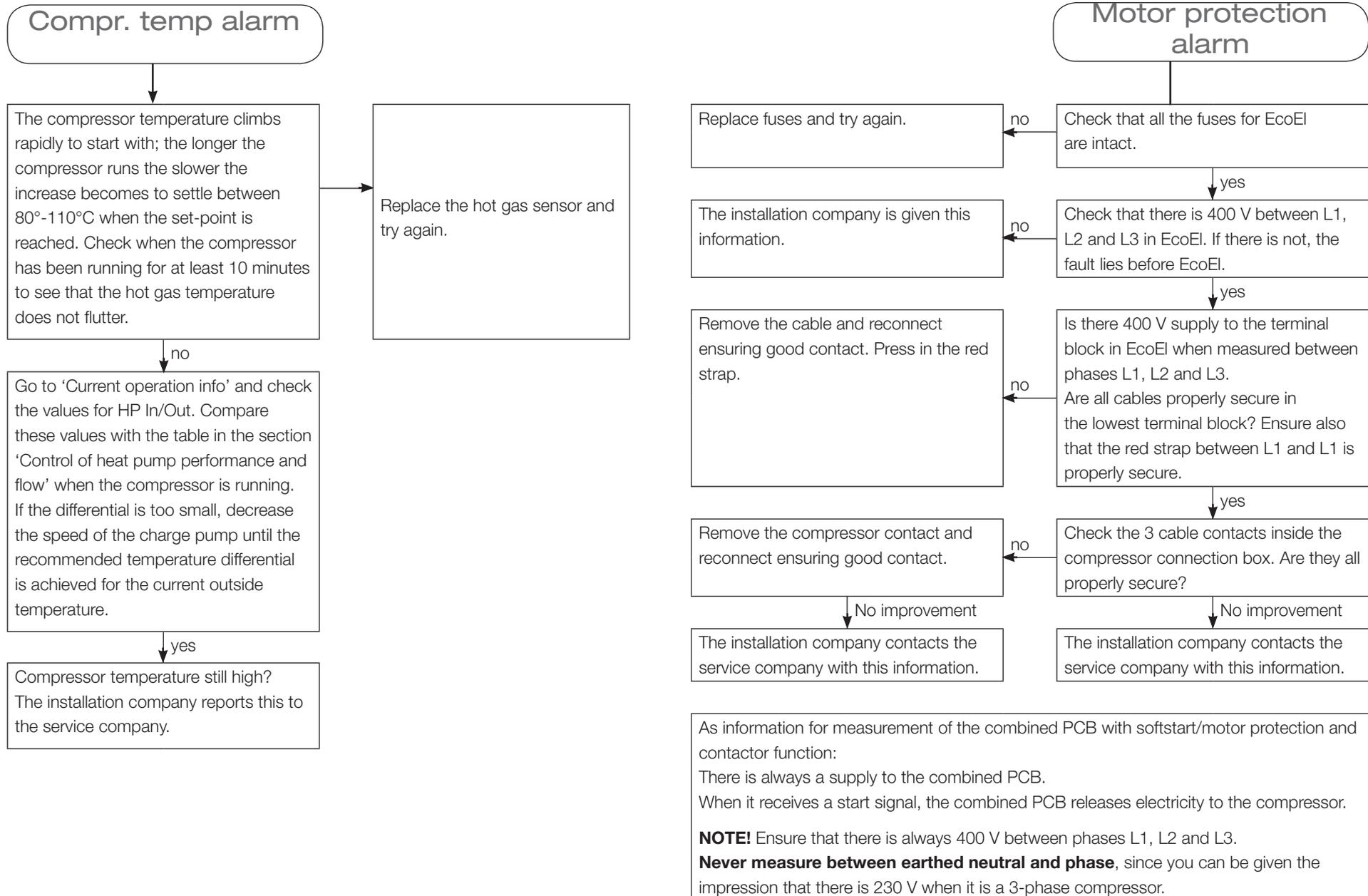


For information:

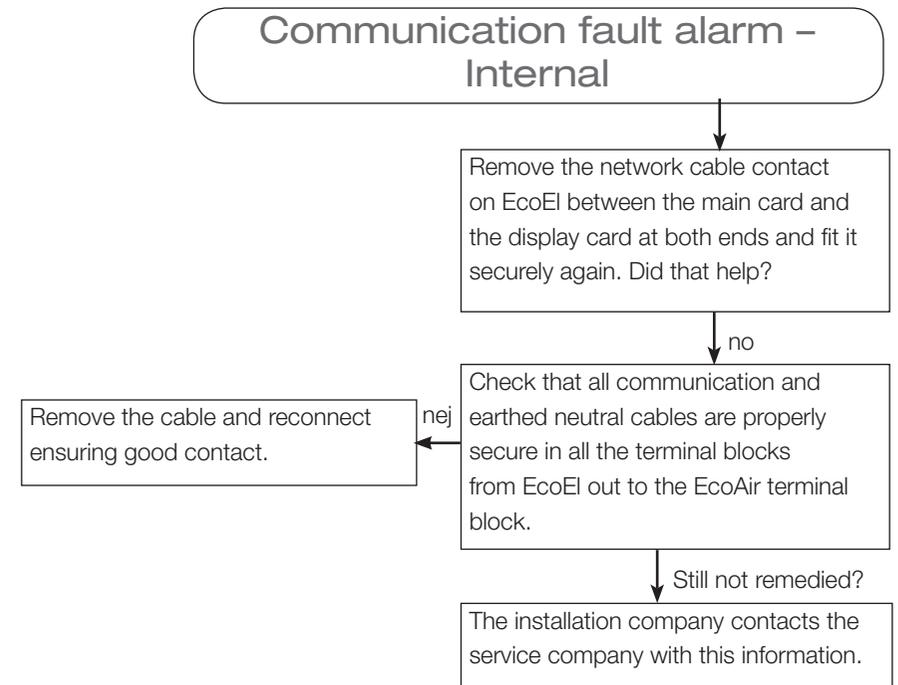
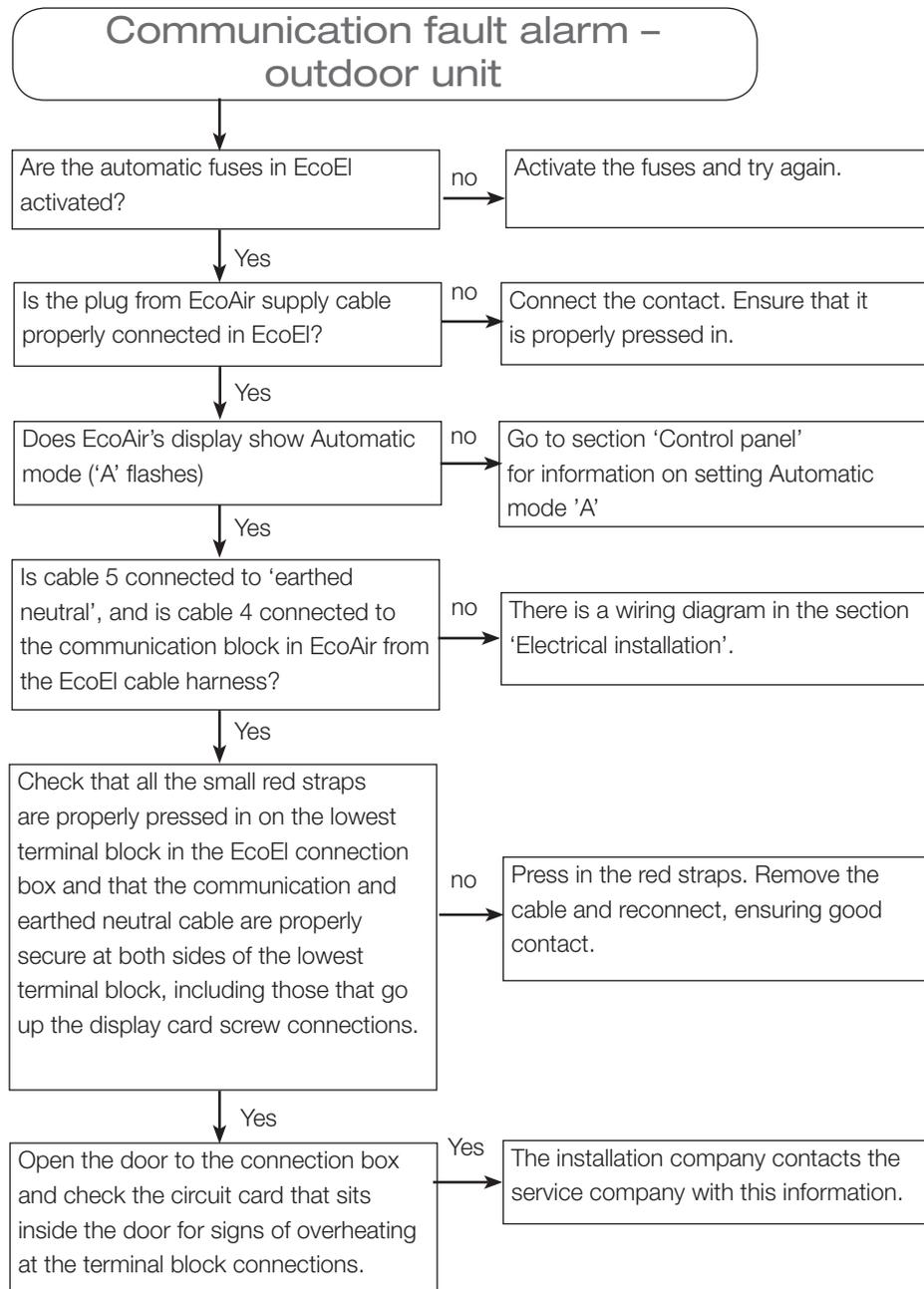
With an outside temperature above +2 °C, the charge pump starts about 5 seconds before the compressor. With an outside temperature below +2 °C, it runs continuously. To guard against possible freezing.

TIP!
Is there air in the pipes between EcoEI and EcoAir? Go to function test and manually start the charge pump. Run it for 5-10 minutes so that the air collects at the top of EcoEI. Turn the safety valve on the top of EcoEI until water comes out. Fill the system again.

Fault tracing procedure CTC EcoAir/CTC EcoEI



Fault tracing procedure CTC EcoAir/CTC EcoEI



Fault messages/ suitable measures

EcoAir is designed to provide reliable service and high comfort and also to have a long service life. Here are some tips that may be helpful should a breakdown occur.

15.2 CTC EcoAir/CTC EcoLogic

If a fault occurs, the fault code is shown in the CTC EcoLogic display. All alarms are acknowledged by pressing the flashing red warning triangle in the left corner on the control panel.

(NOTE! The incorrect phase positioning alarm can only be acknowledged by interrupting the electrical supply to CTC EcoLogic)

Fault messages

High pressure switch alarm	ack B4u sensor alarm
Low pressure switch alarm	W B5 sensor alarm
Motor protection compressor alarm	UP out sensor alarm
Incorrect phase positioning alarm	UP in sensor alarm
Outside sensor alarm	Return sensor alarm
Primary flow sensor alarm	Hot gas sensor alarm
ack B4o sensor alarm	Brine out sensor alarm
Outdoor unit communication fault	Indoor unit communication fault
Brine incoming sensor alarm	High brine temp in alarm
Room sensor alarm	Low brine flow alarm
Compr. temp alarm	External block alarm
Low brine temp in alarm	

Suggestions

If the below suggestion texts flash recurringly, the following tips and advice may help you cancel the text as well as improve the operation and economy of your heat pump.

<compressor start delay>

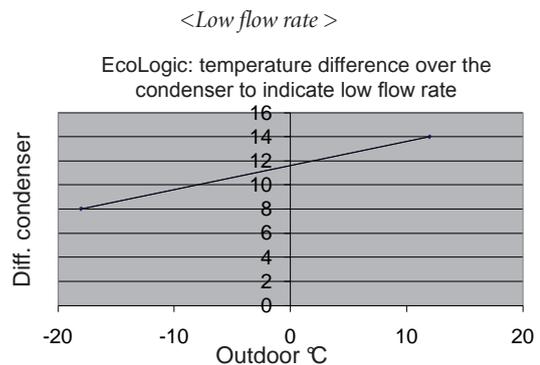
If start delay recurs and there are many starts registered in 'stored operating data' **Starts/24h st**, check that all the thermostat valves on the radiators are fully open. A thermostat can be closed in a room where a lower temperature is required, e.g. bedroom. All other room thermostat valves should be fully open.

Information texts

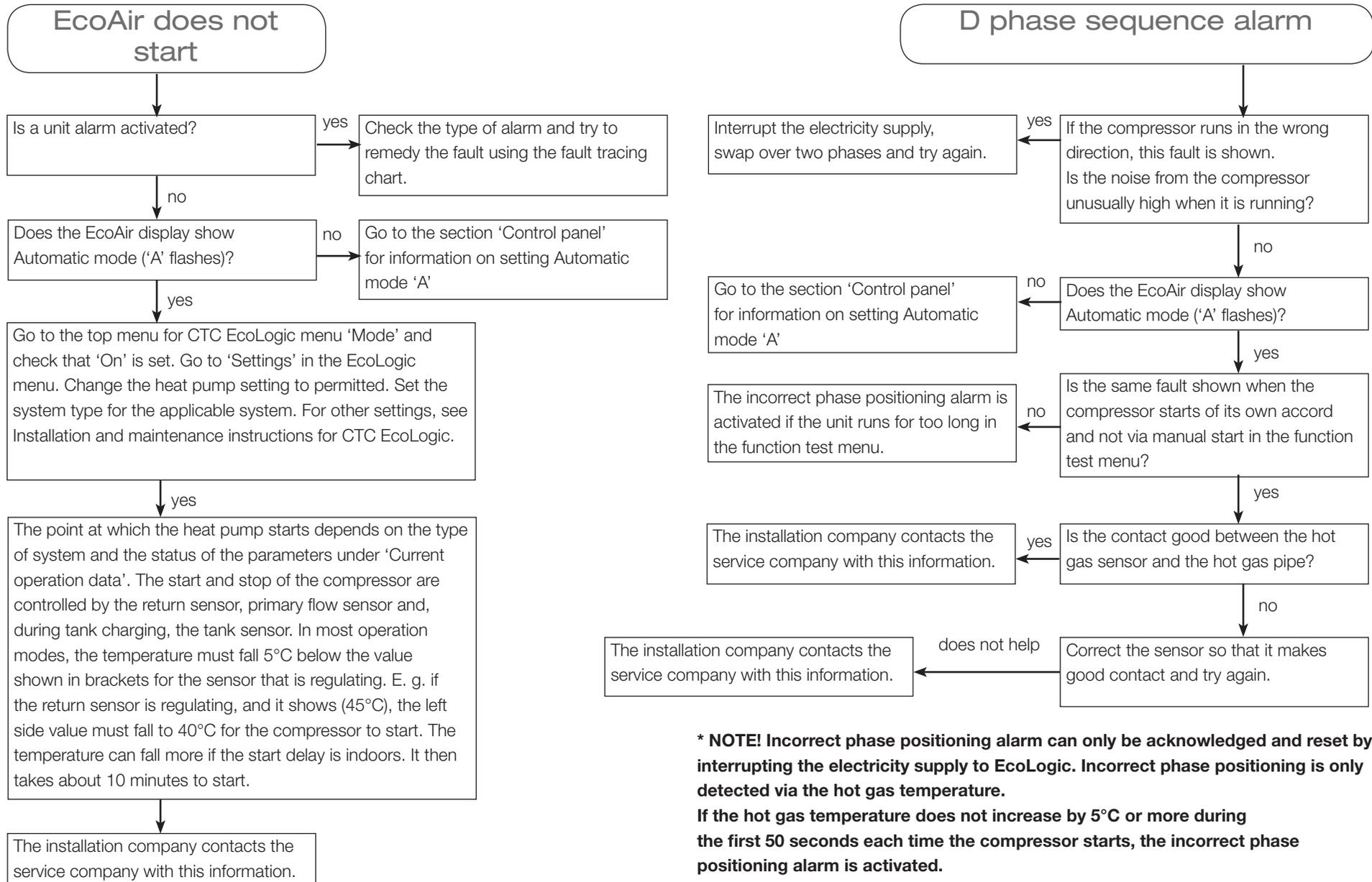
NOTE! The following information texts do not refer to faults but to the current operational status of the heat pump.

Compressor blocked External control SO (shut off)

House heating off Outdoors °C Holiday



Fault tracing procedure CTC EcoAir/CTC EcoLogic

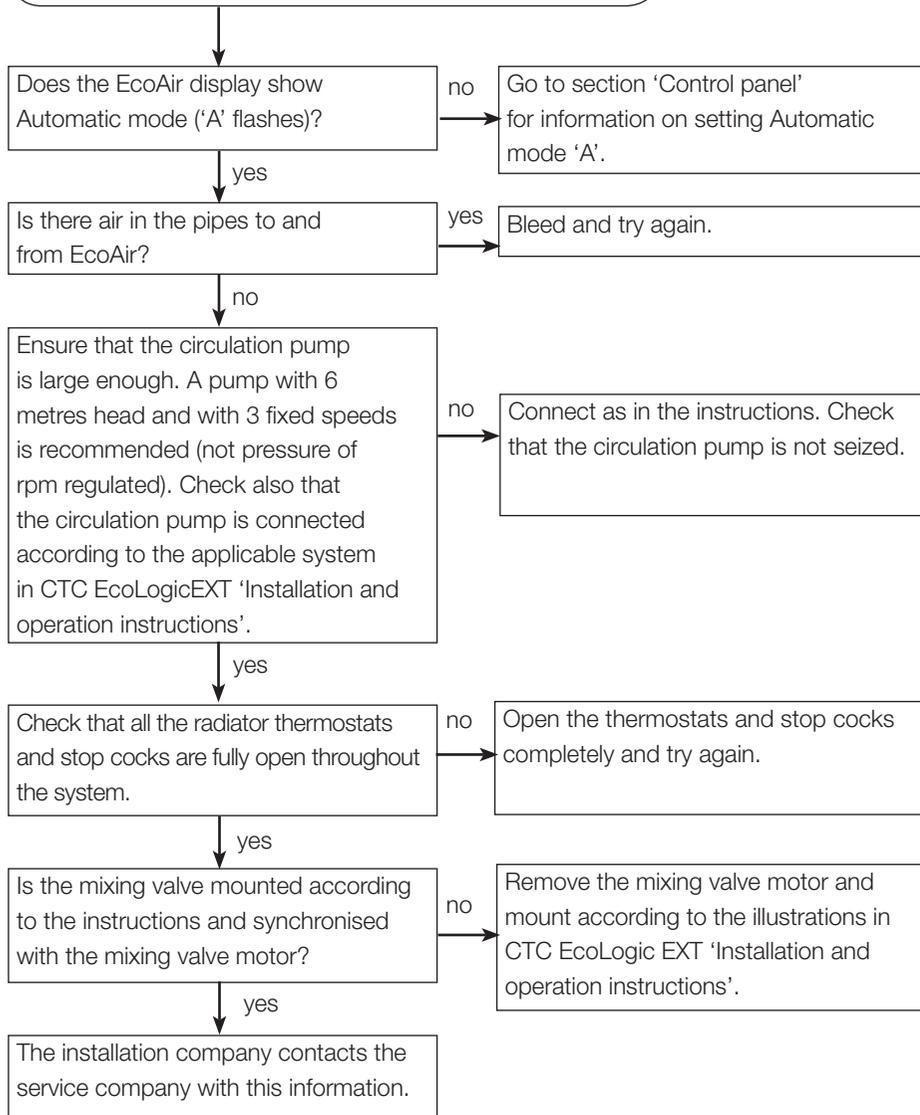


*** NOTE! Incorrect phase positioning alarm can only be acknowledged and reset by interrupting the electricity supply to EcoLogic. Incorrect phase positioning is only detected via the hot gas temperature.**

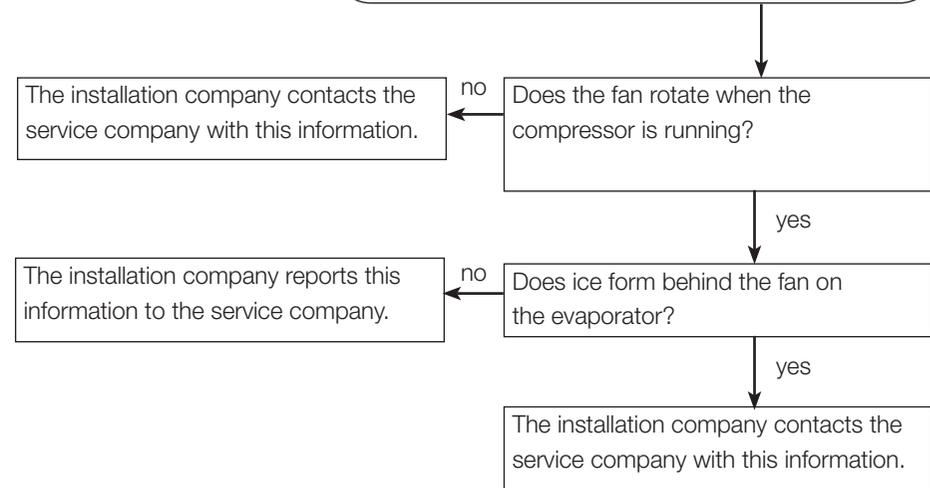
If the hot gas temperature does not increase by 5°C or more during the first 50 seconds each time the compressor starts, the incorrect phase positioning alarm is activated.

Fault tracing procedure CTC EcoAir/CTC EcoLogic

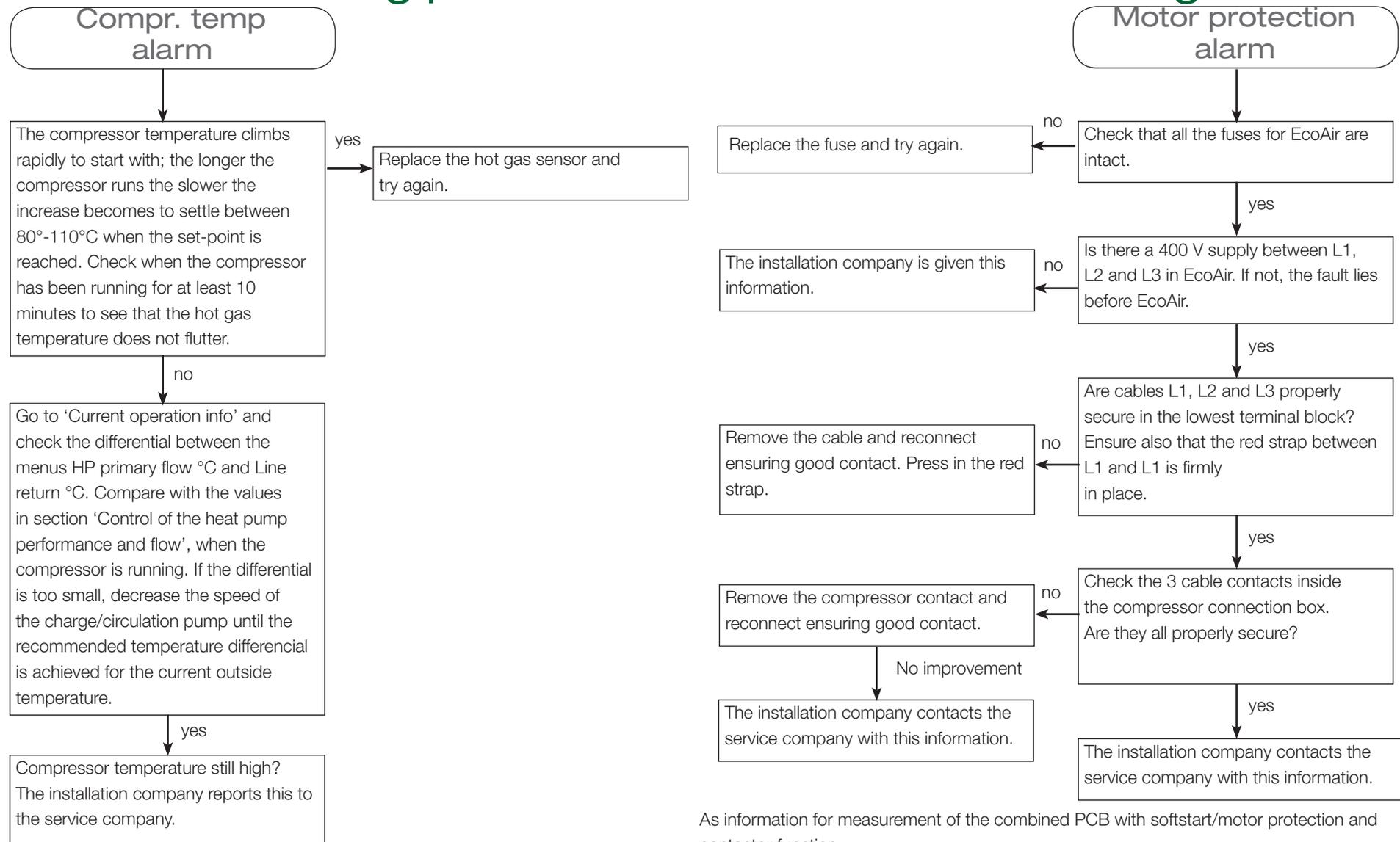
High pressure switch alarm



Low pressure switch alarm



Fault tracing procedure CTC EcoAir/CTC EcoLogic



As information for measurement of the combined PCB with softstart/motor protection and contactor function:

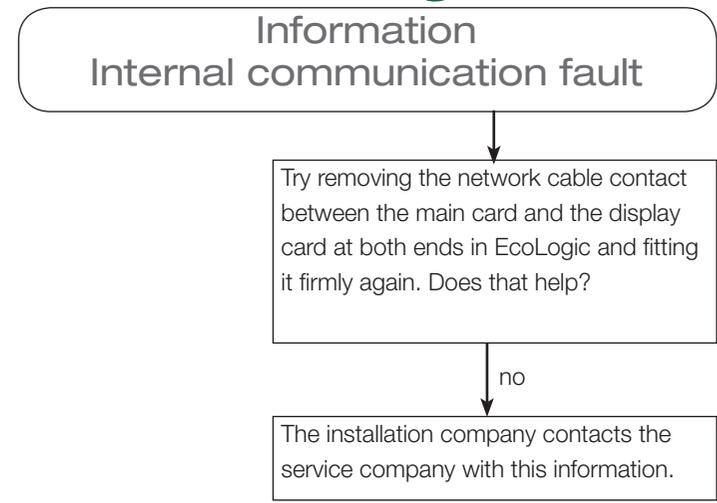
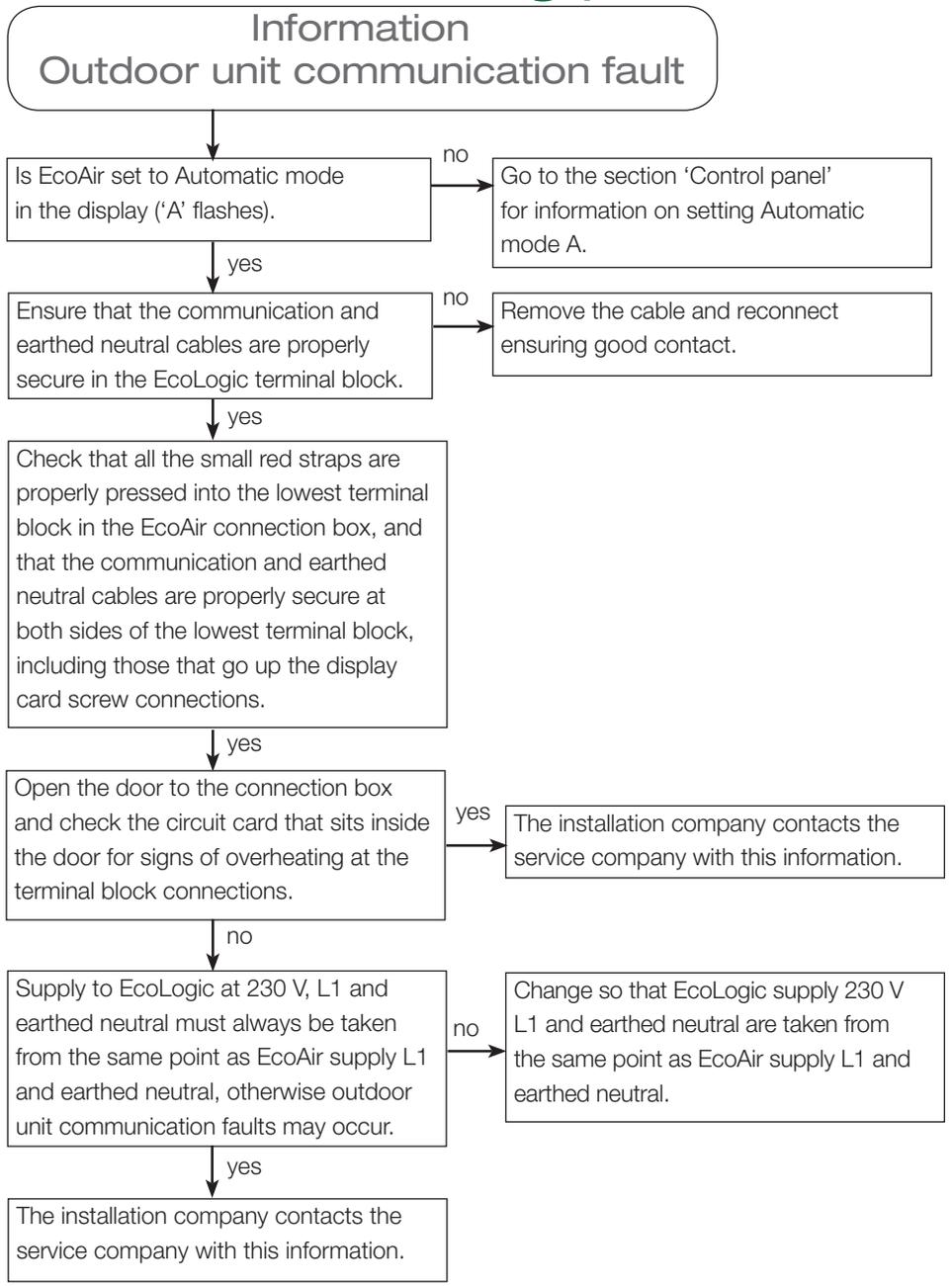
There is always a supply to the combined PCB.

When it receives a start signal, the combined PCB releases electricity to the compressor.

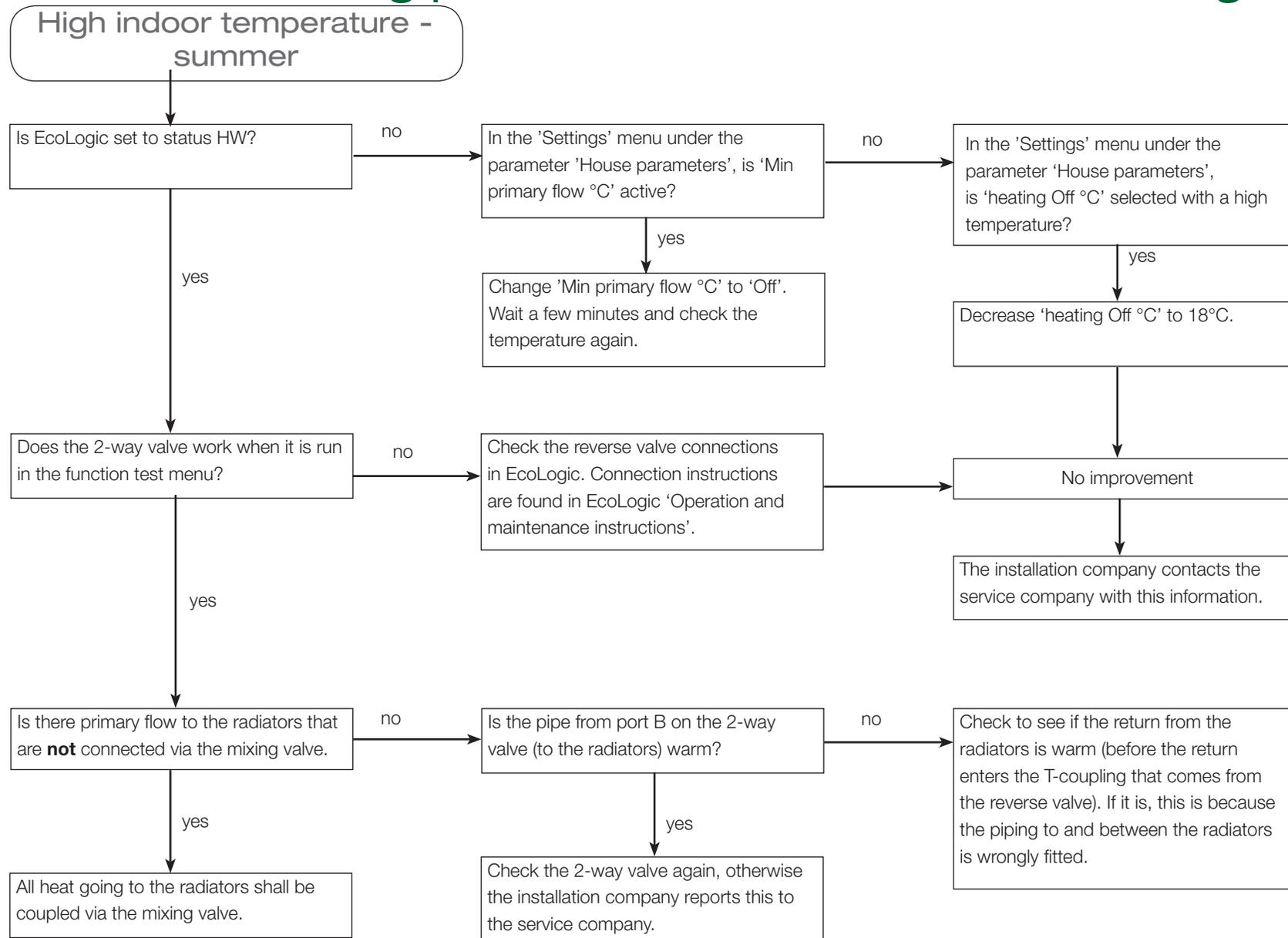
NOTE! Ensure that there is always 400 V between phases L1, L2 and L3.

Never measure between earthed neutral and phase, since you can be given the impression that there is 230 V when it is a 3-phase compressor.

Fault tracing procedure CTC EcoAir/CTC EcoLogic



Fault tracing procedure CTC EcoAir/CTC EcoLogic



Fault messages/ suitable measures

EcoAir is designed to provide reliable service and high comfort and also to have a long service life. Here are some tips that may be helpful should a breakdown occur.

15.3 CTC EcoAir's built-in regulation

If a fault occurs, a fault code is shown in CTC EcoAir's display. To reset after a fault message, hold down the OK button and press the 'down' arrow button at the same time.

The fault codes are:

- E01: High pressure switch alarm.
- E02: Low pressure switch alarm.
- E03: Motor protection alarm.
- E04: Hot gas sensor fault (not connected, short-circuited or outside measurement range).
- E05: Return sensor fault (not connected, short-circuited or outside measurement range).
(E05 flashes alternately with 0 in the display window).
- E06: Outdoor sensor fault (not connected, short-circuited or outside measurement range).
- E07: High compressor temperature (E07 and the hot gas temperature flash alternately).
- E08: Primary flow sensor outside measurement range. Temperatures below 0°C or above 80°C. (E08 flashes alternately with the return temperature in the display.) The unit stops when any of the faults occur apart from E08.
- E09: Incorrect phase positioning. Incorrect compressor direction of rotation.
(NOTE! Cannot be acknowledged in the display; disrupt the electrical supply to CTC EcoAir).
- E10: Fault in defrosting sensor 1 (not connected, short-circuited or outside measurement range).
- E11: Fault in defrosting sensor 2 (not connected, short-circuited or outside measurement range).

Start delay/Quick start

CTC EcoAir is equipped with start delay in order to avoid the compressor starting at intervals that are too short. In the control panel display, the right point flashes when start delay is activated. The start delay is set to 10 minutes. By simultaneously pressing the 'up' and 'down' arrows, the start delay can be bypassed, e.g. during service.

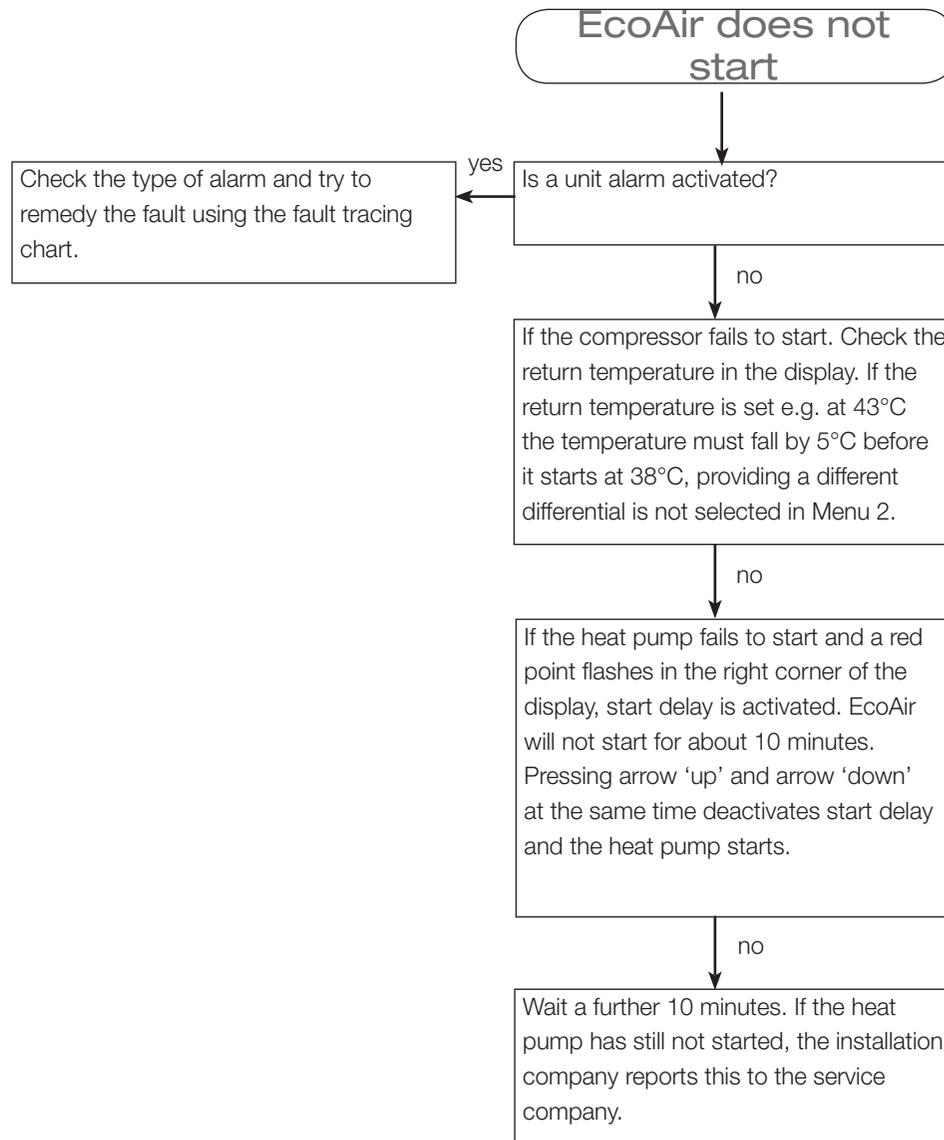


Reset alarm – hold down the OK button and press the 'down' arrow at the same time.



Quick start – press arrow 'up' and arrow 'down' at the same time.

Fault tracing procedure CTC EcoAir's built-in regulation



Fault tracing procedure CTC EcoAir's built-in regulation

E1

High pressure switch alarm

Are all the valves open throughout the system? no

Fully open the valves and try again.

Is there air in the pipes to and from EcoAir? yes

Bleed by slightly loosening the upper water connection on the back of the condenser, and try again.

Is the circulation pump running? no

Ensure that the circulation pump is supplied with electricity, and that it has not seized.

Are the pipes between the boiler and the heat pump fitted the wrong way round? Check that the cold water from the boiler or tank is pumped into the lower EcoAir connection, heated up and pumped out via the upper EcoAir connection. yes

Swap the pipes over and try again.

Is a large enough circulation pump installed? A 6 metre pressure head pump with 3 speeds is recommended (not pressure or rpm regulated). no

Replace the circulation pump with one with the correct pressure head, and connect according to the instructions.

The installation company reports this to the service company.

E2

Low pressure switch alarm

Does the fan rotate when the compressor is running? no

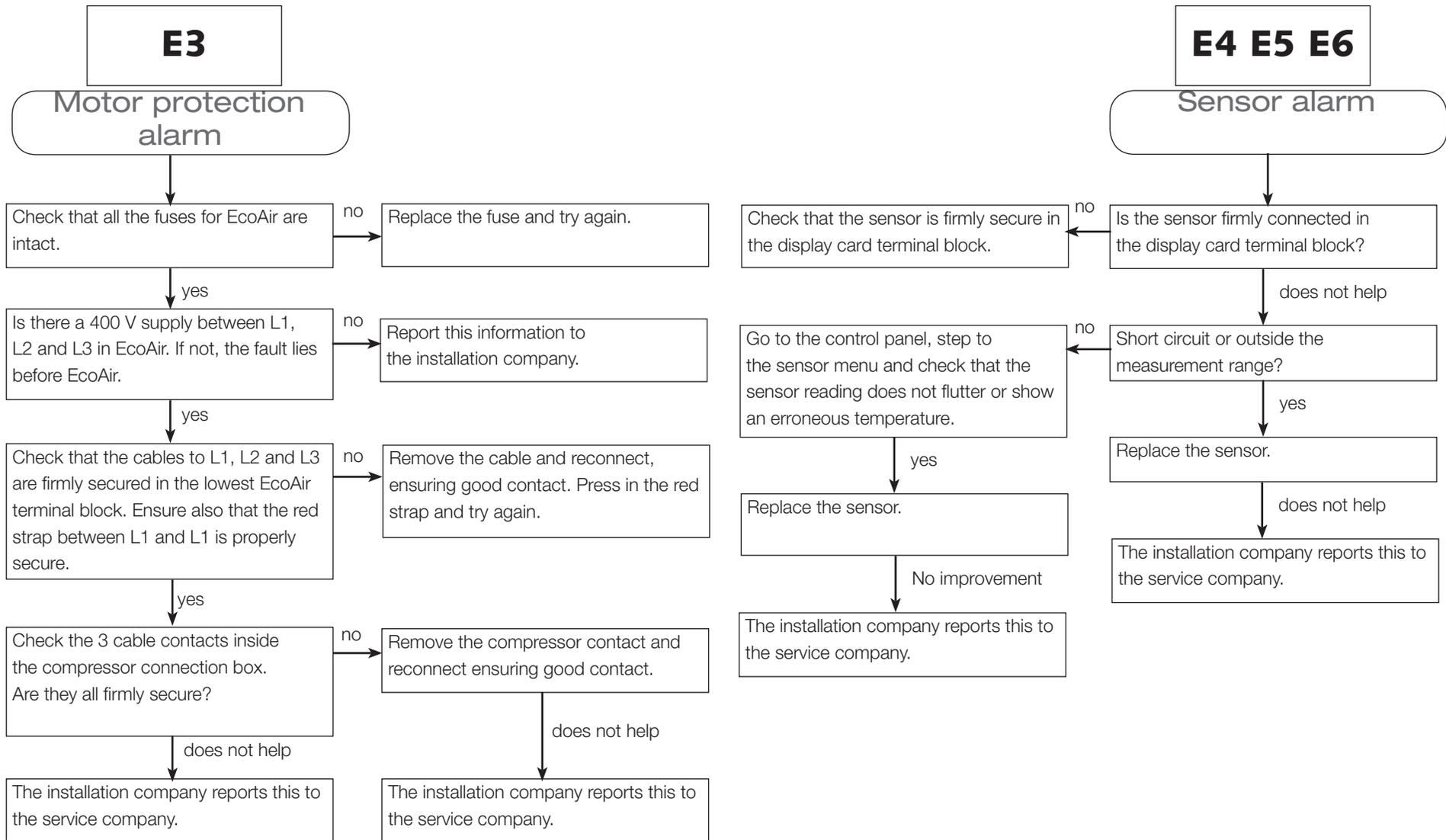
The installation company reports this to the service company.

Does ice form behind the fan on the evaporator? no

The installation company reports this to the service company.

The installation company reports this to the service company.

Fault tracing procedure CTC EcoAir's built-in regulation



For information for measurement of the combined PCB with softstart/motor protection and contactor function!

There is always a supply to the combined PCB.

When it receives a start signal, the combined PCB releases electricity to the compressor.

NOTE! Ensure that there is always 400 V between phases L1, L2 and L3.

Never measure between earthed neutral and phase, since you can be given the impression that there is 230 V when it is a 3-phase compressor.

Fault tracing procedure CTC EcoAir's built-in regulation

E7

Compr. temp alarm

The compressor temperature climbs rapidly to start with; the longer the compressor runs the slower the increase becomes to settle between 80°-110°C when the set-point is reached. Check when the compressor has been running for at least 10 minutes to see that the hot gas temperature does not flutter.

yes
Replace the hot gas sensor and try again.

nej
Check the control panel for the current return temperature. Step down to Menu 8. Check the temperature of the primary flow water and compare this differential with that given in the section 'Control of the heat pump performance and flow' for the current outside temperature under menu 4. NOTE! The compressor must be running. If the differential is too small, decrease the speed of the charge/circulation pump until the recommended temperature differential is achieved for the current outside temperature.

does not help
Is the compressor temperature still high? The installation company reports this to the service company.

E8

Is the return outside the measurement range?

The return sensor flashes alternately with the return temperature in the display.

yes

Is the sensor correctly connected in the terminal block?
yes
Ensure that the sensor is firmly secure in the display card terminal block in EcoAir.

no

no
Go to the control panel, step to the sensor menu and check that the sensor reading does not flutter or show an erroneous temperature.

Short circuit or outside the measurement range?

yes

Replace the sensor.

does not help

The installation company reports this to the service company.

yes
Replace the sensor.

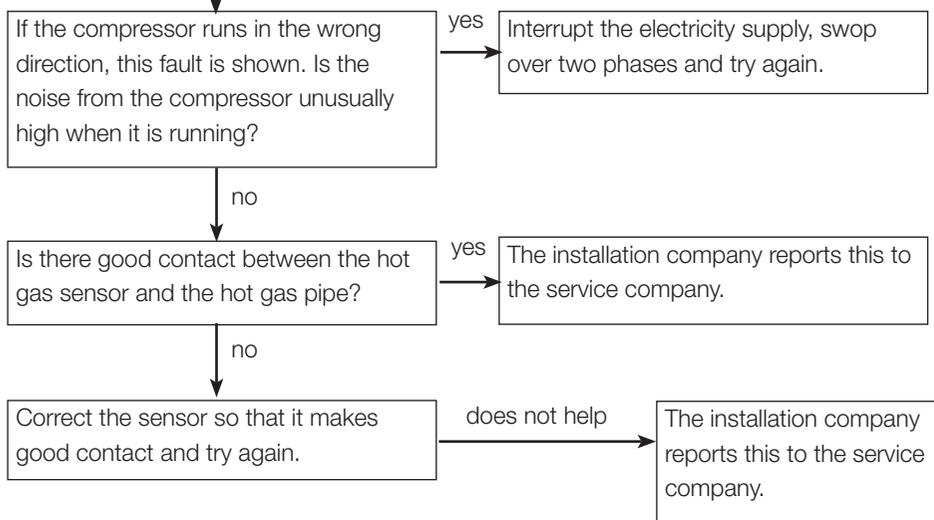
does not help

The installation company reports this to the service company.

Fault tracing procedure CTC EcoAir's built-in regulation

E9

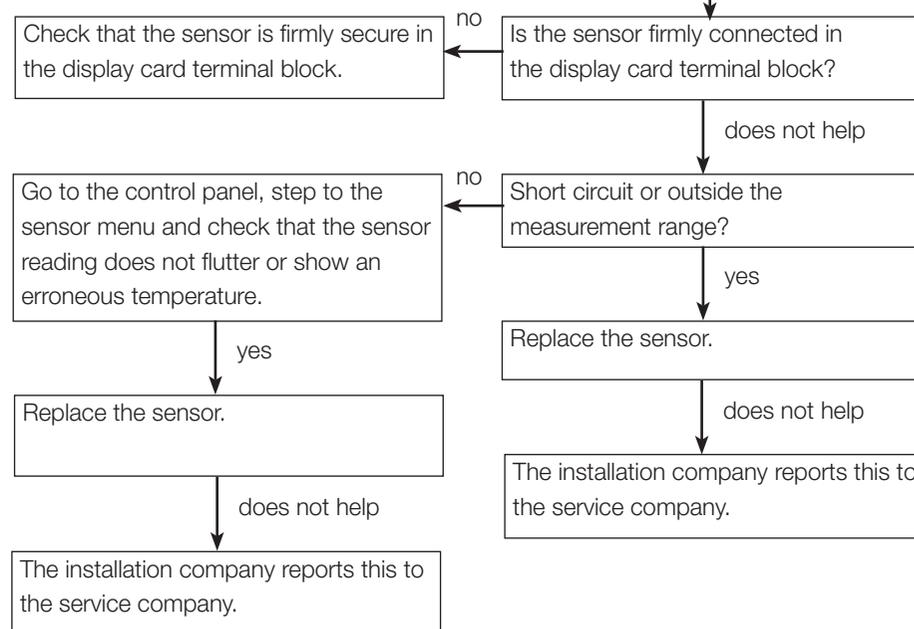
Compressor incorrect phase positioning alarm



*** NOTE! Incorrect phase positioning alarm can only be acknowledged and reset by interrupting the electricity supply to EcoAir. Incorrect phase positioning is only measured via the hot gas temperature. If the hot gas temperature does not increase by 5°C or more during the first 50 seconds each time the compressor starts, the incorrect phase positioning alarm is activated.**

E10 E11

Sensor alarm



16. Technical data

		EcoAir 105	EcoAir 107	EcoAir 110	EcoAir 107 PE	EcoAir 110 PE
Electrical data		400V 3N~				
Power input to compressor at 45°C water temp. and -7/+2/+7°C air temp.**	kW	1,6/1,7/1,8	2,1/2,1/2,1	2,9/3,1/3,2	2,1/2,3/2,5	3,31/3,57/3,76
Power output from compressor at 45°C water temp. and -7/+2/+7°C air temp.**	kW	3,3/4,5/5,8	4,4/5,9/6,8	6,5/8,4/10,9	4,9/5,9/7,5	7,38/9,39/10,88
COP **		2,1/2,6/3,2	2,1/2,8/3,2	2,2/2,7/3,4	2,3/2,6/3,0	
Nominal air flow 2-step	m³/h	2300/2400	2300/2400	3000/3600	2300/2400	3080/3600
Min. group fuse	A	10				
Max. op. current	A	5	7	11	7	11
Max. starting current	A	18	20	23	20	23
Fan	W	90/110	90/110	135/165	90/110	135/165
Water volume Condenser (stainless steel)	l	2	2	2,9	2	2,9
Refrigerant quantity (R407C)*	kg	1,7	1,7	2,6	-	-
Refrigerant quantity (R404A)*		-	-	-	2,1	2,8
Pressure switches HP/LP	bar	29/0,1	29/0,1	29/0,1	31/0,1	31/0,1
Max. operating pressure water (PS)	bar	2,5				
Weight	kg	100	105	156	105	156

*) Note that in the case of any deviation, the product data plate applies. When carrying out a service, always check the product data plate for the correct quantity of refrigerant.

**) The given values are for a product with clean evaporator. Values according to EN14511:2004.

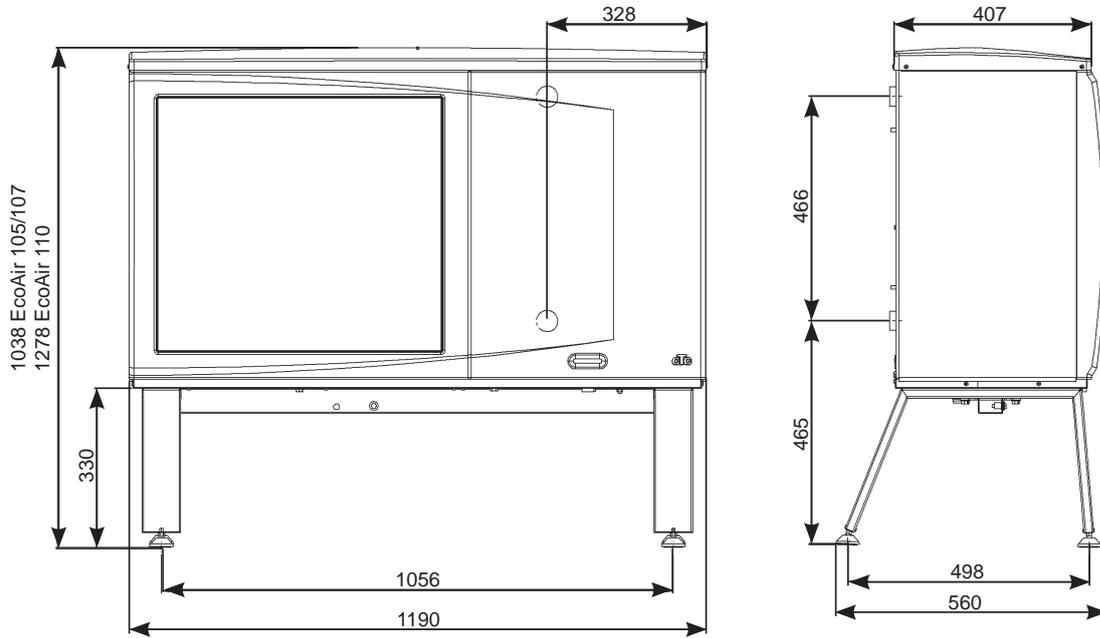
17. Noise data

Ambient temperature above + 10 °C			
Model	Noise level: 1 m*	Noise pressure 5 m*	Noise pressure 10 m*
EcoAir 105	64 dBA	42-45 dBA	36-39 dBA
EcoAir 107	64 dBA	42-45 dBA	36-39 dBA
EcoAir 110	59,5 dBA	37,5-40,5 dBA	31,5-34,5 dBA

Ambient temperature below + 10 °C			
Model	Noise level: 1 m*	Noise pressure 5 m*	Noise pressure 10 m*
EcoAir 105	67 dBA	45-48 dBA	39-42 dBA
EcoAir 107	67 dBA	45-48 dBA	39-42 dBA
EcoAir 110	64 dBA	42-45 dBA	36-39 dBA

* The given noise pressure shall be taken as a pointer since the level is affected by the surroundings. The upper value corresponds to 100% reflecting ground and walls (smooth concrete). Sound measurement data is according to EN12102.

18. Measurements





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,

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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
Low Voltage Directive (LVD) 2006/95/EC

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,

EN ISO 14731	EN 55014-1 –A1, -A2 / -2
EN ISO 3834-2	EN 61 000-4-2, -4, -5, -6, -11
EN ISO 15614-1	EN 60335-1 / -2-40
EN 13133	EN 378
EN 13134	EN 60529
EN 287-1	
EN 10 204, 3.1B	

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Kent Karlsson
Technical Manager

