



Technical manual

NIBE™ F2040

Air/water heat pump

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1 Important information

Document information

This technical manual is a complement to the Installer handbook for F2040, containing:

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

Safety information

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

This appliance is designed for use in a home environment and not intended to be used by persons (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction concerning use of the appliance by a person responsible for their safety. This in accordance to applicable parts of the low-voltage directive 2006/95/EC, LVD. The appliance is also intended for use by experts or trained users in shops, hotels, light industry, on farms and in similar environments. This in accordance to applicable parts of the machinery directive 2006/42/EC.

Children should be supervised to ensure that they do not play with the appliance.

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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

The CE marking means that NIBE ensures that the product meets all regulations that are placed on it based on relevant EU directives. The CE mark is obligatory for most products sold in the EU, regardless where they are made.

Symbols



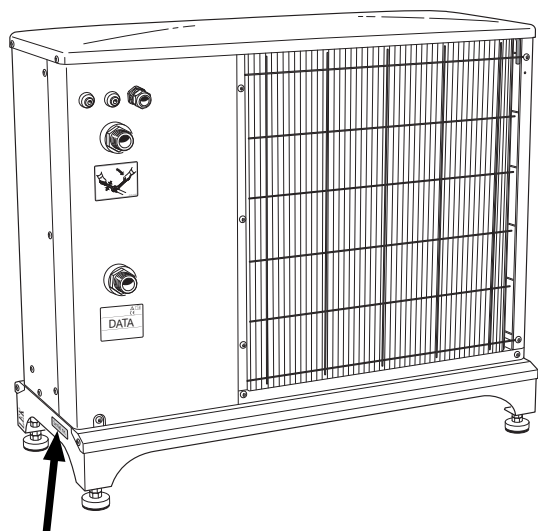
NOTE

This symbol indicates danger to machine or person.

Serial number

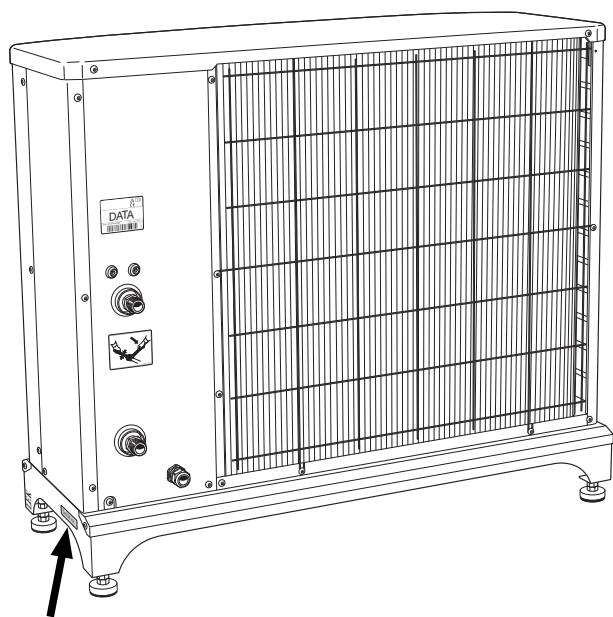
The serial number for F2040 can be found on the side of the foot.

F2040-8



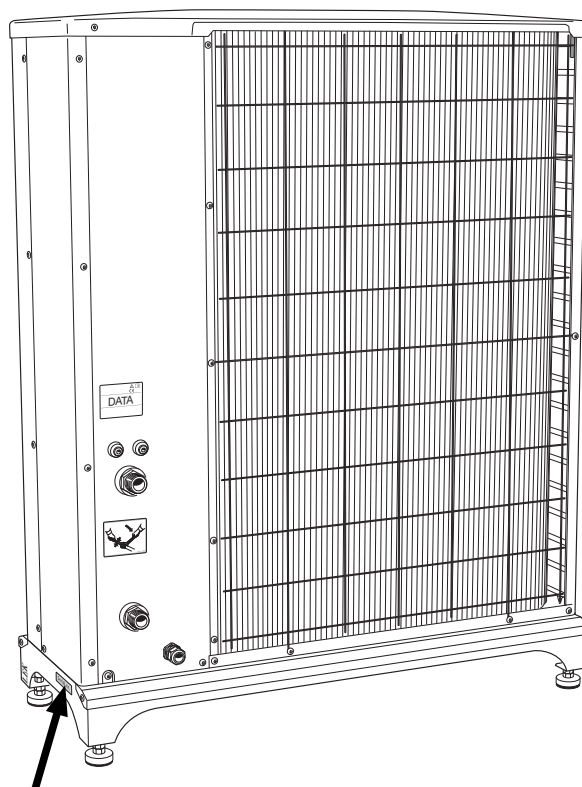
Serial number

F2040-12



Serial number

F2040-16



Serial number



Caution

Always give the product's serial number when reporting a fault.

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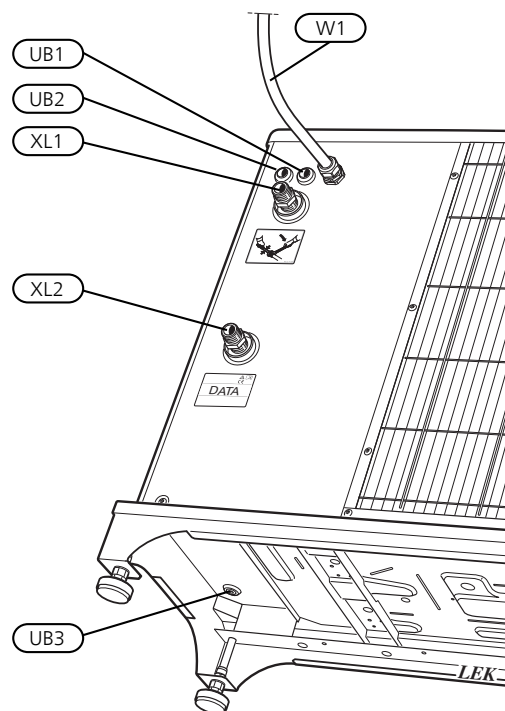
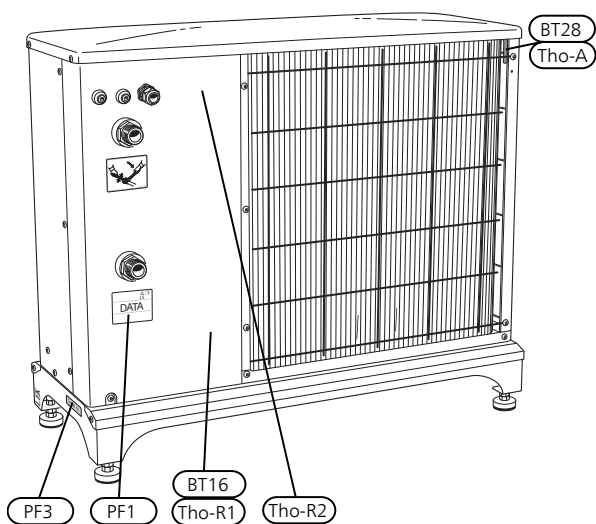
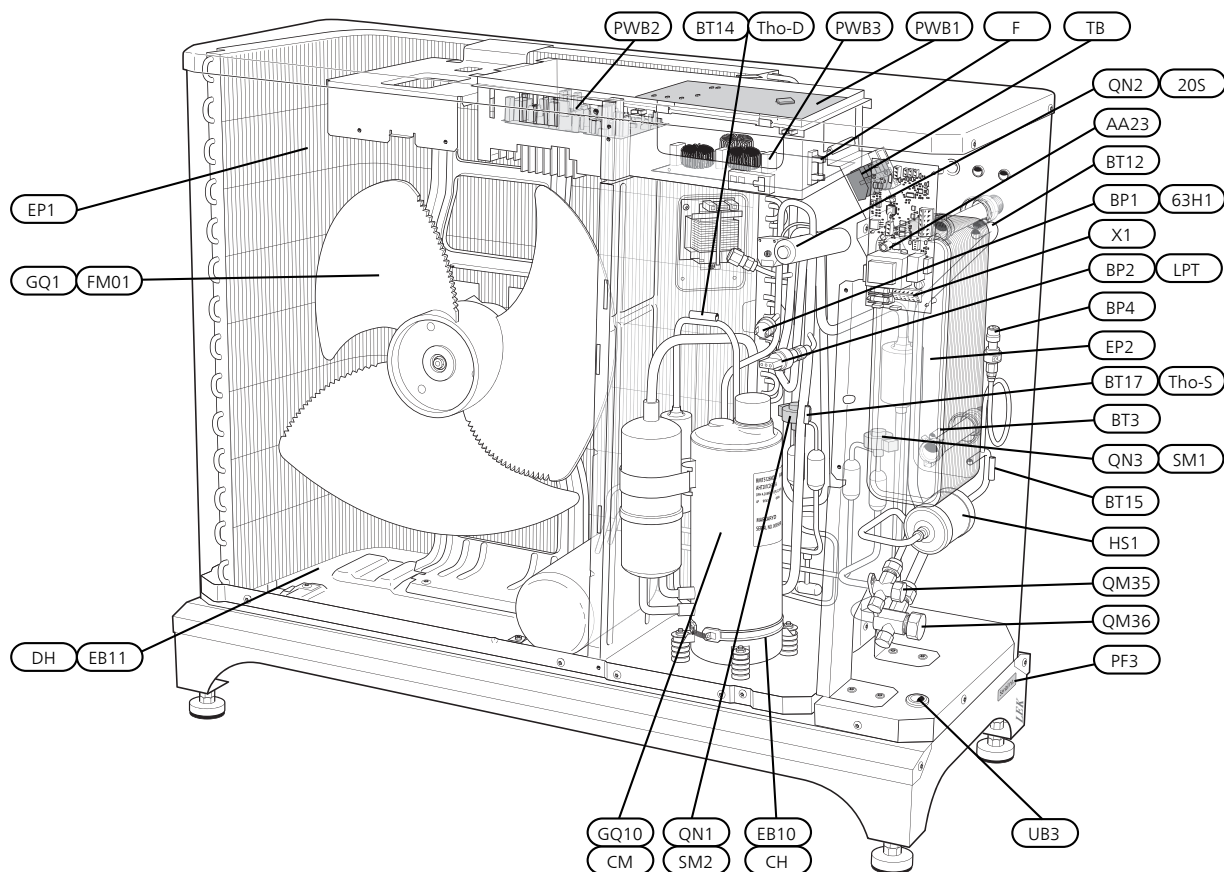
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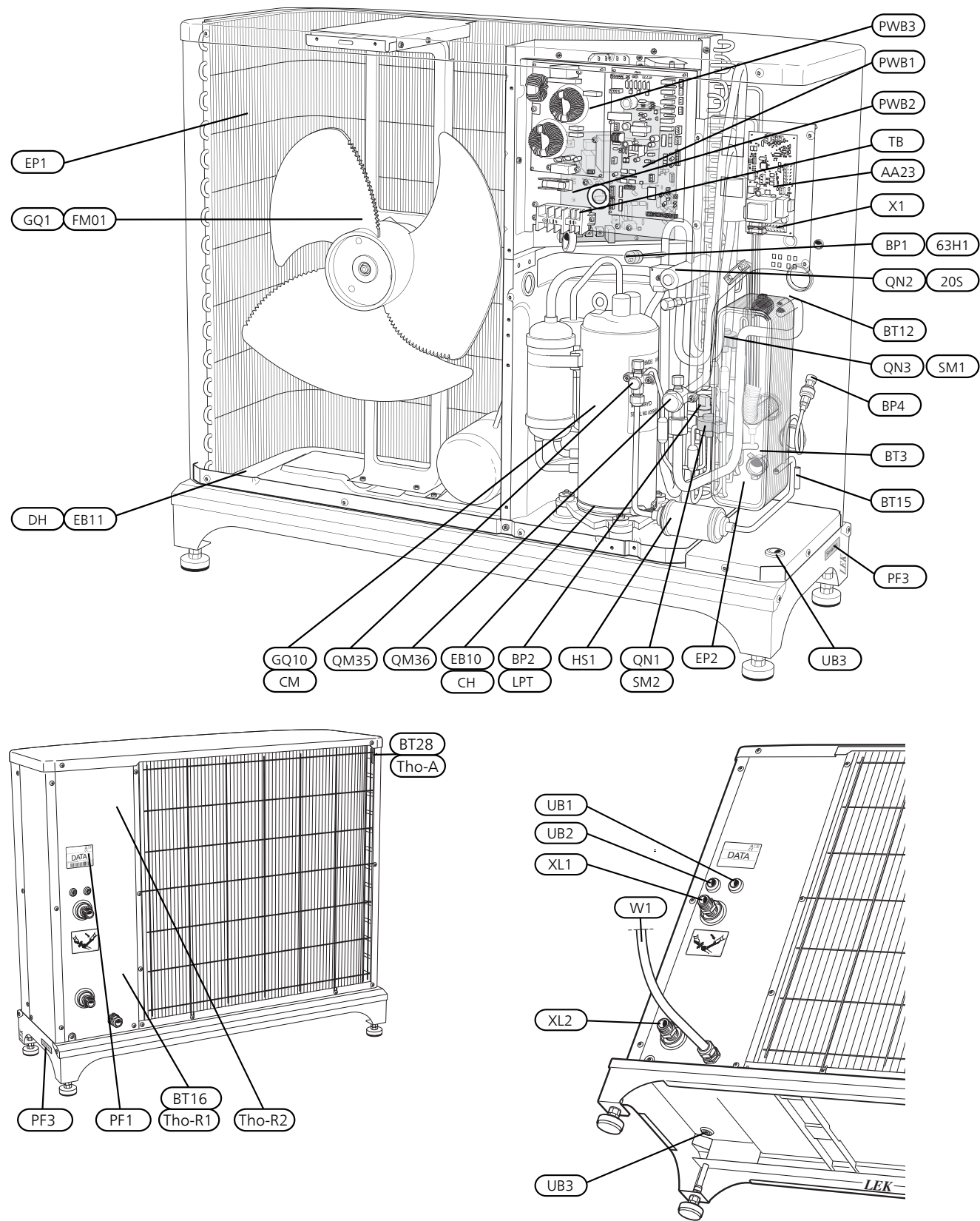
2 The heat pump design

General

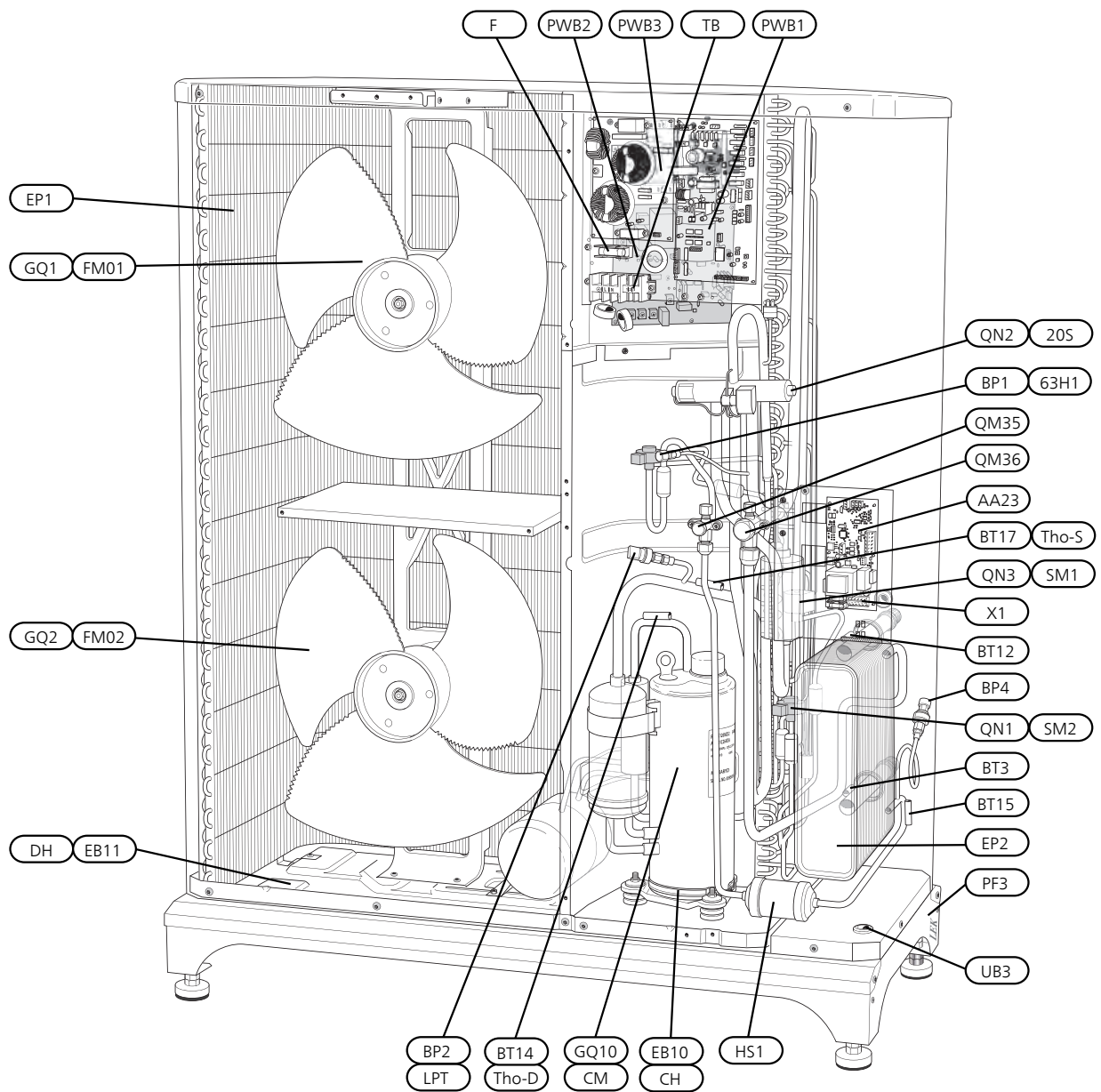
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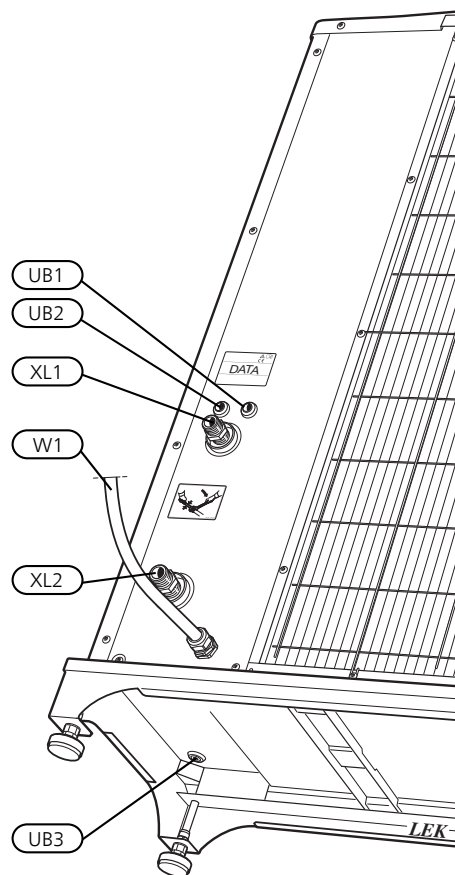
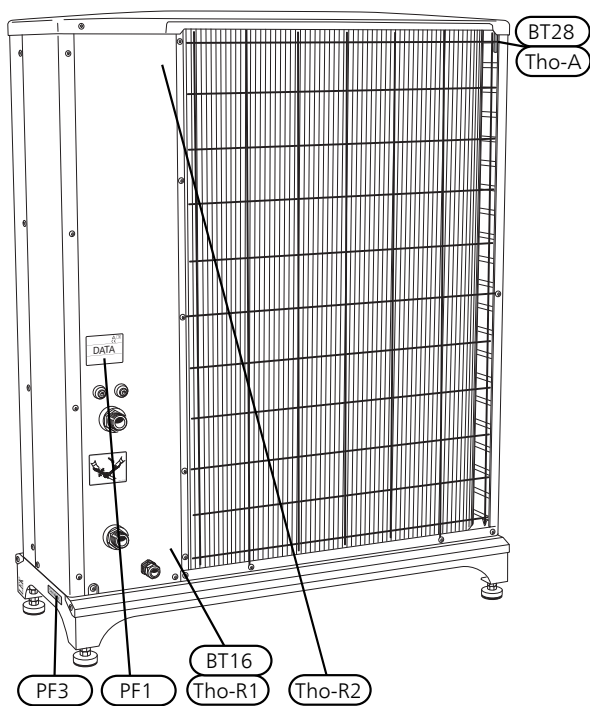


F2040-12



F2040-16





List of components F2040-8, -12, -16

Pipe connections

QM35	Service valve, liquid side
QM36	Service valve, gas side
XL1	Connection, heating medium out off F2040, G1" (Ø28 mm)
XL2	Connection, heating medium in to F2040, G1" (Ø28 mm)

Sensors etc.

BP1 (63H1)	High pressure pressostat
BT3	Temperature sensor, heating medium return line
BT12	Temperature sensor, condenser supply line
BT15	Temperature sensor, fluid pipe
BP2 (LPT)	Low pressure transmitter
BP4	High pressure sensor

Electrical components

AA23	Communication board
AA23-F3	Fuse for external heating cable (250 mA), max 45 W.
AA23-S3	DIP switch, addressing of outdoor unit
AA23-X1	Terminal block, KVR
AA23-X4	Terminal block, communication from indoor module
AA23-X100	Communication with TB
EB10 (CH)	Compressor heater
EB11 (DH)	Drip tray heater
F	Main fuse compressor unit
GQ1 (FM01)	Fan
GQ2 (FM02)	Fan
PWB1	Control board
PWB2	Inverter board
PWB3	Filter board
TB	Terminal block, incoming supply and communication with board AA23

Cooling components

QN2 (20S)	4-way valve
GQ10 (CM)	Compressor
QN3 (SM1)	Expansion valve, cooling
QN1 (SM2)	Expansion valve, heating
EP1	Evaporator (air coil, copper pipe with aluminium flange)
EP2	Condenser (ACH 30, copper/stainless steel)
HS1	Drying filter

Miscellaneous

PF1	Type plate
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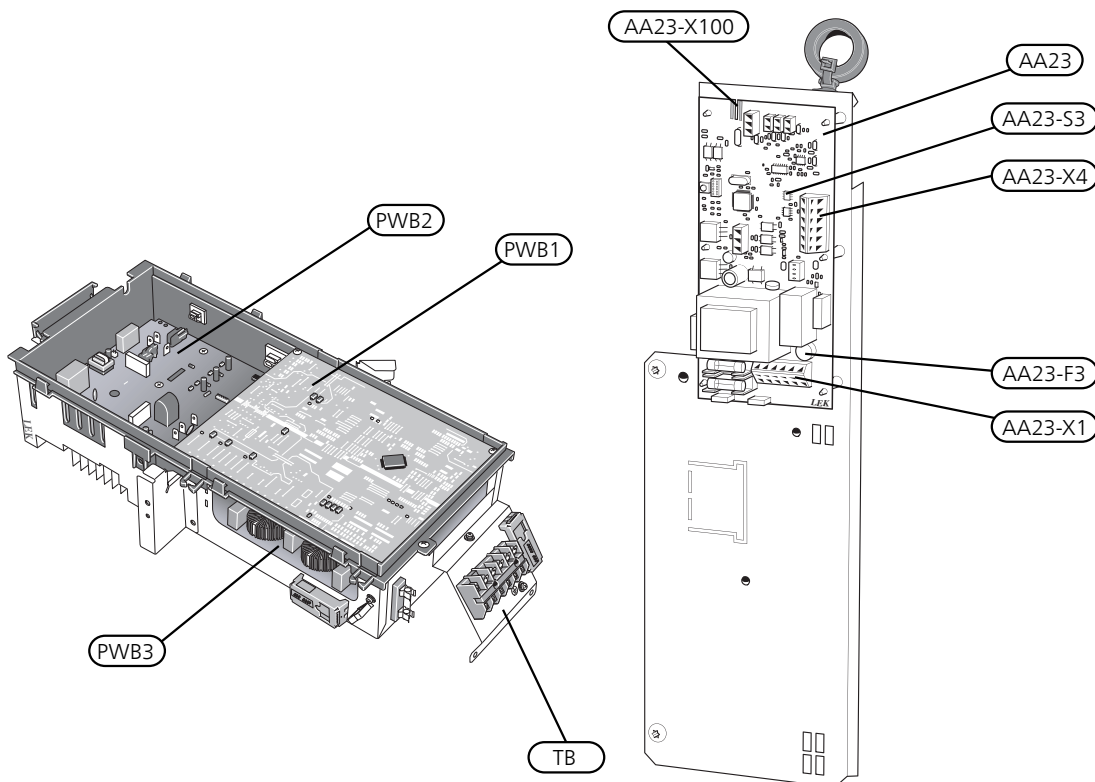
PF3	Serial number
UB1	Cable gland, incoming supply
UB2	Cable grommet, communication
UB3	Cable grommet, heating cable (EB14)
W1	Cable, incoming supply

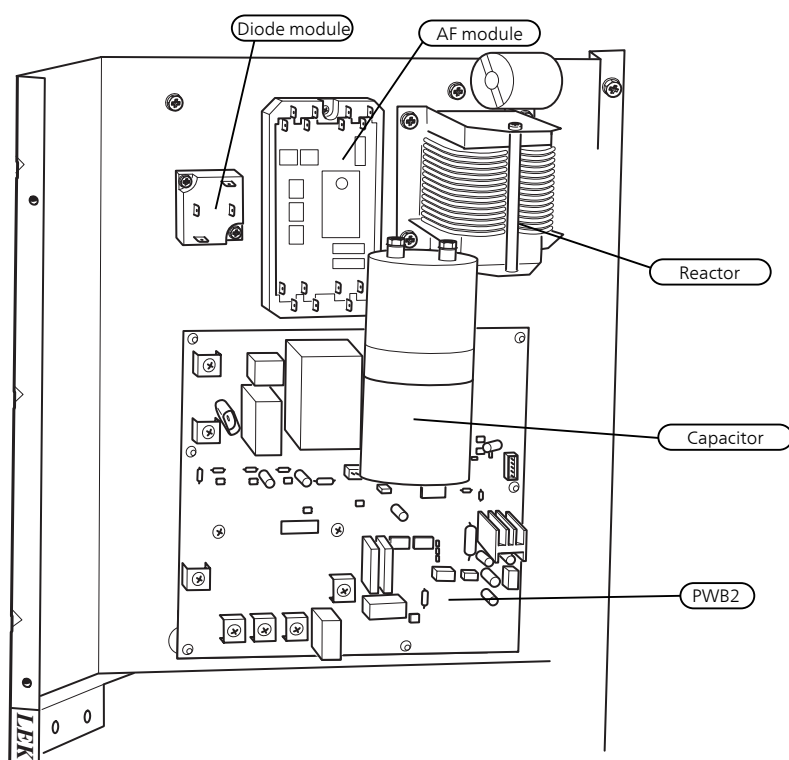
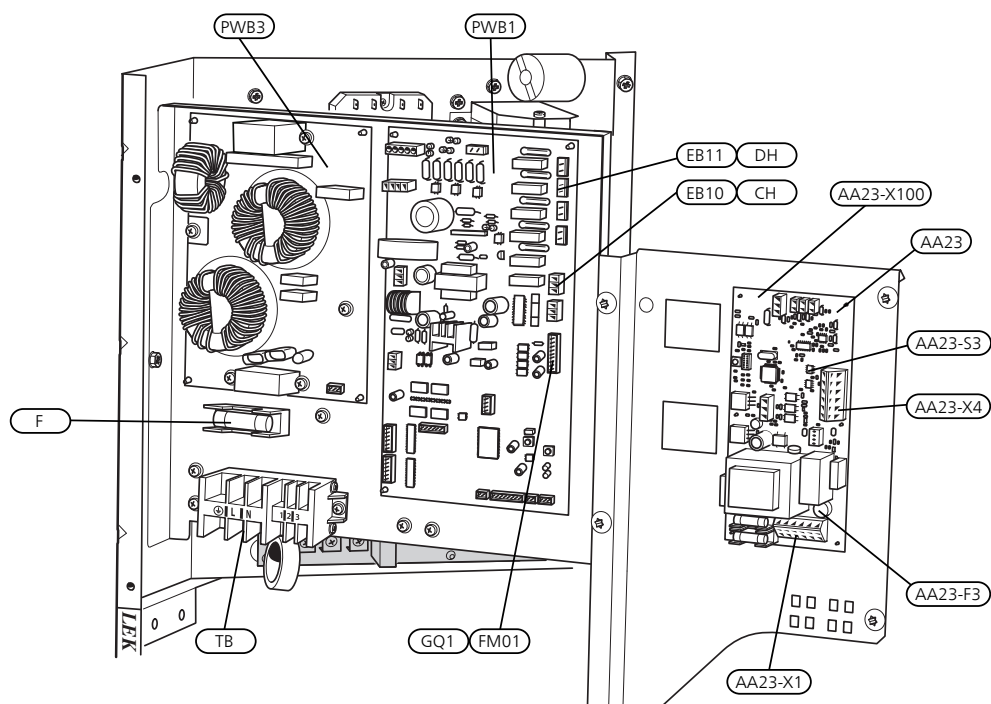
Electrical connection

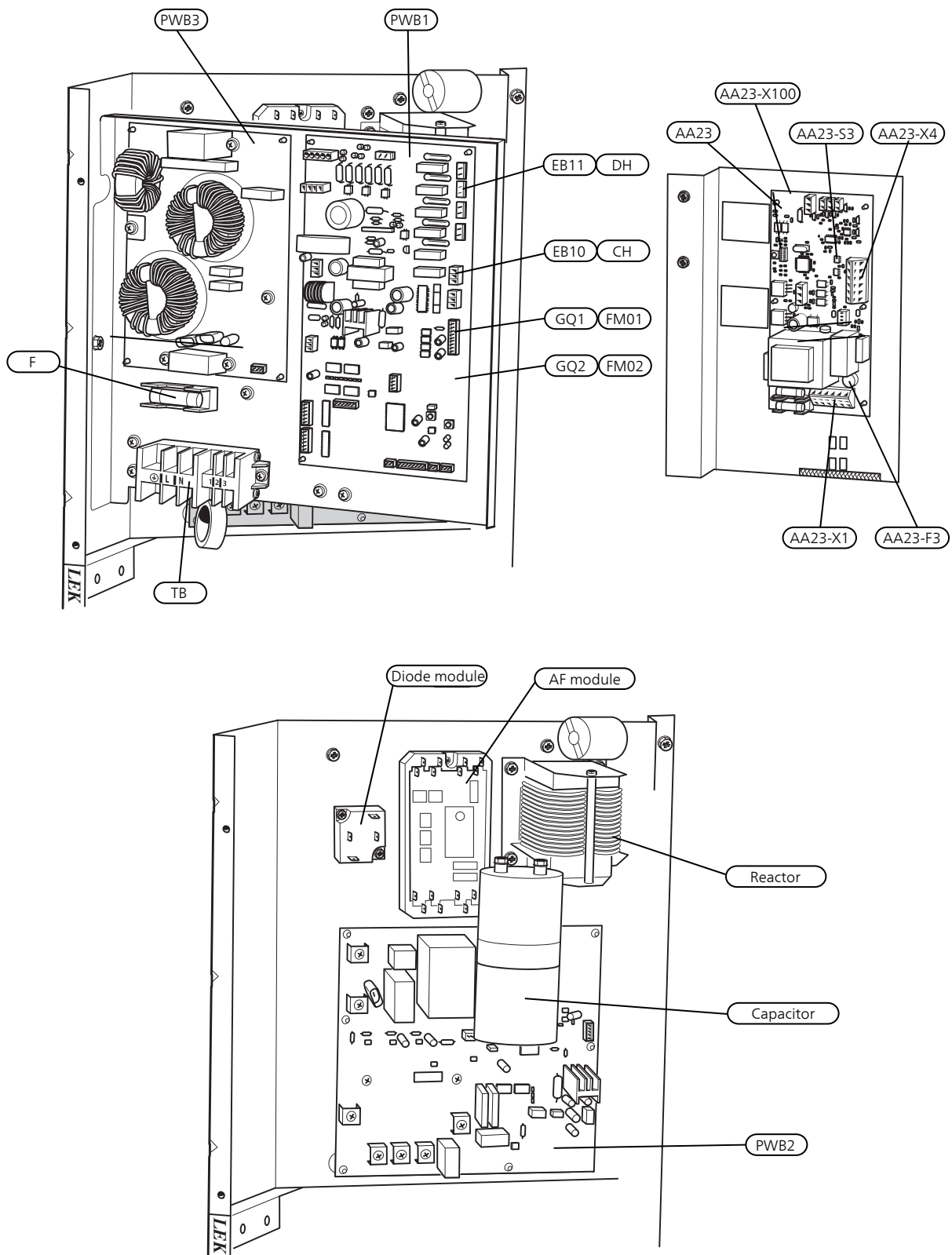
Electrical components

AA23	Communication board
AA23-F3	Fuse for external heating cable (250 mA), max 45 W.
AA23-S3	DIP switch, addressing of outdoor unit
AA23-X1	Terminal block, KVR
AA23-X4	Terminal block, communication from indoor module
AA23-X100	Communication with TB
EB10 (CH)	Compressor heater
EB11 (DH)	Drip tray heater
F	Main fuse compressor unit
GQ1 (FM01)	Fan
GQ2 (FM02)	Fan
PWB1	Control board
PWB2	Inverter board
PWB3	Filter board
TB	Terminal block, incoming supply and communication with board AA23

F2040-8

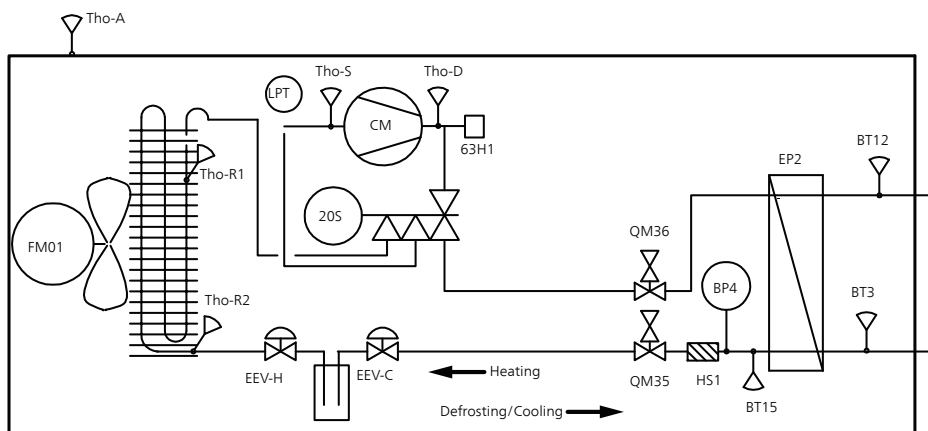






3 System description

Principle of operation



Designation	Information	Designation	Information
QN2 (20S)	4-way valve	HS1	Drying filter
BP1 (63H1)	High pressure pressostat	BP2 (LPT)	Low pressure transmitter
BP4	Pressure sensor, condenser	BT28 (Tho-A)	Temperature sensor, ambient
BT3	Temperature sensor, heating medium return line	BT14 (Tho-D)	Temperature sensor, hot gas
BT12	Temperature sensor, condenser supply line	BT16 (Tho-R1)	Temperature sensor, heat exchanger out
BT15	Temperature sensor, fluid pipe	Tho-R2	Temperature sensor, heat exchanger, in
GQ10 (CM)	Compressor	BT17 (Tho-S)	Temperature sensor, suction gas
EP2	Condenser	QM35	Service valve, liquid side
GQ1 (FM01)	Fan	QM36	Service valve, gas side

Sensor internal

Sensors etc.

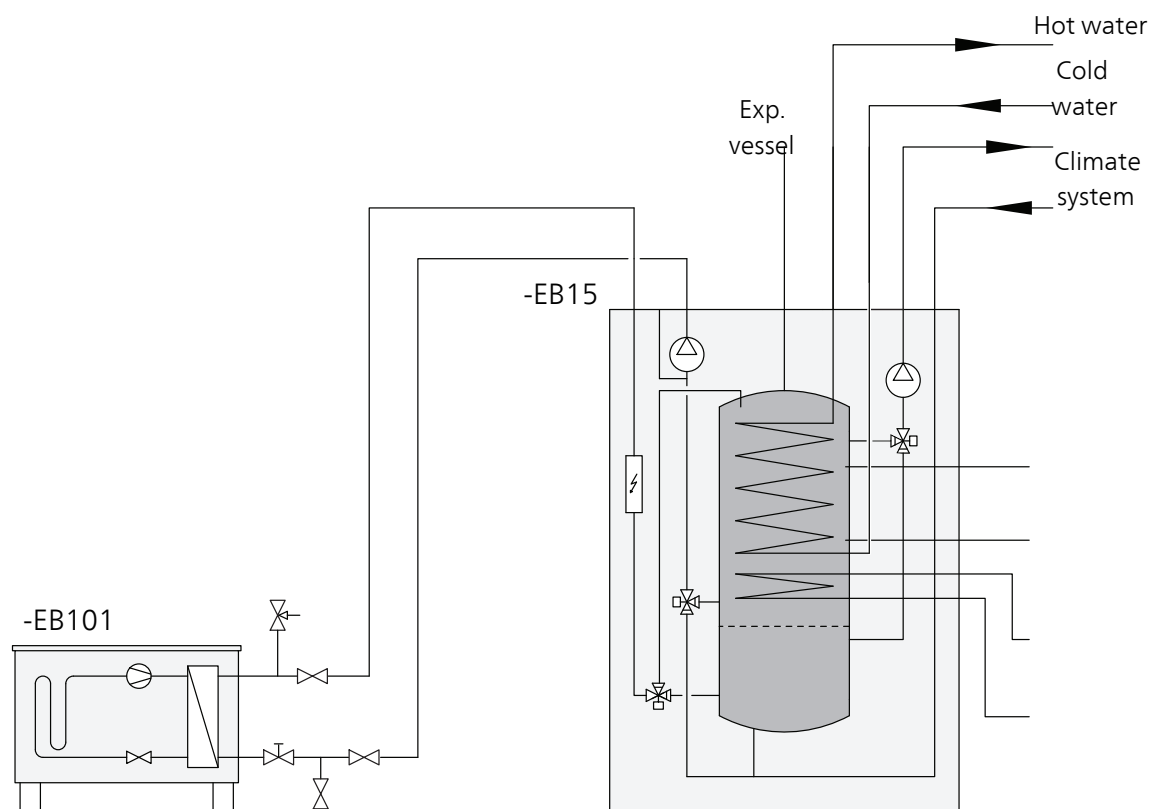
Designation	Name	Location	Function
BP1	High pressure switch (41.5 bar)	On hot gas line.	Protects the compressor against pressures that are too high during normal operation.
BP2	Low pressure transmitter	On suction gas line.	Protects the compressor against pressures that are too low.
BP4	High pressure sensor	On hot gas line.	Stopping the compressor at high pressure.
BT3	Return pipe	On return line at the condenser.	Stopping the compressor at high temp.
BT12	Flow pipe	On supply line at the condenser.	Stopping the compressor at high temp.
BT15	Fluid pipe	On the liquid line after the condenser.	View.

System diagram

System principle Docking

Example of docking F 2040 to VVM 310/VVM 500.

F2040 can also be connected to SMO20, SMO40 and VVM320.



TIP

Several system principles available at www.nibe.se/docking.

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

4 Description of functions

Compressor operation

Max speed

Max speed:

State	Speed F2040 (rps)
Cooling mode	80
Heating mode	120

Max speed can be restricted in menu 9.1.9.

Max speed at high outdoor temperature:

State	Sensor temperature (Tho-A)	Speed F2040 (rps)
Cooling mode	Tho-A > 40 °C	75
Heating mode	-2 < Tho-A ≤ 18 °C	85
	Tho-A > 18 °C	60

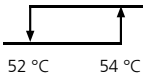
Min speed

Min speed:

State	Speed F2040 (rps)
Cooling mode	20
Heating mode	25

Min speed during high condensing in heating mode:

Lowest compressor speed changes according to following table

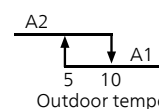
State		Speed F2040 (rps)
Heating mode	Condenser temperature or liquid line temp., the one that is greatest 	35

Min speed at low outdoor temperature:

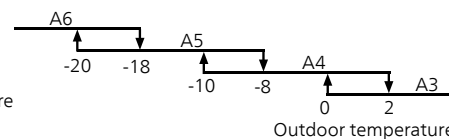
State		Speed F2040 (rps)
Cooling mode	A1	0
	A2	+15

State		Speed F2040 (rps)
Heating mode	A3	0
	A4	+10
	A5	+20
	A6	+30

Cooling mode



Heating mode



The compressor's speed change

The compressor's greatest speed change is 6 rps/30 sec.

Compressor start

The compressor restarts if the following conditions are met:

- The inner unit sends start signals.
- More than three minutes have passed since the compressor was stopped.

The compressor's speed is calculated by the connected indoor unit which requests the necessary output.

Upon first start-up in heating operating mode, after the current has been switched on, the outdoor unit delays the compressor start by 30 minutes, to prevent oil being drained from the compressor.

During the delay, "Protection" appears in menu 5.0.

Start procedure for the compressor

Process 1

The compressor usually starts with process 1.

The compressor starts at a speed of 30 rps and attempts to meet a target speed of "55 rps" with a speed increase of 5 rps / 5 sec.

Defrosting stops when the pressure difference exceeds 0.34 MPa in heating operation.. In cooling operation it is stopped when the low pressure is 0.8 MPa. When the pressure difference is achieved the target speed is changed to "A" rps and maintained for "B" minutes.

State	A rps	B min
Cooling mode	20	4
Heating mode	55	2

Process 2

First start after the heat pump has been powerless.

The compressor starts at a speed of 30 rps and attempts to meet a target speed of "55 rps" with a speed increase of 5 rps / 5 sec.

Defrosting stops when the pressure difference exceeds 0.34 MPa in heating operation.. In cooling operation it is stopped when the low pressure is 0.8 MPa. The compressor then holds "A rps" for "B min".

State	A rps	B min
Cooling mode	30	10
Heating mode	30	10

Process 3

If both the following conditions are met:

- Restart of the compressor in heating operation if the compressor has been stopped for 2 hours or more.
- Ambient temp. at restart is lower than 0 °C.

The compressor starts at a speed of 30 rps and attempts to meet a target speed of "55 rps" with a speed increase of 5 rps / 5 sec.

Defrosting stops when the pressure difference exceeds 0.34 MPa in heating operation.. In cooling operation it is stopped when the low pressure is 0.8 MPa. The compressor then holds "A rps" for "B min".

State	A rps	B min
Heating mode	40	15

Fan speed

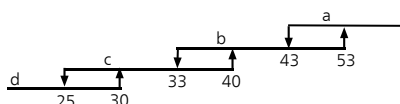
The fan starts at the lowest speed.

The relationship between the heat exchanger temperature and outdoor temperature limits the fan speed as follows.

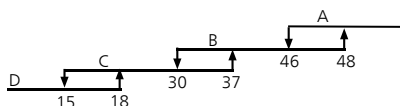
Cooling mode

F2040		Max fan speed (rpm)				Min fan speed (rpm)
Tho-R	Tho-A	A	B	C	D	
a		820	820	820	740	130
b		820	820	740	600	130
c		740	740	600	350	130
d		600	600	350	200	130

Tho-R



Tho-A



F2040	Fan speed (rpm)	
	Min	Max
	130	820

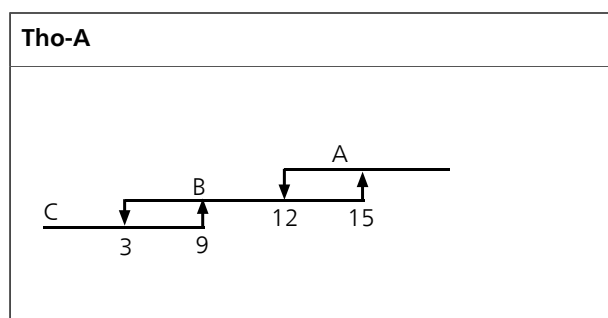
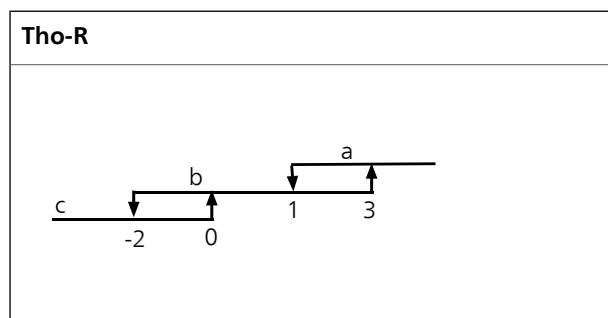
Cooling operation:

The fan speed is checked every 15 seconds so that the heat exchanger temperature (Tho-R1, -R2), the highest one, is within a certain range.

Sensor temperature Tho-R	Fan speed
Below 30 °C	Reduction by 10 rpm
Between 30 °C and 45 °C	Maintains the speed
Above 45 °C	Increase by 10 rpm

Heating mode

F2040		Max fan speed (rpm)			Min fan speed (rpm)
Tho-R	Tho-A	A	B	C	
a		600	600	740	390
b		600	740	740	390
c		740	740	740	390



F2040	Fan speed (rpm)	
	Min	Max
	390	740

The fan speed is checked every 15 seconds so that the temperature difference between the outdoor temperature (Tho-A) and heat exchanger temperature (Tho-R1, -R2), the highest one, is within a certain range.

(Tho-A) - (Tho-R)	Fan speed
Less than 3 °C	Reduction by 10 rpm
Between 3 °C and 6 °C	Maintains the speed
Above 6 °C	Increase by 10 rpm

When the outdoor temperature (Tho-A) is greater than 25 °C, the fan speed is checked by the low pressure (LPT).

LPT	Fan speed
Higher than 1.1 MPa	Reduction by 10 rpm
Between 1.0 and 1.1 MPa	Maintains the speed

LPT	Fan speed
Below 1.0 MPa	Increase by 10 rpm

Expansion valves (EEV)

Cooling mode

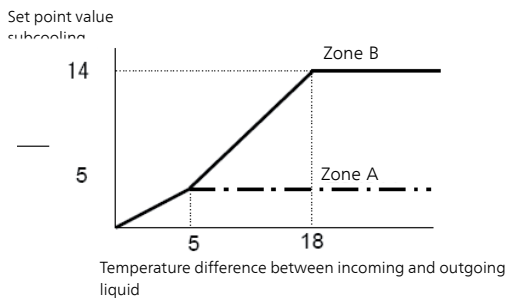
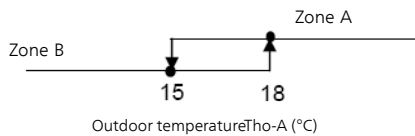
EEV-C regulates so that overheating is 4 K.

EEV-H is fully open when the compressor is in operation.

Heating mode

EEV-H regulates so that overheating is between 3 and 5 K.

EEV-C controls so that sub-cooling is as shown in the diagram.



Defrosting

Start conditions for defrosting

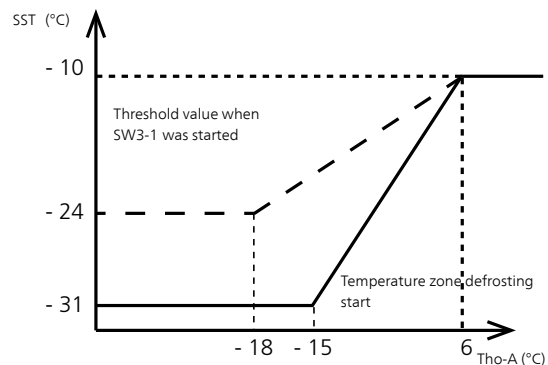
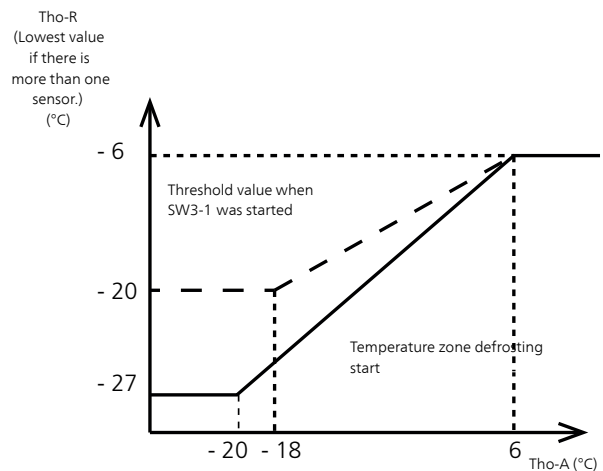
If the following conditions A or B are fulfilled the defrosting starts.

Defrosting conditions A:

- a) When the accumulated run time for the compressor exceeds 37 minutes after the previous defrosting, and more than 30 minutes after heating operation started.
- b) At least 5 minutes after the compressor started.
- c) When one of the following conditions is met:
 - c1) When the association between the outdoor unit's heat exchanger temperature (Tho-R1 or -R2, whichever is the lowest) and the outdoor temperature (Tho-A) is in the temperature range for defrosting start.
 - c2) When the association between the suction gas evaporation temperature (SST) and Tho-A is within the temperature range.

Defrosting will not start under the following conditions c2:

- Less than 10 minutes have passed since the compressor started.
- The outdoor temperature is greater than +4 °C.



Defrosting conditions B:

- a) Defrosting can be started when the accumulated operating time for the compressor has reached 30 minutes, if the previous defrosting is included because of "max defrosting time".
- b) 5 minutes after compressor start

Conditions during defrosting

- When the defrosting conditions are met, the outdoor unit waits 40 seconds to confirm it. If the defrosting conditions are changed during the 40 secs. Defrosting will not start.
- EEV-C opens fully and the compressor speed is set to A rps.

	A rps	B rps
Speed F2040	25	56

- Four way valve switches after 20 seconds (F2040 - 12/16) after the compressor speed reaches A rps or lower.
The fan is stopped when the fourway valve switches.
- EEV-H is fully open and the compressor speed is fixed for 1 minute to prevent low pressure.
- The target speed for the compressor is set to B rps. The compressor speed is checked every fifth second, to prevent the water temperature or low pressure falling.
- EEV-C regulates to 5 K during overheating.
- When the overheating is less than 5 K EEV-H controls to 0.65 MPa at low pressure. When the overheating exceeds 5 K EEV-H controls to 0.82 MPa at low pressure.
- The fan is not active during defrosting. Other circumstances may make the fan rotate.

From and including version 1.05:

- If the value in menu 2.1.5 is lower than 65% the pump runs at 80% during defrosting.
- If the value in menu 2.1.5 is 65% or higher the pump runs at 100% during defrosting.

Conditions for stopping defrosting

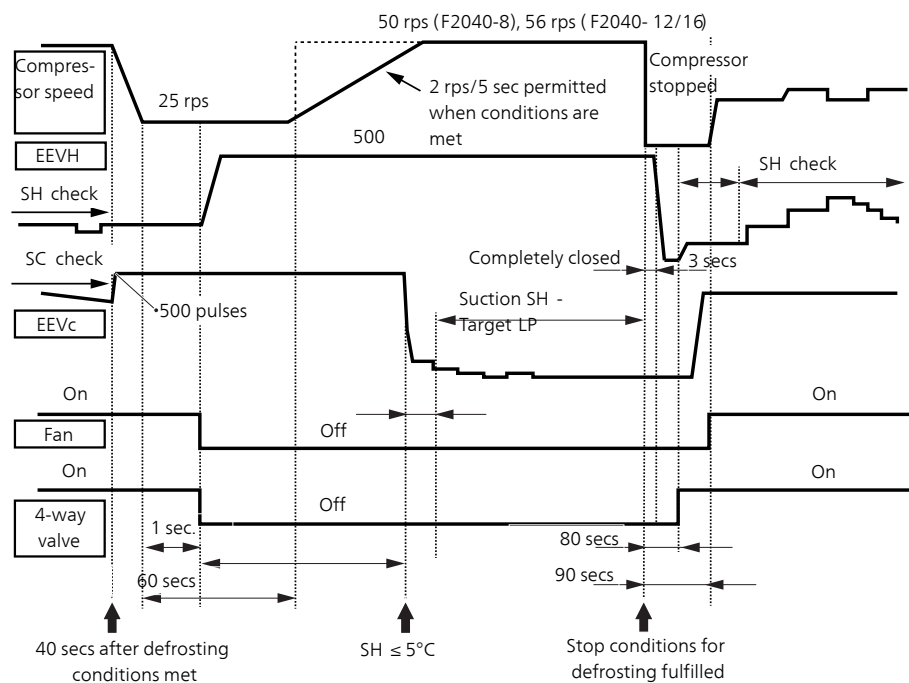
If any of the following conditions are met, defrosting stops,

- 8 minutes and 20 seconds after defrosting start.
- When the evaporation temperature Tho-R1 or -R2 (whichever is lowest) is higher than 12 degrees.

Conditions when defrosting is stopped by a protective function

Defrosting is not permitted for 15 minutes after the stoppage.

Defrosting schedule F(2040)



Oil return

This function ensures that the oil returns to the compressor.

Cooling operation:

- The upper limit for compressor speed is changed to A (rps) when the compressor has worked constantly for more than 60 min.
- During compressor operation below B rps for 10 minutes, the minimum speed is increased to Brps.
- At compressor operation below C rps for 2 hours accumulated, the speed is increased to C rps for 5 minutes.

	A (rps)	B (rps)	C (rps)	D (rps)
F2040	100	25	46	56

Heating operation:

- During heating operation, this function is a variant of defrosting and occurs at 3 hours of accumulated operation.
- During heating operation the compressor speed is D rps instead of B rps.
- The speed of the compressor is locked at 56 rps.
- The fan is temperature controlled.

Outdoor temperature (Tho-A)	< 0 °C	≤ 24 °C	> 24 °C
Speed, fan (rps)	0	200	600

The function stops:

- When overheating is less than 5 K, and more than 50 seconds have passed since the four way valve shifted.
- More than 5 minutes have passed since the function started.

Compressor protection

Hot gas temperature

When the hot gas temperature (Tho-D) indicates an unusually high temperature during operation, the speed decreases to cool it down.

Speed control of the compressor:

- When the temperature is greater than 105 °C, the speed is reduced by 4 rps/minute
- When the temperature is between 100 to 105 °C, no speed changes occur.
- When the temperature is below 100 °C, the function stops.

Stop with automatic reset:

- The compressor stops when the temperature is 115 °C, and restarts when the temperature is below 85 °C

Stop with manual reset:

- If the above occurs 2 times within 60 minutes, or the temperature is greater than 115 °C for 60 minutes, the compressor stops with error code "E36".
- Resetting can occur 45 minutes after the temperature has dropped below 85 °C.

High pressure control

Heating operation:

F2040:

The speed of the compressor decreases by 4 rps every 30 seconds when the fluid line sensor (BT 15) or condensing temperature (BP 4) is 60 °C, at the same time as the high pressure switch is deployed.

The compressor stops when BT 15 or BP 4 reaches 65 °C and restarts when the temperature is ≤ 47 °C.

The compressor stops when Tho-R reaches 65 °C and restarts when the temperature is ≤ 51 °C.

Cooling operation:

The speed of the compressor decreases by 4 rps every minute when Tho-R is 60 °C, at the same time as the high pressure switch is deployed.

The cut-out point is reduced by 2 °C every time the high pressure switch deploys, down to 54 °C.

Stop with manual reset:

The compressor is stopped with error code "261":

- if the pressure switch trips 5 times within 60 minutes.
- If the break temperature for the compressor is reached for more than 60 minutes.

Low pressure control

Speed control of the compressor:

The speed of the compressor decreases by 4 rps every 30 seconds if the low pressure is 0.15MPa or lower for more than 10 seconds. The function is stopped when the low pressure is 0.189 MPa or greater.

Stopped compressor:

When one of the following conditions is met, the compressor stops.

- The low pressure is less than 0.015 MPa for more than 15 seconds.
- The low pressure is less than 0.15 MPa and overheating is greater than 30 °C for more than 60 seconds.

Compressor operation is resumed automatically when the low pressure is 0.227 MPa or greater.

Stop with manual reset:

If the above events occur 3 times within 60 minutes, or the low pressure is lower than 0.079 MPa for more than 5 minutes, the compressor is stopped with fault code "E 49".

High compression ratio:

If the low pressure is less than 0.28 MPa and if the fluid line sensor or condensing temperature is greater than 50 °C, the compressor speed can be lowered.

Inverter

Temperature control:

- When the inverter temperature (Tho-IP) is higher than 85 °C the compressor speed is reduced 2 rps/minute for F2040.
- When the temperature falls below 81 °C the function is stopped.

Current control:

- If the inverter's current exceeds the cut-out value, the compressor speed reduces until it is below the same value.

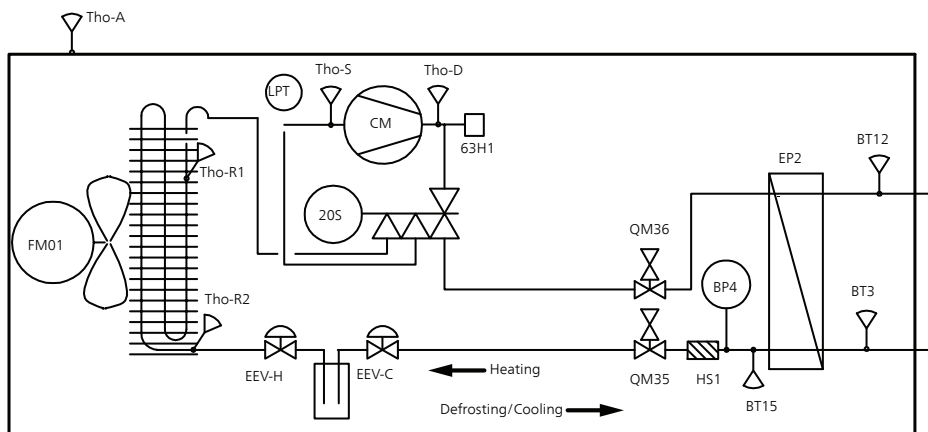
Size heat pump	Operating status	Cut-out value
F2040-8	Cooling	15 A
	Heating	16 A
F2040-12	Cooling	17 A
	Heating	17 A
F2040-16	Cooling	23 A
	Heating	25 A

Compressor stop at high current:

- This is to protect the inverter against too high current.
- When the current out from the inverter exceeds the cut-out value, the compressor stops.
- It then restarts after 3 minutes. If it occurs 4 times within 30 minutes, the compressor stops with error code "263". Restart by acknowledging the alarm.

Temperature and low pressure sensor

Main components cooling system



The outdoor unit's shift, outdoor and low pressure sensor:

If the following conditions are met for 5 seconds between 2 minutes and 2 minutes and 20 seconds after compressor start, the compressor stops:

- Shift temperature: less than -50 °C.
- Outdoor temperature: less than -30 °C.
- Low pressure switch: 0 V or less, or 4 V or more.

Hot gas and suction gas sensor:

If the following conditions occur for 5 seconds between 10 minutes and 10 minutes and 20 seconds after compressor start, the compressor stops.

- Hot gas temperature: less than -10 °C.
- Suction gas temperature: less than -50 °C.

Compressor stop with manual reset:

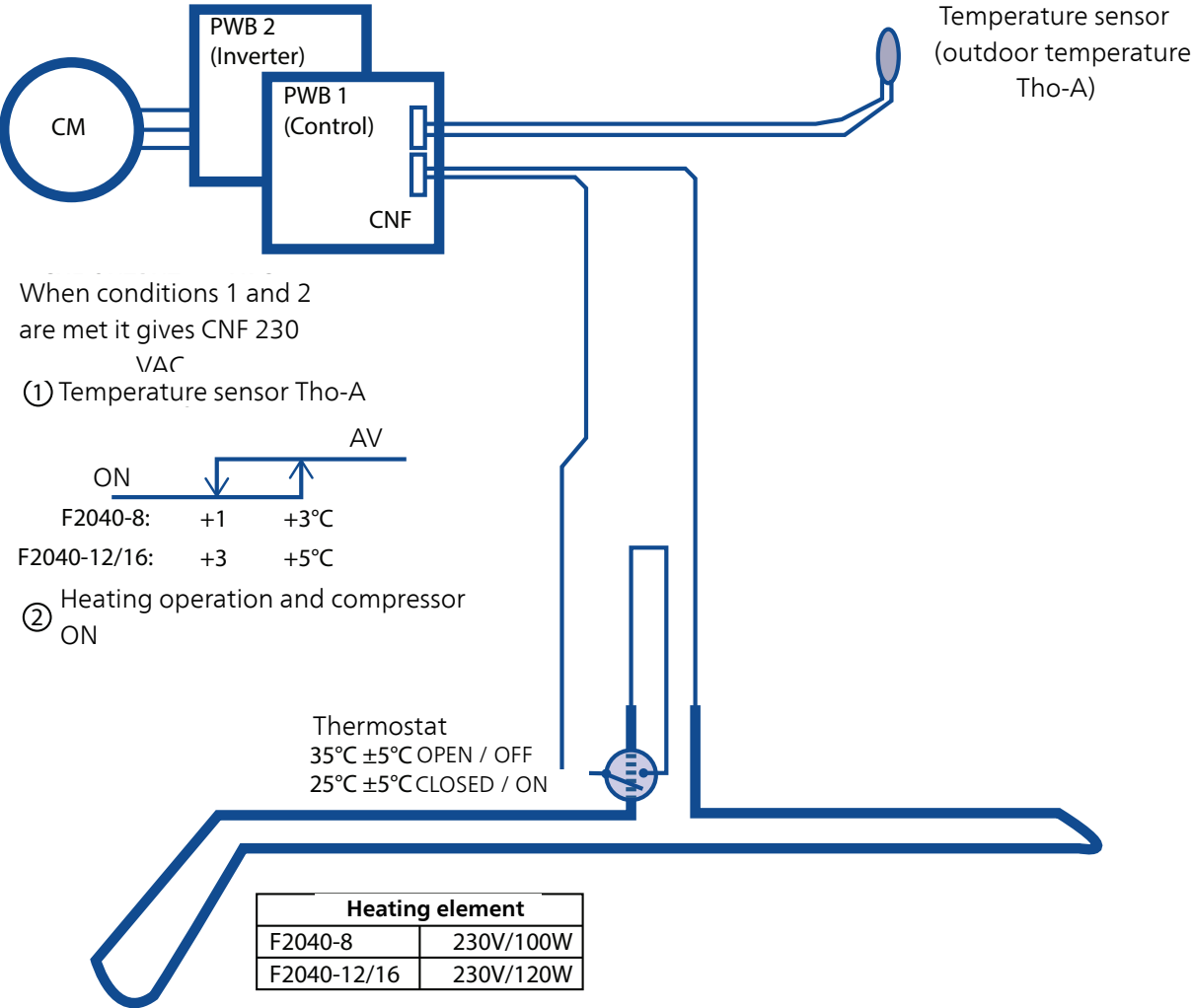
If the above occurs 3 times within 40 minutes, the compressor stops. Restart by acknowledging the alarm.

Drain pan heater

The drain pan heater is on when these conditions are met:

- Operating mode is heating.
- The compressor is in operation, and more than 30 minutes have passed since the compressor stopped.
- The outdoor temp. is less than +1 °C (F2040-8) or +3 °C (F2040-12/16).

Function drain pan heater



Pump down function

This function is to collect the refrigerant in the receiver when replacing the condenser.

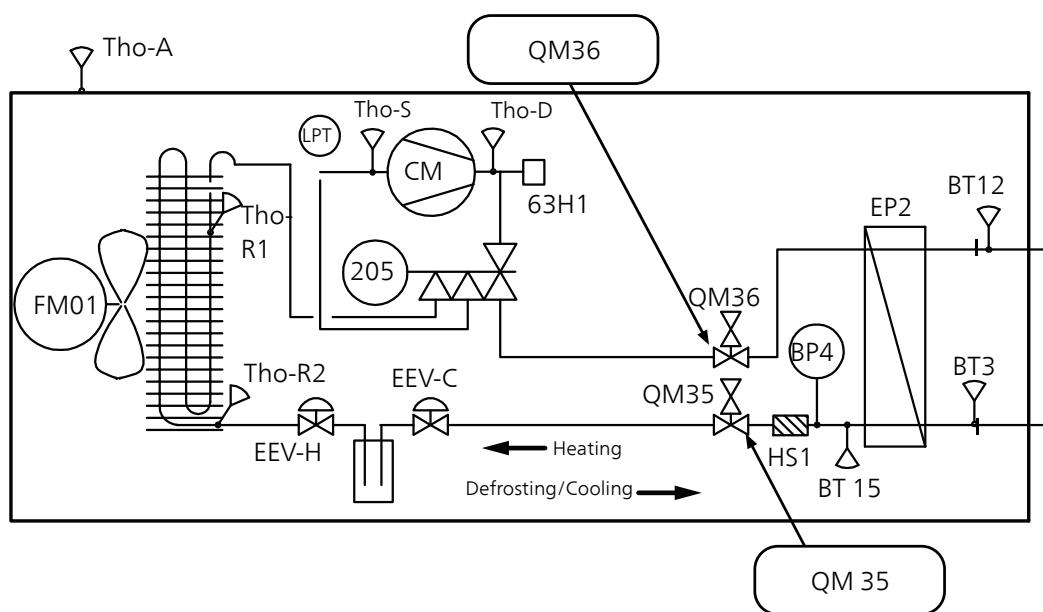
Indoor unit VVM 310 / VVM 320 / VVM 500

1. Switch off the indoor unit using the switch, to reset all time conditions.
2. Start and select operating mode. *Add. heat only* in menu 4.2.

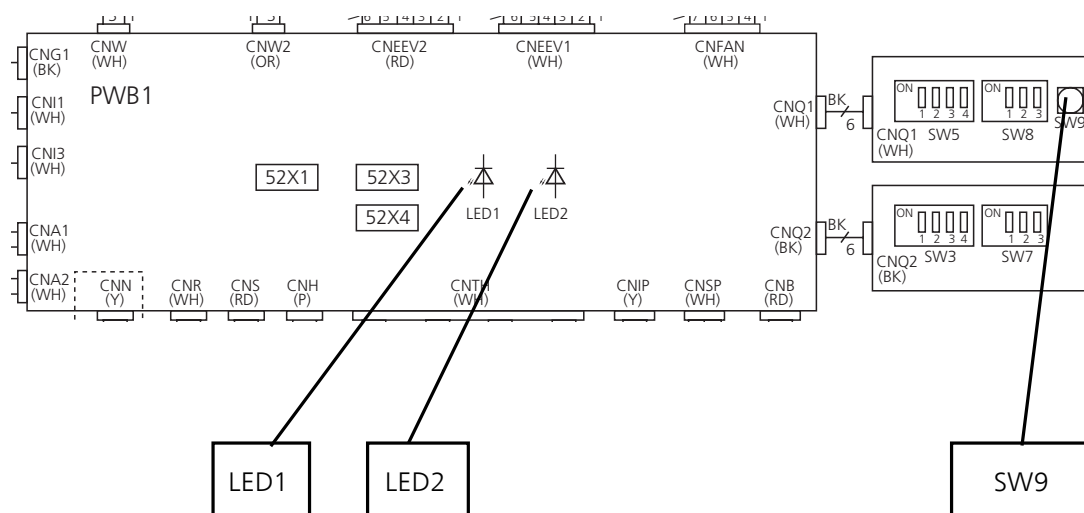
F2040

1. Remove the cover and front panel for the F2040.
2. Close fluid line valve 3/8" (QM35).
3. Press SW9 (F2040-8), SW1 (F2040-12/16) (see image p.29) on the control board for at least 2 seconds, within 10 minutes of the indoor unit being set to "additional heat only".

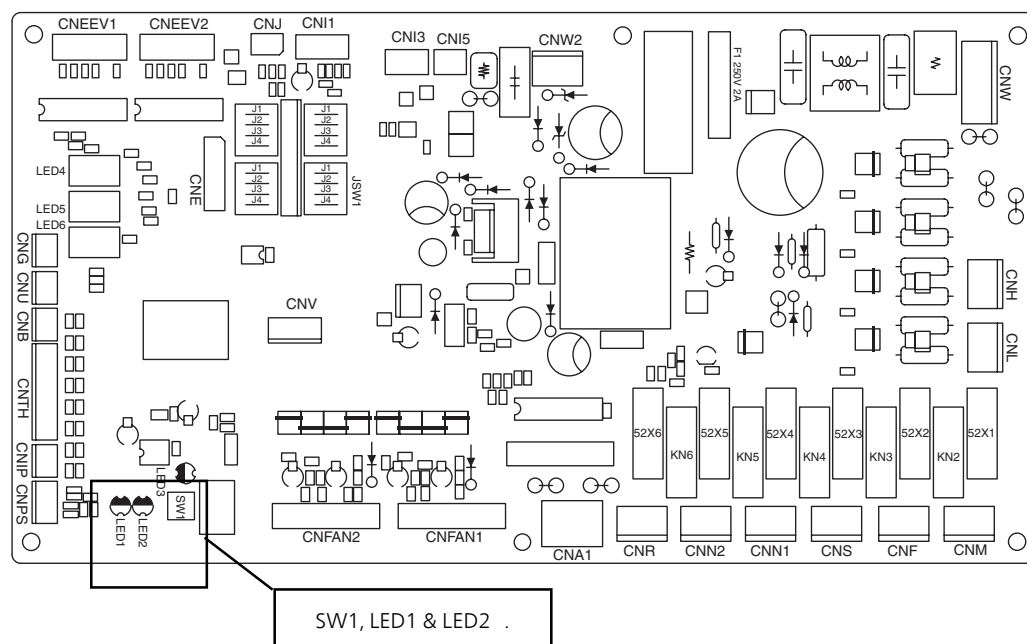
4. The compressor will shortly start in cooling mode process 2, then the compressor speed is locked at 62 rps for F2040-8, 55 rps for F2040-12 and 45 rps for F2040-16.
 - Both LED flash (red/green) continuously.
 - Both expansion valves are fully open.
5. The function stops when the LP is lower than 0.087 MPa (0.87 bar) for 5 seconds or more.
6. The process from point 2 is repeated again when the pressure rises above 0.087 MPa (0.87 bar)
7. When the pressure no longer rises after pump-down, close the suction gas valve 5/8" (QM36) when the LED 2 lights with constant red light and LED 1 flashes green.



PWB1, F2040-8



PWB1, F2040-12/16



The function stops after 5 minutes even if the low pressure reaches 0.087 MPa, or if an alarm occurs.

Silent mode

Name	Description	Menu
Silent mode	Activate start and stop time for silent mode. Activated in the connected indoor unit e.g. VVM or SMO	5.11.1.1.

The function allows the machine to run at a lower capacity to reduce the noise level during specified parts of the day. The time can be set in intervals of 15 minutes. If the start and stop time are the same, the function deactivates. Maximum time for running the function is 23 hours and 45 minutes. During the stated period the compressor and fan capacity are limited according to the table below

	"Silent mode" Heating and cooling	
F2040	Compressor speed	Fan speed
8 kW	81 Hz	600
12 kW	60 Hz	600
16 kW	65 Hz	560

5 Component description

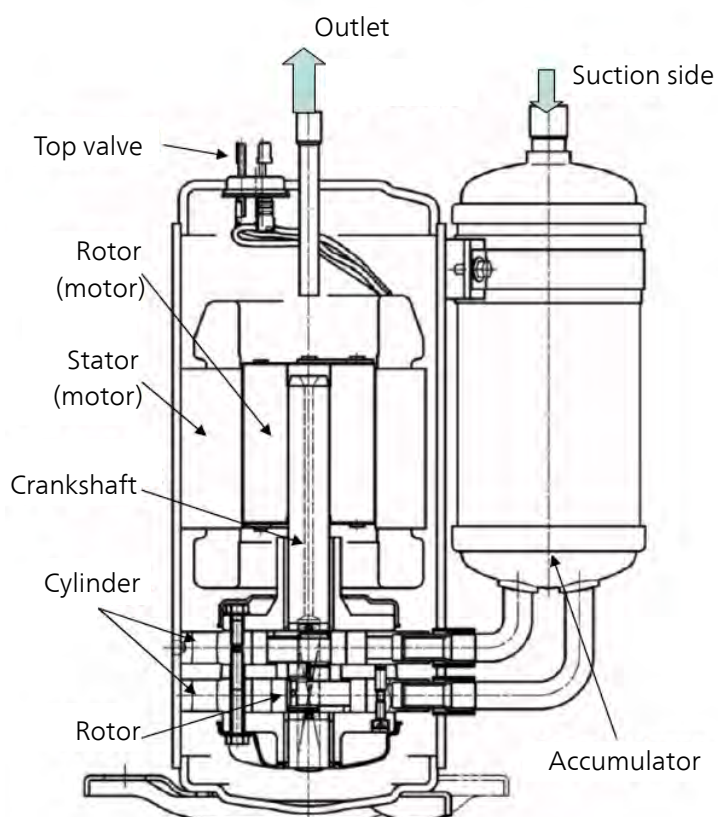
Compressor (GQ10)

Size	Type	Winding resistance*	Max operating current
8 kW	Twin Rotary	1.154 Ω	15 A
12 kW	Twin Rotary	0.293 Ω	22 A
16 kW	Twin Rotary	0.293 Ω	25 A

* at 20 °C +/- 10 %

Size	Type of oil	Oil volume
8 kW	MA68	0.68 l
12 kW	MA68	0.9 l
16 kW	MA68	0.9 l

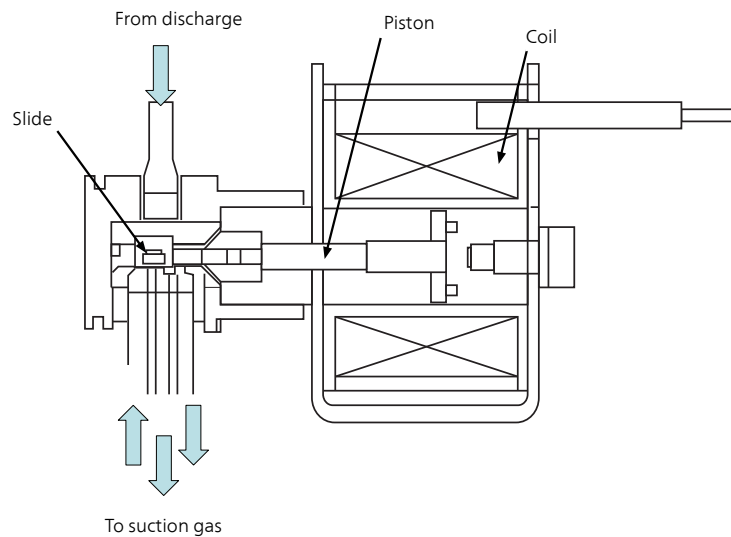
Cut-out value high hot gas	Automatic reset temp. alarm <i>High hotgas</i>
115 °C	85 °C



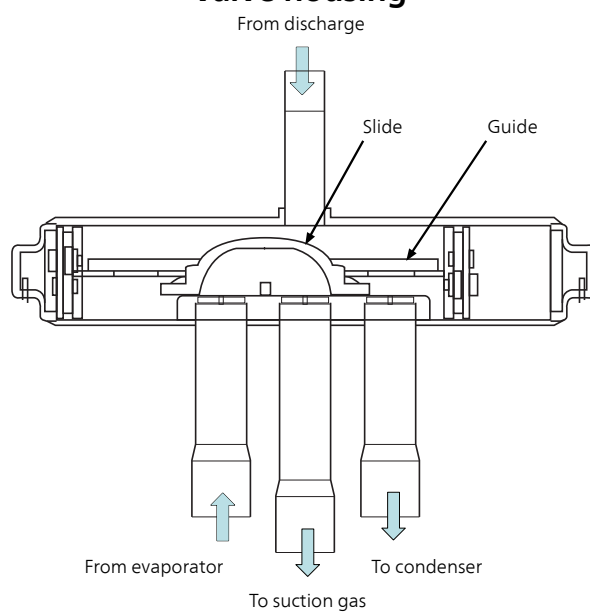
4-way valve

4-way valve

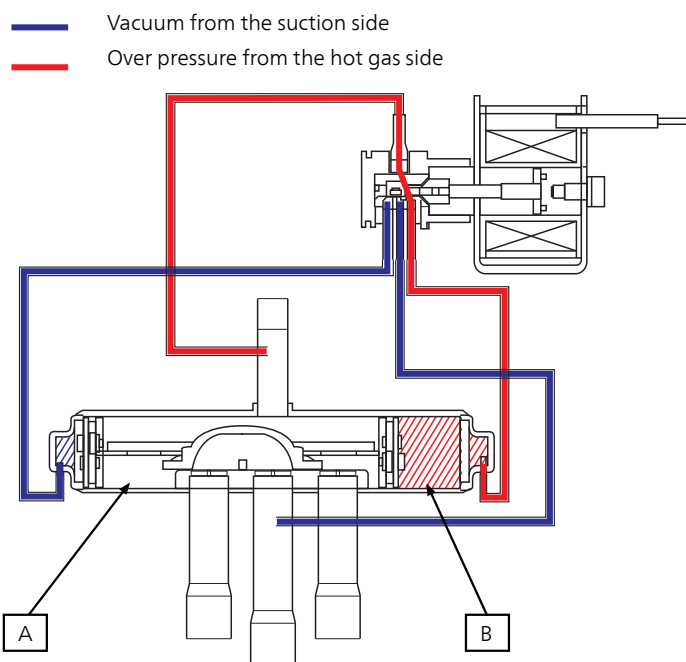
Coil and pilot valve for 4 way valve



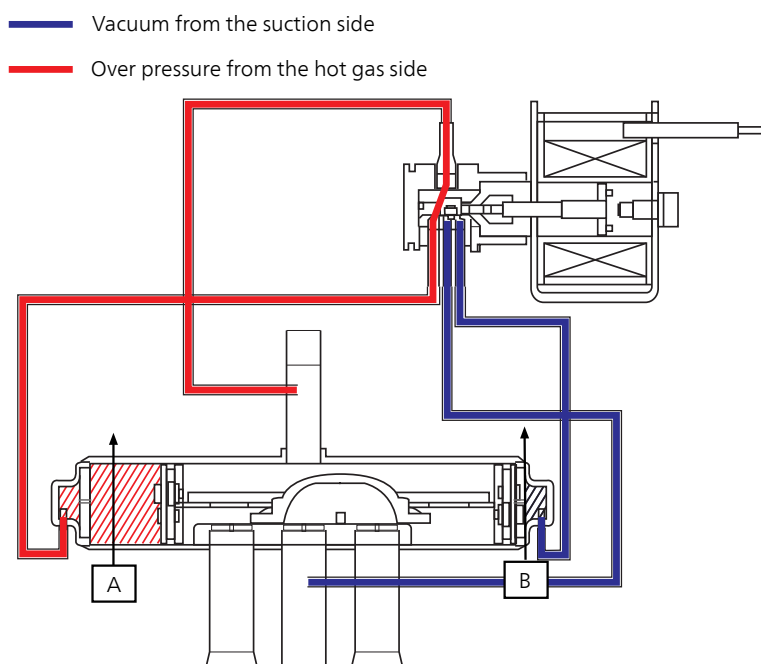
Valve housing



4-way valve function



1. When the current is broken a spring presses the piston to the left.
2. This opens the gas pressure to chamber B and releases the pressure in chamber A.
3. The slide moves to the left which changes how the refrigerant moves. In this case it runs directly from evaporator to suction gas.



1. When the current is switched on a solenoid pulls the piston to the right.
2. This opens the gas pressure to chamber A and releases the pressure in chamber B.
3. The slide moves to the right which changes how the refrigerant moves. In this case it runs directly from suction gas to condenser.

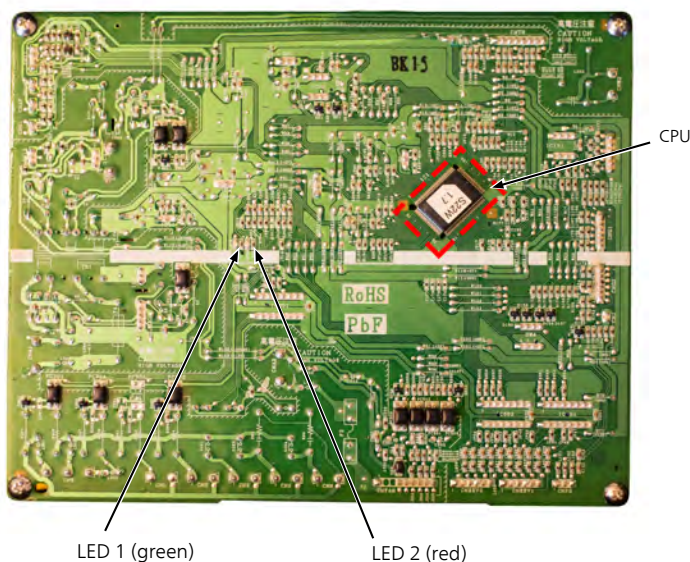
Circuit board

Control board (PWB1)

PWB1 8kW (upper side)

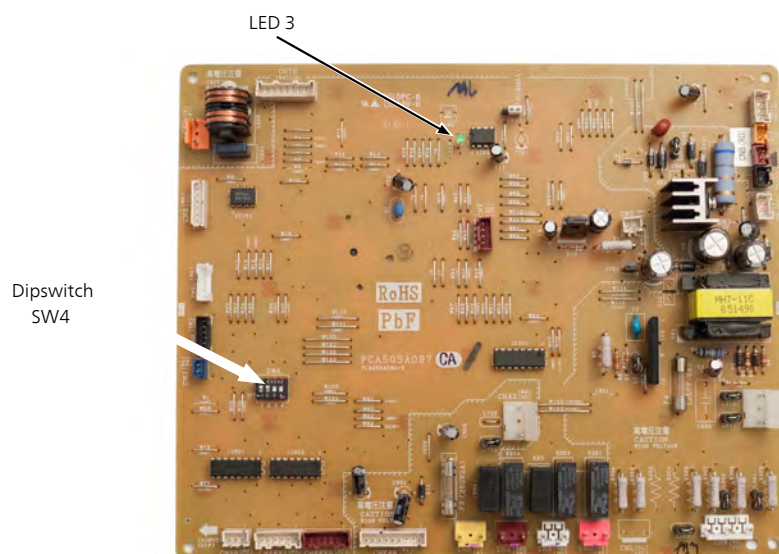
The outdoor unit program is here.

All inputs and outputs for the machine's control functions are connected here.

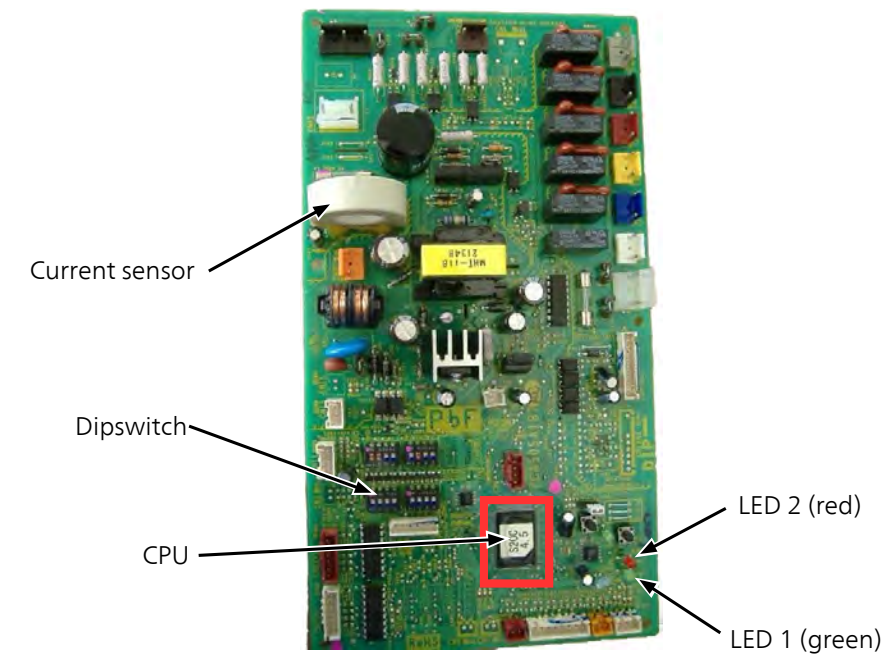


LED 1 (green)	Lit = Normal condition, supply ok.
LED 2 (red)	Flashes = Alarm indication

PWB1 8kW (underside)



LED 3 (green)	Only flashes during software programming.
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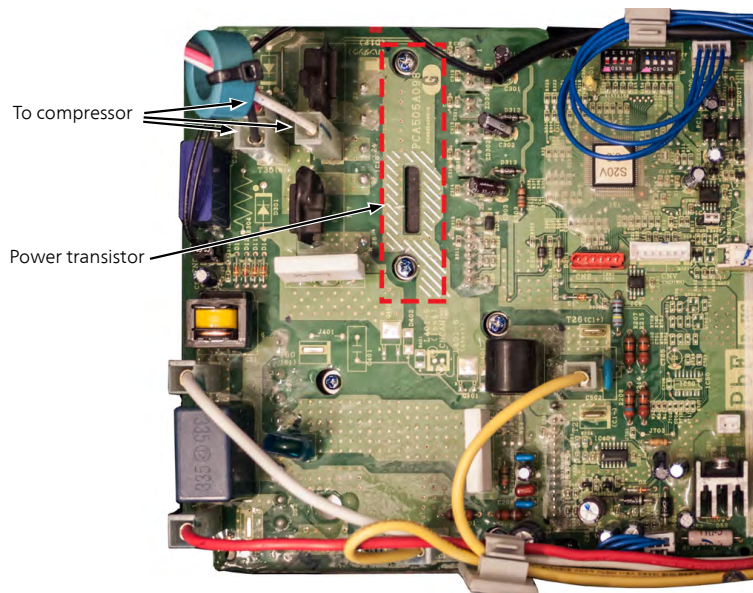


LED 1 (green)	Lit = Normal condition, supply ok.
LED 2 (red)	Flashes = Alarm indication

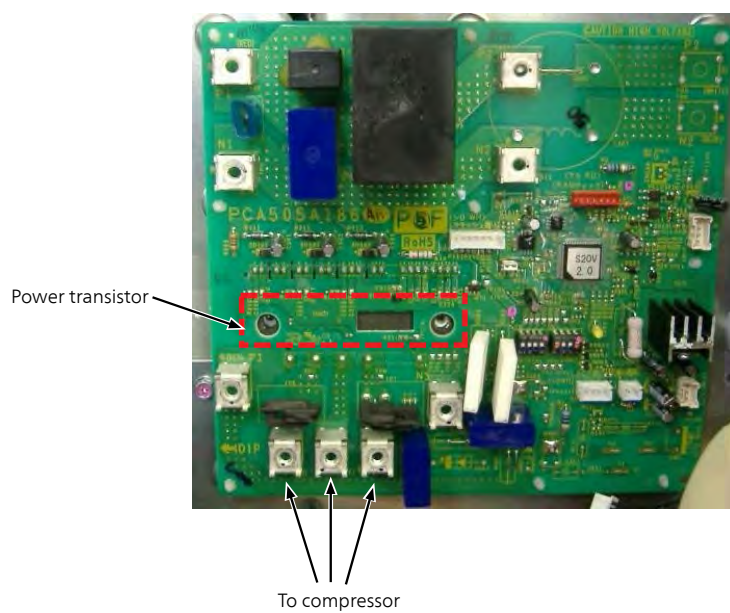
Inverter (PWB2)

Controls the voltage to the compressor.

PWB2 8kW



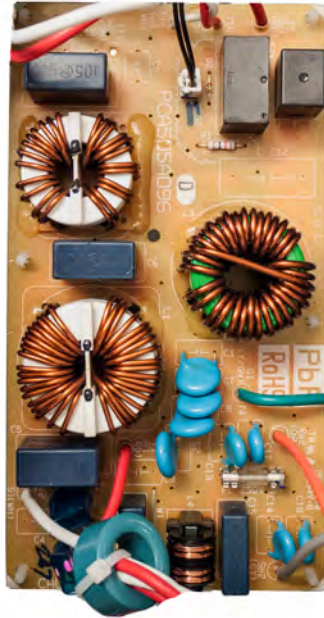
PWB2 12/16 kW



Suppressor filter (PWB3)

PWB3 minimises interruption.

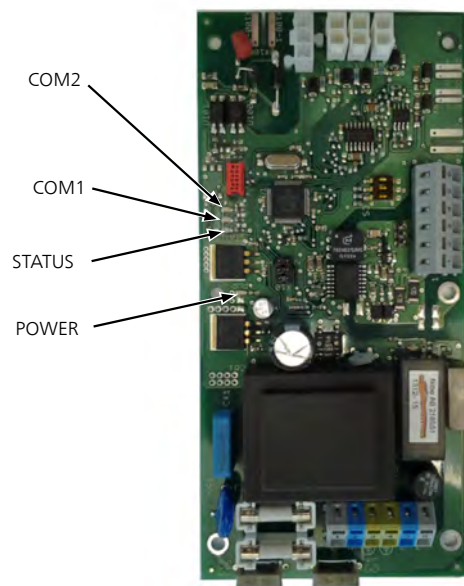
PWB3 8 kW



PWB3 12/16 kW



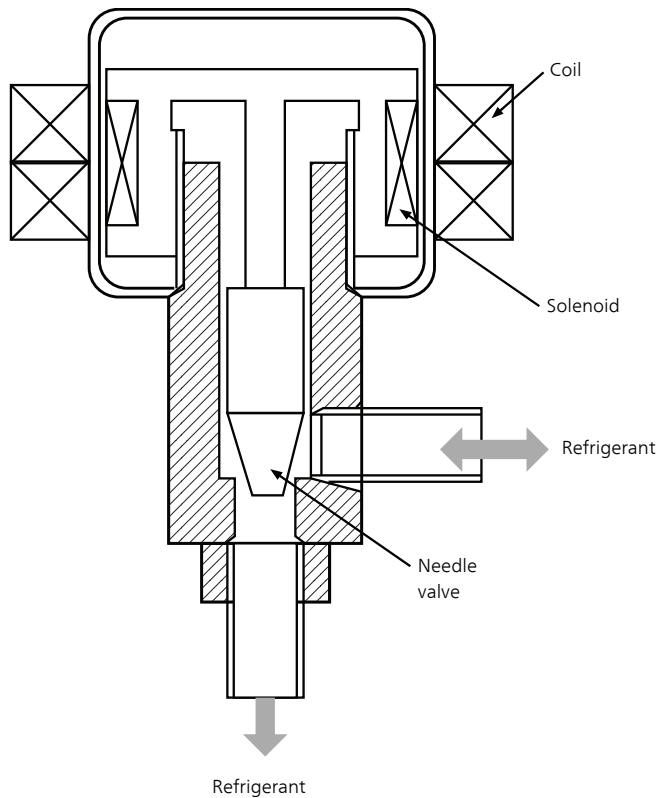
Communication board (AA23)



LED	Status
Status	Flashes=OK
Power	Lit=12V OK
COM1	Flashes=All OK to indoor unit
COM2	Flashes=All OK to outdoor unit

Expansion valve

- The refrigerant is vaporised by reducing the ambient pressure.
- The expansion valve controls the liquid refrigerant flow (480 pulses from completely open to completely closed).



Other components

Component	Pressure range	Working temp.	Connection
High pressure switch (BP1) (63H1)	Breaking value: 41.5 bar Max pressure: 45 bar (4.5 MPa) Reset value: 31.5 bar	-30 – +85 °C	Soldered connection
High pressure sensor (BP4)	1 – 46 bar (0.1 – 4.6 MPa)	Surrounding area: -30 – +100 °C Measurement medium: -30 – +120 °C	1/4" flare connection with Schrader valve.
Low pressure sensor (LPT)	Cut-out value 0.79 bar Reset value: 1.75 bar		1/4" flare connection with Schrader valve,

Component	Ohm	Output	Voltage
F2040-8: Bottom drain pan heater (EB 11)	529 Ω	100 W	230 V

Component	Ohm	Output	Voltage
F2040-12/16: Bottom drain pan heater (EB 11)	440 Ω	120 W	230 V

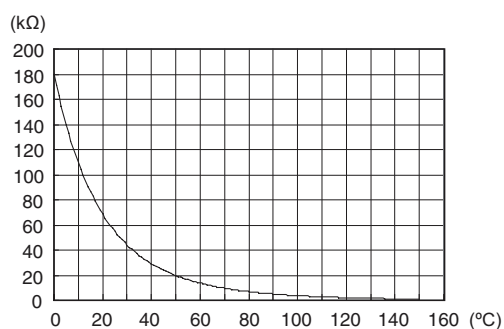
Component	Off	On
Thermostat drain pan heater	35 °C	25 °C (+/- 5 °C)

Component	Ampere	Output
Fuse external heating cable (F3)	250 mA	max 45 W

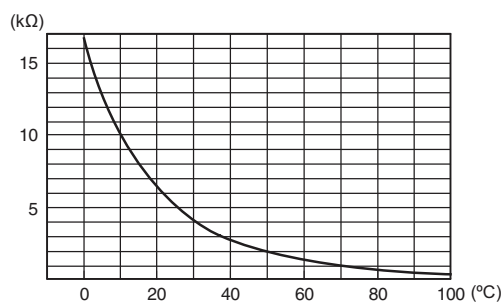
Sensors

Data for temperature sensor in F2040

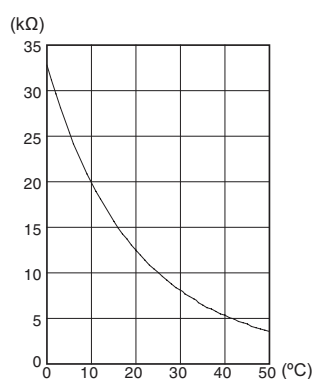
Tho-D



Tho-S, Tho-R1, Tho-R2



Tho-A



Data for return line temperature sensor (BT3), condensor supply (BT12) and fluid pipe (BT15)

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

Reference designation

Name	Description	Sensor type
BP1 (HP) (63H1)	High pressure pressostat	Pressure switch with break value of 41.5 bar
BP2 (LP) (LPT)	Low pressure pressostat	Pressure switch with break value of 0.79 bar
BP4 (HP)	High pressure sensor	
BT3 (T_{return})	Temperature sensor, condenser return line	"EMMY standard sensor"
BT12 (T_{supply})	Temperature sensor, condenser supply line	"EMMY standard sensor"
BT15 (T_{liquid})	Temperature sensor, fluid pipe	"EMMY standard sensor"

Settings DIP Switch

8kW

Control board

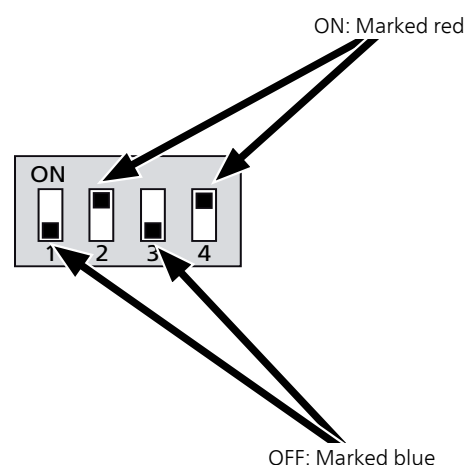
Switches	Factory setting	Notes
SW3-1*	OFF	*See the table below
SW3-2*	OFF	*See the table below
SW3-3	OFF	
SW3-4	ON	
SW4-1	ON	
SW4-2	ON	
SW4-3	OFF	
SW4-4	OFF	
SW5-1	OFF	
SW5-2	OFF	
SW5-3	OFF	
SW5-4	OFF	
SW7-1	OFF	
SW7-2	OFF	
SW7-3	OFF	
SW8-1	OFF	
SW8-2	OFF	
SW8-3*	OFF	*See the table below
SW9*	OFF	Pushbutton

*DIP-Switch Function

Switch	Function	Setting	
		OFF	ON
SW3-1	Defrosting	Normal	Cold region
SW3-2	Snow guard monitor	Normal	Snow guard
SW8-3	Short compressor start delay	30 minutes	5 minutes
SW9	Pump down		

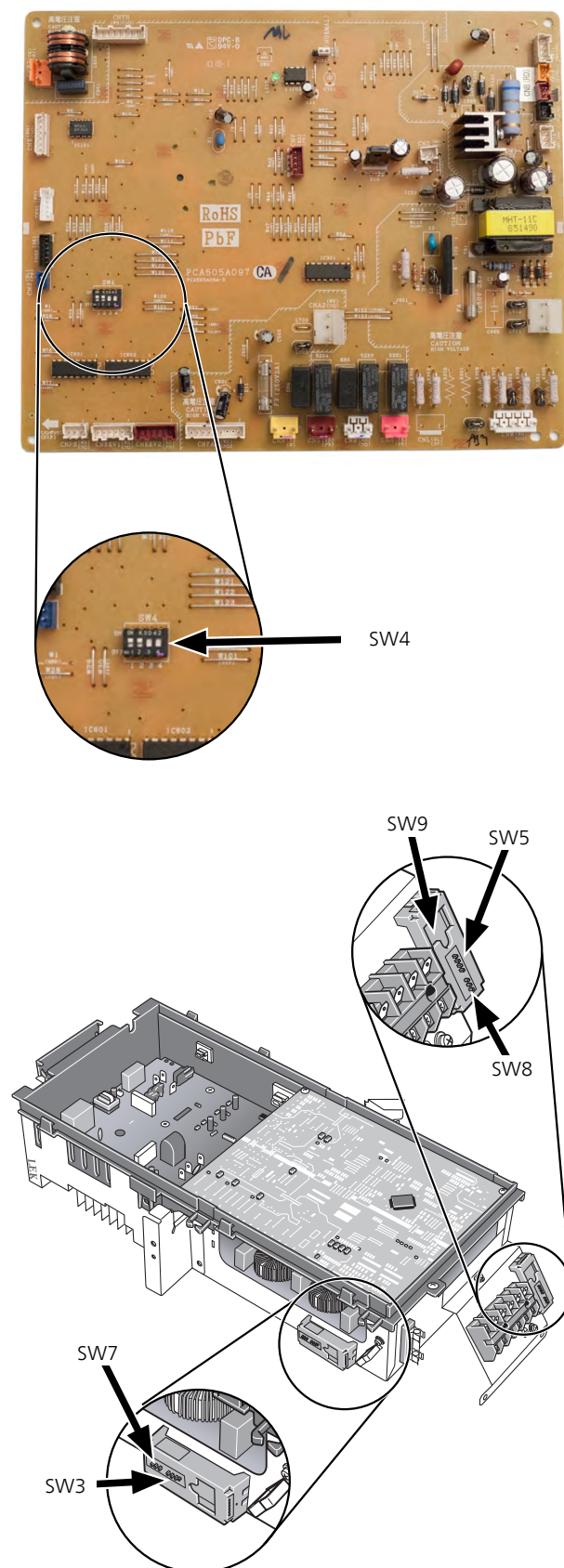
NOTE DIP-Switch markings-Only on original board

The voltage to the outdoor unit must always be switched off before the DIP switches' settings are changed. When replacing the control board, set the DIP switches in the same position as the previous setting or according to factory settings.



F2040-8

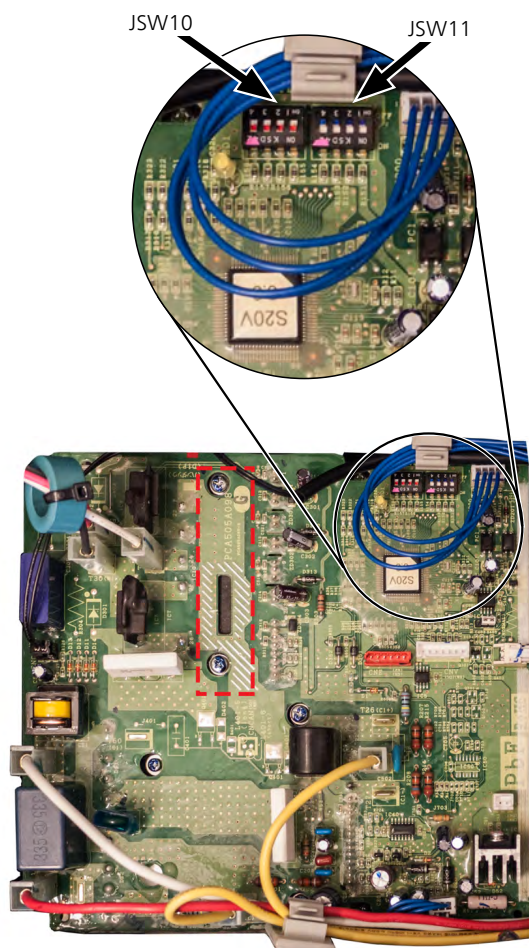
PWB1 8kW (underside)



Inverter board

Switches	Factory setting
JSW10-1	OFF
JSW10-2	OFF
JSW10-3	OFF
JSW10-4	OFF
JSW11-1	ON
JSW11-2	ON
JSW11-3	ON
JSW11-4	ON

PWB2 8kW



12 kW and 16 kW

Control board

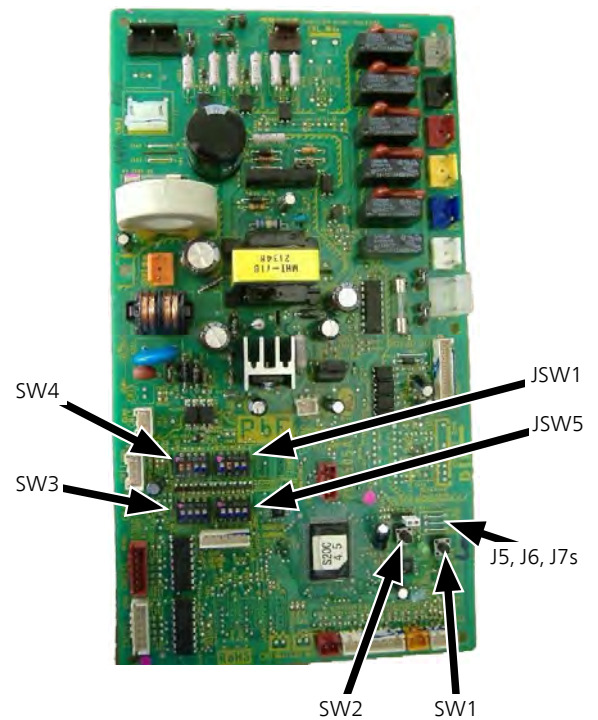
Switches	Factory setting		Notes
	12kW	16kW	
SW1*	OFF	OFF	Pushbutton
SW2*	OFF	OFF	Pushbutton
JSW1-1	OFF	OFF	
JSW1-2	OFF	ON	
JSW1-3	OFF	OFF	
JSW1-4	OFF	OFF	
SW3-1*	OFF	ON	*See the table below
SW3-2*	OFF	ON	*See the table below
SW3-3	OFF	OFF	
SW3-4	OFF	OFF	
SW4-1	ON	ON	
SW4-2	ON	ON	
SW4-3	OFF	OFF	
SW4-4	ON	ON	
SW5-1	OFF	OFF	
SW5-2	ON	ON	
SW5-3*	OFF	ON	*See the table below
SW5-4	OFF	OFF	
J5**	ON		
J6**	ON		
J7**	ON		

*DIP-Switch Function

Switch	Function	Setting	
		OFF	ON
SW1	Pump down		
SW2	Board reset		
SW3-1	Defrosting	Normal	Cold region
SW3-2	Snow guard monitor	Normal	Snow guard
SW5-3	Short compressor start delay	30 minutes	5 minutes

** Original board has a jumper
Replacement part board has DIP-Switch

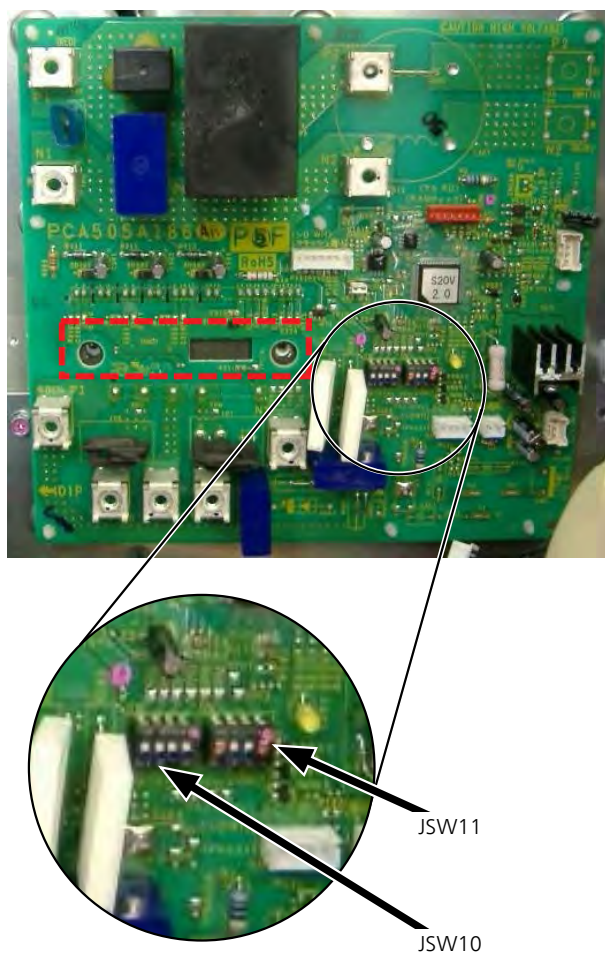
PWB1 12/16 kW



Inverter board

Switches	Factory setting	
	12kW	16kW
JSW10-1	OFF	OFF
JSW10-2	OFF	OFF
JSW10-3	OFF	OFF
JSW10-4	OFF	OFF
JSW11-1	ON	OFF
JSW11-2	OFF	OFF
JSW11-3	OFF	ON
JSW11-4	ON	ON

PWB2 12/16 kW



6 Troubleshooting

Disturbances in comfort



NOTE

Work behind covers secured by screws may only be carried out by, or under the supervision of, a qualified installation engineer.



NOTE

As F2040 can be connected to a large number of external units, these should also be checked.



NOTE

In the event of action to rectify malfunctions that require work within screwed hatches the incoming electricity must be isolated at the safety switch.

There is no danger in acknowledging an alarm because as long as the cause remains the alarm will return.

Alarm codes are displayed in the connected indoor unit, see alarm list for connected indoor unit.

The following tips can be used to rectify the interference:

Basic actions

Start by checking the following possible fault sources:

- That the heat pump is running or that the supply cable to F2040 is connected.
- Group and main fuses of the accommodation.
- The property's earth circuit breaker.
- The heat pump's motor circuit breaker (F).

Low hot water temperature or a lack of hot water

This part of the fault-tracing chapter only applies if the heat pump is docked to the hot water heater.

- Large hot water consumption.
 - Wait until the hot water has heated up.
- Incorrect settings in the NIBE indoor module.
 - See the manual for the indoor module.

Low room temperature

- Closed thermostats in several rooms.
 - Set the thermostats to max in as many rooms as possible.
- External switch for changing the room heating activated.
 - Check any external switches.
- Incorrect settings in NIBE SMO or NIBE indoor module
 - See the manual for the indoor module.

High room temperature

- External switch for changing the room heating activated.
 - Check any external switches.
- Incorrect settings in NIBE SMO or NIBE indoor module

- See the manual for the indoor module.

F2040 is not operational

F2040 communicates all alarms to the indoor module.

- Ensure that the F2040 is connected to the power source.
- Check the indoor module. See section "Disturbances in comfort" in the installation manual for the indoor module.

F2040 does not communicate

- Check that the addressing of F2040 is correct.
- Check that the communication cable has been connected.

Alarm list

Acknowledging alarms

No harm in acknowledging an alarm. If the cause of the alarm remains, the alarm recurs.

- Alarm codes are displayed in the connected indoor unit, see alarm list for connected indoor unit.



NOTE

Recurring alarms mean that there is a fault in the installation.

F2040 alarm

Following alarm blocks outdoor unit. Addition runs at min permitted supply temperature.

Alarm no. in-door unit	Alarm text on the display	Description	May be due to
3	Sensor fault BT3	Sensor fault. Sensor for incoming cold water in F2040 (BT3).	- Open-circuit or short-circuit on sensor input. - Sensor does not work (see "Disturbances in comfort" section) - Defective control board AA23 in F2040.
12	Sensor fault BT12	Sensor fault. Sensor for outgoing water in F2040 (BT12).	- Open-circuit or short-circuit on sensor input. - Sensor does not work (see "Disturbances in comfort" section) - Defective control board AA23 in F2040.
15	Sensor fault BT15	Sensor fault. Sensor fluid line in F2040 (BT15).	- Open-circuit or short-circuit on sensor input. - Sensor does not work (see "Disturbances in comfort" section) - Defective control board AA23 in F2040.
162	High condenser out.	Too high temperature out from the condenser. Self resetting.	- Low flow in heating operation. - For high set temperatures.
163	High condenser in.	Too high temperature in to the condenser. Self resetting.	Temperature generated by another heat source.
183	Defrosting in progress.	No alarm without an operating status.	Set when the heat pump runs the defrosting procedure.
220	HP alarm	The high pressure pressostat (63H1) deployed 5 times within 60 minutes or under 60 minutes continuously.	- Insufficient air circulation or blocked heat exchanger - Open circuit or short circuit on input for high pressure pressostat (63H1) - Defective high pressure pressostat - Expansion valve not correctly connected - Service valve closed - Defective control board in F2040 - Low or no flow during heating operation - Defective circulation pump - Defective fuse, F(4A)
221	LP alarm	Too low value on the low pressure transmitter 3 times within 60 minutes.	- Open circuit or short circuit on input for low pressure transmitter - Defective low pressure transmitter - Defective control board in F2040 - Open circuit or short circuit on input for suction gas sensor (Tho-S) - Defective suction gas sensor (Tho-S)

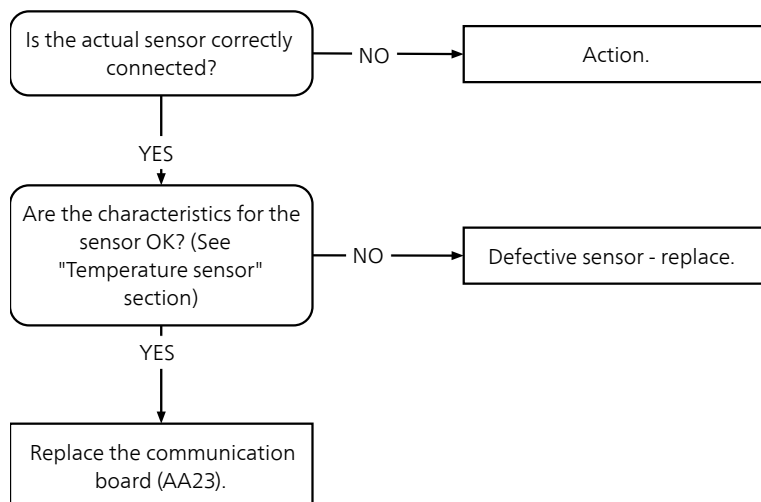
Alarm no. in-door unit	Alarm text on the display	Description	May be due to
223	OU Com. error	Communication between the control board and the communication board is interrupted. There must be 22 volt direct current at the connector CNW2 on the control board (PWB1).	- Any isolator switches for F2040 off - Incorrect cable routing
224	Fan alarm	Deviations in the fan speed in F2040.	- The fan cannot rotate freely - Defective control board in F2040 - Defective fan motor - Control board in F2040 dirty - Fuse (F2) blown
230	Permanent Hot-gas	Temperature deviation on the hot gas sensor (Tho-D) two times within 60 minutes or for 60 minutes continuously.	- Sensor does not work (see "Temperature sensor" section) - Insufficient air circulation or blocked heat exchanger - If the fault persists during cooling, there may be an insufficient amount of refrigerant. - Defective control board in F2040
254	Communication error.	Communication fault with accessory card.	- F2040 unpowered. - Fault in the communication cable.
261	High HX temp	Temperature deviation on the hot gas sensor (Tho-R1/R2) five times within 60 minutes or for 60 minutes continuously.	- Sensor does not work (see "Disturbances in comfort" section) - Insufficient air circulation or blocked heat exchanger - Defective control board in F2040 - Too much refrigerant
262	Power transistor too hot	When IPM (Intelligent power module) displays FO-signal (Fault Output) five times during a 60-minute period.	Can occur when 15V power supply to the inverter PCB is unstable.
263	Inverter error	Voltage from the inverter outside the parameters four times within 30 minutes.	- Incoming power supply interference - Service valve closed - Insufficient amount of refrigerant - Compressor fault - Defective circuit board for inverter in F2040
264	Inverter error	Communication between circuit board for inverter and control board broken.	- Open-circuit in connection between boards - Defective circuit board for inverter in F2040 - Defective control board in F2040
265	Inverter error	Continuous deviation on power transistor for 15 minutes.	- Defective fan motor - Defective circuit board for inverter in F2040

Alarm no. indoor unit	Alarm text on the display	Description	May be due to
266	Insufficient refrigerant	Insufficient refrigerant is detected upon start-up in cooling mode.	- Service valve closed - Loose connection sensor (BT15, BT3) - Defective sensor (BT15, BT3) - Too little refrigerant
267	Inverter error	Failed start for compressor	- Defective circuit board for inverter in F2040 - Defective control board in F2040 - Compressor fault
268	Inverter error	Overcurrent, Inverter A/F module	- Sudden power failure
271	Cold outdoor air.	Temperature of BT28 below the value that permits operation.	- Cold weather conditions - Sensor fault.
272	Hot outdoor air.	Temperature of BT28 above the value that permits operation.	- Warm weather conditions. - Sensor fault.
277	Sensor fault Tho-R	Sensor fault, heat exchanger in F2040 (Tho-R).	- Open-circuit or short-circuit on sensor input - Sensor does not work (see "Disturbances in comfort" section) - Defective control board in F2040
278	Sensor fault Tho-A	Sensor fault, outdoor sensor in F2040 (Tho-A).	- Open-circuit or short-circuit on sensor input - Sensor does not work (see "Disturbances in comfort" section) - Defective control board in F2040
279	Sensor fault Tho-D	Sensor fault, hot gas in F2040 (Tho-D).	- Open-circuit or short-circuit on sensor input - Sensor does not work (see "Disturbances in comfort" section) - Defective control board in F2040
280	Sensor fault Tho-S	Sensor fault, suction gas in F2040 (Tho-S).	- Open-circuit or short-circuit on sensor input - Sensor does not work (see "Disturbances in comfort" section) - Defective control board in F2040
281	Sensor fault LPT	Sensor fault, low pressure transmitter in F2040.	- Open-circuit or short-circuit on sensor input - Sensor does not work (see "Disturbances in comfort" section) - Defective control board in F2040 - Fault in the refrigerant circuit
294	Incompatible outdoor unit.	Faulty combination of indoor and outdoor units.	Incorrectly set DIP switches on circuit board in outdoor unit.
404	Sensor flt BP4	Sensor fault. Sensor high pressure heating/low pressure cooling in F2040 (BP4).	- Open-circuit or short-circuit on sensor input. - Sensor does not work (see "Disturbances in comfort" section). - Defective control board AA23 in F2040.

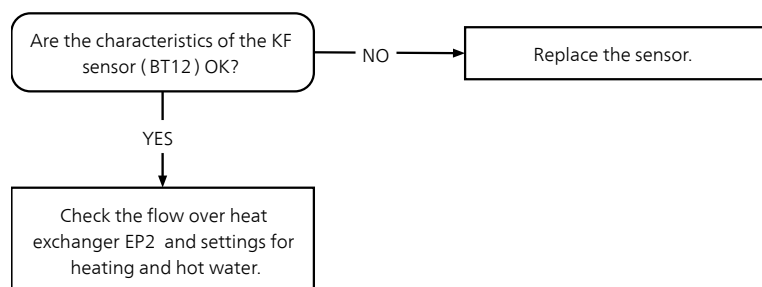
Alarm no. in-door unit	Alarm text on the display	Description	May be due to
998	Starts	Display has restarted.	Temporary dip in power supply.

Troubleshooting guide

3 - Sensor fault BT3, 12 - Sensor fault BT12, 15 - Sensor fault BT15

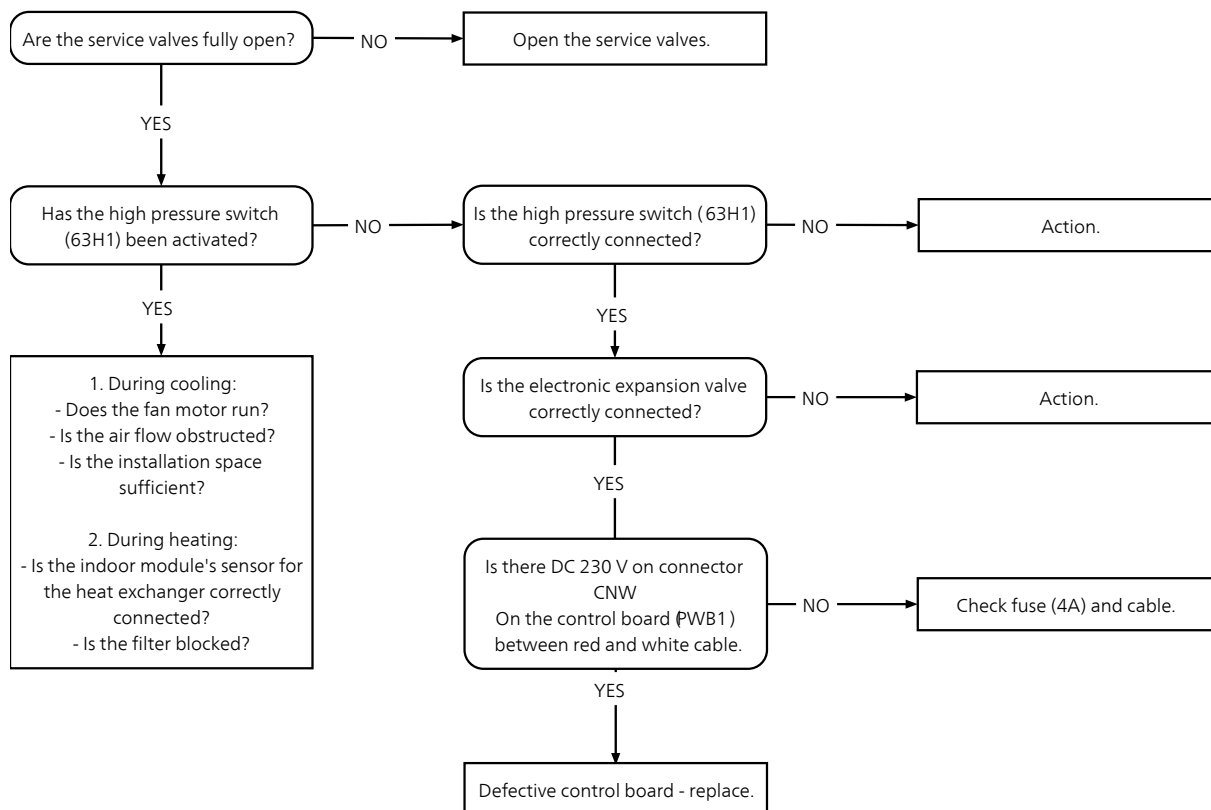


162 - High condenser out

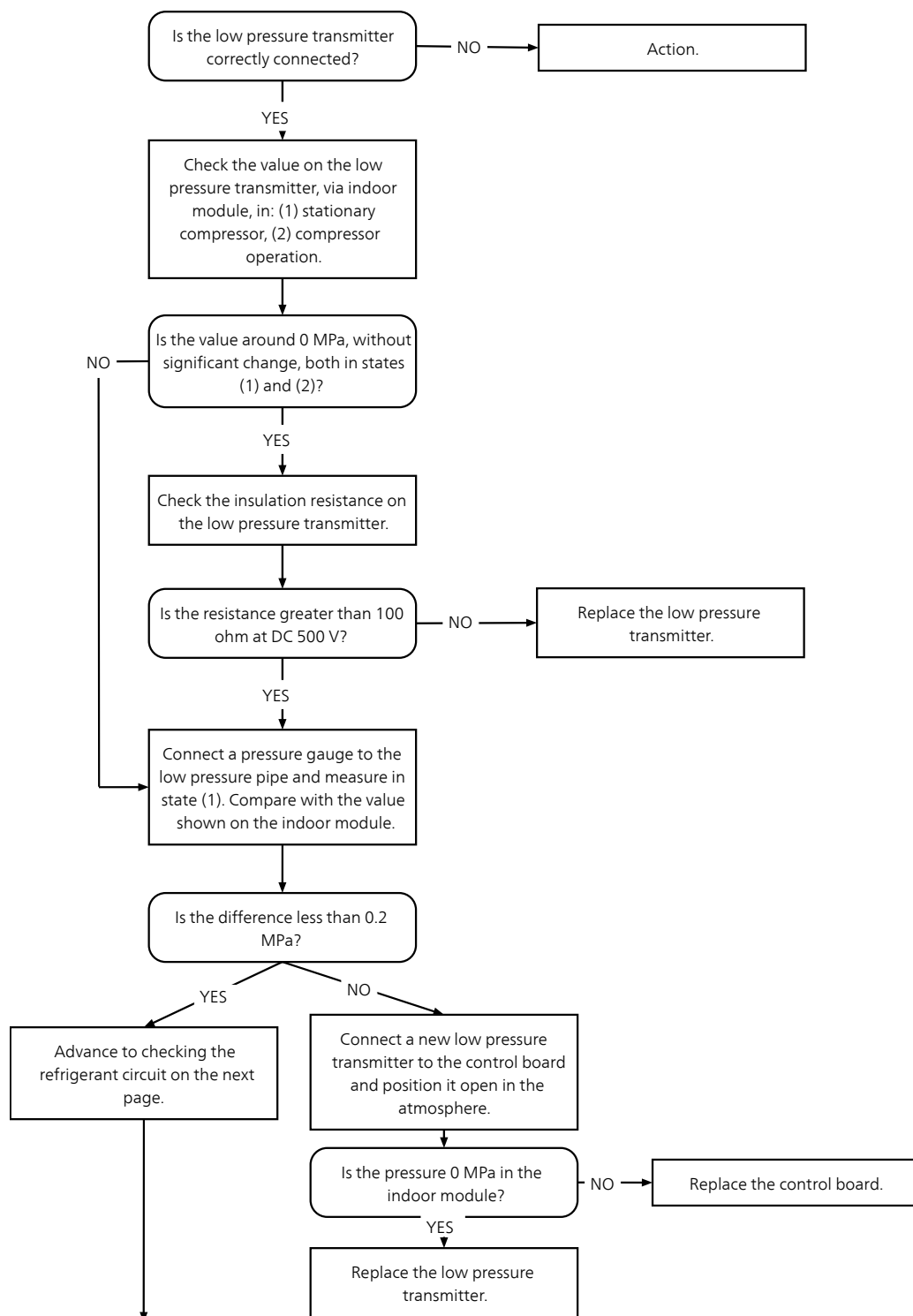


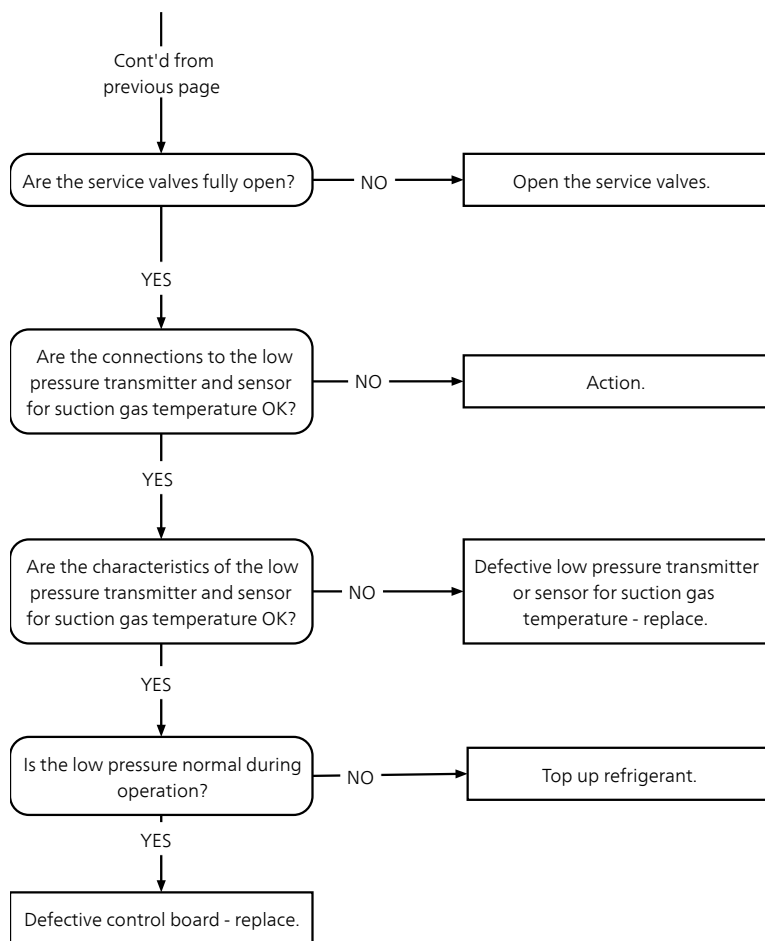
220 - HP alarm

If the voltage supply to the outdoor unit is switched off and on too quickly, 220 may be displayed. This is normal.



221 - LP alarm

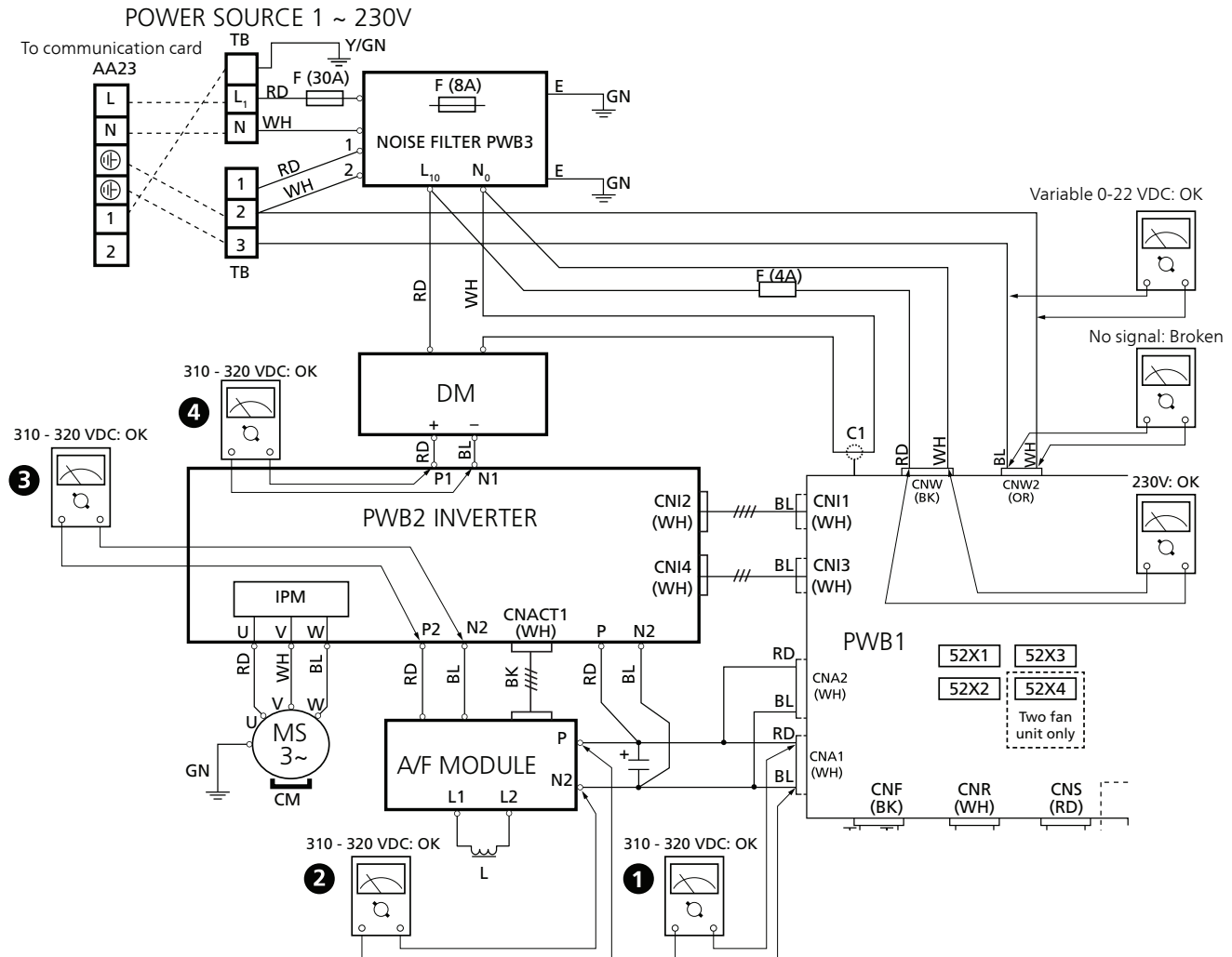




223 - OU com error

223 OU com error

Test points when PWB1 Control is "dead", no LED lit.

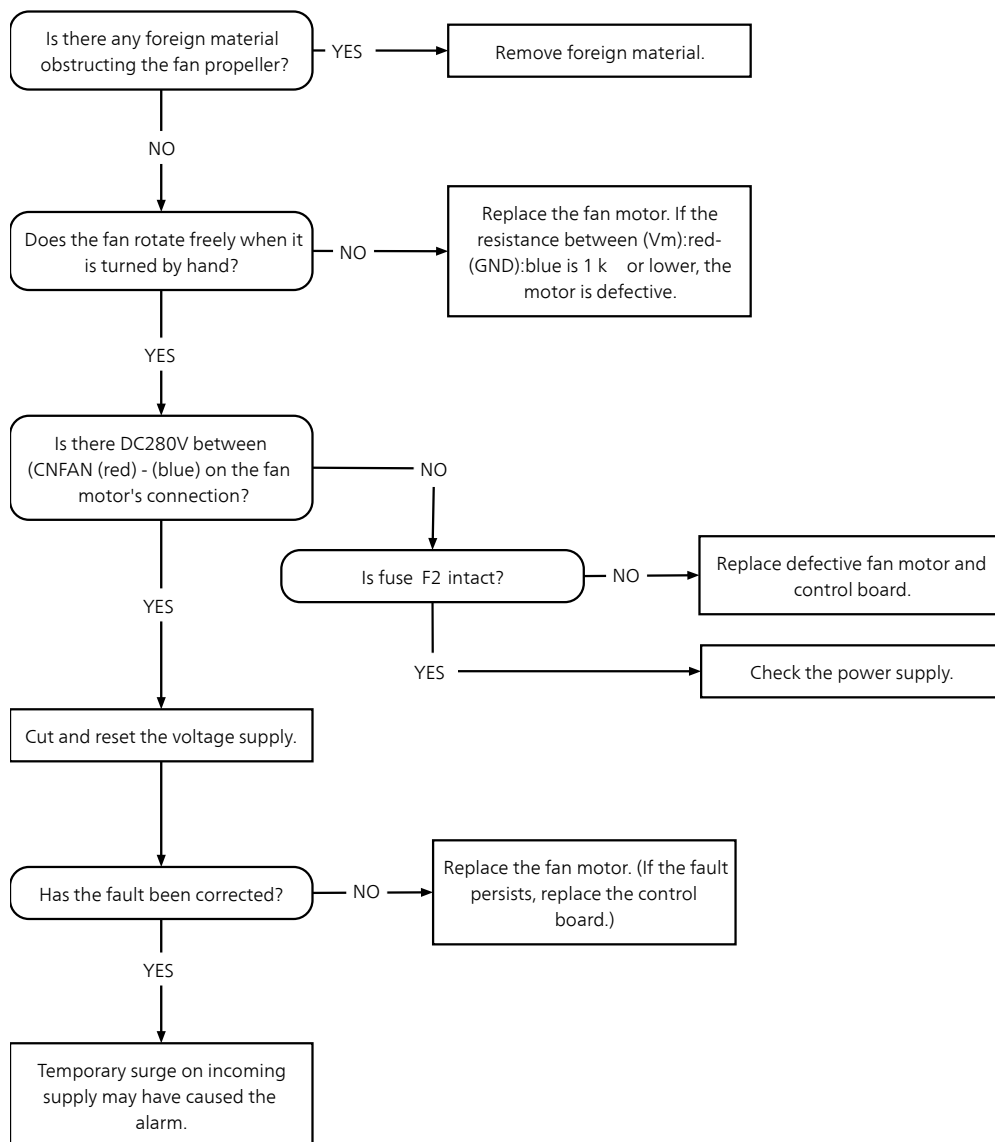


Check the following:

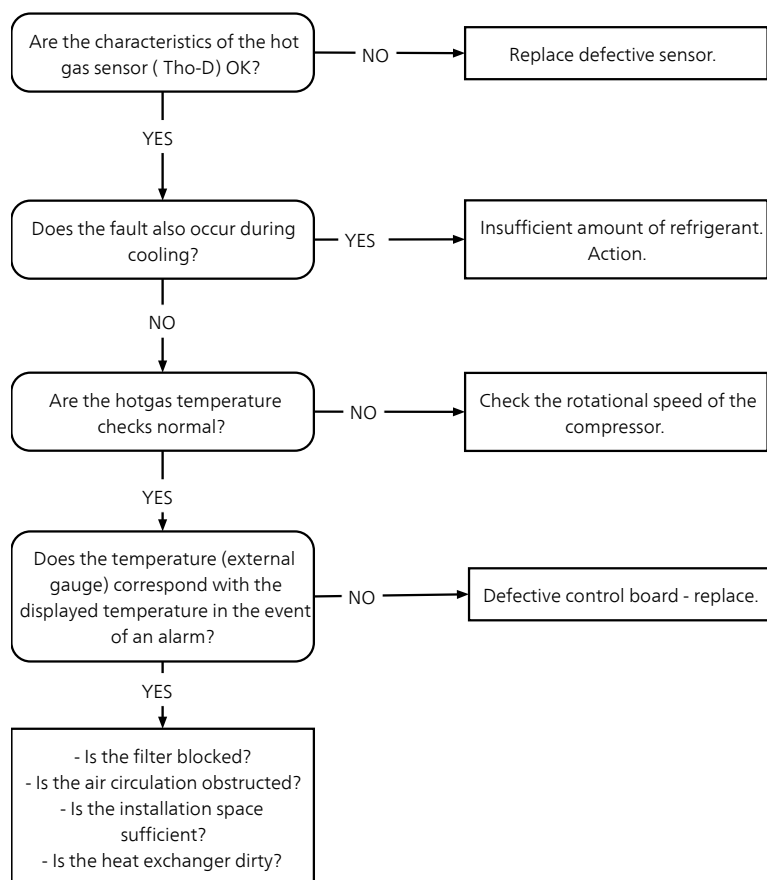
- ❶ Check the voltage between CNA1 (310 - 320 VDC)
- ❷ Check the voltage between P - N2 from AF module to condenser (310 - 320 VDC)
- ❸ Check the voltage between P2-N2 on inverter PCB (310 - 320 VDC)
- ❹ Check the voltage between DM and inverter PCB (310 - 320 VDC)

- CNW2 is connection for the communication cable between the indoor unit and outdoor unit so that there is an oscillating signal 0-22VDC, but there is not a fixed voltage in it. The cable must remain in place while measuring takes place.
- The voltage on CNA1 and CNA2 is approx 310-320VDC with 230V measurement voltage.
- CNA2 is supply voltage to Control PCB then Control PCB creates its own internal control voltage, where voltage to green and red LED is included.
- If the LED on the circuit board is not lit this voltage may be missing. Measure at points 1-4 in turn to establish where the voltage disappears.

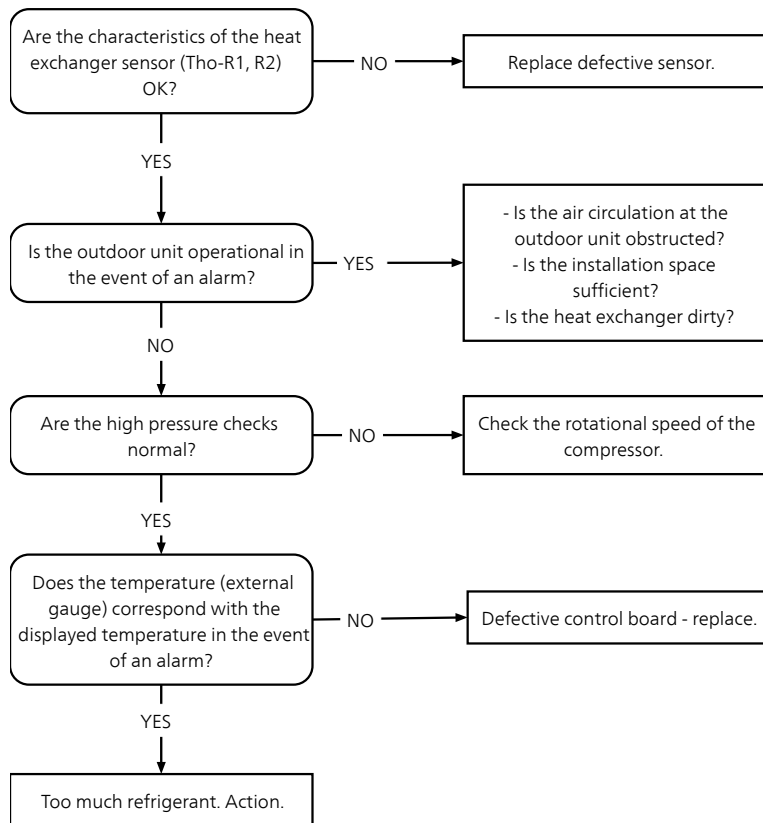
224 - Fan alarm



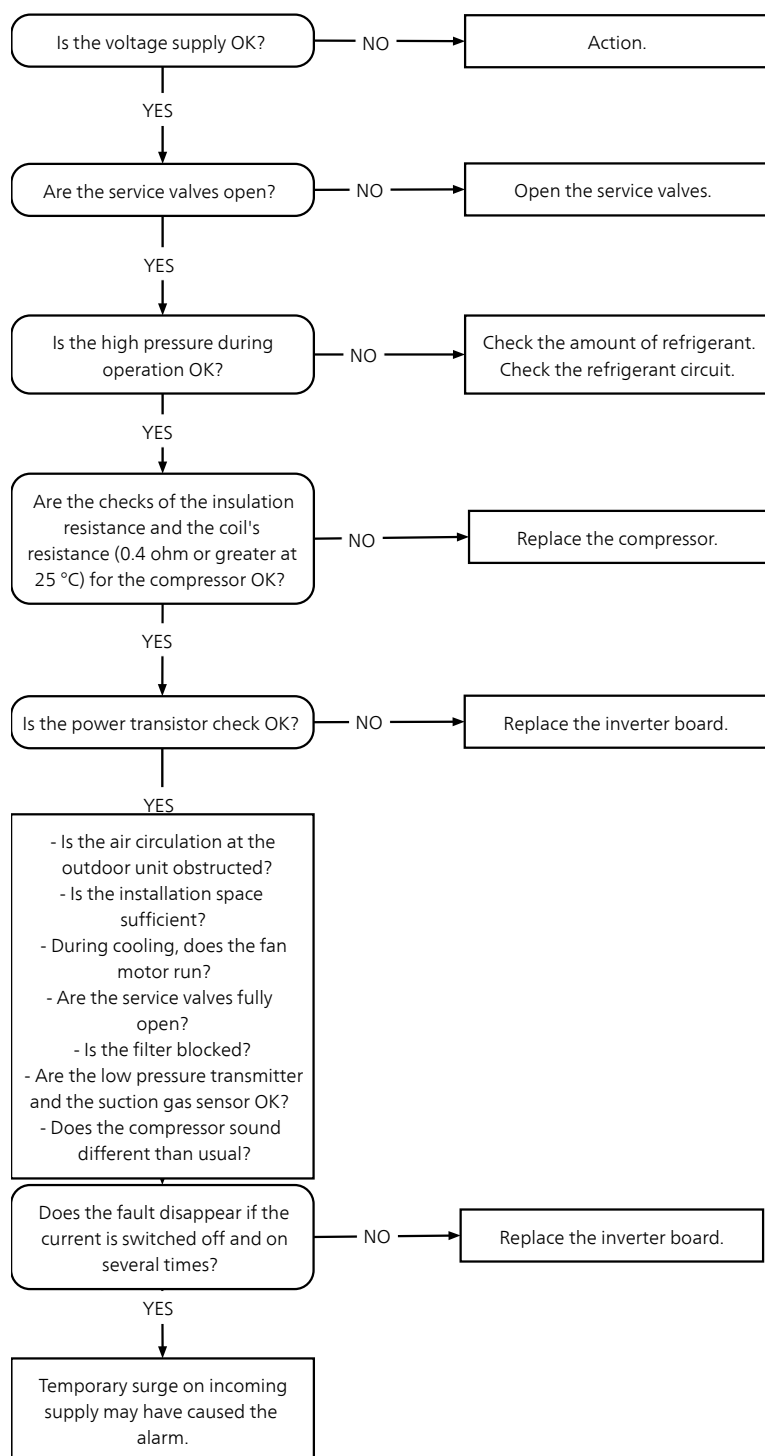
230 - Perm. high hot gas



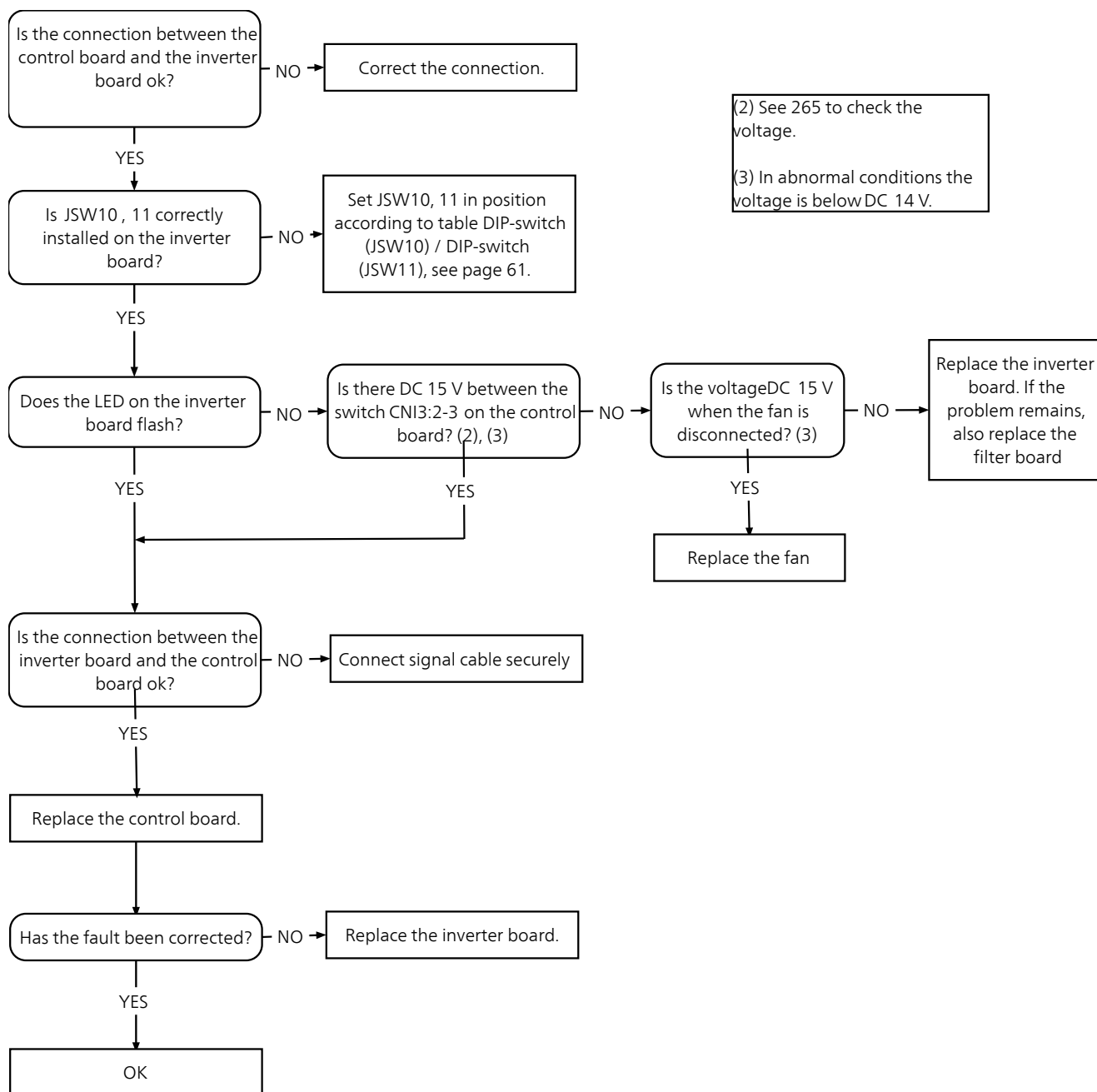
261 - High HWX temp



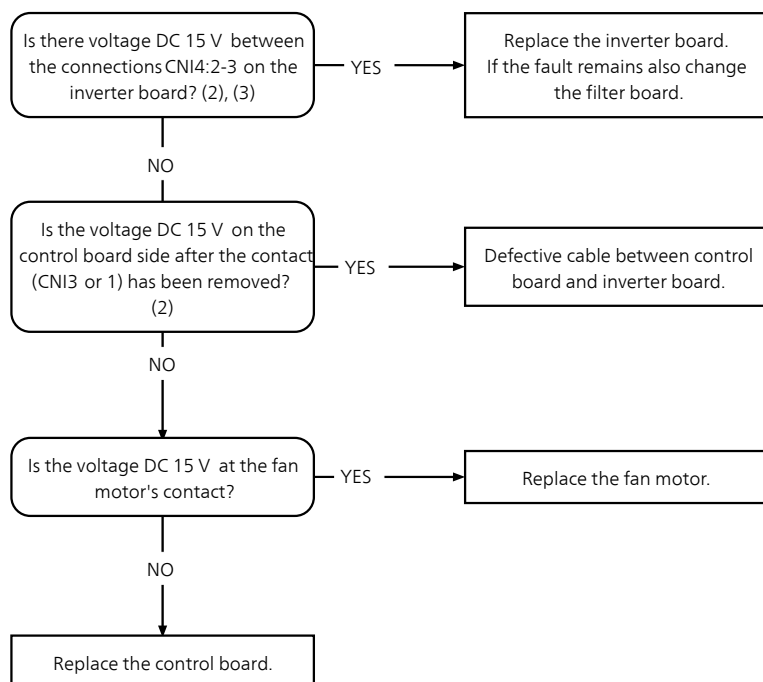
263 - Inverter error



264 - Inverter error



265 - Inverter error

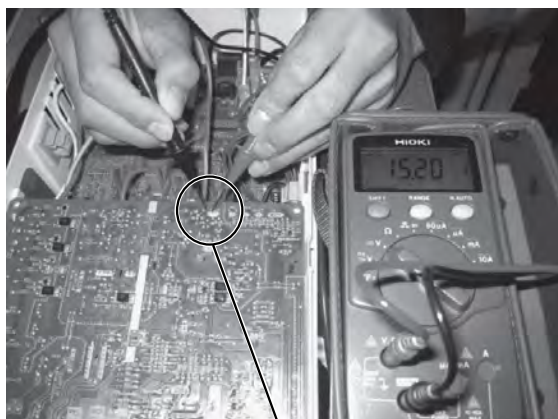


(2) See next page to check the voltage.

(3) In abnormal conditions the voltage is below DC 14 V .

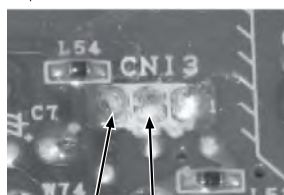
Measuring between CN13:2-3 on the control board:

F2040-8



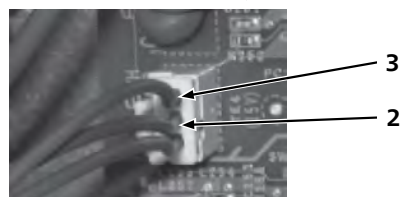
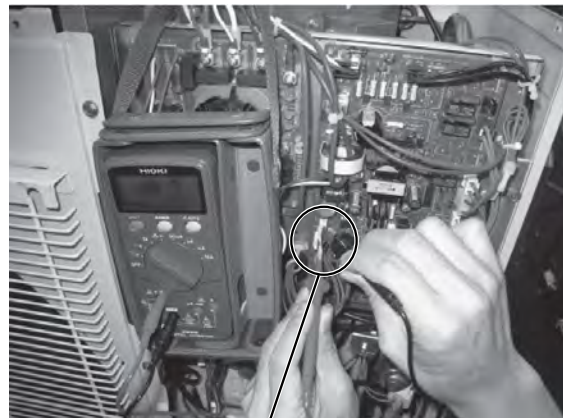
Remove the surface treatment on the soldered points to be measured.

2: 15V (+)
3: GND (-)

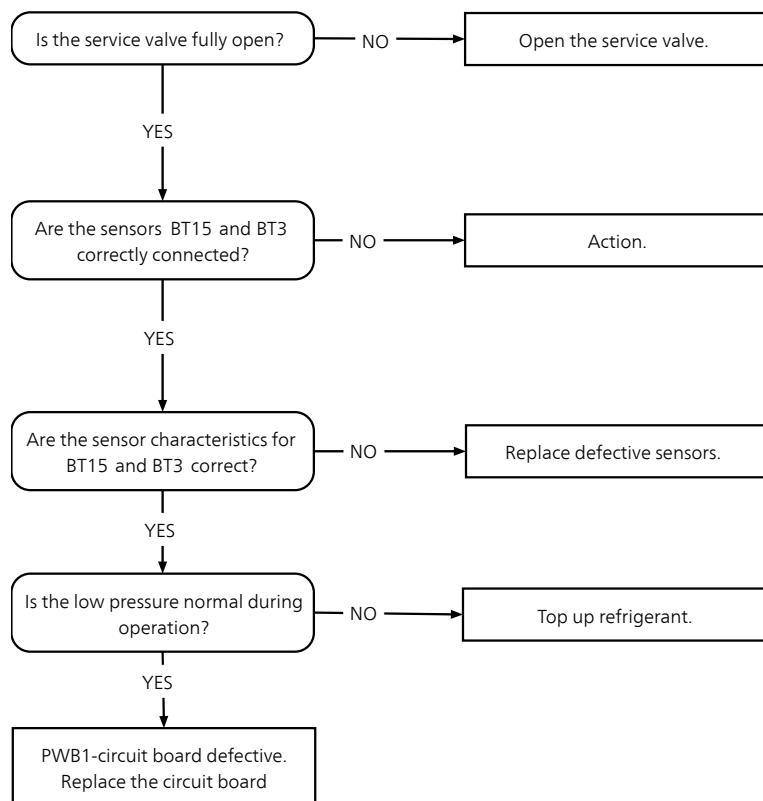


3 2

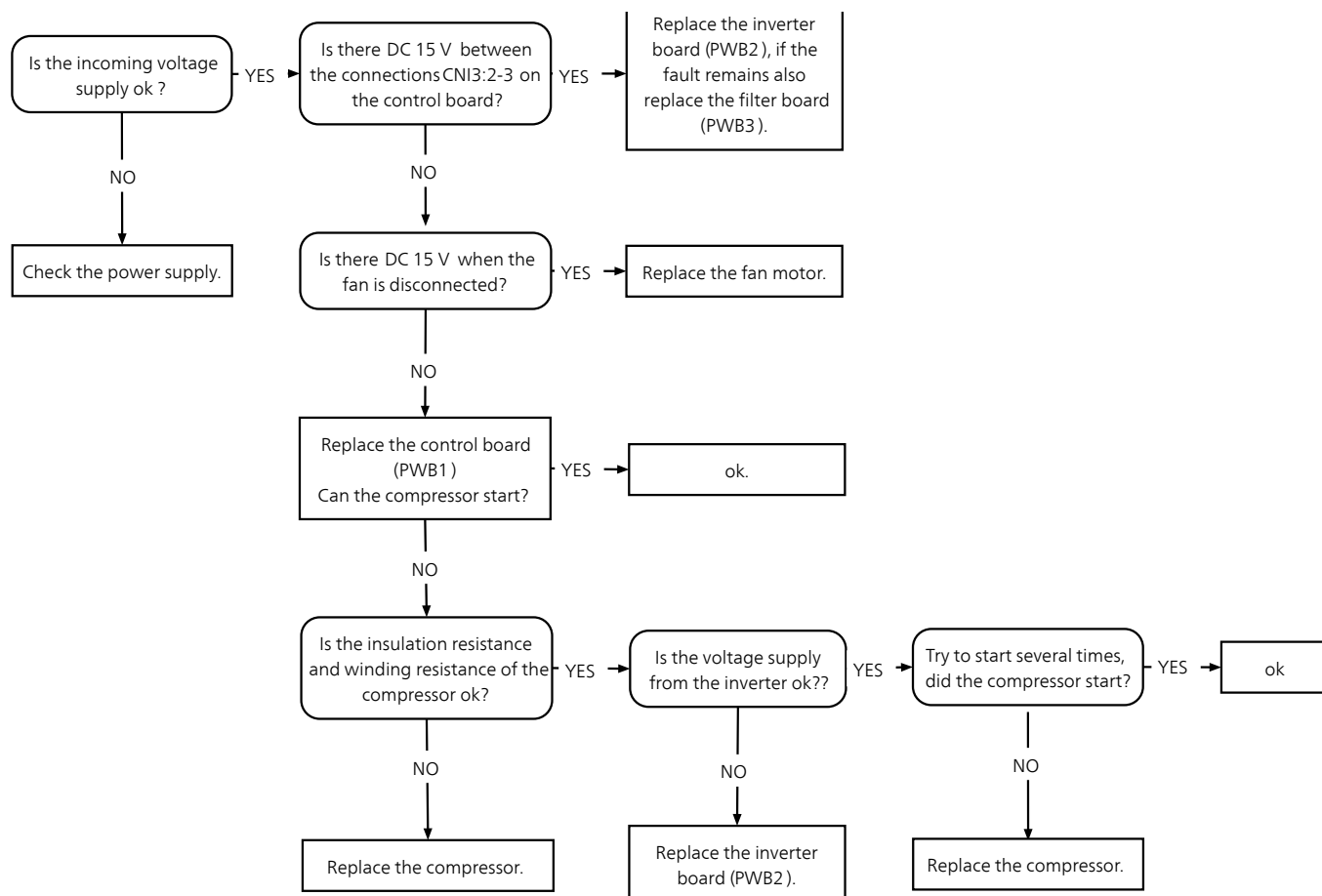
F2040-12/16



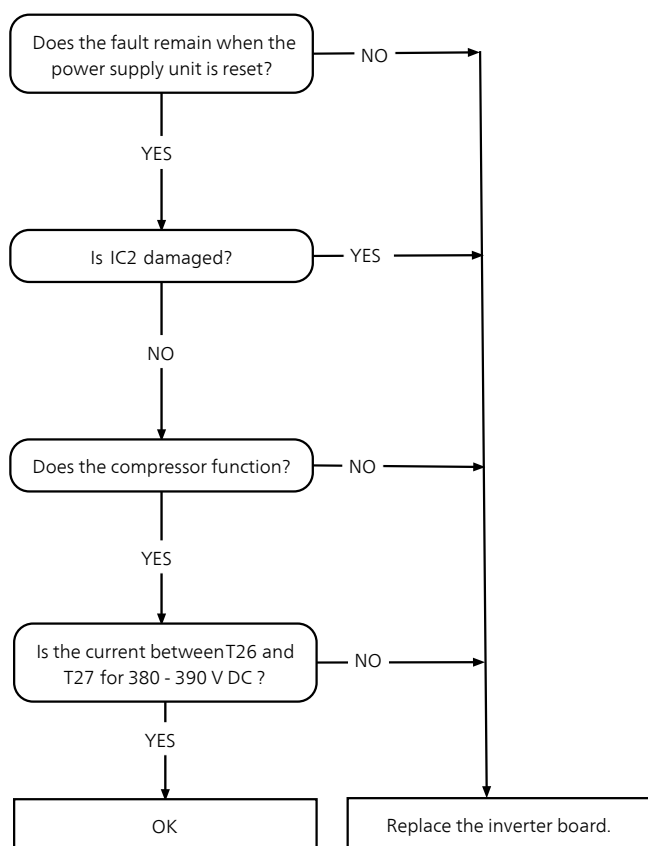
266 - Insufficient refrigerant



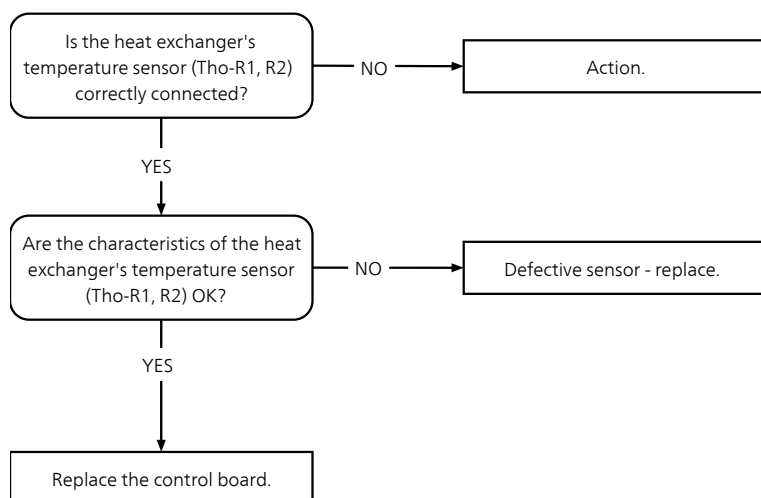
267 - Inverter error



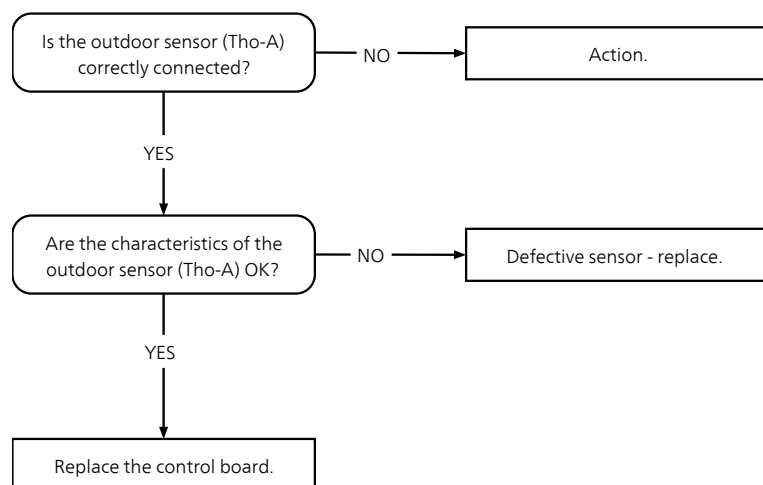
268 - Inverter A/F



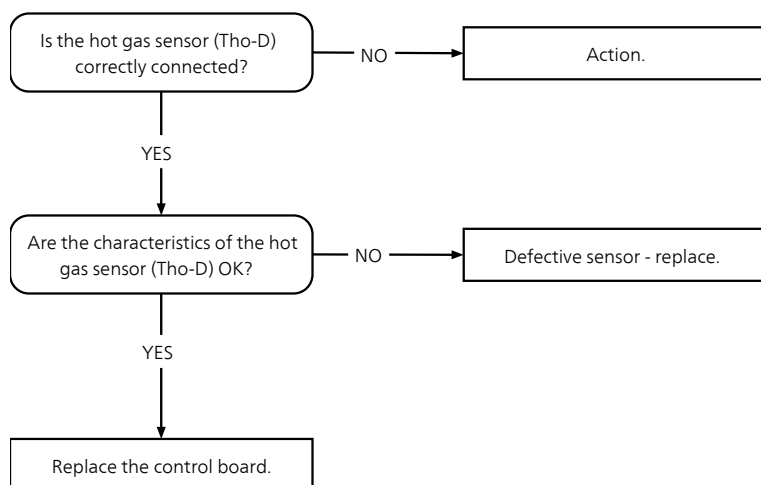
277 - S. fault Tho-R



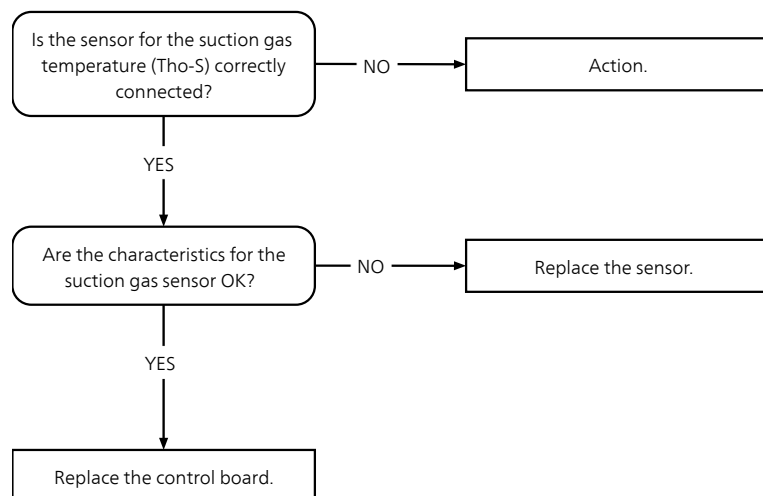
278 - Sensor fault Tho-A



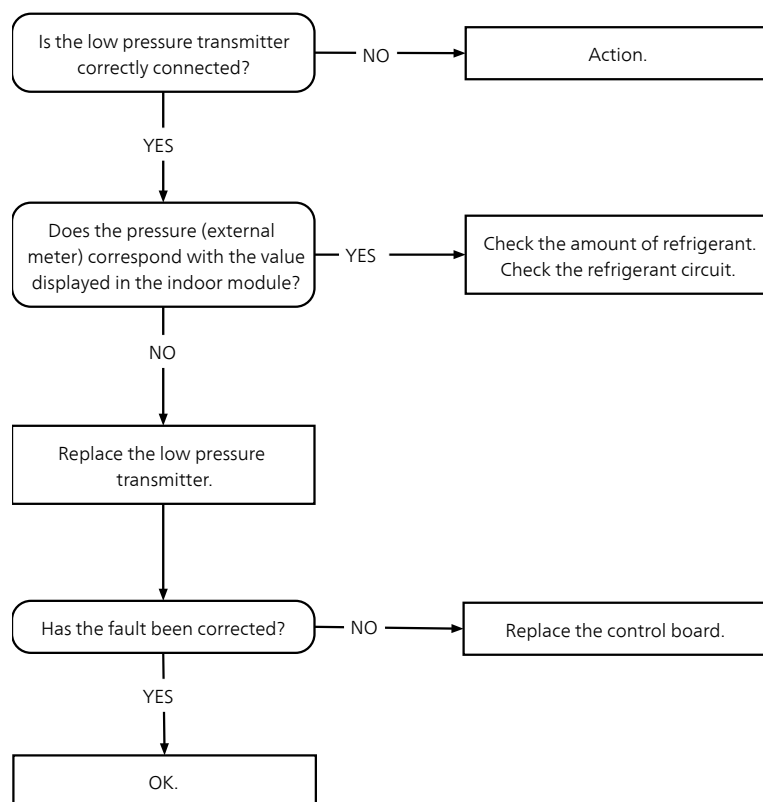
279 - S. fault Tho-D



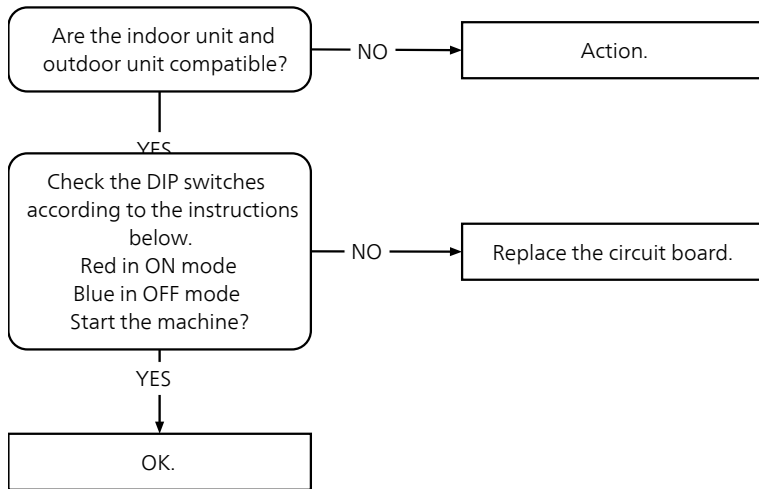
280 - S. fault Tho-S



281 – Sensor fault LPT



294 - NIBE F2040 + VVM 310/320/500 - Incompatible outdoor unit

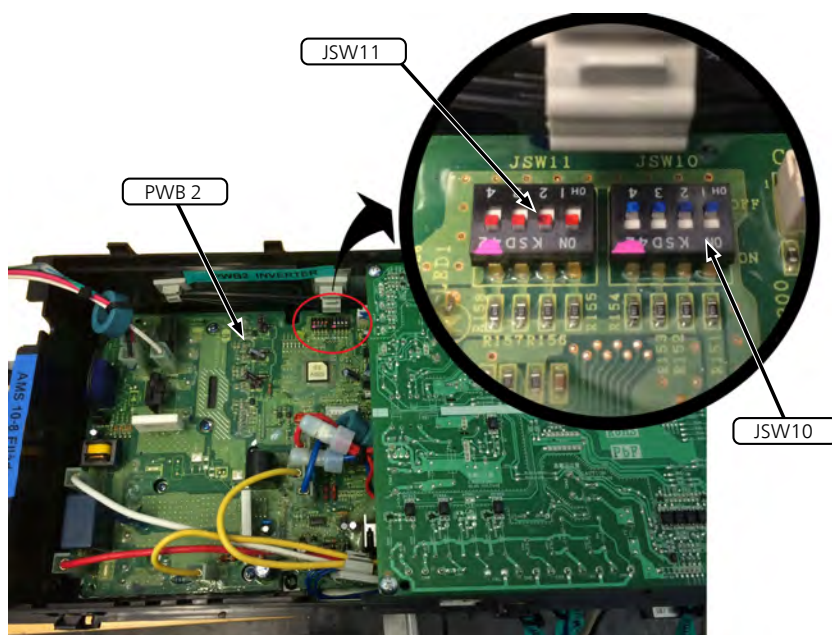


The DIP switches on the circuit board that state capacity of the outdoor unit can move out of position which results in alarm 294.

To rectify this follow the instructions below:

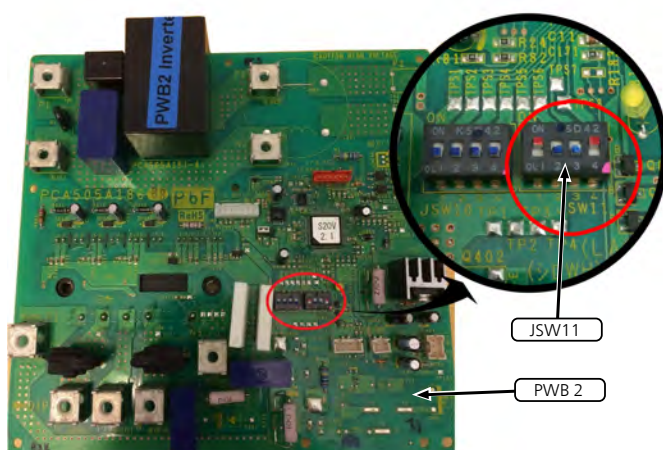
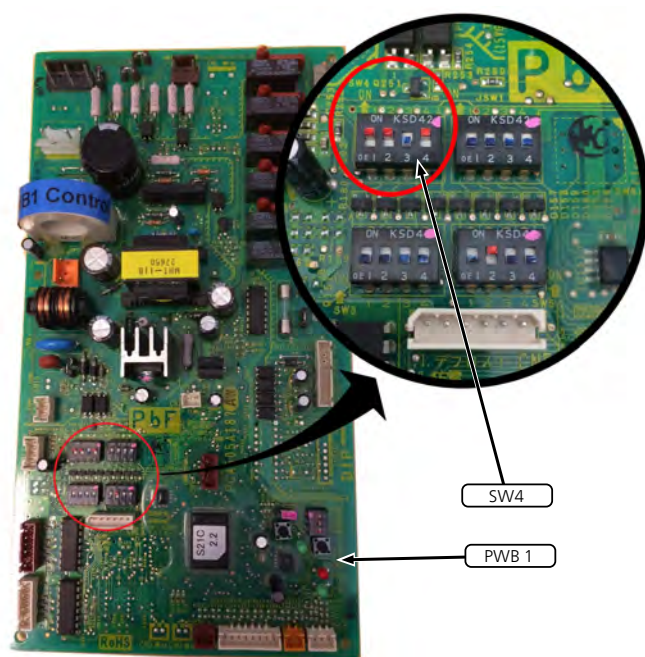
Action F2040-8

- Cut the power to the machine.
- Open the outdoor unit, remove the cover.
- Slacken off and remove the cover of the electrical distribution box.
- Locate DIP switch JSW10 and JSW11 on the inverter board (PWB2), which is recessed to the left in the junction box (see image).
- Change mode back and forth on the switches several times and reset them to the original position.
- Reinstall the covers.
- Start the machine.



Action F2040-12/16

- Cut the power to the machine.
- Open the outdoor unit, remove the cover and panel in front of the circuit board.
- Locate DIP switch SW4 on the control board (PWB1), which is at the front to the right (see image).
- Change mode back and forth on the switches several times and reset them to the original position.
- Locate DIP switch JSW11 on the inverter board (PWB2), which is on the back panel (see image).
- Change mode back and forth on the switches several times and reset them to the original position.
- Reinstall the panels
- Start the machine.

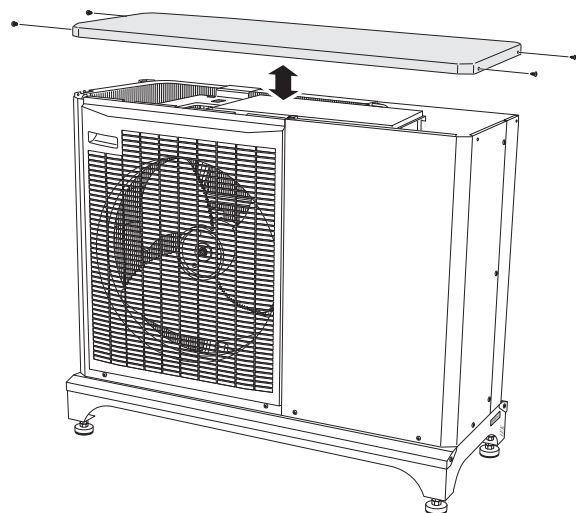


7 Component replacement

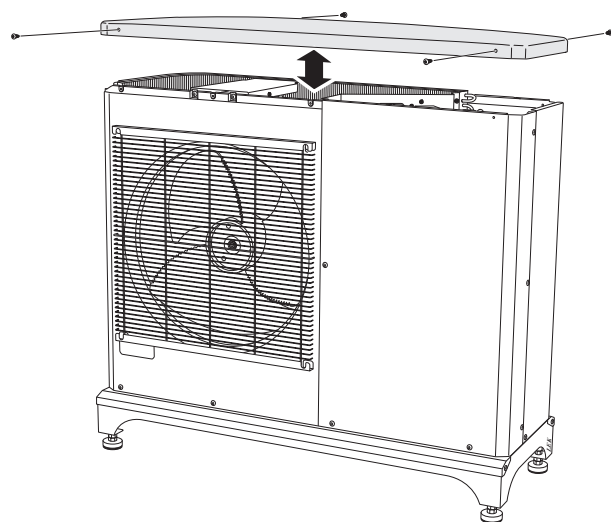
Basic

Removing the covers

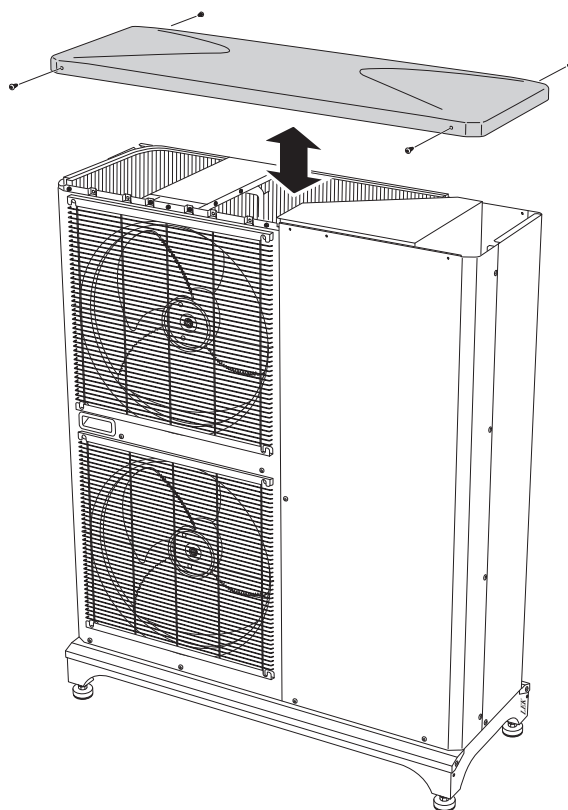
F2040-8



F2040-12

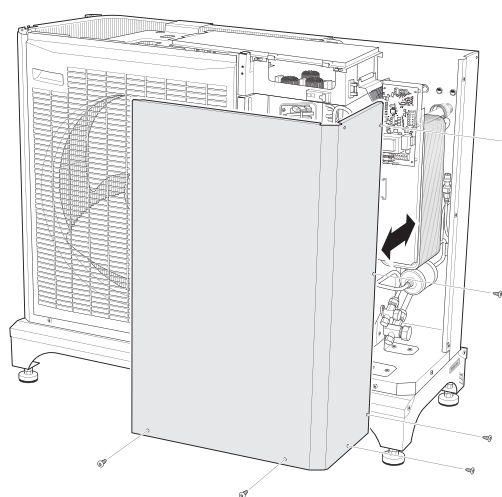


F2040-16

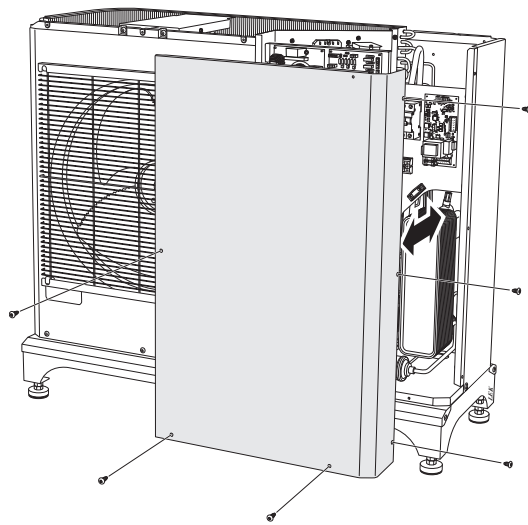


Removing the front panel

F2040-8

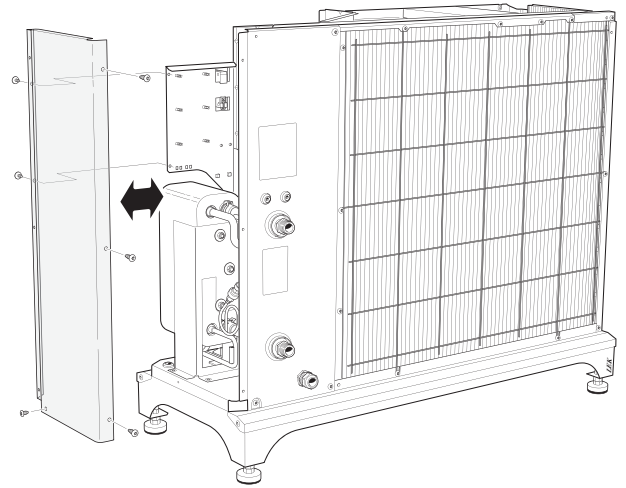


F2040-12

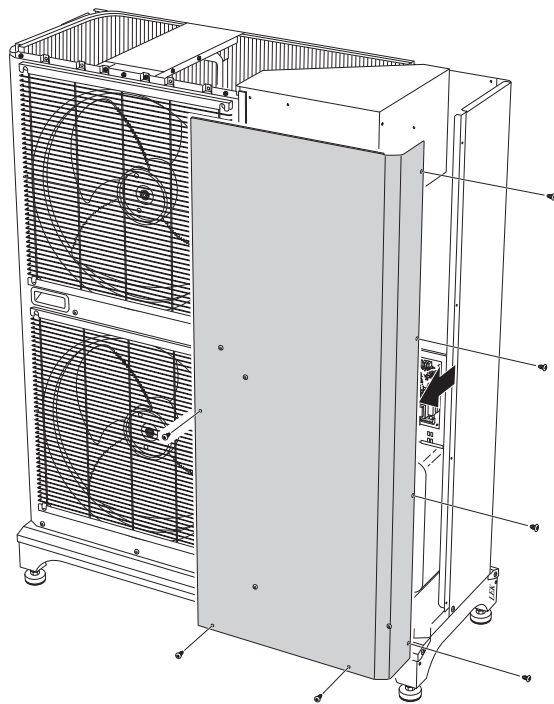


Removing the side panel

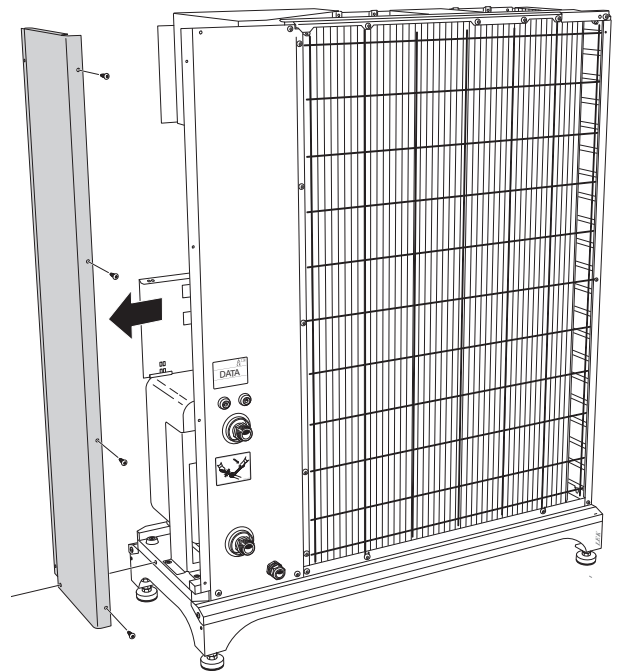
F2040-12



F2040-16

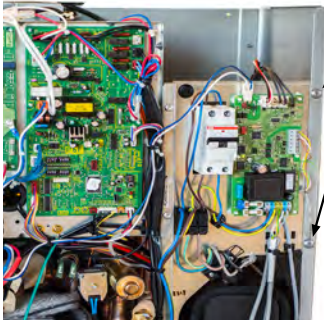
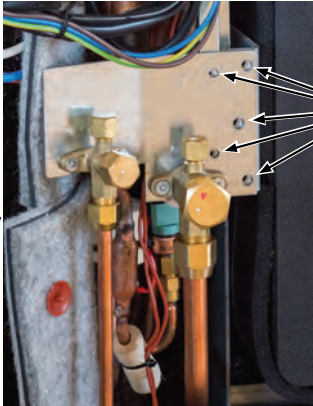


F2040-16



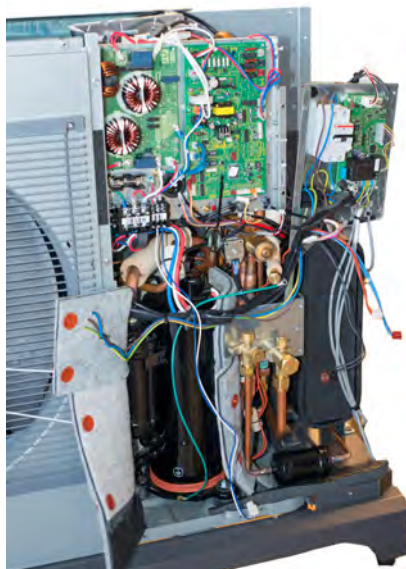
Main components

Compressor (CM)

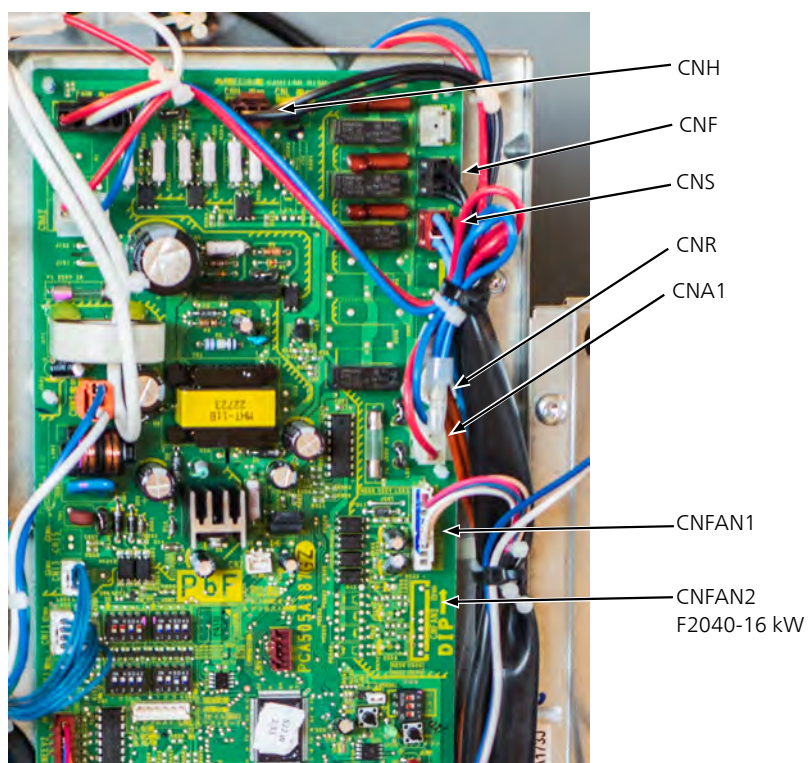
Compressor (CM)	
! NOTE Before the compressor is removed, F2040 must be drained of refrigerant. 1 Remove the top panel and front hatch. 2 Slacken off 6 screws for the side panel. 3 Remove the side panel.	 
4 Slacken off the 5 screws holding the service valves' mounting plate to the heat pump.	 

Compressor (CM)

5 Remove the compressor insulation



6 Remove cable ties and disconnect the connectors in the image (PWB1).



Compressor (CM)

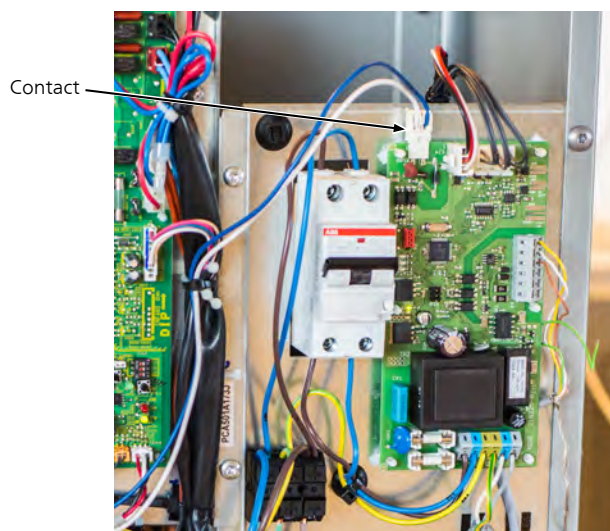
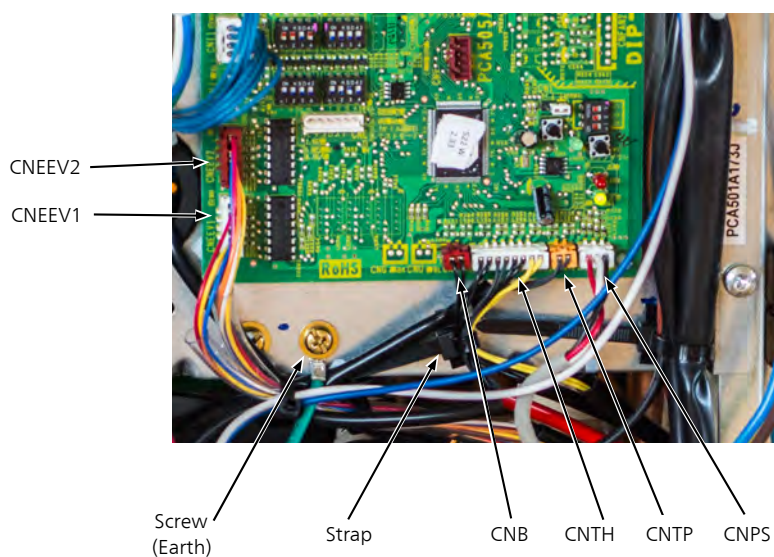
7 Cut off the two cable ties and pull out the sensor (Tho-D).



8 Disconnect the contacts as illustrated (PWB1).

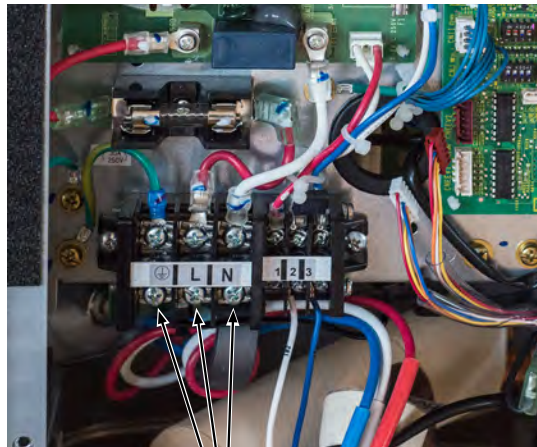
9 Unscrew the ground cable.

10 Disconnect the blue-white connector on the terminal board.



Compressor (CM)

11 Disconnect the electrical connections.

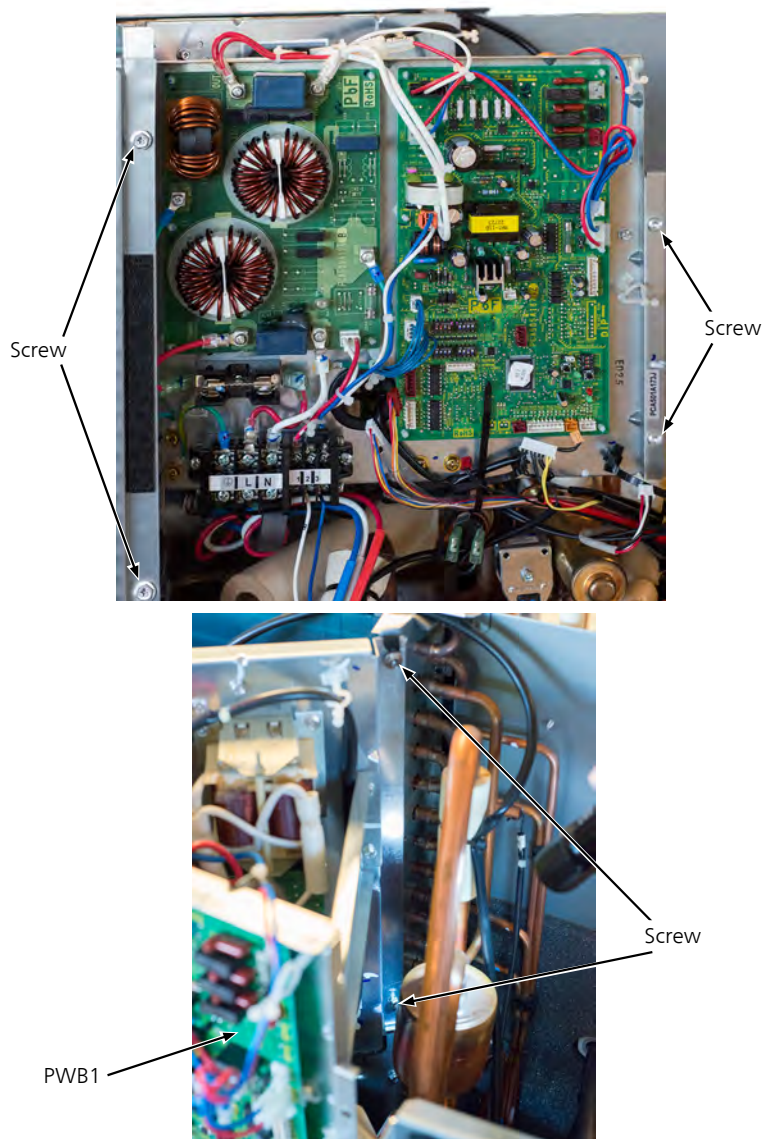


Electrical connections

Compressor (CM)

12 Remove the four screws at the front edge of the electrical connection module.

13 Remove the two screws at the rear edge of the electrical connection module



Compressor (CM)

14 Lift the electrical connection module and place it to one side (see image).

15 The compressor is now released and can be removed.



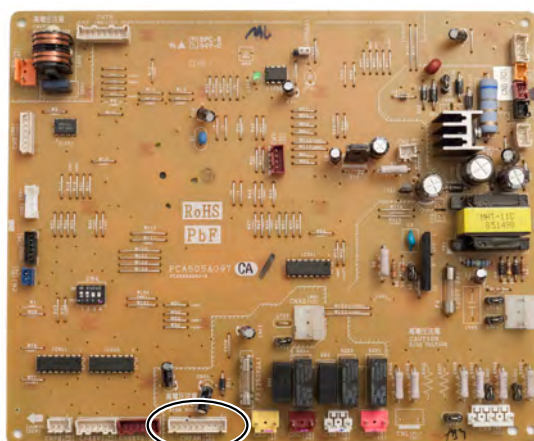
Fan (GQ1)

- 1 Remove the top cover.
- 2 Remove the front panel.

3. Disconnect the fan cable's electrical connector CNFAN1.

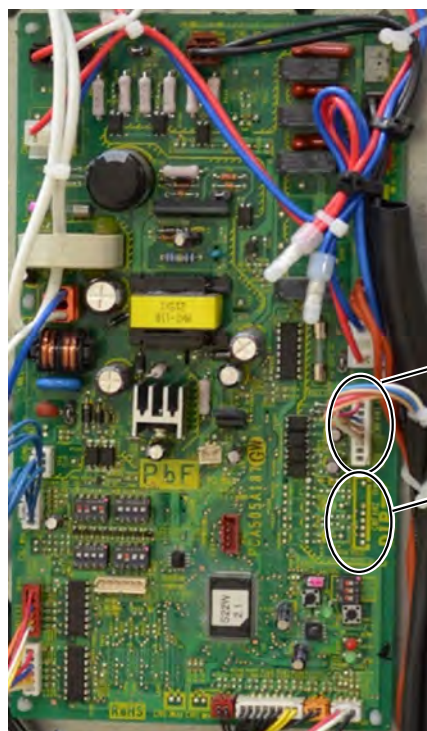
F2040-16 has two fans, disconnect the switch for the one to be replaced. The upper fan has the designation CNFAN1 and the lower has the designation CNFAN2.

F2040-8



CNFAN

F2040-12/16



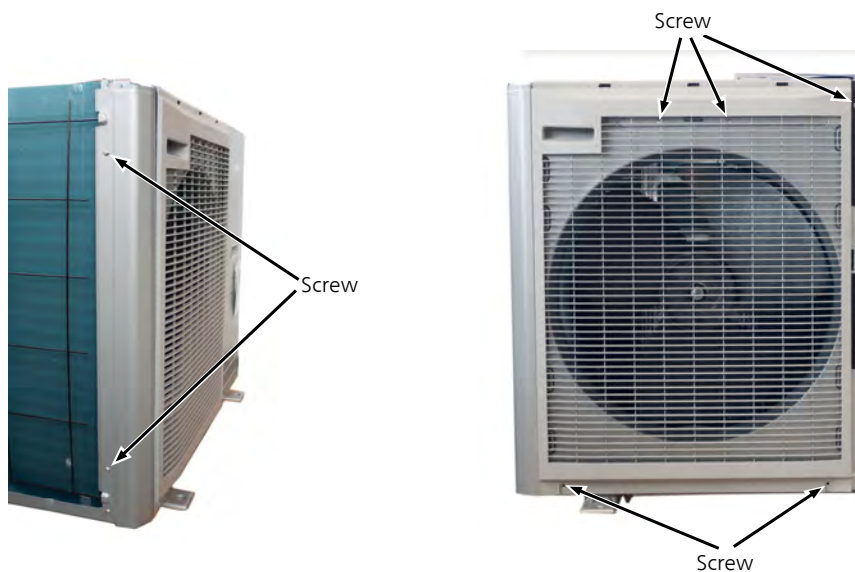
CNFAN1

CNFAN2 (only 16 kW)

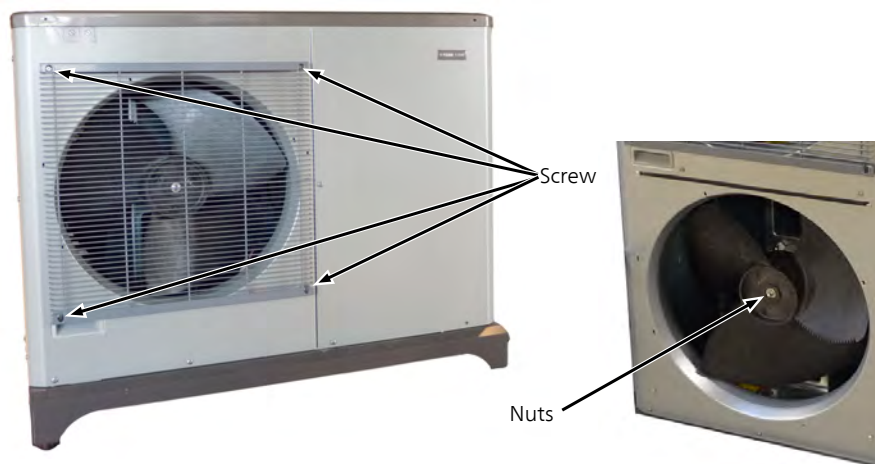
4 Remove the fan grille by removing the four screws (On the F2040-8 the whole front panel must be removed).

5 Remove the nut and then the fan propeller from the shaft.

F2040-8



F2040-12/16

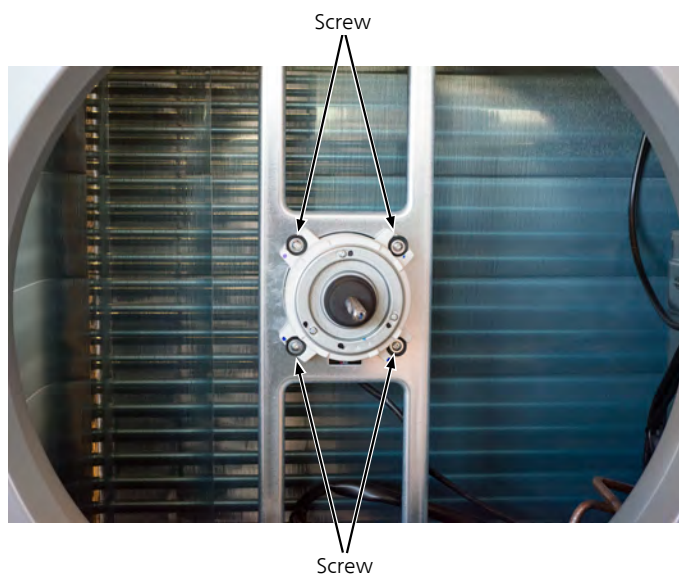
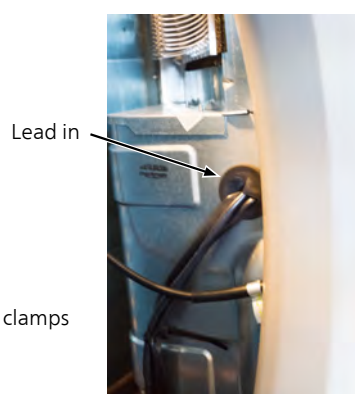
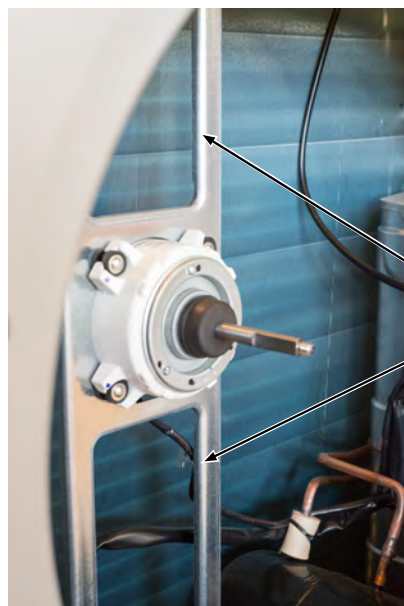


6. Bend up the panel clamps, on the rear of the fan mounting, that hold the electrical cable in position.

7. Route the fan cable through the lead-in to the fan motor.

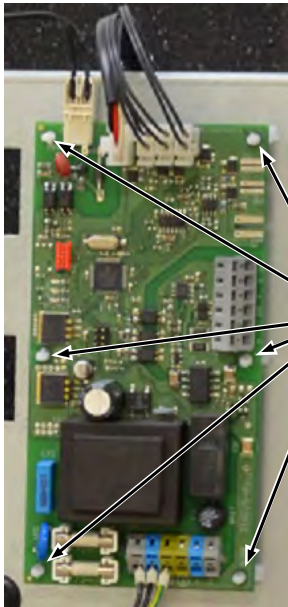
7. Slacken off/remove the four screws holding the fan motor in place and remove it forwards.

8. Assembly takes place in the reverse order.



Circuit board and electronics

Communication board (AA23)

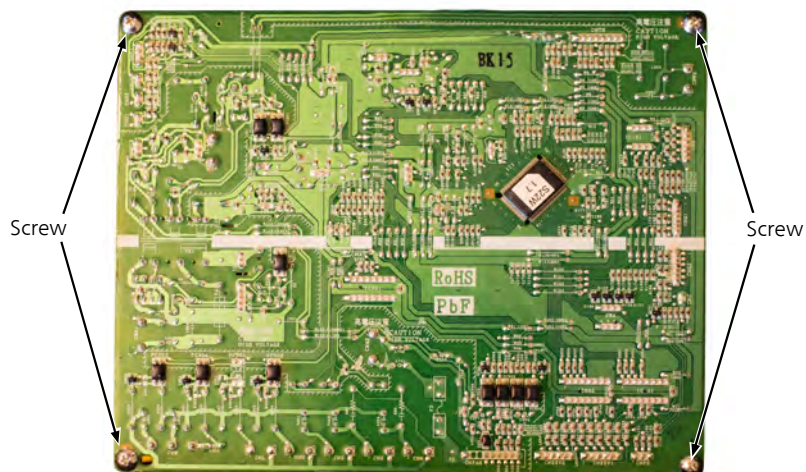
1 Remove the top cover. 2 Remove the front panel.	
3. Disconnect the cables. 4. Remove the six pins and remove the circuit board.	
5. Assembly takes place in the reverse order.	

Control board (PWB1) 8 kW

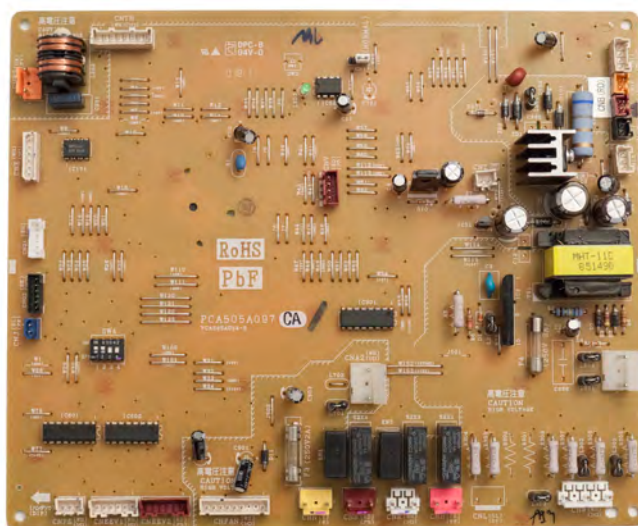
- 1 Remove the top cover.
- 2 Remove the front panel.

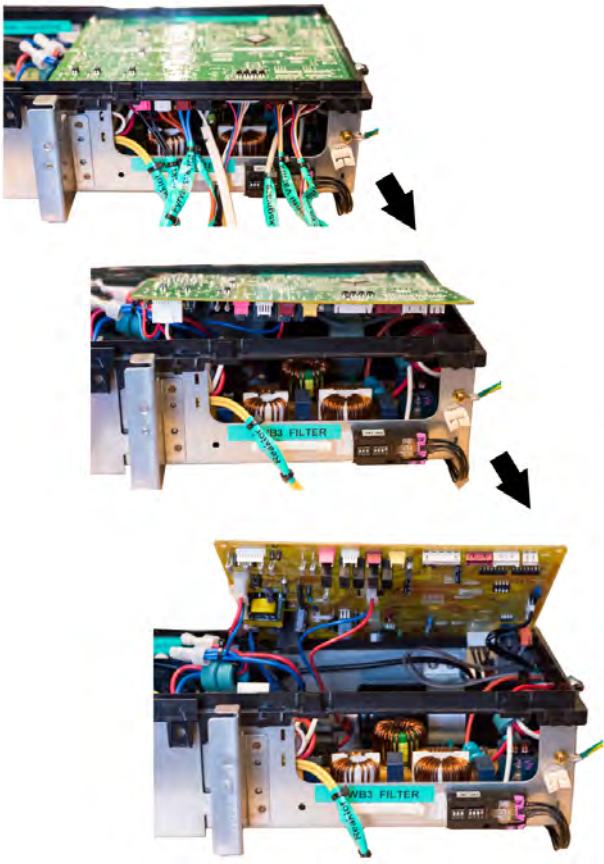
3. Remove the screws in the corners of the board.

F2040 8 kW (upper side)

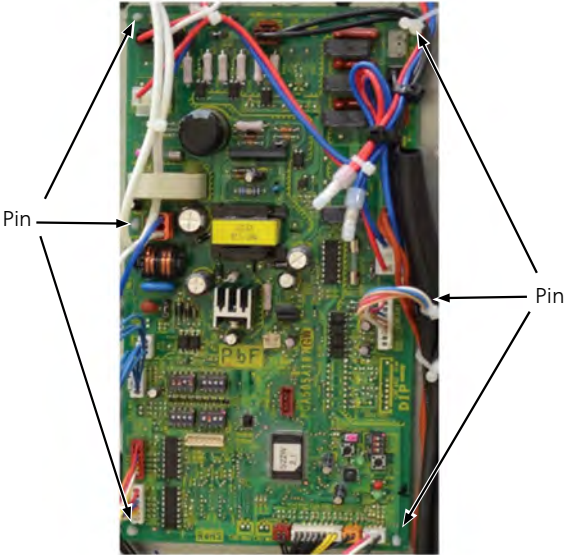


F2040 8 kW (underside)



4. Disconnect the cables from their mountings so that the card can be lifted slightly. 5. Count and note the number of disconnected cables. 6. Carefully lift the side circuit board nearest you and disconnect the connectors one after the other, continue with the connectors along the left side of the circuit board. 7. The circuit board can be further removed and more cables disconnected. 8. Continue until all cables are disconnected.	
9. Assembly takes place in the reverse order. 10. Check that all cables are installed.	

Control board (PWB1) 12/16 kW

1 Remove the top cover. 2 Remove the front panel.	
3. Disconnect the cables. 4. Count and note the number of disconnected cables. 5. Remove the six pins and remove the card.	F2040 12/16 kW 
6. Assembly takes place in the reverse order.	

Inverter board (PWB2 (F2040-8))

- 1 Remove the top cover.
- 2 Remove the front and side panels.
- 3 Remove the control board (PWB1).

4. Disconnect the cables on PWB 2.
5. Remove the five screws, remove the board.

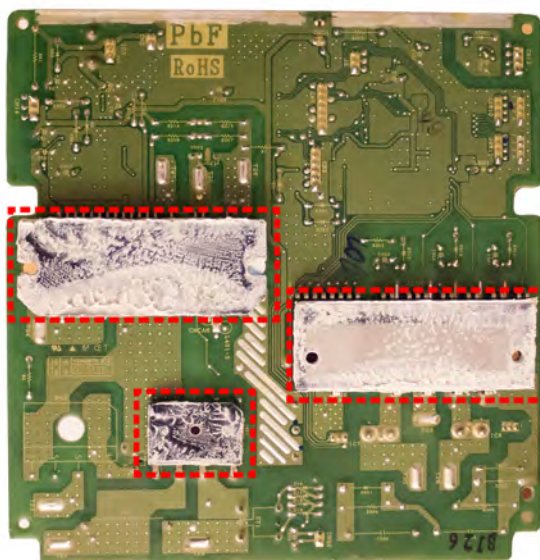


6. Assembly takes place in the reverse order.

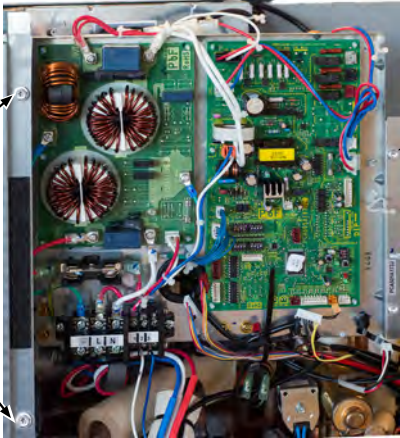
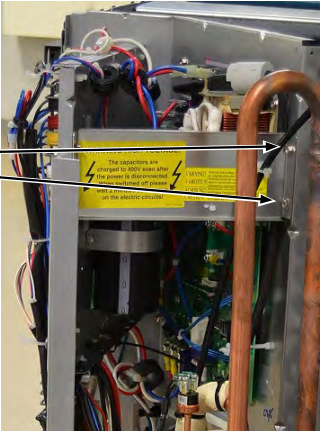


NOTE

New heat transfer paste must be applied to the three contact surfaces of the cooling flange.



Inverter board (PWB2 (F2040-12/16))

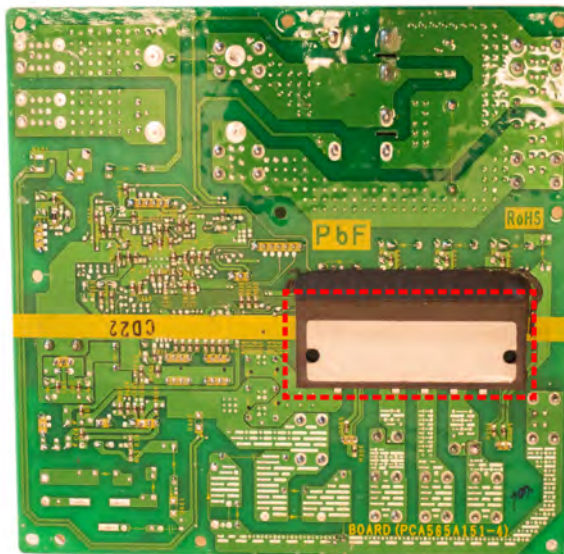
1 Remove the top cover. 2 Remove the front and side panels.	
3. Slacken off 5 screws on the electrical connection module. 4. Angle PWB1 out slightly to access the Inverter board PWB2. 5. Disconnect the cables on PWB 2. 6. Remove the screws and the 6 pins, remove the circuit board.	 Screw Screw  Screw  PWB 2

7. Assembly takes place in the reverse order.



NOTE

New heat transfer paste must be applied to the contact surfaces of the cooling flange.



Filter board (PWB3)

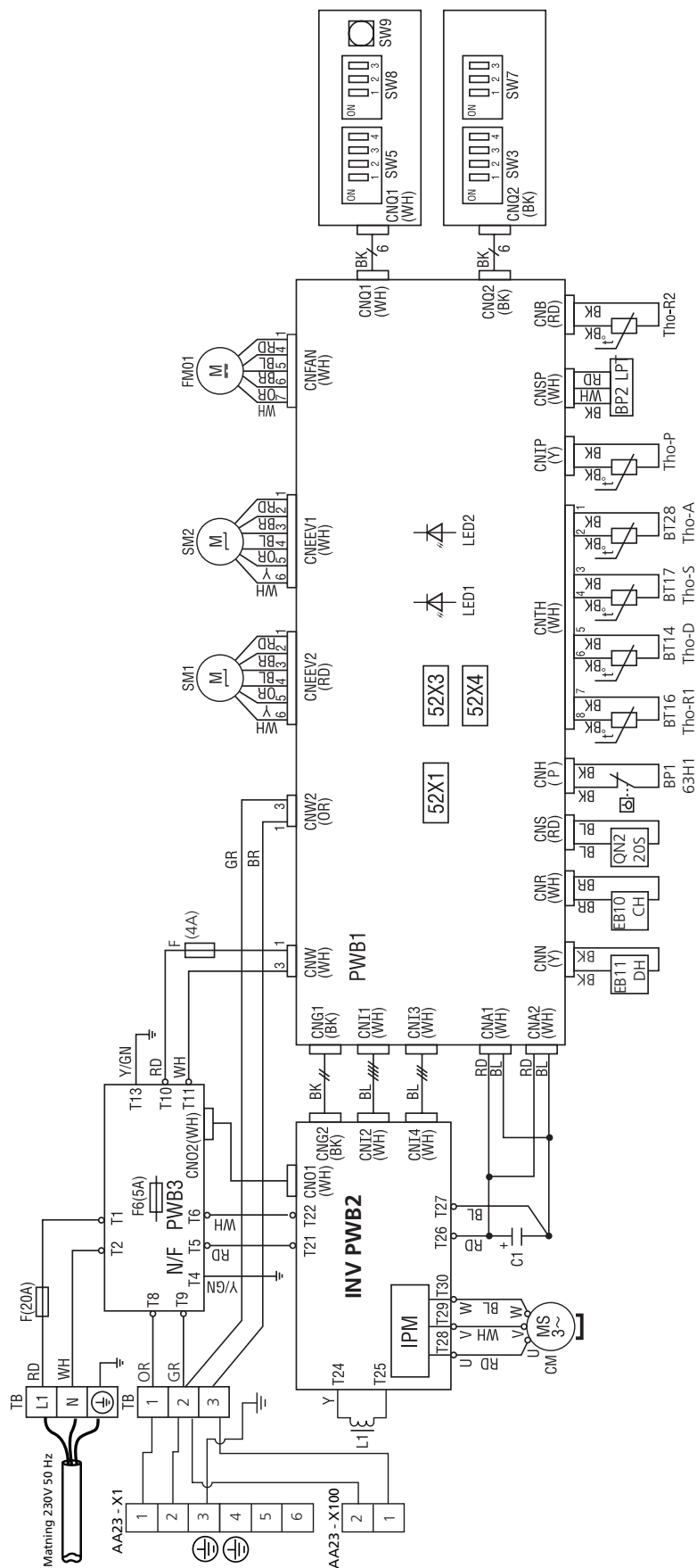
1. Remove the top cover. 2 Slacken off six screws for front panel.	
3. Disconnect the cables. 4. Remove the 6 pins and re-move the circuit board.	8 kW The image shows an 8 kW filter board (PWB3) with a yellow PCB. It features two large toroidal inductors, several electrolytic capacitors, and various electronic components. Six pins are indicated by arrows pointing to specific connection points on the board. 12/16 kW The image shows a 12/16 kW filter board (PWB3) with a green PCB. It features two large toroidal inductors, several electrolytic capacitors, and various electronic components. Six pins are indicated by arrows pointing to specific connection points on the board.
5. Assembly takes place in the reverse order.	

8 Technical data

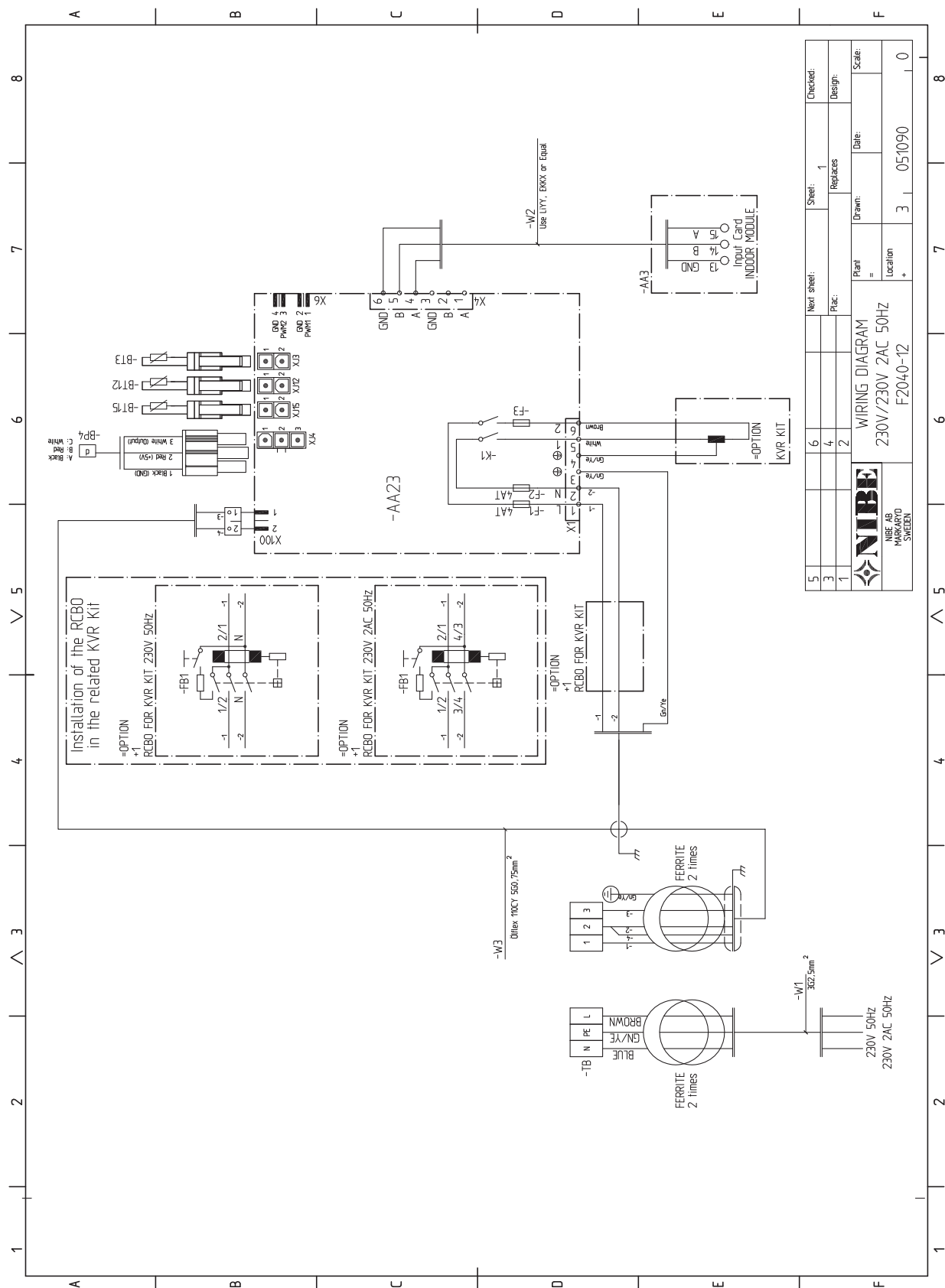
Electrical circuit diagram

Designation	Description	Designation	Description
20S	Solenoid for 4-way valve	LED2	Indicator lamp (red for F2040-8, green for F2040-12/16)
52X1	Help relay (for CH)	LPT	Low pressure transmitter
52X3	Help relay (for 20S)	SM1	Expansion valve for cooling
52X4	Auxiliary relay (for DH)	SM2	Expansion valve for heating
63H1	High pressure pressostat	SV1 (only F2040-16)	Bypass valve
C1	Capacitor	SW1, 9	Pump down
CH	Compressor heater	SW3, 5, 7, 8	Local settings
CM	Compressor motor	TB	Terminal block
CnA~Z	Terminal block	Tho-A	Temperature sensor, outdoor air
CT	Current sensor	Tho-D	Temperature sensor, hot gas
DH	Drain pan heater	Tho-IPM	Temperature sensor, IPM
DM	Diode module	Tho-R1	Temperature sensor, heat exchanger out
F	Fuse	Tho-R2	Temperature sensor, heat exchanger, in
FM01	Fan motor	Tho-S	Temperature sensor, suction gas
FM02 (only F2040-16)	Fan motor 2		
IPM	Inverter power module		
L/L1	Induction coil		
LED1	Indicator lamp (green for F2040-8, red for F2040-12/16)		

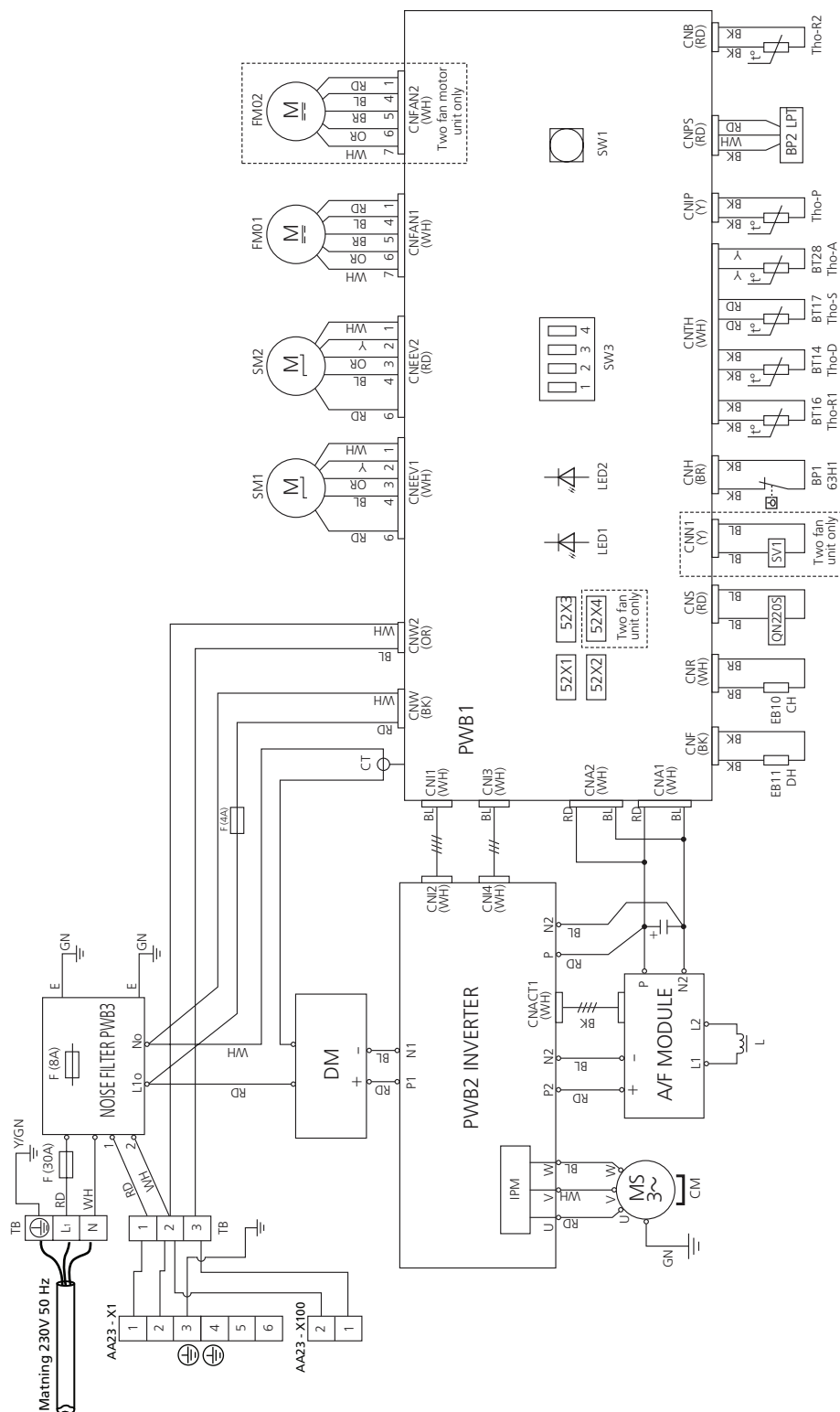




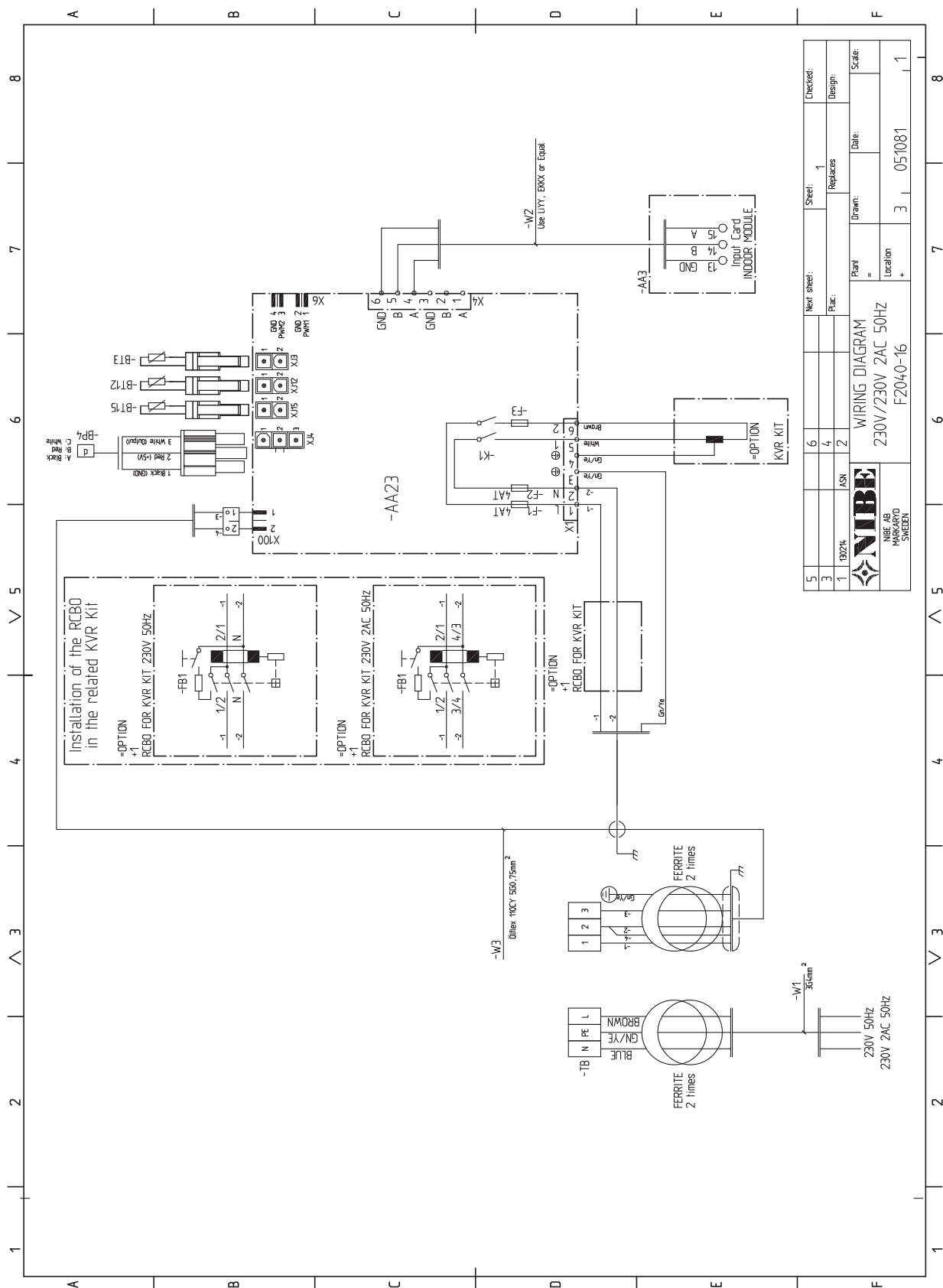
F2040-12



Sheet:	1	Checked:	
Replaces:		Design:	
Plant:		Date:	
Location:		Scale:	
3	051090		0



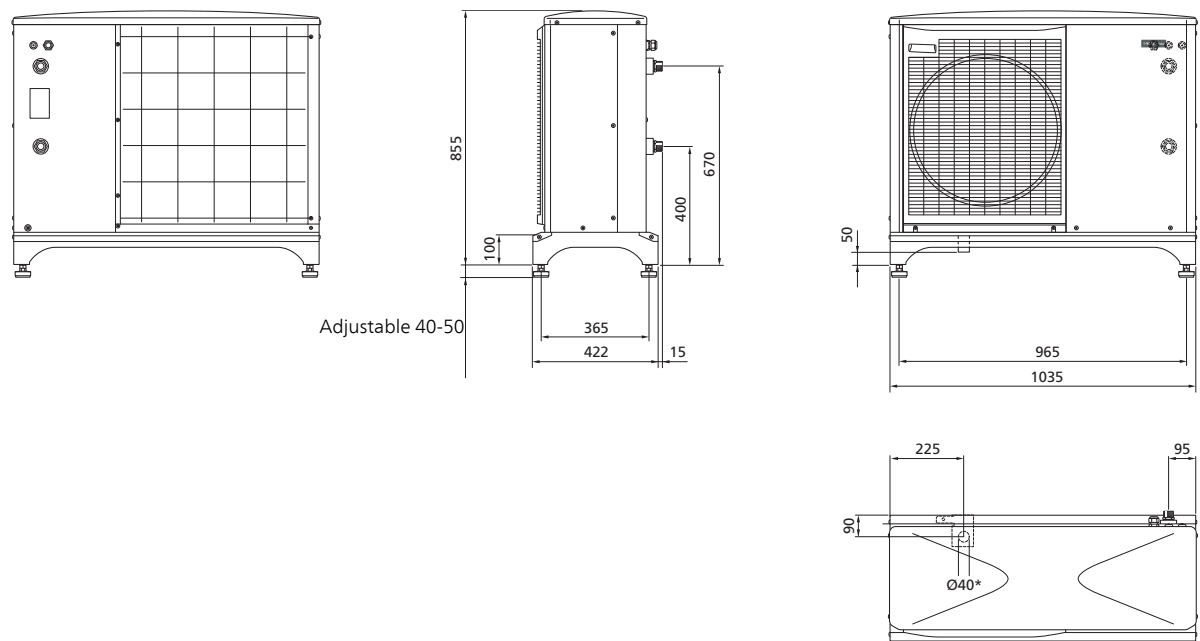
F2040-16



5	Next sheet:	Sheet: 1	Checked:
3	Replaces:	Replaces:	Design:
1	ASN	2	Scale:
WIRING DIAGRAM		Plan:	Date:
230V/230V 2AC 50Hz		Location:	1
F2040-16		3	051081
NIBE AB			
MARKARYD			
SWELEN			

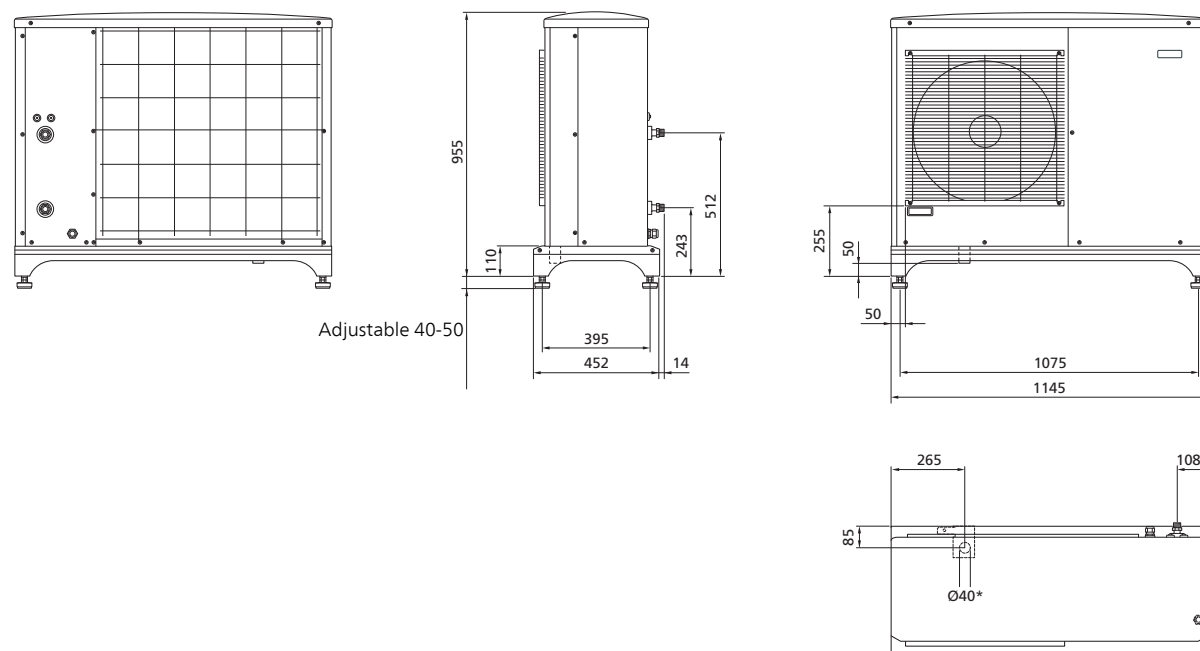
Dimensions and setting-out coordinates

F2040-8



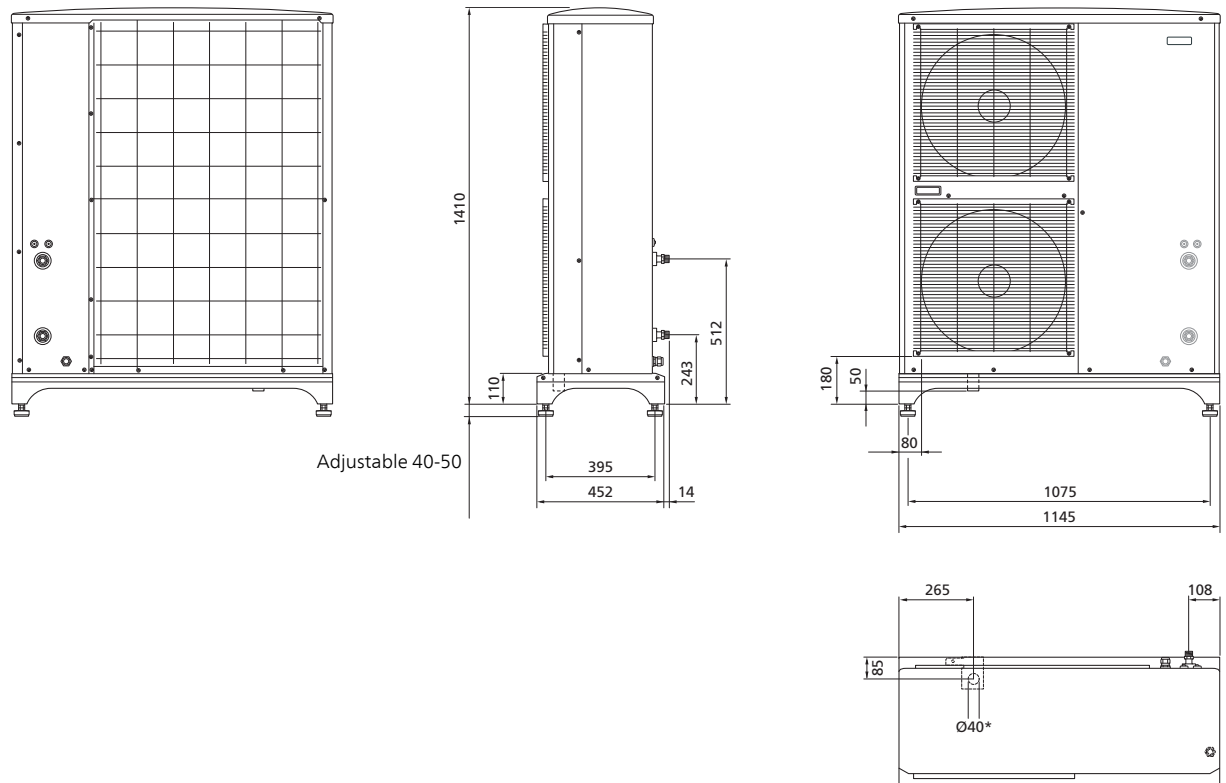
* Accessory KVR 10-xx F2040 is required.

F2040-12

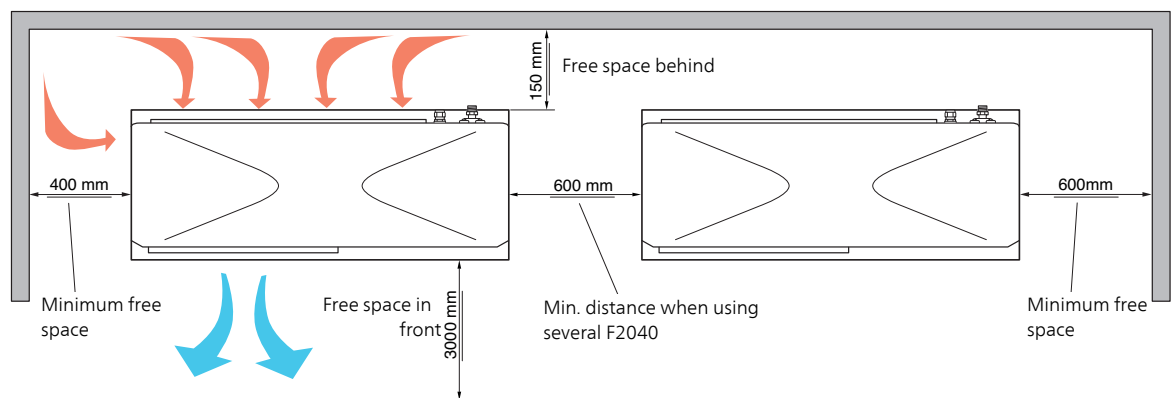


* Accessory KVR 10-xx F2040 is required.

F2040-16



* Accessory KVR 10-xx F2040 is required.



Technical specifications

Air-water heat pump		F2040-8	F2040-12	F2040-16
Heating	Outd. temp: / Supply temp.	Nominal	Nominal	Nominal
Output data according to EN14511 ΔT5K Specified/supplied power/COP (kW/kW/-)	7/35 °C (floor)	3.86/0.83/4.65	5.21/1.09/4.78	7.03/1.45/4.85
	2/35 °C (floor)	5.11/1.36/3.76	6.91/1.79/3.86	9.33/2.38/3.92
	-7/35 °C (floor)	6.64/2.48/2.68	8.98/3.26/2.75	12.12/4.33/2.80
	2/55 °C	4.75/2.07/2.29	6.42/2.72/2.36	8.67/3.62/2.40
	7/45 °C	3.70/1.00/3.70	5.00/1.31/3.82	6.75/1.74/3.88
	2/45 °C	5.03/1.70/2.96	6.80/2.24/3.04	9.18/2.98/3.08
	-7/45 °C	6.58/3.06/2.15	8.90/4.03/2.21	12.01/5.36/2.24
	-15/45 °C	5.13/3.03/1.69	6.94/3.99/1.74	9.36/5.31/1.76
	7/55 °C	3.50/1.17/2.99	4.73/1.54/3.07	6.38/2.04/3.13
-7/55 °C	5.29/2.68/1.97	7.15/3.53/2.03	9.66/4.69/2.06	
Cooling	Outd. temp: / Supply temp.	Max	Max	Max
Output data according to EN14511 ΔT5K Specified/supplied power/EER	27/7 °C	7.52/2.37/3.17	9.87/3.16/3.13	13.30/3.99/3.33
	27/18 °C	11.20/3.20/3.50	11.70/3.32/3.52	17.70/4.52/3.91
	35/7 °C	7.10/2.65/2.68	9.45/3.41/2.77	13.04/4.53/2.88
	35/18 °C	9.19/2.98/3.08	11.20/3.58/3.12	15.70/5.04/3.12
Electrical data				
Rated voltage		230V 50 Hz, 230V 2AC 50Hz		
Max operating current, heat pump	A _{rms}	16	23	25
Max operating current, compressor	A _{rms}	15	22	24
Starting current	A _{rms}	5	5	5
Max permitted impedance at connection point 1)	Ohm	-	-	-
Nominal output, fan	W	86	86	2 x 86
Fuse 2)	A _{rms}	16	25	25
Refrigerant circuit				
Type of refrigerant		R410A		
Type of compressor		Twin Rotary		
Compressor oil		M-MA68		
Volume	kg	2.55	2.9	4.0
Cut-out value pressostat HP	MPa	4.15 (41.5 bar)		
Cut-out value pressostat LP	MPa	0.079 (0.79 bar)		
Brine				
Airflow	m³/h	3000	4380	6000
Max/Min air temp	°C	-20/43		
Defrosting system		reverse cycle		
Heating medium				
Min/Max system pressure heating medium	MPa	0.05/0.25 (0.5/2.5bar)		
Min volume, climate system, heating/cooling	l	50	80	150
Min volume, climate system, under floor cooling	l	80	100	150
Max flow, climate system	l/s	0.38	0.57	0.79

Air-water heat pump		F2040-8	F2040-12	F2040-16
Min flow, climate system, at 100% circulation pump speed (defrosting flow)	l/s	0.19	0.29	0.39
Min flow, heating	l/s	0.12	0.15	0.25
Min flow, cooling	l/s	0.15	0.20	0.32
Max/Min heating medium temp continuous operation	°C	58/25		
Connection heating medium ext thread		G1"		
Dimensions and weight				
Width	mm	1035	1145	1145
Depth	mm	422	452	452
Height with stand	mm	895 (+50/-0)	995 (+50/-0)	1450 (+50/-0)
Weight (excl. packaging)	kg	90	105	135
Miscellaneous				
Enclosure class		IP 24		
Colour		dark grey		
Part No.		064 109	064 092	064 108

¹⁾Max. permitted impedance in the mains connected point in accordance with EN 61000-3-11. Start currents can cause short voltage dips that could 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.

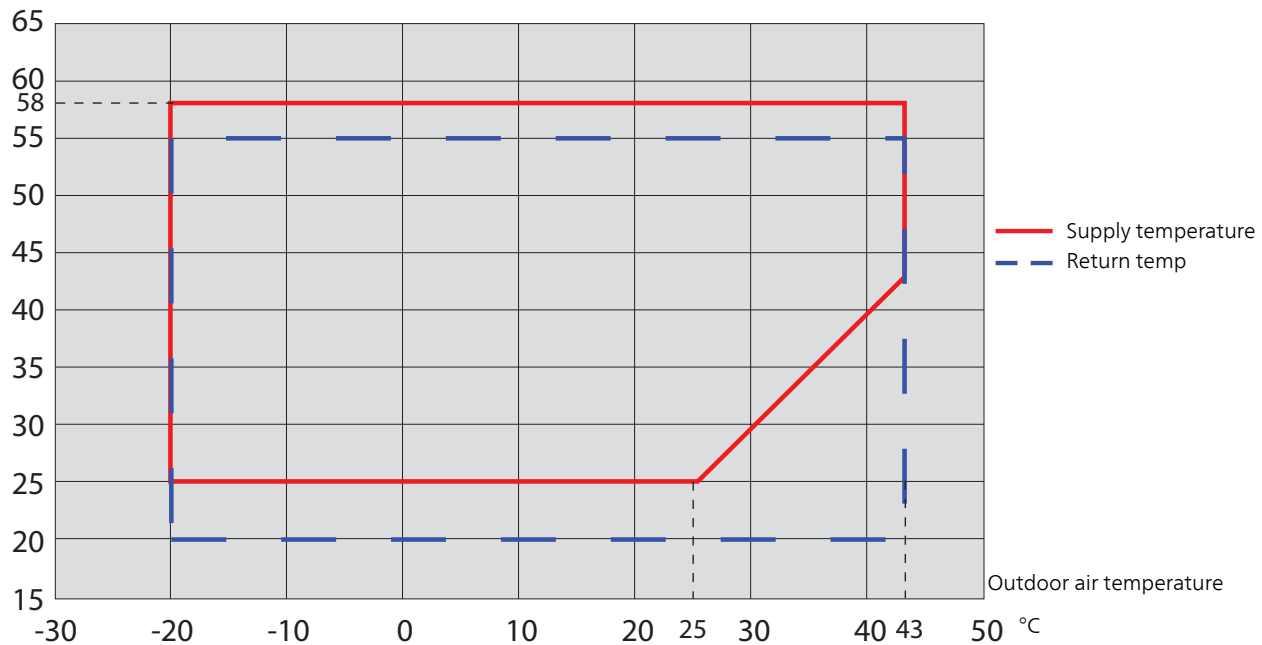
²⁾Specified output is limited with lower fusing.

Working range, compressor operation - heating

F2040-8, -12, -16

Water temperature

°C



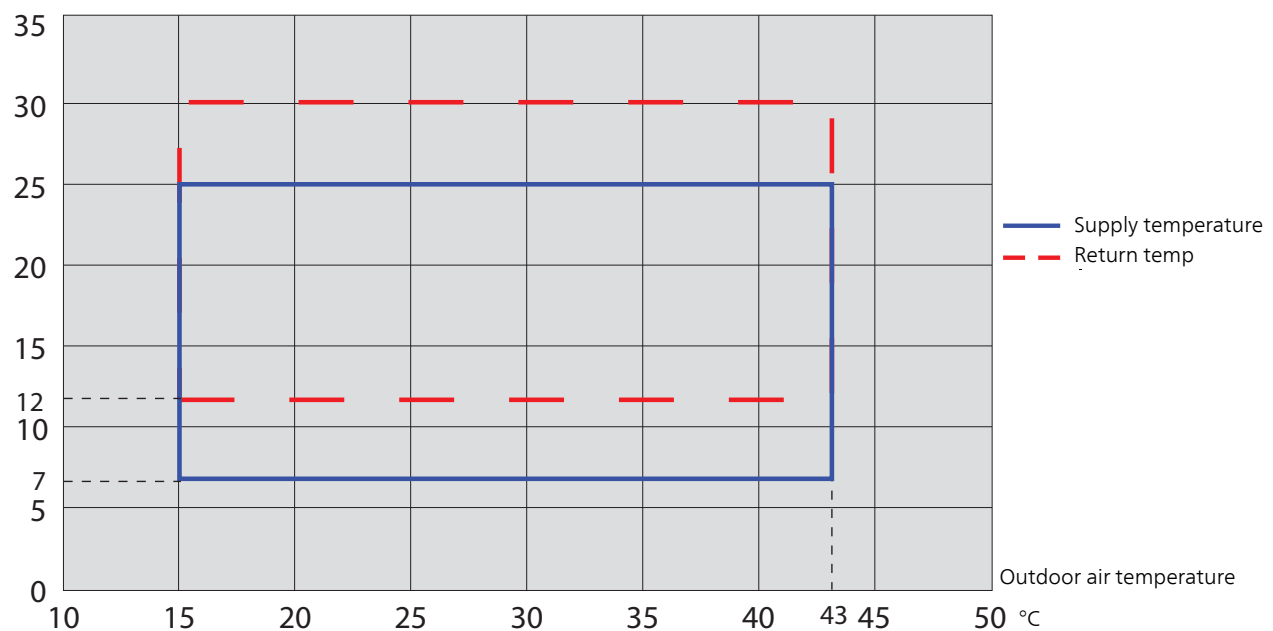
During shorter time it is allowed to have lower working temperatures on the water side, e.g. during start up.

Working range, compressor operation - cooling

F2040-8, -12, -16

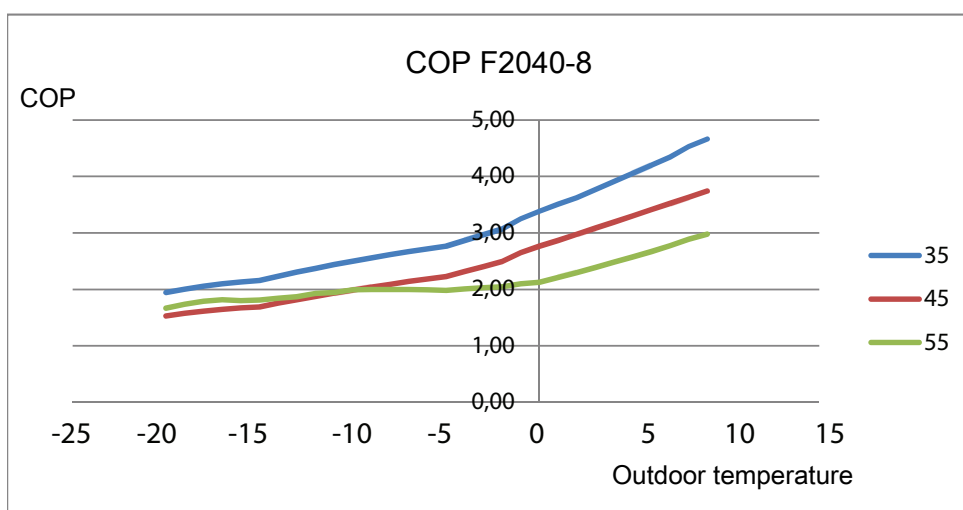
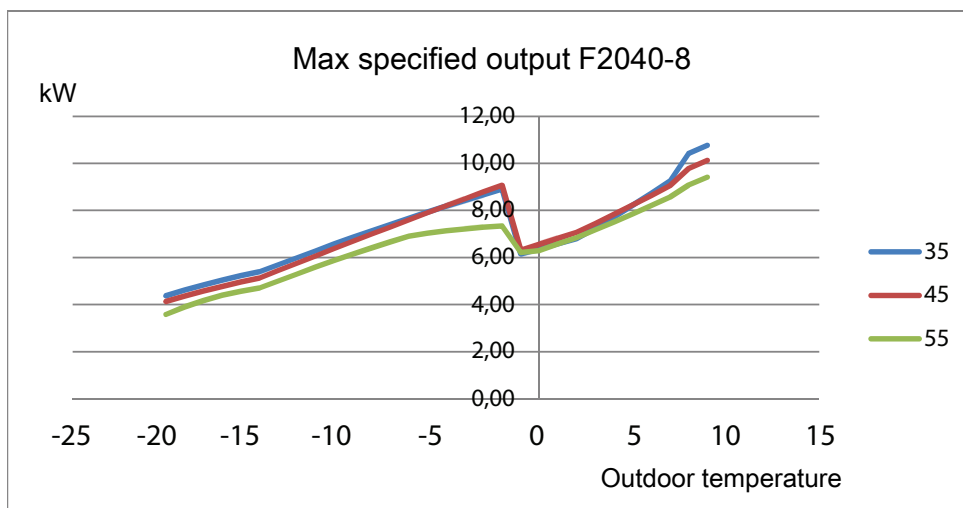
Water temperature

°C

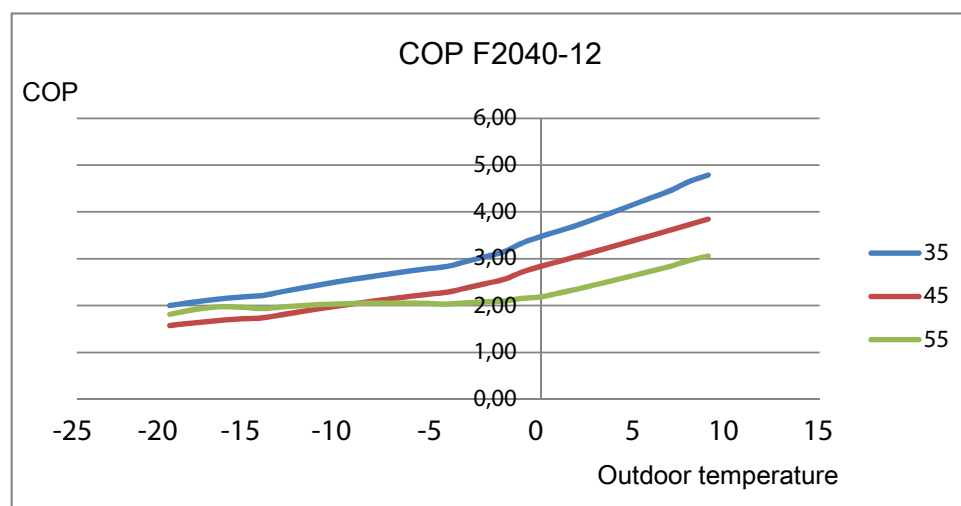
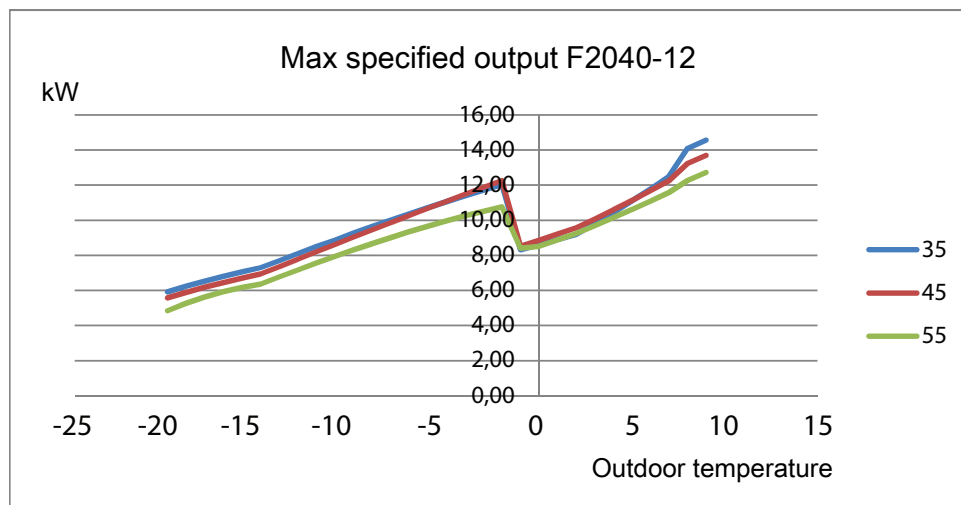


Output and COP at different temperatures

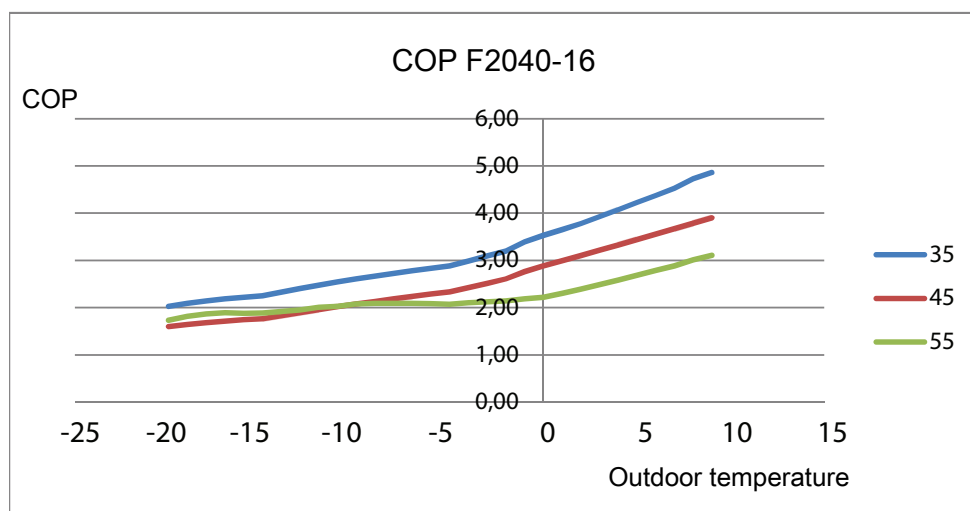
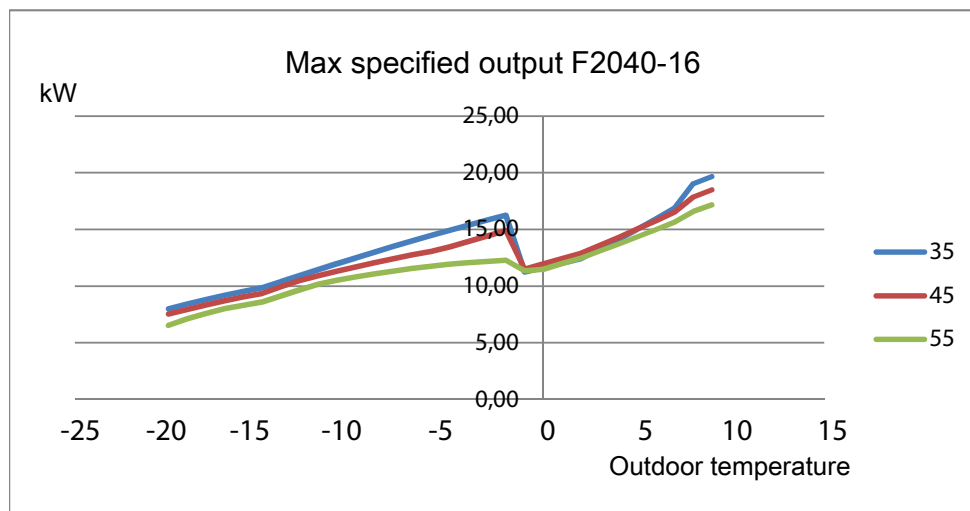
F2040-8



F2040-12

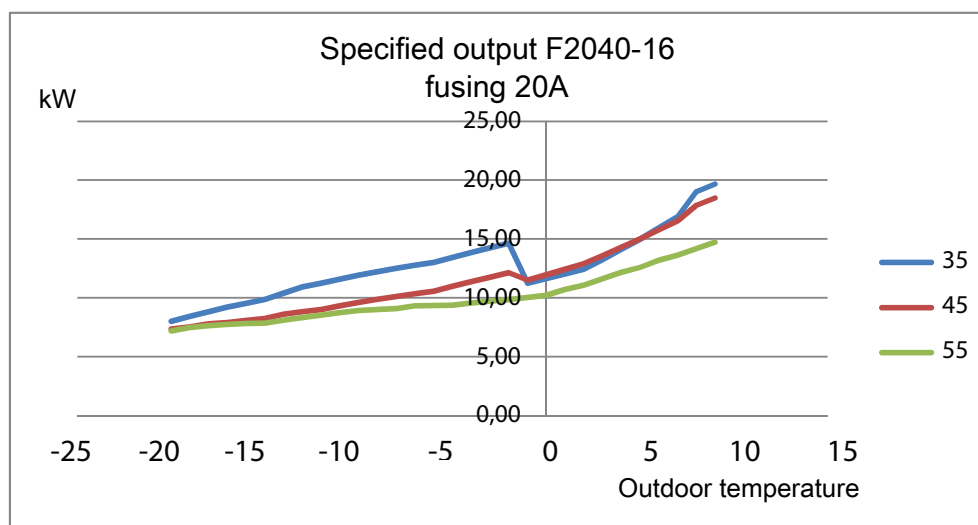
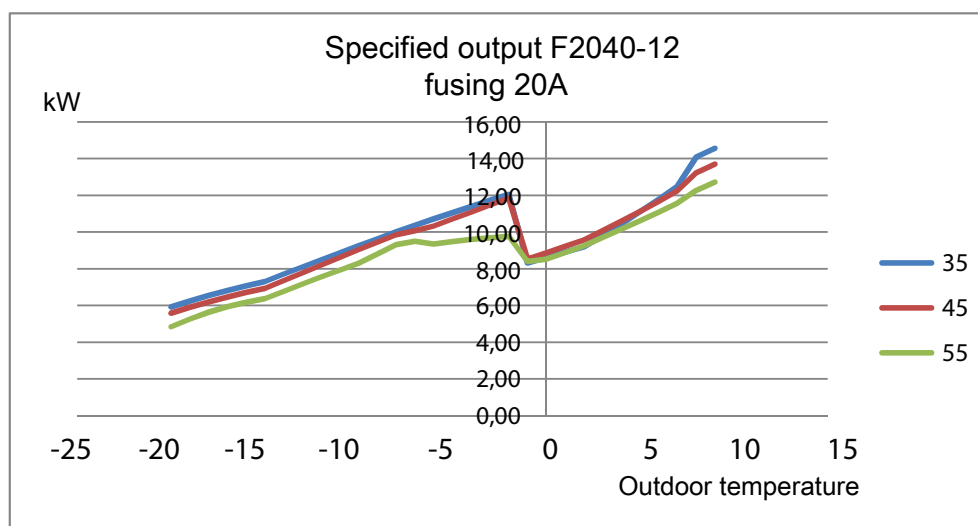
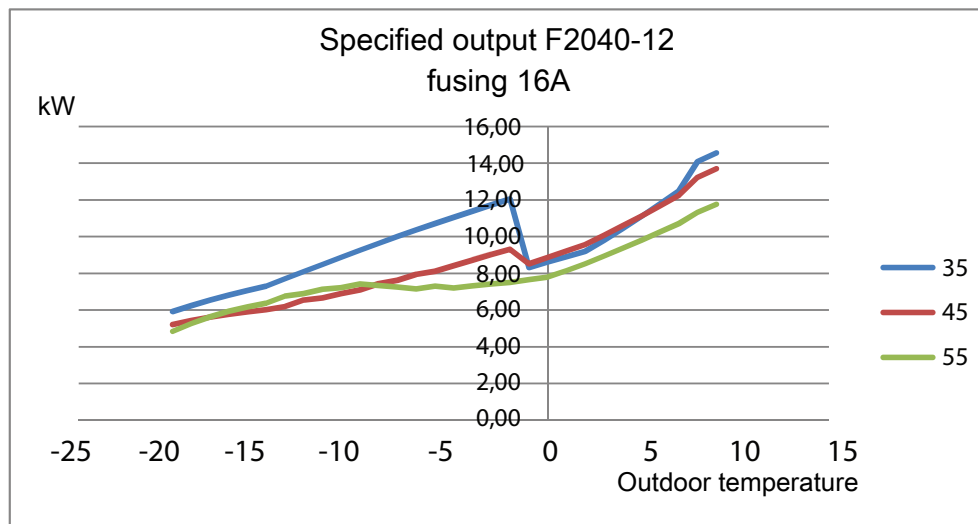


F2040-16



Output with lower fuse rating than recommended

F2040-12/16

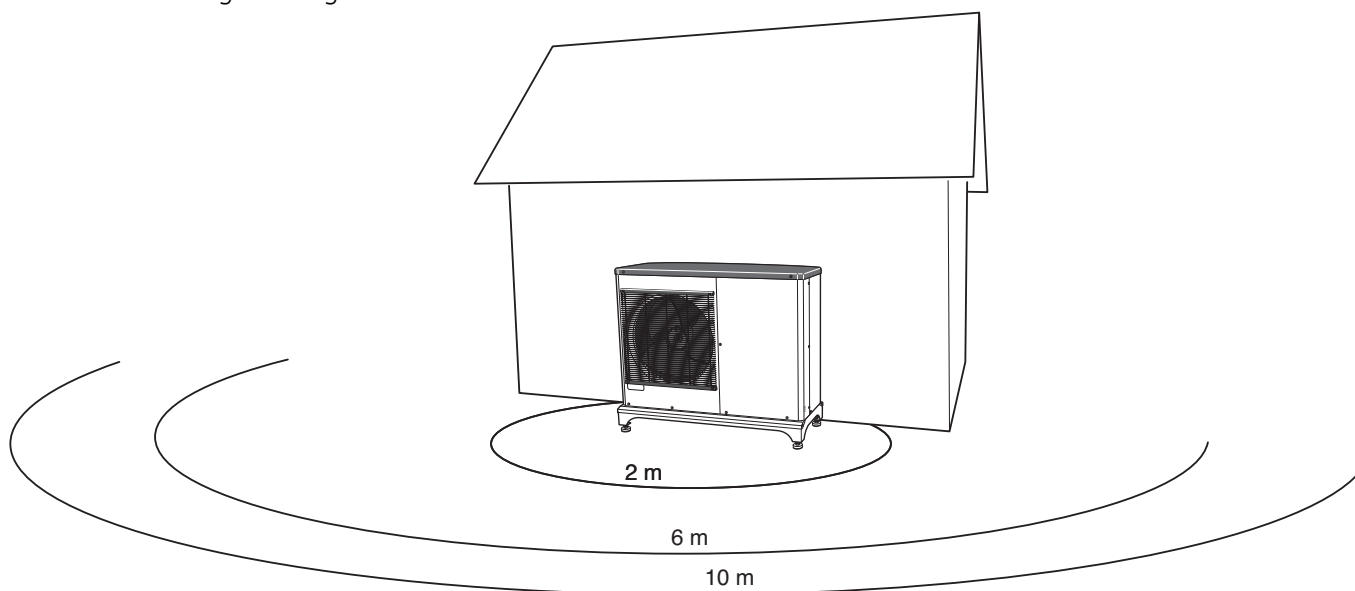


Sound pressure levels

F2040 is usually placed next to a house wall, which gives a directed sound distribution that should be considered. Accordingly, you should always attempt when positioning to choose the side that faces the least sound sensitive neighbouring area.

The sound pressure levels are further affected by walls, bricks, differences in ground level, etc and should therefore only be seen as guide values.

F2040 adjusts the fan speed depending on the ambient temperature and evaporation temperature.



Air-water heat pump		F2040-8	F2040-12	F2040-16
Sound power level* According to EN12102 at 7/45 (nominal)	$L_W(A)$	54	57	68
Sound pressure level at 2 m free standing.*	dB(A)	40	43	54
Sound pressure level at 6 m free standing.*	dB(A)	30.5	33.5	44.5
Sound pressure level at 10 m free standing.*	dB(A)	26	29	40

* Free space.

9 Item register

Item register

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