



Service Instructions

DHP-AQ

Danfoss A/S is not liable or bound by warranty if these instructions are not adhered to during installation or service.

The English language is used for the original instructions.
Other languages are a translation of the original instructions.
(Directive 2006/42/EC)

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1 About documents and decals

1.1 Introduction

The following documents are available for this product:

- Installation quick guide containing information to install a heat pump. Supplied with the heat pump on delivery.
- The Service instructions contain information about the heat pump's function, accessories, fault tracing and technical data. The instructions also contain tips and advice that should be followed before a heat pump installation. It is therefore recommended that the instructions are read before installation. The Service instructions are available for download as below.
- The Wiring diagrams that contain the wiring diagram for the heat pump intended for fault tracing and service. The Wiring diagrams are available for download as below.
- The User manual must be handed over and gone through with the end customer. Supplied with the heat pump on delivery.
- Country specific instructions and forms are available where relevant. Supplied with the heat pump on delivery.
- Self-adhesive decals with translation text. Must be placed on the manufacturing plate in conjunction with installation. Supplied with the heat pump on delivery.




The Service instructions and Wiring diagrams are available for download here:

www.documentation.heatpump.danfoss.com


1.2 Symbols in documents

The instructions contain different warning symbols, which, together with text, indicate to the user that there are risks involved with actions to be taken.

The symbols are displayed to the left of the text and three different symbols are used to indicate the degree of danger:

Danger 	Indicates an immediate danger that leads to fatal or serious injury if necessary measures are not taken.
Warning 	Risk of personal injury! Indicates a possible danger that can lead to fatal or serious injury if necessary measures are not taken.
Caution 	Risk of installation damage. Indicates a possible hazard that can lead to item damage if necessary measures are not taken.

A fourth symbol is used to give practical information or tips on how to perform a procedure.

	Information regarding making the handling of the installation easier or a possible operational technical disadvantage.
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1.3 Symbols on decals

The following symbols can occur on decals on the different parts of the heat pump. Which symbols are used depends on the heat pump model.

1.3.1 General

- | | | | |
|--|--|--|-----------------------------------|
| | Warning, danger! | | Warning, hot surfaces! |
| | Read the documentation provided. | | Warning, moving parts! |
| | Read the documentation provided. | | Warning, risk of crushing injury! |
| | Warning, hazardous electrical voltage! | | |

1.3.2 Electrical components

- | | | | |
|--|--------------------------|----|----------------|
| | Outdoor unit | | Room sensor |
| | Outdoor sensor | or | |
| | Hot water sensor | | |
| | Hot water top sensor | | EVU |
| | Flow guard | | Defrost sensor |
| | Drip tray | | |
| | Shunt valve | | |
| | Circulation pump | | |
| | Exchange valve hot water | | |
| | Supply line sensor | | |
| | Return line sensor | | |

Explanation

- Component, ordinary delivery according to proposed system solutions
- Component, accessories according to proposed system solutions

1.3.3 Pipe connections

- Tap water
- Heating system
- Brine system
- Defrosting tank
- Expansion tank with safety valve, brine
- Air bleeding
- Temperature and pressure relief valve
- Outdoor unit
- Water heater

2 Important information/Safety regulation

2.1 General safety precautions

Warning



Risk of personal injury! Children are not permitted to play with the product.

Caution



The heat pump must be installed by authorised installation engineers and the installation must follow the applicable local rules and regulations as well as these installation instructions.

Caution



This product is not intended for persons (including children) with reduced physical, sensory or psychological capacity, or who do not have knowledge or experience, unless supervised or they have received instructions on how the apparatus functions from a safety qualified person.

Caution



The heat pump must be located in a frost-free environment!

Caution



The heat pump must be placed in an area with a floor drain.

Caution



The heat pump must be located on a stable base. The floor must be able to support the gross weight of the heat pump with filled hot water tank (see Technical data).

Caution



To prevent leaks, ensure that there are no stresses in the connecting pipes!

Caution



It is important that the heating system is bled after installation.

Caution



Bleed valves must be installed where necessary.

Caution



The hot water tank must be equipped with an approved safety valve.

Caution



Heating systems with closed expansion tanks must also be supplied with approved pressure gauges and safety valves.

Caution



Cold and hot water pipes and overflow pipes from safety valves must be made of heat resistant and corrosion-resistant material, for example copper. The safety valve overflow pipes must have an open connection to the drain and visibly flow into this in a frost-free environment.

Caution



The connecting pipe between the expansion tank and the safety valve must slope continuously upwards. A continuous upwards slope means that the pipe must not slope downwards from the horizontal at any point.

Caution



When cooling it is important to limit the lowest flow line temperature to prevent condensation.



If there is any risk of groundwater infiltration at wall lead-ins for brine pipes, watertight grommets must be used.



In addition to applicable local rules and regulations the installation should be carried out in a manner that prevents vibrations from the heat pump being transmitted into the house causing noise.

2.2 Refrigerant

2.2.1 Refrigerant

Caution



Work on the refrigerant circuit must only be carried out by a certified engineer!

Although the heat pump cooling system (refrigerant circuit) is filled with a chlorine-free and environmentally-approved refrigerant that will not affect the ozone layer, work on this system may only be carried out by authorized persons.

2.2.2 Fire risk

The refrigerant is not combustible or explosive in normal conditions.

2.2.3 Toxicity

In normal use and normal conditions the refrigerant has low toxicity. However, although the toxicity of the refrigerant is low, it can cause injury (or be highly dangerous) in abnormal circumstances or where deliberately abused.

Warning



Risk of personal injury! Spaces in which heavy vapour can collect below the level of the air must be well ventilated.

Refrigerant vapour is heavier than air and, in enclosed spaces below the level of a door for example, and in the event of leakage, concentrations can arise with a resultant risk of suffocation due to a lack of oxygen.

Warning



Risk of personal injury! Refrigerant exposed to a naked flame creates a poisonous irritating gas. This gas can be detected by its odour even at concentrations below its permitted levels. Evacuate the area until it has been sufficiently ventilated.

2.2.4 Work on the refrigerant circuit

Caution



When repairing the refrigerant circuit, the refrigerant must not be released from the heat pump, it must be treated in the appropriate way.

Draining and refilling must only be carried out using new refrigerant (for the amount and type of refrigerant see manufacturer's plate) through the service valves.

Caution



All warranties from Danfoss are void if, when filling with refrigerant other than Danfoss A/S specified refrigerant, if there has not been written notification that the new refrigerant is an approved replacement refrigerant together with other remedies.

2.2.5 Scrapping

Caution



When the heat pump is to be scrapped the refrigerant must be extracted for disposal. Local rules and regulations related to the disposal of refrigerant must be followed.

2.3 Electrical connection

Warning



Hazardous electrical voltage! The terminal blocks are live and can be highly dangerous due to the risk of electric shock. All power supplies must be isolated before electrical installation is started. The heat pump is connected internally at the factory, for this reason electrical installation consists mainly of the connection of the power supply.

Caution



Electrical installation may only be carried out by an authorized electrician and must follow applicable local and national regulations.

Caution



The electrical installation must be carried out using permanently routed cables. It must be possible to isolate the power supply using an all-pole circuit breaker with a minimum contact gap of 3 mm. (The maximum load for externally connected units is 2A).

2.4 Water quality

Caution



A normal heating system always contains a certain amount of corrosion particulates (rust) and sludge products from calcium oxide. This comes from acid that is naturally occurring in the fresh water that the system is filled with. It is not good practice to have to fill the heating system regularly which is why any leakage in the heating system should be repaired immediately. Normal filling should occur only once or twice a year. The water in the heating system should be as clean as possible, always position the dirt filter on the return line from the heating system to the heat pump, as close to the heat pump as possible.

Caution



Hard water; Normally it is not a problem installing a heat pump in areas with hard water because the normal operating temperature for the hot water does not exceed 60°C. In areas where there are exceptional prevailing conditions with the water one can install a softening filter, which softens the water, cleans any impurities and prevents the build up of calcification.

2.5 Commissioning

Caution

The installation may only be commissioned if the heating system and brine system have been filled and bled. Otherwise the circulation pumps can be damaged.

Caution

If the installation is only to be driven by the immersion heater during the installation, ensure that the heating system is filled and the brine pump and compressor cannot be started. This is carried out by setting the operating mode to AUX. HEATER.

3 Troubleshooting

3.1 Alarm

In event of alarm this is indicated in the display with the text ALARM and an alarm message, see following table. For alarms that are not reset automatically acknowledgement is required. Acknowledge the alarm by setting the heat pump to operating mode OFF and then back to the desired operating mode.

Message	Meaning
MOTOR P COMP.ERROR	The compressor motor protection has deployed.
MOTOR P FAN ERROR	The fan motor protection has deployed.
EL. HEATER ERROR	The electrical heater overheating protection has deployed.
HEAT / PRESSURE ERROR	The expected pressure and temperature change in the refrigerant circuit has not happened in the correct way at compressor start.
LOW PRESSURE ERROR	Evaporation pressure has fallen too low.
LOW PRESSURE TRANSDUCER	Fault in low pressure transmitter alternatively cable fault.
HIGH PRESSURE ERROR	High pressure switch has deployed.
LOW HEAT CIR. FLOW	The flow sensor has registered too low a flow.
MAX TEMP ELEC. HW	Too high temperature in heat pump junction box/electrical cabinet.
NO. OF TRIES X/5(where X=1...5)	Circulation pump is jammed. Start attempt made.
HEATING CIRC. PUMP	Circulation pump is jammed.
HEATING SYSTEM PUMP	Circulation pump is jammed.
OUTDOOR SENSOR	Sensor fault alternatively cable fault.
DEFROST SENSOR	Sensor fault alternatively cable fault. Defrost sensor.
SUPPLY LINE SENSOR	Sensor fault alternatively cable fault. Supply line sensor.
SYSTEM SUPPLY LINE SENSOR	Sensor fault alternatively cable fault. System supply line sensor.
RETURN LINE SENSOR	Sensor fault alternatively cable fault. Return line sensor.
HIGH RETURN LINE TEMP	Return line temperature too high
BUFFER TANK SENSOR	Sensor fault alternatively cable fault.
HGW SENSOR	Sensor fault alternatively cable fault.
HOT WATER SENSOR	Sensor fault alternatively cable fault (the lower sensor, Start sensor).
HOT WATER TOP	Sensor fault alternatively cable fault.
FAILSAFE MODE	Sensor fault alternatively cable fault on one of the refrigerant sensors. The heat pump goes to fail-safe mode and defrosts on time.
REFR.1 SENSOR	Sensor fault alternatively cable fault. Refrigerant sensor 1
REFR.2 SENSOR	Sensor fault alternatively cable fault. Refrigerant sensor 2
LOW RETURN TEMP 1	The return line temperature is too low to start a defrosting.
LOW RETURN TEMP 2	The return line has fallen too low during defrosting.
LOW EVAP. TEMP 1	Evaporation temperature too low.
LOW EVAP. TEMP 2	Too great a deviation in evaporation temperature average value.
SUCTION TEMP SENSOR	Sensor fault alternatively cable fault.
ROOM SENSOR	Sensor fault alternatively cable fault.
DISCHARGE PIPE SENSOR	Sensor fault alternatively cable fault.
DISTR. CIR. 1 SENSOR	Sensor fault alternatively cable fault.
DISTR. CIR. 2 SENSOR	Sensor fault alternatively cable fault.
POOL SENSOR	Sensor fault alternatively cable fault.
COM. ERROR HP-CARD	Communication broken between display card and heat pump card (outdoor).
COM. ERROR HUB-CARD	Communication broken between display card and hub card (indoor).

Message	Meaning
COM. ERROR EXV-CARD	Communication broken between display card and expansion valve control card (outdoor).
COM. ERROR EXPANSION CARD	Communication broken between display card and expansion card (indoor).



In event of alarm the heat pump will if possible supply heating to the house, primarily with the compressor, secondarily with the auxiliary heater. Hot water will stop to indicate that something noteworthy has occurred.

3.2 Components

3.2.1 Outdoor unit

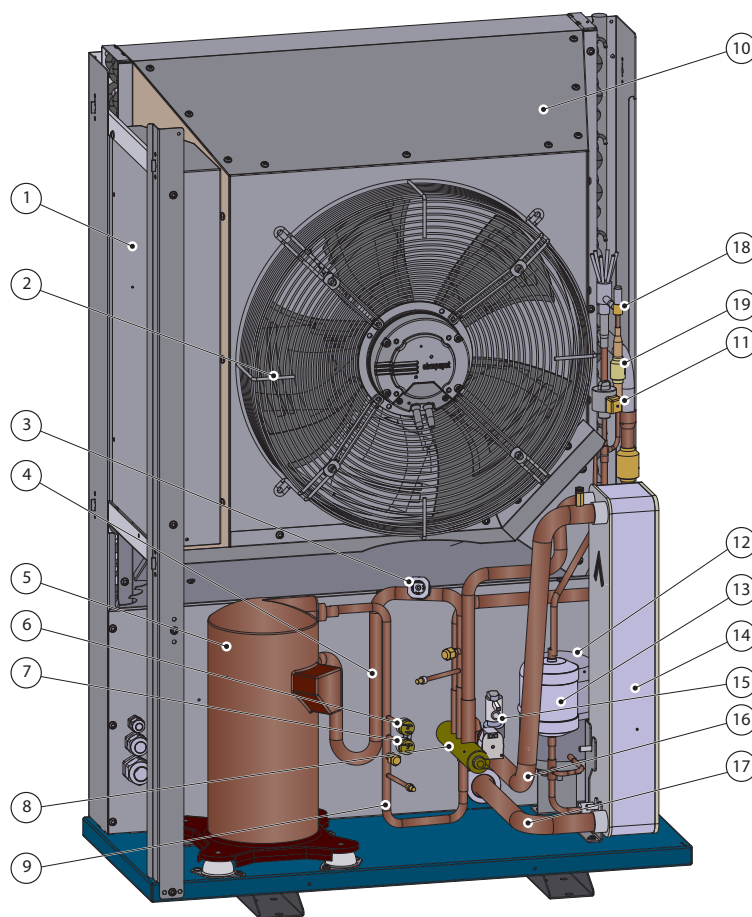
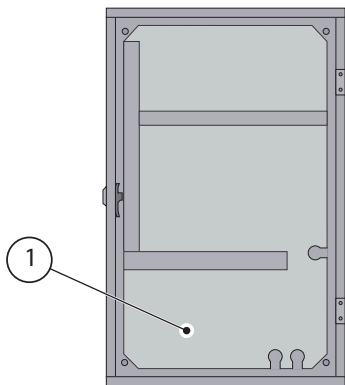


Fig. 1: Components

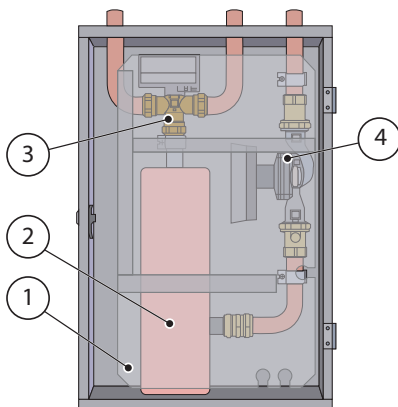
Position	Name	Position	Name
1	Electrical cabinet	11	Electronic expansion valve
2	Fan	12	Receiver
3	Pressure transmitter	13	Drying filter
4	Suction line	14	Heat exchanger
5	Compressor	15	Flow sensor
6	High pressure switch	16	Heating system supply line

Position	Name	Position	Name
7	Operating pressure switch	17	Return line heating system
8	Four-way valve	18	Solenoid
9	Discharge pipe	19	Non-return valve
10	Air heat exchanger		

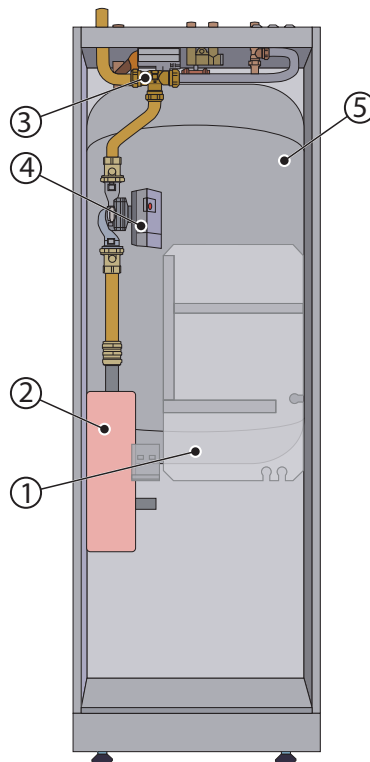
3.2.2 Indoor unit



DHP-AQ Mini



DHP-AQ Midi



DHP-AQ Maxi

1. Control module (transparent in image)
2. Immersion heater
3. Reversing valve
4. Circulation pump
5. Water heater

3.3 Measurement points

Caution



When reading the resistance of the sensors, the sensor leads must first be disconnected from the control equipment.

°C	Outdoor / Defrost sensor 150 ohm, Ω	PT1000 sensor 1000 ohm, Ω	Other sensors 22 kilo ohm, kΩ
-30	1884	-	-
-25	1443	-	-

°C	Outdoor / Defrost sensor 150 ohm, Ω	PT1000 sensor 1000 ohm, Ω	Other sensors 22 kilo ohm, kΩ
-20	1115	–	–
-15	868	–	–
-10	681	–	–
-5	538	–	–
0	428	1000	66,3
5	343	–	52,4
10	276	1039	41,8
15	224	–	33,5
20	183	1078	27,1
25	150	–	22,0
30	124	1117	18,0
35	103	–	14,8
40	86	1155	12,2
45	–	–	10,1
50	–	1194	8,5
55	–	–	7,1
60	–	1232	6,0
65	–	–	5,0
70	–	1271	4,2
75	–	–	3,7
80	–	–	3,1
85	–	–	2,7

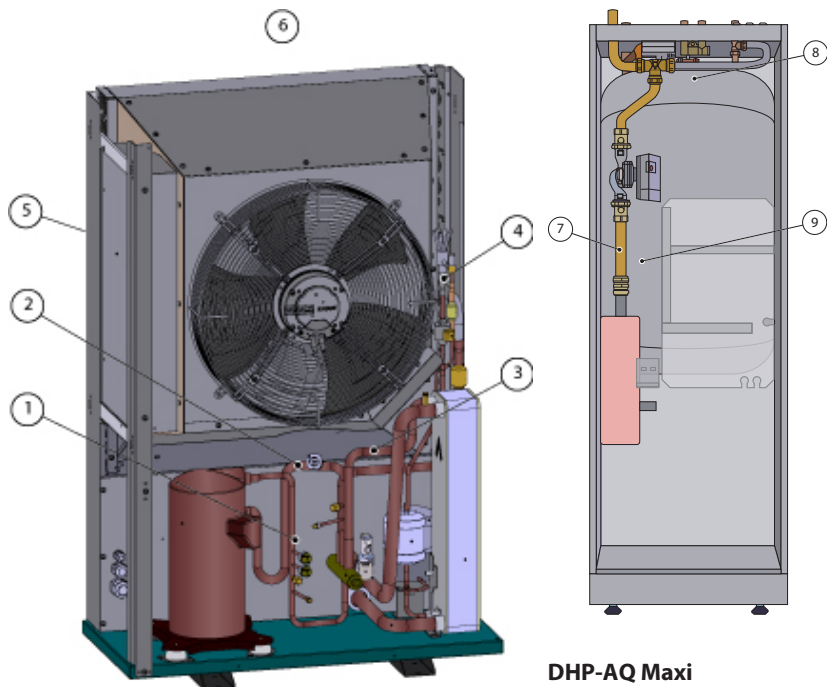
3.3.1 Measurement checking sensors during fault tracing

1. Disconnect the relevant sensor from I/O-card/terminal block.
2. Measure the resistance for the sensor and any extension cables.
3. Then measure the sensor only.



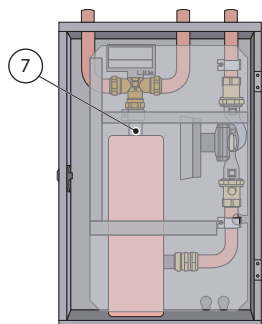
To ensure the sensor value the actual temperature must be checked against the measured resistance.

3.3.2 Positioning sensors



DHP-AQ Maxi

Heat pump



1. DISCHARGE PIPE SENSOR
2. SUCTION TEMP SENSOR
3. REFR.1 SENSOR
4. REFR.2 SENSOR
5. DEFROST SENSOR (located to rear beside air intake)
6. OUTDOOR SENSOR (positioned on wall to north)
7. SUPPLY LINE SENSOR
8. HOT WATER TOP
9. HOT WATER SENSOR

RETURN LINE SENSOR - Located on return pipe that runs to heat pump. See system solution in the Installation instructions.

DHP-AQ Midi

3.4 Check points

Temperatures

Condensing temperature:	0.5 – 1.5 °C above supply line temperature
Evaporation temperature:	7 - 8 °C
Radiator circuit:	8°K temperature difference
Overheating R407C:	4K ±1 K

Pressure switch/pressure transmitter Refrigerant R407C	Break pressure
OP (operating pressure switch)	2.85 MPa
High pressure switch	3,10 MPa
Pressure transmitter low pressure	0.04 MPa

Following parameters can be read off in the display:

- Suction gas temperature
- Evaporation pressure
- Evaporation temperature (calculated from "Dew point")
- Opening percent EXV
- Superheating

This means new opportunities to diagnose the heat pump, without having to remove the covers when working on the cooling circuit.

- In normal operation the heat pump operates with superheating of 5.5°C – 7°C, the expansion valve's degree of opening will vary depending on operating situation.
- At outdoor temperatures of -5°C or lower the opening degree is below 20%
- At outdoor temperatures of +5°C to +13°C the opening degree is around 40-50%
- When cooling (A35W18) the degree of opening is 100%

Caution



If superheating is >9°C and the degree of opening of the expansion valve lies steady at 100% this can indicate that a significant part of the refrigerant has leaked from the heat pump.
If this is the case, the heat pump must be checked by service technicians with personal refrigeration certificates!

3.5 Operational problems

The tables list the most probable and common causes of the problem first. When troubleshooting the cause of a problem start with the first cause and go down the list. There may be more than one way of troubleshooting a cause where the most probable is given first.

3.5.1 Alarm

Problem – Alarm LP (lower pressure transmitter)

Cause	Troubleshooting	Remedy
1. Cable break or loose cable to lower pressure transmitter.	<ul style="list-style-type: none"> ▪ Check that both cables are connected to the lower pressure transmitter. ▪ Using the buzzer, check that there are no cable breaks. In order to do this, disconnect the cables from the lower pressure transmitter and circuit board. 	If a cable has come loose, reconnect it. If there is a cable break, replace the cable.
2. The pressure transmitter opens too soon.	Pressure transmitter fault, opens at a higher pressure than indicated. Check break pressure using the manometer apparatus.	If the pressure transmitter breaks too early, replace it.
3. Lack of refrigerant, not enough refrigerant in the system.	Using manometer apparatus and thermometer, check that the unit's overheating is correct for the specific refrigerant.	Follow the correct procedure (depending on type of refrigerant) to add the correct amount of refrigerant. If there appears to be a leak in the refrigerant circuit, carry out leak tracing and any necessary corrective action.

Cause	Troubleshooting	Remedy
4. Drying filter blockage.	Check the temperature difference above the drying filter. A difference of max 1°C is permissible. If the difference is greater, the filter is blocked. Take a reading during operation.	If the drying filter is sealed, replace it.
5. Blocked evaporator on the refrigerant side.	Using manometer apparatus and thermometer, check that the unit's overheating is correct for the specific refrigerant.	If the evaporator is thought to be blocked by oil for example, try blowing nitrogen through it to release the oil. If this does not work, it must be replaced

Problem – Alarm HP (high pressure switch)

Cause	Troubleshooting	Remedy
1. Air in the heating system.	Listen for air in the heat pump and heating system.	Bleed the heating system according to the installation instructions.
2. Blocked strainer in the heating system.	Check that the strainer is not blocked.	Clean the strainer if necessary.
3. Closed or partially closed thermostats/valves in the heating system.	Check that the thermostats/valves in the heating system are open.	Open closed thermostats/valves.
4. The circulation pump that is defective or has jammed.	Is there voltage and 0 – 10V signal (applies to A classed circulation pumps) up to the circulation pump?	<p>Check that the circulation pump is active in the control system's manual test menu. Check if there is voltage to the circulation pump, if there is, and it does not run, the circulation pump is jammed. If this is the case, open the bleed screw and try to release the paddle wheel using a screwdriver for example (Does not apply to heat pumps in not valid).</p> <p>If there is no voltage to the circulation pump, check if there is voltage from the I/O card, see wiring diagram. If there is voltage from the I/O card, check the components between the I/O card and the circulation pump.</p> <p>If a component is defective, replace it.</p>
5. Shut-off main tap in heating system.	Check that the main tap is open.	Open closed main tap.
6. Cable break or loose cable to high pressure switch.	<ul style="list-style-type: none"> Check that both cables are connected to the pressure switch. Using the buzzer, check that there are no cable breaks. In order to do this, disconnect the cables from the pressure switch and circuit board. 	If a cable has come loose, reconnect it. If there is a cable break, replace the cable.
7. The high pressure switch does not open.	<ul style="list-style-type: none"> Incorrect pressure switch installed. Same or higher break pressure than the high pressure switch. See marking. Pressure switch fault, opens at a higher pressure than indicated (mark pressure). Check using the manometer apparatus. Defective pressure switch, never opens. 	If the high pressure switch does not open, replace it.

Cause	Troubleshooting	Remedy
8. The high pressure switch opens too soon.	<ul style="list-style-type: none"> Incorrect pressure switch installed. As low or lower break pressure than operating pressure switch. See marking. Pressure switch fault, opens at a lower pressure than indicated (mark pressure). Check using the manometer apparatus. Defective pressure switch, always open. 	If the high pressure switch opens too soon or is always open, replace it.
9. External system shunt that closes on time setting.	Check for shunts or valves in the system, which are timer-controlled, that close down the entire or too large a part of the heating system.	Always ensure that there is a sufficiently large water volume for the heat pump to work against, i.e. for the heat to give off its heat to.
10. Incorrectly facing non-return valve with too high opening pressure.	<ul style="list-style-type: none"> Check the system's direction of flow and that the non-return valve is turned the correct way. Check that the heat pump's external available pressure exceeds the non-return valve's opening pressure. 	<p>If the non-return valve is facing the wrong way, turn it.</p> <p>If the non-return valve has too great an opening pressure, replace it.</p>
11. Large pressure drop in the heating system.	<ul style="list-style-type: none"> Dirt in the heating system. Closed or partially closed thermostats/valves in the heating system. Under dimensioned pipe system. Check that the HP's external available pressure exceeds the system pressure drop. 	<p>If necessary, clean/flush the heating system. Open closed thermostats/valves.</p> <p>If there is not sufficient pressure equipment, the heating system can be adjusted according to the system solution for large pressure drop.</p>
12. Blocked condenser on the water side.	<p>If there is no strainer in the heating system, there is a risk of dirt sticking in the condenser and blocking it. Unfortunately there is no easy way of checking if the condenser is blocked.</p> <p>You can carry out a test by allowing the compressor and circulation pumps to remain in operation and after a while, check that the pressure pipe becomes hot and that the circulation pumps work (for circ.pumps with a bleed screw, unscrew it and feel if the pump rotor rotates using a screwdriver).</p> <p>Then read the temperature on both connection pipes to the condenser:</p> <p>If the temperature difference is <3°C, the condenser is probably blocked.</p> <p>If the temperature difference is 3-13°C, it is probably not blocked.</p> <p>If the temperature difference is >13°C, the condenser is probably blocked.</p>	If the condenser is thought to be blocked, try flushing it. If this does not work, it must be replaced
13. Blocked condenser on the refrigerant side.	Using manometer apparatus and thermometer, check that the unit's overheating is correct for the specific refrigerant.	If the condenser is thought to be blocked by oil for example, try blowing nitrogen through it to release the oil. If this does not work, it must be replaced
14. Overfilled refrigerant circuit.	Using manometer apparatus and thermometer, check that the unit's overheating is correct for the specific refrigerant.	<p>Follow the correct procedure (depending on type of refrigerant) to add the correct amount of refrigerant.</p> <p>If there appears to be a leak in the refrigerant circuit, carry out leak tracing and any necessary corrective action.</p>

Problem – Alarm (motor protection)

Cause	Troubleshooting	Remedy
1. Phase drop or blown fuse.	Check the fuses in the fuse box. Check that all phases are present on the terminal block for incoming supply. Also check that all wiring is secure, if screw terminals are used they must be properly tightened, if phoenix flat spring terminals are used, the cables must be secure in the correct hole with load on the cable.	If any of the phases are missing, check backwards towards the building's main electrical cabinet. If there are no phases there, contact the network supplier.
2. Cable break.	Check the supply to the motor protection, soft-starter or compressor.	If a cable is damaged, replace it.
3. Defective soft-starter (three-phase heat pump).	Measurement check and establish that when the Heat pump card gives a signal (there must be voltage between A1 & A2 on the soft-starter), the soft-starter releases all three phases down to the compressor.	If the soft-starter does not release the phases when it receives signals from the heat pump card, replace it.
4. Defective soft-starter (single phase heat pump).	Check measure and establish that when the Heat pump card gives a signal (there must be voltage between ON and N on the soft-starter), the soft-starter releases the phases to the compressor.	If the soft-starter does not release the phases when it receives signals from the heat pump card and does not alarm as below, replace it.
5. Defective or incorrectly set motor protection.	Use a hook-on meter to establish when the motor protection deploys, check what the motor protection is set to. Compare with the table. For three phase heat pumps all three phases must be supplied.	If the motor protection is defective, replace it. If incorrectly set, adjust to the correct value.
6. Defective compressor.	Measurement check the voltage on the phase(s) (each to zero) at the compressor. There must not be any large deviation between the phases. If measurement checking the winding's resistance the same value must be on one to three windings.	If the compressor is defective, replace it.
7. Alarm from single phase soft starter.	Check the fault cause using the soft start LEDs.	

Problem – Alarm sensor (all)

Cause	Troubleshooting	Remedy
Sensor fault alternatively cable fault.	<ul style="list-style-type: none"> When reading the resistance of the sensors, the sensor leads must first be disconnected from the control equipment or terminal block. First take a reading from the sensor including cable and check against the ohm table in Measurement points . If the read off value does not correspond with the table, only measure the sensor and check the ohm table in Measurement points . 	If the sensor gives a correct value, the cable is defective. If the sensor does not give a correct value, the sensor is defective.

Problem – Error phase sequence

Cause	Troubleshooting	Remedy
The incoming phases have the incorrect sequence (only applies to 3-phase heat pumps), appears after a minute when the compressor is started.	<ul style="list-style-type: none"> If the text HEAT / PRESSURE ERROR is displayed it can mean that the phases are in the incorrect order. When the compressor is running, check the pressure pipe temperature by feeling the pressure pipe. If the phases are correctly sequenced it should be hot (not just warm) even a distance from the compressor. When the compressor runs with the phases incorrectly sequenced a strange noise may be heard (loud, rattling) when the compressor runs backwards. 	If the phases are in the incorrect order, switch two incoming phases at the main terminal block and recheck according to the troubleshooting window.

Problem – Alarm electric heater error

Cause	Troubleshooting	Remedy
1. The overheating protection has tripped.	Check if the overheating protection has tripped.	If the overheating protection has tripped, reset it.
2. Phase drop. The alarm occurs when 230 V is not registered between L2 on the circuit board and N. Does not apply if MAX STEP = P.	<ul style="list-style-type: none"> Check if the overheating protection has tripped. Check if any cables at the circuit board or overheating protection are loose or damaged. 	If the overheating protection has tripped, reset it. If the cables are loose or damaged, secure or replace them.
3. Overheating protection fault, cannot be reset.	Press the reset button, measurement check for 230 V on the incoming and outgoing connections.	If the overheating protection is defective, replace it.
4. Flow sensor fault.	Check what the flow sensor shows. Is it a plausible/actual value? Measure the resistance of the sensor, check against the ohm table in Measurement points .	If the sensor is defective, replace it.
5. No or insufficient circulation in the heating system.	Check: <ul style="list-style-type: none"> That the circulation pump spins That the shut-off valves are open. That the strainer is not blocked. That there is no air in the heating system. 	The circulation pump may have jammed. If so, open the bleed screw and try to release the paddle wheel using a screwdriver for example. Open closed valves or taps. Check, and, if necessary, clean the strainer. If necessary, bleed the heating system according to the installation instructions

Problem – Alarm circulation pump

Cause	Troubleshooting	Remedy
The circulation pump's integrated alarm has deployed. (Only applies to not valid)	<ul style="list-style-type: none"> Air in the heating system. Has the circulation pump jammed? 	Vent the heating system and TWS coil. If the circulation pump has jammed, there is an integrated shake function that attempts to shake itself loose up to a maximum of 5 times, if it does not succeed, an alarm will occur. Try cutting the voltage to the heat pump to stop the alarm and then manually run the circulation pump.If the alarm recurs, repeat the procedure several times. If this does not help, replace the circulation pump.

Problem – Operating pressure switch open alternatively high hot gas temperature

Cause	Troubleshooting	Remedy
1. Operating pressure switch, function.	<ol style="list-style-type: none"> Switch off the main switch for the heat pump, wait until the compressor has been stationary for at least 15 minutes. Disconnect the two cables on the pressure switch, using a buzzer check if the pressure switch is closed. 	<p>If the pressure switch is closed, bridge the pressure switch cables temporarily and switch on the voltage to the heat pump again. If there is an indication 0 (zero) in the display this means that the pressure switch is fault-free and the problem is in the wiring or in the circuit board.</p> <p>If the pressure switch is open, try carefully tapping the head of the pressure switch with a screwdriver and use a buzzer test to see if it has closed again.</p> <p>Replace the pressure switch if it appears to jam repeatedly.</p>
2. Fault in the discharge pipe sensor.	<p>Check what the discharge pipe sensor shows. Is it a plausible/actual value? Measure the resistance of the discharge pipe sensor, check against the ohm table in Measurement points .</p>	<p>If the discharge pipe sensor is defective, replace it.</p>
3. Hot gas temperature too high.	<p>The discharge pipe sensor displays more than 140°C. See operating data.</p>	<p>The square symbol appears when the delivery pipe temperature is as high or greater than the maximum temperature of the discharge pipe 140°C.</p>
4. Lack of refrigerant, not enough refrigerant in the system.	<p>Using manometer apparatus and thermometer, check that the unit's overheating is correct for the specific refrigerant.</p>	<p>Follow the correct procedure (depending on type of refrigerant) to add the correct amount of refrigerant.</p> <p>If there appears to be a leak in the refrigerant circuit, carry out leak tracing and any necessary corrective action. If leak tracer is not available, brush soap water on the suspected leak and look for bubbles. Also check for oil as this can come out from the refrigerant circuit.</p>

3.5.2 Leakage

Problem – Leak fluid side

Cause	Troubleshooting	Remedy
1. Insufficiently tightened connections.	<p>Locate the leak.</p>	<ul style="list-style-type: none"> Tighten the connection and check that it is sealed. If it is still not sealed, replace the entire connection and support sleeve (only at soft pipes).
2. Defective gasket or O-ring.	<p>Locate the leak.</p>	<p>Replace the gasket or O-ring.</p>
3. Cracked nut or connection.	<p>Locate the leak.</p>	<p>Replace nut or connection.</p>
4. There is no overflow pipe connected to the safety valve(s).	<p>Establish which safety valve does not have an overflow pipe.</p>	<p>Install an overflow pipe according to the applicable norms.</p>
5. Filler valve between incoming cold water and heating system not closed or leaking.	<p>Check whether water continuously leaks from the safety valve on the expansion vessel on the hot side.</p>	<p>Try closing the filler valve and see if water stops dripping from the safety valve. If not, replace the filler valve.</p>

Cause	Troubleshooting	Remedy
6. Leak at soldered joints.	Locate the leak.	Drain the system of fluid, repair the leak. If the leak is on the connection pipe to the heat exchanger, also drain the refrigerant side.
7. Associated leakage in the condenser.	<ul style="list-style-type: none"> Check for lack of refrigerant in the unit. Check by smelling at the safety valve on the hot side, open the valve and check. 	If the condenser has a leak, replace it.
8. Leak at soldered joint on water heater (only applies to DHP-AQ Maxi DHP-AQ Maxi)	Locate the leak.	If there is a leak at the soldered joint, replace the water heater.
9. Associated leakage on plate heat exchanger (only applies to DHP-AQ Maxi DHP-AQ Maxi)	<ul style="list-style-type: none"> Check for lack of refrigerant in the unit Check by smelling at the safety valve on the hot side, open the valve and check. 	If there is leakage, replace plate heat exchanger.

3.5.3 Noise

Problem – Noise problem in the radiator system

Cause	Troubleshooting	Remedy
1. Flexible hoses missing.	Flexible hoses must be installed according to the instructions.	Install flexible hoses according to the instructions.
2. Incorrectly installed flexible hoses.	Flexible hoses must be installed according to the instructions.	Install flexible hoses according to the instructions.
3. Installing/suspending pipes.	Check if vibrations are transmitted via one of the pipe mountings in the installation.	Remove or move the mounting point or install vibration isolating mounting parts.
4. Circulation noise (whistling noise in the heating system).	<p>Check the heating system.</p> <ul style="list-style-type: none"> Closed valves, choke valves, adjuster valves or other restrictions in the radiator system can cause circulation noise. Is the heating system correctly adjusted for flow? Too great a flow in the heating system can cause circulation noise. 	<p>If the incorrect type of valve is used to choke the flow, replace with the correct type.</p> <p>If the heating system is not correctly adjusted, make adjustments.</p> <p>Can the heating system be run at a lower flow?</p>
5. Clicking.	<ul style="list-style-type: none"> Check that the volume tank is installed and has the correct dimensions for the relevant system. See the installation instructions. Establish when clicking occurs, during heating and/or in connection with completed hot water production? Locate the clicking noises. 	<p>A surge tank can be installed on the supply line to mix the hot water with the existing, slightly cooler, water, before it goes out to the radiators.</p> <p>Try lubricating lead-ins in walls, ceilings and floors with silicone spray.</p>

Problem – Loud compressor noise

Cause	Troubleshooting	Remedy
1. Phase drop. The compressor attempts to start or operates on two phases (only applies to 3 phase heat pumps) .	<ol style="list-style-type: none"> 1. Check that there is 400 V between incoming phases on the heat pump. 2. If there is supply to the heat pump, measure the voltage for all electrical components all the way to the compressor, see wiring diagram. 	Check where the phase drop is and rectify.
2. Touching pipes – vibrations.	Establish which pipe(s) is/are causing the problem.	Try to remove the contact:
3. Compressor fault	Determine whether the compressor is unusually loud. <ul style="list-style-type: none"> ▪ Check with a voltmeter at a point before and after the soft starter. The measurement values should not differ. 	If the compressor is defective, replace it.

Problem – Shrieking, whistling noise

Cause	Troubleshooting	Remedy
1. Noise from the soft-starter.	Measurement check the input and output phases for the soft-starter as well as the control signals from the heat pump card, see wiring diagram.	If the soft-starter is defective, replace it.
2. The compressor's safety valve opens.	The compressor has an integrated safety valve that opens when the pressure difference between high and low pressure sides is too large. A whistling sound can be heard during pressure equalisation. Use a manometer to check at which pressure differential pressure equalisation occurs.	Replace the compressor if the valve opens at too low pressure or when the compressor is stationary.

Problem – Noise – miscellaneous

Cause	Troubleshooting	Remedy
1. Vibrating protective sleeves on the pressure switches.	Establish where the vibration noise is coming from.	Prevent the protection sleeve vibrating by using insulation tape for example.
2. Vibration noise from the electrical installation.	Check for electrical steps or similar devices screwed to the heat pump and wall. These can cause vibrations and noise.	Carry out according to the installation instructions.

3.5.4 Hot-water

Problem – Temperature and/or quantity

Cause	Troubleshooting	Remedy
1. Defective 3-way valve motor.	Check the function of the reversing valve by test running it manually.	If the motor is defective, replace it.
2. Jammed reversing valve. The valve is not secure and releases hot water to the radiators during hot water production.	Detach the motor and test closing and opening the valve by turning the shaft by hand.	If it jams, replace with a new one.
3. Air in TWS coil or water outer jacket.	During hot water production: <ul style="list-style-type: none"> ▪ Listen for air. ▪ Check the temperature difference between supply and return line. 	Bleed the system. A Large temperature difference can indicate air in the system.
4. Start temperature set too high for hot water production.	Check that the start temperature is correctly set. Should not be set above the factory set value.	<ul style="list-style-type: none"> ▪ If the start value is set too high, reduce it to the factory set value.

Cause	Troubleshooting	Remedy
5. Sensor fault, hot water sensor. Hot water production is started by the hot water sensor.	Check what the hot water sensor (the start sensor) shows. Is it a plausible/actual value? Measure the resistance of the sensor, check against the ohm table in Measurement points .	If the sensor is defective, replace it.
6. Large drain flow (>12 l/min).	Check how many litres of hot water (approx. 40°C) per minute drains from the tap. Use a clock and bucket to measure the drain flow.	If the drain water flow is greater than 12 l/min, stratification in the water heater is affected, which reduces the hot water capacity. Suggested corrective actions: <ul style="list-style-type: none"> ▪ Install a pressure reduction valve on the incoming cold water pipe. ▪ Change to a mixer with lower flow. ▪ Adjust the drain flow on the existing mixer, do not open the tap fully.
7. Water heater too small in relation to requirement.	How large is the requirement and what is the capacity of the heater?	Replace with a larger heater or supplement with an extra heater. E.g. supplement with an DWH DWH or an electric heater.
8. The operating pressure switch opens too soon (at too low a pressure). Hot water production ends when the operating pressure switch opens.	Check the break pressure using manometer apparatus.	If the pressure switch opens at the incorrect pressure, replace it. The replacement pressure switch can be installed on the service output (Schrader valve).
9. Insufficient exchange surface to transfer the heat pump's output to the heater. (Only applies to heat pumps with a separate heater.)	Is the exchange surface too small? Can the heater cope with the heat pump's output?	Replace with a heater with a larger exchange surface.
10. Heat loss in the hot water pipe.	Open the hot water tap, read off the temperature on the outgoing hot water pipe from the heat pump and the temperature of the hot water. The temperature difference measured between the heat pump and hot water indicates the temperature loss. Examples of temperature loss causes: <ul style="list-style-type: none"> ▪ Long water pipes. ▪ Uninsulated hot water pipes. ▪ Hot water pipes routed through cold areas. Other causes that can affect the hot water temperature: <ul style="list-style-type: none"> ▪ Is a mixer valve installed in the system? Temperature set too low on the mixer valve? Leaking mixer valve? ▪ Water tap fault? Leaking thermostat mixer? ▪ VVC loss. 	If any problems occur during troubleshooting as per the points, carry out corrective actions. To quickly check that the heat pump's hot water production works as it should, drain the hot water so that the heat pump starts to produce the hot water. When done, read off the temperature on the top sensor and on the start sensor. The top sensor should show a temperature of around 50 - 55°C and the start sensor around 45 - 48°C. If, after completed hot water production, these temperatures are obtained, this means that you have the correct temperature and volume of hot water in the water heater.

3.5.5 Heating comfort

Problem – Too cold

Cause	Troubleshooting	Remedy
1. The heat pump's control computer is not set/adjusted to the customer's requirements/wishes.	Check the ROOM and CURVE and MAX settings.	Adjust incorrect values in the heat pump's control computer. ROOM = Desired indoor temperature CURVE = Should be set so that the desired indoor temperature (ROOM) is maintained regardless of the outdoor temperature. MAX = Highest set-point value on the supply line regardless of the outdoor temperature.
2. Incorrect operating mode set in the heat pump's control computer.	Check which operating mode is set.	If the incorrect operating mode is set, change to the desired operating mode.
3. Sensor fault, OUTDOOR/ ROOM/SUPPLY LINE/ RETURN LINE.	Check what the relevant sensor shows. Is it a plausible/ actual value? Measure the resistance of the sensor, check against the ohm table in Measurement points .	If the sensor is defective, replace it.
4. The 3-way valve has jammed in hot water mode.	<ol style="list-style-type: none"> 1. Check the function of the 3-way valve motor by test running it manually. If the motor does not shift mode during manual test operation, check that there is voltage to the motor, see wiring diagram. 2. Detach the motor and test closing and opening the valve by turning the shaft by hand. 	Is the motor being supplied with voltage according to the wiring diagram in both operating instances? MANUAL TEST – REV.V. HOT WATER 0=Radiator mode 1=Hot water mode If there is voltage to the motor but it does not shift mode, replace it.
5. Defective electric heating element.	Use a buzzer and check if all coils in the electric heating element are intact.	If the electric heating element is defective, replace it.
6. The heat pump has stopped on HIGH RETURN.	<ul style="list-style-type: none"> ▪ Check what the MAX RETURN value is set at in the heat pump's control computer. It must be adjusted to the unit's maximum supply temperature and the system's delta temperature so that it does not cut at too high a return temperature when the highest supply temperature is transmitted. ▪ Check what the return line sensor shows. Is it a plausible/actual value? If not, take a resistance reading from the sensors and check against the ohm table in Measurement points . 	If the MAX RETURN value is not adjusted for the system according to the troubleshooting window, adjust it. If the sensor is defective, replace it.
7. Heat production is stopped by the HYSTERESIS function.	<p>If the flow temperature rises as soon as heat production is stopped by HYSTERESIS before INTEGRAL reaches 0, there may be heating deficit in the house.</p> <ul style="list-style-type: none"> ▪ Check if heat production stops because the hysteresis value is set too low? (See the installation instructions for factory setting.) ▪ Check if heat production stops because thermostats/ valves in the heating system are closed or partially closed? ▪ Check if heat production stops because the heating system is under dimensioned? 	<ul style="list-style-type: none"> ▪ Try increasing the hysteresis value until the heat pump stops on INTEGRAL instead. ▪ Open thermostats/valves in the heating system and check that the heat pump stops on INTEGRAL. ▪ If the heating system is deemed to be under dimensioned, the system must be extended (the heat emitting surface increased).

Cause	Troubleshooting	Remedy
<p>8. The auxiliary heater is not permitted to cut in with sufficient output. Value set too low on MAXSTEP.</p> <p>MAXSTEP 1 = 3 kW</p> <p>MAXSTEP 2 = 6 kW</p> <p>MAXSTEP 3 = 9 kW</p> <p>MAXSTEP 4 = 12 kW</p> <p>MAXSTEP 5 = 15 kW</p>	<p>Check the set value on MAXSTEP in the heat pump's control computer.</p>	<p>If necessary, adjust the MAXSTEP value in the heat pump's control computer. 230V 1-N MAXSTEP 1 – 3400 V 3-N: MAXSTEP 1 – 5 MAXSTEP 1 = 3 kW</p> <p>MAXSTEP 2 = 6 kW</p> <p>MAXSTEP 3 = 9 kW</p> <p>MAX STEP 4 = 12 kW (cannot cut in when the compressor is running.)</p> <p>MAX STEP 5 = 15 kW (cannot cut in when the compressor is running.)</p>
<p>9. The external auxiliary heater does not start when the heat pump's control computer requests it.</p>	<p>If an external auxiliary heater is used, check that it is correctly installed by test running it in MANUAL TEST – EXT.AUX.HEATER - 1. If it does not start at manual test operation, check that the start signal/voltage comes from the heat pump. See wiring diagram.</p>	<p>Connect the external auxiliary heater according to the instructions. Measure the voltage on the I/O card's probe L2 Oil/Electricity.</p>
<p>10. Closed or partially closed thermostats/valves in the heating system.</p>	<p>Check that the thermostats/valves in the heating system are open.</p>	<p>Open closed thermostats/valves.</p>
<p>11. The total output of the heat pump and auxiliary heater is too low in relation to the building's power demand.</p>	<p>What is the building's power demand? What is the output of the heat pump?</p> <p>What is the output of the auxiliary heater, what is it set to?</p>	<p>Ensure that available power is at least as great as the building's power demand.</p>
<p>12. Under dimensioned heating system.</p>	<p>Check existing heating system. What output is it dimensioned for to produce at what supply temperature?</p> <p>What output is required to keep the room warm?</p>	<p>If the heating system is dimensioned for greater supply temperatures than the heat pump can provide, it must be adjusted by increasing the heat emitting surface for example. If the room requires a higher output than the heating system can provide, extend the heating system.</p>
<p>13. Changed conditions Have you increased your heating and/or hot water demand?</p>	<ul style="list-style-type: none"> ▪ If the heat pump has been dimensioned for a certain demand and this demand is increased, the heat pump might not be able to maintain the desired room temperature. ▪ If hot water consumption increases, a larger proportion of time is used to produce hot water, which means less time for heat production (only applies to system solution 1). 	<p>If the heat pump cannot cope with the demand, replace it with one with a higher output or supplement it with a higher output auxiliary heater.</p>

Problem – Too hot

Cause	Troubleshooting	Remedy
1. The heat pump's control computer is not set/adjusted to the customer's requirements/wishes.	Check the ROOM and CURVE and MIN settings.	Adjust incorrect values in the heat pump's control computer. ROOM = Desired indoor temperature. CURVE = Should be set so that the desired indoor temperature (ROOM) is maintained regardless of the outdoor temperature. MIN = Lowest set-point value on the supply line regardless of the outdoor temperature.
2. Sensor fault, OUTDOOR/ROOM/SUPPLY LINE.	Check what the relevant sensor shows. Is it a plausible/actual value? Measure the resistance of the sensor, check against the ohm table in Measurement points .	If the sensor is defective, replace it.
3. Defective 3-way valve motor. The motor should set the valve to the relevant position depending on operating conditions. If it does not, hot water from the water heater will mix with the radiator water.	Check the function of the 3-way valve motor by test running it manually. If the motor does not shift mode during manual test operation, check that there is voltage to the motor, see wiring diagram.	Is the motor being supplied with voltage according to the wiring diagram in both operating instances? MANUAL TEST – REV.V. HOT WATER 0=Radiator mode 1=Hot water mode If there is voltage to the motor but it does not shift mode, replace it.
4. Jammed reversing valve. If the valve is not sealed, hot water from the water heater will mix with the radiator water.	Detach the motor and test closing and opening the valve by turning the shaft by hand.	If it is sluggish or jams, replace with a new one.

Problem – Irregular indoor temperature

Cause	Troubleshooting	Remedy
<p>1. The heat pump's control computer is not set/adjusted to the customer's requirements/wishes.</p>	<p>Check the ROOM and CURVE, MIN, MAX CURVE5, CURVE0, CURVE-5 and HEAT STOP settings.</p>	<p>Adjust incorrect values in the heat pump's control computer.</p> <p>ROOM = Desired indoor temperature</p> <p>CURVE = Should be set so that the desired indoor temperature (ROOM) is maintained regardless of the outdoor temperature.</p> <p>MIN = Lowest set-point value on the supply line regardless of the outdoor temperature (on the condition that heat stop does not apply).</p> <p>MAX = Highest set-point value on the supply line regardless of the outdoor temperature.</p> <p>CURVE5,0,-5 =The supply temperature can be adjusted up or down 5°C at these outdoor temperatures.</p> <p>HEAT STOP = Stops all production of heat when the outdoor temperature is the same as or greater than the set value. To exit heat stop the outdoor temperature must drop to 3°C below the set value.</p>
<p>2. Incorrectly positioned/installed sensors.</p>	<p>Check that outdoor sensors and any room sensors are installed according to the instructions and that they are calibrated.</p>	<ul style="list-style-type: none"> ▪ Check that the room sensor is positioned in a suitable place that is representative of the building and calibrate it if necessary. Avoid placing near external doors, windows and heat sources. ▪ Install the outdoor sensor according to the instructions and calibrate it, if necessary.

3.5.6 Other

Problem – The heat pump runs and runs but never stops

Cause	Troubleshooting	Remedy
1. Air in the heating system.	Listen for air in the heat pump and heating system.	Bleed the heating system according to the installation instructions.
2. Changed conditions Have you increased your heating and/or hot water demand?	<ul style="list-style-type: none"> If the heat pump has been dimensioned for a certain demand and this demand is increased, the heat pump might not be able to maintain the desired room temperature. If hot water consumption increases, a larger proportion of time is used to produce hot water, which means less time for heat production. 	If the heat pump cannot cope with the demand, replace it with one with a higher output or supplement it with a higher output auxiliary heater.
3. Lack of refrigerant, not enough refrigerant in the system.	Using manometer apparatus and thermometer, check that the unit's overheating is correct for the specific refrigerant.	Follow the correct procedure (depending on type of refrigerant) to add the correct amount of refrigerant. If there appears to be a leak in the refrigerant circuit, carry out leak tracing and any necessary corrective action. If leak tracer is not available, brush soap water on the suspected leak and look for bubbles. Also check for oil as this can come out from the refrigerant circuit.

Problem – Runs on electric heating element

Cause	Troubleshooting	Remedy
1. Operating mode AUX. HEATER is selected.	If this operating mode is selected, the auxiliary heater is used for heating and hot water production, not the compressor.	If AUX. HEATER mode is selected and you no longer want it, change to AUTO, the heat pump then controls both the compressor and auxiliary heater.
2. The compressor cannot run due to an alarm.	Check the alarm that is indicated in the display.	Rectify the problem and reset the alarm. See Alarm .
3. The integral value has reached the start level for the auxiliary heater.	Check what the integral value is in the control system.	If the auxiliary heater is in operation because the integral value has counted down to the start value, the computer reacts as it should, see the Installation instructions for further information.
4. Peak heat operation (anti-legionella function) is running.	Check if the heat pump runs peak heat.	Peak heat operation occurs in connection with hot water production with the set interval. The compressor should then start to produce hot water and 2 minutes later the auxiliary heater starts. The compressor must then stop and the stop temperature be reached with only the auxiliary heater connected. Take no corrective action.
5. The heat pump has stopped on HIGH RETURN.	<ul style="list-style-type: none"> Check what the MAX RETURN value is set at in the heat pump's control computer. It must be adjusted to the unit's maximum supply temperature and the system's delta temperature so that it does not cut at too high a return temperature when the highest supply temperature is transmitted. Check what the return line sensor shows. Is it a plausible/actual value? If not, take a resistance reading from the sensors and check against the ohm table in Measurement points . 	If the MAX RETURN value is not adjusted for the system according to the troubleshooting window, adjust it. If the sensor is defective, replace it.

Cause	Troubleshooting	Remedy
6. The compressor runs backwards. The incoming phases have the incorrect sequence (only applies to 3-phase heat pumps). If the compressor runs backwards, it will not cope with compressing the refrigerant and therefore does not produce the correct power, which leads to the control system requesting auxiliary heating.	<ul style="list-style-type: none"> If the text ERR PHASE SEQ. appears in the display when the heat pump is powered, (only appears in the first 10 minutes) this means that the phases have the incorrect sequence. When the compressor is running, check the pressure pipe temperature by feeling the pressure pipe. If the phases are correctly sequenced it should be hot (not just warm) even a distance from the compressor. When the compressor runs with the phases incorrectly sequenced a strange noise may be heard (loud, rattling) when the compressor runs backwards. 	If the phases are in the incorrect order, switch two incoming phases at the main terminal block and recheck according to the troubleshooting window.
7. Changed conditions Have you increased your heating and/or hot water demand?	<ul style="list-style-type: none"> If the heat pump has been dimensioned for a certain demand and this demand is increased, the heat pump might not be able to maintain the desired room temperature. If hot water consumption increases, a larger proportion of time is used to produce hot water, which means less time for heat production. 	If the heat pump cannot cope with the demand, replace it with one with a higher output or supplement it with a higher output auxiliary heater.

Problem – The auxiliary heater is in operation but not the compressor

Cause	Troubleshooting	Remedy
1. Operating mode AUX. HEATER is selected.	If this operating mode is selected, the auxiliary heater is used for heating and hot water production, not the compressor.	If AUX. HEATER mode is selected and you no longer want it, change to AUTO, the heat pump then controls both the compressor and auxiliary heater.
2. Peak heat operation (anti-legionella function) is running.	Check if the heat pump runs peak heat.	Peak heat operation occurs in connection with hot water production with the set interval. The compressor should then start to produce hot water and 2 minutes later the auxiliary heater starts. The compressor must then stop and the stop temperature be reached with only the auxiliary heater connected. Take no corrective action, this is normal.
3. The compressor cannot run due to an alarm.	Check the alarm that is indicated in the display.	Rectify the problem and reset the alarm.
4. The heat pump has stopped on high return.	<ul style="list-style-type: none"> Check what the MAX value is set at in the heat pump's control computer. It must be adjusted to the unit's maximum supply temperature and the system's delta temperature so that it does not cut at too high a return temperature when the highest supply temperature is transmitted. Check what the return line sensor shows. Is it a plausible/actual value? If not, take a resistance reading from the sensors and check against the ohm table in Measurement points. 	<ul style="list-style-type: none"> If the MAX RETURN value is not adjusted for the system according to the troubleshooting window, adjust it. If the sensor is defective, replace it.

Cause	Troubleshooting	Remedy
5. The compressor has been stopped by the operating pressure switch or delivery line sensor.	<p>Check if a square appears in the display's lower left corner. If so, the operating pressure switch is open or the delivery pipe sensor triggers an alarm for too high temperature.</p> <ul style="list-style-type: none"> ▪ The operating pressure switch is most easily checked by using a buzzer to see if it is connected. ▪ The pressure pipe sensor value is read off from the control system in the HEAT PUMP menu. Is it a plausible/actual value? If not, take a resistance reading from the sensor and check against the ohm table in Measurement points . ▪ The compressor has been stopped by the delivery line sensor and you have established that it shows the correct temperature. This may have been caused by a leak in the refrigerant circuit. 	<p>If the operating pressure switch has stuck in the open position, try gently tapping on the pressure switch head. If this does not help, or it sticks in the open position repeatedly, replace the pressure switch. If the delivery line sensor is defective, replace it. If the delivery line temperature gets so hot that the compressor stops, start by leak-tracing the unit. Rectify the leak, if a leak is found. If no leak is found, try draining and refilling the unit and then restarting the heat pump and seeing what the delivery line temperature is. If the problem persists, replace the compressor.</p>
6. The compressor runs backwards. The incoming phases have the incorrect sequence (only applies to 3-phase heat pumps). If the compressor runs backwards, it will not cope with compressing the refrigerant and therefore does not produce the correct power, which leads to the control system requesting auxiliary heating.	<ul style="list-style-type: none"> ▪ If the text ERR PHASE SEQ. appears in the display when the heat pump is powered, (only appears in the first 10 minutes) this means that the phases have the incorrect sequence. ▪ When the compressor is running, check the pressure pipe temperature by feeling the pressure pipe. If the phases are correctly sequenced it should be hot (not just warm) even a distance from the compressor. ▪ When the compressor runs with the phases incorrectly sequenced a strange noise may be heard (loud, rattling) when the compressor runs backwards. 	<p>If the phases are in the incorrect order, switch two incoming phases at the main terminal block and recheck according to the troubleshooting window.</p>
7. The built-in overheating protection (bi-metal protection) in the compressor has tripped.	<p>Check if the heat pump's control computer indicates that the compressor is in operation, and if there is voltage in the soft-starter control inputs. Then read off and check that there is voltage on the compressor's electrical connection(s).</p>	<p>If there is voltage on the compressor's electrical connection(s) and the overheating protection does not close when the compressor has not run and has cooled down for at least 1 hour, replace the compressor.</p>

Problem – The heat pump consumes too much energy

Cause	Troubleshooting	Remedy
1. Blocked strainer in the heating system.	<p>Check that the strainer is not blocked.</p>	<p>Clean the strainer if necessary.</p>
2. The compressor cannot run due to an alarm.	<p>Check the alarm that is indicated in the display.</p>	<p>Rectify the problem and rest the alarm. See section Alarm .</p>
3. Incorrect flow over hot side of the heat pump.	<p>Measurement check what the difference between the supply and return line is using a thermometer (Δt). The difference should be about 8°C (can vary depending on refrigerant). A lower Δt results in reduced efficiency in the heat pump.</p>	<p>Adjust the system to obtain the correct Δt.</p>
4. The heat pump's control computer is not set/adjusted to the customer's requirements/wishes.	<p>Check the ROOM and CURVE and MIN settings.</p>	<p>Adjust incorrect values in the heat pump's control computer. ROOM = Desired indoor temperature CURVE = Should be set so that the desired indoor temperature (ROOM) is maintained regardless of the outdoor temperature. MIN = Lowest set-point value on the supply line regardless of the outdoor temperature.</p>

Cause	Troubleshooting	Remedy
5. The interval for peak heat operation has changed to a lower value than the factory set value. This results in the heat pump going into peak heat operation more often than calculated.	Check the specified interval for peak heat operation in the control computer.	If there is a shorter interval between the peak heat productions, this explains why the unit consumes more current than calculated, but this does not mean for sure that it should be increased, there might be a reason why the interval has been changed.
6. The heat pump has stopped on HIGH RETURN.	<ul style="list-style-type: none"> Check what the MAX RETURN value is set at in the heat pump's control computer. It must be adjusted to the unit's maximum supply temperature and the system's delta temperature so that it does not cut at too high a return temperature when the highest supply temperature is transmitted. Check what the return line sensor shows. Is it a plausible/actual value? If not, take a resistance reading from the sensors and check against the ohm table in Measurement points . 	If the MAX RETURN value is not adjusted for the system according to the troubleshooting window, adjust it. If the sensor is defective, replace it.
7. The compressor runs backwards. The incoming phases have the incorrect sequence (only applies to 3-phase heat pumps). If the compressor runs backwards, it will not cope with compressing the refrigerant and therefore does not produce the correct power, which leads to the control computer requesting auxiliary heating.	<ul style="list-style-type: none"> If the text ERR PHASE SEQ. appears in the display when the heat pump is powered, (only appears in the first 10 minutes) this means that the phases have the incorrect sequence. When the compressor is running, check the pressure pipe temperature by feeling the pressure pipe. If the phases are correctly sequenced it should be hot (not just warm) even a distance from the compressor. When the compressor runs with the phases incorrectly sequenced a strange noise may be heard (loud, rattling) when the compressor runs backwards. 	If the phases are in the incorrect order, switch two incoming phases at the main terminal block and recheck according to the troubleshooting window.
8. The compressor has been stopped by the operating pressure switch or delivery line sensor.	<p>Check if a square appears in the display's lower left corner. If so, the operating pressure switch is open or the delivery pipe sensor triggers an alarm for too high temperature.</p> <ul style="list-style-type: none"> The operating pressure switch is most easily checked by using a buzzer to see if it is connected. The delivery line sensor value is read off from the control computer in the HEAT PUMP menu. Is it a plausible/actual value? If not, take a resistance reading from the sensor and check against the ohm table in the installation instructions. The compressor has been stopped by the delivery line sensor and you have established that it shows the correct temperature. This may have been caused by a leak in the refrigerant circuit. 	If the operating pressure switch has stuck in the open position, try gently tapping on the pressure switch head. If this does not help, or it sticks in the open position repeatedly, replace the pressure switch. If the delivery line sensor is defective, replace it. If the delivery line temperature gets so hot that the compressor stops, start by leak-tracing the unit. Rectify the leak, if a leak is found. If no leak is found, try draining and refilling the unit and then restarting the heat pump and seeing what the delivery line temperature is. If the problem persists, replace the compressor.
9. Expansion valve defective or incorrectly set.	Using manometer apparatus and thermometer check what the overheating reading of the unit is.	If the expansion valve is defective, replace it.
10. Lack of refrigerant, not enough refrigerant in the system.	Using manometer apparatus and thermometer, check that the unit's overheating is correct for the specific refrigerant.	If there appears to be a leak in the refrigerant circuit, carry out leak tracing and any necessary corrective action. If leak tracer is not available, brush soap water on the suspected leak and look for bubbles. Also check for oil as this can come out from the refrigerant circuit.

Cause	Troubleshooting	Remedy
11. Overfilled refrigerant circuit.	Using manometer apparatus and thermometer, check that the unit's overheating is correct for the specific refrigerant.	Follow the correct procedure (depending on type of refrigerant) to add the correct amount of refrigerant.
12. Changed conditions Have you increased your heating and/or hot water demand?	<ul style="list-style-type: none"> If the heat pump has been dimensioned for a certain demand and this demand is increased, the heat pump might not be able to maintain the desired room temperature. If hot water consumption increases, a larger proportion of time is used to produce hot water, which means less time for heat production. 	If the heat pump cannot cope with the demand, replace it with one with a higher output or supplement it with a higher output auxiliary heater.

Problem – Auxiliary heater cuts in too soon

Cause	Troubleshooting	Remedy
1. The heat pump's control computer is not set/adjusted to the customer's requirements/wishes.	Check the ROOM, CURVE, INTEGRAL A1 and INTEGRAL A2 settings	Adjust incorrect values in the heat pump's control computer. ROOM = Desired indoor temperature CURVE = Should be set so that the desired indoor temperature (ROOM) is maintained regardless of the outdoor temperature. INTEGRAL A1 = Start value for the compressor. INTEGRAL A2 = Start value (calculated from A1) for the auxiliary heater.
2. Changed conditions Have you increased your heating and/or hot water demand?	<ul style="list-style-type: none"> If the heat pump has been dimensioned for a certain demand and this demand is increased, the heat pump might not be able to maintain the desired room temperature. If hot water consumption increases, a larger proportion of time is used to produce hot water, which means less time for heat production. 	If the heat pump cannot cope with the demand, replace it with one with a higher output or supplement it with a higher output auxiliary heater.
3. Lack of refrigerant, not enough refrigerant in the system.	Using manometer apparatus and thermometer, check that the unit's overheating is correct for the specific refrigerant.	If there appears to be a leak in the refrigerant circuit, carry out leak tracing and any necessary corrective action. If leak tracer is not available, brush soap water on the suspected leak and look for bubbles. Also check for oil as this can come out from the refrigerant circuit.

Problem – Short operating times despite heating demand

Cause	Troubleshooting	Remedy
ROOM and/or CURVE set too high in combination with a heating system with poor circulation due to closed radiator valves, too small elements or insufficient water volume. A tight fitting system with poor pipe dimensions may produce the same phenomena.	Check if the heat pumps starts, if the supply temperature rises quickly whilst nothing happens to the return temperature. If this happens and the heat pump is stopped by the hysteresis function to later quickly drop in temperature (supply) in order to start again, but cannot due to time conditions in regulation, this means that the heat pump cannot transport the heat away from the condenser as it should. In such a case, hysteresis starts and stops the heat pump often.	Adjust ROOM and CURVE if necessary. Ensure that there is sufficient flow over the condenser and the heating circuit.

Problem – Connection of external AH

Cause	Troubleshooting	Remedy
Incorrectly connected auxiliary heater. Does not start when the control computer gives the signal.	Check the connection against the instructions/wiring diagram. Test the function in manual mode.	If the auxiliary heater is incorrectly connected, reconnect according to the instructions.

3.5.7 Heat pump

Problem – Noise/loud noise

Cause	Troubleshooting	Remedy
1. Positioning the heat pump.	Determine whether the heat pump can be moved to a more suitable location.	Move the heat pump if possible.
2. Connection/wall lead-ins.	Check that the unit is installed according to the instructions.	Rigid mountings can generate noise from the heat pump via walls in the house.

Problem – Defrosting problems

Cause	Troubleshooting	Remedy
Location/calibration of the outdoor sensor.	Check that the outdoor sensor is installed according to the installation instructions and that it is correctly calibrated.	Install according to the instructions and calibrate, if necessary.
Defrost sensor calibration	Check that the defrost sensor is installed according to the installation instructions and that it is correctly calibrated.	Calibrate if necessary.

Problem – Build-up of ice under and around the outdoor unit

Cause	Troubleshooting	Remedy
Insufficient drainage.	Does a lot of ice accumulate under and around the outdoor unit because the melted water has nowhere to run?	Drain the ground under and around the outdoor section or install a drainpipe routed to an indoor drain or gully. NOTE! Install a heating cable in the drainpipe.

Problem – Water run-off by the outdoor unit, risk of moisture problems in house foundations

Cause	Troubleshooting	Remedy
Insufficient drainage.	During some periods when the outdoor unit is being defrosted, large amounts of water can run off.	Drain the ground under and around the outdoor unit so that it can cope with the extra amount of water produced because of defrosting or install a drainpipe routed to an indoor drain or gully. NOTE! Install a heating cable in the drainpipe.

Danfoss Heat Pumps
Box 950
671 29 ARVIKA
Phone +46 570 81300
E-mail: dhpinfo@danfoss.com
Internet: www.heating.danfoss.com

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