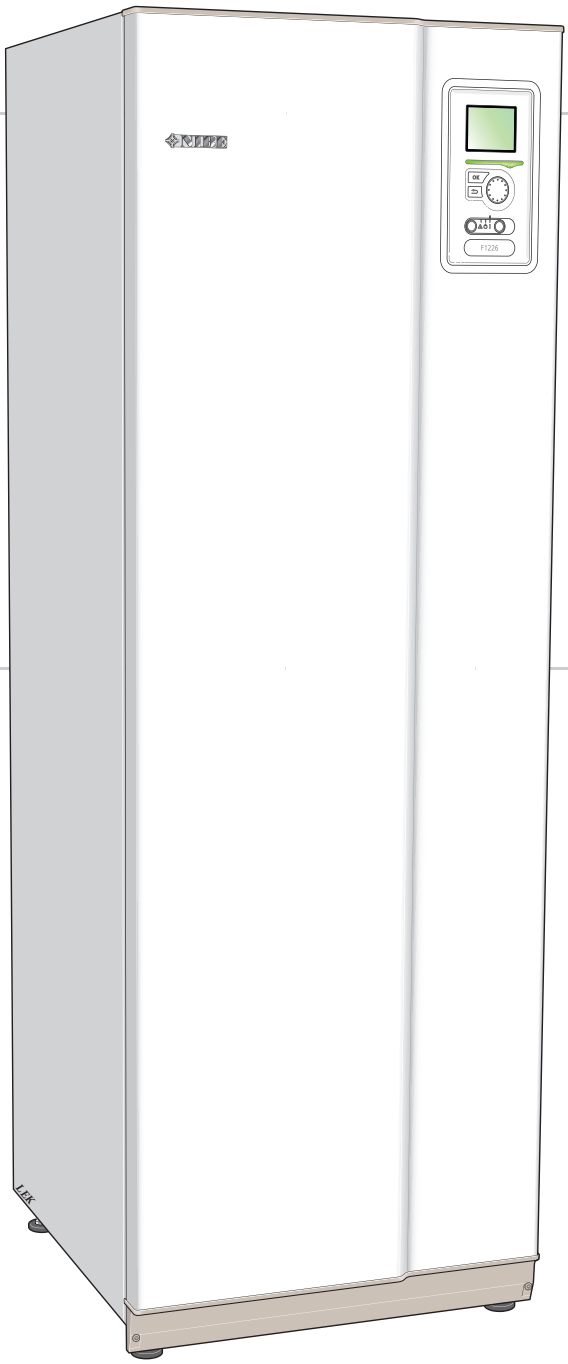


Service manual

NIBE F1226

Ground source heat pump

SEM EN 1737-1
431585

Table of Contents

1 Important information

Document information

This technical manual is a complement to the Installer handbook for F1226, containing:

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

The document applies to heat pumps with software version 7994R2.

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.

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.

Read the User Manual.

Serial number

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

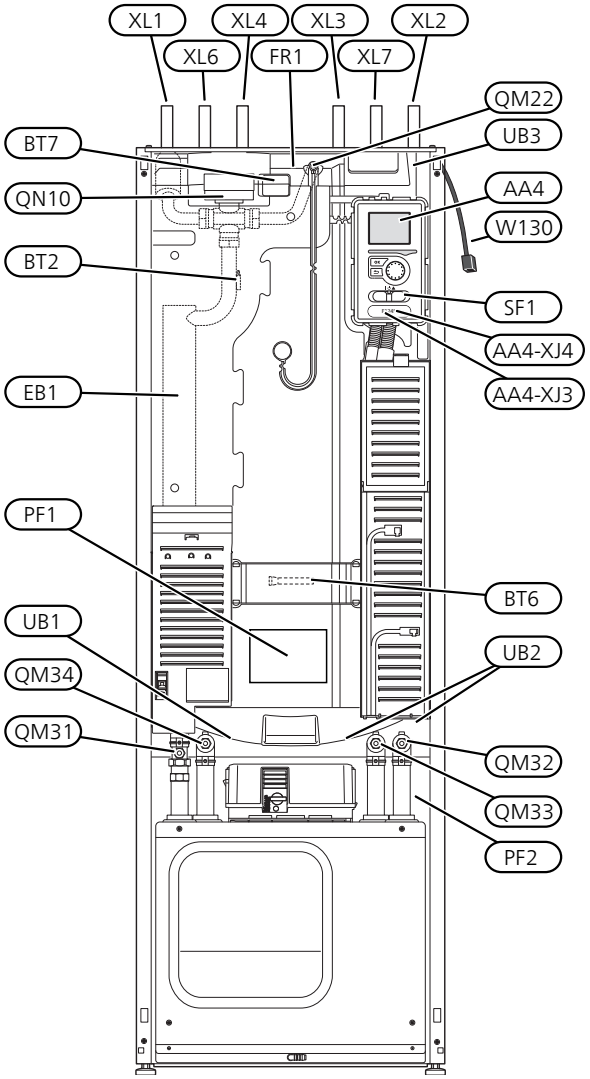
Caution

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

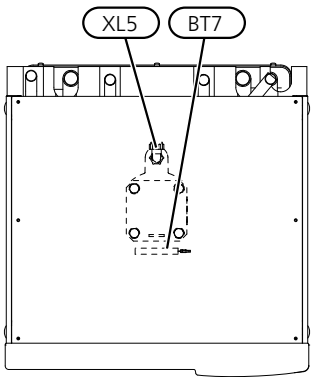
2 The heat pump design

The heat pump design

General



View from above



Pipe connections

XL1	Connection, heating medium flow
XL2	Connection, heating medium return
XL3	Connection, cold water
XL4	Connection, hot water
XL5	Connection, HWC*
XL6	Connection, brine in
XL7	Connection, brine out

* Only heat pumps with stainless steel vessel.

HVAC components

QM22	Venting, coil
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.

BT1	Outdoor temperature sensor*
BT2	Temperature sensors, heating medium flow
BT6	Temperature sensor, hot water charging
BT7	Temperature sensor, hot water top

* Not illustrated

Electrical components

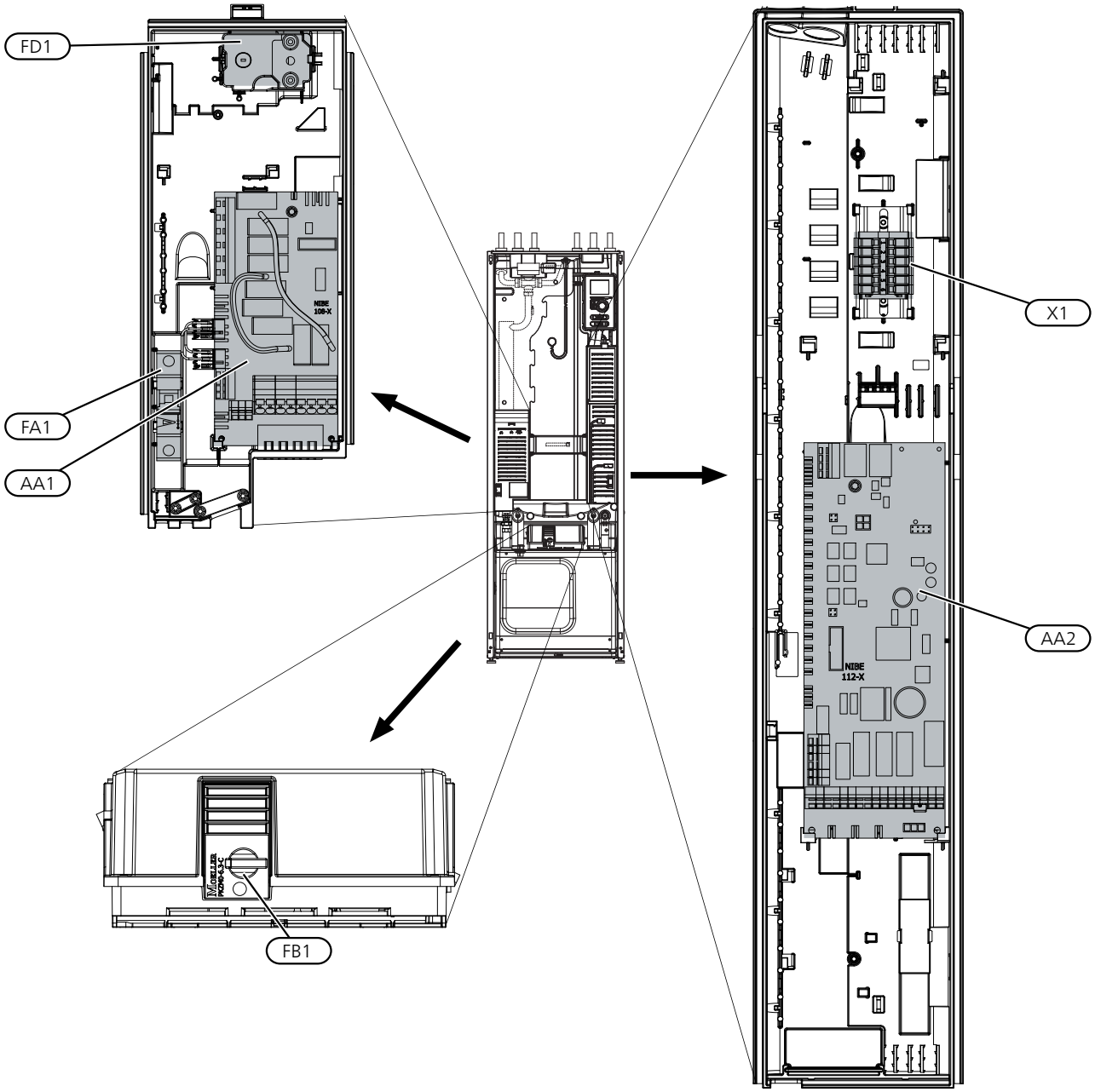
AA4	Display unit
	AA4-XJ3 USB socket
	AA4-XJ4 Service outlet (No function)
EB1	Immersion heater
SF1	Switch

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

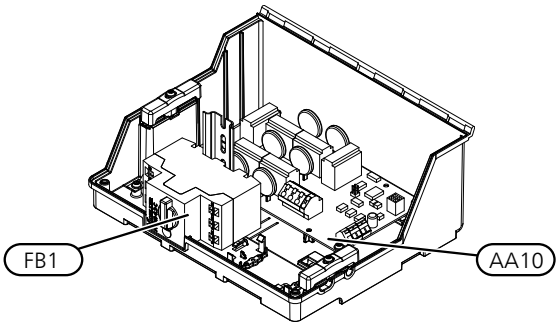


Electrical components

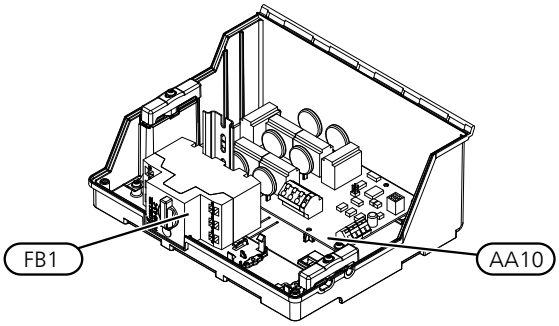
AA1	Immersion heater card
AA2	Base card
FA1	Miniature circuit-breaker
FB1	Motor cut-out
FD1	Temperature limiter/Emergency mode thermostat
X1	Terminal block

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

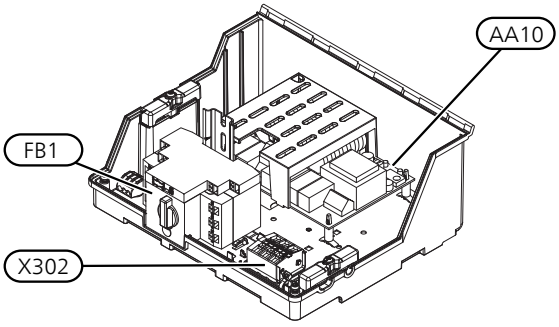
3x400 V 6-12 kW

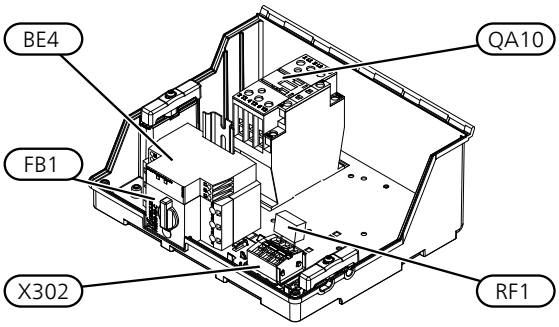


3x400 V 6-12 kW



3x230 V 6-10 kW





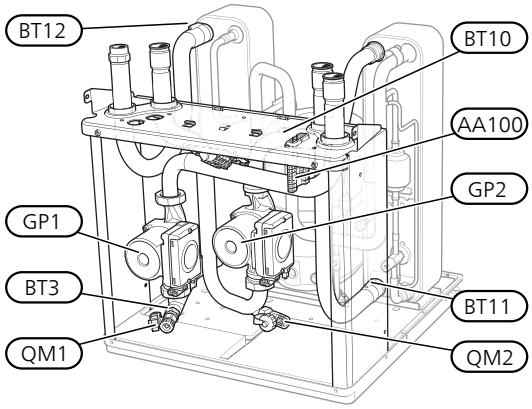
Electrical components

AA10 Soft-start card
FB1 Motor cut-out

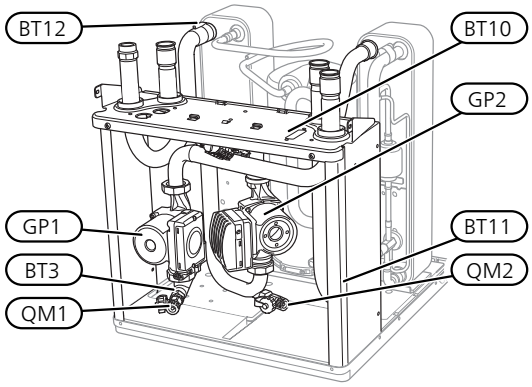
Designations in component locations according to standard IEC 81346-1 and 81346-2.

Cooling section

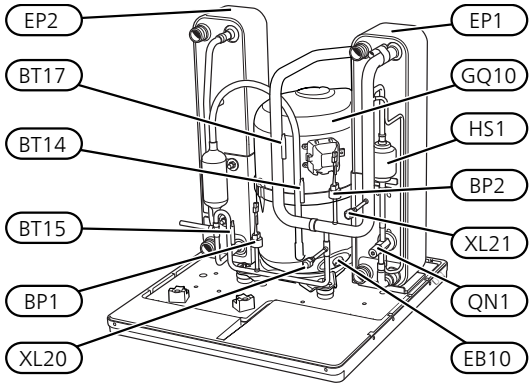
6 & 8 kW



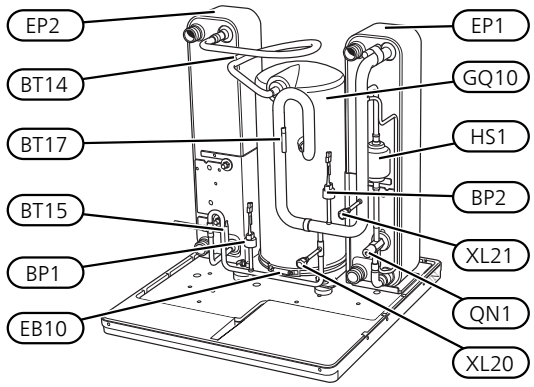
12 kW



6 & 8 kW



12 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
EB10 Compressor heater

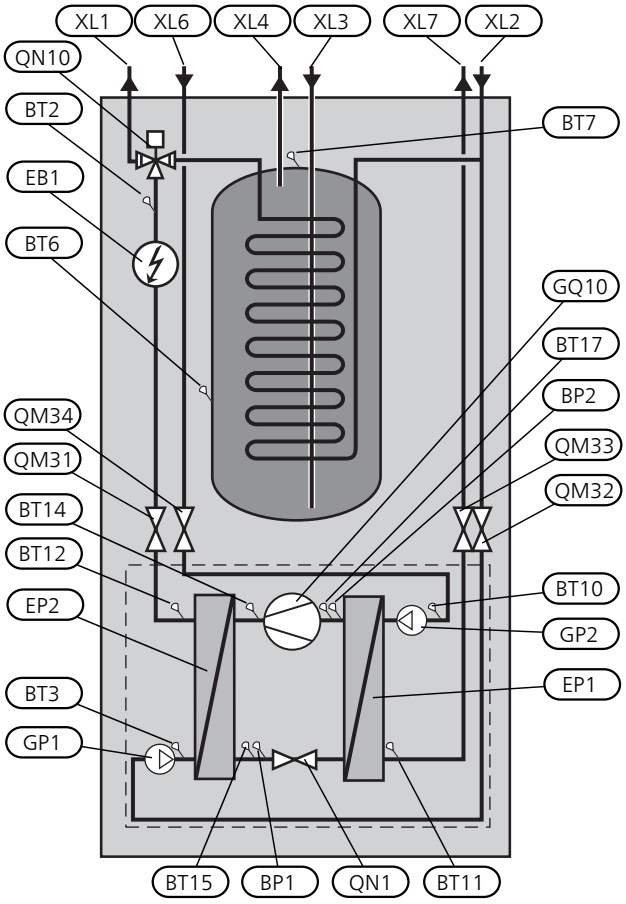
Cooling components

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 3 Connection, cold water
XL 4 Connection, hot water
XL 6 Connection, brine in
XL 7 Connection, brine out

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.

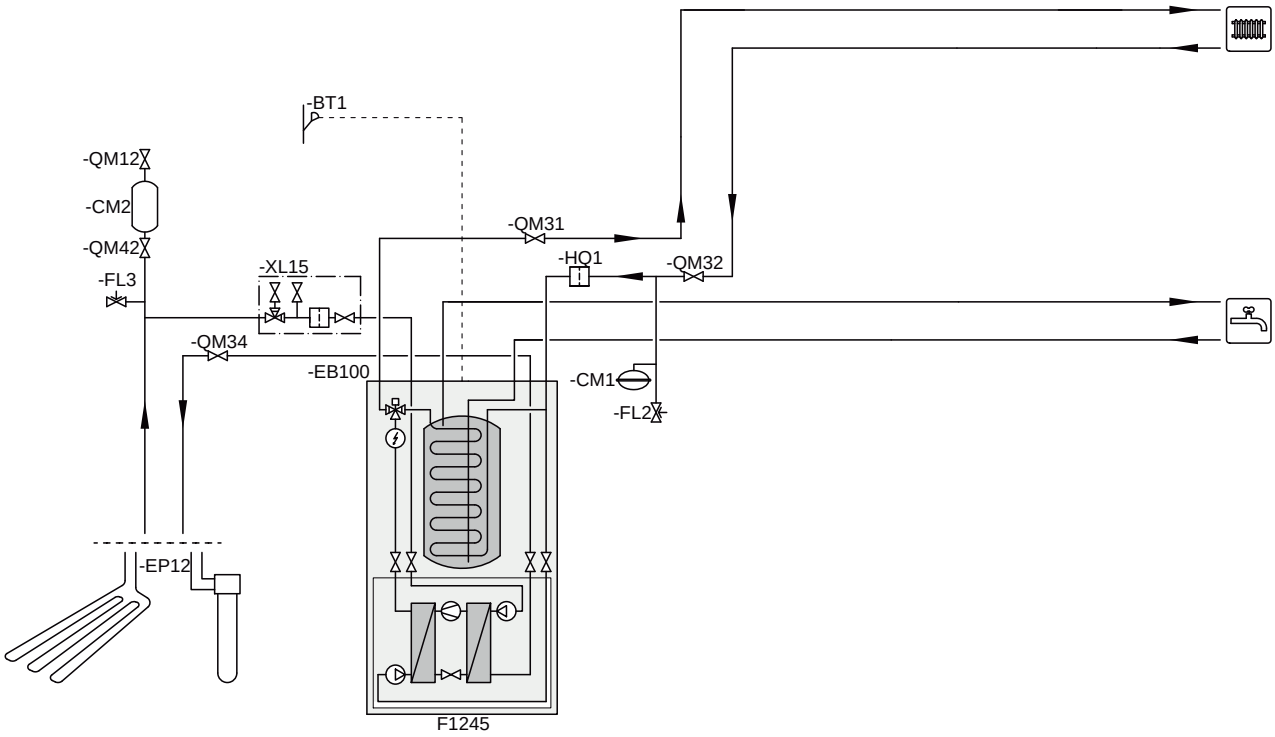
Internal

	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.
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. If BT25 is connected.
BT50*	Room sensor	In suitable indoor location.	Correction of the indoor temperature.

* Externally mounted (not included in outline diagram).

System diagram

Heating



Lables according to IEC 61346-2

Function

The heat pump prioritises hot water charging. The circulation pump GP1 runs at a set speed.

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

		6 kW	8 kW	12 kW
Max system pressure	Bar	4		
Min recommended volume heating system*	l	90	120	165
Min flow**	l/s	0.09	0.12	0.18
Nominal flow	l/s	0.12	0.16	0.25
Max recommended flow	l/s	0.17	0.21	0.33
Max external available pressure at nom flow***	kPa	53	47	57
Min/max temperature	°C	See diagram page 58.		

* min volume refers to circulating flow

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

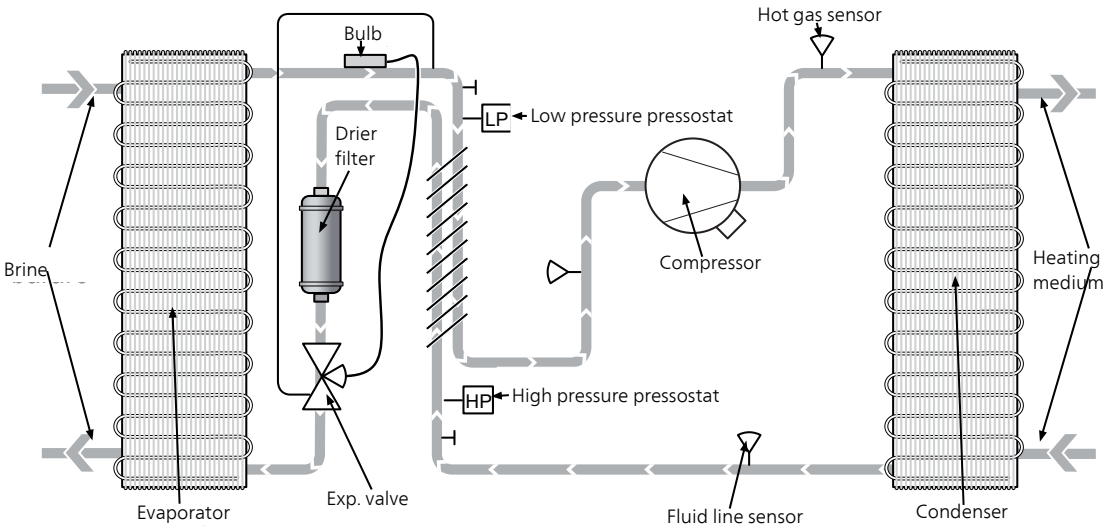
*** external circulation pump must be used when the pressure drop in the system is greater than the available external pressure. In such cases, a bypass line with non-return valve must be installed.

Brine side

		6 kW	8 kW	12 kW
Max system pressure	Bar	3		
Min flow	l/s	0,22	0,30	0,43
Nominal flow	l/s	0,30	0,42	0,64
Max external available pressure at nom flow	kPa	49	39	57
Max/min incoming temperature	°C	See diagram page 58.		
Min outgoing temperature	°C	-10		

4 Cooling circuit

Outline diagram



Compressor control

High pressure pressostat

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

Stop with manual restart:

- The above has occurred 2 times within 150 minutes.
- More than 300 minutes have passed since the above stop occurred.

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 minutes after switching between charging type HW and heating.

Motor protection

Tripped motor protection is reset manually on the motor protection breaker.

F1226	Setting
6 kW	4.0 A
8 kW	6.0 A
12 kW	9.0 A

If two phases are missing this is indicated as a motor protection alarm.

Phase monitor

Stop with automatic restart:

- When a phase is below ~160V.
- Incorrect phase sequence.

Stop with manual restart:

- More than 30 minutes have passed since the above events occurred.

Working area

See diagram page 58.

Time conditions

Minimum time between stop and start is 4 min.

Compressor heater

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

When the compressor is inactive the compressor heater is always active.

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 temperature of the heating medium flow is 30 - 55 °C and the brine in is -5 - +15 °C.

F1226	superheat
6 kW	4 - 6 °C
8 kW	4 - 6 °C
12 kW	4 - 6 °C

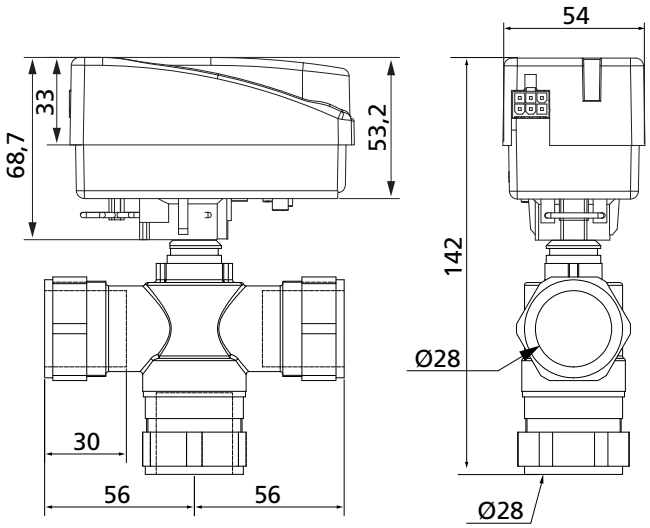
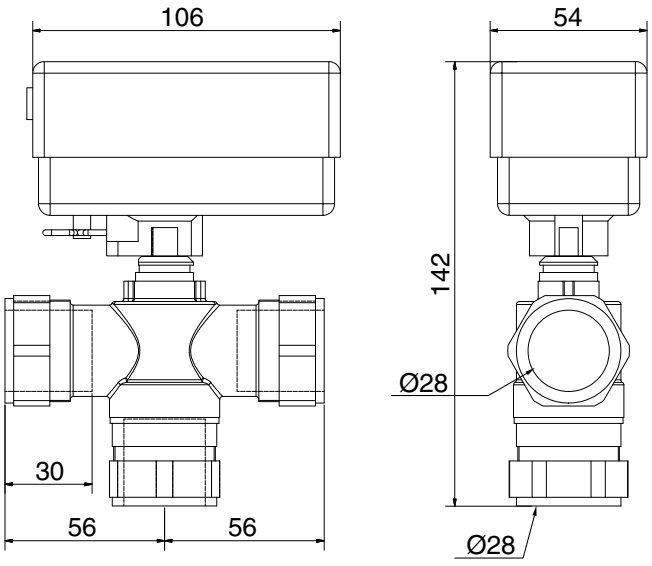
5 Component description

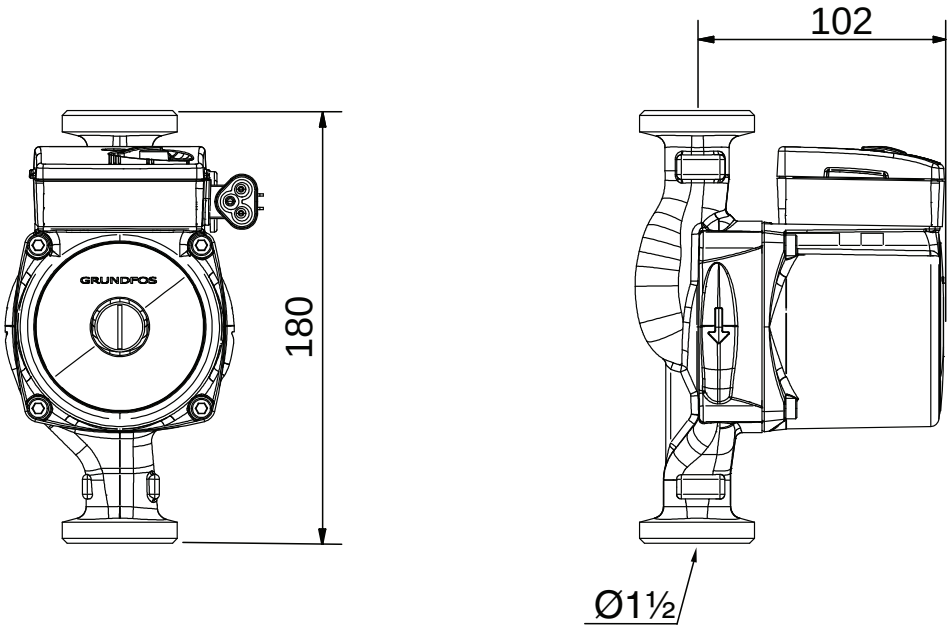
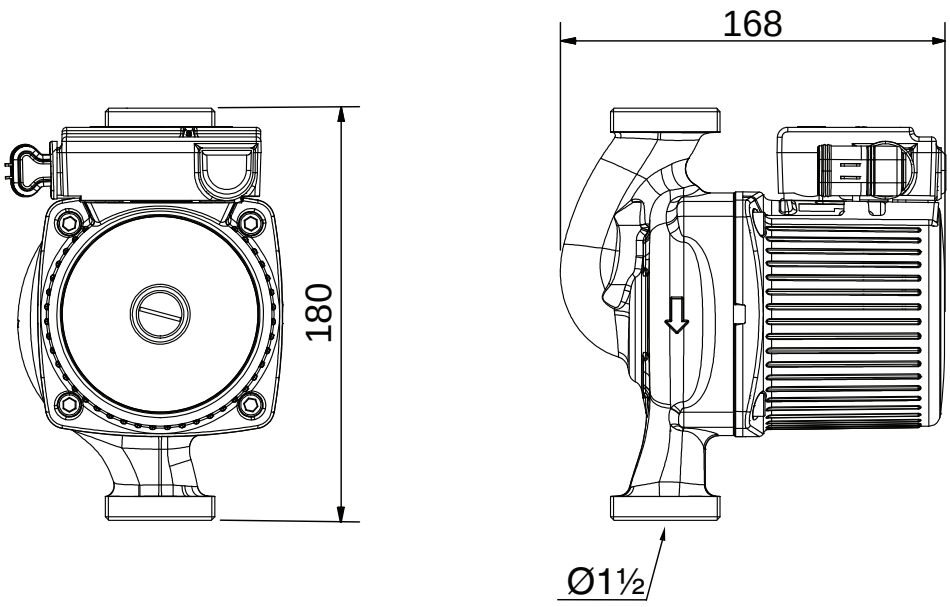
Compressor (GQ10)

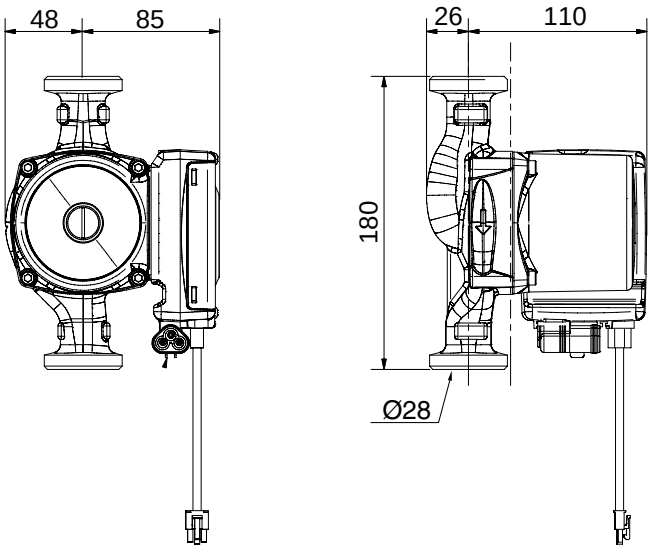
3 x 400 V

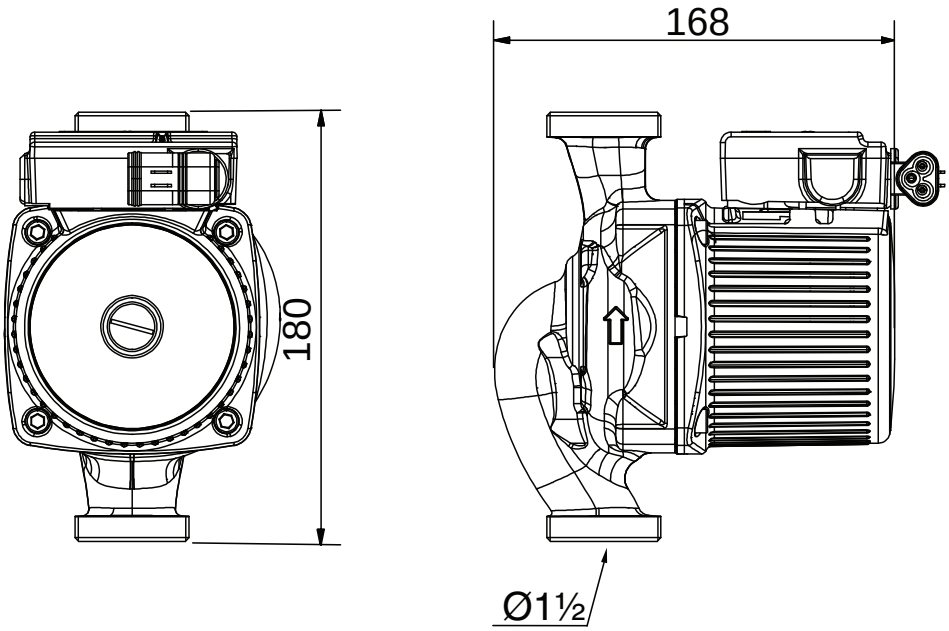
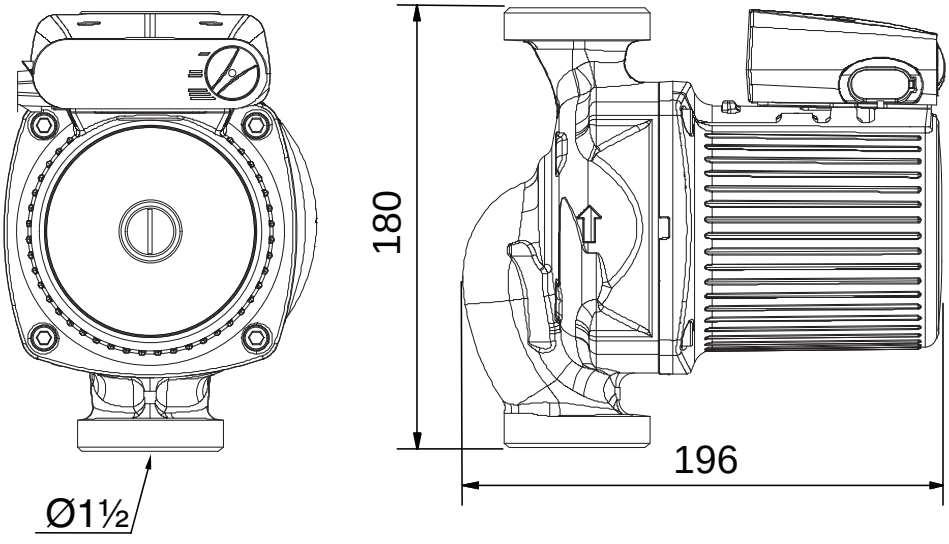
Size (kW)	Type	Resistance range (Ω at 20 °C +/- 10 %)		
		W-V[C-R]	W-U[C-S]	U-V[S-R]
6	Piston	5.19	5.19	5.19
8	Piston	3.56	3.56	3.56
12	Scroll	3.64	3.64	3.64

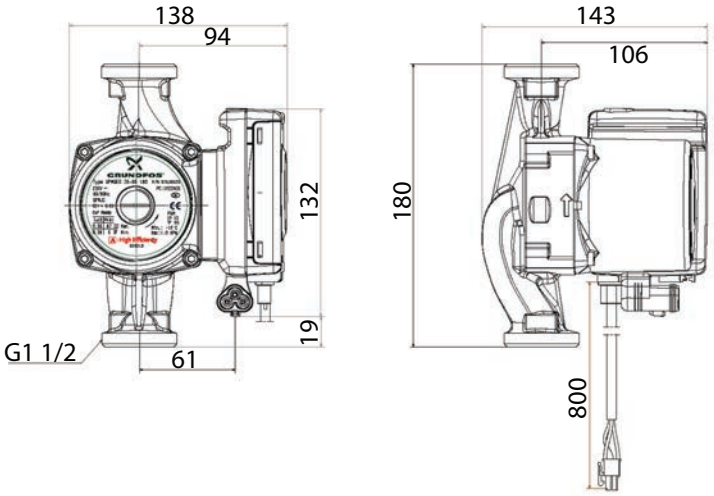
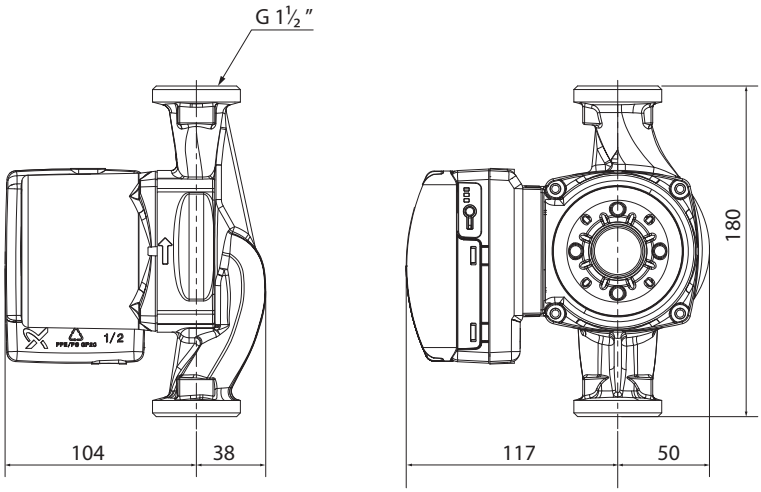
Other components

Component	Description
Immersion heater (EB1)	1x230 V and 3x400 V White coil (1/3 kW), internal resistance: 55 ohm Brown coils (3 x 2 kW), internal resistance: 27 ohm
	3x230 V White coil (3 kW), internal resistance 18 ohm Red coil (2 kW), internal resistance 27 ohm Brown coil (2 kW), internal resistance 27 ohm Black coil (2 kW), internal resistance 27 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) *From September 2012*  *Before September 2012* 

Component	Description
Heating medium pump (GP1) **Up until 14/12/2015**	**5 - 8 kW** Max flow: 4.0 m^3/h | Max lift height: 5.5 m Motor: 1x230 VAC, 50 Hz | Max. output: 80 W  **11 kW** Max flow: 7.0 m^3/h | Max lift height: 8.0 m Motor: 1x230 VAC, 50 Hz | Max. output: 140 W 

Component	Description
Heating medium pump (GP1) **From 15/12/2015**	**6 - 12 kW** Max flow: 3.5 m^3/h | Max lift height: 7.5 m Motor: 1x230 VAC, 50 Hz | Max. output: 80 W Control signal: PWM 0-10 V DC (max-min speed) 

Component	Description
Brine pump (GP2) **Up until 11/11/2015**	**5 - 8 kW** Max flow: 7.0 m^3/h | Max lift height: 8.0 m Motor: 1x230 VAC, 50 Hz | Max. output: 140 W  **11 kW** Max flow: 11.0 m^3/h | Max lift height: 10.0 m Motor: 1x230 VAC, 50 Hz | Max. output: 250 W 

Component	Description
Brine pump (GP2) **From 12/11/2015**	*6 - 8 kW* Max flow: 5 m³/h Max lift height: 8.5 m Control signal: PWM 0-10 V DC (max-min speed)  *12 kW* UPM XL –Geo 25-125. Operating voltage 1*230 V, max 180 W Control signal: PWM 0 - 10 V DC (max-min speed) 
High pressure switch (BP1)	Breaking value: 29 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 Capacity (12): 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.

3x400V

Output	Function
K1	Supply L1
K2	Supply L2
K3	Supply L3
K4	Immersion heater 2 kW
K5	No function
K6	Immersion heater 2 kW
K7	Immersion heater 3 kW on K9
K8	Immersion heater 2 kW
K9	Immersion heater 1/3 kW

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	No function
PWM2: Orange	No function
K1 - K4: Orange	A steady light means that the relevant relay is engaged.

Output	Function
PWM1	No function
PWM2	No function
K1	Reversing valve (QN10)
K2	Brine pump (GP2)
K3	HM pump (GP1)
K4	Compressor heater (EB10) (inverted signal)

Expansion card (AA7)

LED	Indication
K1 - K3: Orange	A steady light means that the relevant relay is engaged.

Output	Function
K1	Alarm
K2	Groundwater pump
K3	Hot water circulation

Soft-start card (AA10)

3x400 V

LED	Indication
Power: Green	A steady light means that incoming 12V is OK.
Com: Green	Steady light for approx 10 secs at start-up. Flashes 3 x/3 secs during communication.
Error: Red	Shows alarm status. **1 flash:** Phase 1 missing **2 flash:** Phase L2 missing **3 flash:** Phase L3 missing **4 flash:** Motor protection deployed Continuous light: Incorrect phase sequence
Compr. on: Orange	Steady light when the compressor is active.
Bypass: Orange	Bypass bridge installed (alarm ignored).

Soft-start card (QA30)

LED	Indication
Power: Green	A steady light indicates correct control voltage 230 V+/- 15%. A flashing light indicates that control voltage is < 90 V.
Error: Red	Shows alarm status. **2 flash:** Low incoming voltage (<190 V for 1sec). Automatic reset with 5 minutes recovery. **3 flash:** If an over current is detected under the ramp. 2x automatic resets with 5 minutes recovery, requires that the control voltage is broken for 1 minute. **4 flash:** Indicates defective start condenser/relay. **5 flash:** Unsuccessful voltage stepping. 2x automatic resets with 5 minutes recovery, requires that the control voltage is broken for 1 minute.

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.

Alarm no.	Alarm text on the display	Cause	Heat pump action.	Repairers action
1	Sensor fault: BT1 outdoor temperature sensor	The input for the sensor receives unreasonably high or low value for longer than 2 seconds.	Calculated supply temp is set to "min supply".	See fault-tracing schedule page 28.
2	Sensor fault: BT2 supply temperature sensor 1	The input for the sensor receives unreasonably high or low value for longer than 2 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 29.
3	Sensor fault: BT3 return line sensor 1	Sensor not connected/defective (heating medium return).	Compressor blocked during hot water charging.	See fault-tracing schedule page 30.
10	Sensor fault BT10 brine in	Sensor not connected/defective (brine in).	GP2 switches to manual speed if auto controlled is selected.	See fault-tracing schedule page 30.
11	Sensor fault BT11 brine out	The input for the sensor receives unreasonably high or low value for longer than 2 seconds.	Compressor blocked. GP2 switches to manual speed if auto controlled is selected.	See fault-tracing schedule page 30.
12	Sensor fault BT12 condenser out	The input for the sensor receives unreasonably high or low value for longer than 2 seconds.	Compressor blocked. GP2 switches to manual speed if auto controlled is selected.	See fault-tracing schedule page 30.
28	Sensor fault BT71	Sensor not connected/defective (external return sensor)	No action. Together with alarm 25, heating is blocked	Check the sensor connection.
40	Compressor phase 1 missing	The compressor phase mentioned has been below 160 V for 30 min.	Compressor blocked.	Reset the phase.
41	Compressor phase 2 missing			
42	Compressor phase 3 missing			
43	Incorrect phase sequence	The phases are connected in the wrong order.	Compressor blocked.	Reconnect the phase sequence for incoming electricity.

Alarm no.	Alarm text on the display	Cause	Heat pump action.	Repairers action
50	High pressure alarm	The high pressure switch has deployed 2 times within 150 minutes or has been deployed for 300 minutes continuously.	Compressor blocked.	See fault-tracing schedule page 31.
51	Low pressure alarm	Low pressure switch has tripped. The alarm is blocked for 1 minute at each switch between operating modes.	Compressor blocked.	See fault-tracing schedule page 32.
52	Temperature limiter	Temperature limiter has tripped	Internal electrical addition is blocked.	See fault-tracing schedule page 33.
53	Level monitor	Brine level switch/ pressure switch has tripped.	Compressor and brine pump blocked.	Fill up and seal off any leakage in the collector circuit
54	Motor protection	The motor protection breaker has tripped.	Compressor blocked.	See fault-tracing schedule page 34.
55	Hot gas alarm	The compressor has been stopped 3 times in 240 min because the hot gas has exceeded 135°C for 20 mins or temporarily exceeded 150°°C.	Compressor blocked.	Call a qualified refrigeration technician.
60	Low HTFout	The temperature of the outgoing brine goes below the set min-temperature and the alarm is selected to be permanent.	Compressor blocked.	Bad circulation in the brine circuit. - Check the brine pump. - Check that the brine is bled. - Check the brine's freezing point.
71	Perm. Com. error base card	Communication with the base board has been missing for 15 seconds.	Compressor blocked.	See fault-tracing schedule page 34.
72	Perm. com. fault soft-start card	Communication with the soft-start board has been missing for 15 seconds.	Compressor blocked.	See fault-tracing schedule page 35.

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.

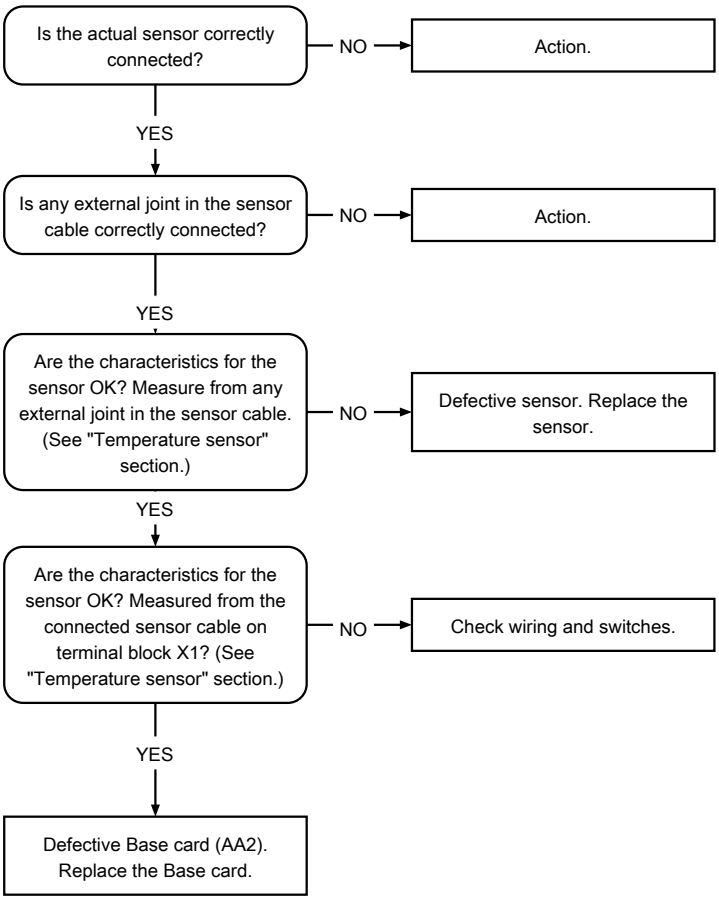
No.	Information in display	Cause	Heat pump action.	May be due to
101	Sensor fault BT1	Sensor temporarily missing	Only information	■ The sensor and its connections. - See also the troubleshooting schedule on page 28 for alarm 1
102	Sensor fault BT2	Sensor temporarily missing	Only information	■ The sensor and its connections. - See also the troubleshooting schedule on page 29 for alarm 2
103	Sensor fault BT3	Sensor temporarily missing	Only information	■ The sensor and its connections. - See also the troubleshooting schedule on page 30 for alarm 3
104	Sensor fault BT4	Sensor temporarily missing	Only information	■ The sensor and its connections
105	Sensor fault BT5	Sensor temporarily missing	Only information	■ The sensor and its connections
106	Sensor fault BT6	Sensor temporarily missing	Only information	■ The sensor and its connections
107	Sensor fault: BT7 HW sensor top	Sensor temporarily missing	Only information	■ The sensor and its connections
108	Sensor fault BT8	Sensor temporarily missing	Only information	■ The sensor and its connections
109	Sensor fault BT9	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
111	Sensor fault BT11	Sensor temporarily missing	Only information	■ The sensor and its connections. - See also the troubleshooting schedule on page 30 for alarm 11
112	Sensor fault BT12	Sensor temporarily missing	Only information	■ The sensor and its connections. - See also the troubleshooting schedule on page 30 for alarm 12

No.	Information in display	Cause	Heat pump action.	May be due to
113	Sensor fault BT13	Sensor temporarily missing	Only information	■ The sensor and its connections
114	Sensor fault BT14	Sensor temporarily missing	Only information	■ The sensor and its connections
115	Sensor fault BT15	Sensor temporarily missing	Only information	■ The sensor and its connections
116	Sensor fault BT16	Sensor temporarily missing	Only information	■ The sensor and its connections
117	Sensor fault BT17	Sensor temporarily missing	Only information	■ The sensor and its connections
118	Sensor fault BT18	Sensor temporarily missing	Only information	■ The sensor and its connections
119	Sensor fault BT19	Sensor temporarily missing	Only information	■ The sensor and its connections
128	Sensor fault BT71	Sensor temporarily missing	Only information	■ The sensor and its connections
140	Compressor phase 1 missing	Compressor phase 1 has been briefly missing.	Only information	■ Phase fuse ■ Cable connections
141	Compressor phase 2 missing	Compressor phase 2 has been briefly missing.	Only information	■ Phase fuse ■ Cable connections
142	Compressor phase 3 missing	Compressor phase 3 has been briefly missing.		■ Phase fuse ■ Cable connections
145	Temporary general phase fault	Temporary problem with the communication from the base card to the motor protection		■ Communication cables.
150	Temporary HP alarm	High pressure switch has tripped once		■ No action necessary
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

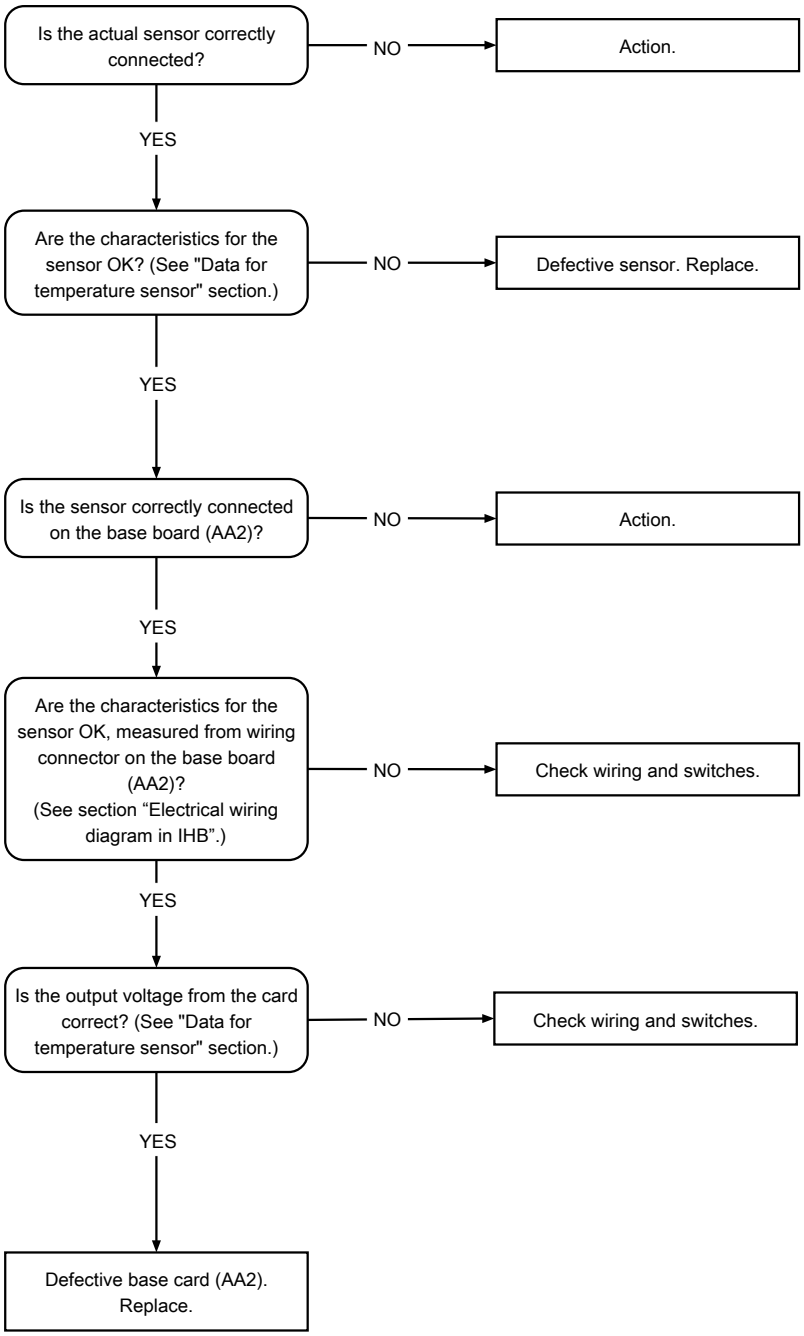
No.	Information in display	Cause	Heat pump action.	May be due to
163	High condenser in temperature	Condenser in has reached max permitted temperature	Resets automatically when condenser in has fallen two degrees	■ Settings
166	Electrical anode incorrect	Fault in the electrical anode		
171	Com. error 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
350	Sensor fault BT50	Sensor fault BT50 room sensor	Only information	The sensor and its connections
359	Int temp OPT error	A temporary alarm from OPT	Resets when OPT is not issuing an alarm	
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

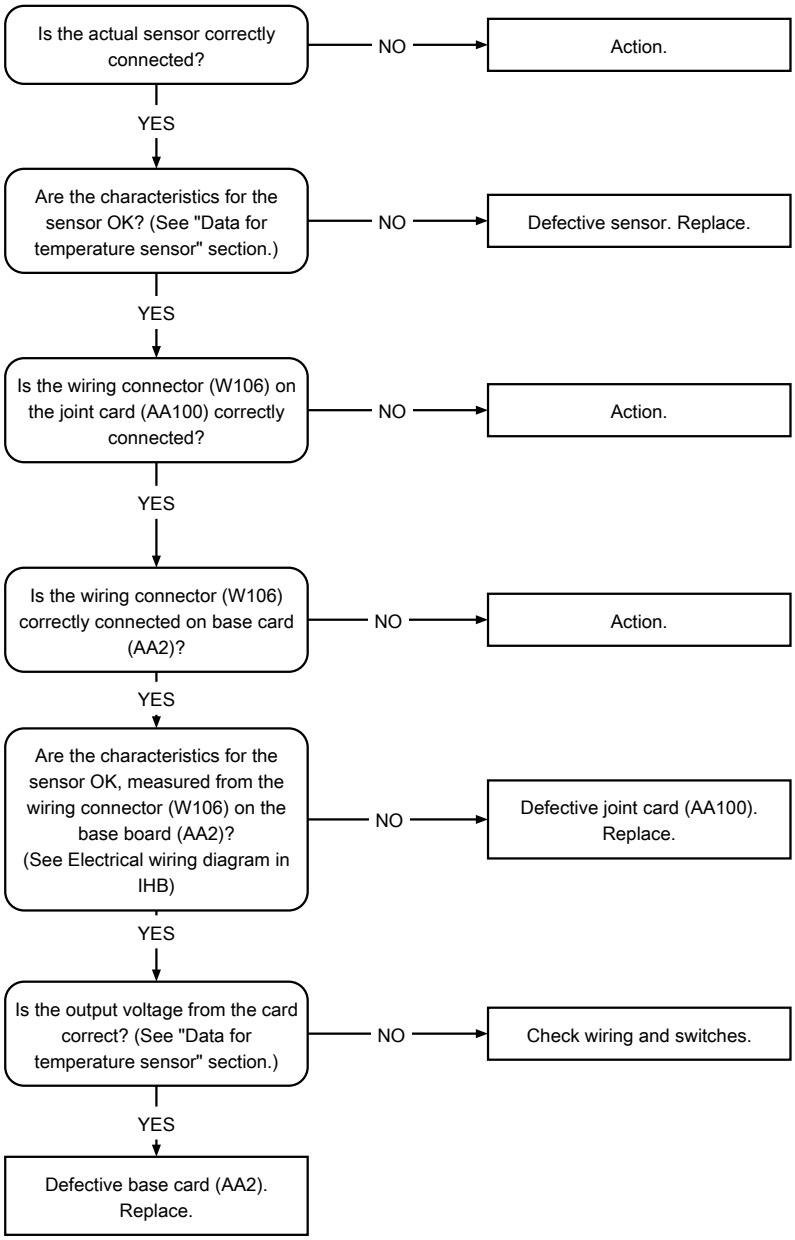
Alarm 1, 25 – sensor fault



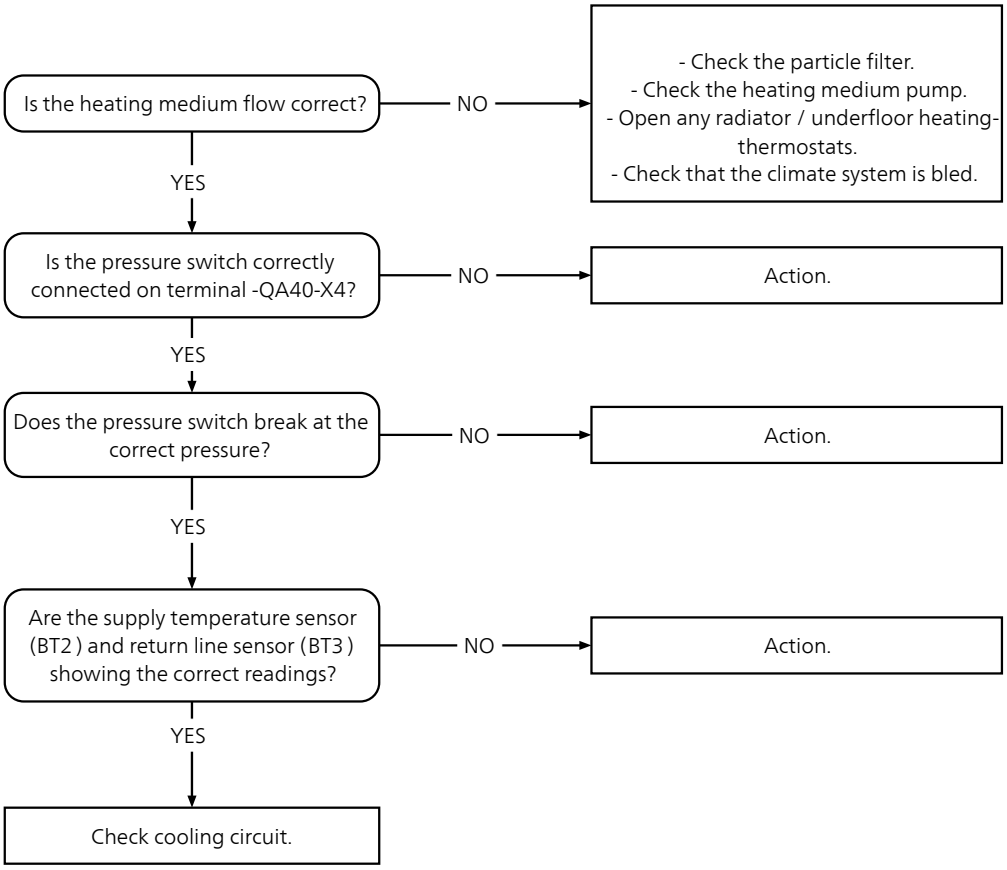
Alarm 2 – sensor fault



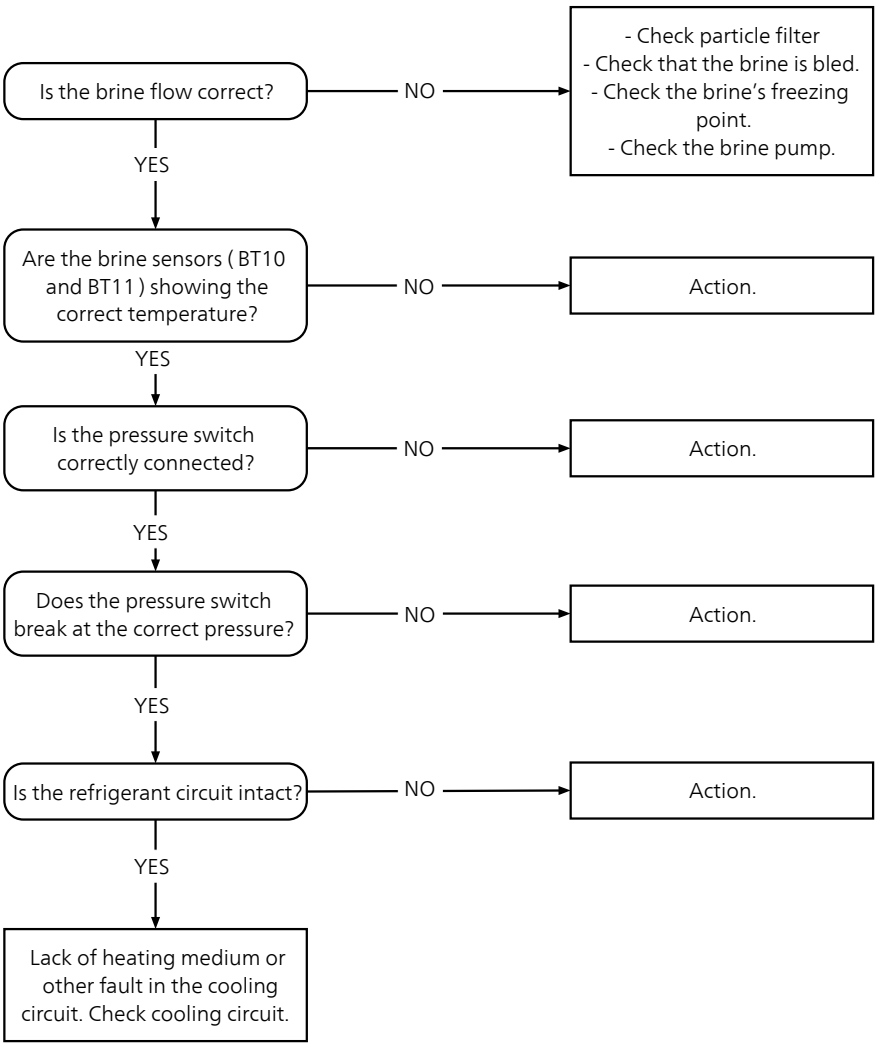
Alarm 3, 11, 12 – sensor fault



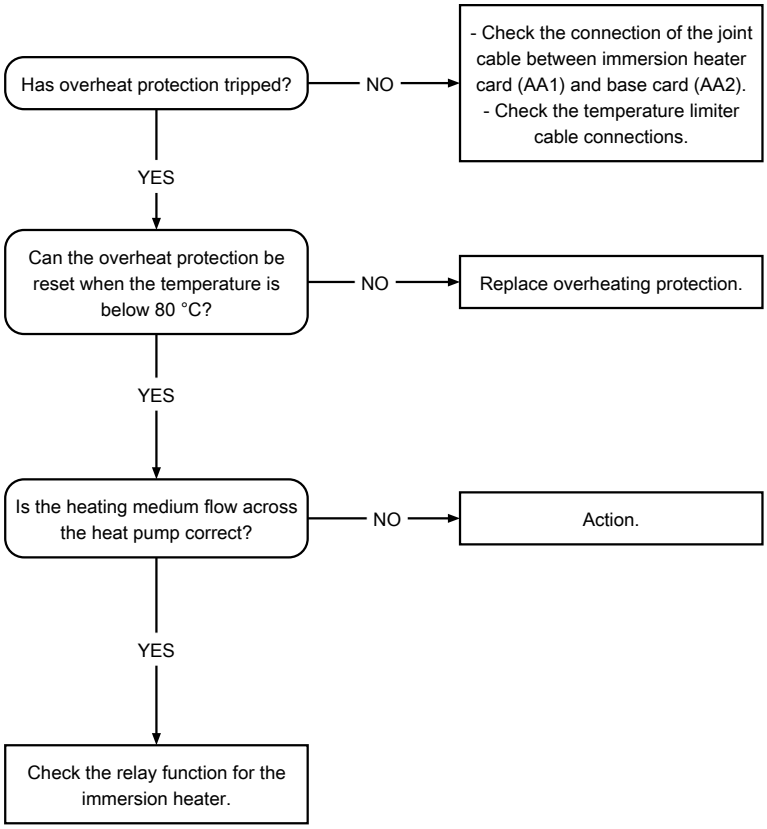
Alarm 50 – high pressure alarm



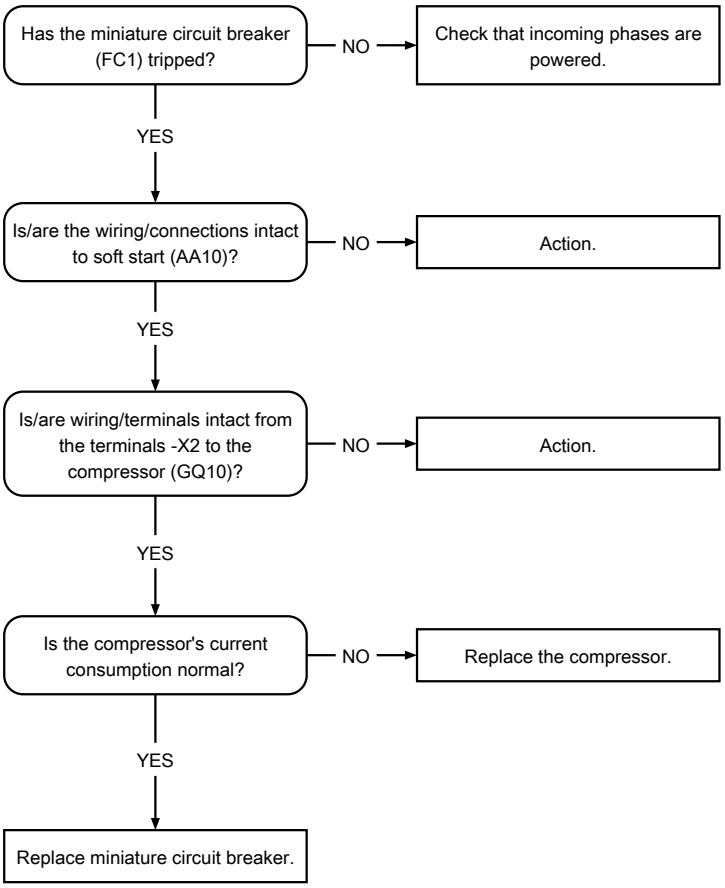
Alarm 51 – low pressure alarm



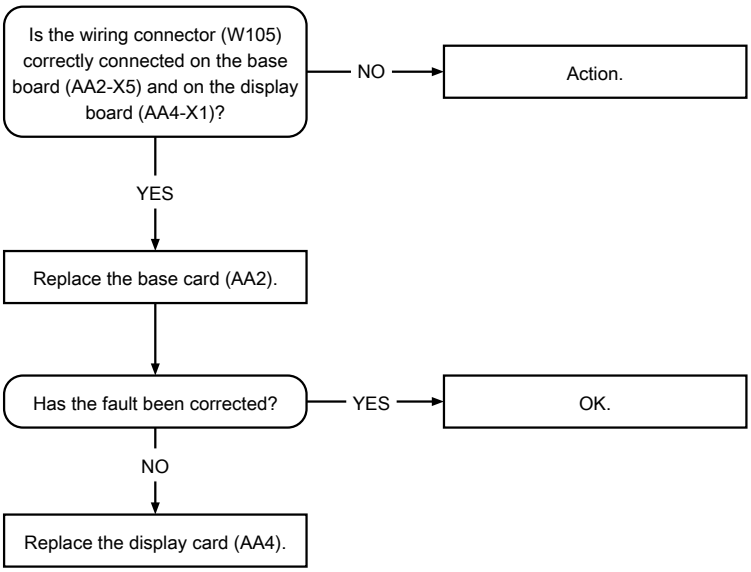
Alarm 52 – temperature limiter



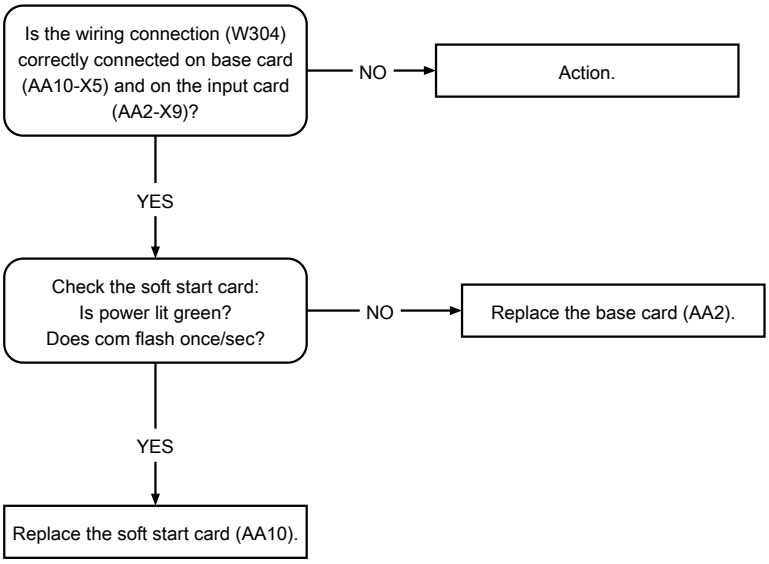
Alarm 54 – motor protection



Alarm 71 - perm. com.error input card



Alarm 72 - perm. com.error soft-start card



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
AA10	Compressor (GQ10)
AA2-K1	Reversing valve (QN10)
AA2-K2	Brine pump (GP1)
AA2-K3	Heating medium pump (GP2)
AA2-K4	Compressor relay
AA1-K4	Immersion heater 2 kW
AA1-K5	No function
AA1-K6	Immersion heater 2 kW
AA1-K7	Immersion heater 3 kW on K9
AA1-K8	Immersion heater 2 kW
AA1-K9	Immersion heater 1/3 kW

Expansion card (EXC 40)

Output	Function
AA7 - K1	Alarm
AA7 - K2	Groundwater pump
AA7 - K3	Hot water circulation

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.

F1226 can contain liquids at high temperature and under high pressure.

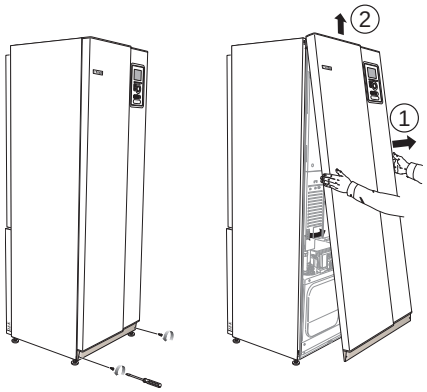
When replacing components on F1226 only replacement parts from NIBE may be used.

An ESD bracelet must be worn when replacing the card.

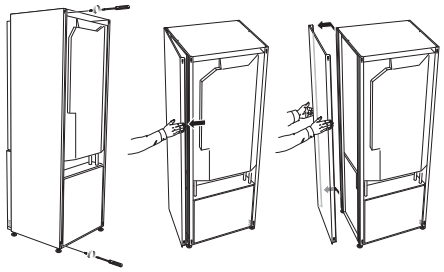
Basic

Removing the covers

Front cover



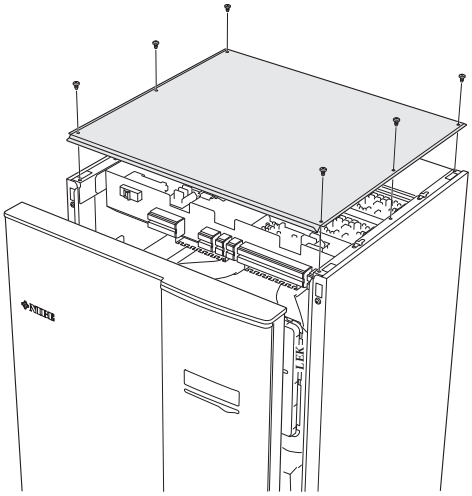
1. Remove the screws from the lower edge of the front panel.
2. Lift the panel out at the bottom edge and up.



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.

Top panel



1. Lift off the front cover, according to the previous instructions.
2. Remove the six screws in the top panel.
3. Lift the top panel straight up.

Pulling out the cooling module

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

Weight of the cooling module

Type	Weight (kg)
F1226-6	112
F1226-8	120
F1226-12	130

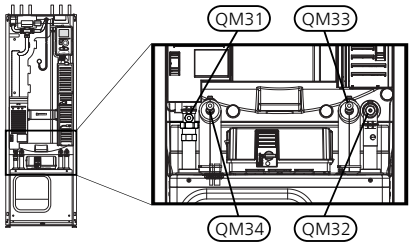
NOTE

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

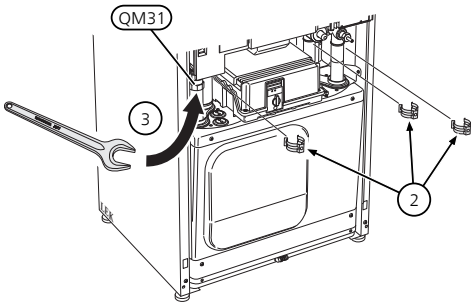
Caution

Drain the cooling module according to IHB to facilitate lifting.

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

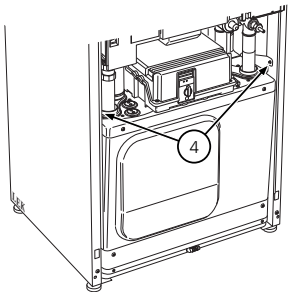


2 Pull off the lock catches.

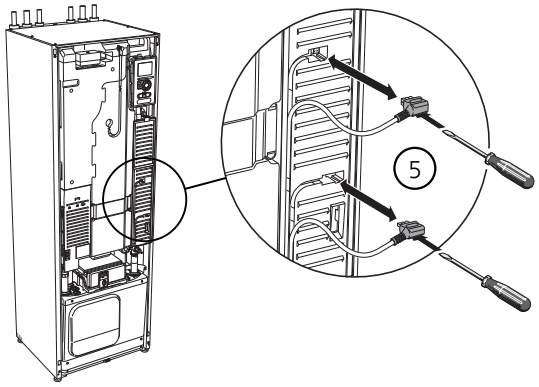


3 Disconnect the pipe connection at the shut-off valve (QM31).

4 Remove the two screws.



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

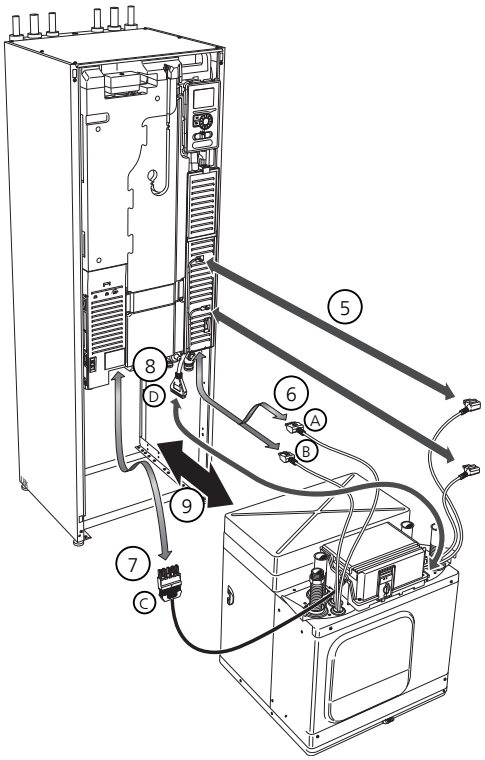


6 Disconnect the connectors (A) and (B) from the underside of the base card cabinet.

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.

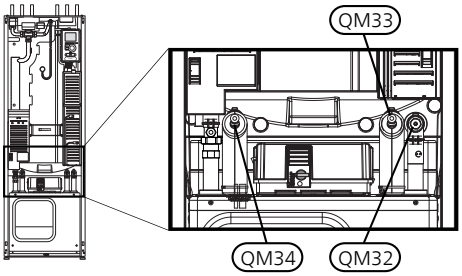


TIP

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).



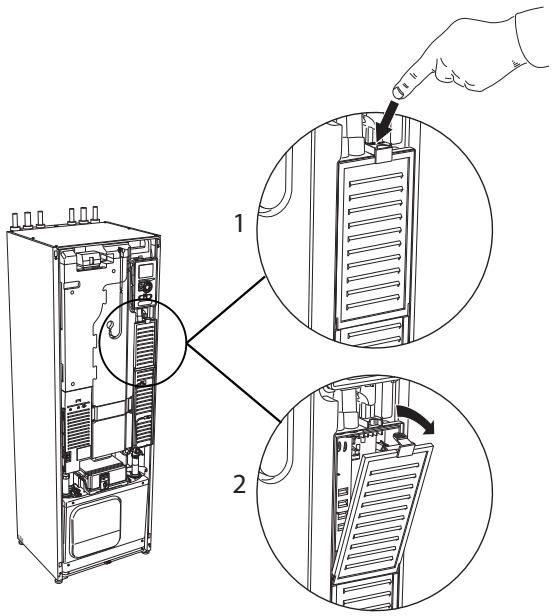
Accessibility, electrical connection

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

NOTE

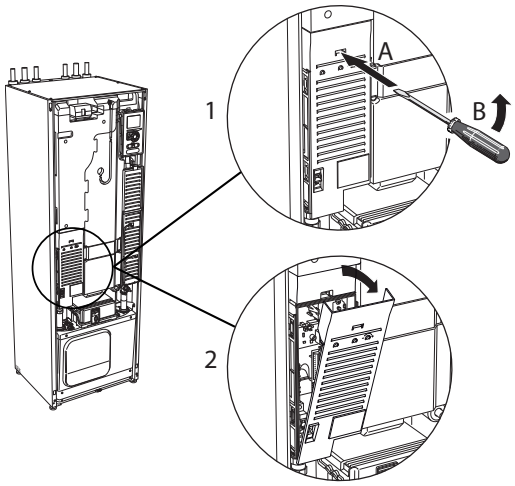
The cover for the terminal block for soft inputs is opened without a tool.

Removing the cover, terminal block



1. Push the catch down.
2. Angle out the cover and remove it.

Removing the cover, immersion heater circuit board

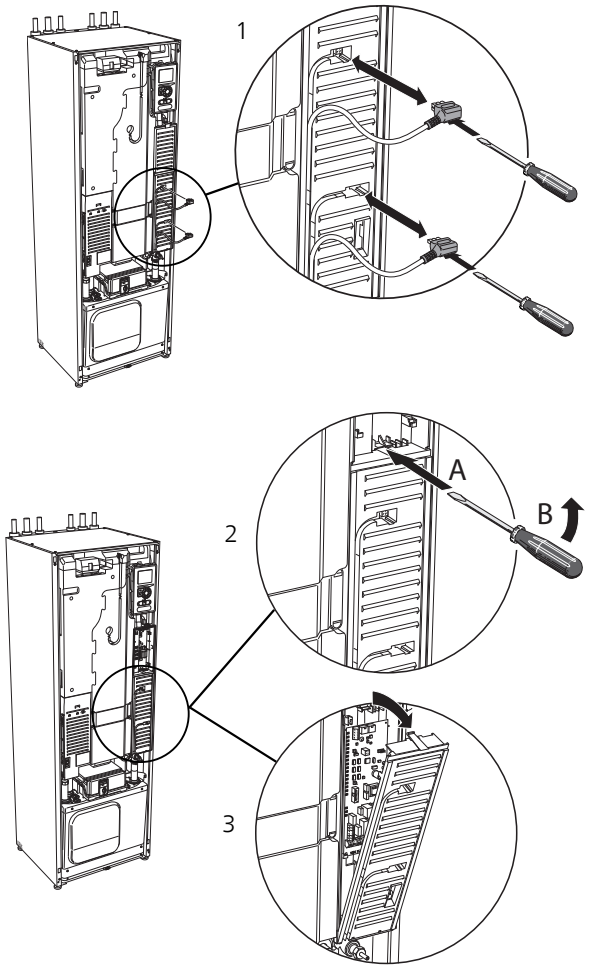


1. Insert the screwdriver (A) and pry the catch carefully downwards (B).
2. Angle out the cover and remove it.

Removing the cover, base board

Caution

To remove the cover for the base board, the cover for the terminal block for soft inputs must first be removed.



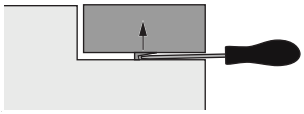
1. Disconnect the switches using a screwdriver.
2. Insert the screwdriver (A) and pry the catch carefully downwards (B).
3. Angle out the cover and remove it.

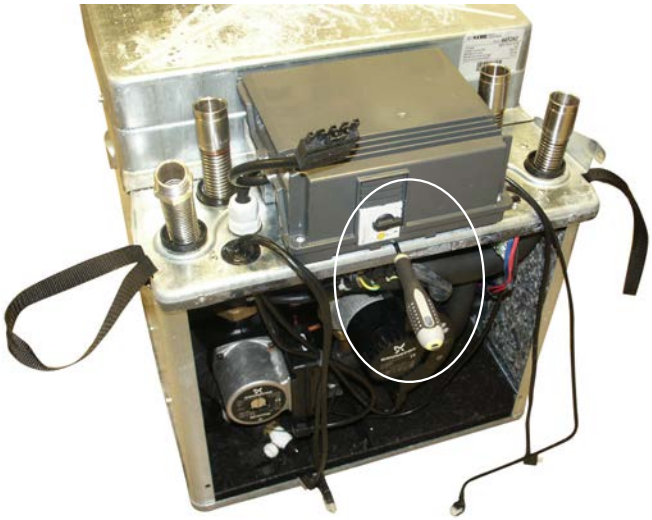
Main components

Compressor (GQ10)

1 Remove the cooling module according to the instruction on page 37.

2 Remove the motor module by inserting a screwdriver and carefully lifting the catch as illustrated.



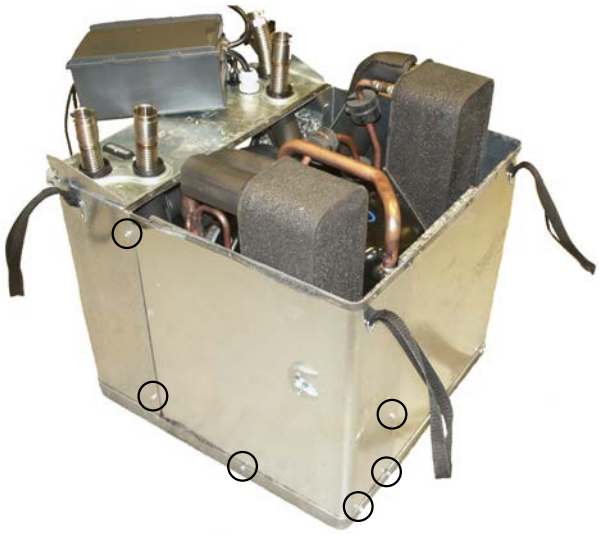


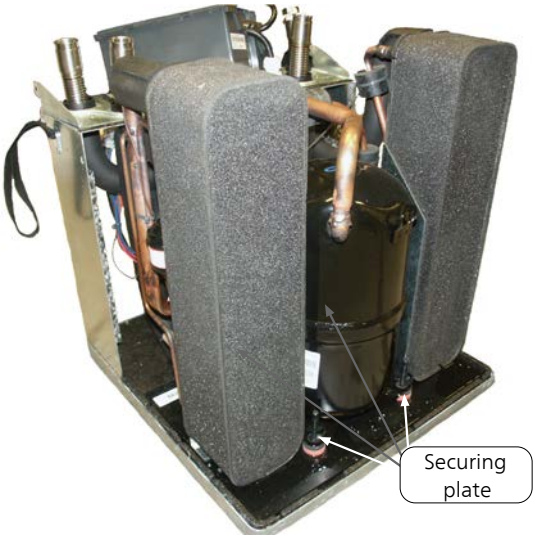
3 Slacken off 10 screws.

4 Remove the cover on the cooling module.

5 Slacken off 6 screws.

6 Remove the right/rear side panel on the cooling module.

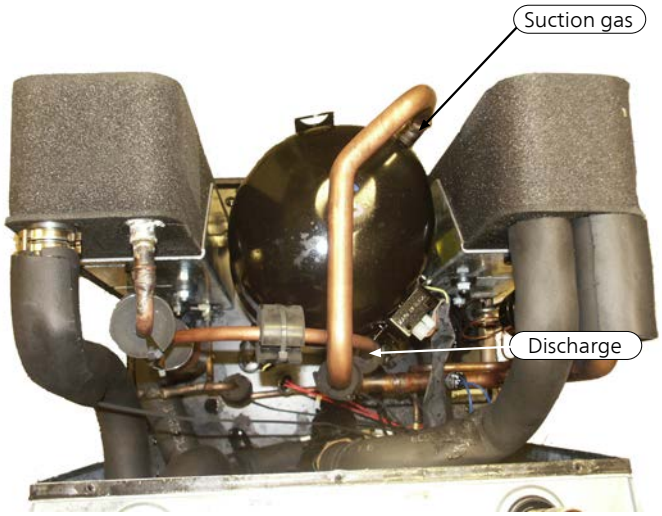


7 Slacken off 6 screws. **8** Remove the left/rear side panel on the cooling module.	
9 Unscrew the ground cable. **10** Disconnect the compressor cables.	
11 Remove the 4 locking plates holding the compressor.	

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

13 Disconnect the pipes for suction gas and hot gas.

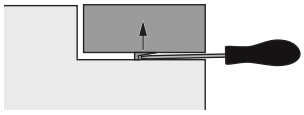
14 Remove the compressor.

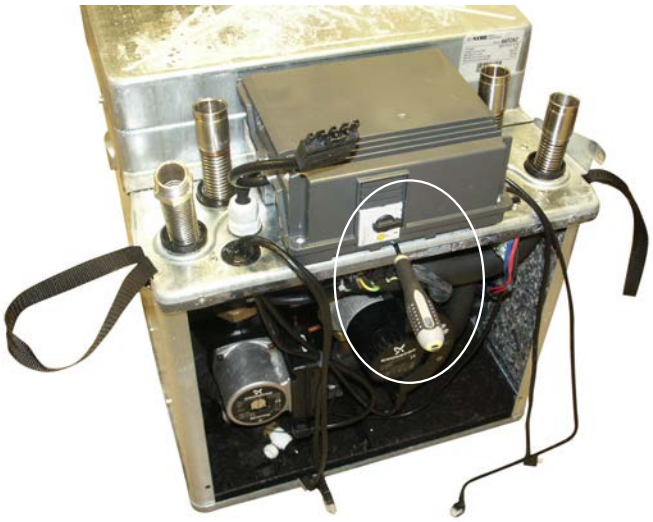


Expansion valve (QN1)

1 Remove the cooling module according to the instruction on page 37.

2 Remove the motor module by inserting a screwdriver and carefully lifting the catch as illustrated.



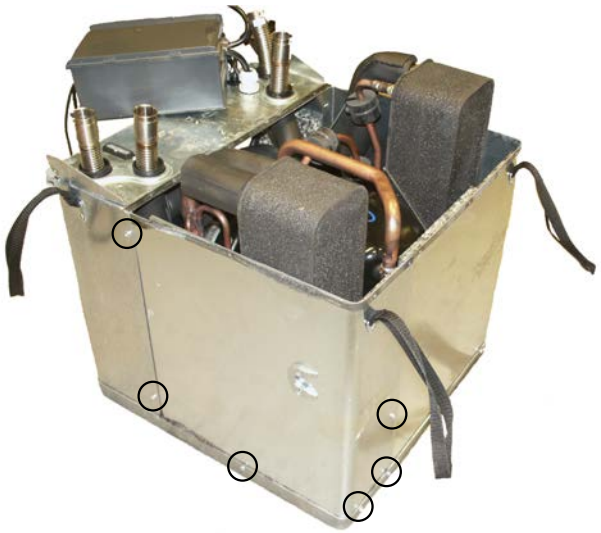


3 Slacken off 10 screws.

4 Remove the cover on the cooling module.

5 Slacken off 6 screws.

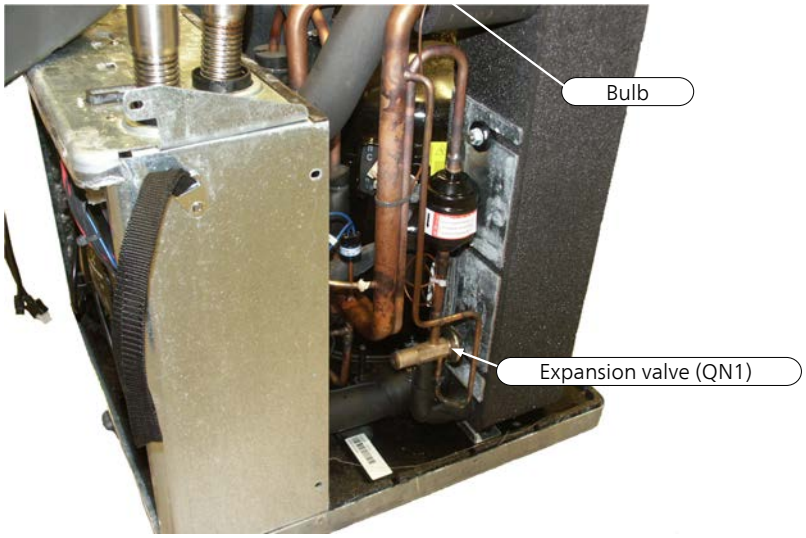
6 Remove the right/rear side panel on the cooling module.



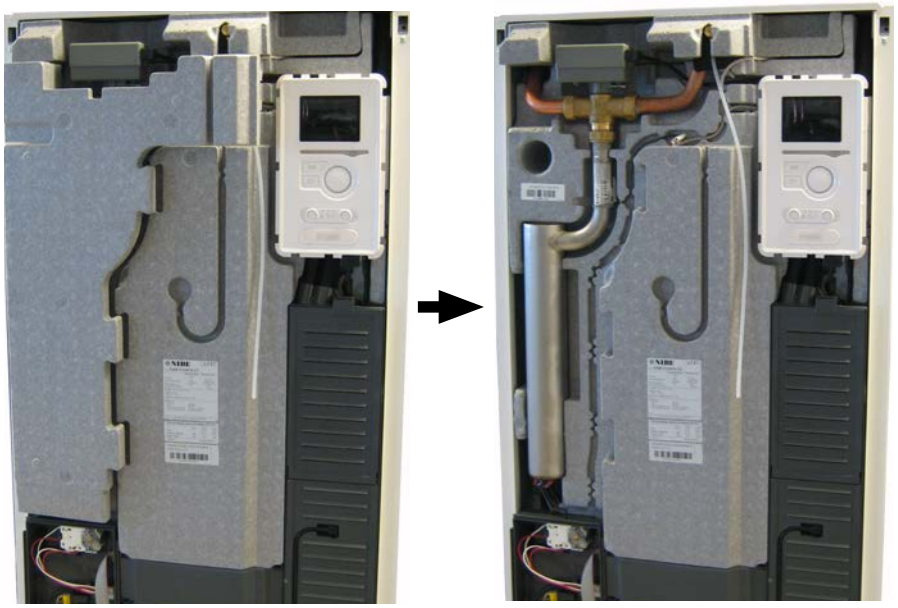
7 Drain the cooling circuit and ensure that no refrigerant remains before you continue.

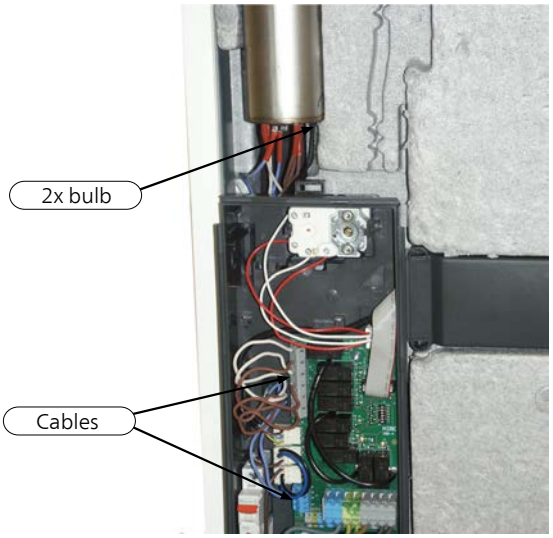
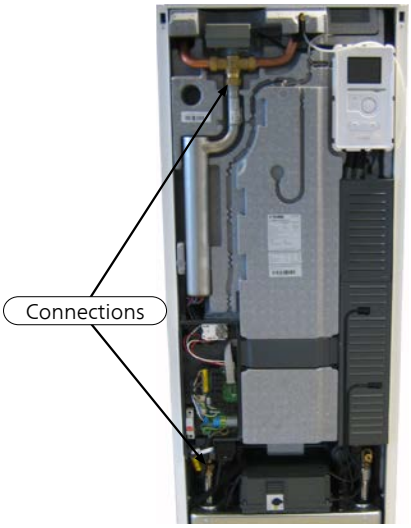
8 Slacken off the bulb for the expansion valve.

9 Disconnect the pipes and remove the valve.

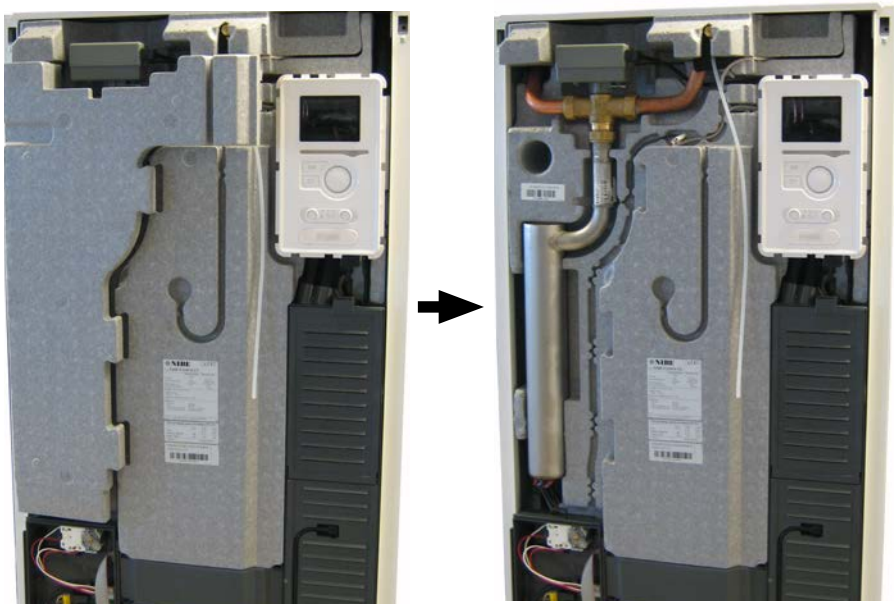


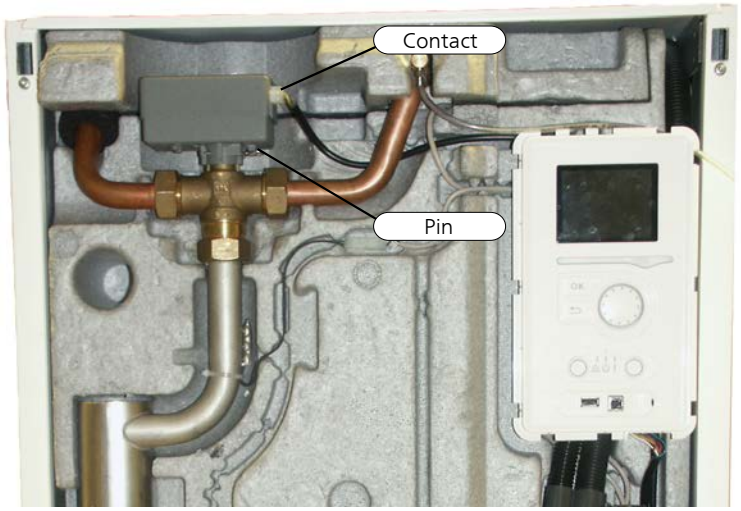
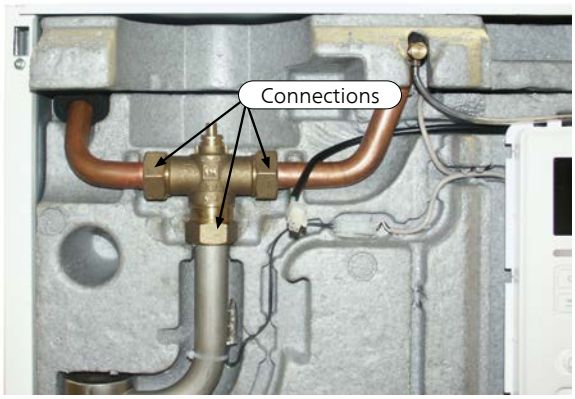
Immersion heater (EB1)

1 Drain the heating medium system.	
2 Remove the plastic cap over (AA1) using a screwdriver.	
3 Remove the insulation in front of the immersion heater.	

4 Ensure that the heat pump is unpowered before continuing. **5** Disconnect the 2 blue cables, the 2 white and the 3 brown cables from the terminal block X3 and X7 on (AA1). **6** Pull out the two bulbs from the immersion heater.	
7 Disconnect the immersion heater at the marked couplings. **8** Remove the box for the immersion heater circuit board (AA1). **9** Remove the immersion heater.	

Reversing valve (QN10)

1 Drain the heating medium system.	
2 Remove the plastic cap over (AA1) using a screw-driver.	
3 Remove the insulation.	

4 Remove the switch on the actuator. **5** Remove the pin and remove the actuator.	
6 Disconnect and remove the three way valve.	

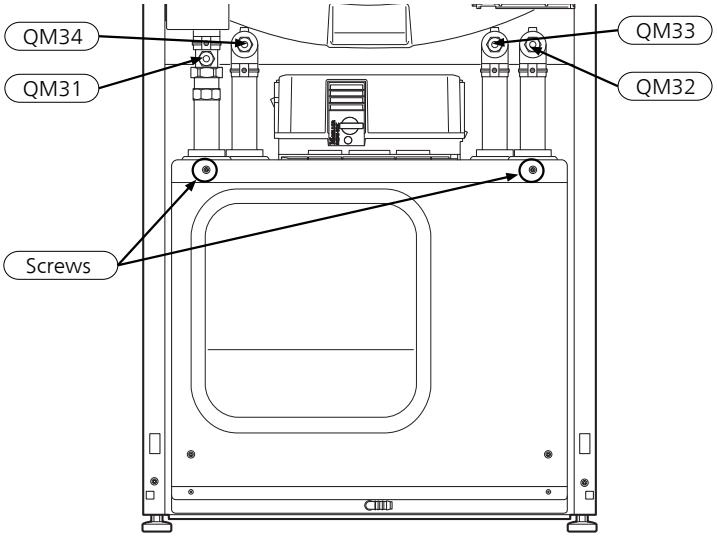
Heating medium pump (GP1)

1 Close the valves QM31, QM32, QM33 and QM34.

2 Slacken off 2 x screws.

3 Remove the front hatch on the cooling module.

4 Close the shut-off valves.

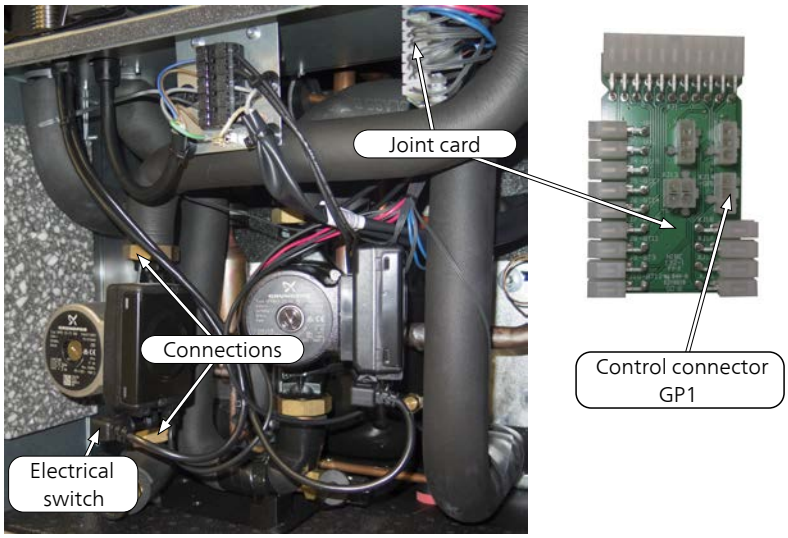


5 Remove the switch on the circulation pump.

6 Disconnect the connector for
the control cable on the joint board for GP1.

7 Release the pressure by carefully opening the connections to the circulation pump.

8 Disconnect and remove the circulation pump.



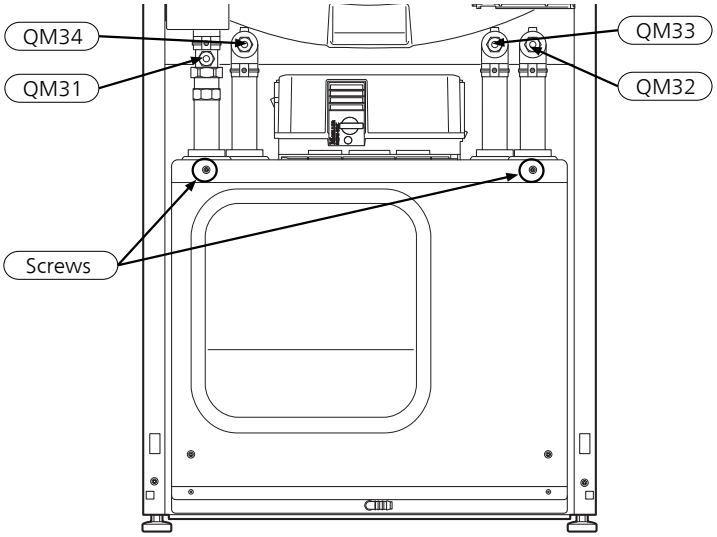
Brine pump (GP2)

1 Slacken off 2 x screws.

2 Remove the front hatch on the cooling module.

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

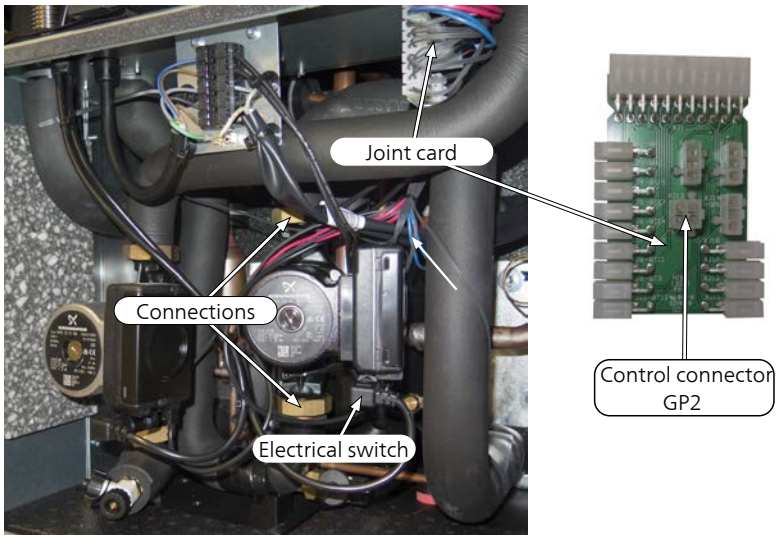
4 Drain the brine system.



5 Remove the switch on the circulation pump.

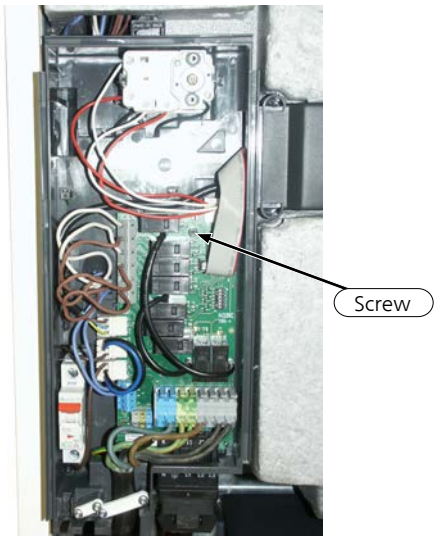
6 Disconnect the connector for
the control cable on the joint board for GP2.

7 Disconnect and remove the circulation pump.

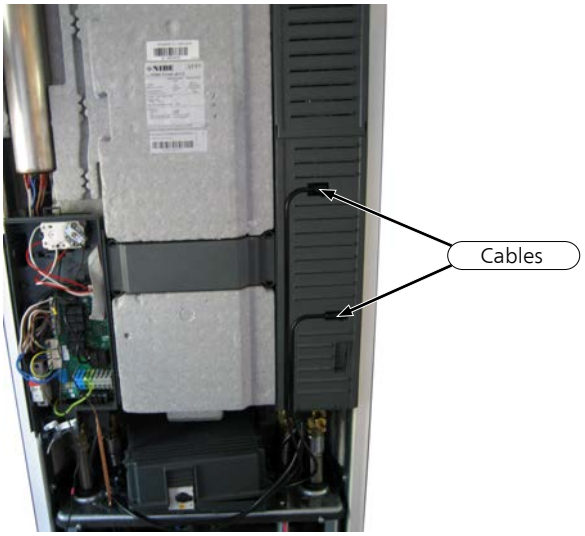
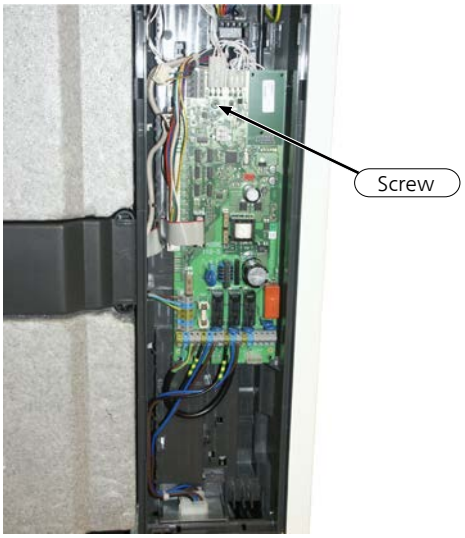


Circuit board and electronics

Immersion heater card (AA1)

1 Remove the plastic cap over (AA1) using a screw-driver.	
2 Disconnect the cables and screws holding the card in position.	
3 Remove the immersion heater card (.AA1).	

Base card (AA2)

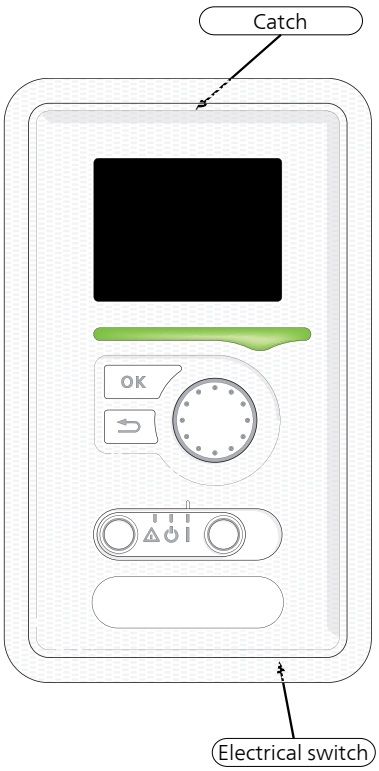
1 Remove the plastic cover over (AA3. See page 39.	
2 Disconnect the two cables through the cover in front of (AA2).	
3 Remove the plastic cover over (AA2).	
4 Disconnect the cables and screws holding the card in position.	
5 Remove the base card (AA2).	

Display unit (AA4)

1 Remove the communication cable and any Ethernet connection at the lower edge of the display unit.

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

3 Remove the display unit.



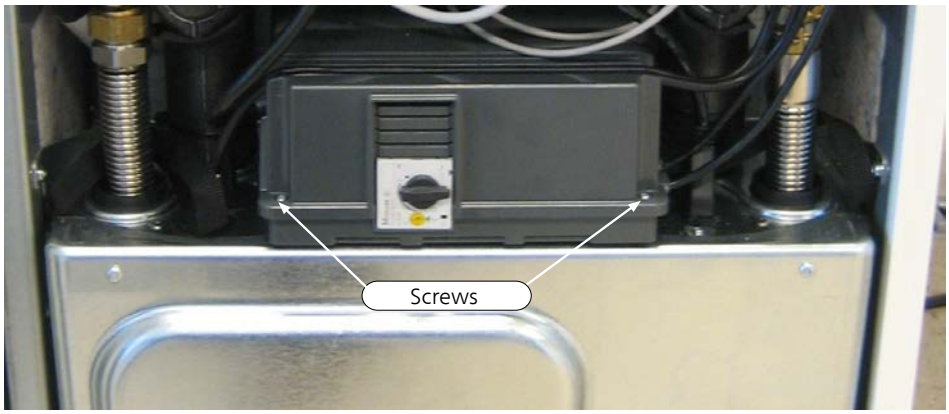
Soft-start card (AA10)/Soft-start card (QA30)

1 Remove the two screws in the motor module.

2 Open the motor module.

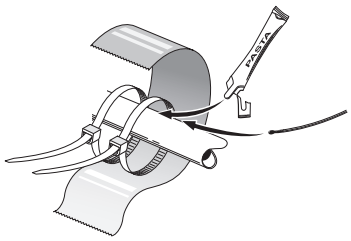
3 Disconnect all cables.

4 Replace the card/soft starter.



Temperature sensor

Mounting

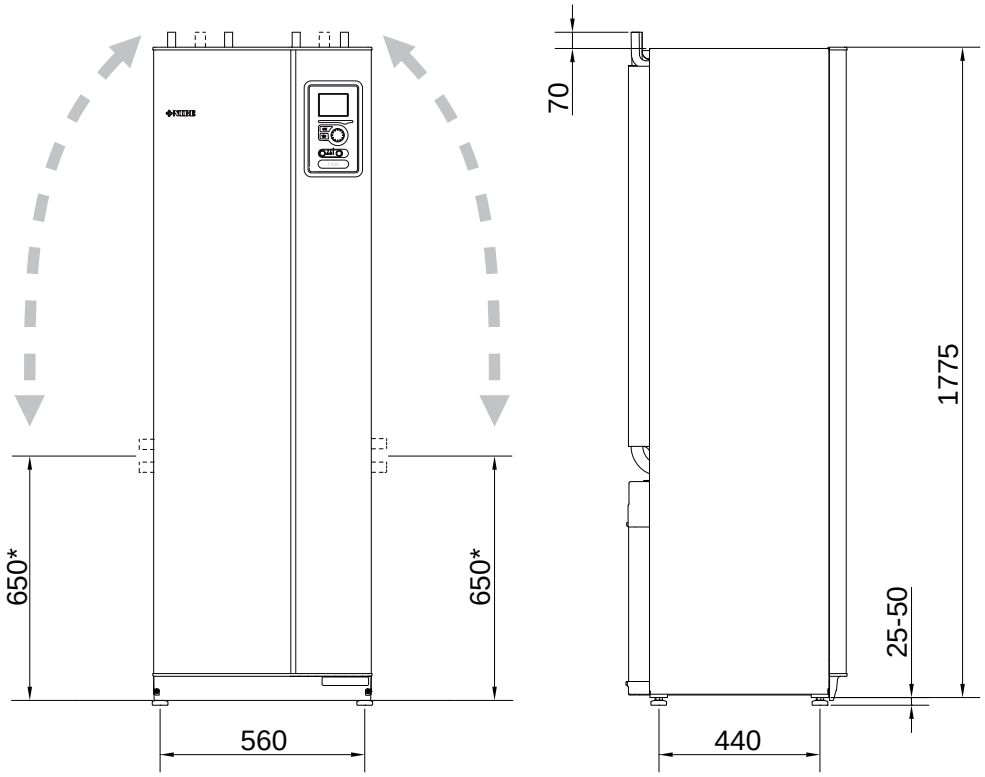


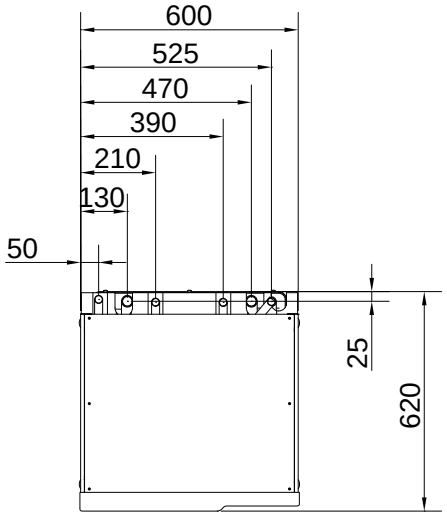
Install the temperature sensor with cable ties with the heat conducting paste and aluminium tape.

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.

CE IP 21

3x400 V

Model		F1226-6	F1226-8	F1226-12
Output data according to EN 14511				
0/35				
Rated output (P_H)	kW	5.49	7.37	11.52
Supplied power (P_E)	kW	1.31	1.65	2.68
COP	-	4.17	4.46	4.30
0/45				
Rated output (P_H)	kW	4.62	6.43	10.88
Supplied power (P_E)	kW	1.40	1.83	3.14
COP	-	3.31	3.51	3.46
Output data according to EN 14825				
Pdesignh	kW	7 / 6	9 / 8	13
SCOP cold climate, 35 °C / 55 °C	-	4.4 / 3.4	4.8 / 3.7	4.6 / 3.6
SCOP average climate, 35 °C / 55 °C	-	4.3 / 3.3	4.7 / 3.6	4.5 / 3.5
Electrical data				
Rated voltage		400V 3N ~ 50Hz		
Starting current		18	23	29
Additional power	kW	1/2/3/4/5/6/7 (switchable to 2/4/6/9)		
Max. operating current compressor, including control system, circulation pumps and 0 kW immersion heater	A_{rms}	4.6	6.6	9.0
Max. operating current heat pump including 1 – 6 kW immersion heater (recommended fuse rating)	A_{rms}	13 (16)	15 (16)	18 (20)
Max. operating current heat pump including 7 kW immersion heater, connected upon delivery (recommended fuse rating)	A_{rms}	19 (20)	21 (25)	23 (25)
Max. operating current heat pump including 9 kW immersion heater, requires reconnection (recommended fuse rating)	A_{rms}	19 (20)	22 (25)	24 (25)
Max. permitted impedance in connection point [1)]	ohm	-	-	-
Output, Brine pump	W	5 – 87	5 – 87	3 – 180
Output, Heating medium pump	W	4 – 70	4 – 70	4 – 70
Enclosure class		IP 21		
Refrigerant circuit				
Type of refrigerant		R407C		
GWP refrigerant		1,774		
Fill amount	kg	0.9	1.1	1.2
CO_2 equivalent	ton	1.6	1.95	2.13
Cut-out value pressure switch HP / LP	MPa	2.9 (29 bar) / 0.15 (1.5 bar)		
Difference pressostat HP	MPa	-0.7 (-7 bar) / 0.15 (1.5 bar)		
Brine circuit				
Min/max system pressure brine	MPa	0.05 (0.5 bar) / 0.3 (3 bar)		
Min flow	l/s	0.22	0.30	0.43
Nominal flow	l/s	0.30	0.42	0.64
Max external avail. press at nom flow	kPa	49	39	57
Min/Max incoming Brine temp	°C	see diagram		
Min. outgoing brine temp.	°C	-10		

Model		F1226-6	F1226-8	F1226-12
Heating medium circuit				
Min/Max system pressure heating medium	MPa	0.05 (0.5 bar) / 0.45 (4.5 bar)		
Min flow	l/s	0.09	0.12	0.18
Nominal flow	l/s	0.13	0.16	0.25
Max external avail. press at nom flow	kPa	53	47	57
Min/max HM-temp	°C	see diagram		
Noise				
Sound power level (L_{WA}) according to EN 12102 at 0/35	dB(A)	43	44	44
Sound pressure level (L_{PA}) calculated values according to EN ISO 11203 at 0/35 and 1 m range	dB(A)	28	29	29
Pipe connections				
Brine ext diam. CU pipe		28	28	28
Heating medium ext diam. CU pipes		22	22	28
Hot water connection external diam		22		
Cold water connection external diam		22		

1)Max. permitted impedance in the mains connection point in accordance with EN 61000-3-11. Start currents can cause short voltage dips that may affect other equipment in unfavourable conditions. If the impedance in the mains connection point is higher than that stated, it is possible that interference will occur. If the impedance in the mains connection point is higher than that stated, check with the power supplier before purchasing the equipment.

Miscellaneous

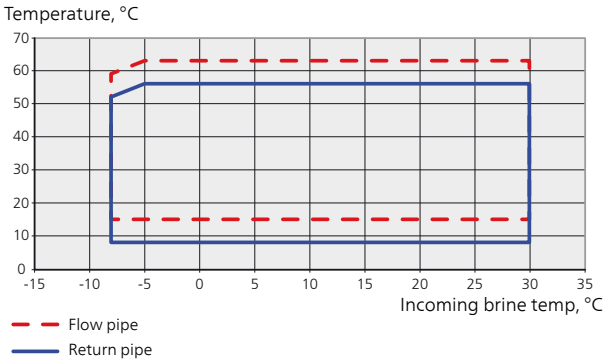
Miscellaneous		F1226-6	F1226-8	F1226-12
Water heater				
Volume water heater		180		
Max pressure in water heater		1.0 (10 bar)		
Compressor oil				
Oil type		POE		
Volume	l	1.33	1.33	1.89
Dimensions and weight				
Height (including feet) x width x depth	mm	1,800 x 600 x 620		
Required ceiling height 1)	mm	1,950		
Weight complete heat pump, stainless steel	kg	215	225	235
Weight complete heat pump, copper	kg	235	245	255
Weight only cooling module	kg	112	120	130
Part no., 3x400V, stainless steel		065 228	065 229	065 230
Part no., 3x400V, copper		065 220	065 226	065 227

1)With feet removed, the height is approx. 1930 mm.

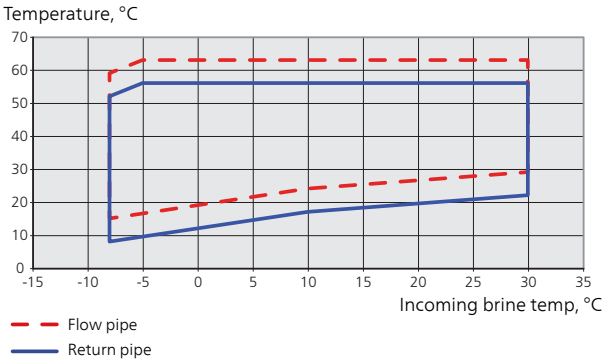
Working range heat pump, compressor operation

The compressor provides a supply temperature up to 63 °C, at 0 °C incoming brine temperature, the remainder (up to 70°C) is obtained using the additional heat.

6-8 kW



12 kW



9 Item register

Item register

NIBE AB Sweden
Hannabadsvägen 5
Box 14
SE-285 21 Markaryd
info@nibe.se
www.nibe.eu

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