IHB EN 2014-6
331036

INSTALLER MANUAL

Ground source heat pump NIBE F1345

NIBE

Table of Contents

1 Important information

Safety information

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

This appliance can be used by children aged from 8 years and above and persons with reduced physical, sensory or mental capabilities or lack of experience and knowledge if they have been given supervision or instruction concerning use of the appliance in a safe way and understand the hazards involved. The product is intended for use by experts or trained users in shops, hotels, light industry, farming and similar environments.

Children must be instructed/supervised to ensure that they do not play with the appliance.

Do not allow children to clean or maintain the appliance unsupervised.

This is an original manual. It may not be translated without the approval of NIBE.

Rights to make any design or technical modifications are reserved.

Do not start F1345 if there is a risk that the water in the system has frozen.

F1345 must be installed via an isolator switch. The cable area has to be dimensioned based on the fuse rating used.

Symbols

WARNING!

This symbol indicates serious danger to person or machine.

NOTE

This symbol indicates danger to person or machine .

Caution

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

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

IP21 Classification of enclosure of electro-technical equipment.

Danger to person or machine.

Read the operating manual.

Safety precautions

CAUTION

Install the system in full accordance with this installation manual.
Incorrect installation can cause bursts, personal injury, water leaks, refrigerant leaks, electric shocks and fire.

Pay attention to the measurement values before working on the cooling system, especially when servicing in small rooms, so that the limit for the refrigerant's concentration is not exceeded.
Consult an expert to interpret the measurement values. If the refrigerant concentration exceeds the limit, there may be a shortage of oxygen in the event of any leak, which can cause serious injury.

Use original accessories and the stated components for the installation.
If parts other than those stated by us are used, water leaks, electric shocks, fire and personal injury may occur as the unit may not work properly.

Ventilate the working area well – refrigerant leakage may occur during service work.
If the refrigerant comes into contact with naked flames, poisonous gas is created.

Install the unit in a location with good support.
Unsuitable installation locations can cause the unit to fall and cause material damage and personal injury. Installation without sufficient support can also cause vibrations and noise.

Ensure that the unit is stable when installed, so that it can withstand earthquakes and strong winds.
Unsuitable installation locations can cause the unit to fall and cause material damage and personal injury.

The electrical installation must be carried out by a qualified electrician and the system must be connected as a separate circuit.
Power supply with insufficient capacity and incorrect function can cause electric shocks and fire.

Use the stated cables for the electrical connection, tighten the cables securely in the terminal blocks and relieve the wiring correctly to prevent overloading the terminal blocks.
Loose connections or cable mountings can cause abnormal heat production or fire.

Check, after completed installation or service, that no refrigerant leaks from the system in gas form.
If refrigerant gas leaks into the house and comes into contact with an aerotemp, an oven or other hot surface, poisonous gases are produced.

Use types of pipe and tools stated for this type of refrigerant.
Using existing parts for other refrigerants can cause breakdowns and serious accidents due to process circuit bursts.

Switch off the compressor before opening/breaching the refrigerant circuit.
If the refrigerant circuit is breached /opened whilst the compressor is running, air can enter the process circuit. This can cause unusually high pressure in the process circuit, which can cause bursts and personal injury.

Switch off the power supply in the event of a service or inspection.
If the power supply is not shut off, there is a risk of electric shocks and damage due to the rotating fan.

Do not run the unit with removed panels or protection.
Touching rotating equipment, hot surfaces or high voltage parts can cause personal injury due to entrapment, burns or electric shocks.

Cut the power before starting electrical work.
Failure to cut the power can cause electric shocks, damage and incorrect function of the equipment.

CARE

Carry out the electrical installation with care.
Do not connect the ground lead to the gas line, water line, lightning conductor or telephone line's ground lead. Incorrect grounding can cause unit faults such as electric shocks due to short-circuiting.

Use main switch with sufficient breaking capacity.
If the switch does not have sufficient breaking capacity, malfunctions and fire can occur.

Always use a fuse with the correct rating in the locations where fuses are to be used.
Connecting the unit with copper wire or other metal thread can cause unit breakdown and fire.

Cables must be routed so that they are not damaged by metal edges or trapped by panels.
Incorrect installation can cause electric shocks, heat generation and fire.

Do not install the unit in close proximity to locations where leakage of combustible gases can occur.
If leaking gases collect around the unit, fire may occur.

Do not install the unit where corrosive gas (for example nitrous fumes) or combustible gas or steam (for example thinner and petroleum gases) can build up or collect, or where volatile combustible substances are handled.
Corrosive gas can cause corrosion to the heat exchanger, breaks in plastic parts etc. and combustible gas or steam can cause fire.

Do not use the unit for specialist purposes such as for storing food, cooling precision instruments, freeze-conservation of animals, plants or art.
This can damage the items.

Do not install and use the system close to equipment that generates electromagnetic fields or high frequency harmonics.
Equipment such as inverters, standby sets, medical high frequency equipment and telecommunications equipment can affect the unit and cause malfunctions and breakdowns. The unit can also affect medical equipment and telecommunications equipment, so that it functions incorrectly or not at all.

Take care when carrying the unit by hand.
If the unit weights more than 20 kg, it must be carried by two people. Wear safety gloves to minimise the risk of cuts.

Dispose of any packaging material correctly.
Any remaining packaging material can cause personal injury as it may contain nails and wood.

Do not touch any buttons with wet hands.
This can cause electric shocks.

Do not touch any refrigerant pipes with your hands when the system is in operation.
During operation the pipes become extremely hot or extremely cold, depending on the method of operation. This can cause burn injuries or frost injuries.

Do not shut off the power supply immediately after operation has start.
Wait at least 5 minutes, otherwise there is a risk of water leakage or breakdown.

Do not control the system with the main switch.
This can cause fire or water leakage. In addition, the fan can start unexpectedly, which can cause personal injury.

ESPECIALLY FOR UNITS INTENDED FOR R407C AND R410A

- Do not use other refrigerants that those intended for the unit.

- Do not use charging bottles. These types of bottles change the composition of the refrigerant, which makes the performance of the system worse.

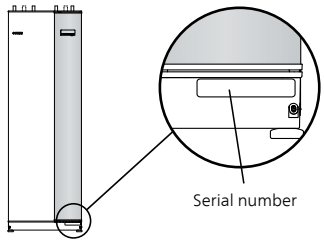
- When filling refrigerant, the refrigerant must always leave the bottle in liquid form.

- R410A means that the pressure is about 1.6 times as high as for conventional refrigerants.

- The filling connections on units with R410A are different sizes, to prevent the system being filled with the incorrect refrigerant by mistake.

Serial number

The serial number can be found at the bottom right of the front cover, in the info menu (menu 3.1) and on the type plate (PZ1).



Caution

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

Recovery

Leave the disposal of the packaging to the installer who installed the product or to special waste stations.

Do not dispose of used products with normal household waste. It must be disposed of at a special waste station or dealer who provides this type of service.

Improper disposal of the product by the user results in administrative penalties in accordance with current legislation.

Environmental information

F-GAS REGULATION (EU) NO. 517/2014

This unit contains a fluorinated greenhouse gas that is covered by the Kyoto agreement.

The equipment contains R407C or R410A, fluorinated greenhouse gases with GWP values (Global Warming Potential) of 1774 and 2088 respectively. Do not release R407C or R410A into the atmosphere.

Inspection of the installation

Current regulations require the heating installation to be inspected before it is commissioned. The inspection must be carried out by a suitably qualified person. In addition, fill in the page for the installation data in the Operating Manual.

✔	*Description*	*Notes*	*Signature*	*Date*
Brine (page 18)				
	Non-return valves			
	System flushed			
	System vented			
	Antifreeze			
	Level/Expansion vessel			
	Particle filter			
	Safety valve			
	Shut off valves			
	Circulation pumps set			
Heating medium (page 20)				
	Non-return valves			
	System flushed			
	System vented			
	Expansion vessel			
	Particle filter			
	Safety valve			
	Shut off valves			
	Circulation pumps set			
Electricity (page 23)				
	Connections			
	Main voltage			
	Phase voltage			
	Fuses heat pump			
	Fuses property			
	Outside sensor			
	Room sensor			
	Current sensor			
	Safety breaker			
	Earth circuit-breaker			
	Relay output for emergency mode			

2 Delivery and handling

Transport

F1345 has to be transported and stored vertically in a dry place. While being moved into a building, the heat pump may be carefully tilted backwards 45°.

Ensure that F1345 has not been damaged during transport.

NOTE

The heat pump is top heavy.

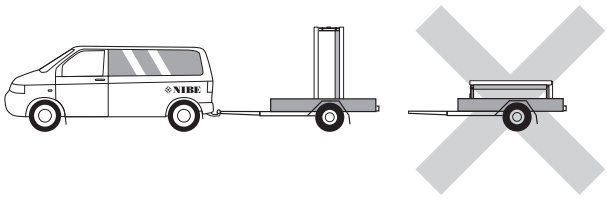
If the cooling modules are pulled out and transported upright, F1345 can be transported on its back.

NOTE

Ensure that the heat pump cannot fall over during transport.

TIP

The side panels can be removed for easier installation in the building.



LIFT FROM THE STREET TO THE SET UP LOCATION

If the base allows, the simplest thing is to use a pallet truck to move the F1345 to the set up location.

NOTE

The centre of gravity is offset to one side (see print on the packaging).

F1345 must be lifted on the heaviest side and can be moved on a sack truck. Two people are required to lift F1345.

LIFT FROM THE PALLET TO FINAL POSITIONING

Before lifting, remove the packaging and the load anchor to the pallet as well as front and side panels.

Before lifting, the heat pump must be separated by pulling the cooling modules out from the cabinet. See the service chapter in the operating manual for instructions about the separation.

Carry the heat pump by the upper cooling module's slide rails, use gloves.

NOTE

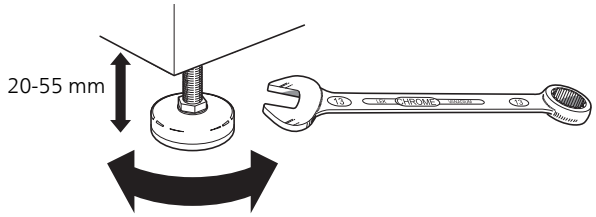
The heat pump must not be moved when only the lower cooling module has been pulled out. If the heat pump is not secured in position the upper cooling module must always be removed before the lower one can be pulled out.

SCRAPPING

For scrapping, remove the product in reverse order.

Assembly

- Place F1345 on a solid foundation indoors that can take the heat pump's weight. Use the product's adjustable feet to obtain a horizontal and stable set-up.

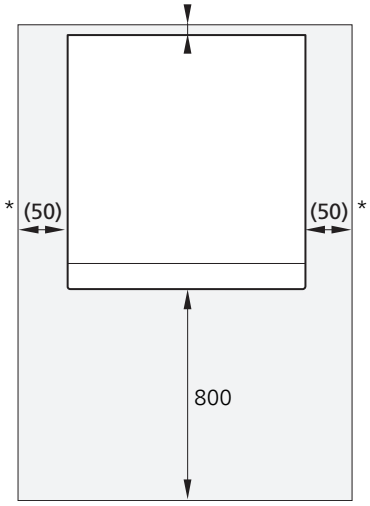


- Because water comes from F1345, the area where the heating pump is located must be equipped with floor drainage.
- Install with its back to an outside wall, ideally in a room where noise does not matter, in order to eliminate noise problems. If this is not possible, avoid placing it against a wall behind a bedroom or other room where noise may be a problem.

- Wherever the unit is located, walls to sound sensitive rooms should be fitted with sound insulation.
- Route pipes so they are not fixed to an internal wall that backs on to a bedroom or living room.

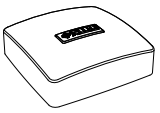
INSTALLATION AREA

Leave a free space of 800 mm in front of the product. Approx. 50 mm free space is required on each side, to remove the side panels (see image). The panels do not need to be removed during service. All service on F1345 can be carried out from the front. Leave space between the heat pump and the wall behind (and any routing of supply cables and pipes) to reduce the risk of any vibration being propagated.

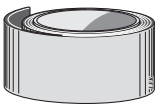


* A normal installation needs 300 – 400 mm (any side) for connection equipment, valves and electrical equipment.

Supplied components



Outdoor temperature sensor
1 x



Insulation tape
1 x

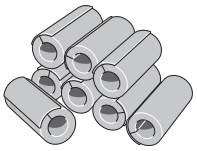
Temperature sensor
5 x

Safety valve
0.3 MPa (3 bar)
1 x

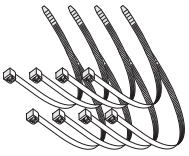
O-rings
16 x

Current sensor
(not 60 kW)
3 pcs

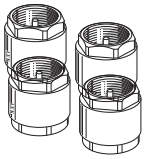
Tubes for sensors
4 x



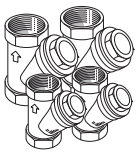
Pipe insulation
8 pcs



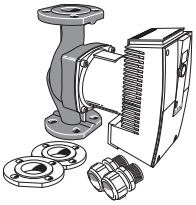
Cable tie
8 x



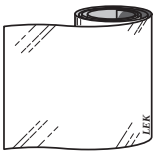
Non-return valves
24 - 30 kW: 4 x G2 (internal thread)
40 - 60 kW: 2 x G2 (internal thread)



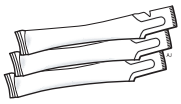
Particle filter
24 - 30 kW: 4 x G1 1/4 (internal thread)
40 - 60 kW: 2 x G1 1/4 (internal thread), 2 x G2 (internal thread)



External brine pump
(only for 40 and 60 kW)
1 x



Aluminium tape
1 x



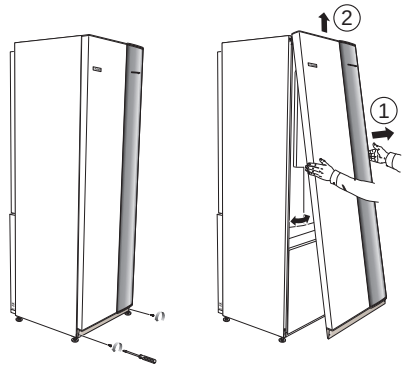
Heat conducting paste
3 x

LOCATION

The enclosed kit is placed in the packaging next to the heat pump.

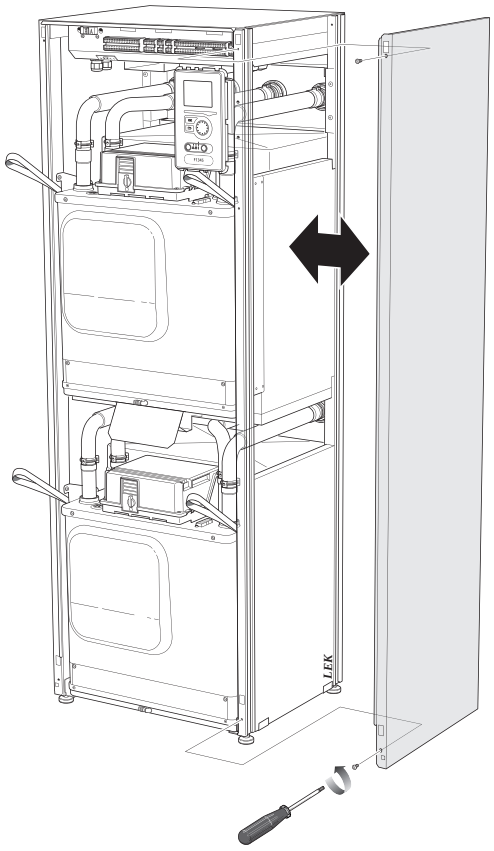
Removing the covers

FRONT COVER



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

SIDE PANELS

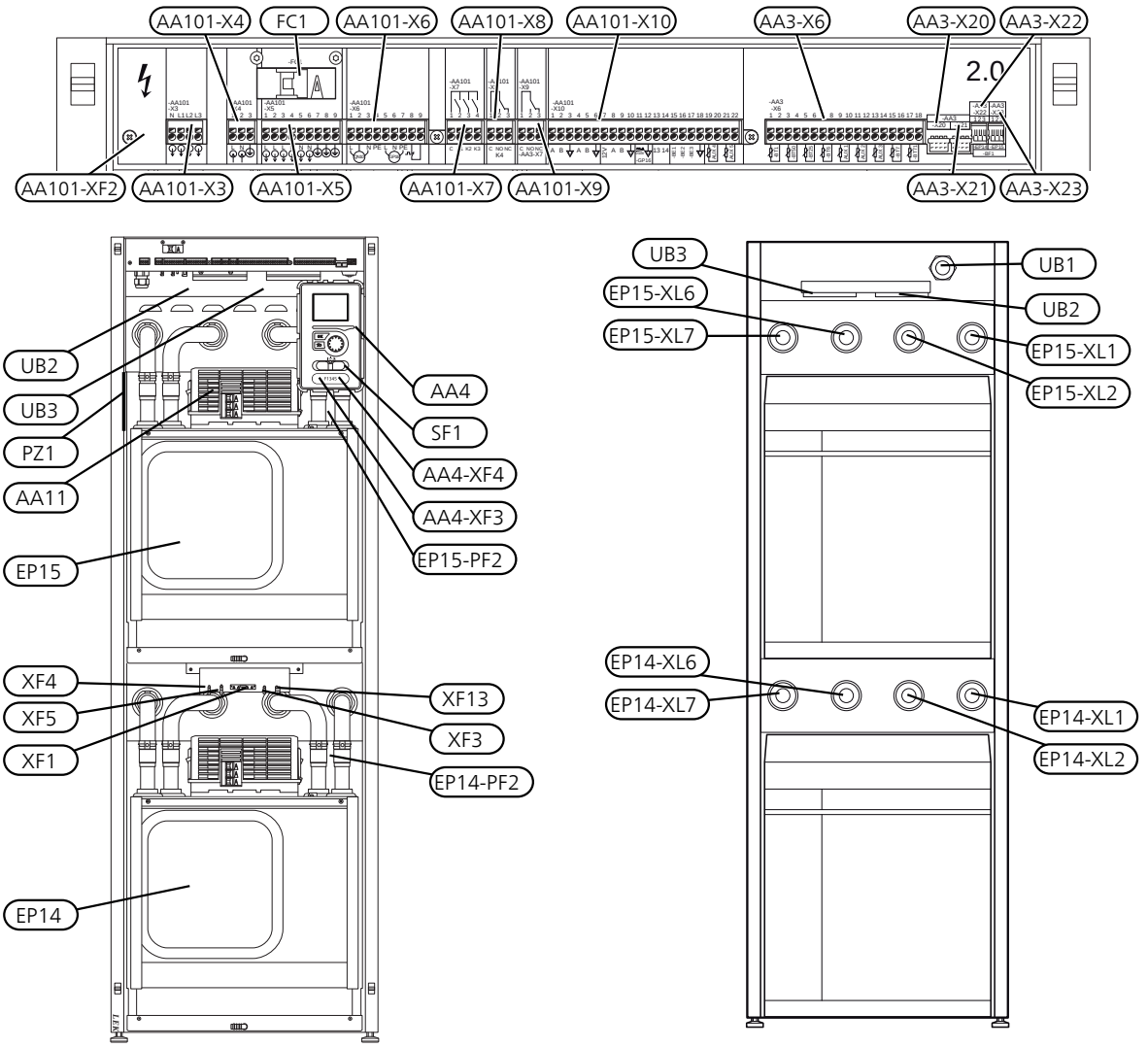


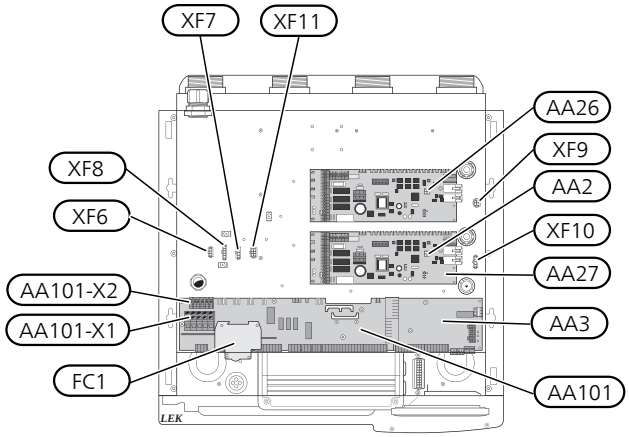
The side covers can be removed to facilitate the installation.

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

3 The heat pump design

General




XF7
XF11
AA26
XF9
XF8
AA2
XF6
XF10
AA27
AA101-X2
AA3
AA101-X1
FC1
AA101

PIPE CONNECTIONS

XL1	Connection, heating medium flow
XL2	Connection, heating medium return
XL6	Connection, brine in
XL7	Connection, brine out

HVAC COMPONENTS

EP14	Cooling module
EP15	Cooling module

SENSORS ETC.

BT1	Outdoor temperature sensor[1]

1 Not illustrated

ELECTRICAL COMPONENTS

AA2	Base card
AA3	Input circuit board
AA3-X6	Terminal block, sensor
AA3-X20	Terminal block -EP14 -BP8
AA3-X21	Terminal block -EP15 -BP8
AA3-X22	Terminal block, flow meter -EP14 -BF1
AA3-X23	Terminal block, flow meter -EP15 -BF1
AA4	Display unit
AA4-XF3	USB outlet (no function)
AA4-XF4	Service outlet (No function)
AA11	Motor module
AA23	Communication board
AA26	Base card 2
AA27	Relay board for base
AA101	Interface board
AA101-X1	Terminal block, incoming electrical supply
AA101-X2	Terminal block, supply -EP14
AA101-X3	Terminal block, operating voltage out -X4
AA101-X4	Terminal block, operating voltage in (tariff option)
AA101-X5	Terminal block, supply, external accessories.
AA101-X6	Terminal block -QN10 and -GP16
AA101-X8	Emergency mode relay
AA101-X9	Alarm relay, AUX relay
AA101-X10	Communication, PWM, power supply
FC1	Miniature circuit-breaker
RF3	EMC-filter
XF1	Connector, electrical supply to compressor, cooling module -EP14
XF3	Connector, compressor heater -EP14
XF4	Connector, brine pump, cooling module -EP14 (only 24 and 30 kW)
XF5	Connector, heating medium pump, cooling module -EP14
XF6	Connector, compressor heater -EP15
XF7	Connector, brine pump, cooling module -EP15 (only 24 and 30 kW)
XF8	Connector, heating medium pump, cooling module -EP15
XF9	Communication motor module -EP15
XF10	Communication motor module -EP14
XF11	Pumps, compressor heater -EP14
XF13	Communication motor module -EP14

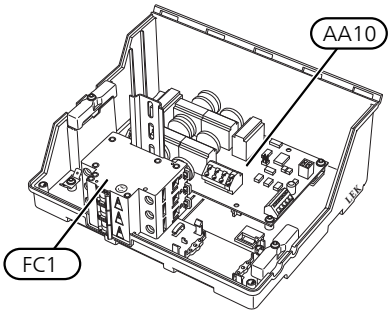
MISCELLANEOUS

PZ1	Rating plate
PZ2	Type plate, cooling section
PZ3	Serial number plate
UB1	Cable gland, incoming electricity
UB2	Cable gland, power
UB3	Cable gland, signal

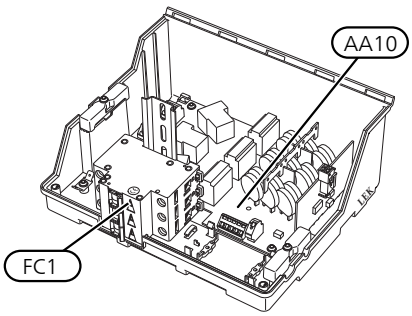
Designations according to standard EN 81346-2.

Motor module (AA11)

F1345 24 KW



F1345 30, 40 and 60 kW

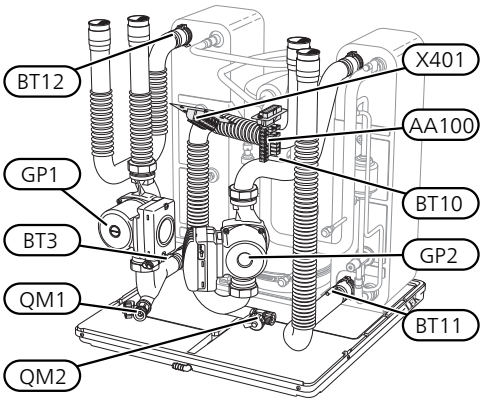


ELECTRICAL COMPONENTS

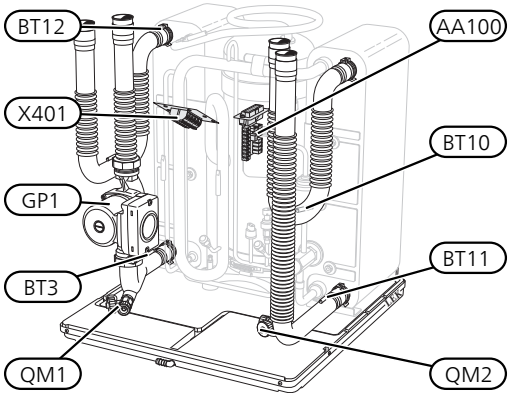
AA10	Soft-start card
FC1	Miniature circuit-breaker

Cooling sections

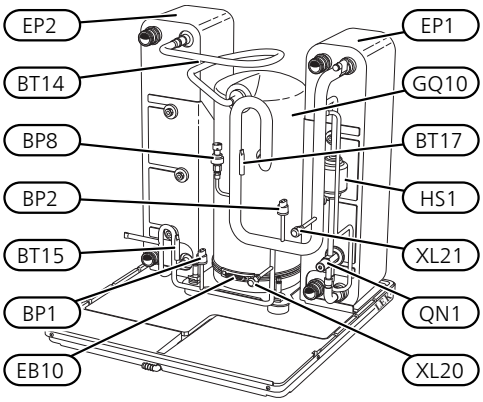
F1345 24 and 30 kW, 3x400 V



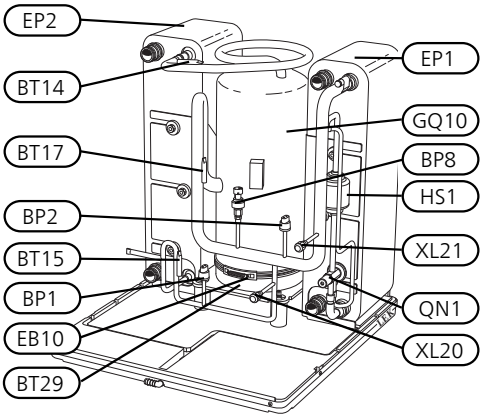
F1345 40 and 60 kW, 3x400 V



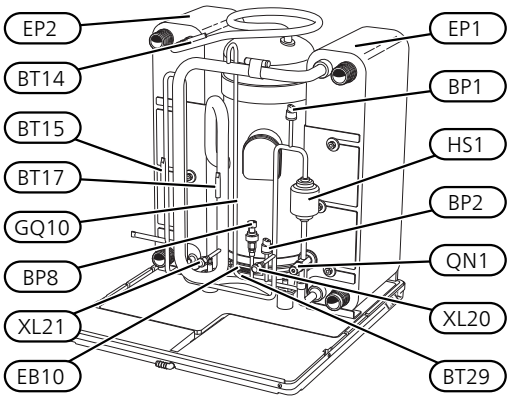
F1345 24 kW, 3x400 V



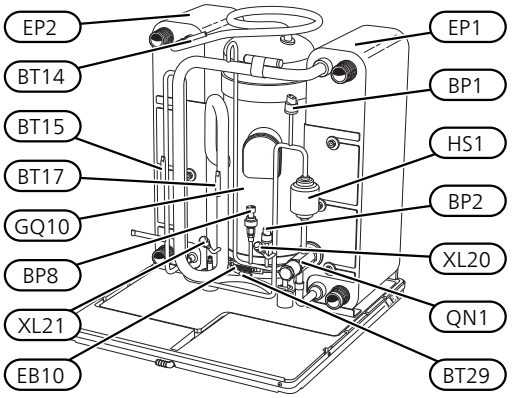
F1345 30 kW, 3x400 V



F1345 40 kW, 3x400 V



F1345 60 kW, 3x400 V



PIPE CONNECTIONS

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

HVAC COMPONENTS

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

SENSORS ETC.

BP1 High pressure pressostat
BP2 Low pressure pressostat
BP8 Sensor, low pressure
BT3 Temperature sensors, heating medium return
BT10 Temperature sensor, brine in
BT11 Temperature sensor, brine out
BT12 Temperature sensor, condenser supply line
BT14 Temperature sensor, hot gas
BT15 Temperature sensor, fluid pipe
BT17 Temperature sensor, suction gas
BT29 Temperature sensor, compressor

ELECTRICAL COMPONENTS

AA100 Joint card
EB10 Compressor heater
QA40 Inverter
RF2 EMC-filter
X401 Joint connector, compressor and motor module

COOLING COMPONENTS

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

4 Pipe connections

General

Pipe installation must be carried out in accordance with current standards and directives. F1345 can operate with a return temperature of up to 58 °C and an outgoing temperature of 65 °C.

F1345 is not equipped with internal shut-off valves; instead, these should be installed to facilitate any future servicing. In addition, non-return valves and particle filters must be fitted.

NOTE

The pipe systems have to be flushed clean before F1345 is connected, to prevent any contaminants from damaging the components.

NOTE

Do not solder directly on the pipes in F1345, because of internal sensors.

Compression ring coupling alternatively pressure connection should be used.

NOTE

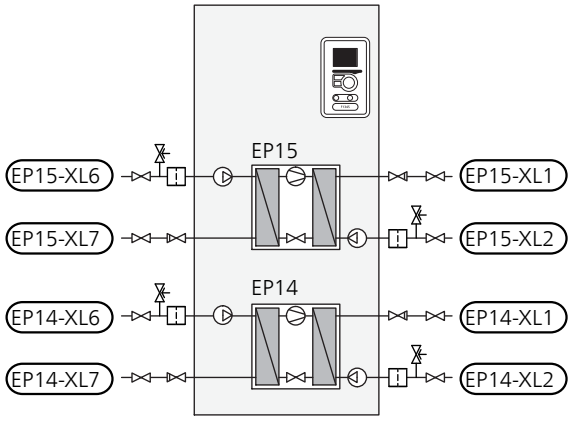
The heating system's pipes must be earthed to prevent a potential difference between them and the building's protective earth.

SYMBOL KEY

SYSTEM DIAGRAM

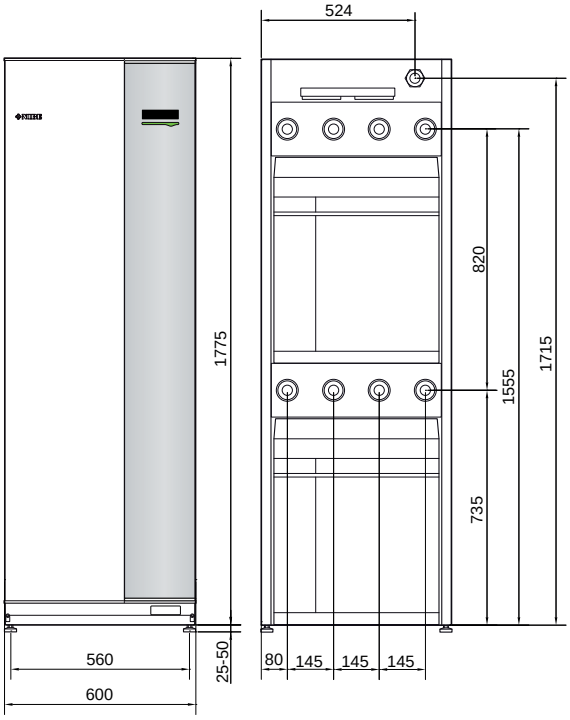
F1345 consists of two heat pump modules, circulation pumps and control system with possibility of additional heat. F1345 is connected to the brine and heating medium circuits.

In the heat pump evaporator, the brine (water mixed with anti-freeze, glycol or ethanol) releases its energy to the refrigerant, which is vaporised in order to be compressed in the compressor. The refrigerant, of which the temperature has now been raised, is passed to the condenser where it gives off its energy to the heating medium circuit and, if necessary, to any docked water heater. If there is a greater need for heating/hot water than the compressors can provide it is possible is to connect an external immersion heater.

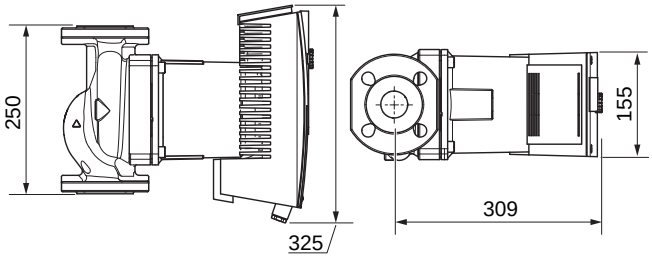


EP14	Cooling module
EP15	Cooling module
XL1	Connection, heating medium flow
XL2	Connection, heating medium return
XL6	Connection, brine in
XL7	Connection, brine out

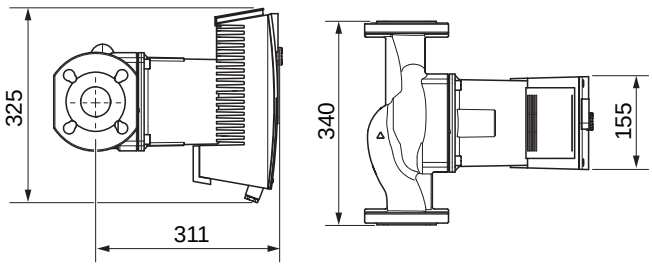
Dimensions and pipe connections

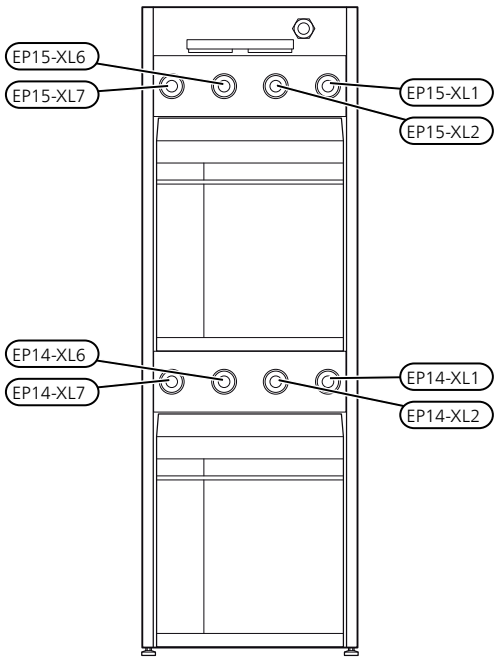


External brine pump 40 kW



External brine pump 60 kW





PIPE DIMENSIONS

Connection	
(XL1) Heating medium supply	internal thread G 1½ external thread G2
(XL2) Heating medium return	internal thread G 1½ external thread G2
(XL6) Brine in	internal thread G 1½ external thread G2
(XL7) Brine out	internal thread G 1½ external thread G2
External brine pump 40 kW	compression ring coupling Ø 42mm
External brine pump 60 kW	compression ring coupling Ø 54mm

Brine side

COLLECTOR

Caution

The length of the collector hose varies depending on the rock/soil conditions, climate zone and on the climate system (radiators or underfloor heating) and the heating requirement of the building Each installation must be sized individually.

Max. length per coil for the collector should not exceed 500 m.

The collectors must always be connected in parallel with the possibility of adjusting the flow for the relevant coil.

For surface soil heat, the hose should be buried at a depth determined by local conditions and the distance between the hoses should be at least 1 metre.

For several bore holes, the distance between the holes must be determined according to local conditions.

Ensure the collector hose rises constantly towards the heat pump to avoid air pockets. If this is not possible, airvents should be used.

Because the temperature of the brine system may fall below 0 °C, it must be protected against freezing down to -15 °C. When making the volume calculation, 1 litres of ready mixed brine per metre of collector hose (applies when using PEM-hose 40x2.4 PN 6.3) is used as a guide value.

Caution

Because the temperature of the brine system varies depending on the heat source, the 5.1.7 "br pmp al set." menu must be set to a suitable value.

CONNECTING THE BRINE SIDE

- The pipe connections are on the rear of the heat pump.
- Insulate all indoor brine pipes against condensation.

NOTE

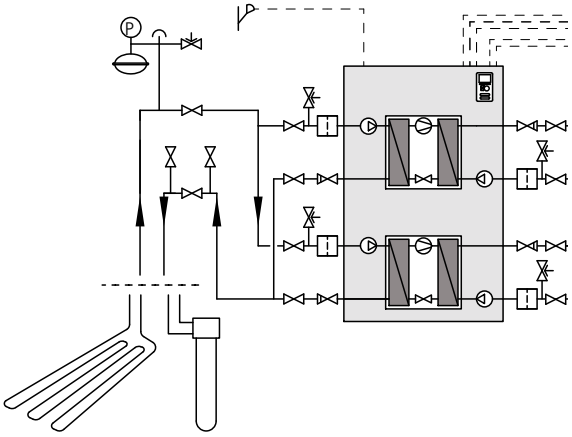
Condensation may drip from the expansion vessel. Position the vessel so that this does not harm other equipment.

Caution

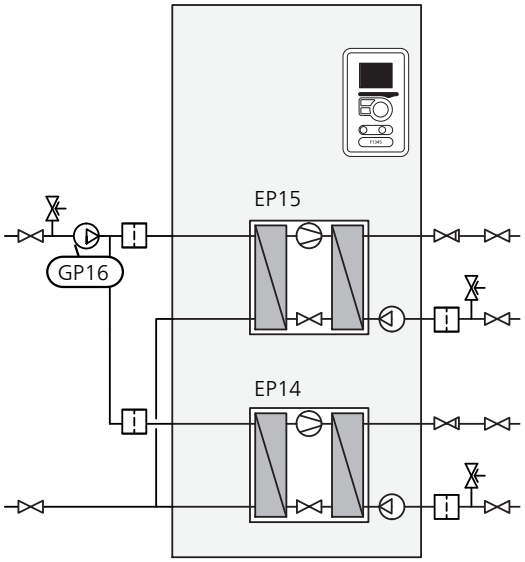
When necessary you should install venting valves in the brine system.

- Mark the brine system with the antifreeze that is used.
- Install the supplied safety valve at the expansion vessel as illustrated in the outline diagram. The entire length of the overflow water pipe from the safety valves must be inclined to prevent water pockets and must also be frost-free.
- Install shut off valves as close to the heat pump as possible so that the flow to individual cooling modules can be shut off. Extra safety valves between the particle filter and shut off valves (according the outline diagram) are required.
- Fit the supplied particle filter on the incoming pipe.
- Fit the supplied non-return valves on the outgoing pipe.

In the case of connection to an open groundwater system, an intermediate frost-protected circuit must be provided, because of the risk of dirt and freezing in the evaporator. This requires an extra heat exchanger.



Install the brine pump (GP16) according to the circulation pump manual for connection of incoming brine (EP14-XL6) and (EP15-XL6) between the heat pump and shut-off valve (see image).



NOTE

Insulate the brine pump against condensation (do not cover the drainage hole).

EXPANSION VESSEL

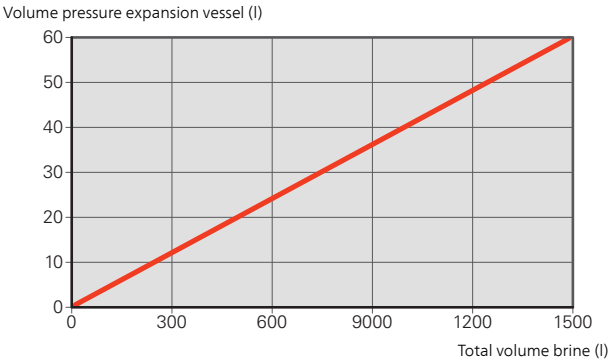
The brine circuit must be supplied with a pressure expansion vessel.

The brine side must be pressurised to at least 0.05 MPa (0.5 bar).

The pressure expansion vessel should be dimensioned as set out in the following diagram, to prevent malfunctions. The diagrams cover the temperature range from 10 °C to +20 °C at pre-pressure 0.05 MPa (0.5 bar) and the safety valve's opening pressure of 0.3 MPa (3.0 bar).

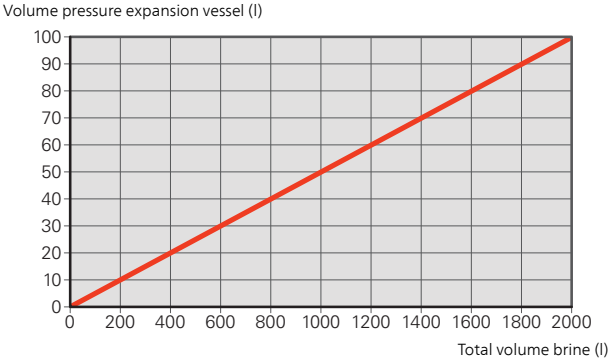
Ethanol 28% (volume percent)

In installations with ethanol (28% volume percent) as the brine the pressure expansion vessel must be dimensioned according to the following diagram.



Ethylene glycol 40% (volume percent)

In installations with ethylene glycol (40% volume percent) as the brine the pressure expansion vessel must be dimensioned according to the following diagram.



Heating medium side

CONNECTING THE CLIMATE SYSTEM

A climate system is a system that regulates indoor comfort with the help of the control system in F1345 and for example radiators, underfloor heating/cooling, fan convectors etc.

- The pipe connections are on the rear of the heat pump.
- Install the necessary safety equipment and shut-off valves (installed as close to F1345 as possible so that the flow to individual cooling modules can be shut off).
- Fit the supplied particle filter on the incoming pipe.
- The safety valve must have a maximum 0.6 MPa (6.0 bar) opening pressure and be installed on the heating medium return. The entire length of the overflow water pipe from the safety valve must be inclined, to prevent water pockets and must also be frost-free.
- When connecting to a system with thermostats on all radiators, a relief valve must be fitted, or some of the thermostats must be removed to ensure sufficient flow.
- Fit the supplied non-return valves on the outgoing pipe.

Caution

When necessary you should install vent valves in the climate system.

Caution

F1345 is designed so that heating production can be performed using one or two cooling modules. However, this entails different pipe or electrical installations.

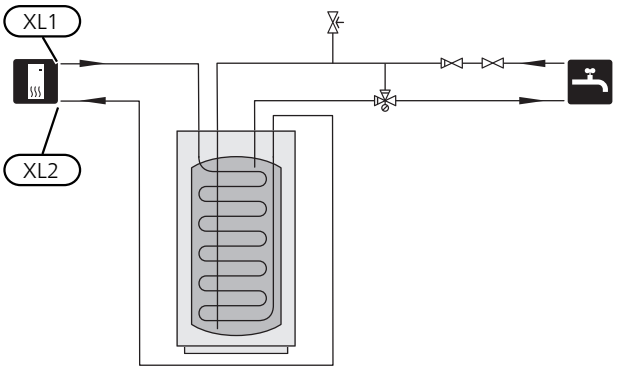
Cold and hot water

CONNECTING THE HOT WATER HEATER

- Fit shut-off valve, non-return valve and safety valve as illustrated.
- The safety valve must have max. 1.0 MPa (10.0 bar) opening pressure, and be installed on the incoming domestic water line as shown.
- A mixer valve must also be installed, if the factory setting for hot water is changed. National regulations must be observed.
- Hot water production is activated in the start guide or in menu 5.2.

Caution

The heat pump/system is designed so that hot water production can occur with one or several cooling modules. This however entails different pipe or electrical installations.



Fixed condensing

If F1345 is to work with fixed condensing, you must connect external supply temperature sensor (BT25) according to the description on page 26. In addition, you must make the following menu settings.

Menu	*Menu setting (local variations may be required)*
1.9.3.1 - min. flow line temp. heating	Desired temperature in the tank.
5.1.2 - max flow line temperature	Desired temperature in the tank.
5.1.10 - op. mod heat med pump	intermittent
4.2 - op. mode	manual

Docking alternatives

F1345 can be connected in several different ways. Examples are shown below.

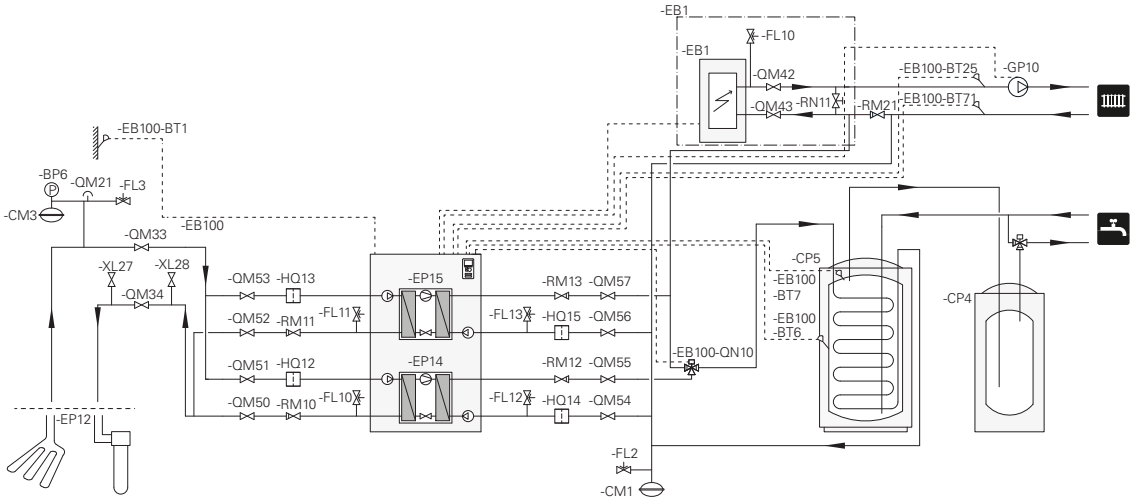
> *Caution*
>
> The examples are outline diagrams; items included on delivery of the product are set out in section *"Supplied components"*.

Further information about the options is available at nibe.eu and in the manuals for the accessories used. See page 42 for the list of the accessories that can be used with F1345.

EXPLANATION

EB1	*External additional heat*
EB1	External electrical additional heat
FL10	Safety valve, heating medium side
QM42, QM43	Shut-off valve, heating medium side
RN11	Trim valve
EB100, EB101	*Heat pump system*
BT1	Temperature sensor, outdoor
BT6	Temperature sensor, hot water charging
BT25	Temperature sensor, heating medium flow, external
BT71	Temperature sensor, heating medium return, external
EB100	Heat pump F1345 (Master)
EB101	Heat pump F1345 (Slave)
EP14, EP15	Cooling module
FL10, FL11	Safety valve, collector side
FL12, FL13	Safety valve, heating medium side
HQ12 - HQ15	Particle filter
QM50 - QM53	Shut-off valve, brine side
QM54 - QM57	Shut-off valve, heating medium side
QN10	Reversing valve, heating/hot water
RM10 - RM13	Non-return valve
QZ1	*Hot water circulation*
AA5	Accessory card
BT70	Temperature sensor, hot water flow
FQ1	Mixer valve, hot water
GP11	Circulation pump, domestic hot water circulation
RM23, RM24	Non-return valve
RN20, RN21	Trim valve
EP21	*Climate system 2*
BT2	Temperature sensors, heating medium flow
BT3	Temperature sensors, heating medium return
GP20	Circulation pump
QN25	Shunt valve
Miscellaneous	
AA5	Accessory card
BP6	Manometer, brine side
BT7	Temperature sensor, hot water flow
CP5	Storage tank
CM1	Expansion vessel, closed, heating medium side
CM3	Expansion vessel, closed, brine side
CP4	Additional water heater
EP12	Collector, brine side
FL2	Safety valve, heating medium side
FL3	Safety valve, brine
GP10	Circulation pump, heating medium external
QM21	Venting valve, brine side
QM33	Shut off valve, brine flow
QM34	Shut off valve, brine return
RM21	Non-return valve
XL27 - XL28	Connection, filling brine

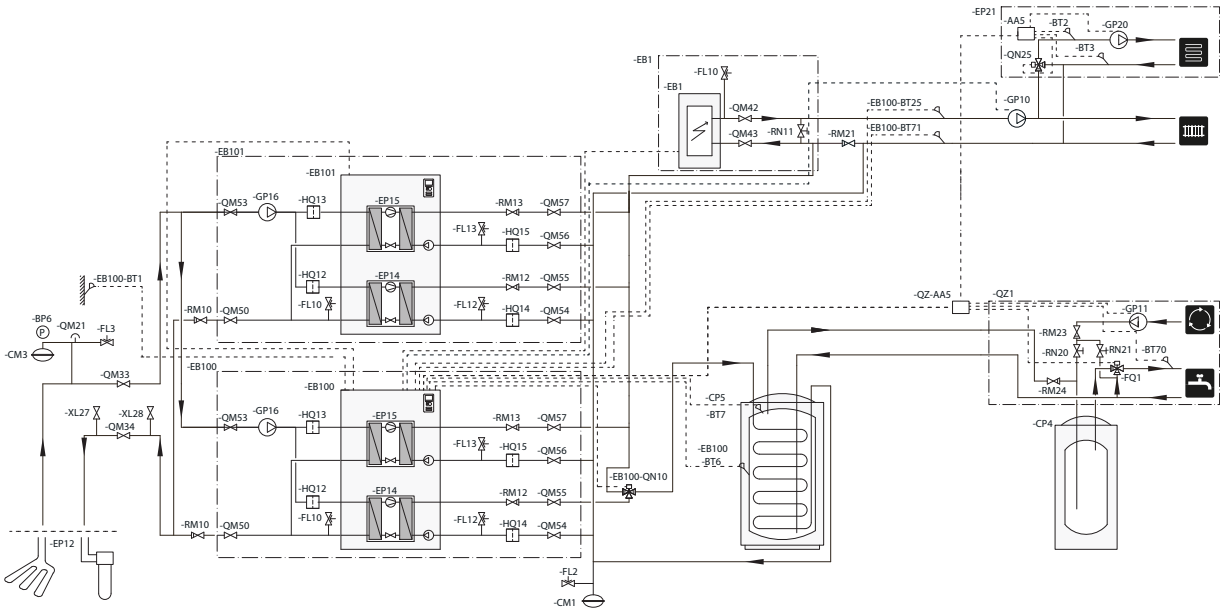
F1345 24/30 KW DOCKED WITH ELECTRIC ADDITIONAL HEAT AND HOT WATER HEATER (FLOATING CONDENSING)



The heat pump (EB100) prioritises charging of hot water with a cooling module (EP14) via a reversing valve (EB100-QN10). When the water heater/accumulator tank (CP5) is fully charged, (EB100-QN10) switches to the heating circuit. When there is a demand for heat, cooling module (EP15) starts first. On greater demand, cooling module (EP14) also starts for heating operation.

Additional heat (EB1) is connected automatically, when the energy requirement exceeds the heat pump capacity.

TWO F1345 40/60 KW DOCKED WITH ELECTRIC ADDITIONAL HEAT AND WATER HEATER (FLOATING CONDENSING)



The heat pump (EB100) prioritises charging of hot water with a cooling module (EP14) via a reversing valve (EB100-QN10). When the water heater/accumulator tank (CP5) is fully charged, (EB100-QN10) switches to the heating circuit. When there is a demand for heat, cooling module (EP15) starts in heat pump (EB101) first. In the event of a large demand, cooling module (EP14) also starts in (EB101) for heating operation.

Additional heat (EB1) is connected automatically, when the energy requirement exceeds the heat pump capacity.

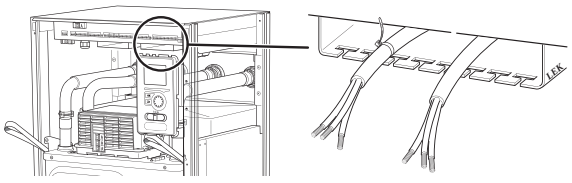
5 Electrical connections

General

All electrical equipment, except the outdoor sensors, room sensors and the current sensors are ready connected at the factory.

For 40 and 60 kW, the brine pump is enclosed (does not apply to all countries, see list of enclosed items) and must be installed outside the heat pump.

- Disconnect the heat pump before insulation testing the house wiring.
- If the building is equipped with an earth-fault breaker, each F1345 should be equipped with a separate one.
- If a miniature circuit breaker is used this should have at least motor characteristic "C". See page 46 for fuse size.
- Electrical wiring diagram for the heat pump, see page 53.
- Communication and sensor cables to external connections must not be laid close to high current cables.
- The minimum area of communication and sensor cables to external connections must be 0.5 mm² up to 50 m, for example EKKX or LiYY or equivalent.
- When cable routing in F1345, cable grommets (e.g. UB2, power cables and UB3, signal cables, marked in image) must be used. Secure the cables in the grooves in the panel using cable ties (see image).



NOTE

The switch (SF1) must not be moved to "I" or "⚠" until the boiler has been filled with water. Components in the product could be damaged.

NOTE

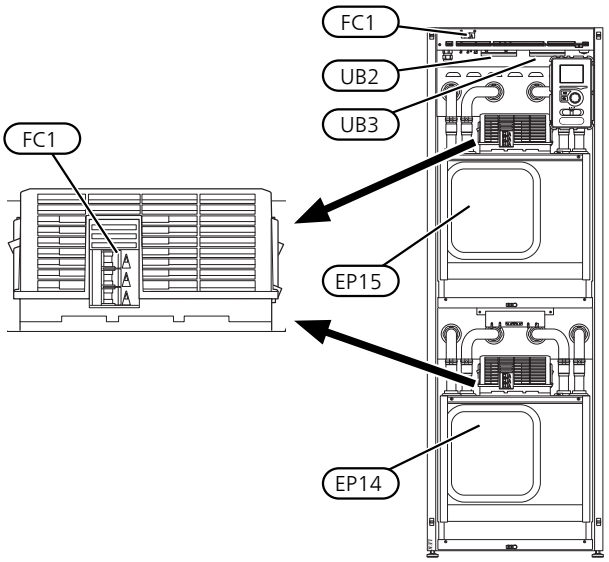
Electrical installation and service must be carried out under the supervision of a qualified electrician. Cut the current with the circuit breaker before carrying out any servicing. Electrical installation and wiring must be carried out in accordance with the stipulations in force.

NOTE

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

NOTE

Refer to the outline diagram of your system for positioning of the temperature sensor.



MINIATURE CIRCUIT-BREAKER

The heat pump operating circuit and some of its internal components are internally fused by a miniature circuit breaker (FC1).

Miniature circuit-breakers (EP14-FC1) and (EP15-FC1) cut the power to the relevant compressor if the current is too high.

Resetting

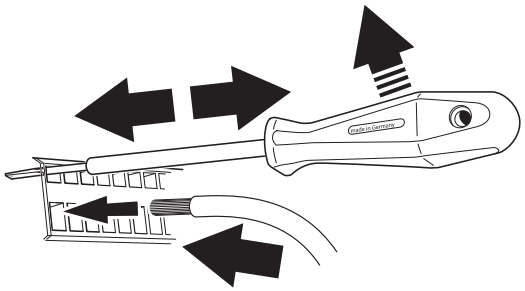
Miniature circuit-breakers (EP14-FC1) and (EP15-FC1) are accessible behind the front cover. The affected miniature circuit-breakers are reset by pushing back to the fused position.

Caution

Check the miniature circuit-breakers. They may have tripped during transportation.

CABLE LOCK

Use a suitable tool to release/lock cables in the heat pump terminal blocks.



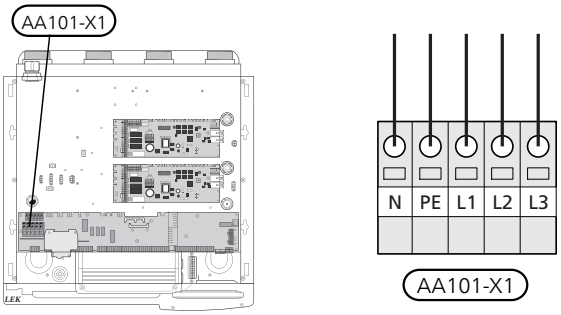
Connections

NOTE

To prevent interference, unscreened communication and/or sensor cables to external connections must not be laid closer than 20 cm from high voltage cables.

POWER CONNECTION

F1345 must be installed with a disconnect option on the supply cable. Minimum cable area must be sized according to the fuse rating used. Supplied cable for incoming supply electricity is connected to terminal block X1. All installation must be carried out in accordance with current norms and directives.



NOTE

It is important that the electrical connection is made with the correct phase sequence. With the incorrect phase sequence, the compressor does not start and an alarm is displayed.

TARIFF CONTROL

If the voltage to the compressors disappears for a given period, simultaneous blocking of these must take place via software controlled input (AUX input) to avoid alarm, see page 25.

At the same time, external operating voltage for the control system must be connected to F1345, see section "Connecting external operating voltage for the control system".

CONNECTING EXTERNAL BRINE PUMP

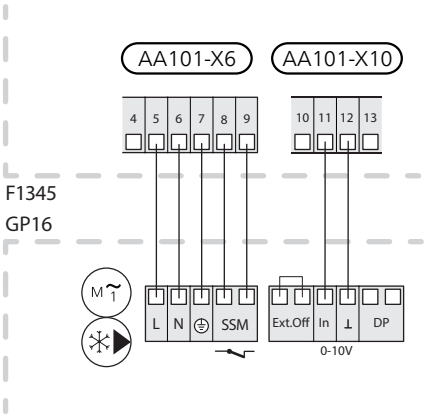
NOTE

Only 40 and 60 kW.

Connect the external circulation pump (GP16) to terminal block AA101-X6:5 (230 V), AA101-X6:6 (N) and AA101-X6:7 (PE) as shown.

Connect the external circulation pump's motor protection (GP16:SSM) to the terminal block AA101-X6:8 and AA101-X6:9 as illustrated.

Connect 0-10V, as shown, to terminal block AA101-X10:11 and AA101-X10:12 to the external circulation pump, according to its wiring diagram.



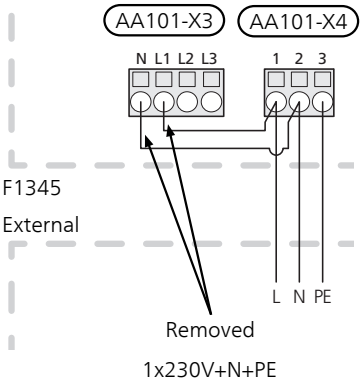
CONNECTING EXTERNAL OPERATING VOLTAGE FOR THE CONTROL SYSTEM

NOTE

Mark up any junction boxes with warnings for external voltage.

When connecting external operating voltage with separate earth-fault breaker, remove the cables between terminal block AA101-X3:N and AA101-X4:2 and between terminal block AA101-X3:L1 and AA101-X4:1 (as illustrated).

Operating voltage (1x230V+N+PE) is connected to AA101-X4:3 (PE), AA101-X4:2 (N) and AA101-X4:1 (L) (as illustrated).

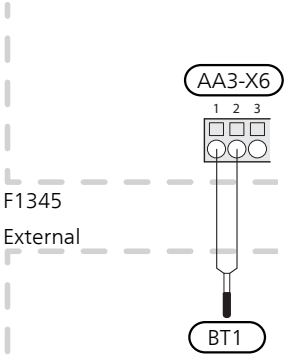


OUTDOOR TEMPERATURE SENSOR (BT1)

Install the outside temperature sensor (BT1) in the shade on a wall facing north or north-west, so it is unaffected by the
morning sun.

Connect the sensor to terminal block AA3-X6:1 and AA3-X6:2. Use a twin core cable with a cable area of at least 0.5 mm².

If a conduit is used it must be sealed to prevent condensation in the sensor capsule.

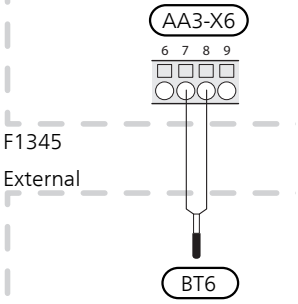


TEMPERATURE SENSOR, HOT WATER CHARGING (BT6)

The temperature sensor, hot water charging (BT6) is placed in the submerged tube on the water heater.

Connect the sensor to terminal block AA3-X6:7 and AA3-X6:8. Use a twin core cable with a cable area of at least 0.5 mm².

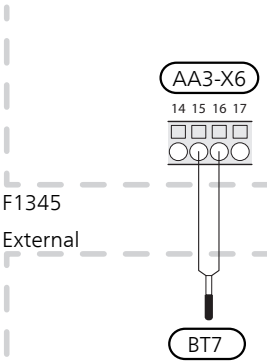
Hot water charging is activated in menu 5.2 or in the start guide.



TEMPERATURE SENSOR, HOT WATER TOP (BT7)

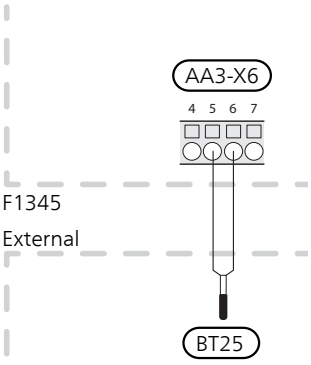
A temperature sensor for hot water top (BT7) can be connected to F1345 for showing the water temperature at the top of the tank (if possible).

Connect the sensor to terminal block AA3-X6:15 and AA3-X6:16. Use a twin core cable with a cable area of at least 0.5 mm².



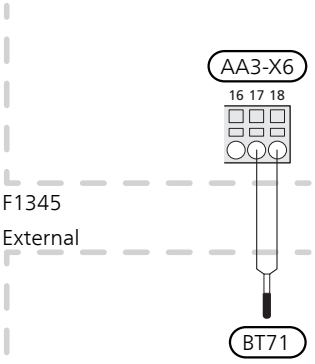
TEMPERATURE SENSOR, EXTERNAL SUPPLY LINE (BT25)

Connect temperature sensor, external supply line (BT25) to terminal block AA3-X6:5 and AA3-X6:6. Use a twin core cable with a cable area of at least 0.5 mm².



TEMPERATURE SENSOR, EXTERNAL RETURN LINE (BT71)

Connect temperature sensor, external return line (BT71) to terminal block AA3-X6:17 and AA3-X6:18. Use a twin core cable with a cable area of at least 0.5 mm².

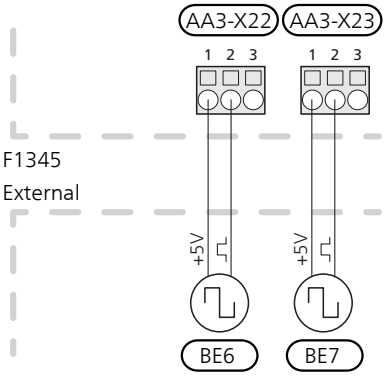


CONNECTING EXTERNAL ENERGY METER

NOTE

Connection of external energy meter requires version 35 or later on input board (AA3) as well as "display version" 7157R3 or later.

One or two energy meters (BE6, BE7) are connected to terminal block X22 and/or X23 on input board (AA3).



Activate the energy meter(s) in menu 5.2.4 and then set the desired value (energy per pulse) in menu 5.3.21.

Optional connections

MASTER/SLAVE

Several heat pumps can be interconnected by selecting one heat pump as master and the others as slaves. Ground source heat pump models with master/slave functionality from NIBE can be connected to F1345.

The heat pump is always delivered as master and up to till 8 slaves can be connected to it. In systems with several heat pumps, each pump must have a unique name, i.e. only one heat pump can be "Master" and only one can be e.g. "Slave 5". Set master/slaves in menu 5.2.1.

External temperature sensors and control signals must be connected solely to the master, except for external control of the compressor module and reversing valve(s) (QN10) that can be connected one to each heat pump. See page 31 for connecting the reversing valve (QN10).

NOTE

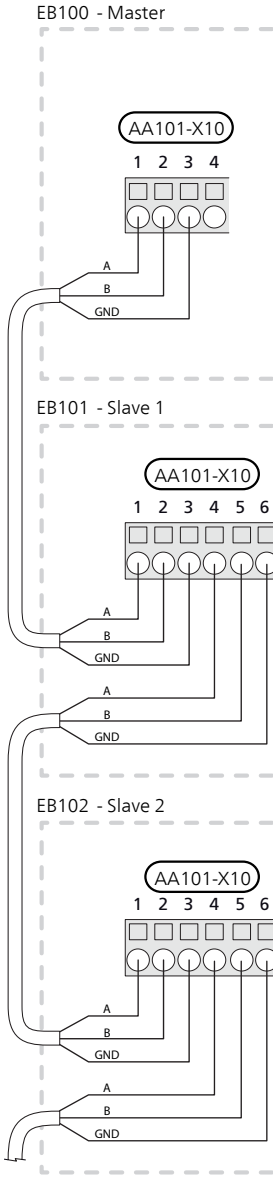
When several heat pumps are connected together (master/slaves), an external supply temperature sensor (BT25) and an external return sensor BT71 must be used. If these sensors are not connected, the product will give a sensor fault.

Connect the communications cables to the Master's terminal block AA101-X10:1 (A), AA101-X10:2 (B) and AA101-X10:3 (GND), as illustrated.

Incoming communications cables from Master or Slave to Slave are connected to the terminal block AA101-X10:1 (A), AA101-X10:2 (B) and AA101-X10:3 (GND), as illustrated.

Incoming communications cables from Slave to Slave are connected to terminal block AA101-X10:4 (A), AA101-X10:5 (B) and AA101-X10:6 (GND), as illustrated.

Use cable type LiYY, EKKX or similar.



LOAD MONITOR

When many power consumers are connected in the property at the same time as the electric additional heat is in operation, there is a risk of the property's main fuses tripping. F1345 has an integrated load monitor that controls the power steps for the electric additional heat by disconnecting step by step in event of overload in a phase. Reconnection occurs when other current consumption is reduced.

Connecting current sensors

A current sensor (BE1 - BE3) must be installed on each incoming phase conductor into the electrical distribution unit, to measure the current. The electrical distribution unit is an appropriate installation point.

Connect the current sensors to a multi-core cable in an enclosure directly adjacent to the electrical distribution unit. The multi-core cable between the enclosure and F1345 must have a cable area of at least 0.5 mm².

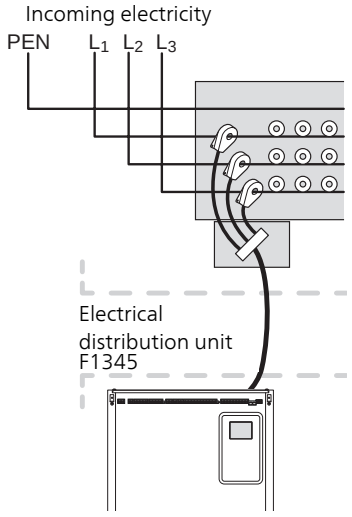
Connect the cable to terminal block AA101-X10:15 to AA101-X10:16 and AA101-X10:17 as well as to the common AA101-X10:18 terminal block for the three current sensors.

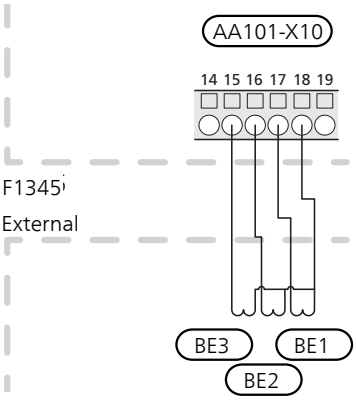
The value for the size of the fuse is set in menu 5.1.12 to correspond with the size of the property's main fuse. Here it is also possible to adjust the current sensor's transformer ratio.

Enclosed current sensors have a transformer ratio of 300 and, if these are used, the incoming current must not exceed 50 A.

NOTE

The voltage from the current sensor to the input board must not exceed 3.2 V.





ROOM SENSOR

F1345 can be supplemented with a room sensor (BT50). The room temperature sensor has up to three functions:

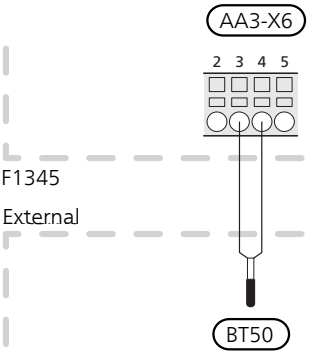
1. Show current room temperature in the heat pump's display.
2. Option of changing the room temperature in °C.
3. Makes it possible to change/stabilise the room temperature.

Install the sensor in a neutral position where the set temperature is required. A suitable location is on a free inner wall in a hall approx. 1.5 m above the floor. It is important that the sensor is not obstructed from measuring the correct room temperature by being located, for example, in a recess, between shelves, behind a curtain, above or close to a heat source, in a draft from an external door or in direct sunlight. Closed radiator thermostats can also cause problems.

F1345 operates without the sensor, but if you want to read the home's indoor temperature from the display, the sensor must be installed. Connect the room sensor to AA3-X6:3 and AA3-X6:4.

If the sensor is to be used to change the room temperature in °C and/or to change/stabilise the room temperature, the sensor must be activated in menu 1.9.4.

If the room sensor is used in a room with underfloor heating it should only have an indicatory function, not control of the room temperature.



Caution

Changes of temperature in the accommodation take time. For example, short periods of change combined with underfloor heating will not result in a noticeable difference in the room temperature.

STEP CONTROLLED ADDITIONAL HEAT

NOTE

Mark up any junction boxes with warnings for external voltage.

External step-controlled additional heat can be controlled by up to three potential-free relays in F1345 (3 step linear or 7 step binary). With the AXC 50 accessory, a further three potential-free relays are used for additional heat control, which then gives max 3+3 linear or 7+7 binary steps.

Step in occurs with at least 1 minute interval and step outs with at least 3 seconds interval.

Connect the common phase to terminal block AA101-X7:1.

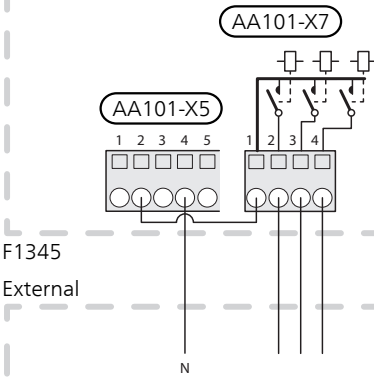
Step 1 is connected to terminal block AA101-X7:2.

Step 2 is connected to terminal block AA101-X7:3.

Step 3 is connected to terminal block AA101-X7:4.

The settings for step controlled additional heat are made in menu 4.9.3 and menu 5.1.12.

All additional heat can be blocked by connecting a potential-free switch function to AUX input on terminal block AA3-X6 and AA101-X10. The function must be activated in menu 5.4.



Caution

If the relays are to be used for operating voltage, bridge the supply from AA101-X5:1 - 3 to AA101-X7:1. Connect the neutral from the external additional heat to AA101-X5:4 - 6.

SHUNT CONTROLLED ADDITIONAL HEAT

NOTE

Mark up any junction boxes with warnings for external voltage.

This connection enables an external additional heater, e.g. an oil boiler, gas boiler or district heating exchanger to aid with heating.

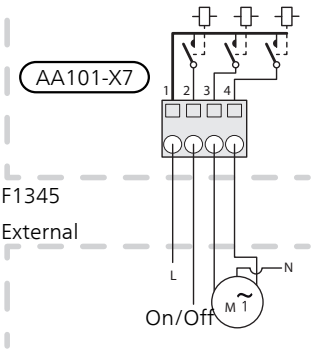
The connection requires that the boiler sensor (BT52) is connected to one of the AUX inputs in F1345, see page 32. The sensor is only selectable when "shunt controlled add. heat" is selected in menu 5.1.12.

F1345 controls a shunt valve and start signal for the additional heating using three relays. If the unit does not manage to maintain the correct supply temperature, the additional heat starts. When the boiler sensor (BT52) exceeds the set value, F1345 sends a signal to the shunt (QN11) to open from the additional heat. The shunt (QN11) is controlled to ensure the true supply temperature corresponds with the control system's theoretically calculated set point value. When the heating demand drops sufficiently so that additional heat is no longer required, the shunt (QN11) closes completely. Factory-set minimum operating time for the boiler is 12 hours (can be adjusted in menu 5.1.12).

The settings for shunt controlled additional heat are made in menu 4.9.3 and menu 5.1.12.

Connect the shunt motor (QN11) to terminal block AA101-X7:4 (230 V, open) and 3 (230 V, close).

To control switching the additional heat on and off, connect it to terminal block AA101-X7:2.



All additional heat can be blocked by connecting a potential-free switch function to AUX input on terminal block AA3-X6 and AA101-X10. The function must be activated in menu 5.4.

ADDITIONAL HEAT IN TANK

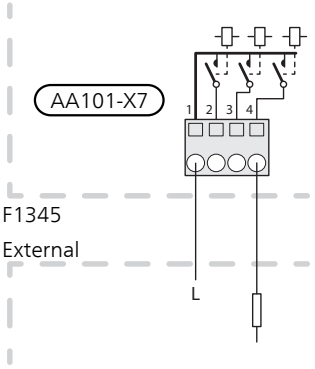
NOTE

Mark up any junction boxes with warnings for external voltage.

This connection allows an external additional heater in the tank to assist with the production of hot water when the compressors are busy producing heating.

Additional heat in tank is activated in menu 5.1.12.

To control switching the additional heat on and off in the tank, connect it to terminal block AA101-X7:4.



All additional heat can be blocked by connecting a potential-free switch function to AUX input on terminal block AA3-X6 and AA101-X10. The function must be activated in menu 5.4.

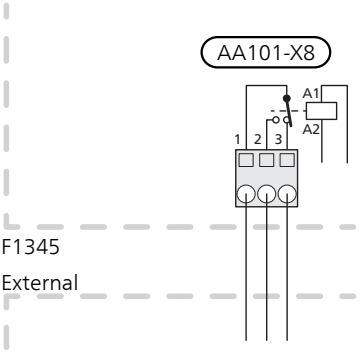
RELAY OUTPUT FOR EMERGENCY MODE

NOTE

Mark up any junction boxes with warnings for external voltage.

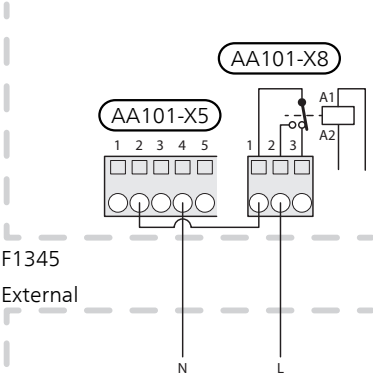
When the switch (SF1) is set to "⚠" mode (emergency mode), the internal circulation pumps (EP14-GP1 and EP15-GP1) and the potential-free variable emergency mode relay (AA101-K4) are activated. External accessories are disconnected.

The emergency mode relay can be used to activate external additional heat, an external thermostat must then be connected to the control circuit to control the temperature. Ensure that the heating medium circulates through the external additional heating.



Caution

No hot water is produced when emergency mode is activated.



Caution

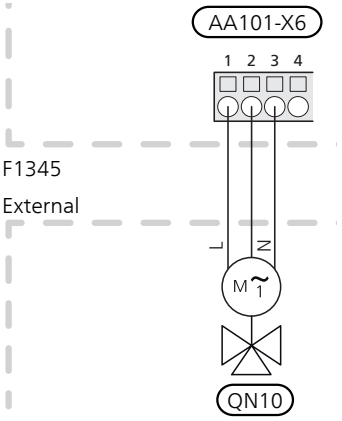
If the relays are to be used for operating voltage, bridge the supply from AA101-X5:1 - 3 to AA101-X8:1. Connect the neutral from the external additional heat to AA101-X5:4 - 6.

REVERSING VALVES

F1345 can be supplemented with an external reversing valve (QN10) for hot water control (see page 42 for accessory).

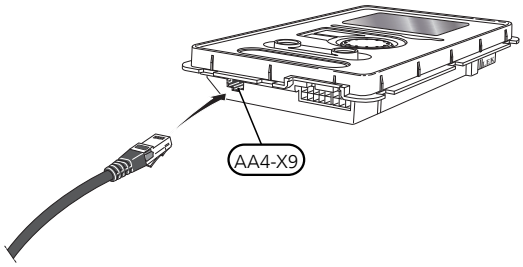
Connect the external reversing valve (QN10) to terminal block AA101-X6:3 (N), AA101-X6:2 (operation) and AA101-X6:1 (L) as illustrated.

With several heat pumps connected as master/slave, connect the reversing valve electrically to a suitable heat pump. The reversing valve is controlled by the master heat pump regardless which heat pump it is connected to.



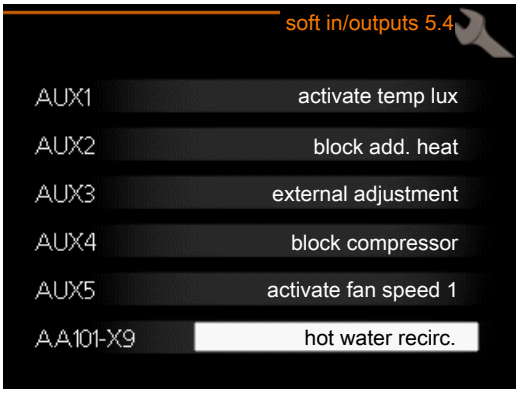
NIBE UPLINK

Connect a network-connected cable (straight, Cat.5e UTP) with RJ45 contact (male) to contact AA4-X9 on the display unit (as illustrated). Use the cable grommet (UB3) on the heat pump for cable routing.



EXTERNAL CONNECTION OPTIONS (AUX)

F1345 has software-controlled AUX inputs and outputs on the input board (AA3), for connecting the external switch function or sensor. This means that when an external switch function (the switch must be potential-free) or sensor is connected to one of six special connections, this function must be selected for the correct connection in menu 5.4.



For certain functions, accessories may be required.

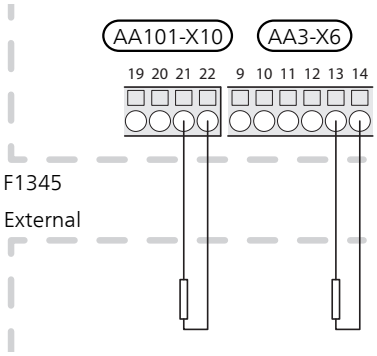
Selectable inputs

Selectable inputs on the input board for these functions are:

AUX1	AA3-X6:9-10
AUX2	AA3-X6:11-12
AUX3	AA3-X6:13-14

Selectable inputs on terminal block AA101-X10 for these functions are:

AUX4	AA101-X10:19-20
AUX5	AA101-X10:21-22



The example above uses the inputs AUX3 (AA3-X6:13-14) and AUX5 (AA101-X10:21-22) on the terminal block.

Selectable output

A selectable output is AA101-X9.

TIP

Some of the following functions can also be activated and scheduled via menu settings.

Possible selection for AUX inputs

Temperature sensor

Temperature sensor can be connected to F1345.

Available options are:

- boiler (BT52) (shown if shunt-controlled additional heat is selected in menu 5.2.4 or if shunt-controlled additional heat is selected in menu 5.1.12)
- cooling/heating (BT74), determines when it is time to switch between cooling and heating mode (can be selected when the cooling function is activated in menu 5.2.4).

  When several room sensors have been installed, you can select which one of them will be controlling in menu 1.9.5.

  When (BT74) has been connected and activated in menu 5.4, no other room sensor can be selected in menu 1.9.5.
- return temperature (BT71)

Monitor

Available options are:

- alarm from external units. The alarm is connected to the control, which means that the malfunction is presented as an information message in the display. Potential-free signal of type NO or NC.
- level (accessory NV10)/, pressure/flow monitor for the brine (NC).
- pressure switch for climate system (NC).
- stove monitor. (A thermostat that is connected to the chimney. When the negative pressure is too low and the thermostat is connected, the fans in ERS (NC) are switched off.

External activation of functions

An external switch function can be connected to F1345 to activate various functions. The function is activated during the time the switch is closed.

Possible functions that can be activated:

- forced control of brine pump
- hot water comfort mode "temporary lux"
- hot water comfort mode "economy"
- "external adjustment"

  When the switch is closed, the temperature changes in °C (if the room sensor is connected and activated). If a room sensor is not connected or not activated, the desired change of "temperature" (heating curve offset) is set with the number of steps selected. The value is adjustable between -10 and +10. External adjustment of climate systems 2 to 8 requires accessories.

  – *climate system 1 to 8*

    The value for the change is set in menu 1.9.2, "external adjustment".
- activation of one of four fan speeds.

  (Can be selected if ventilation accessory is activated.)

  The following five options are available:

  – 1-4 is normally open (NO)

  – 1 is normally closed (NC)

  The fan speed is activated during the time the switch is closed. Normal speed is resumed when the switch is opened again.
- SG ready

> *Caution*
>
> This function can only be used in mains networks that support the "SG Ready" standard.
>
> "SG Ready" requires two AUX inputs.

"SG Ready" is a smart form of tariff control, which allows your electricity supplier to affect the indoor, hot water and/or pool temperatures (if applicable) or simply block the additional heat and/or compressor in F1345 at certain times of the day (can be selected in menu 4.1.5 after the function is activated). Activate the function by connecting potential-free switch functions to two inputs selected in menu 5.4 (SG Ready A and SG Ready B).

Closed or open switch means one of the following:

– *Blocking (A: Closed, B: Open)*

"SG Ready" is active. The compressor in the heat pump and additional heat is blocked like the day's tariff blocking.

– *Normal mode (A: Open, B: Open)*

"SG Ready" is not active. No effect on the system.

– *Low price mode (A: Open, B: Closed)*

"SG Ready" is active. The system focuses on costs savings and can for example exploit a low tariff from the electricity supplier or over-capacity from any own power source (effect on the system can be adjusted in the menu 4.1.5).

– *Overcapacity mode (A: Closed, B: Closed)*

"SG Ready" is active. The system is permitted to run at full capacity at over capacity (very low price) with the electricity supplier (effect on the system is settable in menu 4.1.5).

(A = SG Ready A and B = SG Ready B)

External blocking of functions

An external switch function can be connected to F1345 for blocking various functions. The switch must be potential-free and a closed switch results in blocking.

NOTE

Blocking entails a risk of freezing.

Functions that can be blocked:

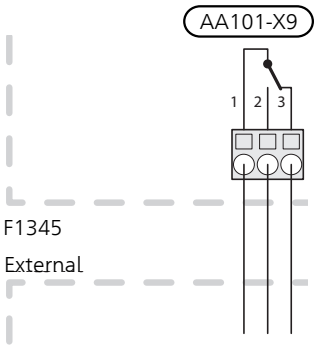
- heating (blocking of heating demand)
- compressor (blocking of EP14 and EP15 can be combined. If you want to block both (EP14) and (EP15), this will occupy two AUX inputs).
- hot water (hot water production). Any hot water circulation (HWC) remains in operation.
- internally controlled additional heat
- tariff blocking (additional heat, compressor, heating, cooling and hot water are disconnected)

Possible selections for AUX output

It is possible to have an external connection through the relay function via a potential-free variable relay (max 2 A) on terminal block AA101-X9.

NOTE

An accessory board is required if several functions are to be connected to terminal block AA101-X9 at the same time that indication of the common alarm is activated (see page 42).



The picture shows the relay in the alarm position.

When switch (SF1) is in the "⏻" or "⚠" position the relay is in the alarm position.

Caution

The relay outputs may be subjected to a max load of 2 A at resistive load (230V AC).

TIP

The AXC accessory is required if more than one function is to be connected to the AUX output.

Optional functions for external connection:

Indications

- alarm indication
- indication of common alarm
- cooling mode indication (only applies if there are cooling accessories)
- holiday indication

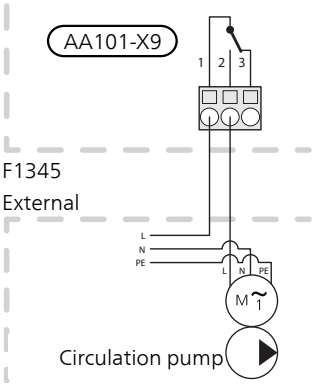
Control

- controlling ground water pump
- control of circulation pump for hot water circulation
- control of external circulation pump (for heating medium)
- control of additional heat in charge circuit

NOTE

The relevant distribution box must be marked with a warning about external voltage.

External circulation pump, ground water pump or hot water circulation pump is connected to the common alarm relay as illustrated below. If the pump has to work in the event of alarm, the cable is moved from position 2 to position 3.



Caution

For relay position operation, see section "Relay output for emergency mode", see page 30.

Connecting accessories

Instructions for connecting accessories are in the installation instructions provided for the respective accessory. See information at nibe.eu for the list of the accessories that can be used with F1345.

6 Commissioning and adjusting

Preparations

1. Check that the switch (SF1) is in position " ⏻".
2. Check for water in any hot water heater and climate system.

Caution

Check the miniature circuit-breaker. It may have tripped during transport.

NOTE

Do not start F1345 if there is a risk that the water in the system has frozen.

Filling and venting

FILLING AND VENTING THE CLIMATE SYSTEM

Filling

1. Open the filling valve (external, not included in the product). Fill the climate system with water.
2. Open the vent valve (external, not included in the product).
3. When the water that exits the venting valve is not mixed with air, close the valve. After a while the pressure starts to rise.
4. Close the filling valve when the correct pressure is obtained.

Venting

1. Vent F1345 via a vent valve (external, not included in the product) and other climate systems via their respective vent valves.
2. Keep topping up and venting until all air has been removed and the pressure is correct.

NOTE

Make sure that the heating medium system contains no air, before start-up. Failure to properly vent the system may result in damage to components.

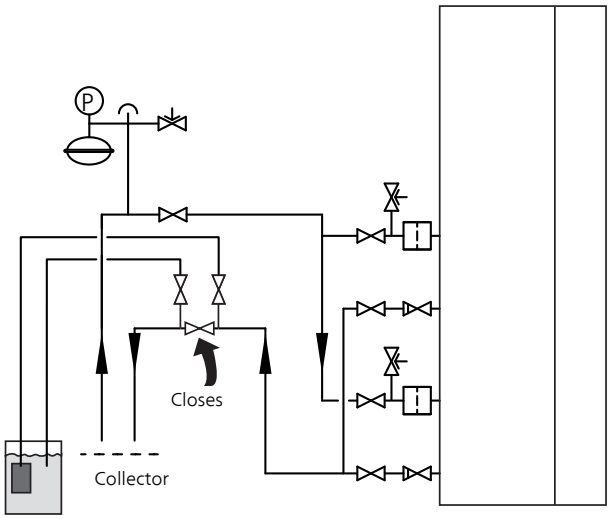
FILLING AND VENTING THE BRINE SYSTEM

When filling the brine system, mix the water with anti-freeze in an open container. The mixture should be protected against freezing down to about -15 -C. The brine is filled by connecting a filling pump.

1. Check the brine system for leakage.
2. Connect the filling pump and return line on the brine system's service connections as shown in figure.
3. Close the shut-off valve between the service connections.
4. Open the service connections.
5. Start the filling pump.
6. Fill and bleed the brine system until clear, air free, liquid enters the return pipe.
7. Close the service connections.
8. Open the shut-off valve between the service connections.

NOTE

Make sure that the brine system does not contain air before it is started up.. Failure to properly vent the system may result in damage to components.



SYMBOL KEY

Symbol	*Meaning*
	Shut-off valve
	Safety valve
	Expansion vessel
Ⓟ	Pressure gauge
	Particle filter

Start-up and inspection

START GUIDE

NOTE

There must be water in the climate system before the switch is set to "I".

NOTE

With several heat pumps connected, the start guide must first be run in the subordinate heat pumps.

In the heat pumps that are not the main unit, you can only make settings for each heat pump's circulation pumps. Other settings are made and controlled by the main unit.

1. Set switch (SF1) on F1345 to position "I".
2. Follow the instructions in the display's start guide. If the start guide does not start when you start the F1345, start it manually in menu 5.7.

TIP

Refer to the operating manual for a more in-depth introduction to the control system in F1345 (operation, menus, etc.).

Commissioning

The first time the installation is started a start guide is started. The start guide instructions state what needs to carried out at the first start together with a run through of the installation's basic settings.

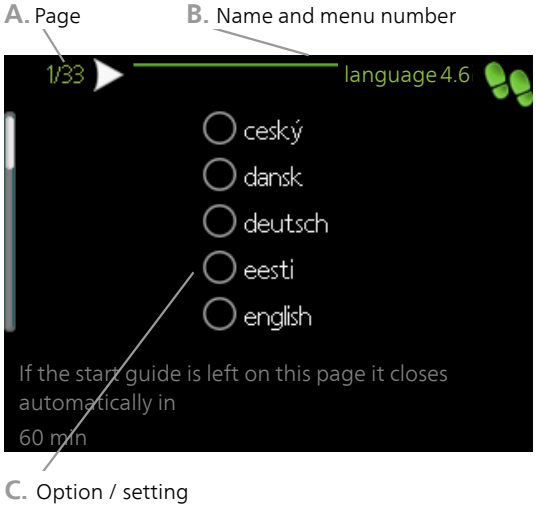
The start guide ensures that the start-up is carried out correctly and, for this reason, cannot be skipped.

Caution

As long as the start guide is active, no function in the installation will start automatically.

The start guide will appear at each restart of the installation, until it is deselected on the last page.

Operation in the start guide



A. Page

Here you can see how far you have come in the start guide.

Scroll between the pages of the start guide as follows:

1. Turn the control knob until one of the arrows in the top left corner (at the page number) has been marked.
2. Press the OK button to skip between the pages in the start guide.

B. Name and menu number

Here, you can see which menu in the control system this page of the start guide is based on. The digits in brackets refer to the menu number in the control system.

If you want to read more about affected menus either read off in the sub-menu or in the operating manual under the chapter "Control - Menus"

If you want to read more about affected menus either consult the help menu or read the user manual.

C. Option / setting

Make settings for the system here.

POST ADJUSTMENT AND VENTING

Pump adjustment, automatic operation

Brine side

To set the correct flow in the brine system, the brine pump must run at the correct speed. F1345 has a brine pump that is controlled automatically in standard mode. Certain functions and accessories may demand that it be run manually, in which case the correct speed must be set.

TIP

For optimum operation when several heat pumps are installed in a multi-installation, all heat pumps should have the same compressor size.

This automatic control occurs when the compressor is running and sets the speed of the brine pump so that the optimum temperature difference between the supply and return lines is attained.

Heating medium side

To set the correct flow in the heating medium system, the heating medium pump must run at the correct speed. F1345 has a heating medium pump that can be automatically controlled in standard mode. Certain functions and accessories may require it to run manually and the correct speed must then be set.

This automatic control occurs when the compressor is running and sets the speed of the heating medium pump, for the relevant operating mode, so the optimum temperature difference between the supply and return lines is achieved. During heating operation, the set DOT (dimensioned outdoor temperature) and temperature differential in menu 5.1.14 are used. If necessary, the maximum speed of the circulation pump can be limited in menu 5.1.11.

Pump adjustment, manual operation

Brine side

F1345 has brine pumps that can be controlled automatically. For manual operation: deactivate "auto" in menu 5.1.9 and then set the speed according to the diagrams below.

Caution

When an accessory for passive cooling is used, the brine pump speed must be set in menu 5.1.9.

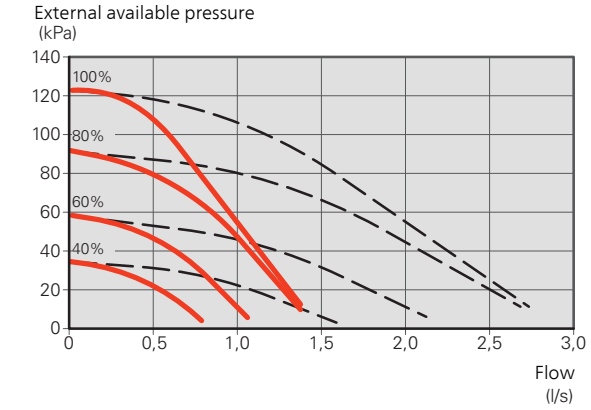
Set the pump speed when the system has come into balance (ideally 5 minutes after compressor start).

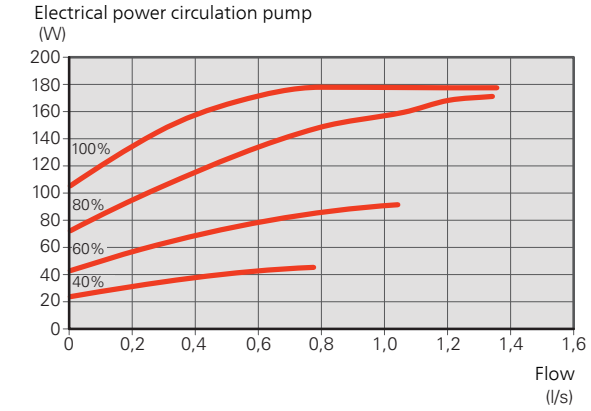
Adjust the flow so the temperature difference between brine out (BT11) and brine in (BT10) is between 2 - 5 °C. Check these temperatures in menu 3.1 "service info" and adjust the brine pumps' (GP2) speed until the tem-

perature difference is obtained. A high difference indicates a low brine flow and a low difference indicates a high brine flow.

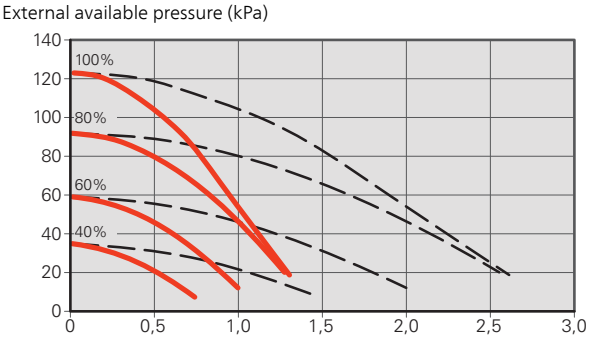
1 circulation pump
2 circulation pumps

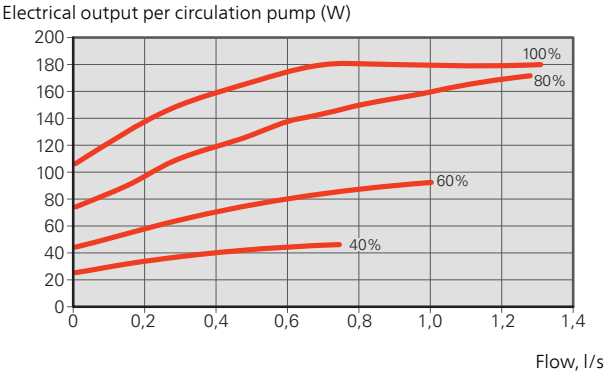
F1345 24 kW



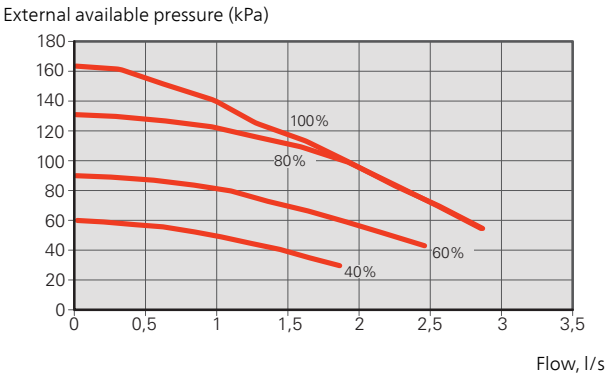


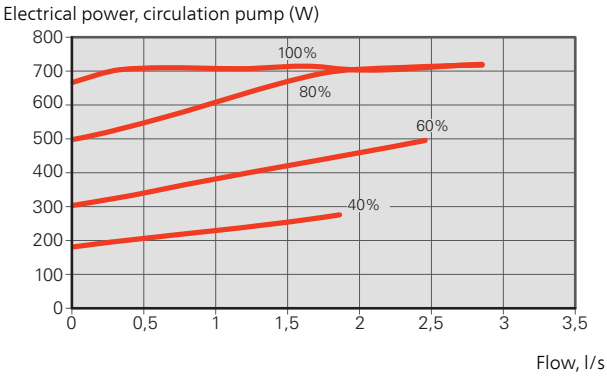
F1345 30 kW



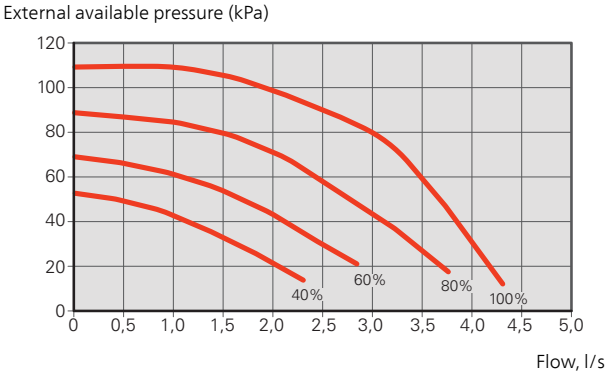


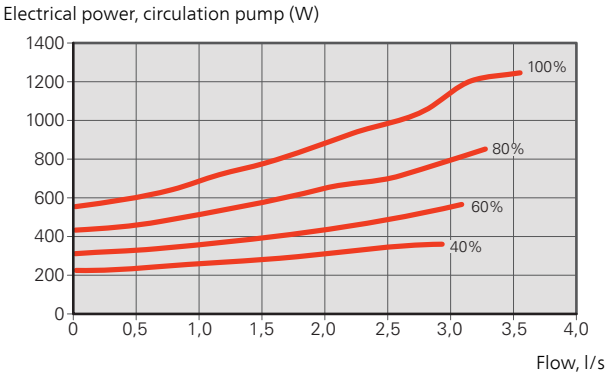
F1345 40 kW





F1345 60 kW





Heating medium side

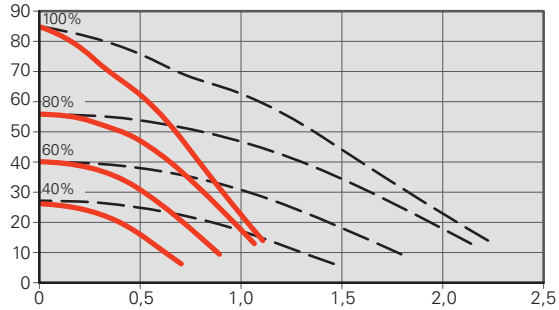
F1345 has heating medium pumps that can be automatically controlled. For manual operation: deactivate "auto" in menu 5.1.11 and then set the speed according to the diagrams below.

The flow must have a suitable temperature difference for the operating case (heating operation: 5 - 10 °C, hot water generation: 5 - 10 °C, pool heating: approx. 15 °C) between controlling supply temperature sensor and return line sensor. Check these temperatures in menu 3.1 "service info" and adjust the heating medium pumps' (GP1) speed until the temperature difference is obtained. A high difference indicates a low heating medium supply and a low difference indicates a high heating medium supply.

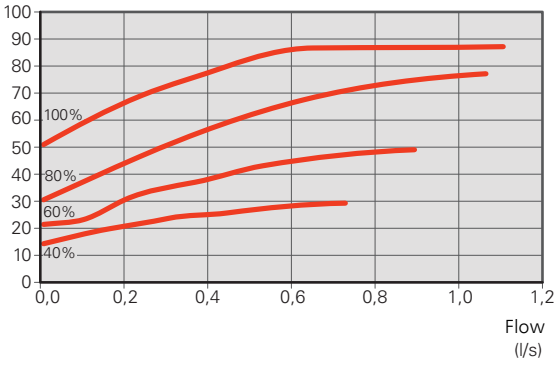
1 circulation pump
2 circulation pumps

F1345 24 kW

External available pressure (kPa)

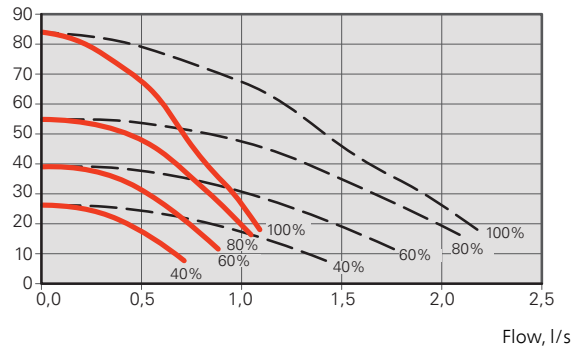


Electrical power circulation pump (W)

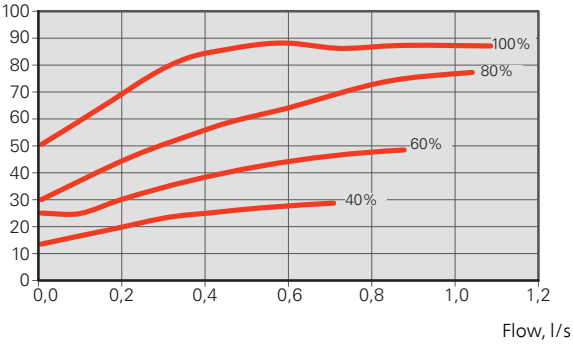


F1345 30 kW

External available pressure (kPa)

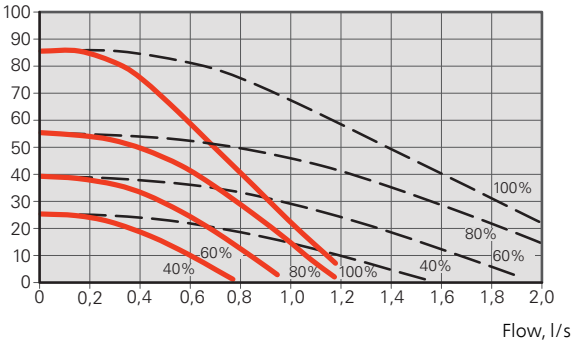


Electrical output per circulation pump (W)

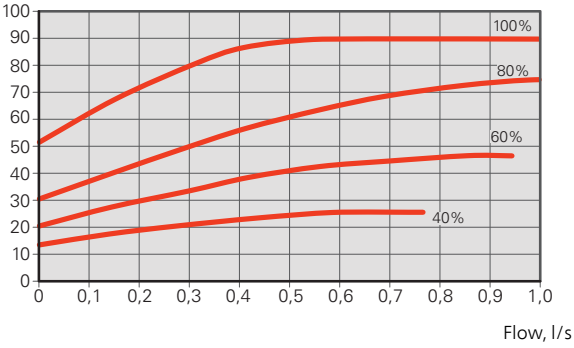


F1345 40 kW

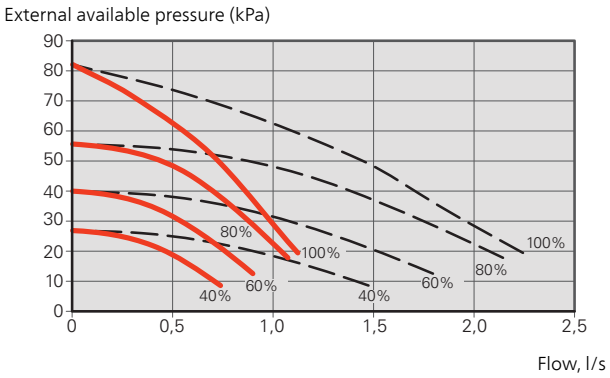
External available pressure (kPa)

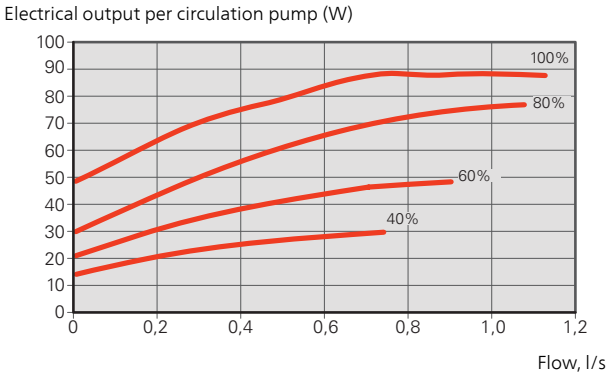


Electrical output per circulation pump (W)



F1345 60 kW



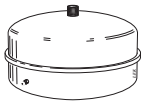


Readjusting, venting, heat medium side

Air is initially released from the hot water and venting may be necessary. If gurgling sounds can be heard from the heat pump or climate system, the entire system requires additional venting. Check the pressure in the pressure expansion vessel (CM1) with the pressure gauge (BP5). If the pressure drops, the system should be replenished.

Readjusting, venting, collector side

Expansion vessel



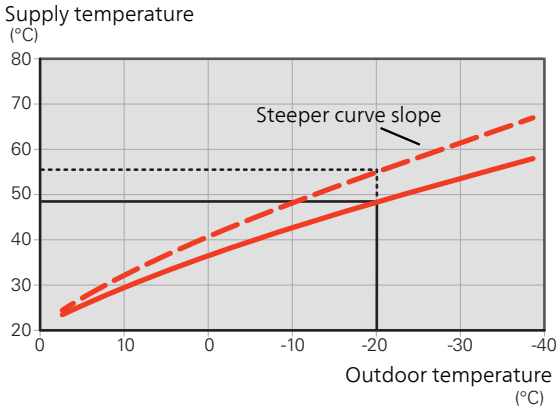
Check the pressure in the pressure expansion vessel (CM3) with the pressure gauge (BP6). If the pressure drops, the system should be replenished.

Setting the heating curve

In menu Curve, heating you can view the heating curve for your house. The task of the curve is to give an even indoor temperature, regardless of the outdoor temperature, and thereby energy-efficient operation. Based on this curve, the F1345 determines the temperature of the water to the climate system (the supply temperature) and thus the indoor temperature.

CURVE COEFFICIENT

The slope of the heating curve indicates how many degrees the supply temperature is to be increased/reduced when the outdoor temperature drops/increases. A steeper slope means a higher supply temperature at a certain outdoor temperature.

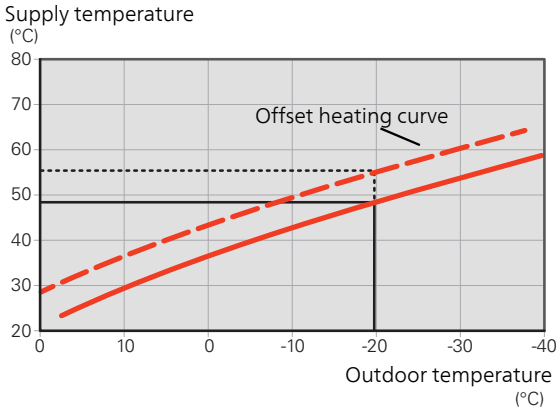


The optimum curve slope depends on the climate conditions in your location, whether the house has radiators, fan coils or underfloor heating and how well insulated the house is.

The heating curve is set when the heating installation is installed, but may need adjusting later. Normally, the curve will not need further adjustment.

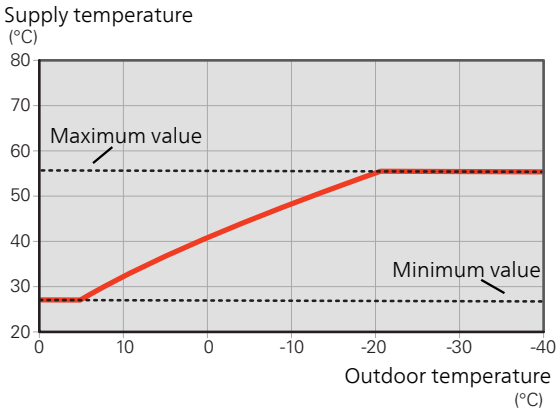
CURVE OFFSET

An offset of the heating curve means that the supply temperature is changed by the same amount for all outdoor temperatures, e.g. a curve offset of +2 steps increases the supply temperature by 5 °C at all outdoor temperatures.



SUPPLY TEMPERATURE – MAXIMUM AND MINIMUM VALUES

Because the flow line temperature cannot be calculated higher than the set maximum value or lower than the set minimum value the heating curve flattens out at these temperatures.

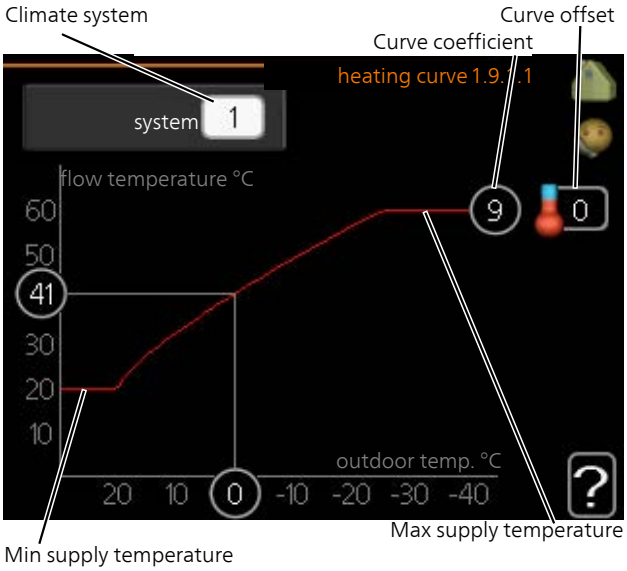


Caution

With underfloor heating systems, the maximum supply temperature is normally set between 35 and 45 °C.

Check the max floor temperature with your floor supplier.

ADJUSTMENT OF CURVE



1. Select the climate system (if more than one) for which the curve is to be changed.
2. Select curve slope and curve offset.

Caution

If you need to adjust "min. flow line temp." and/or "max flow line temperature", you do this in other menus.

Settings for "min. flow line temp." in menu 1.9.3.

Settings for "max flow line temperature" in menu 5.1.2.

Caution

Curve 0 means that own curve is used.

Settings for own curve are made in menu 1.9.7.

TO READ OFF A HEATING CURVE

1. Turn the control knob so that the ring on the shaft with the outdoor temperature is marked.
2. Press the OK button.
3. Follow the grey line up to the curve and out to the left to read off the value for the supply temperature at the selected outdoor temperature.
4. You can now select to take read outs for different outdoor temperatures by turning the control knob to the right or left and read off the corresponding flow temperature.
5. Press the OK or Back button to exit read off mode.

7 Accessories

Not all accessories are available on all markets.

ACCESSORY CARD AXC 50

An accessory board is required if, for example, a ground water pump or external circulation pump is to be connected to F1345 at the same time as the indication of common alarm is activated.

Part no. 067 193

ACTIVE/PASSIVE COOLING IN 2-PIPE SYSTEM HPAC 45

Combine F1345 with HPAC 45 for passive or active cooling.

Intended for heat pumps with outputs 24 – 60 kW.

Part no. 067 446

ACTIVE/PASSIVE COOLING IN 4-PIPE SYSTEM ACS 45

Part no 067 195

AUXILIARY RELAY HR 10

Auxiliary relay HR 10 is used to control external 1 to 3 phase loads such as oil burners, immersion heaters and pumps.

Part no 067 309

BUFFER VESSEL UKV

UKV is an accumulator tank that is suitable for connection to a heat pump or another external heat source, and can have several different applications. It can also be used during external control of the heating system.

UKV 200

Part no. 080 300

UKV 300

Part no. 080 301

UKV 500

Part no. 080 114

COMMUNICATIONS MODULE MODBUS 40

MODBUS 40 enables F1345 to be controlled and monitored using a DUC (computer sub-centre) in the building. Communication is then performed using MODBUS-RTU.

Part no 067 144

COMMUNICATIONS MODULE SMS 40

When there is no internet connection, you can use the accessory SMS 40 to control F1345 via SMS.

Part no 067 073

CONNECTION BOX K11

Connection box with thermostat and overheating protection.
(When connecting Immersion heater IU)

Part no. 018 893

DOCKING KIT SOLAR 42

Solar 42 means that F1345 (together with VPAS) can be connected to thermal solar heating.

Part no 067 153

DOMESTIC WATER EXCHANGER PLEX

310 - 20

Part no. 075 315

310 - 40

Part no. 075 316

310 - 60

Part no. 075 317

310 - 80

Part no. 075 318

322 - 30

Part no. 075 319

322 - 40

Part no. 075 320

322 - 60

Part no. 075 321

ENERGY MEASUREMENT KIT EMK 500

This accessory is installed externally and used to measure the amount of energy that is supplied for the pool, hot water, heating and cooling in the building.

Cu pipe Ø28.

Part no. 067 178

EXHAUST AIR MODULE NIBE FLM

NIBE FLM is an exhaust air module designed to combine recovery of mechanical exhaust air with ground source heating.

NIBE FLM

Part no. 067 011

Bracket BAU 40

Part no. 067 666

EXTERNAL ELECTRIC ADDITIONAL HEAT ELK

These accessories may need an accessory board AXC 50 (step controlled additional heat).

ELK 15

15 kW, 3 x 400 V
Part no. 069 022

ELK 26

26 kW, 3 x 400 V
Part no. 067 074

ELK 42

42 kW, 3 x 400 V
Part no. 067 075

ELK 213

7-13 kW, 3 x 400 V
Part no. 069 500

EXTRA SHUNT GROUP ECS 40/ECS 41

This accessory is used when F1345 is installed in houses with two or more different heating systems that require different supply temperatures.

ECS 40 (Max 80 m²)

Part no 067 287

ECS 41 (approx. 80-250 m²)

Part no 067 288

FILLING VALVE KIT KB 32

Valve kit for filling brine in the collector hose. Includes particle filter and insulation.

KB 32 (max. 30 kW)

Part no 089 971

GAS ACCESSORY

Communications module OPT 10

OPT 10 is used to enable connection and control of gas boiler NIBE GBM 10-15.

Part no. 067 513

HOT WATER CONTROL

VST 11

Reversing valve, cu-pipe Ø28

(Max recommended power, 17 kW)

Part no. 089 152

VST 20

Reversing valve, cu-pipe Ø35

(Max recommended power, 40 kW)

Part no 089 388

HUMIDITY SENSOR HTS 40

This accessory is used to show and regulate humidity and temperatures during both heating and cooling operation.

Part no. 067 538

IMMERSION HEATER IU

3 kW

Part no. 018 084

6 kW

Part no. 018 088

9 kW

Part no. 018 090

LEVEL MONITOR NV 10

Level monitor for extended checks of the brine level.

Part no. 089 315

POOL HEATING POOL 40

POOL 40 is used to enable pool heating with F1345.

Max. 17 kW.

Part no 067 062

ROOM SENSORRTS 40

This accessory is used to obtain a more even indoor temperature.

Part no. 067 065

ROOM UNIT RMU 40

The room unit is an accessory that allows the control and monitoring of F1345 to be carried out in a different part of your home to where it is located.

Part no 067 064

SOLAR PACKAGE NIBE PV

Solar panel package, 3 – 24 kW (10 – 80 panels), which is used to produce your own electricity.

VENTILATION HEAT EXCHANGER ERS

This accessory is used to supply the accommodation with energy that has been recovered from the ventilation air. The unit ventilates the house and heats the supply air as necessary.

ERS 10-400

Part no. 066 115

WATER HEATER/ACCUMULATOR TANK

VPA

Water heater with double-jacketed vessel.

VPA 300/200		*VPA 450/300*	
Copper	Part no. 082 023	Copper	Part no. 082 030
Enamel	Part no. 082 025	Enamel	Part no. 082 032

VPAS

Water heater with double-jacketed vessel and solar coil.

VPAS 300/450

Copper	Part no. 082 026
Enamel	Part no. 082 027

VPB

Water heater without immersion heater with charging coil.

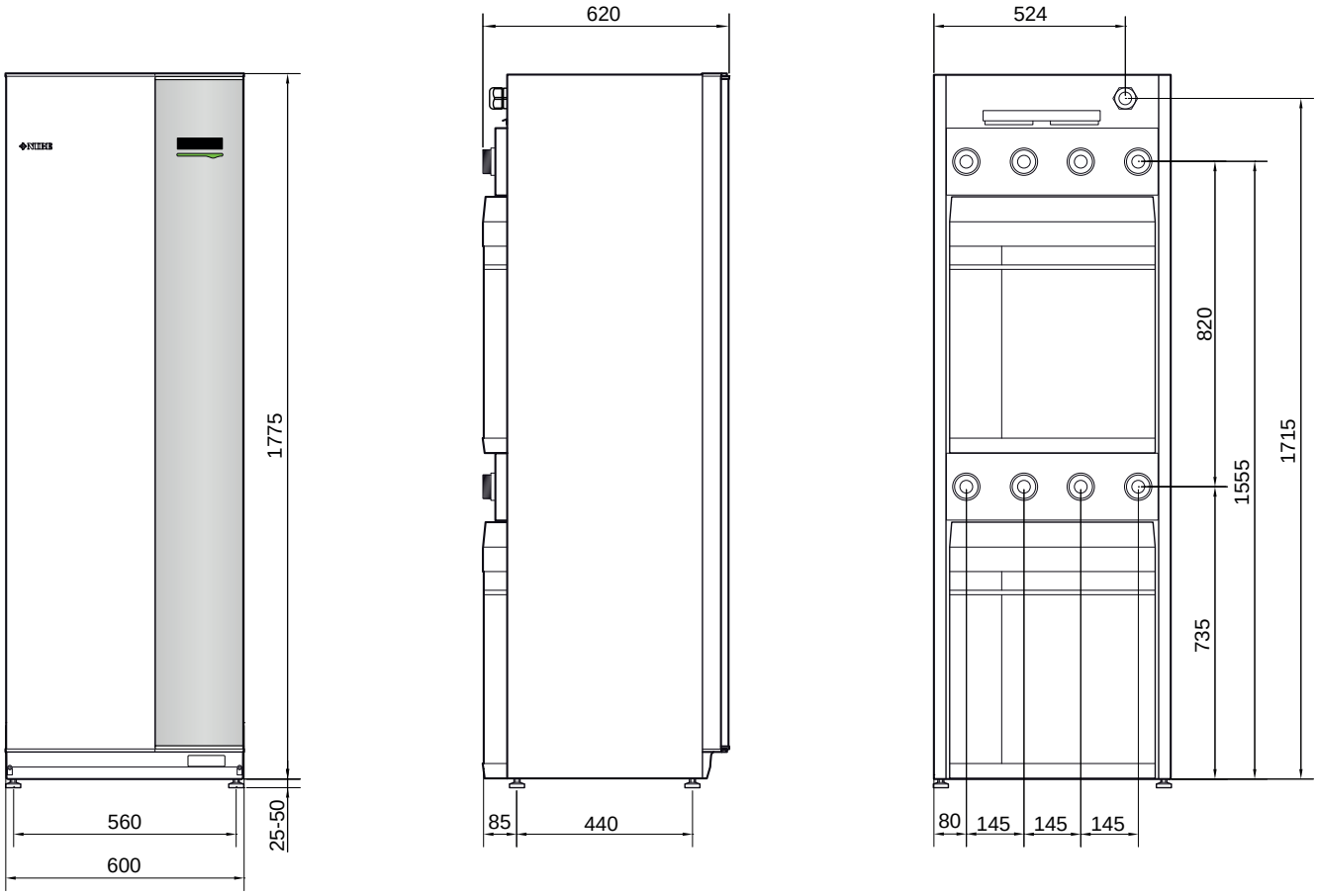
VPB 500		*VPB 750*	
Copper	Part no. 081 054	Copper	Part no. 081 052

VPB 1000

Copper	Part no. 081 053

8 Technical data

Dimensions and setting-out coordinates



Technical specifications

Model		*24*	*30*	*40*	*60*
Output data according to EN 14511					
Heating capacity (P_H)	kW	-	-	-	-
0/35					
Heating capacity (P_H)	kW	23.00	30.72	39.94	59.22
Supplied power (P_E)	kW	4.94	6.92	8.90	13.72
COP	-	4.65	4.44	4.49	4.32
0/45					
Heating capacity (P_H)	kW	21.98	29.74	38.90	56.12
Supplied power (P_E)	kW	5.96	8.34	10.61	16.02
COP	-	3.69	3.57	3.67	3.50
10/35					
Heating capacity (P_H)	kW	30.04	40.08	51.71	78.32
Supplied power (P_E)	kW	5.30	7.24	9.81	15.08
COP	-	5.67	5.53	5.27	5.19
10/45					
Heating capacity (P_H)	kW	29.28	39.16	50.79	74.21
Supplied power (P_E)	kW	6.34	8.84	11.82	17.60
COP	-	4.62	4.43	4.30	4.22
Output data according to EN 14825					
$P_{designh}$, 35 °C / 55 °C	kW	28	35	46	67
SCOP cold climate, 35 °C / 55 °C	-	5.0 / 4.0	4.9 / 3.8	5.0 / 3.9	4.7 / 3.8
SCOP average climate, 35 °C / 55 °C	-	4.8 / 3.8	4.7 / 3.6	4.8 / 3.8	4.6 / 3.7
Energy rating, average climate					
The product's room heating efficiency class 35 °C / 55 °C [1]	-	A+++ / A++	A+++ / A++	A+++ / A++	A+++ / A++
The system's room heating efficiency class 35 °C / 55 °C [2]	-	A+++ / A++	A+++ / A++	A+++ / A++	A+++ / A++
Electrical data					
Rated voltage	-	400V 3N ~ 50Hz			
Max operating current, heat pump [3]	A_{rms}	20.5	25.3	29.5	44.3
Max operating current per compressor	A_{rms}	8.4	11.1	13.1	19.9
Recommended fuse rating	A	25	30	35	50
Starting current	A_{rms}	29	30	42	53
Max permitted impedance at connection point [4]	ohm	-	-	-	0.4
Total output, Brine pumps [3]	W	6 – 360	6 – 360	35 – 730	40 – 1,250
Total output, HM pumps	W	5 – 174	5 – 174	5 – 174	5 – 174
Enclosure class	-	IP 21			
Refrigerant circuit					
Type of refrigerant	-	R407C	R407C	R407C	R410A
Volume	kg	2 x 2.0	2 x 2.0	2 x 1.7	2 x 1.7
GWP refrigerant	-	1,774	1,774	1,774	2,088
CO_2 equivalent	ton	2 x 3.55	2 x 3.55	2 x 3.02	2 x 3.55
Cut-out value pressostat HP	MPa	3.2 (32 bar)	3.2 (32 bar)	3.2 (32 bar)	4.2 (42 bar)
Difference pressostat HP	MPa	-0.7 (-7 bar)	-0.7 (-7 bar)	-0.7 (-7 bar)	-0.7 (-7 bar)
Cut-out value pressostat LP	MPa	0.08 (0.8 bar)	0.08 (0.8 bar)	0.08 (0.8 bar)	0.2 (2 bar)
Difference pressostat LP	MPa	0.07 (0.7 bar)	0.07 (0.7 bar)	0.07 (0.7 bar)	0.07 (0.7 bar)
Cut-out value, pressure transmitter LP	MPa	0.08 (0.8 bar)	0.08 (0.8 bar)	0.08 (0.8 bar)	0.2 (2.0 bar)
Difference, pressure transmitter LP	MPa	0.01 (0.1 bar)	0.01 (0.1 bar)	0.01 (0.1 bar)	0.01 (0.1 bar)
Brine circuit					
Max system pressure brine	MPa	0.6 (6 bar)	0.6 (6 bar)	0.6 (6 bar)	0.6 (6 bar)
Min flow	l/s	0.92	1.23	1.59	2.36
Nominal flow	l/s	1.18	1.62	2.09	3.10
Max external available press at nominal flow [5]	kPa	92	75	92	78
Min/Max incoming Brine temp	°C	see diagram			
Min. outgoing brine temp.	°C	-12	-12	-12	-12
Heating medium circuit					
Max system pressure heating medium	MPa	0.6 (6 bar)	0.6 (6 bar)	0.6 (6 bar)	0.6 (6 bar)
Min flow	l/s	0.37	0.50	0.64	0.92
Nominal flow	l/s	0.54	0.73	0.93	1.34
Max external avail. pressure at nominal flow	kPa	78	72	70	50
Min/max HM-temp	°C	see diagram			

Model		*24*	*30*	*40*	*60*
Noise					
Sound power level (L_{WA}) according to EN 12102 at 0/35	dB(A)	47	47	47	47
Sound pressure level (L_{PA}) calculated values according to EN ISO 11203 at 0/35 and 1 m range	dB(A)	32	32	32	32
Pipe connections					
Brine diam. CU pipe	-	G50 (2" external) / G40 (1 1/2" internal)			
Heating medium diam. CU pipes	-	G50 (2" external) / G40 (1 1/2" internal)			
Compressor oil					
Oil type	-	POE			
Volume	l	2 x 1.9	2 x 1.1	2 x 1.9	2 x 1.9
Dimensions and weight					
Width	mm	600			
Depth	mm	620			
Height	mm	1,800			
Required ceiling height [6]	mm	1,950			
Weight complete heat pump	kg	320	330	345	346
Weight only cooling module	kg	130	135	144	144
Part no. 3x400V[3]		065 297	065 298	065 299	065 300
Part no. 3x400V [7]				065 301	065 302

1 Scale for the product's efficiency class room heating: A+++ to D.

2 Scale for the system's efficiency class room heating: A+++ to G. Reported efficiency for the system takes the product's temperature regulator into account.

3 24 and 30 kW with internal brine pump. 40 and 60 kW with enclosed external brine pump.

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

5 This technical specification applies to the enclosed brine pump.

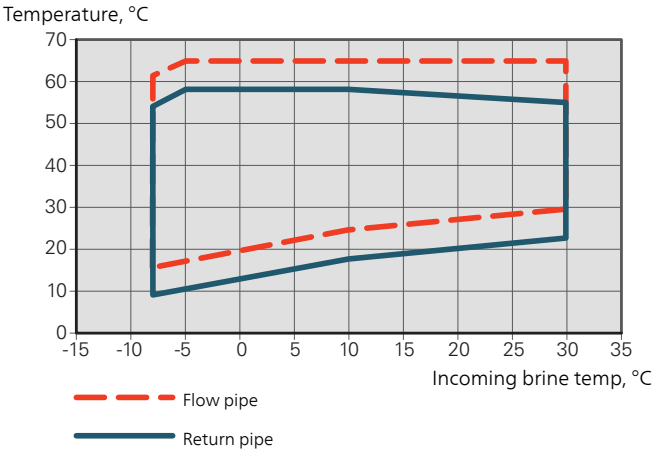
6 With feet removed, the height is approx. 1930 mm.

7 40 and 60 kW without enclosed external brine pump.

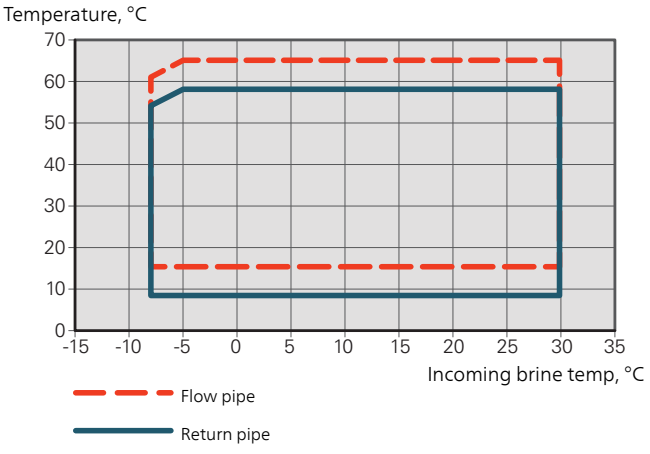
WORKING RANGE HEAT PUMP, COMPRESSOR OPERATION

The compressor provides a supply temperature up to 65 °C.

24 kW



30 kW, 40 kW, 60 kW



Energy labelling

INFORMATION SHEET

Supplier		*NIBE*			
Model		*F1345-24*	*F1345-30*	*F1345-40*	*F1345-60*
Model hot water heater		-	-	-	-
Temperature application	*°C*	*35 / 55*	*35 / 55*	*35 / 55*	*35 / 55*
Declared load profile for water heating		**-**	**-**	**-**	**-**
Seasonal space heating energy efficiency class, average climate		**A+++ / A++**	**A+++ / A++**	**A+++ / A++**	**A+++ / A++**
Water heating energy efficiency class, average climate		**-**	**-**	**-**	**-**
Rated heat output ($P_{designh}$), average climate	kW	28	35	46	67
Annual energy consumption space heating, average climate	kWh	11,996 / 15,287	15,539 / 19,880	19,996 / 25,093	30,169 / 38,048
Annual energy consumption water heating, average climate	kWh	-	-	-	-
Seasonal space heating energy efficiency, average climate	%	185 / 143	178 / 137	182 / 143	176 / 138
Water heating energy efficiency, average climate	%	-	-	-	-
Sound power level L_{WA} indoors	dB	47	47	47	47
Rated heat output ($P_{designh}$), cold climate	kW	28	35	46	67
Rated heat output ($P_{designh}$), warm climate	kW	28	35	46	67
Annual energy consumption space heating, cold climate	kWh	13,730 / 17,514	17,817 / 22,770	22,939 / 28,857	34,918 / 43,924
Annual energy consumption water heating, cold climate	kWh	-	-	-	-
Annual energy consumption space heating, warm climate	kWh	7,823 / 9,904	10,063 / 12,803	12,931 / 16,202	19,396 / 24,446
Annual energy consumption water heating, warm climate	kWh	-	-	-	-
Seasonal space heating energy efficiency, cold climate	%	193 / 150	186 / 144	190 / 149	181 / 142
Water heating energy efficiency, cold climate	%	-	-	-	-
Seasonal space heating energy efficiency, warm climate	%	183 / 143	178 / 138	182 / 144	177 / 138
Water heating energy efficiency, warm climate	%	-	-	-	-
Sound power level L_{WA} outdoors	dB	-	-	-	-

DATA FOR ENERGY EFFICIENCY OF THE PACKAGE

Model		*F1345-24*	*F1345-30*	*F1345-40*	*F1345-60*
Model hot water heater		-	-	-	-
Temperature application	*°C*	*35 / 55*	*35 / 55*	*35 / 55*	*35 / 55*
Controller, class		II			
Controller, contribution to efficiency	%	2			
Seasonal space heating energy efficiency of the package, average climate	%	187 / 145	180 / 139	184 / 145	178 / 140
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	%	195 / 152	188 / 146	192 / 151	183 / 144
Seasonal space heating energy efficiency of the package, warm climate	%	185 / 145	180 / 140	184 / 146	179 / 140

The reported efficiency of the package also takes the controller into account. If an external supplementary boiler or solar heating is added to the package, the overall efficiency of the package should be recalculated.

TECHNICAL DOCUMENTATION

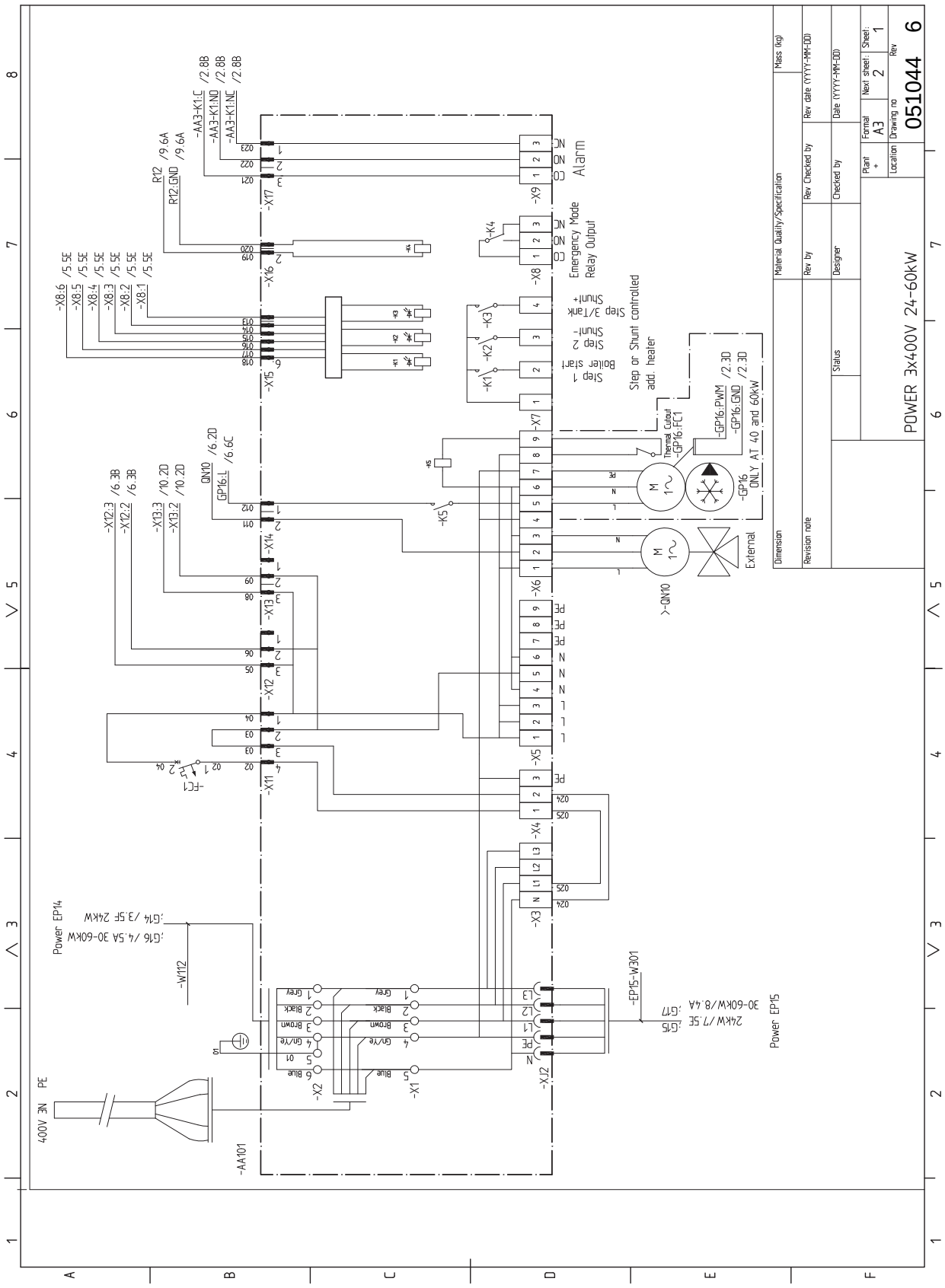
Model		*F1345-24*					
Type of heat pump		☐ Air-water ☐ Exhaust-water ☒ Brine-water ☐ Water-water					
Low-temperature heat pump		☐ Yes ☒ No					
Integrated immersion heater for additional heat		☐ Yes ☒ No					
Heat pump combination heater		☐ Yes ☒ No					
Climate		☒ Average ☐ Cold ☐ Warm					
Temperature application		☒ Average (55 °C) ☐ Low (35 °C)					
Applied standards		EN-14825					
Rated heat output	Prated	28,0	kW	*Seasonal space heating energy efficiency*	η_s	143	%
Declared capacity for space heating at part load and at outdoor temperature Tj				*Declared coefficient of performance for space heating at part load and at outdoor temperature Tj*			
Tj = -7 °C	Pdh	22.2	kW	Tj = -7 °C	COPd	3.27	-
Tj = +2 °C	Pdh	22.8	kW	Tj = +2 °C	COPd	3.83	-
Tj = +7 °C	Pdh	11.7	kW	Tj = +7 °C	COPd	4.31	-
Tj = +12 °C	Pdh	11.8	kW	Tj = +12 °C	COPd	4.58	-
Tj = biv	Pdh	22.4	kW	Tj = biv	COPd	3.45	-
Tj = TOL	Pdh	22.0	kW	Tj = TOL	COPd	3.10	-
Tj = -15 °C (if TOL < -20 °C)	Pdh		kW	Tj = -15 °C (if TOL < -20 °C)	COPd		-
Bivalent temperature	T_{biv}	-4.8	°C	Min. outdoor air temperature	TOL	-10.0	°C
Cycling interval capacity	Pcych		kW	Cycling interval efficiency	COPcyc		-
Degradation coefficient	Cdh	0.99	-	Max supply temperature	WTOL	65.0	°C
Power consumption in modes other than active mode				*Additional heat*			
Off mode	P_{OFF}	0.002	kW	Rated heat output	Psup	6.0	kW
Thermostat-off mode	P_{TO}	0.030	kW				
Standby mode	P_{SB}	0.007	kW	Type of energy input	Electric		
Crankcase heater mode	P_{CK}	0.070	kW				
Other items							
Capacity control	Variable			Rated airflow (air-water)			m^3/h
Sound power level, indoors/outdoors	L_{WA}	47 / -	dB	Nominal heating medium flow		2.37	m^3/h
Annual energy consumption	Q_{HE}	15,287	kWh	Brine flow brine-water or water-water heat pumps		4.46	m^3/h
Contact information	*NIBE Energy Systems – Box 14 – Hannabadsvägen 5 – 285 21 Markaryd – Sweden*						

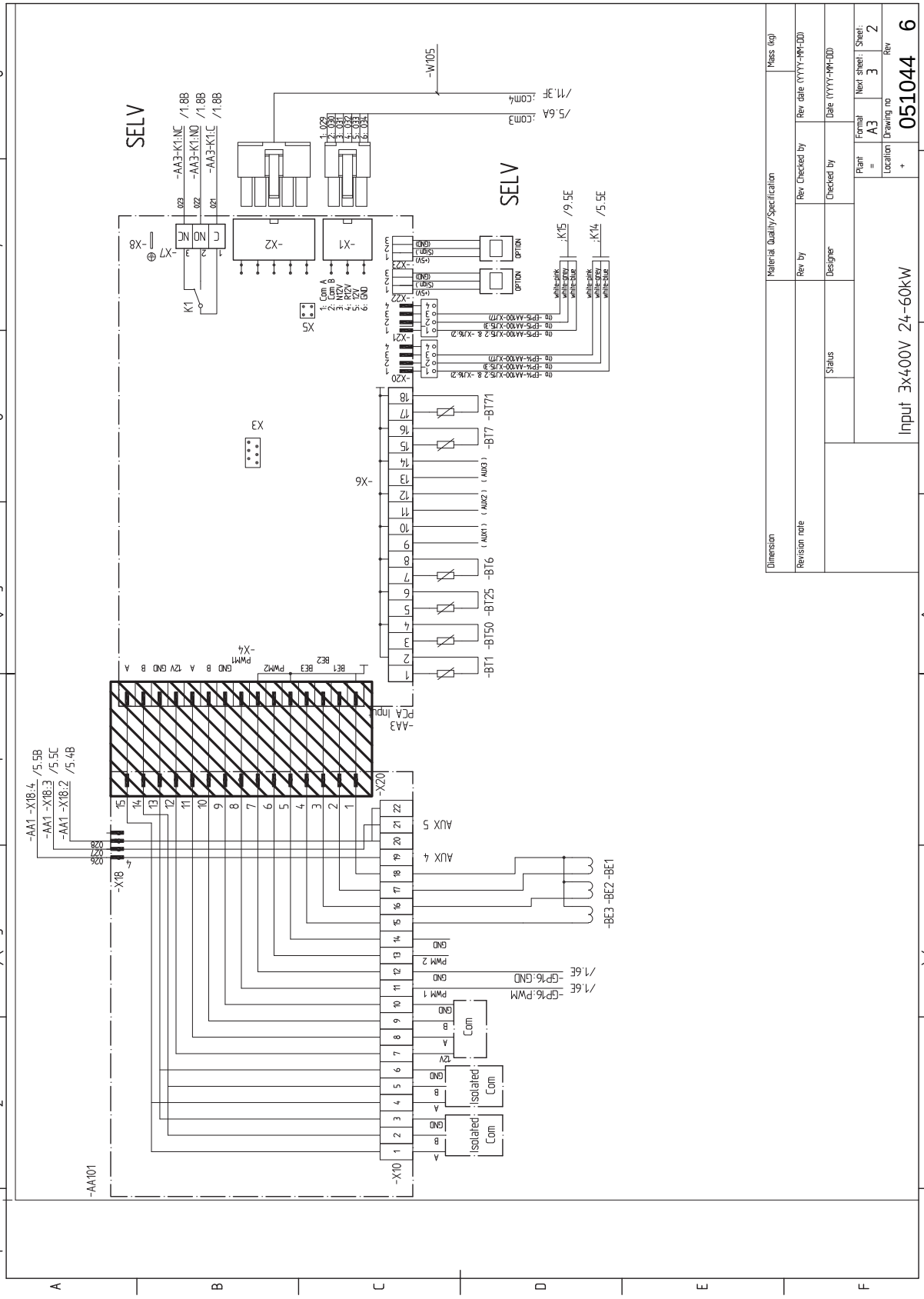
Model		*F1345-30*					
Type of heat pump		☐ Air-water ☐ Exhaust-water ☒ Brine-water ☐ Water-water					
Low-temperature heat pump		☐ Yes ☒ No					
Integrated immersion heater for additional heat		☐ Yes ☒ No					
Heat pump combination heater		☐ Yes ☒ No					
Climate		☒ Average ☐ Cold ☐ Warm					
Temperature application		☒ Average (55 °C) ☐ Low (35 °C)					
Applied standards		EN-14825					
Rated heat output	Prated	35	kW	*Seasonal space heating energy efficiency*	η_s	137	%
Declared capacity for space heating at part load and at outdoor temperature Tj				*Declared coefficient of performance for space heating at part load and at outdoor temperature Tj*			
Tj = -7 °C	Pdh	29.5	kW	Tj = -7 °C	COPd	3.15	-
Tj = +2 °C	Pdh	30.2	kW	Tj = +2 °C	COPd	3.64	-
Tj = +7 °C	Pdh	15.3	kW	Tj = +7 °C	COPd	4.09	-
Tj = +12 °C	Pdh	15.4	kW	Tj = +12 °C	COPd	4.40	-
Tj = biv	Pdh	29.6	kW	Tj = biv	COPd	3.23	-
Tj = TOL	Pdh	29.3	kW	Tj = TOL	COPd	2.99	-
Tj = -15 °C (if TOL < -20 °C)	Pdh		kW	Tj = -15 °C (if TOL < -20 °C)	COPd		-
Bivalent temperature	T_{biv}	-6.0	°C	Min. outdoor air temperature	TOL	-10.0	°C
Cycling interval capacity	Pcych		kW	Cycling interval efficiency	COPcyc		-
Degradation coefficient	Cdh	0.99	-	Max supply temperature	WTOL	65.0	°C
Power consumption in modes other than active mode				*Additional heat*			
Off mode	P_{OFF}	0.002	kW	Rated heat output	Psup	5.7	kW
Thermostat-off mode	P_{TO}	0.040	kW				
Standby mode	P_{SB}	0.007	kW	Type of energy input	Electric		
Crankcase heater mode	P_{CK}	0.070	kW				
Other items							
Capacity control	Variable			Rated airflow (air-water)			m^3/h
Sound power level, indoors/outdoors	L_{WA}	47 / -	dB	Nominal heating medium flow		3.15	m^3/h
Annual energy consumption	Q_{HE}	19,880	kWh	Brine flow brine-water or water-water heat pumps		5.83	m^3/h
Contact information	*NIBE Energy Systems – Box 14 – Hannabadsvägen 5 – 285 21 Markaryd – Sweden*						

Model		*F1345-40*					
Type of heat pump		☐ Air-water ☐ Exhaust-water ☒ Brine-water ☐ Water-water					
Low-temperature heat pump		☐ Yes ☒ No					
Integrated immersion heater for additional heat		☐ Yes ☒ No					
Heat pump combination heater		☐ Yes ☒ No					
Climate		☒ Average ☐ Cold ☐ Warm					
Temperature application		☒ Average (55 °C) ☐ Low (35 °C)					
Applied standards		EN-14825					
Rated heat output	Prated	46	kW	*Seasonal space heating energy efficiency*	η_s	143	%
Declared capacity for space heating at part load and at outdoor temperature Tj				*Declared coefficient of performance for space heating at part load and at outdoor temperature Tj*			
Tj = -7 °C	Pdh	38.2	kW	Tj = -7 °C	COPd	3.33	-
Tj = +2 °C	Pdh	39.1	kW	Tj = +2 °C	COPd	3.79	-
Tj = +7 °C	Pdh	19.9	kW	Tj = +7 °C	COPd	4.21	-
Tj = +12 °C	Pdh	20.1	kW	Tj = +12 °C	COPd	4.51	-
Tj = biv	Pdh	38.4	kW	Tj = biv	COPd	3.41	-
Tj = TOL	Pdh	37.8	kW	Tj = TOL	COPd	3.19	-
Tj = -15 °C (if TOL < -20 °C)	Pdh		kW	Tj = -15 °C (if TOL < -20 °C)	COPd		-
Bivalent temperature	T_{biv}	-5.7	°C	Min. outdoor air temperature	TOL	-10.0	°C
Cycling interval capacity	Pcych		kW	Cycling interval efficiency	COPcyc		-
Degradation coefficient	Cdh	0.99	-	Max supply temperature	WTOL	65.0	°C
Power consumption in modes other than active mode				*Additional heat*			
Off mode	P_{OFF}	0.002	kW	Rated heat output	Psup	8.2	kW
Thermostat-off mode	P_{TO}	0.050	kW				
Standby mode	P_{SB}	0.007	kW	Type of energy input	Electric		
Crankcase heater mode	P_{CK}	0.080	kW				
Other items							
Capacity control	Variable			Rated airflow (air-water)			m^3/h
Sound power level, indoors/outdoors	L_{WA}	47 / -	dB	Nominal heating medium flow		4.07	m^3/h
Annual energy consumption	Q_{HE}	25,093	kWh	Brine flow brine-water or water-water heat pumps		7.77	m^3/h
Contact information	*NIBE Energy Systems – Box 14 – Hannabadsvägen 5 – 285 21 Markaryd – Sweden*						

Model		*F1345-60*					
Type of heat pump		☐ Air-water ☐ Exhaust-water ☒ Brine-water ☐ Water-water					
Low-temperature heat pump		☐ Yes ☒ No					
Integrated immersion heater for additional heat		☐ Yes ☒ No					
Heat pump combination heater		☐ Yes ☒ No					
Climate		☒ Average ☐ Cold ☐ Warm					
Temperature application		☒ Average (55 °C) ☐ Low (35 °C)					
Applied standards		EN-14825					
Rated heat output	Prated	67	kW	*Seasonal space heating energy efficiency*	η_s	138	%
Declared capacity for space heating at part load and at outdoor temperature Tj				*Declared coefficient of performance for space heating at part load and at outdoor temperature Tj*			
Tj = -7 °C	Pdh	54.8	kW	Tj = -7 °C	COPd	3.17	-
Tj = +2 °C	Pdh	56.6	kW	Tj = +2 °C	COPd	3.62	-
Tj = +7 °C	Pdh	29.2	kW	Tj = +7 °C	COPd	4.06	-
Tj = +12 °C	Pdh	29.8	kW	Tj = +12 °C	COPd	4.31	-
Tj = biv	Pdh	55.2	kW	Tj = biv	COPd	3.26	-
Tj = TOL	Pdh	54.1	kW	Tj = TOL	COPd	3.03	-
Tj = -15 °C (if TOL < -20 °C)	Pdh		kW	Tj = -15 °C (if TOL < -20 °C)	COPd		-
Bivalent temperature	T_{biv}	-5.4	°C	Min. outdoor air temperature	TOL	-10.0	°C
Cycling interval capacity	Pcych		kW	Cycling interval efficiency	COPcyc		-
Degradation coefficient	Cdh	0.99	-	Max supply temperature	WTOL	65.0	°C
Power consumption in modes other than active mode				*Additional heat*			
Off mode	P_{OFF}	0.002	kW	Rated heat output	Psup	12.9	kW
Thermostat-off mode	P_{TO}	0.060	kW				
Standby mode	P_{SB}	0.007	kW	Type of energy input	Electric		
Crankcase heater mode	P_{CK}	0.080	kW				
Other items							
Capacity control	Variable			Rated airflow (air-water)			m^3/h
Sound power level, indoors/outdoors	L_{WA}	47 / -	dB	Nominal heating medium flow		5.83	m^3/h
Annual energy consumption	Q_{HE}	38,048	kWh	Brine flow brine-water or water-water heat pumps		10.87	m^3/h
Contact information	*NIBE Energy Systems – Box 14 – Hannabadsvägen 5 – 285 21 Markaryd – Sweden*						

Electrical circuit diagram

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-W105
/11.3F :COM4
/5.6A :COM3
-AA3-K1:NC /1.8B
-AA3-K1:NO /1.8B
-AA3-K1:C /1.8B
-X7
-X8
-X2
-X1
K1
X5
Com A
Com B
+12V
GND
OPTION
-X22
-X21
-X20
-K15 /9.5E
-K14 /5.5E
-EPS-AA100-X1:2 & -X16:2
-EPS-AA100-X1:3
-EPS-AA100-X1:7
white-pink
white-grey
white-blue
X3
-X6
-BT1 -BT50 -BT25 -BT6 -BT7 -BT71
(AUX1) (AUX2) (AUX3)
-AA3
PCA: Input
-X4
BE1 BE2 BE3 PWM1 PWM2
GND B A 12V GND B A
-AA1 -X18:4 /5.5B
-AA1 -X18:3 /5.5C
-AA1 -X18:2 /5.4B
-X18
-X10
-X20
AUX 5
AUX 4
-BE3 -BE2 -BE1
-GP16:GND /1.6E
-GP16:PWM /1.6E
PWM 1
PWM 2
GND
12V
Com
Isolated Com
-AA101
Material Quality/Specification
Mass (kg)
Dimension
Revision note
Rev by
Rev Checked by
Rev date (YYYY-MM-DD)
Designer
Checked by
Date (YYYY-MM-DD)
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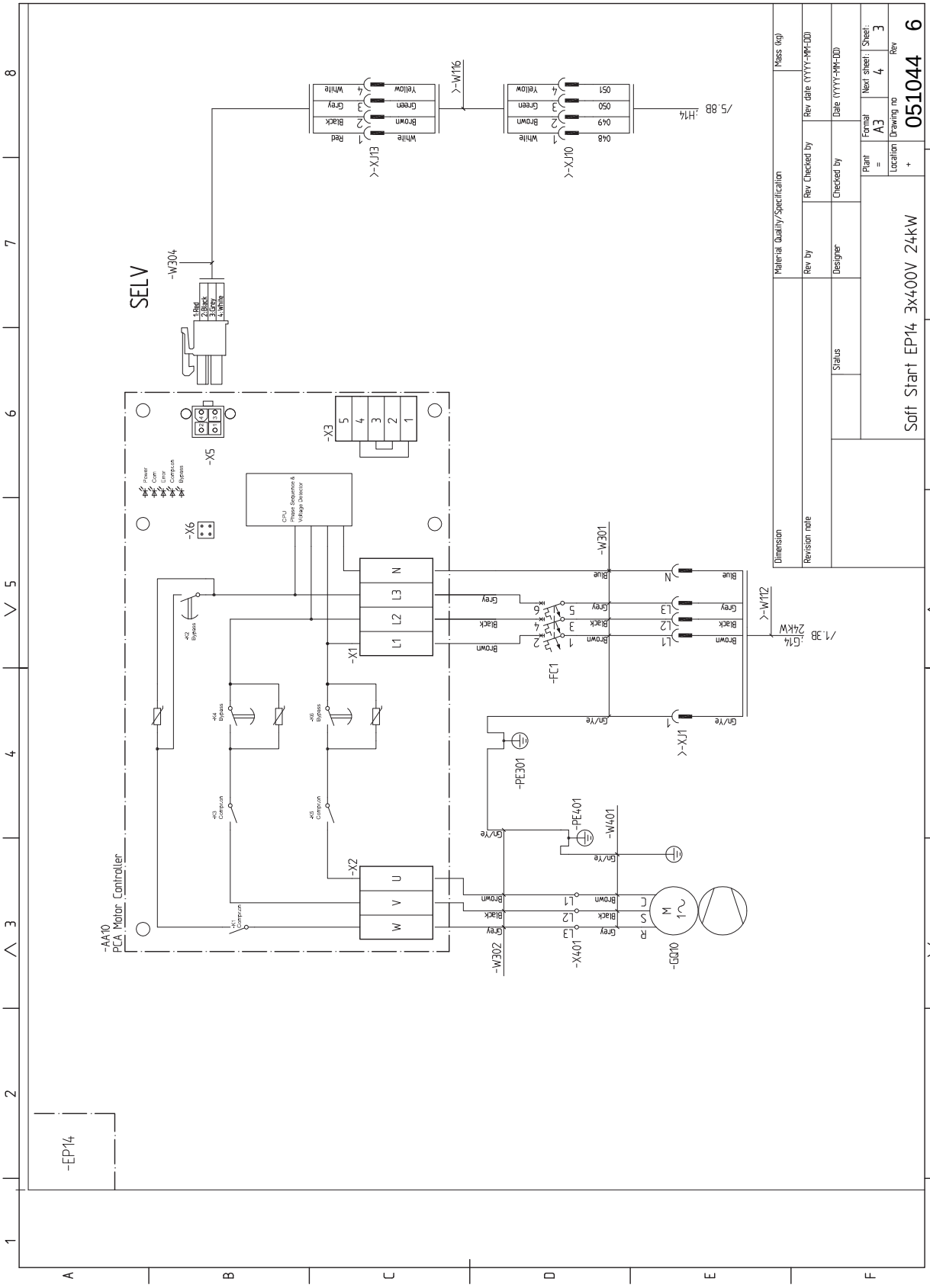
Sheet: 2
Location +
Drawing no 051044
Rev 6
Input 3x400V 24-60kW


Soft Start EP14 3x400V 24kW
051044 6
-EP14
-AA10
PCA Motor Controller
SELV
-W304
-X5
-X3
-X6
-X1
-X2
-W301
-W302
-X401
-W401
-PE301
-PE401
-GQ10
-FC1
-W116
-X110
-X113
-W112
-X11
/5.8B
/1.3B 24kW
Material Quality/Specification
Dimension
Revision note
Rev by
Rev Checked by
Rev date (YYYY-MM-DD)
Designer
Checked by
Date (YYYY-MM-DD)
Status
Mass (kg)
Plant
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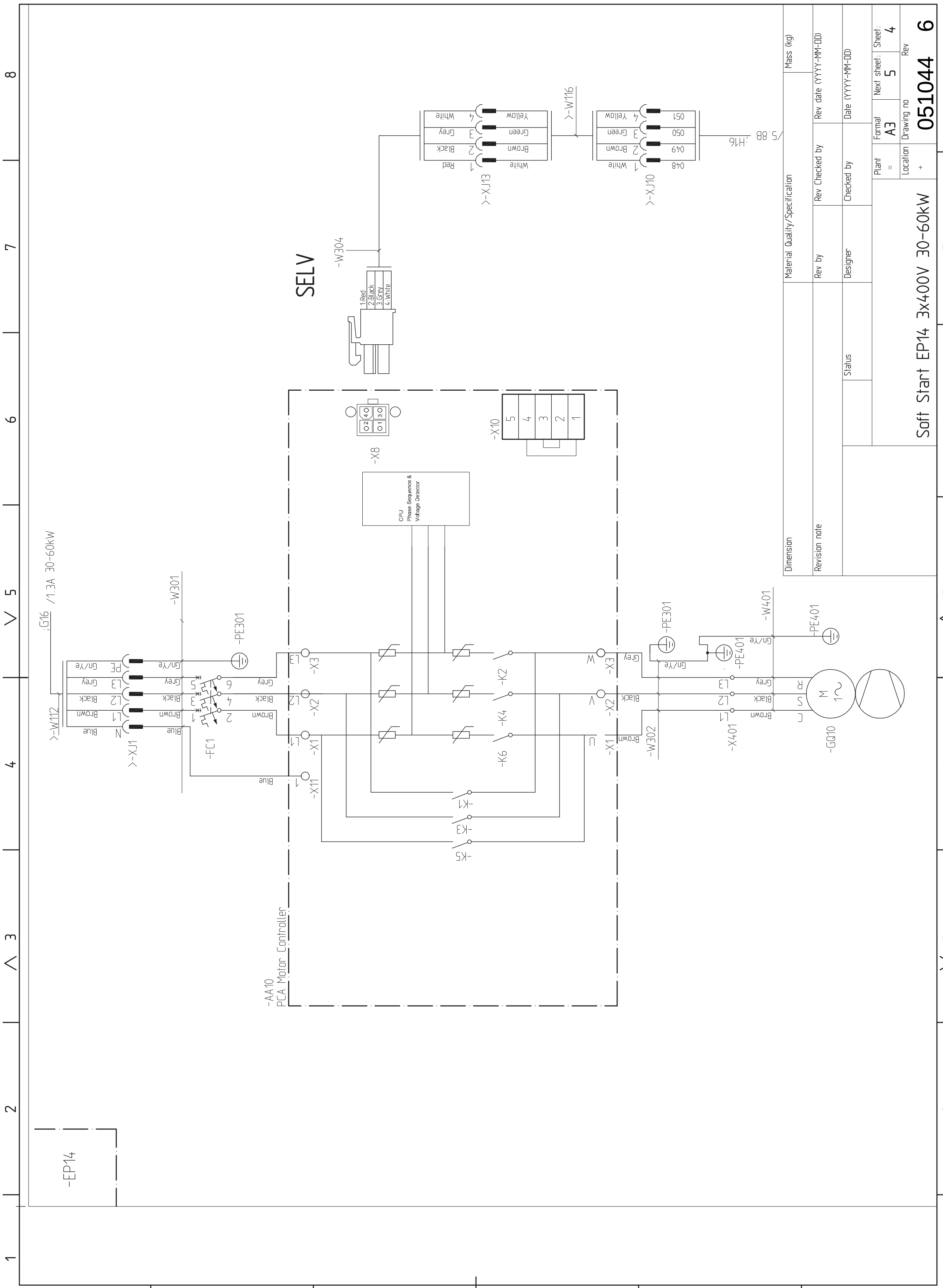
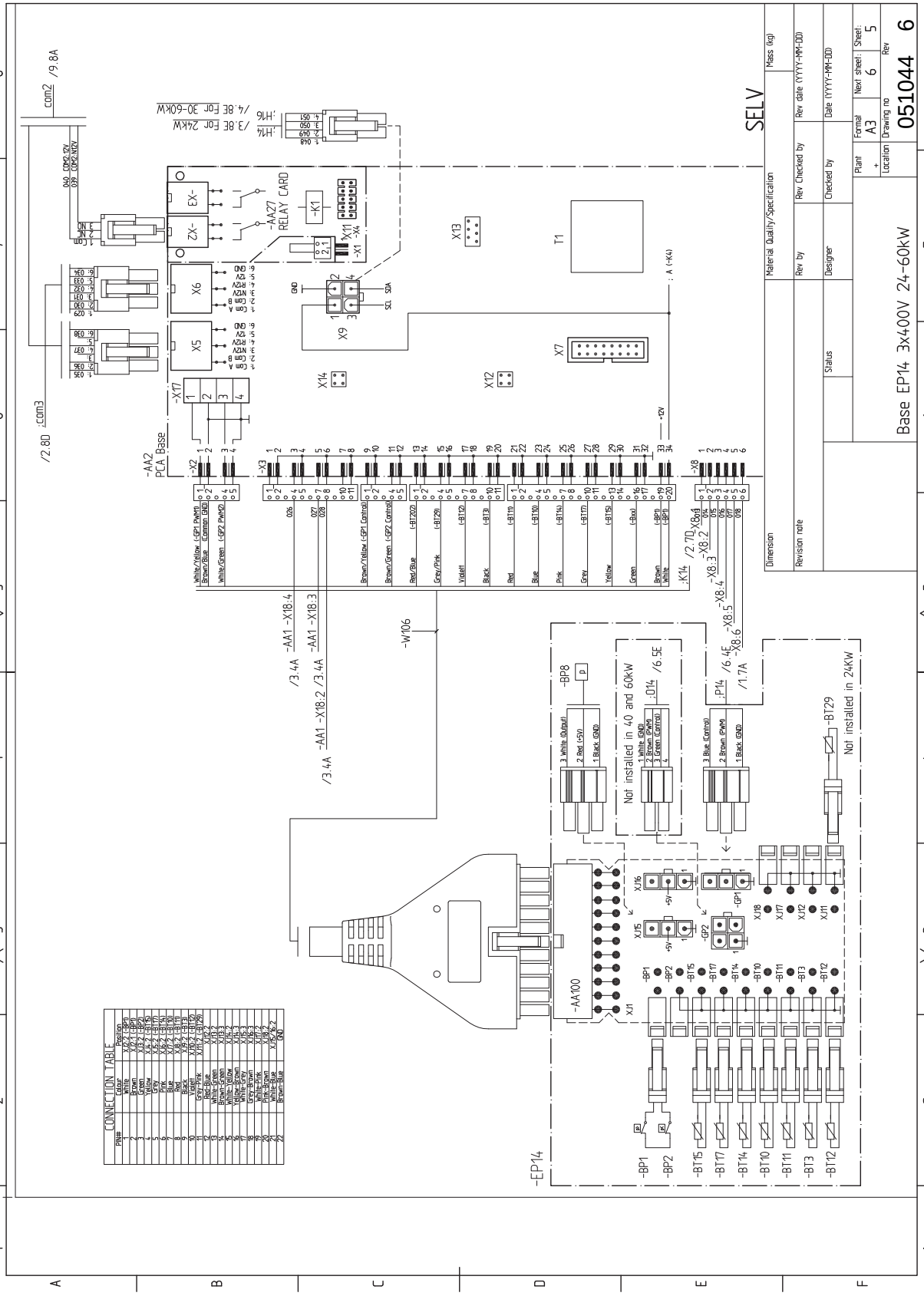
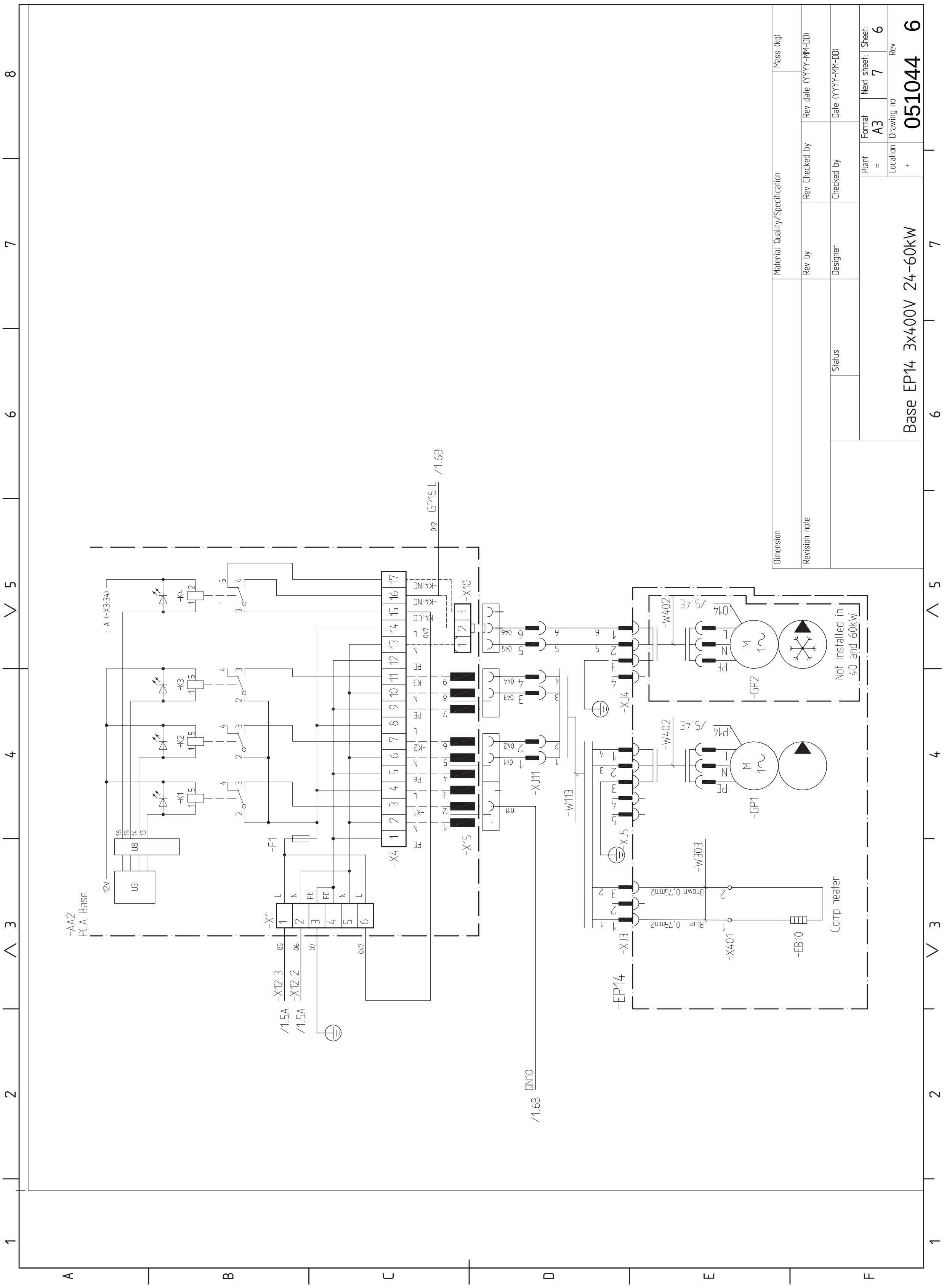
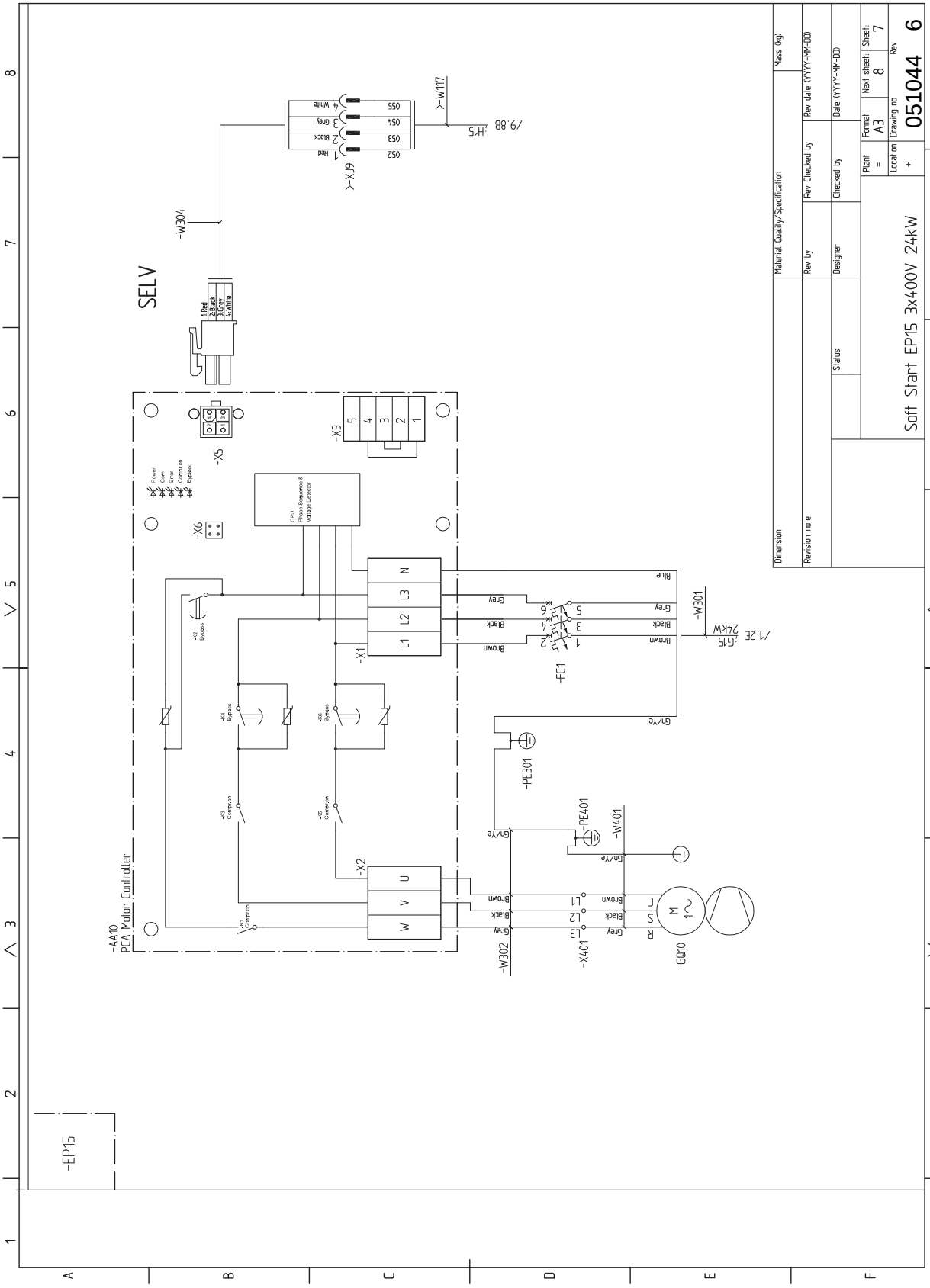
Next sheet 4
Sheet 3
Location
Drawing no
Rev


Soft Start EP14 3x400V 30-60kW
051044
6
Format A3
Next sheet: 5
Sheet: 4
SELV
-AA10
PCA Motor Controller
CPU
Phase Sequence &
Voltage Detector
-EP14
-FC1
-GQ10
-W112
-W301
-W302
-W304
-W401
-W116
-XJ1
-XJ10
-XJ13
-X8
-X10
-X401
-PE301
-PE401
-K1
-K2
-K3
-K4
-K5
-K6
-H16
/5.8B
.G16 /1.3A 30-60kW
Material Quality/Specification
Mass (kg)
Dimension
Revision note
Rev by
Rev Checked by
Rev date (YYYY-MM-DD)
Designer
Checked by
Date (YYYY-MM-DD)
Status
Plant
Location
Drawing no
Rev


Base EP14 3x400V 24-60kW
051044 6
SELV
-AA2 PCA Base
-AA27 RELAY CARD
-EP14
-AA100
Not installed in 40 and 60kW
Not installed in 24KW
CONNECTION TABLE


Base EP14 3x400V 24-60kW
051044
6
Material Quality/Specification
Mass (kg)
Rev by
Rev Checked by
Rev date (YYYY-MM-DD)
Designer
Checked by
Date (YYYY-MM-DD)
Status
Dimension
Revision note
Plant
Format
A3
Next sheet:
7
Sheet:
6
Location
Drawing no
Rev
-AA2
PCA Base
-X1
-X4
-X10
-X15
-F1
-K1
-K2
-K3
-K4
-XJ3
-XJ4
-XJ5
-XJ11
-W113
-W303
-W402
-X401
-EB10
Comp.heater
-GP1
-GP2
-EP14
Not installed in
40 and 60kW
GP16:L
QN10
/1.6B
/1.5A
-X12:3
-X12:2
/5.4E
Brown 0,75mm2
Blue 0,75mm2


SELV
-AA10
PCA Motor Controller
-EP15
-W304
-X19
-W117
-X5
-X6
-X3
-X1
-X2
-FC1
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-PE401
-W401
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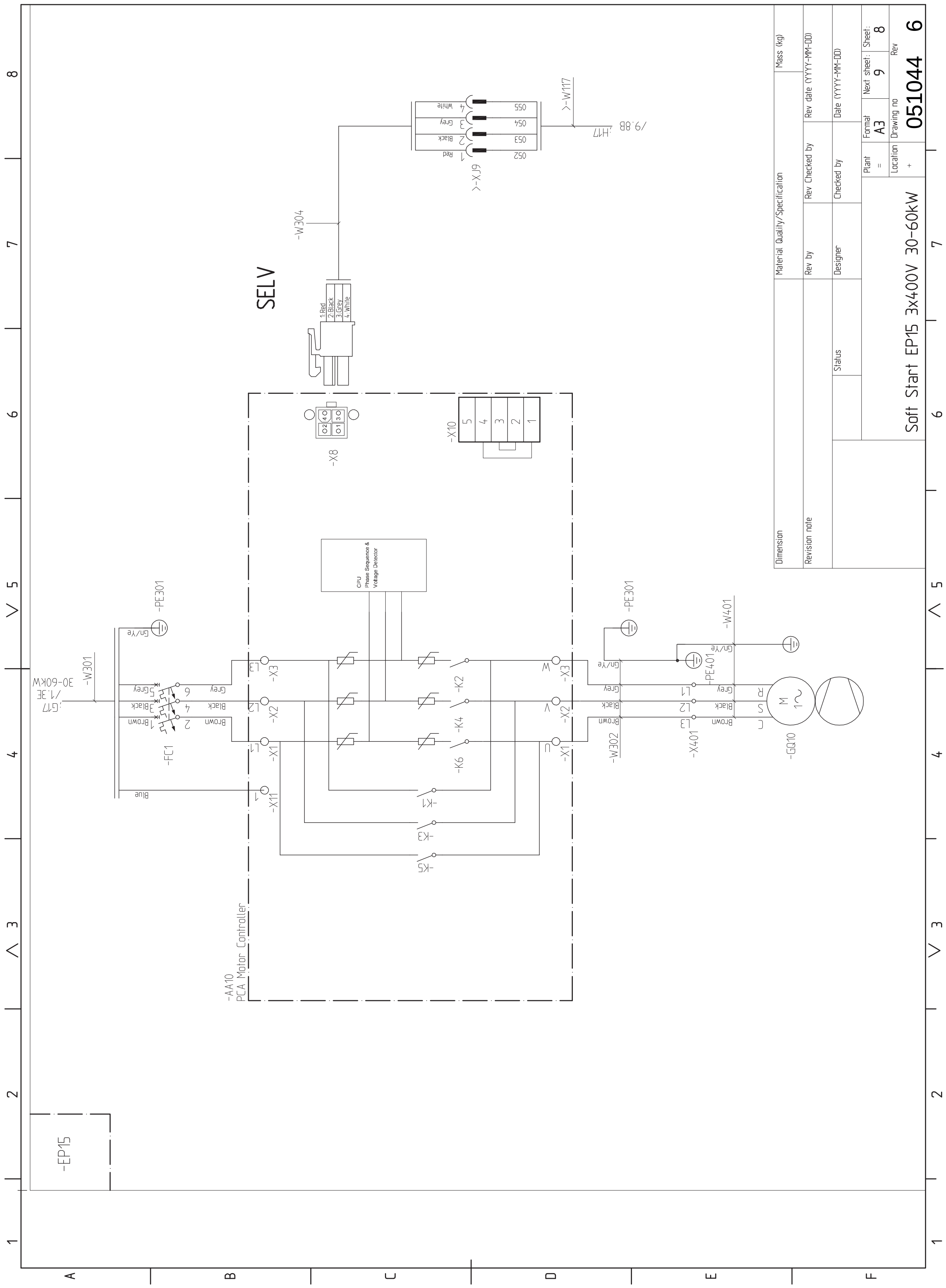
-X401
-GQ10
-W301
Soft Start EP15 3x400V 24kW
051044 6



Soft Start EP15 3x400V 30-60kW
051044
6
SELV
-AA10
PCA Motor Controller
-EP15
-GQ10
-FC1
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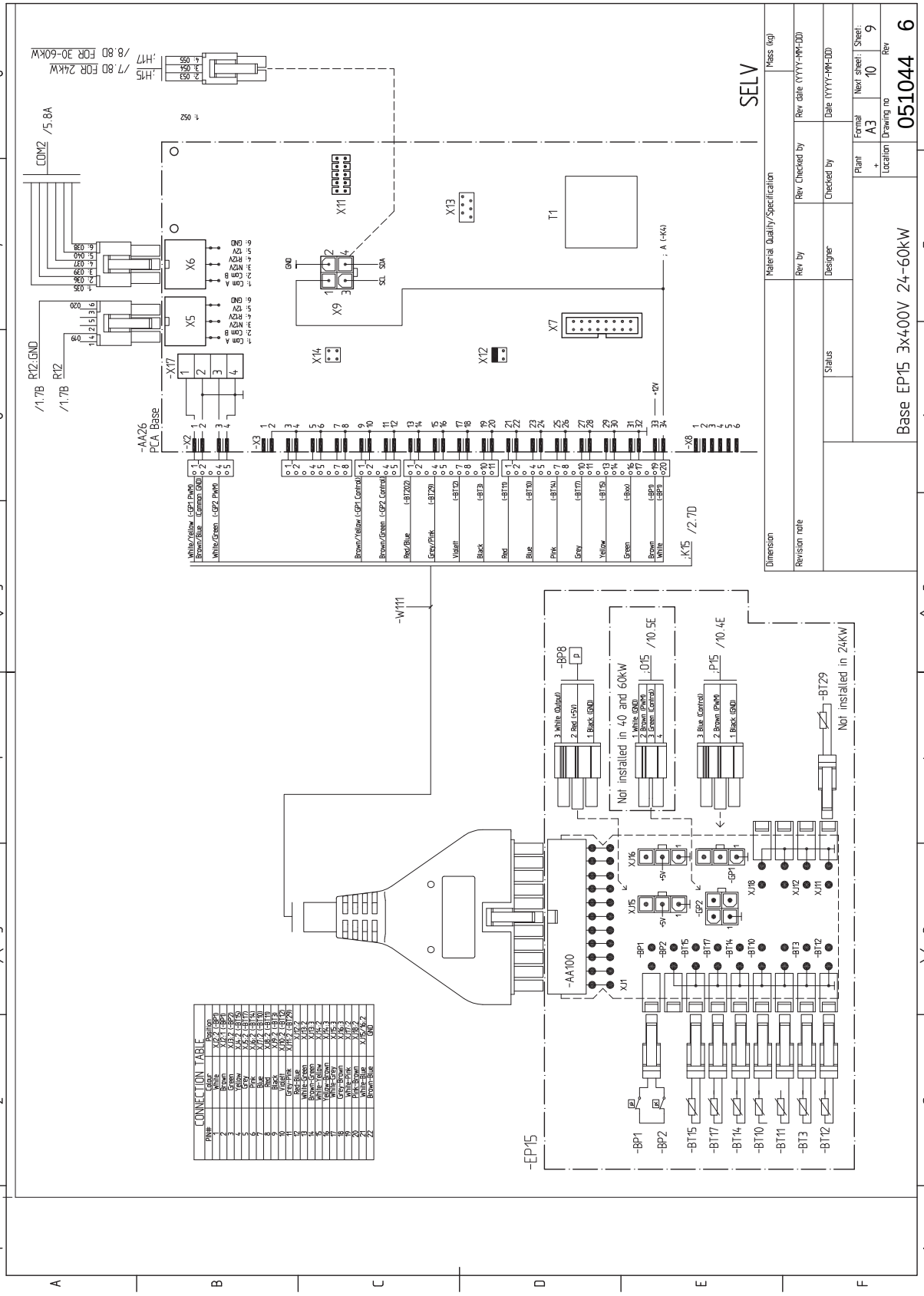
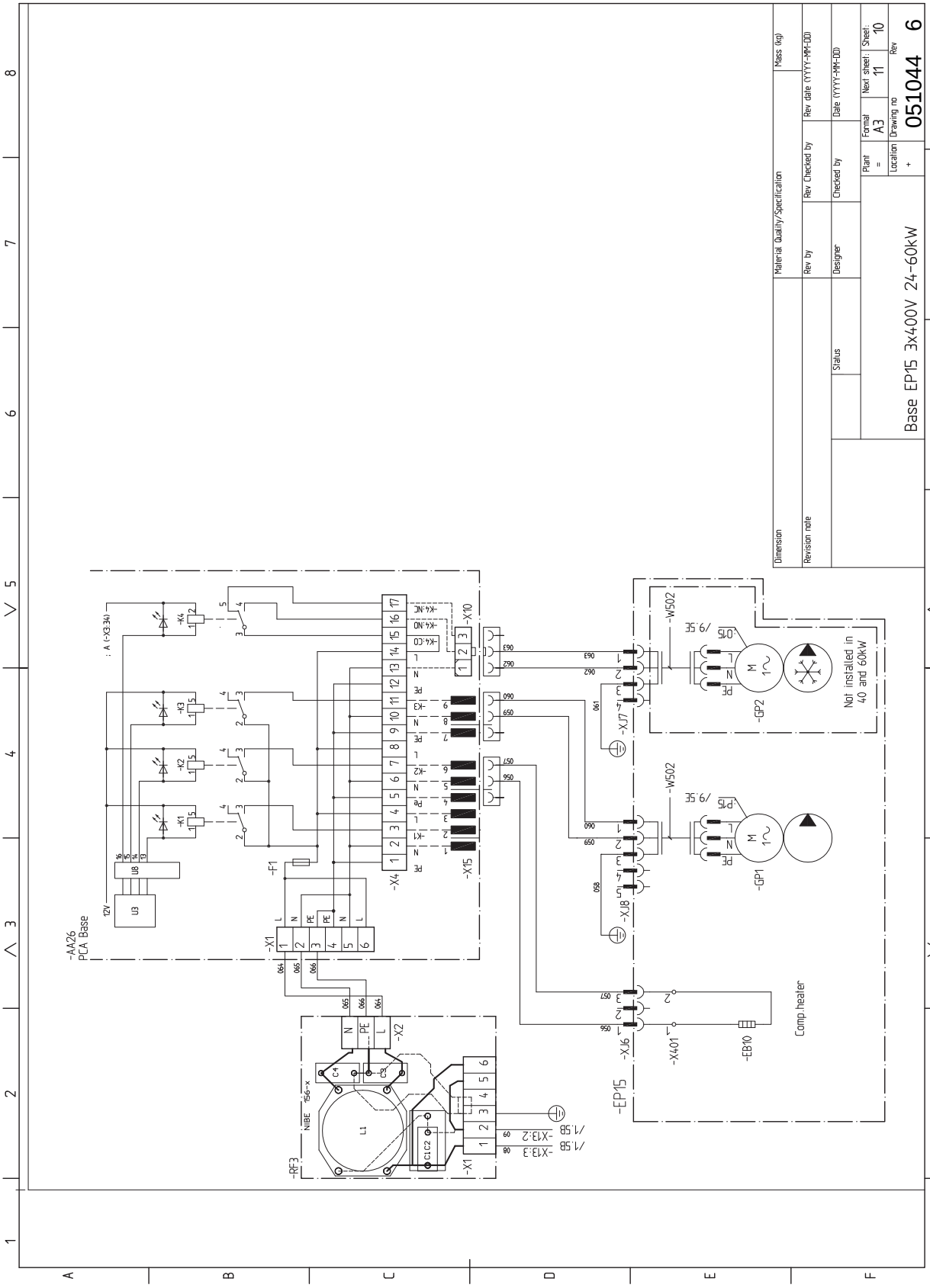
-PE401
-W301
-W302
-W304
-W401
-X401
CPU
Phase Sequence &
Voltage Detector


SELV
Base EP15 3x400V 24-60kW
051044 6
-AA26
PCA Base
-AA100
-EP15
-W111
-BP8
-BP1
-BP2
-BT15
-BT17
-BT14
-BT10
-BT11
-BT3
-BT12
-BT29
-GP1
-GP2
Not installed in 40 and 60kW
Not installed in 24kW
CONNECTION TABLE


Base EP15 3x400V 24-60kW
051044 6
Material Quality/Specification
Mass (kg)
Rev by
Rev Checked by
Rev date (YYYY-MM-DD)
Designer
Checked by
Date (YYYY-MM-DD)
Status
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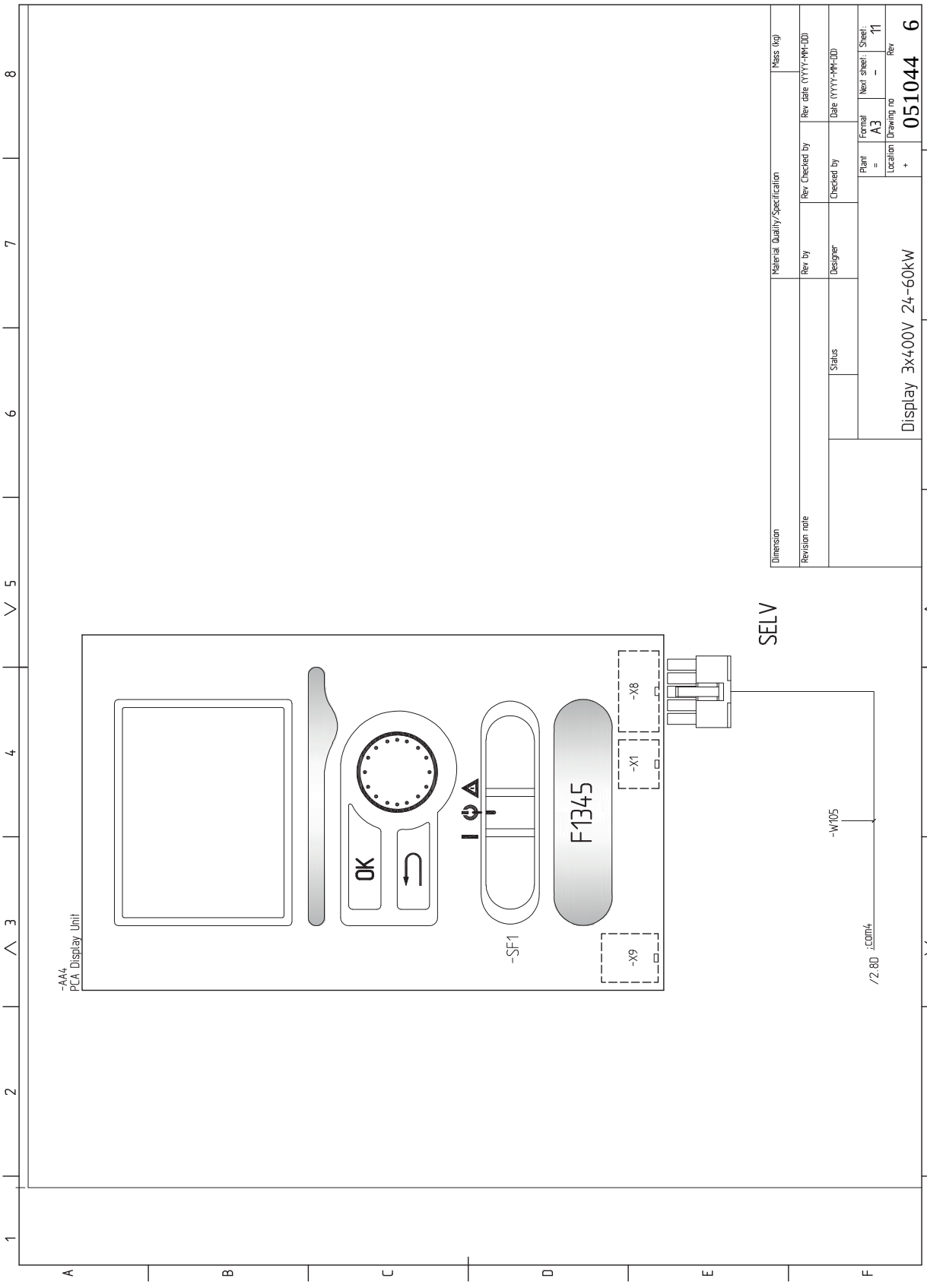
Location +
Drawing no
Rev
Dimension
Revision note
-AA26
PCA Base
-EP15
-GP1
-GP2
-EB10
-RF3
-X1
-X2
-X4
-X10
-X15
-X401
-W502
-F1
Not installed in 40 and 60kW
Comp.heater


-AA4
PCA Display Unit
OK
F1345
-SF1
-X8
-X1
-X9
SELV
-W105
/2.8D :com4
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)
Plant
=
Location
+
Format
A3
Next sheet
-
Sheet
11
Drawing no
051044
Rev
6
Display 3x400V 24-60kW

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