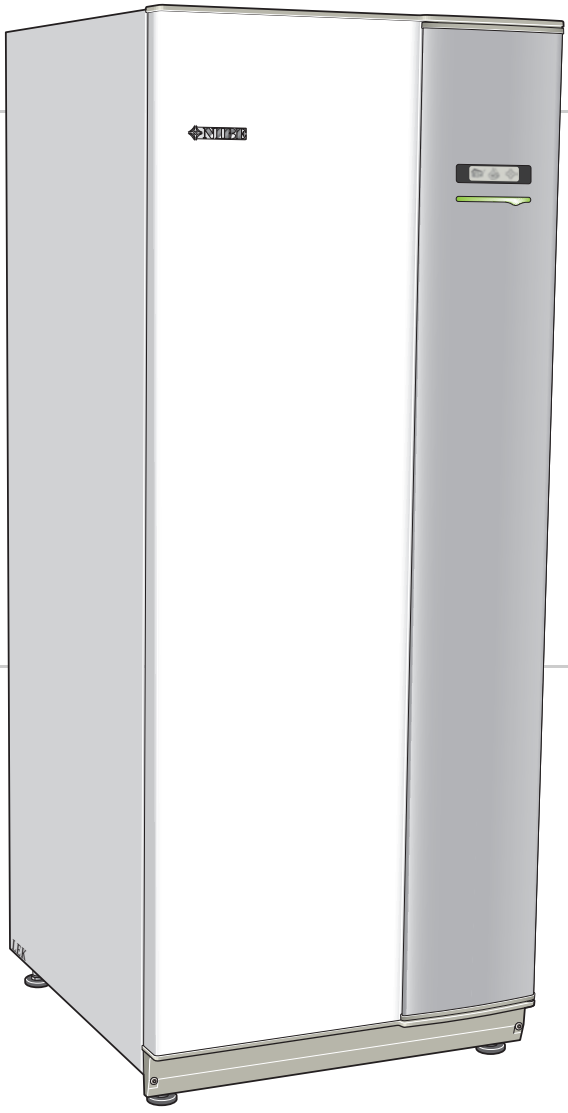


Service manual

F1155

Ground source heat pump

SEM GB 1716-2
431539

Table of Contents

1 Important information

Document information

This technical manual is a complement to the Installer handbook for F1155, containing:

- Description of functions and component description.
- Information to facilitate fault-tracing.
- Instructions for replacing components.
- Supplementary technical information.

The document applies to heat pumps with software version 7740R5.

The heat pump software version can be found in the info menu (menu 3.1).

Safety information

This manual describes installation and service procedures for implementation by specialists.

This appliance can be used by children aged from 8 years and above and persons with reduced physical, sensory or mental capabilities or lack of experience and knowledge if they have been given supervision or instruction concerning use of the appliance in a safe way and understand the hazards involved. Children shall not play with the appliance. Cleaning and user maintenance shall not be made by children without supervision.

Symbols

NOTE

This symbol indicates danger to person or machine .

Caution

This symbol indicates important information about what you should observe when maintaining your installation.

TIP

This symbol indicates tips on how to facilitate using the product.

Marking

CE The CE mark is obligatory for most products sold in the EU, regardless of where they are made.

IP21 Classification of enclosure of electro-technical equipment.

Danger to person or machine.

Serial number

The serial number can be found at the bottom right of the front cover and in the info menu (menu 3.1).

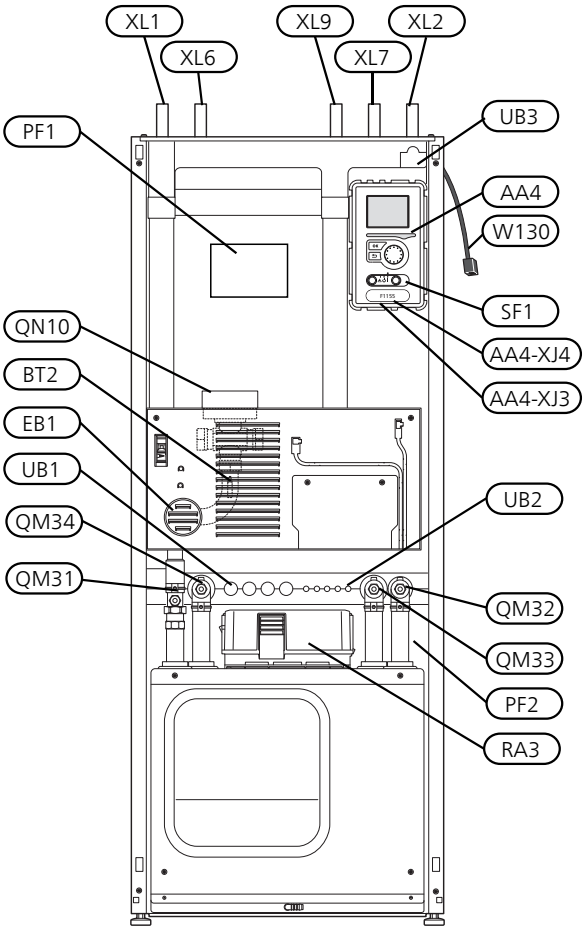
Caution

You need the product's (14 digit) serial number for servicing and support.

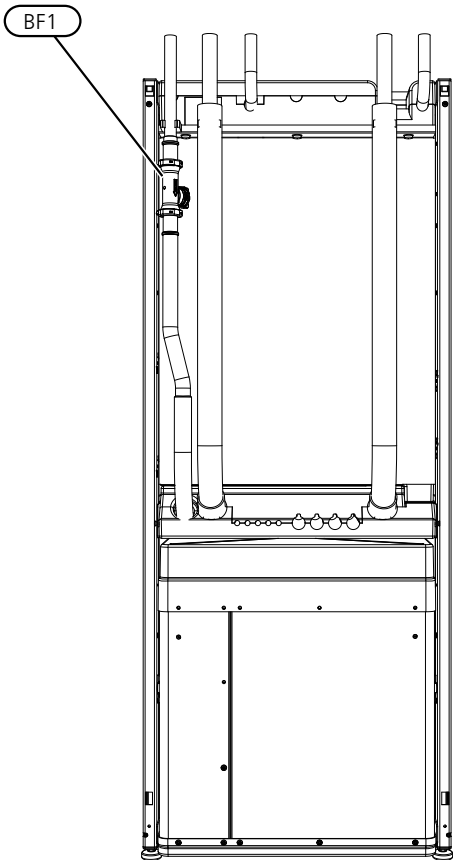
2 The heat pump design

The heat pump design

General



View from behind



Pipe connections

XL1	Connection, heating medium flow
XL2	Connection, heating medium return
XL6	Connection, brine in
XL7	Connection, brine out
XL9	Connection, hot water heater

HVAC components

QM31	Shut-off valve, heating medium flow
QM32	Shut off valve, heating medium return
QM33	Shut off valve, brine out
QM34	Shut-off valve, brine in
QN10	Shuttle valve, climate system/water heater

Sensors etc.

BF1	Flow meter**
BT1	Outdoor temperature sensor*
BT2	Temperature sensors, heating medium flow

**Only heat pumps with energy meter

* Not illustrated

Electrical components

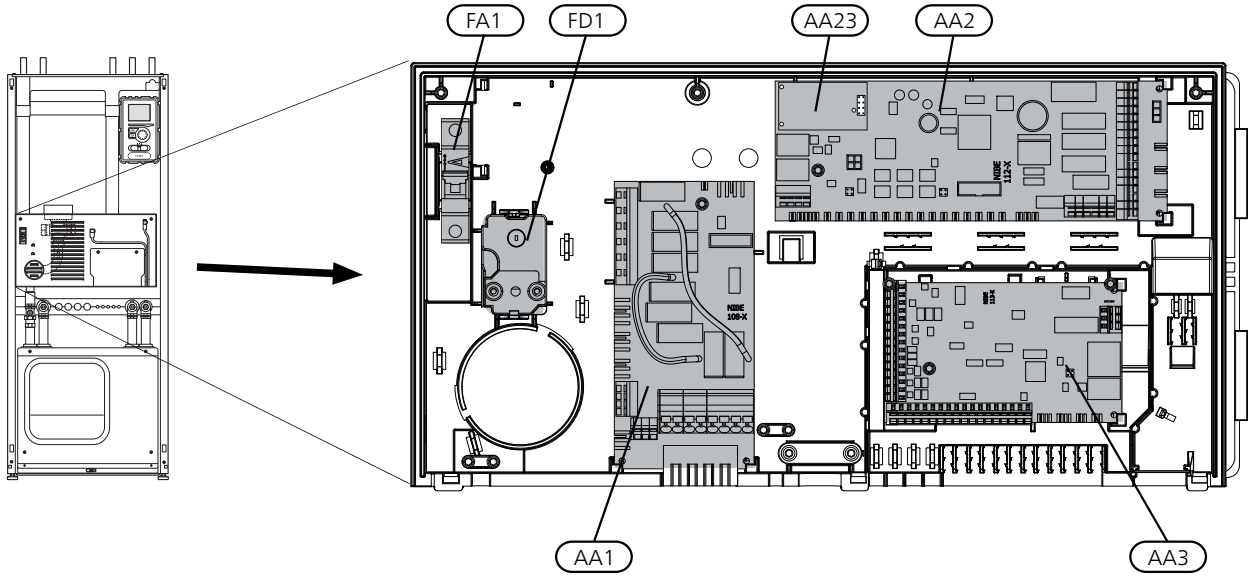
AA4	Display unit
	AA4-XJ3 USB socket
	AA4-XJ4 Service outlet (No function)
EB1	Immersion heater
SF1	Switch
W130	Network cable for NIBE Uplink

Miscellaneous

PF1	Rating plate
PF2	Type plate, cooling section
UB1	Cable gland, incoming electricity
UB2	Cable gland
UB3	Cable gland, rear side, sensor

Designations in component locations according to standard IEC 81346-1 and 81346-2.

Distribution boxes



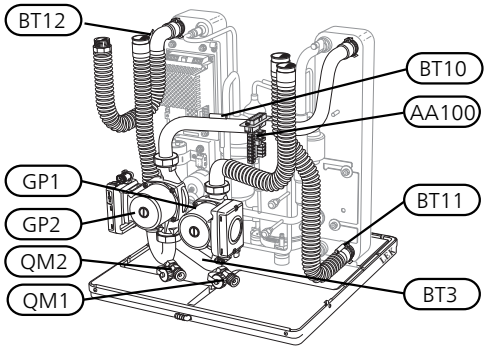
Electrical components

AA1	Immersion heater card
AA2	Base card
AA3	Input circuit board
AA23	Communication board
FA1	Miniature circuit-breaker
FD1	Temperature limiter/Emergency mode thermostat

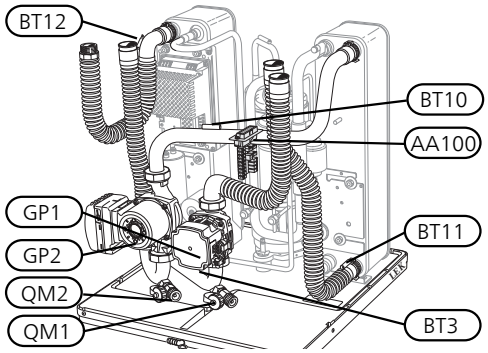
Designations in component locations according to standard IEC 81346-1 and 81346-2.

Cooling section

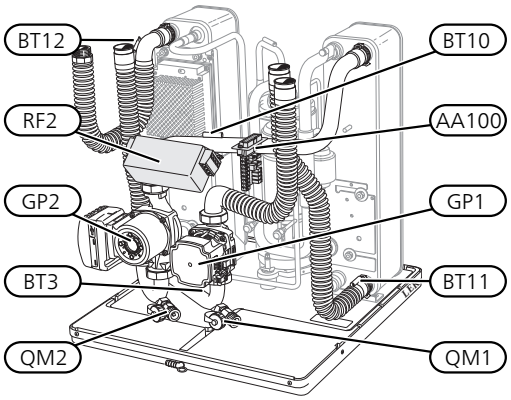
6 kW



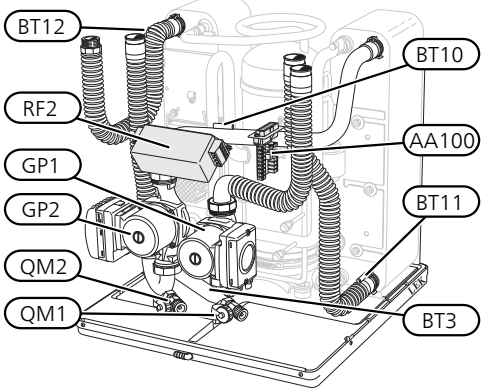
1x230 V 12 kW
3x230 V 12 kW



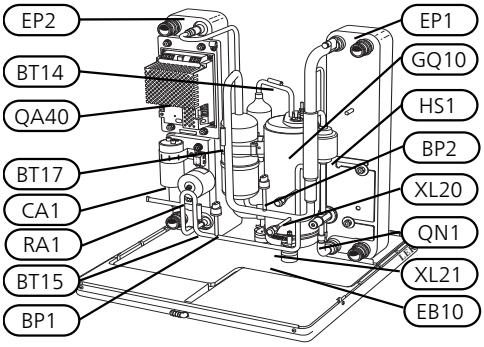
3x400 V 12 kW



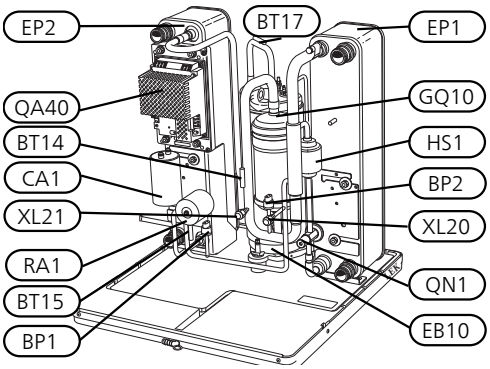
16 kW



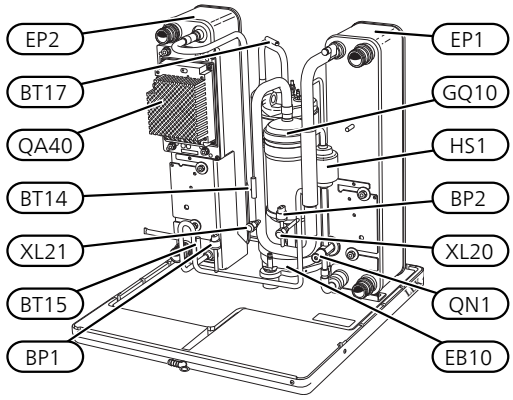
6 kW



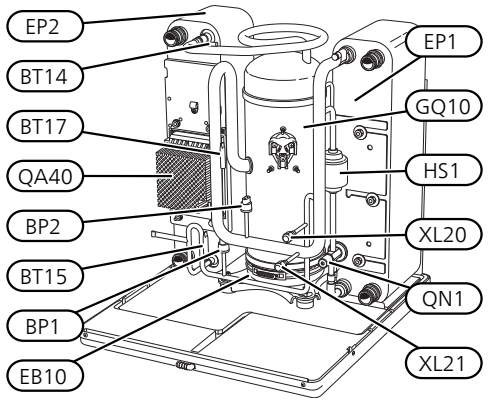
1x230 V 12 kW
3x230 V 12 kW



3x400 V 12 kW



3x400 V 16 kW



Pipe connections

XL20	Service connection, high pressure
XL21	Service connection, low pressure

HVAC components

GP1	Circulation pump
GP2	Brine pump
QM1	Drainage, climate system
QM2	Draining, brine side

Sensors etc.

BP1	High pressure pressostat
BP2	Low pressure pressostat
BT3	Temperature sensors, heating medium return
BT10	Temperature sensor, brine in
BT11	Temperature sensor, brine out
BT12	Temperature sensor, condenser supply line
BT14	Temperature sensor, hot gas
BT15	Temperature sensor, fluid pipe
BT17	Temperature sensor, suction gas

Electrical components

AA100	Joint card
CA1	Capacitor
EB 10	Compressor heater
QA40	Inverter
RA1	Choke
RF2*	EMC-filter

* Only 12 & 16 kW 3X400 V.

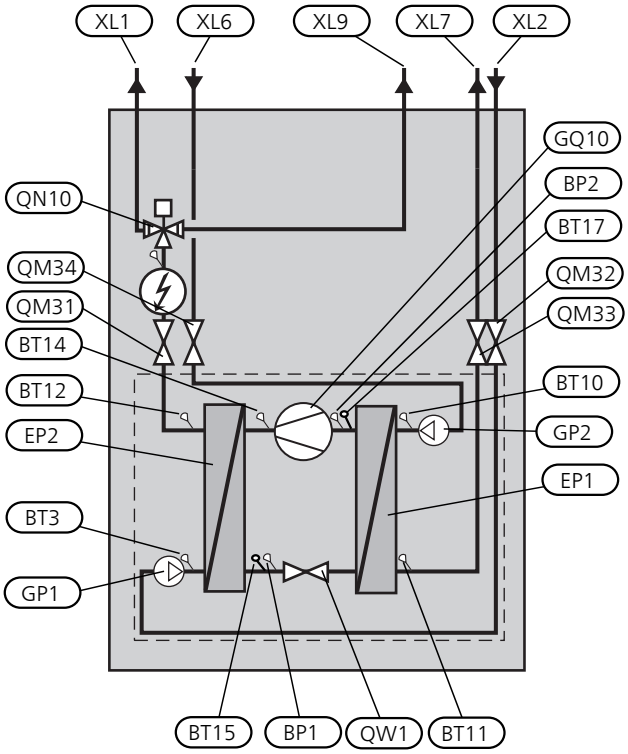
Cooling components

EP1	Evaporator
EP2	Condenser
GQ10	Compressor
HS1	Drying filter
QN1	Expansion valve

Designations in component locations according to standard IEC 81346-1 and 81346-2.

3 System description

Principle of operation



List of components

Pipe connections

XL 1 Connection, heating medium flow
XL 2 Connection, heating medium return
XL 6 Connection, brine in
XL 7 Connection, brine out
XL 9 Connection, hot water heater

Cooling components

EP 1 Evaporator
EP 2 Condenser
GQ 10 Compressor
QN 1 Expansion valve

HVAC components

GP 1 Circulation pump
GP 2 Brine pump
QM 31 Shut-off valve, heating medium flow
QM 32 Shut off valve, heating medium return
QM 33 Shut off valve, brine out
QM 34 Shut-off valve, brine in
QN 10 Shuttle valve, climate system/water heater

Sensors etc.

Internal

	Name	Location	Function
BP1	High pressure pressostat	On the liquid line.	Protects the compressor against pressures that are too high.
BP2	Low pressure pressostat	On suction gas line.	Protects the compressor against pressures that are too low.
BT1*	Outside sensor	Outdoor, shaded location on north side of the house.	Set point values for heating and cooling demand calculation. Operating mode change.
BT2	Flow pipe	On supply line after immersion heater (EB1).	Calculation of DM. If BT25 is installed, only view.
BT3	Return pipe	On return line between circulation pump (GP1) and condenser (EP2).	Stopping the compressor at high temperature.
BT6*	Hot water, charging	On water heater lower section.	Stop and start of hot water charging. Also used for display if BT7 is not installed.
BT7*	Hot water, top	At water heater peak.	View.
BT10	Brine in	On incoming brine line before circulation pump (GP2).	View. Stops compressor at high temperature. Controls brine pump speed together with BT11
BT11	Brine out	On outgoing brine line after evaporator (EP1).	Stopping the compressor at low temperature. Controls brine pump speed together with BT10
BT12	Condenser flow line	On supply line between condenser (EP2) and immersion heater (EB1).	Stopping the compressor at high temperature.
BT14	Discharge	On hot gas line after compressor (GQ10).	Stopping the compressor at high temperature.
BT15	Fluid pipe	On the liquid line after the condenser (EP2).	View.
BT17	Suction gas	On suction gas line before the compressor (GQ10).	View.
BT25*	External flow line	Externally on the flow line to the heating system.	Calculation of DM. Actual value for additional shunt.
BT50*	Room sensor	In suitable indoor location.	Correction of the indoor temperature.

* Externally mounted (not included in outline diagram).

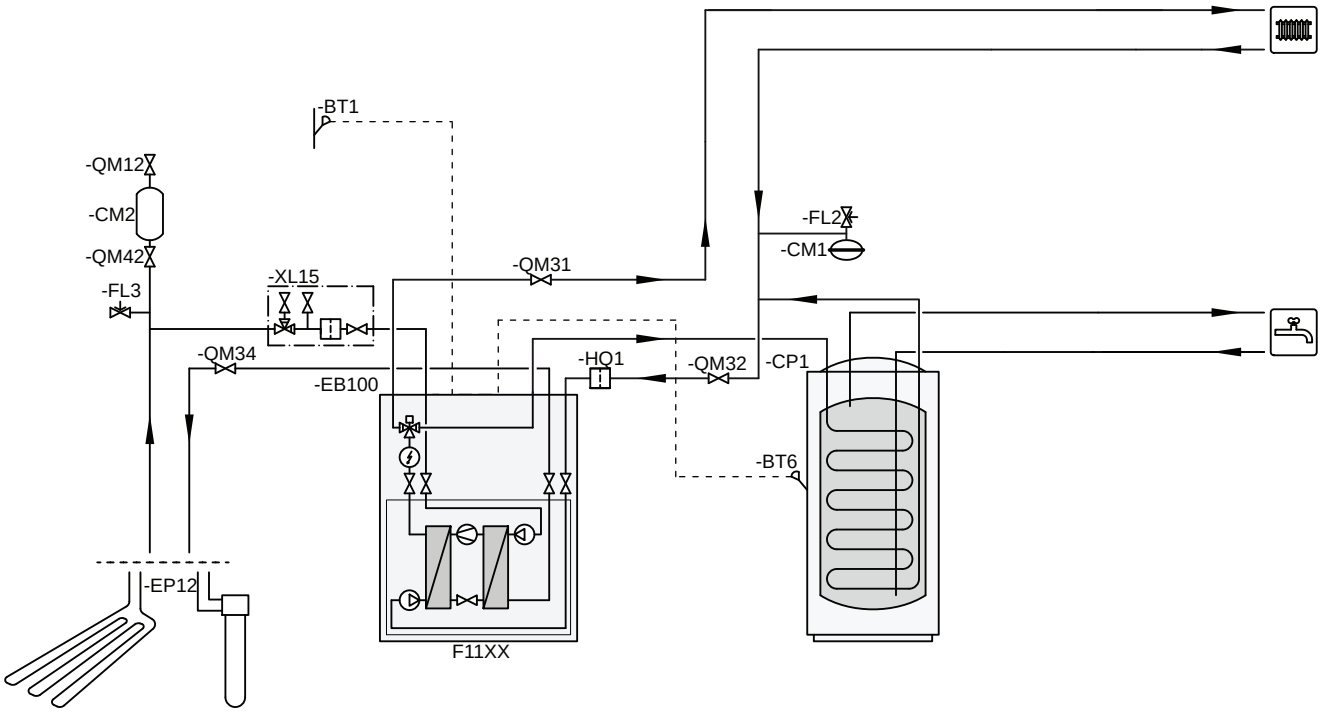
External

	Name	Location	Function
CL11-BT51	Pool sensor	On pool water pipe in heat exchanger.	Stop and start of pool charging.
EP30-BT53	Solar panel sensor	On the solar panel	In relation to BT54, stop and start of solar charging.
EP30-BT54	Solar tank, bottom	On solar tank bottom	In relation to BT53, stop and start of solar charging.
EM1-BT52	Boiler sensor	In additional heat boiler	Closes additional heat mixing valve when boiler is cold.
EQ1-BT64	Flow line, cooling	On flow line, cooling	Actual value for mixing valve cooling (EQ1-QN18)
EQ1-BT65	Return line, cooling	On return line, cooling	View
EP21-BT2	Flow line, extra climate system	On flow line to extra climate system 2.	Actual value for mixing valve, climate system 2.
EP21-BT3	Return line, extra climate system	On return line from extra climate system 2.	View.
EP22-BT2	Flow line, extra climate system	On flow line to extra climate system 3.	Actual value for mixing valve, climate system 3.
EP22-BT3	Return line, extra climate system	On return line from extra climate system 3.	View.
EP23-BT2	Flow line, extra climate system	On flow line to extra climate system 4.	Actual value for mixing valve, climate system 4.
EP23-BT3	Return line, extra climate system	On return line from extra climate system 4.	View.
EP24-BT2	Flow line, extra climate system	On supply line to extra climate system 5.	Actual value for shunt valve, climate system 5.
EP24-BT3	Return line, extra climate system	On return line from extra climate system 5.	View
EP25-BT2	Flow line, extra climate system	On supply line to extra climate system 6.	Actual value for shunt valve, climate system 6.
EP25-BT3	Return line, extra climate system	On return line from extra climate system 6.	View
EP26-BT2	Flow line, extra climate system	On supply line to extra climate system 7.	Actual value for shunt valve, climate system 7.
EP26-BT3	Return line, extra climate system	On return line from extra climate system 7.	View
EP27-BT2	Flow line, extra climate system	On supply line to extra climate system 8.	Actual value for shunt valve, climate system 8.
EP27-BT3	Return line, extra climate system	On return line from extra climate system 8.	View
AZ1-BT20	Exhaust air	In exhaust air in FLM.	View.

	Name	Location	Function
AZ1-BT21	Extract air	In extract air in FLM.	Controls defrosting
AZ1-BT26	Collector in	On incoming collector line in FLM.	View.
AZ1-BT27	Collector out	On outgoing collector line in FLM.	View.

System diagram

Heating



Function

The heat pump prioritises hot water charging. The circulation pump GP1 runs at a calculated speed. When the water heater is fully charged QN10 switches to the heating system. The heat pump works to a calculated set point value on the supply line. If the compressor cannot meet the whole heating requirement, electric heat is shunted in as necessary.

TIP

More system principles are on www.nibe.eu.

Refer to the Installer manual for description of possible docking alternatives.

Installation requirements

Heating medium side

		6kW	12kW	16kW
Max system pressure	Bar	4,5		
Min. flow** (50 Hz)	l/s	0.06	0.08	0.15
Nominal flow (50 Hz)	l/s	0.08	0.12	0.22
Max. recommended flow, (50 Hz)	l/s	0.10	0.016	0.30
Max. external available pressure at nominal flow*** (50 Hz)	kPa	69	73	71
Min/max temperature	°C	See diagram page 78.		

* min volume refers to circulating flow

** overflow valve must be used if min flow cannot be guaranteed

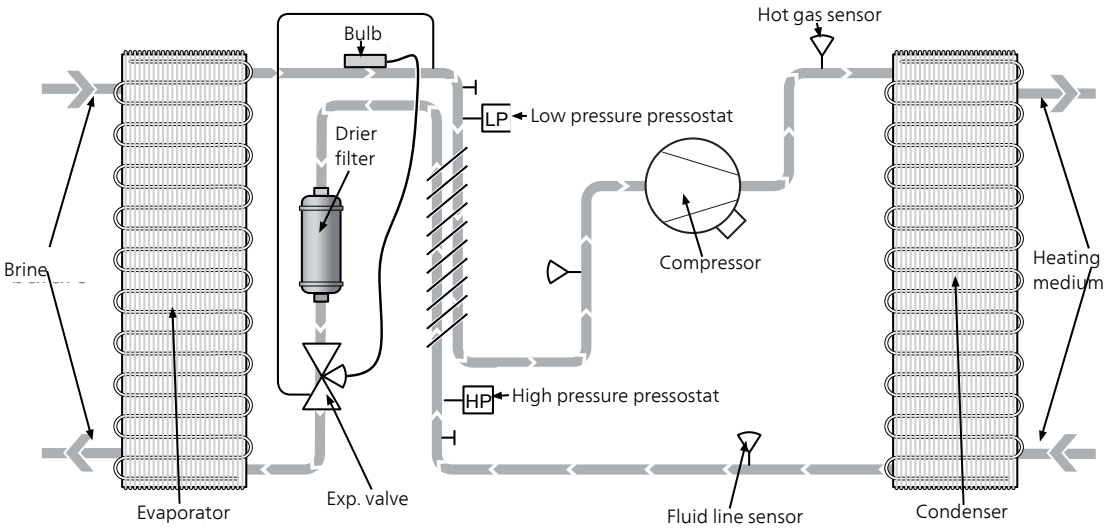
*** external circulation pump must be used when the pressure drop in the system is greater than the available external pressure. In such cases, a bypass line with non-return valve must be installed.

Brine side

		6kW	12kW	16kW
Max system pressure	Bar	4.5		
Min. flow (50 Hz)	l/s	0.13	0.20	0.36
Nominal flow (50 Hz)	l/s	0.18	0.29	0.51
Max. external available pressure at nominal flow (50 Hz)	kPa	64	115	95
Max/min incoming temperature	°C	See diagram page 79.		

4 Cooling circuit

Outline diagram



Compressor control

blockFreq

- 2x selectable blockFreq (5.1.24) with blocking range 3-50Hz.

Model	Factory settings	Remarks
6 kW	91-120Hz	
12 kW	-	
16 kW	-	

Hot gas limit BT 14

	6 kW	12 kW	16 kW
The compressor is stopped. Alarm 55	120°C	120°C	135°C
Reduces the compressor's frequency by 5 Hz/min.	110°C	110°C	130°C
Increase of compressor frequency blocked > Return to free control of the compressor <	107°C	107°C	125°C

High pressure pressostat

Stop with automatic restart:

- The compressor stops when the pressure is 32 bar, and restarts automatically when the pressure is below 25 bar.

Stop with manual restart missing.

Compressor	Stop	Reconnection differential
16 kW	32 bar	-7 bar
12 kW	32 bar	-7 bar
6 kW	32 bar	-7 bar

Low pressure pressostat

Stop with manual restart:

- The compressor stops when the pressure is below 1.5 bar, and can restart when the pressure is above 3 bar.

  The function is blocked for 1 minute after switching between charging type (HW, heating, pool).

Compressor	Stop	Reconnection differential
16 kW	1.5 bar	1.5 bar
12 kW	1.5 bar	1.5 bar
6 kW	1.5 bar	1.5 bar

The function is blocked for 1 minute after switching between charging type (HW, heating, pool).

Working area

Time conditions

Minimum time between stop and start is 5 min.

Minimum time from start to stop to start is 20 min.

Minimum time to start at start-up/restart is 30 minutes if hot gas (BT14) - brine out (BT11) is less than 6.5 K (Only applies to 6 kW / 12 kW).

Compressor heater

The compressor heater is active when relay (K4) on the base card is in unaffected mode.

When the compressor is inactive and ΔT between hot gas (BT14) - brine out (BT11) is less than 6.5 K (Only applies to 6 kW / 12 kW).

When the compressor is inactive, the compressor heater is always active (only applies to 16 kW).

Expansion valve

Check that overheating occurs by measuring the vapour temperature with a manometer and the suction gas temperature with a service thermometer. The suction gas temperature is measured on the suction pipe at the entrance to the compressor.

Overheating is shown in the table below and must be checked when the compressor frequency is 30 - 90 Hz and when the temperature of the heating medium supply is 30 - 55 °C and brine in is -5 - +10 °C.

Brine temperatures higher than +10 °C in combination with high compressor frequency (Hz) can cause greater overheating.

F1155	superheat
6 kW	4 - 8 °C
12 kW	4 - 8 °C
16 kW	4 - 8 °C

5 Component description

Compressor (GQ10)

1 x 230 V, 3 x 230 V, 3 x 400 V

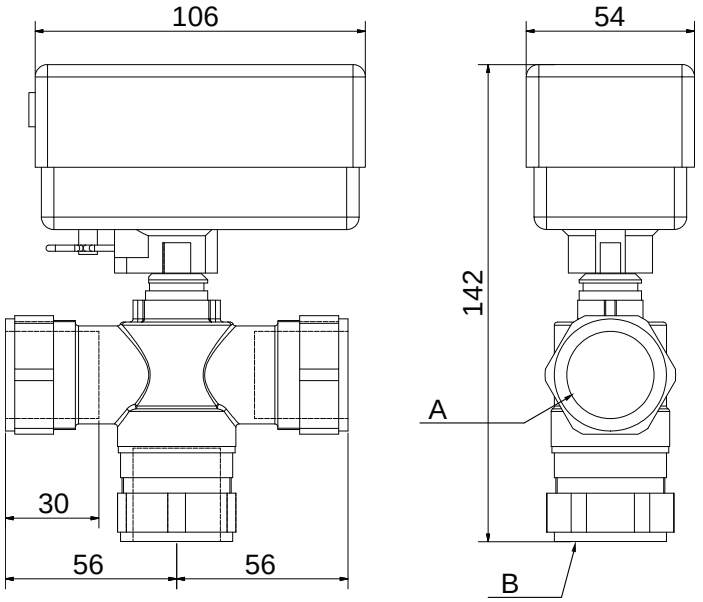
Size (kW)	Type	Resistance range (Ω at 20 °C +/- 10 %)		
		W-V[C-R]	W-U[C-S]	U-V[S-R]
6	Rotation	0.72	0.72	0.72
12	Scroll	0.43	0.43	0.43

3 x 400 V

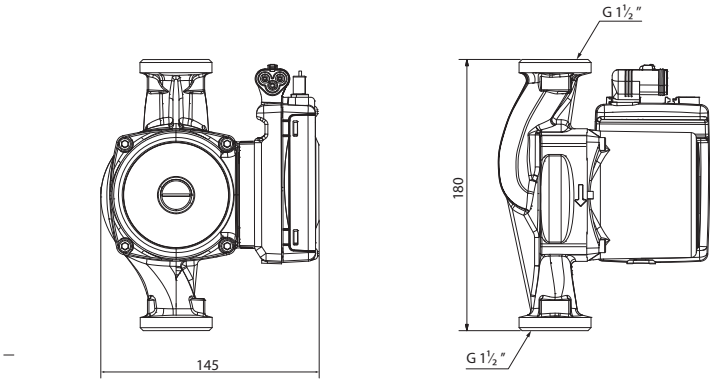
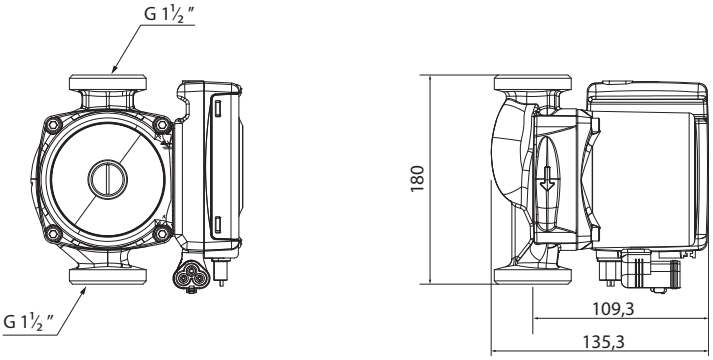
Size (kW)	Type	Resistance range (Ω at 20 °C +/- 10 %)		
		W-V[C-R]	W-U[C-S]	U-V[S-R]
16	Scroll	5.19	5.19	5.19

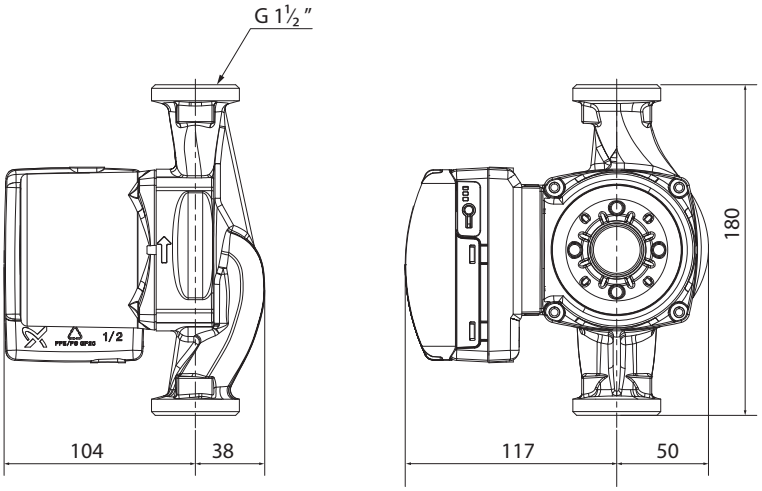
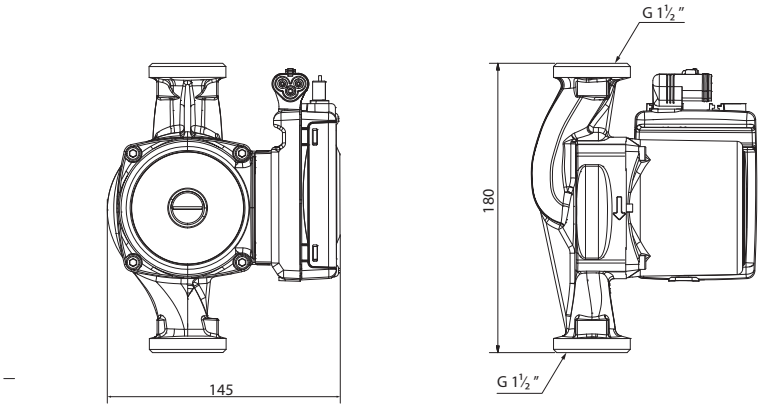
Other components

Component	Description
Immersion heater (EB1)	**F1255-16**, 3 x 400 V White coil (1/3 kW), internal resistance: 55 ohm Brown coils (3 x 2 kW), internal resistance: 27 ohm
	F1255-12, 1 x 300 V, 3 x 230 V, 3 x 400 V Brown coils (3 x 2 kW), internal resistance: 27 ohm White coil: ■ 1 x 230 V: (1 kW), internal resistance 55 ohm ■ 3 x 230 V: (3 kW), internal resistance 18 ohm ■ 3 x 400 V: (1/3 kW), internal resistance 55 ohm
	F1255-6, 1 x 230 V, 3 x 230 V, 3 x 400 V White coil (2 kW), internal resistance 27 ohm Red coil: ■ 1 x 230 V: (1 kW), internal resistance 55 ohm ■ 3 X 230 V: (1 kW), internal resistance 55 ohm ■ 3 x 400 V: (3 kW), internal resistance 55 ohm Brown coil (1 kW), internal resistance 55 ohm Black coil (0.5 kW), internal resistance 110 ohm
Reversing valve (QN10)	Actuator motor: 7 VA, 230/24 VAC, 50 Hz, IP 40. Running time approx 8 seconds Max. operating pressure: 1.0 MPa Operating temperature: 5 - 80 °C (90 °C briefly)



	F1255-6	F1255-16
A	Ø22 mm	Ø28 mm
B	Ø22 mm	Ø28 mm

Component	Description
Heating medium pump (GP1)	**F1255-16** UPM GEO 25-85. Operating voltage 1x230 V, max 70 W Control signal: PWM 0 - 10 V DC (max-min speed) Max flow: 8.5 m3/h Max lift height: 5 m.  **F1255-12** UPM3 25-75. Operating voltage 1x230 V, max. 60 W Control signal: PWM 0 - 10 V DC (max-min speed) Max flow: 5 m3/h Max lift height: 7 m. **F1255-6** UPM2 25-70. Operating voltage 1x230 V, max 63 W Control signal: PWM 0 - 10 V DC (max-min speed) Max flow: 5 m3/h Max lift height: 7 m. 

Component	Description
Brine pump (GP2)	**F1255-16** / **F1255-12** UPM XL –Geo 25-125. Operating voltage 1*230 V, max 180 W Control signal: PWM 0 - 10 V DC (max-min speed)  **F1255-6** UPM GEO 25-85. Operating voltage 1x230 V, max 70 W Control signal: PWM 0 - 10 V DC (max-min speed) Max flow: 8.5 m3/h Max lift height: 5 m. 
High pressure switch (BP1)	Breaking value: 32 bar Reconnection differential: -7 bar
Low pressure switch (BP2)	Breaking value: 1.5 bar Reconnection differential: 1.5 bar
Compressor heater	Output (5-10): 30 W Output (12-17): 40 W

Sensors

Temperature sensor data

Temperature (°C)	Resistance (kOhm)	Voltage (VDC)
-40	351.0	3.256
-35	251.6	3.240
-30	182.5	3.218
-25	133.8	3.189
-20	99.22	3.150
-15	74.32	3.105
-10	56.20	3.047
-5	42.89	2.976
0	33.02	2.889
5	25.61	2.789
10	20.02	2.673
15	15.77	2.541
20	12.51	2.399
25	10.00	2.245
30	8.045	2.083
35	6.514	1.916
40	5.306	1.752
45	4.348	1.587
50	3.583	1.426
55	2.968	1.278
60	2.467	1.136
65	2.068	1.007
70	1.739	0.891
75	1.469	0.785
80	1.246	0.691
85	1.061	0.607
90	0.908	0.533
95	0.779	0.469
100	0.672	0.414

Electronics

Immersion heater card (AA1)

LED	Indication
K1 - K10: Orange	A steady light means that the relevant relay is engaged.

Output	1x230 V	3x230 V	3x400 V
K1	Supply L1	Supply L1	Supply L1
K2	Supply L1	Supply L2	Supply L2
K3	Supply L1	Supply L2	Supply L3
K4	1255-6: Immersion heater 0.5 kW 1255-12: Immersion heater 2 kW	Supply L3	1255-6: Immersion heater 0.5 kW 1255-12:Immersion heater 2 kW 1255-16:Immersion heater 2 kW
K5	No function	Supply L3	1255-6: Immersion heater 3 kW on K9 1255-12: No function 1255-16: No function
K6	1255-6: Immersion heater 1 kW 1255-12: Immersion heater 2 kW	Immersion heater 2 kW	1255-6: Immersion heater 1kW 1255-12:Immersion heater 2 kW 1255-16:Immersion heater 2 kW
K7	No function	1255-6: Immersion heater 0.5 kW 1255-12: Immersion heater 2 kW	1255-6: No function 1255-12:Immersion heater 3 kW (K9) 1255-12:Immersion heater 3 kW (K9)
K8	Immersion heater 2 kW	1255-6: No function 1255-12: Immersion heater 2 kW	1255-6: Immersion heater 2 kW 1255-12:Immersion heater 2 kW 1255-16:Immersion heater 2 kW
K9	Immersion heater 1 kW	1255-6: Immersion heater 1 kW 1255-12: Immersion heater 2 kW	1255-6: Immersion heater 3 kW on K5 1255-12:Immersion heater 1/3 kW 1255-16:Immersion heater 1/3 kW
K10	No function	1255-6: Immersion heater 1 kW 1255-12: No function	No function

Base card (AA2)

LED	Indication
Power: Green	A steady light means that 12 V is OK.
Run: Green	Flashing once/sec. Indicates that the processor is OK.
Com: Green	Flashes irregularly during communication.
PWM1: Orange	Continuous light during active output.
PWM2: Orange	Continuous light during active output.
K1 - K4: Orange	A steady light means that the relevant relay is engaged.

Output	Function
PWM1	Control signal HM pump (GP1)
PWM2	Control signal brine pump (GP2)
K1	Reversing valve (QN10)

Output	Function
K2	Brine pump (GP2)
K3	HM pump (GP1)
K4	Compressor heater (EB10) (inverted signal)

Input circuit board (AA3)

LED	Indication
Power: Green	A steady light means that 12V is OK.
Run: Green	Flashing once/sec. Indicates that the processor is OK.
Com: Green	Flashes irregularly during communication.
PWM1: Orange	Continuous light during active output.
PWM2: Orange	Continuous light during active output.
K1: Orange	A steady light means that the relay is engaged.

Communication board (AA123)

LED	Indication
INV: Lights green	A steady light indicates supply from the inverter.
PWR: Lights green	A steady light indicates voltage from the AA2 Base card.
COM: Flashes green	Irregular flashing indicates communication with the inverter.

Inverter

The inverter's Status-LED indicates acc. to the table below:

Status LED	Status
Green, steady	The compressor stopped, OK
Green, flashing	The compressor stopped, OK
Orange, steady	Compressor is operational, OK
Red, steady	Alarm
Red, flashing	Broken circuit on terminal block X4

The inverter’s power LED lights orange continuously when the inverter is powered. (Applies only to 16 kW)

MODBUS 40

LED	Indication
BATT	No function.
RUN	No function.
COM1	Flashes during communication with the heat pump.
LED 4 (-)	No function.
LEV	No function.
COM2	No active communication between Modbus 40 and "external control".
SYNC	No function.
VCC	A steady light means that supply voltage is OK.

SMS 40

LED	Indication
BATT	A steady light if voltage in the battery is above 0 V. Out if the battery is discharged or if no battery is installed.
RUN	No function.
COM1	Flashes during communication with heat pump and at start-up.
LED 4 (-)	A steady light that indicates that 12V is OK.
LEV	Steady light when the GSM signal is OK. Out if the GSM signal is too low.
COM2	Flashes during communication with the GSM modem.
SYNC	Flashes when SMS 40 sends/receives SMS.
VCC	A steady light means that supply voltage is OK.

Accessory card (AA5)

LED	Indication
Power: Green	A steady light means that 12V is OK.
Run: Green	Flashing once/sec. Indicates that the processor is OK.
Com: Green	Flashes irregularly during communication.
PWM1: Orange	Continuous light during active output.
PWM2: Orange	Continuous light during active output.
K1 - K4: Orange	A steady light means that the relevant relay is engaged.

Output	Function
See relevant accessory.	

6 Troubleshooting

Alarm list

Alarm

In event of an alarm, the red lamp on the front lights up and an alarm icon is displayed. First go through the suggested actions shown in the display.

An alarm means that:

- the red lamp on the front lights.
- an alarm icon is shown in the display.
- an alarm relay is activated if AUX output is set for this.
- if there are several alarms, these are shown in numerical order (scroll with the OK button).
- there is a comfort reduction according to selection in menu 5.1.4.

Resetting alarms:

- alarm numbers 1 - 39 are reset automatically when a sensor has functioned for 60 seconds or via manual resetting in the menu.
- alarms 40 – 53 manual resetting in menu.
- alarm 54 manual resetting of the motor protection breaker and manual resetting in the menu.
- alarms 55 – 57 manual resetting in menu.
- alarms 70-99 reset automatically when communication is established.
- alarms 100 – 481 manual resetting in menu.

Alarm no.	Alarm text on the display	Cause	Heat pump action.	May be due to
2	Sensor fault: BT2 supply temperature sensor 1	The input for the sensor receives an unreasonably high or low value for longer than two seconds.	* BT12 is used to calculate degree minutes. *Additional heat is blocked. *If BT2 about internally controlled addition is active and GP1 is regulated go to manual operation	See fault-tracing schedule page 39.
3	Sensor fault: BT3 return line sensor 1	The input for the sensor receives an unreasonably high or low value for longer than two seconds.	GP1 switches to manual speed if auto controlled is selected.	See fault-tracing schedule page 40.
6	Sensor fault BT6 hot water charging	The input for the sensor receives an unreasonably high or low value for longer than two seconds.	Blocks hot water	See fault-tracing schedule page 38.
10	Sensor fault BT10 brine in	Sensor not connected/defective (brine in).	GP2 switches to manual speed if auto controlled is selected.	■ Defective sensor and its connections.
11	Sensor fault BT11 brine out	The input for the sensor receives an unreasonably high or low value for longer than two seconds.	Compressor blocked. GP2 switches to manual speed if auto controlled is selected.	■ Defective sensor and its connections.
12	Sensor fault BT12 condenser out	The input for the sensor receives an unreasonably high or low value for longer than two seconds.	Compressor blocked. GP2 switches to manual speed if auto controlled is selected.	■ Defective sensor and its connections.

Alarm no.	Alarm text on the display	Cause	Heat pump action.	May be due to
25	Sensor fault BT25 external supply	The input for the sensor receives an unreasonably high or low value for longer than two seconds.	All additions are blocked. New actual value = BT71 + 10K	■ Defective sensor and its connections.
26	Sensor fault AZ1-BT26 collector in	The input for the sensor receives an unreasonably high or low value for longer than two seconds.	Circulation pump (AZ1-GP2) in FLM is blocked.	■ Defective sensor and its connections.
28	Sensor fault BT71 ext return line sensor	The input for the sensor receives an unreasonably high or low value for longer than two seconds.	No action, but if at the same time as Alarm 25, heating is blocked.	■ Defective sensor and its connections.
29	Sensor fault BT29 oil temp.sensor	The input for the sensor receives an unreasonably high or low value for longer than two seconds.	Compressor heater is active if compressor is not in operation.	■ Defective sensor and its connections.
33	Sensor fault EP30-BT53 solar panel temperature	The input for the sensor receives an unreasonably high or low value for longer than two seconds.	Solar accessory is blocked	■ Defective sensor and its connections.
34	Sensor fault EP30-BT54 solar tank	The input for the sensor receives an unreasonably high or low value for longer than two seconds.	Solar accessory is blocked	■ Defective sensor and its connections.
35	Sensor fault EM1-BT52 boiler sensor	The input for the sensor receives an unreasonably high or low value for longer than two seconds.	Shunt closes. Burner stops. Circ.pump (GP15) stops. Immersion heater blocking stops.	■ Defective sensor and its connections.
36	Sensor fault EP21_BT2 supply sensor	The input for the sensor receives an unreasonably high or low value for longer than two seconds.	Shunt waiting time for EP21 – QN25 is shunt waiting time2*10 and Sensor signal is replaced by "EP21-BT3"-10K during shunt control.	■ Defective sensor and its connections.
37	Sensor fault EP22_BT2 supply sensor	The input for the sensor receives an unreasonably high or low value for longer than two seconds.	Shunt waiting time for EP22 – QN25 is shunt waiting time3*10 and Sensor signal replaced by "EP22-BT3"-10K during shunt control.	■ Defective sensor and its connections.
38	Sensor fault EP23_BT2 supply sensor	The input for the sensor receives an unreasonably high or low value for longer than two seconds.	Shunt waiting time for EP23 – QN25 is shunt waiting time4*10 and Sensor signal replaced by "EP23-BT3"-10K during shunt control.	■ Defective sensor and its connections.
39	Sensor fault EQ1-BT64 cooling supply	The input for the sensor receives an unreasonably high or low value for longer than two seconds.	Shuts off cooling, Closes shunt (QN18) for cooling.	■ Defective sensor and its connections.

Alarm no.	Alarm text on the display	Cause	Heat pump action.	May be due to
50	High pressure alarm	The high pressure switch has deployed two times within 150 minutes or has been deployed for 300 minutes continuously.	Compressor blocked.	See fault-tracing schedule page 43.
51	Low pressure alarm	The low pressure switch has been deployed. However, the alarm is blocked for one minute at each switch between operating modes.	Compressor blocked.	See fault-tracing schedule page 44.
52	Temperature limiter alarm	Temperature limiter has deployed and been "open" for longer than 30 seconds	None (Handled by hardware)	See fault-tracing schedule page 46.
53	Level monitor Brine	Brine level monitor / pressure switch has tripped (accessory).	Brine pump should stop, also the compressor.	■ Any leakage on the brine circuit.
55	Hot gas alarm	Three hot gas stops within 240 minutes.	Compressor –Epxx is blocked	Call a qualified refrigeration technician.
56	Incorrect serial number	The heat pump has a serial number that does not exist.	The compressor stops, all relay outputs are set to 0 V	
57	Incorrect software	Serial number and program do not match	The compressor stops, all relay outputs are set to 0 V	
58	Pressure switch alarm	High or low pressure switch has tripped.	Compressor blocked.	Bad circulation in the brine or heating medium side. See fault-tracing schedule page 46.
60	Low temp brine out	The temperature of the outgoing brine goes below the set min-temperature and the alarm is selected to be permanent.	Compressor blocked.	■ Poor circulation in the brine circuit. - Check the brine pump. - Check that the brine is bled. - Check the brine's freezing point.
70	Communication fault with PCA Input.	Communication with the input board missing for 60 seconds.	None. For sensors that are no longer available, see each sensor's alarm action	See fault-tracing schedule page 47.
71	Communication fault with PCA base	Communication with the base board missing for 15 seconds.	Compressor –EPxx is blocked	See fault-tracing schedule page 47.
100	Communication fault with inverter	Communication with the inverter missing for 15 seconds.	Compressor blocked.	■ Communication cables.
299	Incorrect version, PCA Base	The software version of the base board (AA2) is too low for inverter communication.	Compressor is blocked	■ Base board needs replacing (AA2)

Alarm no.	Alarm text on the display	Cause	Heat pump action.	May be due to
421	Inverter alarm type II	A temporary communication alarm has occurred three times within two hours or has been persistent for one hour.	Compressor blocked. Manual reset in menu.	■ Main and group fuses, as well as their cable connections.
423	Inverter alarm type II	A temporary alarm on the inverter's external input has occurred three times within two hours or the input has been broken continuously for one hour.	Compressor blocked. Manual reset in menu.	■ Communication cable to the inverter and its connections.
427	Inverter alarm type III	A temporary internal fault in the inverter has occurred three times within two hours or has been persistent for one hour.	Compressor blocked.	■ Main and group fuses and their cable connections. - Restart the heat pump by switching it off via its switch and cut the current via the circuit breaker for example.
429	Inverter alarm type II	A temporary internal fault in the inverter has occurred three times within two hours or has been persistent for one hour.	Compressor blocked.	■ Main and group fuses, as well as their cable connections.
431	Inverter alarm type I	Continuous over voltage has been registered by the inverter for one hour.	Compressor blocked.	■ Main and group fuses, as well as their cable connections.
433	Inverter alarm type I	Continuous under voltage has been registered by the inverter for one hour.	Compressor blocked.	■ Main and group fuses, as well as their cable connections.
435	Inverter alarm type I	One compressor phase to the inverter has been missing continuously for one hour.	Compressor blocked.	■ Main and group fuses, as well as their cable connections.
437	Inverter alarm type II	A temporary inverter fault in the inverter has occurred three times within two hours or has been persistent for one hour.	Compressor blocked.	■ Main and group fuses and their cable connections. - Restart the heat pump by switching it off via its switch and cut the current via the circuit breaker for example.
439	Inverter alarm type II	The inverter has temporarily reached max. working temperature due to poor cooling three times within two hours or has been missing continuously for one hour.	Compressor blocked.	■ Bad circulation in the heating medium circuit. - Bleed heat pump and climate system. - Check that the particle filter is not blocked. - Open any radiator / underfloor heating thermostats. ■ Poor position of inverter. - Check screws and paste.

Alarm no.	Alarm text on the display	Cause	Heat pump action.	May be due to
441	Inverter alarm type II	Max. current in has temporarily been too high three times within two hours or missing continuously for one hour.	Compressor blocked.	■ Main and group fuses, as well as their cable connections.
443	Inverter alarm type II	The inverter has temporarily reached max. working temperature due to poor cooling three times within two hours or has been missing continuously for one hour.	Compressor blocked.	■ Bad circulation in the heating medium circuit. - Bleed heat pump and climate system. - Check that the particle filter is not blocked. - Open any radiator / underfloor heating thermostats. ■ Poor position of inverter - Check screws and paste.
445	Inverter alarm type II	A temporary inverter fault in the inverter has occurred three times within two hours or has been persistent for one hour.	Compressor blocked.	■ Main and group fuses and their cable connections. - Restart the heat pump by switching it off via its switch and cut the current via the circuit breaker for example.
447	Inverter alarm type II	One phase has been missing three times within two hours or missing continuously for one hour.	Compressor blocked.	■ Main and group fuses and their cable connections. ■ Compressor wiring to the inverter.
449	Inverter alarm type II	The compressor has run temporarily at a lower speed than the minimum permitted three times within two hours or has been missing continuously for one hour.	Compressor blocked.	■ Main and group fuses and their cable connections. ■ The compressor and its wiring.
451	Inverter alarm type III	A temporary inverter alarm has occurred three times within two hours or has been missing continuously for one hour. Unused function (false alarm).	Compressor blocked.	■ Main and group fuses and their cable connections. Restart the heat pump by switching it off via its switch and cut the current via the circuit breaker for example.
453	Inverter alarm type II	The current out from the inverter to the compressor has been temporarily too high three times within two hours or missing continuously for one hour.	Compressor blocked.	■ Main and group fuses and their cable connections. ■ Internal compressor wiring. -if compressor runs slowly, if no, replace inverter.

Alarm no.	Alarm text on the display	Cause	Heat pump action.	May be due to
455	Inverter alarm type II	The power output from the inverter has been too high temporarily three times within two hours or missing continuously for one hour.	Compressor blocked.	■ Main and group fuses and their cable connections. ■ Internal compressor wiring, Inverter. If OK, may be due to compressor.
461	Inverter alarm type II	(Only 1-phase) The current in to the inverter has been too high temporarily three times within two hours or missing continuously for one hour. May be due to low incoming voltage (> 198 VAC)	Compressor blocked.	■ Main and group fuses, as well as their cable connections.
469	Inverter alarm type III	A temporary inverter alarm has occurred three times within two hours or has been missing continuously for one hour. Unused function (false alarm)	Compressor blocked.	■ Main and group fuses and their cable connections. Restart the heat pump by switching it off via its switch and cut the current via the circuit breaker for example.
471	Inverter alarm type III	A temporary inverter alarm has occurred three times within two hours or has been missing continuously for one hour. Unused function (false alarm).	Compressor blocked.	■ Main and group fuses and their cable connections. Restart the heat pump by switching it off via its switch and cut the current via the circuit breaker for example.
473	Inverter alarm type III	A temporary inverter alarm has occurred three times within two hours or has been missing continuously for one hour. Unused function (false alarm).	Compressor blocked.	■ Main and group fuses and their cable connections. Restart the heat pump by switching it off via its switch and cut the current via the circuit breaker for example.
475	Inverter alarm type III	A temporary inverter alarm has occurred three times within two hours or has been missing continuously for one hour. Unused function (false alarm).	Compressor blocked.	■ Main and group fuses and their cable connections. Restart the heat pump by switching it off via its switch and cut the current via the circuit breaker for example.
477	Inverter alarm type III	A temporary inverter alarm has occurred three times within two hours or has been missing continuously for one hour. Unused function (false alarm).	Compressor blocked.	■ Main and group fuses and their cable connections. - Restart the heat pump by switching it off via its switch and cut the current via the circuit breaker for example. - Inverter replacement

Alarm no.	Alarm text on the display	Cause	Heat pump action.	May be due to
479	Inverter alarm type III	A temporary inverter alarm has occurred three times within two hours or has been missing continuously for one hour. Unused function (false alarm).	Compressor blocked.	■ Main and group fuses and their cable connections. - Restart the heat pump by switching it off via its switch and cut the current via the circuit breaker for example. - Inverter replacement
481	Inverter alarm type III	A temporary inverter alarm has occurred three times within two hours or has been missing continuously for one hour. Unused function (false alarm).	Compressor blocked.	■ Main and group fuses and their cable connections. - Restart the heat pump by switching it off via its switch and cut the current via the circuit breaker for example. - Inverter replacement

Information messages

In the event of an information message, the green light lights up on the front, and a symbol with a service technician is displayed in the information window, until the message is reset. All information messages are automatically reset, if the cause is rectified. These messages are not registered in the alarm log.

No.	Information in display	Cause	Heat pump action.	May be due to
107	Sensor fault: BT7 HW sensor top	Sensor temporarily missing	Only information	■ The sensor and its connections
110	Sensor fault: BT10brine in	Sensor temporarily missing	Only information	■ The sensor and its connections
155	Hot gas alarm	The hot gas (BT14) has been temporarily above 135 °C	The compressor is stopped	- Contact an authorised refrigeration technician
160	Low temp brine out	BT11 < Minimum value of brine out	Resets automatically when the temp has fallen 1 °C	■ Settings
161	High HTFin	Brine in has reached set max temperature.		■ Settings
162	High condenser out	Condenser out has reached max permitted temperature		■ Settings
162	High condenser out temperature	Condenser out has reached max permitted temperature	Resets automatically when condenser in has fallen two degrees	■ Settings
163	High condenser in temperature	Condenser in has reached max permitted temperature	Resets automatically when condenser in has fallen two degrees	■ Settings
166	Electrical anode incorrect	Fault in the electrical anode		
170	Com. error input card	Communication with the input card is temporarily missing.	Only information	■ Communication cables and connections
171	Com. error base card	Communication with the base card is temporarily missing.	Only information	■ Communication cables and connections
180	Freeze prot	Anti-freeze active. Occurs if the outdoor temperature is below 3 °C and no heating is permitted	Permits room heating	■ Operating settings
181	Unsuccessful periodic increase	Periodic increase did not reach the stop temperature in five hours.	Only information	■ Operating settings
182	Load monitor activated	One or more power steps cannot be activated because the current in at least one phase is too high	Only information	■ Phase load. ■ It may require a larger main fuse
274	The compressor's phase has been overloaded.		Only information	■ No action

No.	Information in display	Cause	Heat pump action.	May be due to
275	The compressor's phase has been persistently overloaded.		Only information	■ No action
299	Incorrect version, PCA Base	The software version of the base board is too low for inverter communication.	Compressor blocked.	
322	SPA not updated	Electricity spot price cannot be obtained.	An average value of the most recently obtained prices is used.	
350	Sensor fault BT50	Sensor fault BT50 room sensor	Only information	The sensor and its connections
351	Uncertain sensor accuracy	Uncertain sensor accuracy of brine sensors BT10, BT11. Difference of more than 2K between them at calibration.	GP2 switches to manual speed if auto controlled is selected.	■ Connections to sensor BT10, BT11
353	Uncertain sensor accuracy	Uncertain sensor accuracy of heating medium sensors BT3, BT12. Difference of more than 2K between them at calibration.	GP1 switches to manual speed if auto controlled is selected.	■ Connections to sensor BT3, BT12
359	Int temp OPT error	A temporary alarm from OPT	Resets when OPT is not issuing an alarm	
420	Inverter alarm type II	A temporary communication alarm has occurred.	The compressor is stopped. The compressor makes a new attempt to start 60 s after inverter error has been reset.	■ Main and group fuses, as well as cables to the inverter and its connections.
422	Inverter alarm type II	A temporary alarm on the inverter's external input has occurred.	The compressor is stopped. The compressor makes a new attempt to start 60 s after inverter error has been reset.	■ Main and group fuses and their cable connections.
426	Inverter alarm type III	A temporary internal fault in the inverter has occurred.	The compressor is stopped.	■ Main and group fuses and their cable connections. - Restart the heat pump by switching it off via its switch and cut the current via the circuit breaker for example.
428	Inverter alarm type II	A temporary internal fault in the inverter has occurred.	The compressor is stopped.	■ Main and group fuses and their cable connections. - Restart the heat pump by switching it off via its switch and cut the current via the circuit breaker for example. If the fault occurs again, contact service.

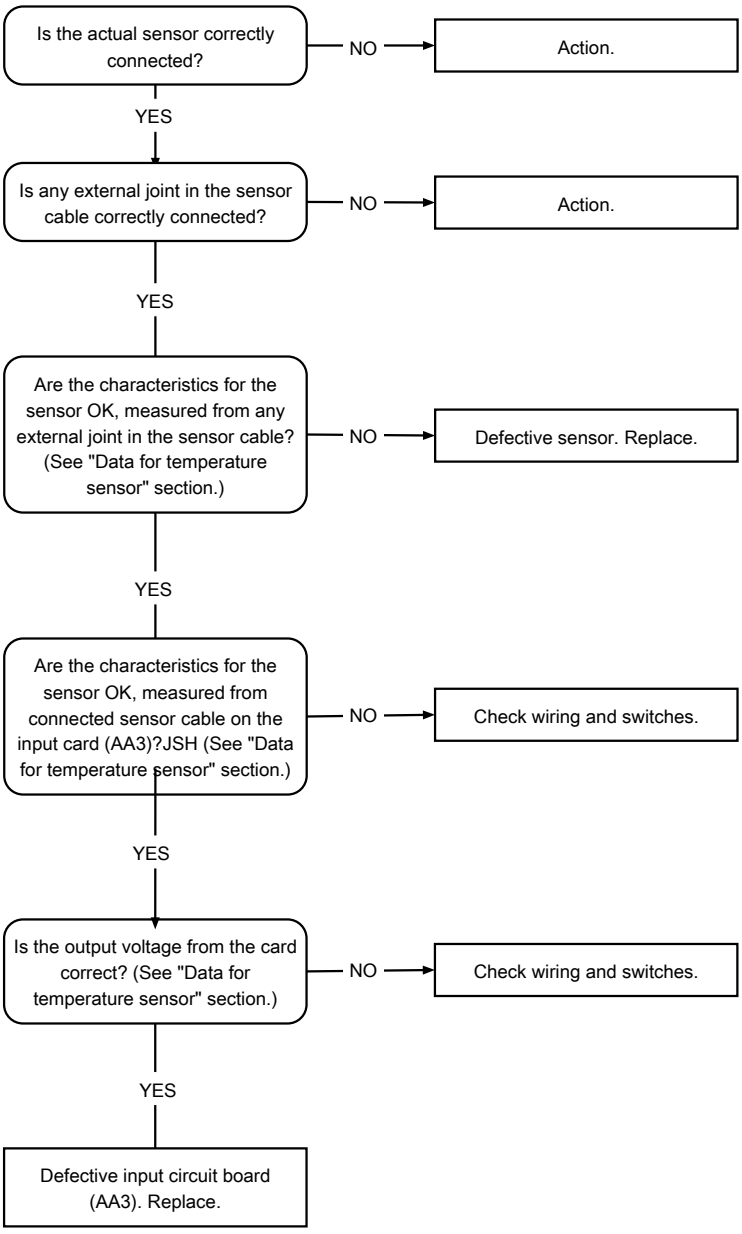
No.	Information in display	Cause	Heat pump action.	May be due to
430	Inverter alarm type I	A temporary over voltage has been registered by the inverter.	The compressor is stopped.	■ Main and group fuses and their cable connections.
432	Inverter alarm type I	A temporary under voltage has been registered by the inverter.	The compressor is stopped.	■ Main and group fuses and their cable connections.
434	Inverter alarm type I	A compressor phase has been missing temporarily.	The compressor is stopped.	■ Main and group fuses and their cable connections.
436	Inverter alarm type II	A temporary internal fault in the inverter has occurred.	The compressor is stopped.	■ Main and group fuses and their cable connections. - Restart the heat pump by switching it off via its switch and cut the current via the circuit breaker for example.
438	Inverter alarm type II	The inverter has reached max working temperature temporarily due to poor cooling.	The compressor is stopped.	■ Bad circulation in the heating medium circuit. - Bleed heat pump and climate system. - Check that the particle filter is not blocked. - Open any radiator / underfloor heating thermostats.
440	Inverter alarm type II	Max current in has been too high temporarily.	The compressor is stopped.	■ Main and group fuses and their cable connections.
442	Inverter alarm type II	The inverter has reached max working temperature temporarily due to poor cooling.	The compressor is stopped.	■ Bad circulation in the heating medium circuit. - Bleed heat pump and climate system. - Check that the particle filter is not blocked. - Open any radiator / underfloor heating thermostats.
444	Inverter alarm type II	A temporary internal fault in the inverter has occurred.	The compressor is stopped.	■ Main and group fuses and their cable connections. - Restart the heat pump by switching it off via its switch and cut the current via the circuit breaker for example.
446	Inverter alarm type II	A compressor phase has been missing temporarily.	The compressor is stopped.	■ Main and group fuses and their cable connections.
448	Inverter alarm type II	compressor has run temporarily at a lower speed than the minimum permitted.	The compressor is stopped.	■ Check main and group fuses and their cable connections.

No.	Information in display	Cause	Heat pump action.	May be due to
450	Inverter alarm type III	A temporary inverter alarm has occurred. Unused function (false alarm).	The compressor is stopped.	■ Main and group fuses and their cable connections. - Restart the heat pump by switching it off via its switch and cut the current via the circuit breaker for example.
452	Inverter alarm type II	The current out from the inverter to the compressor has been too high temporarily.	The compressor is stopped.	■ Main and group fuses and their cable connections.
454	Inverter alarm type II	Too high power output from the inverter has occurred temporarily.	The compressor is stopped.	■ Main and group fuses and their cable connections.
460	Inverter alarm type II	(Only 1-phase) Too high current in to the inverter has occurred temporarily. May be due to low incoming voltage (> 198 VAC)	The compressor is stopped.	■ Main and group fuses and their cable connections.
468	Inverter alarm type III	A temporary inverter alarm has occurred. Unused function (false alarm).	The compressor is stopped.	■ Main and group fuses and their cable connections. - Restart the heat pump by switching it off via its switch and cut the current via the circuit breaker for example.
470	Inverter alarm type III	A temporary inverter alarm has occurred. Unused function (false alarm).	The compressor is stopped.	■ Check main and group fuses and their cable connections. - Restart the heat pump by switching it off via its switch and cut the current via the circuit breaker for example.
472	Inverter alarm type III	A temporary inverter alarm has occurred. Unused function (false alarm).	The compressor is stopped.	■ Check main and group fuses and their cable connections. - Restart the heat pump by switching it off via its switch and cut the current via the circuit breaker for example.
474	Inverter alarm type III	A temporary inverter alarm has occurred. Unused function (false alarm).	The compressor is stopped.	■ Check main and group fuses and their cable connections. - Restart the heat pump by switching it off via its switch and cut the current via the circuit breaker for example.

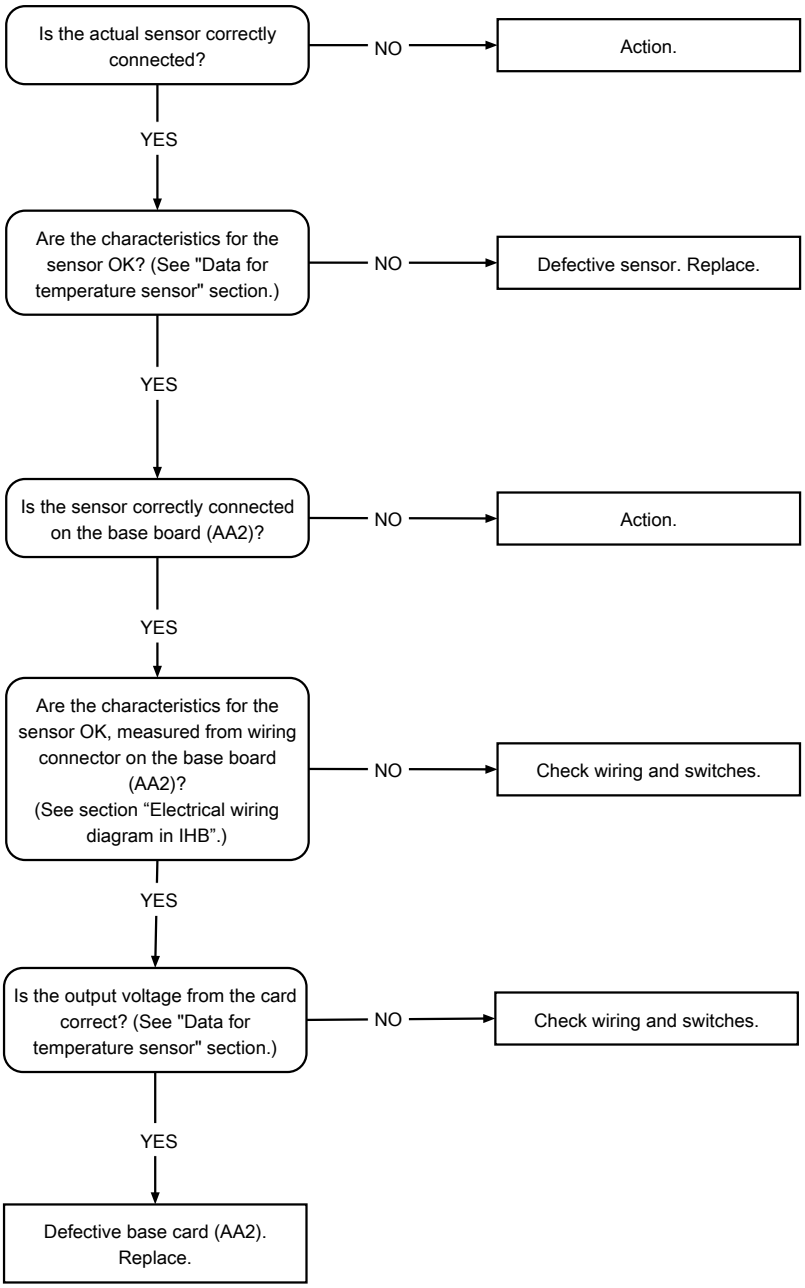
No.	Information in display	Cause	Heat pump action.	May be due to
476	Inverter alarm type III	A temporary inverter alarm has occurred. Unused function (false alarm).	The compressor is stopped.	■ Check main and group fuses and their cable connections. - Restart the heat pump by switching it off via its switch and cut the current via the circuit breaker for example.
478	Inverter alarm type III	A temporary inverter alarm has occurred. Unused function (false alarm).	The compressor is stopped.	■ Check main and group fuses and their cable connections. - Restart the heat pump by switching it off via its switch and cut the current via the circuit breaker for example.
480	Inverter alarm type III	A temporary inverter alarm has occurred. Unused function (false alarm).	The compressor is stopped.	■ Check main and group fuses and their cable connections. - Restart the heat pump by switching it off via its switch and cut the current via the circuit breaker for example.
900	Country not defined.	Stops in the position reached when the message was displayed.	Resets when country is selected in menu 5.12.	
990	Country not defined	Country not selected	Only info. Resets when country is selected in menu 5.12	
995	External alarm	An alarm according to selected function on AUX input.	Only info.	■ Check any external connection functions.
996	Blocked	Additional heat is externally blocked via AUX input.	Additional heat is blocked	■ Check any external connection functions.
997	Blocked	Additional heat is externally blocked via AUX input.	Compressor is blocked	■ Check any external connection functions.

Troubleshooting guide

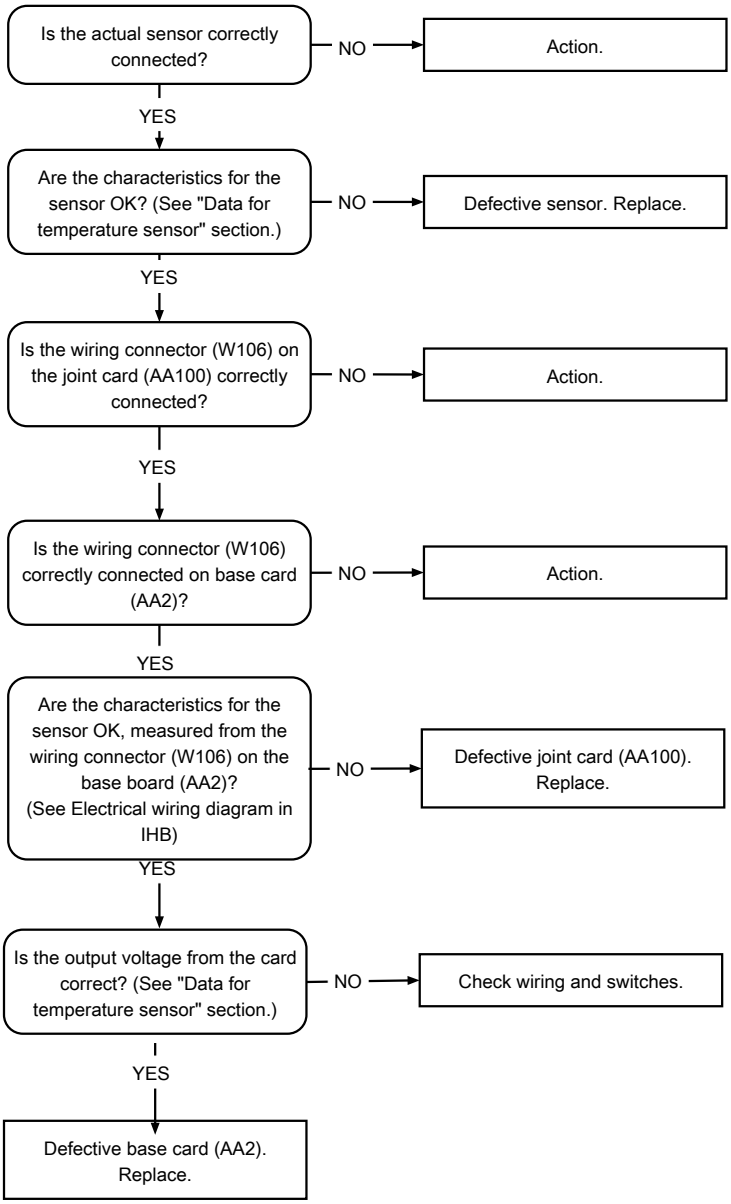
Alarm 1, 25 – sensor fault



Alarm 2 – sensor fault

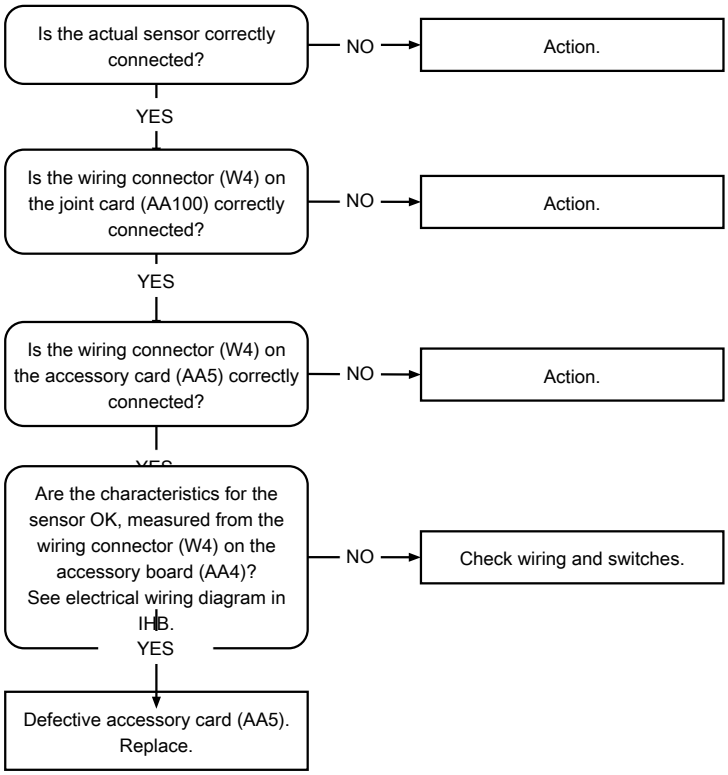


Alarm 3, 11, 12 – sensor fault



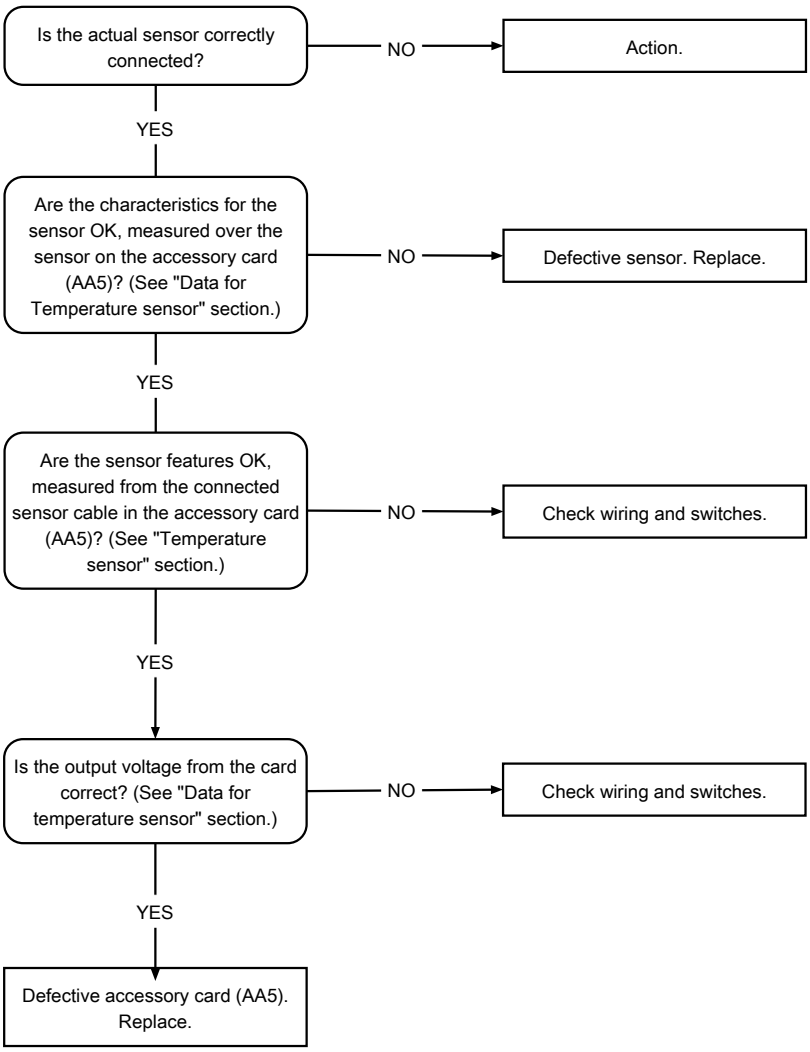
Alarm 20, 21, 26 – sensor fault

Fault-tracing in NIBE FLM

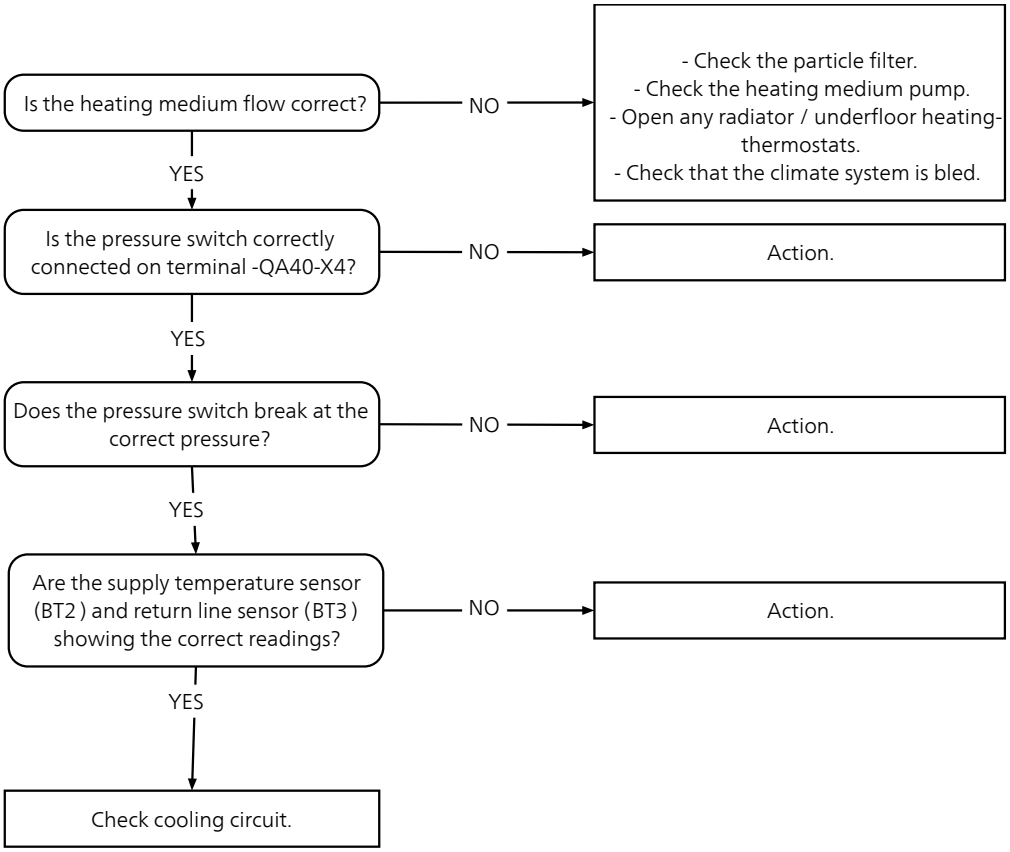


Alarm 33-39 – sensor fault

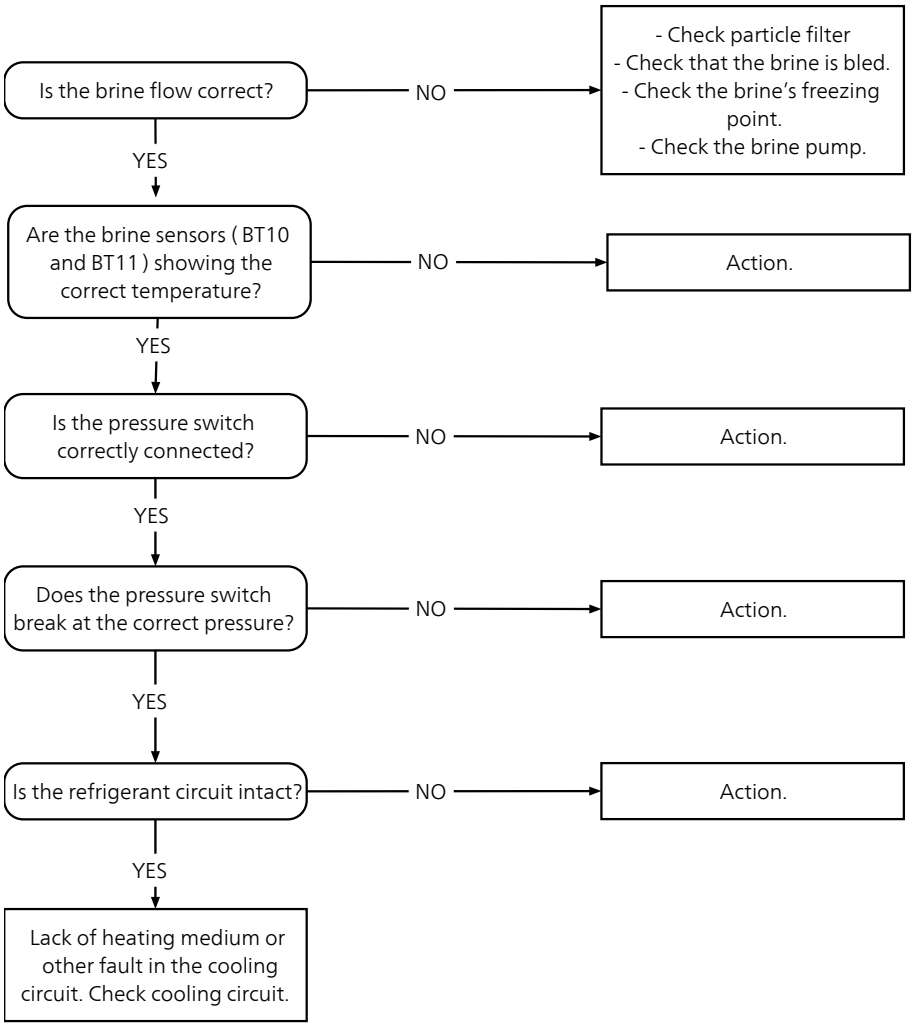
Fault-tracing in accessory card.



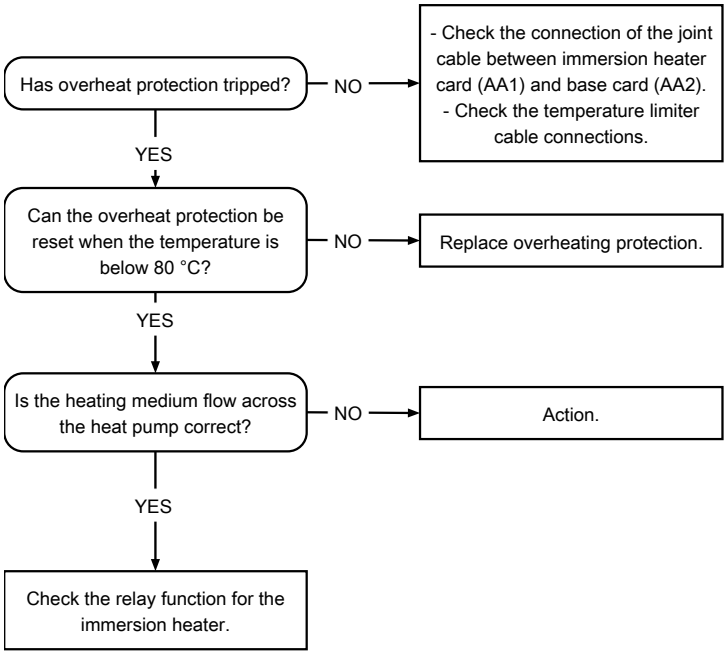
Alarm 50 – high pressure alarm



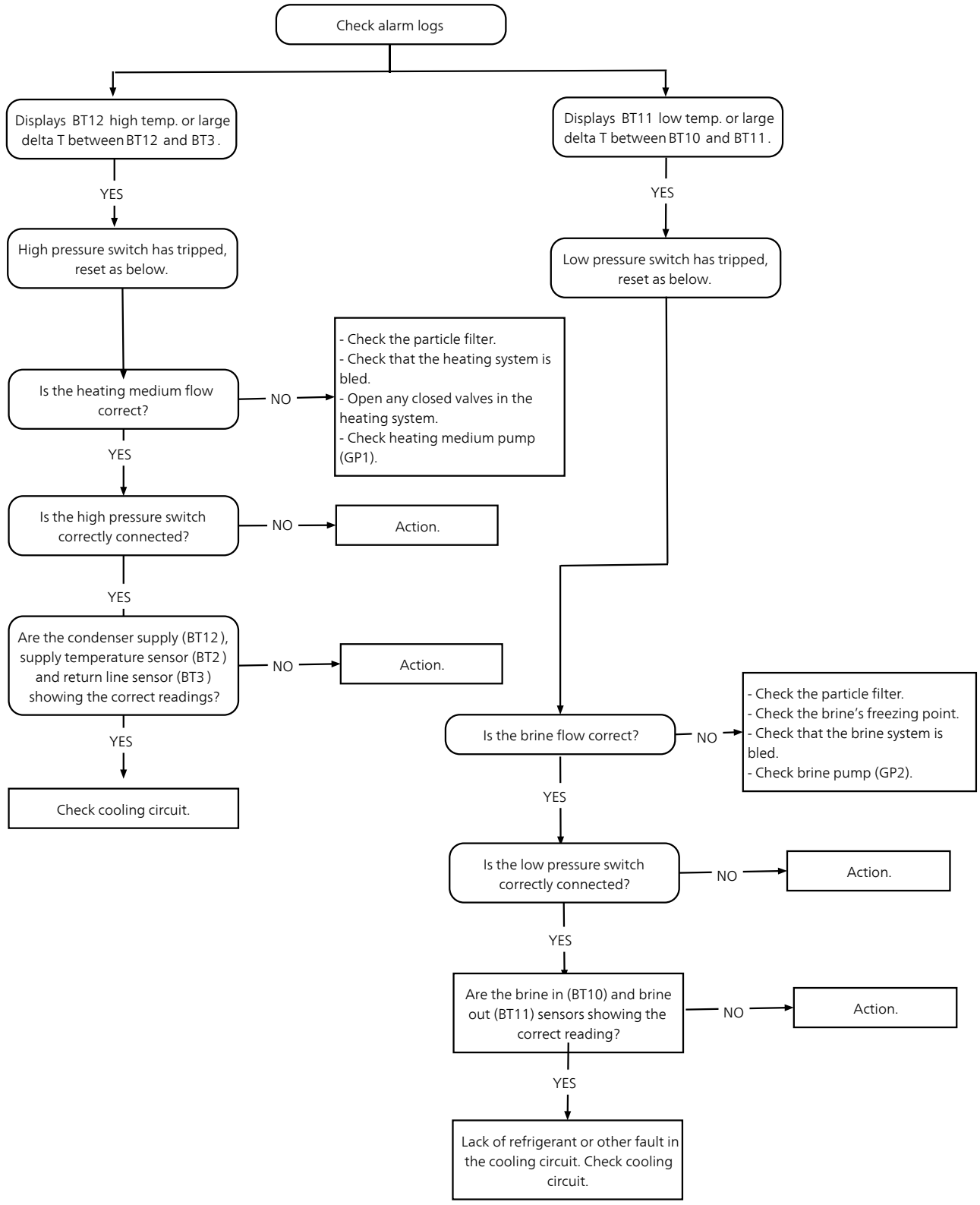
Alarm 51 – low pressure alarm



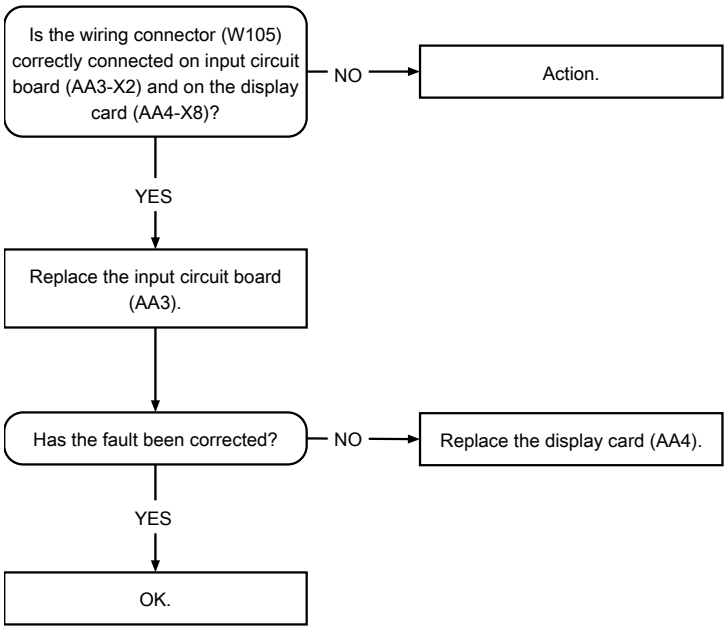
Alarm 52 – temperature limiter



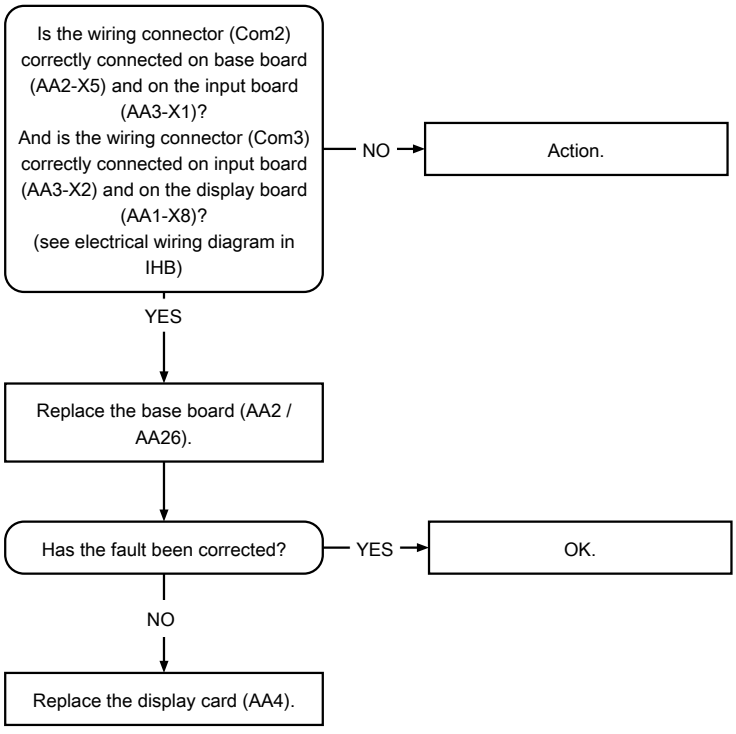
Alarm 58 - pressure switch alarm



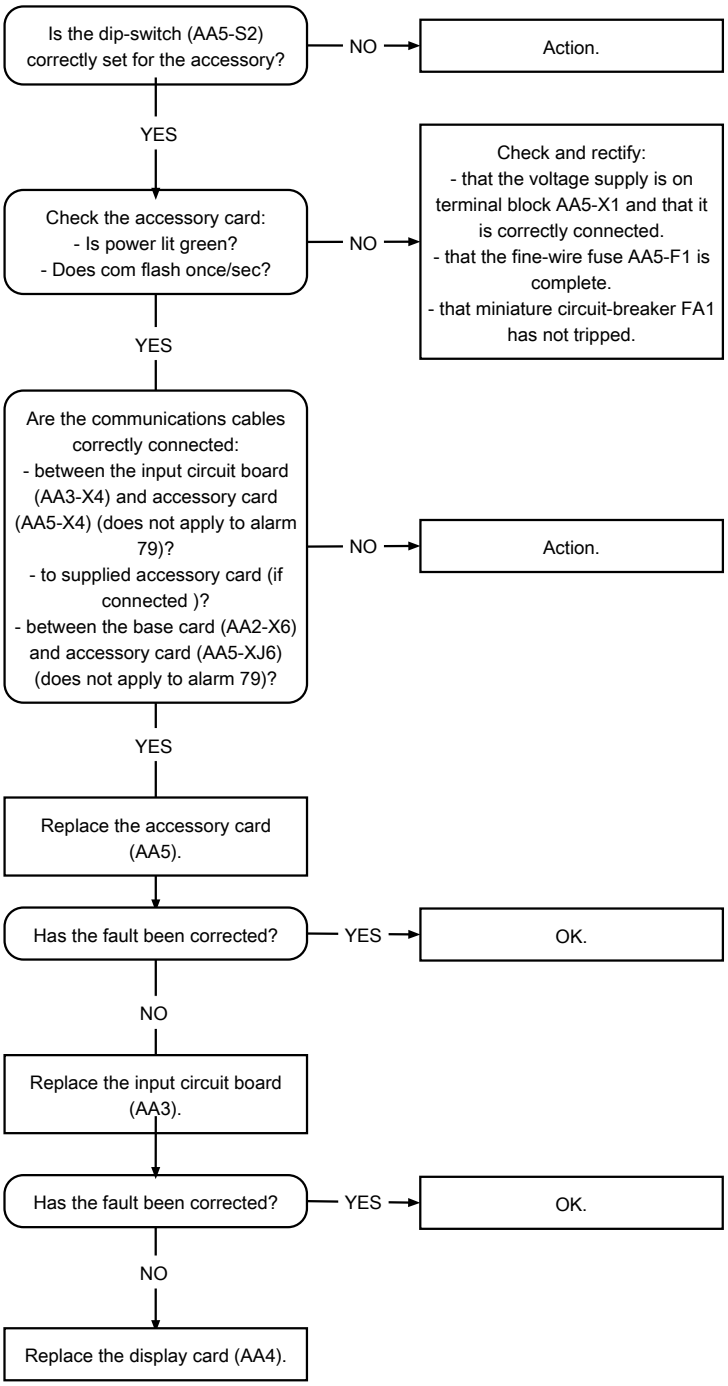
Alarm 70 - perm. com.error input card



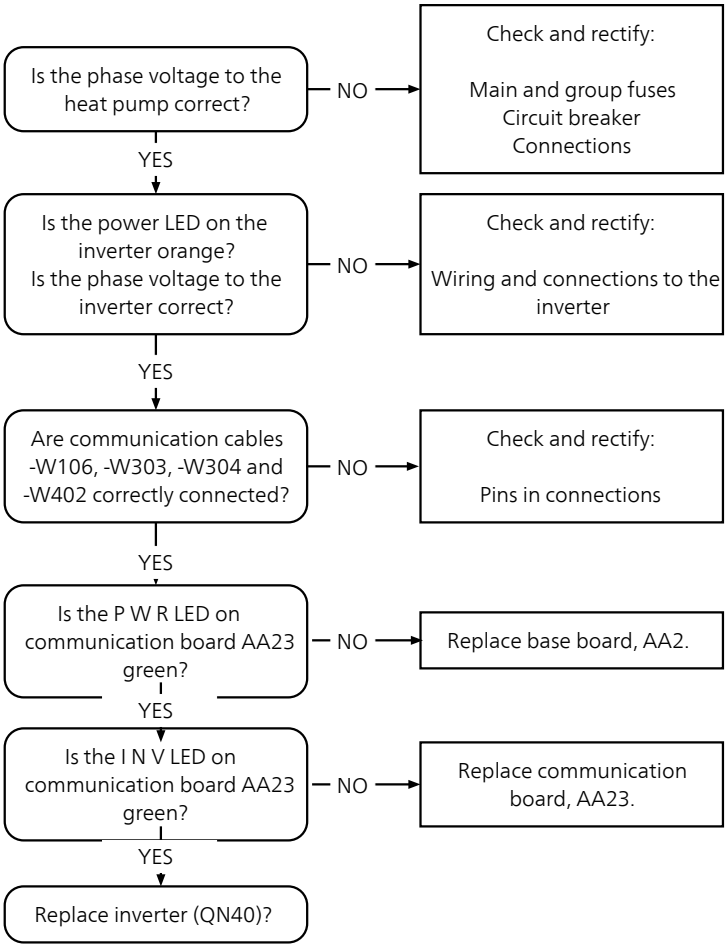
Alarm 71 - perm. com.error input card



Alarm 73–95 - perm. com.error accessory card



Alarm 100 – Inverter fault



Function check, relays/components

Relay test - forced control

The heat pumps relay outputs can be force controlled from menu 5.6.

1. Tick "activated". Forced control is then activated for 10 minutes.
2. Tick the outputs that you want to activate.
3. Check the relay/component function.

WARNING!

Forced control must only be used by users familiar with the system. When forced control is activated, the alarm functions are disabled.

Internal outputs

Output	Function		
	1x230 V	3x230 V	3x400 V
K1	Supply L1	Supply L1	Supply L1
K2	Supply L1	Supply L2	Supply L2
K3	Supply L1	Supply L2	Supply L3
K4	1255-6: Immersion heater 0.5 kW 1255-12: Immersion heater 2 kW	Supply L3	1255-6: Immersion heater 0.5 kW 1255-12:Immersion heater 2 kW 1255-16:Immersion heater 2 kW
K5	No function	Supply L3	1255-6: Immersion heater 3 kW on K9 1255-12: No function 1255-16: No function
K6	1255-6: Immersion heater 1 kW 1255-12: Immersion heater 2 kW	Immersion heater 2 kW	1255-6: Immersion heater 1kW 1255-12:Immersion heater 2 kW 1255-16:Immersion heater 2 kW
K7	No function	1255-6: Immersion heater 0.5 kW 1255-12: Immersion heater 2 kW	1255-6: No function 1255-12:Immersion heater 3 kW (K9) 1255-16:Immersion heater 3 kW (K9)
K8	Immersion heater 2 kW	1255-6: No function 1255-12: Immersion heater 2 kW	1255-6: Immersion heater 2 kW 1255-12:Immersion heater 2 kW 1255-16:Immersion heater 2 kW
K9	Immersion heater 1 kW	1255-6: Immersion heater 1 kW 1255-12: Immersion heater 2 kW	1255-6: Immersion heater 3 kW on K5 1255-12:Immersion heater 1/3 kW 1255-16:Immersion heater 1/3 kW
K10	No function	1255-6: Immersion heater 1 kW 1255-12: No function	No function

Climate system 2 (ECS 40/41)

Output	Function
EP21-AA5-K2	Mixing valve, close
EP21-AA5-K3	Mixing valve, open
EP21-AA5-K4	External circulation pump

Climate system 3 (ECS 40/41)

Output	Function
EP22-AA5-K2	Mixing valve, close
EP22-AA5-K3	Mixing valve, open
EP22-AA5-K4	External circulation pump

Climate system 4 (ECS 40/41)

Output	Function
EP23-AA5-K2	Mixing valve, close
EP23-AA5-K3	Mixing valve, open
EP23-AA5-K4	External circulation pump

Climate system 5 (ECS 40/41)

Output	Function
EP44-AA5-K2	Mixing valve, close
EP44-AA5-K3	Mixing valve, open
EP44-AA5-K4	External circulation pump

Climate system 6 (ECS 40/41)

Output	Function
EP45-AA5-K2	Mixing valve, close
EP45-AA5-K3	Mixing valve, open
EP45-AA5-K4	External circulation pump

Climate system 7 (ECS 40/41)

Output	Function
EP46-AA5-K2	Mixing valve, close
EP46-AA5-K3	Mixing valve, open
EP46-AA5-K4	External circulation pump

Climate system 8 (ECS 40/41)

Output	Function
EP47-AA5-K2	Mixing valve, close
EP47-AA5-K3	Mixing valve, open
EP47-AA5-K4	External circulation pump

Mixing valve controlled additional heat (AXC 40)

Output	Function
EM1-AA5-K1	External addition (burner) permitted
EM1-AA5-K2	Mixing valve, close
EM1-AA5-K3	Mixing valve, open
EM1-AA5-K4	External circulation pump

Pool 1 (POOL 40)

Output	Function
CL11-A5-K1	External circulation pump
CL11-A5-K3	Pool reversing valve
CL11-A5-K4	Pool pump

Pool 2 (POOL 40)

Output	Function
CL12-A5-K1	External circulation pump
CL12-A5-K3	Pool reversing valve
CL12-A5-K4	Pool pump

Exhaust air module 1 (FLM)

Output	Function
AZ1-AA5-K3	Fan (relay)
AZ1-AA5-K4	Brine pump FLM

Exhaust air module 2 (FLM)

Output	Function
AZ2-AA5-K3	Fan (relay)
AZ2-AA5-K4	Brine pump FLM

Exhaust air module 3 (FLM)

Output	Function
AZ3-AA5-K3	Fan (relay)
AZ3-AA5-K4	Brine pump FLM

Exhaust air module 4 (FLM)

Output	Function
AZ4-AA5-K3	Fan (relay)
AZ4-AA5-K4	Brine pump FLM

Ground water pump (AXC 40)

Output	Function
EP12-AA5-K4	Groundwater pump

Passive cooling 2-pipe (PCM40/PCM42)

Output	Function
EQ1-AA5-K1	External circulation pump
EQ1-AA5-K2	Shunt valve, (QN18) close
EQ1-AA5-K3	Shunt valve, (QN18) open
EQ1-AA5-K4	Reversing valve (QN12)

Passive cooling 4-pipe (PCS44)

Output	Function
EQ1-AA5-K1	Circulation pump cooling (GP13)
EQ1-AA5-K2	Mixing valve (QN18), close
EQ1-AA5-K3	Mixing valve (QN18), open

Passive/active cooling (HPAC, ACS45)

Output	Function
EQ1-AA5-K1	AC
EQ1-AA5-K2	PC
EQ1-AA5-K4	External circulation pump

Step controlled additional heat (AXC40)

Output	Function
EB1-AA5-K1	Step 1
EB1-AA5-K2	Step 2
EB1-AA5-K3	Step 3

Function check, circulation pumps

With forced control of the heating medium pump (GP1) or the brine pump (GP2) it can be necessary to check the supply (230 V AC) and the control signal (0-10 V DC) to the circulation pump.

Heating medium pump (GP1) Grundfos

Pump speed GP1	PVM1, X2:1-2	LED PWM1 on Board AA2
100 %	approx 0 V DC	Not lit
50 %	approx 5 V DC	Half lit
0 %	approx 10 V DC	Lit

Brine pump (GP2) Grundfos

Pump speed GP2	PVM2, X2:3-4	LED PWM2 on Board AA2
100 %	approx 0 V DC	Not lit
50 %	approx 5 V DC	Half lit
0 %	approx 10 V DC	Lit

Pump speed GP1	PVM2, X2:3-4	LED PWM2 on Board AA2
0 %	approx 0 V DC	Not lit
50 %	approx 5 V DC	Half lit
100 %	approx 10 V DC	Lit

Fan (GQ10) FLM

Fan speed GQ10	PVM2, X2:3-4	LED PWM2 on Board AA2
100 %	approx 0 V DC	Not lit
50 %	approx 5 V DC	Half lit
0 %	approx 10 V DC	Lit

7 Component replacement

NOTE

Servicing should only be carried out by persons with the necessary expertise.

Cut the current with the circuit breaker before carrying out any servicing.

F1155 can contain liquids at high temperature and under high pressure.

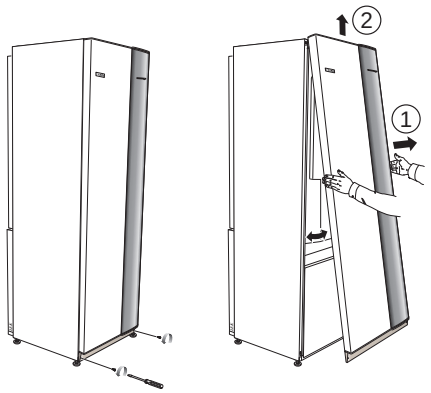
When replacing components on F1155 only replacement parts from NIBE may be used.

An ESD bracelet must be worn when replacing the card.

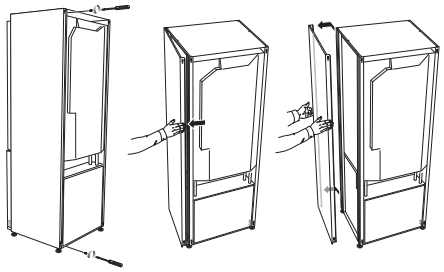
Basic

Removing the covers

Front cover



1. Remove the screws from the lower edge of the front panel.
2. Lift the panel out at the bottom edge and up.



The side covers can be removed to facilitate the installation.

1. Remove the screws from the upper and lower edges.
2. Twist the cover slightly outward.
3. Move the hatch outwards and backwards.
4. Assembly takes place in the reverse order.

Pulling out the cooling module

The cooling module can be pulled out for service and transport.

NOTE

Shut off the heat pump and turn off the current on the safety breaker.

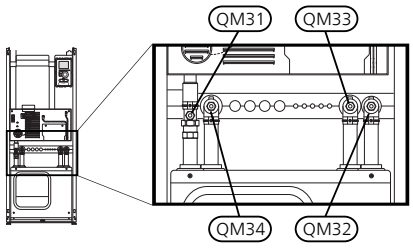
Caution

Drain the cooling module according to IHB to facilitate lifting.

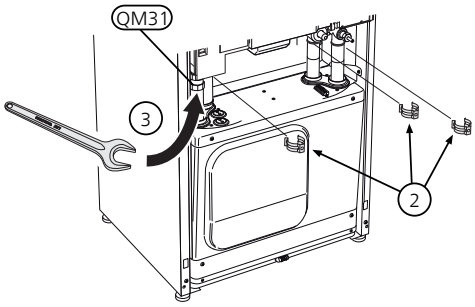
Caution

Remove the front cover according to the description on page 54.

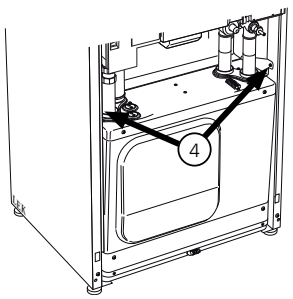
1. Close the shut-off valves (QM31), (QM32), (QM33) and (QM34).



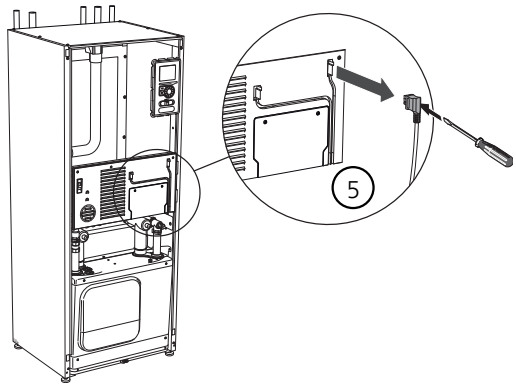
2. Pull off the lock catches.



3. Disconnect the pipe connection at the shut-off valve (QM31).
4. Remove the two screws.



5 Remove the connection from the base card (AA2) using a screwdriver.

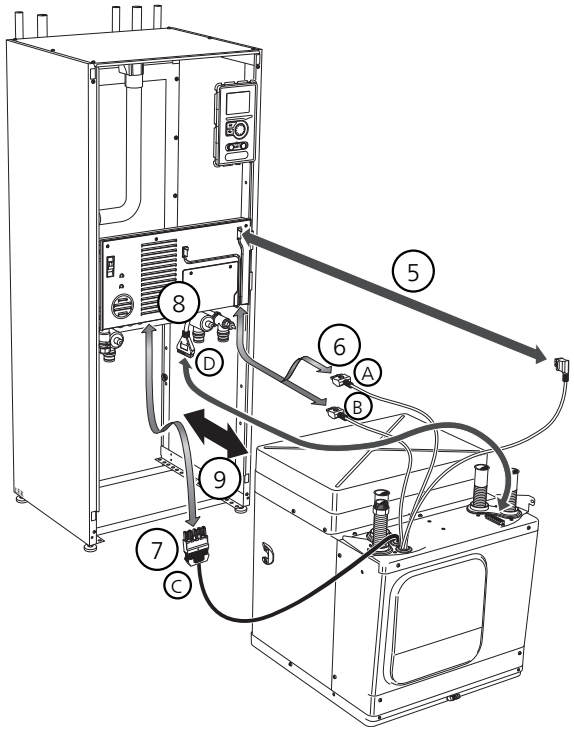


6 Disconnect the connectors (A) and (B) from the underside of the base card cabinet.

7 Disconnect the connector (C) from the immersion heater circuit board (AA1) using a screwdriver.

8 Disconnect the connector (D) from the joint circuit board (AA100).

9 Carefully pull out the cooling module.

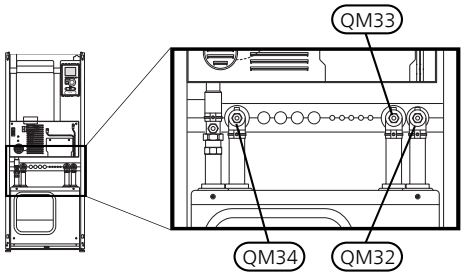


TIP

The cooling module is installed in reverse order.

NOTE

At reinstallation, the supplied O-rings must replace the existing ones at the connections to the heat pump (see image).



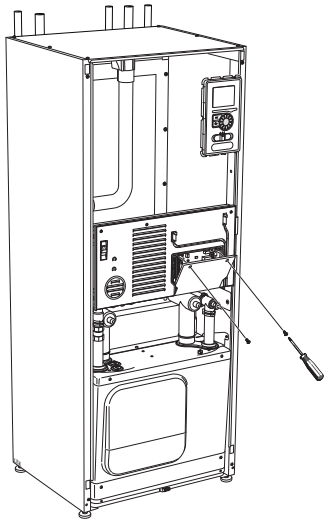
Accessibility, electrical connection

The plastic cap of the electrical boxes is opened using a screwdriver.

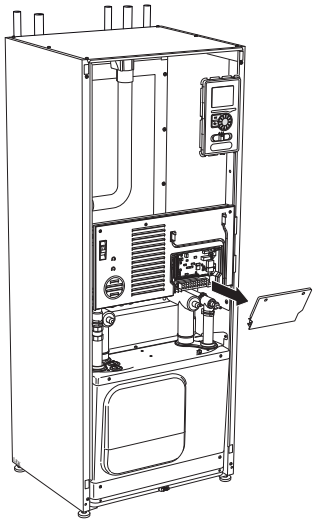
> **NOTE**
>
> The cover for the input card is opened without a tool.

Removing the cover, input circuit board

1. Unscrew the screws and angle out the cover.

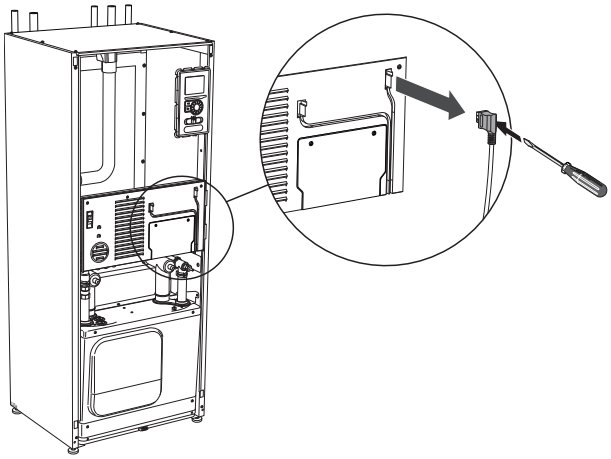


2. Pull off the cover.

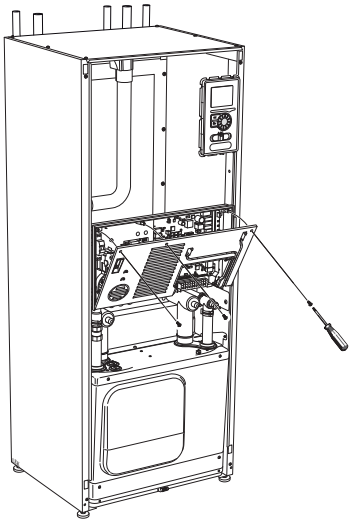


Removing the hatch, electrical cabinet

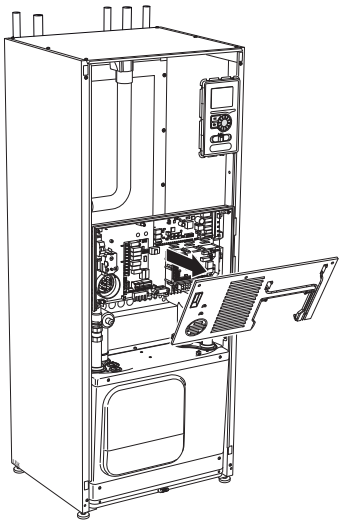
1. Disconnect the contacts.



2. Unscrew the screws and angle out the cover.

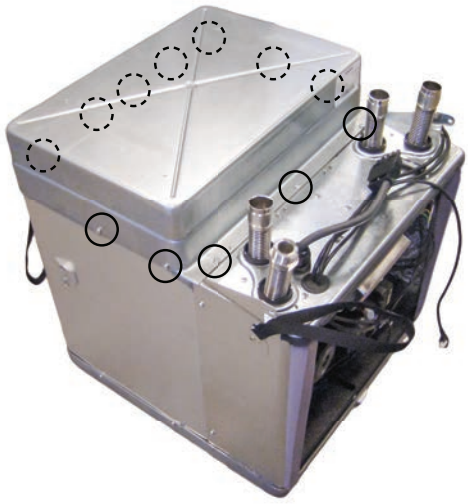


3. Pull off the cover.



Main components

Compressor (GQ10)

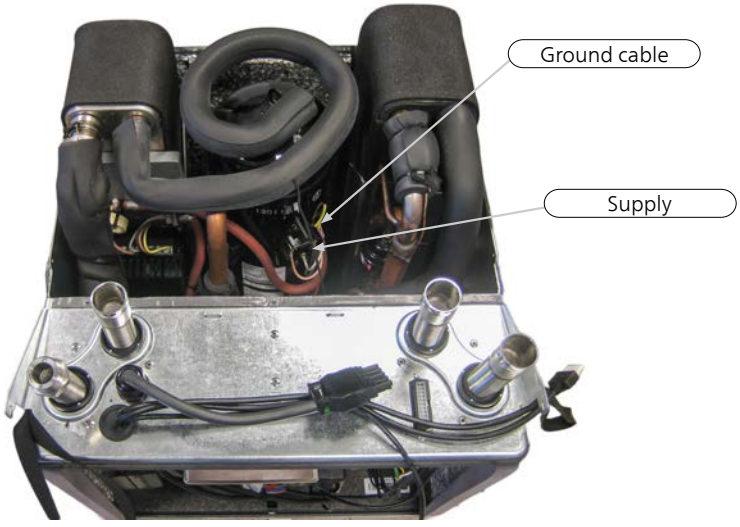
1 Remove the cooling module according to the instruction on page 54.	
3 Slacken off 12 screws. **4** Remove the cover on the cooling module.	
5 Slacken off 8 screws. **6** Remove the right/rear side panel on the cooling module.	

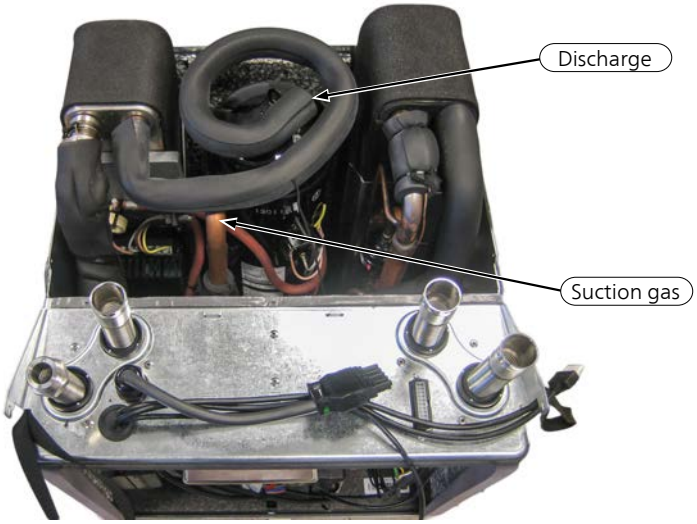
7 Slacken off 7 screws.

8 Remove the left/rear side panel on the cooling module.

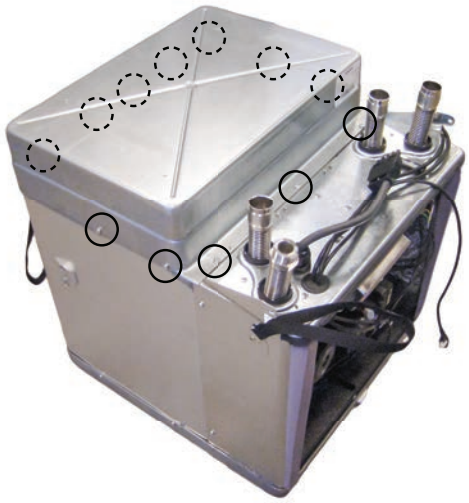
9 Unscrew the ground cable.

10 Disconnect the compressor supply cables.



11 Remove the 4 locking plates holding the compressor.	
12 Drain the cooling circuit and ensure that no refrigerant remains before you continue. **13** Disconnect the pipes for suction gas and hot gas. **14** Remove the compressor.	

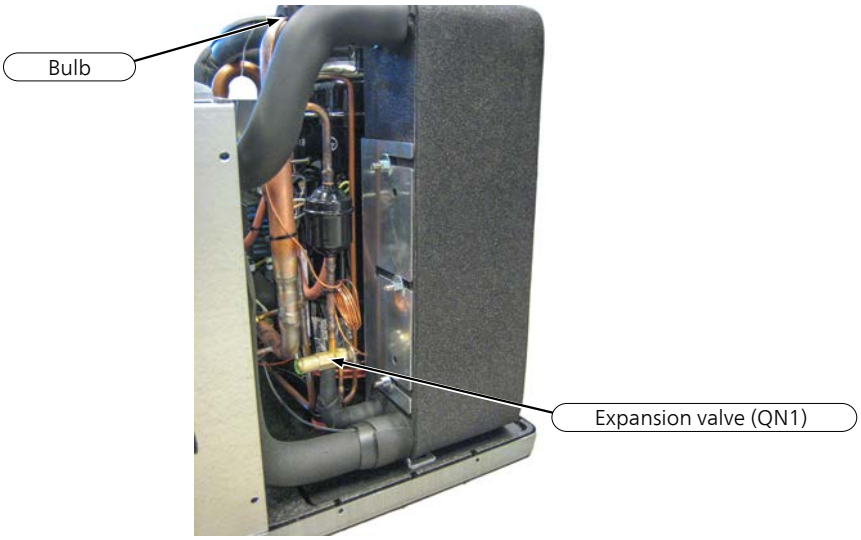
Expansion valve (QN1)

1 Remove the cooling module according to the instruction on page 54.	
3 Slacken off 12 screws. **4** Remove the cover on the cooling module.	
5 Slacken off 8 screws. **6** Remove the right/rear side panel on the cooling module.	

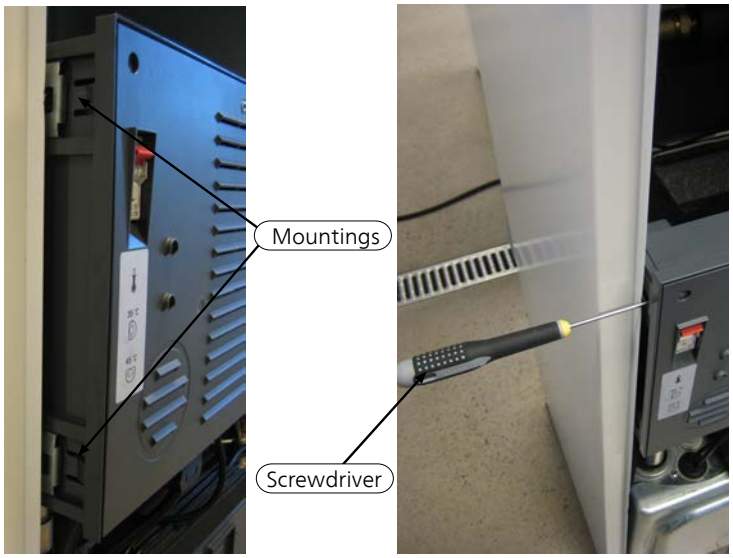
7 Drain the cooling circuit and ensure that no refrigerant remains before you continue.

8 Slacken off the bulb for the expansion valve.

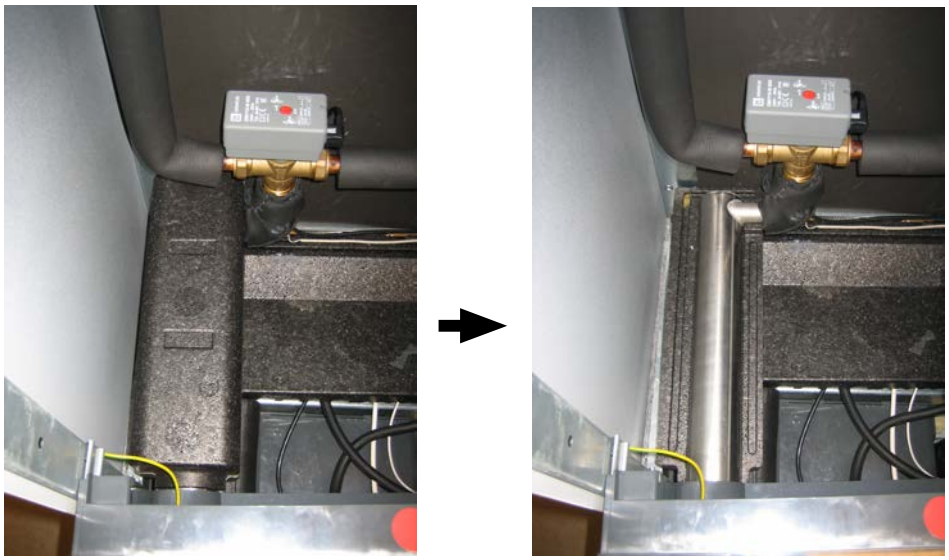
9 Disconnect the pipes and remove the valve.



Immersion heater (EB1)

1 Drain the heating medium system.	
2 Remove the electrical connection from its mountings using a screwdriver and pull out the electrical connector.	 4041)
3 Disconnect the two cables through the cover in front of (AA2).	

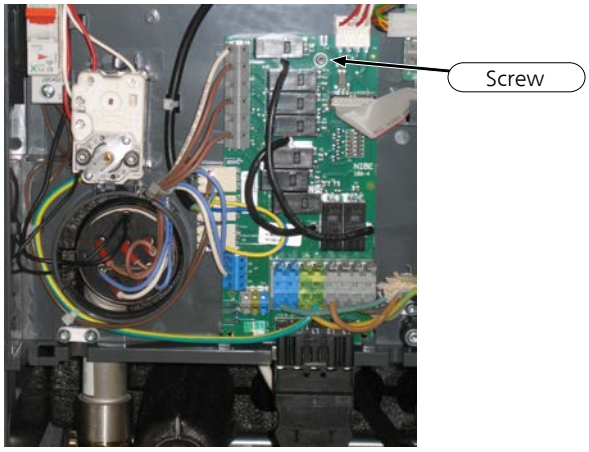
4 Remove the insulation over the immersion heater.



5 Ensure that the heat pump is unpowered before continuing.

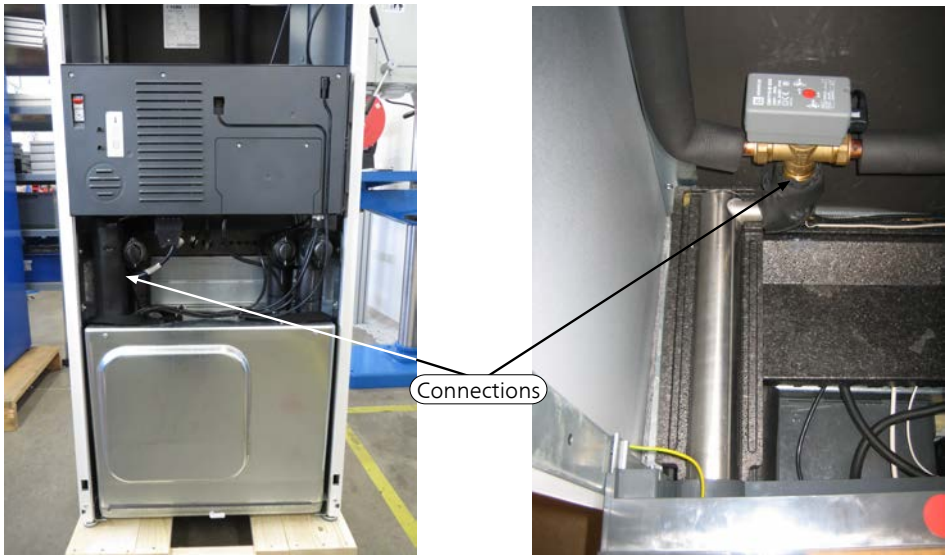
6 Disconnect the 2 blue cables, the 2 white and the 3 brown cables from the terminal block X3 and X7 on (AA1).

7 Pull out the two bulbs from the immersion heater.

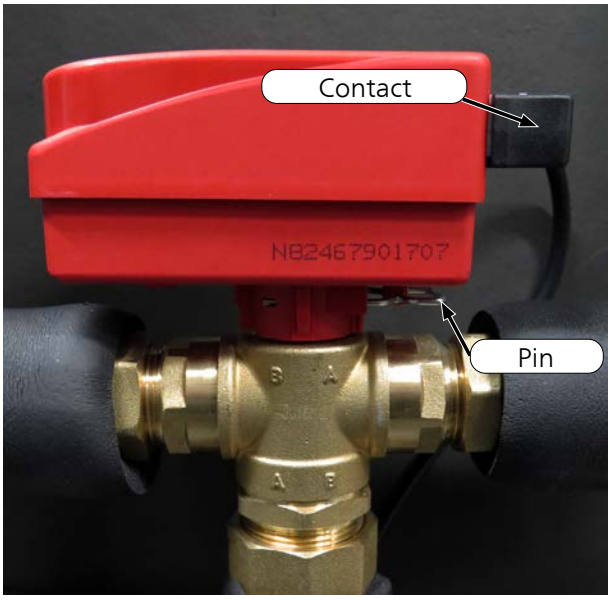


8 Disconnect the immersion heater at the marked couplings.

9 Remove the immersion heater.



Reversing valve (QN10)

1 Drain the heating medium system.	
2 Remove the switch on the actuator. **3** Remove the pin and lift up the actuator.	
4 Disconnect and remove the three way valve.	

Heating medium pump (GP1)

1 Drain the heating medium system.

2 Slacken off 2 x screws.

3 Remove the front hatch on the cooling module.

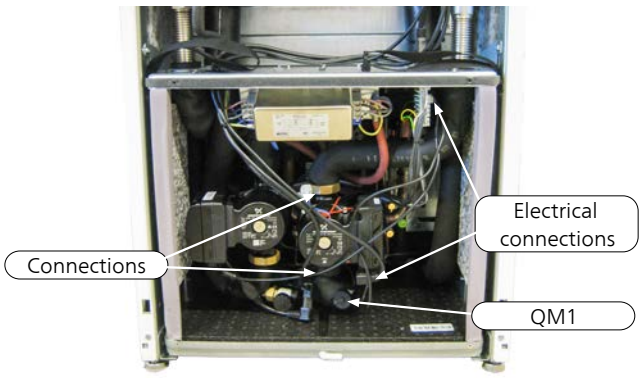
4 Close the shut-off valves QM31 and QM32

5 Drain the heating circuit by QM1

6 Remove the electric switch on the circulation pump.

7 Remove the switch for the control cable on the joint board. AA100

8 Disconnect and remove the circulation pump.



Brine pump (GP2)

1 Slacken off 2 x screws.

2 Remove the front hatch on the cooling module.

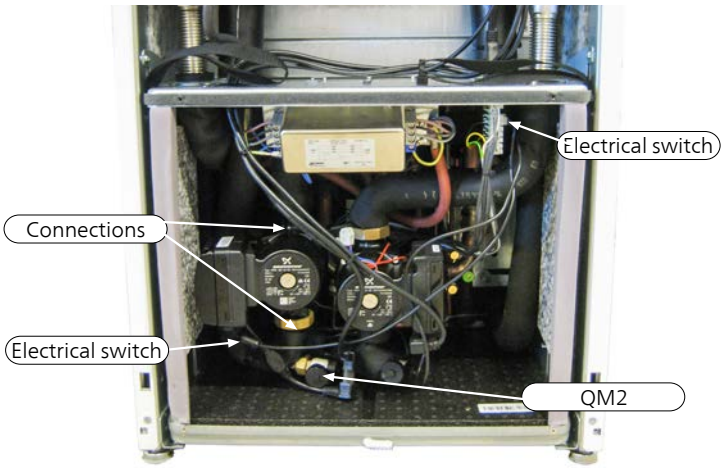
3 Close the shut-off valves (QM33) and (QM34).

4 Drain the brine system via drain valve QM2.

5 Remove the electric switch on the circulation pump.

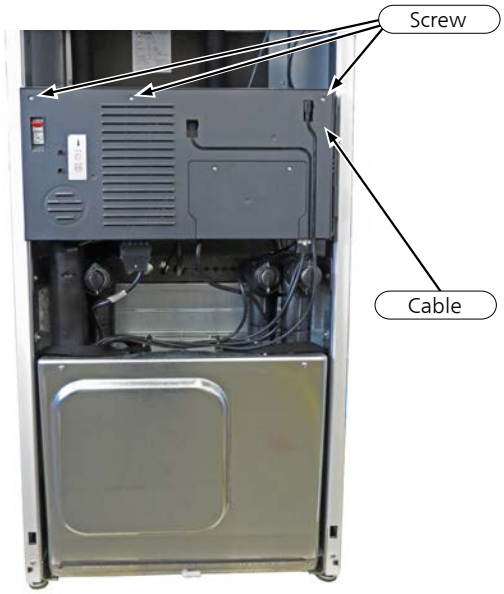
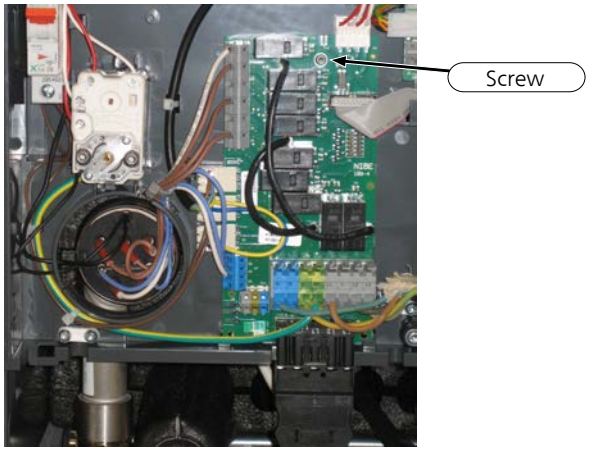
6 Remove the switch for the control cable on the joint board. AA100.

7 Disconnect and remove the circulation pump.

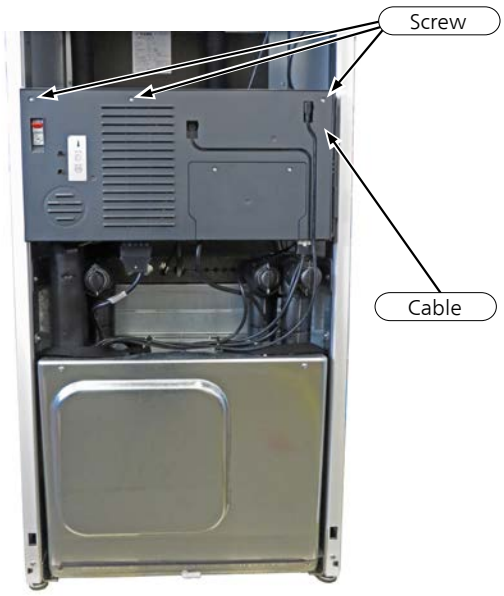
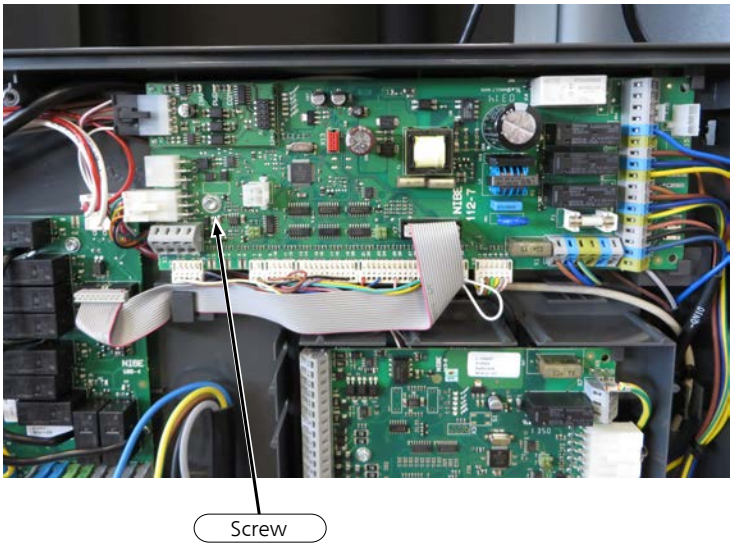


Circuit board and electronics

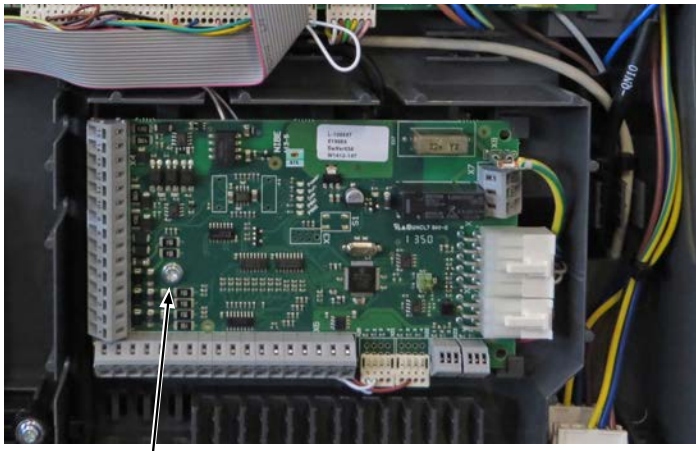
Immersion heater card (AA1)

1 Remove the plastic cover over the electronics box.	
2 Disconnect the cables and screws holding the card in position. **3** Remove the immersion heater card (.AA1).	

Base card (AA2)

1 Disconnect the cables and the three screws for the electronics cabinet. **2** Remove the plastic cover over the electronics box.	
3 Disconnect the cables and screws holding the card in position. **4** Remove the base card (AA2).	

Input circuit board (AA3)

1 Remove the plastic cover over (AA3. See page 56.	
2 Disconnect the cables and screws holding the card in position. **3** Remove the input card (AA3).	

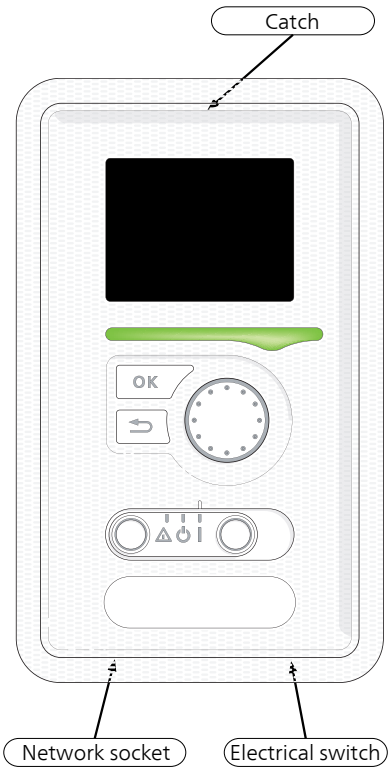
Display unit (AA4)

1 Disconnect the electrical connector from the underside of the display unit.

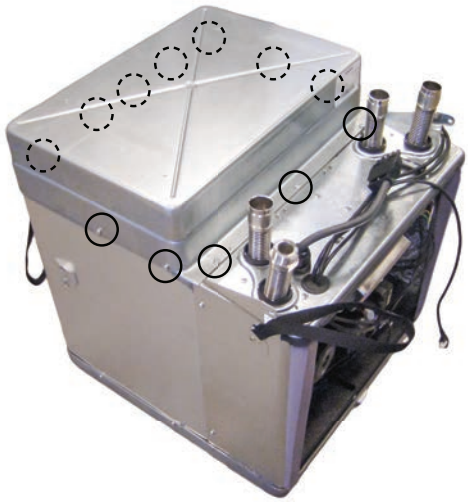
2 Disconnect the network cable from the network socket.

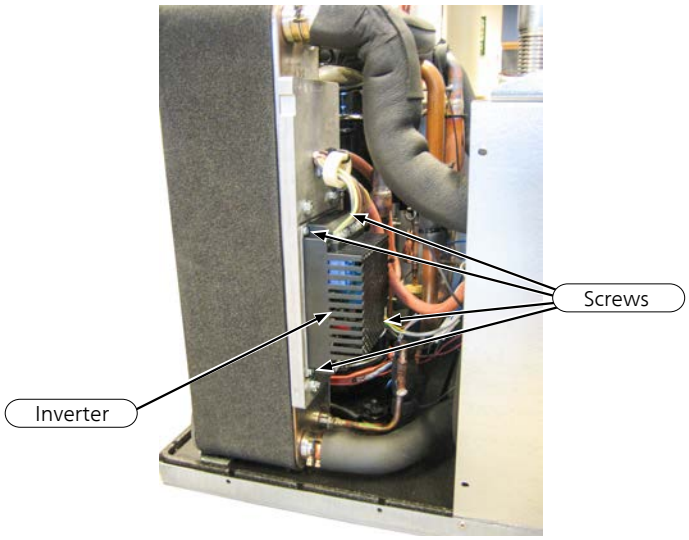
3 Press the catch on the upper rear side of the display unit towards you.

4 Remove the display unit.



Inverter (QA40)

1 Remove the cooling module according to the instruction on page ?? **2** Slacken off 12 screws. **3** Remove the top cover from the cooling module.	
4 Slacken off 9 screws. **5** Remove the left/rear side panel on the cooling module.	 

6 Remove cables and connectors. **7** Slacken off 4 screws. **8** Remove the inverter.	

9 Scrape the paste from the aluminium plate using, for example, a plastic ice scraper.

10 Thoroughly clean the plate using denatured alcohol.

11 For **6 kW**: Apply the silicon paste to the new inverter's heat dispersing plate as follows: Run a bead between the holes and a bead on each side with approx. 15 mm between. Start application so that most of the paste goes in the middle and the finish towards the edges is a little thinner. The beads must be thin. (See illustration.)

For **12/16 kW**: Apply the silicon paste to the new inverter's heat dispersing plate as follows: Run one bead between the holes in the shape of a "J" and two beads on each side. Then run a sixth small bead along the bottom. Start application so that most of the paste goes in the middle and the finish towards the edges is a little thinner. The beads must be thin. (See illustration.)

12 Install the inverter securely on the aluminium plate (4 screws), tightening the screws diagonally (Torque 4.0 Nm).

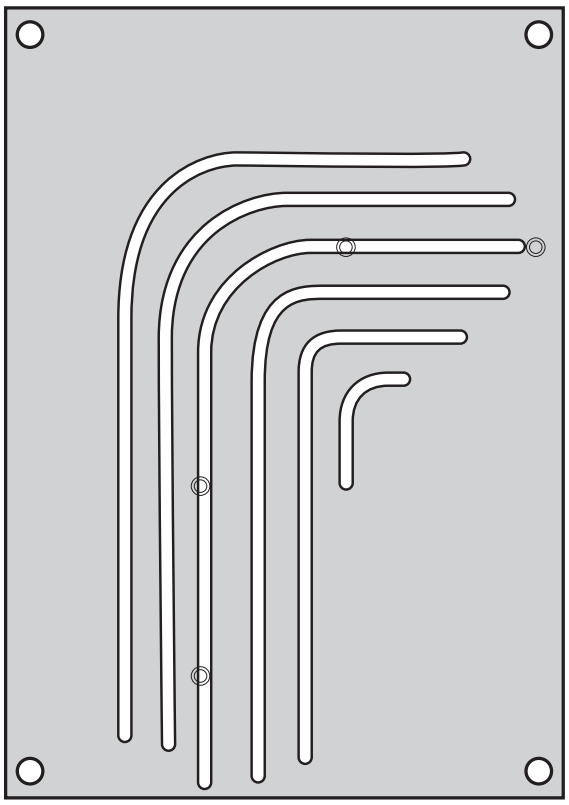
13 Wait 5 minutes for the silicone paste to flow outwards and spread better.

14 Remove the inverter from the aluminium plate (4 screws) and check that the paste has smoothed out the irregularities. If not, add more paste.

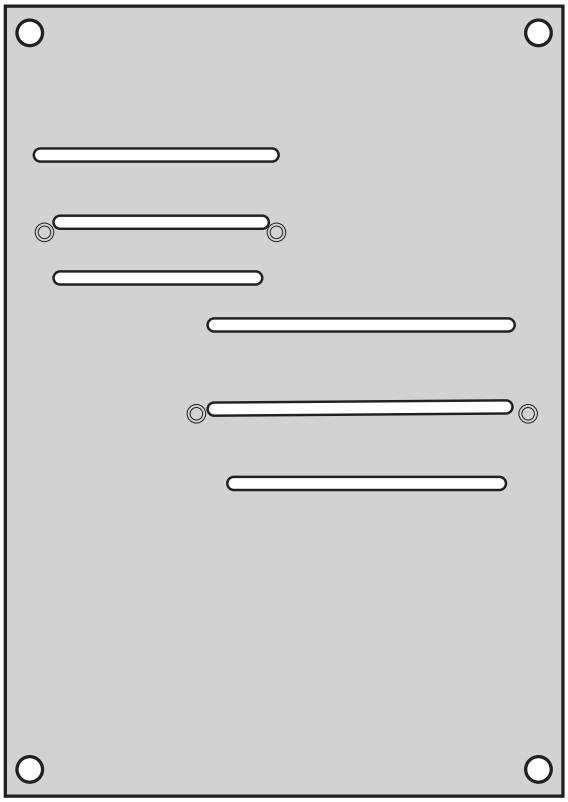
15 Install the inverter securely on the aluminium plate (4 screws), tightening the screws diagonally (Torque 4.0 Nm).

16 Wipe off any excess paste.

6kW



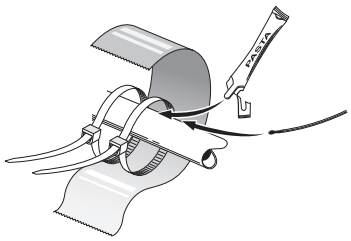
12/16 kW



17 Re-install the cables, see electrical wiring diagram in the Installer Manual for the specific model.	

Temperature sensor

Mounting

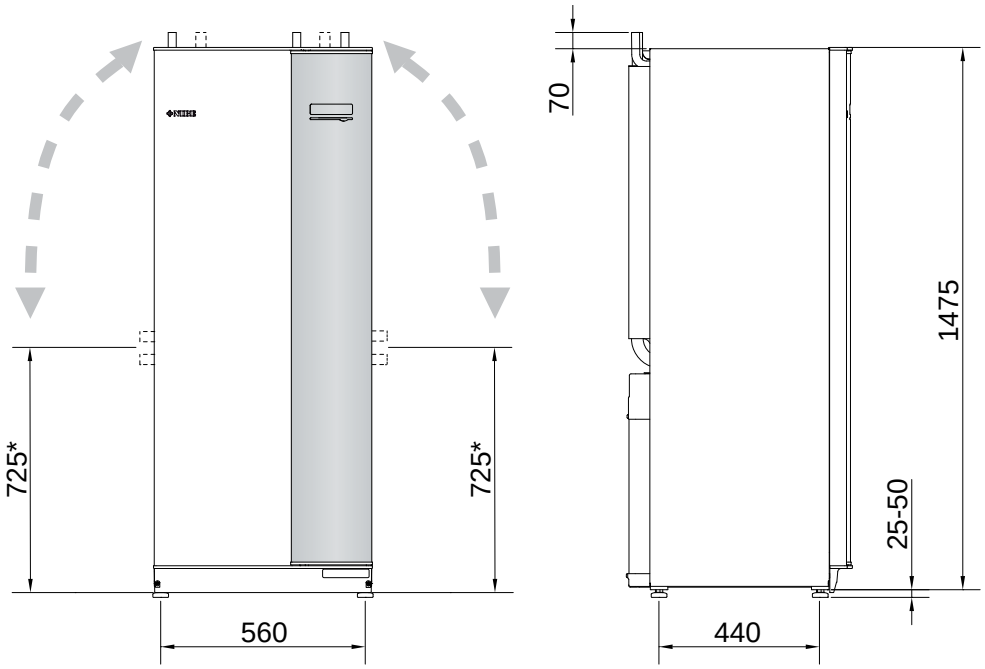


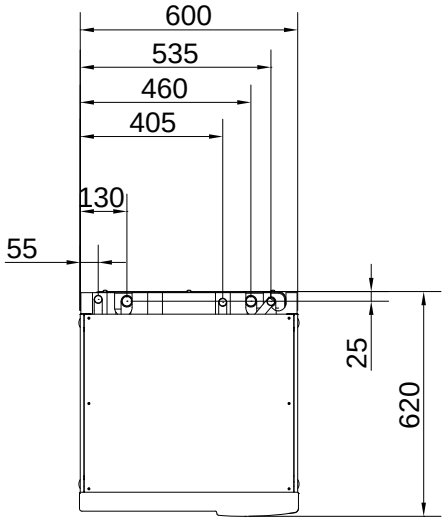
Install the temperature sensor with cable ties with the heat conducting paste and aluminium tape.

Then insulate with supplied insulation tape.

8 Technical specifications

Dimensions and setting-out coordinates





* This dimension applies at 90° angle on the brine pipes (side connection). The dimension can vary approx. ±100 mm in height as the brine pipes partially consist of flexible pipes.

1x230V

F1155-6		
Electrical data		
Rated voltage		230V ~ 50Hz
Max operating current including 0 – 0.5 kW immersion heater (Recommended fuse rating).	A_{rms}	15(16)
Max operating current including 1 – 1.5 kW immersion heater (Recommended fuse rating).	A_{rms}	20(20)
Max operating current including 2 – 2.5 kW immersion heater (Recommended fuse rating).	A_{rms}	24(25)
Max operating current including 3 – 4 kW immersion heater (Recommended fuse rating).	A_{rms}	31(32)
Max operating current including 4.5 kW immersion heater (Recommended fuse rating).	A_{rms}	33(40)
Additional power	kW	0.5/1/1.5/2/2.5/3 /3.5/4/4.5

F1155-12		
Electrical data		
Rated voltage		230 V ~ 50 Hz
Max operating current including 0 – 1 kW immersion heater (Recommended fuse rating).	A_{rms}	26(32)
Max operating current including 2 – 4 kW immersion heater (Recommended fuse rating).	A_{rms}	39(40)
Max operating current including 5 – 7 kW immersion heater (Recommended fuse rating).	A_{rms}	52(63)
Additional power	kW	1/2/3/4/5/6/7

3x230V

F1155-6		
Electrical data		
Rated voltage		230V 3 ~ 50Hz
Max operating current including 0 – 1 kW immersion heater (Recommended fuse rating).	A_{rms}	16(16)
Max operating current including 1.5 – 4.5 kW immersion heater (Recommended fuse rating).	A_{rms}	20(20)
Additional power	kW	0.5/1/1.5/2/2.5/3 /3.5/4/4.5

F1155-12		
Electrical data		
Rated voltage		230V 3 ~ 50Hz
Max operating current including 2 – 4 kW immersion heater (Recommended fuse rating).	A_{rms}	28(32)
Max operating current including 6 kW immersion heater (Recommended fuse rating).	A_{rms}	36(40)
Max operating current including 9 kW immersion heater (Recommended fuse rating).	A_{rms}	46(50)
Additional power	kW	1/2/3/4/5/6/7/8/9

3x400V

F1155-6		
Electrical data		
Rated voltage		400V 3N ~ 50Hz
Max operating current including 0 kW immersion heater (Recommended fuse rating).	A_{rms}	12(16)
Max operating current including 0.5 – 6.5 kW immersion heater (Recommended fuse rating).	A_{rms}	16(16)
Additional power	kW	0.5/1/1.5/2/2.5/3 /3.5/4/4.5/5/5.5/6/6.5

F1155-16		
Electrical data		
Rated voltage		400V 3N ~ 50Hz
Max operating current including 0 kW immersion heater (Recommended fuse rating).	A_{rms}	10(10)
Max operating current including 1 kW immersion heater (Recommended fuse rating).	A_{rms}	13(16)
Max operating current including 2 – 4 kW immersion heater (Recommended fuse rating).	A_{rms}	17(20)
Max operating current including 5 – 7 kW immersion heater (Recommended fuse rating).	A_{rms}	21(25)
Max operating current including 9 kW immersion heater, requires reconnection (Recommended fuse rating).	A_{rms}	24(25)
Additional power	kW	1/2/3/4/5/6/7 (switchable to 2/4/6/9)
Short circuit power (Ssc)*	MVA	2.0

*) This equipment complies with IEC 61000-3-12, on the condition that the short circuit power Ssc is greater than or equal to 2.0 MVA at the connection point between the customer installation electrical supply and the mains network. It is the responsibility of the installer or user to ensure, through consultation with the distribution network operator if required, that the equipment is only connected to a supply with a short circuit power Ssc equal to or greater than 2.0 MVA.

1x230V, 3x230V and 3x400V

[1)]Reported efficiency for the system takes the product's temperature regulator into account.

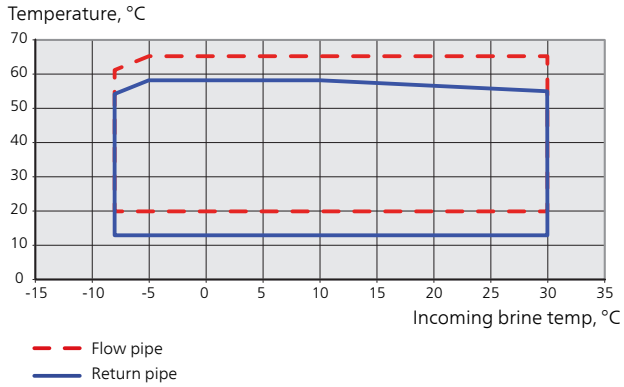
[2)]With feet removed the height is approx. 1650 mm for F1155.

Working range heat pump, compressor operation

The compressor provides a supply temperature up to 65 °C, at 0 °C incoming brine temperature, the remainder (up to 70°C) is obtained using the additional heat.

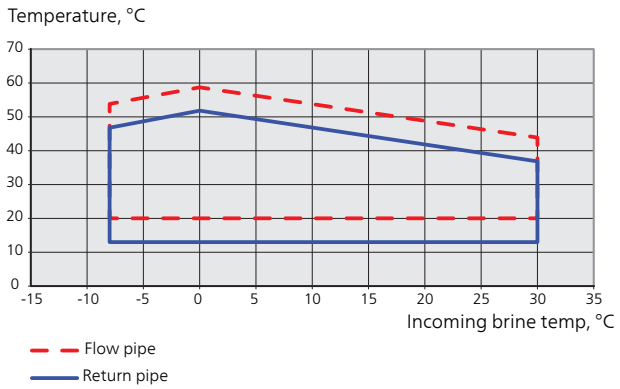
F1155-6, -12, -16

This diagram shows the working range below 75 % for F1155-6 and the entire working range for F1155-12, -16.



F1155-6

This diagram shows the working range above 75 % for F1155-6.



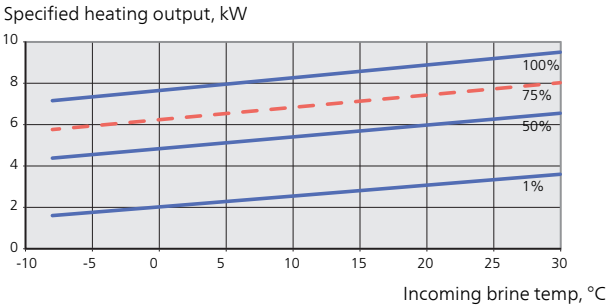
Diagram, dimensioning compressor speed

Heating mode 35 °C

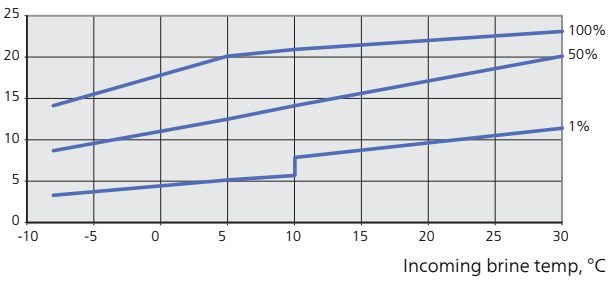
Use this diagram to dimension the heat pump.

The percentages show approximate compressor speed.

F1155-6



F1155-16



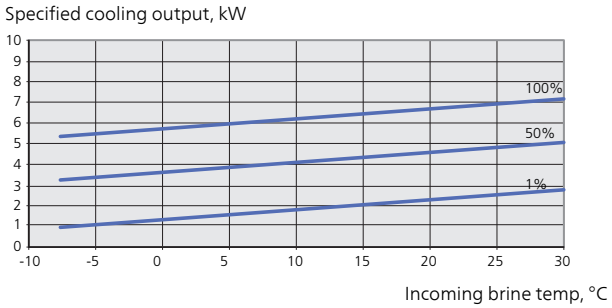
Cooling mode (Accessory required)

Caution

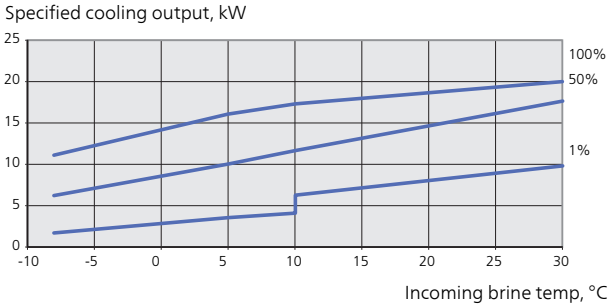
To dimension heating dump, see the diagram for heating operation.

Supply temperature, heating medium 35 °°C

F1155-6

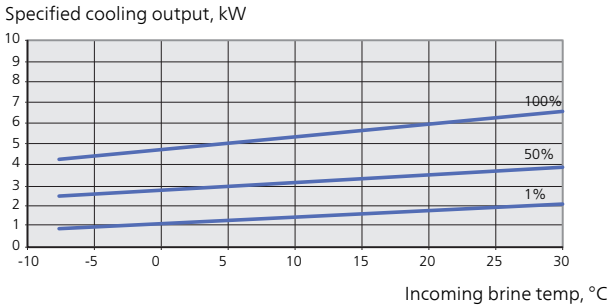


F1155-16

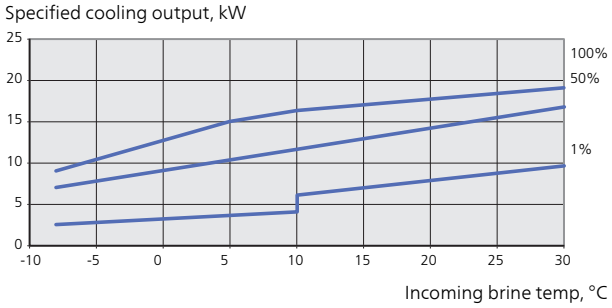


Supply temperature, heating medium 50 °°C

F1155-6



F1155-16



9 Item register

Item register

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