

# Air/water heat pump

## **NIBE F2050** 6, 10, 12, 16

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# Important information

## Safety information

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

The manual must be left with the customer.

For the latest version of the product's documentation, see [nibe.eu](http://nibe.eu).



### CAUTION!

Also read the enclosed Safety Manual before starting the installation.

## Symbols

Explanation of symbols that may be present in this manual.



### CAUTION!

This symbol indicates danger to person or machine.



### NOTE!

This symbol indicates important information about what you should consider when installing or servicing the installation.



### TIP!

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

## Marking

Explanation of symbols that may be present on the product's label(s).



Fire hazard!



Flammable.



Read the User Manual.



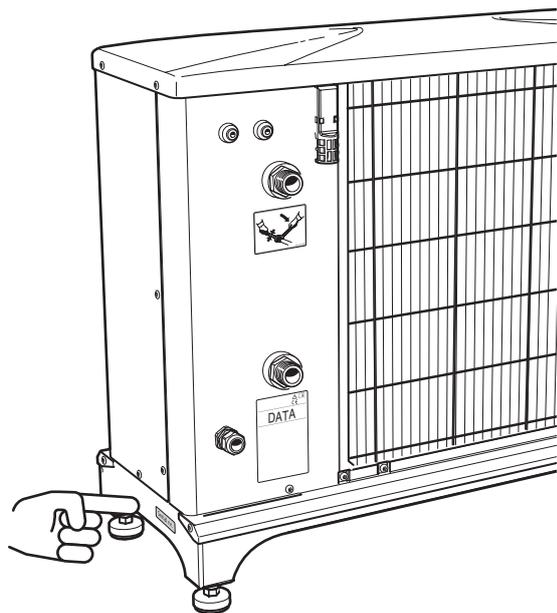
Read the User Manual.



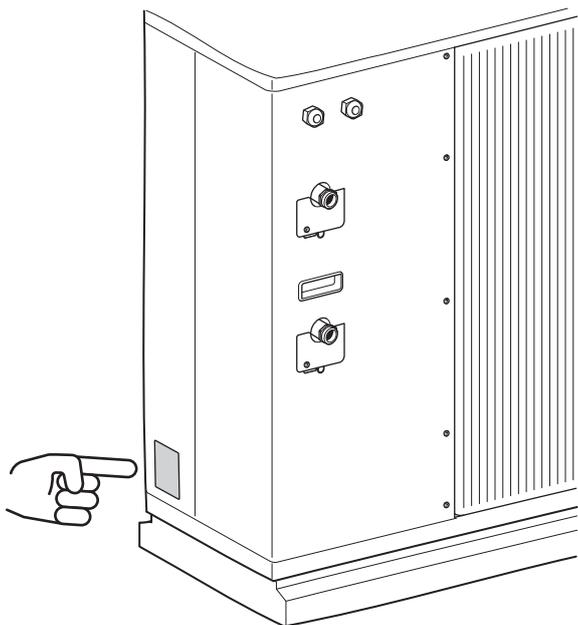
Read the Installer Manual.

## Serial number

The serial number for F2050-6 and F2050-10 can be found on the side of the foot.



The serial number for F2050-12 and F2050-16 can be found on the right-hand side.



### NOTE!

You need the product's serial number for servicing and support.

## Inspection of the installation

Current regulations require the heating installation to pass an installation inspection before it is commissioned. The inspection must be carried out by a suitably qualified person. In addition, complete the page in the User Manual for information about the installation data.

✓	Description	Notes	Signature	Date
	Heating medium (page 25)			
	System flushed			
	System vented			
	Particle filter			
	Shut-off and drain valve			
	Charge flow set			
	Electricity (page 27)			
	Fuses property			
	Safety breaker			
	Earth circuit-breaker			
	Heating cable type/effect			
	Fuse size, heating cable (F3)			
	Communication cable connected			
	F2050 addressed (only when cascade connection)			
	Connections			
	Main voltage			
	Phase voltage			
	When installing F2050-6, check that the software version of the indoor module/control module is at least v8320.			
	Miscellaneous			

## Compatible indoor modules and control modules

	SMO S40	VVM S320	VVM S500	VVM S330
F2050-6	X	X	X	X
F2050-10	X	X	X	X
F2050-12	X	X	X	X
F2050-16	X		X	

	VVM 225	VVM 310	SMO 20	SMO 40
F2050-6	X	X	X	X
F2050-10	X	X	X	X
F2050-12	X	X	X	X
F2050-16		X	X	X

### Indoor module

#### VVM S320

Stainless steel, 1x230 V  
Part no. 069 198

#### VVM S320

Enamel, 3x400 V  
Part no. 069 206

#### VVM S330

Stainless steel, 1 x 230 V  
Part no. 069 249

#### VVM S500

Stainless steel, 1x230 V  
Part no. 069 277

#### VVM 225<sup>1</sup>

Stainless steel, 1x230 V  
Part no. 069 231

#### VVM 225<sup>1</sup>

Stainless steel, 3x400 V  
Part no. 069 229

#### VVM 310

Stainless steel, 3x400 V  
With integrated EMK 310  
Part no. 069 084

#### VVM S320

Stainless steel, 3x230 V  
Part no. 069 201

#### VVM S320

Stainless steel, 3x400 V  
Part no. 069 196

#### VVM S330

Stainless steel, 3 x 400 V  
Part no. 069 250

#### VVM S500

Stainless steel, 3x400 V  
Part no. 069 276

#### VVM 225<sup>1</sup>

Enamel, 3x400 V  
Part no. 069 227

#### VVM 310

Stainless steel, 3x400 V  
Part no. 069 430

### Control module

#### SMO S40

Control module  
Part no. 067 654

#### SMO 20

Control module  
Part no. 067 224

#### SMO 40

Control module  
Part no. 067 225

<sup>1</sup> In combination with F2050-12, the system must be supplemented with NIBE UKV.

# Delivery and handling

## Transport

F2050 should be transported and stored vertically in a dry place.



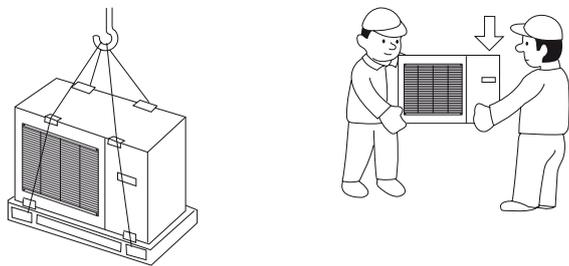
### CAUTION!

Ensure that the heat pump cannot fall over during transport.

Check that F2050 has not been damaged during transport.

## LIFT FROM THE STREET TO THE SET UP LOCATION

If the surface allows, the easiest method is to use a pallet truck to move the heat pump to the installation area.



If the heat pump needs to be transported across soft ground, such as a lawn, we recommend using a crane truck that can lift it to the installation location. When the heat pump is lifted with a crane, the packaging must be intact.

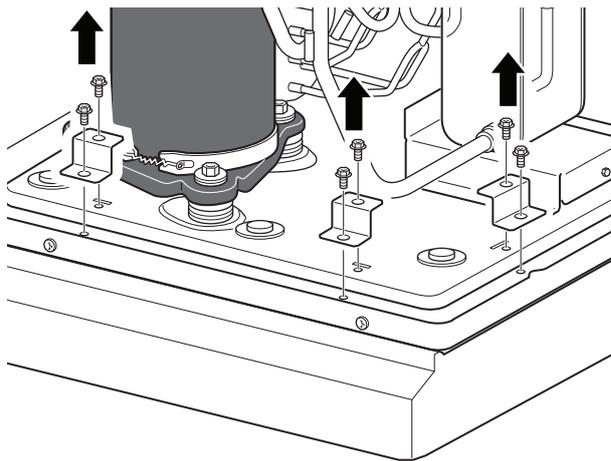
If a crane truck cannot be used, the heat pump can be transported on an extended sack truck. The heat pump must be taken hold of from its heaviest side and two people are required to lift it.

## LIFT FROM THE PALLET TO FINAL POSITIONING

Before lifting remove the packaging and the securing strap to the pallet.

Place lifting straps around each foot. It is recommended that two people perform the lift from the pallet to the base.

After the final placement of F2050-12/-16, the three transport securing devices that are attached to the base plate and in the compressor plate are removed.



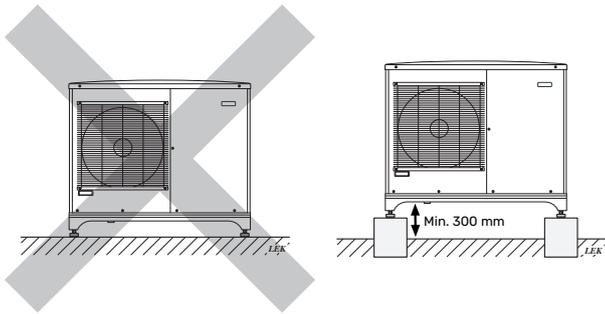
## SCRAPPING

When scrapping, remove the heat pump in reverse order. In this case, lift by the base plate rather than the pallet!

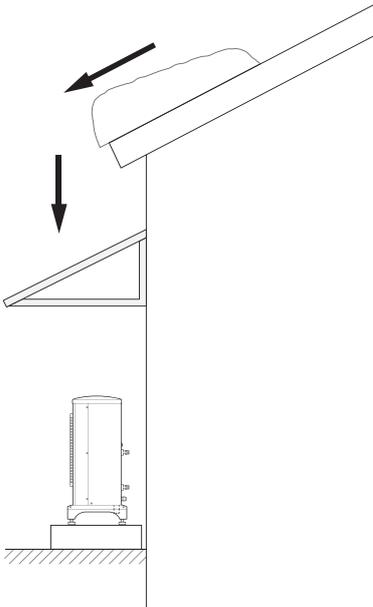
## Assembly

- Place the heat pump in a suitable location outdoors to prevent any risk of the refrigerant flowing in through ventilation openings, doors or similar openings in the event of a leak. It must also not constitute a hazard to people or property in any other way.
- If the heat pump is placed in a location where any refrigerant leak could accumulate, for example below ground level (in a dip or low-lying recess), the installation must satisfy the same requirements that apply for gas detection and the ventilation of engineering rooms. Requirements regarding sources of ignition must be applied where appropriate.
- Place F2050 outdoors on a solid level base that can take the weight, preferably a concrete foundation. If concrete slabs are used they must rest on asphalt or shingle.
- The lower edge of the evaporator must not be lower than the level of the average local snow depth, or at least 300 mm above ground level. The base should be at least 70 mm tall.
- F2050 should not be positioned next to noise sensitive walls, for example, next to a bedroom.
- Also ensure that the placement does not inconvenience the neighbours.

- F2050 must not be placed so that recirculation of the outdoor air is possible. Recirculation entails reduced power and impaired efficiency.
- The evaporator must be sheltered from direct wind / , which negatively affects the defrosting function. Place F2050 protected from wind / against the evaporator.
- Large amounts of condensation, as well as melt water from defrosting, may be produced. Condensation must be led off to a drain or similar (see section "Condensation water").
- Care must be exercised so that the heat pump is not scratched during installation.



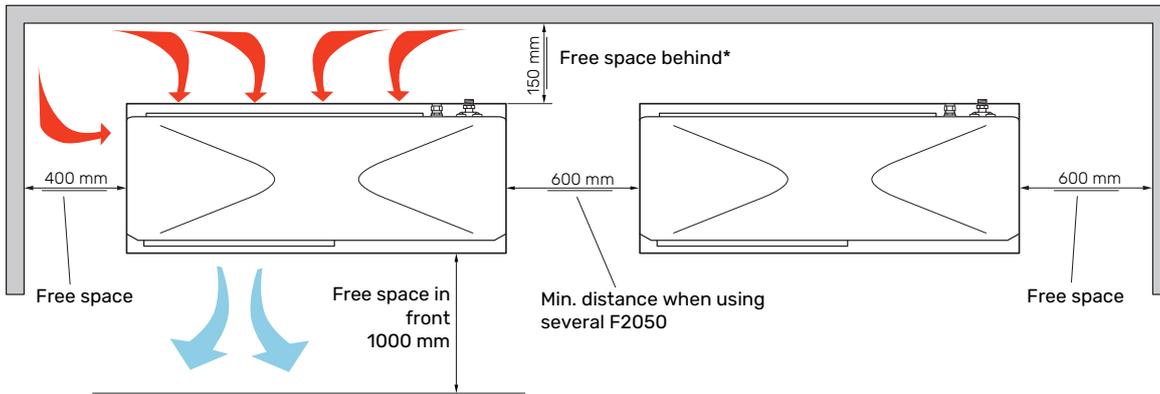
Do not place F2050 directly on the lawn or other non solid surface.



If there is a risk of snow slip from roof, a protective roof or cover must be erected to protect the heat pump, pipes and wiring.

## INSTALLATION AREA

The distance between F2050 and the house wall must be at least 150 mm, but not more than 500 mm in locations that are exposed to the wind. The free space above F2050 must be at least 1,000 mm. The free space in front must be at least 1,000 mm for any future servicing.



\* The space behind must not exceed 500 mm in locations that are exposed to the wind.

## Condensation

The condensate drain pan collects and leads away the condensation water.



### CAUTION!

It is important to the heat pump function that condensation water is led away and that the drain for the condensation water run off is not positioned so that it can cause damage to the house.

Condensation run-off should be checked regularly, especially during the autumn. Clean if necessary.

- The condensation water (up to 50 litres / 24 hrs) must be routed away by a pipe to an appropriate drain, it is recommended that the shortest outdoor length possible is used.
- The section of the pipe that can be affected by frost must be heated by the heating cable to prevent freezing.



### TIP!

Pipe with heating cable for draining the condensation water trough is not included.



### TIP!

To ensure this function, the accessory KVR should be used.

- Route the pipe downward from the heat pump.
- The outlet of the condensation water pipe must be at frost free depth.
- Use a water trap for installations where air circulation may occur in the condensation water pipe.
- The insulation must seal against the bottom of the condensation water trough.

## DRAIN PAN HEATER, CONTROL

The drain pan heater is supplied with power when one of the following conditions is met:

1. The compressor has been in operation for at least 30 minutes after last start.
2. The ambient temperature is lower than 1 °C.

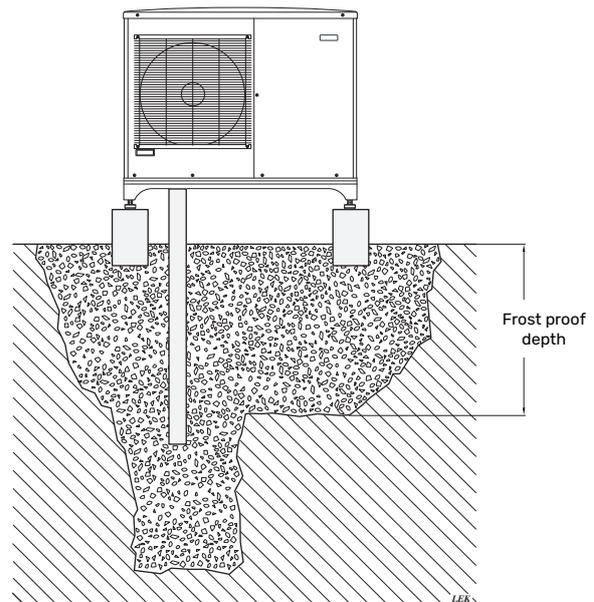
## DRAINAGE OF CONDENSATION



### NOTE!

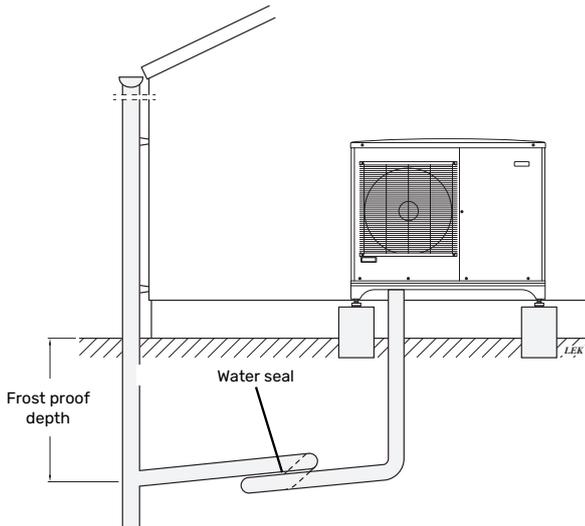
If none of the following recommended alternatives is used, good drainage of condensation must be provided.

## Stone caisson



If the house has a cellar the stone caisson must be positioned so that condensation water does not affect the house. Otherwise the stone caisson can be positioned directly under the heat pump.

## Gutter drainage

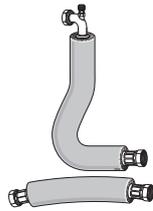


Route the pipe sloping down from the heat pump. The condensation water pipe must have a water seal to prevent air circulation in the pipe.

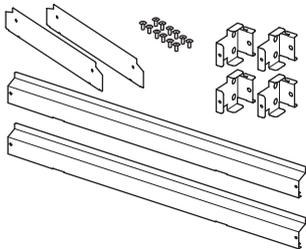
## Supplied components



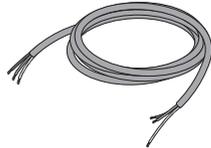
1 x filterball (G1") (QZ2)



2 x flexible pipes (DN25, G1")  
with 4 x gaskets



1 x plinths

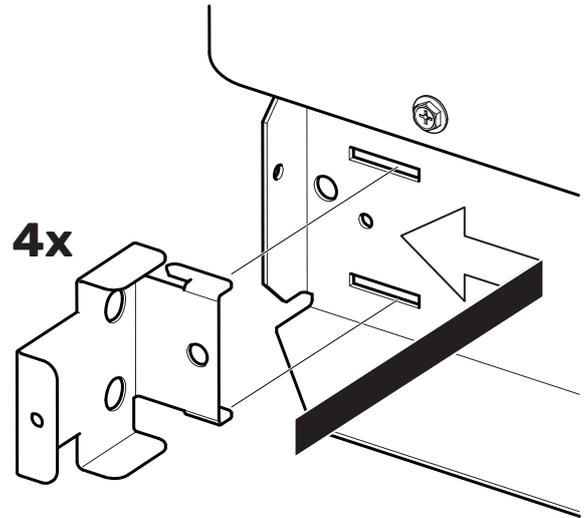


1 x incoming power supply  
cable (W1)<sup>1</sup>

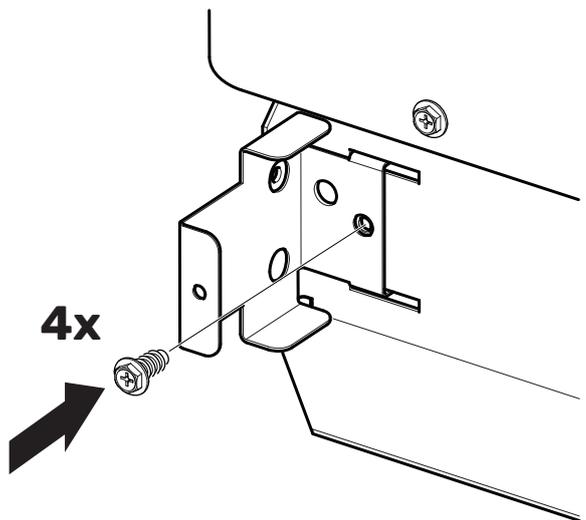
## Installing the plinth around F2050-12/-16

A plinth is enclosed with F2050-12/-16.

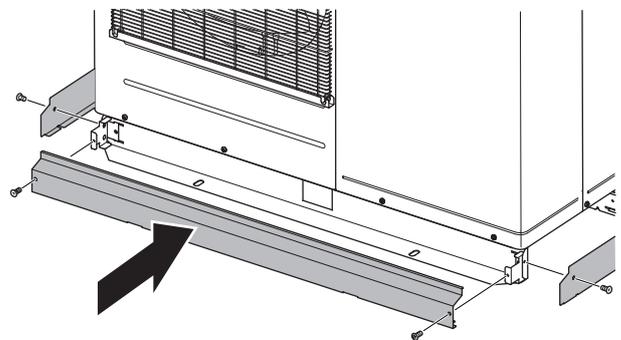
1. Install the four spacer brackets, one in each corner.



2. Attach with the enclosed screws.



3. Install the four skirting boards and attach with the enclosed screws.

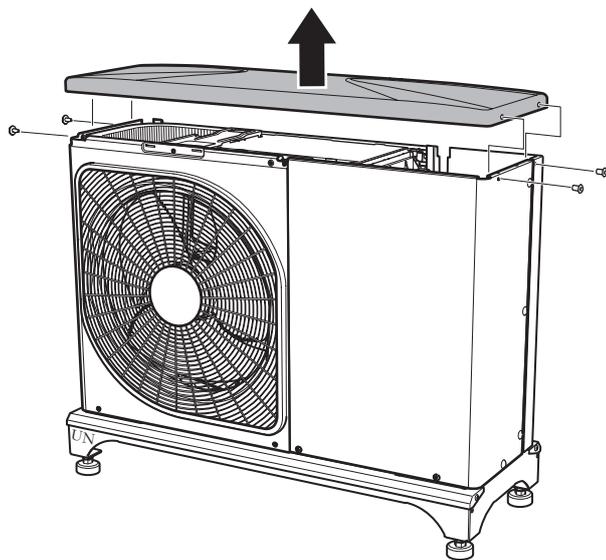


<sup>1</sup> Only applies to F2050-12/-16.

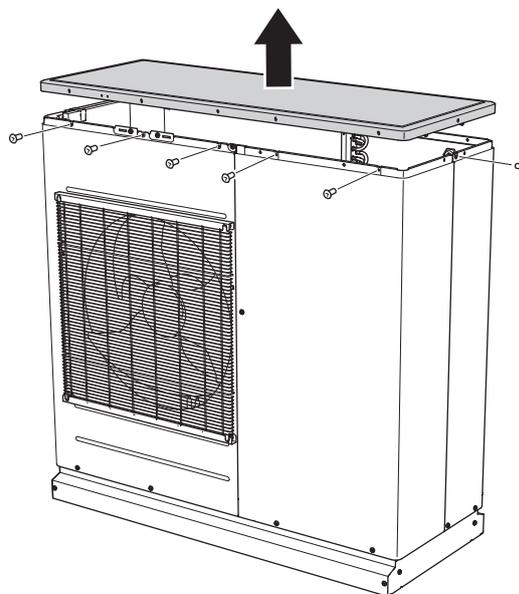
## Dismantling panels

### DISMANTLING TOP PANEL

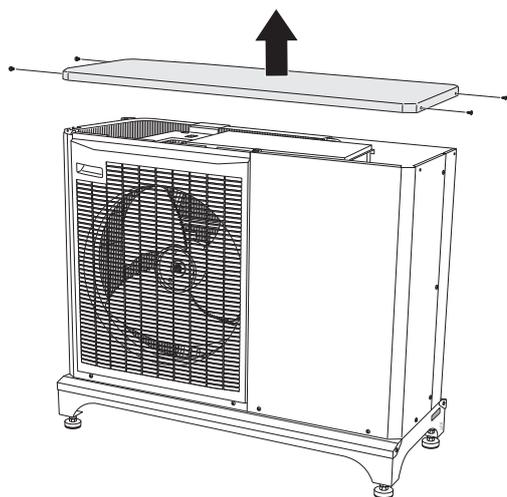
**F2050-6**



**F2050-12/-16**

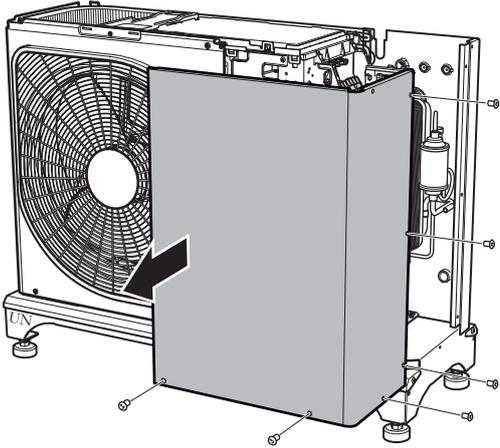


**F2050-10**

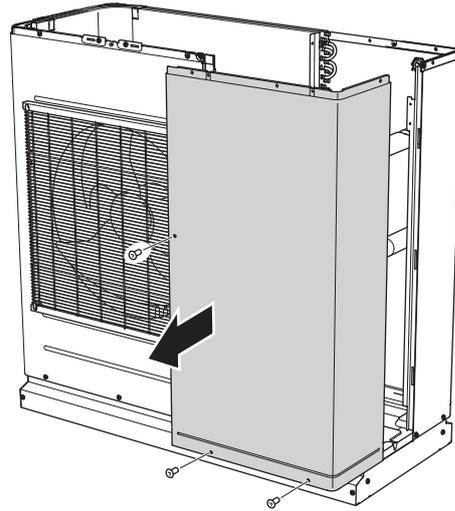


## REMOVING THE FRONT PANEL

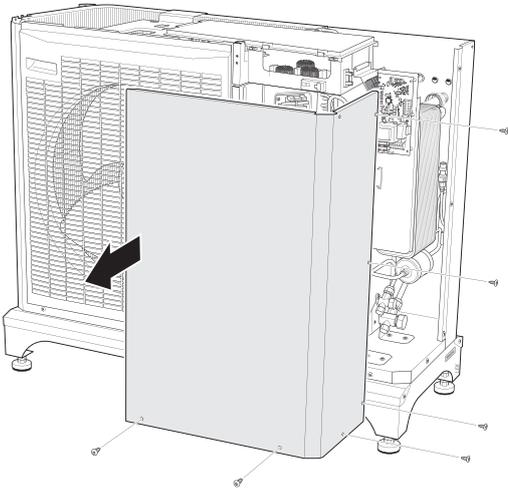
### F2050-6



### F2050-12/-16



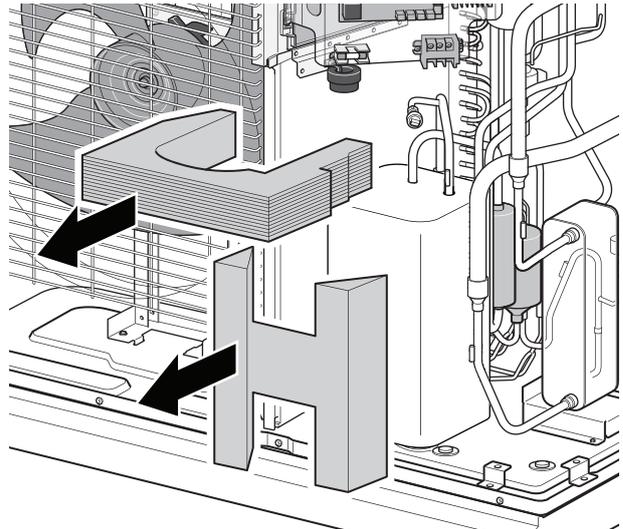
### F2050-10



## Dismantling cardboard box

### F2050-12/-16

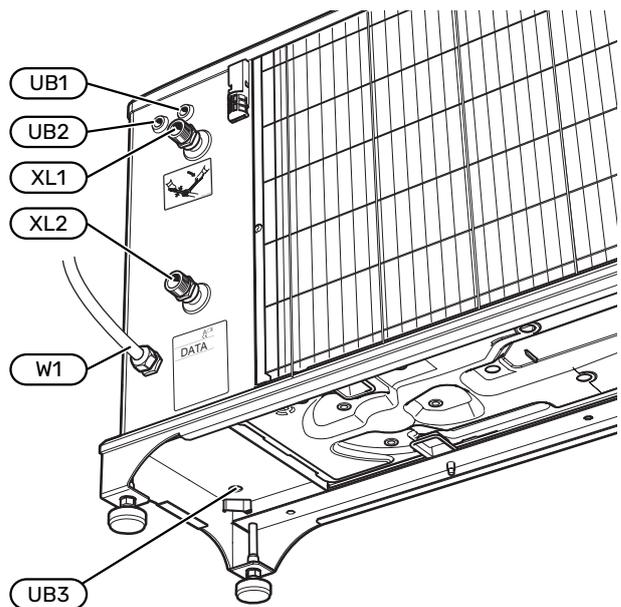
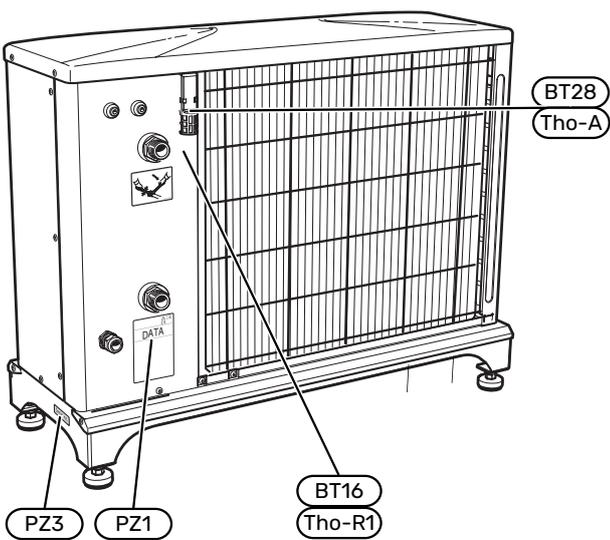
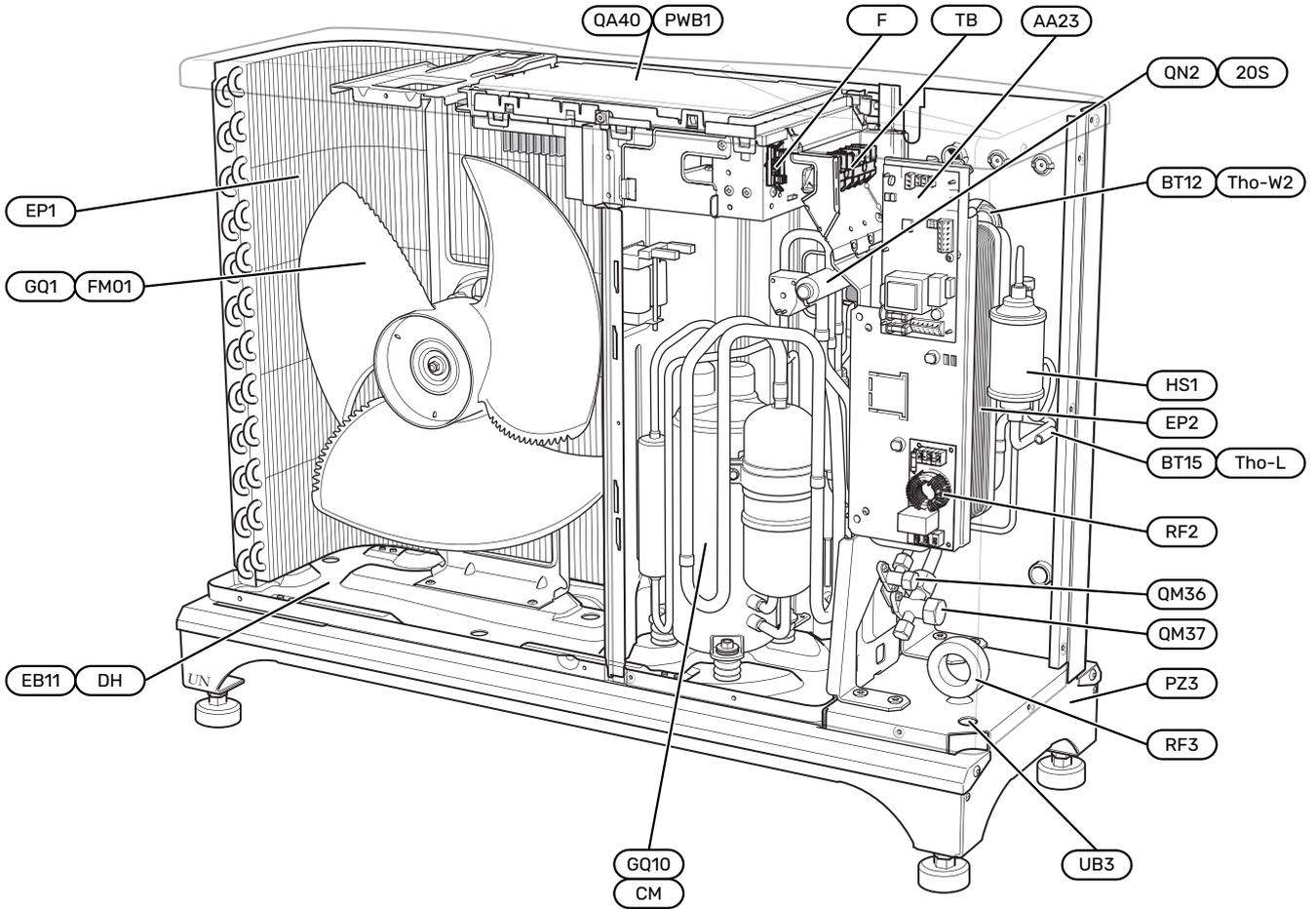
Remove the pieces of cardboard that are inside F2050-12/-16.

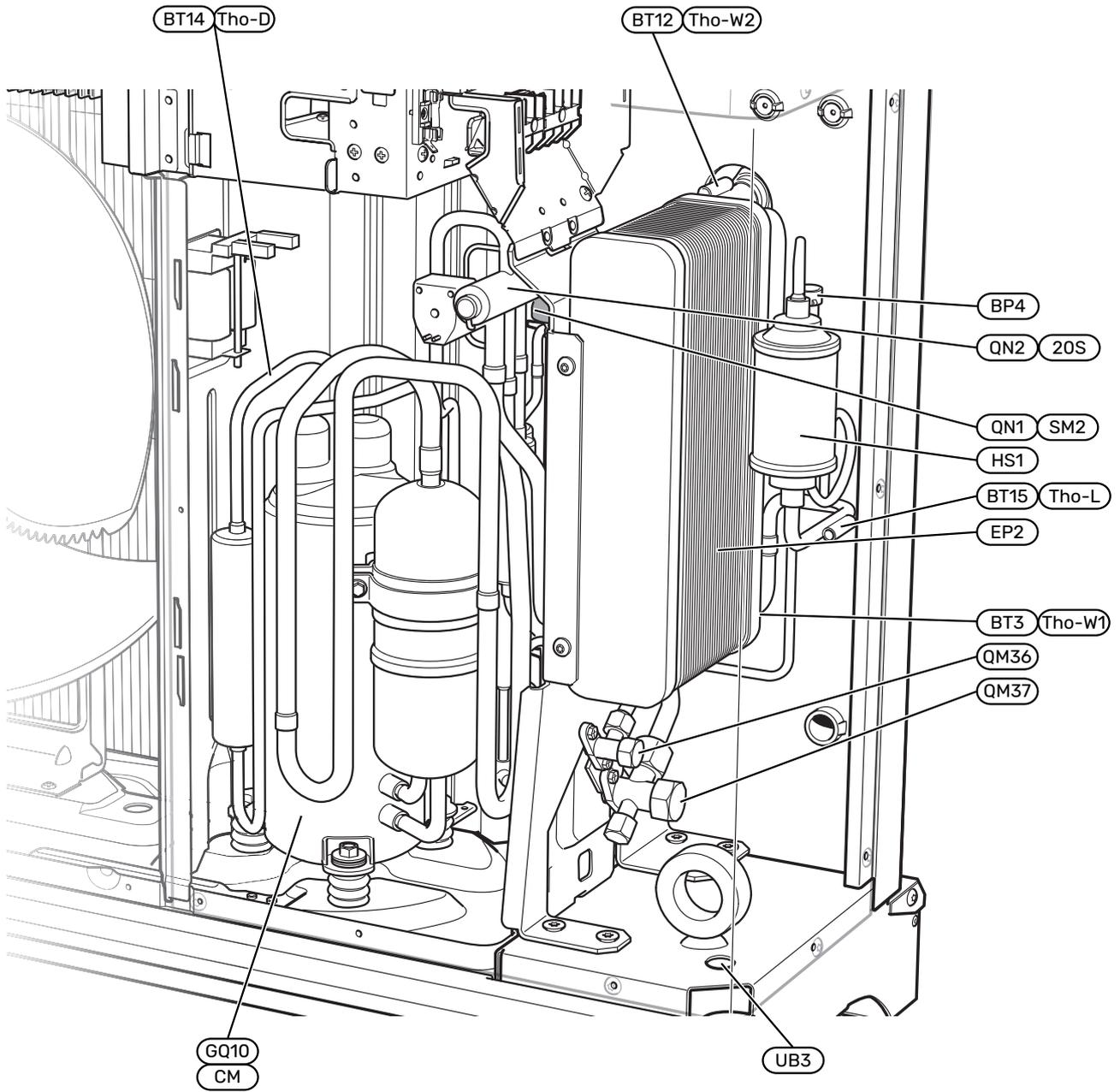


# The heat pump design

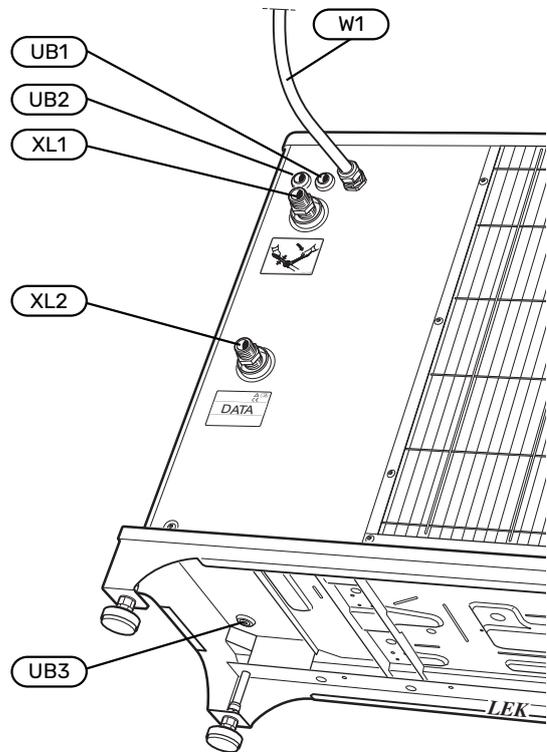
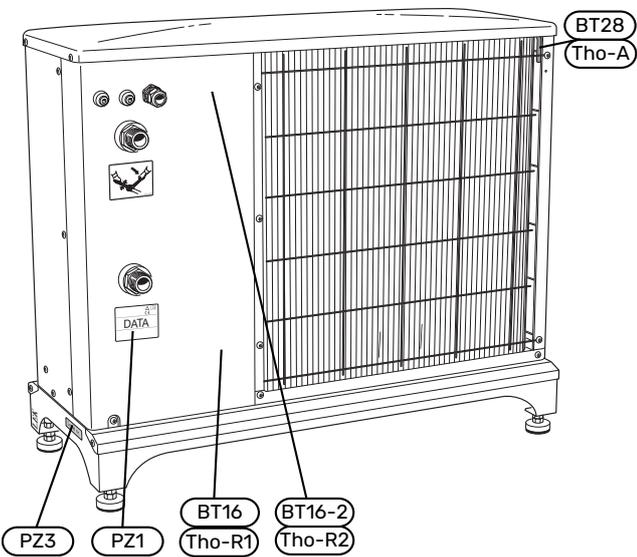
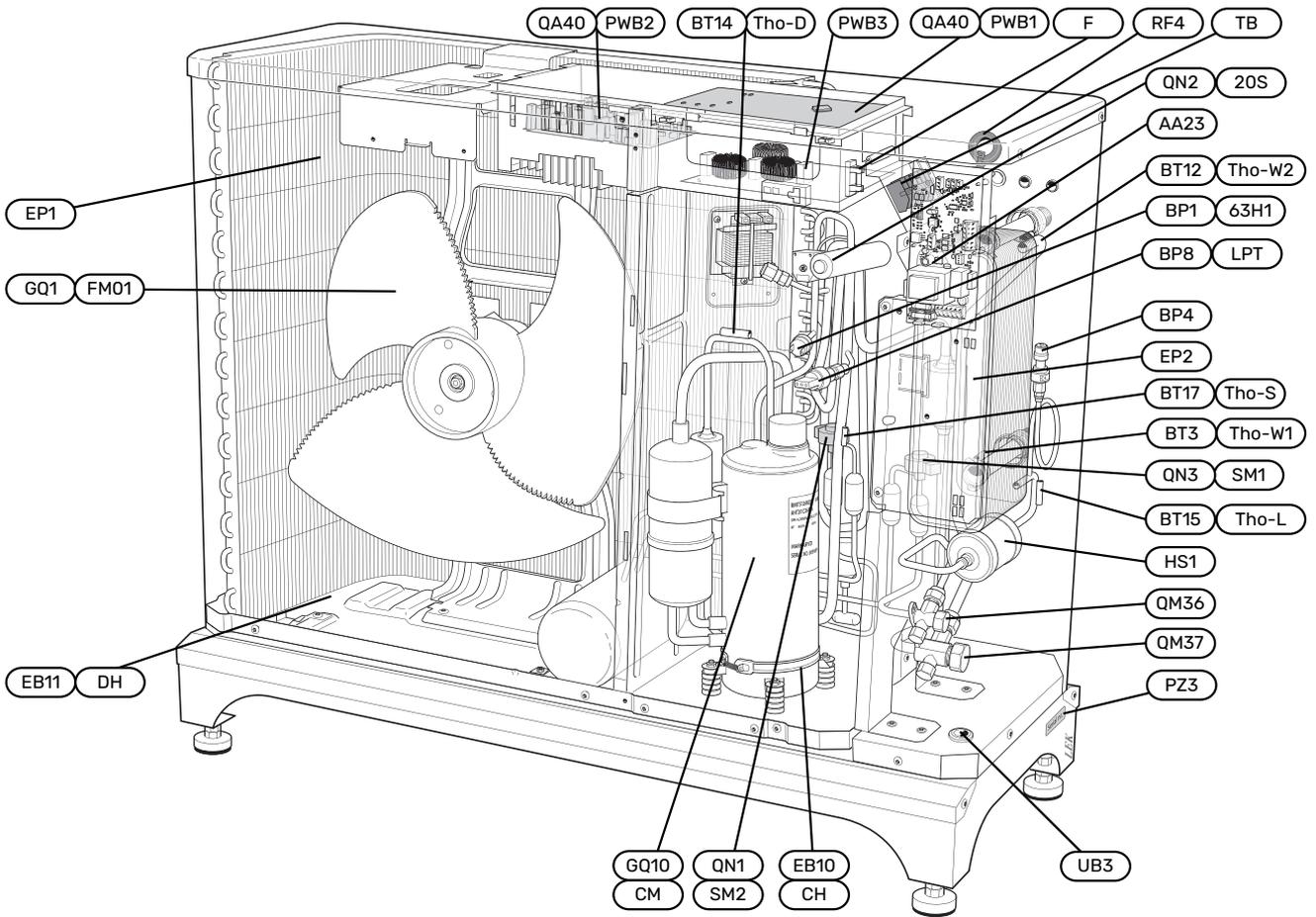
## General

F2050-6

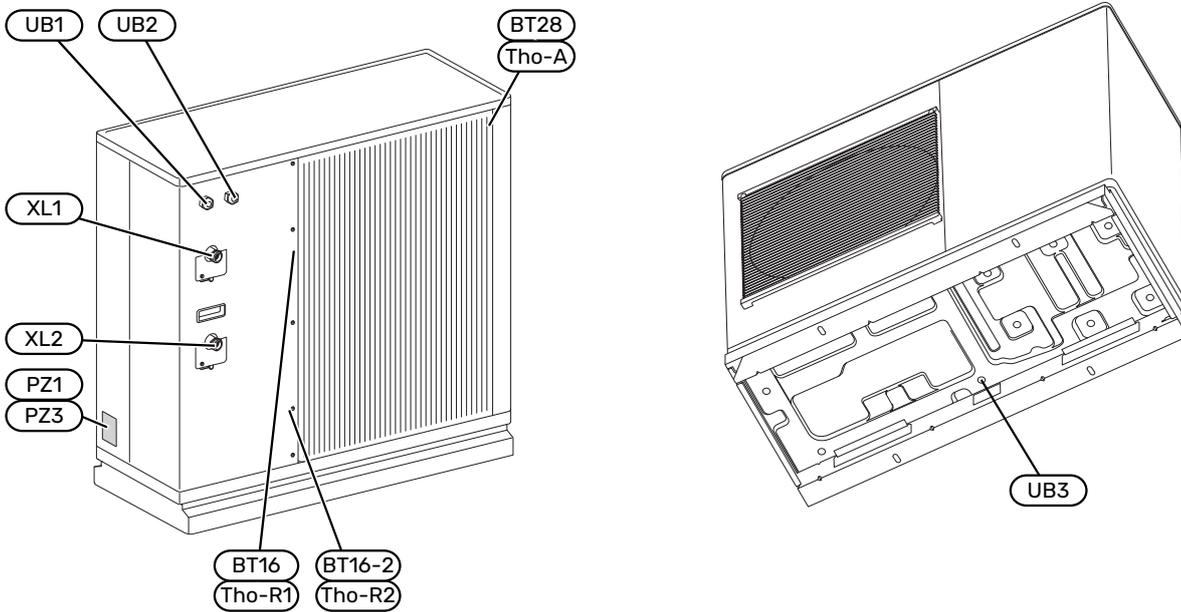
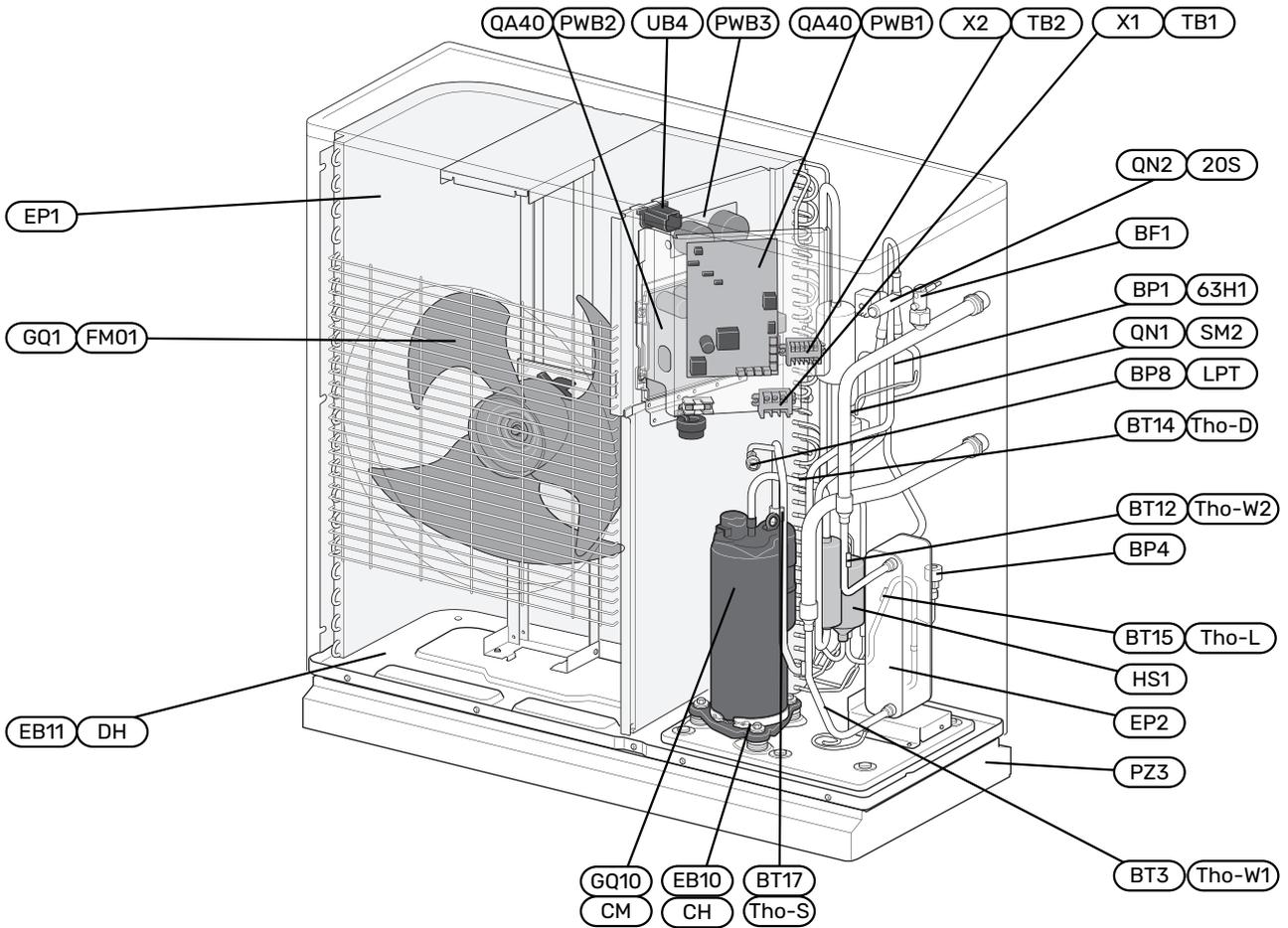




# F2050-10



**F2050-12 / -16**



## Pipe connections

XL1	Heating medium connection, supply (out from F2050)
XL2	Heating medium connection, return (to F2050)

## Sensors etc.

BP1 (63H1)	High pressure pressostat
BP4	Pressure sensor, condenser
BP8 (LPT)	Low pressure transmitter
BT3 (Tho-W1)	Return line sensor
BT12 (Tho-W2)	Condenser sensor, supply line
BT14 (Tho-D)	Hot gas sensor
BT15 (Tho-L)	Fluid line sensor
BT16 (Tho-R1)	Evaporator sensor 1
BT16-2 (Tho-R2)	Evaporator sensor 2
BT17 (Tho-S)	Suction gas sensor
BT28 (Tho-A)	Ambient sensor

## Electrical components

AA23	Communication board
EB10 (CH)	Compressor heater
EB11 (DH)	Drip tray heater
F	Main fuse compressor unit
GQ1 (FM01)	Fan
QA40 (PWB1)	Control board with inverter unit
QA40 (PWB2)	Inverter module
(PWB3)	Filter board
RF2	EMC filter for inverter
RF3	EMC filter for incoming supply
RF4	EMC filter for communication
(TB)	Terminal block, supply voltage and communication with board AA23
UB1	Cable gland, incoming supply
UB2	Cable grommet, communication
UB3	Cable gland, heating cable (EB14)
UB4	Cable grommet, fan
W1	Cable, incoming supply

## Cooling components

EP1	Evaporator
EP2	Condenser
GQ10 (CM)	Compressor
HS1	Drying filter
QM36	Shut-off valve, liquid line
QM37	Shut-off valve, gas line
QN1 (SM2)	Expansion valve, heating and cooling
QN2 (20S)	4-way valve
QN3 (SM1)	Expansion valve, cooling

## Miscellaneous

PZ1	Rating plate
PZ3	Serial number plate

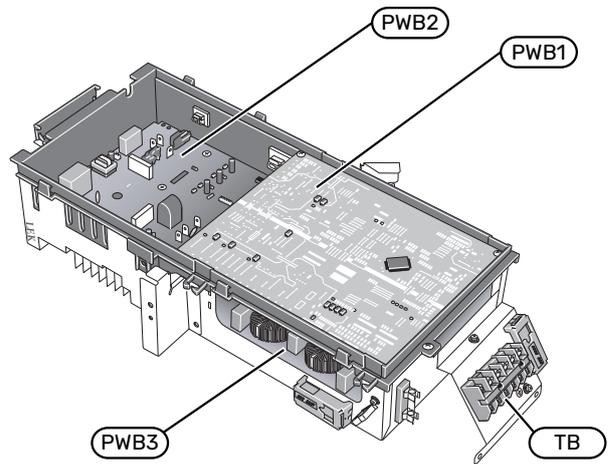
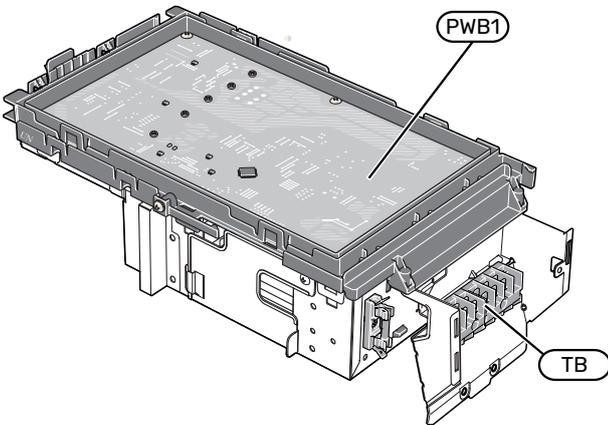
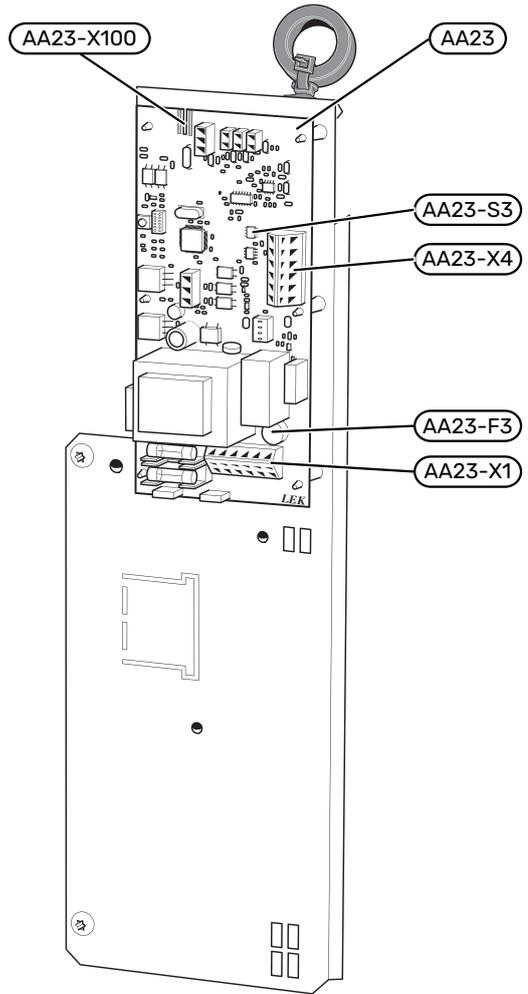
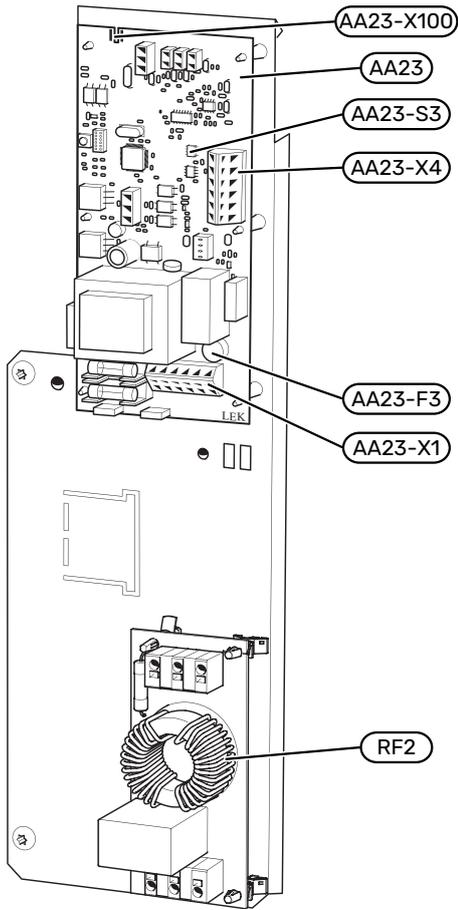
Designations according to standard EN 81346-2.

Designations within brackets according to the supplier's standard.

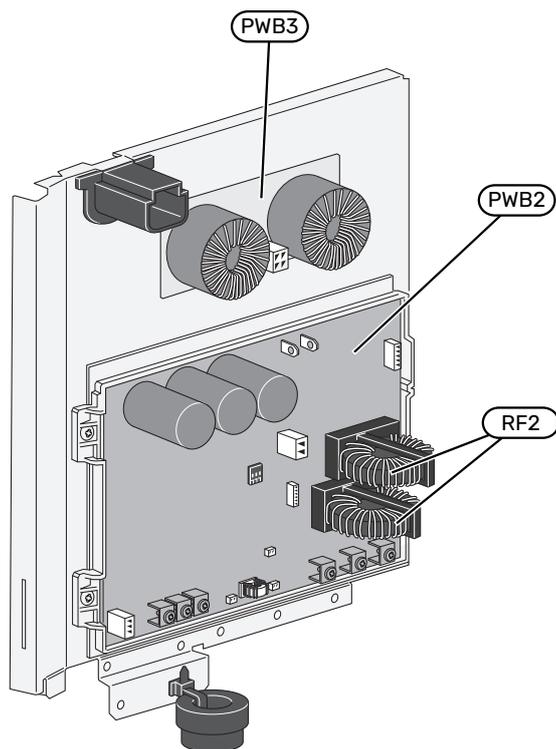
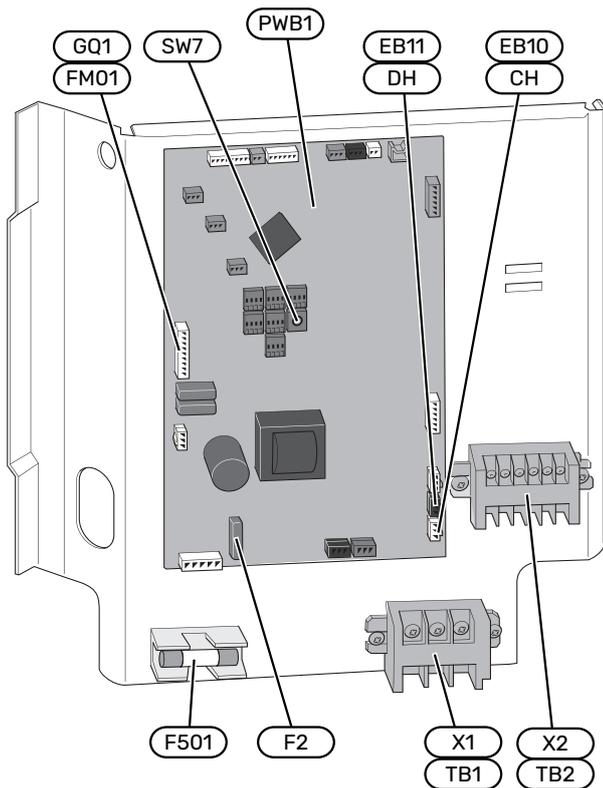
# Electrical connection

## F2050-10

### F2050-6



## F2050-12/-16



## Electrical components

AA23	Communication board
F3	Fuse for external heating cable (250 mA), max 45 W.
S3	DIP switch, addressing of outdoor module
X1	Terminal block, KVR
X4	Terminal block, communication from indoor module
X100	Communication with TB
(F501)	Fuse, fan, 2A
(PWB1)	Control board
EB10 (CH)	Compressor heater, terminal block
EB11 (DH)	Drip tray heater, terminal block
F2	Fuse, 2A
GQ1 (FM01)	Fan, terminal block
SW7	DIP switch, addressing of outdoor module
(PWB2)	Inverter board
RF2	EMC-filter
(PWB3)	Filter board
(TB)	Terminal block, supply voltage and communication with board AA23
X1 (TB1)	Terminal block, power supply
X2 (TB2)	Terminal block, communication with indoor unit

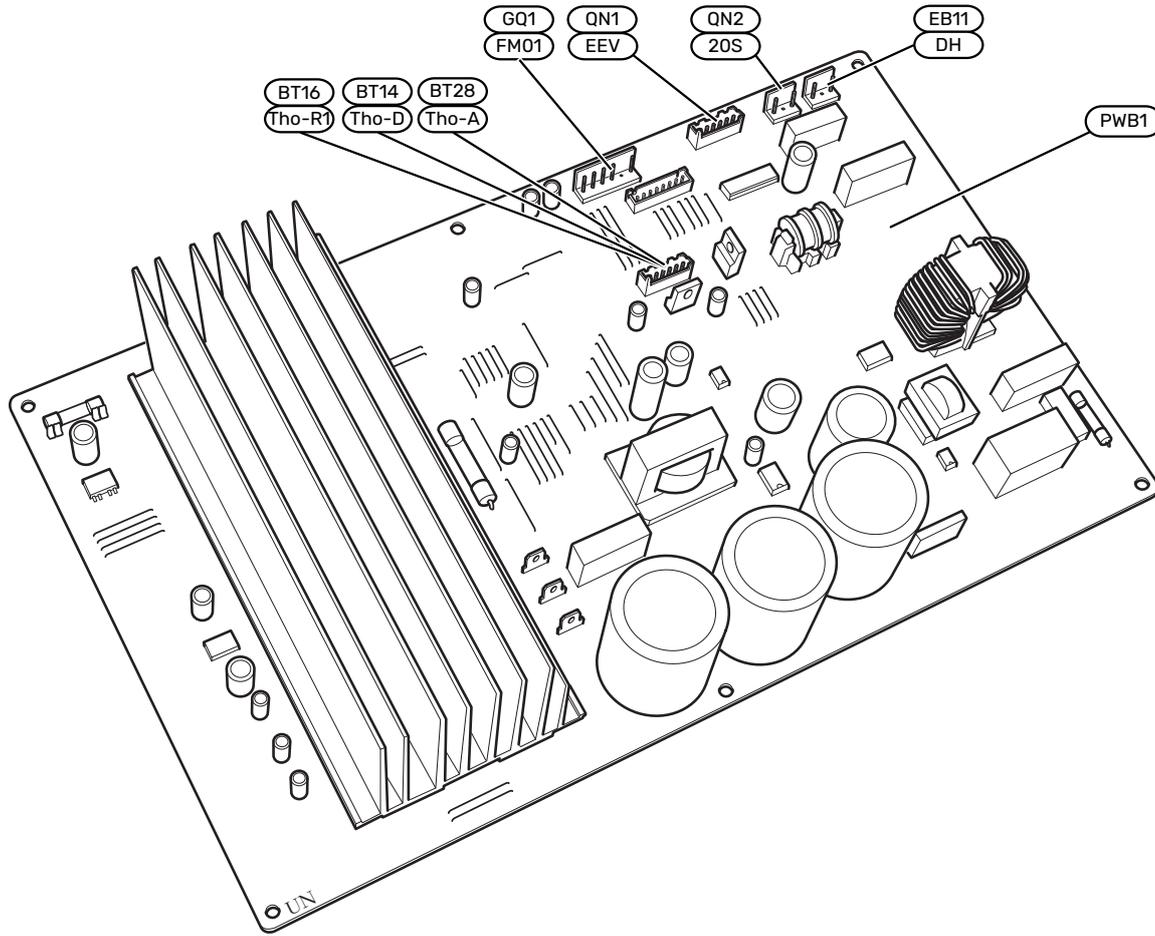
Designations according to standard EN 81346-2.

Designations within brackets according to the supplier's standard.

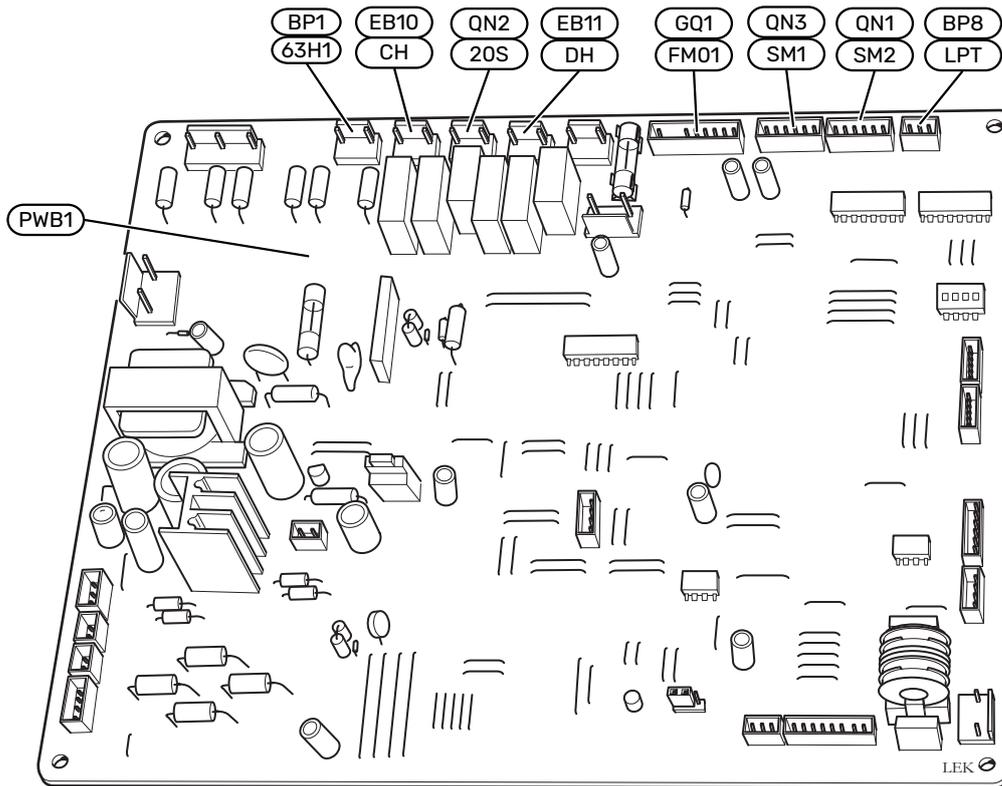
# Sensor placement

## CONNECTION ON CONTROL BOARD (PWB1)

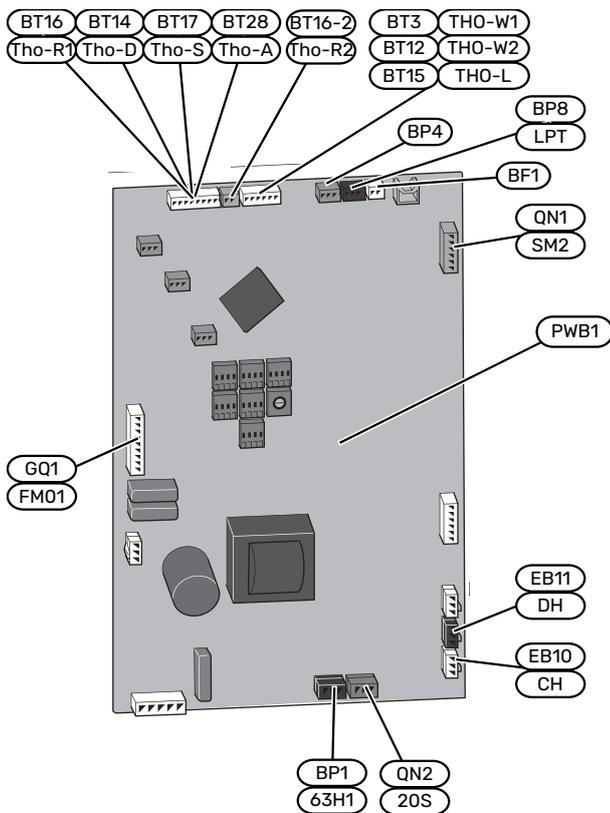
### F2050-6



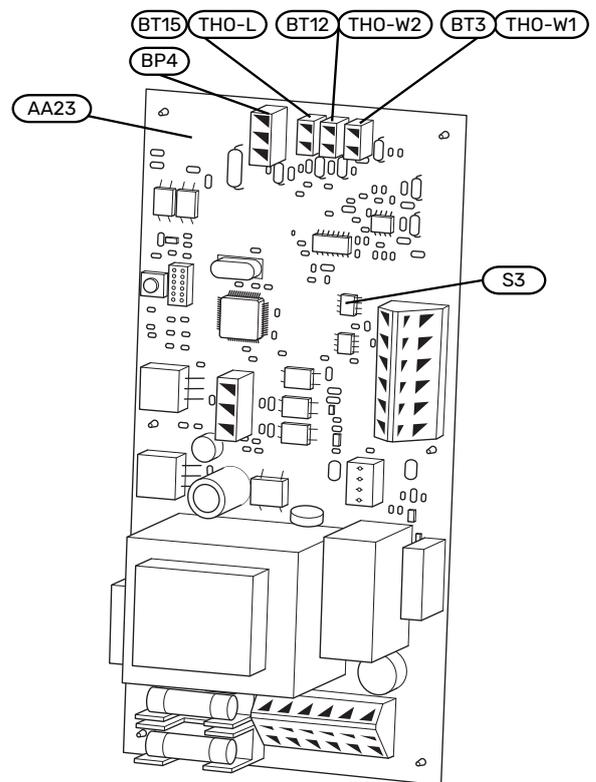
## F2050-10



## F2050-12 / -16

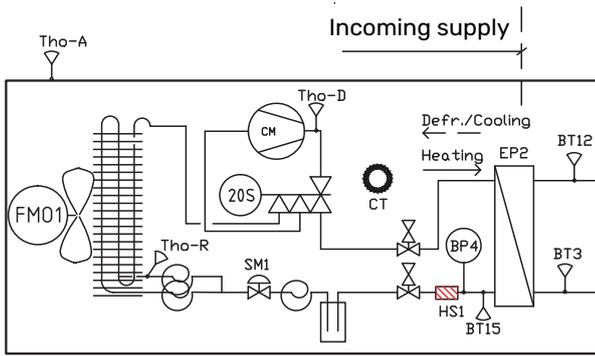


## CONNECTION ON COMMUNICATION BOARD (AA23)

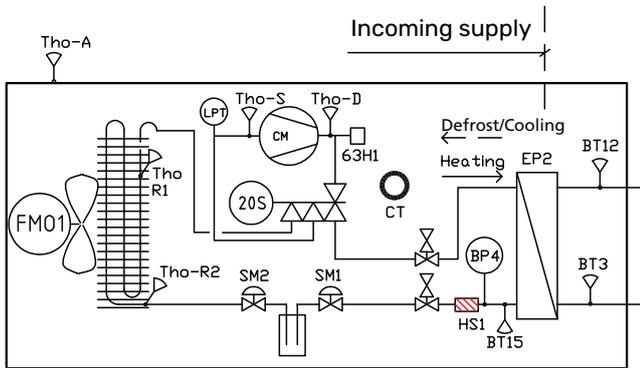


## SENSOR PLACEMENT IN F2050

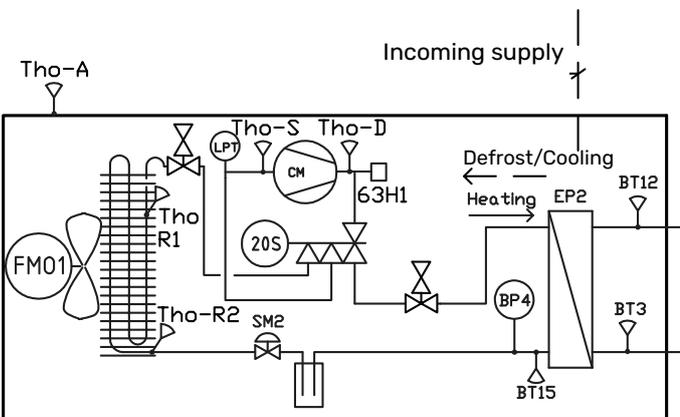
### Outdoor module F2050-6



### Outdoor module F2050-10



### Outdoor unit F2050-12 / -16



AA23	Communication board
BP4	Pressure sensor, condenser
S3	DIP switch, addressing of outdoor unit
BT3 (Tho-W1)	Temperature sensor, heating medium return line
BT12 (Tho-W2)	Temperature sensor, condenser supply line
BT15 (Tho-L)	Temperature sensor, fluid pipe
PWB1	Control board
BE1 (CT)	Current sensor
BP1 (63H1)	High pressure pressurestat
BP8 (LPT)	Low pressure transmitter
BP4	Pressure sensor, condenser
BT3 (Tho-W1)	Temperature sensor, heating medium return line
BT12 (Tho-W2)	Temperature sensor, condenser supply line
BT14 (Tho-D)	Temperature sensor, hot gas
BT15 (Tho-L)	Temperature sensor, fluid pipe
BT16 (Tho-R1)	Temperature sensor, heat exchanger, 1
BT16-2 (Tho-R2)	Temperature sensor, heat exchanger, 2
BT17 (Tho-S)	Temperature sensor, suction gas
BT28 (Tho-A)	Temperature sensor, ambient
EB10 (CH)	Compressor heater
EB11 (DH)	Drip tray heater
EP2	Condenser
GQ1 (FM01)	Fan
GQ10 (CM)	Compressor
HS1	Drying filter
QN1 (EEV)	Expansion valve
QN1 (SM2)	Expansion valve, heating
QN2 (20S)	4-way valve
QN3 (SM1)	Expansion valve, cooling

Designations according to standard EN 81346-2.

Designations within brackets according to the supplier's standard.

# Pipe connections

## General

Pipe installation must be carried out in accordance with current norms and directives.

### MINIMUM SYSTEM FLOWS



**CAUTION!**  
An undersized climate system can result in damage to the product and lead to malfunctions.

Each climate system must be dimensioned individually to provide the recommended system flows.

The installation must be dimensioned to provide at least the minimum defrosting flow at 100 % circulation pump operation.

Air/water heat pump	Minimum flow during defrosting 100% circulation pump operation (l/s)	Minimum recommended pipe dimension (DN)	Minimum recommended pipe dimension (mm)
F2050-6	0.19	20	22
F2050-10			
F2050-12	0.29	20	22
F2050-16	0.39	25	28

F2050 can only operate up to a return temperature of about 55 °C and an outgoing temperature of about 58 °C from the heat pump.

F2050 is not equipped with shut-off valves on the heating medium side, rather these must be installed to facilitate any future servicing. The return temperature is limited by the return line sensor.

### WATER VOLUMES

When docking with F2050 free flow in the climate system is recommended for correct heat transfer. This can be achieved by use of a bypass valve. If free flow cannot be ensured, it is recommended that a buffer tank (NIBE UKV) is installed.

### Following water volumes are recommended

F2050	-6	-10
Minimum volume, climate system during heating/cooling	20 l	50 l
Minimum volume, climate system during under floor cooling	50 l	80 l

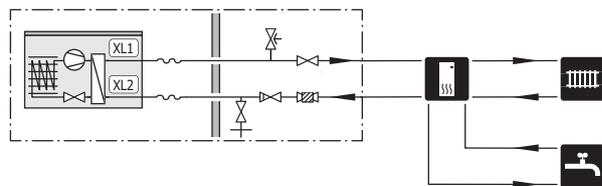
F2050	-12	-16
Minimum volume, climate system during heating/cooling	80 l	150 l
Minimum volume, climate system during under floor cooling	100 l	150 l



**CAUTION!**  
The pipe installation must be flushed out before the heat pump is connected so debris cannot damage component parts.

### SYSTEM DIAGRAM

System principles with hot water and heating system.



- XL1 Heating medium connection, supply (out from F2050)
- XL2 Heating medium connection, return (to F2050)

### Symbol key

Symbol	Meaning
	Shut-off valve
	Tapping valve
	Non-return valve
	Circulation pump
	Expansion vessel
	Filterball
	Pressure gauge
	Safety valve
	Reversing valve/shunt
	Control module
	Domestic hot water
	Outdoor module
	Water heater
	Heating system

## Pipe coupling heating medium circuit

You can find a list of compatible products in the section "Compatible indoor modules and control modules".

### NOTE!

There is a difference between connection to a control module compared with connection to an indoor module.

See the Installer Manual for the indoor module/control module.

Vent the heat pump by the "heating medium supply" connection (XL1) using the venting nipple on the enclosed flexible hose.

Install as follows:

- expansion vessel
- pressure gauge
- safety valves
- drain valve

For draining the heat pump during prolonged power failures.

- non-return valve

Installations with only one heat pump: a non-return valve is only required in those cases where the placement of the products in relation to each other can cause self-circulation.

Cascade installations: each heat pump must be fitted with a non-return valve.

- charge pump
- shut-off valve

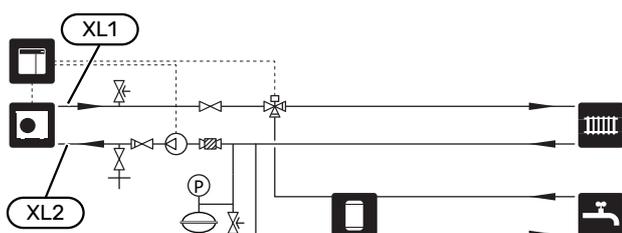
To facilitate any future servicing.

- enclosed filterball (QZ2)

Installed before connection "heating medium return" (XL2) (the lower connection) on the vacuum pump.

- reversing valve.

When connecting to the control module, and if the system is to be able to work with both the climate system and the hot water heater.



The image shows connection to the control module.

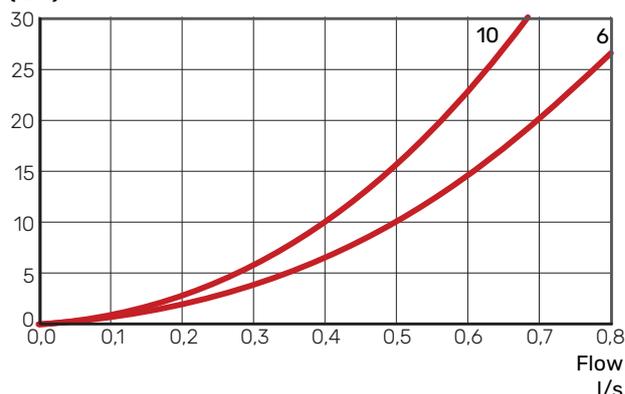
## CHARGE PUMP

The charge pump (not included in the product) is powered and controlled from the indoor module/control module. It has a built-in frost protection function and, for this reason, must not be switched off when there is a risk of freezing.

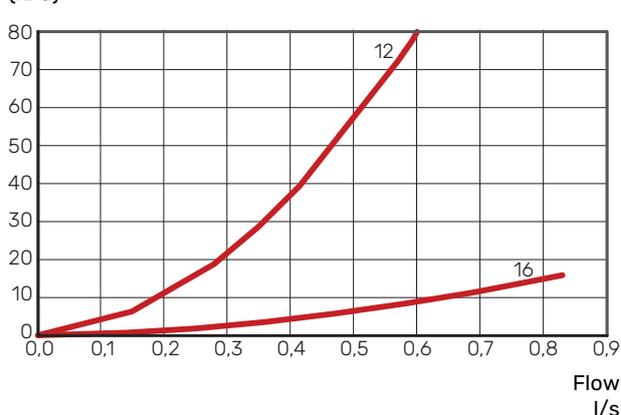
At outdoor temperatures below +2 °C, the charge pump runs periodically, to prevent the water from freezing in the charge circuit. The function also protects against excess temperatures in the charge circuit.

## PRESSURE DROP, HEATING MEDIUM SIDE

Pressure drop (kPa)



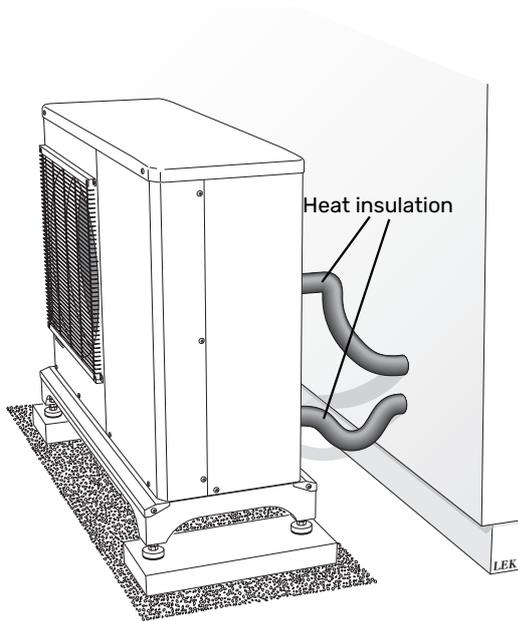
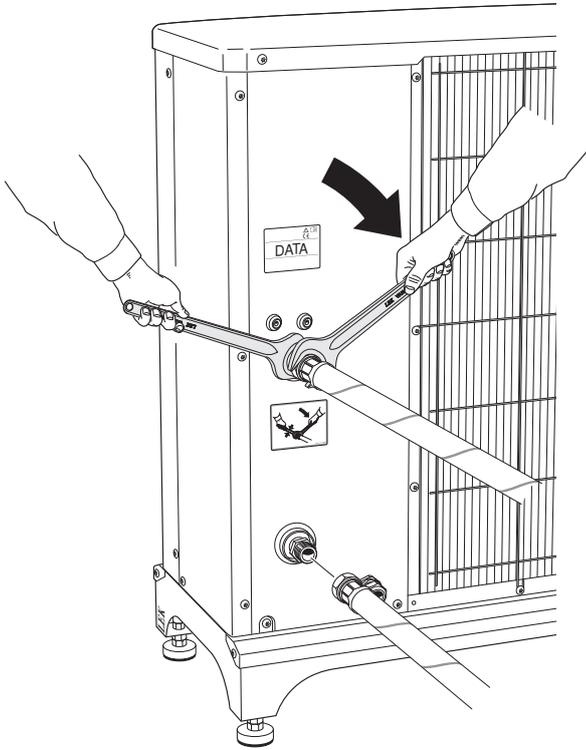
Pressure drop (kPa)



## PIPE CONNECTIONS FLEX HOSE

All outdoor pipes must be insulated with at least 19 mm thick pipe insulation.

The supplied flexible hoses act as vibration dampers. The flexible pipes are fitted so an elbow is created, thus acting as vibration damping.



## Installation alternative

F2050 can be installed with indoor unit or control module.

For all of the installation options, the necessary safety equipment must be installed in accordance with current regulations.

See [nibe.eu](http://nibe.eu) for more installation options.

## CONNECTING ACCESSORIES

Instructions for connecting accessories can be found in the installation instructions provided for each accessory. See section Accessories for a list of the accessories that can be used with F2050.

# Electrical connections

## General

- Electrical installation and wiring must be carried out in accordance with national provisions.
- Prior to insulation testing the house wiring, disconnect the air/water heat pump installation.
- If a miniature circuit breaker is used, this must have at least triggering characteristic "C". See section "Technical specifications" for fuse size.
- F2050 must be installed via an isolator switch. The cable area has to be dimensioned based on the fuse rating used.
- F2050 must be fitted with a residual current device. If the property is equipped with a residual current device, F2050 must be equipped with a separate one.
- The RCD should have a nominal tripping current of no more than 30 mA. The incoming supply must be 230V~50Hz via an electrical distribution unit with fuses.
- The routing of cables for heavy current and signals should be made out through the cable glands on the heat pump's right-hand side, seen from the front.
- The communication cable must be a screened cable with three conductors.
- To prevent interference, communication cables to external connections must not be laid in the vicinity of high voltage cables.
- Connect the charge pump to the control module. See where the charge pump is to be connected in the Installer Manual for your control module.



### CAUTION!

If the supply cable is damaged, only NIBE, its service representative or similar authorised person may replace it to prevent any danger and damage.



### CAUTION!

Do not start the system before filling up with water. Components in the system could be damaged.

## Accessibility, electrical connection

See section "Dismantling panels".



### CAUTION!

Electrical installation and any servicing must be carried out under the supervision of a qualified electrician. Disconnect the current using the circuit breaker before carrying out any servicing.



### CAUTION!

Check the connections, main voltage and phase voltage before the product is started, to prevent damage to the heat pump electronics.



### CAUTION!

The live external control must be taken into consideration when connecting.

# Connections

## POWER CONNECTION

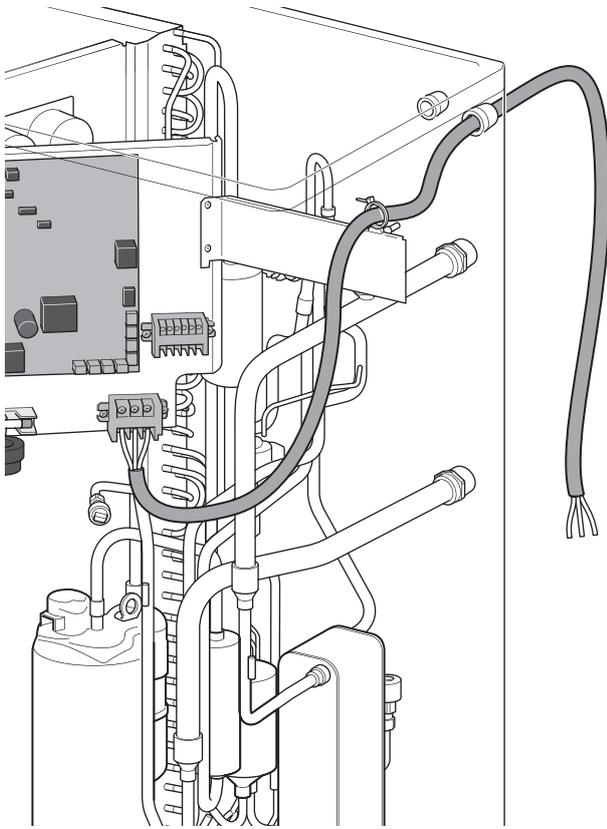
### F2050-6 and F2050-10

Incoming power supply cable (W1) is enclosed and connected at the factory to terminal block X1 in F2050-6 and F2050-10. Outside the heat pump there is approx.1.8 m of cable available.

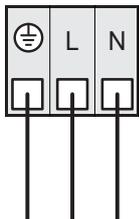
### F2050-12 and F2050-16

Incoming power supply cable (W1) is enclosed for F2050-12 and F2050-16.

1. Select the end of the power supply cable that has welded end tips.
2. Insert the power supply cable through the cable grommet on the rear and on through the cable holder.



3. Connect the power supply cable to the terminal block X1 (TB1). Tightening torque 1Nm. (Earth = yellow/green, L = brown, N = blue)



## AMBIENT TEMPERATURE SENSOR

An ambient temperature sensor BT28 (Tho-A) is located on the rear of F2050.

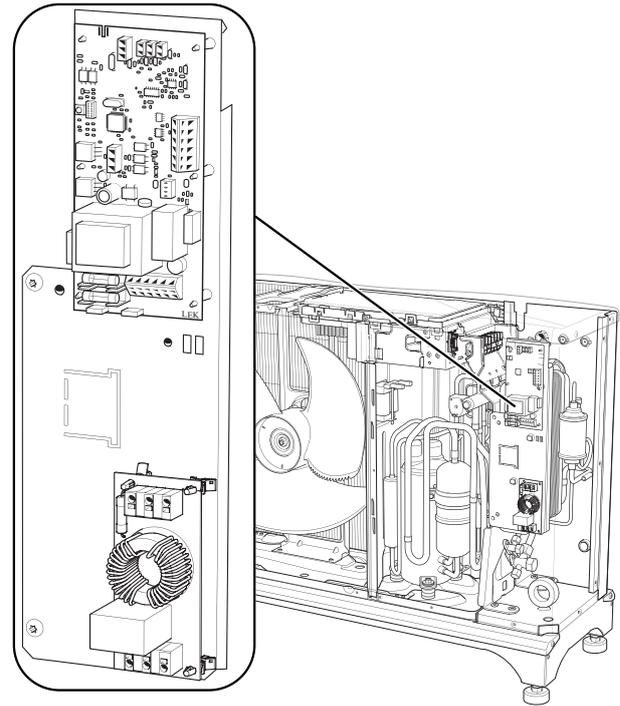
## COMMUNICATION

For connection of indoor module / control module, see relevant manual on nibe.eu.

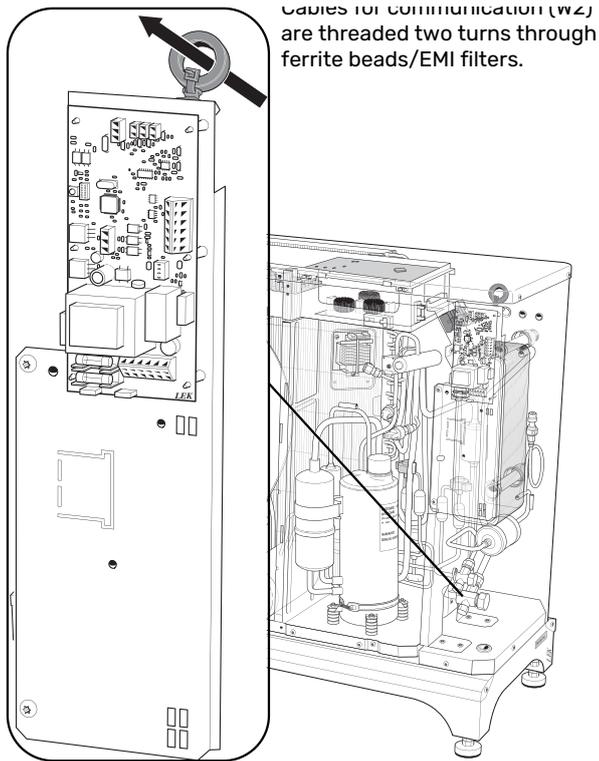
### Cable routing, communication F2050-6/-10

Communication cable (provided by installer) must be routed through cable grommet, communication (UB2), connected to terminal block AA23-X4 and secured with two cable ties.

### F2050-6



## F2050-10

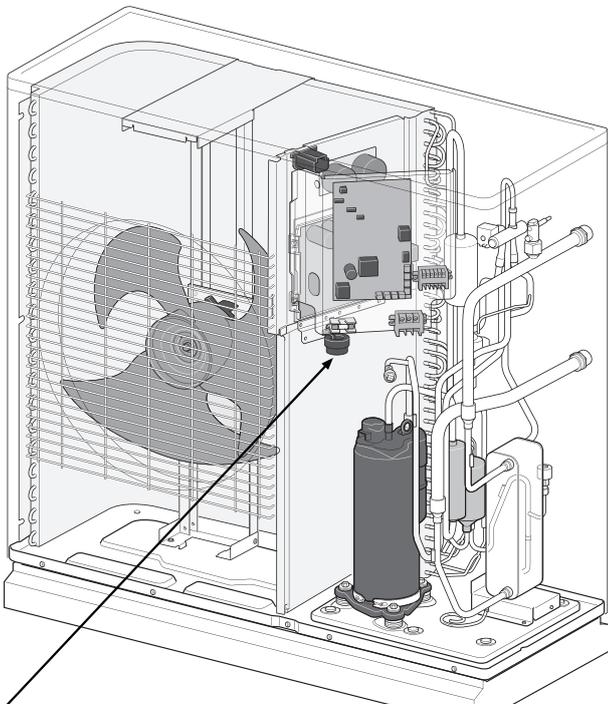


Cables for communication (W2) are threaded two turns through ferrite beads/EMI filters.

### Cable routing, communication F2050-12/-16

Communication cable (provided by installer) must be routed through cable grommet, communication (UB2), connected to terminal block X2(TB):4-6 and secured with two cable ties.

## F2050-12 / -16



Cables for communication (W2) are threaded two turns through ferrite beads/EMI filters.

## Software version

To allow F2050 to communicate with indoor unit/control module, you may need to update to a more recent software version in the indoor unit/control module.

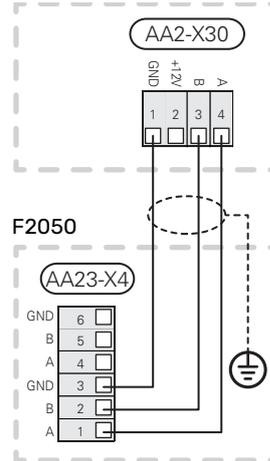
### Connection F2050-6/-10 to indoor unit

Communication cable (W2) is inserted from the rear through "cable grommet, communication" (UB2).

F2050 can communicate with indoor units, by connecting the indoor unit to the terminal block for communication (AA23-X4:1-3).

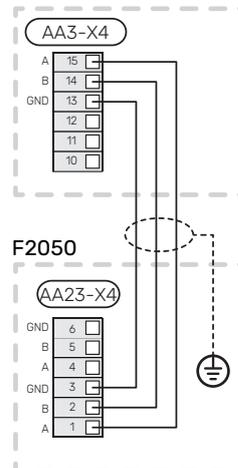
## VVM S

Indoor module



## VVM

Indoor module



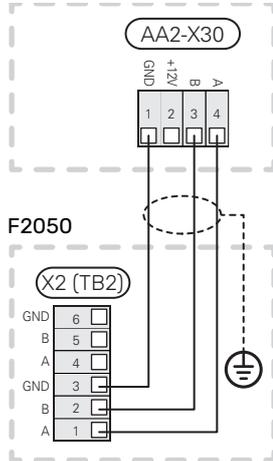
### Connection F2050-12/-16 to indoor unit

Communication cable (W2) is inserted from the rear through "cable grommet, communication" (UB2).

F2050 can communicate with indoor units, by connecting the indoor unit to the terminal block for communication (X2(TB2):1-3).

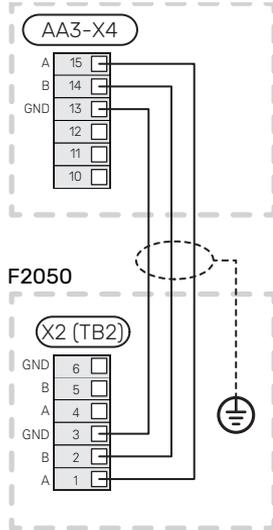
### VVM S

Indoor module



### VVM

Indoor module



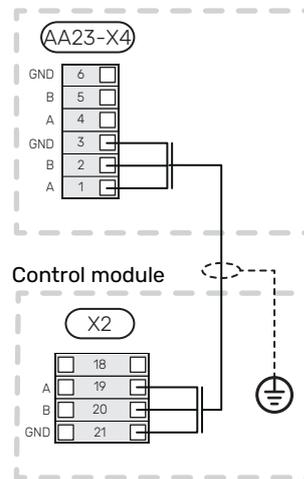
### Connection F2050-6/-10 to control module

#### SMO 20

F2050 can communicate with control module (SMO 20), by connecting the terminal block for communication (AA23-X4:1, 2, 3) in F2050 to the terminal block for communication in SMO 20, X2-19(A), -20(B), -21(GND).

Stripped length of conductor is 6 mm.

F2050



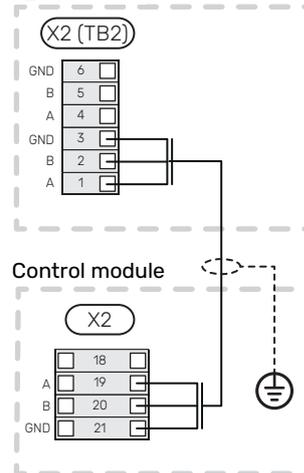
### Connection F2050-12/-16 to control module

#### SMO 20

F2050 can communicate with control module (SMO 20), by connecting the terminal block for communication (X2(TB2):1-3) in F2050 to the terminal block for communication in SMO 20, X2-19(A), -20(B), -21(GND).

Stripped length of conductor is 6 mm.

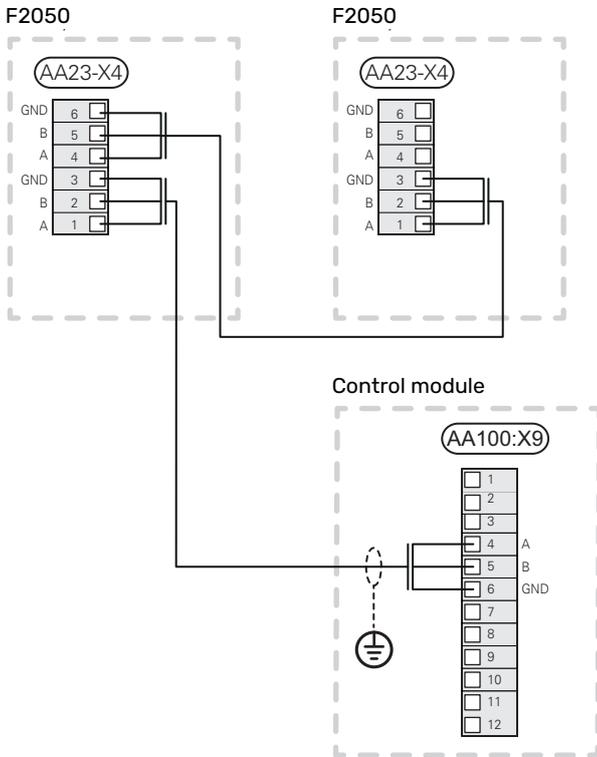
F2050



## Cascade connection

### F2050-6/-10 and control module

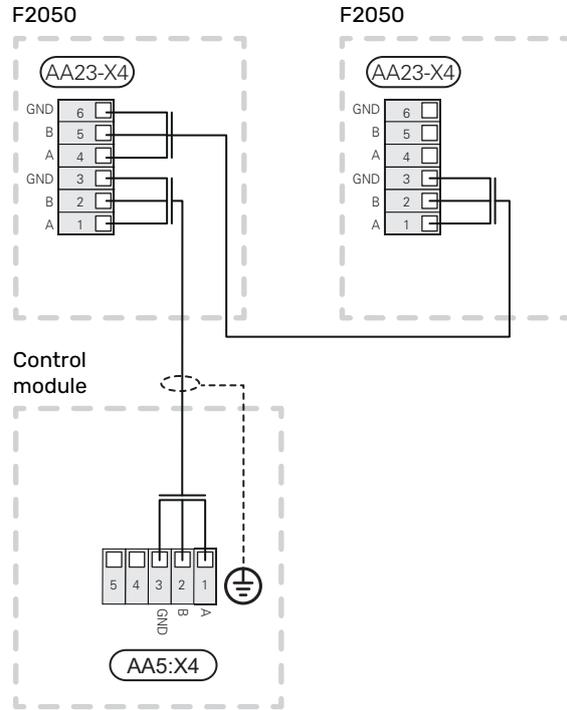
F2050 (one or more) can communicate with control module (SMO S40), by connecting the terminal block for communication (AA23-X4:1, 2, 3) in F2050 to the terminal block for communication in SMO S40, AA100:X9-4(A), -5(B), -6(GND).



### F2050-6/-10 and control module

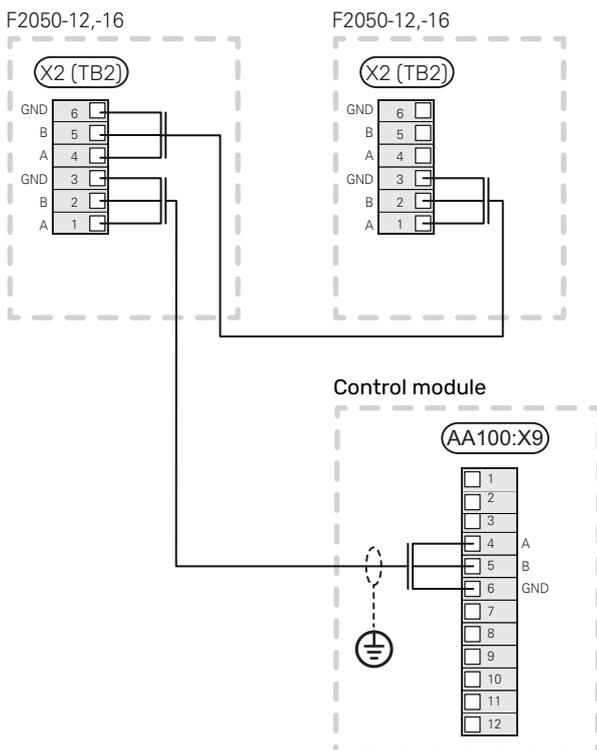
F2050 (one or more) can communicate with control module (SMO 40), by connecting the terminal block for communication (AA23-X4:1, 2, 3) in F2050 to the terminal block for communication in SMO 40, AA5:X4-1(A), -2(B), -3(GND).

Stripped length of conductor is 6 mm.



### F2050-12/-16 and control module

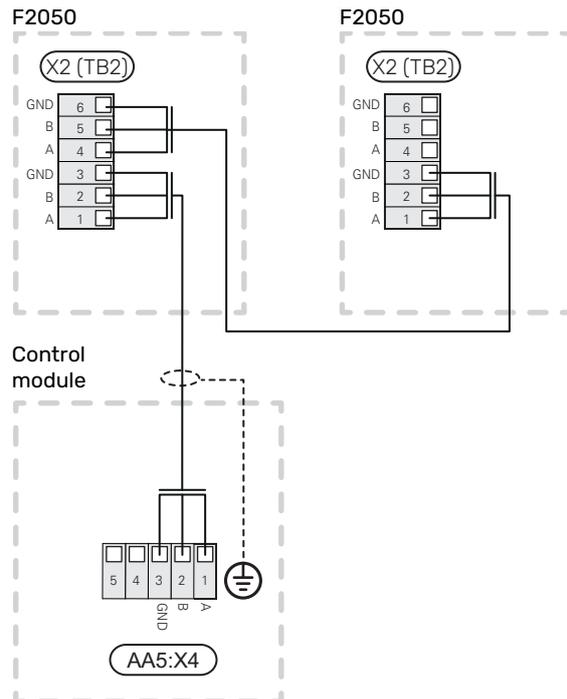
F2050 (one or more) can communicate with control module (SMO S40), by connecting the terminal block for communication (X2(TB2):1, 2, 3) in F2050 to the terminal block for communication in SMO S40, AA100:X9-4(A), -5(B), -6(GND).



### F2050-12/-16 and control module

F2050 (one or more) can communicate with control module (SMO 40), by connecting the terminal block for communication (X2(TB2):1, 2, 3) in F2050 to the terminal block for communication in SMO 40, AA5:X4-1(A), -2(B), -3(GND).

Stripped length of conductor is 6 mm.



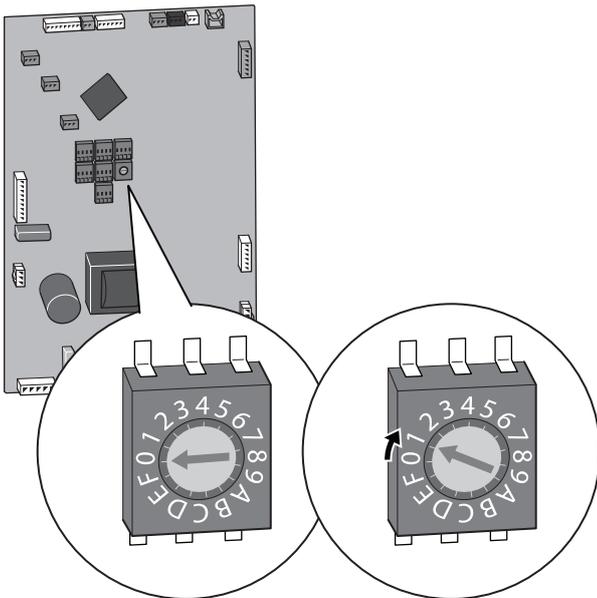
## Addressing for cascade connection F2050-6/-10

On the communication board (AA23-S3), the communication address is selected for F2050 to the control module. The default address for F2050 is **1**. In a cascade connection, all F2050 must have a unique address. The address is coded in binary.

Address	S3:1	S3:2	S3:3
1	OFF	OFF	OFF
2	On	OFF	OFF
3	OFF	On	OFF
4	On	On	OFF
5	OFF	OFF	On
6	On	OFF	On
7	OFF	On	On
8	On	On	On

## Addressing for cascade connection F2050-12/-16

On the control board (PWB1), there is a switch where the communication address for F2050 to the control module is selected. The default address for F2050 is **0**. In a cascade connection, all F2050 must have a unique address.



Turn the switch on the control board (PWB1) and set the desired value, see table. Heat pump 1 is set to "0" and heat pump 2 is set to "1", and so on.

Air/water heat pump	PWB1:SW7
1 (EB101)	0 (Default)
2 (EB102)	1
3 (EB103)	2
4 (EB104)	3
5 (EB105)	4
6 (EB106)	5
7 (EB107)	6
8 (EB108)	7

# Commissioning and adjusting

## Preparations

- Before commissioning, check that the charge circuit and climate system are filled and well vented.
- Check the pipe system for leaks.



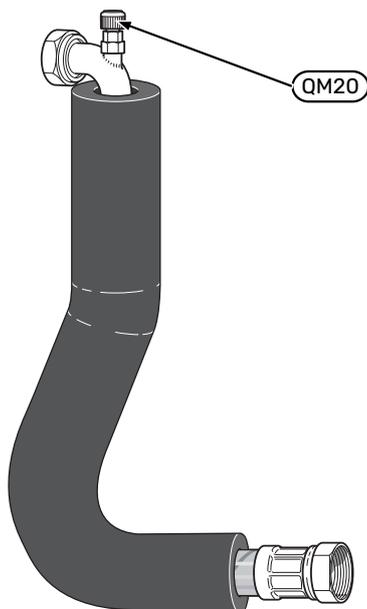
### CAUTION!

Do not start F2050 if there is a risk that the water in the system has frozen.

## Filling and venting

Filling and venting the heating medium system.

1. The heating medium system is filled with water to the required pressure.
2. Vent the system using the venting nipple (QM20) on the enclosed flexible hose and possibly the circulation pump.



## Compressor heater F2050-10

F2050-10 is equipped with a compressor heater that heats the compressor before start-up and when the compressor is cold.



### CAUTION!

The compressor heater must have been connected for 6 – 8 hours before the first start, see the section “Start-up and inspection” in the Installer Manual for the indoor unit.

## Start-up and inspection

1. The compressor heater (CH) must have been operational for at least 6 - 8 hours before the compressor start can be initiated. This is done by switching on the control voltage and disconnecting the communication cable.
2. F2050 must be given an address, if it is to have an address other than 1 or 0. See section "Addressing for cascade connection F2050-6/-10"/"Addressing for cascade connection F2050-12/-16".
3. The communication cable on the terminal block for communication (AA23-X4) in F2050-6/-10 or (X2(TB2)) in F2050-12/-16 must *not* be connected.
4. Turn the isolator switch on.
5. Ensure that the F2050 is connected to the power source.
6. After 6 - 8 hours, connect the communication cable (W2) to the terminal block for communication (AA23-X4) in F2050-6/-10 or (X2(TB2)) in F2050-12/-16.
7. If necessary, restart the indoor module. Follow the instructions for "Start-up and inspection" in the Installer Manual for the indoor module.

The heat pump starts 30 minutes after the outdoor unit is powered up and the communication cable (W2) is connected, if necessary.

If scheduled *silent operation* is required, it must be scheduled in the indoor module or the control module.



### CAUTION!

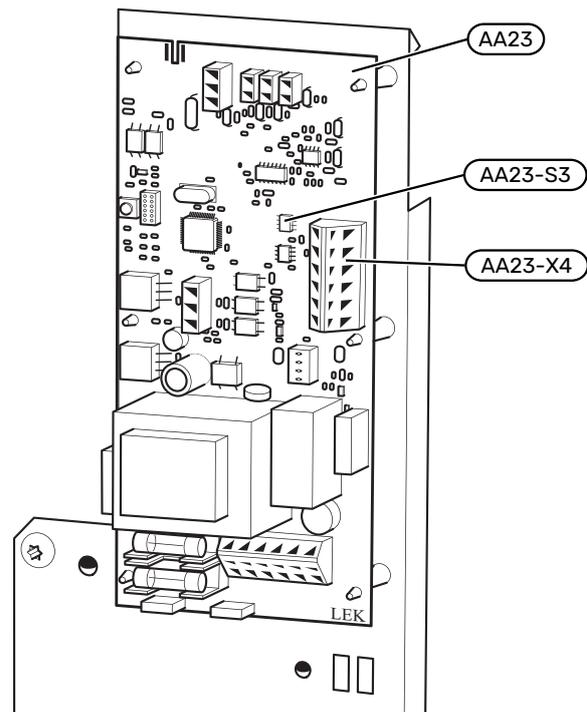
Do not start any electrical work until at least two minutes after cutting the power.



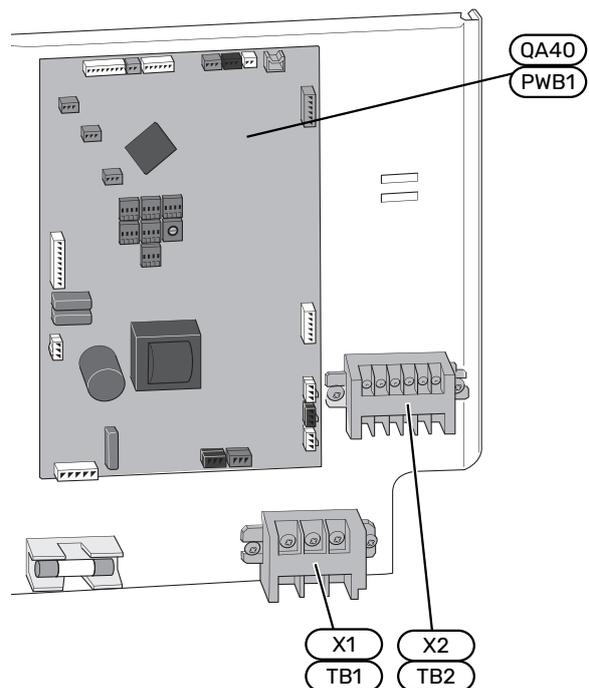
### NOTE!

Silent mode should only be scheduled periodically because the maximum output is limited to approx. the nominal values.

## F2050-6/-10



## F2050-12/-16



## Readjusting, heating medium side

Air is initially released from the hot water and venting may be necessary. If bubbling sounds can be heard from the heat pump, the circulation pump and radiators the entire system will require further venting. When the system is stable (correct pressure and all air eliminated) the automatic heating control system can be set as required.

## Adjustment, charge flow

Instructions for adjusting hot water charging are in the Installer Manual for the relevant indoor module. See the sections "Compatible indoor modules and control modules" and "Accessories" for the list of the indoor modules / control modules and accessories that can be connected to F2050.

# Control - Heat pump EB101

## S-series – indoor module / control module

These settings are made on the display on the indoor module/control module.

### MENU 7.3.2 - INSTALLED HEAT PUMP

Here, you make specific settings for the installed heat pump.

#### MENU 7.3.2.1 - HEAT PUMP SETTINGS

Here, you make settings that are specific for the installed heat pumps.

##### Cooling permitted

Alternative: on/off

##### Silent mode permitted

Alternative: on/off

##### Max. frequency 1

Setting range: 25 – 120 Hz

##### Max. frequency 2

Setting range: 25 – 120 Hz

##### Compressor phase

Setting range F2050 1 x 230 V: L1, L2, L3

##### Detect compressor phase

Alternative F2050 1 x 230 V: on/off

##### Current limit

Alternative F2050 1 x 230 V: on/off

##### Max. current

Setting range F2050 1 x 230 V: 6 – 32 A

##### Stop temperature compressor

Setting range -20 – -2 °C

##### BlockFreq 1 and 2

Setting range, heating: 25 – 120 Hz

Setting range, cooling: 25 – 120 Hz

**Cooling permitted:** Here, you can set whether the cooling function will be activated for the outdoor unit.

**Silent mode permitted:** Here, you set whether silent mode will be activated for the heat pump. Note, it is now possible to schedule when silent mode will be active. The function should only be used for limited periods, because F2050 might not reach its dimensioned power.

**Detect compressor phase:** This shows in which phase the heat pump detected that you have F2050 230V-50Hz. Phase detection normally occurs automatically in connection with start-up of the indoor module/control module. This setting can be changed manually.

**Current limitation:** Here, you set whether the current limitation function will be activated for the outdoor unit, if you have F2050 230V-50Hz. During active function, you can limit the value of the maximum current.

**BlockFreq 1-2:** Here, you can select the frequency ranges within which the outdoor unit is not permitted to work. This function can be used if certain compressor speeds cause disruptive noise in the house. The setting range varies depending on heat pump model and size.

Setting range: on/off

## F-series – indoor module / control module

These settings are made on the display on the indoor module/control module.

### MENU 5.11.1.1 - HEAT PUMP

Here, you make specific settings for the installed heat pump.

**Cooling permitted**

Setting range: off / on

**Silent mode permitted**

Setting range: yes / no

**Detect compressor phase**

Setting range F2050 1 x 230 V: off/on

**Current limit**

Setting range: 6 – 32 A

Factory setting: 32 A

**blockFreq 1**

Setting range: yes / no

**blockFreq 2**

Setting range: yes / no

**Cooling permitted:** Here, you can set whether the cooling function will be activated for the heat pump.

**Silent mode permitted:** Here, you set whether silent mode will be activated for the heat pump. Please note that you now have the option to schedule when silent mode will be active.

The function should only be used for limited periods, because F2050 possibly may not reach its dimensioned output.

**Detect compressor phase:** This shows in which phase the heat pump detected that you have F2050 230V-50Hz. Phase detection normally occurs automatically in connection with start-up of the indoor module/control module. This setting can be changed manually.

**Current limitation:** Here, you set whether the current limitation function will be activated for the heat pump, if you have F2050 230V-50Hz. During active function, you can limit the value of the maximum current.

**BlockFreq 1:** Here, you can select a frequency range within which the heat pump is not permitted to work. This function can be used if certain compressor speeds cause disturbing noise in the house.

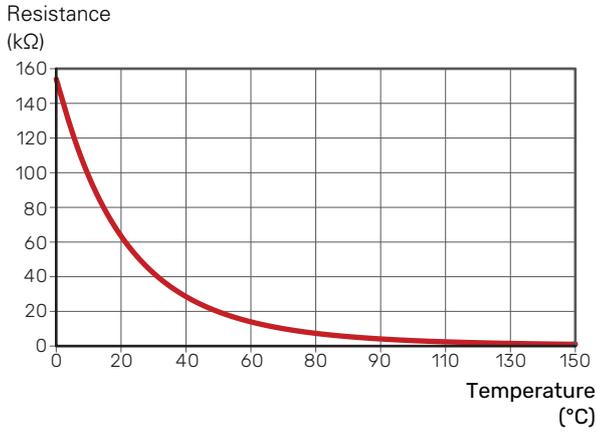
**BlockFreq 2:** Here, you can select a frequency range within which the heat pump is not permitted to work.

# Service

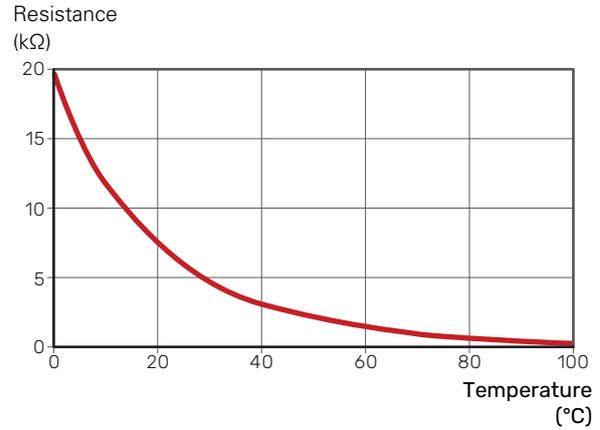
## Temperature sensor data

### DATA FOR TEMPERATURE SENSOR IN F2050-6

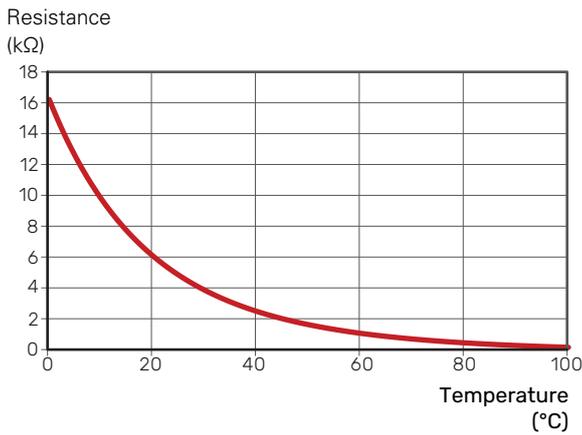
#### Tho-D



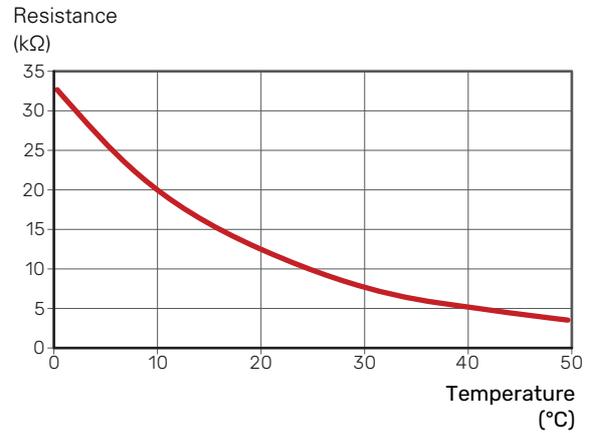
#### Tho-S, Tho-R1, Tho-R2



#### Tho-A, R

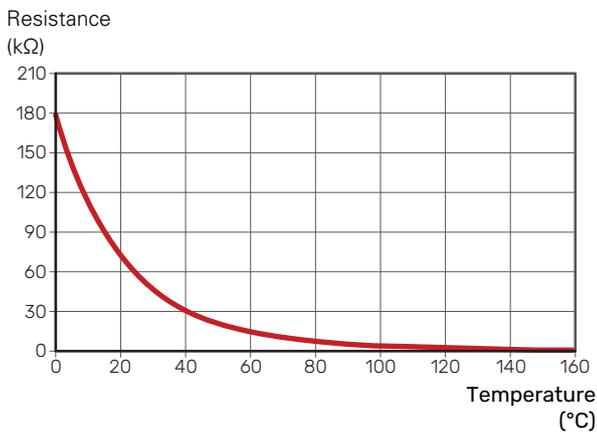


#### BT28 (Tho-A)



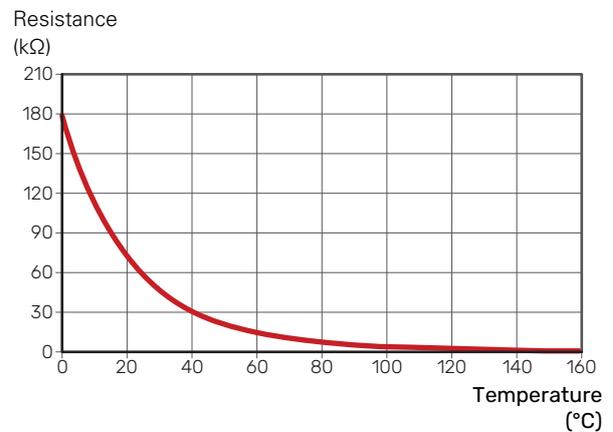
### DATA FOR TEMPERATURE SENSOR IN F2050-10

#### Tho-D

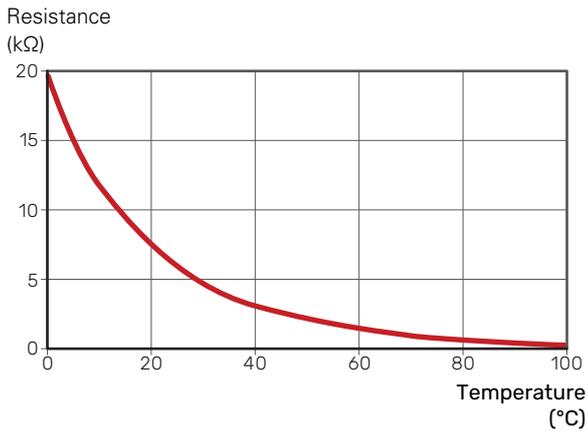


### DATA FOR TEMPERATURE SENSOR IN F2050-12, -16

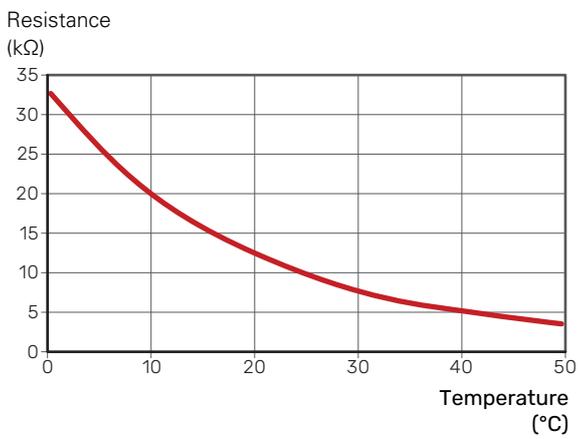
#### Tho-D



## Tho-S, Tho-R1, Tho-R2



## BT28 (Tho-A)



## DATA FOR TEMPERATURE SENSOR BT3, BT12, BT15

Temperature (°C)	Resistance (kΩ)	Voltage (VDC)
-10	56.20	3.047
0	33.02	2.889
10	20.02	2.673
20	12.51	2.399
30	8.045	2.083
40	5.306	1.752
50	3.583	1.426
60	2.467	1.136
70	1.739	0.891
80	1.246	0.691

# Disturbances in comfort

In most cases, the indoor module/control module notes a malfunction (a malfunction can lead to disturbance in comfort) and indicates this with alarms and action instructions in the display.

## Troubleshooting



### CAUTION!

In the event of action to rectify malfunctions that require work within screwed hatches, the incoming supply electricity must be isolated at the safety switch by or under the supervision of a qualified electrician.



### NOTE!

Alarms are acknowledged on the indoor module / control module.

If the operational interference is not shown in the display the following tips can be used:

### BASIC ACTIONS

Start by checking the following:

- All supply cables to the heat pump are connected.
- Group and main fuses of the accommodation.
- The property's earth circuit breaker.
- The heat pump's fuse / automatic protection. (FC1 / FB1, FB1 only if KVR is installed.)
- The indoor module's/control module's fuses.
- The indoor module's/control module's temperature limiters.
- That the air flow to F2050 is not blocked by foreign objects.
- That F2050 does not have any external damage.

### F2050 DOES NOT START

- There is no demand.
  - The indoor module/control module does not call on heating, cooling or hot water.
- Compressor blocked due to the temperature conditions.
  - Wait until the temperature is within the product's working range.
- Minimum time between compressor starts has not been reached.
  - Wait for at least 30 minutes and then check if the compressor has started.
- Alarm tripped.
  - Follow the display instructions.

### F2050 NOT COMMUNICATING

- Check that the addressing of F2050 is correct.
- Check that the communication cable is correctly connected and working.

### LOW HOT WATER TEMPERATURE OR A LACK OF HOT WATER



### NOTE!

The setting for the hot water is always performed on the indoor module or the control module.

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 hot water settings in indoor module or control module.
  - See the Installer Manual for the indoor module/control module.
- Clogged filterball.
  - Switch off the system. Check and clean the filterball.

### LOW ROOM TEMPERATURE

- Closed thermostats in several rooms.
  - Set the thermostats to max in as many rooms as possible.
- Incorrect settings in indoor module or control module.
  - See the Installer Manual for the indoor module/control module.
- Air-filled radiators/underfloor heating coils.
  - Bleed the system.

### HIGH ROOM TEMPERATURE

- Incorrect settings in indoor module or control module.
  - See the Installer Manual for the indoor module/control module.

### LARGE AMOUNT OF WATER BELOW F2050

- The accessory KVR 10 is required.
- If KVR 10 is installed, check that the water drainage can flow freely.

## Alarm list

Alarms S-series	Alarm F-series	Alarm text on the display	Description	May be due to
103	3	Sensor fault BT3	Sensor fault, Sensor incoming water in F2050 (BT3).	<ul style="list-style-type: none"> <li>Open circuit or short circuit on sensor input</li> <li>Sensor does not work (see section "Disturbances in comfort")</li> <li>Defective control board (PWB1) in F2050</li> </ul>
108	12	Sensor fault BT12	Sensor fault, Sensor outgoing water in F2050 (BT12).	<ul style="list-style-type: none"> <li>Open circuit or short circuit on sensor input</li> <li>Sensor does not work (see section "Disturbances in comfort")</li> <li>Defective control board (PWB1) in F2050</li> </ul>
	15	Sensor fault BT15	Sensor fault, Sensor liquid line in F2050 (BT15).	<ul style="list-style-type: none"> <li>Open circuit or short circuit on sensor input</li> <li>Sensor does not work (see section "Disturbances in comfort")</li> <li>Defective control board (PWB1) in F2050</li> </ul>
147	277	Sensor fault Tho-R	Sensor fault, heat exchanger in F2050 (Tho-R).	<ul style="list-style-type: none"> <li>Open circuit or short circuit on sensor input</li> <li>Sensor does not work (see section "Disturbances in comfort")</li> <li>Defective control board (PWB1) in F2050</li> </ul>
148	278	Sensor fault Tho-A	Sensor fault, outdoor temperature sensor in F2050 (Tho-A).	<ul style="list-style-type: none"> <li>Open circuit or short circuit on sensor input</li> <li>Sensor does not work (see section "Disturbances in comfort")</li> <li>Defective control board (PWB1) in F2050</li> </ul>
149	279	Sensor fault Tho-D	Sensor fault, hot gas in F2050 (Tho-D).	<ul style="list-style-type: none"> <li>Open circuit or short circuit on sensor input</li> <li>Sensor does not work (see section "Disturbances in comfort")</li> <li>Defective control board (PWB1) in F2050</li> </ul>
150	280	Sensor fault Tho-S	Sensor fault, suction gas in F2050 (Tho-S).	<ul style="list-style-type: none"> <li>Open circuit or short circuit on sensor input</li> <li>Sensor does not work (see section "Disturbances in comfort")</li> <li>Defective control board (PWB1) in F2050</li> </ul>
151	281	Sensor fault LPT	Sensor fault, low pressure transmitter in F2050.	<ul style="list-style-type: none"> <li>Open circuit or short circuit on sensor input</li> <li>Sensor does not work (see section "Disturbances in comfort")</li> <li>Defective control board (PWB1) in F2050</li> <li>Fault in the refrigerant circuit</li> </ul>
215	162	High condenser out	Too high temperature out from the condenser. Self-resetting.	<ul style="list-style-type: none"> <li>Low flow during heating operation</li> <li>Too high set temperatures</li> </ul>
216	163	High condenser in	Too high temperature into the condenser. Self-resetting.	<ul style="list-style-type: none"> <li>Temperature generated by another heat source</li> </ul>
221	183	Defrosting in progress	not an alarm, but an operating status instead.	<ul style="list-style-type: none"> <li>Set when the heat pump runs the defrosting procedure</li> </ul>
229	220	HP alarm	The high pressure switch (63H1) deployed 5 times within 60 minutes or for 60 minutes continuously.	<ul style="list-style-type: none"> <li>Insufficient air circulation or blocked heat exchanger</li> <li>Open-circuit or short-circuit on input for high pressure switch (63H1)</li> <li>Defective high pressure switch</li> <li>Expansion valve not connected correctly</li> <li>Service valve closed</li> <li>Defective control board (PWB1) in F2050</li> <li>Low or no flow during heating operation</li> <li>Defective circulation pump</li> <li>Defective fuse F (4A)</li> </ul>
230	221	LP alarm	Too low value on the low pressure sensor 3 times within 60 minutes.	<ul style="list-style-type: none"> <li>Open circuit or short circuit on input for low pressure sensor</li> <li>Defective low pressure sensor</li> <li>Defective control board (PWB1) in F2050</li> <li>Open-circuit or short-circuit on input for suction gas sensor (Tho-S)</li> <li>Defective suction gas sensor (Tho-S)</li> </ul>

Alarms S-series	Alarm F-series	Alarm text on the display	Description	May be due to
232	223	OU Com. error	Communication between the control board and the communication board is interrupted. There must be 22 volt direct current (DC) at the switch (CNW2) on the control board (PWB1).	<ul style="list-style-type: none"> <li>Any circuit breakers for F2050 off</li> <li>Incorrect cable routing</li> </ul>
233	224	Fan alarm	Deviations in the fan speed in F2050.	<ul style="list-style-type: none"> <li>The fan cannot rotate freely</li> <li>Defective control board (PWB1) in F2050</li> <li>Defective fan motor</li> <li>Control board (PWB1) in F2050 dirty</li> <li>Fuse (F2) tripped</li> </ul>
238	230	Continuously high hot gas	Temperature deviation on the hot gas sensor (Tho-D) twice within 60 minutes or for 60 minutes continuously.	<ul style="list-style-type: none"> <li>Sensor does not work (see section "Ambient temperature sensor")</li> <li>Insufficient air circulation or heat exchanger</li> <li>Blocked</li> <li>If the fault persists during cooling, there may be an insufficient amount of refrigerant.</li> <li>Defective control board (PWB1) in F2050</li> </ul>
247	254	Communication error	Communication fault with accessory board	<ul style="list-style-type: none"> <li>F2050 not powered</li> <li>Fault in the communication cable.</li> </ul>
251	261	High temperature in heat exchanger	Temperature deviation on the heat exchanger sensor (Tho-R1/R2) five times within 60 minutes or for 60 minutes continuously	<ul style="list-style-type: none"> <li>Sensor does not work (see section "Disturbances in comfort")</li> <li>Insufficient air circulation or blocked heat exchanger</li> <li>Defective control board (PWB1) in F2050</li> <li>Too much refrigerant</li> </ul>
252	262	Power transistor too hot	When IPM (Intelligent power module) displays FO-signal (Fault Output) five times during a 60-minute period.	<ul style="list-style-type: none"> <li>Can occur when 15V power supply to the inverter (PCB) is unstable.</li> </ul>
253	263	Inverter error	Voltage from the inverter outside the parameters four times within 30 minutes.	<ul style="list-style-type: none"> <li>Incoming power supply interference</li> <li>Service valve closed</li> <li>Insufficient amount of refrigerant</li> <li>Compressor fault</li> <li>Defective circuit board for inverter in F2050</li> </ul>
254	264	Inverter error	Communication between circuit board for inverter and control board broken.	<ul style="list-style-type: none"> <li>Open circuit in connection between boards</li> <li>Defective circuit board for inverter in F2050</li> <li>Defective control board (PWB1) in F2050</li> </ul>
255	265	Inverter error	Continuous deviation on power transistor for 15 minutes.	<ul style="list-style-type: none"> <li>Defective fan motor</li> <li>Defective circuit board for inverter in F2050</li> </ul>
256	266	Not enough refrigerant	Not enough refrigerant is detected on start-up in cooling mode.	<ul style="list-style-type: none"> <li>Service valve closed</li> <li>Loose connection, sensor (BT15, BT3)</li> <li>Defective sensor (BT15, BT3)</li> <li>Too little refrigerant</li> </ul>
257	267	Inverter error	Failed start for compressor	<ul style="list-style-type: none"> <li>Defective circuit board for inverter in F2050</li> <li>Defective control board (PWB1) in F2050</li> <li>Compressor fault</li> </ul>
258	268	Inverter error	Overcurrent, Inverter A/F module	<ul style="list-style-type: none"> <li>Sudden power failure</li> </ul>
260	271	Cold outdoor air	Temperature of BT28 below the value that permits operation	<ul style="list-style-type: none"> <li>Cold weather conditions</li> <li>Sensor fault</li> </ul>
261	272	Hot outdoor air	Temperature of BT28 above the value that permits operation	<ul style="list-style-type: none"> <li>Warm weather conditions</li> <li>Sensor fault</li> </ul>
269	294	Non-compatible air/water heat pump	Heat pump and indoor module do not function together properly due to technical parameters.	<ul style="list-style-type: none"> <li>Outdoor module and indoor module are not compatible.</li> </ul>
316	404	Sensor fault BP4	Sensor fault, Sensor high pressure heating/low pressure cooling in F2050 (BP4).	<ul style="list-style-type: none"> <li>Open circuit or short circuit on sensor input</li> <li>Sensor does not work (see section "Disturbances in comfort")</li> <li>Defective control board (PWB1) in F2050</li> </ul>

# Accessories

Detailed information about the accessories and complete accessories list available at [nibe.eu](http://nibe.eu).

Not all accessories are available on all markets.

## CONDENSATION WATER PIPE KVR

Condensation water pipe, different lengths.

KVR 10 suitable for (F2050-6 och F2050-10):

### **KVR 10-10**

1 metres

Part no. 067 614

### **KVR 10-30**

3 metres

Part no. 067 616

### **KVR 10-60**

6 metres

Part no. 067 618

KVR 13 suitable for (F2050-12 och F2050-16):

### **KVR 13-10**

1 metres

Part no. 067 973

### **KVR 13-30**

3 metres

Part no. 067 974

### **KVR 13-60**

6 metres

Part no. 067 975

## STAND AND BRACKETS

### **Ground stand GSU 30**

F2050-6, -10

Part no. 067 653

### **Ground stand GSU 40**

F2050-12, -16

Part no. 067 965

### **Wall bracket BAU 30**

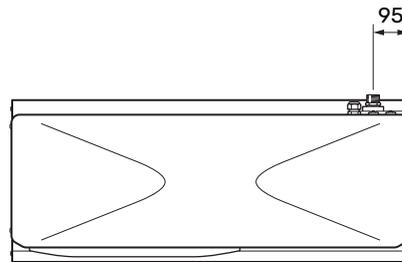
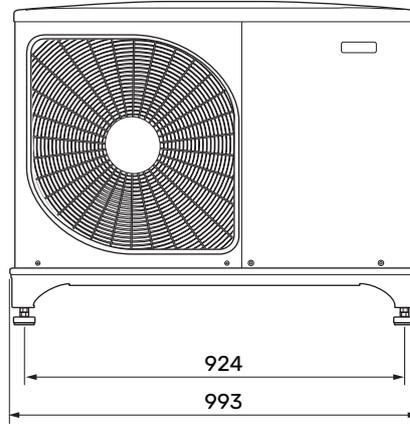
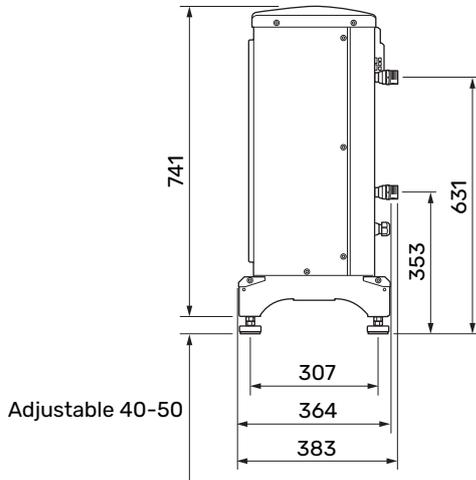
For wall mounting F2050-6, -10

Part no. 067 832

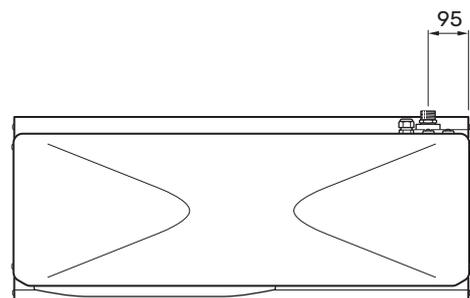
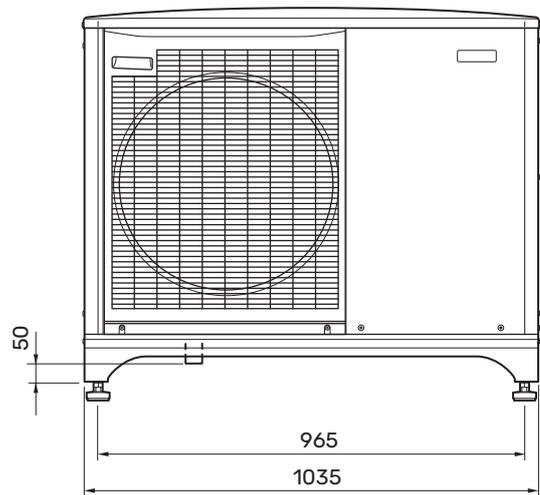
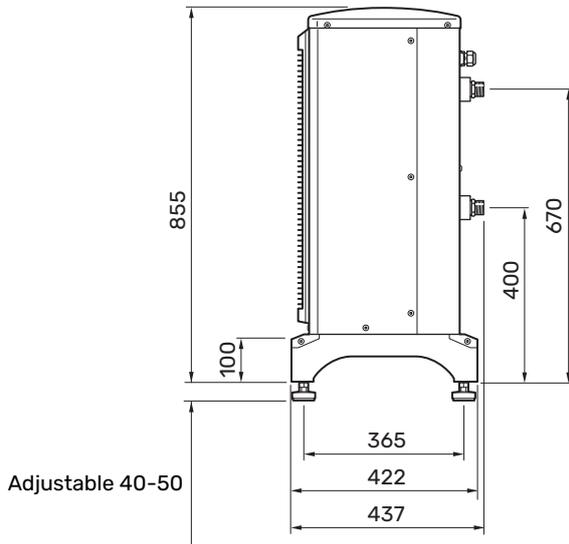
# Technical data

## Dimensions

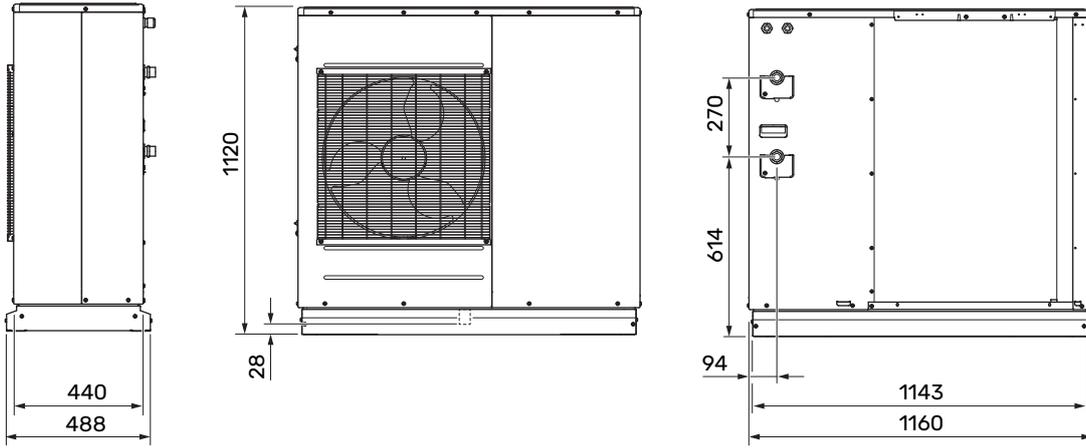
F2050-6



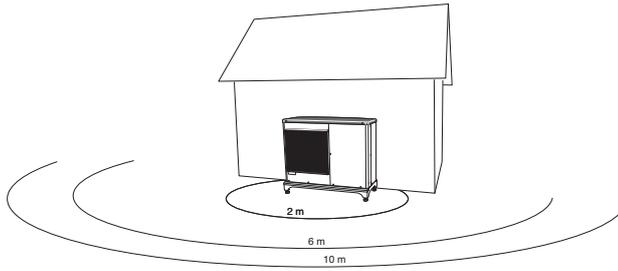
F2050-10



F2050-12/-16



## Sound levels



F2050 is usually placed next to a house wall, which gives a directed sound distribution that has to be taken into consideration. Accordingly, when setting up, you should always attempt to select 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.

F2050 adjusts the fan speed depending on the ambient temperature and evaporation temperature.

		Sound power <sup>1</sup>	Sound pressure at distance (m) <sup>2</sup>									
			1	2	3	4	5	6	7	8	9	10
F2050-6	Nominal sound value	53	48.0	42.0	38.5	36.0	34.0	32.5	31.1	30.0	28.9	28.0
	Max. sound value	62	57.0	51.0	47.5	45.0	43.0	41.5	40.1	39.0	37.9	37.0
	Max. sound value, silent mode	53	48.0	42.0	38.5	36.0	34.0	32.5	31.1	30.0	28.9	28.0
F2050-10	Nominal sound value	53	48.0	42.0	38.5	36.0	34.0	32.5	31.1	30.0	28.9	28.0
	Max. sound value	65	60.0	54.0	50.5	48.0	46.0	44.5	43.1	42.0	40.9	40.0
	Max. sound value, silent mode 60 Hz	53	48.0	42.0	38.5	36.0	34.0	32.5	31.1	30.0	28.9	28.0
F2050-12	Nominal sound value	60	55.0	49.0	45.5	43.0	41.0	39.5	38.1	37.0	35.9	35.0
	Max. sound value	60	55.0	49.0	45.5	43.0	41.0	39.5	38.1	37.0	35.9	35.0
	Max. sound value, silent mode 47 Hz	56	51.0	45.0	41.5	39.0	37.0	35.5	34.1	33.0	31.9	31.0
	Max. sound value, silent mode 30 Hz	54	49.0	43.0	39.5	37.0	35.0	33.5	32.1	31.0	29.9	29.0
F2050-16	Nominal sound value	63	58.0	52.0	48.5	46.0	44.0	42.5	41.1	40.0	38.9	38.0
	Max. sound value	63	58.0	52.0	48.5	46.0	44.0	42.5	41.1	40.0	38.9	38.0
	Max. sound value, silent mode 45 Hz	58	53.0	47.0	43.5	41.0	39.0	37.5	36.1	35.0	34.0	33.0
	Max. sound value, silent mode 30 Hz	55	50.0	44.0	40.5	38.0	36.0	34.5	33.1	32.0	31.0	30.0

<sup>1</sup> Sound power level,  $L_W(A)$ , according to EN12102

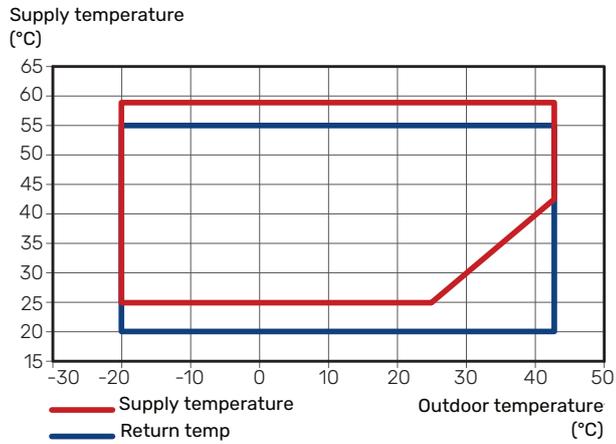
<sup>2</sup> Sound pressure calculated according to directivity factor  $Q=4$

# Technical specifications

## WORKING RANGE, HEATING

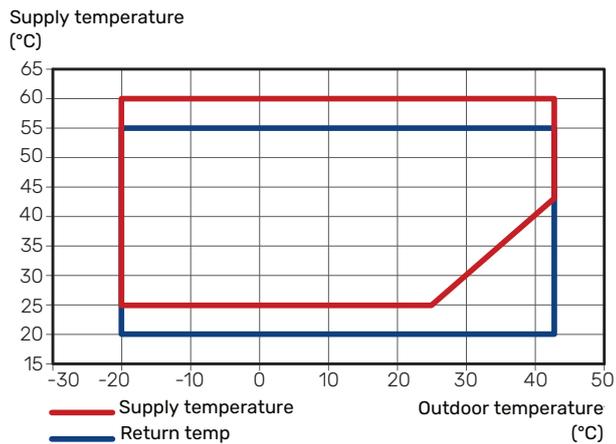
### F2050-6

The supply temperature is permitted to be lower for a short period, e.g. at start-up.



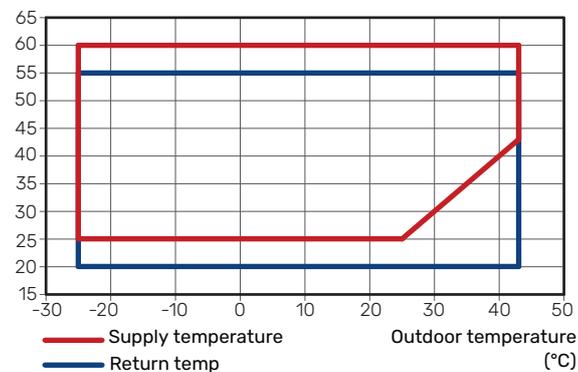
### F2050-10

The supply temperature is permitted to be lower for a short period, e.g. at start-up.



### F2050-12/-16

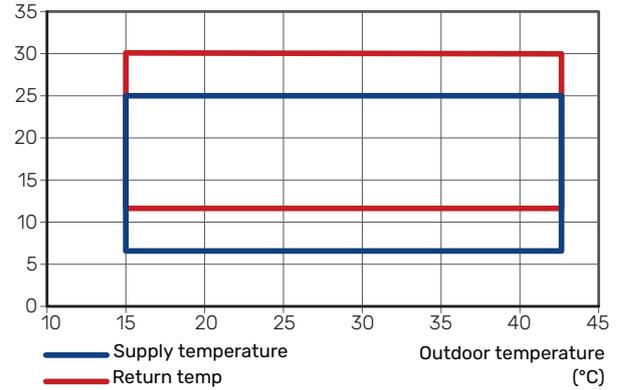
Supply temperature (°C)



## WORKING RANGE, COOLING

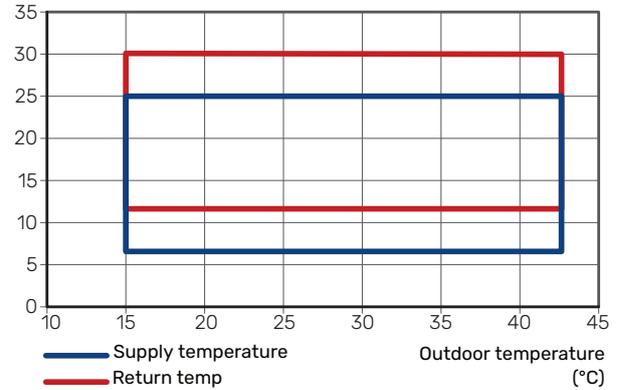
### F2050-6/-10

Supply temperature (°C)



### F2050-12/-16

Supply temperature (°C)



## CAPACITY

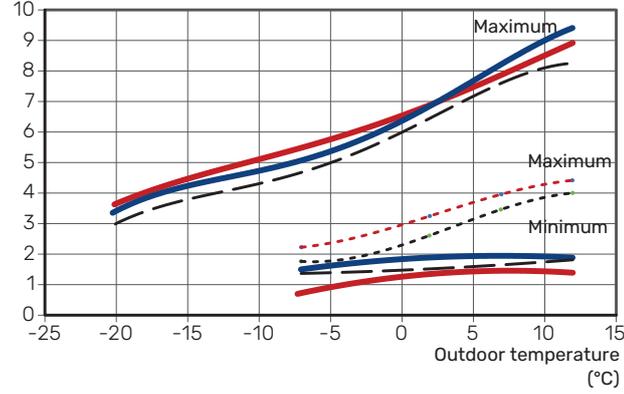
Power at different supply temperatures during continuous operation (excluding defrosting).

### Power during heating operation

Maximum and minimum capacity during continuous operation.

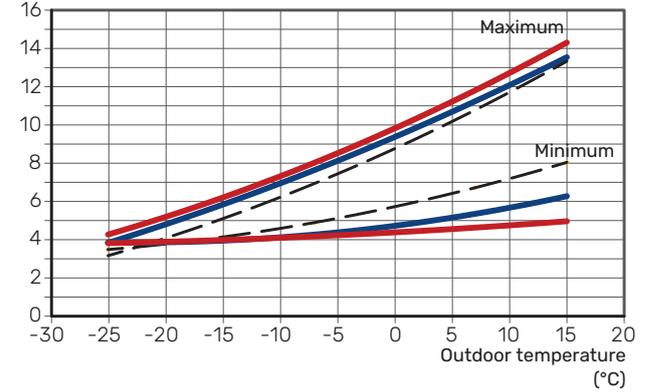
#### F2050-6

Heating output (kW)



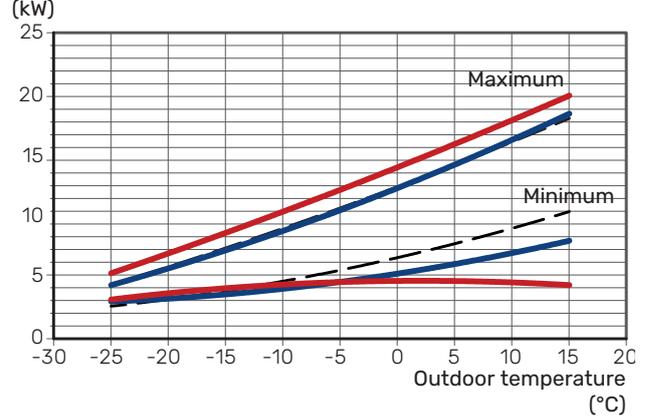
#### F2050-12

Heating output (kW)



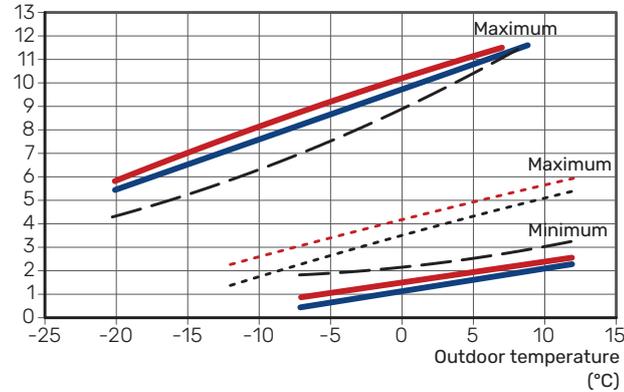
#### F2050-16

Heating output (kW)



#### F2050-10

Heating output (kW)

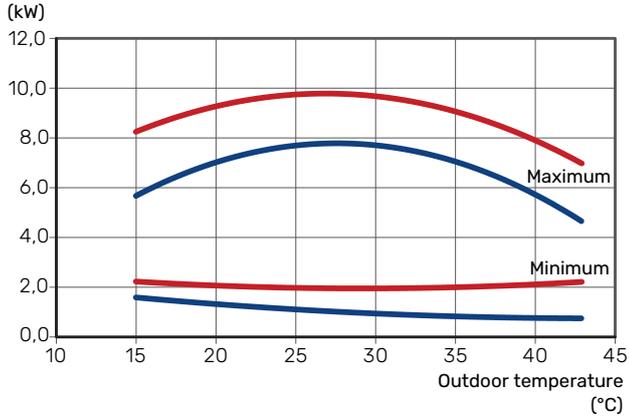


## Power during cooling operation

Maximum and minimum capacity during continuous operation.

### F2050-6

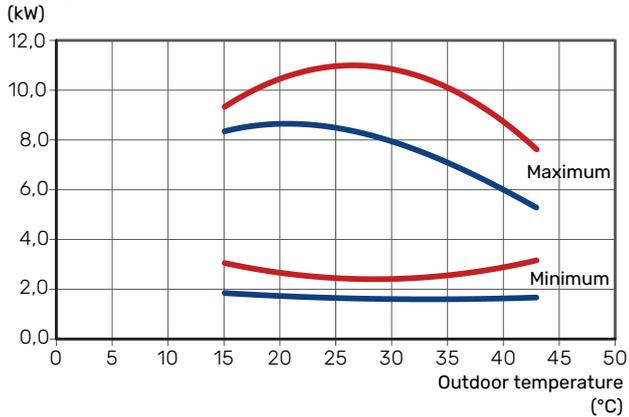
Cooling output (kW)



— Supply temperature 18°C  
— Supply temperature 7°C

### F2050-10

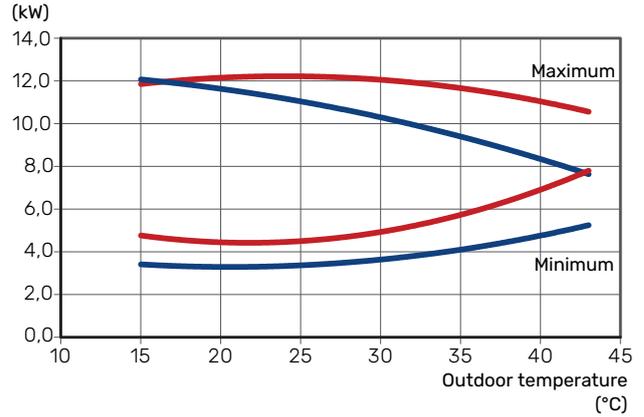
Cooling output (kW)



— Supply temperature 18°C  
— Supply temperature 7°C

### F2050-12

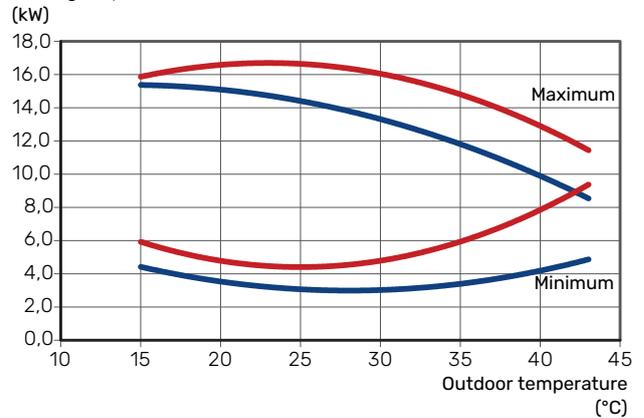
Cooling output (kW)



— Supply temperature 18°C  
— Supply temperature 7°C

### F2050-16

Cooling output (kW)



— Supply temperature 18°C  
— Supply temperature 7°C



F2050		6	10	12	16
<b>Output data according to EN 14 511, partial load<sup>1</sup></b>					
Heating	-7 / 35 °C	5.55 / 2.05 / 2.71	7.18 / 2.93 / 2.45	6.61 / 2.32 / 2.85	10.50 / 3.62 / 2.90
Capacity / power input / COP (kW/kW/-) at nominal flow	2 / 35 °C	2.31 / 0.56 / 4.13	3.46 / 0.83 / 4.17	4.57 / 1.15 / 3.97	5.21 / 1.19 / 4.38
	2 / 45 °C	2.02 / 0.67 / 3.01	3.24 / 1.12 / 3.24	6.80 / 2.20 / 3.10	9.18 / 3.21 / 2.86
Outdoor temp. / Supply temp.	7 / 35 °C	2.65 / 0.49 / 5.41	4.00 / 0.75 / 5.33	5.36 / 1.01 / 5.31	6.31 / 1.20 / 5.26
	7 / 45 °C	2.43 / 0.65 / 3.74	5.00 / 1.28 / 3.91	5.00 / 1.43 / 3.50	6.75 / 1.69 / 4.00
Cooling	35 / 7 °C	5.32 / 1.94 / 2.74	7.07 / 2.40 / 2.95	9.00 / 3.21 / 2.80	12.5 / 4.31 / 2.90
Capacity / power input / EER (kW/kW/-) at maximum flow	35 / 18 °C	7.55 / 2.11 / 3.58	10.79 / 3.00 / 3.60	12.50 / 3.68 / 3.70	16.5 / 4.34 / 3.80
	Outdoor temp. / Supply temp.				
<b>SCOP according to EN 14825</b>					
Nominal heat output (P <sub>designh</sub> ) average climate 35 °C / 55 °C (Europe)	kW	5.2 / 5.6	6.3 / 6.5	7.5 / 7.5	11.5 / 11.5
Nominal heat output (P <sub>designh</sub> ) cold climate 35 °C / 55 °C	kW	5.8 / 5.7	6.5 / 6.2	11.0 / 11.0	16.0 / 16.0
Nominal heat output (P <sub>designh</sub> ) warm climate 35 °C / 55 °C	kW	5.6 / 5.5	6.8 / 6.6	9.0 / 9.0	12.0 / 12.0
SCOP average climate, 35 °C / 55 °C (Europe)		5.08 / 3.56	4.59 / 3.36	4.87 / 3.49	4.58 / 3.42
SCOP cold climate, 35 °C / 55 °C		4.10 / 3.05	3.95 / 2.94	3.85 / 2.95	3.47 / 2.75
SCOP warm climate, 35 °C / 55 °C		6.70 / 4.53	6.59 / 4.49	6.47 / 4.34	5.77 / 4.21
<b>Energy rating, average climate<sup>2</sup></b>					
The product's room heating efficiency class 35 °C / 55 °C <sup>3</sup>		A+++ / A++	A+++ / A++	A+++ / A++	A+++ / A++
The system's room heating efficiency class 35 °C / 55 °C <sup>4</sup>		A+++ / A++			
<b>Electrical data</b>					
Rated voltage		230 V – 50 Hz, 230 V 2 – 50 Hz			
Max operating current, heat pump	A <sub>rms</sub>	15	16	21	28
Max operating current, compressor	A <sub>rms</sub>	14	15	20	27
Max. power, fan	W	50	86	39	46
Fuse	A <sub>rms</sub>	16	16	25	30
Enclosure class		IP24			
<b>Refrigerant circuit</b>					
Type of refrigerant		R32			
GWP refrigerant		675			
Volume	kg	1.3	1.84	2.0	2.9
Type of compressor		Twin Rotary			
CO <sub>2</sub> -equivalent (The cooling circuit is hermetically sealed.)	t	0.88	1.24	1.35	1.96
Cut-out value pressure switch HP (BP1)	MPa (bar)	-	4.15 (41.5)	4.15 (41.5)	4.15 (41.5)
<b>Airflow</b>					
Max airflow	m <sup>3</sup> /h	2,530	3,000	3,180	3,600
<b>Working area</b>					
Min./max. air temperature, heating	°C	-20 / 43	-20 / 43	-25 / 43	-25 / 43
Min./max. air temperature, cooling	°C	15 / 43			
Defrosting system		Reverse cycle			
<b>Heating medium circuit</b>					
Max system pressure heating medium	MPa (bar)	0.6 (6.0)	0.6 (6.0)	0.45 (4.5)	0.45 (4.5)
Recommended flow interval, heating operation	l/s	0.08 – 0.32	0.12 – 0.38	0.15 – 0.42	0.25 – 0.79
Recommended flow interval, cooling operation	l/s	0.11 – 0.29	0.15 – 0.38	0.20 – 0.42	0.32 – 0.80
Min. design flow, defrosting (100% pump speed)	l/s	0.19	0.19	0.26	0.40
Min./max. HM temp, continuous operation	°C	25 / 58	25 / 58	25 / 60	25 / 60
Connection heating medium F2050 external thread		G1 (Ø28 mm)			
Connection heating medium flex pipe		G1 (Ø28 mm)			
Min. recommended pipe dimension (system)	DN (mm)	20 (22)			
<b>Dimensions and weight</b>					
Width	mm	993	1,035	1,160	1,160
Depth	mm	383	422	440	440
Height (with stand)	mm	781 (+10/-0)	895 (+10/-0)	1,120	1,120
Net weight	kg	76	83	104	118
<b>Miscellaneous</b>					
Part no.		064 328	064 318	064 361	064 362

<sup>1</sup> Power statements including defrosting according to EN 14511 at heating medium supply corresponding to DT=5 K at 7 / 45.

<sup>2</sup> Reported efficiency for the system also takes the temperature regulator into account. If the system is supplemented with external additional heat or

solar heating, the total efficiency of the system must be recalculated.

<sup>3</sup> Scale for the product's room heating efficiency class A+++ to D. Control module model SMO S.

<sup>4</sup> Scale for the system's room heating efficiency class A+++ to G. Control module model SMO S.

# Energy labelling

## INFORMATION SHEET

Supplier		NIBE			
Model		F2050-6	F2050-10	F2050-12	F2050-16
Temperature application	°C	35 / 55	35 / 55	35 / 55	35 / 55
Seasonal space heating energy efficiency class, average climate		A+++ / A++	A+++ / A++	A+++ / A++	A+++ / A++
Rated heat output (P <sub>design,h</sub> ), average climate	kW	5 / 6	6 / 6	7.5 / 7.8	11.5 / 11.5
Annual energy consumption space heating, average climate	kWh	2,116 / 3,250	2,834 / 3,961	3,183 / 4,613	5,182 / 6,950
Seasonal space heating energy efficiency, average climate	%	200 / 139	181 / 132	192 / 137	180 / 134
Sound power level L <sub>WA</sub> indoors	dB	-	-	-	-
Rated heat output (P <sub>design,h</sub> ), cold climate	kW	6 / 6	7 / 6	11.0 / 11.0	16.0 / 16.0
Rated heat output (P <sub>design,h</sub> ), warm climate	kW	6 / 5	7 / 7	9.0 / 9.0	12.0 / 12.0
Annual energy consumption space heating, cold climate	kWh	3,487 / 4,604	4,059 / 5,204	7,051 / 9,187	11,360 / 14,350
Annual energy consumption space heating, warm climate	kWh	1,110 / 1,617	1,379 / 1,964	1,860 / 2,768	2,780 / 3,810
Seasonal space heating energy efficiency, cold climate	%	161 / 119	155 / 114	151 / 115	136 / 107
Seasonal space heating energy efficiency, warm climate	%	265 / 178	260 / 177	256 / 171	228 / 165
Sound power level L <sub>WA</sub> outdoors	dB	53	53	60	63

### DATA FOR ENERGY EFFICIENCY OF THE PACKAGE

Model		F2050-6	F2050-10	F2050-12	F2050-16
Control module model		SMO	SMO	SMO S40	SMO S40
Temperature application	°C	35 / 55	35 / 55	35 / 55	35 / 55
Controller, class		VI			
Controller, contribution to efficiency	%	4.0			
Seasonal space heating energy efficiency of the package, average climate	%	204 / 143	185 / 136	196 / 141	184 / 138
Seasonal space heating energy efficiency class of the package, average climate		A+++ / A++	A+++ / A++	A+++ / A++	A+++ / A++
Seasonal space heating energy efficiency of the package, cold climate	%	165 / 123	159 / 118	155 / 119	140 / 111
Seasonal space heating energy efficiency of the package, warm climate	%	269 / 182	264 / 181	260 / 175	232 / 169

Reported efficiency for the system also takes the temperature regulator into account. If the system is supplemented with external additional heat or solar heating, the total efficiency of the system must be recalculated.

# TECHNICAL DOCUMENTATION

Model		F2050-6					
Type of heat pump	<input checked="" type="checkbox"/> Air-water <input type="checkbox"/> Exhaust-water <input type="checkbox"/> Brine-water <input type="checkbox"/> Water-water						
Low-temperature heat pump	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No						
Integrated immersion heater for additional heat	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No						
Heat pump combination heater	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No						
Climate	<input checked="" type="checkbox"/> Average <input type="checkbox"/> Cold <input type="checkbox"/> Warm						
Temperature application	<input checked="" type="checkbox"/> Medium (55°C) <input type="checkbox"/> Low (35°C)						
Applied standards	EN14511 / EN14825 / EN12102						
Rated heat output	Prated	5.6	kW	Seasonal space heating energy efficiency	$\eta_s$	139	%
Declared capacity for space heating at part load and at outdoor temperature $T_j$				Declared coefficient of performance for space heating at part load and at outdoor temperature $T_j$			
$T_j = -7\text{ °C}$	Pdh	5.0	kW	$T_j = -7\text{ °C}$	COPd	1.95	-
$T_j = +2\text{ °C}$	Pdh	2.9	kW	$T_j = +2\text{ °C}$	COPd	3.51	-
$T_j = +7\text{ °C}$	Pdh	1.9	kW	$T_j = +7\text{ °C}$	COPd	4.99	-
$T_j = +12\text{ °C}$	Pdh	1.7	kW	$T_j = +12\text{ °C}$	COPd	6.33	-
$T_j = \text{biv}$	Pdh	5.0	kW	$T_j = \text{biv}$	COPd	1.95	-
$T_j = \text{TOL}$	Pdh	4.6	kW	$T_j = \text{TOL}$	COPd	1.75	-
$T_j = -15\text{ °C}$ (if TOL < -20 °C)	Pdh		kW	$T_j = -15\text{ °C}$ (if TOL < -20 °C)	COPd		-
Bivalent temperature	$T_{\text{biv}}$	-7	°C	Min. outdoor air temperature	TOL	-10	°C
Cycling interval capacity	P <sub>cy</sub>		kW	Cycling interval efficiency	COP <sub>cy</sub>		-
Degradation coefficient	Cdh	0.96	-	Max supply temperature	WTOL	58	°C
Power consumption in modes other than active mode				Additional heat			
Off mode	P <sub>OFF</sub>	0.007	kW	Rated heat output	P <sub>sup</sub>	1.0	kW
Thermostat-off mode	P <sub>TO</sub>	0.011	kW				
Standby mode	P <sub>SB</sub>	0.011	kW	Type of energy input	Electric		
Crankcase heater mode	P <sub>CK</sub>	0.000	kW				
<i>Other items</i>							
Capacity control	Variable			Rated airflow (air-water)		2,340	m <sup>3</sup> /h
Sound power level, indoors/outdoors	L <sub>WA</sub>	- / 53	dB	Nominal heating medium flow			m <sup>3</sup> /h
Annual energy consumption	Q <sub>HE</sub>	3,250	kWh	Brine flow brine-water or water-water heat pumps			m <sup>3</sup> /h
Contact information	NIBE Energy Systems - Box 14 - Hannabadsvägen 5 - 285 21 Markaryd - Sweden						

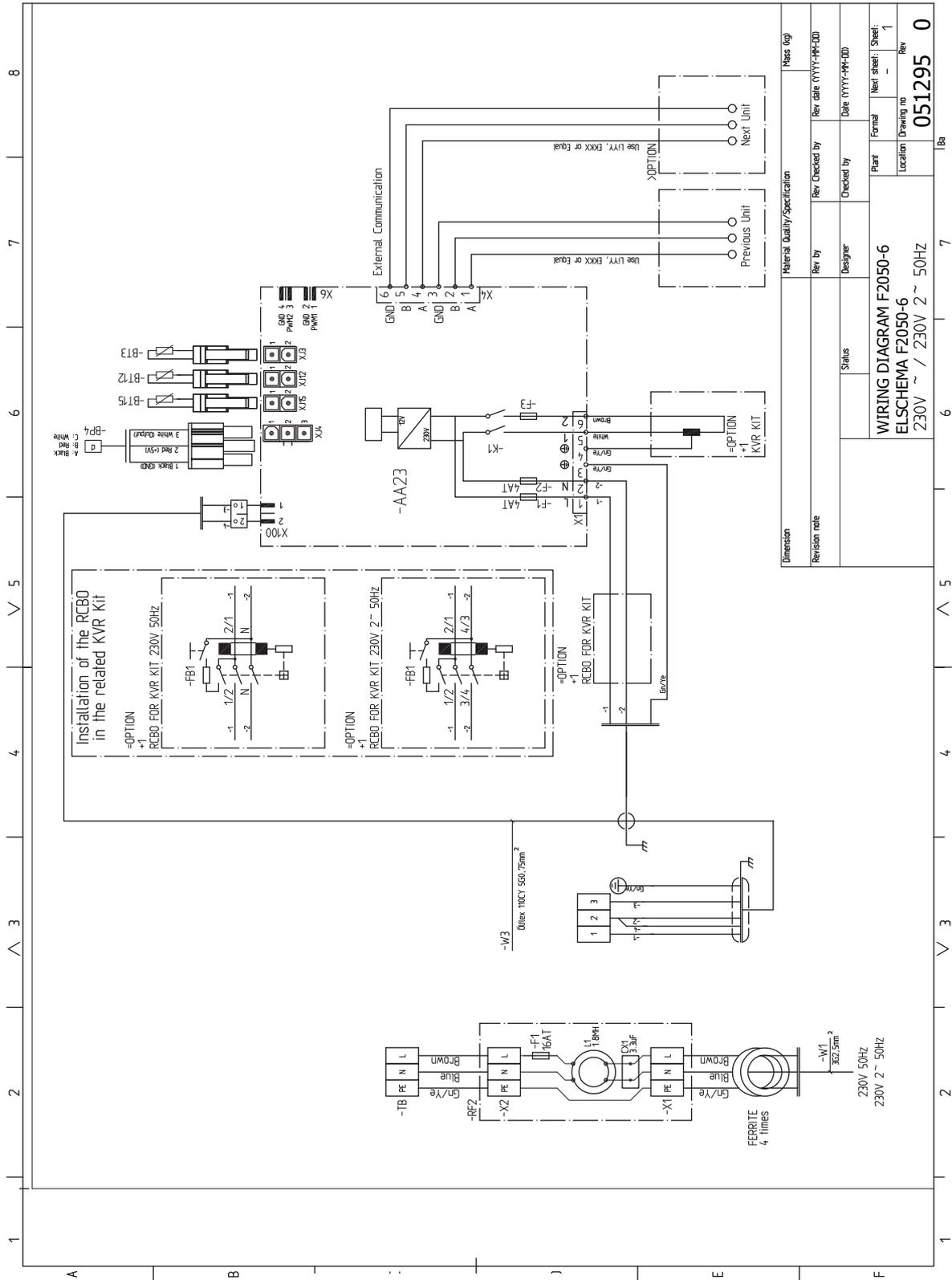
Model		F2050-10					
Type of heat pump	<input checked="" type="checkbox"/> Air-water <input type="checkbox"/> Exhaust-water <input type="checkbox"/> Brine-water <input type="checkbox"/> Water-water						
Low-temperature heat pump	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No						
Integrated immersion heater for additional heat	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No						
Heat pump combination heater	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No						
Climate	<input checked="" type="checkbox"/> Average <input type="checkbox"/> Cold <input type="checkbox"/> Warm						
Temperature application	<input checked="" type="checkbox"/> Medium (55°C) <input type="checkbox"/> Low (35°C)						
Applied standards	EN14511 / EN14825 / EN12102						
Rated heat output	Prated	6.5	kW	Seasonal space heating energy efficiency	$\eta_s$	132	%
Declared capacity for space heating at part load and at outdoor temperature $T_j$				Declared coefficient of performance for space heating at part load and at outdoor temperature $T_j$			
$T_j = -7\text{ °C}$	Pdh	5.8	kW	$T_j = -7\text{ °C}$	COPd	1.98	-
$T_j = +2\text{ °C}$	Pdh	3.5	kW	$T_j = +2\text{ °C}$	COPd	3.17	-
$T_j = +7\text{ °C}$	Pdh	2.3	kW	$T_j = +7\text{ °C}$	COPd	4.98	-
$T_j = +12\text{ °C}$	Pdh	2.2	kW	$T_j = +12\text{ °C}$	COPd	5.50	-
$T_j = \text{biv}$	Pdh	5.8	kW	$T_j = \text{biv}$	COPd	1.98	-
$T_j = \text{TOL}$	Pdh	5.8	kW	$T_j = \text{TOL}$	COPd	1.69	-
$T_j = -15\text{ °C}$ (if TOL < -20 °C)	Pdh		kW	$T_j = -15\text{ °C}$ (if TOL < -20 °C)	COPd		-
Bivalent temperature	$T_{\text{biv}}$	-7	°C	Min. outdoor air temperature	TOL	-10	°C
Cycling interval capacity	P <sub>cy</sub>		kW	Cycling interval efficiency	COP <sub>cy</sub>		-
Degradation coefficient	Cdh	0.98	-	Max supply temperature	WTOL	60	°C
Power consumption in modes other than active mode				Additional heat			
Off mode	P <sub>OFF</sub>	0.003	kW	Rated heat output	P <sub>sup</sub>	0.7	kW
Thermostat-off mode	P <sub>TO</sub>	0.008	kW				
Standby mode	P <sub>SB</sub>	0.008	kW	Type of energy input	Electric		
Crankcase heater mode	P <sub>CK</sub>	0.000	kW				
<i>Other items</i>							
Capacity control	Variable			Rated airflow (air-water)		3,000	m <sup>3</sup> /h
Sound power level, indoors/outdoors	L <sub>WA</sub>	- / 53	dB	Nominal heating medium flow			m <sup>3</sup> /h
Annual energy consumption	Q <sub>HE</sub>	3,961	kWh	Brine flow brine-water or water-water heat pumps			m <sup>3</sup> /h
Contact information	NIBE Energy Systems – Box 14 – Hannabadsvägen 5 – 285 21 Markaryd – Sweden						

Model		F2050-12							
Type of heat pump	<input checked="" type="checkbox"/> Air-water <input type="checkbox"/> Exhaust-water <input type="checkbox"/> Brine-water <input type="checkbox"/> Water-water								
Low-temperature heat pump	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No								
Integrated immersion heater for additional heat	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No								
Heat pump combination heater	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No								
Climate	<input checked="" type="checkbox"/> Average <input type="checkbox"/> Cold <input type="checkbox"/> Warm								
Temperature application	<input checked="" type="checkbox"/> Medium (55°C) <input type="checkbox"/> Low (35°C)								
Applied standards	EN 14825:2022 / EN 12102-1:2022								
Rated heat output	Prated	7.8	kW	Seasonal space heating energy efficiency	$\eta_s$	137	%		
Declared capacity for space heating at part load and at outdoor temperature $T_j$				Declared coefficient of performance for space heating at part load and at outdoor temperature $T_j$					
$T_j = -7\text{ °C}$	Pdh	6.9	kW	$T_j = -7\text{ °C}$	COPd	2.00	-		
$T_j = +2\text{ °C}$	Pdh	4.4	kW	$T_j = +2\text{ °C}$	COPd	3.45	-		
$T_j = +7\text{ °C}$	Pdh	3.3	kW	$T_j = +7\text{ °C}$	COPd	4.85	-		
$T_j = +12\text{ °C}$	Pdh	4.0	kW	$T_j = +12\text{ °C}$	COPd	6.90	-		
$T_j = \text{biv}$	Pdh	6.9	kW	$T_j = \text{biv}$	COPd	2.00	-		
$T_j = \text{TOL}$	Pdh	5.4	kW	$T_j = \text{TOL}$	COPd	1.40	-		
$T_j = -15\text{ °C}$ (if TOL < -20 °C)	Pdh		kW	$T_j = -15\text{ °C}$ (if TOL < -20 °C)	COPd		-		
Bivalent temperature	$T_{\text{biv}}$	-7	°C	Min. outdoor air temperature	TOL	-10	°C		
Cycling interval capacity	P <sub>cy</sub>		kW	Cycling interval efficiency	COP <sub>cy</sub>		-		
Degradation coefficient	Cdh	0.95	-	Max supply temperature	WTOL	60	°C		
Power consumption in modes other than active mode				Additional heat					
Off mode	P <sub>OFF</sub>	0.028	kW	Rated heat output	P <sub>sup</sub>	2.4	kW		
Thermostat-off mode	P <sub>TO</sub>	0.031	kW						
Standby mode	P <sub>SB</sub>	0.031	kW	Type of energy input	Electric				
Crankcase heater mode	P <sub>CK</sub>	0.000	kW						
Other items									
Capacity control	Variable			Rated airflow (air-water)		3,180	m <sup>3</sup> /h		
Sound power level, indoors/outdoors	L <sub>WA</sub>	- / 60	dB	Nominal heating medium flow			m <sup>3</sup> /h		
Annual energy consumption	Q <sub>HE</sub>	4,613	kWh	Brine flow brine-water or water-water heat pumps			m <sup>3</sup> /h		
Contact information	NIBE Energy Systems – Box 14 – Hannabadsvägen 5 – 285 21 Markaryd – Sweden								

Model		F2050-16					
Type of heat pump	<input checked="" type="checkbox"/> Air-water <input type="checkbox"/> Exhaust-water <input type="checkbox"/> Brine-water <input type="checkbox"/> Water-water						
Low-temperature heat pump	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No						
Integrated immersion heater for additional heat	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No						
Heat pump combination heater	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No						
Climate	<input checked="" type="checkbox"/> Average <input type="checkbox"/> Cold <input type="checkbox"/> Warm						
Temperature application	<input checked="" type="checkbox"/> Medium (55°C) <input type="checkbox"/> Low (35°C)						
Applied standards	EN 14825:2022 / EN 12102-1:2022						
Rated heat output	Prated	11.5	kW	Seasonal space heating energy efficiency	$\eta_s$	134	%
Declared capacity for space heating at part load and at outdoor temperature $T_j$				Declared coefficient of performance for space heating at part load and at outdoor temperature $T_j$			
$T_j = -7\text{ °C}$	Pdh	10.5	kW	$T_j = -7\text{ °C}$	COPd	2.06	-
$T_j = +2\text{ °C}$	Pdh	6.3	kW	$T_j = +2\text{ °C}$	COPd	3.18	-
$T_j = +7\text{ °C}$	Pdh	4.1	kW	$T_j = +7\text{ °C}$	COPd	4.83	-
$T_j = +12\text{ °C}$	Pdh	4.6	kW	$T_j = +12\text{ °C}$	COPd	7.42	-
$T_j = \text{biv}$	Pdh	10.5	kW	$T_j = \text{biv}$	COPd	2.06	-
$T_j = \text{TOL}$	Pdh	9.4	kW	$T_j = \text{TOL}$	COPd	1.79	-
$T_j = -15\text{ °C}$ (if TOL < -20 °C)	Pdh		kW	$T_j = -15\text{ °C}$ (if TOL < -20 °C)	COPd		-
Bivalent temperature	$T_{\text{biv}}$	-7	°C	Min. outdoor air temperature	TOL	-10	°C
Cycling interval capacity	P <sub>cy</sub>		kW	Cycling interval efficiency	COP <sub>cy</sub>		-
Degradation coefficient	Cdh	0.95	-	Max supply temperature	WTOL	60	°C
Power consumption in modes other than active mode				Additional heat			
Off mode	P <sub>OFF</sub>	0.028	kW	Rated heat output	P <sub>sup</sub>	2.1	kW
Thermostat-off mode	P <sub>TO</sub>	0.031	kW				
Standby mode	P <sub>SB</sub>	0.031	kW	Type of energy input	Electric		
Crankcase heater mode	P <sub>CK</sub>	0.000	kW				
Other items							
Capacity control	Variable			Rated airflow (air-water)		3,600	m <sup>3</sup> /h
Sound power level, indoors/outdoors	L <sub>WA</sub>	- / 63	dB	Nominal heating medium flow			m <sup>3</sup> /h
Annual energy consumption	Q <sub>HE</sub>	6,950	kWh	Brine flow brine-water or water-water heat pumps			m <sup>3</sup> /h
Contact information	NIBE Energy Systems – Box 14 – Hannabadsvägen 5 – 285 21 Markaryd – Sweden						

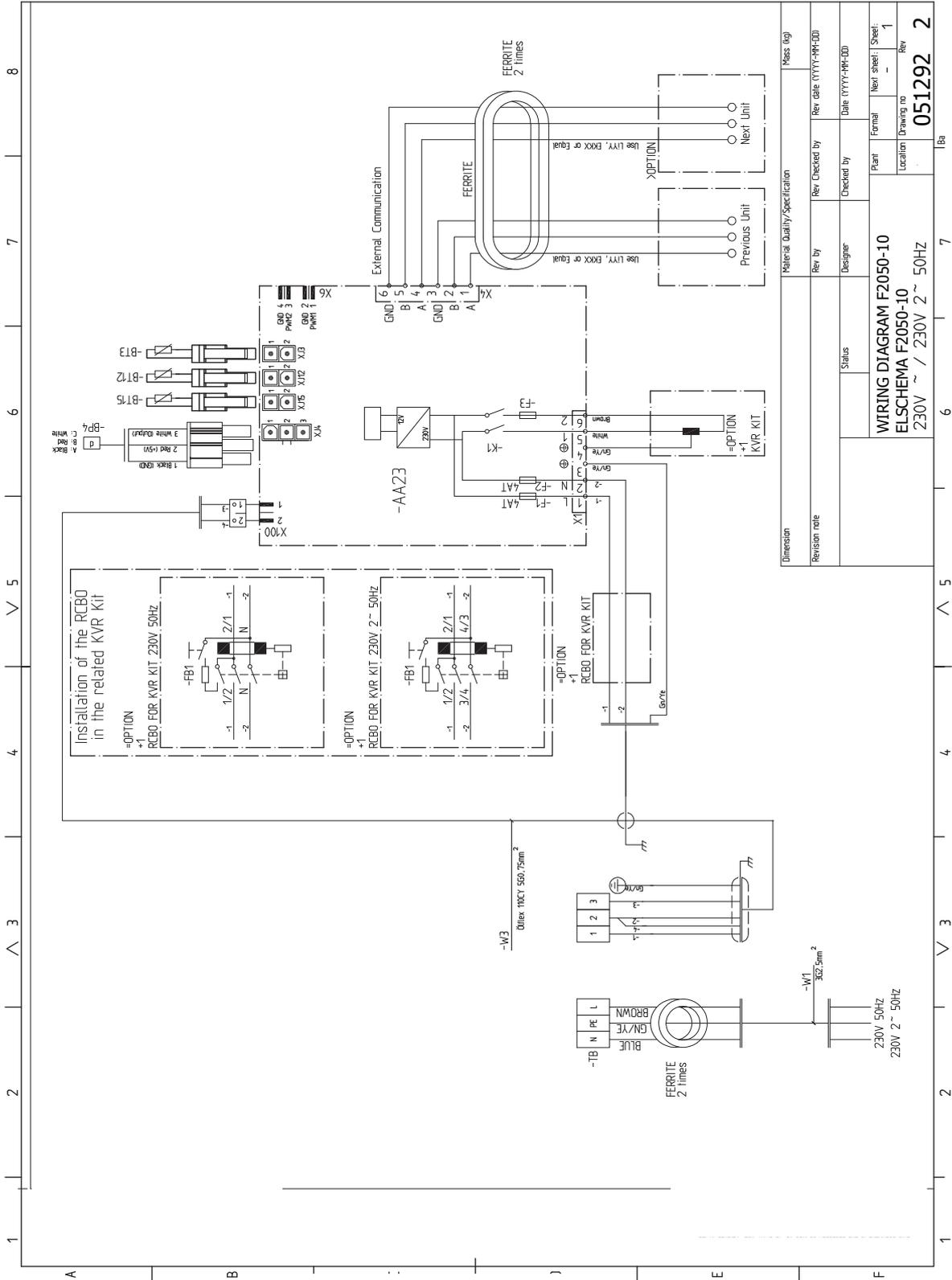
# Electrical circuit diagram

## F2050-6

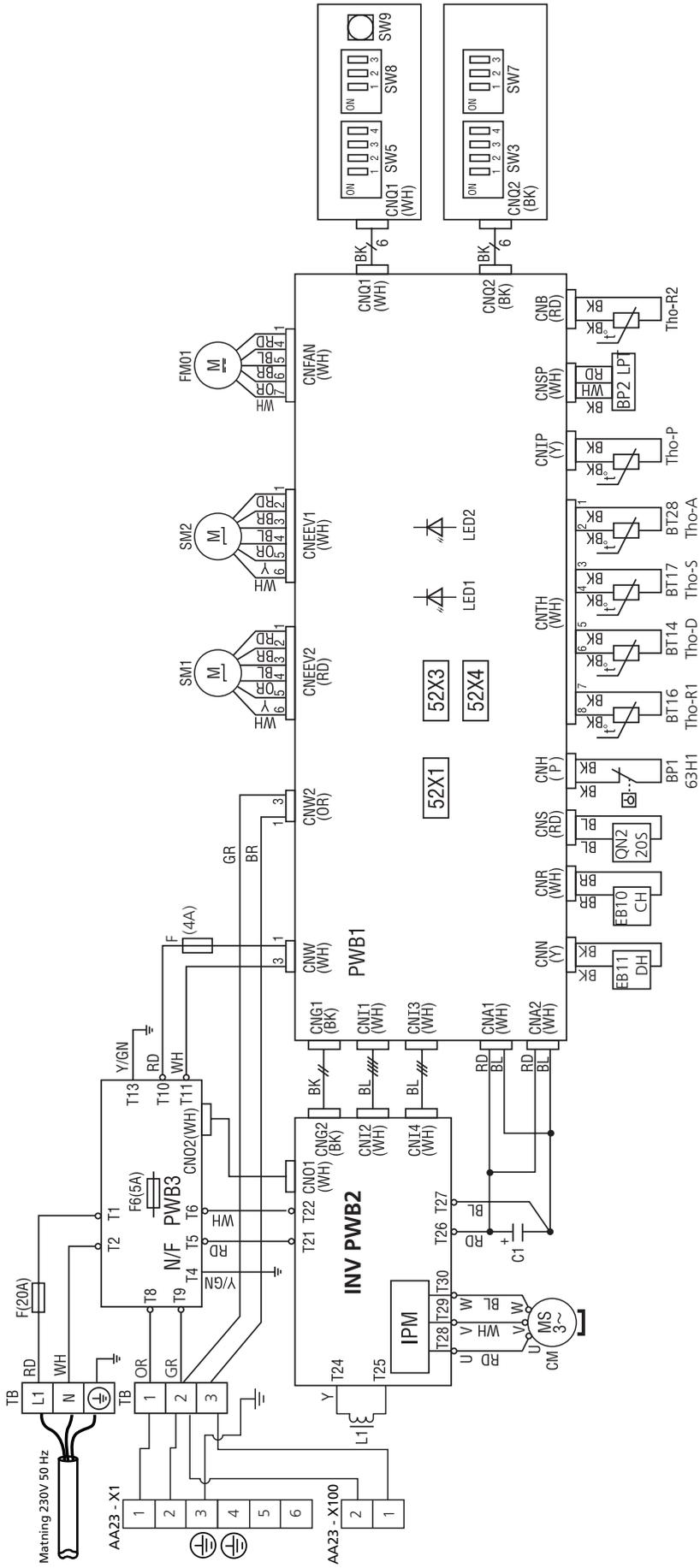


Material Quality/Specification		Mass (kg)	
Revision note	Revision date	Rev. Checked by	Rev. date (YYYY-MM-DD)
Status	Designer	Checked by	Date (YYYY-MM-DD)
WIRING DIAGRAM F2050-6		Plant	Next sheet: Sheet: 1
ELSCHEMA F2050-6		Location	Drawing no. 051295
230V ~ / 230V 2~ 50HZ		Rev	0

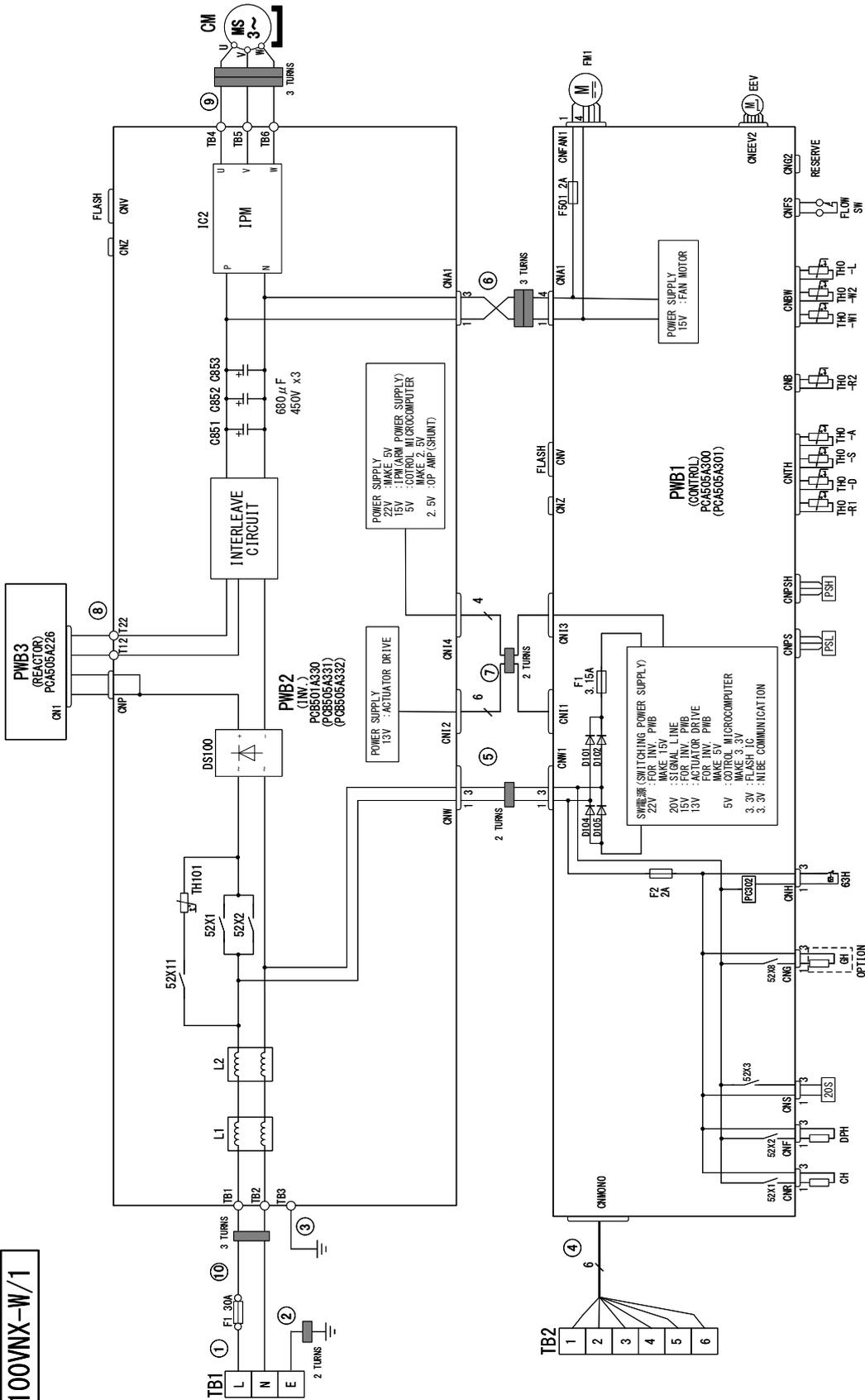




Dimension	Material Quality/Specification		Mass (kg)
Revision note	Rev. by	Rev. Checked by	Rev. date (YYYY-MM-DD)
	Status	Designer	Checked by
			Date (YYYY-MM-DD)
	WIRING DIAGRAM F2050-10		Plant
	ELSCHEMA F2050-10		Formal
	230V ~ / 230V 2~ 50HZ		Next sheet
			Sheet: 1
			Drawing no
			Location
			Rev
			051292
			2



FDCM100VNX-W/1





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