Installer Manual

Ground source heat pump
NIBE F1345

IHB EN 2344-1
731077

Table of Contents

Important information

Safety information

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

The manual must be left with the customer.

For the latest version of the product's documentation, see nibe.eu.

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

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

This is an original instruction manual. Translation is not allowed without approval from NIBE.

Rights to make any design or technical modifications are reserved.

		Min	Max
System pressure			
Heating medium	MPa (bar)	0.05 (0.5 bar)	0.6 (6 bar)
Brine	MPa (bar)	0.05 (0.5 bar)	0.6 (6 bar)
Temperature			
Heating medium[1]	°C	3	70
Brine	°C	-12	35

1 Compressor and additional heat

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

Water may drip from the safety valve's overflow pipe. The overflow pipe must be routed to a suitable drain, to prevent hot water splashes from causing harm. The overflow pipe must be inclined along its entire length to prevent pockets where water can accumulate, and must be frost-proof. The overflow pipe must be at least the same size as the safety valve. The overflow pipe must be visible and its mouth must be open and not placed close to electrical components.

The safety valves must be actuated regularly to remove dirt and to check that they are not blocked.

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

Electrical installation and wiring must be carried out in accordance with national provisions.

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

Symbols

Explanation of symbols that may be present in this manual.

CAUTION!

This symbol indicates danger to person or machine.

NOTE!

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

TIP!

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

Marking

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

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 close to locations where combustible gases could leak out.
If leaking gases collect around the unit, fire could break out.

Do not install the unit where corrosive gas (for example gas with sulphuric acid content) or combustible gas or steam (for example thinner and petroleum fumes) can be produced or collect, or where volatile combustible substances are handled.
Corrosive gas can cause corrosion to the heat exchanger, fractures 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 weighs more than 20 kg, it should be carried by two people. Wear safety gloves to reduce 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 switch off the power supply immediately after the operation has stopped.
Wait for 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.

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.

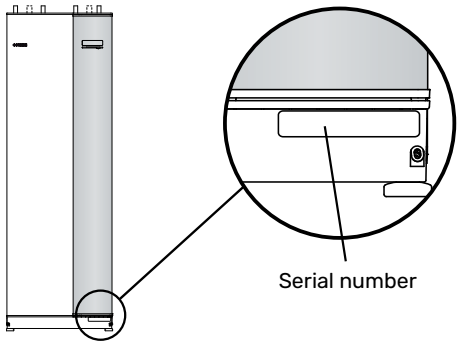
- When filling refrigerant, the refrigerant must always leave the bottle in liquid form.

- 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).



NOTE!

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 19)				
	Non-return valves			
	System flushed			
	System vented			
	Antifreeze			
	Level/Expansion vessel			
	Particle filter			
	Safety valves			
	Shut off valves			
	Circulation pumps set			
Climate system (page 20)				
	Non-return valves			
	System flushed			
	System vented			
	Expansion vessel			
	Particle filter			
	Safety valves			
	Shut off valves			
	Circulation pumps set			
Electricity (page 25)				
	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			

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°.

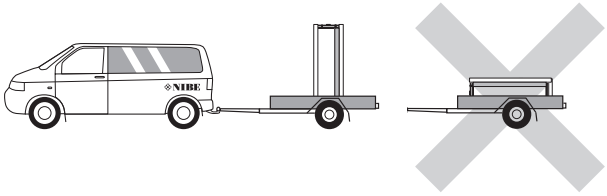
Ensure that F1345 has not been damaged during transport.

> **CAUTION!**
>
> The heat pump is top heavy.

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

> **CAUTION!**
>
> Ensure that the heat pump cannot fall over during transport.

Remove the outer panels in order to protect them when moving in confined spaces inside buildings.



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.

> **CAUTION!**
>
> 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.

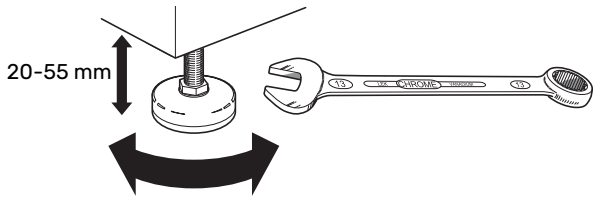
> **CAUTION!**
>
> The heat pump must not be moved when only the lower cooling module has been pulled out. If the heat pump is not secured in position the upper cooling module must always be removed before the lower one can be pulled out.

SCRAPPING

For scrapping, remove the product in reverse order.

Assembly

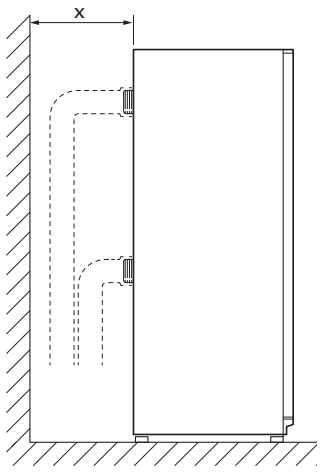
- Position F1345 on a solid foundation indoors that withstands water and the weight of the product.
- Use the product's adjustable feet to attain a horizontal and stable set-up.



- Since water comes from F1345, the area where F1345 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, and 150 mm above, the product. Approx. 50 mm free space is required on each side to allow the side panels to be removed. All service on F1345 can be carried out from the front, however the right-hand panel may need to be removed. Leave free space between the heat pump and the wall behind (and any routing of supply cables and pipes), to reduce the risk of any vibrations being propagated.

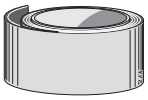


x Leave the required space for pipe installation.

Supplied components

Outdoor temperature sensor (BT1)
1 pcs

Temperature sensor (BT)
5 pcs



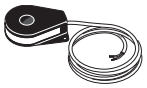
Insulation tape
1 pcs

Aluminium tape
1 pcs

Heat conduction paste
3 pcs

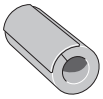
Safety valve (FL3)
0.3 MPa (3 bar)
1 pcs

O-rings
16 pcs

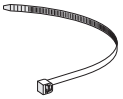


Current sensor (not 60 kW)
3 x

Tubes for sensors
4 pcs



Pipe insulation
8 pcs

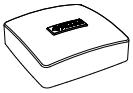


Cable ties
8 pcs

Non-return valves(RM1)
24 - 30 kW: 4 pcs G2 (internal thread)
40 - 60 kW: 2 pcs G2 (internal thread)

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

Brine pump(GP16) (only for 40 and 60 kW)
1 pcs



IPA 10 (AA34) (only for 40 and 60 kW)
1 pcs

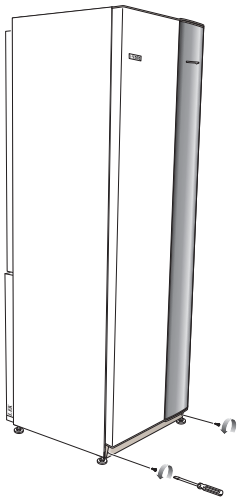
LOCATION

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

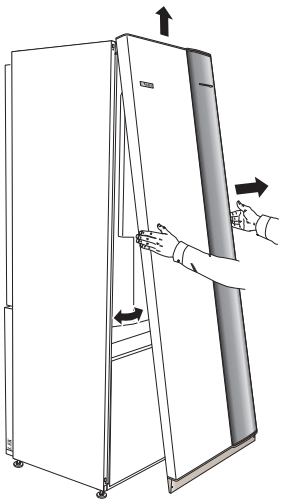
Removing the covers

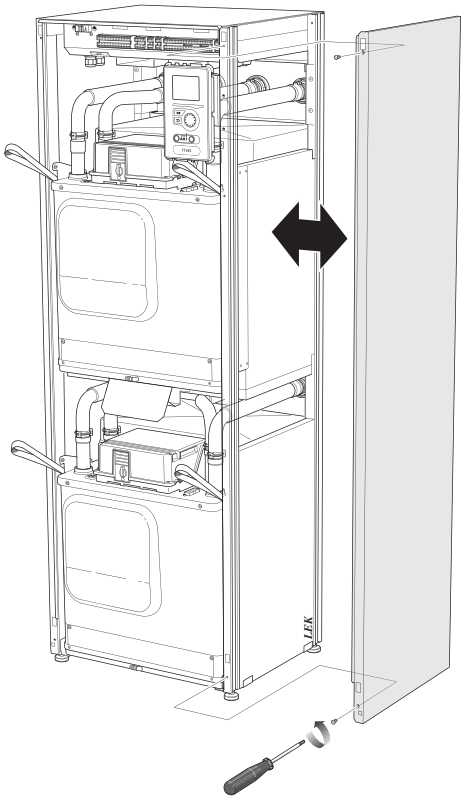
FRONT COVER

1. Remove the screws from the lower edge of the front panel.



2. Lift the panel out at the bottom edge and up.
3. Pull the panel towards yourself.





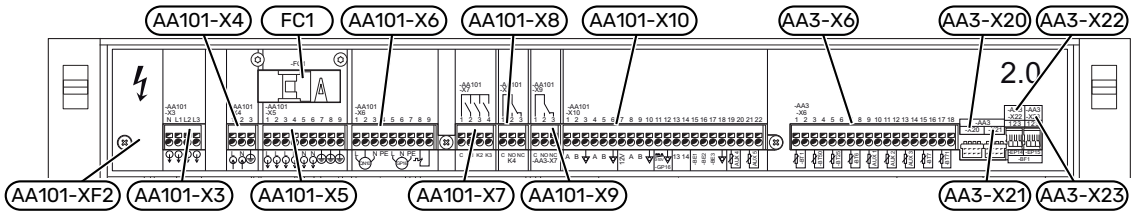
4. Assembly takes place in the reverse order.

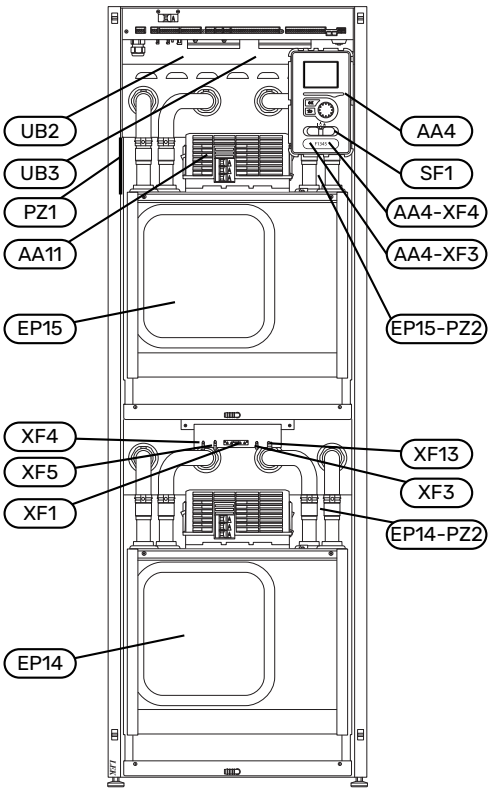
SIDE PANELS

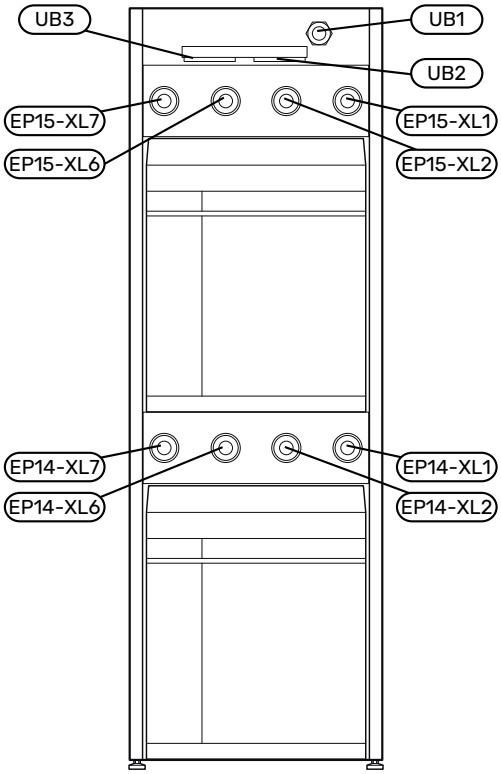
1. Remove the screws from the upper and lower edges.
2. Twist the panel slightly outwards.
3. Move the panel outwards and backwards.

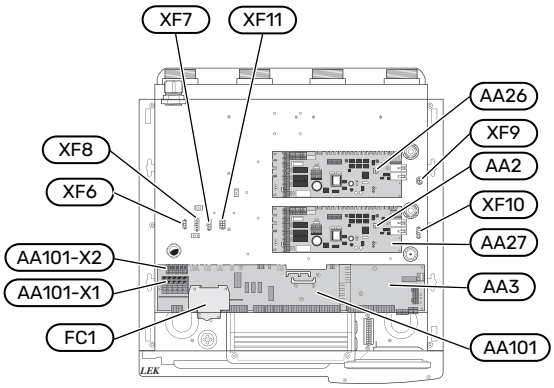
The heat pump design

General









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 (inverter-controlled)
EP15	Cooling module

SENSORS ETC.

BP12	Pressure sensor, exhaust air duct
BP13	Pressure sensor, filter
BP14	Pressure sensor, fan

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
AA26	Base board 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, control 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-X7	Terminal block, step-controlled or shunted additional heat
AA101-X8	Emergency mode relay
AA101-X9	Alarm relay, AUX relay
AA101-X10	Communication, PWM, power supply
FC1	Miniature circuit-breaker
SF1	Switch
XF1	Connector, electrical supply to compressor, cooling module -EP14
AA101-XF2	Connector, electrical supply to compressor, cooling module -EP15
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

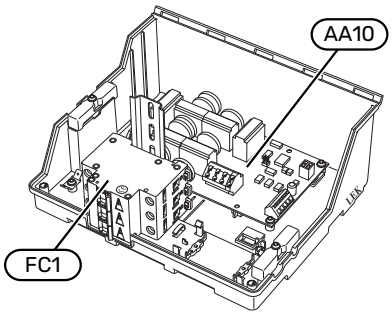
MISCELLANEOUS

PZ1	Rating plate
PZ2	Identification plate, cooling module
UB1	Cable gland, incoming electricity
UB2	Cable gland, power
UB3	Cable gland, signal

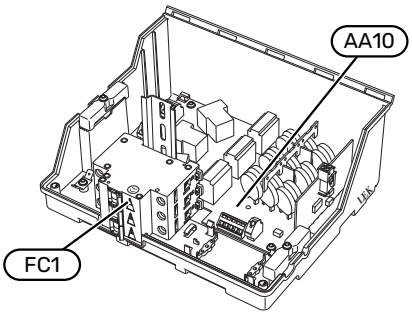
Designations according to standard EN 81346-2.

Motor module (AA11)

F1345 24 KW



F1345 30, 40 AND 60 KW

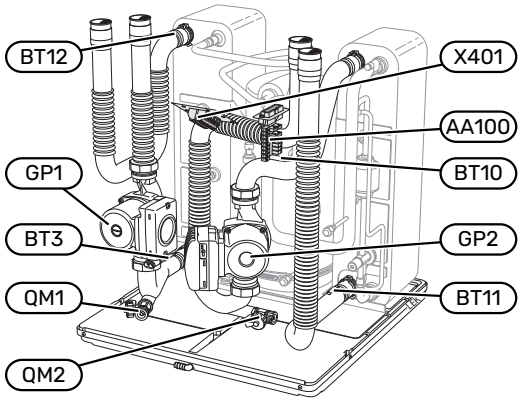


ELECTRICAL COMPONENTS

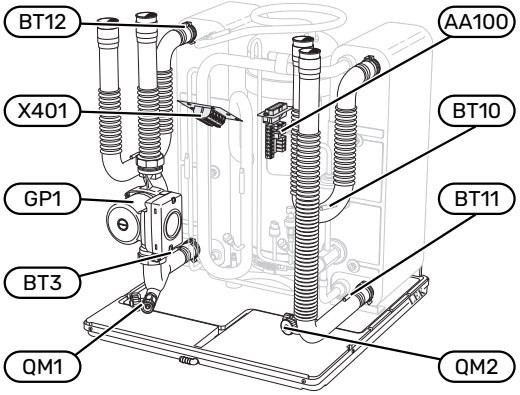
AA10	Soft-start card
FC1	Miniature circuit-breaker

Cooling module

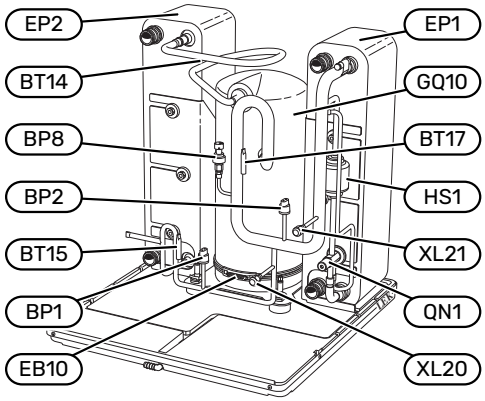
F1345 24 and 30 kW, 3x400 V



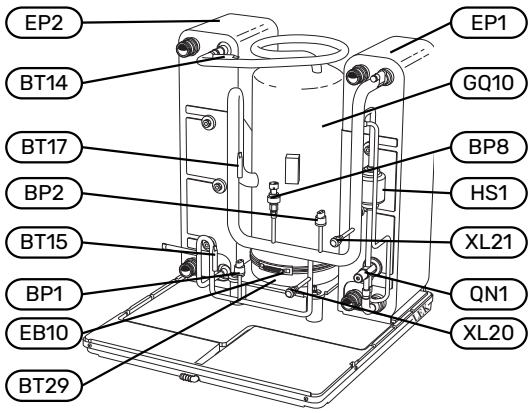
F1345 40 AND 60 KW, 3X400 V



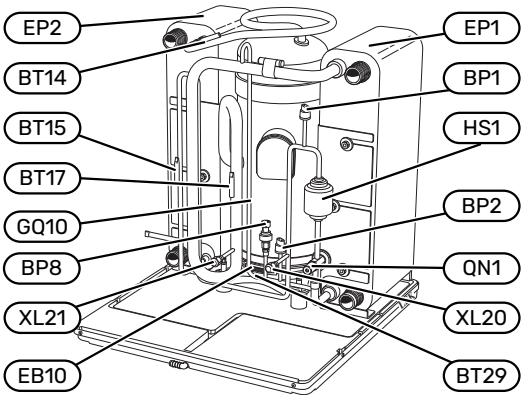
F1345 24 kW, 3x400 V



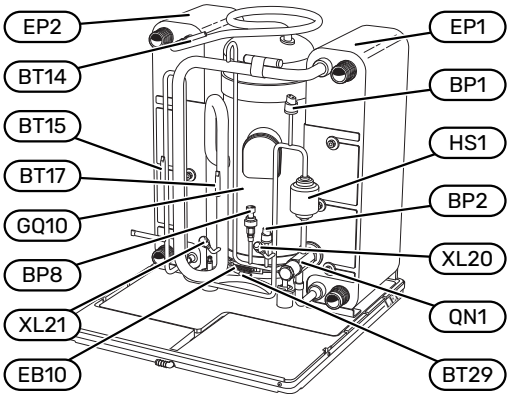
F1345 30 kW, 3x400 V



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
X401	Joint connector, compressor and motor module

COOLING COMPONENTS

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

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.

The pipe connections are on the rear of the heat pump.

NOTE!

Ensure that incoming water is clean. When using a private well, it may be necessary to supplement with an extra water filter.

NOTE!

Any high points in the climate system, must be equipped with air vents.

CAUTION!

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

CAUTION!

Water may drip from the safety valve's overflow pipe. The overflow pipe must be routed to a suitable drain, to prevent hot water splashes from causing harm. The overflow pipe must be inclined along its entire length to prevent pockets where water can accumulate, and must be frost-proof. The overflow pipe must be at least the same size as the safety valve. The overflow pipe must be visible and its mouth must be open and not placed close to electrical components.

CAUTION!

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

Compression ring coupling alternatively pressure connection should be used.

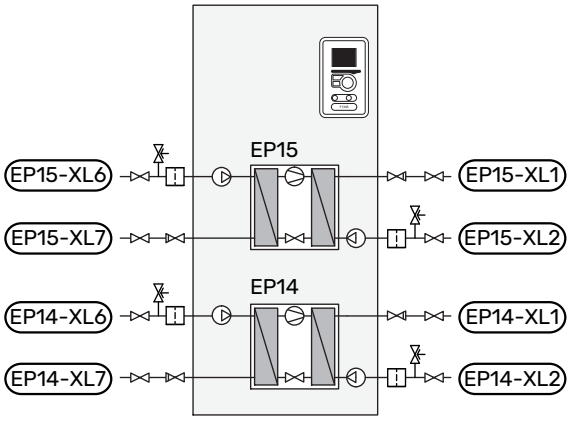
CAUTION!

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

SYSTEM DIAGRAM

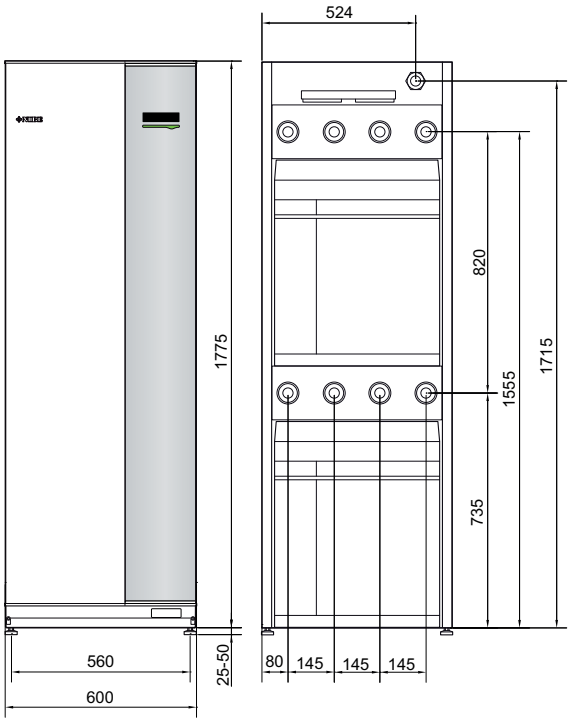
F1345 consists of two cooling modules, circulation pumps and control system with the option for additional heating, where applicable. F1345 is connected to the brine and heating medium circuits.

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.

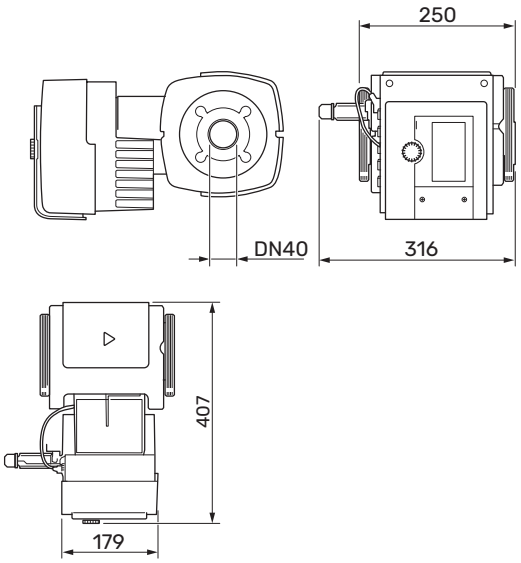


EP14	Cooling module
EP15	Cooling module
XL1	Connection, heating medium flow
XL2	Connection, heating medium return
XL6	Connection, brine in
XL7	Connection, brine out

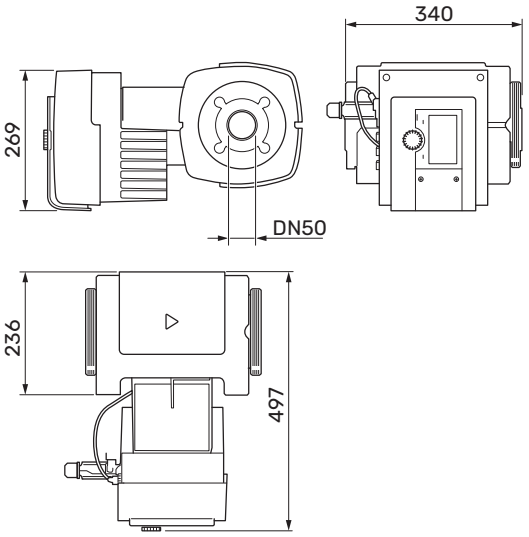
Dimensions and pipe connections

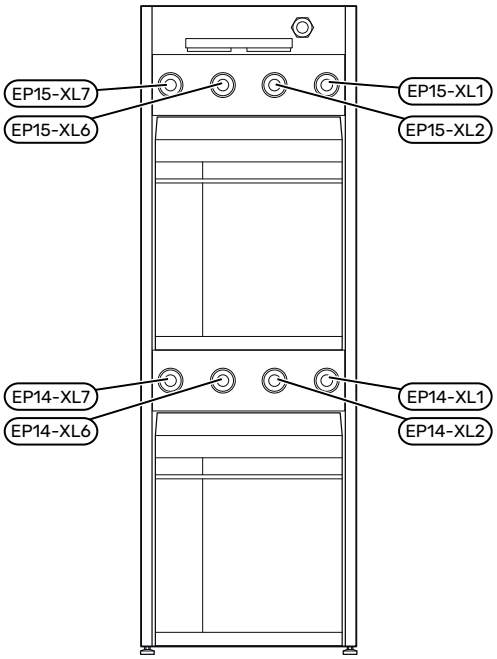


Enclosed brine pump (GP16) 40 kW



Enclosed brine pump (GP16) 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
(GP16) brine pump 40 kW	compression ring coupling ø 42mm
(GP16) brine pump 60 kW	compression ring coupling ø 54mm

Brine side

COLLECTOR

> NOTE!
> 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.

> NOTE!
> 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

Insulate all indoor brine pipes against condensation.

Mark the brine system with the antifreeze that is used.

Install as follows:

- expansion vessel

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

- enclosed safety valve (FL3)

  Install the safety valve next to the expansion vessel as illustrated.

- pressure gauge
- shut-off valves

  Install the shut-off valves as close to the cooling modules as possible.

- enclosed particle filter (HQ1, HQ2)

  Install the particle filters as close as possible to F1345 on the incoming pipe.

- vent valve

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

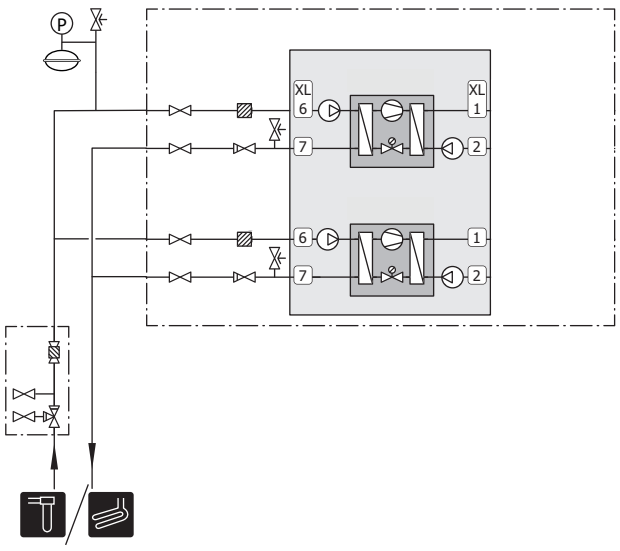
- enclosed non-return valves (RM1)

  Install the non-return valves on the outgoing pipe.

- safety valves

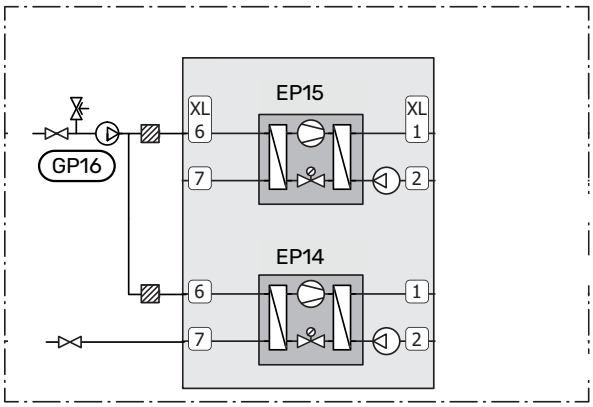
  Install the safety valves on the outgoing pipe, as close to the cooling modules as possible.

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.



CONNECTING THE ENCLOSED BRINE PUMP (ONLY F1345-40 AND 60 KW)

Install the brine pump (GP16) at the connection for incoming brine (EP14-XL6) and (EP15-XL6) between the heat pump and the shut-off valve.



> **CAUTION!**
>
> Insulate the brine pump against condensation (do not cover the drainage hole).

EXPANSION VESSEL

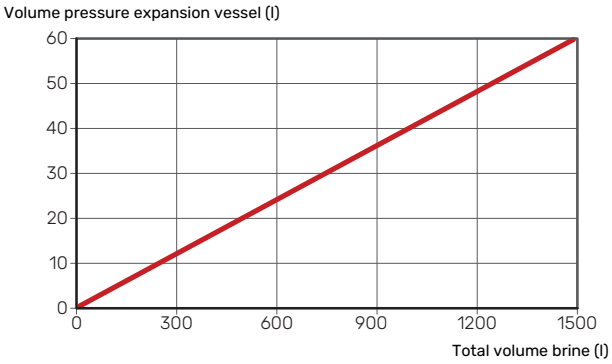
The brine circuit must be supplied with a pressure expansion vessel.

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

Dimension the pressure expansion vessel in accordance with 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).

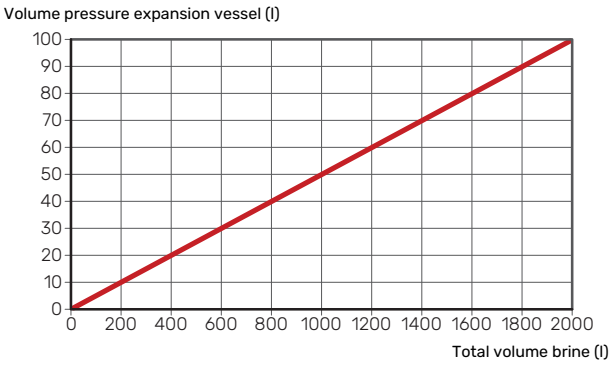
Ethanol 28% (volume percent)

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.



Climate system

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

CONNECTING THE CLIMATE SYSTEM

Install as follows:

- expansion vessel
- pressure gauge
- safety valves

  The maximum opening pressure is 0.6 MPa (6.0 bar). Install the safety valves as illustrated.

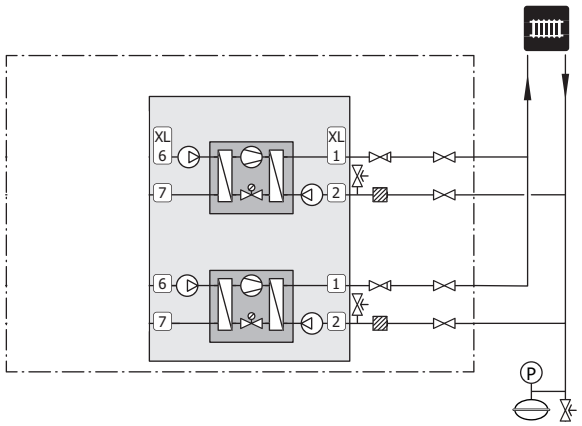
- enclosed particle filter (HQ3, HQ4)(DN40)
- shut-off valves

  Install the shut-off valves as close to the cooling modules as possible.
- vent valve

  When necessary you should install vent valves in the climate system.
- enclosed non-return valves (RM1)
- When connecting to a system with thermostats, either a bypass valve must be fitted or, alternatively, some of the thermostats must be removed to ensure there is sufficient flow and heat emission.

NOTE!

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

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

The settings for hot water are made in menu 5.1.1.

Connecting the hot water heater

Install as follows:

- controlling hot water sensor (BT6)

  The sensor is placed in the middle of the water heater.
- displayed hot water sensor (BT7) [1]

  The sensor is optional and is placed in the top of the water heater.
- shut-off valve
- non-return valve
- pressure relief valve

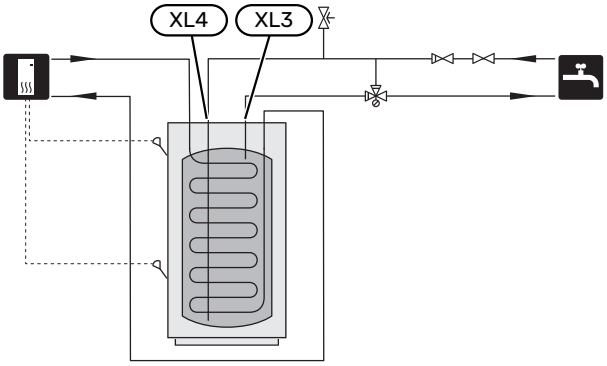
  The safety valve must have an opening pressure of max. 1.0 MPa (10.0 bar).
- mixing valve

  A mixer valve must also be installed, if the factory setting for hot water is changed. National regulations must be observed.

1 The sensor is factory fitted on some water heater/accumulator tank models from NIBE.

NOTE!

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



Installation alternative

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

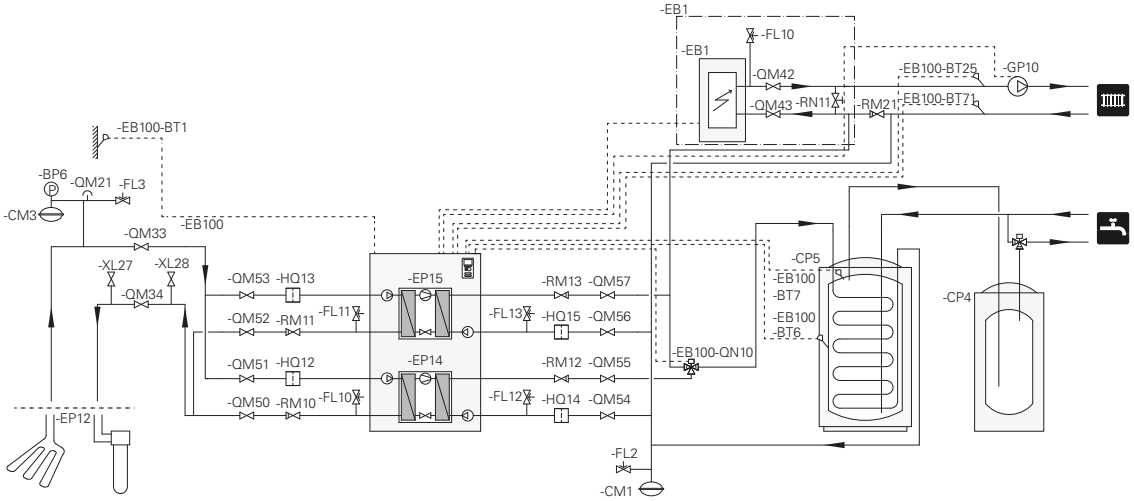
Further information about the options is available at nibe.eu and in the manuals for the accessories used. See page 44 for the list of the accessories that can be used with F1345.

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

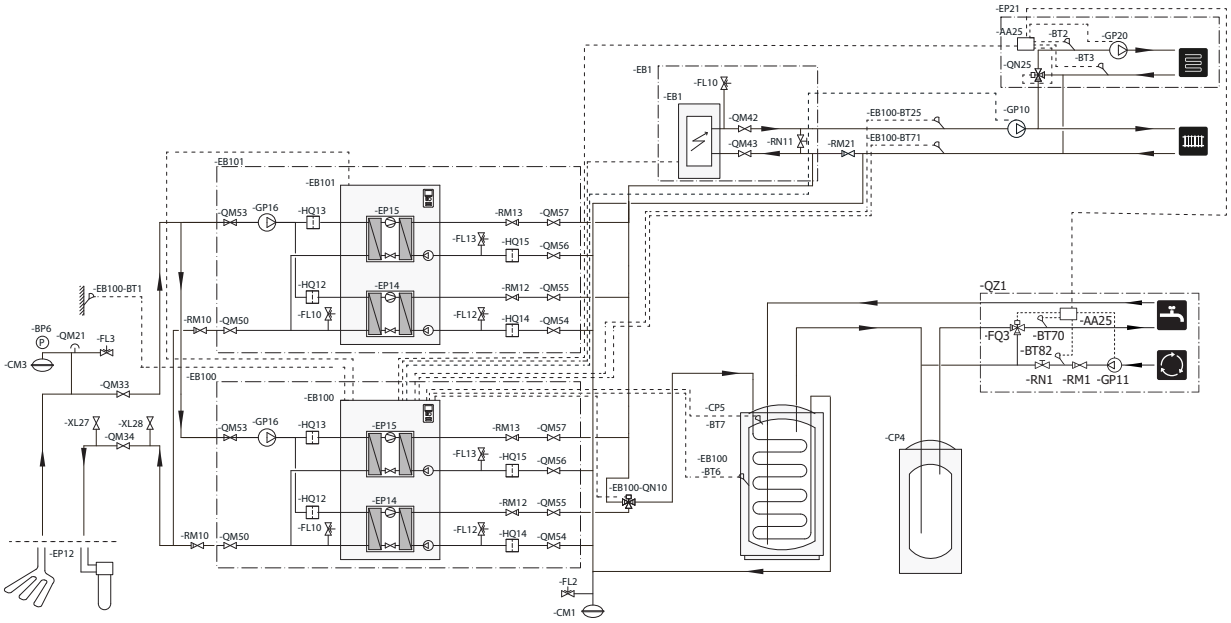
F1345 -24 and 30 kW docked with electric additional heat and hot water heater (floating condensing)



The heat pump (EB100) prioritises charging of hot water with a cooling module (EP14) via 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 heating demand, cooling module (EP15) starts first. If there is a greater demand, cooling module (EP14) also starts for heating operation.

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

Two F1345-40 and/or 60 kW docked with electric additional heating 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, the cooling module (EP15) starts first in the heat pump (EB101). In the event of a large demand, the cooling module (EP14) also starts in (EB101) for heating operation.

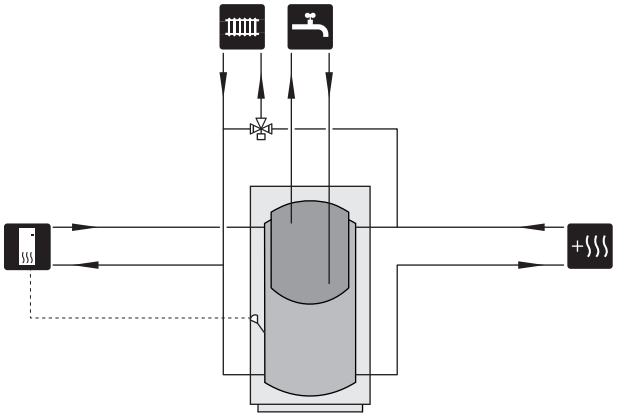
Additional heat (EB1) is connected automatically, when the energy requirement exceeds the heat pump's capacity.

FIXED CONDENSING

If the heat pump is to work towards an accumulator tank with fixed condensing, you must connect an external supply temperature sensor (BT25). The sensor is placed in the tank.

The following menu settings are made:

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



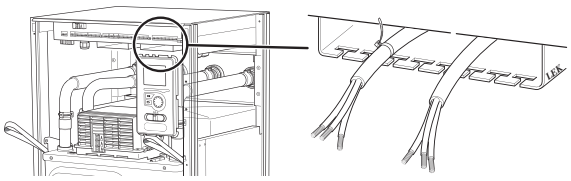
Electrical connections

General

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

For 40 kW 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.
- F1345 must be installed via an isolator switch. The cable area has to be dimensioned based on the fuse rating used.
- If a miniature circuit breaker is used this should have at least motor characteristic “C”. See page 47 for fuse size.
- Electrical wiring diagram for the heat pump, see page 55.
- 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).



CAUTION!

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

CAUTION!

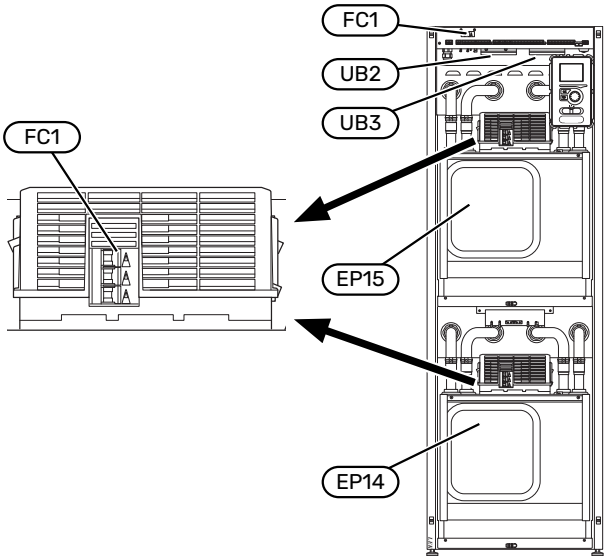
Electrical installation and service must be carried out under the supervision of a qualified electrician. Cut the current with the circuit breaker before carrying out any servicing. Electrical installation and wiring must be carried out in accordance with the stipulations in force.

CAUTION!

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

CAUTION!

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



MINIATURE CIRCUIT-BREAKER

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

Fuse (EP14-FC1) and (EP15-FC1) cut the power to the relevant compressor, if the current becomes too high.

Resetting

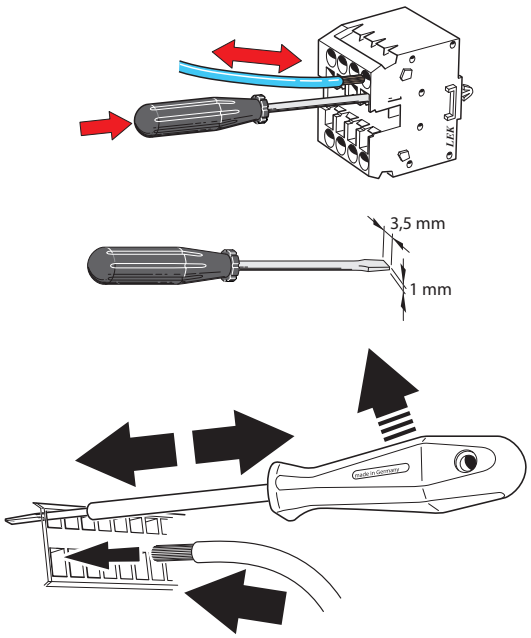
Fuse (EP14-FC1) and (EP15-FC1) are accessible behind the front cover. The miniature circuit breakers affected are reset by pushing back to the fused position.

NOTE!

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

CABLE LOCK

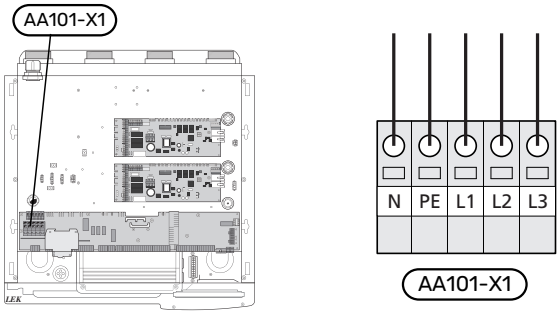
Use a suitable tool to release/lock cables in the heat pump terminal blocks.



Connections

POWER CONNECTION

Enclosed cable for incoming supply electricity is connected to terminal block X1.



> **CAUTION!**
>
> 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.

EXTERNAL CONTROL VOLTAGE FOR THE CONTROL SYSTEM

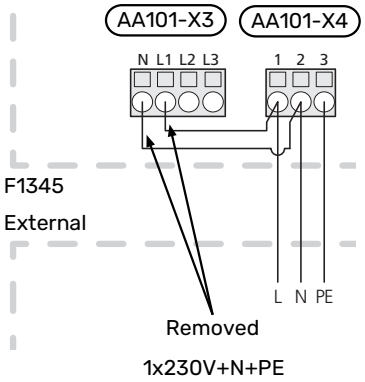
If the control system is to be powered separately from the other components in the heat pump (e.g. for tariff control), a separate operating cable must be connected.

> **CAUTION!**
>
> During service, all supply circuits must be disconnected.

> **CAUTION!**
>
> Mark up any junction boxes with warnings for external voltage.

Remove the cables between terminal block AA101-X3:N and AA101-X4:2 as well as between terminal block AA101-X3:L1 and AA101-X4:1 (see illustration).

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



TARIFF CONTROL

If the voltage to the compressors is lost for a certain period, "tariff blocking" must be selected via the electable inputs, see section "Possible selection for AUX inputs".

CONNECTION OF ENCLOSED BRINE PUMP (GP16)

> **CAUTION!**
> Only applies to F1345-40 kW and 60 kW.

The enclosed IPA 10 (AA34) is installed between the heat pump and the circulation pump (GP16) for communication.

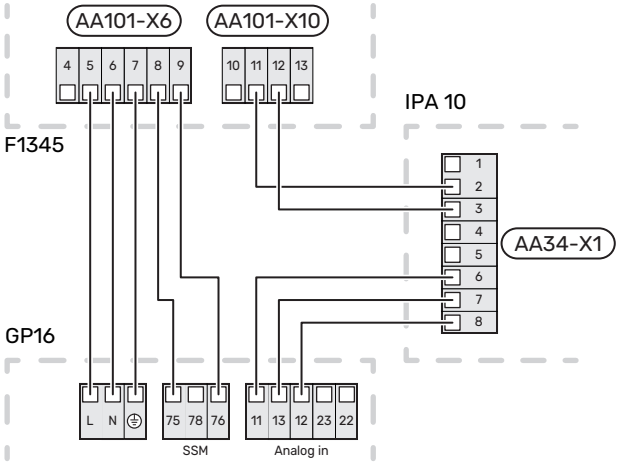
IPA 10 is installed on the wall and the cable length between IPA 10 and the circulation pump (GP16) must not exceed 2 metres. The cable must be screened between IPA 10 and the circulation pump (GP16) if the length exceeds 2 metres.

Connect the circulation pump (GP16) to F1345 on AA101-X6:5 (230 V), AA101-X6:6 (N), AA101-X6:7 (PE), AA101-X6:8 (75) and AA101-X6:9 (76).

Connect the circulation pump to IPA 10 on AA34-X1:6 (11), AA34-X1:7 (13) and AA34-X1:8 (12).

Connect IPA 10 to F1345 on AA101-X10:11 (2) and AA101-X10:12 (3).

See section "Setting the enclosed brine pump (GP16)" för commissioning the brine pump.

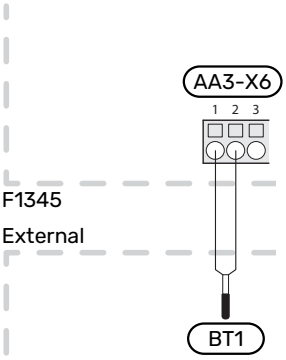


OUTDOOR TEMPERATURE SENSOR (BT1)

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

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.

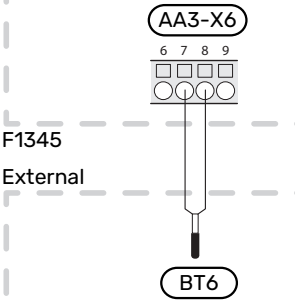


TEMPERATURE SENSOR, HOT WATER CHARGING (BT6)

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.

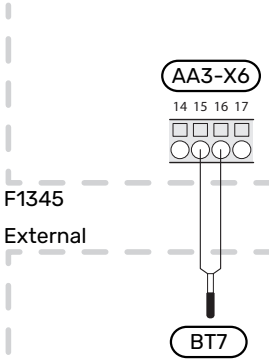
Hot water charging is activated in menu 5.2 or in the start guide.



TEMPERATURE SENSOR, HOT WATER TOP (BT7)

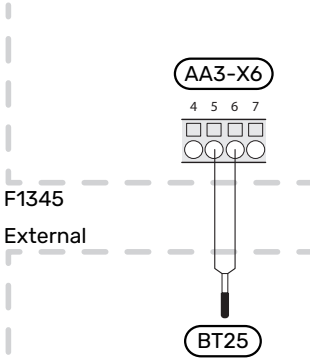
A temperature sensor for hot water top (BT7) can be connected to F1345 to display the water temperature at the top of the tank (if possible).

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.



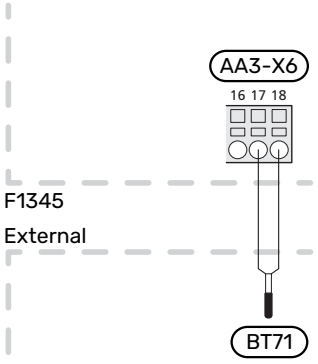
EXTERNAL SUPPLY TEMPERATURE SENSOR (BT25)

Connect external supply temperature sensor (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.



EXTERNAL RETURN LINE SENSOR (BT71)

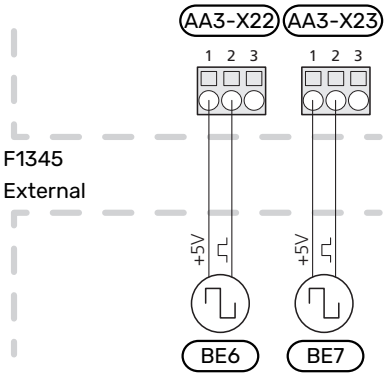
Connect external return line sensor (BT71) to terminal block (AA3-X6:17) and (AA3-X6:18). Use a twin core cable with a cable area of at least 0.5 mm².



EXTERNAL ENERGY METER

> **CAUTION!**
> 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

Multiple heat pumps can be interconnected, by selecting one of the heat pumps as the 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.

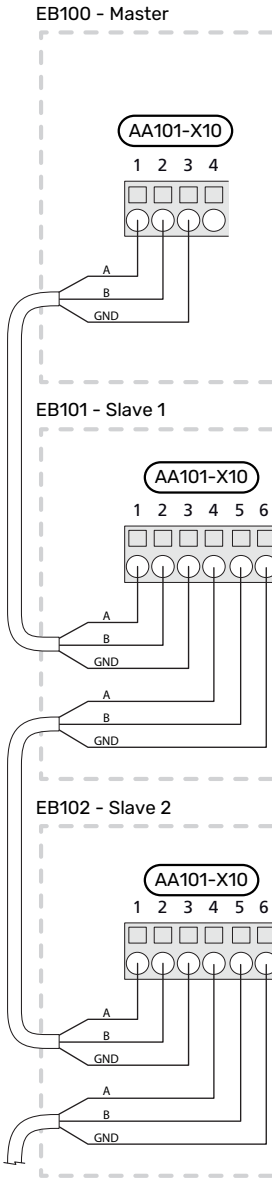
External temperature sensors and control signals must be connected solely to the master, except for external control of the compressor module and reversing valve(s) (QN10) that can be connected one to each heat pump. See page 33 for connecting the reversing valve (QN10).

> **CAUTION!**
> 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.

Outgoing 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.



LOAD MONITOR

Load monitor with current sensor

When many power-consuming products are connected in the property at the same time as the compressor and/or the electric additional heat is operating, there is a risk of the property's main fuses tripping.

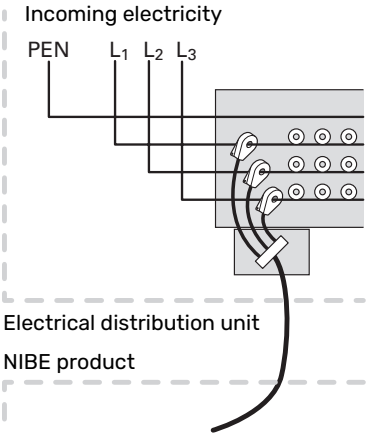
F1345 has a load monitor that, with the aid of a current sensor, controls the power steps for the external electric additional heat by disconnecting from the electric additional heat step-by-step in event of overload in a phase.

Reconnection occurs when the other current consumption is reduced.

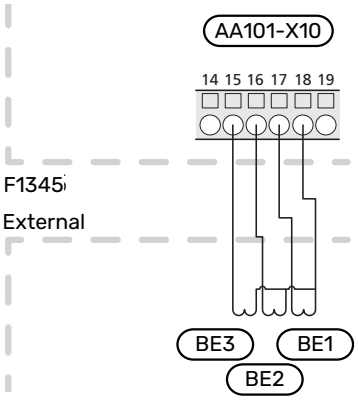
Connection and activation of current sensors

> **CAUTION!**
> The incoming current must not exceed 50 A and the voltage from the current sensor to the input board must not exceed 3.2 V. At a higher current/voltage, the enclosed current sensors are replaced with the accessory CMS 10-200.

1. Install a current sensor on each incoming phase conductor into the electrical distribution unit. This is best done in the electrical distribution unit.
2. 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.



3. 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.



4. Specify the size of the property's main fuse in menu 5.1.12 - "addition".

ROOM SENSOR

F1345 can be supplemented with a room sensor (BT50). The room sensor has a number of functions:

1. Shows current room temperature in the display on F1345.
2. Option of changing the room temperature in °C.
3. Provides the option of fine-tuning the room temperature.

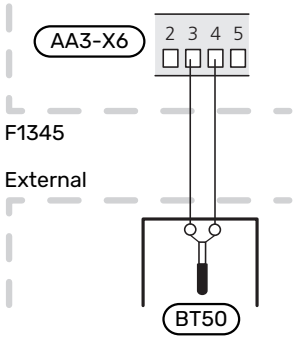
Install the sensor in a neutral position where the set temperature is wanted.

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 prevented from measuring the correct room temperature, for example by being located in a recess, between shelves, behind a curtain, above or close to a heat source, in a draught from an external door or in direct sunlight. Closed radiator thermostats can also cause problems.

F1345 operates without the room sensor, but if you want to read the home's indoor temperature from the display on F1345, the sensor must be fitted. Connect the room sensor to X6:3 and X6:4 on the input board (AA3).

If the room temperature sensor will have a controlling function, it is activated in menu 1.9.4 - " room sensor settings".

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.



NOTE!

Changes of temperature in accommodation take time. For example, short time periods in combination with underfloor heating will not give a noticeable difference in room temperature.

STEP CONTROLLED ADDITIONAL HEAT

> **CAUTION!**
> Mark up any junction boxes with warnings for external voltage.

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

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

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

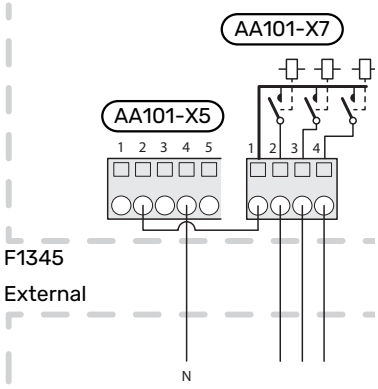
Step 1 is connected to terminal block AA101-X7:2.

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.



> **NOTE!**
> 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

> **CAUTION!**
> 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.

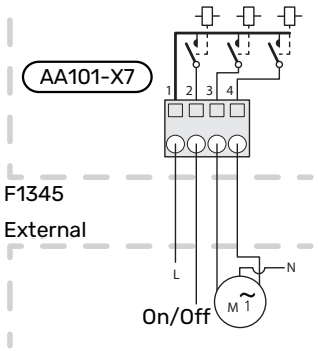
The connection requires that the boiler sensor (BT52) is connected to one of the AUX inputs in F1345, see page 34. The sensor is only selectable when "shunt controlled add. heat" is selected in menu 5.1.12.

F1345 controls a shunt valve and start signal for the additional heat using three relays. If the installation cannot 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) adjusts to ensure that the true supply temperature corresponds with the control system's theoretically calculated set point value. When the heating demand drops sufficiently, so additional heat is no longer required, the shunt (QN11) closes completely. The 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.

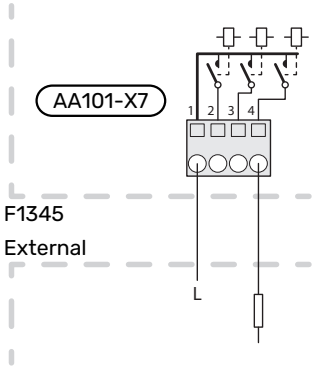
ADDITIONAL HEAT IN TANK

> **CAUTION!**
> 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.



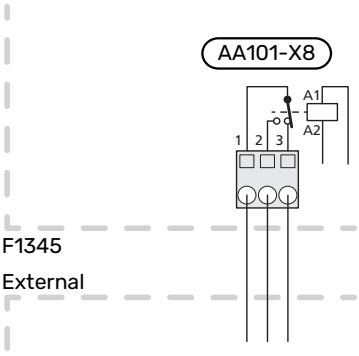
All additional heat can be blocked by connecting a potential-free switch function to AUX input on terminal block AA3-X6 and AA101-X10. The function must be activated in menu 5.4.

RELAY OUTPUT FOR EMERGENCY MODE

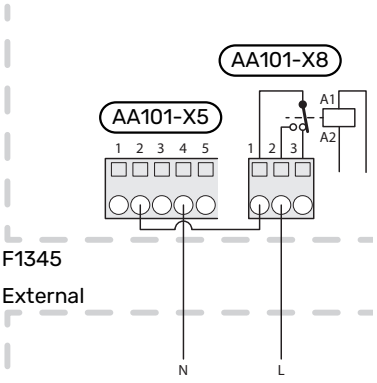
> **CAUTION!**
> Mark up any junction boxes with warnings for external voltage.

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.



> **NOTE!**
> No hot water is produced when emergency mode is activated.



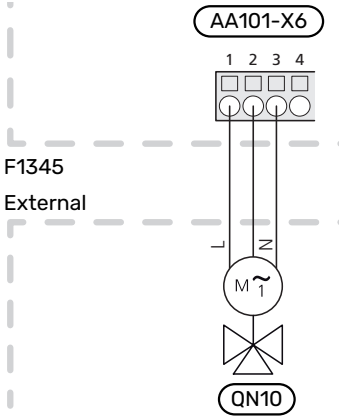
> **NOTE!**
> If the relays are to be used for operating voltage, bridge the supply from AA101-X5:1 - 3 to AA101-X8:1. Connect the neutral from the external additional heat to AA101-X5:4 - 6.

REVERSING VALVES

F1345 can be supplemented with an external reversing valve (QN10) for hot water control (see page 44 for accessories).

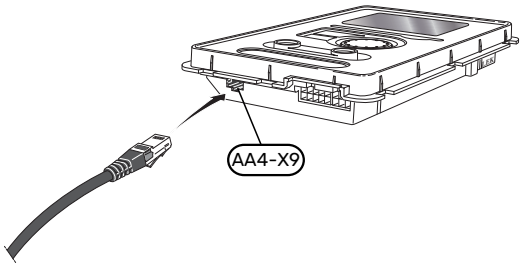
Connect the external reversing valve (QN10) to terminal block AA101-X6:3 (N), AA101-X6:2 (operation) and AA101-X6:1 (L), as illustrated.

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.



MYUPLINK

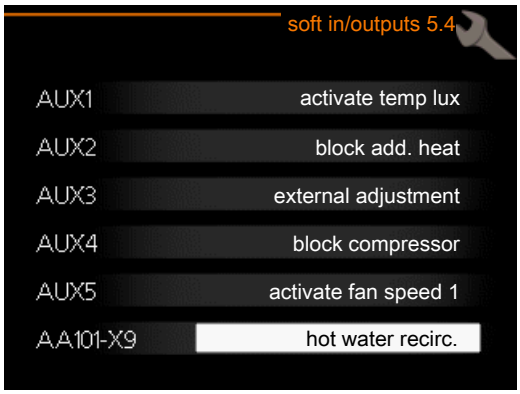
Connect a network-connected cable (straight, Cat.5e UTP) with RJ45 contact (male) to contact AA4-X9 on the display unit (as illustrated). Use the cable grommet (UB3) on the heat pump for cable routing.



EXTERNAL CONNECTION OPTIONS (AUX)

F1345 has software-controlled AUX inputs and outputs for connecting the external switch function (contact has to be potential-free) or sensor.

In menu 5.4 - "soft in/outputs", you select the AUX connection to which each function has been connected.



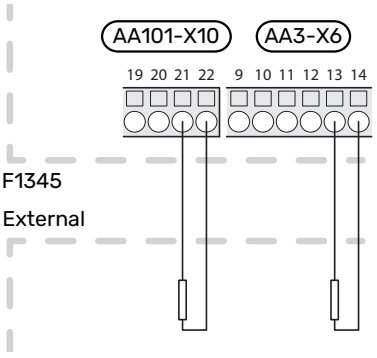
For certain functions, accessories may be required.

> **TIP!**
>
> Some of the following functions can also be activated and scheduled via menu settings.

Selectable inputs

Selectable inputs on terminal blocks (AA3) and (AA101) for these functions are:

AUX1	AA3-X6:9-10
AUX2	AA3-X6:11-12
AUX3	AA3-X6:13-14
AUX4	AA101-X10:19-20
AUX5	AA101-X10:21-22



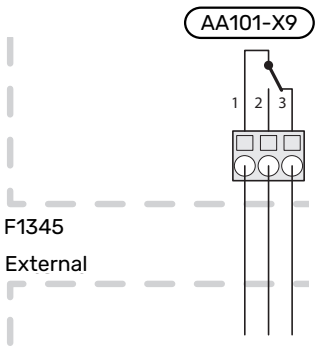
The example above uses the inputs AUX3 (AA3-X6:13-14) and AUX5 (AA101-X10:21-22) on the terminal block.

Selectable outputs

A selectable output is AA101-X9.

The output is a potential-free switching relay.

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



> **NOTE!**
>
> The relay output may be subjected to a max load of 2 A at resistive load (230 V~).

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

Possible selection for AUX inputs

Temperature sensor

Available options are:

- boiler (BT52) (only shown if shunt-controlled additional heat is selected in menu 5.1.12 - " internal electrical addition")
- cooling/heating (BT74), determines when it is time to switch between cooling and heating mode (selectable when the cooling function is activated in menu 5.2.4 - "accessories").

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

  When the cooling/heating sensor (BT74) has been connected and activated in menu 5.4, no other room sensor can be selected in menu 1.9.5 - "cooling settings".
- external return line sensor (BT71)

Monitor

Available options are:

- alarm from external units.
  The alarm is connected to the control, which means that the malfunction is shown as an information message in the display. Potential free signal of type NO or NC.
- level monitor[1] / pressure switch / flow monitor for brine.
  - Blocks the entire installation, a specific heat pump or compressor module (NO/NC).
- pressure switch for climate system (NC).
- stove monitor for accessory ERS.
  Stove monitor is a thermostat that is connected to the chimney. When the negative pressure is too low, 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*

1 (Accessory NV10)

Setting the value for the change is performed in menu 1.9.2 - "external adjustment".

- activation of one of four fan speeds.

  (Can be selected if ventilation accessory is activated.)

  The following options are available:

  - "activate fan speed 1 (NO)" - "activate fan speed 4 (NO)"
  - "activate fan speed 1 (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

> **NOTE!**
>
> 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 heating and/or compressor in F1345 at certain times of the day (can be selected in menu 4.1.5 - "SG Ready" after the function is activated). Activate the function by connecting potential free switch functions to two inputs as selected in menu 5.4 - "soft in/outputs" (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.

- *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.

> **CAUTION!**
>
> 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

Indications

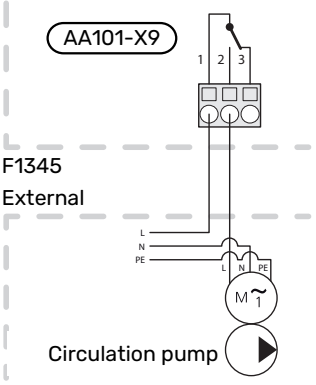
- alarm
- common alarm
- cooling mode indication (only applies if there are cooling accessories)
- holiday

Control

- ground water pump
- circulation pump for hot water circulation
- external heating medium pump
- additional heat in charge circuit

> **CAUTION!**
>
> The relevant distribution box must be marked with a warning about external voltage.

An external circulation pump is connected to the AUX output, as illustrated below. If the pump has to work in the event of alarm, the cable is moved from position 2 to position 3.



NOTE!

For relay position operation, see section “Relay output for emergency mode”, see page 32.

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.

Commissioning and adjusting

Preparations

1. Check that the switch (SF1) is in position "⏻".
2. Check that the externally mounted filling valves are fully closed.

> **NOTE!**
>
> Check the miniature circuit-breaker and the motor protection breakers. They may have tripped during transportation.

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

Filling and venting

Filling the climate system

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 vent 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.

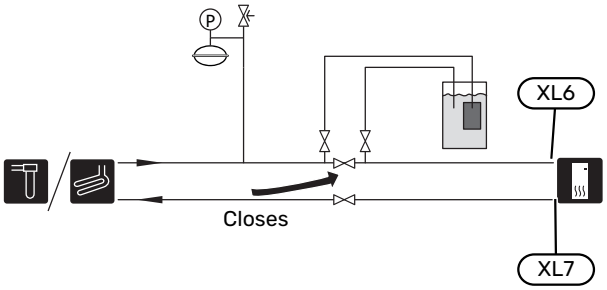
Venting the climate system

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.

FILLING AND VENTING THE BRINE SYSTEM

When filling the brine system, mix the water with antifreeze 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.



Symbol key

Symbol	Meaning
	Shut-off valve
	Expansion vessel
	Pressure gauge
	Safety valve

Start-up and inspection

START GUIDE

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

> **CAUTION!**
>
> 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, you can 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

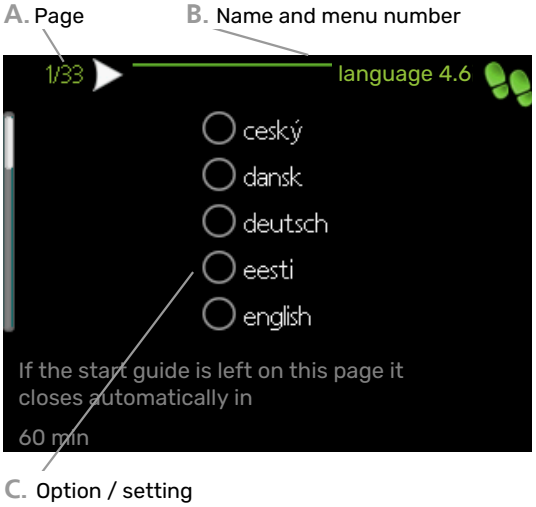
The first time the installation is started a start guide is started. The start guide instructions state what needs to carried out at the first start together with a run through of the installation's basic settings.

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

> **NOTE!**
>
> 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.

> **NOTE!**
>
> At start-up of F1345-30 to 60kW, preheating of the compressors starts. Preheating continues until the temperature sensor BT29 is stable 10 degrees greater than sensor BP8 (for F1345-60kW this can take up to 12 hours).
>
> See the info menu for more information.

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.

SETTING PUMP SPEEDS

Pump adjustment, automatic operation

Brine side F1345-24/30 kW

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.

Climate system

To set the correct flow in the climate 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 demand that it be run manually, in which case the correct speed must be set.

This automatic control takes place 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 obtained. During heating operation, the set DOT (dimensioned outdoor temperature) and temperature difference 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 F1345-24/30 kW

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.

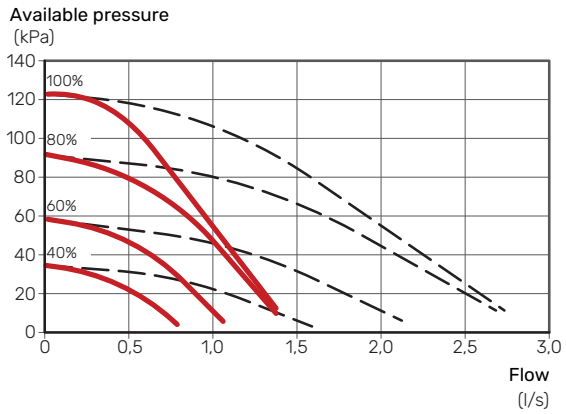
> **NOTE!**
>
> When an accessory for passive cooling is used, the brine pump speed must be set in menu 5.1.9.

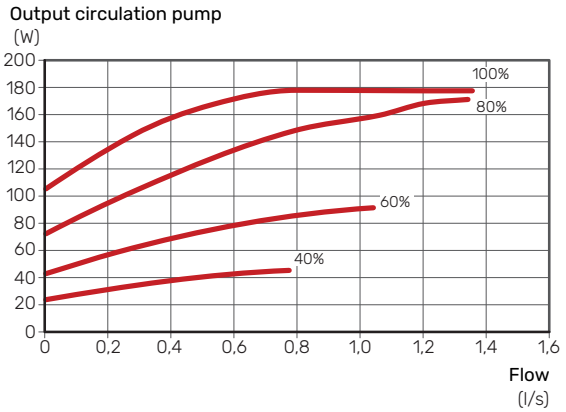
Set the pump speed when the system has come into balance (ideally 5 minutes after compressor start).

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 temperature difference is obtained. A large difference indicates a low brine flow and a small difference indicates a high brine flow.

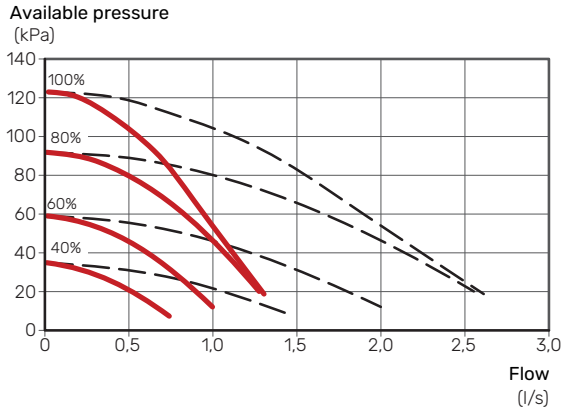
1 circulation pump
2 circulation pumps

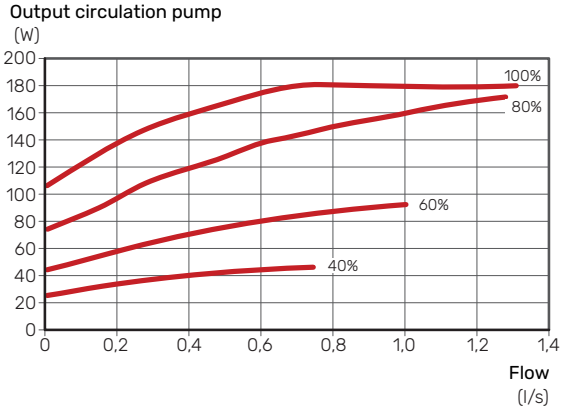
F1345 24 kW





F1345 30 kW



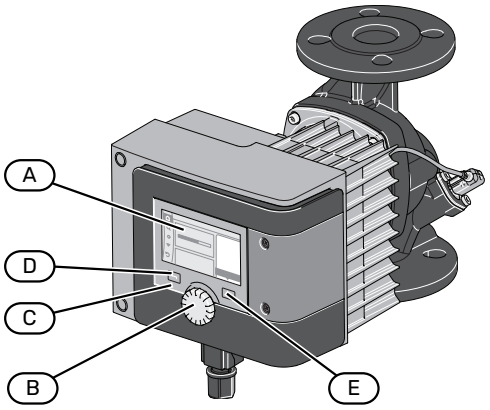


Brine side F1345-40/60 kW

Setting the enclosed brine pump (GP16)

In order configure the enclosed brine pump (GP16), the following settings in the brine pump display are required.

Display unit



A Display	Instructions and settings are shown on the display. You can easily navigate between different menus and options to make settings or to obtain information.
B Control knob	The control knob can be turned to the right or left. You can: • scroll in menus and between options. • increase and decrease the values.
C Status lamp	The status lamp lights up blue when the configuration has been successfully completed. Otherwise, the lamp is not lit.
D Enter	Confirm the selection by pressing the button.
E Setting	Bring up the menu for more settings.

Commissioning

TIP!
The first time the installation is started, a start guide is launched. In the start guide, you select the language you want in the display.

1. Select "Start venting".
2. Vent the brine circuit and wait until the procedure is completed after approx. 10 minutes. Repeat if necessary.
3. Select the "Start with factory settings" menu.

Menu settings - control via analogue input

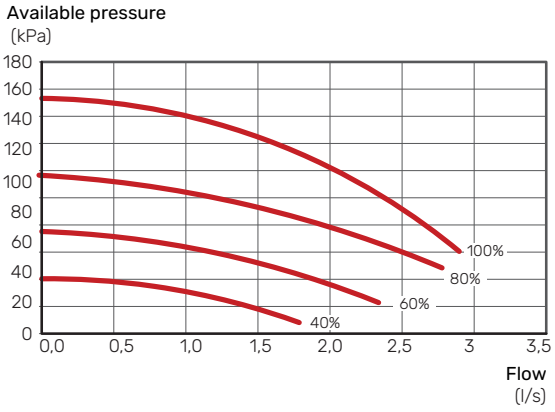
1. Go to the "Settings" menu.
2. Select option "Set auto control".
3. Select option "Settings assistant".
4. Select option "Basic control modes".
5. Select option "Speed n".
6. Return to the home screen by pressing and holding in the Enter button for a couple of seconds.
7. Check that a blue lamp under the Enter button lights up to confirm that the configuration has been completed successfully.

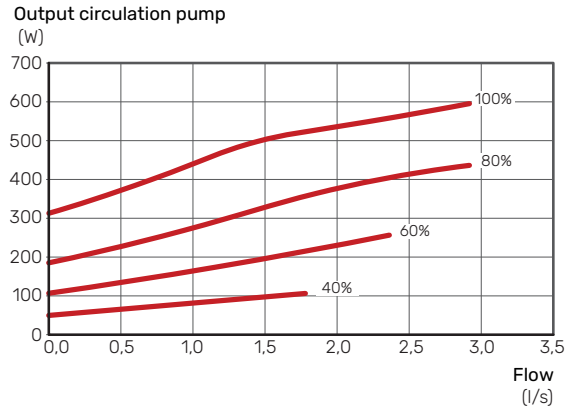
Configuration for analogue input

1. Go to the "Settings" menu.
2. Select option "External interfaces".
3. Select option "Function analogue input".
4. Select option "AI1" or "AI2", depending on which input the signal cable has been installed in.
5. Select option "Set analogue input".
6. Select option "Setpoint controller".
7. Select the option "0-10V".
8. Select option "Use specifications".
9. Select option "Overview of analogue input".
10. Check which signal is sent to the circulation pump and the corresponding pump speed.
11. Go back to the home screen by pressing and holding theEnter button for a couple of seconds.
12. Go back to the "Settings" menu.
13. Select option "Set auto control".
14. Select option "Setpoint speed".
15. Press the settings button.
16. Select "Setpoint of external source".
17. Select the same analogue input that was selected in step 4.
18. Return to the home screen by pressing and holding in the Enter button for a couple of seconds.
19. Check that the selected analogue input is the one that is shown on the display.

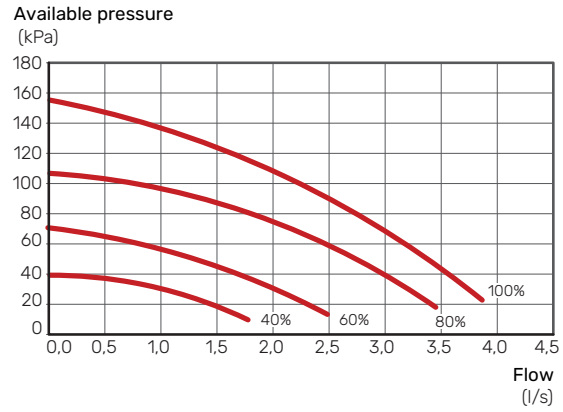
1 circulation pump

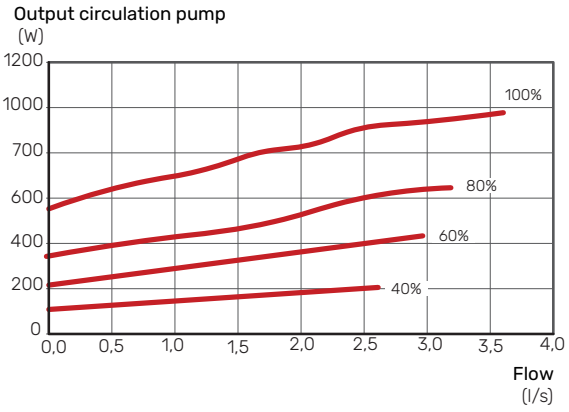
F1345 40 kW





F1345 60 kW





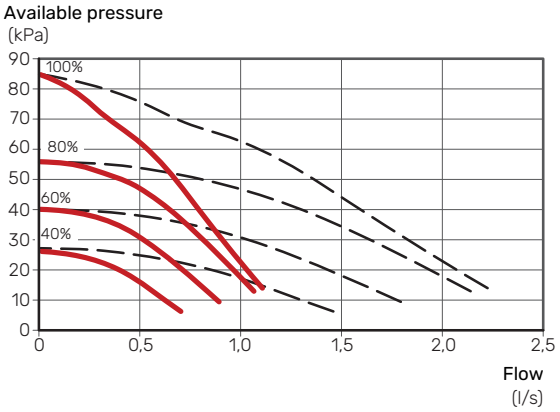
Climate system

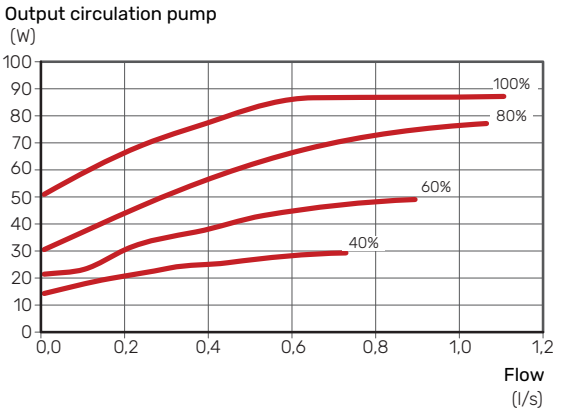
F1345 has heating medium pumps that can be automatically controlled. For manual operation: deactivate “auto” in menu 5.1.11 and then set the speed according to the diagrams below.

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 large difference indicates a low heating medium flow and a small difference indicates a high heating medium flow.

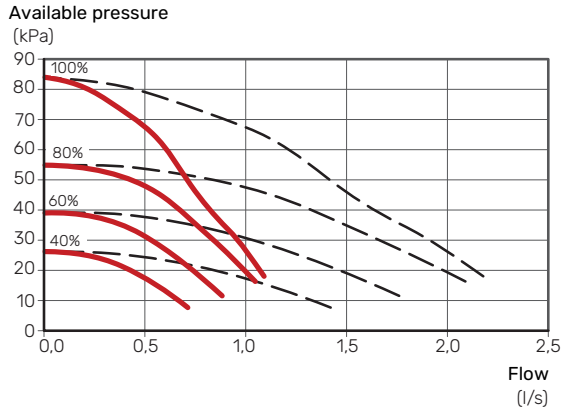
1 circulation pump
2 circulation pumps

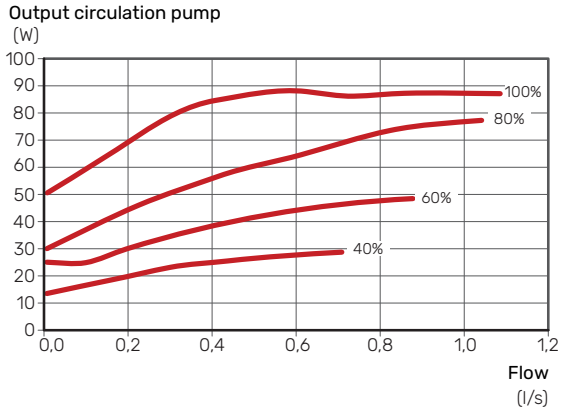
F1345 24 kW



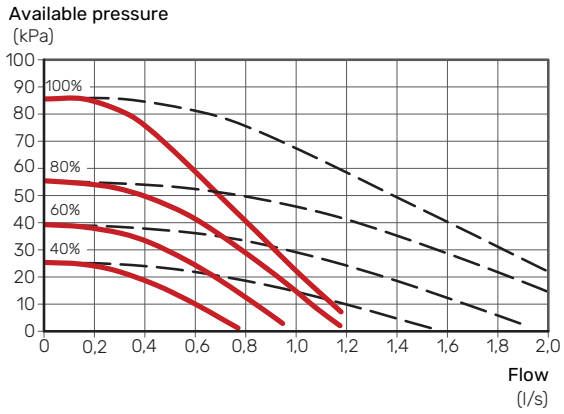


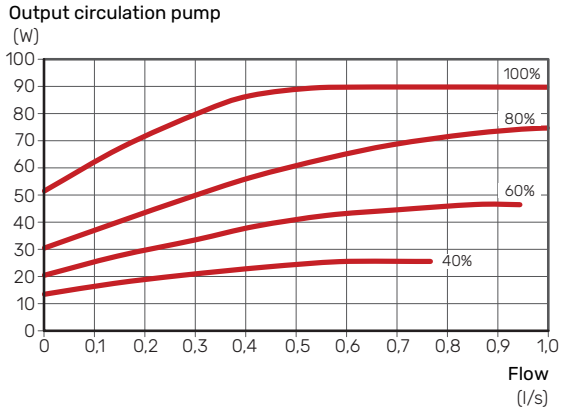
F1345 30 kW



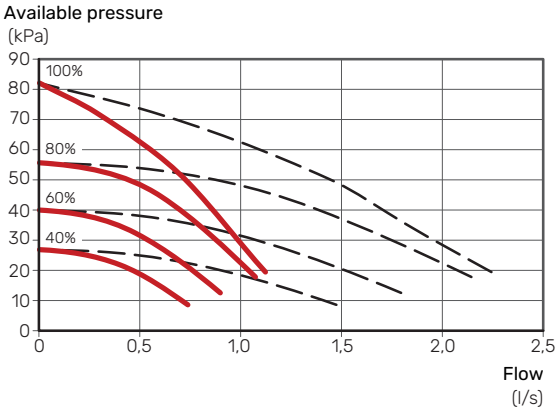


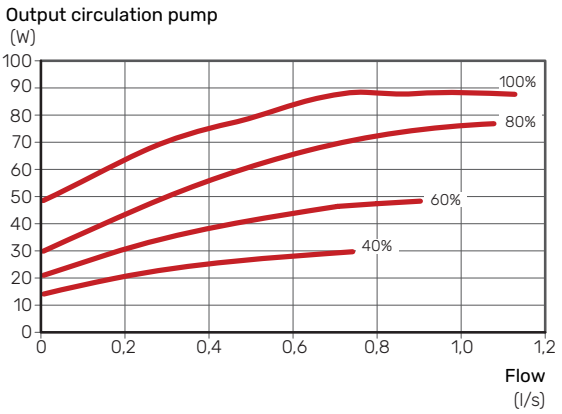
F1345 40 kW





F1345 60 kW



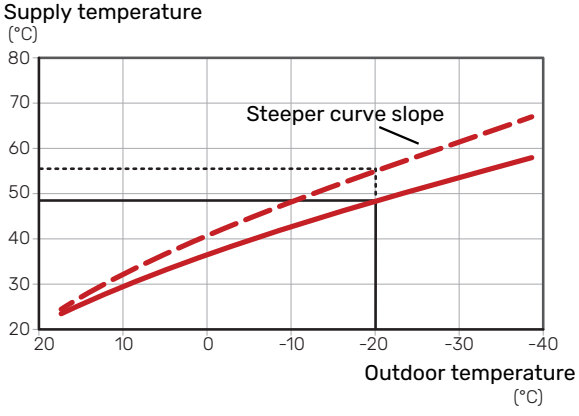


Setting the heating curve

In the menu "heating curve", you can see the heating curve for your house. The task of the curve is to provide an uniform 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.



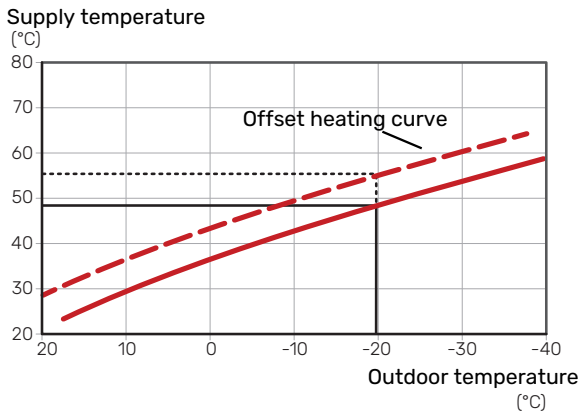
The optimum curve slope depends on the climate conditions and the lowest dimensioned outdoor temperature (DOT) in your location, whether the house has radiators, fan coils or underfloor heating and how well insulated the house is.

For houses with radiators or fan coils, a higher curve (e.g. curve 9) is appropriate, for houses with underfloor heating, a lower curve (e.g. curve 5) is appropriate.

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

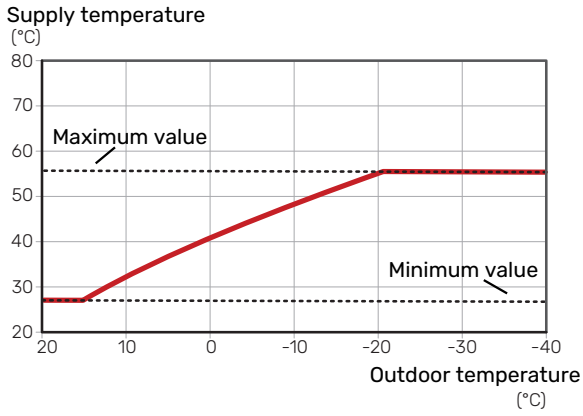
CURVE OFFSET

An offset of the heating curve means that the supply temperature changes 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 supply temperature cannot be calculated higher than the set maximum value or lower than the set minimum value, the curves flatten out at these temperatures.



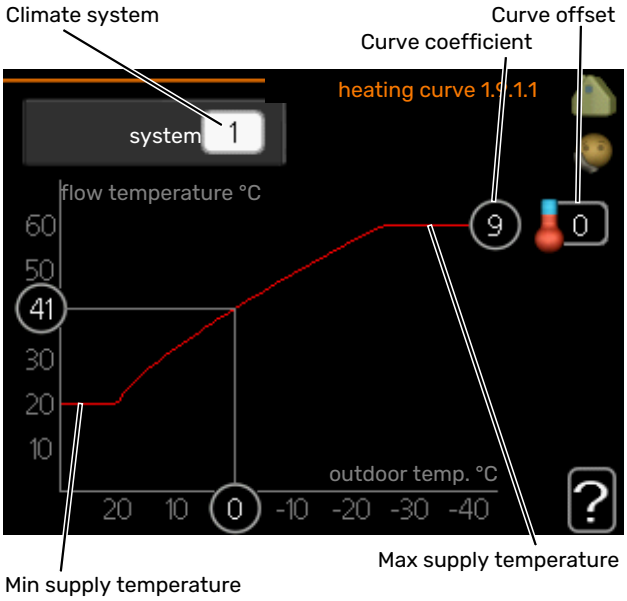
NOTE!

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

NOTE!

With underfloor cooling, "Min. supply temp. cooling" must be restricted to prevent condensation.

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.

NOTE!

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.

NOTE!

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.

Accessories

Detailed information about the accessories and complete accessories list available at nibe.eu.

Not all accessories are available on all markets.

ACTIVE/PASSIVE COOLING IN 4-PIPE SYSTEM ACS 45

Part no 067 195

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

DOCKING KIT SOLAR 42

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

Part no 067 153

IMMERSION HEATER IU

3 kW
Part no. 018 084

6 kW
Part no. 018 088

9 kW
Part no. 018 090

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

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

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

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

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

GAS ACCESSORY

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

Gas boiler GBM 10-15
Part no. 069 122

Communications module OPT 10
Part no. 067 513

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

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

CONNECTION BOX K11

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

Part no. 018 893

ASSEMBLY SYSTEM FMS

In systems where both the compressors are working to the same demand, 2 x packs of FMS 40 are required.

In systems where the lower compressor is used for hot water production or pool, 1 x pack of FMS 40 and 1 x pack of FMS 42 are required.

FMS 40
Part no. 067 792

FMS 42
Part no. 067 793

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

FILLING VALVE KIT KB

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

KB 32 (max. 30 kW)
Part no. 089 971

ROOM UNIT RMU 40

The room unit is an accessory with a built-in room sensor, which 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

ROOM SENSORRTS 40

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

Part no. 067 065

SOLAR PACKAGE NIBE PV

NIBE PV is a modular system comprising solar panels, assembly parts and inverters, which is used to produce your own electricity.

CURRENT SENSOR CMS 10-200

Current sensor with working area 0-200 A.

Part no. 067 596

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

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

BUFFER VESSEL UKV

A buffer vessel is an accumulator tank that is suitable for connection to a heat pump or another external heat source, and can have several different applications.

UKV 200
Part no. 080 300

UKV 300
Part no. 080 301

UKV 500
Part no. 080 114

WATER HEATER/ACCUMULATOR TANK

VPA

Water heater with double-jacketed vessel.

VPA 300/200
Corrosion protection:

Copper	Part no. 082 023
Enamel	Part no. 082 025

VPA 450/300
Corrosion protection:

Copper	Part no. 082 030
Enamel	Part no. 082 032

VPAS

Water heater with double-jacketed vessel and solar coil.

VPAS 300/450
Corrosion protection:

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

VPB

Water heater without immersion heater with charging coil.

VPB 500
Corrosion protection:

Copper	Part no. 081 054

VPB 750
Corrosion protection:

Copper	Part no. 081 052

VPB 1000
Corrosion protection:

Copper	Part no. 081 053

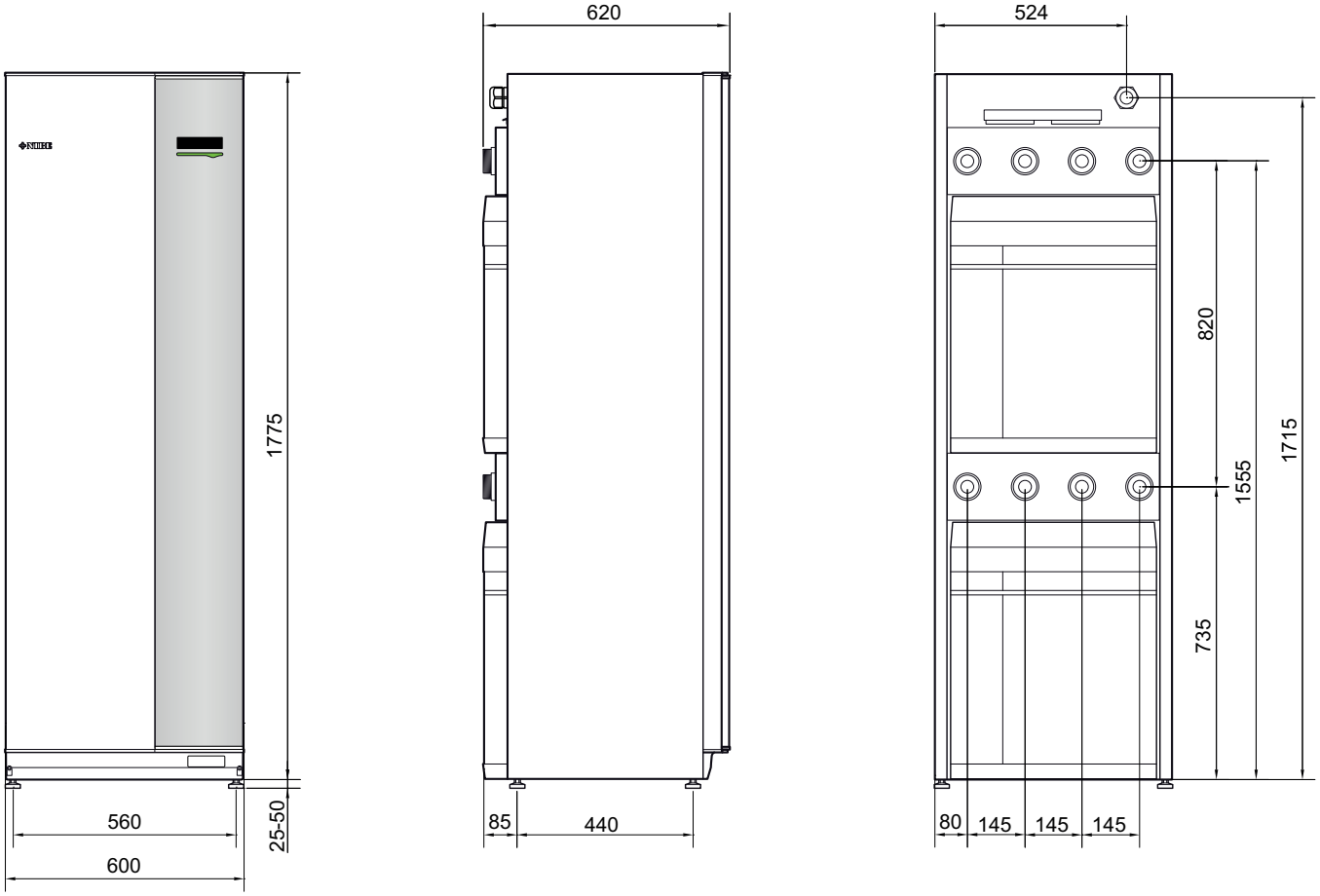
HOT WATER CONTROL

VST 20
Reversing valve, cu-pipe Ø35
(Max recommended power, 40 kW)
Part no 089 388

VST 30
Reversing valve, cu-pipe Ø45
(Max recommended power, 60 kW)
Part no. 067 388

Technical data

Dimensions



Technical specifications

Model		24	30	40	60
Output data according to EN 14511					
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	15 – 640	20 – 1,500
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	105	65
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			
Noise					
Sound power level (L_{WA}) according to EN 12102 at 0/35	dB(A)	47	47	47	47

Model		24	30	40	60
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 F1345-24 and 30 kW with internal brine pump. 40 and F1345-60 kW with enclosed 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.

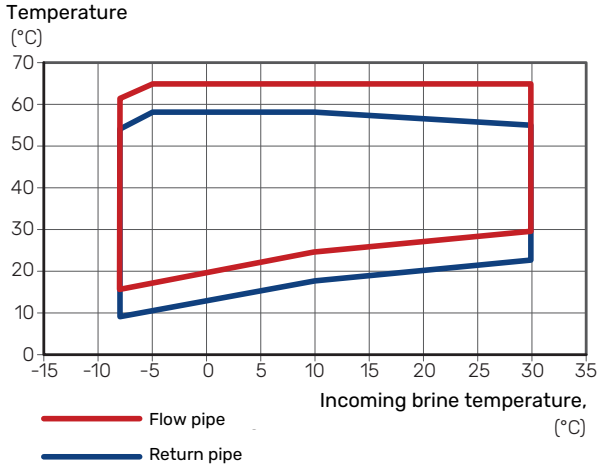
6 With feet removed, the height is approx. 1930 mm.

7 Including brine pump.

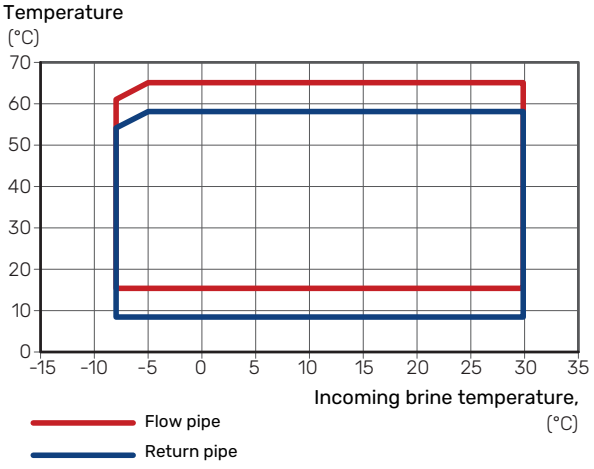
WORKING RANGE HEAT PUMP, COMPRESSOR OPERATION

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

F1345-24 kW



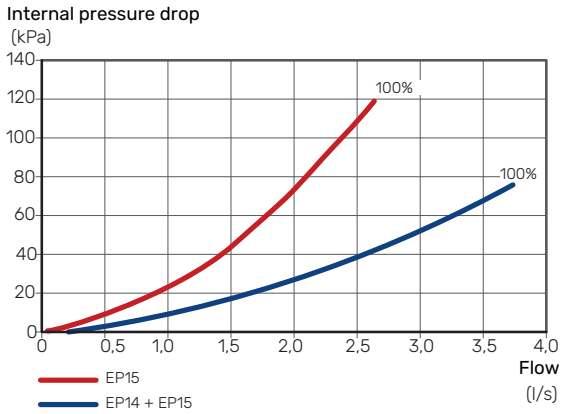
F1345-30 kW, 40 kW, 60 kW



DIAGRAM, INTERNAL PRESSURE DROP

Diagram for sizing the brine pump for F1345.

F1345-40 kW and 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	-	-	-	-

Compressor motor is exempted from EU 2019/1781 due to that motors completely integrated into compressor and energy performance cannot be tested independently from the product.

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

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

TECHNICAL DOCUMENTATION

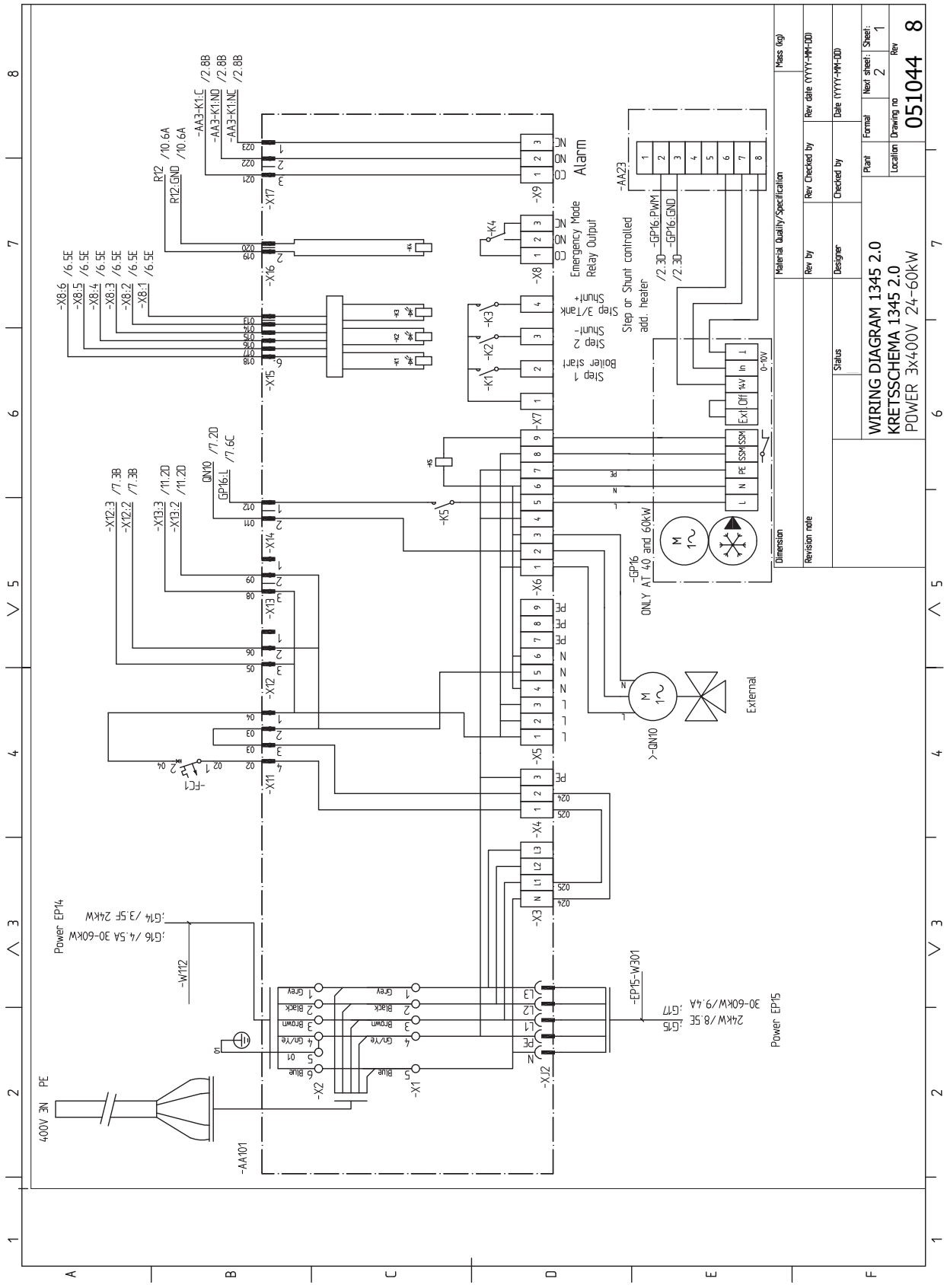
Model		F1345-24					
Type of heat pump	☐ Air-water ☐ Exhaust-water ☒ Brine-water ☐ Water-water						
Low-temperature heat pump	☐ Yes ☒ No						
Integrated immersion heater for additional heat	☐ Yes ☒ No						
Heat pump combination heater	☐ Yes ☒ No						
Climate	☒ Average ☐ Cold ☐ Warm						
Temperature application	☒ Medium (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)			m³/h
Sound power level, indoors/outdoors	L_{WA}	47 / -	dB	Nominal heating medium flow		2.37	m³/h
Annual energy consumption	Q_{HE}	15,287	kWh	Brine flow brine-water or water-water heat pumps		4.46	m³/h
Contact information	*NIBE Energy Systems – Box 14 – Hannabadsvägen 5 – 285 21 Markaryd – Sweden*						

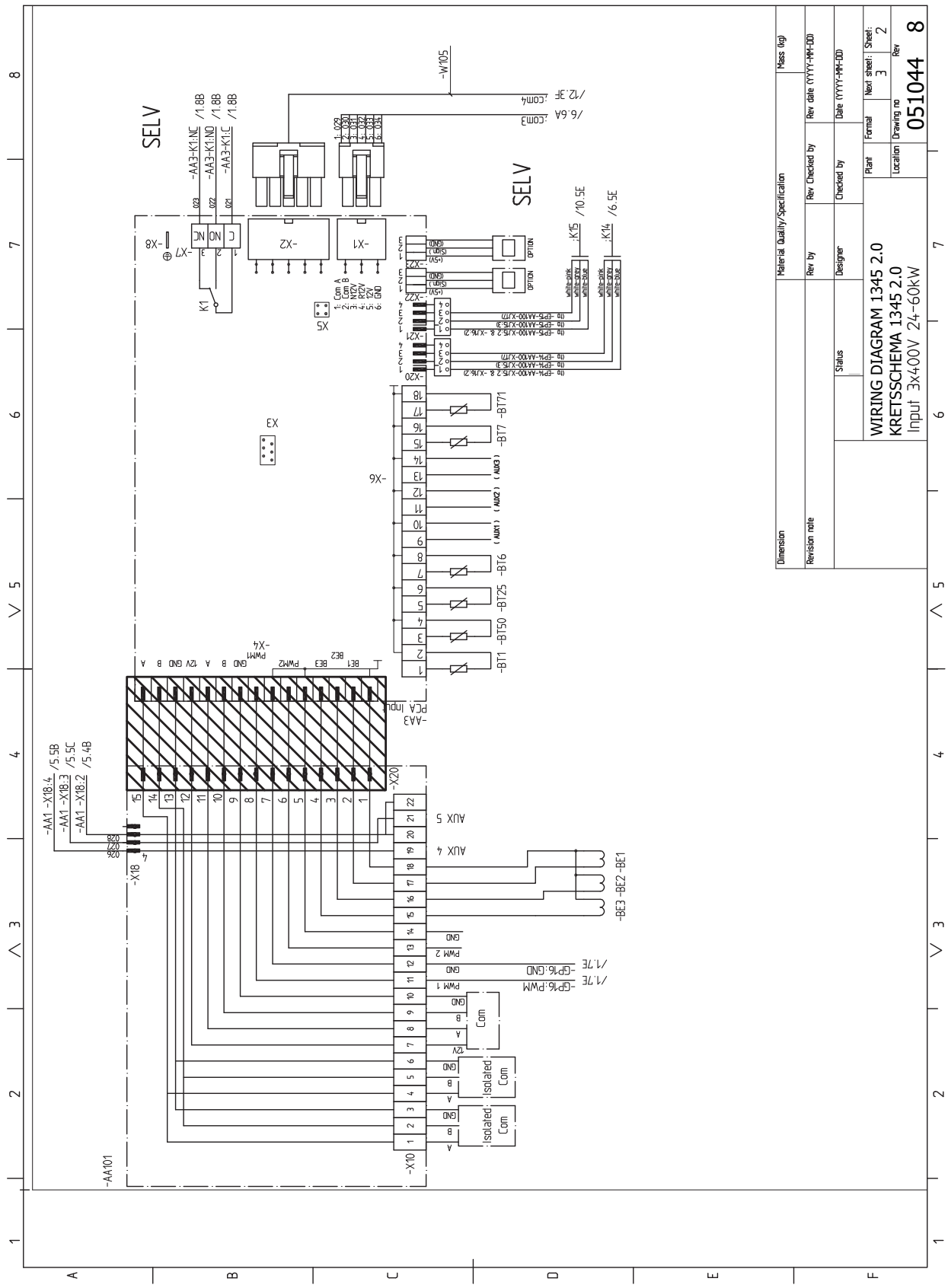
Model		F1345-30					
Type of heat pump		☐ Air-water ☐ Exhaust-water ☒ Brine-water ☐ Water-water					
Low-temperature heat pump		☐ Yes ☒ No					
Integrated immersion heater for additional heat		☐ Yes ☒ No					
Heat pump combination heater		☐ Yes ☒ No					
Climate		☒ Average ☐ Cold ☐ Warm					
Temperature application		☒ Medium (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)			m³/h
Sound power level, indoors/outdoors	L_{WA}	47 / -	dB	Nominal heating medium flow		3.15	m³/h
Annual energy consumption	Q_{HE}	19,880	kWh	Brine flow brine-water or water-water heat pumps		5.83	m³/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		☒ Medium (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)			m³/h
Sound power level, indoors/outdoors	L_{WA}	47 / -	dB	Nominal heating medium flow		4.07	m³/h
Annual energy consumption	Q_{HE}	25,093	kWh	Brine flow brine-water or water-water heat pumps		7.77	m³/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		☒ Medium (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)			m³/h
Sound power level, indoors/outdoors	L_{WA}	47 / -	dB	Nominal heating medium flow		5.83	m³/h
Annual energy consumption	Q_{HE}	38,048	kWh	Brine flow brine-water or water-water heat pumps		10.87	m³/h
Contact information	*NIBE Energy Systems – Box 14 – Hannabadsvägen 5 – 285 21 Markaryd – Sweden*						

Electrical circuit diagram




WIRING DIAGRAM 1345 2.0
KRETSSCHEMA 1345 2.0
Input 3x400V 24-60kW
051044 8
SELV
SELV
-AA101
-AA3
-X10
-X18
-X20
-X4
-X6
-BT1 -BT50 -BT25 -BT6 -BT7 -BT71
-BE3 -BE2 -BE1
-GP16:PWM
-GP16:GND
-W105
-AA3-K1:NC
-AA3-K1:NO
-AA3-K1:C
-X7
-X8
-X1
-X2
-X21
-X22
-K15
-K14
-AA1 -X18:4
-AA1 -X18:3
-AA1 -X18:2
AUX 5
AUX 4
Com
Isolated Com
PCA Input
Material Quality/Specification
Mass (kg)
Dimension
Revision note
Rev by
Designer
Status
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Checked by
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Date (YYYY-MM-DD)
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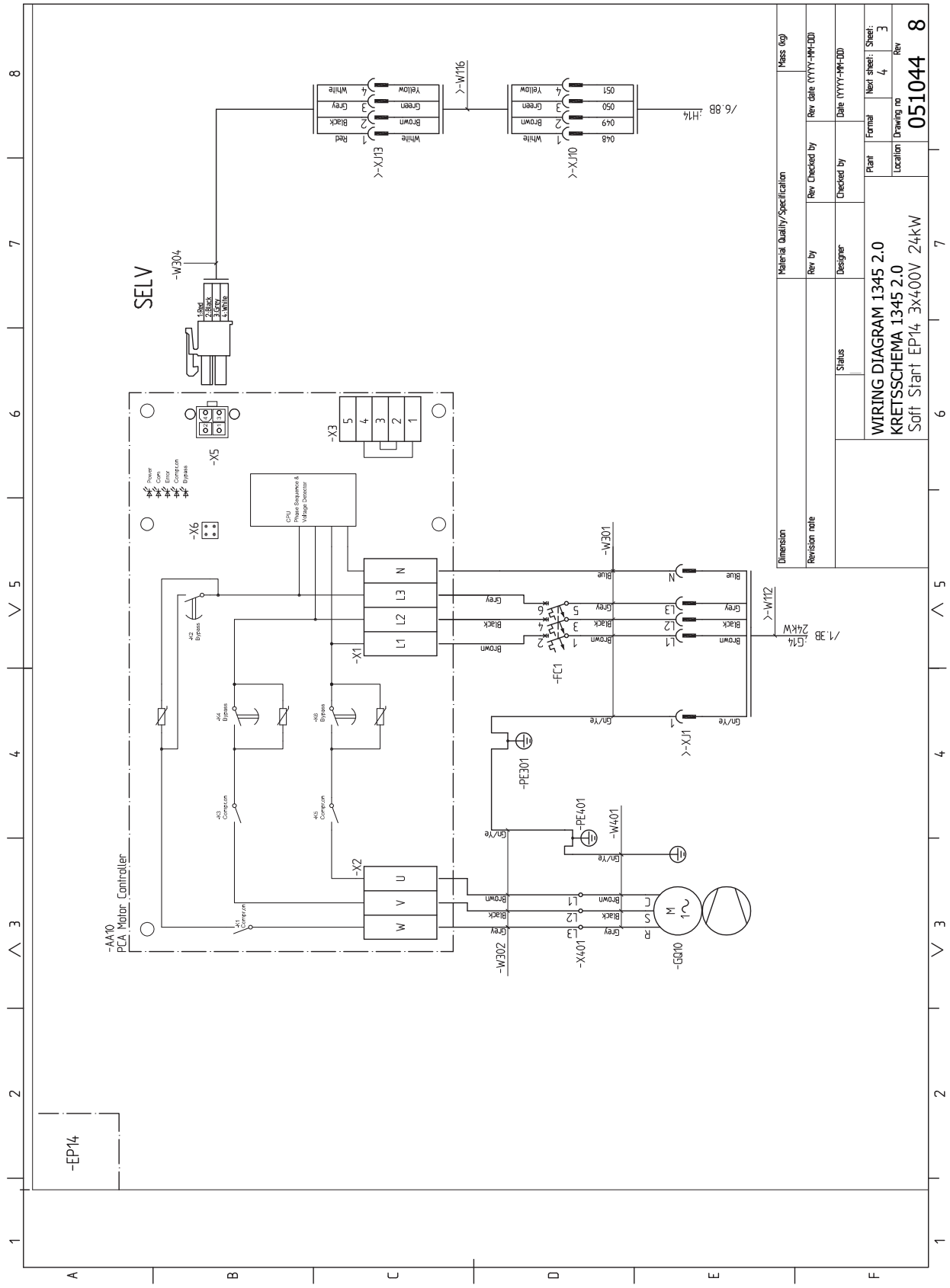
Sheet:
Rev


WIRING DIAGRAM 1345 2.0
KRETSSCHEMA 1345 2.0
Soft Start EP14 3x400V 24kW
051044 8
SELV
-EP14
-AA10
PCA Motor Controller
-W304
-W116
-W112
-W301
-W302
-W401
-X1
-X2
-X3
-X5
-X6
-fC1
-PE301
-PE401
-GQ10
-X401
-X110
-X113
-X11
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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Location
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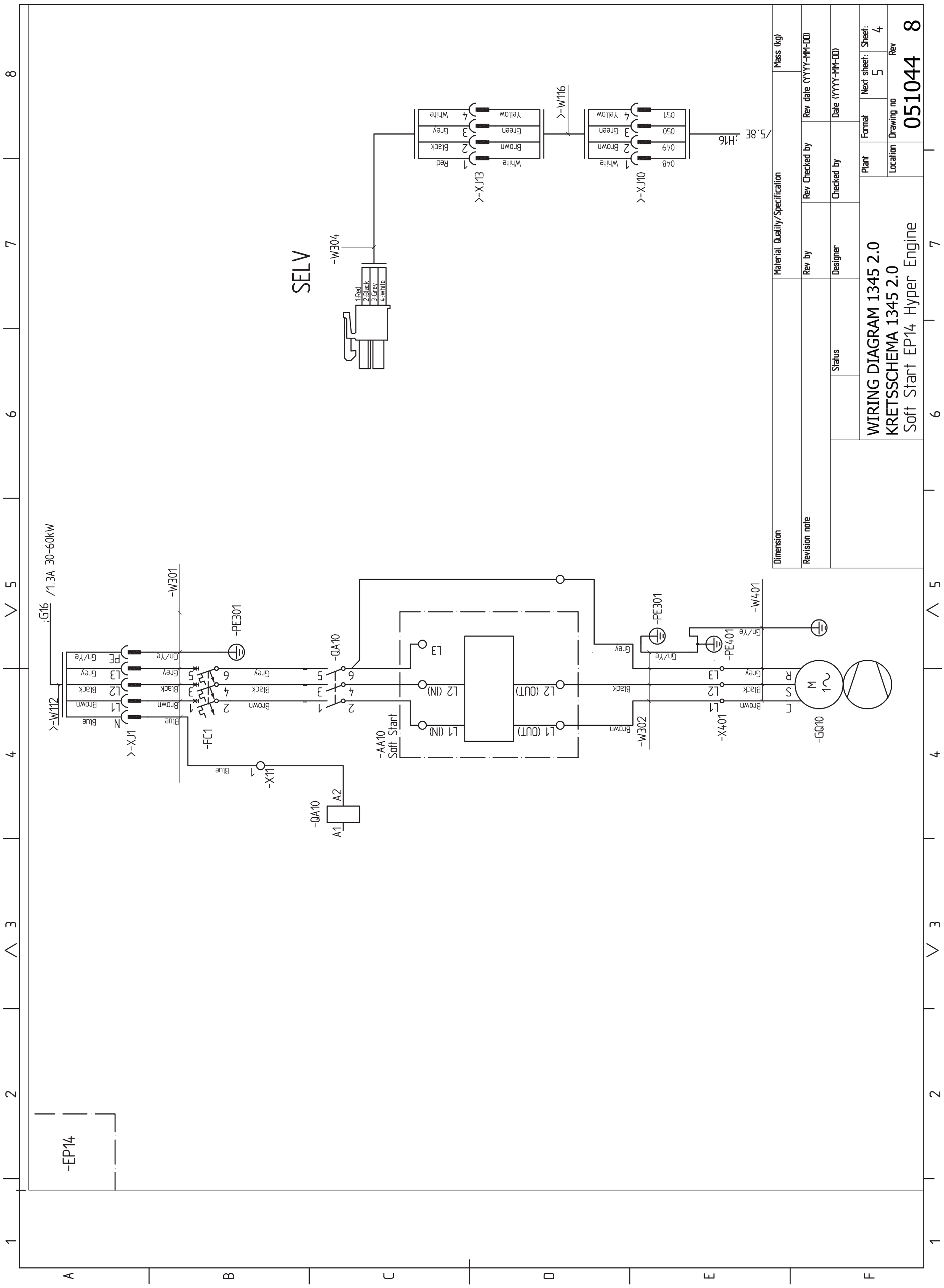
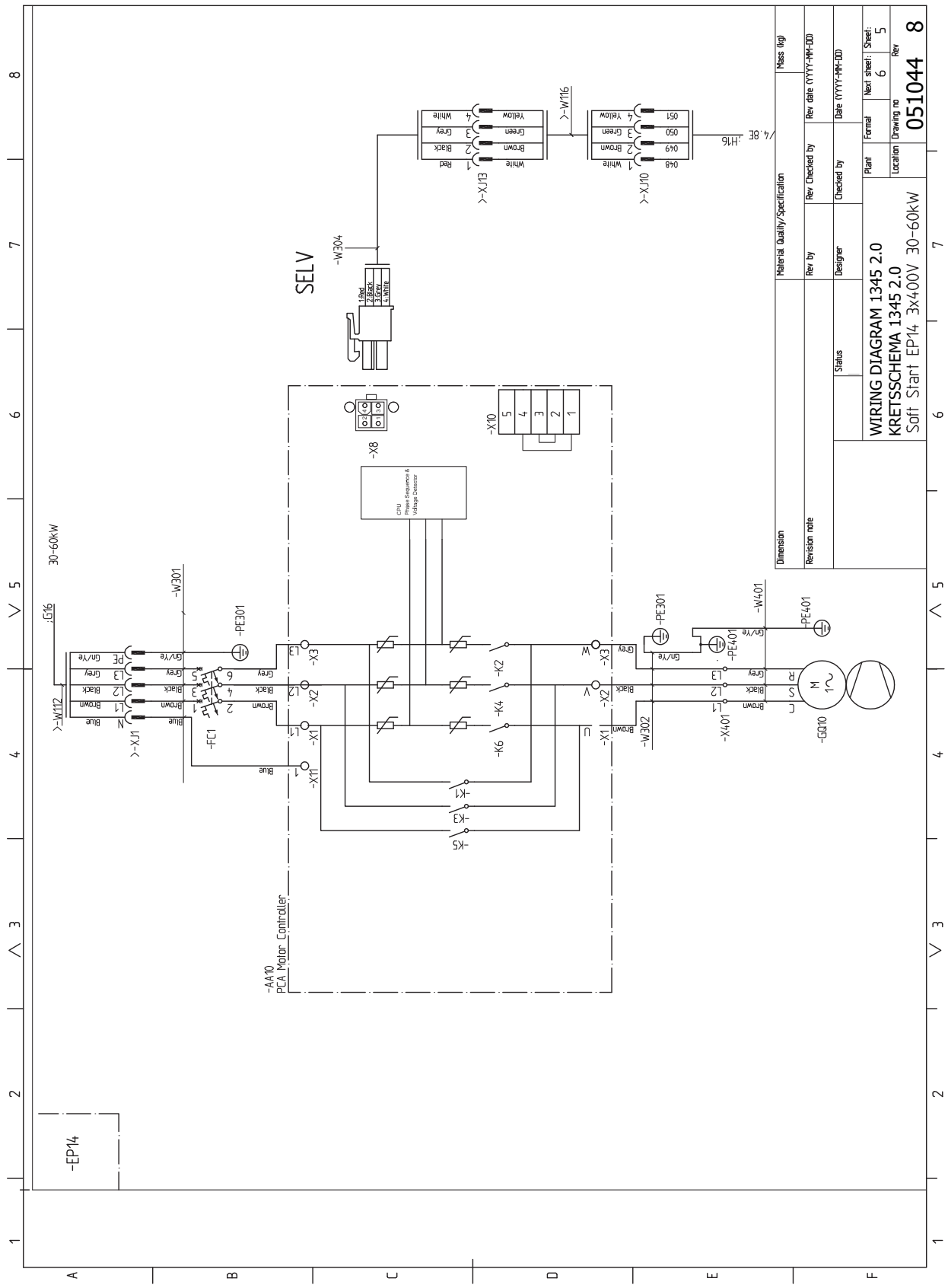
Rev


WIRING DIAGRAM 1345 2.0
KRETSSCHEMA 1345 2.0
Soft Start EP14 Hyper Engine
051044
8
SEL V
-EP14
-AA10 Soft Start
-QA10
-FC1
-GQ10
-W112
-W301
-W302
-W304
-W401
-W116
-XJ1
-XJ10
-XJ13
-X401
-X11
-PE301
-PE401


WIRING DIAGRAM 1345 2.0
KRETSSCHEMA 1345 2.0
Soft Start EP14 3x400V 30-60kW
051044 8
SELV
-EP14
-AA10
PCA Motor Controller
-FC1
-K1
-K2
-K3
-K4
-K5
-K6
-GQ10
-W301
-W304
-W116
-W302
-W401
-PE301
-PE401
-X1
-X2
-X3
-X8
-X10
-X11
-X111
-X401
-XJ1
-XJ10
-XJ13
-XJ112
30-60kW
Material Quality/Specification
Mass (kg)
Dimension
Revision note
Rev by
Rev Checked by
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Designer
Checked by
Date (YYYY-MM-DD)
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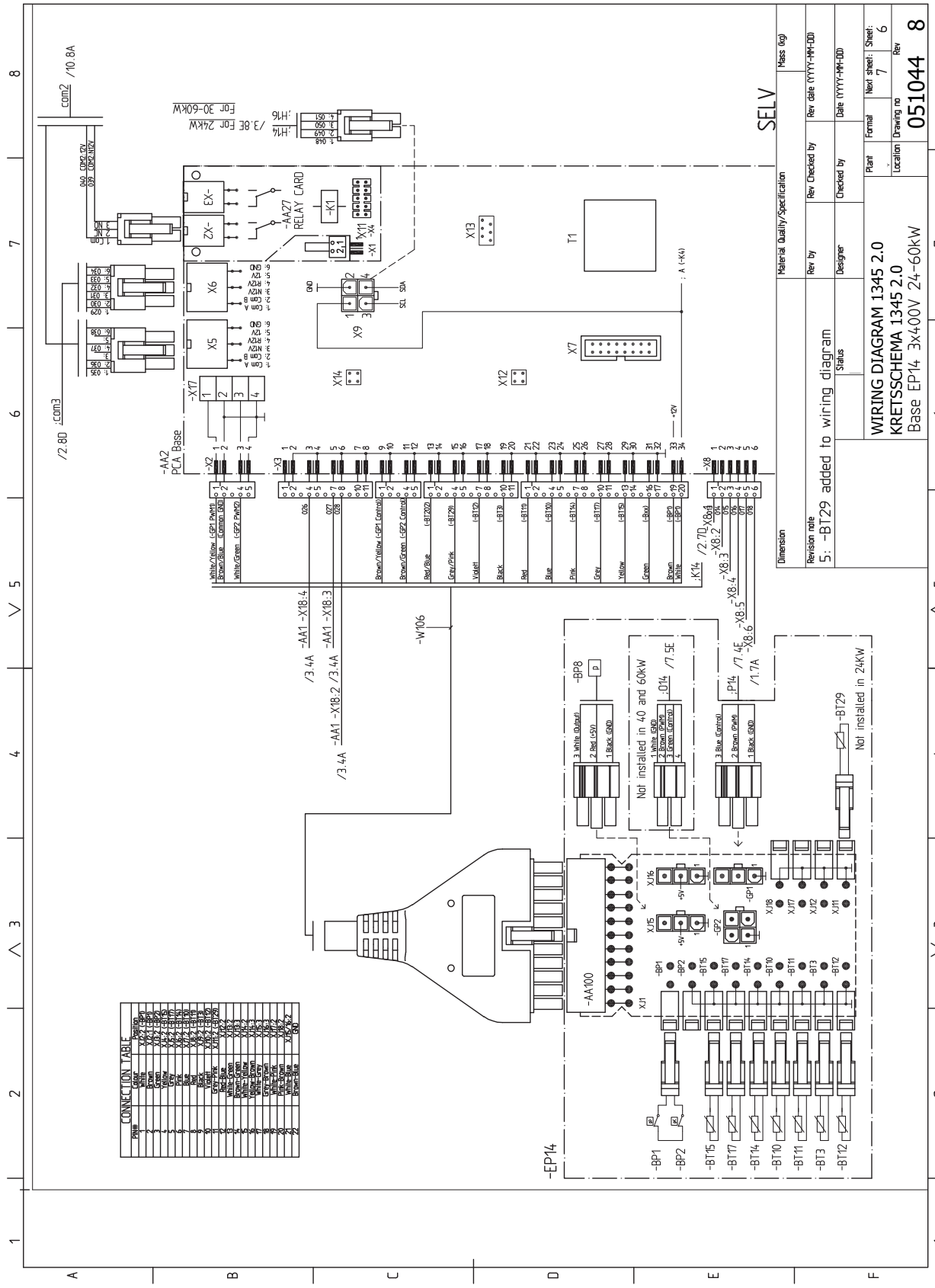
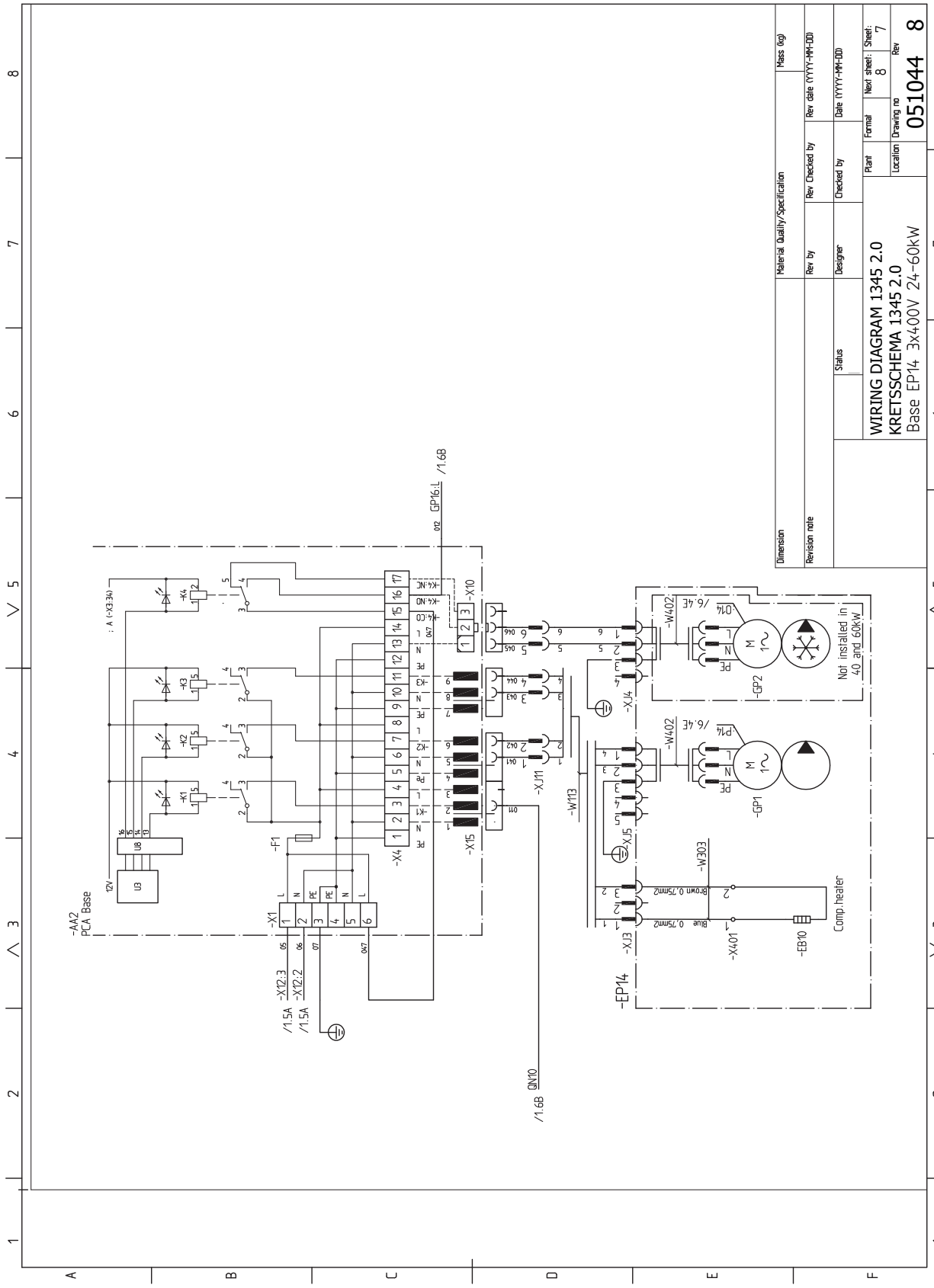
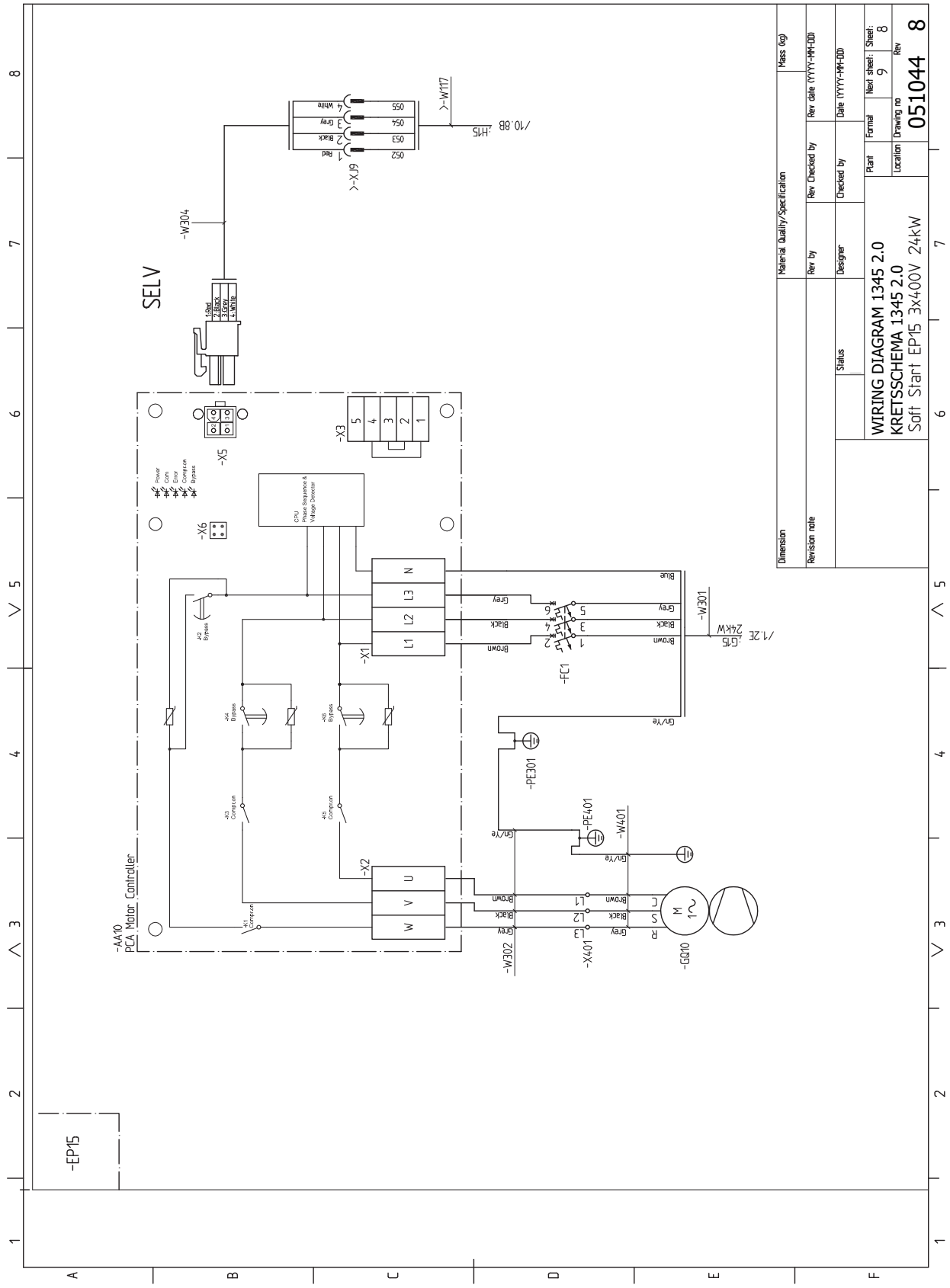
Rev


WIRING DIAGRAM 1345 2.0
KRETSSCHEMA 1345 2.0
Base EP14 3x400V 24-60kW
051044 8
SELV
Revision note
5: -BT29 added to wiring diagram
-EP14
-AA100
-AA2 PCA Base
-AA27 RELAY CARD
-BP8
-BT29
Not installed in 40 and 60kW
Not installed in 24KW
CONNECTION TABLE


WIRING DIAGRAM 1345 2.0
KRETSSCHEMA 1345 2.0
Base EP14 3x400V 24-60kW
051044 8
-AA2
PCA Base
-EP14
-GP1
-GP2
-EB10
-X1
-X4
-X10
-X15
-X111
-X13
-X14
-X15
-X401
-W113
-W303
-W402
-F1
/1.5A
/1.6B
Not installed in 40 and 60kW
Comp.heater
Brown 0.75mm2
Blue 0.75mm2


-EP15
-AA10
PCA Motor Controller
SELV
-W304
-X5
-X3
-X6
-X1
-X2
-W301
-W302
-W401
-X401
-PE301
-PE401
-FC1
-GQ10
-W117
-X19
Material Quality/Specification
Mass (kg)
Dimension
Revision note
Rev by
Designer
Rev Checked by
Checked by
Rev date (YYYY-MM-DD)
Date (YYYY-MM-DD)
Status
Plant
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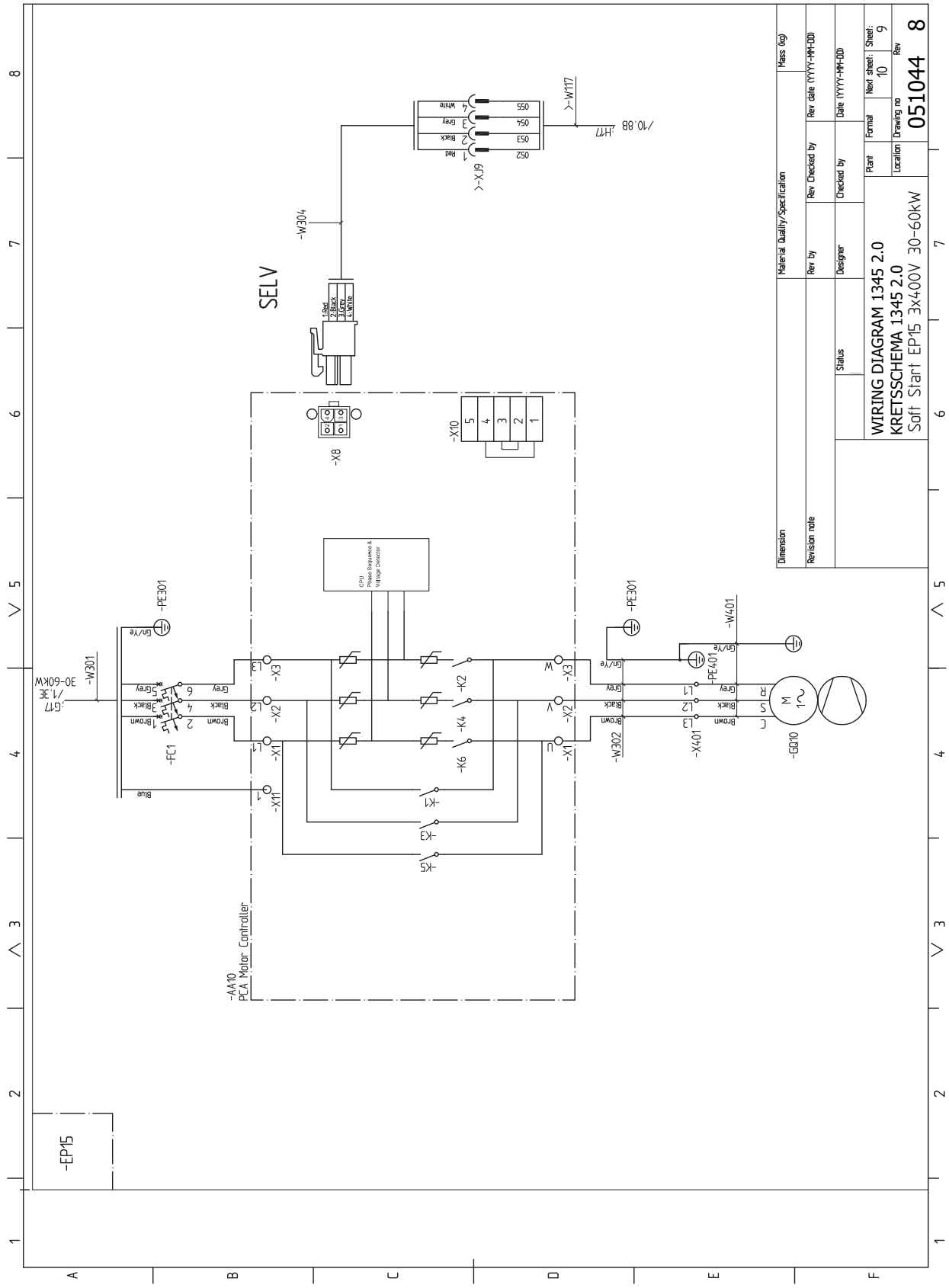
Drawing no
Rev
051044 8
WIRING DIAGRAM 1345 2.0
KRETSSCHEMA 1345 2.0
Soft Start EP15 3x400V 24kW


SELV
-EP15
-AA10
PCA Motor Controller
-W304
-W1117
-X9
-X8
-X10
-PE301
-W301
-FC1
-K1
-K2
-K3
-K4
-K5
-K6
-X1
-X2
-X3
-W302
-W401
-PE401
-X401
-GQ10
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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Format
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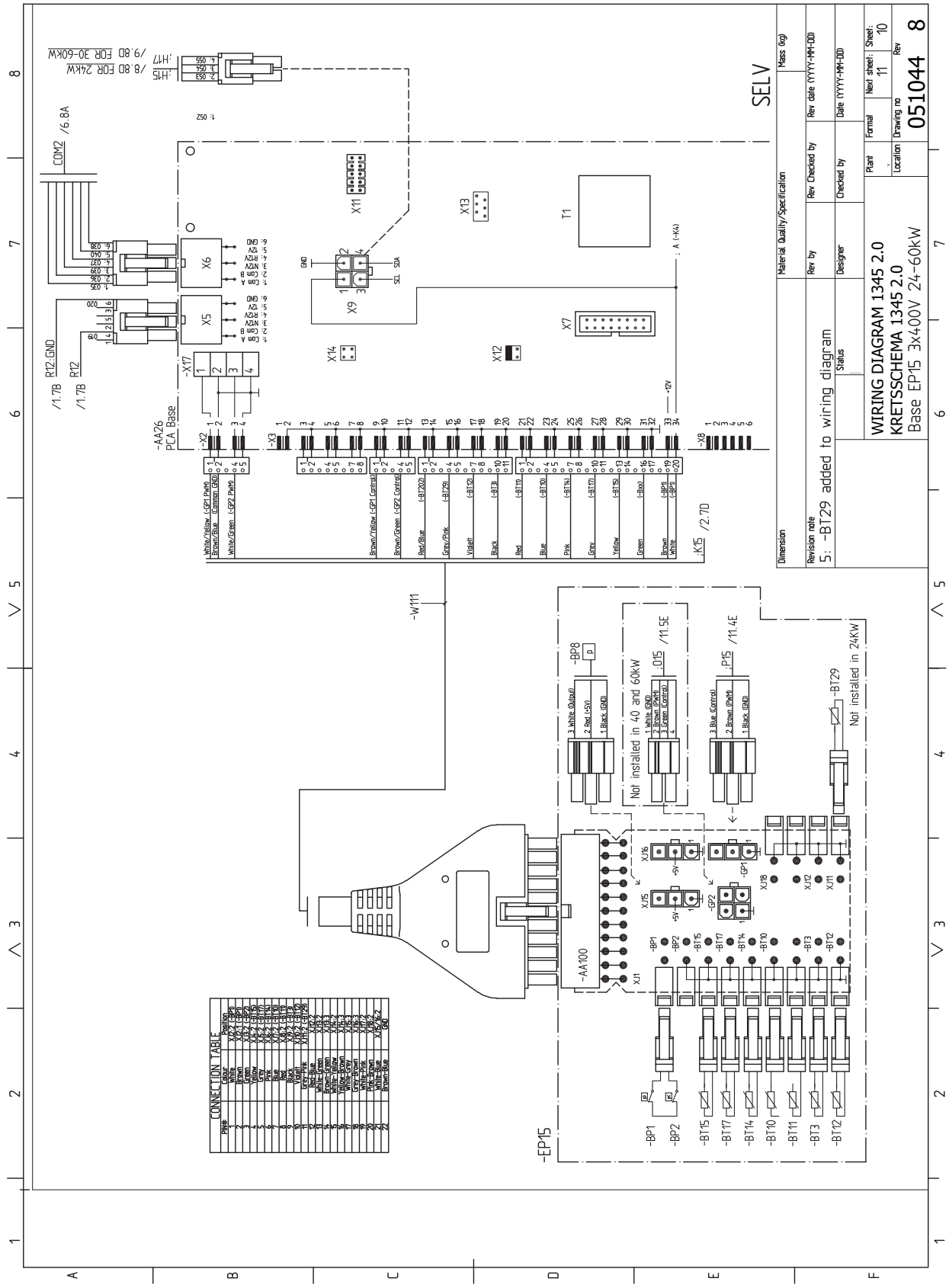
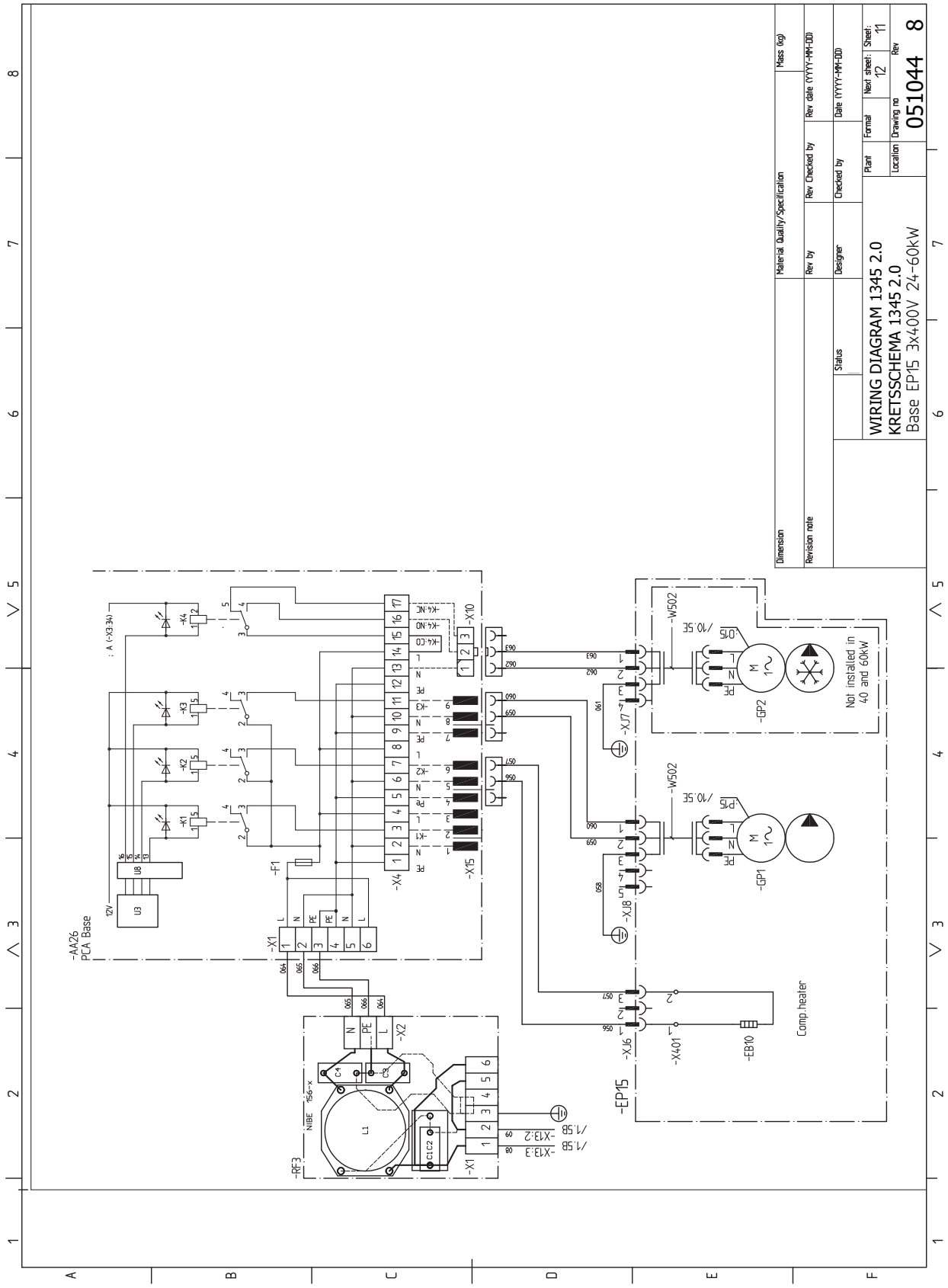
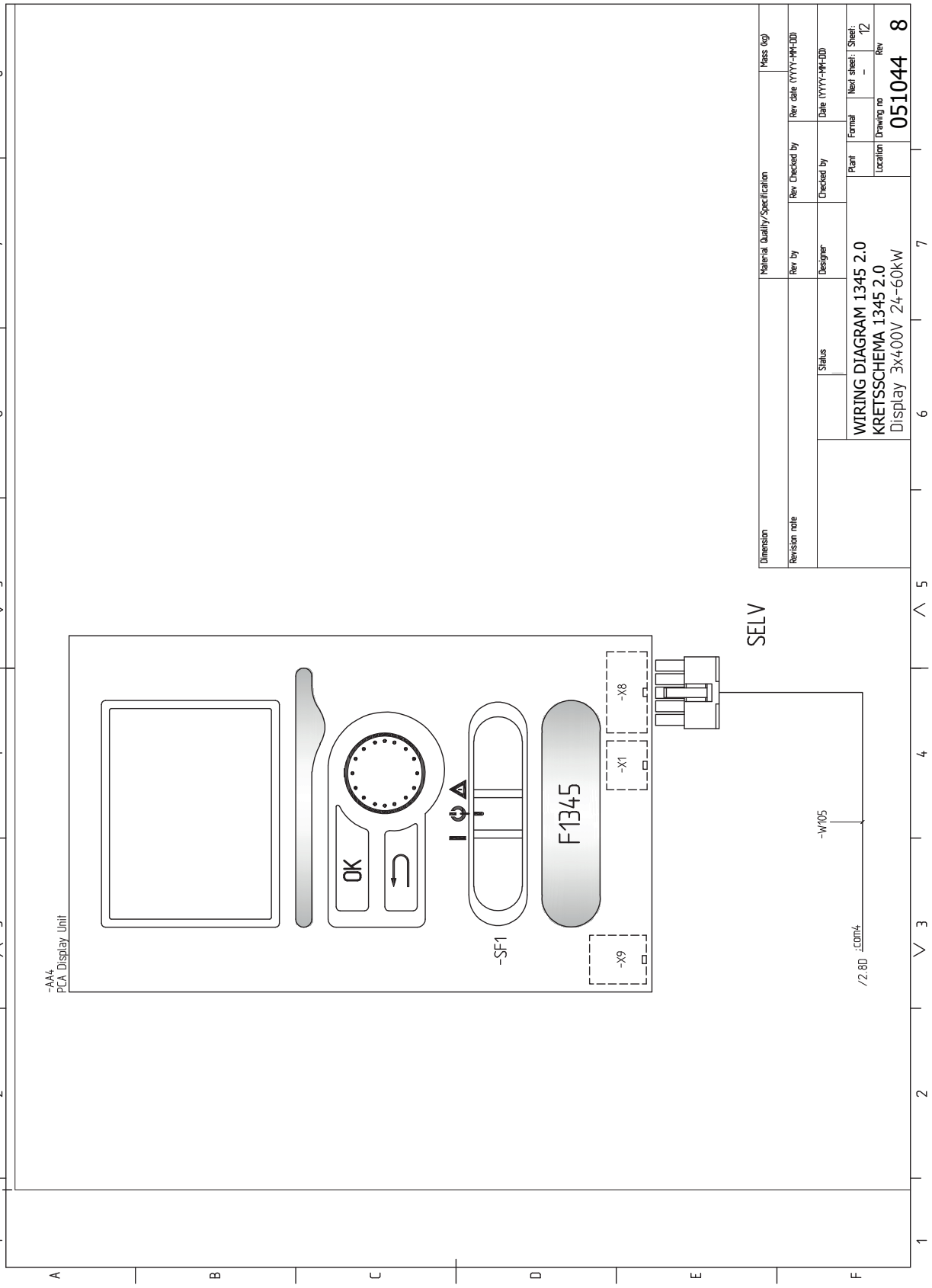
Rev
WIRING DIAGRAM 1345 2.0
KRETSSCHEMA 1345 2.0
Soft Start EP15 3x400V 30-60kW
051044 8


WIRING DIAGRAM 1345 2.0
KRETSSCHEMA 1345 2.0
Base EP15 3x400V 24-60kW
051044 8
SELV
5: -BT29 added to wiring diagram
Not installed in 40 and 60kW
Not installed in 24kW
-EP15
-AA100
-AA26
PCA Base
CONNECTION TABLE


WIRING DIAGRAM 1345 2.0
KRETSSCHEMA 1345 2.0
Base EP15 3x400V 24-60kW
051044 8
Material Quality/Specification
Mass (kg)
Dimension
Revision note
Rev by
Designer
Checked by
Rev Checked by
Rev date (YYYY-MM-DD)
Date (YYYY-MM-DD)
Status
Plant
Format
Next sheet: 12
Sheet: 11
Location
Drawing no
Rev
-AA26
PCA Base
-EP15
-GP1
-GP2
-WS02
-X1
-X2
-X4
-X10
-X15
-X16
-X17
-X18
-X401
-EB10
-RF3
-F1
-K1
-K2
-K3
-K4
-X13:2
-X13:3
Not installed in 40 and 60kW
Comp.heater


-AA4
PCA Display Unit
OK
-SF1
F1345
-X9
-X1
-X8
SELV
-W105
/2.8D :COM4
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
Format
Next sheet:
Sheet:
12
Location
Drawing no
051044 8
Rev
WIRING DIAGRAM 1345 2.0
KRETSSCHEMA 1345 2.0
Display 3x400V 24-60kW

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R

S

T

W

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