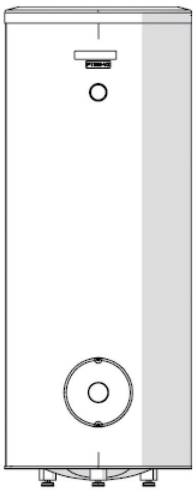
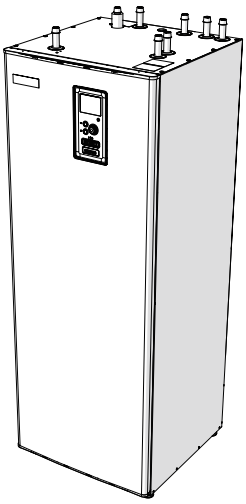
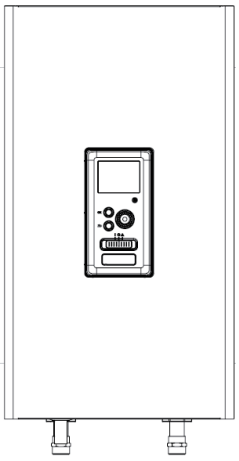
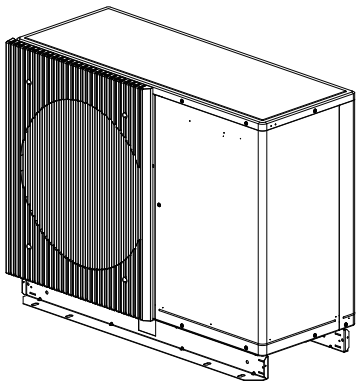
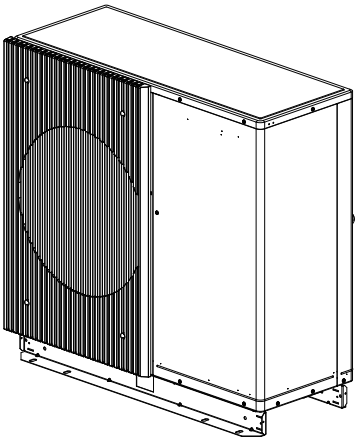
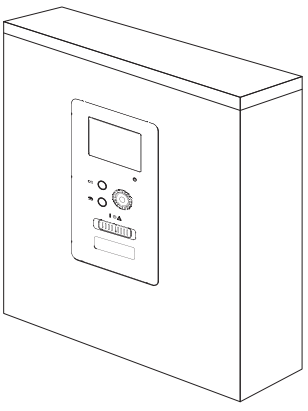
INSTALLATION MANUAL

MITSUBISHI HEAVY INDUSTRIES

Air to Water Heat Pump using R290 refrigerant

Hydrolution EZY

FDCM60/71VNX-P
FDCM100/140VNX-P
FDCM100/140VSX-P
HMM100/HBM140/HBM140H/PT300/PT300-V2/PT500
RC-HY20-W/RC-HY40-W

CE

English：Original instructions

This heat pump complies with EMC Directive 2004/108/EC (replaced by 2014/30/EU on 20/4/2016), LV Directive 2006/95/EC (replaced by 2014/35/EU on 20/4/2016).
CE marking is applicable to the area of 50 Hz power supply.

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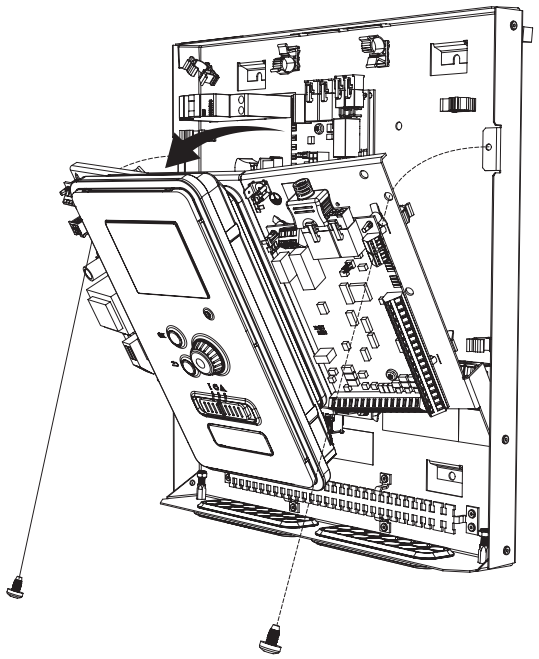
RC-HY20/40-W



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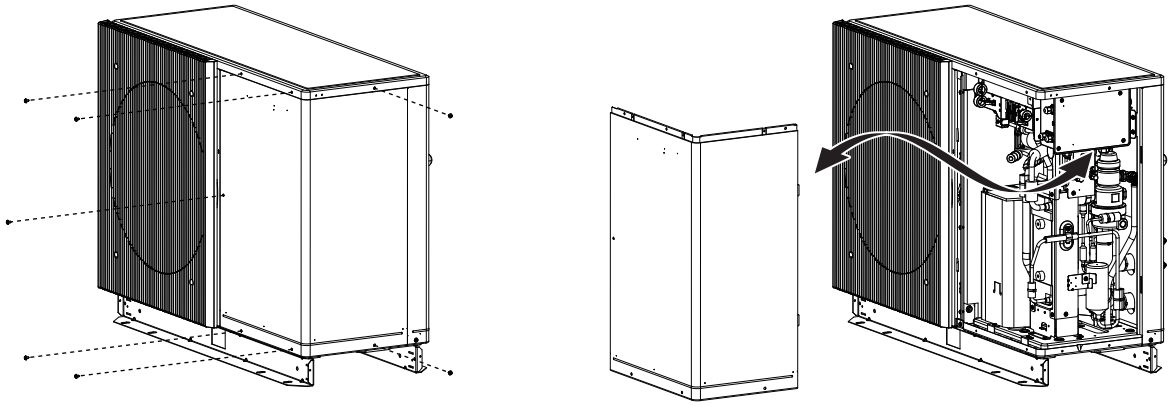

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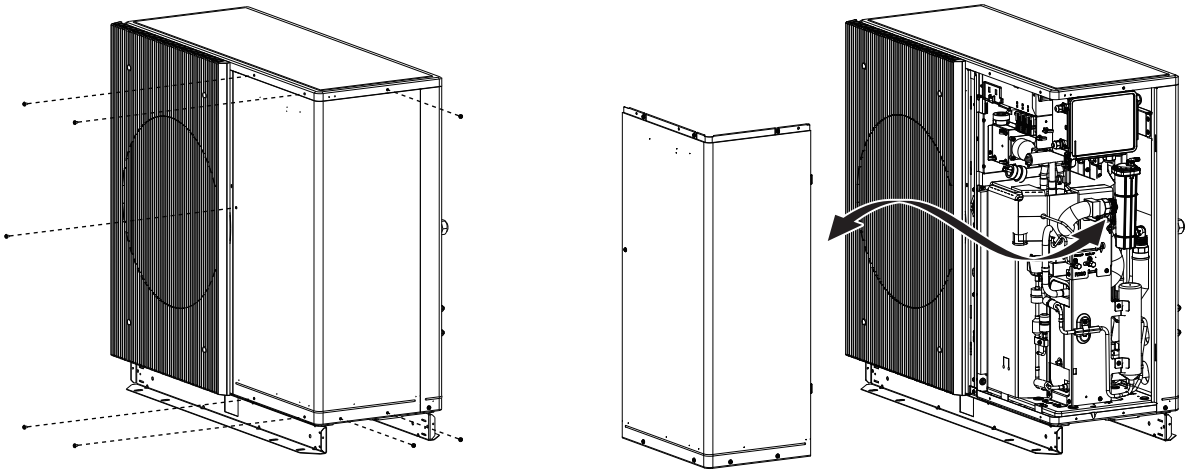

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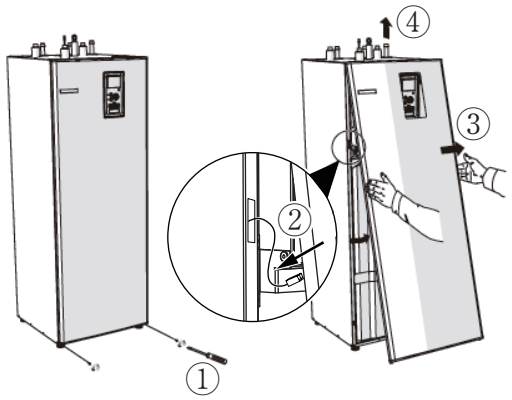

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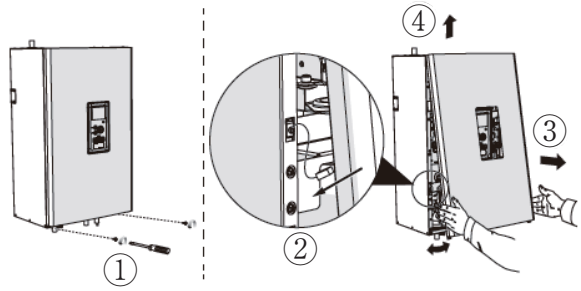

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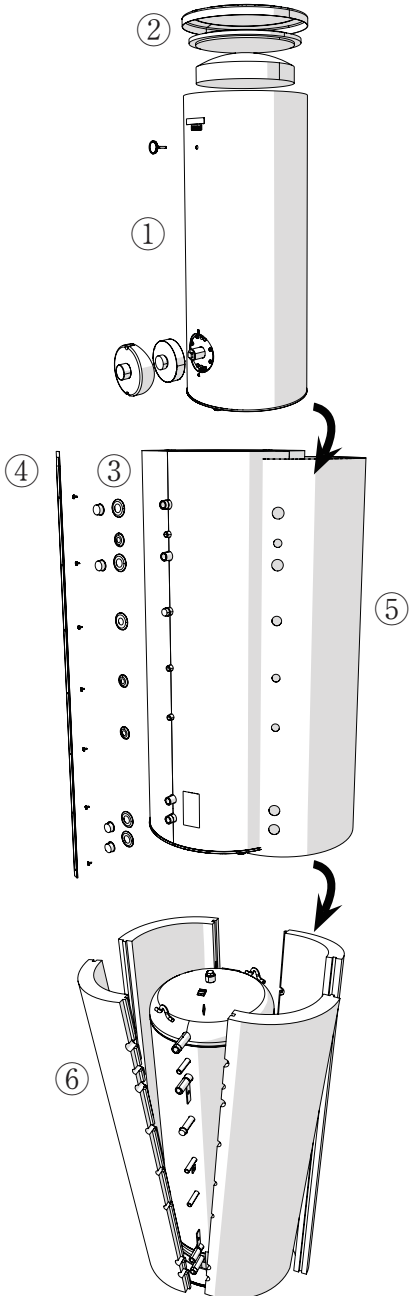

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1. Safety precautions

When installing the unit, be sure to check whether the selection of installation place, power supply specifications, usage limitation (piping length, height differences between indoor and outdoor units, power supply voltage and etc.) and installation spaces.

- We recommend you to read this "SAFETY PRECAUTIONS" carefully before installation in order to gain full advantage of the functions of the unit and to avoid malfunction due to mishandling.
- The precautions described below are divided into ⚠WARNING and ⚠CAUTION. The matters with possibilities leading to serious consequences such as death or serious personal injury due to erroneous handling are listed in the ⚠WARNING and the matters with possibilities leading to personal injury or damage of the unit due to erroneous handling including probability leading to serious consequences in some cases are listed in ⚠CAUTION. These are very important precautions for safety. Be sure to observe all of them without fail.

■ The symbols used throughout the main text of this manual have the following meaning.

⚠ ⚠marks mean danger, alarm, and caution. The specified prohibited item is described in the triangle. The left mark means "Shock hazard alarm".

⃠ ⃠marks mean prohibited items. The specified prohibited item is described in the circle or in the vicinage.

❗ ❗marks mean compulsory action or instruction. The specified prohibited item is described in the circle. The left mark means "Earth is needed".

The user's manual should be read carefully.

There is information included in the user's manual and/or installation manual.

A service personnel should be handing this equipment with reference to the installation manual.

NOTE
This indicates danger to machine or person.

Caution
This indicates important information about what you should observe when maintaining your installation.

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

- Be sure to confirm no anomaly on the equipment by commissioning after completed installation and explain the operating methods as well as the maintenance methods of this equipment to the user according to the owner's manual.
- Keep the installation manual together with owner's manual at a place where any user can read at any time. Moreover if necessary, ask to hand them to a new user.

This appliance is designed for use in a home environment and can be used by children aged from 8 years and above and persons with reduced physical, sensory or mental capabilities or lack of experience and knowledge if they have been given supervision or instruction concerning use of the appliance in a safe way and understand the hazards involved. Children shall not play with the appliance. Cleaning and user maintenance shall not be made by children without supervision.
This appliance is also intended for use by experts or trained users in shops, hotels, light industry, on farms and in similar environments.

1.1. General

Following precaution is only for R290.

This unit uses R290, a highly flammable refrigerant.
If any refrigerant leaks or comes in contact with fire or a heated surface or environment, there is a risk of fire or explosion, and the installer and/or user is warned to take all possible safety precautions when handling the unit and R290, being sure to keep a safe distance at all times to any related fire or explosion and to notify the fire department immediately on becoming aware of such an outcome.

⚠ DANGER

Strict compliance of the domestic laws must be observed when disposing the appliance.

Do not use any means to accelerate the defrosting process or to clean, other than those recommended by the manufacturer.

Do not pierce or burn.

Be aware that refrigerants may not contain an odour.

The appliance shall be stored in a well-ventilated area where the room size corresponds to the room area as specified for operation.

The staff in servicing operations must hold the national qualification or other relevant qualifications.

⚠ WARNING

Installation must be carried out by the qualified installer.
If you install the system by yourself, it may cause serious trouble such as water leaks, electric shocks, fire and personal injury, as a result of a system malfunction.

Install the system in full accordance with the instruction manual.
Incorrect installation may cause bursts, personal injury, water leaks, electric shocks and fire, abnormal vibration, increased noise generation.

Use the original accessories, prescribed optional parts for installation. electric shocks, fire and personal injury.
If parts other than those prescribed by manufacture are used, it may cause serious trouble such as water leaks, electric shocks, fire and personal injury.

When installing in small rooms, take prevention measures not to exceed the density limit of refrigerant in the event of leakage.
Consult the expert about prevention measures. If the density of refrigerant exceeds the limit in the event of leakage, lack of oxygen can occur, which can cause serious accidents.

Ventilate the working area well in the event of refrigerant leakage during installation.
If refrigerant comes into contact with a flame, a fire or explosion will occur.

Hang up the unit at the specified points with ropes which can support the weight in lifting for portage. And to avoid jolting out of alignment, be sure to hang up the unit at 4-point support.
An improper manner of portage such as 3-point support can cause death or serious personal injury due to falling of the unit.

Install the unit in a location with good support with sufficient strength.
Unsuitable installation locations can cause the unit to fall and cause material damage and personal injury.

Ensure 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 the qualified electrician in accordance with "the norm for electrical work" and "national wiring regulation", and the system must be connected to the dedicated circuit.
Power supply with insufficient capacity and incorrect function done by improper work can cause electric shocks and fire.

Be sure to shut off the power supply before starting installation, electrical work, inspection, or servicing.
Failure to shut off the power supply can cause electric shocks, unit failure, incorrect function of equipment or personal injury due to the unexpected start of fan.

Be sure to use the cables conformed to safety standard and cable ampacity for power distribution work.
Unconformable cables can cause electric leak, anomalous heat production or fire.

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

Arrange the wiring in the control box so that it cannot be pushed up further into the box. Install the service panel correctly.
Incorrect installation may result in overheating and fire.

Do not perform brazing work in the airtight room.
It can cause lack of oxygen.

Be sure to use appropriate protective equipment and tools for safety, and wear protective goggles and gloves while performing installation work.
Improper safety measures can result in personal injury.

Do not put the drainage pipe directly into drainage channels where poisonous gases such as sulphide gas can occur.
Poisonous gases will flow into the room through drainage pipe and seriously affect the user's health and safety.

Perform the drainage/piping work securely according to the installation manual.
If there is a defect in the drainage/piping work, water could drop from the unit and household goods could be wet and damaged.

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

Be sure to fix up the service panels.
Incorrect fixing can cause electric shocks or fire due to intrusion of dust or water.

Do not perform any repairs or modifications by yourself. Consult the dealer if the unit requires repair.
If you repair or modify the unit, it can cause water leaks, electric shocks or fire.

Do not perform any change of protective device itself or its setup condition.
The forced operation by short-circuiting protective device of pressure switch and temperature controller or the use of non specified component can cause fire or burst.

Consult the dealer or an expert regarding removal of the unit.
Incorrect installation can cause water leaks, electric shocks or fire.

Stop the compressor before disconnecting refrigerant pipes.
If disconnecting refrigerant pipes before compressor stopping, air can be sucked, which can cause burst or personal injury due to anomalously high pressure in the refrigerant circuit.

Do not process, splice or modify the power cable, or share the socket with other power plugs.
Improper power cable or power plug can cause fire or electric shock due to poor connection, insufficient insulation or over-current.

When plugging this unit, a plug conforming to the norm IEC60884-1 must be used.
Using improper plug can cause electric shock or fire.

Do not bundle or wind or process the power cord. Do not deform the power cord by treading it.
This may cause fire or heating.

Make sure 5 minutes after switch off the power supply in the event of installation, inspection or servicing.
If the power supply is not shut off, there is a risk of electric shocks, unit failure or personal injury due to the unexpected start of fan.

Do not vent R290 into atmosphere.
If refrigerant leaks and comes into contact with hot surface, a fire or explosion will occur.

As the outlet water temperature can reach 85 ºC at maximum, do not touch the water piping directly with a bare hand.

For water circuit installation work, follow to relevant European and national regulations (including EN61770) and local plumbing and building regulation codes.

The unit is only for use in a closed water system.
Utilization in an open water system may lead to excessive corrosion of the water piping and risk of incubating bacteria colonies, particularly Legionella, in water.

Select a location where in case of water leakage, the leakage will not cause damage to other properties.

This installation may be subjected to building regulation approval applicable to respective country that may require to notify the local authority before installation.

Mitsubishi Heavy Industries does not accept responsibility for any direct, indirect, special or consequential loss, damage, liability or expense incurred or suffered which results from any works undertaken by an unqualified or third party installer, or any failure, claim, damage or deficiency caused to a unit by improper installation, servicing, relocation, repair or disposing.

Any personnel conducting an operation, servicing or maintenance on a system or associated parts of the equipment should be trained and certified.

Before a new refrigerating system is put into service, the person responsible for placing the system in operation should ensure that trained and certified operating personnel are instructed on the basis of the instruction manual about the construction, supervision, operation and maintenance of the refrigerating system, as well as the safety measures to be observed, and the properties and handling of the refrigerant used.

The system is inspected, regularly supervised and maintained by a trained and certified service personnel who is employed by the person user or party responsible.

Refrigerants could cause asphyxia when inhaled in high concentrations.
The symptoms could include lose of mobility and consciousness.

The refrigerant is heavier than air and accumulates near the ground.

If unavoidable work is required in the presence of a high concentration of refrigerant, breathing apparatus must be worn.

The general requirement of trained and certified personnel are indicated as below:

a) Knowledge of legislation, regulations and standards relating to flammable refrigerants; and,
b) Detailed knowledge of and skills in handling flammable refrigerants, personal protective equipment, refrigerant leakage prevention, handling of cylinders, charging, leak detection, recovery and disposal; and,
c) Able to understand and to apply in practice the requirements in the national legislation, regulations and Standards; and,
d) Continuously undergo regular and further training to maintain this expertise.

⚠ CAUTION

Compliance with national gas regulations shall be observed.

Servicing shall be performed only as recommended by the manufacturer.

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

Avoid damage by metal edge or trapped by panels.
Broken wire can cause unit faults such as electric shock due to short circuiting.

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

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

Do not touch any refrigerant pipes when the system is in operation.
During operation the refrigerant pipes become extremely hot or extremely cold depending the operating condition, and it can cause burn injury or frost injury.

Do not operate the outdoor unit with any article placed on it.
You may incur property damage or personal injure from a fall of the article.

Do not step onto the outdoor unit.
You may incur injury from a drop or fall.

Do not apply excessive force to water pipes that may damage the pipes.
If water leakage occurs, it will cause flooding and damage to other properties.

FDCM60/71/100/140VNX-P and FDCM100/140VSX-P are partial unit air conditioner, complying with partial unit requirements of this International Standard, and must only be connected to other units that have been confirmed as complying to corresponding partial unit requirements of this International Standard.

Do not switch ON the unit while shutoff valves are closed.
Unit may be damaged.

If the system is expected to remain idle for a long period, it is recommended to empty water inside the unit.

Do not touch the check joints or functional parts during installation.

Do not use electronic equipment in the surrounding area during installation.

Do not smoke in the vicinity of the unit during any work and transportation.

Wear gloves that are designed for static electricity protection.

Utilize a driver with brushless motors.

Ensure that no tools are left behind after installation or repair work.

Keep any required ventilation openings clear of obstruction.

The terminal block cover panel of the outdoor unit must be firmly attached.
If the cover panel is mounted incorrectly and dust and moisture enter the unit, electric shock or fire may result.

Turn on the main power switch more than 5 minutes before starting operation.
If starting operation just after turning on the power switch, leak detector cannot detect refrigerant leak.

Keep the main power switch turned on so that refrigerant sensor keeps working for safety.

Before starting operation, check that all panels, guards and other protective parts are correctly installed.

Rotating, hot, or high voltage parts can cause injuries.

For installation and relocation work, follow the instructions in the Installation Manual and use tools and pipe components specifically made for use with R290 refrigerant.

Wear protective equipment when touching the bottom of the outdoor unit.
Failure to do so could cause injuries.

Do not damage the refrigerant circuit otherwise refrigerant may leak.

After installation or any service work has been completed, installer must check for refrigerant leaks by using a professional leak detector tool.
Never turn on the power if there is a refrigerant leak.

If refrigerant leaks into the room and comes into contact with the flame of a heater, or portable cooking range, sparks, static electricity or objects with high surface temperature (>470° C), a fire or explosion will occur, and all persons in close or adjacent vicinity of the leak must be immediately advised to move away to a safe distance in order for the area to be checked by a professional.

In the event of refrigerant leakage, do the following:

- Evacuate any people from the danger zone.
- Switch off the power supply.
- Remove ignition sources from the danger zone.
- Do not operate the unit until repairs are completed.

Warn against intentional misuse.
It's absolutely essential to comply with the first aid measures if accidents occur.

The operating safety of the system is only guaranteed when it is used as intended.

The limit values stipulated in the technical data must not be exceeded under any circumstances.

In case of fire, the refrigerant inside the unit may leak by melting welding part, which may cause an explosion.
Do not remain in the vicinity of unit.

⚠ CAUTION

1.2. Storage and Transport

1.2.1. Storage

An area where the appliance is stored shall be constructed that there are no danger to create a fire or explosion in case of refrigerant leakage.

The appliance shall be stored so as to prevent mechanical damage from occurring.

The appliance shall be stored in a room without continuously operating ignition sources (for example: open flames, an operating gas appliance or an operating electric heater).

1.2.2. Transport

Take care when carrying the unit by hand.
Avoid dropping the unit during transportation. If the unit weights more than 20kg, it must be carried by two or more persons. Do not carry by the plastic straps. Use gloves to minimize the risk of cuts by the aluminum fins.

Be sure to observe the following safety requirements when transporting the unit.

Do not use a source of ignition during transportation, which includes: naked flames, sparks, static electricity, objects with high surface temperature.

Vehicles with ventilation in the cargo area should be used.

Be sure to carry the R290 detector and keep it working properly.

When transporting the unit, do not touch the fan, bell mouth, and heat exchanger.

1.3. Selection of installation location for the outdoor unit

Do not install the unit where corrosive gas (such as sulfurous acid gas etc.) or combustible gas (such as thinner and petroleum gases) can accumulate or collect, or where volatile combustible substances are handled.

Corrosive gas can cause corrosion of heat exchanger, breakage of plastic parts and etc. And combustible gas can cause fire.

Do not use the indoor unit at the place where water splashes may occur.

Since the indoor unit is not waterproof, it can cause electric shocks and fire.

Do not install or use the system close to the equipment that generates electromagnetic fields or high frequency harmonics.

Equipment such as inverters, standby generators, medical high frequency equipments and telecommunication equipments can affect the system, and cause malfunctions and breakdowns.
The system can also affect medical equipment and telecommunication equipment, and obstruct its function or cause jamming.

Do not install the outdoor unit in a location where insects and small animals can inhabit.

Insects and small animals can enter the electric parts and cause damage or fire. Instruct the user to keep the surroundings clean.

Do not install the controller at the direct sunlight.

It can cause malfunction or deformation of the controller.

Do not install the outdoor unit in indoor.

Do not install the unit in the locations listed below.

- Locations where carbon fiber, metal powder or any powder is floating.
- Locations where any substances that can affect the unit such as sulphide gas, chloride gas, acid and alkaline can occur.
- Vehicles and ships.
- Locations where cosmetic or special sprays are often used.
- Locations with direct exposure of oil mist and steam such as kitchen and machine plant.
- Locations where any machines which generate high frequency harmonics are used.
- Locations with salty atmospheres such as coastlines.
- Locations with heavy snow (If installed, be sure to provide base flame and snow hood mentioned in the manual).
- Locations where the unit is exposed to chimney smoke.
- Locations at high altitude (more than 1000m high).
- Locations with ammonic atmospheres.
- Locations where heat radiation from other heat source can affect the unit.
- Locations without good air circulation.
- Locations with any obstacles which can prevent inlet and outlet air of the unit.
- Locations where short circuit of air can occur (in case of multiple units installation).
- Locations where strong air blows against the air outlet of outdoor unit.
- Locations with calcium chloride (e.g. snow melting agent).
- Location where something located above the unit could fall.
- Locations with steam.
- Location with near a road or parking area where it can be damaged by passing traffic.

It can cause remarkable decrease in performance, corrosion and damage of components, malfunction and fire.

Do not install the outdoor unit in the locations listed below.

- Locations where discharged hot air or operating sound of the outdoor unit can bother neighborhood.
- Locations where outlet air of the outdoor unit blows directly to animal or plants.
- Locations where vibration can be amplified and transmitted due to insufficient strength of structure.
- Locations where vibration and operation sound generated by the outdoor unit can affect seriously (on the wall or at the place near bed room).
- Locations where an equipment affected by high harmonics is placed (TV set or radio receiver is placed within 5m).
- Locations where drainage cannot run off safely.

It can affect surrounding environment and cause a claim.

Do not install the unit in the locations listed below.

- Location where poorly ventilated.
- Location near vehicles.
- Location where children and animal play.
- Location where inclined surfaces.
- Location where directly perpendicular to air flow direction.

If despite the instructions delineated of this Installation Manual, in case installing a unit in a space where all four sides are blocked and/or there are obstructions, do as your own risk and volition.

No warrant or represent the functionality; specification; quality; accuracy; or output deriving from any such unit installed in such a way and shall not be liable for any resulting cost or damage.

Do not install outdoor unit near handrail of veranda.

When installing outdoor unit at veranda of high rise building, child may climb up to outdoor unit and cross over the handrail and causing accident.

Do not install the outdoor unit in the locations listed below.

- Place where semi-underground and machine rooms.
- Place where ignition source equipment exist in the surroundings.

It is necessary to have counter measure on site against leak of refrigerant.

1.4. General information for installer

Secure a space for installation, inspection and maintenance specified in the manual.

Insufficient space can result in accident such as personal injury due to falling from the installation place.

When the outdoor unit is installed on a roof or a high place, provide permanent ladders and handrails along the access route and fences and handrails around the outdoor unit.

If safety facilities are not provided, it can cause personal injury due to falling from the installation place.

When using a frame, select the appropriate one.

Do not use the base frame for outdoor unit which is corroded or damaged due to long periods of operation.

Using an old and damage base flame can cause the unit falling down and cause personal injury.

Dispose of any packing materials correctly.

Any remaining packing materials can cause personal injury as it contains nails and wood. And to avoid danger of suffocation, be sure to keep the plastic wrapper away from children and to dispose after tear it up.

When securing the leg bolts, ensure not to damage the heat exchanger.

Ensure that everything is securely fastened to prevent any tipping or falling.

Be careful not to damage the surrounding piping when removing the transportation brackets.

The outdoor unit produces condensation during the heating operation.
Make sure to provide drainage around the outdoor unit if such condensation is likely to cause damage.

Attach wires in locations where strong winds are anticipated.

Pay attention not to damage the drain pan by weld spatter when welding work is done near the indoor unit.
If weld spatter entered into the indoor unit during welding work, it can cause pin-hole in drain pan and result in water leakage. To prevent such damage, keep the indoor unit in its packing or cover it.

1.5. Pipe installation

The piping installation work must be flushed before the outdoor unit is connected to remove contaminants.
Contaminants may damage the outdoor unit components.

Do not perform brazing or welding of water circuits near the outdoor unit.

The installation of pipe-work shall be kept to a minimum.

Pipe-work shall be securely mounted and guarded from physical damage.

Precautions shall be taken to avoid excessive vibration or pulsation to water piping.

Avoid use dented pipe and do not allow acute bending.

Be sure to insulate the water pipes so as not to condense the ambient air moisture on them.
Insufficient insulation can cause condensation, which can lead to moisture damage, and insufficient capacity by heat loss.

Install the supplied check valve at the inlet of the water circuit.
If not installed, refrigerant will flow back into the room when refrigerant leaks.

Be sure to insulate the water pipes so as people do not touch it.
Touching the water piping can cause burns.

Tighten the nut to the appropriate torque (40-50 N·m) by using two spanners and torque wrench. Be sure not to tighten the nut too much.
Loose connection or damage on the part by tighten with excess torque can cause burst or water leaks.

1.6. Electric connections

Always perform grounding work. Carry out the electrical work for ground lead 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 shortcircuiting.

Use an all-pole circuit breaker with a contact gap of 3 mm or more.
This provides complete disconnection under Overvoltage Category III. If the breaker does not have sufficient breaking capacity, it can cause the unit malfunction and fire.

Earth leakage breaker must be installed.
If the earth leakage breaker is not installed, it can cause electric shocks.

Do not use any materials other than a fuse with the correct rating in the location where fuses are to be used.
Connecting the circuit with copper wire or other metal thread can cause unit failure and fire.

Use the circuit breaker for all pole with correct capacity.
Using the incorrect circuit breaker, it can cause the unit malfunction and fire.

Install isolator or disconnect switch on the power supply wiring in accordance with the local codes and regulations.
The isolator should be locked in accordanced with EN60204-1.

Make sure the power supply cord does not contact with hot part (i.e. water piping).
High temperature may cause insulator of power supply cord damage hence electrical shock or fire.

Be careful not to bend the piping during electrical work.

Always close the cover after wiring work.

Do not touch the circuit board with bare hands.

Check that cabling will not be subject to wear, corrosion, excessive pressure, vibration, sharp edges or any other adverse environmental effects.

The check shall also take into account the effects of aging or continual vibration from sources such as compressors or fans.

When installing the power lines, do not apply tension to the cables.

If the connections are loosened, the cables can snap or break and overheating or fire may result.

Ensure the correct polarity is maintained throughout all wiring.
Otherwise, it will cause electrical shock or fire.

Shut off the power supply when using DIP switch.

1.7. Commissioning and adjusting

Check that there is no water leakage from the water circuit before starting commissioning.
If there is water leakage, you may get scalded by hot water. There is also a risk that the indoor unit or electric equipment will be damaged by the water.

Ensure to check that there are no water leaks from the water pump during the trial operation.

All automatic air vents installed in indoor water circuits MUST be closed after the air is removed from the water circuit during commissioning.

1.8. Using

Do not use the unit for special purposes such as storing foods, cooling precision instruments and preservation of animals, plants or art.
It can cause the damage of the items.

In the event of a prolonged power outage, close all shut-off valves in the water circuit and drain water from the outdoor water circuit.

The main power source should keep turned on during low ambient season.
If the power is turned off, it may cause freezing and/or damage to the unit.

Ventilate the room if there is refrigerant gas leakage during operation.

1.9. Maintenance, Removal and evacuation

1.9.1. General

Do not clean up the machines with water.
It could cause electric shock.

If the supply cord is damaged, it must be replaced by the manufacturer, its service agent or similarly qualified persons in order to avoid a hazard.

Disposal and cleaning of refrigerant should be handled by a qualified specialist.
Contact the sales company for details.

After maintenance, all wiring, wiring ties and the like, should be returned to their original state and wiring route, and the necessary clearance from all metal parts should be secured.

The base and attachments of the outdoor unit must be periodically checked for looseness, cracks or other damage.
If such defects are left uncorrected, the unit may fall down and cause damage or injuries.

If there is a risk of frozen damage, drain the heating water from the unit.

The user/owner or their authorized representative shall regularly check the alarms, mechanical ventilation and detectors, at least once a year, where as required by national regulations, to ensure their correct functioning.

Any work carried out on the outdoor unit after removing any panels which is secured by screws, must be carried out under the supervision of authorized dealer and licensed installation contractor.

Any qualified person who is involved with working on or breaking into a refrigerant circuit should hold a current valid certificate from an industry-accredited assessment authority, which authorizes their competence to handle refrigerants safely in accordance with an industry recognized assessment specification.

Servicing shall be performed only as recommended by the manufacturer.

Appropriate equipment for R290 should be used.

1.9.2. Repairs to sealed components

During repairs to sealed components, all electrical supplies shall be disconnected from the equipment being worked upon prior to any removal of sealed covers, etc.

If it is absolutely necessary to have an electrical supply to equipment during servicing then a permanently operating leak detector shall be located at the most critical point to warn of a potentially hazardous situation.

Particular attention shall be paid to the following to ensure that by working on electrical components, the casing is not altered in such a way that the level of protection is affected.
This shall include damage to cables, excessive number of connections, terminals not made to original specification, damage to seals, incorrect fitting of glands, etc.

Ensure that seals or sealing materials have not degraded to the point that they no longer serve the purpose of preventing the ingress of flammable atmospheres.

Replacement parts shall be in accordance with the manufacturer's specifications.

Check that cabling will not be subject to wear, corrosion, excessive pressure, vibration, sharp edges or any other adverse environmental effects. The check shall also take into account the effects of aging or continual vibration from sources such as compressors or fans.

1.9.3. Repair to intrinsically safe components

Do not apply any permanent inductive or capacitance loads to the circuit without ensuring that this will not exceed the permissible voltage and current permitted for the equipment in use.

Intrinsically safe components are the only types that can be worked on while live in the presence of a flammable atmosphere.

The test apparatus shall be at the correct rating.

Replace components only with parts specified by the manufacturer.
Other parts may result in the ignition of refrigerant in the atmosphere from a leak.

When the installer is performing brazing work, be sure to ventilate the room sufficiently.

Make sure that there are no hazardous or flammable materials nearby.

When performing the work in a closed room, small room, or similar location, make sure that there are no refrigerant leaks before performing the work.
If refrigerant leaks and accumulates, it may ignite.

1.9.4. Removal and evacuation

When breaking into the refrigerant circuit to make repairs - or for any other purpose - conventional procedures shall be used.
However, for flammable refrigerants it is important that best practice is followed since flammability is a consideration.

The following procedure shall be adhered to:
- safety remove refrigerant following local and national regulations;
- purge the circuit with inert gas;
- evacuate;
- continuously flush with inert gas when using flame to open circuit;
- open the circuit.

For appliances containing flammable refrigerants, the system shall be "flushed" with oxygen-free nitrogen to render the unit safe for flammable refrigerants.

Compressed air or oxygen shall not be used for purging refrigerant systems.

Purging of the refrigerant circuit, refrigerants purging shall be achieved by breaking the vacuum in the to system with oxygen-free nitrogen and continuing fill until the working pressure is achieved, then venting to atmosphere, and finally pulling down to a vacuum.
This process shall be repeated until no refrigerant is within the system.

When the final oxygen-free nitrogen charge is used, the system shall be vented down to atmospheric pressure to enable work to take place.
This operation is absolutely vital if brazing operations on the pipe-work are to take place.

Ensure that the outlet for the vacuum pump is not close to any ignition sources and that ventilation is available.

When carrying out work on the refrigerant circuit, take protective measures to prevent static discharges.

Take care of the liquid refrigerant, it may cause frostbite.

When evacuating the refrigerant, open the expansion valve and connect the hose to both check joints..

1.9.5. Charging procedures

In addition to conventional charging procedures, the following requirements shall be followed.

Ensure that contamination of different refrigerants does not occur when using charging equipment.

- Ensure that contamination of different refrigerants does not occur when using charging equipment. Hoses of lines shall be as short as possible to minimize the amount of refrigerant contained in them.
- Cylinders shall be kept in an appropriate according to the instructions.
- Ensure that the refrigerating system is earthed prior to charging the system with refrigerant.
- Label the system when charging is complete (if not already).

Prior to recharging the system, it shall be pressure tested with the appropriate purging gas.

The system shall be leak-tested on completion of charging but prior to commissioning.

A follow up leak test shall be carried out prior to leaving the site.

When servicing the outdoor unit, use only the specified refrigerant (R290) to charge the refrigerant lines.

Do not mix it with any other refrigerant and do not allow air to enter/remain in the refrigerant circuit.
If air is mixed with the refrigerant, then it can be the cause of abnormal high pressure in the refrigerant circuit, and may result in burst and personal injury.

The use of any refrigerant other than that specified for the system will cause mechanical failure or system malfunction or unit breakdown.
In the worst case, this could lead to a serious impediment to securing product safety.

Do not fill the unit with more refrigerant than the specified amount.
Failure to follow this instruction may result in unit failure or fire hazard.

To avoid fire or explosion, dissipate static electricity during transfer by grounding and bonding containers and equipment before charging/discharging.
Electrostatic charge may accumulate and create a hazardous condition when charging and discharging the refrigerant.

Ensure refrigerant charge not to leak.

Close the check joints after filling the refrigerant.

1.9.6. Decommissioning

Before carrying out this procedure, it is essential that the technician is' completely familiar with the equipment and all its detail.

It is recommended good practice that all refrigerants are recovered safely.

Prior to the task being carried out, an oil and refrigerant sample shall be taken in case analysis is required prior to re-use of recovered refrigerant.

It is essential to confirm the followings before the task is commenced.

a) Become familiar with the equipment and its operation.
b) Isolate system electrically.
c) Before attempting the procedure ensure that
- mechanical handling equipment is available, if required, for handling refrigerant cylinders,
- all personal protective equipment is available and being used correctly,
- the recovery process is supervised at all times by a competent person,
- recovery equipment and cylinders conform to the appropriate standards.

d) Make sure that cylinder is situated on the scales before recovery takes place.
e) Start the recovery machine and operate in accordance with instructions.
f) Do not overfill cylinders (no more than 80 % volume liquid charge).
g) Do not exceed the maximum working pressure of the cylinder, even temporarily .
h) When the cylinders have been filled correctly and the process completed, make sure that the cylinders and the equipment are removed from site promptly and all isolation valves on the equipment are closed off.
i) Recovered refrigerant shall not be charged into another refrigerating system unless it has been cleaned and checked.

1.9.7. Labelling

Equipment shall be labelled stating that it has been de-commissioned and emptied of refrigerant.
The label shall be dated and signed.

For appliances containing flammable refrigerants, ensure that there are labels on the equipment stating the equipment contains flammable refrigerant.

1.9.8. Recovery

When removing refrigerant from a system, either for servicing or decommissioning, it is recommended good practice that all refrigerants are removed safely.

When transferring refrigerant into cylinders, ensure that only appropriate refrigerant recovery cylinders are employed.

Ensure that the correct number of cylinders for holding the total system charge is available.

All cylinders to be used are designated for the recovered refrigerant and labelled for that refrigerant (i.e. special cylinders for the recovery of refrigerant).

Cylinders shall be complete with pressure relief valve and associated shut-off valves in good working order.

Empty recovery cylinders are evacuated and, if possible, cooled before recovery occurs.

The recovery equipment shall be in good working order with a set of instructions concerning the equipment that is at hand and shall be suitable for the recovery of all appropriate refrigerants including, when applicable, flammable refrigerants.

In addition, a set of calibrated weighing scales shall be available and in good working order.

Hoses shall be complete with leak-free disconnect couplings and in good condition.

Before using the recovery machine, check that it is in satisfactory working order, has been properly maintained and that any associated electrical components are sealed to prevent ignition in the event of a refrigerant release.
Consult manufacturer if in doubt.

The recovered refrigerant shall be according to local legislation in the correct recovery cylinder, and the relevant Waste Transfer Note arranged.
Do not mix refrigerants in recovery units and especially not in cylinders.

If compressors or compressor oils are to be removed, ensure that they have been evacuated to an acceptable level to make certain that flammable refrigerant does not remain within the lubricant.

The evacuation process shall be carried out prior to returning the compressor to the suppliers.

The compressor body shall not be heated by an open flame or other ignition sources to accelerate this process.

Draining of oil from a system shall be carried out safely.

When evacuating the refrigerant, open the expansion valve and connect the hose to both check joints.

After replacing the piping, purge the circuit with inert gas and evacuate.
Further reducing the risk of air contaminating the refrigerant circuit.

1.9.9. Other safety precautions

A brazed, welded, or mechanical connection shall be made before opening the valves to permit refrigerant to flow between the refrigerating system parts.

Flammable refrigerant used, refrigerant tubing protected or enclosed to avoid mechanical damage (IEC/EN 60335-2-40/A1).

Tubing protected to extent that it will not be handled or used for carrying during moving of product (IEC/EN 60335-2-40/A1).

Flammable refrigerant used, low temperature solder alloys, such as lead/tin alloys, not acceptable for pipe connections (IEC/EN 60335-2-40/A1).

Do not use flare nut indoor which is locally procured.

The unit needs to be treated according to WEEE. Be sure to observe the following.

Do not dispose of the unit with the household waste.

If the unit is disposed, hand in the unit to a collection center for waste electrical or electronic equipment or to a recycler.

When discharging refrigerant into the air as removal method, place the end of the hose in a well-ventilated area.

Be careful not to pinch the wiring with LID etc.

Be careful not to apply excessive stress when replacing the circuit board.

Be careful not to scratch or stain the circuit board.

Be sure to install the functional parts before energizing.

1.10. Precaution for servicing R290 refrigerant

1.10.1. Checks to the area

- Prior to beginning work on systems containing flammable refrigerants, safety checks are necessary to ensure that the risk of ignition is minimized.

1.10.2 Work procedure

- Work shall be under taken under a controlled procedure so as to minimize the risk of a flammable gas or vapor being present while the work is being performed.

1.10.3 General work area

- All maintenance staff and others working in the local area shall be instructed on the nature of work being carried out.
- Work in confined spaces shall be avoided.
- The area around the workspace shall be sectioned off.
- Ensure that the conditions within the area have been made safe by control of flammable material.
- Always ensure away from source, at least 3 meter of safety distance, or zoning of free space area of at least 3 meter in radius.

1.10.4 Checking for presence of refrigerant

- The area shall be checked with an appropriate refrigerant detector prior to and during work, to ensure the technician is aware of potentially toxic or flammable atmospheres.
- Ensure that the leak detection equipment being used is suitable for use with all applicable refrigerants, i.e. non-sparking, adequately sealed or intrinsically safe.
- In case of leakage/spillage happened, immediately ventilate area and stay upwind and away from spill/release.
- In case of leakage/spillage happened, do notify persons down wind of the leaking/spill, isolate immediate hazard area and keep unauthorized personnel out.

1.10.5 Presence of fire extinguisher

- If any hot work is to be conducted on the refrigerating equipment or any associated parts, appropriate fire extinguishing equipment shall be available to hand.
  Have a dry powder or CO2 fire extinguisher adjacent to the charging area.

1.10.6 No ignition sources

- No person carrying out work in relation to a refrigerating system which involves exposing any pipe work shall use any sources of ignition such a manner that it may lead to the risk of fire or explosion.
- All possible ignition sources, including cigarette smoking, should be kept sufficiently far away from the site of installation, repairing, removing and disposal, during which refrigerant can possibly be released to the surrounding space.
- Prior to work taking place, the area around the equipment is to be surveyed to make sure that there are no flammable hazards or ignition risks.
- ”No Smoking” signs shall be displayed.

1.10.7 Ventilated area

- Ensure that the area is in the open or that it is adequately ventilated before breaking into the system or conducting any hot work.
- A degree of ventilation shall continue during the period that the work is carried out.
- The ventilation should safely disperse any released refrigerant and preferably expel it externally into the atmosphere.

1.10.8 Checks to the refrigerating equipment

- Where electrical components are being changed, they shall be fit for the purpose and to the correct specification.
- At all times the manufacturer’s maintenance and service guidelines shall be followed.
- If in doubt, consult the manufacturer’s technical department for assistance.
- The following checks shall be applied to installations using flammable refrigerants:
  - the actual refrigerant charge size is in accordance with the room size within which the refrigerant containing parts are installed.
  - the ventilation machinery and outlets are operating adequately and are not obstructed;
  - the secondary circuit shall be checked for the presence of refrigerant,
  - marking to the equipment continues to the visible and legible.
    Markings and signs that are illegible shall be corrected,
  - refrigerating pipe or components are installed in a position where they are unlikely to e exposed to any substance which may corrode refrigerant containing components, unless the component are constructed of materials which are inherently resistant to being corroded or are suitably protected against being so corroded.

1.10.9 Checks to electrical devices

- Repair and maintenance to electrical components shall include initial safety checks and component inspection procedures.
- If a fault exists that could compromise safety, then no electrical supply shall be connected to the circuit until it is satisfactorily dealt with.
- If the fault cannot be corrected immediately but it is necessary to continue operation, an adequate temporary solution shall be used.
- This shall be reported to the owner of the equipment so all parties are advised.

- Initial safety checks shall include:
  – that capacitors are discharged: this shall be done in a safe manner to avoid possibility of sparking;
  – that no live electrical components and wiring are exposed while changing, recovering or purging the system.
  – that there is continuity of earth bonding.

1.10.10 Detection of flammable refrigerants

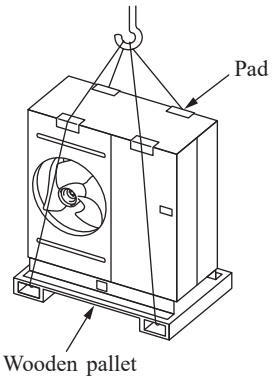
- Under no circumstances shall potential sources of ignition be used in the searching for or detection of refrigerant leaks.
- A halide torch (or any other detector using a naked flame) shall not be used.
- Electronic leak detectors may be used to detect refrigerant leaks but, in the case of flammable: refrigerants, the sensitivity may not be adequate, or may need re-calibration. (Detection equipment shall be calibrated in a refrigerant-free area.)
- Ensure that the detector is not a potential source of ignition and is suitable for the refrigerant used.
- Leak detection equipment shall be set at 2,000ppm of the refrigerant and shall be calibrated to the refrigerant employed, and the appropriate percentage of gas (25 % maximum) is contirmed.
- Leak detection fluids are suitable for use with most refrigerants but the use of detergents containing chlorine shall be avoided as the chlorine may react with the refrigerant and corrode the copper pipe-work.
  Example of leak detection methods are
  – bubble method
  – fluorescent agent method
- If a leak is suspected, all naked flames shall be removed/ extinguished.
- If a leakage of refrigerant is found which requires brazing, all of the refrigerant shall be recovered from the system.
- Removal of refrigerant shall be according to Item.1.9.

Delivery and handling

1. Transport

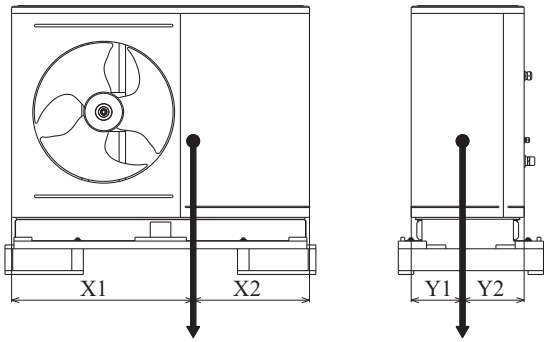
1.1. FDCM60/71/100/140VNX-P FDCM100/140VSX-P

- When a unit is hoisted with slings for haulage, take into consideration the offset of its gravity center position. Gravity center position is shown in the table below.
  If not properly balanced, the unit can be thrown off-balance and fall.
- Unit shall be hoisted without fitting fan guard.
- Deliver the unit as close as possible to the installation site before removing it from the packaging.
- When some compelling reason necessitates the unpacking of the unit before it is carried in, use nylon slings or protective wood pieces so as not to damage the unit by ropes lifting it.
- Always carry or move the unit with two or more persons.
- The right hand side of the unit as viewed from the front is heavier. The person carrying the right hand side must be aware of this.



Gravity center position with wooden pallet

Model	X1 (mm)	X2 (mm)	Y1 (mm)	Y2 (mm)
60VNX-P	693	467	210	230
71VNX-P	675	485	218	222
100VNX-P	694	466	215	225
100VSX-P	695	465	214	226
140VNX-P	684	476	221	219
140VSX-P	686	474	219	221



1.2. HMM100

- The unit must be transported and stored vertically in a dry place. The unit can be, however, carefully placed on the rear side of the casing when carrying the device into the building.

1.3. HBM140/140H

- The unit should be transported and stored vertically or horizontally on the rear wall with the display facing up. If it is in a cardboard box, please keep the unit vertically or horizontally with "FRONT" side up.
  Storage location must be dry.
  The unit can be transported into the building vertically or carefully placed on the rear wall with the display facing up.

1.4. PT300/PT300-V2/PT500

- Tank unit must be transported and stored vertically in dry conditions.

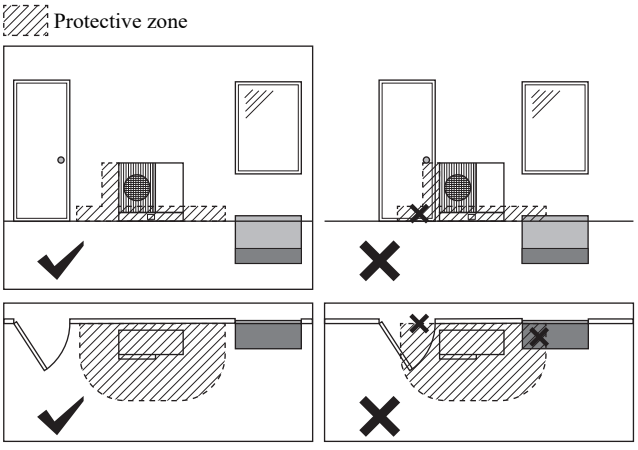
2. Selection of installation location for the outdoor unit

Be sure to select a suitable installation place in consideration of following conditions.

- Unit will be stable, horizontal and free of any vibration transmission.
- A place where it is horizontal, stable and can endure the unit weight and will not allow vibration transmittance of the unit.
- A place where it can be free from possibility of bothering neighbors due to noise or exhaust air from the unit.
- A place where the unit is not exposed to oil splashes.
- A place where it can be free from danger of flammable gas leakage.
- A place where drain water can be disposed without any trouble.
- A place where the unit will not be affected by heat radiation from other heat source.
- A place where snow will not accumulate.
- A place where the unit can be kept away 5m or more from TV set and/or radio receiver in order to avoid any radio or TV interference.
- A place where good air circulation can be secured, and enough service space can be secured for maintenance and service of the unit safely.
- A place where the unit will not be affected by electromagnetic waves and/or high-harmonic waves generated by other equipment.
- A place where chemical substances like sulfuric gas, chloric gas, acid and alkali (including ammonia), which can harm the unit, will not be generated and not remain.
- A place where strong wind will not blow against the outlet air blow of the unit.
- Do not install the unit in places which exposed to sea breeze (e.g. coastal area) or calcium chloride (e.g. snow melting agent), exposed to ammonia substance (e.g. organic fertilizer).

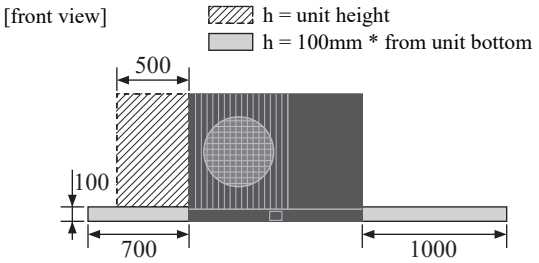
3. Protective zone

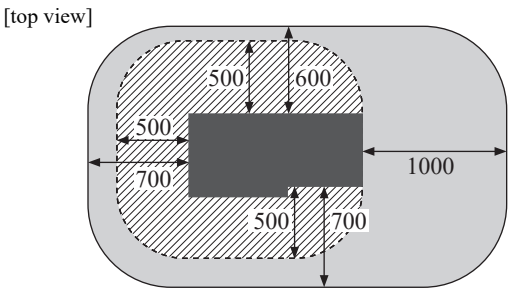
- This outdoor unit is filled with R290 (Higher flammable gas, safety A3 group per ISO 817).
- Great care must be taken when installing and servicing the unit which must be installed/serviced by a competent electrician, with the requisite professional qualifications to install this unit in your jurisdiction.
- Note that this refrigerant has a higher density than air.
- In case of a refrigerant leak, the leaked refrigerant may accumulate near the ground.
- Prevent accumulation of refrigerant in any way that is potentially dangerous, explosive or risk suffocation.
- Prevent refrigerant from entering the building through building openings. Prevent accumulation of refrigerant in the drain grooves.
- A protective zone must be maintained around the area closest to the unit.
- There must be no building openings, windows, doors, light shafts, cellar entrances, escape hatches, flat-roof windows or ventilation openings in the protective zone.
- There must be no ignition sources, such as heat above 470° C, sparks, open flame, plug sockets, light switches, lamps, electrical switches or other permanent ignitions sources, in the protective zone.
- The protective zone must not extend to adjacent buildings or public traffic areas (boundaries of neighbors, the public road, neighbor's private roads, subsidence area, depressions, pump shafts, sewers intakes, waste water shafts and so on.).

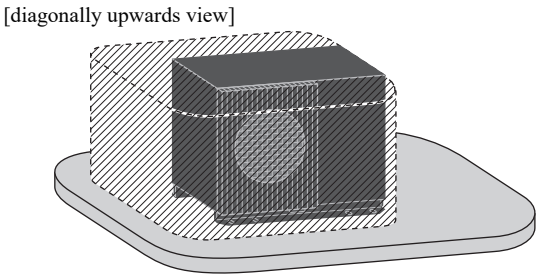


3.1. FDCM60/71VNX-P

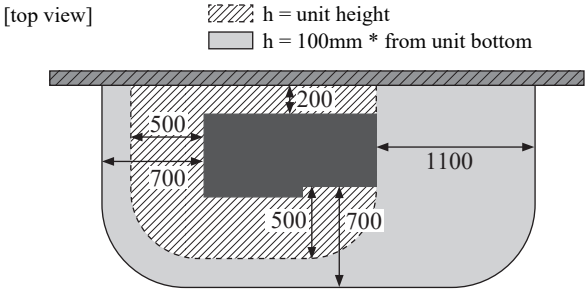
1) Protective zone for ground installation (or flat-roof installation) at the open areas



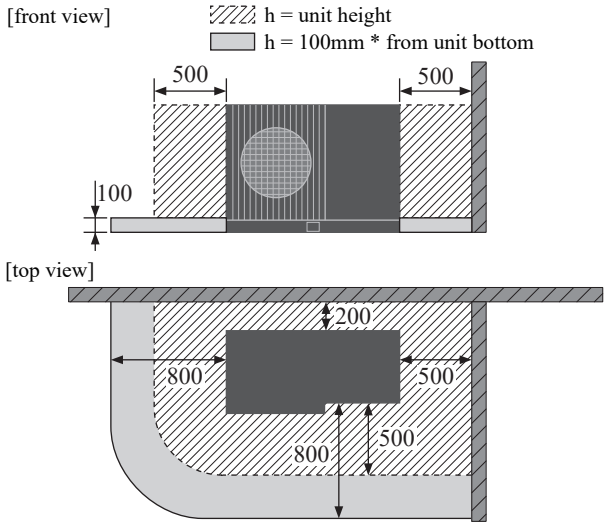




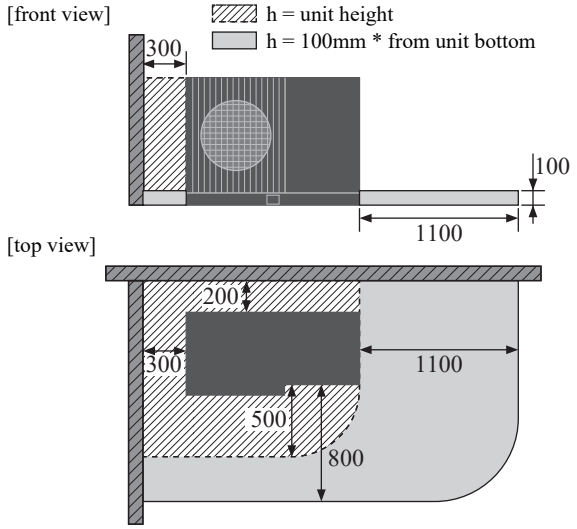
2) Protective zone for ground installation in front of a building wall



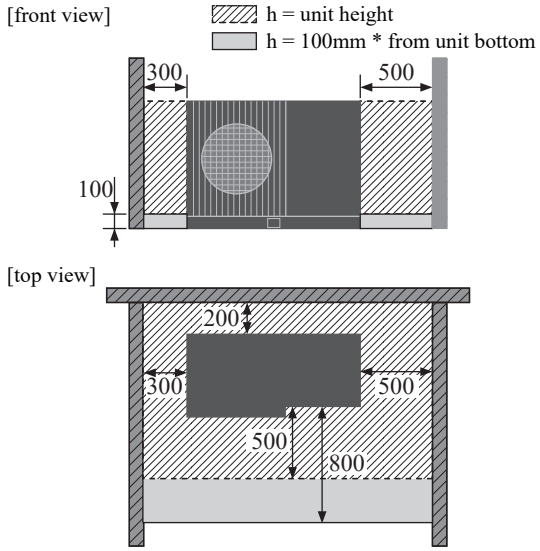
3) Protective zone for ground installation in a building corner



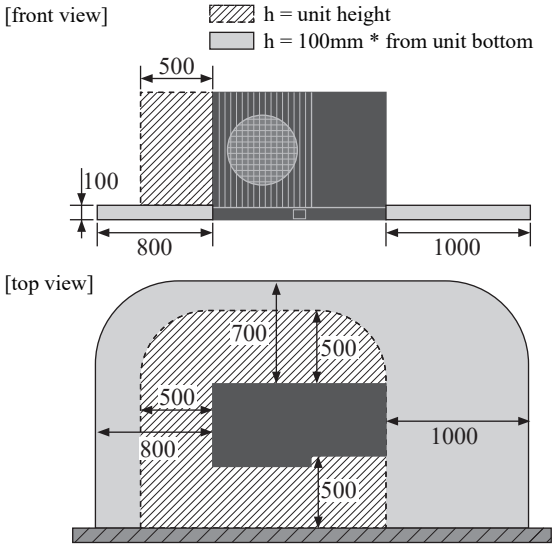
4) Protective zone for ground installation in a building left corner



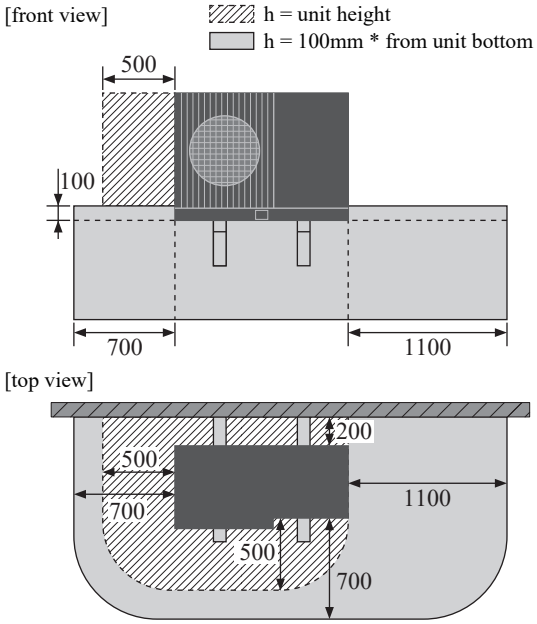
5) Protective zone for ground installation surrounded by three-sided wall



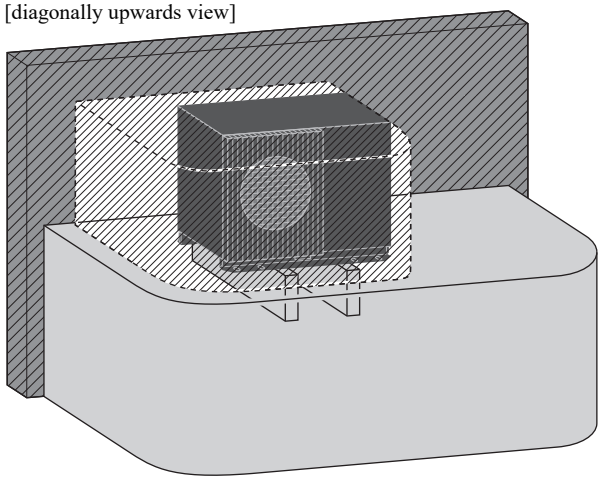
6) Protective zone for ground installation facing a building wall



7) Protective zone away from ground installation



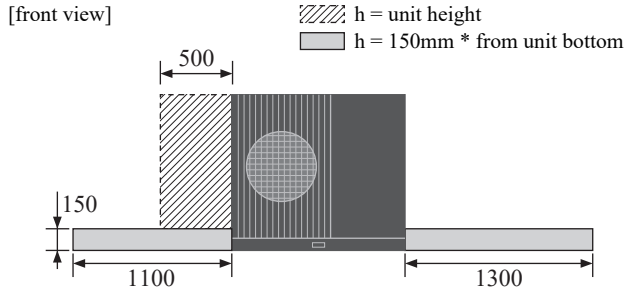
[diagonally upwards view]



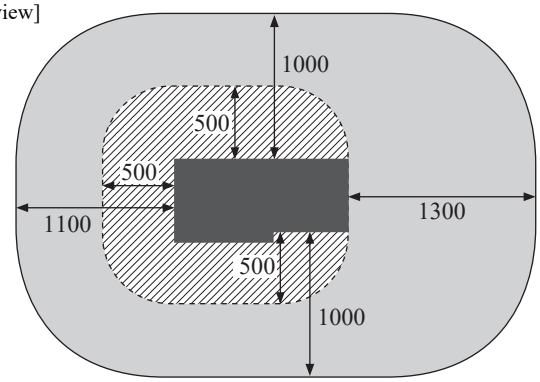
3.2. FDCM100/140VN(S)X-P

1) Protective zone for ground installation (or flat-roof installation) at the open areas

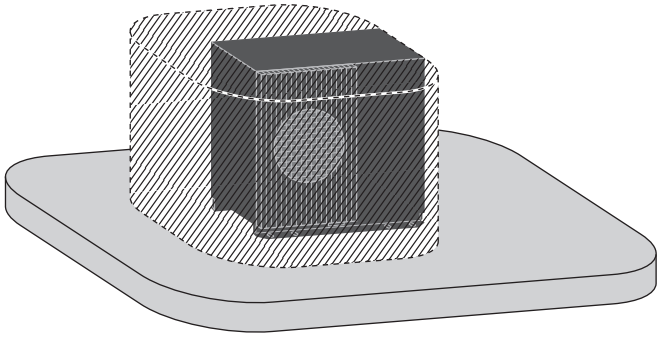
[front view]



[top view]

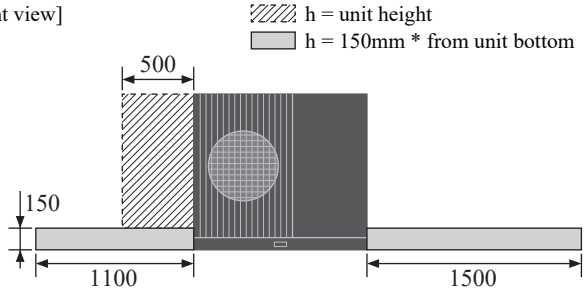


[diagonally upwards view]



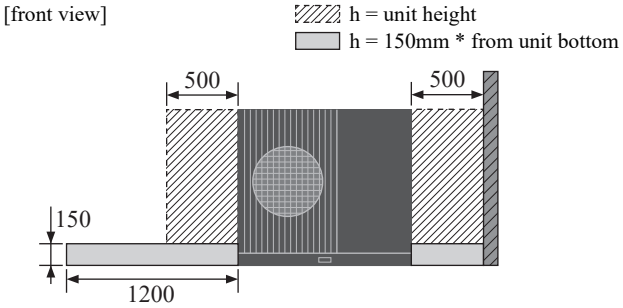
2) Protective zone for ground installation in front of a building wall

[front view]

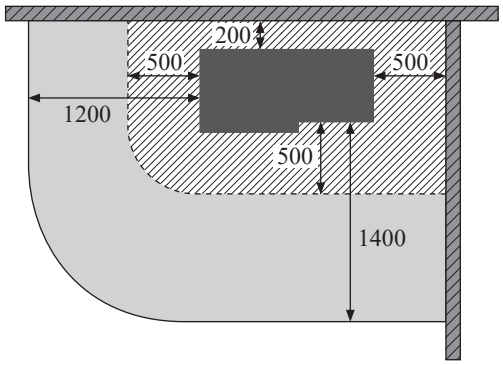


3) Protective zone for ground installation in a building right corner

[front view]

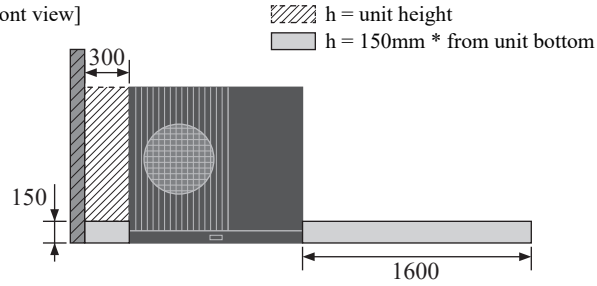


[top view]

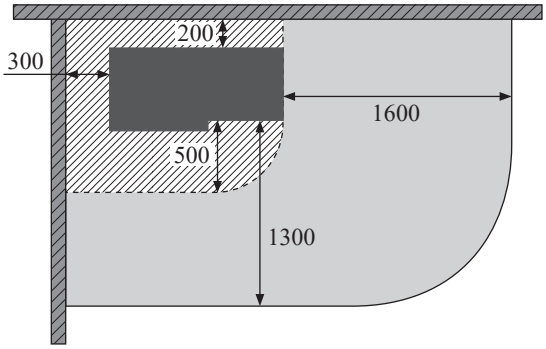


4) Protective zone for ground installation in a building left corner

[front view]

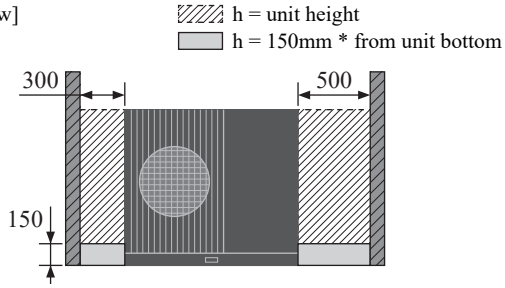


[top view]

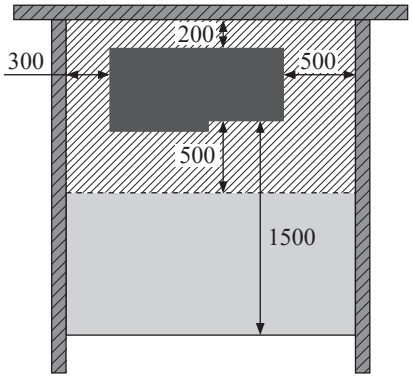


5) Protective zone for ground installation surrounded by 3-way wall

[front view]

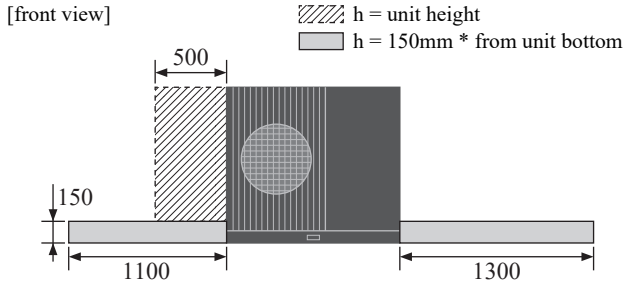


[top view]

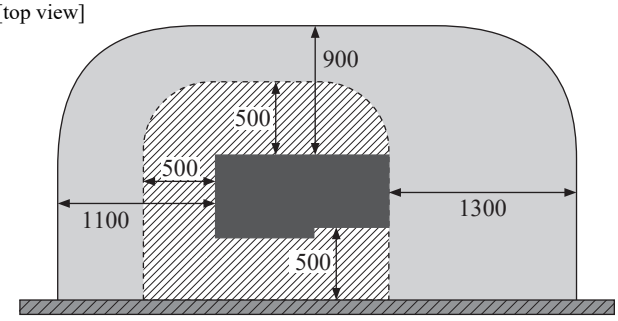


6) Protective zone for ground installation facing a building wall

[front view]

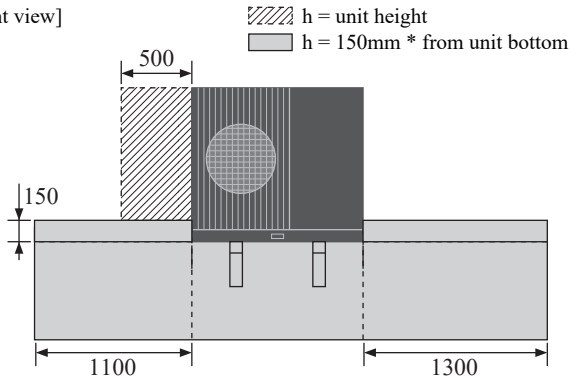


[top view]

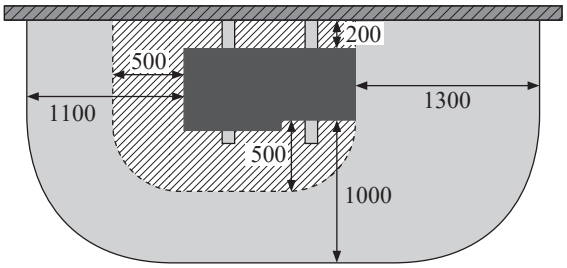


7) Protective zone away from ground installation

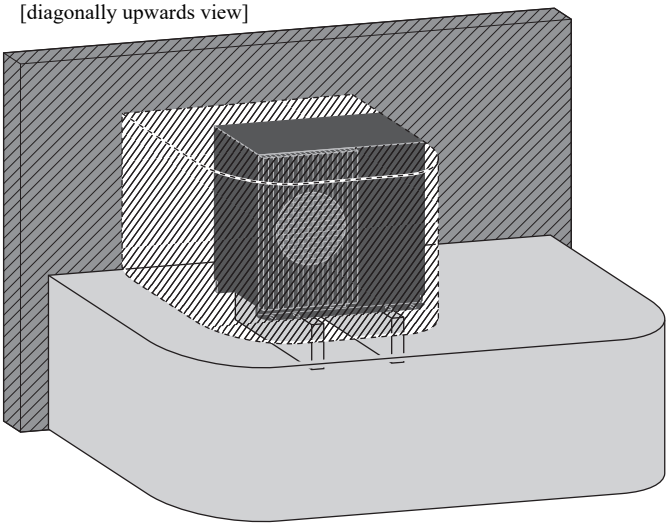
[front view]



[top view]



[diagonally upwards view]

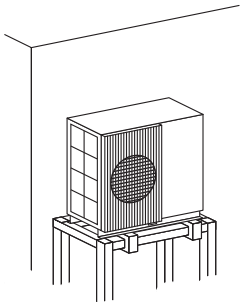


4. Caution about selection of installation location

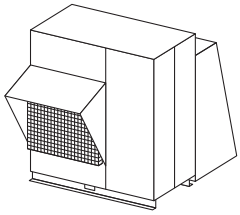
4.1. FDCM60/71/100/140VNX-P
FDCM100/140VSX-P

(1) If the unit is installed in the area where the snow will accumulate, following measures are required.
The bottom plate of unit and intake, outlet may be blocked by snow.

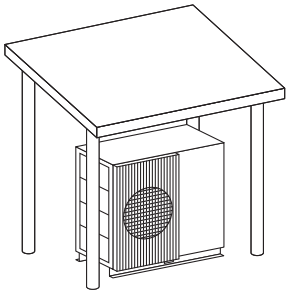
A. Install the unit of the base so that the bottom is higher than the snow cover surface.



B. Provide a snow hood to the outdoor unit on site.
Remove plastic fan guard (if already installed) and install wire fan guard (part number PCA008A361) with a snow hood.



C. Install the unit under eaves or provide the roof on site.

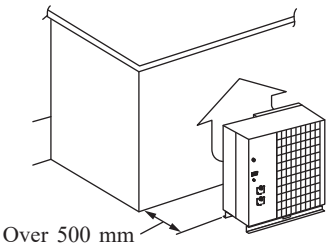


Since drain water generated by defrost control may freeze, the following measures are required.

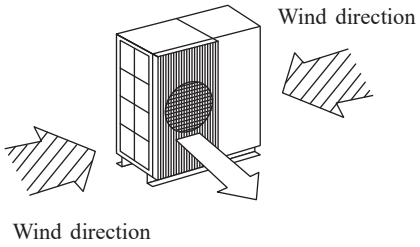
- Don't execute drain piping work without pipe heater.
- Recommend setting Defrost Control (SW2-1) and Snow Guard Fan Control (SW2-2). [Refer to Setting SW2-1, SW2-2.]

(2) If the unit can be affected by strong wind, following measures are required. Strong wind can cause damage of fan (fan motor), or can cause performance degradation, or can trigger anomalous stop of the unit due to rising of high pressure.

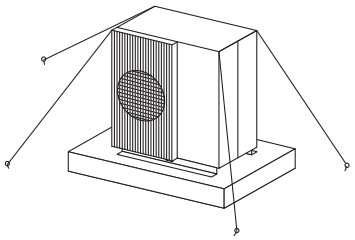
A. Install the outlet air blow side of the unit to face a wall of the building or provide a fence or a windbreak screen.



B. Install the outlet air blow side of the unit in a position perpendicular to the direction of wind.



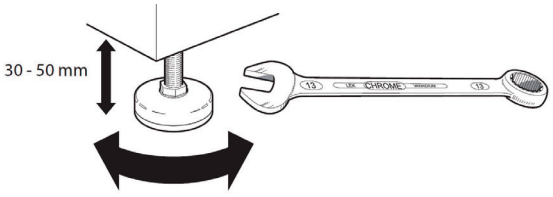
C. The unit should be installed on a stable and leveled foundation. If it is not leveled, tie down the unit with wires.



D. Use a wind guard in case the outdoor unit is installed where the ambient temperature drops below -10°C and natural wind blows into the outdoor unit direcly.

4.2. HMM100

HMM100 must be set on a solid waterproof base that would keep the weight of the indoor unit.
The regulated legs of the heat pump allow for levelling and stable setting of the device.



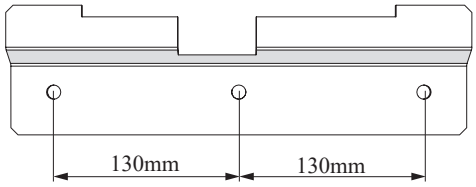
Because HMM100 is equipped with condensate drain, indoor unit installation site must be furnished with a floor drain with a discharge to the sewer system.

4.3. HBM140/140H

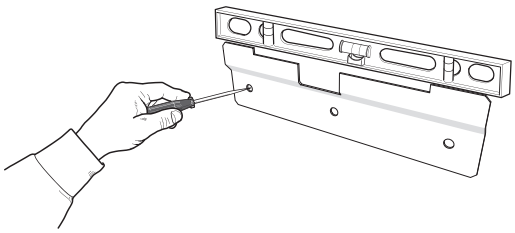
CAUTION

HBM should be hung on the wall using the hanger included in the set. The device may only be mounted in a vertical position.

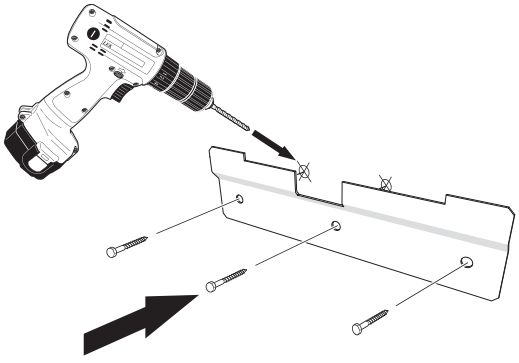
- HBM is equipped with wall-mounted hanger. For mounting hole spacing, see drawing below.
- HBM must be hung on walls of sufficient load-bearing capacity able to take the weight of a filled indoor unit.



- Since HBM is equipped with condensate drain-off system, the indoor unit must be installed at the site with sewage system drain.



1. Place the included mounting hanger horizontally against the wall. Level the hanger using the spirit level. Mark the points for the mounting holes to be drilled.

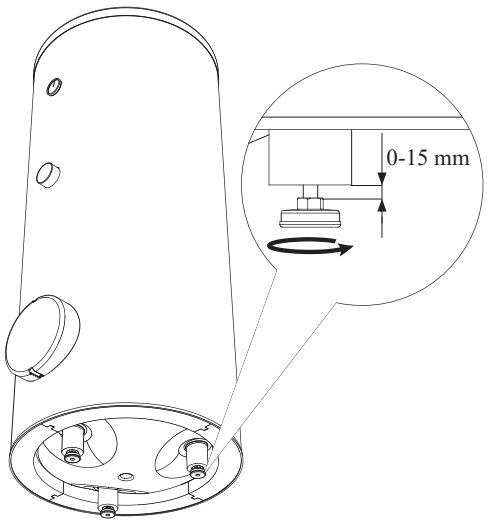


2. Drill the holes in marked points.
3. Screw the attachments to the wall using the provided rawlplugs and bolts.
4. Install HBM on the mounted hanger.
5. Level the device using the bottom adjustment screws

CAUTION

The device should be hung in a place ensuring its stable mounting. The installer independently assesses which rawplugs are suitable for the wall on which the device is to be hung.

4.4. PT300/300-V2/500



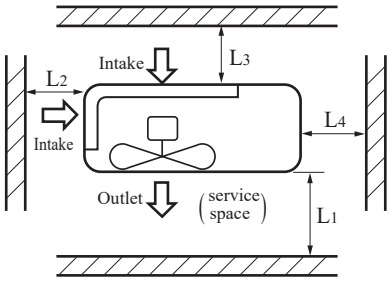
- Install tank unit indoors in order to avoid icing.
- Ensure free space described in the following figures for future maintenance.
- Tank unit must be set on a solid waterproof base that would keep the weight of the unit. The height-adjusting legs allow for levelling and stable setting.

5. Installation space (Service space)

5.1. FDCM60/71/100/140VNX-P
FDCM100/140VSX-P

The installation space for the outdoor unit:

- Walls surrounding the unit in the four sides are not acceptable.
- There must be a 1 m or larger space in the above.
- Where a danger of short-circuiting exists, install guide louvers.
- When more than one unit is installed, provide sufficient intake space consciously so that short-circuiting may not occur.
- Where pilling snow can bury the outdoor unit, provide proper snow guards.
- A barrier wall placed in front of the exhaust diffuser must not be higher than the unit.
- Advisable to keep the right space (L4) more than 500mm for easy maintenance.



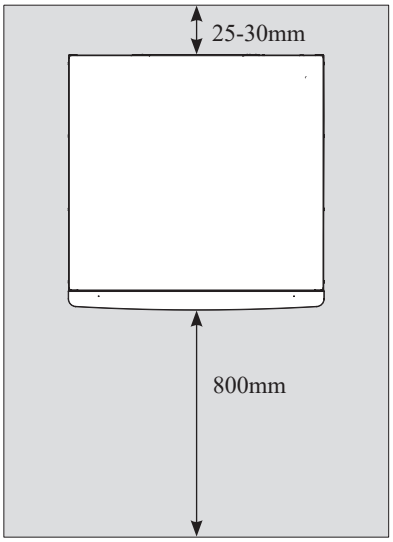
The table below shows some installation examples

FDCM60/71/100/140VNX-P FDCM100/140VSX-P			
	I	II	III
L1	Open	Open	500mm
L2	300mm	5mm (*200m)	Open
L3	150mm (*200mm)	300mm	150mm (*200mm)
L4	500mm	500mm	500mm

*Advisable to keep the service space for easy maintenance.

5.2. HMM100

Leave 800 mm free space at the front of the heat pump. All maintenance works on HMM100 can be done from the front.



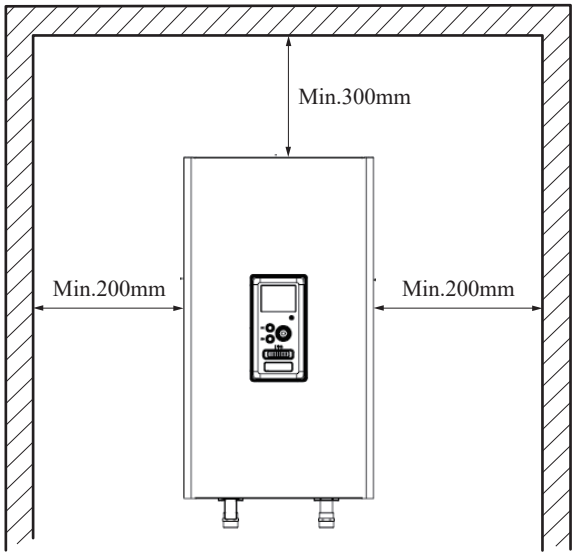
NOTE

When using an additional heat source, leave behind the device the space necessary for non trouble free connections and subsequent maintenance.

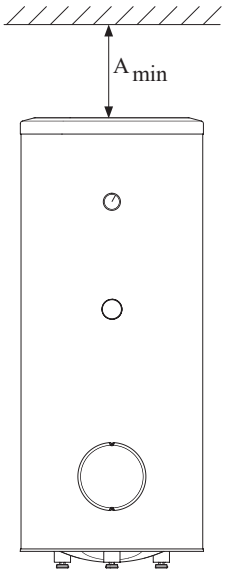
5.3. HBM140/140H

HBM can be installed in any room that meets the requirements of local regulations and is protected against temperature drop below 0°C to avoid freezing of the heating medium. 800 mm of free space should be ensured in the front of the indoor unit. All servicing of HBM can be performed from the front.

Wall placement recommendations



5.4. PT300/300-V2/500

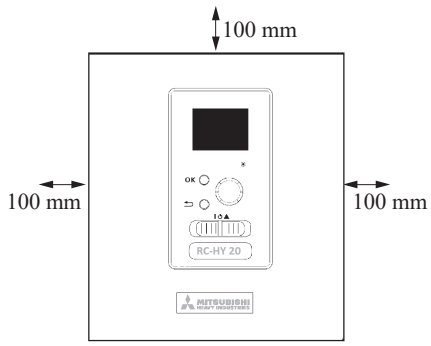


A_{min} is required on top to replace anode bar, and 500 mm is required in front to replace immersion heater if equipped.

Application	Connector pipe dia.	Type of anode	A_{min}
PT300	1"	Chain ø26 × 8	150 mm
	¾"	Titanium anode	200 mm
PT300-V2	1"	Chain ø26 × 8	150 mm
	¾"	Titanium anode	200 mm
PT500	1 1/4"	Chain ø33 × 5	150 mm
	3/4"	Titanium anode	200 mm

5.5. RC-HY20/40-W

The controller must be installed indoors and must be kept on a vertical position.
It is necessary to leave at least 100 mm free space around the controller for service and maintenance.



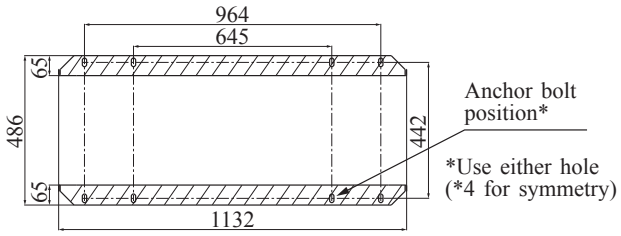
6. Outdoor unit installation

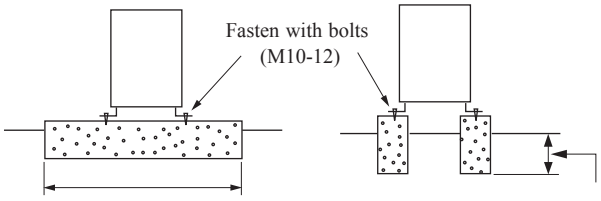
- When installing the unit, fix the unit legs with bolts as shown right.
- When installing the unit, fix the unit's legs with bolts specified on the right.
- The protrusion of an anchor bolt on the front side must be kept within 20 mm.
- Securely install the unit so that it does not fall over during earthquakes or strong winds, etc..
- Refer to the illustrations on the right for information regarding concrete foundations.
- Install the unit in a level area (With a gradient of 5 mm or less).
  Improper installation can result in a compressor failure, broken piping within the unit and abnormal noise generation.
- Construct a base to the size of a shadowed area (the entire bottom area of an outdoor unit's anchoring leg) shown on the right drawing or larger.
- Orient a base in the traversal direction (direction of W1132mm) of an outdoor unit as illustrated on the right side of this page.
- A vibration isolating rubber must support an outdoor unit's anchoring leg by its entire bottom area.

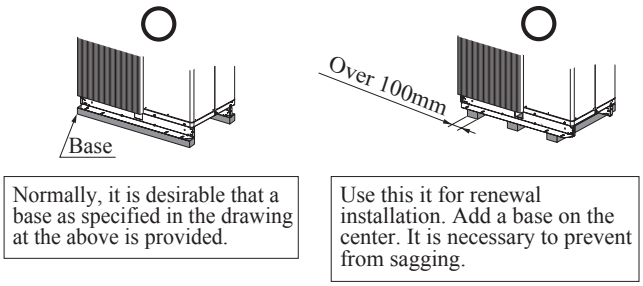
NOTE

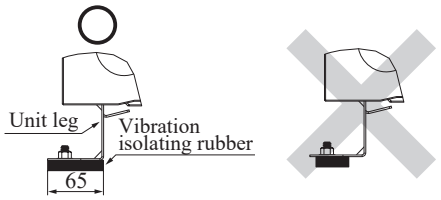
Install a vibration isolating rubber in such a manner that the entire bottom area of an outdoor unit's anchoring leg will rest on it.

Do not install an outdoor unit in such a manner that a part of the bottom area of its anchoring leg is off a vibration isolating rubber.









7. Accessories to be attached or removed before commissioning

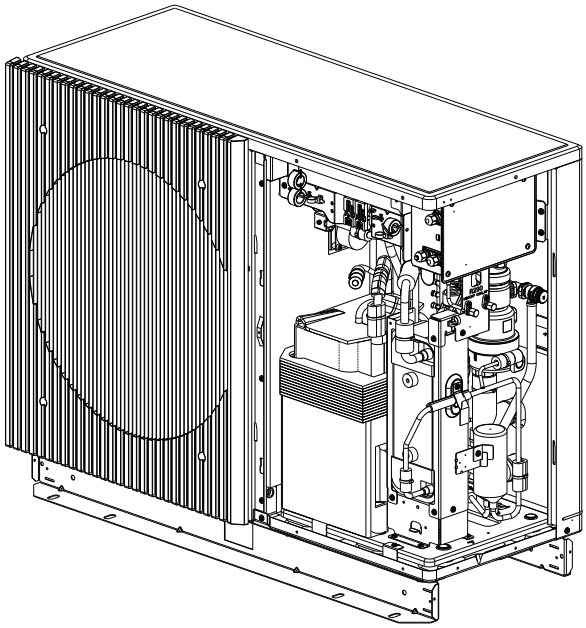
7.1. To remove transportation parts

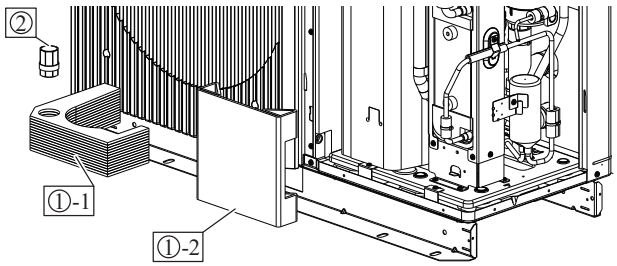
Before starting the unit operation please make sure that all the carton protections around the compressor and pipes are removed.

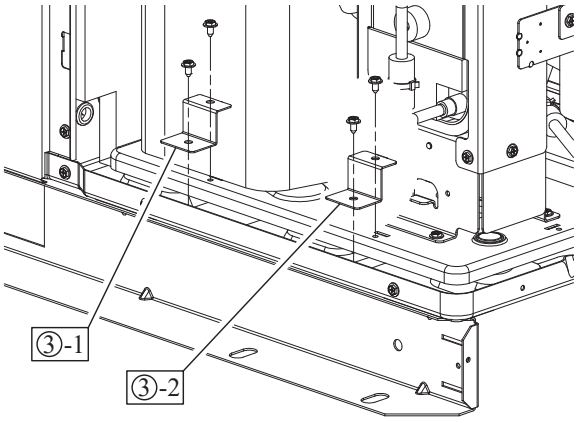
1 2 the carton parts (①-1, ①-2) to be removed are shown on the diagram below .

2 Remove the check valve ② from the carton parts ①-1

3 It is also necessary to remove the transportation brackets that come fixed on the compressor anti-vibration plate ③-1,③-2 (2 brackets, 4 screws).





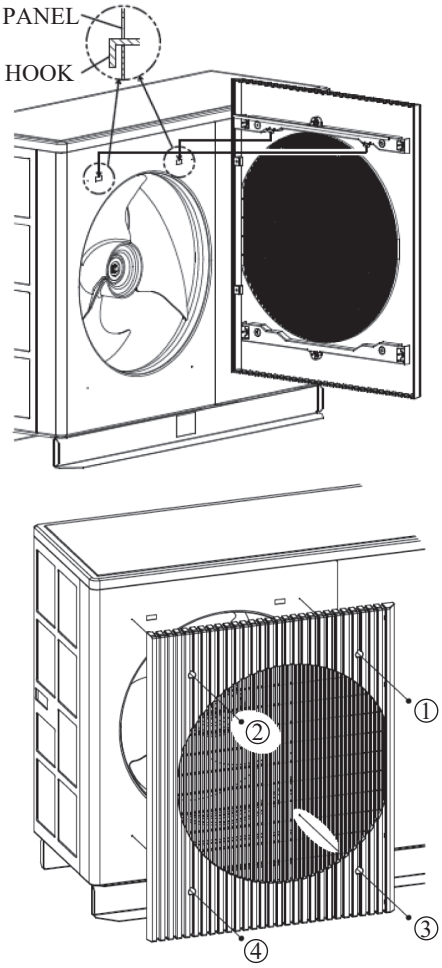


7.2. To attach fan guard

Before starting the unit operation please make sure that the fan guard is attached.

1 Hook fan guard at the hole of panel .

2 Tighten the 4 screws in the order of ①~④ as shown.
These screws are packaged in same carton as the fan guard.



CAUTION

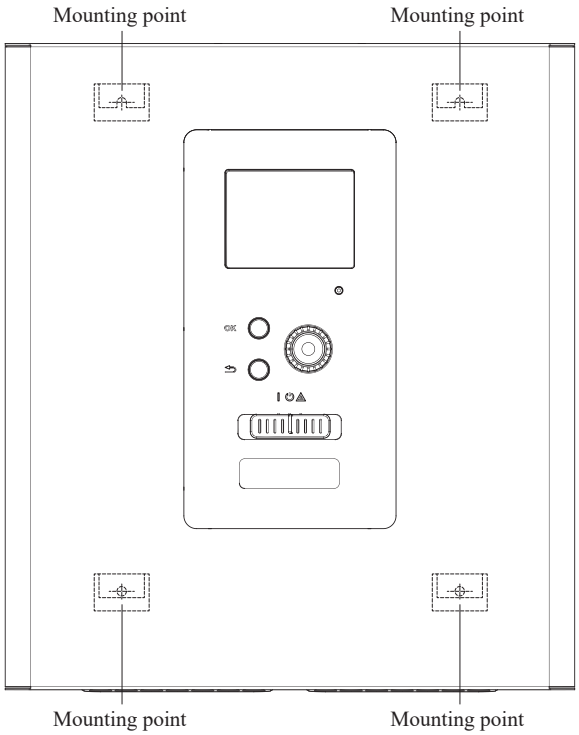
All these works must be done without any power supply on the outdoor unit.

NOTE

If the unit is operated with the parts mentioned in left, abnormal vibration or noise can be noticed.

8. Hanging control unit

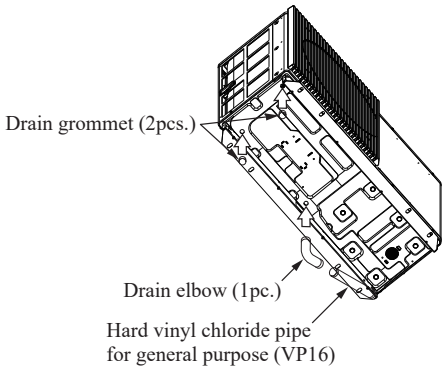
Use all mounting points and install control unit upright against a flat wall. Make sure whole back surface faces the wall.



9. Drain piping work

The outdoor unit produces condensation and for that it is necessary to prepare a dedicated drain to the outdoor unit. The following guidelines must be adhered:

- Execute drain piping by using drain elbow and drain grommets supplied as optional parts, where water drained from the outdoor unit is a problem.



- There are 3 drain holes provided on the bottom plate of an outdoor unit to discharge condensed water.
- When condensed water needs to be led to a drain, etc., install the unit on a flat base or concrete blocks.
- Connect a drain elbow as shown in the illustration and close the other two drain holes with grommets.
- Do not use drain elbow and grommet made of plastic for drain piping when base heater for outdoor unit is used.

  Plastic grommet and elbow will be damaged and burnt in worst case.
- Prepare another drain tray made of metallic material for collecting drain.
- In case plastic grommet and drain elbow is used in warm climate area, disconnect the connector for heater from the outdoor unit.
- Be careful not to injure yourself with the heat exchanger when working.
- Do not tilt the unit during drainage work.

10. Others

- In the event of a prolonged power outage, close all shut-off valves in the water circuit and drain water from the outdoor water circuit.
- Do not turn OFF the power of the system when outdoor unit is -25°C or below. If you do it there is the risk of freezing.
- Do not put anything on top of this product. It may lead to injures resulting from dropping or falling.
- Do not step onto the outdoor unit. It might be occurred injury due to drop or fall from the unit.
- Do not clean up this product with water. It may cause electric shock.
- Make sure that the unit installation foundation is not damaged due to long-term use. If it is left to stand, the unit may fall down causing injury.
- Do not insert fingers or sticks into the air inlet or outlet grilles. It may cause injuries because of the fan rotating at high speed.
- Do not touch the aluminum fin. Otherwise it may lead to injuries
- Do not store a flammable spray and so on near the unit, nor blow directly to the unit. It may lead to fire.
- If the unit has been submerged under water due to a natural disaster such as flood or typhoon, consult your dealer before using it again. If you use it as it stands, it may lead to failure, electric shock or fire.
- Glycol antifreeze is not allowed to use as heating medium.
- Water quality of the water circuit must meet the same as quality JRA water quality standards(JRA GL-02-1994) requirement.

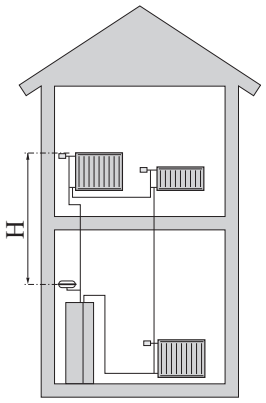
Item		Value
Standard items	pH (25˚C)	7.0 - 8.0
	Electric conductivity (25˚C)	≤ 30 mS/m
	Chloride ion	≤ 30 mgC1—/L
	Sulphate ion	≤ 30 mgSO_4^{2-}/L
	Acid consumption (pH4.8)	≤ 50 mg$CaCO_3$ /L
	Sulphide ion/acid consumption	≤ 0.5
	Total hardness	≤ 70 mg$CaCO_3$ /L
	Calcium hardness	≤ 50 mg$CaCO_3$ /L
	Ionic silica	≤ 20 mgSiO_2 /L
Reference items	Iron	≤ 1.0 mgFe/L
	Copper	≤ 1.0 mgCu/L
	Sulphide ion	Not detected
	Ammonium ion	≤ 0.1 mgNH_4 /L
	Residual chlorine	≤ 0.1 mgC1/L
	Free carbon dioxide	≤ 0.4 mgCO_2 /L
	Stability index	-

Dimensioning expansion vessel

The expansion vessel volume must be at least 5% of total water volume in the circulation system.

Initial pressure and max height difference

Recommended maximum height difference between expansion vessel and the highest point in the system is 5m.
The initial pressure of the pressure expansion vessel must be dimensioned according to the maximum height (H) between the vessel and the highest positioned radiator, see figure. An initial pressure of 0.5 bar (5 mvp) means a maximum permitted height difference of 5 m.
If the standard initial pressure in the pressure vessel is not high enough it can be increased by filling via the valve in the expansion vessel. The expansion vessel's standard initial pressure must be entered in the check list on User's manual.
Any change in the initial pressure affects the ability of the expansion vessel to handle the expansion of the water.
Consult local distributor in case height difference exceeds 5m.

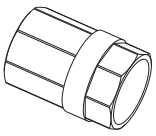


Recommended installation order

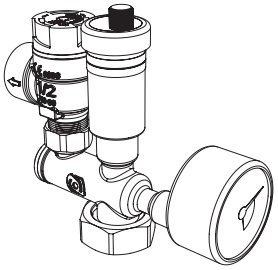
1. Place outdoor unit and hang control unit to appropriate position.
2. Connect outdoor unit to climate system, cold and hot water lines as well as any external heat sources. See page 44.
3. Connect current limiter, any centralised load control and external contacts as well as the cable between controller and outdoor unit.
4. Connect incoming electricity to outdoor unit. See page 76-77.
5. Follow the commissioning instructions on page 78-108.

Supplied components

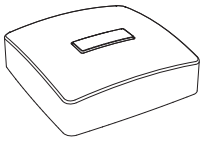
Outdoor unit
FDCM60/71/100/140VNX-P
FDCM100/140VSX-P
Check valve



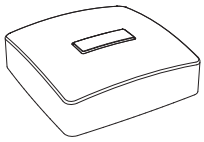
Indoor unit
HMM100



Safety group with safety valve (3 bar), pressure gauge and automatic air vent

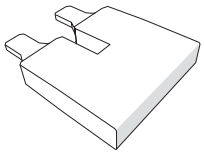


Outside sensor

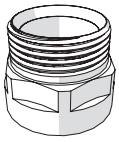


Room sensor

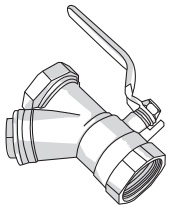
Current sensor



230V connection jumper



Connector 1”



Particle filter

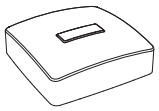
Temperature sensor BT

NOTE

The rated opening pressure of the safety valve is 3 bar.

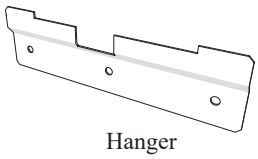
HBM140/140H

Outside sensor

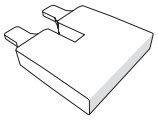


Room sensor

Temperature sensor BT

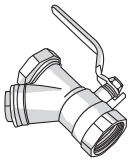


Hanger



230V connection jumper (HBM140H only)

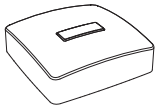
Current sensor



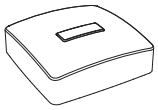
Particle filter

Controller

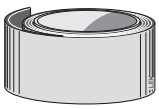
RC-HY20/40-W



Outside sensor

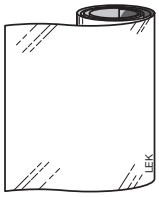


Room sensor (RC-HY40-W only)

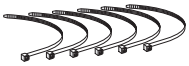


Insulation tape

Temperature sensor

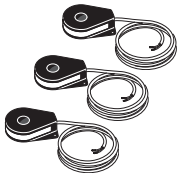


Aluminium tape



Cable ties

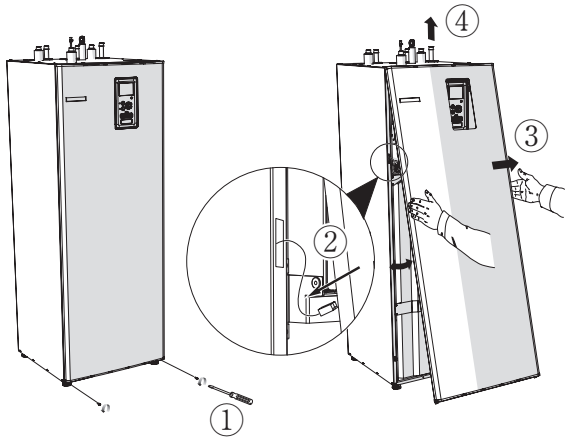
Heating pipe paste



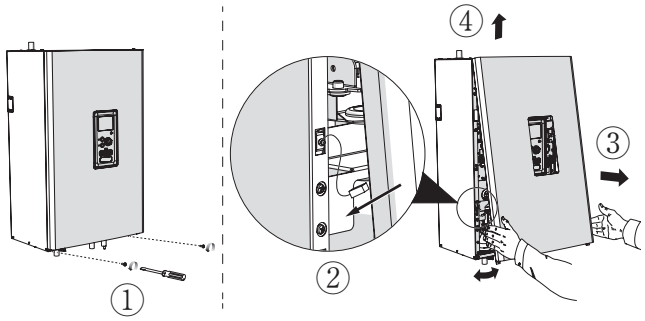
Current sensor (RC-HY40-W only)

Removing the cover

HMM100



HBM140/140H



1. Unscrew the bolts from the lower edge of the front cover ① .
2. Tilt the cover at the edge, making sure that the connection cables are not damaged and disconnect the cable grounding the front cover ② .
3. Disassemble the front cover by tilting its lower edge toward you ③ and lifting it up ④ .

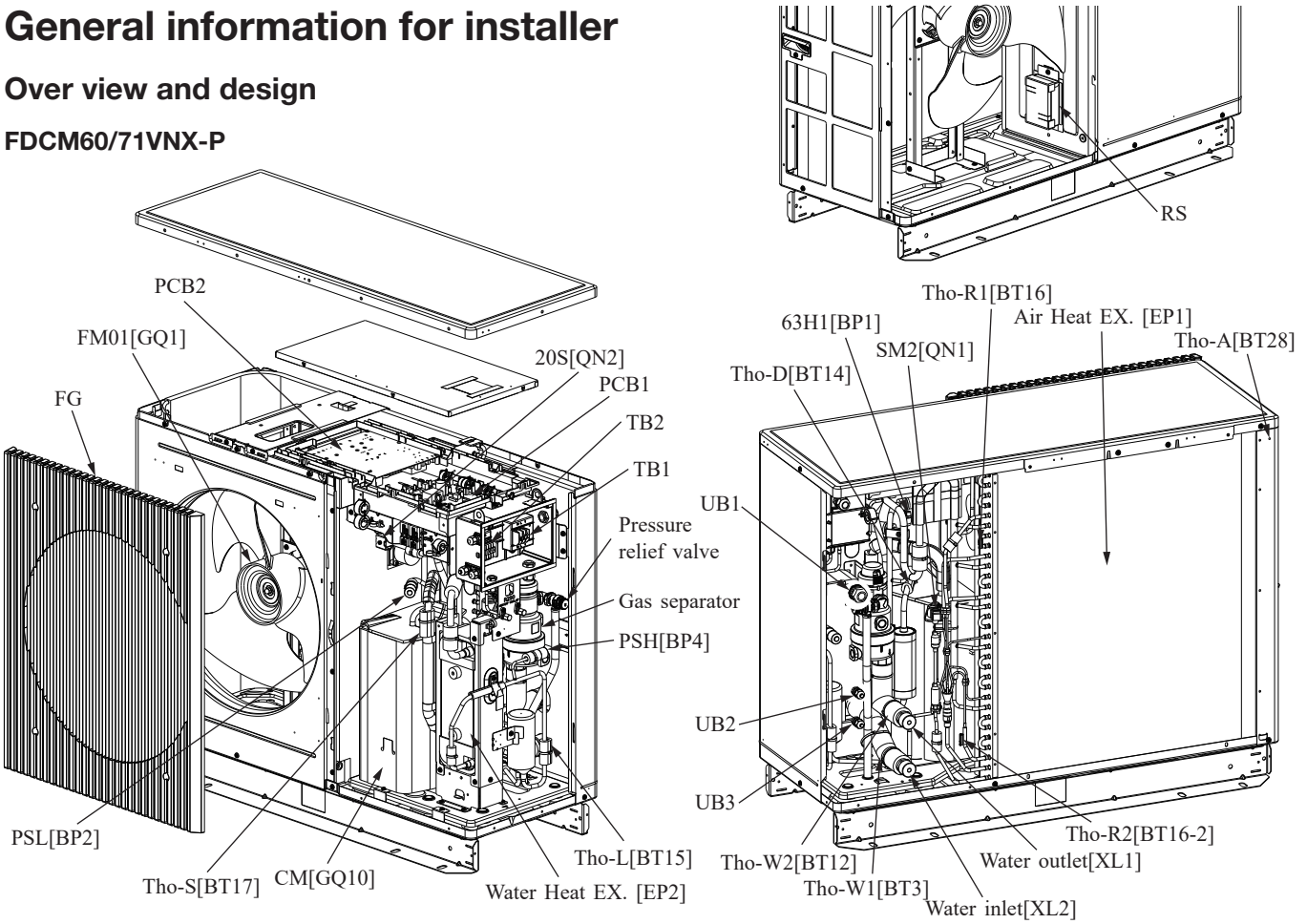
CAUTION

After reassembling the cover, the earthing wire must be connected.

General information for installer

Over view and design

FDCM60/71VNX-P



Pipe connections

Water outlet [XL1]	Climate system supply
Water inlet [XL2]	Climate system return
Gas Separator	Gas Separator
Pressure relief valve	Pressure relief valve

Sensors, switches

63H1 [BP1]	High pressure switch
PSL [BP2]	Low pressure sensor
PSH [BP4]	High pressure sensor
Tho-W1 [BT3]	Temperature sensor, climate system return
Tho-W2 [BT12]	Temperature sensor, climate system supply
Tho-D [BT14]	Temperature sensor, hot gas
Tho-L [BT15]	Temperature sensor, liquid pipe
Tho-R1 [BT16]	Temperature sensor1, Air Heat EX.
Tho-R2 [BT16-2]	Temperature sensor2, Air Heat EX.
Tho-S [BT17]	Temperature sensor, suction gas
Tho-A [BT28]	Temperature sensor, ambient
RS	Refrigerant sensor

Electrical components

PCB1	Control board
PCB2	Inverter board
TB1 [X1]	Terminal block, power supply
TB2 [X2]	Terminal block, communication with controller and other slaves (cascade)
FM01[GQ1]	Fan motor

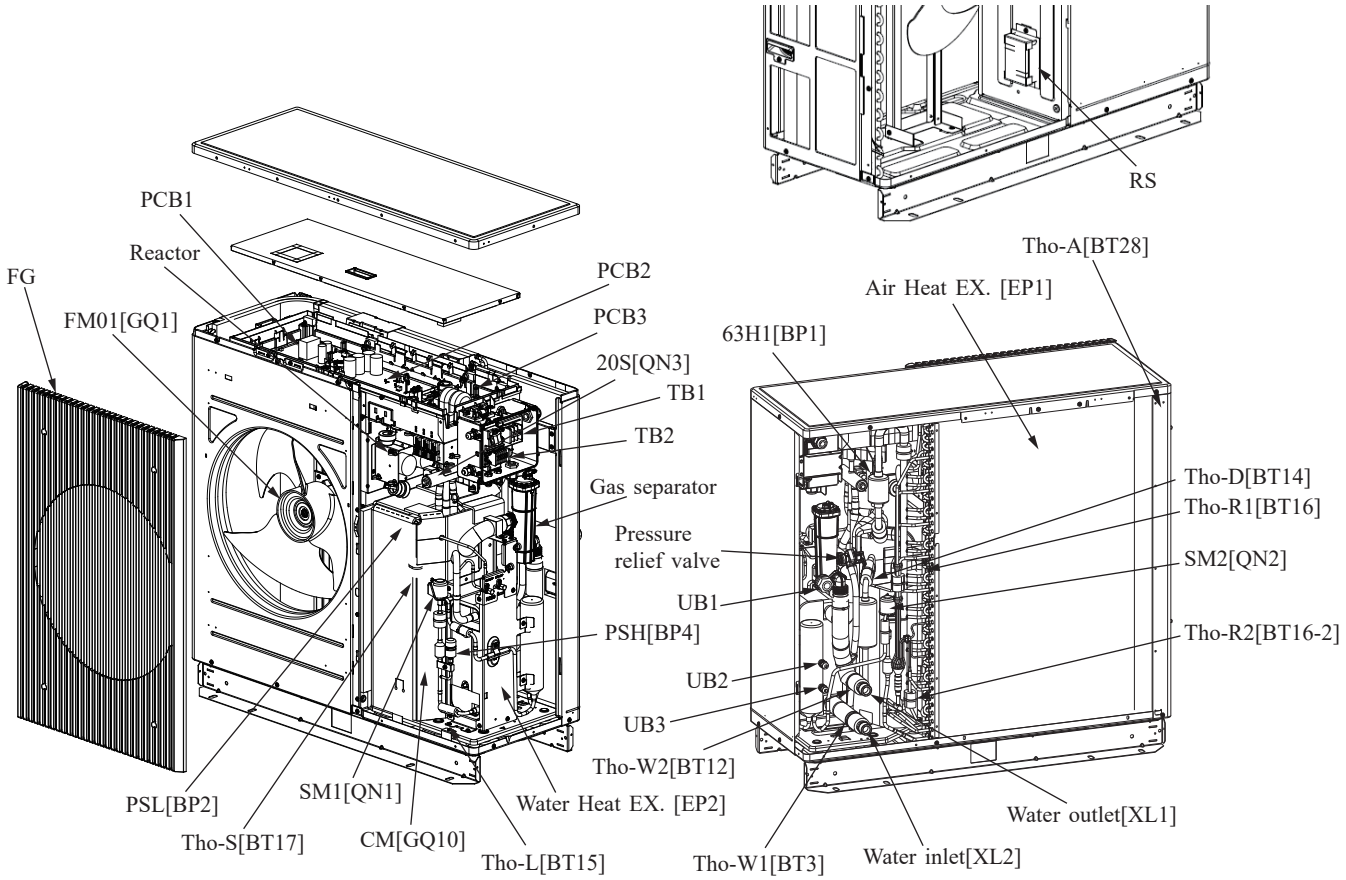
Cooling components

Air Heat EX. [EP1]	Heat exchanger, air to air
Water Heat EX. [EP2]	Heat exchanger, air to water
CM [GQ10]	Compressor
SM2 [QN1]	Expansion valve
20S [QN2]	4-way valve

Miscellaneous

UB1	Cable gland, power supply
UB2	Cable gland, communication
UB3	Cable gland, communication
FG	Fan guard

FDCM100/140VN(S)X-P



Pipe connections

Water outlet [XL1]	Climate system supply
Water inlet [XL2]	Climate system return
Gas Separator	Gas Separator
Pressure relief valve	Pressure relief valve

Sensors, switches

63H1 [BP1]	High pressure switch
PSL [BP2]	Low pressure sensor
PSH [BP4]	High pressure sensor
Tho-W1 [BT3]	Temperature sensor, climate system return
Tho-W2 [BT12]	Temperature sensor, climate system supply
Tho-D [BT14]	Temperature sensor, hot gas
Tho-L [BT15]	Temperature sensor, liquid pipe
Tho-R1 [BT16]	Temperature sensor1, Air Heat EX.
Tho-R2 [BT16-2]	Temperature sensor2, Air Heat EX.
Tho-S [BT17]	Temperature sensor, suction gas
Tho-A [BT28]	Temperature sensor, ambient
RS	Refrigerant sensor

Electrical components

PCB1	Control board
PCB2	Inverter board
PCB3	Noise filter board
TB1 [X1]	Terminal block, power supply
TB2 [X2]	Terminal block, communication with controller and other slaves (cascade)
FM01[GQ1]	Fan motor

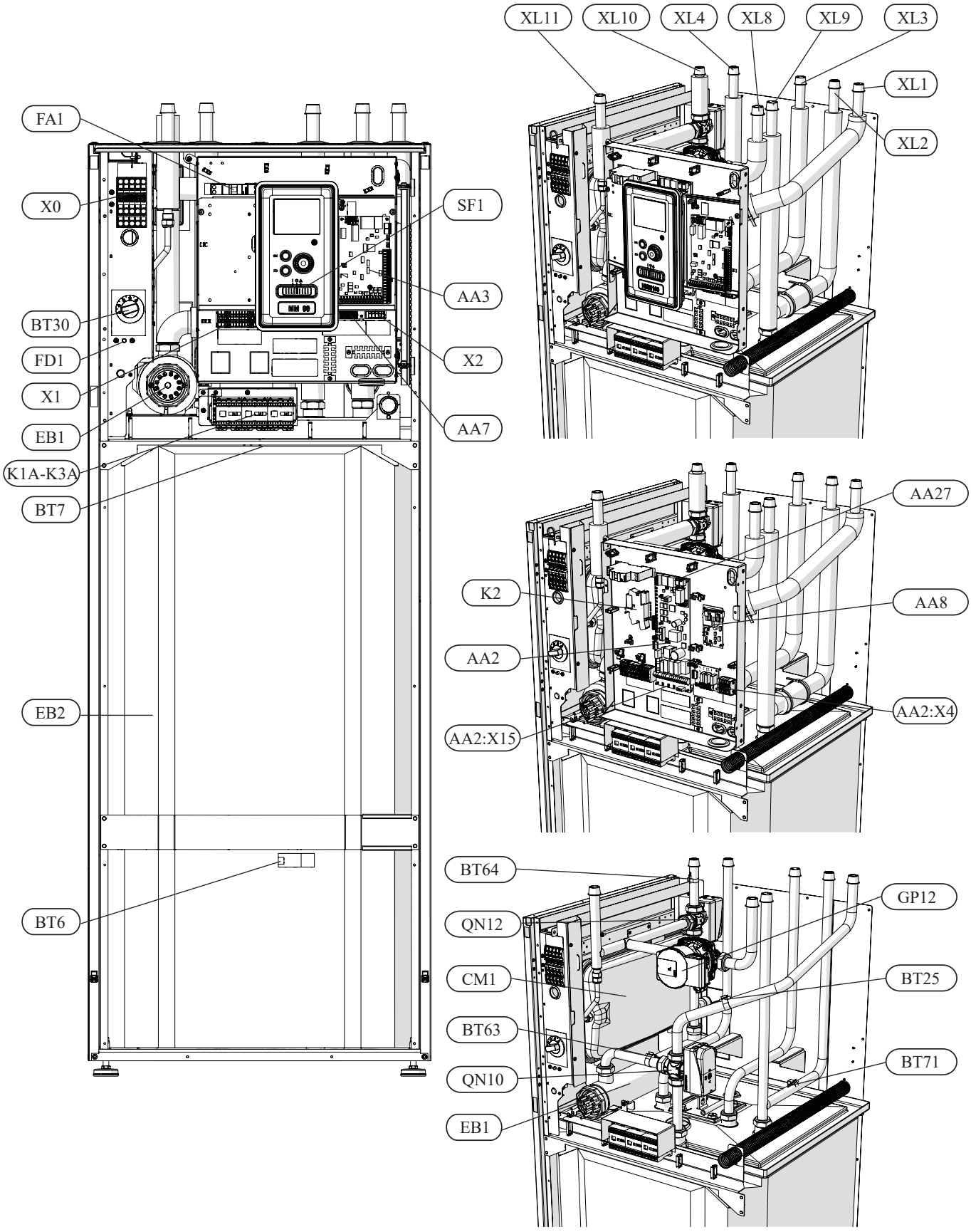
Cooling components

Air Heat EX. [EP1]	Heat exchanger, air to air
Water Heat EX. [EP2]	Heat exchanger, air to water
CM [GQ10]	Compressor
SM1 [QN1]	Expansion valve
SM2 [QN2]	Expansion valve
20S [QN3]	4-way valve

Miscellaneous

UB1	Cable gland, power supply
UB2	Cable gland, communication
UB3	Cable gland, communication
FG	Fan guard

HMM100


FA1
X0
BT30
FD1
X1
EB1
K1A-K3A
BT7
EB2
BT6
SF1
AA3
X2
AA7
XL11
XL10
XL4
XL8
XL9
XL3
XL1
XL2
AA27
K2
AA8
AA2
AA2:X4
AA2:X15
BT64
GP12
QN12
CM1
BT25
BT63
BT71
QN10
EB1

Pipe connections

XL1	Connection, heating medium, supply
XL2	Connection, heating medium, return
XL3	Connection, cold water
XL4	Connection, hot water
XL5	Connection, hot water circulation
XL8	Connection, docking from heat pump
XL9	Connection, docking to heat pump
XL10	Connection, cooling
XL11	Connection, safety group, manometer

HVAC elements

CM1	Diaphragm expansion vessel, closed
QN10	Isolation valve, domestic hot water / central heating
QN12	Isolation valve, cooling/heating
GP12	Circulation pump

Sensors

BT6	Temperature sensor, hot water loading
BT7	Temperature sensor, top of the hot water heater
BT25	Temperature sensor, heating medium supply
BT63	Temperature sensor, heating medium supply downstream the submersible heater
BT64	Temperature sensor, cooling medium supply
BT71	Temperature sensor, heating medium return

Electrical elements

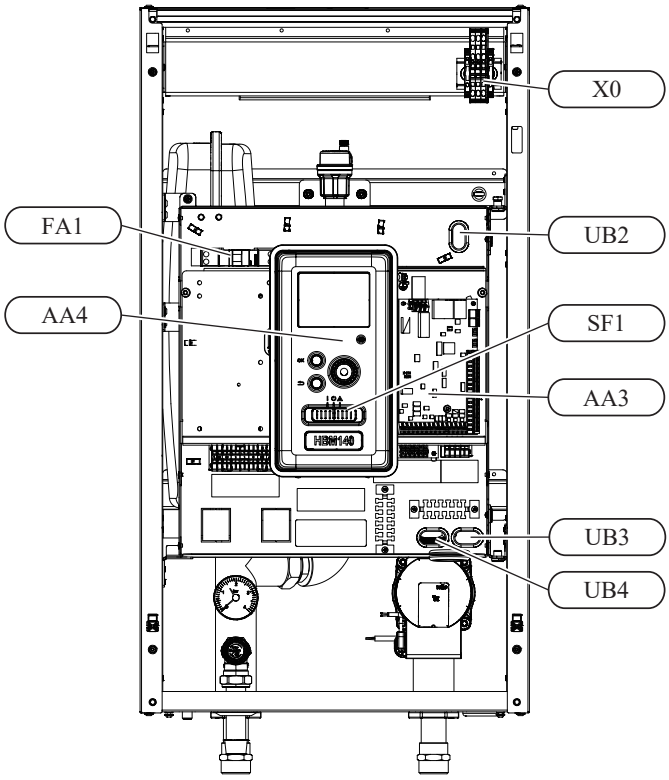
X0	High voltage terminal block 400V~/230V~
X1	Low voltage terminal block 230V~
X2	Low voltage terminal block 230V~
AA2:X4	Low voltage terminal block
AA2: X15	Low voltage terminal block
K1A-K3A	Submersible heater switch
K2	Alarm relay
BT30	Thermostat - emergency mode Main
AA2	card
AA3	Sensor card
AA7	Relay card
AA8	Titanium anode card
AA27	Relay card
FD1	Temperature limiter
FA1	Circuit breaker (to internal module)
EB1	Submersible heater

Other

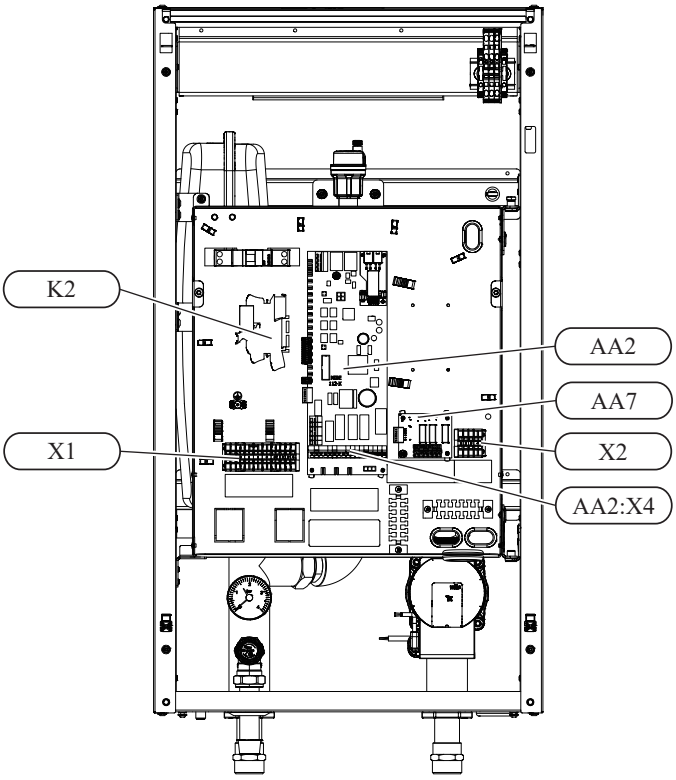
SF1	Controller switch
EB2	Domestic hot water tank

HBM140

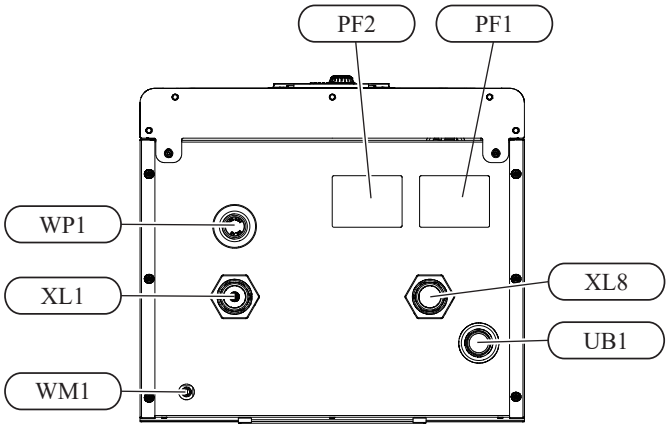
Front view



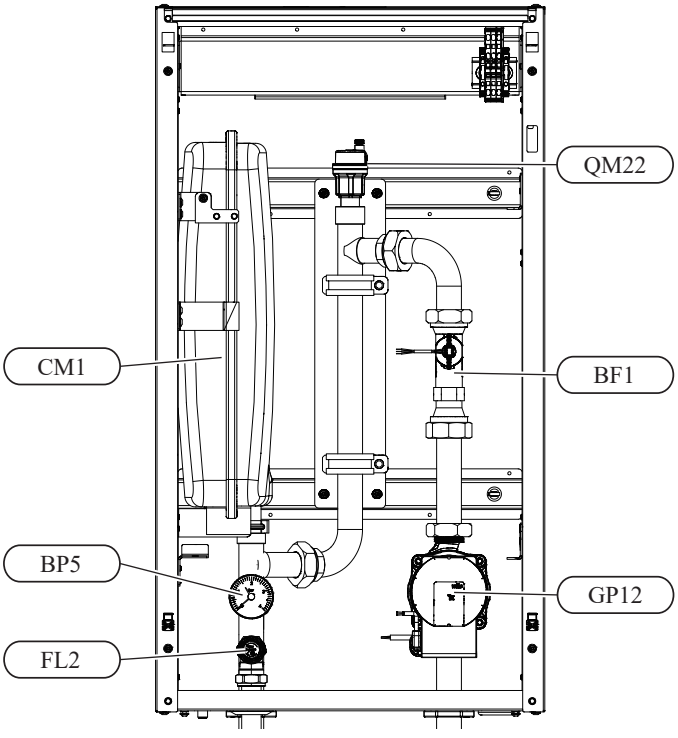
View with removed controler



Bottom view

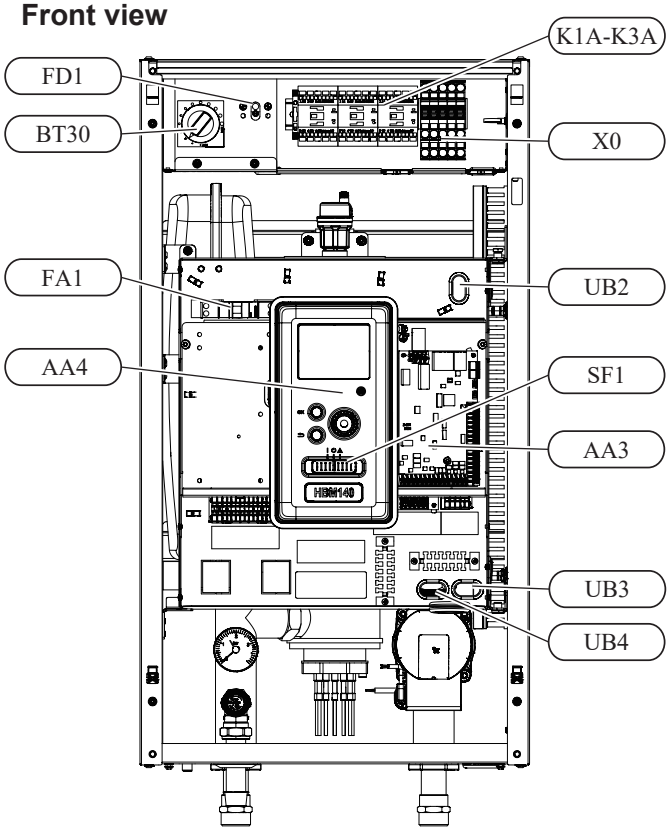


View with opened control panel

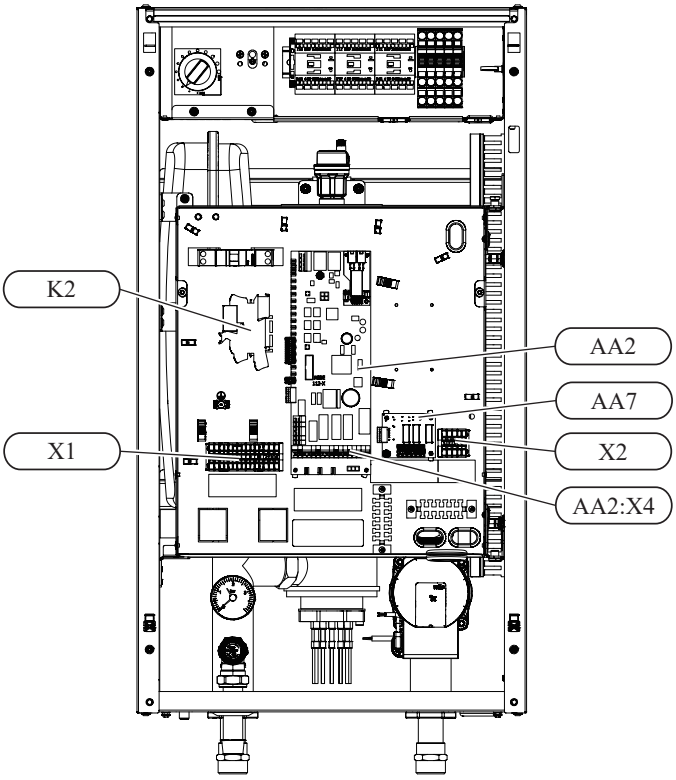


HBM140H

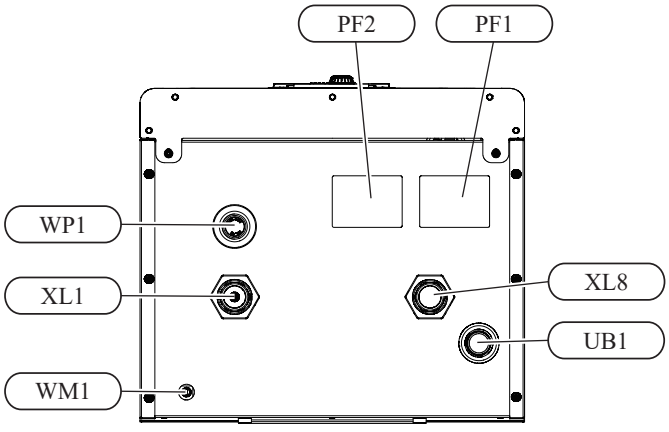
Front view



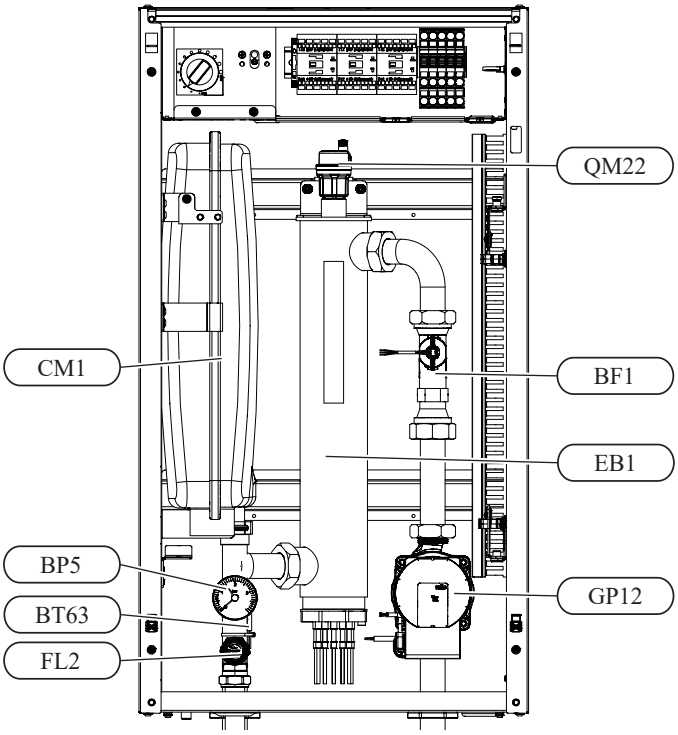
View with removed controler



Bottom view



View with opened control panel



Pipe connections

XL1	Connection, heating medium, supply
XL8	Connection, docking from heat pump
WP1	Connection, overflow pipe from safety valve
WM1	Condensate drip tray drain

HVAC components

CM1	Expansion vessel, closed
FL2	Safety valve
QM22	Automatic air venting
GP12	Circulation pump

Sensors

BP5	Pressure gauge
BT63	Temp. sensor, supply heating medium behind electric additional heat

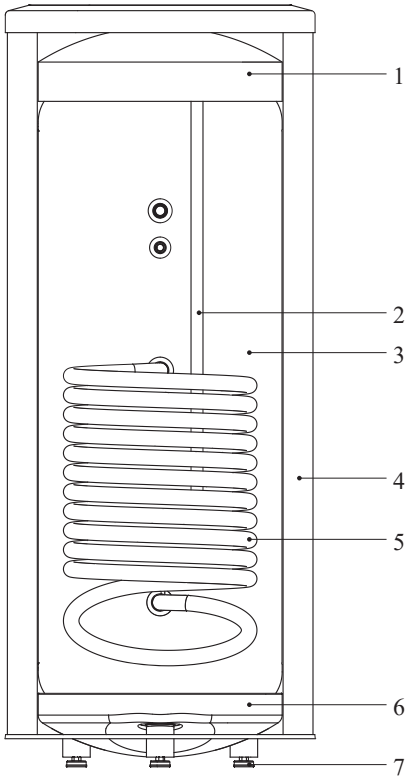
Electrical components

X0	Terminal block 230V~ (HBM140) Terminal block 400V~/230V~ (HBM140H)
X1	Control panel terminal block
X2	Control panel terminal block
AA2:X4	Terminal block - low voltage
K1A-K3A	Contactors for electric additional heat (HBM140H)
K2	Alarm relay
BT30	Standby mode thermostat (HBM140H)
AA2	Main board
AA3	Input board
AA7	Extra relay circuit board
FD1	Thermal circuit breaker
FA1	Miniature circuit breaker (protecting the control system of indoor unit)
EB1	Electric additional heat (HBM140H)

Miscellaneous

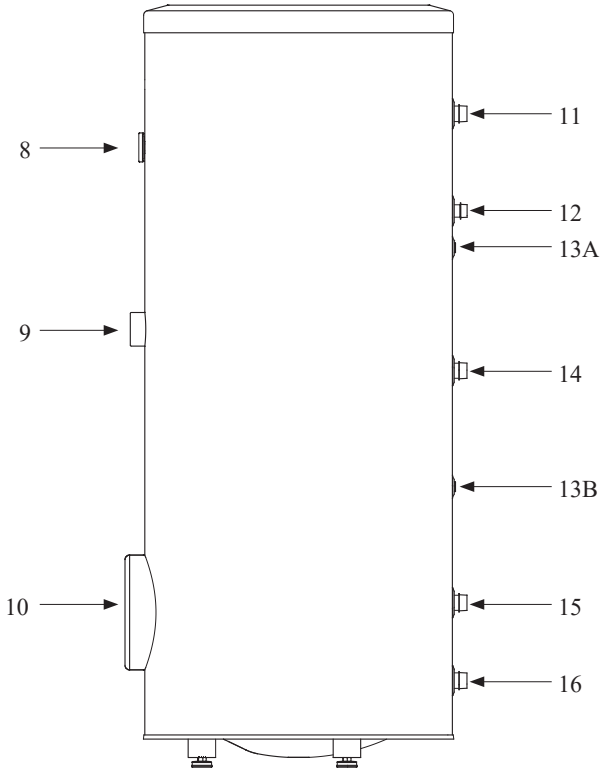
BF1	Flow sensor
SF1	Controller switch
AA4	Controller
PF1	Nameplate
PF2	Plate with the designation of the hydraulic connections
UB1- UB4	Cable grommets

PT300/500



Section of the PT300/500 storage tanks.

1. Upper insulation of the storage tank
2. Protective magnesium anode
3. Enamelled tank
4. Side insulation of the storage tank
5. Coil
6. Lower insulation of the storage tank
7. Adjustable foot



Side view of the PT300/500 storage tanks.

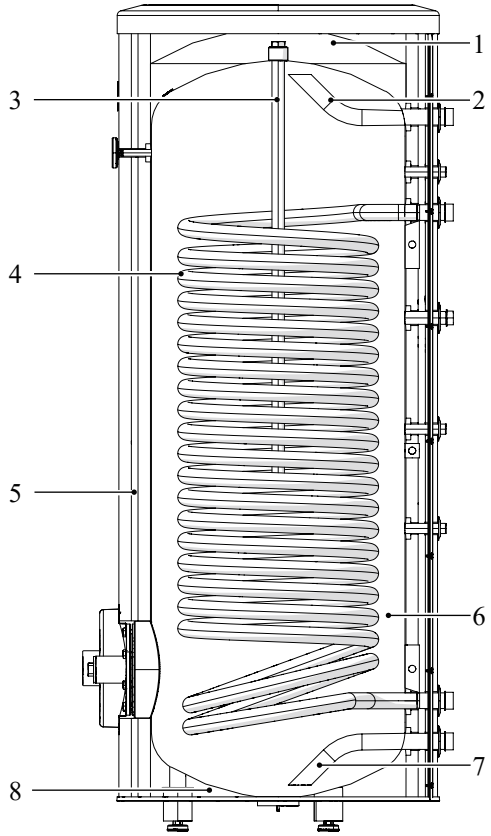
8. Thermometer
9. Connector pipe for mounting electric heating unit
10. Inspection opening
11. Hot water intake connector pipe
12. Hot water circulation connector pipe

13A BT7 temperature sensor cover

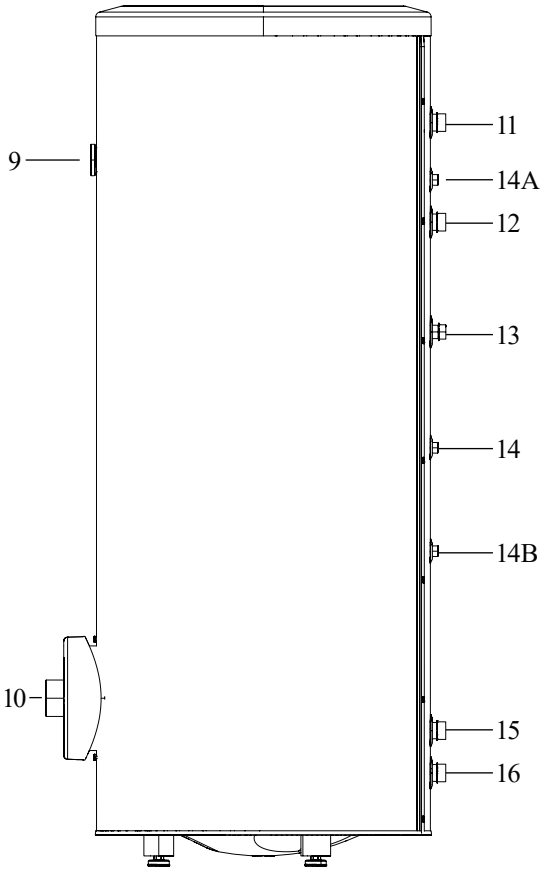
13B BT6 temperature sensor cover

14. Coil supply connector pipe
15. Connection of return line from the coil
16. Cold water supply connector pipe

PT300-V2



Section of the PT300-V2 storage tank



Side view of the PT300-V2 storage tank

1. Upper insulation of the storage tank
2. Hot water intake pipe
3. Protective magnesium anode
4. Coil
5. Thermal insulation
6. Enamelled tank
7. Cold water supply pipe
8. Lower insulation of the storage tank

9. Thermometer
10. Inspection opening with 1½" Female sleeve
11. Hot water intake connector pipe
12. Coil supply connector pipe
13. Hot water circulation connector pipe
14. Temperature sensor cover

14A. BT7 temperature sensor cover

14B. BT6 temperature sensor cover

15. Connection of return line from the coil
16. Cold water supply connector pipe

Installation requirements

Outdoor unit	FDCM60VNX-P	FDCM71VNX-P	FDCM100VN(S)X-P	FDCM140VN(S)X-P
Highest recommended supply/return temperature	75/70˚C			
Max pressure, climate system	0.3 MPa (3 bar)			
Max temperature, climate system	75˚C			
Max temperature from external source	85˚C			
Max return temperature to outdoor unit	70˚C			
Max supply temperature with compressor (heating/hot water mode)	75˚C			
Min supply temperature with compressor (cooling mode)	5˚C			
Min volume, climate system during heating, cooling	50L	50L	80L	100L
Min volume, climate system during underfloor cooling	80L	80L	100L	120L
Max flow, climate system	0.42L/s	0.50L/s	0.73L/s	0.88 L/s
Min flow, climate system (only heating mode)	0.08L/s	0.12L/s	0.13 L/s	0.23 L/s
Min flow, climate system (with cooling mode)	0.11L/s	0.15L/s	0.20 L/s	0.32 L/s
Nominal system flow (heating mode)	0.26L/s	0.40L/s	0.49L/s	0.62L/s
Nominal system flow (cooling mode)	0.36L/s	0.43L/s	0.62 L/s	0.70 L/s

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

Docking alternatives

It is possible to combine several outdoor units, hot water tanks and other accessories with RC-HY controllers.
Depending on the type of installation the controller must be chosen.
Please refer to the below table in order to make the correct selection.

Function	RC-HY20-W	RC-HY40-W***
Heating	○	○
Cooling	○	○
Hot water	○	○
Hot water circulation*	○	○
Hot water comfort*	–	○
Remote monitoring	○	○
Extra climate system*	–	○
Solar heating*	–	○
Solar electricity*	–	○
Pool heating*	–	○
Shunt control additional heat*	–	○
Modbus*	–	○
Energy meter*	–	○
Cascade control*, ***	–	○

*Accessories are required

** RC-HY40-W functions are same as HMM100, HBM140 and HBM140H.

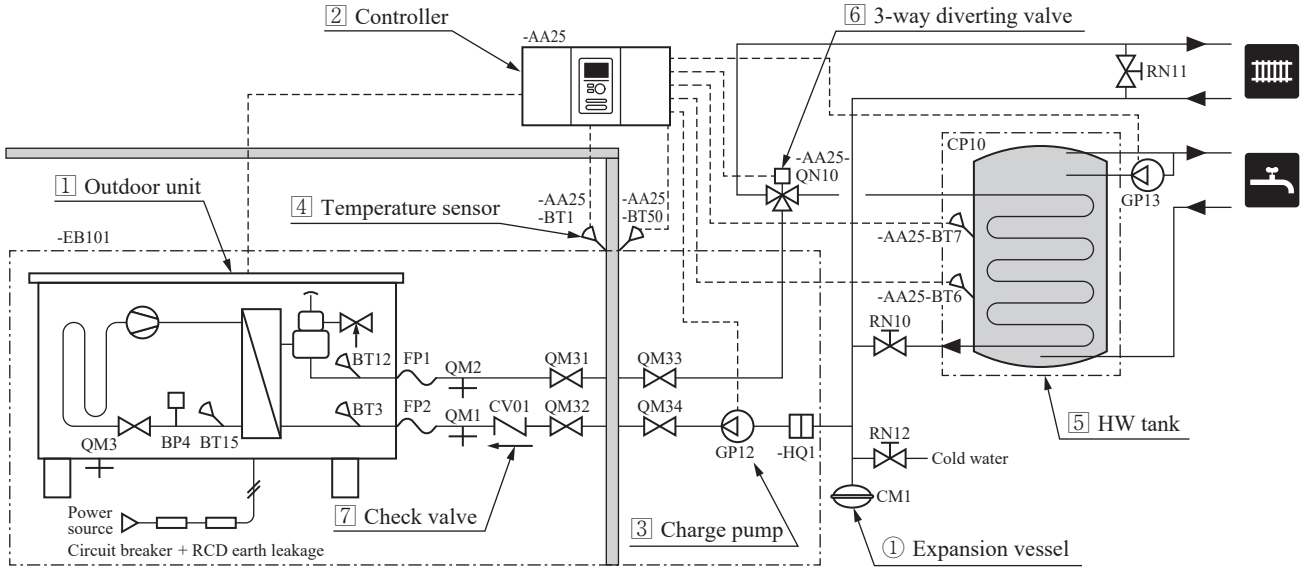
*** In case of HMM100 and HBM140H cascade control cannot be applied.

Pipe installation

General

Pipe installation must be carried out in accordance with current norms and directives.
This heat pump is designed for low (35°C) and medium (55°C) temperature space heating systems but it is possible to reach an outgoing temperature of 75°C with the compressor.
For future maintenance and servicing it is recommended to install shut-off valves on the outdoor unit and these must be procured locally.
The same applies for all the necessary security devices on the hydraulic system (ex. pressure relief valve + expansion vessel).
See below typical diagram and necessary components.

Typical diagram: Heating and domestic hot water production



Components list: Heating and domestic hot water production

(a) Procured at MHI

Part no.	Part name	Model	General description
1	Outdoor unit	FDCM60VNX-P FDCM71VNX-P FDCM100VNX-P FDCM140VNX-P FDCM100VSX-P FDCM140VSX-P	Outdoor unit for hot water, heating and cooling. Operates down to -25°C Equipped with Gas separator, Relief valve and Automatic air vent
2	Controller	RC-HY20-W RC-HY40-W	To control and monitor the climate system. RC-HY20-W - Basic controller RC-HY40-W - Advanced controller
3	Charge pump [GP12]	CPD11-25M/65 CPD11-25M/75	To circulate the water in the climate system.
4	Temperature sensor	-	To monitor and control the climate system, hot water operation or any other connected accessory. Example: **BT1** - Outdoor temperature sensor **BT6** - Tank temperature sensor, bottom **BT7** - Tank temperature sensor, top

Part no.	Part name	Model	General description
5	HW tank	PT300 PT300-V2 PT500	Indirect domestic hot water storage tank PT300/PT300-V2 - 300 L(1coil) PT500 - 500L (1coil)
6	3-way diverting valve [QN10]	VST05M VST11M VST20M	To divert between heating and hot water production.
7	Check valve [CV01]		To prevent refrigerant from flowing back if refrigerant leaks.

(b) Procured locally

Part no.	Part name	Model	General description
①	Expansion vessel	-	To keep the system pressure constant as the water is heated up and cools down again.

Symbol key

Symbol	Meaning	Symbol	Meaning
	Venting valve		Temperature sensor
	Shut-off valve		Expansion vessel
	Check valve		Anti-vibration joint
	Control valve		Circulation pump
	Safety valve		Shunt / shuttle valve
	Drain valve		Particle filter

System requirements

The minimum water volume in the climate system is subject to the values in the table below.

(liter)

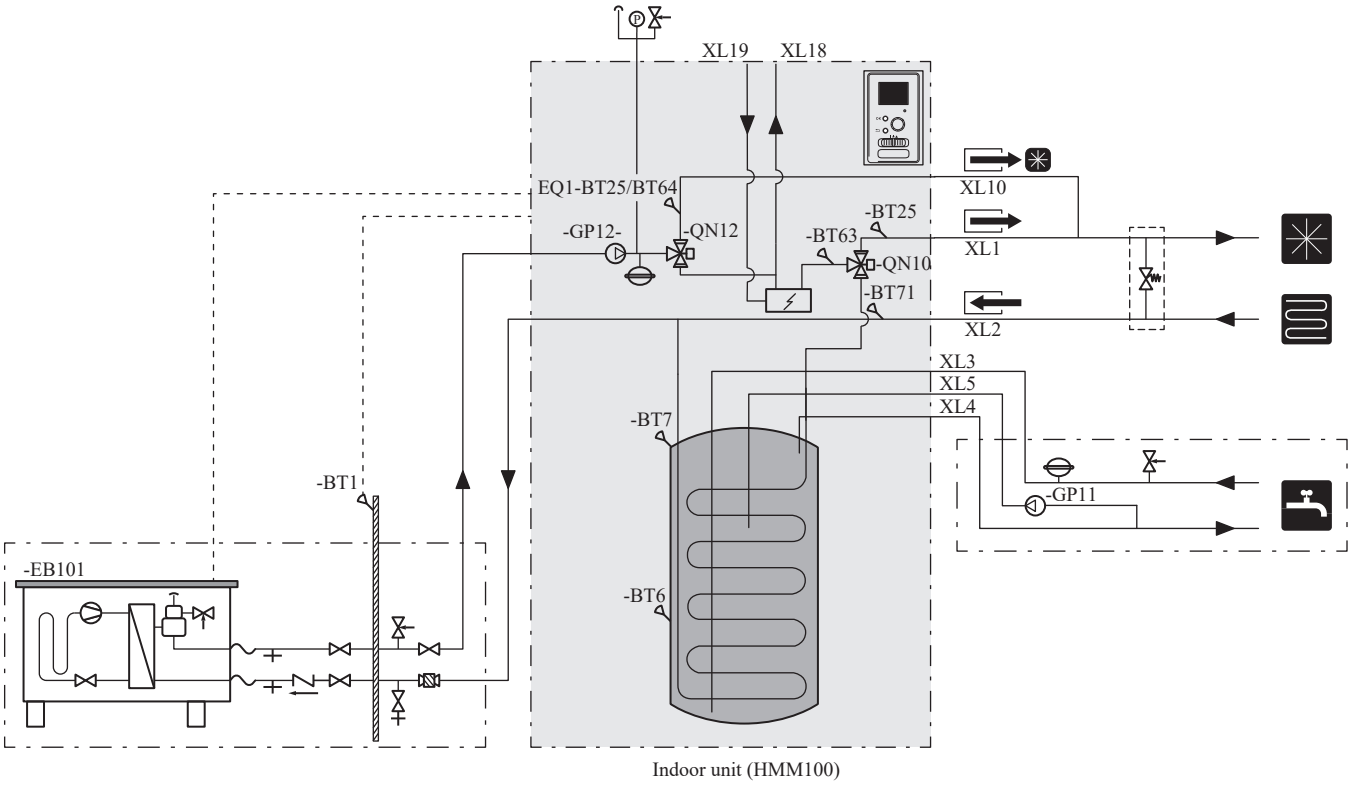
Outdoor unit	With cooling application	Without cooling application
FDCM60VNX-P FDCM71VNX-P	80	50
FDCM100VNX-P FDCM100VSX-P	100	80
FDCM140VNX-P FDCM140VSX-P	120	100

If these values are not fullfilled, a volume vessel must be installed.

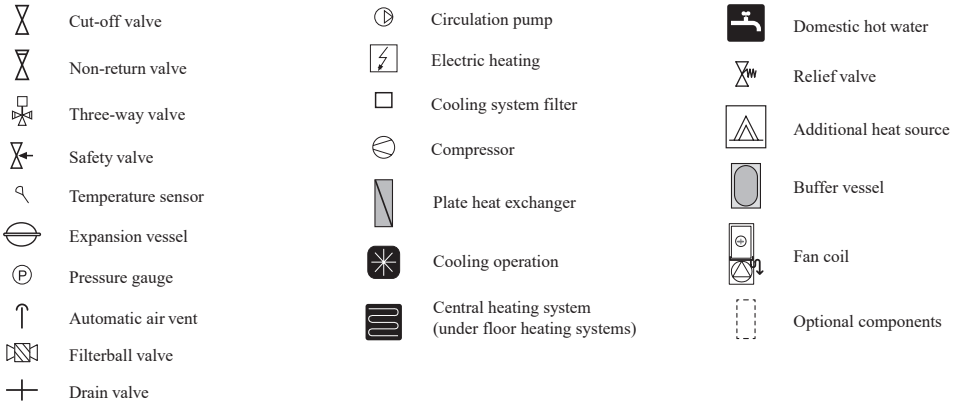
HMM100

HMM100 indoor unit is equipped with a coil water heater, diaphragm expansion vessel, safety group, electric heating module (heater), isolation valves, metering instruments, and an electronic circulation pump.

Basic connection diagram

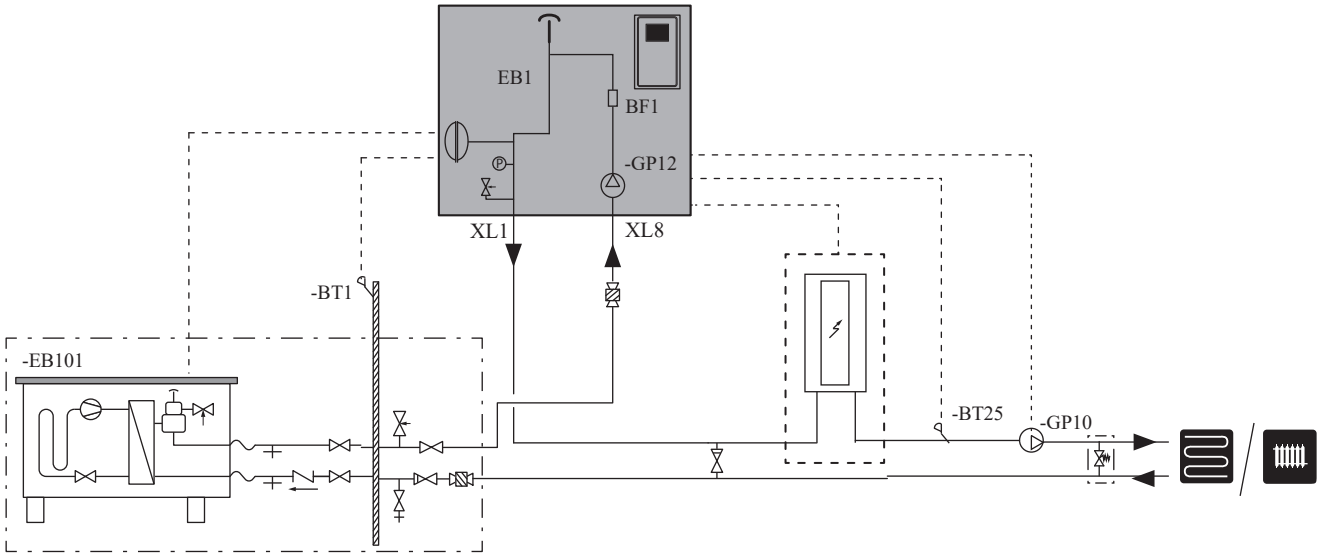


Indoor unit (HMM100)



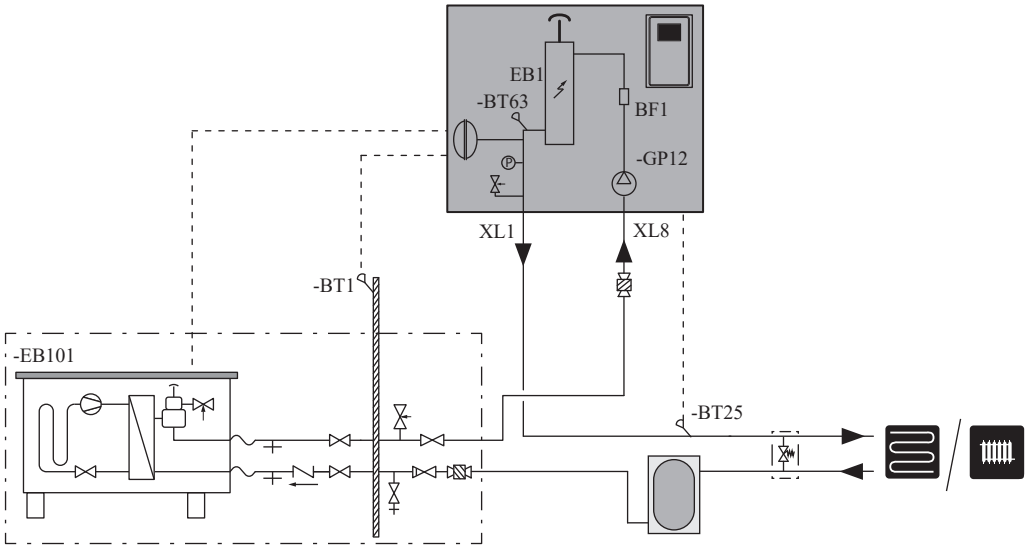
HBM140

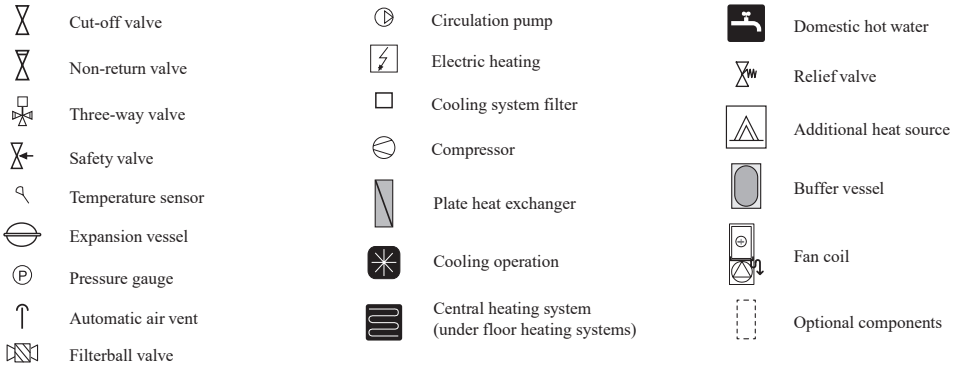
Basic connection diagram



HBM140H

Basic connection diagram





Overflow valve

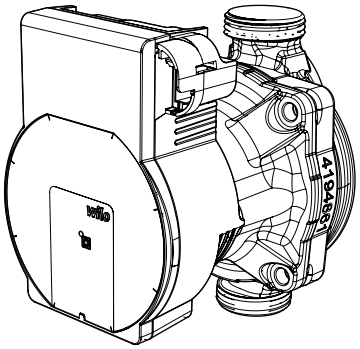
NOTE

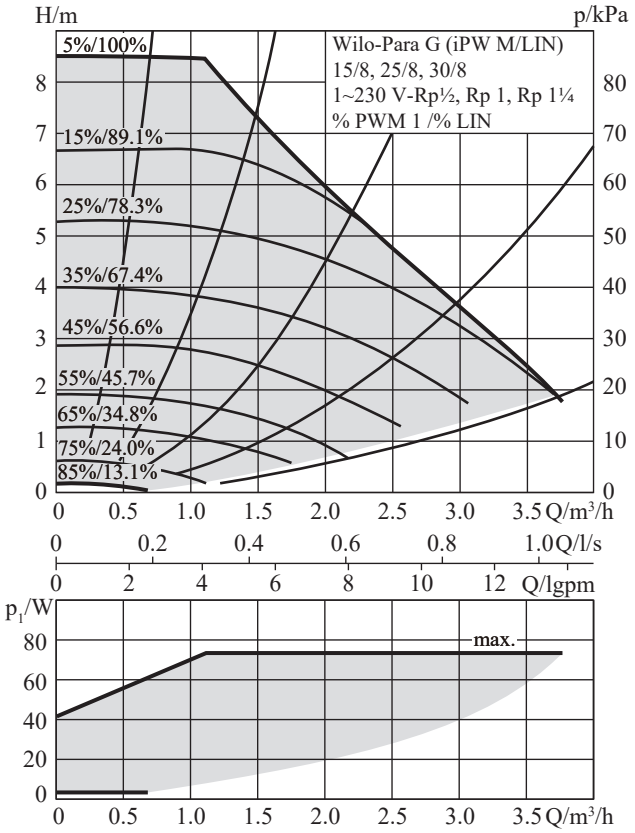
A free flow is required for all docking options, which means that an overflow valve must be installed.
The circulation pump may become damaged.

Pump capacity diagram

HMM100, HBM140/140H

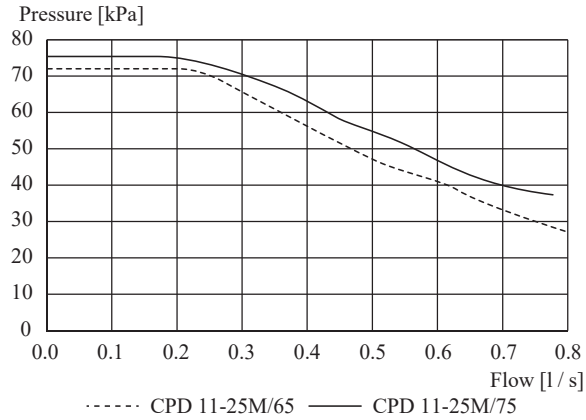
The circulation pump is controlled by frequency and is automatically regulated via control and based on the heating / hot water demand.





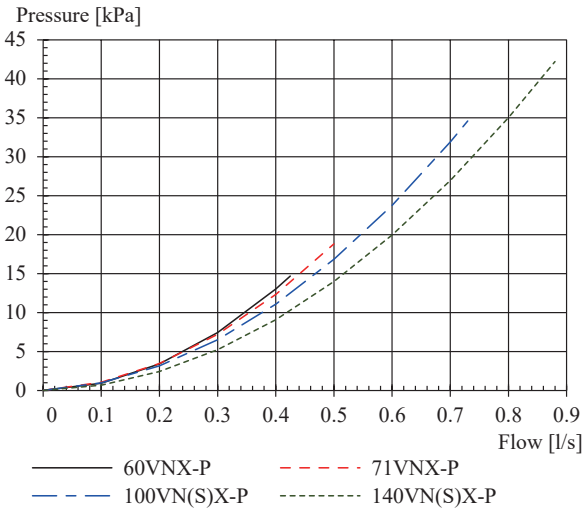
CPD11-25M/65, 75

This graph shows the pump capacity diagram for CPD11-25M/65 and CPD11-25M/75.



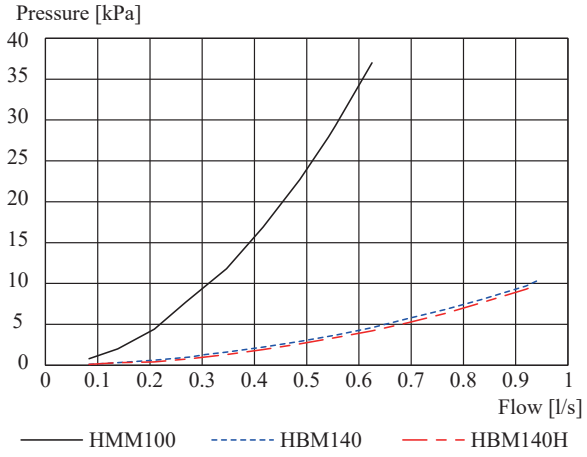
Pressure drop on the outdoor unit

FDCM60/71VNX-P
FDCM100VN(S)X-P, FDCM140VN(S)X-P



Pressure drop on the indoor unit

HMM100
HBM140/140H



Connection of extra circulation pump

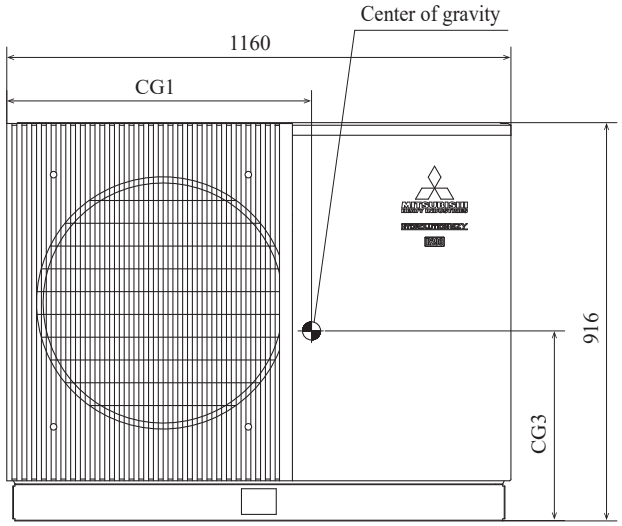
When connecting an extra circulation pump, requirements for pressure, maximum flow, etc must be met.

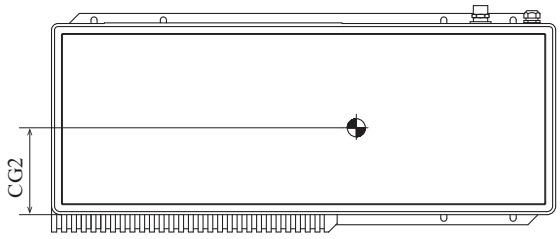
NOTE

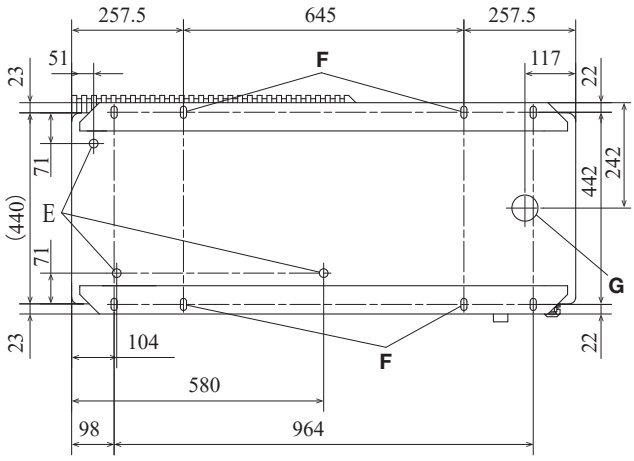
Non-return valve must be installed in case extra circulation pump is used.
The circulation pump may become damaged.

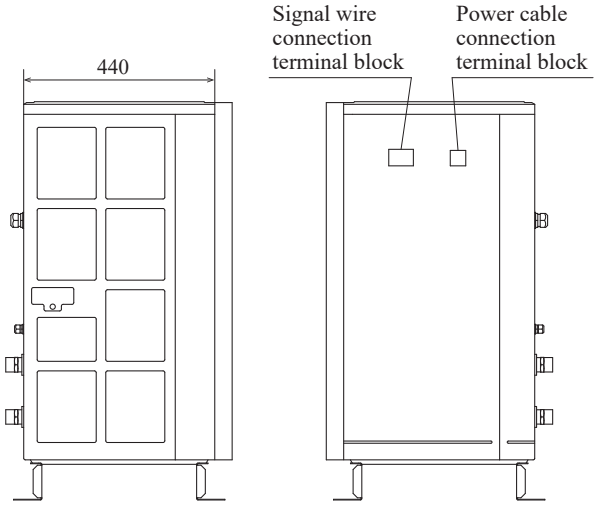
Dimensions and pipe connections

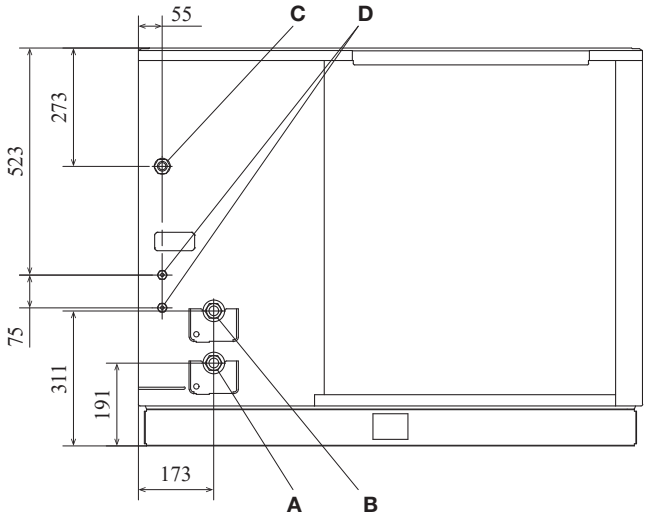
FDCM60/71VNX-P









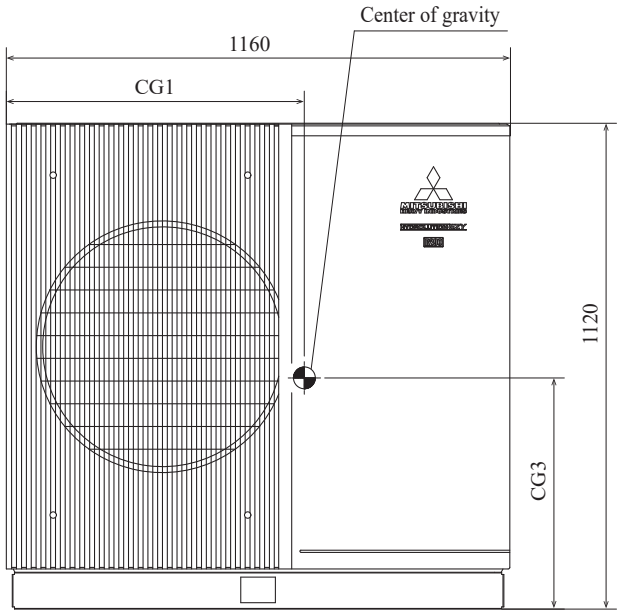


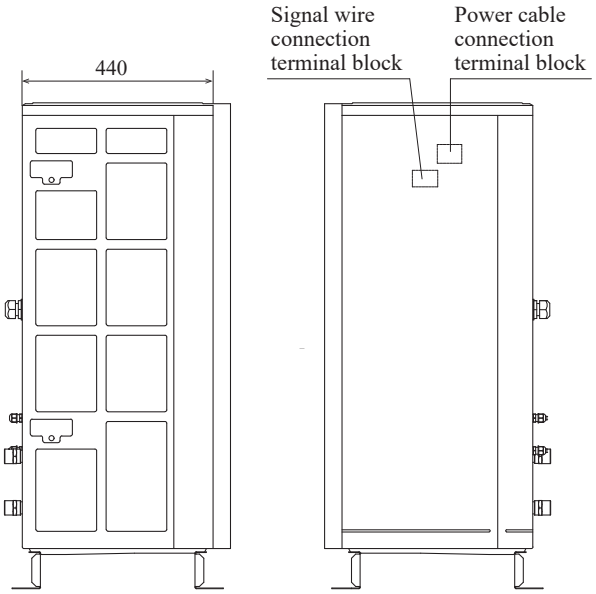
Pipe connections

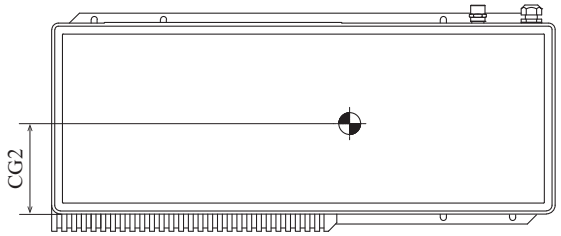
Symbol	Content	
A	Water inlet port	G1 (Copper tube)
B	Water outlet port	G1 (Copper tube)
C	Cable draw-out hole (power cable)	
D	Cable draw-out hole (signal wire)	2 places
E	Drain discharge hole	φ20×3 places
F	Anchor bolt hole	M10×4 places
G	Hole for refrigerant leak check	φ60×1 place

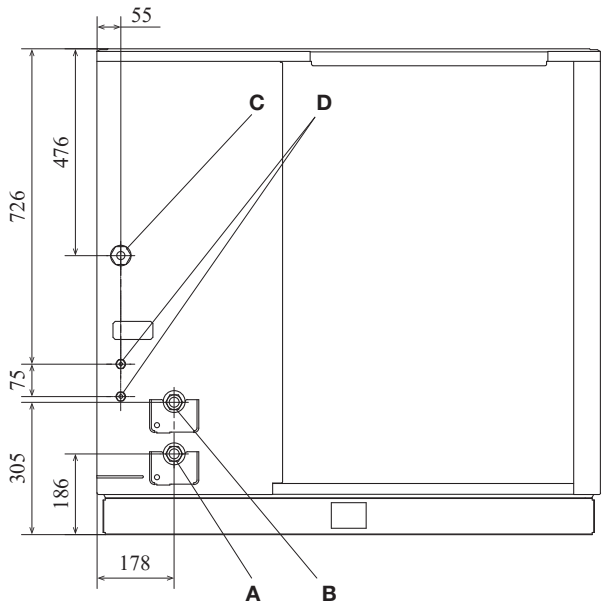
MODEL \ Dimensions	CG1	CG2	CG3
FDCM60VNX-P	692	201	446
FDCM71VNX-P	673	210	448

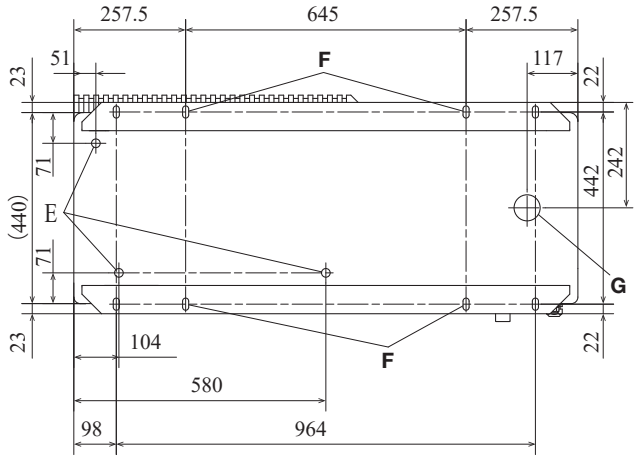
FDCM100/140VN(S)X-P









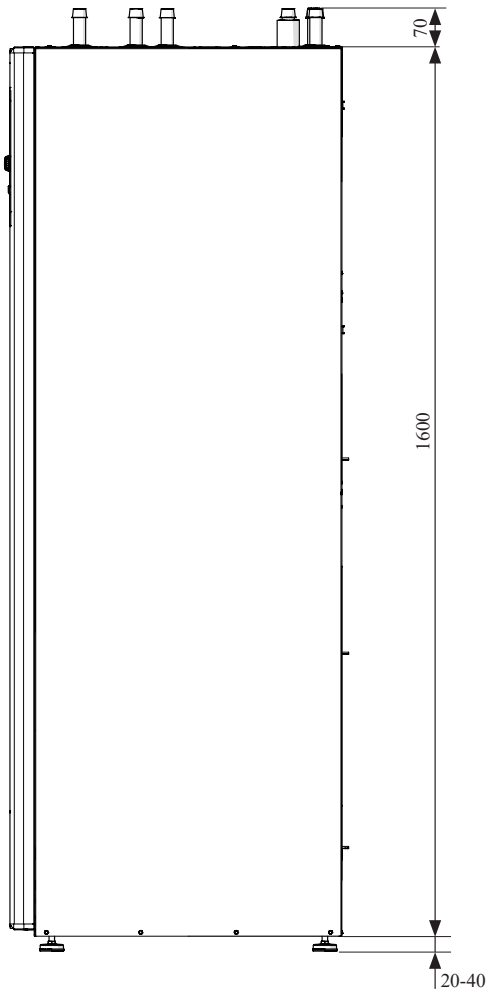


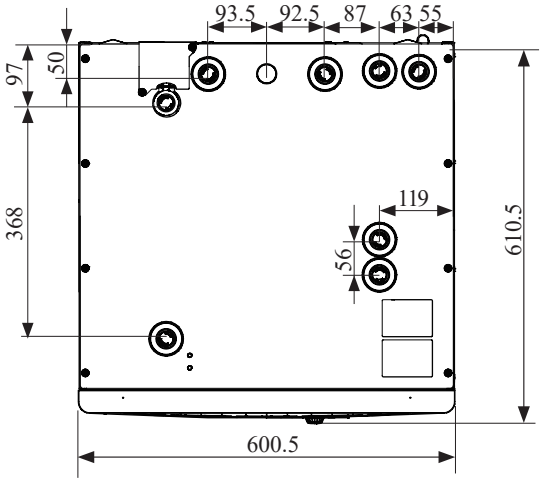
Pipe connections

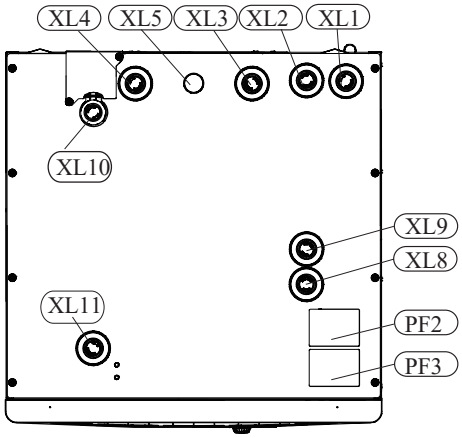
Symbol	Content	
A	Water inlet port	G1 (Copper tube)
B	Water outlet port	G1 (Copper tube)
C	Cable draw-out hole (power cable)	
D	Cable draw-out hole (signal wire)	2 places
E	Drain discharge hole	φ20×3 places
F	Anchor bolt hole	M10×4 places
G	Hole for refrigerant leak check	φ60×1 place

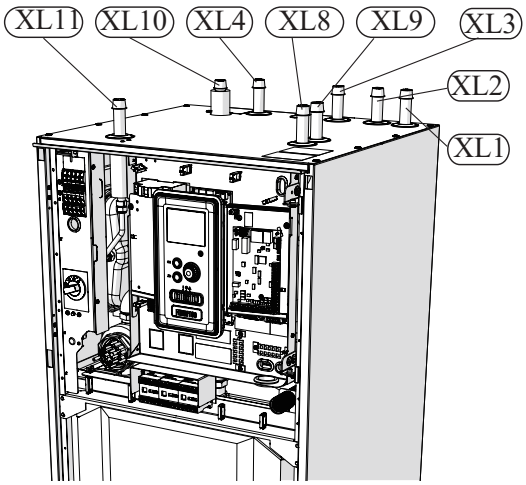
Dimensions / MODEL	CG1	CG2	CG3
FDCM100VNX-P	686	208	533
FDCM140VNX-P	677	214	532
FDCM100VSX-P	688	207	547
FDCM140VSX-P	678	213	546

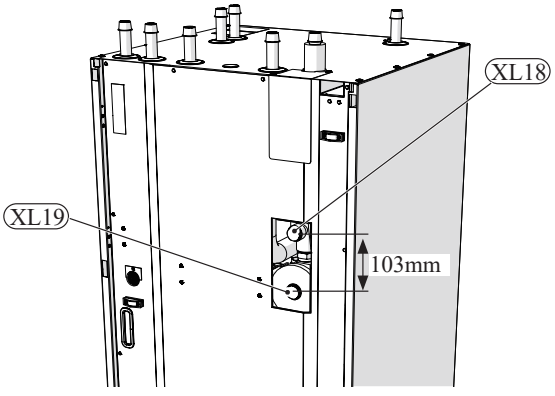
HMM100











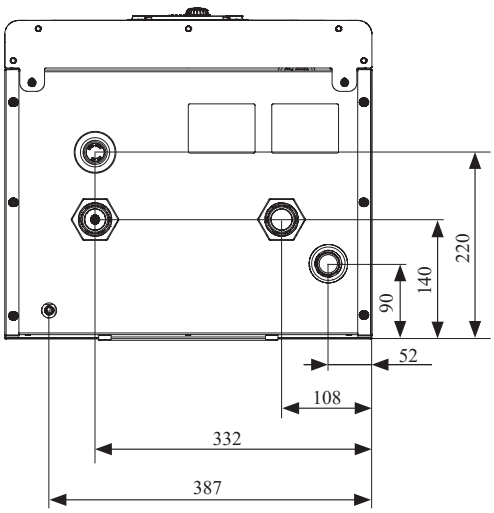
Pipe connections

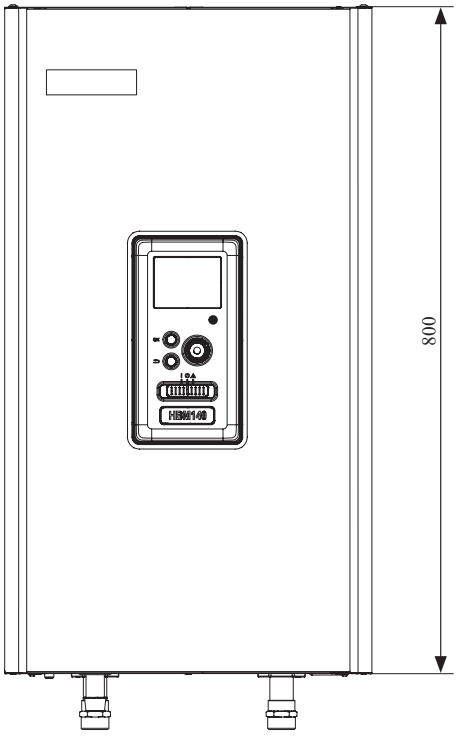
XL1	Connection, Heating medium supply Ø22 mm
XL2	Connection, Heating medium return Ø22 mm
XL3	Connection, cold water Ø22 mm
XL4	Connection, hot water Ø22 mm
XL5	Connection, circulation Ø15 mm
XL8	Connection, supply of the heating medium from the external unit Ø22 mm
XL9	Connection, discharge of the heating medium to the external unit Ø22 mm
XL10	Connection, cooling Ø22 mm
XL11	Connection, safety group Ø22 mm, manometer
XL 18	Connection, return to an additional heat source Ø22 mm
XL 19	Connection, supply from additional heat source Ø22 mm

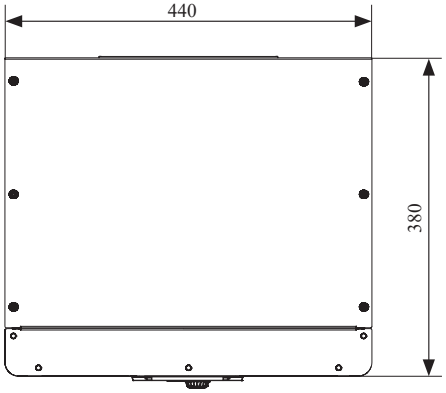
Other information

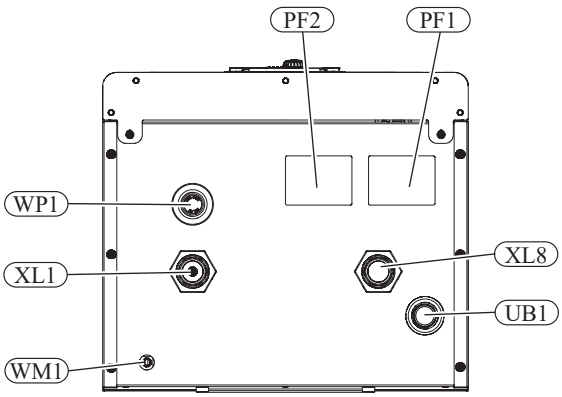
PF2	Serial number plate Hydraulic
PF3	connection plate

HBM140/140H









Pipe connections

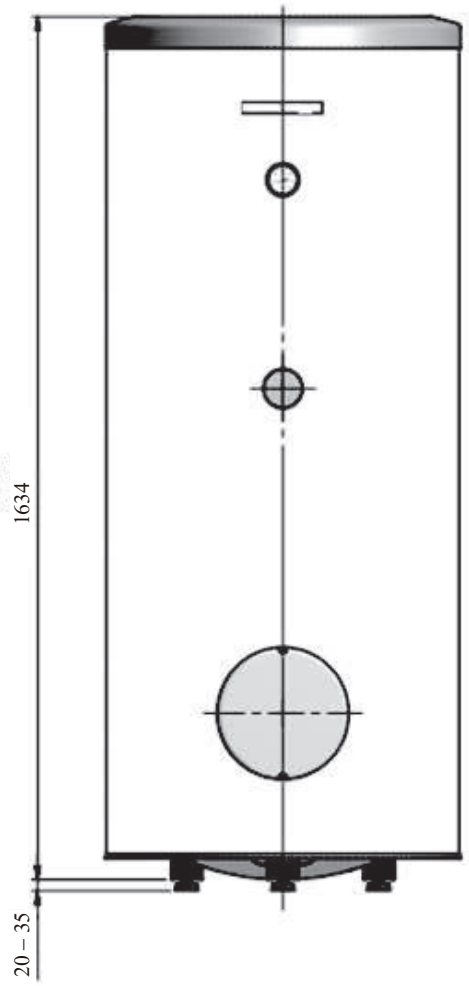
XL1	Connection, heating medium supply Ø28 mm
XL8	Connection, docking from heat pump Ø28 mm
WP1	Connection, overflow pipe from safety valve Ø22 mm
WM1	Condensate drip tray drain

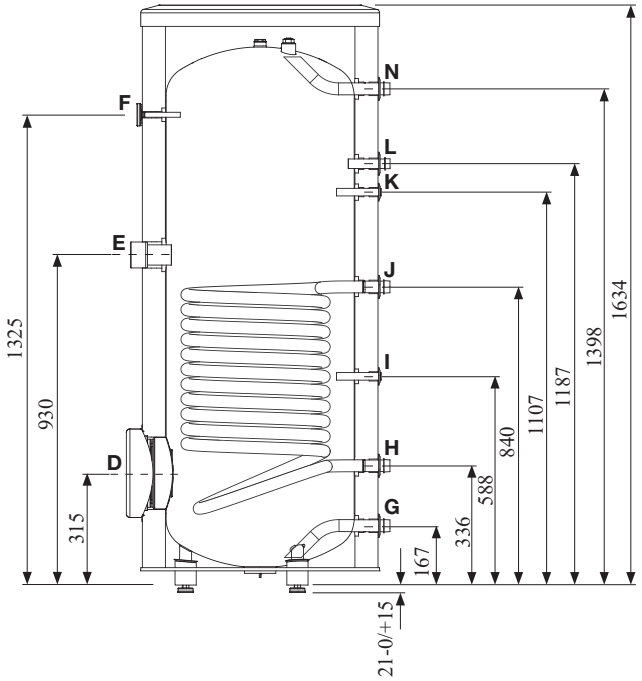
Other information

PF1	Nameplate
PF2	Plate with the designation of the hydraulic connections

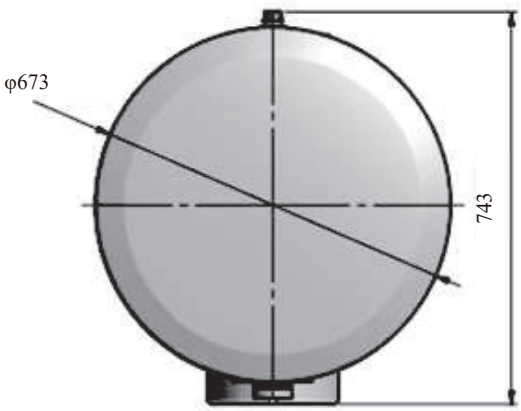
Tank unit

PT300

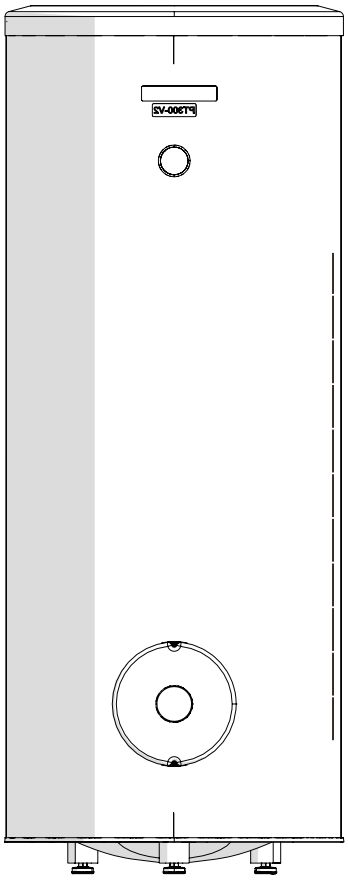


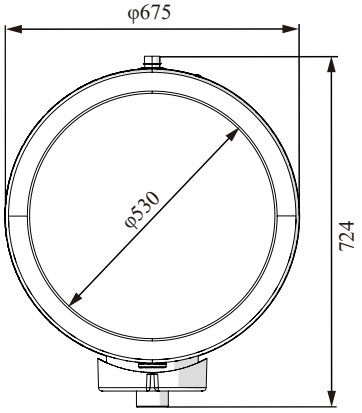


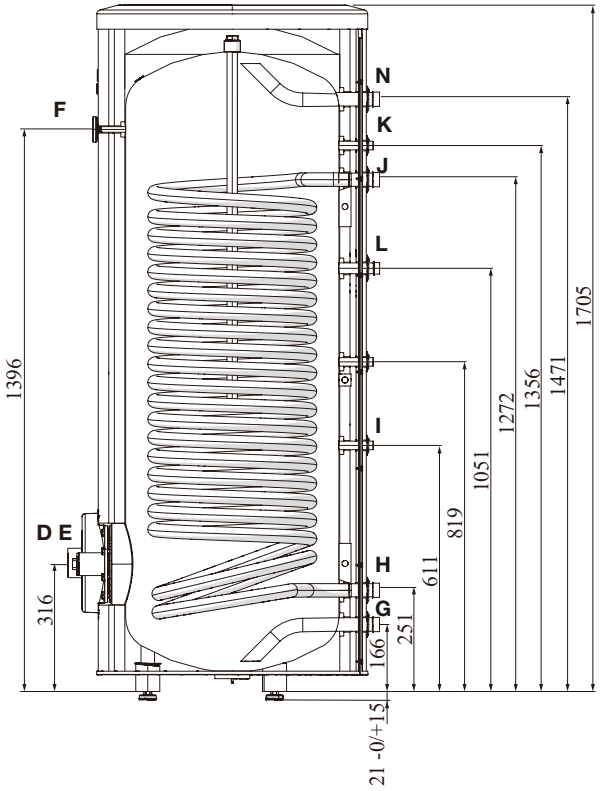
Connection		U/m	PT300
D	Inspection opening	mm	φ120
E	Heating unit connection	inch	1½″Female
F	Thermometer enclosure	mm	φ10 Female
N	Hot water outlet	inch	1″Male
L	Hot water circulation	inch	¾″Male
K	Temperature sensor enclosure (BT7)	mm	φ16 Female
J	Coil supply	inch	1″Male
I	Temperature sensor enclosure (BT6)	mm	φ16 Female
H	Return from coil	inch	1″Male
G	Cold water input	inch	1″Male



PT300-V2



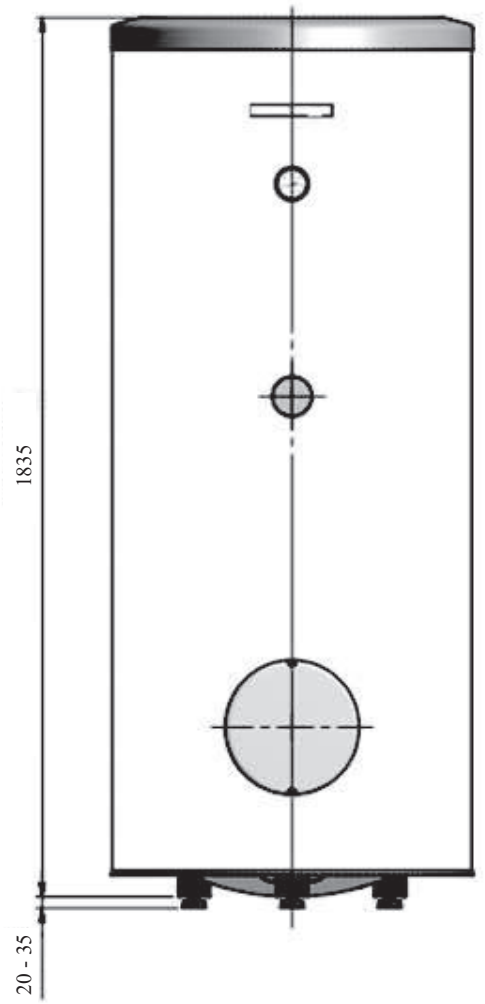


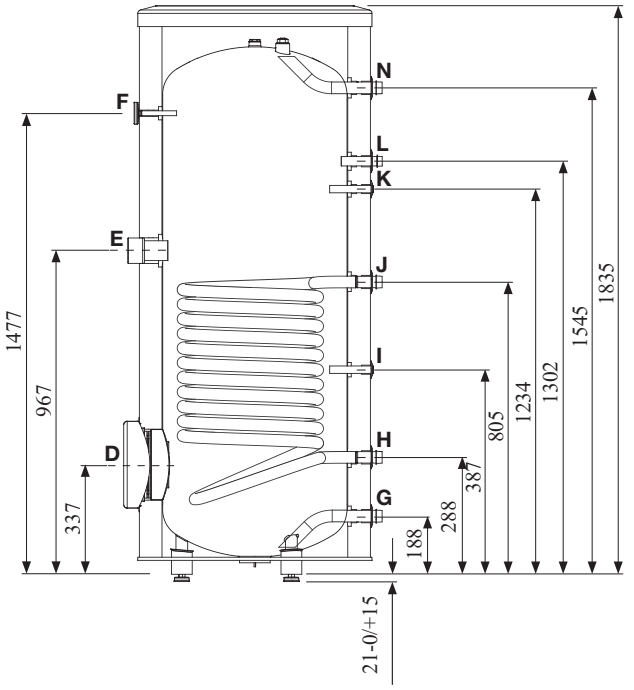


Meaning of symbol

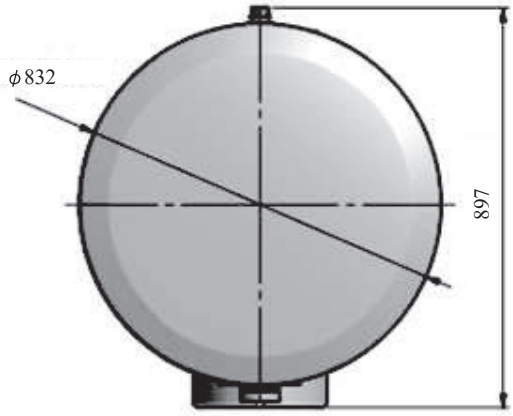
	Connection	U/m	PT300-V2
D	Inspection opening	mm	φ120
E	Heating unit connection	inch	1½″Female
F	Thermometer enclosure	mm	φ10 Female
N	Hot water outlet	mm	l″Male
L	Hot water circulation	inch	¾″Male
K	Temperature sensor enclosure (BT7)	inch	φ16 Female
J	Coil supply	mm	1″Male
I	Temperature sensor enclosure (BT6)	mm	φ16 Female
H	Return from coil	mm	1″Male
G	Cold water input	inch	1″Male

PT500





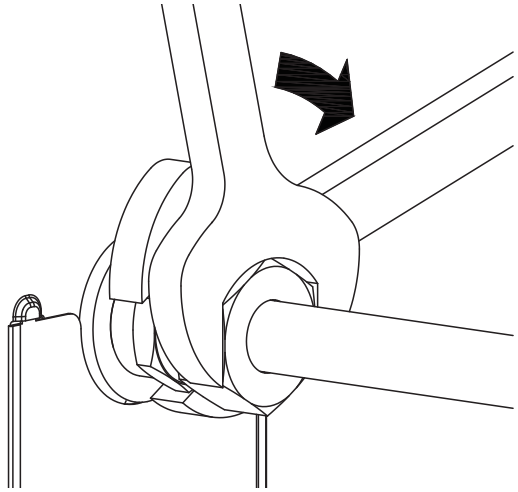
Connection		U/m	PT500
D	Inspection opening	mm	φ120
E	Heating unit connection	inch	1½″Female
F	Thermometer enclosure	mm	φ10 Female
N	Hot water outlet	inch	1″Male
L	Hot water circulation	inch	¾″Male
K	Temperature sensor enclosure (BT7)	mm	φ16 Female
J	Coil supply	inch	1″Male
I	Temperature sensor enclosure (BT6)	mm	φ16 Female
H	Return from coil	inch	1″Male
G	Cold water input	inch	1″Male



Water circuit

General

Tighten the nut to the appropriate torque (40-50 N·m) by using two spanners and torque wrench. Be sure not to tighten the nut too much.



Connection to heating system

It is possible to make several combinations with this heat pump such as:

- Heating only
- Heating + Hot water
- Heating + Cooling + Hot water
- Cooling only

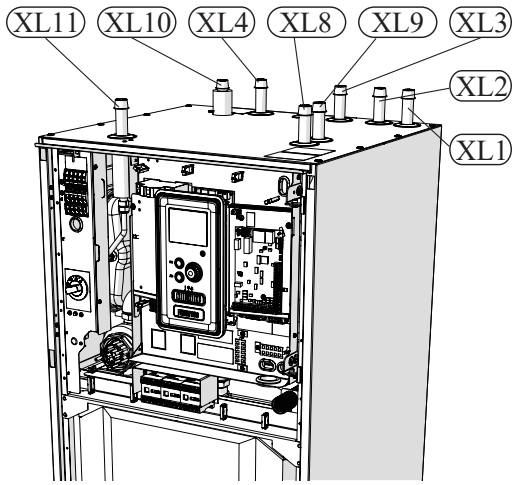
When doing the heat pump system installation please make sure that the following components/accessories are installed:

- Flexible hoses: It is necessary to reduce noise (Locally procured).
- Water pressure gauge: It is necessary to control the system pressure (Locally procured).
- Shut off and drain valves: It is necessary to install them for future maintenance and servicing (Locally procured).
- Charge pump (GP12): for water circulation on the space heating/hot water system. (Part no. CPD11- 25M/65 or CPD11-25M/75).
- Strainer: it is recommended to install it on the outdoor unit inlet pipe to avoid intrusion of dirt/foreign materials to the heat exchanger. It is necessary to reduce noise (Locally procured).
- 3 way valve: to divert between heating and hot water production (Part no. VST05M, VST11M or VST20M).
- Automatic air vent valve: it is necessary to install it to ensure that all the air is removed from the installation (locally procured).
- Pressure relief valve: it is supplied from factory on the outdoor unit gas separator.
  Do not install an additional pressure relief valve to the climate system to keep fire safety due to the refrigerant flammability.
- Expansion vessel: keeps pressure on the system stable while it heats or cools. (Procured locally). The expansion vessel must be at least 5% of total water volume in the circulation system (refer to page 31).
  For futher details, options and required system components please generate your drawing using the selection software tools. These are provided by your local distributor.
- Anti-freeze valves: it is recommneded to install anti-freeze valves in case of cold climate application to protect the system from freezing in case of temporary power failure.

Connect Water outlet to supply line and Water inlet to return line from heating system.

- All required safety devices and shut-off valves must be installed as close to the indoor unit as possible.
- Install bleed valves where necessary, highest point of the water system in usual case.
- When connecting to a system with thermostats on all heaters install an overflow valve or remove some of the thermostats to ensure sufficient flow.
- See section Dockings for outline diagram.
- Install a safety valve with manometer on heating circuit and hot water circuit. (FL2).
  For FDCM60/71/100/140VNX-P,FDCM100/140VSX-P: pressure relief valve included in the gas separator.
- The end of overflow water pipe from the safety valves must be left open to the atmosphere. The water may drip from the pipe.

HMM100



The pipe connections of the heating system are to be made at the top .

- All the required protections and cut-off valves must be installed as close to the HMM100 module as possible.
- Vent valves must be installed where necessary.
- Safety valve with a nanometer at the central heating circuit and the safety valve at the hot water system must be installed on relevant conductors XL 11 and XL 4. In order to prevent air sockets, the overflow pipe must be slanted at the entire length from the safety valve, and must be secured against freezing.
- When connecting to the installation where all heaters have been equipped with thermostat valves, install a discharge valve or remove several thermostats to assure appropriate flow.

NOTE

The term "heating system", as used in this installation and operation manual, shall mean the heating or cooling system supplied with a hot or cold medium from the HMM100 module for heating or cooling purposes.

CAUTION

Suitable safety valve must be installed directly on the cold water supply line to the hot water tank. Safety valve will protect against excessive increase of pressure. The drain from the safety valve should be discharged into the sewage system or drain.

Connection to hot water heater

For FDCM60/71VNX-P, FDCM100VN(S)X-P, FDCM140VN(S)X-P outdoor unit, it is necessary to connect PT300/300-V2/500 tank unit applying 3 way valve in order to use domestic hot water function.

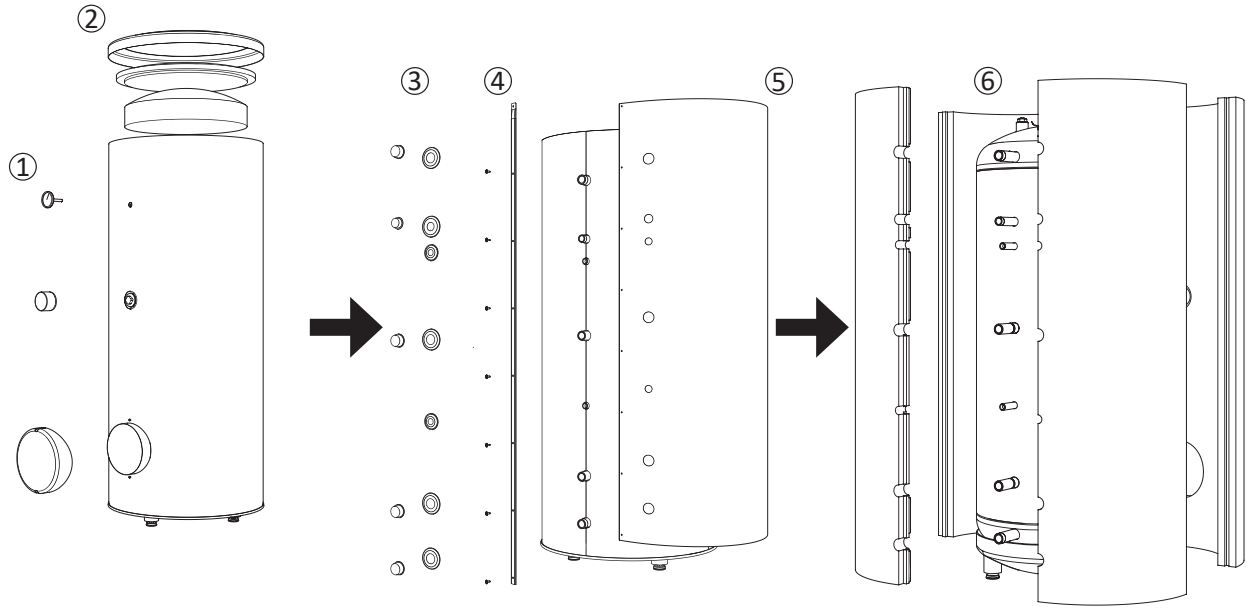
Housing disassembly of tank unit

Removable housing with thermal insulation facilitates transport and installation of the storage tank. Disassembly the housing in the following order (see next page figure):

1. Remove the Temperature gauge, plug of the heating element connector pipe and blanking plate of the inspection opening.
2 Remove the upper cover of the housing together with thermal insulation.
3. Remove the plugs from the connector pipes and black bushings.
4. Remove the fixing screws and the strip connecting the housing jacket.
5. Remove the jacket surrounding the tank (housing jacket).
6. Remove the four-piece thermal insulation.

After the installation of the storage tank in its final location, reinstall the removed components in the reverse order.

Housing and thermal insulation disassembly



Connecting hot water tank to outdoor unit

CAUTION

Installation and commissioning of the storage tank shall only be done by appropriately qualified installer. The installer should inform the user of the functions of the product and provide the necessary in formation on its safe use.

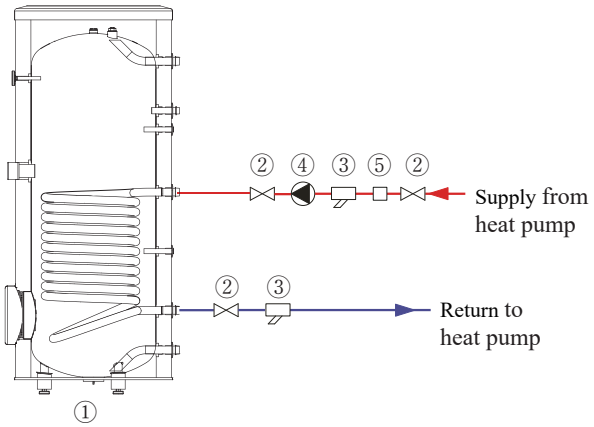
Information

We recommend installing a strainer in order to protect the pumps, check valve and the components of the heating system.

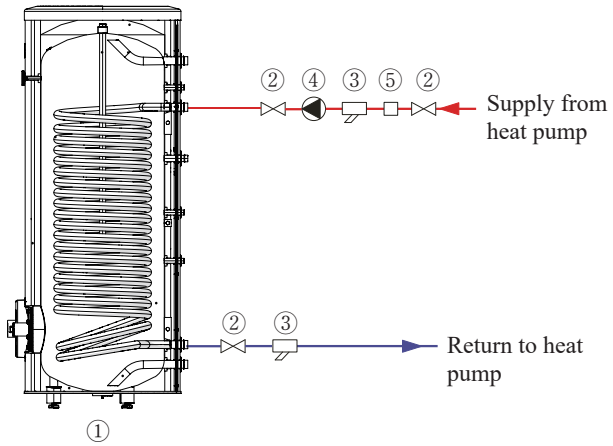
- Maximum piping length between outdoor unit and tank is 10 m.
- Tank unit should be placed on firm, preferably a concrete floor or foundation.
- Tank unit can be aligned using the adjustable feet.
- Protection against overpressure shall be made in accordance with the relevant regulations.
- Connect the heating system according to the installation diagram (see figure).

Installation diagram of the PT storage tank with one coil.

PT300/500



PT300-V2



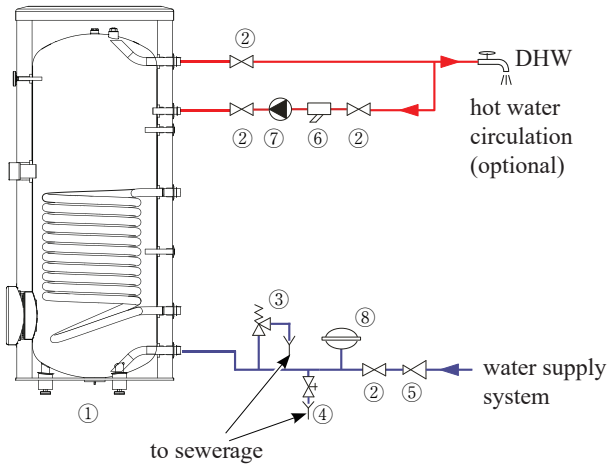
① PT storage tank
② Cut-off valve
③ Strainer
④ C/H circulating pump
⑤ Vent valve

Connecting hot water tank to water main

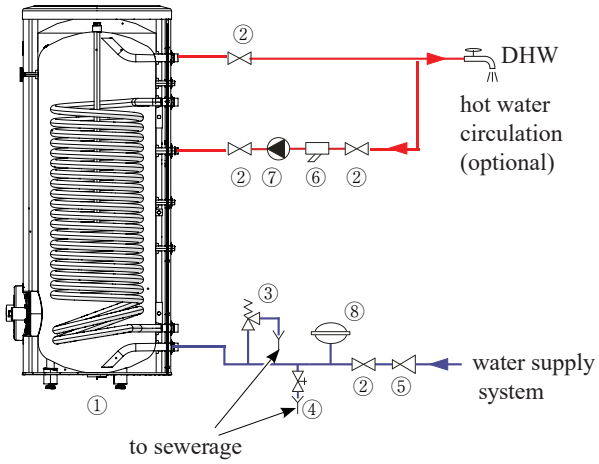
- Install a mixing valve if the temperature exceeds 60 °C.
- It is recommended to install a thermostatic mixing valve for stable temperature hot water supply.
- Connect the storage tank to the water supply system of water pressure at least 1 bar and max 10 bar. Install a pressure reducer if the pressure at the cold water inlet to the tank is higher than allowed.
- Install a safety valve which have a maximum 8.0 bar opening pressure on the incoming domestic water line according to outline diagram in order to protect the storage tank against overpressure. Pressure increases during heating the water.
- During heating the water, small and temporary water flow from the safety valve can occur, which indicates that the pressure has increased above the rated value, which triggered the valve. This may in no way be prevented.
- Safety valve drain line should be installed with a decline, in an environment free of freezing and remain open to the atmosphere. The manufacturer is not responsible for flooding the room through the safety valve.
- Blocked safety valve can cause equipment failure. Drain the outflow from the safety valve to the sewerage or drain grate.
- See section Dockings for outline diagram.
- Connect the water supply system according to the installation diagram.

Installation diagram of the PT storage tank with one coil.

PT300/500



PT300-V2



① PT storage tank
② Cut-off valve
③ Safety valve
④ Drain valve
⑤ Pressure reducer (option, if the pressure in the system exceeds the allowable value)
⑥ Strainer
⑦ Hot water circulating pump
⑧ Hot water expansion vessel

Information

We recommend installing a strainer in order to protect the pumps, check valve and the components of the heating system.

Information

In order to minimize the flow of water from the safety valve associated with the thermal expansion of the liquid, it is advisable to install a suitable expansion vessel at the cold water connection (see item 8).

CAUTION

Installation of the appropriate safety valve in the cold water supply line protecting the unit against overpressure is mandatory!

CAUTION

Installation of necking of any kind (such as reducers, dirt pockets, etc.) and cut-off valves between the storage tank and the safety valve is not allowed. Only a T-pipe with a drain valve and a T-pipe with an expansion vessel may be installed in these line sections.

CAUTION

Never block the safety valve or drain line. This can cause a dangerous overpressure in the storage tank.

CAUTION

When heating water, slight, temporary discharge from the safety valve can occur. This is a correct safety valve function. Any attempt to interfere in its operation can lead to the danger and destruction of the storage tank.

CAUTION

Never use the equipment with clogged safety valves.

Connection

After the installation and levelling the tank, follow the procedure below (for the connector pipe symbols, refer to page 53-55):

1. Remove protecting plugs from the connector pipes.
2. Connect the hot water intake line (N).
3. Connect the cold water supply line together with the required safety valves (G).
4. If the system has the hot water circulation system, connect it to the connector pipe (L). Otherwise, plug the pipe.
5. Connect the supply (J) and return (H) of the heating medium to the coil.

CAUTION

If there is an electric heating module installed in the storage tank, fill the tank with water before connecting it to the electrical installation.

Hot water circulation circuit

Hot water circulation function is available for PT300/300-V2/500 and for HMM100.

PT300/300-V2/500

If the system has the hot water circulation system, connect it to the port L (see page 53-55).

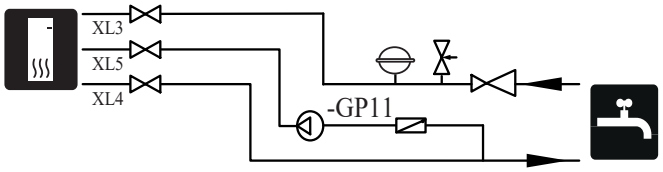
Then install the Cut-off valves, circulation pump and strainer.

DHW circulation

NOTE

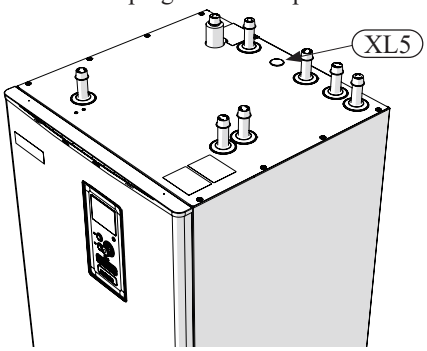
If connection AA3: X7 is used for another purpose, an additional AXC 30M is required to connect the hot water circulation pump control.

The HMM100 have possibility to connect DHW circulation. The circulation connection (XL5) is located at the top of the tank.

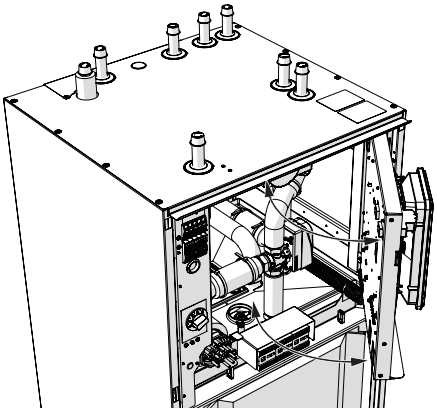


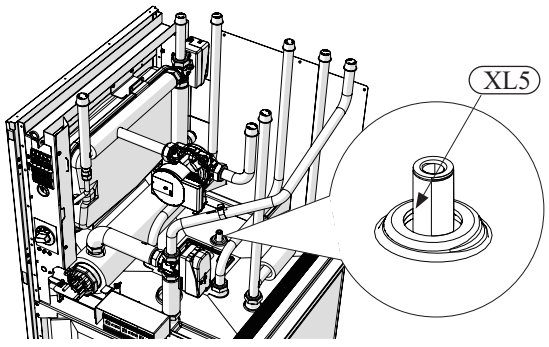
To connect the circulation:

1. Remove the XL5 plug from the top of the housing.

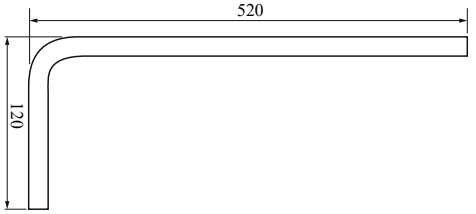


2. Remove the front panel, then move the control box to the right to gain access, to the hydraulic connections.





3. Install the elbow (not included in the HMM100), facing the rear housing, on the circulation pipe.
4. Connect the pipe to the elbow, with the dimensions shown in the figure below, leading pipe in the top of the housing.
5. Install the circulation pump on the pipe outlet of the HMM100 device, and then connect its control to the controller or AA5 card.
6. Install the control box and the front panel.



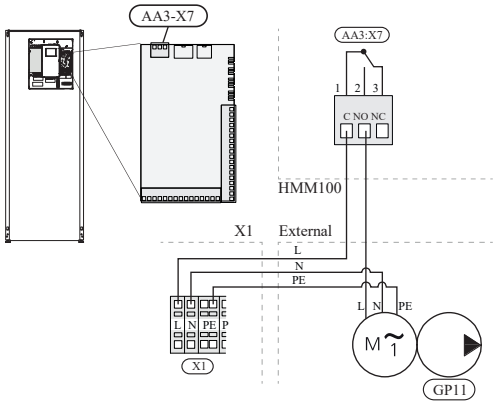
Dimensions of the pipe for circulation

Elbow 15x15

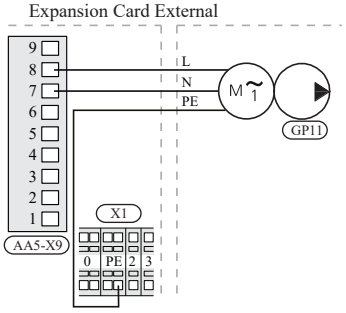
Connecting the control of the hot water circulation pump

The hot water circulation pump can be connected in two configurations:

- to board AA3: X7 (potential free relay; max. 2 A), on terminal block AA3-X7: NO (230 V), and N and PE on terminal block X1.



- in case AA3:X7 output is already in use, to accessory board AA5 (not included in HMM100) on block AA5-X9:8 (230V), AA5-X9:7 (N) and X1:PE



See the AA5 expansion card manual for more information.

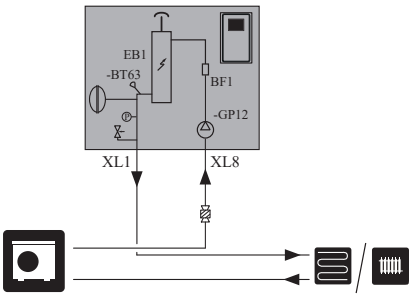
Connection options

Docking the indoor unit

The HBM140 / HBM140H unit is not equipped with a shutoff valve for the central heating system, it must be installed on the outside of the indoor unit to allow any future servicing. Remember to protect the unit with a particle filter.

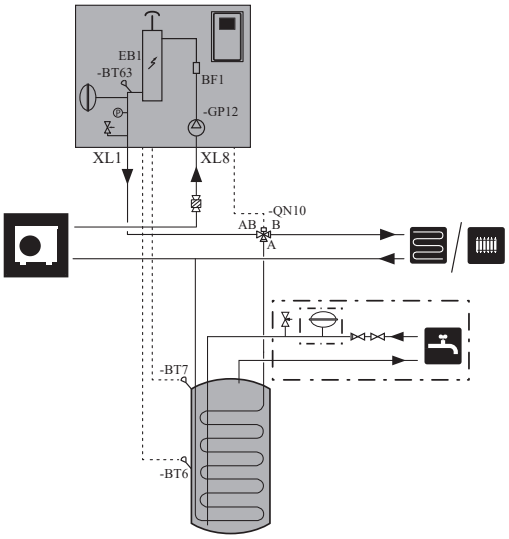
Docking the climate system

When connecting to a system with thermostatic valves on all radiators/underfloor heating circuits (in case of insufficient flow and/or volume of the heating system), use the appropriate hydraulic solutions which ensure the proper heating medium volume and minimum, undisturbed flow.



Connecting cold and hot water

The HBM140 / HBM140H unit should be connected to the coil in the external hot water tank for domestic hot water (accessory needed). The exchange area of the coil is very important when selecting it. The sensors BT6 and BT7 should be placed in the appropriate places. BT7 sensor in the place that will show the highest temperature in the tank. Whereas the BT6 sensor in 1/3÷1/2 of the coil height measured from the lower extreme point. The location of the sensors is shown in the domestic hot water connection diagram. DHW tank should be connected to a water system with a water pressure recommended by the tank manufacturer. If the pressure at the inlet of cold water to the tank is higher than allowed, use a pressure reducer. When heating the water in the tank, the pressure increases, therefore each tank must be equipped with a suitable safety valve, installed on the cold water inlet, which will protect the DHW tank against excessive pressure build-up. In the case of using DHW circulation see section “Hot water circulation”.



CAUTION

The location of the BT6 sensor should be selected based on the design of the domestic hot water tank used.

CAUTION

It is absolutely necessary to install a properly selected safety valve on the cold water supply pipe.

CAUTION

Safety valve for the HW storage tank must be fitted as recommended by the storage tank manufacturer and applicable regulations.

CAUTION

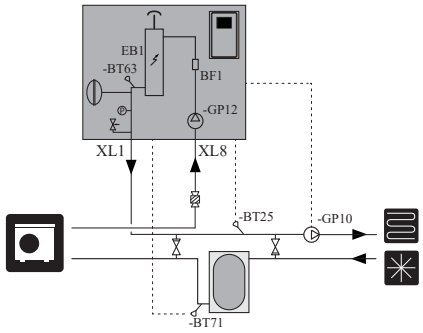
Do not use the appliance if the safety valve is blocked / damaged.

CAUTION

It is forbidden to install any constrictors (e.g. reducers, particle filter, etc.) and shut-off valves between the storage tank and the safety valve. Only fitting a tee with a draining valve and a tee with an expansion vessel is permitted.

Connecting the 2-pipe cooling operation system

In the 2-pipe cooling operation system degree minutes are counted according to BT25. The BT25 sensor should be placed to the installation according to the diagram.

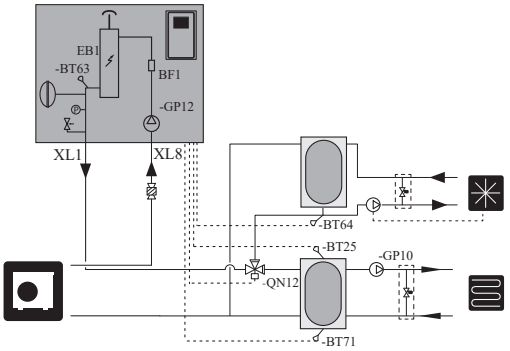


CAUTION

The hydraulic system and all its components should be suitable for heating and cooling and have appropriate thermal insulation (allowed for cooling).

Connecting the 4-pipe cooling operation system

The 4-pipe system requires an additional cooling buffer vessel. Sensor BT64 must be placed in the buffer vessel. Degree minutes for heating are counted according to BT 12 or BT25. Degree minutes for cooling operation are counted according to BT64.

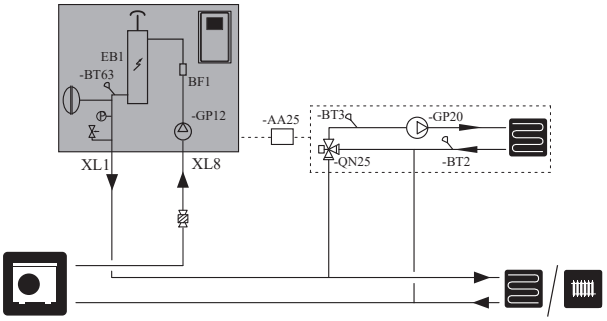


CAUTION

The heat pump should have cooling insulation and the operating mode of the GP12 circulation pump should be set to intermittent mode.

Docking an additional climate system

The system can be expanded to include additional heating/ cooling circuits, provided an additional accessory board is used. Once the AXC 30M card or ready-to-use ECS 41M kit has been put into use, an additional heating/ cooling circuit can be activated using the controller.



Additional accessories and the connection options and methods for these are described in the instructions for AXC 30M and ECS 40M/41M.

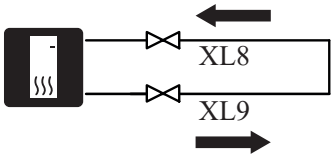
HMM100

Docking the indoor unit

The HMM100 unit is not equipped with a shut-off valve for the central heating system, it must be installed on the outside of the indoor unit to allow any future servicing. Remember to protect the unit with a particle filter.

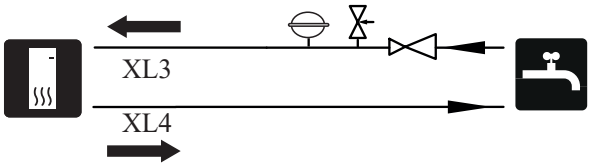
Docking without heat pump

Connect the pipe for docking in from the heat pump (XL8) with the pipe out to the heat pump (XL9).



Connecting cold and hot water

The hot water tank should be connected to a water supply system with water pressure of min. 1 bar, max. 10 bar. If the pressure at the cold water inlet to the tank is higher than the permissible level, use a pressure reducer. During heating of the water in the tank, the pressure increases, which is why each tank must be equipped with the appropriate safety valve, installed on the cold water supply, which will protect the tank against an excessive increase in pressure. If using hot water circulation, see subsection “Hot water circulation”.



NOTE

It is absolutely necessary to install a properly selected safety valve on the cold water supply pipe.

NOTE

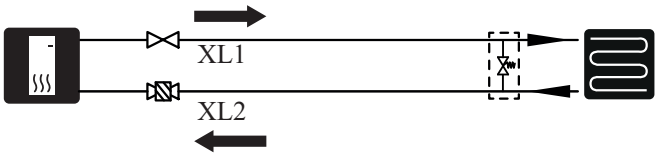
Do not use the appliance if the safety valve is blocked / damaged.

NOTE

It is forbidden to install any constrictors (e.g. reducers, particle filter, etc.) and shut-off valves between the storage tank and the safety valve. Only fitting a tee with a draining valve and a tee with an expansion vessel is permitted.

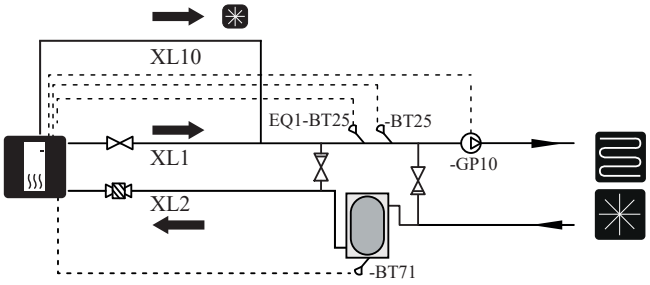
Docking the climate system

When connecting to a system with thermostatic valves on all radiators/underfloor heating circuits, use the appropriate hydraulic solutions which ensure the proper heating medium volume and minimum, undisturbed flow.



Connecting the 2-pipe cooling operation system

In the 2-pipe cooling operation system, the sensor BT64 / EQ1-BT25 assumes the function of sensor BT25. Degree minutes are counted according to EQ1-BT25. The BT25 and EQ1-BT25 sensors should be moved to the installation according to the diagram.

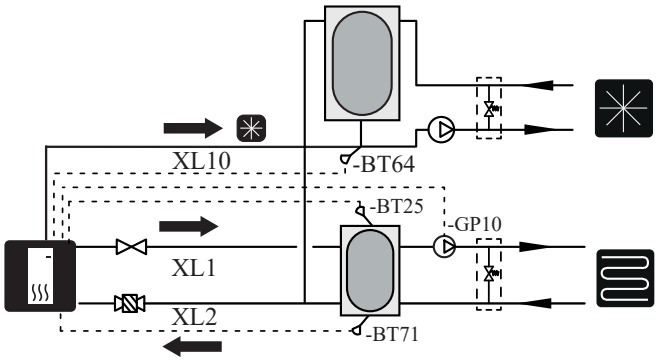


NOTE

The hydraulic system should be suitable for heating and cooling and have appropriate thermal insulation (allowed for cooling).

Connecting the 4-pipe cooling operation system

The 4-pipe system requires an additional cooling buffer vessel. Sensor BT64 must be transferred to the buffer vessel. Degree minutes for heating are counted according to BT25. Degree minutes for cooling operation are counted according to BT 64.

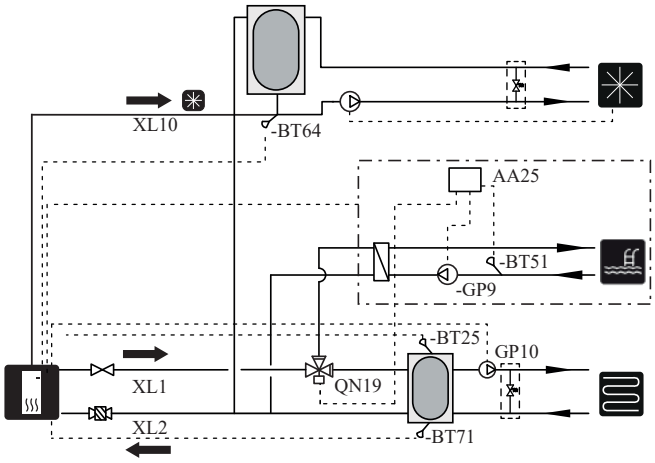


NOTE

The heat pump should have cooling insulation and working in an intermittent mode.

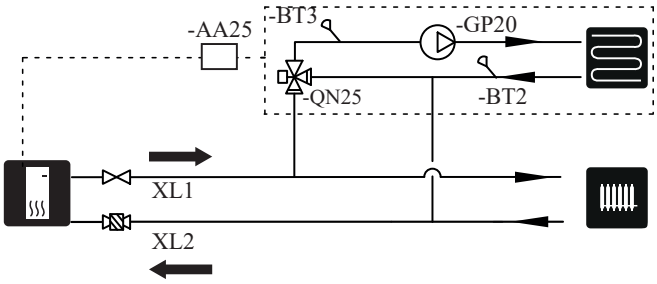
Connecting the 4-pipe cooling operation system and pool heating

In case the installation in the building requires 4-pipe cooling and pool heating, the controller allows it to be implemented according to the following hydraulic diagram (QN12 valve must be installed before QN19 valve)



Docking an additional climate system

The system can be expanded to include additional heating/cooling circuits, provided an additional accessory board is used. Once the AXC 30M card or ready-to-use ECS 41M kit has been put into use, an additional heating/cooling circuit can be activated using the controller.

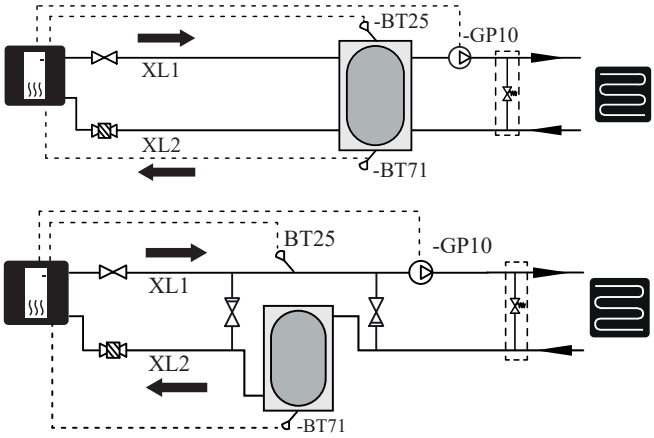


Additional accessories and the connection options and methods for these are described in the instructions for AXC 30M and ECS 40M/41M.

Buffer circuit

When connecting to a system with thermostatic valves on all radiators/underfloor heating pipes, use the appropriate hydraulic solutions which ensure the proper heating medium volume and minimum, undisturbed flow.

In the case of a system equipped with a buffer installed in parallel, the BT25 sensor should be installed in the buffer or in a place that ensures a correct reading of the supply temperature to the heating system. In order to correctly read the return temperature, it is recommended to move the BT71 sensor to the lower part of the buffer or to the return pipeline of the heating installation.

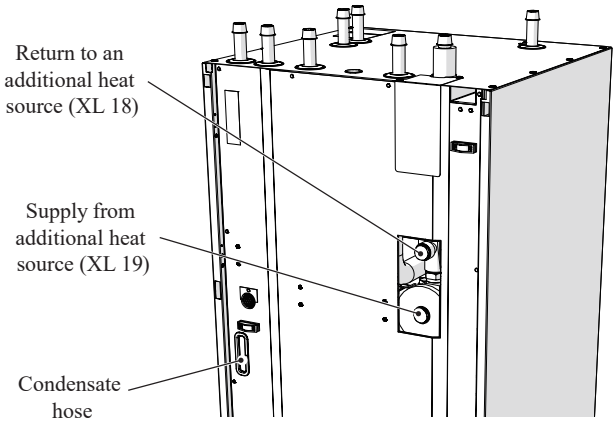


Connection of external heat source

External heat source, e.g. a gas or oil boiler or electric heater, can be connected on supply line of heating system (XL1).

HMM100

An external heat source, with max power of 15kW, eg a gas or oil boiler, can be connected to the back of the HMM100, removing the access block to the connection sockets (picture below).



Piping insulation

Install insulation on all piping in order to avoid condensation during cooling operation, a drop in heating capacity, and freezing of the outdoor water circuit piping in winter.

It is also strongly recommended to insulate piping for heating only application in order to avoid getting burned or reducing the heating capacity.

The thickness of the insulation should be 20mm.

Freezing prevention of piping

In case of a power supply failure or pump operating failure, do one of the following to protect the water circuit against freezing:

- Drain the system when it happens.
- Make sure to remove water from outdoor unit.
- Install freeze protection valves. Freeze protection valves drain the water from the system before it can freeze. Insulate the freeze protection valves in a similar way as the water piping, but do NOT insulate the inlet and outlet (release) of these valves.

  When installing an anti-freeze valve, a pressurization and supply circuit for tap water is required.

CAUTION

Some countries do not allow pressurization of the system. If so, please require only supply circuit for tap water.

Electric connections

General

All the units must be installed via an isolator switch in accordance to the local codes and regulations.

The following guidelines must also be followed:

- Disconnect the outdoor unit and control unit before insulation testing of the house wiring.
- If the building is equipped with an earth-fault breaker, the outdoor unit should be equipped with a separate one.
- The diagram of indoor module connection can be found in section “Diagram of electrical connections”.
- Do not lay communication, sensor or signal cables for external connection close to high voltage lines.
- Minimum cross section of communication, sensor or signal cables for external connections must be 0.5 mm2 up to 50 m, for example EKKK, LiYY or equivalent.
- Use three core cable for communication between controller (RC-HY20/40-W) and outdoor unit (FDCM60/71/100/140VNX-P,FDCM100/140VSX-P). Same applies for communication between outdoor units (cascade connection).
- Make sure that cables are not damaged by metal edges or are trapped by panels.
- Use the UB1 and UB2 (as marked in the illustration) to lead the cables to the HMM100. In the UB1 and UB2, the cables are routed through the entire indoor unit from the rear wall towards the front.

NOTE

The switch (SF1) for the controller must not be set to “I” or “⚠” until the climate system has been filled with heating medium and vented. Otherwise, the thermal circuit breaker, thermostat and the electric additional heat may be damaged.

NOTE

Cut off the power using the circuit breaker before carrying out any servicing. Electrical installation must be carried out in accordance with the current regulations by a person with the proper authorisations and qualifications.

NOTE

When SF1 is set to “⚠” - the HMM unit switches the QN10 valve to the central heating and heating takes place according to thermostat BT30. Hot water is not heated while the switch is set to “⚠”.

NOTE

If the system is operating at “⚠” the temperature on BT30 should be aligned with the operating temperature of the central heating system. If the temperature set on the thermostat is too high, it can damage the system.

Outdoor unit

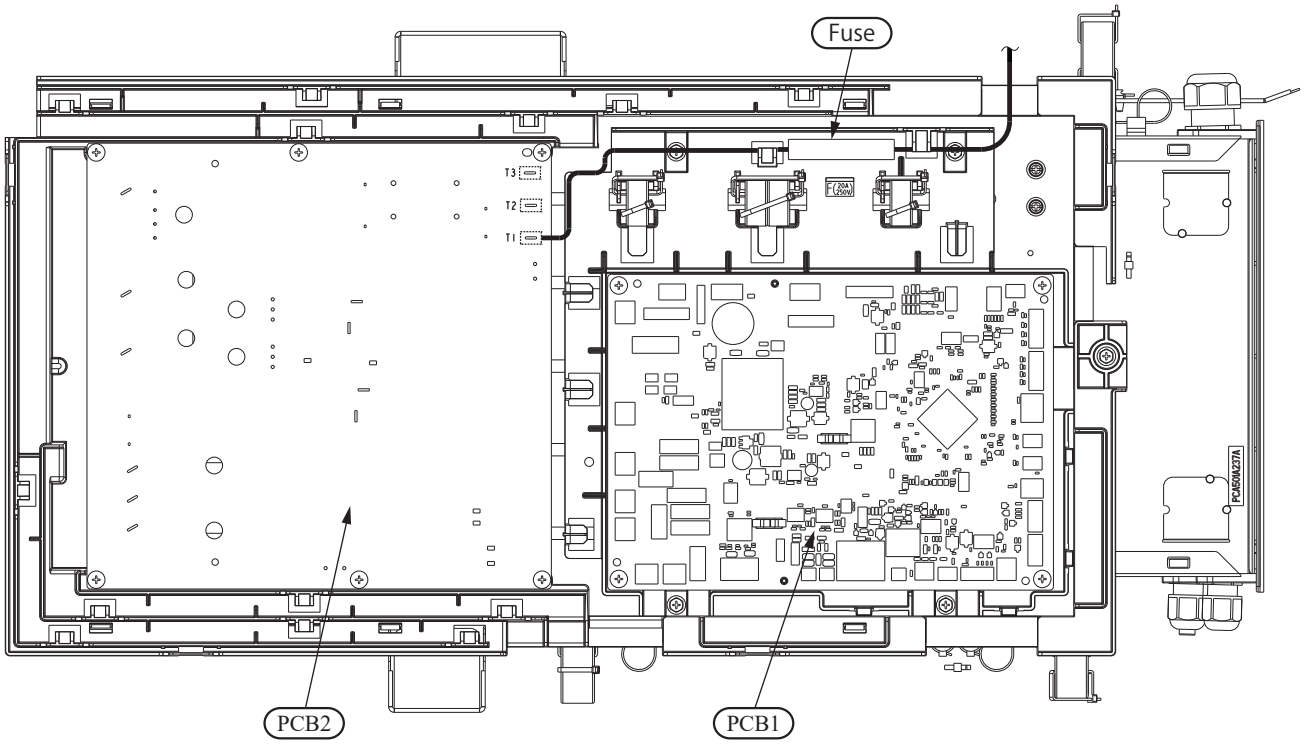
Electrical installation work must be performed by an electrical installation service provider qualified by a power provider of the country.

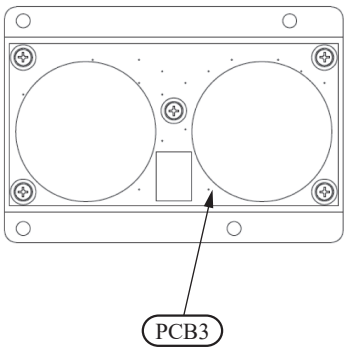
Electrical installation work must be executed according to the technical standards and other regulations applicable to electrical installations in the country.

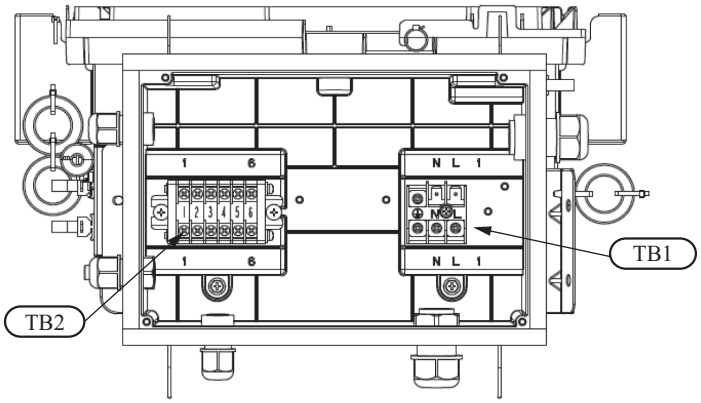
- Do not use any supply cord lighter than one specified in parentheses for each type below for indoor use.
  - braided cord (code designation 60245 IEC 51),
  - ordinary tough rubber sheathed cord (code designation 60245 IEC 53)
  - flat twin tinsel cord (code designation 60227 IEC 41);
- Do not use anything lighter than polychloroprene sheathed flexible cord (code designation 60245 IEC57) for supply cords of parts of appliances for outdoor use.
- Ground the unit. Do not connect the grounding wire to a gas pipe, water pipe, lightning rod or telephone grounding wire. If improperly grounded, an electric shock or malfunction may result.
- A grounding wire must be connected before connecting the power cable. Provide a grounding wire longer than the power cable.
- The installation of an impulse withstanding type earth leakage breaker is necessary. A failure to install an earth leakage breaker can result in an accident such as an electric shock or a fire.
- Do not turn on the power until the electrical work is completed.
- Do not use a condensive capacitor for power factor improvement under any circumstances (It does not improve power factor, while it can cause an abnormal overheat accident).
- For power supply cables, use conduits.
- Do not lay communication cables (controller and signaling wires) and other cables together outside the unit. Laying them together can result in the malfunctioning or a failure of the unit due to electric noises.
- Fasten cables so that may not touch the piping, etc.
- When cables are connected, make sure that all electrical components within the electrical component box are free of loose connector coupling or terminal connection and then attach the cover securely (Improper cover attachment can result in malfunctioning or a failure of the unit, if water penetrates into the box).
- Always use a three-core cable for communication cable. Never use a shield cable.
- Fasten the terminal of cables securely to the terminal block. Loose connection may cause abnormal heat and/or a fire.
- Arrange the wiring route appropriately so that the cable is not damaged by edge of sheet metal nor pinched by panels.

Electrical components

FDCM60/71VNX-P

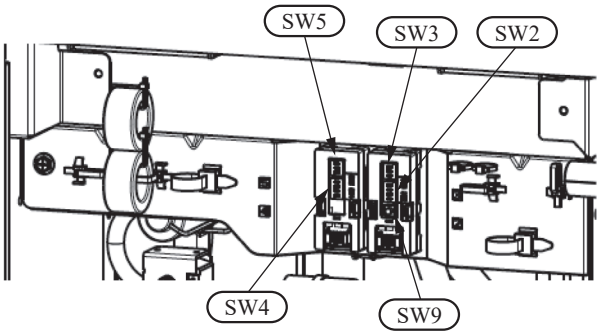




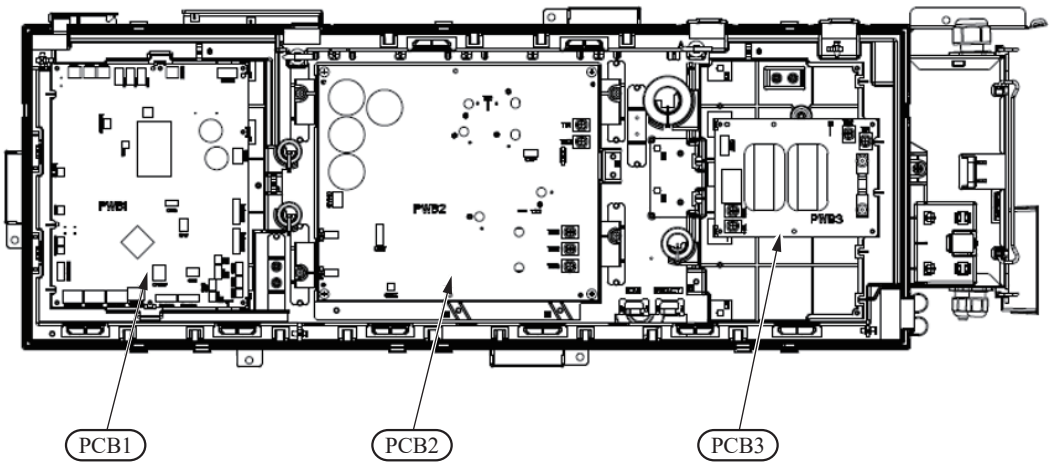


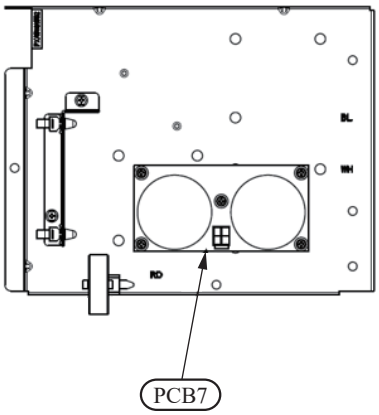
Explanation

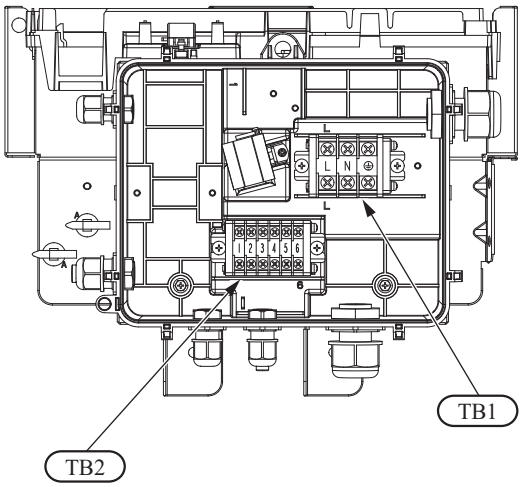
PCB1	Printed wiring board 1
PCB2	Printed wiring board 2
PCB3	Printed wiring board 3
SW2-5	DIP switch of outdoor unit
SW9	Button swich of outdoor unit
Fuse	Fuse for power cable
TB1	Terminal block, power cable
TB2	Terminal block, communication cable between outdoor unit / controller



FDCM100/140VNX-P

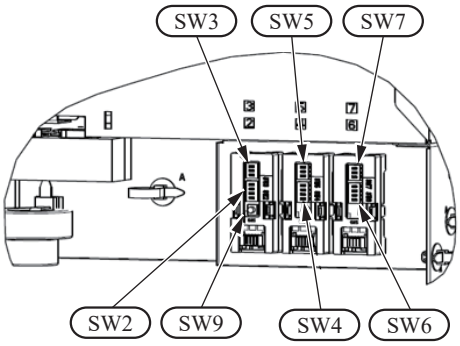




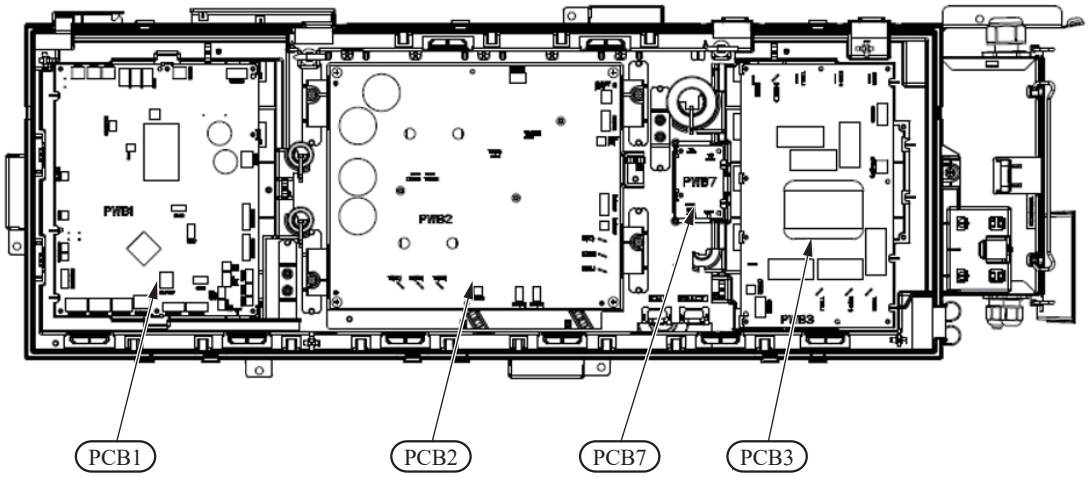


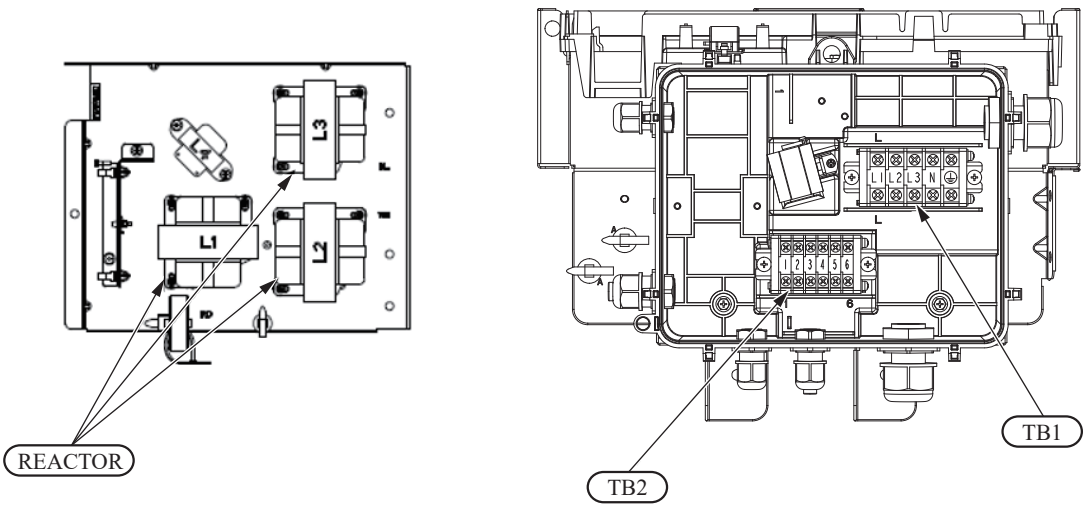
Explanation

PCB1	Print circuit board 1
PCB2	Print circuit board 2
PCB3	Print circuit board 3
PCB7	Print circuit board7
SW2-7	DIP switch of outdoor unit
SW9	Button swich of outdoor unit
TB1	Terminal block, power cable
TB2	Terminal block, communication cable between outdoor unit / controller



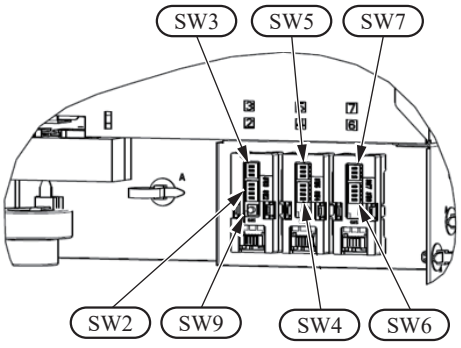
FDCM100/140VSX-P



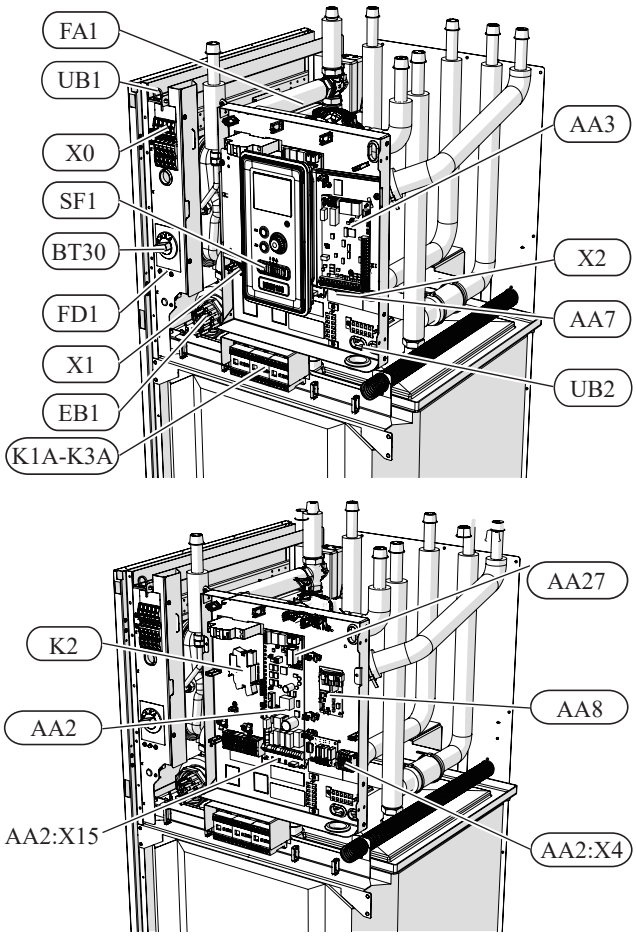


Explanation

PCB1	Print circuit board 1
PCB2	Print circuit board 2
PCB3	Print circuit board 3
PCB7	Print circuit board 7
SW2-7	DIP switch of outdoor unit
SW9	Button swich of outdoor unit
TB1	Terminal block, power cable
TB2	Terminal block, communication cable between outdoor unit / controller



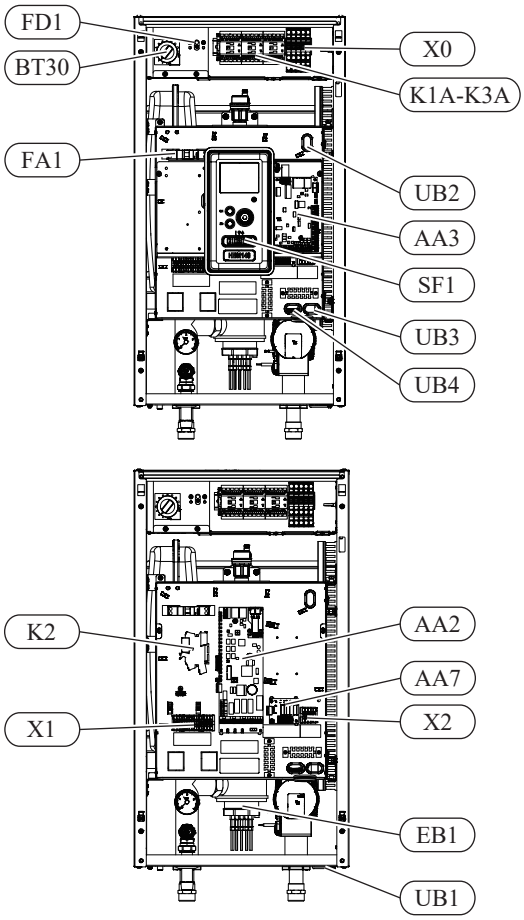
HMM100



Explanation

X0	Power terminal 400V~/230V~
X1	Control panel terminal block
X2	Control panel terminal block
X10	Voltage terminal block 230V~
FA1	Miniature circuit breaker (protecting the control system of indoor unit)
K1A-K3A	Electric additional heat contactor
BT30	Thermostat, standby mode
AA3	Sensor card
AA23	Communication card
AA7	Relay card
FD1	Thermal circuit breaker STB
UB1	Cable pass
UB2	Cable pass
K2	Alarm relay
AA2	Main card
AA2:X15	Terminal block - low voltage
AA2:X4	Terminal block - low voltage
AA8	Titanium anode card
AA27	Relay card

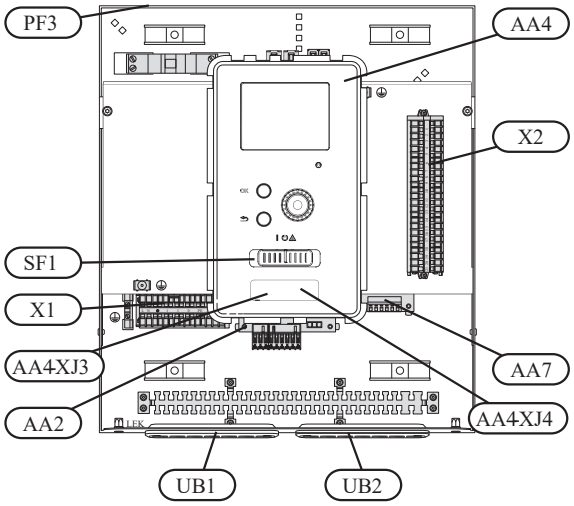
HBM140/140H

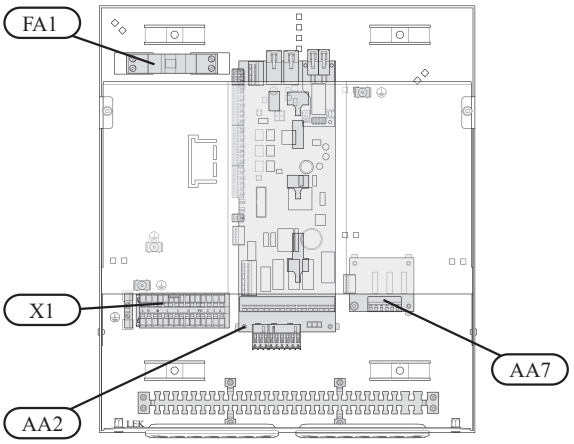


Explanation

X0	Terminal block 230V~ (HBM140) Terminal block 400V~/230V~ (HBM140H)
X1	Control panel terminal block
X2	Control panel terminal block
AA2:X4	Terminal block - low voltage
K1A-K3A	Contactors for electric additional heat (only HBM140H)
K2	Alarm relay
BT30	Standby mode thermostat (only HBM140H)
AA2	Main board
AA3	Input board
AA7	Extra relay circuit board
FD1	Thermal circuit breaker
FA1	Miniature circuit breaker (protecting the control system of indoor unit)
EB1	Electric additional heat (only HBM140H)
UB1-UB4	Cable grommets

RC-HY20-W

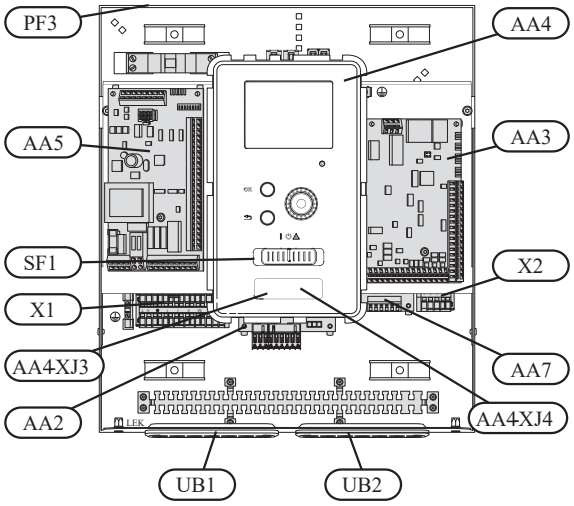


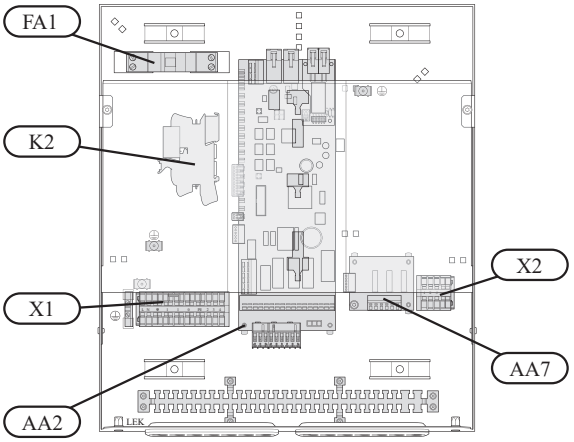


Explanation

AA2	Base card
AA4	Display unit
	AA4-XJ3 USB socket
AA4-XJ4	Service outlet (No function)
AA7	Extra relay circuit board
FA1	Miniature circuit-breaker
X1	Terminal block, incoming electrical supply
X2	Terminal block, control signal circulation pump, sensors AUX inputs and heat pump
SF1	Switch
PF3	Serial number plate
UB1	Cable grommet, incoming supply electricity, power for accessories
UB2	Cable grommet, signal

RC-HY40-W

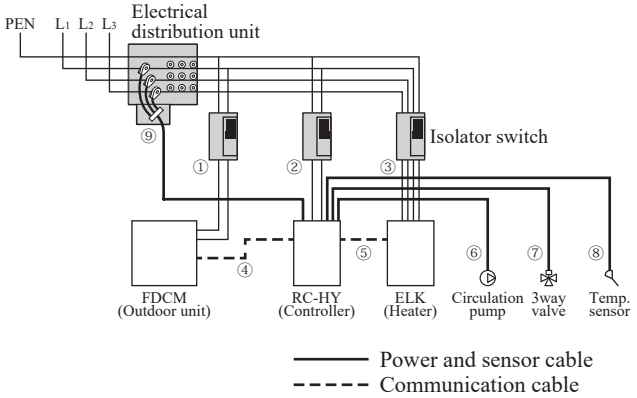




Explanation

AA2	Base card
AA3	Input circuit board
AA4	Display unit
AA4-XJ3	USB socket
AA4-XJ4	Service outlet (No function)
AA5	Accessory card
AA7	Extra relay circuit board
FA1	Miniature circuit-breaker
K2	Emergency mode relay
X1	Terminal block, incoming electrical supply
X2	Terminal block, AUX4 - AUX6
SF1	Switch
PF3	Serial number plate
UB1	Cable grommet, incoming supply electricity, power for accessories
UB2	Cable grommet, signal

Principle diagram, electrical installation



Item		Cable size
①	Power - Outdoor unit FDCM60/71VNX-P	3core, 2.5mm^2 (power cable)
	Power - Outdoor unit FDCM100/140VNX-P	3 core, 6.0mm^2 (power cable)
	Power - Outdoor unit FDCM100/140VSX-P	5 core, 2.5mm^2 (power cable)
②	Power - Controller	3core, 1.5mm^2 (power cable)
③	Power - Electrical heater	Selected according to power source voltage (230V/400V). Please refer to installation manual for ELK
④	Outdoor unit <–> Controller	3 cores, 0.5 mm² (Communication cable)
⑤	Controller <–> Electrical heater	4core, 0.5mm^2 (communication cable)
⑥	Controller <–> Circulation pump	3 cores, 0.75 mm² (Power cable) 2 cores, 0.5 mm² (Communication cable)
⑦	Controller <–> 3 way valve	3 cores, 0.75 mm² (Power cable)
⑧	Controller <–> Temp. sensors	2 cores, 0.5 mm² (Each sensor)
⑨	Current sensor (RC-HY40-W only)	6core, 0.5mm^2

The cable size shown on above table is minimum size.
Choose appropriate size according to local laws and regulations.

NOTE

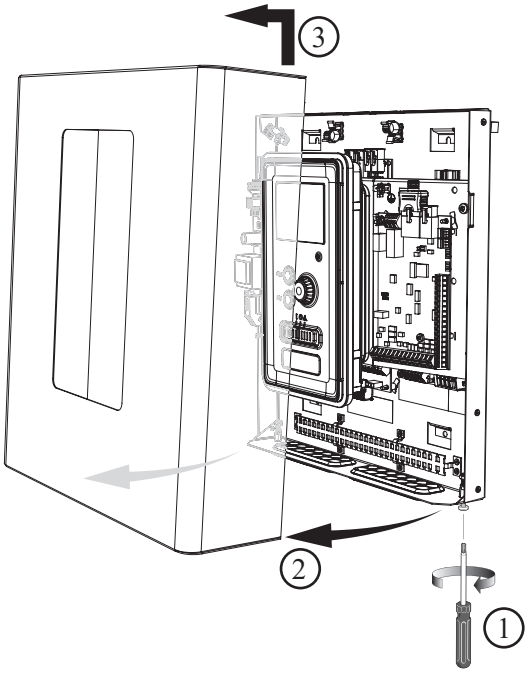
When laying cables into the controllers, make sure that the cables are groomed to avoid excessive resistance to the terminal blocks.

If there is an excessive resistance applied to the wiring, they may disconnect and damage the unit (short circuit).

Accessibility, electrical connection

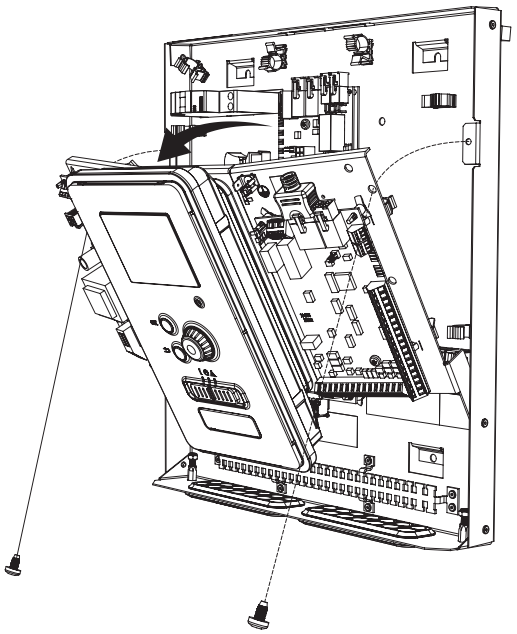
RC-HY20/40-W

The cover of the controller is opened using a Torx 25 screwdriver. Assembly takes place in the reverse order.

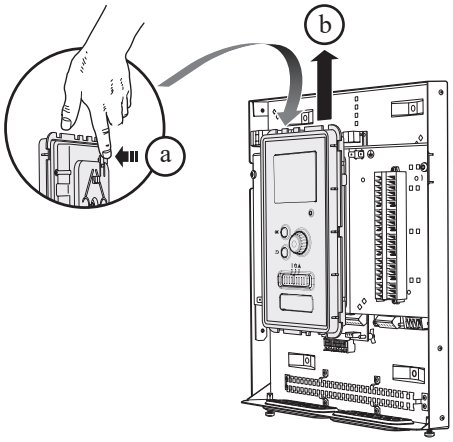


NOTE

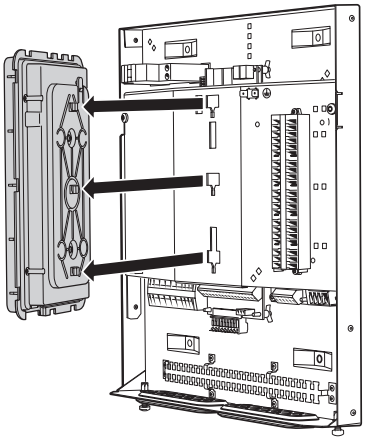
The cover to access the base board is opened using a Torx 25 screwdriver.



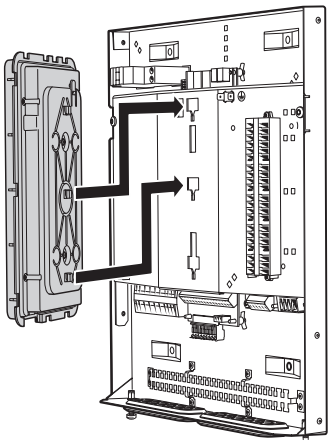
The display may need to be moved for easier access when connecting electrics. This is easily done by following these steps.



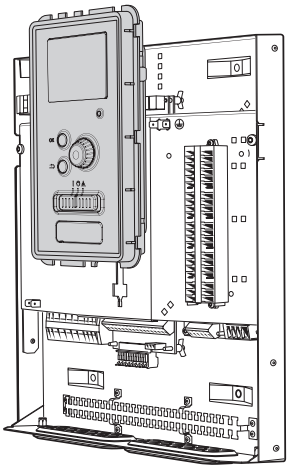
1. Press in the catch on the upper rear side of the display unit towards you (a) and move the display unit upwards (b) so that the mountings unhook from the panel.



2. Lift the display unit from its mountings.



3. Align the two lower mountings on the reverse of the display unit with the two upper holes in the panel as illustrated.



4. Secure the display on the panel.
5. When the electrical connection is ready the display must be reinstalled with three mounting points again, otherwise the front cover cannot be installed.

Thermal circuit breaker STB -HMM100

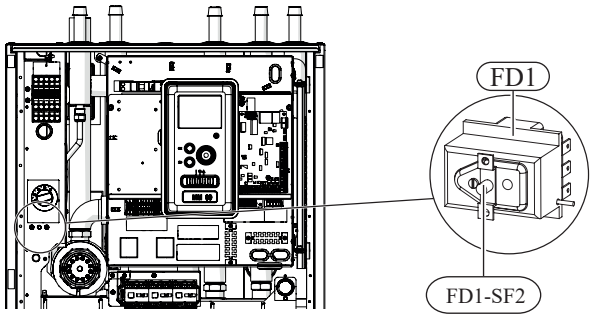
Temperature limiter (FD1) cuts off the power supply of the electrical heating module if the temperature increases to the range of approximately 96°C or decreases below -8°C.

NOTE

In case of activation of the STB temperature limiter, it must be reported to an authorized service in order to diagnose the possible cause of its activation.

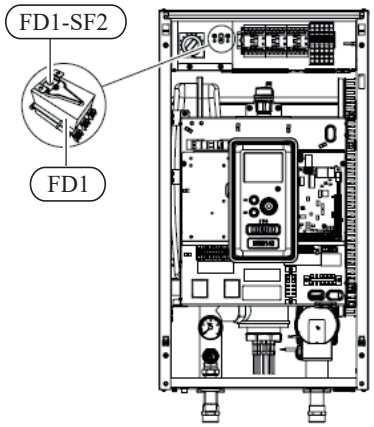
Resetting -HMM100

The thermal circuit breaker (FD1) is accessible behind the front cover. It is reset by pressing firmly on the button (FD1-SF2) using a small screwdriver. Press the button using max.force 15 N (approx. 1.5 kg).



Resetting -HBM140H

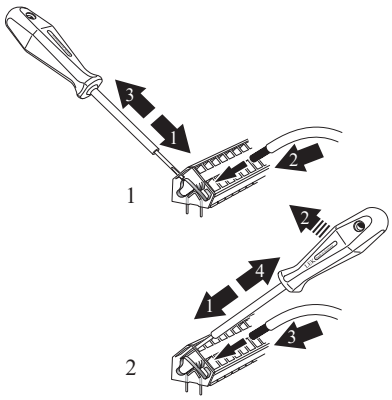
The thermal circuit breaker (FD1) is accessible behind the front cover. It is reset by pressing firmly on the button (FD1-SF2) using a small screwdriver. Press the button using max. force 15 N (approx. 1.5 kg).



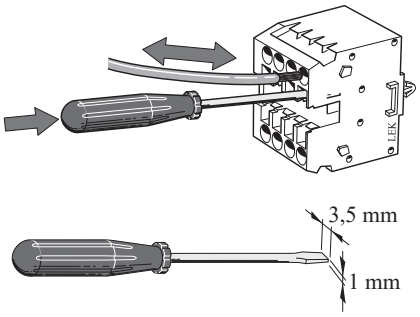
Cable lock

Use a suitable tool to release/lock the cables in the terminal block.

Terminal block on the electrical card



Terminal block



Cable connection

FDCM60/71VNX-P

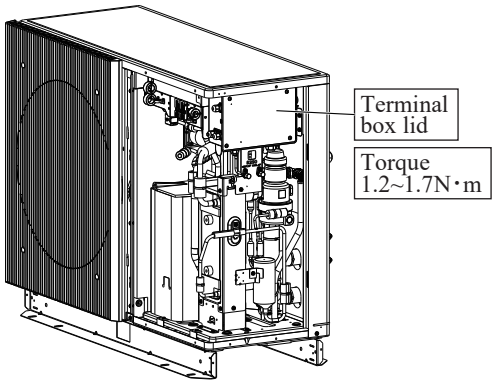
To connect the cable, you need to remove the terminal box lid.

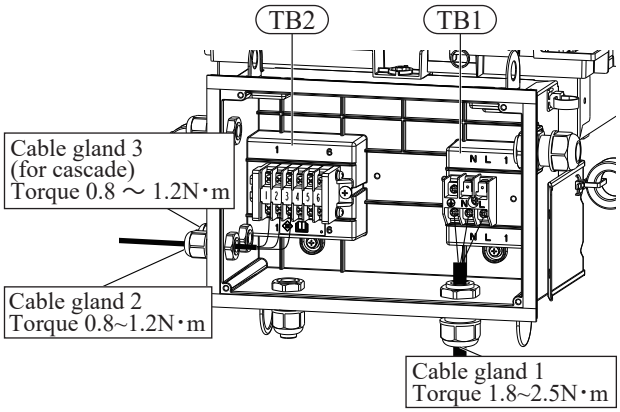
For outdoor unit, power supply is connected on TB1 terminal and communication cable is connected on TB2 terminal.

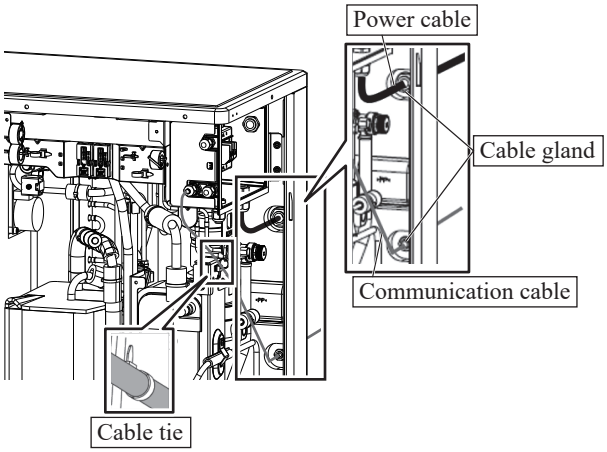
Route the cables out of the terminal box through the cable gland and tighten cable gland to the specified torque.

Fix communication cable with cable tie. And route the cables out of outdoor unit through the cable gland.

After the connection, attach the lid to the terminal box to the specified torque.







Recommended cable

Power source cable

Model	Power source	Power cable thickness (mm^2)	Max. over current (A)	Max cable length (m)
60VNX-P	Single phase 3 wire 230V 50Hz	2.5	13	19
71VNX-P			16	15

Communication cable

Model	Power source	Communication cable thickness (mm^2)	Max. over current (A)
60VNX-P	DC 5V	0.5	1
71VNX-P			

NOTE

Power source cable: Use the cable which is conformed with 60245 IEC57.
When selecting the power source cable length, make sure that voltage drop is less than 2%. If the wire length gets longer, increase the wire diameter.
Communication cable: Use the wires which is conformed with 60245 IEC57.
And both terminals to which the communication cable is connected are SELV connection point.
Choose appropriate size according to local laws and regulations.

NOTE

External overcurrent protection should be selected by an appropriately qualified installer, based on the technical data contained in the manual, in accordance with the installed equipment system.

NOTE

The indicated cross-sections of power cables are recommended for cables laid on the wall with a length. The selection of cables/sections and their arrangement should be consulted with a qualified electrician each time.

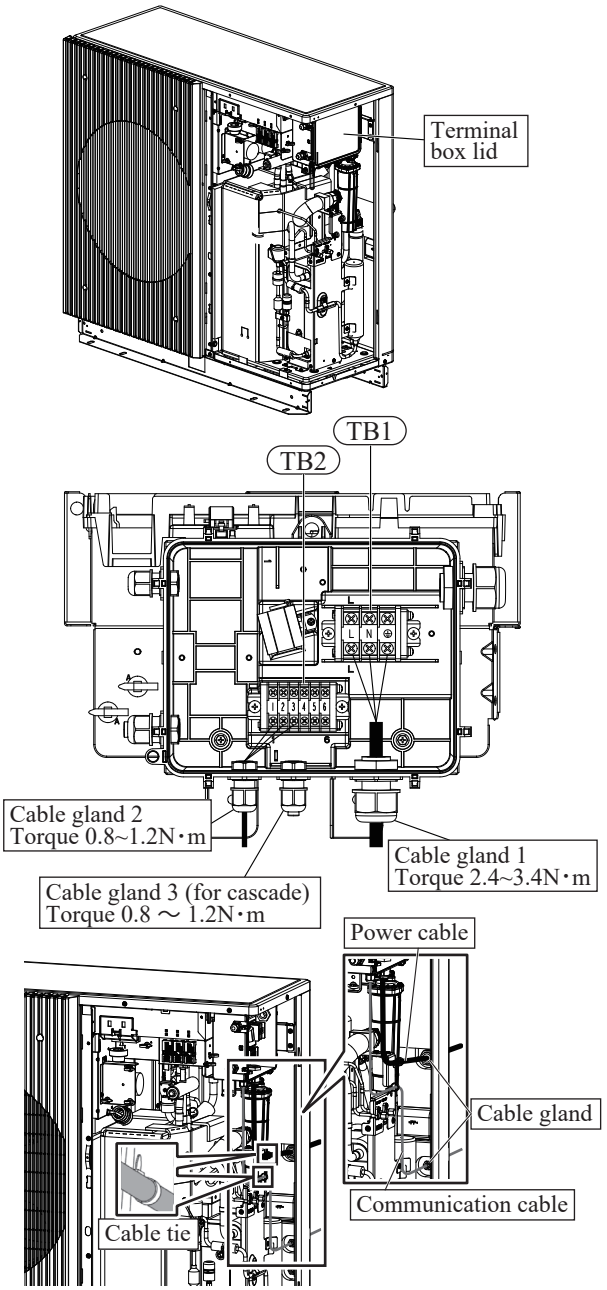
NOTE

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

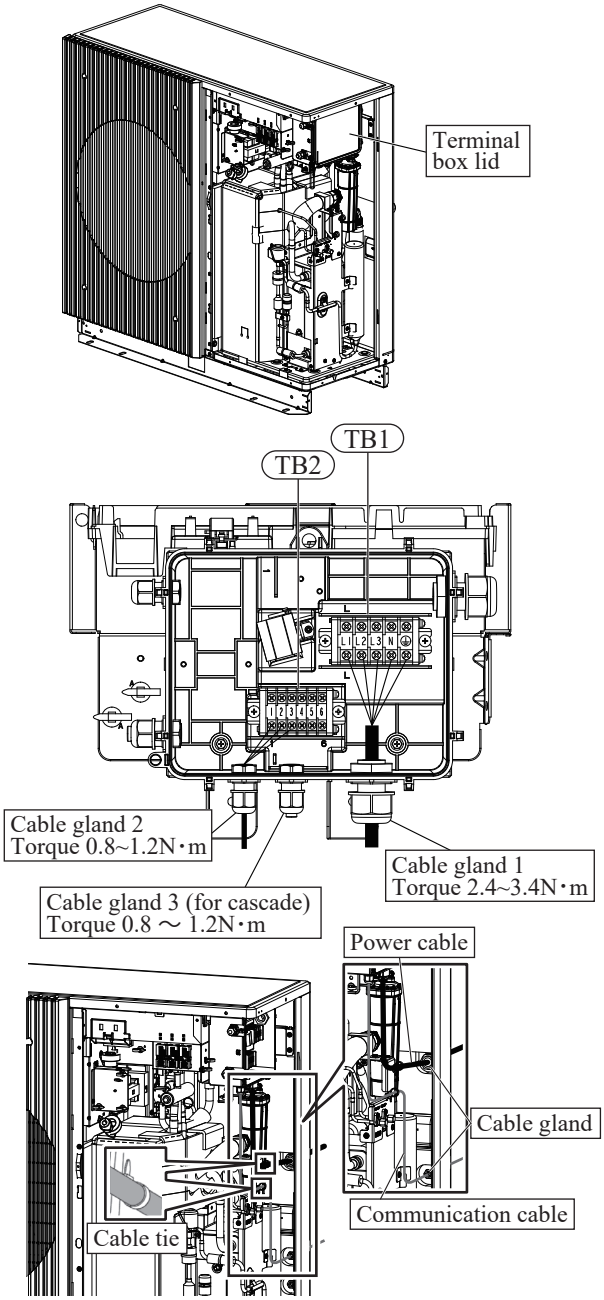
NOTE

The electrical system to which the device will be connected should be built in accordance with current regulations.

FDCM100/140VNX-P



FDCM100/140VSX-P



Recommended cable

Power source cable

Model	Power source	Power cable thickness (mm^2)	Max. over current (A)	Max cable length (m)
100VNX-P	Single phase 3 wire 230V 50Hz	6.0	21	28
140VNX-P			28	21
100VSX-P	Three phase 5 wire 400V 50Hz	2.5	11	45
140VSX-P			11	45

Communication cable

Model	Power source	Communication cable thickness (mm^2)	Max. over current (A)
100VNX-P	DC 5V	0.5	1
140VNX-P			
100VSX-P	DC 5V	0.5	1
140VSX-P			

Power supply

Indoor unit

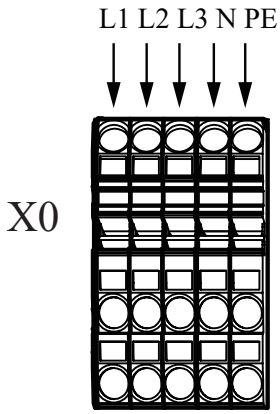
HMM100

Power supply connection 400 V

The power supply connection is connected to terminal block (X0) through the input on the back of the unit (UB1). The cable must be dimensioned according to the applicable standards.

The 400V connection allows for a maximum power of 9kW to the electric additional heat. The connection should be made according to the diagram in the user manual. Detailed electrical diagram - see subsection “Electrical wiring diagrams”.

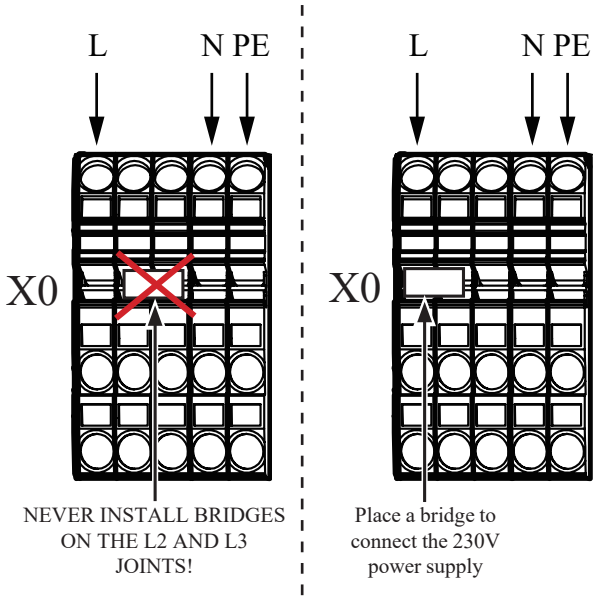
Diagram - connecting power supply 400 V



NOTE

If a 400V connection is used, the maximum power of the electric additional heater placed in the HMM100 unit is 9 kW.

Diagram - connecting power supply 230 V



NOTE

When a 230V connection is used, the maximum power of the additional heat used in the HMM100 unit is 6.0 kW.

NOTE

It is forbidden to install bridges at the connection of lines L2 and L3. Otherwise, the appliance and the electrical system may be damaged.

The manufacturer is not liable for any damage caused by failure to comply with the above instructions.

Recommended fuse size

The recommended fuse size shown in the following table is reference value. Choose appropriate size according to local laws and regulations.

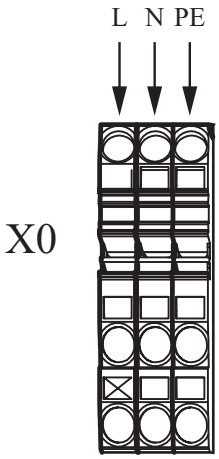
	Recommended fuse size
FDCM60VNX-P	16A/230V 1AC 50Hz
FDCM71VNX-P	18A/230V 1AC 50Hz
FDCM100VNX-P	25A/230V 1AC 50Hz
FDCM140VNX-P	32A/230V 1AC 50Hz
FDCM100/140VSX-P	16A/400V 3NAC 50Hz
RC-HY20/40-W	10A/230V 1AC 50Hz
Electric heater (ELK9M/9M1)	16A/400V 3NAC 50Hz 9kW
	40A/230V 1AC 50Hz 9kW
	20A/230V 1AC 50Hz 4.5kW
HMM100	16A/400V 3NAC 50Hz
	32A/230V 1AC 50Hz
HBM140	16A/230V 1AC 50Hz
HBM140H	16A/400V 3NAC 50Hz
	32A/230V 1AC 50Hz

HBM140

Power supply connection 230 V

The power supply connection is connected to terminal block (X0) through the input on the back of the unit (UB1). The cable must be dimensioned according to the applicable standards.

Detailed electrical diagram - see subsection “Electrical wiring diagrams”.



HBM140H

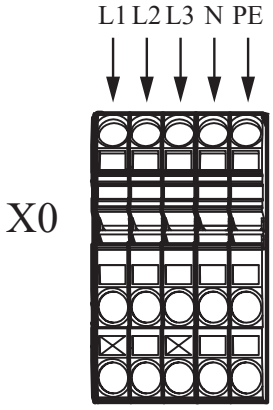
Power supply connection 400 V

The power supply connection is connected to terminal block (X0) through the input on the back of the unit (UB1).

The cable must be dimensioned according to the applicable standards.

The 400 V connection allows for a maximum power of 9 kW to the electric additional heat. The connection should be made according to the diagram in the manual.

Detailed electrical diagram - see subsection “Electrical wiring diagrams”.



CAUTION

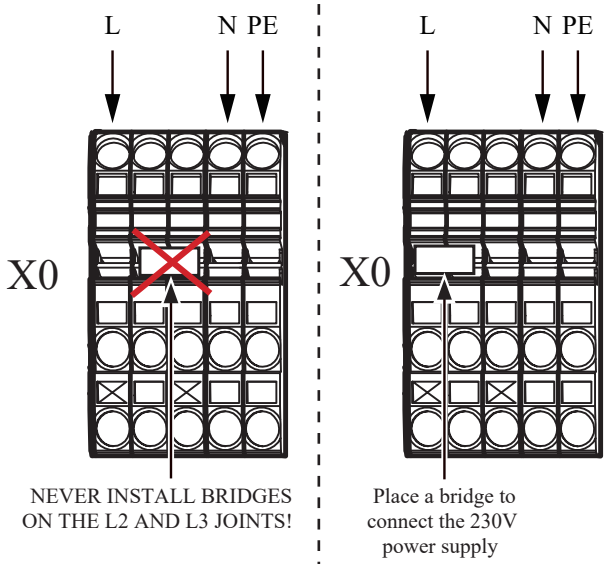
If a 400 V connection is used, the maximum power of the electric additional heater placed in theHBM140H unit is 9 kW.

Power supply connection 230 V

The power supply connection is connected to terminal block (X0) through the input on the back of the unit (UB1).

The 230 V connection allows for a maximum power of 6,0 kW to the additional heating. The connection should be made according to the diagram in the manual.

Detailed electrical diagram - see subsection “Electrical wiring diagrams”.



CAUTION

When a 230 V connection is used, the maximum power of the additional heat used in the HBM140H unit is 6,0 kW.

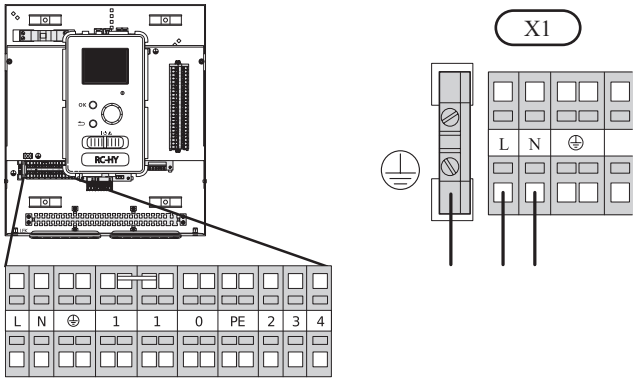
CAUTION

It is forbidden to install bridges at the connection of lines L2 and L3. Otherwise, the appliance and the electrical system may be damaged.

The manufacturer is not liable for any damage caused by failure to comply with the above instructions.

Controller (RC-HY20/40-W)

RC-HY20/40-W must be installed bia an isolator switch with a minimum gap of 3 mm. Minimum cable area must be sized according to the fuse rating used.



RC-HY20/40-W X1

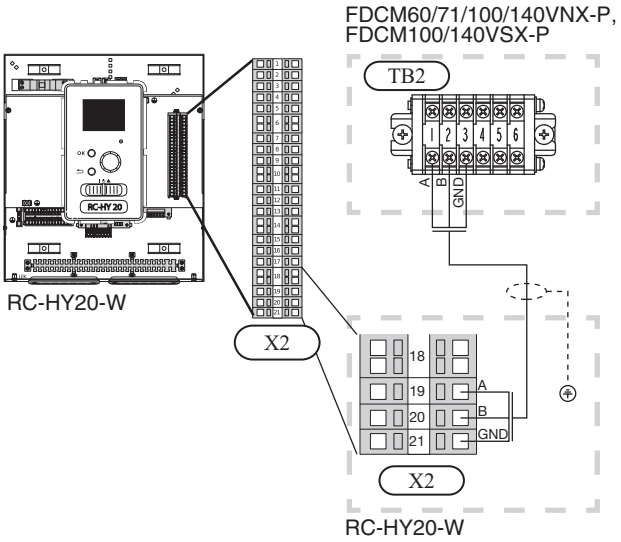
For RC-HY20-W detailed connection on communications (communication, circulation pump, sensors, etc) please refer to contents from next chapter "RC-HY20-W - Connections".

For RC-HY40-W detailed connection on communications (communication, charge pump, sensors, etc) please refer to page 86.

RC-HY20-W
Connections

Communication with outdoor unit

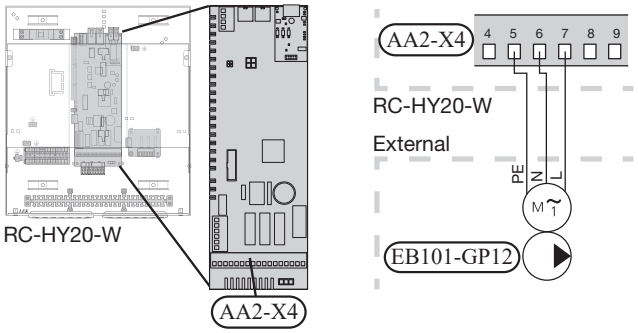
It is necessary to connect a signal cable to enable the communication between the controller and the outdoor unit. Connect the outdoor unit (EB101) with a screened three core cable to terminal block X2:19 (A), X2:20 (B) and X2:21 (GND) as illustrated.



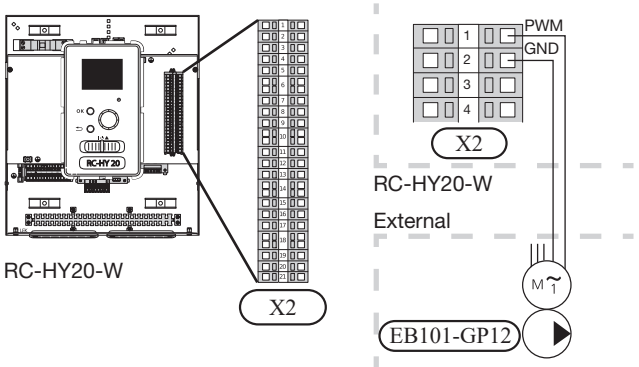
Circulation pump (GP12)

For Hydrolution EZY series it is necessary to install the circulation pump externally and it is also necessary to make its electrical connections.

Connect the circulation pump (EB101-GP12) power supply to the terminal block X4:5 (PE), X4:6 (N) and X4:7 (L) on AA2 board as illustrated.



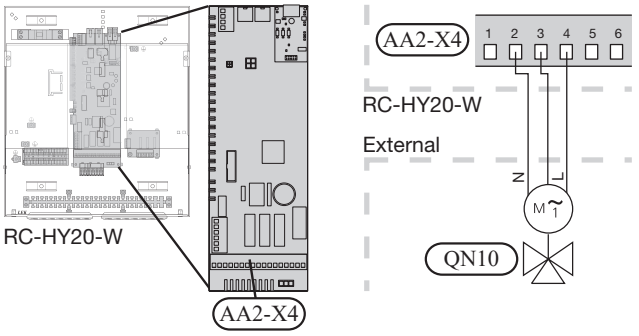
Connect the control signal cable to the terminal block X2:1 (PWM), X2:2 (GND) as illustrated.



3 way valve (QN10)

3 way reversing valve for hot water and space heating control reverses according to system demand.

Connect the QN10 to terminal block X4:2 (N), X4:3 (Control) and X4:4 (L) on AA2 board as illustrated.

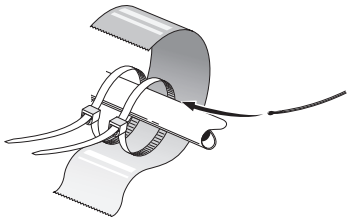


Temperature sensors

Use 2 core cable with a minimum 0.5 mm² cross section.

If any temperature sensor is not mentioned below please refer to option connection.

Temperature sensor installation on pipe



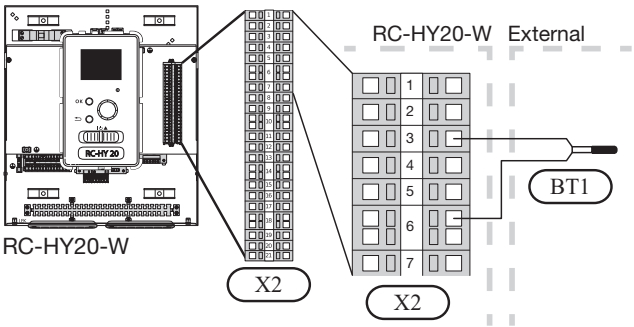
The temperature sensors are fitted using heat conducting paste, cable ties (the first cable tie is secured to the pipe in the middle of the sensor and the other cable tie is mounted approx. 5 cm after the sensor) and aluminium tape. Then insulate them using the enclosed insulation tape.

- **Ambient air temperature sensor (BT1)**

Install ambient air 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 the terminal block X2:3 and X2:6 as illustrated.

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

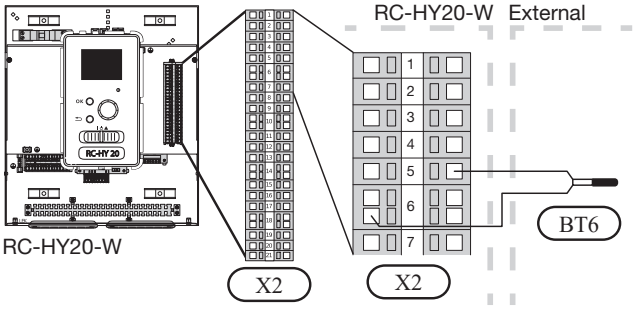


- **Temperature sensor, hot water charging (BT6)**

The temperature sensor, hot water charging (BT6) is placed in a submerged tube located on the bottom part of the hot water tank.

Connect the sensor to the terminal block X2:5 and X2:6 as illustrated.

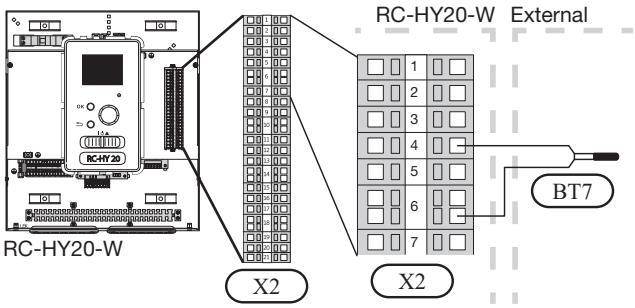
Hot water production is activated in menu 5.2 in the start guide or service menu.



- **Temperature sensor, hot water top (BT7)**

The temperature sensor, hot water top (BT7) is placed in a submerged tube located on the top part of the hot water tank. It can be connected to show the hot water temperature at the top of the tank.

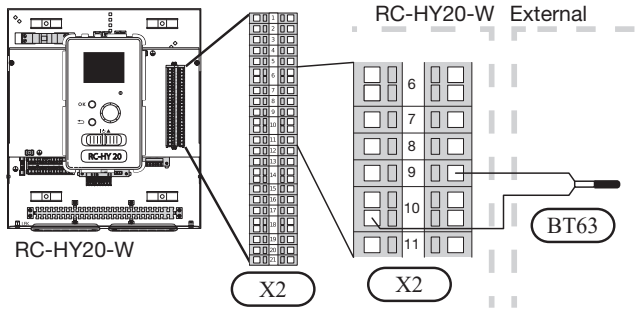
Connect the sensor to the terminal block X2:4 and X2:6 as illustrated.



- **Temperature sensor, additional heating (BT63)**

This temperature sensor is used in case the additional heating (boiler, electrical heater or other) is placed before the 3 way valve (QN10).

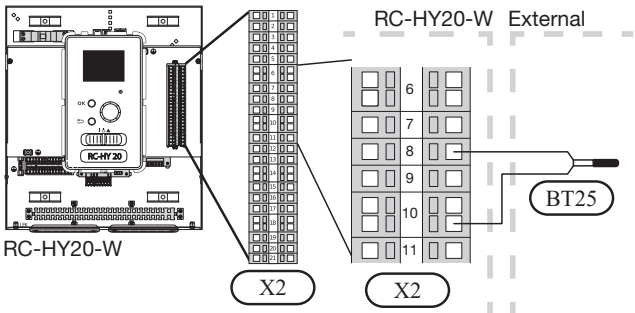
Connect the sensor to the terminal block X2:9 and X2:10 as illustrated.



- **Temperature sensor, external flow line (BT25)**

This temperature sensor is used in case the additional heating (boiler, electrical heater or other) is placed after the 3 way valve (QN10).

Connect the sensor to the terminal block X2:8 and X2:10 as illustrated.



Optional connections

- **Room sensor (BT50)**

It is possible to connect a room sensor (accessory part) to the RC-HY20-W controller.

The room temperature sensor has three functions:

1. Show current room temperature in the controller display.

2. Option of changing the room temperature in °C.

3. Makes it possible to change/stabilise the room temperature.

Install the sensor in a neutral position where the set temperature is required. A suitable location is on a free inner wall in a hall approx. 1.5 m above the floor.

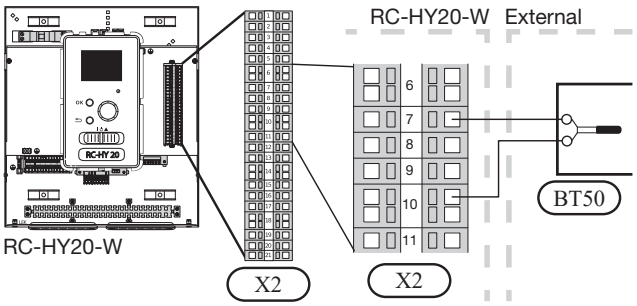
Do not install the room sensor where correct room temperature cannot be detected such as in a recess, between shelves, behind a curtain, above or close to a heat source, in a draft from an external door or in direct sunlight. Closed radiator thermostats can also cause problems.

The controller can operate without the sensor, but if the end user wants to read off the accommodation's indoor temperature in controller display, the sensor must be installed.

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

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

Connect the room sensor to the terminal block X2:7 and X2:10 as illustrated.



CAUTION

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**

Before the reversing valve QN10

External step-controlled additional heat can be controlled by up to three potential-free relays in the control module (3 step linear or 7 step binary).

The electric additional heat will charge with the maximum permitted immersion heater output together with the compressor to conclude the hot water charging and return to charging the heating as soon as possible. This only occurs when the number of degree minutes is below the start value for the additional heat.

After the reversing valve QN10

External step-controlled additional heat can be controlled by two relays (2 step linear or 3 step binary), which means that the third relay is used to control the immersion heater in the water heater/accumulator tank.

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

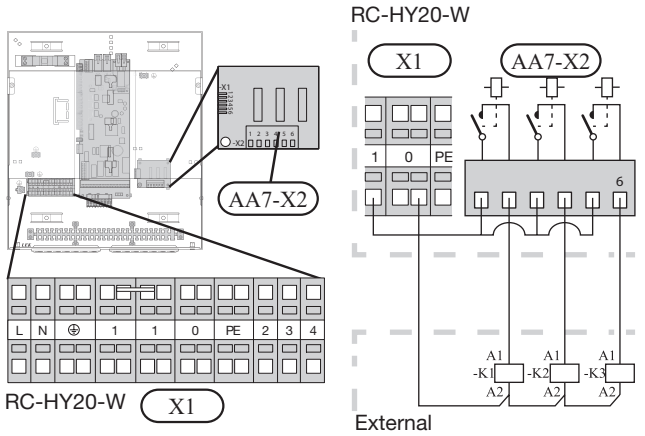
Step 1 is connected to terminal block X2:2 on the additional relay board (AA7).

Step 2 is connected to terminal block X2:4 on the additional relay board (AA7).

Step 3 or immersion heater in the water heater/accumulator tank is connected to terminal block X2:6 on the additional relay board (AA7).

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

If the relays are to be used for control voltage, bridge the supply from terminal block X1:1 toX2:1, X2:3 and X2:5 on additional relay board (AA7). Connect the neutral from the external additional heat to terminal block X1:0.



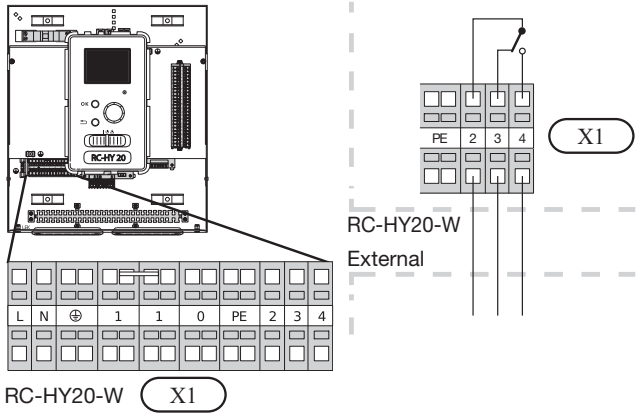
NOTE

Mark up any junction boxes with warnings for external voltage.

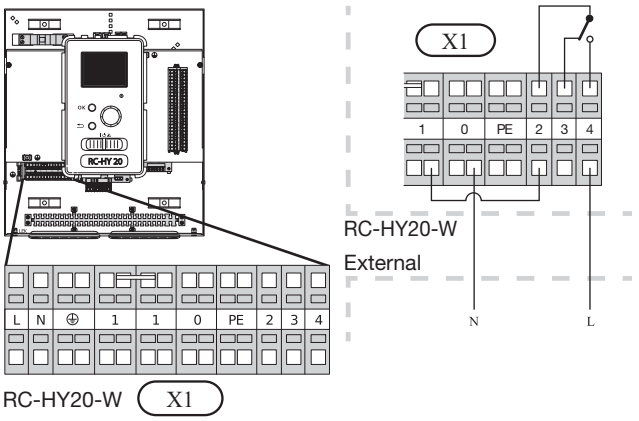
- **Emergency mode**

When the switch (SF1) is in "⚠" mode (emergency mode) the circulation pump is activated (EB101-GP12).

The emergency mode relay can be used to activate external additional heat. Between the port 2 and 4 is closed during emergency mode. An external thermostat must be connected to the control circuit (port 4) to control the temperature. Ensure that the heating medium circulates through the external additional heating.



If the relay is to be used for control voltage, bridge the supply from terminal block X1:1 to X1:2 and connect neutral and control voltage from the external additional heat to X1:0 (N) and X1:4 (L).



CAUTION

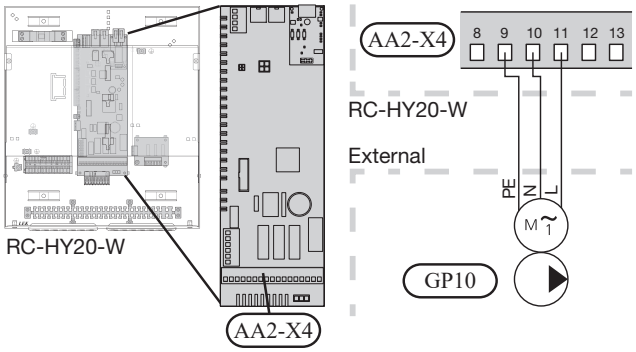
No hot water is produced when emergency mode is activated.

NOTE

Mark up any junction boxes with warnings for external voltage.

- **External circulation pump (GP10)**

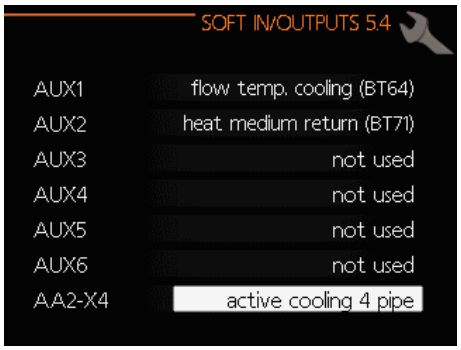
Connect the external circulation pump (GP10) to terminal block X4:9 (PE), X4:10 (N) and X4:11 (230V) on the AA2 board as illustrated.



- **External connection options**

RC-HY20-W has software-controlled AUX inputs and outputs for connecting the external switch function (contact has to be potential-free) or sensor.

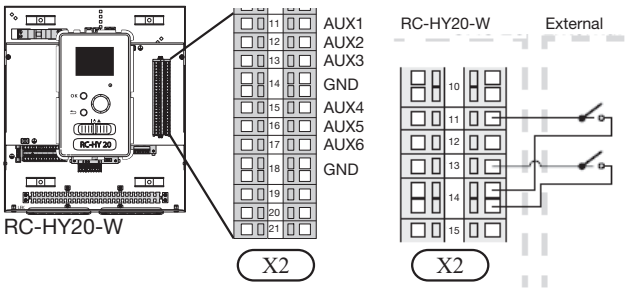
In menu 5.4 - "soft in/outputs", you select the AUX connection to which each function has been connected.



For certain functions, accessories may be required.

- **Selectable inputs**

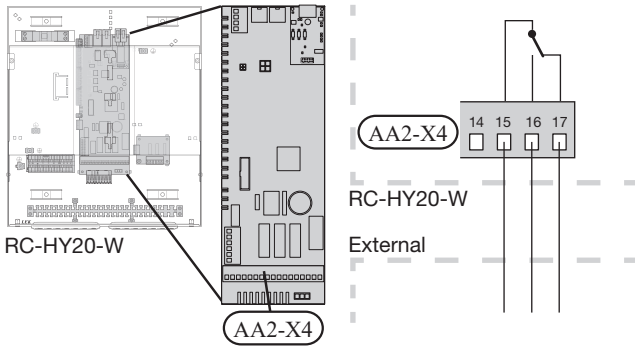
Selectable inputs on terminal block (X2) for these functions are:
AUX1 X2:11
AUX2 X2:12
AUX3 X2:13
AUX4 X2:15
AUX5 X2:16
AUX6 X2:17
GND is connected to terminal block X2:14 or X2:18.



The example above uses the inputs AUX1 (X2:11) and AUX3 (X2:13) on terminal block X2.

- **Selectable outputs**

A selectable output is AA2-X4:15-17.
The output is a potential-free switching relay.
When switch (SF1) is in the "⏻" or "⚠" position, the relay is in the alarm position.



CAUTION

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

- **Possible selection for AUX inputs**

Temperature sensor

Available options are:

- external supply temperature sensor cooling (EQ1-BT25) is used when docking 2-pipe cooling (can be selected when the air/water heat pump is permitted to produce cooling)
- 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"). (can be selected when the air/water heat pump is permitted to produce cooling)
- supply cooling (BT64) is used with active cooling 4-pipe (can be selected when the air/water heat pump is permitted to produce cooling)
- external return line sensor (BT71)
- displayed hot water sensor for HWC (BT70). Placed on the supply line.
- displayed hot water sensor for HWC (BT82). Placed on the return line.

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.

External activation of functions

An external switch function can be connected to RC-HY20-W to activate various functions. The function is activated during the time the switch is closed.

Possible functions that can be activated:

- hot water comfort mode "temporary lux"
- hot water comfort mode "economy"
- "external adjustment"
  When the switch is closed, the temperature is changed 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.
  - *climate system 1*
    The value for the change is set in menu 1.9.2, "external adjustment".
- SG ready

NOTE

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

In cases where this function is wanted it must be connected to terminal block X2.

"SG Ready" is a smart form of tariff control where your electricity supplier can affect the indoor and hot water temperatures or simply block the additional heat and/or the compressor in the heat pump at certain times of the day (can be selected in menu 4.1.5 after the function is activated). Activate the function by connecting potentialfree switch functions to two inputs selected in menu 5.4 (SG Ready A and SG Ready B).
Closed or open switch means one of the following:

- *Blocking (A: Closed, B: Open)*
  "SG Ready" is active. The compressor in the heat pump and additional heat is blocked.
- *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 RC-HY20-W for blocking various functions. The switch must be potentialfree and a closed switch results in blocking.

NOTE

Blocking entails a risk of freezing.

Functions that can be blocked:

- hot water (hot water production). Any hot water circulation (HWC) remains in operation.
- external supply temperature sensor (BT25) (control of temperature to the heating system)
- heating (blocking of heating demand)
  cooling (blocking cooling requirement)
- internally controlled additional heat
- compressor in heat pump (EB101)
- tariff blocking (additional heat, compressor, heating, cooling and hot water are disconnected)

- **Possible selections for AUX output**

Indications

- alarm
- cooling mode indication (can be selected when the heat pump is permitted to produce cooling)
- delayed cooling mode indication (only applies if there are cooling accessories)
- holiday
- away mode for "smart home" (complement to the functions in menu 4.1.7 - "smart home")

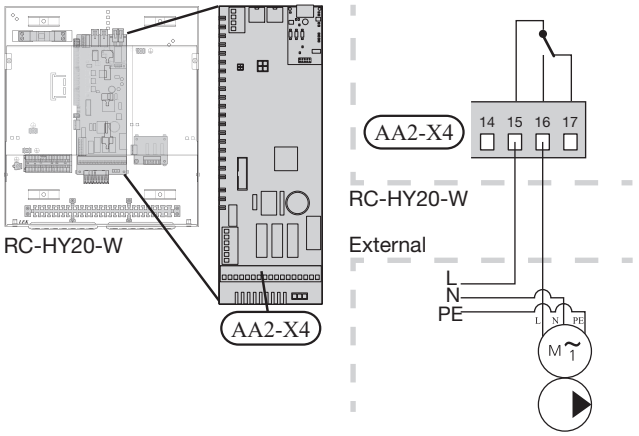
Control

- circulation pump for hot water circulation
- active cooling in a 4-pipe system (can be selected when the air/water heat pump is permitted to run cooling)
- external heating medium pump
- wood docking
- photovoltaic control (Can be selected when the accessory EME20M is activated.)

NOTE

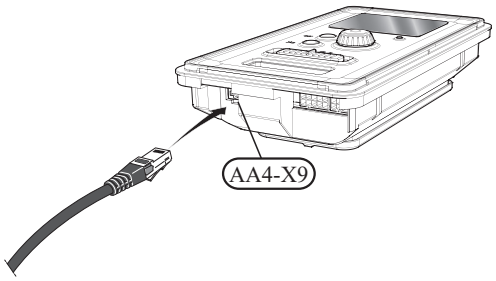
The relevant distribution box must be marked with a warning about external voltage.

An external circulation pump is connected to the AUX output, as illustrated below.



- **myUplink**

Connect the 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 (UB2) in the controller for cable routing.



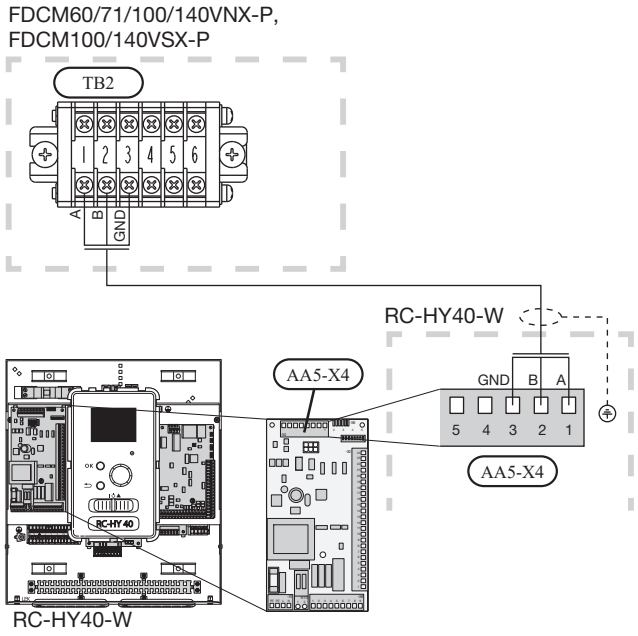
RC-HY40-W

Connections

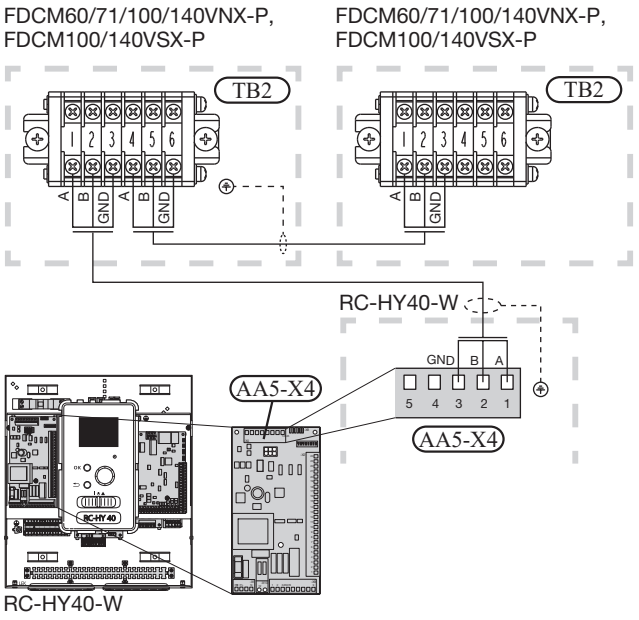
This chapter shows all the necessary and available connections with RC-HY40-W.

Communication with outdoor unit

It is necessary to connect a signal cable to enable the communication between the controller and the outdoor unit. Connect the outdoor unit (EB101) with a screened three core cable to terminal block X4:1 (A), X4:2 (B), X4:3 (GND) on the accessory board AA5 as illustrated.



In case several systems are connected to one controller, connect the port 4, 5 and 6 on TB2 terminal on PCB1 board to the next outdoor unit as illustrated.



When several systems are connected it is also necessary to allocate an address to the outdoor unit.

For that it is necessary to set the DIP switch SW5 on outdoor unit PCB as shown below:

Unit address	SW5-1	SW5-2	SW5-3
1	OFF	OFF	OFF
2	ON	OFF	OFF
3	OFF	ON	OFF
4	ON	ON	OFF
5	OFF	OFF	ON
6	ON	OFF	ON
7	OFF	ON	ON
8	ON	ON	ON

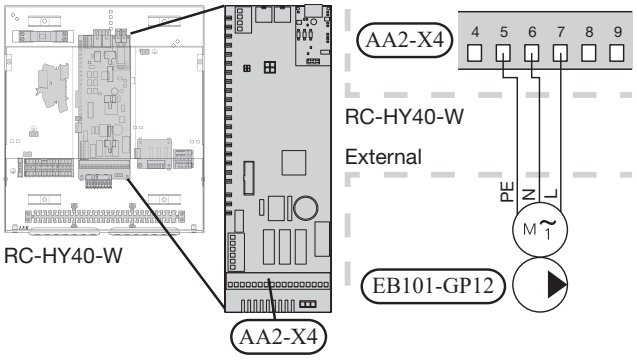
Circulation pump (GP12)

For Hydrolution EZY series it is necessary to install the circulation pump externally and it is also necessary to make its electrical connections.

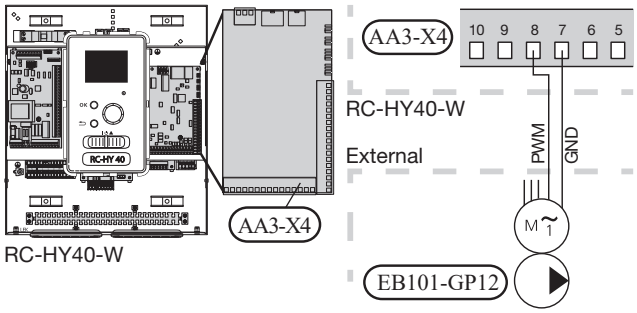
With RC-HY40-W it is possible to connect up to 2 circulation pumps, one for outdoor unit 1 (EB101) and outdoor unit 2 (EB102).

- **GP12 for unit 1 (EB101)**

Connect the circulation pump (EB101-GP12) power supply to the terminal block X4:5 (PE), X4:6 (N) and X4:7 (L) on AA2 board as illustrated.

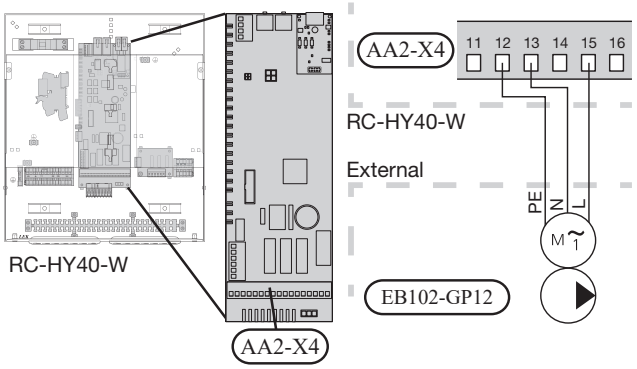


Connect the control signal cable to the terminal block X4:7 (PWM), X4:8 (GND) on AA3 board as illustrated.

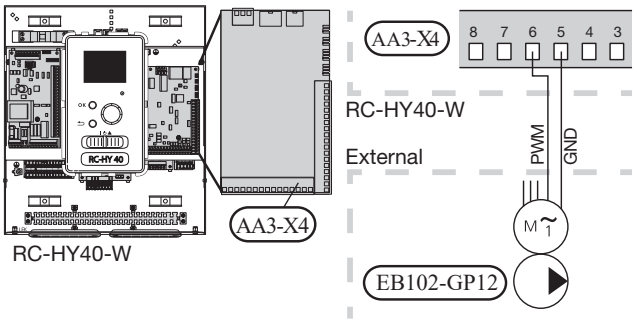


- **GP12 for unit 2 (EB102)**

Connect the circulation pump (EB102-GP12) power supply to the terminal block X4:12 (PE), X4:13 (N) and X4:15 (L) on AA2 board as illustrated.



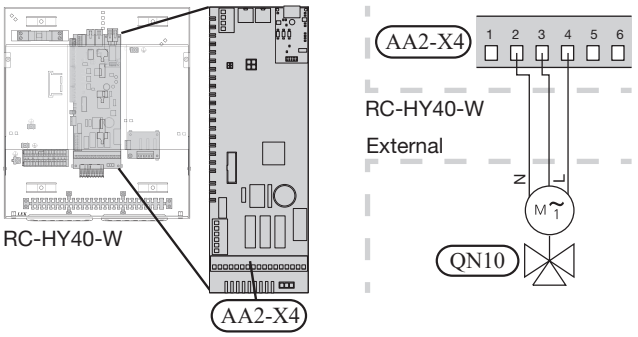
Connect the control signal cable to the terminal block X4:5 (PWM), X4:6 (GND) on AA3 board as illustrated.



3 way valve (QN10)

3 way reversing valve for hot water and space heating control reverses according to system demand.

Connect the QN10 to terminal block X4:2 (N), X4:3 (Control) and X4:4 (L) on AA2 board as illustrated.

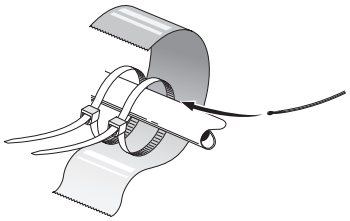


Temperature sensors

Use 2 core cable with a minimum 0.5 mm² cross section.

If any temperature sensor is not mentioned below please refer to option connection.

Temperature sensor installation on pipe



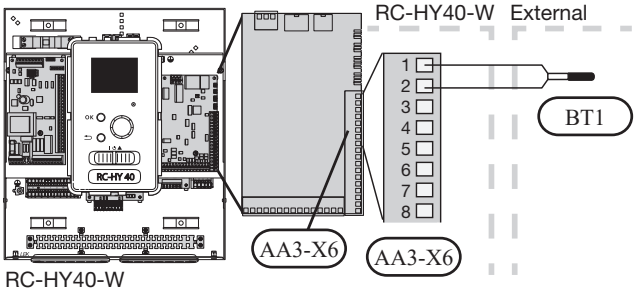
The temperature sensors are fitted using heat conducting paste, cable ties (the first cable tie is secured to the pipe in the middle of the sensor and the other cable tie is mounted approx. 5 cm after the sensor) and aluminium tape. Then insulate them using the enclosed insulation tape.

- **Ambient air temperature sensor (BT1)**

Install ambient air 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 the terminal block X6:1 and X6:2 on AA3 board as illustrated.

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

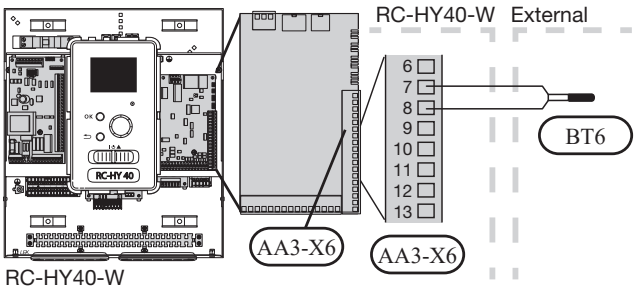


- **Temperature sensor, hot water charging (BT6)**

The temperature sensor, hot water charging (BT6) is placed in a submerged tube located on the bottom part of the hot water tank.

Connect the sensor to the terminal block X6:7 and X6:8 on AA3 board as illustrated.

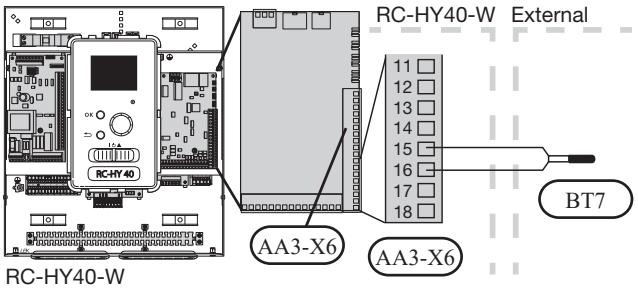
Hot water production is activated in menu 5.2 in the start guide or service menu.



- **Temperature sensor, hot water top (BT7)**

The temperature sensor, hot water top (BT7) is placed in a submerged tube located on the top part of the hot water tank. It can be connected to show the hot water temperature at the top of the tank.

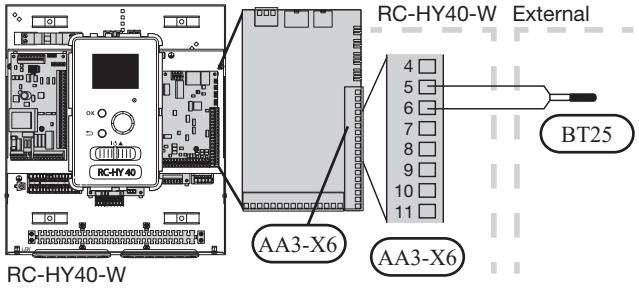
Connect the sensor to the terminal block X6:15 and X6:16 on AA3 board as illustrated.



- **Temperature sensor, external flow line (BT25)**

This temperature sensor is used in case the additional heating (boiler, electrical heater or other) is placed after the 3 way valve (QN10).

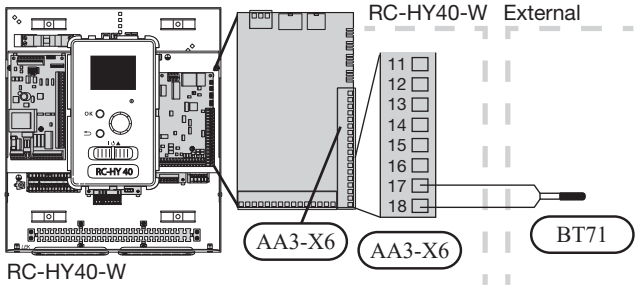
Connect the sensor to the terminal block X6:5 and X6:6 on AA3 board as illustrated.



- **Temperature sensor, external return line (BT71)**

This temperature sensor is used in case the additional heating (boiler, electrical heater or other) is placed after the 3 way valve (QN10).

Connect the sensor to the terminal block X6:17 and X6:18 on AA3 board as illustrated.



Optional connections

- **Load monitor**

In case many power electrical appliances are connected in the property and the electric heater is energised at the same time, there is a risk of tripping the main fuse of the property.

The controller has an integrated load monitor that controls the power steps of the electric heater by disconnecting step by step in the event of overload in a phase. It will be reconnected if other current consumption is reduced.

Connecting current sensors

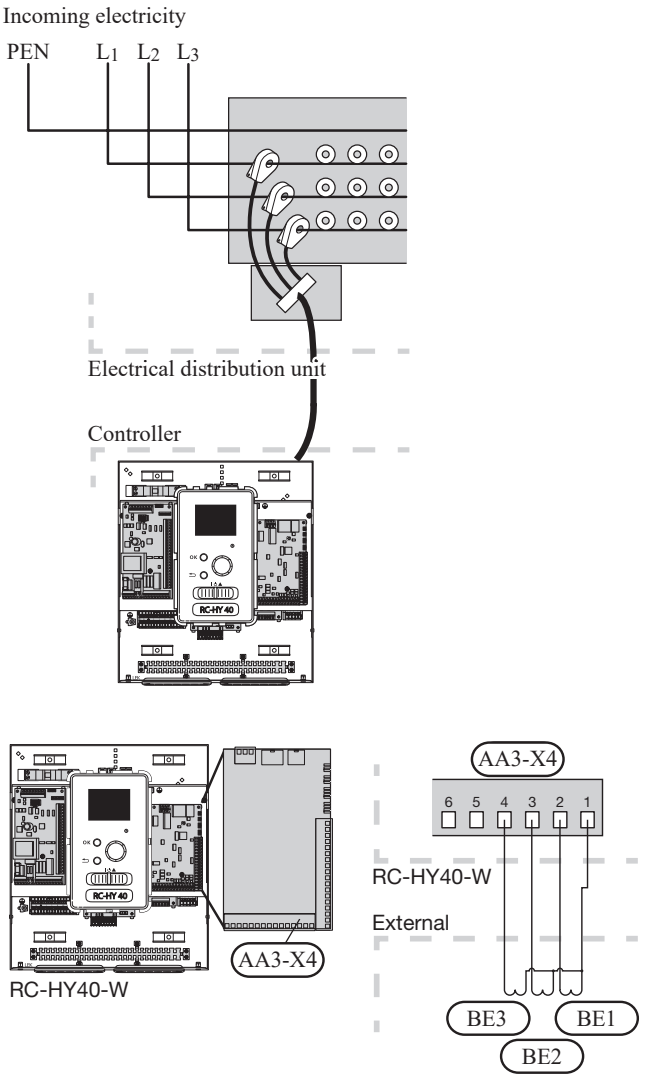
A current sensor (BE1 - BE3) should be installed on each incoming phase conductor in to the electrical distribution unit to measure the current. This is best done in the electrical distribution unit.

Connect the current sensors to a multi-core cable in an enclosure next to the electrical distribution unit. Use a multi-core cable of at least 0.5 mm² from the enclosure to the heat pump.

Connect the cable to terminal block X4:1 to 4.

X4:1 is the common terminal block for the three current sensors.

Set the size of the property's main fuse in menu 5.1.12.

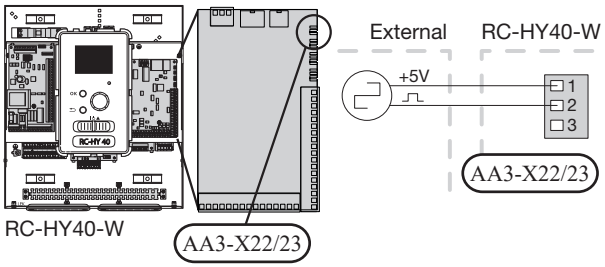


- **Connecting external energy meter**

NOTE

Connection of external energy meter requires version 35 or later on input board (AA3) as well as "display version" 8762 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.

- **Room sensor (BT50)**

It is possible to connect a room sensor to the RC-HY40-W controller.

The room temperature sensor has three functions:

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

Install the sensor in a neutral position where the set temperature is required. A suitable location is on a free inner wall in a hall approx. 1.5 m above the floor.

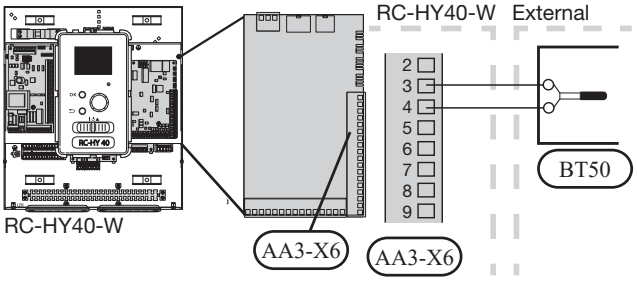
Do not install the room sensor where correct room temperature cannot be detected such as in a recess, between shelves, behind a curtain, above or close to a heat source, in a draft from an external door or in direct sunlight. Closed radiator thermostats can also cause problems.

The controller can operate without the sensor, but if the end user wants to read off the accommodation's indoor temperature in controller display, the sensor must be installed.

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

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

Connect the sensor to the terminal block X6:3 and X6:4 on AA3 board as illustrated.



CAUTION

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**

Before the reversing valve QN10

External step controlled additional heat can be controlled by up to three potential-free relays in the controller (3-step linear or 7-step binary).

The electric additional heat will charge with the maximum permitted immersion heater output together with the compressor to conclude hot water charging and return to charging the heating as soon as possible. This only occurs when the number of degree minutes is below the start value for the additional heat.

After the reversing valve QN10

External step controlled additional heat can be controlled by 2 relays (2 step liner or 3 step binary), which means that the third relay is used to control the immersion heater in the hot water tank.

With the AXC30M accessory or the AA5 card included on the RC-HY40-W (if this card is not being used for other function), a further three potential free relays can be used for additional heat control, which then gives an additional 3 liner or 7 binary steps.

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

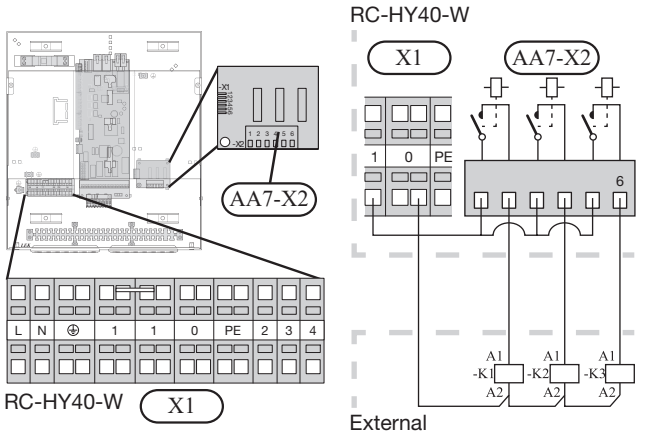
Step 1 is connected to terminal block X2:2 on the additional relay board (AA7).

Step 2 is connected to terminal block X2:4 on the additional relay board (AA7).

Step 3 or immersion heater in the water heater/accumulator tank is connected to terminal block X2:6 on the additional relay board (AA7).

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 the software controlled input on terminal block X2 which is selected in menu 5.4.



NOTE

Mark up any junction boxes with warnings for external voltage.

- **Shunt controlled additional heat**

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

RC-HY40-W controls a shunt valve and start the signal for the additonal heat using three relays. If the installation cannot manage to maintain the correct supply temperature, the additional heat starts. When the boiler sensor (BT52) shows approx. 55°C, RC-HY40-W send s signal to the shunt valve (QN11) to open from the additional heat. The shunt (QN11) is controlled to ensure the true supply temperature corresponds with the control system's theroretically calculated set point value. When the heating demand drops sufficiently so that additional heat is no longer required, the shunt valve (QN11) closes completely.

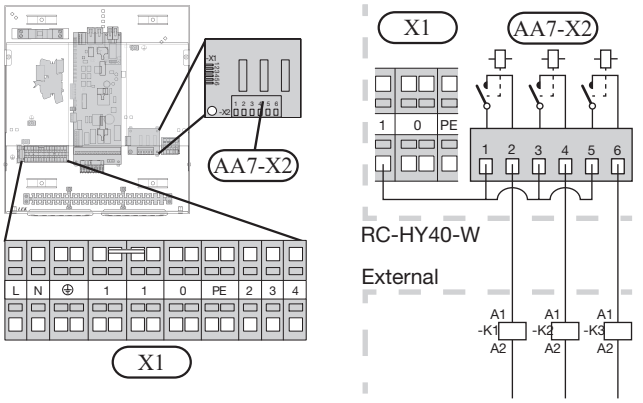
Factory setting minimum operating time for the boiler is 12 hours (can be adjusted in menu 5.1.12).

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

The boiler sensor (BT52) is connceted to the soft inputs and selected in menu 5.4.

Connect the shunt motor (QN11) to terminal block X2:4 (230V, close) and 6 (230V, open) on the additional realy board (AA7) and therminal block X1:0 (N).

To control switching the additional heat ON and OFF, connect it to terminal block X2:2 on the extra relay board (AA7).



NOTE

Mark up any junction boxes with warnings for external voltage.

- **Emergency mode**

When the switch (SF1) is in "⚠" mode (emergency mode) the following components are activated (if they are connected).

• the circulation pumps (EB101-GP12 and EB102-GP12)

• external circulation pump (GP10)

• the potential free switching emergency mode relay (K2).

CAUTION

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

CAUTION

The relay outputs on the accessory board (AA5) may be subjected to a max load of 2 A (230 V~) in total.

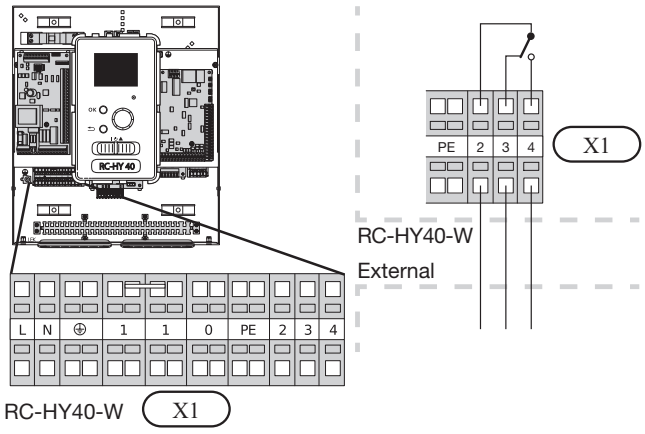
CAUTION

External accessories are disconnected.

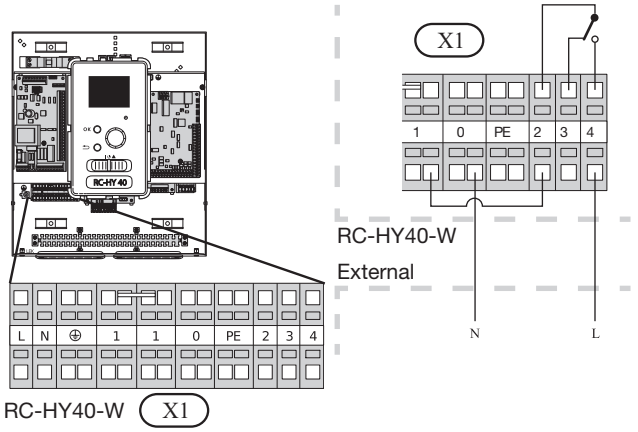
CAUTION

No hot water is produced when emergency mode is activated.

The emergency mode relay can be used to activate external additional heat. Between the port 2 and 4 is closed during emergency mode. An external thermostat must be connected to the control circuit (port 4) to control the temperature. Ensure that the heating medium circulates through the external additional heating.



If the relay is to be used for control voltage, bridge the supply from terminal block X1:1 to X1:2 and connect neutral and control voltage from the external additional heat to X1:0 (N) and X1:4 (L).



NOTE

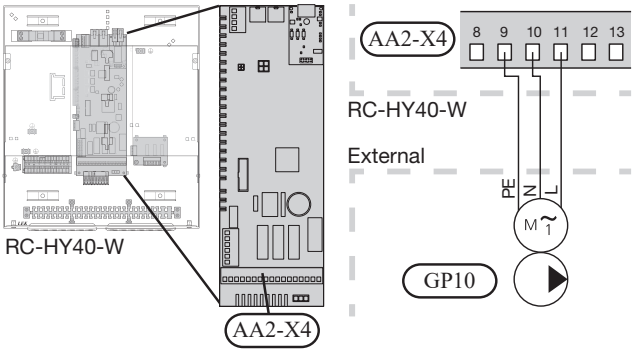
Mark up any junction boxes with warnings for external voltage.

CAUTION

No hot water is produced when emergency mode is activated.

- **External circulation pump (GP10)**

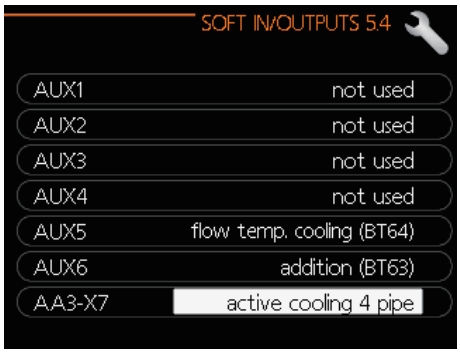
Connect the external circulation pump (GP10) to terminal block X4:9 (PE), X4:10 (N) and X4:11 (230V) on the AA2 board as illustrated.



- **AUX inputs**

RC-HY40-W 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.

NOTE

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

- **Selectable inputs**

Selectable inputs on terminal block (X2) for these functions are:

AUX1 X2:11

AUX2 X2:12

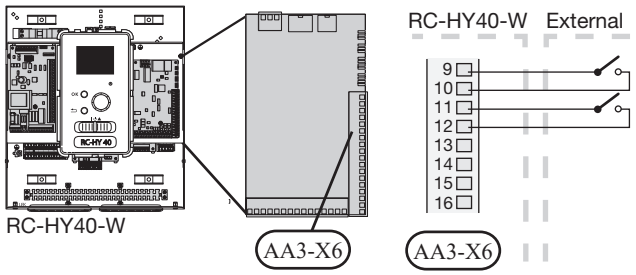
AUX3 X2:13

AUX4 X2:15

AUX5 X2:16

AUX6 X2:17

GND is connected to terminal block X2:14 or X2:18.



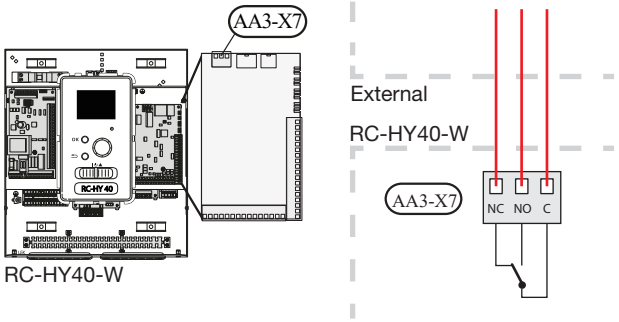
The example above uses the inputs AUX1 (X6:9-10) and AUX2 (X6:11-12) on the input board (AA3).

- **Selectable outputs**

A selectable output is AA3-X7.

The output is a potential-free switching relay.

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



CAUTION

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

NOTE

The AXC accessory is required, if more than two functions are to be connected to the AUX outputs.

- **Possible selection for AUX inputs**

Temperature sensor

Available options are:

- external supply temperature sensor cooling (EQ1-BT25) is used when docking 2-pipe cooling (can be selected when the air/water heat pump is permitted to produce cooling)
- cooling/heating (BT74), determines when it is time to switch between cooling and heating mode. (can be selected when the air/water heat pump is permitted to produce cooling)
  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".
- supply cooling (BT64) is used with active cooling 4-pipe (can be selected when the air/water heat pump is permitted to produce cooling)
- boiler (BT52) (only shown if shunt-controlled additional heat is selected in menu 5.1.12 - " internal electrical addition")
- additional heat (BT63), is used when docking "step-controlled additional heat before reversing valve for hot water" in order to measure the temperature after the additional heat.
- displayed hot water sensor for HWC (BT70). Placed on the supply line.
- displayed hot water sensor for HWC (BT82). Placed on the return line.

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.

External activation of functions

An external switch function can be connected to RC-HY40-W to activate various functions. The function is activated during the time the switch is closed.

Possible functions that can be activated:

- 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*
    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 five options are available:
  - 1–4 is normally open (NO)
  - 0 is normally closed (NC)
    The fan speed is activated during the time the switch is closed. Normal speed is resumed when the switch is opened again.
- SG ready

NOTE

This function can only be used in mains networks that support the "SG Ready"-standard .

"SG Ready" requires two AUX inputs.

In cases where this function is required, it must be connected to terminal block X6 on the input board (AA3) or to terminal block X2.

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

- *Blocking (A: Closed, B: Open)*
  "SG Ready" is active. The compressor in the heat pump and additional heat is blocked.
- *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)

• +Adjust

Using +Adjust, the installation communicates with the underfloor heating's control centre* and adjusts the heating curve and calculated supply temperature according to the underfloor heating system's reconnection.

Activate the climate system you want +Adjust to affect by highlighting the function and pressing the OK button.

*Support for +Adjust required

CAUTION

This accessory may require a software update in your RC-HY40-W. The version can be checked in the "Service info" menu 3.1. Visit myuplink.com and click on the "Software" tab to download the latest software to your installation.

External blocking of functions

An external switch function can be connected to RC-HY40-W for blocking various functions. The switch must be potentialfree and a closed switch results in blocking.

NOTE

Blocking entails a risk of freezing.

Functions that can be blocked:

- hot water (hot water production). Any hot water circulation (HWC) remains in operation.
- external supply temperature sensor (BT25) (control of temperature to the heating system)
- cooling (blocking cooling requirement)
- internally controlled additional heat
- compressor in heat pump (EB101) and/or (EB102)
- tariff blocking (additional heat, compressor, heating, cooling and hot water are disconnected)

- **Possible selections for AUX output**

Indications

- common alarm
- cooling mode indication (can be selected when the heat pump is permitted to produce cooling)
- holiday
- away mode for "smart home" (complement to the functions in menu 4.1.7 - " smart home")

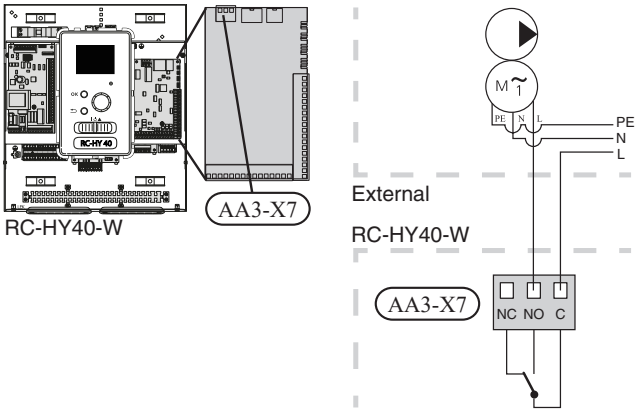
Control

- circulation pump for hot water circulation
- active cooling in a 4-pipe system (can be selected when the air/water heat pump is permitted to run cooling)
- external heating medium pump
- photovoltaic control (Can be selected when the accessory EME20M is activated.)

NOTE

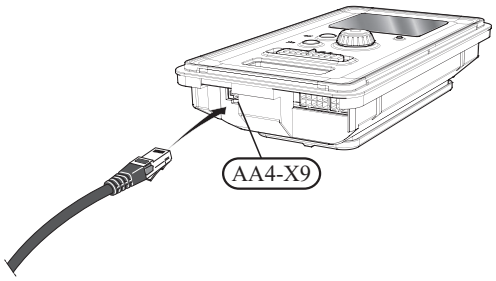
The relevant distribution box must be marked with a warning about external voltage.

An external circulation pump is connected to the AUX output, as illustrated below. If the pump has to work during an alarm, the cable is moved from position NO to position NC.



- **myUplink**

Connect the 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 (UB2) in the controller for cable routing.



Accessories

Instruction for connection and configuration of other accessories provided with each accessory part.

- **Accessories with accessory board (AA5)**

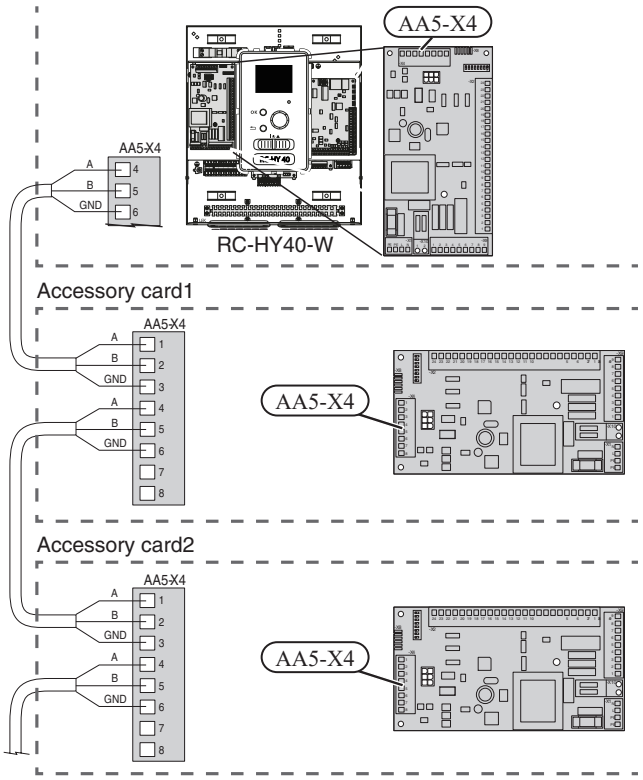
Accessories with accessory board (AA5) are connected to the control module's terminal block X3:4-6 on the input board AA5 (included on RC-HY40-W).

If several accessories are to connected or are already installed, the following instructions must be followed.

The first accessory board must be connected directly to the control module's terminal block AA5-X4. The following boards must be connected in series with the previous board.

Use cable type LiYY, EKKX or similar.

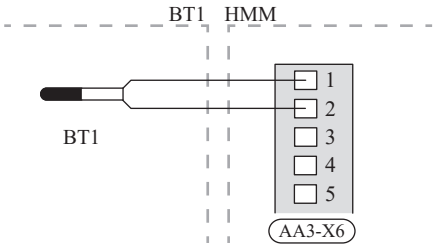
Refer to the acccessory manual for further instructions.



HMM100

Connecting the outdoor temperature sensor

The outdoor temperature sensor BT1 (included) should be connected to the HMM100 unit via terminal block AA3-X6:1 and AA3-X6:2.



Current sensors

When many power consumers are connected in the property at the same time as the electric additional heat is in operation, there is a risk of the property's main fuses tripping.

HMM comes with current sensors that controls the power steps for the electric additional heat by disconnecting step by step in event of overload in a phase. Reconnection occurs when other current consumption is reduced.

CAUTION

If current sensors are installed, full functionality is obtained by enabling "detect phase sequence" and changing the fuse size to 20A in menu 5.1.12.

Connecting current sensors

NOTE

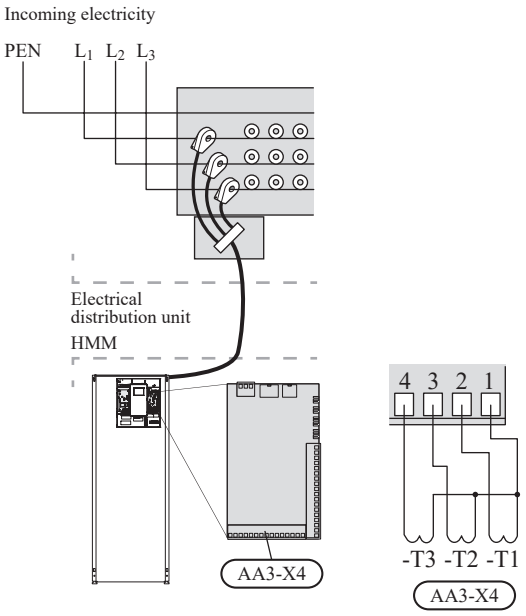
If the current value (MENU 5.1.12) is set too low, it may cause the additional heat to be switched off, reduce the heat pump capacity and may affect the efficiency of the compressor.

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

Current sensors should be connected to the four-wire cable in the distribution box. Between the housing and HMM, use a four-wire cable with a cross-section of min. 0.5mm².

Connect the cable to the input board (AA3) on terminal block X4:1-4 where X4:1 is the common terminal block for the three current sensors.

If the current value (MENU 5.1.12) is set too low, it may cause the additional heat to be switched off, reduce the heat pump capacity and may affect the efficiency of the compressor.



NOTE

If the current value (MENU 5.1.12) is set too low, it may cause the additional heat to be switched off, reduce the heat pump capacity and may affect the efficiency of the compressor.

Settings

Electric additional heat maximum power

The electric additional heat has a maximum power of 9 kW (400 V) / 6.0 kW (230 V). The power is split into 3 steps. The possible operational power steps are: 3, 6 and 9 kW (400 V) or 1.5, 3.0 and 6.0 kW (230 V). The maximum power step of the immersion heater can be set using menu 5.1.12.

Emergency mode

When the controller is set to emergency mode (SF1 is set to ⚠) only the most necessary functions are activated.

- Hot water is not heated.
- Constant temperature in the supply line, more information in the section Emergency mode thermostat.

NOTE

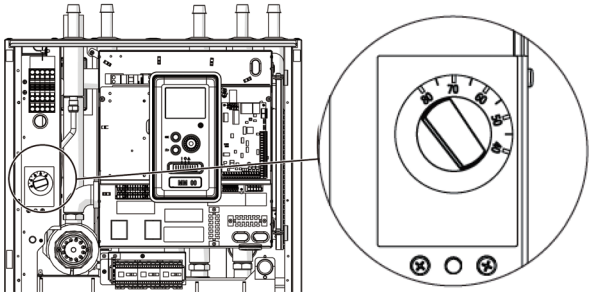
While on emergency mode, it is not possible to heat hot water.

Emergency mode thermostat

The supply temperature in emergency mode is set using a thermostat (BT30). It should be set according to the demands of the heating/cooling circuits in operation.

The adjustment range is 6 - 67°C. Please note, however, that for underfloor heating the setting should be min. 20°C, max.

35-45°C to maintain comfort in the room and efficient operation of the system.



NOTE

The maximum available heater power in emergency mode is 3kW.

NOTE

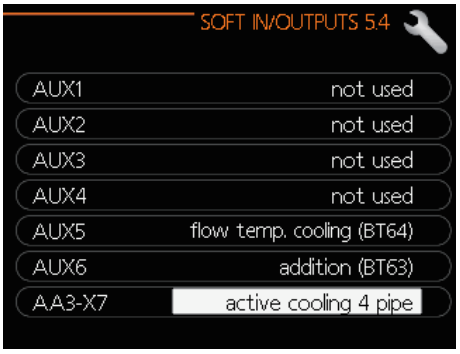
The temperature on the thermostat must be set according to the system requirements. If the temperature is too high, it can damage the system.

- **AUX inputs**

HMM 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.

NOTE

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

- **Selectable inputs**

Selectable inputs on terminal block (X2) for these functions are:

AUX1 X2:11

AUX2 X2:12

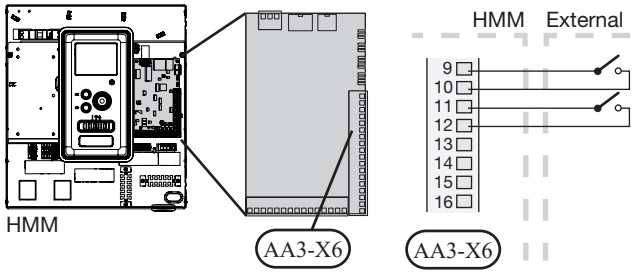
AUX3 X2:13

AUX4 X2:15

AUX5 X2:16

AUX6 X2:17

GND is connected to terminal block X2:14 or X2:18.



The example above uses the inputs AUX1 (X6:9-10) and AUX2 (X6:11-12) on the input board (AA3).

NOTE

This function can only be used in mains networks that support the "SG Ready"-standard.

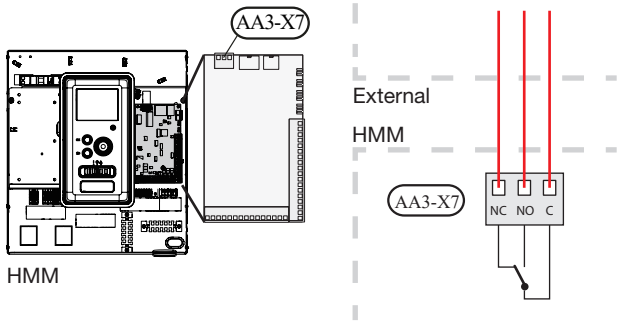
"SG Ready" requires two AUX inputs.

- **Selectable outputs**

A selectable output is AA3-X7.

The output is a potential-free switching relay.

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



CAUTION

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

NOTE

The AXC accessory is required, if more than two functions are to be connected to the AUX outputs.

- **Possible selection for AUX inputs**

Temperature sensor

Available options are:

- external supply temperature sensor cooling (EQ1-BT25) is used when docking 2-pipe cooling (can be selected when the air/water heat pump is permitted to produce cooling)
- cooling/heating (BT74), determines when it is time to switch between cooling and heating mode. (can be selected when the air/water heat pump is permitted to produce cooling)
  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".
- supply cooling (BT64) is used with active cooling 4-pipe (can be selected when the air/water heat pump is permitted to produce cooling)
- boiler (BT52) (only shown if shunt-controlled additional heat is selected in menu 5.1.12 - " internal electrical addition")
- additional heat (BT63), is used when docking "step-controlled additional heat before reversing valve for hot water" in order to measure the temperature after the additional heat.
- displayed hot water sensor for HWC (BT70). Placed on the supply line.
- displayed hot water sensor for HWC (BT82). Placed on the return line.

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.

External activation of functions

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

Possible functions that can be activated:

- 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*
    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 five options are available:

- 1–4 is normally open (NO)
- 0 is normally closed (NC)
  The fan speed is activated during the time the switch is closed. Normal speed is resumed when the switch is opened again.

• SG ready

NOTE

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

In cases where this function is required, it must be connected to terminal block X6 on the input board (AA3) or to terminal block X2.

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

- *Blocking (A: Closed, B: Open)*
  "SG Ready" is active. The compressor in the heat pump and additional heat is blocked.
- *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)

• +Adjust

Using +Adjust, the installation communicates with the underfloor heating's control centre* and adjusts the heating curve and calculated supply temperature according to the underfloor heating system's reconnection.

Activate the climate system you want +Adjust to affect by highlighting the function and pressing the OK button.

*Support for +Adjust required

CAUTION

This accessory may require a software update in your HMM The version can be checked in the "Service info" menu 3.1. Visit myuplink.com and click on the "Software" tab to download the latest software to your installation.

External blocking of functions

An external switch function can be connected to HMM for blocking various functions. The switch must be potentialfree and a closed switch results in blocking.

NOTE

Blocking entails a risk of freezing.

Functions that can be blocked:

• hot water (hot water production). Any hot water circulation (HWC) remains in operation.
• external supply temperature sensor (BT25) (control of temperature to the heating system)
• cooling (blocking cooling requirement)
• internally controlled additional heat
• compressor in heat pump (EB101) and/or (EB102)
• tariff blocking (additional heat, compressor, heating, cooling and hot water are disconnected)

• Possible selections for AUX output

Indications

• common alarm
• cooling mode indication (can be selected when the heat pump is permitted to produce cooling)
• holiday
• away mode for "smart home" (complement to the functions in menu 4.1.7 - " smart home")

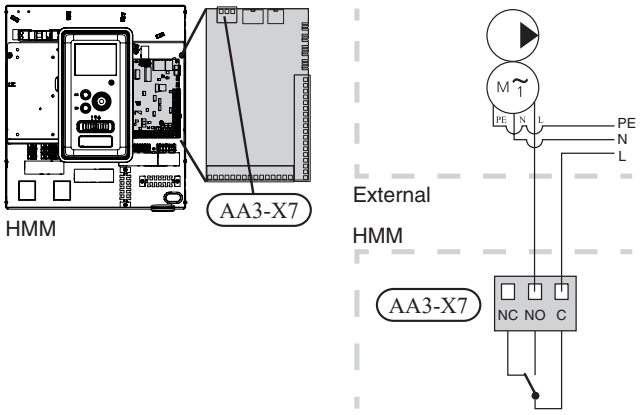
Control

• circulation pump for hot water circulation
• active cooling in a 4-pipe system (can be selected when the air/water heat pump is permitted to run cooling)
• external heating medium pump
• photovoltaic control (Can be selected when the accessory EME20M is activated.)

NOTE

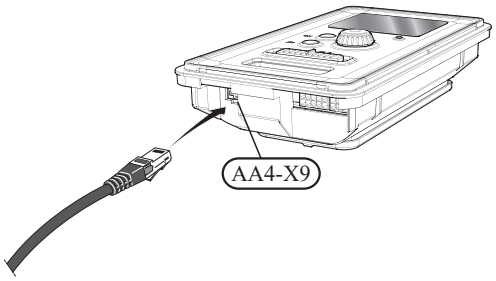
The relevant distribution box must be marked with a warning about external voltage.

An external circulation pump is connected to the AUX output, as illustrated below. If the pump has to work during an alarm, the cable is moved from position NO to position NC.



- **myUplink**

Connect the 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 (UB2) in the controller for cable routing.



Accessories

Instruction for connection and configuration of other accessories provided with each accessory part.

- **Accessories with accessory board (AA5)**

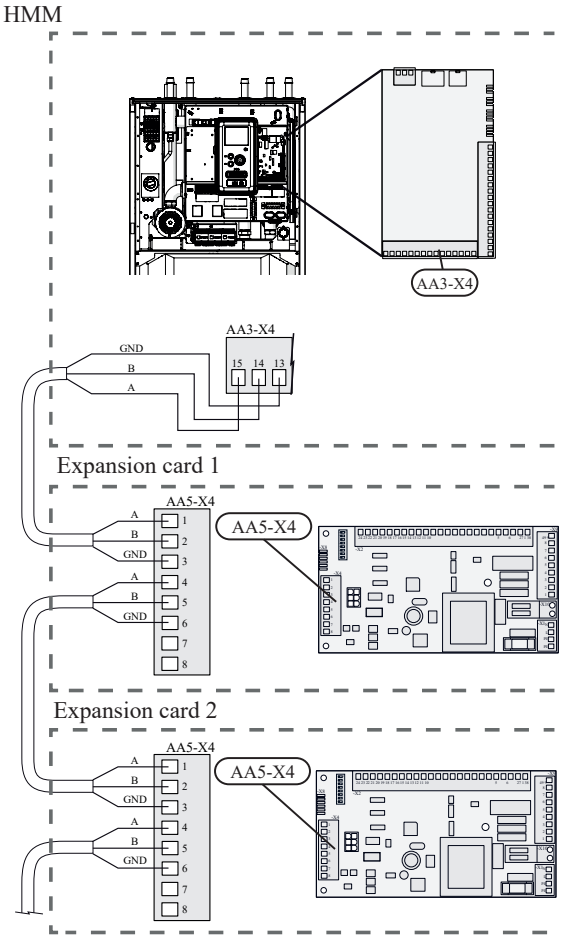
Accessories with accessory board (AA5) are connected to the HMM100 to the AA3 card according to the diagram below.

If several accessories are to connected or are already installed, the following instructions must be followed.

The first accessory board must be connected directly to the control module's terminal block AA3-X4. The following boards must be connected in series with the previous board.

Use cable type LiYY, EKKX or similar.

Refer to the acccessory manual for further instructions.



For detailed information on using the expansion card, see the installer manual for the AXC30M accessory.

HBM140 / 140H

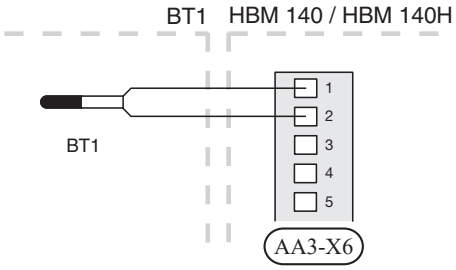
Connection with heat pump

Using a shielded three-core cable, connect the heat pump to terminals X4: 15 (A), X4: 14 (B) and X4: 13 (GND) on the AA3 card.

For more information about connecting compatible units, please check our website https://www.mhi.com

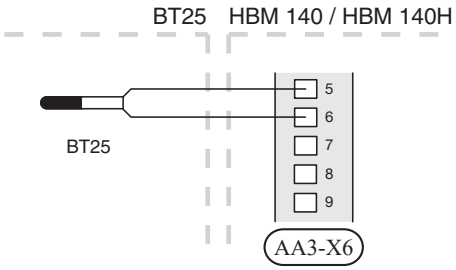
- **Connection of the external temperature sensor**

The outdoor temperature sensor (included) should be connected to the unit on the AA3-X6:1 and AA3-X6:2.



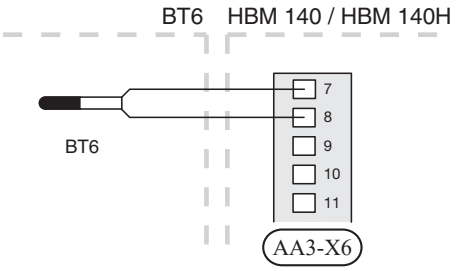
- **Connecting the temperature sensor BT25**

The temperature sensor BT25 should be connected to the unit on the AA3-X6: 5 and AA3-X6: 6. For the location of the sensor, see the section “Connection options”.



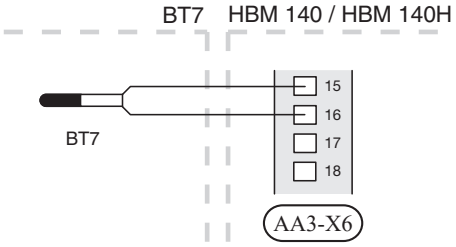
- **Connecting the temperature sensor BT6**

The temperature sensor BT6 should be connected to the unit via terminal block AA3-X6: 7 and AA3-X6: 8.



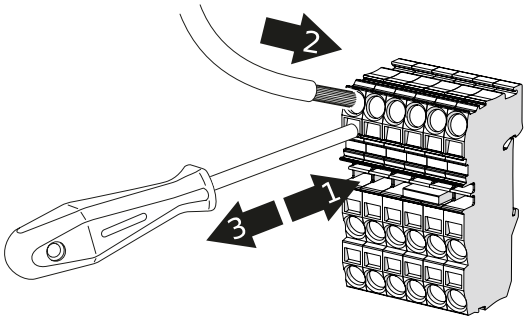
- **Connecting the temperature sensor BT7**

The temperature sensor BT7 should be connected to the unit via terminal block AA3-X6: 15 and AA3-X6: 16.



Cable key lock

Use a suitable tool to release/lock the cables in the terminal blocks of the indoor unit.

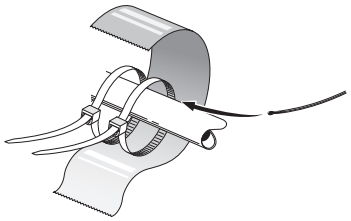


Temperature sensors

Use 2 core cable with a minimum 0.5 mm² cross section.

If any temperature sensor is not mentioned below please refer to option connection.

Temperature sensor installation on pipe



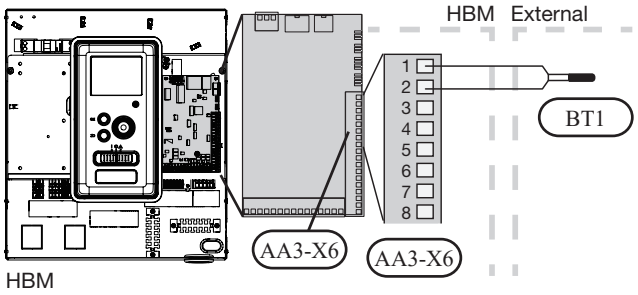
The temperature sensors are fitted using heat conducting paste, cable ties (the first cable tie is secured to the pipe in the middle of the sensor and the other cable tie is mounted approx. 5 cm after the sensor) and aluminium tape. Then insulate them using the enclosed insulation tape.

- **Ambient air temperature sensor (BT1)**

Install ambient air 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 the terminal block X6:1 and X6:2 on AA3 board as illustrated.

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

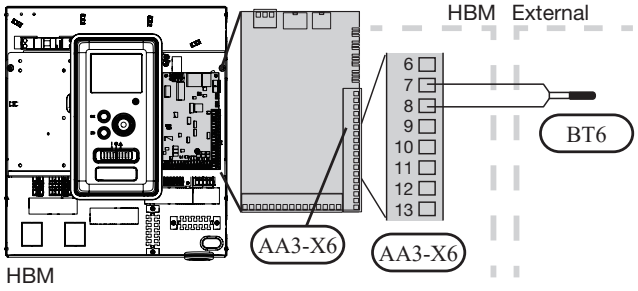


- **Temperature sensor, hot water charging (BT6)**

The temperature sensor, hot water charging (BT6) is placed in a submerged tube located on the bottom part of the hot water tank.

Connect the sensor to the terminal block X6:7 and X6:8 on AA3 board as illustrated.

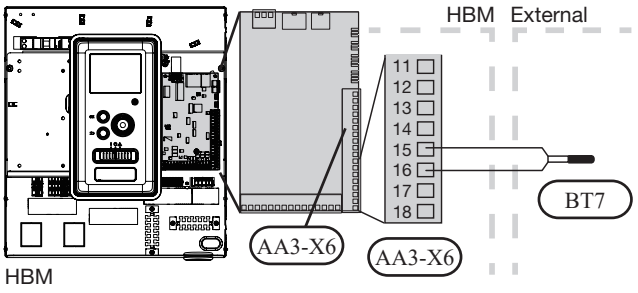
Hot water production is activated in menu 5.2 in the start guide or service menu.



- **Temperature sensor, hot water top (BT7)**

The temperature sensor, hot water top (BT7) is placed in a submerged tube located on the top part of the hot water tank. It can be connected to show the hot water temperature at the top of the tank.

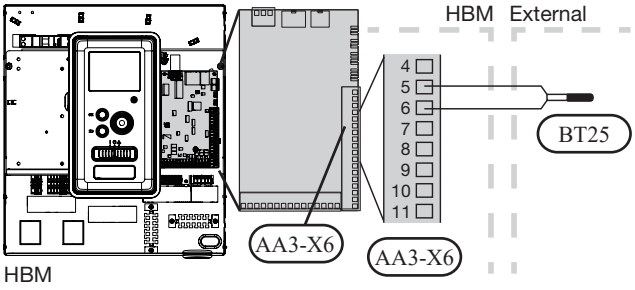
Connect the sensor to the terminal block X6:15 and X6:16 on AA3 board as illustrated.



- **Temperature sensor, external flow line (BT25)**

This temperature sensor is used in case the additional heating (boiler, electrical heater or other) is placed after the 3 way valve (QN10).

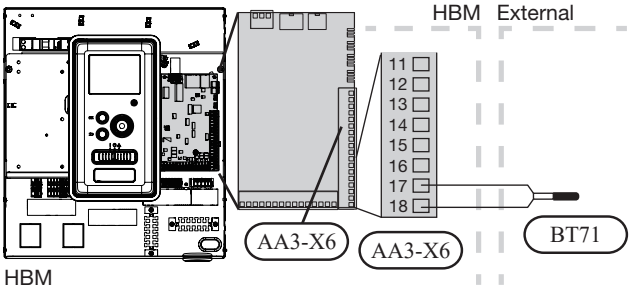
Connect the sensor to the terminal block X6:5 and X6:6 on AA3 board as illustrated.



- **Temperature sensor, external return line (BT71)**

This temperature sensor is used in case the additional heating (boiler, electrical heater or other) is placed after the 3 way valve (QN10).

Connect the sensor to the terminal block X6:17 and X6:18 on AA3 board as illustrated.



Optional connections

- **Load monitor**

In case many power electrical appliances are connected in the property and the electric heater is energised at the same time, there is a risk of tripping the main fuse of the property.

The controller has an integrated load monitor that controls the power steps of the electric heater by disconnecting step by step in the event of overload in a phase. It will be reconnected if other current consumption is reduced.

Connecting current sensors

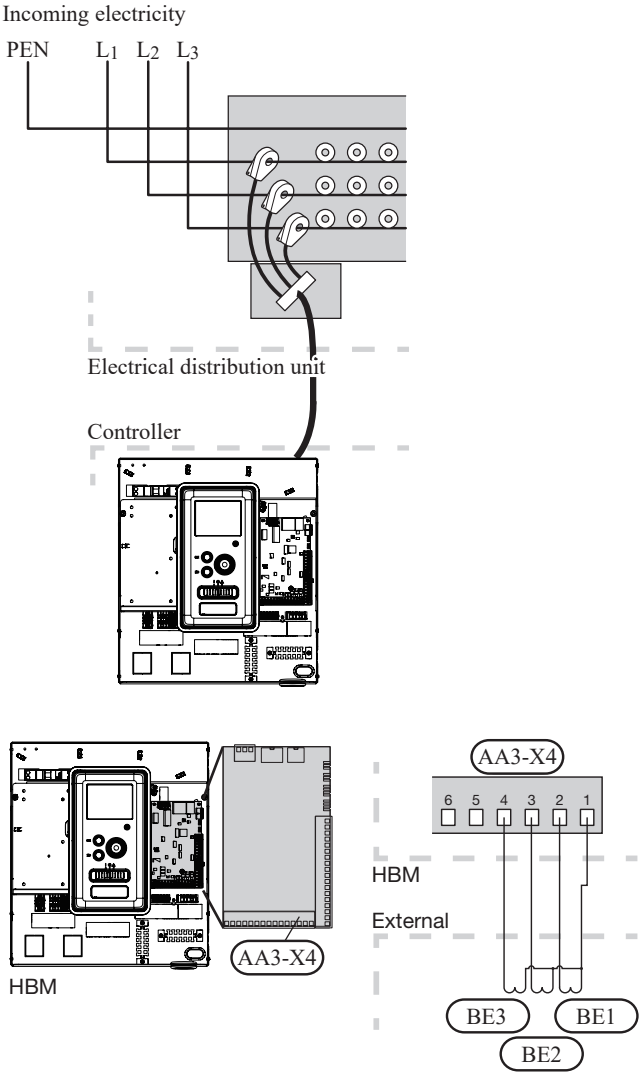
A current sensor (BE1 - BE3) should be installed on each incoming phase conductor in to the electrical distribution unit to measure the current. This is best done in the electrical distribution unit.

Connect the current sensors to a multi-core cable in an enclosure next to the electrical distribution unit. Use a multi-core cable of at least 0.5 mm² from the enclosure to the heat pump.

Connect the cable to terminal block X4:1 to 4.

X4:1 is the common terminal block for the three current sensors.

Set the size of the property's main fuse in menu 5.1.12.

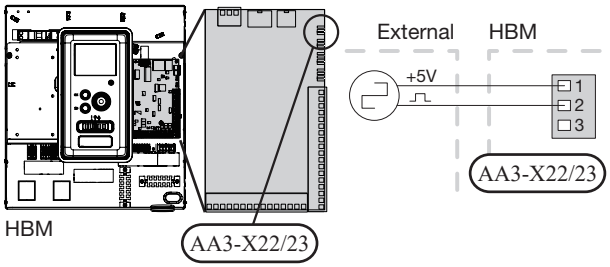


- **Connecting external energy meter**

NOTE

Connection of external energy meter requires version 35 or later on input board (AA3) as well as "display version" 8762 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.

- **Room sensor (BT50)**

It is possible to connect a room sensor to the HBM controller.

The room temperature sensor has three functions:

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

Install the sensor in a neutral position where the set temperature is required. A suitable location is on a free inner wall in a hall approx. 1.5 m above the floor.

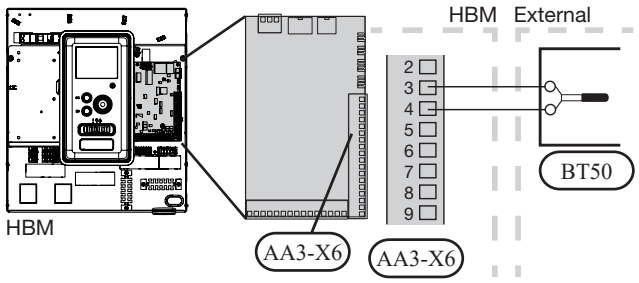
Do not install the room sensor where correct room temperature cannot be detected such as in a recess, between shelves, behind a curtain, above or close to a heat source, in a draft from an external door or in direct sunlight. Closed radiator thermostats can also cause problems.

The controller can operate without the sensor, but if the end user wants to read off the accomodation's indoor temperature in controller display, the sensor must be installed.

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

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

Connect the sensor to the terminal block X6:3 and X6:4 on AA3 board as illustrated.



CAUTION

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**

Before the reversing valve QN10

External step controlled additional heat can be controlled by up to three potential-free relays in the controller (3-step linear or 7-step binary).

The electric additional heat will charge with the maximum permitted immersion heater output together with the compressor to conclude hot water charging and return to charging the heating as soon as possible. This only occurs when the number of degree minutes is below the start value for the additional heat.

After the reversing valve QN10

External step controlled additional heat can be controlled by 2 relays (2 step liner or 3 step binary), which means that the third relay is used to control the immersion heater in the hot water tank.

With the AXC30M accessory or the AA5 card included on the HBM (if this card is not being used for other function), a further three potential free relays can be used for additional heat control, which then gives an additional 3 liner or 7 binary steps.

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

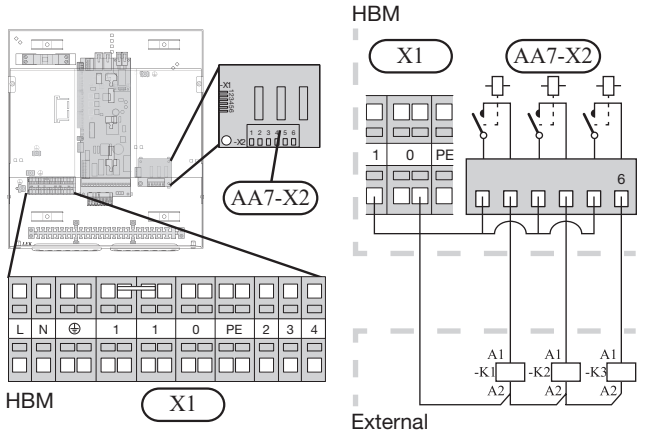
Step 1 is connected to terminal block X2:2 on the additional relay board (AA7).

Step 2 is connected to terminal block X2:4 on the additional relay board (AA7).

Step 3 or immersion heater in the water heater/accumulator tank is connected to terminal block X2:6 on the additional relay board (AA7).

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 the software controlled input on terminal block X2 which is selected in menu 5.4.



NOTE

Mark up any junction boxes with warnings for external voltage.

Settings

- **Auxiliary preheater - max power (HBM140H)**

The electric additional heat has a maximum power of 9 kW (400 V) / 6,0 kW (230 V). The power is split into 3 steps. The possible operational power steps are: 3, 6 and 9 kW (400 V) or 1,5, 3,0 and 6,0 kW (230 V). The maximum power step of the electric additional heat can be set using menu 5.1.12.

Emergency mode

When the controller automation is in the emergency mode (SF1 is set as ⚠), only the most necessary functions are active.

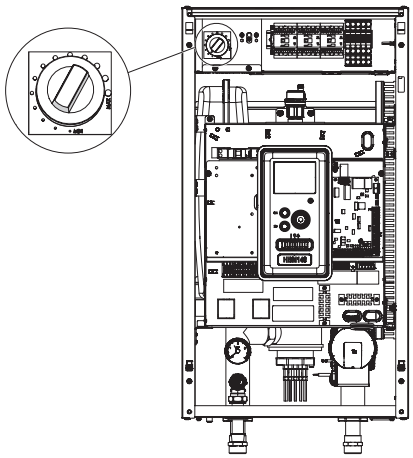
- Domestic hot water is not heated.
- Constant temperature in the supply pipeline; more information to be found in the Chapter Emergency Mode Thermostat.

CAUTION

During emergency operation, DHW heating is not possible.

- **Emergency Mode Thermostat (HBM140H)**

In the emergency mode, the supply temperature is set using a thermostat (BT30). It must be set according to the demand of the circuits in operation. The available regulation range is between 5 and 65°C. Remember that for floor heating, the settings must be min. 20°C, max. 35-45°C in order to preserve heat comfort in the room and assure effective system operation.



CAUTION

The maximum available heater power in emergency mode is 3kW.

CAUTION

The temperature on the thermostat must be set according to the installation requirements. Too high a temperature can damage the system.

CAUTION

When SF1 is set to "⚠" - the unit switches the QN10 valve to the central heating and heating takes place according to thermostat BT30. Hot water is not heated while the switch is set to "⚠".

CAUTION

If the system is operating at "⚠" the temperature on BT30 should be aligned with the operating temperature of the central heating system. If the temperature set on the thermostat is too high, it can damage the system.

Current sensors

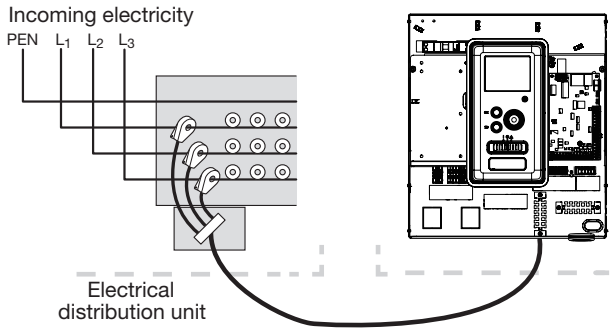
When many power consumers are connected in the property at the same time as the electric additional heat is in operation, there is a risk of the property's main fuses tripping. Unit comes with current meters that controls the power steps for the electric additional heat by disconnecting step by step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

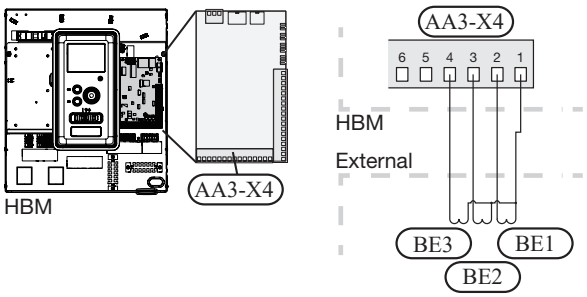
- **Connecting current sensors**

A current sensor (BE1 - BE3) must be installed on each incoming phase conductor into the electrical distribution unit, to measure the current. The electrical distribution unit is an appropriate installation point. Connect the current sensors to a multi-core cable in an enclosure next to the electrical distribution unit. Use unscreened multi-core cable of at least 0.5 mm², from the enclosure to control module. Connect the cable to the input board (AA3) on terminal block X4:1-4 where X4:1 is the common terminal block for the three current sensors. The value for the size of the fuse is set in menu 5.1.12 to correspond with the size of the property's main fuse. Here it is also possible to adjust the current sensor's transformer ratio.

CAUTION

If the current value (MENU 5.1.12) is set too low, it may cause the additional heat to be switched off, reduce the heat pump capacity and may affect the efficiency of the compressor.

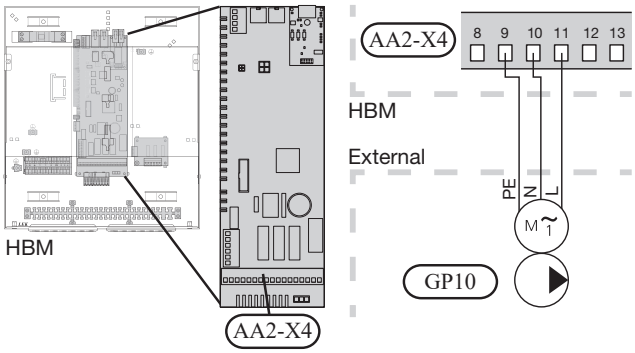




If the current value (MENU 5.1.12) is set too low, it may cause the additional heat to be switched off, reduce the heat pump capacity and may affect the efficiency of the compressor.

- **External circulation pump (GP10)**

Connect the external circulation pump (GP10) to terminal block X4:9 (PE), X4:10 (N) and X4:11 (230V) on the AA2 board as illustrated.

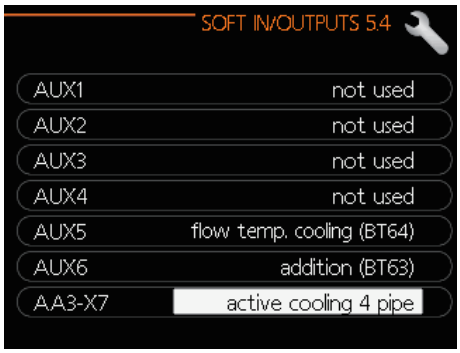


- **AUX inputs**

HBM 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.

NOTE

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

- **Selectable inputs**

Selectable inputs on terminal block (X2) for these functions are:

AUX1 X2:11

AUX2 X2:12

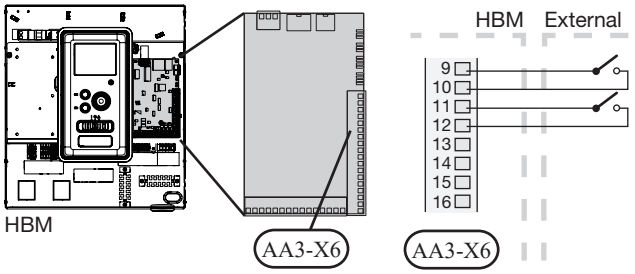
AUX3 X2:13

AUX4 X2:15

AUX5 X2:16

AUX6 X2:17

GND is connected to terminal block X2:14 or X2:18.



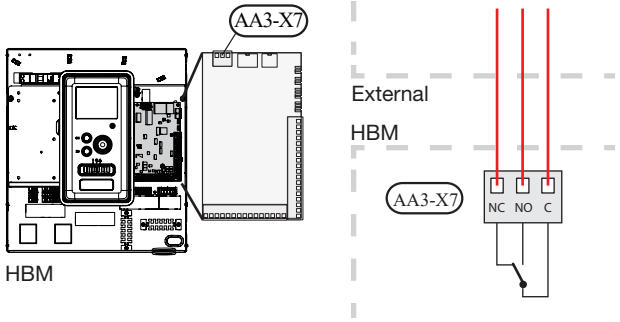
The example above uses the inputs AUX1 (X6:9-10) and AUX2 (X6:11-12) on the input board (AA3).

- **Selectable outputs**

A selectable output is AA3-X7.

The output is a potential-free switching relay.

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



CAUTION

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

NOTE

The AXC accessory is required, if more than two functions are to be connected to the AUX outputs.

- **Possible selection for AUX inputs**

Temperature sensor

Available options are:

- external supply temperature sensor cooling (EQ1-BT25) is used when docking 2-pipe cooling (can be selected when the air/water heat pump is permitted to produce cooling)
- cooling/heating (BT74), determines when it is time to switch between cooling and heating mode. (can be selected when the air/water heat pump is permitted to produce cooling)
  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".
- supply cooling (BT64) is used with active cooling 4-pipe (can be selected when the air/water heat pump is permitted to produce cooling)
- boiler (BT52) (only shown if shunt-controlled additional heat is selected in menu 5.1.12 - " internal electrical addition")
- additional heat (BT63), is used when docking "step-controlled additional heat before reversing valve for hot water" in order to measure the temperature after the additional heat.
- displayed hot water sensor for HWC (BT70). Placed on the supply line.
- displayed hot water sensor for HWC (BT82). Placed on the return line.

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.

External activation of functions

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

Possible functions that can be activated:

- 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*
    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 five options are available:
  - 1–4 is normally open (NO)
  - 0 is normally closed (NC)
    The fan speed is activated during the time the switch is closed. Normal speed is resumed when the switch is opened again.
- SG ready

NOTE

This function can only be used in mains networks that support the "SG Ready"-standard .

"SG Ready" requires two AUX inputs.

In cases where this function is required, it must be connected to terminal block X6 on the input board (AA3) or to terminal block X2.

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

- *Blocking (A: Closed, B: Open)*
  "SG Ready" is active. The compressor in the heat pump and additional heat is blocked.
- *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)

• +Adjust

Using +Adjust, the installation communicates with the underfloor heating's control centre* and adjusts the heating curve and calculated supply temperature according to the underfloor heating system's reconnection.

Activate the climate system you want +Adjust to affect by highlighting the function and pressing the OK button.

*Support for +Adjust required

CAUTION

This accessory may require a software update in your HBM. The version can be checked in the "Service info" menu 3.1. Visit myuplink.com and click on the "Software" tab to download the latest software to your installation.

External blocking of functions

An external switch function can be connected to HBM for blocking various functions. The switch must be potentialfree and a closed switch results in blocking.

NOTE

Blocking entails a risk of freezing.

Functions that can be blocked:

- hot water (hot water production). Any hot water circulation (HWC) remains in operation.
- external supply temperature sensor (BT25) (control of temperature to the heating system)
- cooling (blocking cooling requirement)
- internally controlled additional heat
- compressor in heat pump (EB101) and/or (EB102)
- tariff blocking (additional heat, compressor, heating, cooling and hot water are disconnected)

- **Possible selections for AUX output**

Indications

- common alarm
- cooling mode indication (can be selected when the heat pump is permitted to produce cooling)
- holiday
- away mode for "smart home" (complement to the functions in menu 4.1.7 - " smart home")

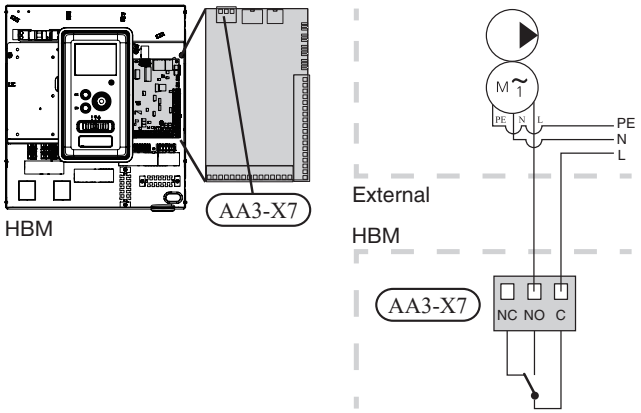
Control

- circulation pump for hot water circulation
- active cooling in a 4-pipe system (can be selected when the air/water heat pump is permitted to run cooling)
- external heating medium pump
- photovoltaic control (Can be selected when the accessory EME20M is activated.)

NOTE

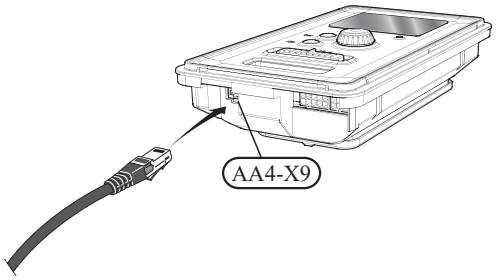
The relevant distribution box must be marked with a warning about external voltage.

An external circulation pump is connected to the AUX output, as illustrated below. If the pump has to work during an alarm, the cable is moved from position NO to position NC.



- **myUplink**

Connect the 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 (UB2) in the controller for cable routing.



Accessories

Instruction for connection and configuration of other accessories provided with each accessory part.

- **Accessories with accessory board (AA5)**

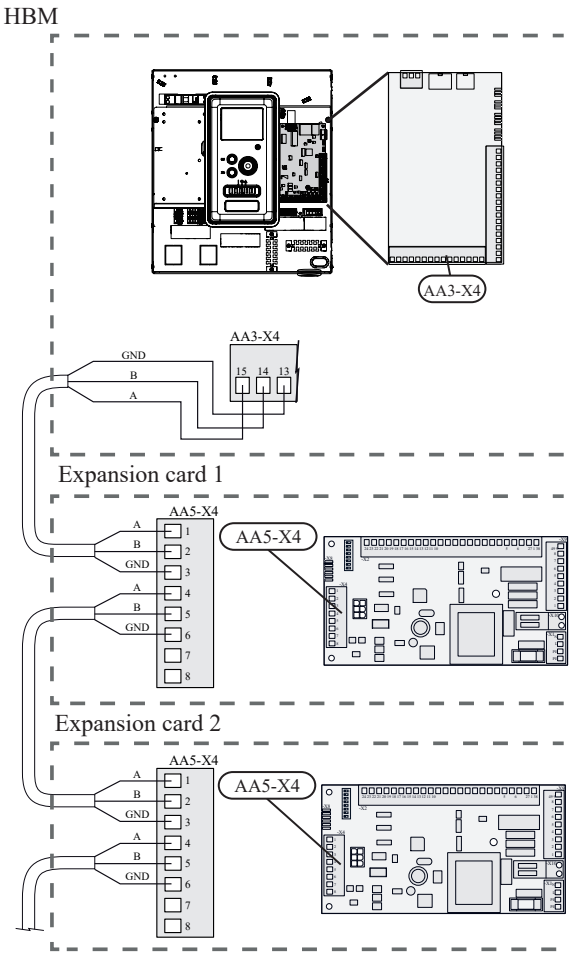
Accessories with accessory board (AA5) are connected to the control module's terminal block X3:4-6 on the input board AA5 (included on HBM).

If several accessories are to connected or are already installed, the following instructions must be followed.

The first accessory board must be connected directly to the control module's terminal block AA5-X4. The following boards must be connected in series with the previous board.

Use cable type LiYY, EKKX or similar.

Refer to the acccessory manual for further instructions.



For detailed information on using the expansion card, see the installer manual for the AXC30M accessory.

Commissioning and adjusting

Preparations

Before starting commissioning, check the followings;

- The signal cable is connected between outdoor unit and controller according to the instructions.
- The power cable is connected to outdoor unit and controller according to the instruction.
- Operation switch in controller is the position ⏻ .
- Drain valve is closed before filling water in the system.
- Temperature limiter and electrical switch are not tripped.
- The system is filled with water and well vented.
- There are no leaks on the water pipe.

Filling and venting

Hot water tank

1. Open the hot water tap as well as venting valve if applicable, and then open the cold water cut-off valve at the inlet.
2. Fill the storage tank until obtaining uniform water outflow at the hot water tap, and then close the hot water tap and venting valve.
3. Fill the water heater coil in the tank. See Climate system for details.

After the installation and levelling the tank, follow the procedure below (for the connector pipe symbols, refer to page 41, 42):

1. Remove protecting plugs from the connector pipes.
2. Connect the hot water intake line (N).
3. Connect the cold water supply line together with the required safety valves (G).
4. If the system has the hot water circulation system, connect it to the connector pipe (L). Otherwise, plug the pipe.
5. Connect the supply (J) and return (H) of the heating medium to the coil.

Filling the DHW heater at HMM100

1. Open the hot water tap in the building to the tank.
2. Open the valve cutting off cold water. When doing so, the valve should be completely open.
3. When water starts to flow from the intake point with hot water without air bubbles, the HW tank is full and you can close the intake point.

CAUTION

If there is an electric heating module installed in the storage tank, fill the tank with water before connecting it to the electrical installation.

CAUTION

Make sure water quality complies with JRA water standards (JRA GL-02-1994, refer to page 30).

CAUTION

Open the hot water intake valves before heating the system up for the first time or after a longer break in its operation in order to check whether the storage tank is filled with water and the shut-off valve at the cold water inlet is not closed.

Climate system

1. Open the vent at the top of the heating system.
2. Open all shut-off valves, where installed, so that water flows into all circuits.
3. Open the valve for filling the heating circuit and fill it with water.
4. Close the vent when water comes out continuously without bubbles.
5. Check the manometer and close the filling valve when the pressure reaches the required value (2 bar is recommended).
6. Start the circulation pump of the heating system, and open the vent from time to time and release the all remaining air in the heating system.
7. Open safety valve until the pressure of the heating system drops down to about 1 bar. If the pressure drops below 1 bar during venting, add additional water in the circuit.

Start-up and inspection

Before start-up

1. In case of cascade connection, check if each outdoor unit has a unique address. See Cascade connection setting on page 86 for details.
2. Start commissioning by the following steps.

WARNING

Before conduct a test run, make sure that the shut-off valves are open.

In case of the first operation after turning on power, even if the unit does not operate for 5 minutes, it is not a breakdown.

Always give a 3-minute or longer interval before you start the unit again whenever it is stopped.

Removing the service panel will expose high-voltage live parts and high-temperature parts, which are quite dangerous. Take utmost care not to incur an electric shock or burns. Do not leave the unit with the service panel open.

CAUTION

Before commissioning, ensure that:

No miswiring such as disconnection or reversed-phase.

If more that one unit is installed, cables must not cross connect between units.

Ground with a dedicated ground wire that is not connected to the ground wire of the other unit.

No loose screws at the cable connection points.

Hold the cable with a cable clamp so that no external force is applied to the terminal connections.

Commissioning

NOTE

Commissioning of the system must be carried out by a person with appropriate authorizations and manufacturer's authorization!

In order to start the heat pump

1. Turn on the power of the HMM100 unit making sure that the compatible unit has been properly connected to the power supply.
2. Follow the instructions displayed in the controller's start guide.

Commissioning with outdoor unit

Start guide is shown on the display on the controller when it is turned ON for the first time. Follow the start guide in the display, or choose menu 5.7 to show the start guide. For details, see Start guide from page 117-136.

Commissioning with additional heater only

Follow the start guide in the display as same as commissioning with outdoor unit, and then follow the list below.

1. Go to menu 4.2 op. mode.
2. Mark "add. heat only" using the control knob and then press the OK button.
3. Return to the main menus by pressing the Back button.

CAUTION

When commissioning without outdoor unit an alarm communication error may appear in the display.

The alarm is reset if the relevant outdoor unit is deactivated in menu 5.2.2 ("installed heat pump").

Secondary adjustment

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

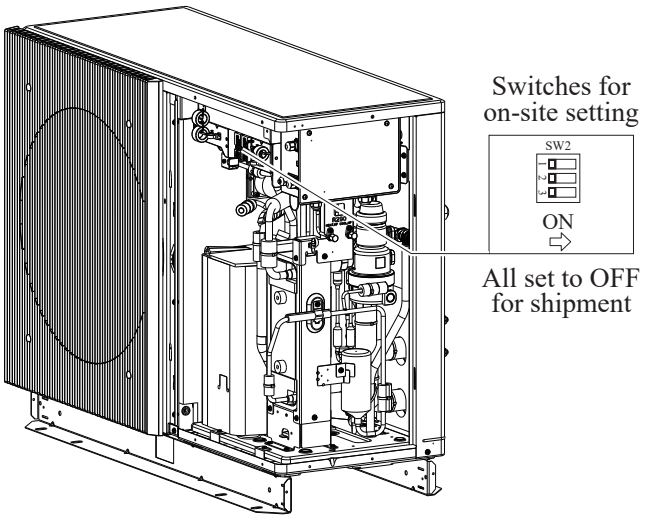
Additional settings on outdoor unit:

(1) Defrost control switching (SW2-1)

- When this switch is turned ON, the unit will run in the defrost mode more frequently.
- Set this switch to ON, when installed in a region where outdoor temperature falls below zero during the season the unit is run for a heating operation.

(2) Snow guard fan control (SW2-2)

- When this switch is turned on, the outdoor unit fan will run for 10 seconds in every 10 minutes, when outdoor temperature falls to 3˚C or lower and the compressor is not running.
- When the unit is used in a very snowy country, set this switch to ON.



Inspection report

Current regulations require that the climate system is inspected before it is commissioned. The inspection must be carried by a qualified person and must be documented. Do not replace any part of the system without carrying out new checks.
While doing these works it is recommended to use personal protective equipment, a leak detection sensor (before accessing the unit) and always carry a leak monitor with the capability of leak detection level of 2000 ppm (in case of leakage of refrigerant). Additionally we also recommend to have a fire extinguisher inside the safe working area.
Before starting the unit, make sure that the unit has power source for at least 15 minutes. Starting the operation just after turning on the power switch can severely damage the internal parts. It is also advisable to keep the main power switch turned on during the operation season to avoid risk of freezing.

1) Project information

Project name		Checker		Date	
O.U no.	**Model name**	**Serial number**		**Remarks**	
1					
2					
3					
4					
5					
6					
7					
8					
RC-HY/HMM/HBM no.	**Model name**	**Serial number**		**Remarks**	
1					

2) Check list for installation

• Before opening the outdoor unit **○ : OK △: shall be revised - : No item**

Description	Checked result	Remarks
Is there any leakage surround of the outdoor unit?		
Is there any refrigerant leakage inside the outdoor unit?		Leak check can be made from the bottom of the outdoor unit
Is the safe working zone created?		3 meter safe working area needs to be created around the unit
Is there any possible ignition source inside the safe working area? - Example: light switches, sparks, socket outlets, open flames, etc		Smoking is not allowed inside the safe working area

• Installation work **○ : OK △: shall be revised - : No item**

Description	Checked result	Remarks
Are the outdoor units installed on the level?		
Are the outdoor units fixed with anchor bolt?		
Are the foundations suitable for the outdoor unit weight?		
Is the drainage for the outdoor unit according to recommendation?		
Are the anti-vibration measures for the outdoor unit and piping performed?		
Is there enough service space for the outdoor unit?		
Is the outdoor unit location respecting the protective zone?		Refer chapter 3 on page 20-23.
Is there any window, door or drain around the unit in the protective zone?		If yes the system cannot be started.
Is there any possibility of having ignition source 3 meter around the unit during operation? Ex: gas boiler, ligher, sparks		
Are the outdoor units installed nearby or surrounded by oil and/or dangerous gases?		
Is there any possibility to generate combustible gases and/or flammable substances near the units?		
Are the water pipes in the system insulated properly, especially all the external pipework?		
Is there any water leakage in the system?		
Are the check valves installed on the water inlet as per MHI guideline?		Refer to page 44 (page with water pipe diagram)

Description	Checked result	Remarks
Are there isolation valves and drain valves installed as per MHI guideline?		Refer to page 44 (page with water pipe diagram)
Is the drain valve closed?		
Is the water quality according to JRA GL-02-1994 standard?		Refer to page 28
Is the pressure relief valve at the gas separator inside the outdoor unit working properly? Operation can be checked by manually opening the pressure relief valve.		
Can the air purge of the whole system be done?		
Is the strainer installed on the water inlet to the outdoor unit?		
Is the strainer cleaned?		
Is the expansion vessel installed?		
Is the system filled with 1.5 to 2 bar pressure?		It is recommended to keep the operating pressure lower than 3.0 bar as the outdoor unit pressure relief valve can open when pressure is bigger than 3.0
Is the system volume according to requirement? If not, volume vessel might be required.		
Are the air vent valves in the indoor unit closed after purging the system?		
Are there any measures for cold regions like snow hoods, mounting stand for the units and anti-freeze protection for water pipe work?		
Are the transportation brackets and transportation cartons removed?		

• Electrical installation **○: OK △: shall be revised - : No item**

Description	Checked result	Remarks
Does the power supply breaker capacity, selection of earth leakage breaker and wire thickness comply with local national standards?		
Are all electrical connections/wires connected and tightened correctly in the outdoor unit? FDCM60/71 - Power supply cable torque - 1.8 ~ 2.5 N•m - Communcation cable torque - 0.8 ~ 1.2 N•m FDCM100/140 - Power supply cable torque - 2.4 ~ 3.4 N•m - Communcation cable torque - 0.8 ~ 1.2 N•m		
Are there cable touching the refrigerant pipe?		If yes, make sure that this is fixed and cables do not touch any refrigerant pipe
Is the electrical earth grounding done properly?		
Are the wires clamped correctly?		
Are there any defects on the wires like scratches, cracks, etc?		
Are the wires for the controller (RC-HY) communication with the outdoor unit connected properly? - RC-HY20-W (X2-19,20,21) - FDCM (TB2 (1, 2, 3)) - RC-HY40-W (AA5:X4 - 1, 2,3) - FDCM (TB2 (1, 2, 3)) - HMM100 (AA3:X4 - 13,14,15) - FDCM (TB2 (1, 2, 3)) - HBM140/140H(AA3:X4 - 13,14,15) - FDCM (TB2 (1, 2, 3))		
Is the outdoor unit fuse within the range of specifications?		
Is the power source voltage to the outdoor unit and controller within the range of specifications?		
Are the current sensors installed (In case RC-HY40-W, HMM100 and HBM140/140H)?		
Is the water pump, valves and sensors connected properly?		
Is the outdoor unit power supply box closed after connecting power supply and communication cables?		

• Units configuration **○: OK △: shall be revised - : No item**

Description	Checked result	Remarks
Are the addresses of outdoor units set correctly? (In case multiple outdoor units are connected)		
Are the addresses of the accessories set correctly? (In case accessories are connected to RC-HY40-W, HMM100 or HBM140/140H).		
Defrost setting		SW2-1 - OFF (Normal) SW2-1 - ON (Cold region)
Snow protection control		SW2-2 - OFF (Normal) SW2-2 - ON (Snow protection)

Start guide

NOTE

Fill in the climate system with water before the switch is set to "|".

1. Set the controller's switch to "|".
2. Follow the instructions in the start guide in the controller display. If the start guide does not start when you start the controller start it manually in menu 5.7.

TIP

See page 138 for a more in-depth introduction to the installation's control system (operation, menus, etc.).

Commissioning

The start guide is displayed when the installation is started. Is describes what needs to be carried out at the first start together with a run through of the installation's basic settings.

The start guide ensures that start-up is carried out correctly and cannot be bypassed. The start guide can be started anytime in menu 5.7.

During the start guide, the reversing vavles and the shunt valves are run back and forth to help vent the heat pump.

For commissioning with RC-HY20-W please check page 116.

For commissioning with RC-HY40-W please check page 120.

For commissioning with HMM100, please check page 125.

For commissioning with HBM140/140H, please check page 130.

CAUTION

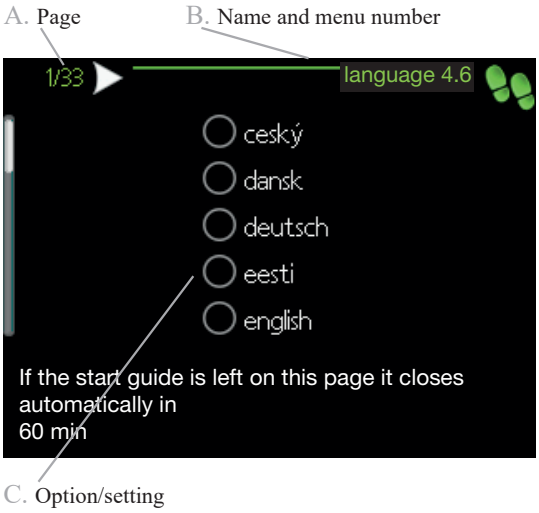
As long as the start guide is active, no function in the heat pump will start automatically.

Each time the controller is ON, the guide will appear until it is deselected on the last page.

NOTE

If starting up the system in low outdoor temperatures and a low heating medium temperature in the central heating system, the central heating system should be warmed up first, using the additional heat, to a temperature of about 20 - 25 °C.

Operation in the start guide



A. Page

You can see the current page of the start guide.

Scroll between the pages of the start guide as follows:

1. Turn the control knob until the arrow is marked in the top left corner (at the page number).
2. Press OK button to proceed to the next page in the start guide.

B. Name and menu number

You can see the menu name of this page. The number refers to the menu number in the control system.

To read more about affected menus, see the help menu or read the user manual.

C. Option / setting

Make settings for the system here.

D. Help menu

In many menus there is a symbol that indicates that extra help is available. The symbol is a question mark as shown below:

To acess the help text:

1. Use the control knob to select the help symbol.
2. Press OK button.

The help text consists of several windows that you can scroll between using the control knob.

Commissioning without heat pump

The indoor unit can be used without a heat pump only as an electric boiler, to produce heat and hot water before the heat pump is installed, for example.

Go to menu 5.2 System settings and turn off the heat pump.

NOTE

Select the auto or manual operating mode when the indoor unit is to be used again with the heat pump.

Overflow valve

The overflow valve adjustment procedure applies to units with a flow meter installed. It should be carried out during system commissioning as follows:

1. Fully open the overflow valve.
2. Close the flow on all heating circuits downstream of the overflow valve.
3. Go to menu 5.6 Forced control and manually set the feed pump speed to 100%.
4. Go to menu 3.1.12.
5. At quarter turn intervals of one minute, close the pressure overflow valve while checking the flow reading in menu 3.1.12. When the „Minimum flow during defrosting" value has been reached - see table in chapter 4, subchapter „Minimum flow in the system", complete the valve closure.
6. You can then reopen the heating circuits and set the circulation pump to automatic mode in menu 5.6 Forced control.

Commissioning with outdoor unit

Start guide is shown on the display on the controller when it is turned ON for the first time. Follow the start guide in the display, or choose menu 5.7 to show the start guide. For details, see Start guide from page 114.

Commissioning with additional heater only

Follow the start guide in the display as same as commissioning with outdoor unit, and then follow the list below.

1. Go to menu 4.2 op. mode.
2. Mark "add. heat only" using the control knob and then press the OK button.
3. Return to the main menus by pressing the Back button.

CAUTION

When commissioning without outdoor unit an alarm communication error may appear in the display. The alarm is reset if the relevant outdoor unit is deactivated in menu 5.2.2 ("installed heat pump").

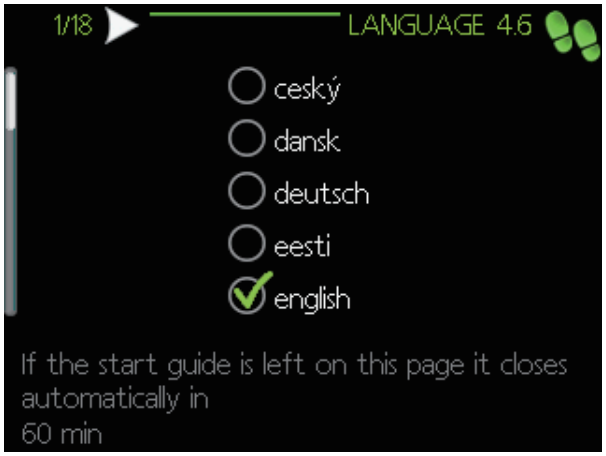
Start guide - RC-HY20-W

This menu is shown at the first time that the heat pump is started. It ensures that commissioning is carried out correctly and all necessary steps are followed.

The following menus are basic settings. If accessories are connected other menus will appear.

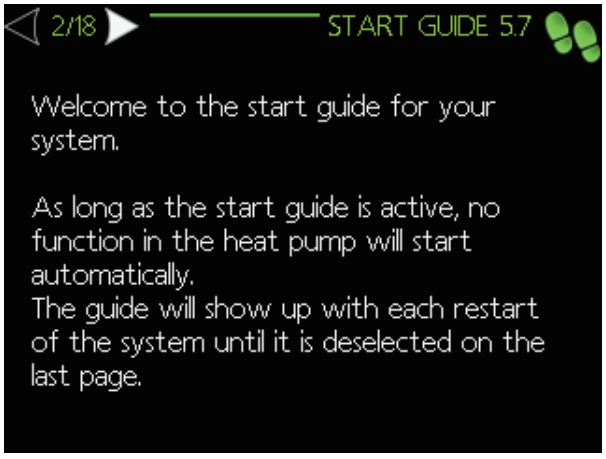
This start guide can be started anytime onn service menu 5.7.

1/18 - Language



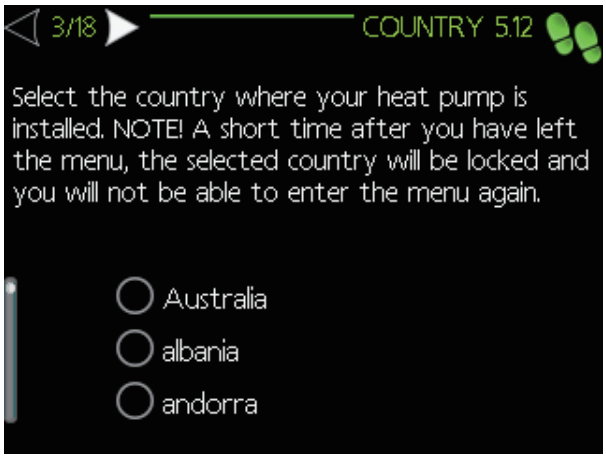
Select the language of the controller.
Factory setting: English
Available languages: Czech, Danish, German, Estonian, English, Spanish, French, Croatian, Icelandic, Italian, Latvian, Lithuanian, Hungarian, Dutch, Norwegian, Portuguese, Romanian, Russian, Slovenian , Finnish, Swedish, Turkish, Polish, Bulgarian, Ukrainian.

2/18 - Information.



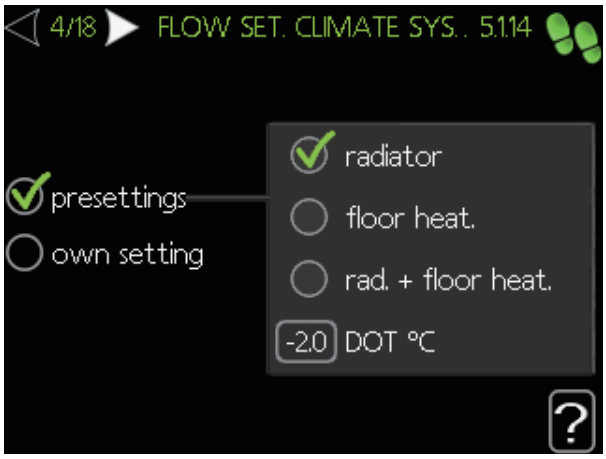
This menu displays information about the start guide.
No action needed.

3/18 - Country



Select the country where the heat pump is installed.

4/18 - Flow set. climate sys.

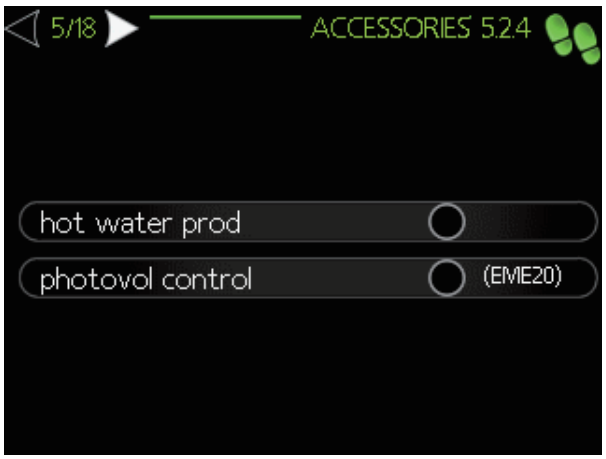


The type of heating distribution system the heating medium pump works towards is set here.
Factory settings: Presettings – Radiator Setting range:

- **Pre-settings**
  - Radiator
  - Floor heating
  - Rad. + Floor heat.
- **Own setting**
  - Setting range dt at DOT: 0.0 – 25.0 °C
  - Setting range DOT: -40.0 – 20.0 °C

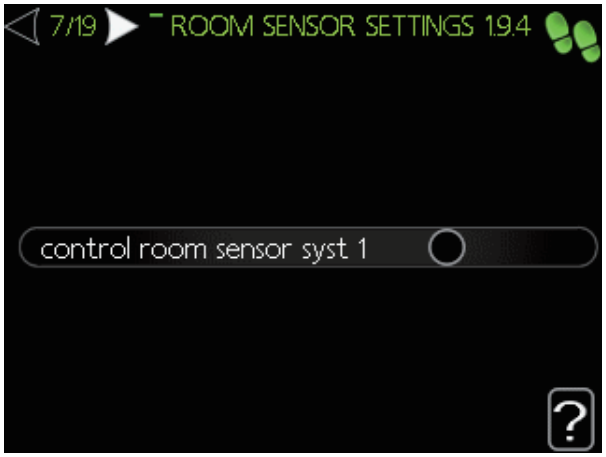
Where dt at DOT is the difference in degrees between the flow at return temperature at dimensioned outdoor temperature.

5/18 - Accessories



Activate additional connected accessories here.
Setting range:
- Hot water production
- Photovoltaic control (EME20M)

6/18 - Soft in/outputs

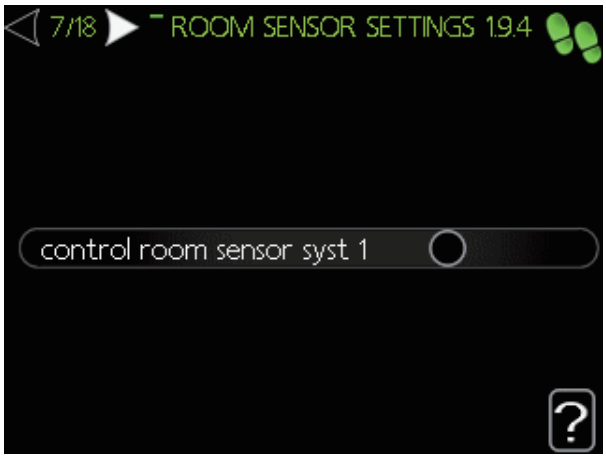


Set the function of each input and output for each terminal (if connected).

Setting range:

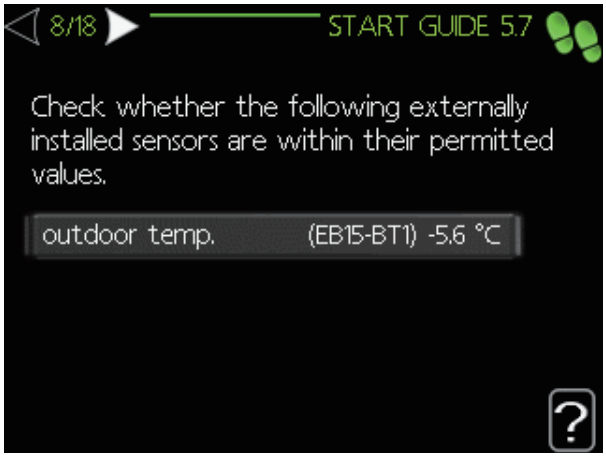
- AUX 1-6
  - Temperature sensor, cooling/heating (BT74)
  - Temperature sensor, heating external return line (BT71)
  - Temperature sensor, flow line cooling (BT64)
  - Contact for external tariff blocking
  - Switch for “SG ready”
  - Contact for activation of “external adjustment”
  - Switch for external alarm
  - Switch for external blocking
- AA3-X7
  - Alarm output
  - Cooling mode indication
  - Active cooling 4 pipe
  - External heating medium pump (GP10)
  - Hot water circulation (GP11)
  - Holiday output

7/18 - Room sensor settings



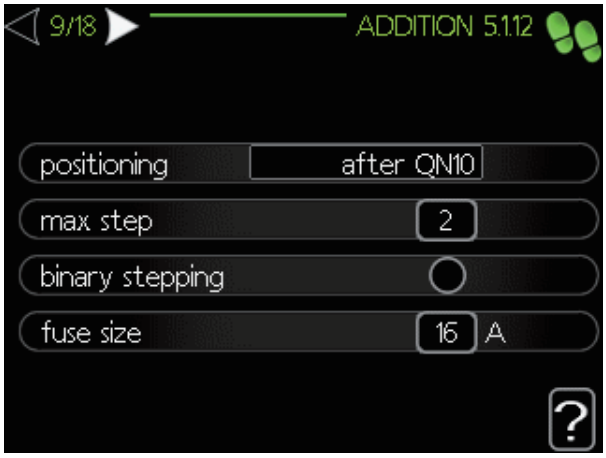
Activate and set the room temperature sensor RTS40M settings for climate system 1 (if connected).

8/18 - Start guide



Check if the values of the shown temperature sensors are correct. If they are not correct please check your connections.

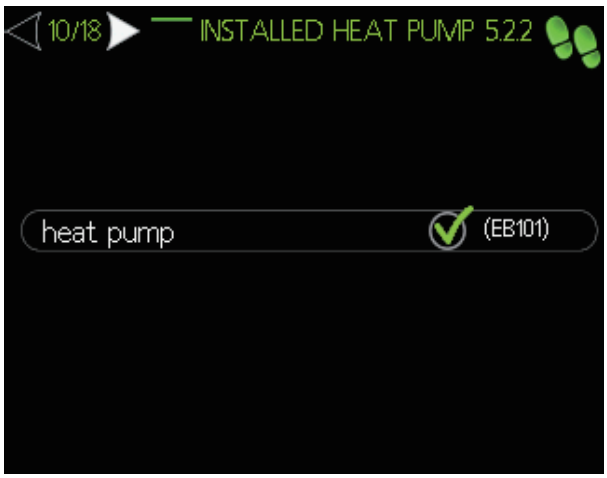
9/18 - Addition



Set addition settings here.
Factory setting:
- Positioning: Before QN10
- Max step: 3
- Binary stepping: OFF
- Fuse size: 16A

Setting range:
- Positioning:
  - Before QN10
  - After QN10
- Max step:
  - Binary stepping deactivated: 0-3
  - Binary stepping activated: 0-7
- Binary stepping:
  - OFF
  - ON
- Fuse size: 1 – 200 A

10/18 - Installed heat pump



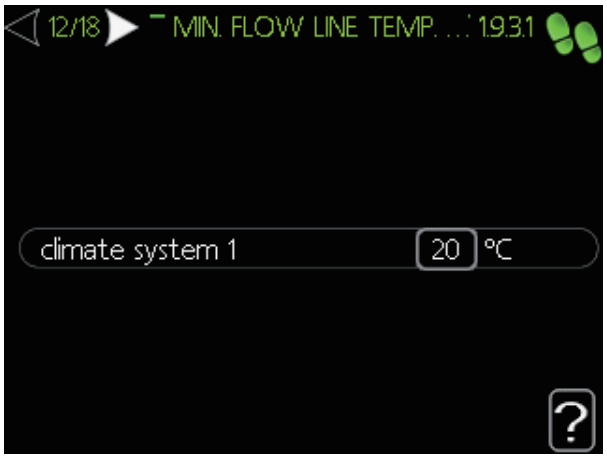
Enable outdoor unit here (if connected).

11/18 - Time & date

Set time and date here.

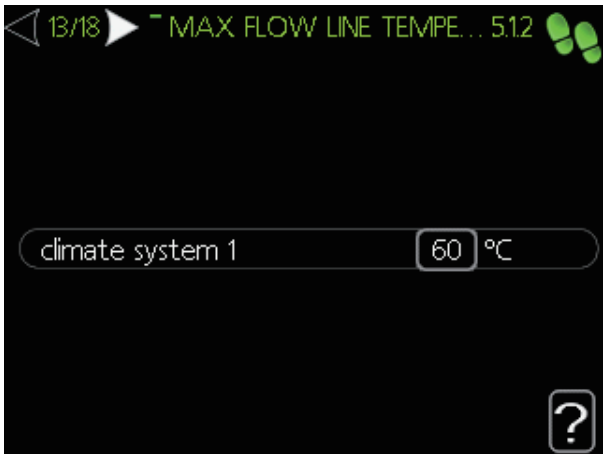
If the system is connected to myUplink then time and date are set automatically.

12/18 - Mln. flow line temperature



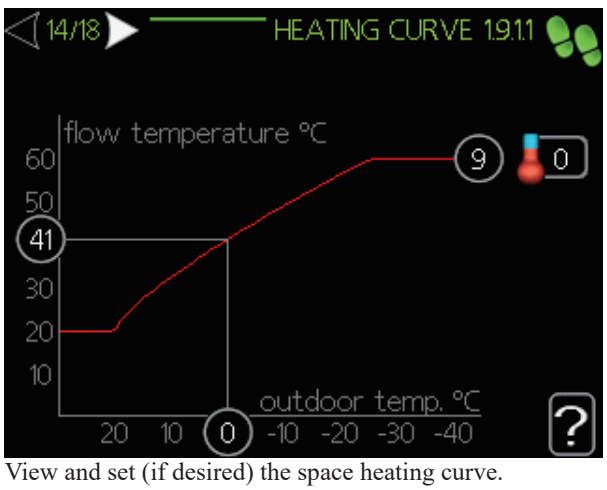
Set the minimum flow line temperature of the climate system.
Factory setting: 20.0 °C
Setting range: 5.0 - 70.0 °C

13/18 - Max. flow line temperature



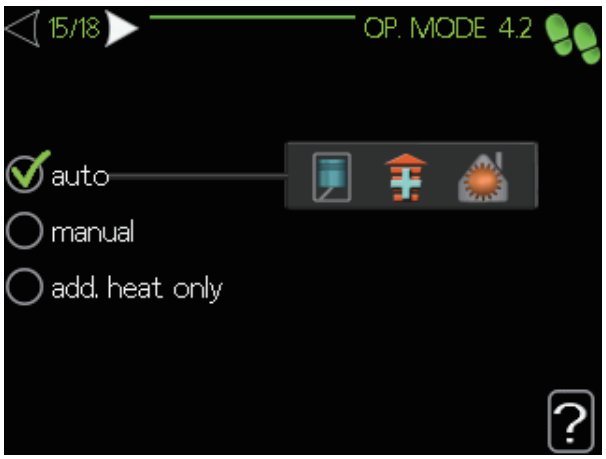
Set the maximum flow line temperature of the climate system.
Factory setting: 60.0 °C
Setting range: 5.0 - 70.0 °C

14/18 - Heating curve



View and set (if desired) the space heating curve.

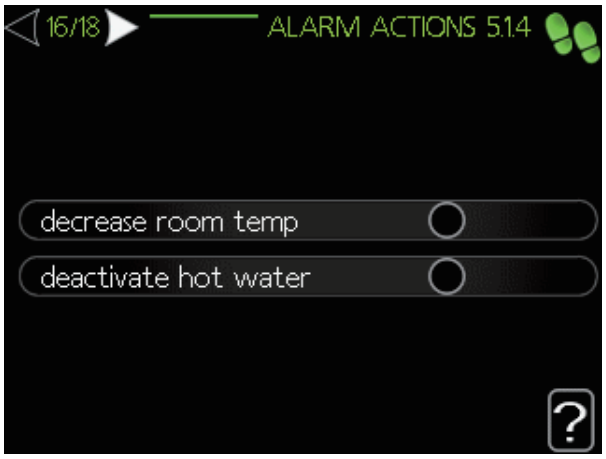
15/18 - Op. mode



Set the operation mode of the heat pump system.
Factory setting: Auto
Setting range:

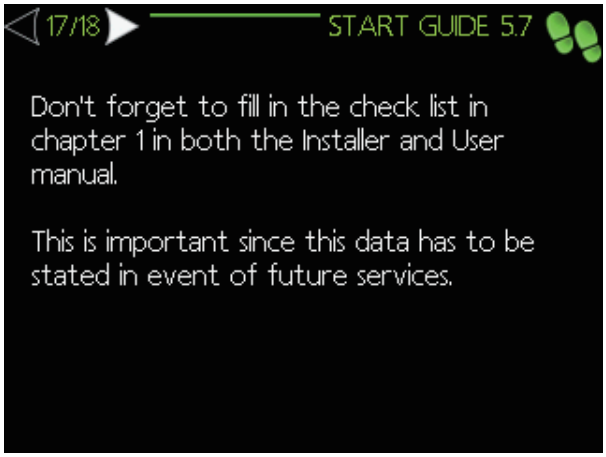
- Auto
- Manual
  - Heating
  - Cooling (only if permitted)
  - Add. heat only
- Add. heat only
  - Heating

16/18 - Alarm actions



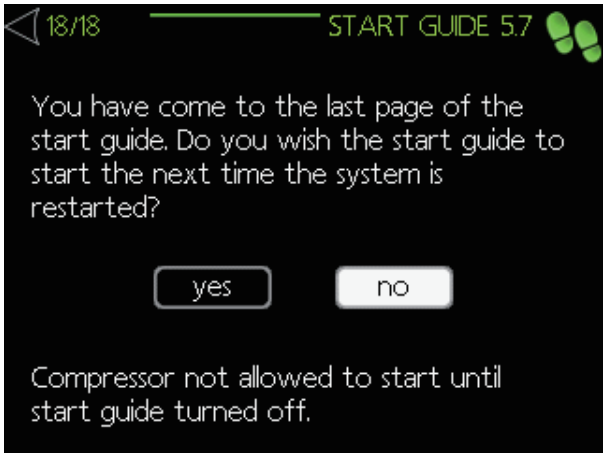
Set how to control the heat pump in case of alarm.

17/18 - Start guide



Set how to control the heat pump in case of alarm.

18/18 - Start guide



Commissioning guide finishes here. It is possible to set it to open again upon restart of the controller or do not open it anymore.

Proceed to page 124 in order to skip commissioning guide for RC-HY40-W and check other adjustments.

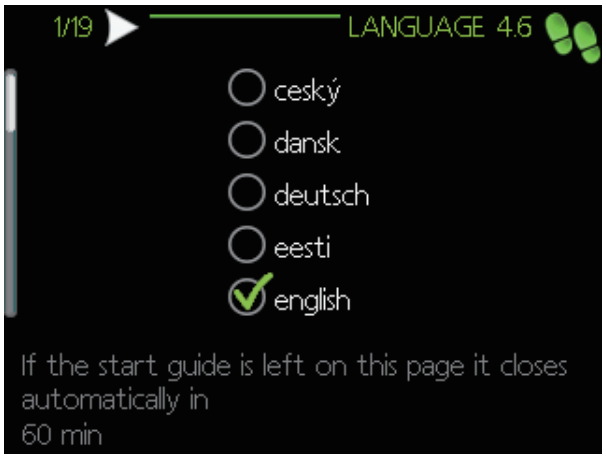
Start guide - RC-HY40-W

This menu is shown at the first time that the heat pump is started. It ensures that commissioning is carried out correctly and all necessary steps are followed.

The following menus are basic settings. If accessories are connected other menus will appear.

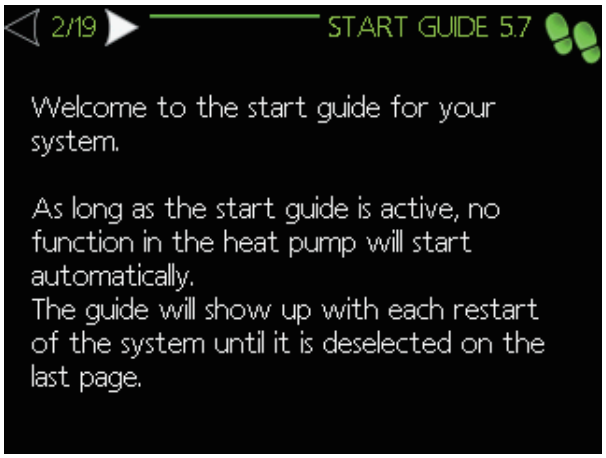
This start guide can be started anytime onn service menu 5.7.

1/19 - Language



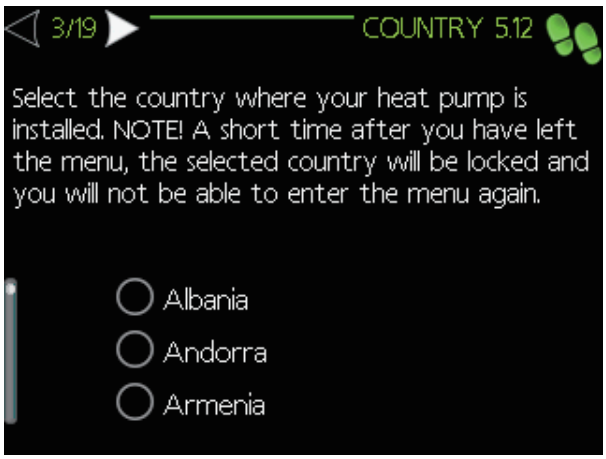
Select language of the controller.
Factory setting: English
Available languages: Czech, Danish, German, Estonian, English, Spanish, French, Croatian, Icelandic, Italian, Latvian, Lithuanian, Hungarian, Dutch, Norwegian, Portuguese, Romanian, Russian, Slovenian , Finnish, Swedish, Turkish, Polish, Bulgarian, Ukrainian.

2/19 - Information



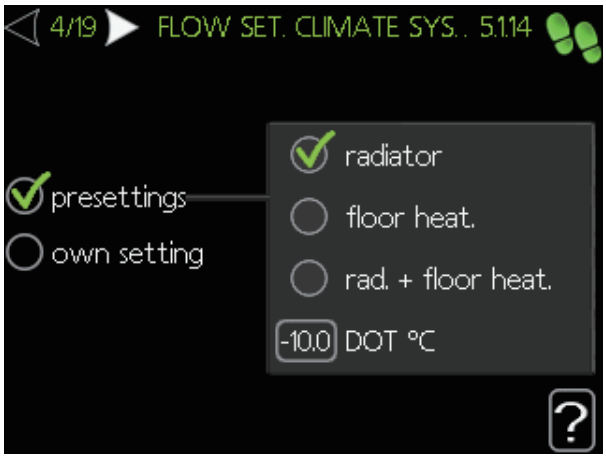
This menus displays information about the start guide.
No action needed.

3/19 - Country



Select the country where the heat pump is installed.

4/19 - Flow set. climate syst.

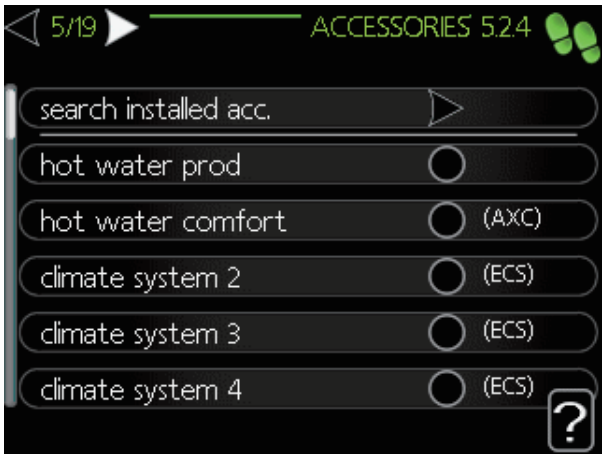


The type of heating distribution system the heating medium pump works towards is set here.
Factory settings: Presettings – Radiator Setting range:

- Pre-settings
  - Radiator
  - Floor heating
  - Rad. + Floor heat.
- Own setting
  - Setting range dt at DOT: 0.0 – 25.0 °C
  - Setting range DOT: -40.0 – 20.0 °C

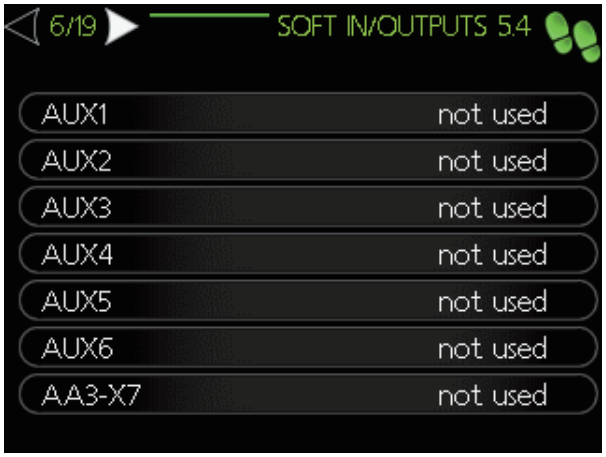
Where dt at DOT is the difference in degrees between the flow at return temperature at dimensioned outdoor temperature.

5/19 - Accessories



Activate or search for connected accessories here.
Some accessories require DIP Switch configuration on their AA5 board.

6/19 - Soft in/outputs

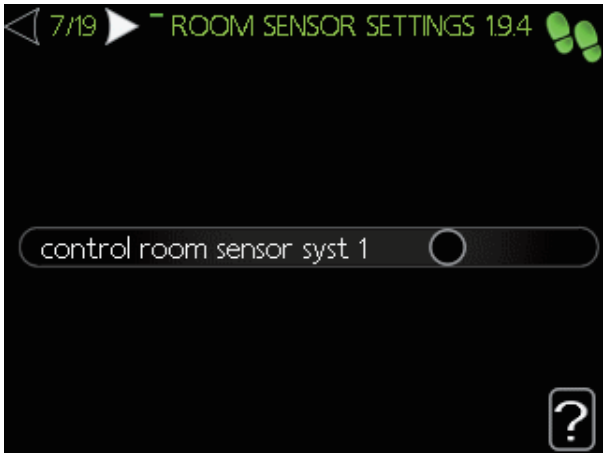


Set the function of each input and output for each terminal (if connected).

Setting range:

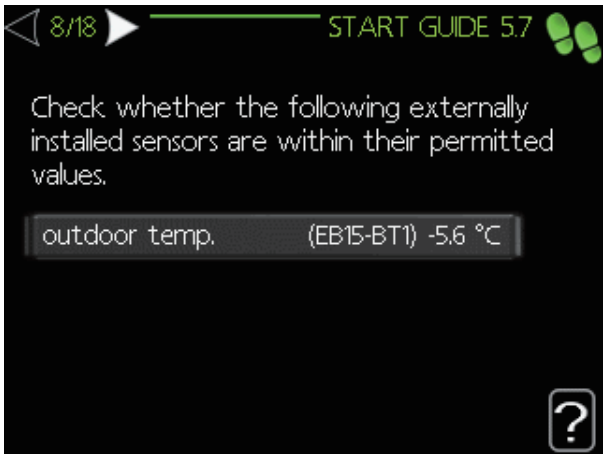
- AUX 1-6
  - Temperature sensor, cooling/heating (BT74)
  - Temperature sensor, additional heating (BT63)
  - Temperature sensor, flow line cooling (BT64)
  - Temperature sensor, boiler (BT52)
  - Contact for external tariff blocking
  - Switch for “SG ready”
  - Contact for activation of “external adjustment”
  - Switch for external alarm
  - Switch for external blocking
- AA3-X7
  - Alarm output
  - Cooling mode indication
  - Active cooling 4 pipe
  - External heating medium pump (GP10)
  - Hot water circulation (GP11)
  - Holiday output

7/19 - Room sensor settings



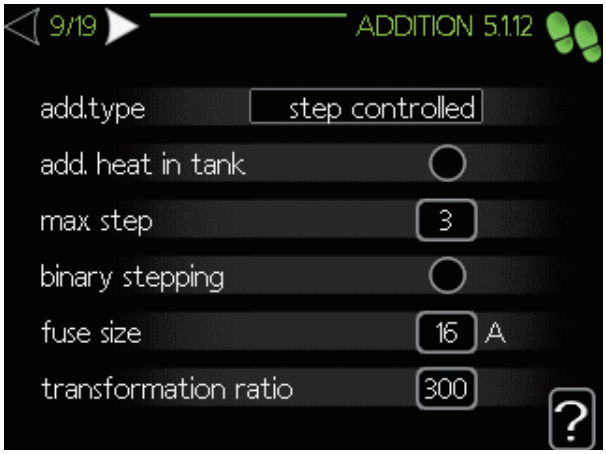
Activate and set the room temperature sensor RTS40M settings for each climate system.

8/19 - Start guide



Check if the values of the shown temperature sensors are correct. If they are not correct please check your connections.

9/19 - Addition

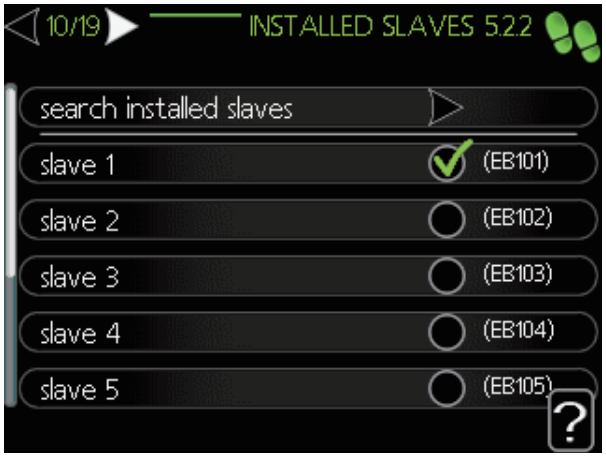


Set addition settings here.
Factory setting:
- Add. type: step controlled
- Add. heat in tank: OFF
- Max step: 3

◦Binary stepping: OFF
- Fuse size: 16A
- Transformation ratio: 300

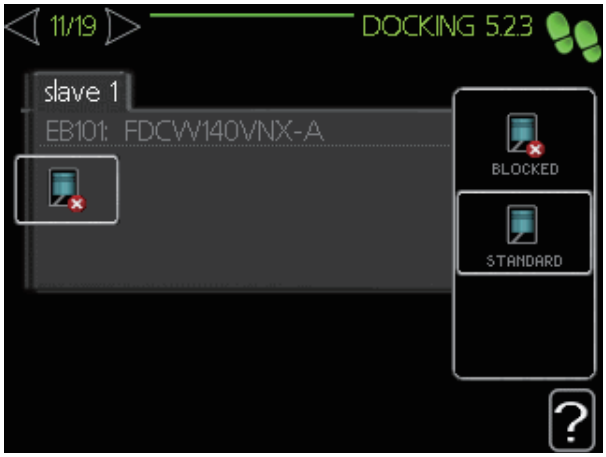
Setting range:
- Add. type:
  - Step controlled
  - Shunt controlled
- Positioning:
  - Before QN10
  - After QN10
- Add. heat in tank:
  - OFF
  - ON
- Add. heat heating (In case add heat in tank is ON):
  - OFF
  - ON
- Max step:
  - Binary stepping deactivated: 0-3
  - Binary stepping activated: 0-7
- Binary stepping:
  - OFF
  - ON
- Fuse size: 1 – 200 A
- Transformation ratio: 300-300

10/19 - Installed slaves



Search for installed slaves and enable them (if connected) here. If everything is correct the units are automatically selected after searching for installed slaves.

11/19 - Docking



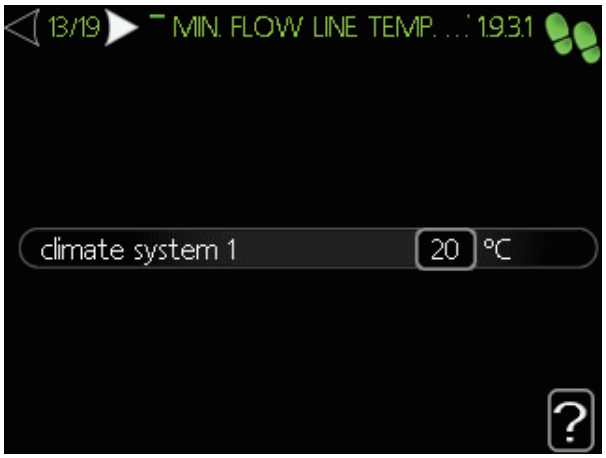
Set outdoor unit docking. As from factory the unit comes set as space heating and hot water only the above docking will appear automatically. If other accessories are connected please adjust the docking accordingly.

12/19 - Time & Date

Set time and date here.

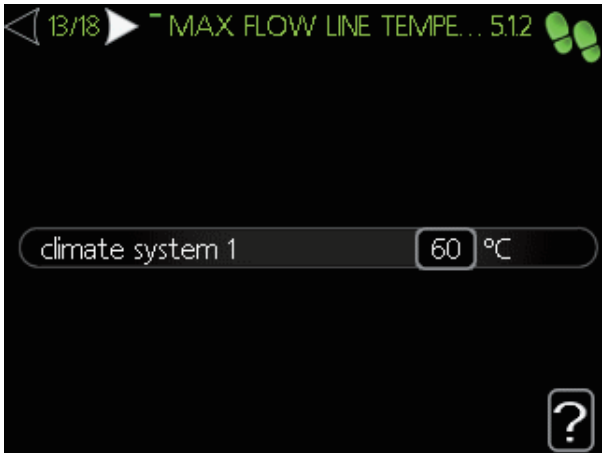
If the system is connected to myUplink then time and date are set automatically.

13/19 - Mln. flow line temperature



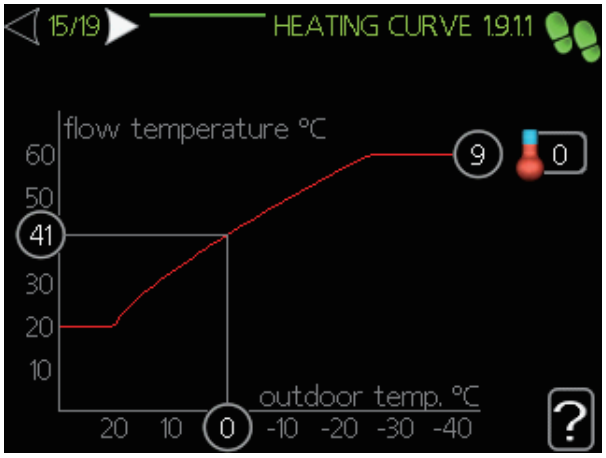
Set the minimum flow line temperature for each climate system.
Factory setting: 20.0 °C
Setting range: 5.0 - 70.0 °C

14/18 - Max. flow line temperature



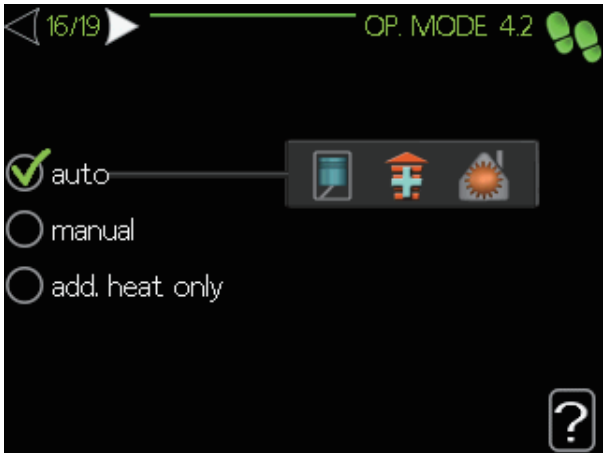
Set the maximum flow line temperature for each climate system.
Factory setting: 60.0 °C
Setting range: 5.0 - 70.0 °C

15/19 - Heating curve



View and set (if desired) the space heating curve for each climate system.

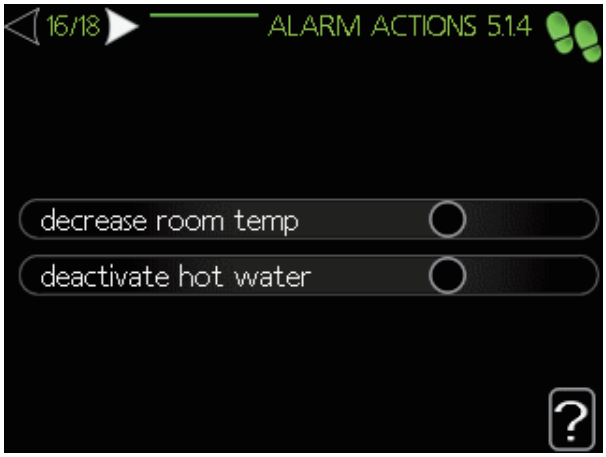
16/18 - Op. mode



Set the operation mode of the heat pump system.
Factory setting: Auto
Setting range:

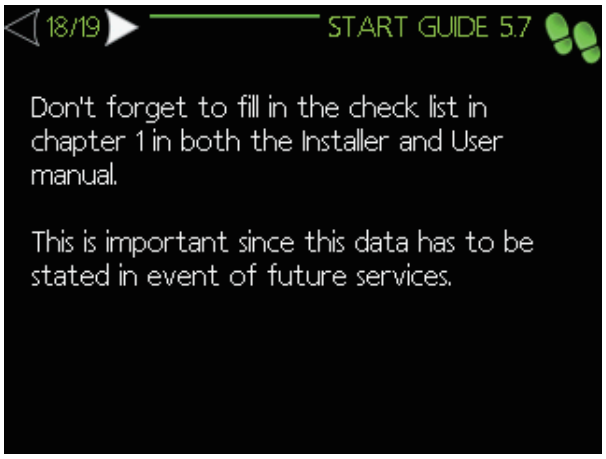
- Auto
- Manual
  - Heating
  - Cooling (only if permitted)
  - Add. heat only
- Add. heat only
  - Heating

17/19 - Alarm actions



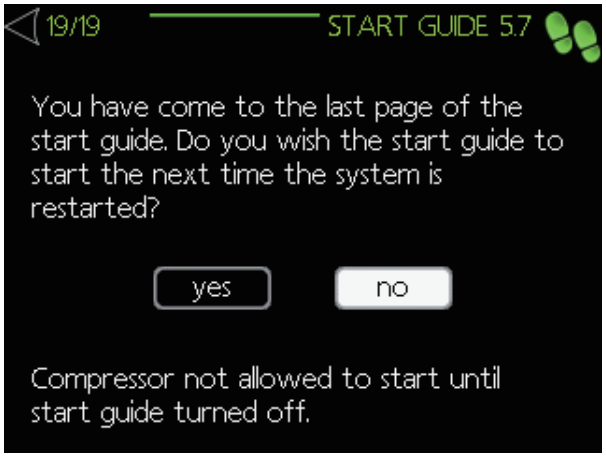
Set how to control the heat pump in case of alarm.

18/19 - Start guide



Set how to control the heat pump in case of alarm.

19/19 - Start guide



Commissioning guide finishes here. It is possible to set it to open again upon restart of the controller or do not open it anymore.

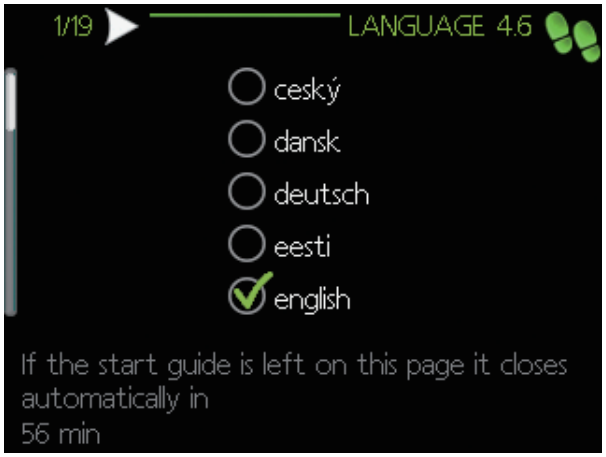
Start guide – HMM100

This menu is shown when the heat pump is started for the first time. It ensures that commissioning is carried out correctly and all necessary steps are followed.

The following menus are basic settings. If accessories are connected other menus might appear.

Start guide can be started anytime on service menu 5.7

1/19 – Language

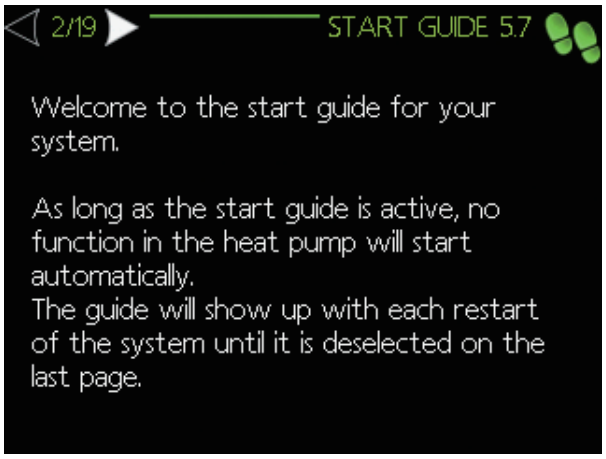


Select the language of the controller.

Factory setting: English

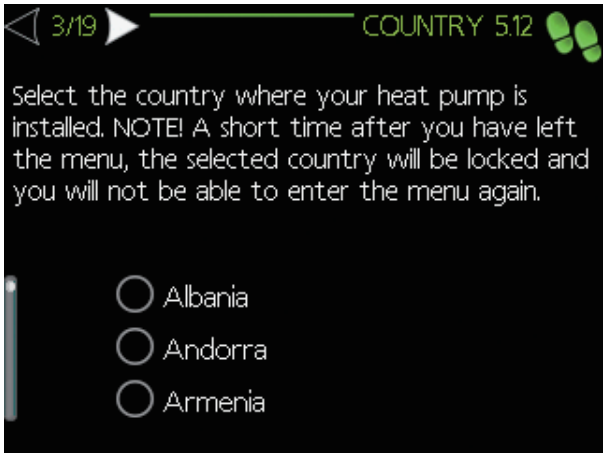
Available languages: Czech, Danish, German, Estonian, English, Spanish, French, Croatian, Icelandic, Italian, Latvian, Lithuanian, Hungarian, Dutch, Norwegian Polish, Portuguese, Romanian, Russian, Slovenian, Finnish, Swedish, Turkish, Polish, Bulgarian, Ukrainian.

2/19 – Start guide



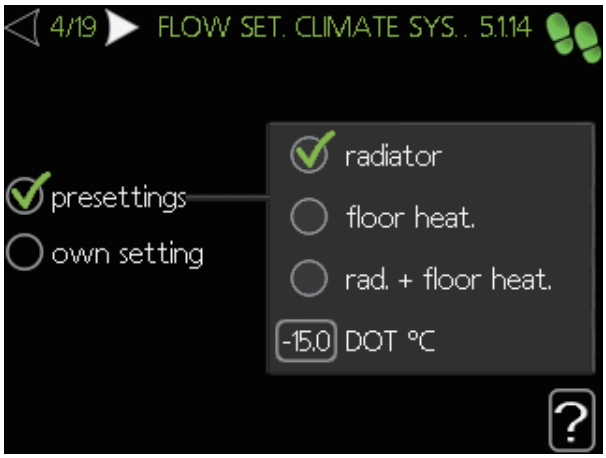
This menu displays information about the start guide.
No action needed.

3/19 – Country



Select the country where the heat pump is installed.

4/19 – Flow set/ climate syst.



The type of heating distribution system the heating medium pump works towards is set here.

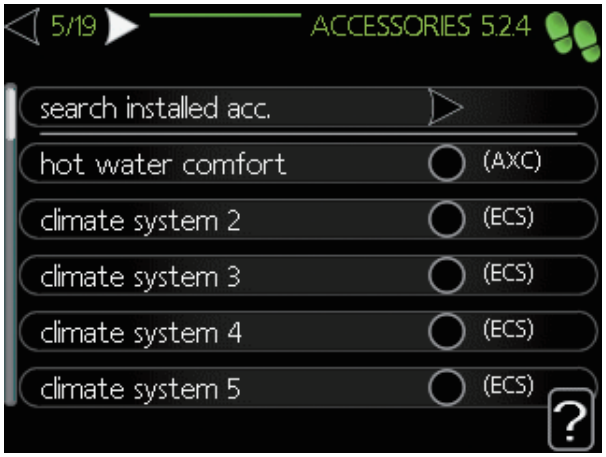
Factory settings: Presettings – Radiator

Setting range:

- Presettings
  - Radiator
  - Floor heating
  - Rad. + Floor heat.
- Own setting
  - Setting range dt at DOT: 0.0 – 25.0 °C
  - Setting range DOT: -40.0 – 20.0 °C

Where dt at DOT is the difference in degrees between the flow at return temperature at dimensioned outdoor temperature.

5/19 – Accessories

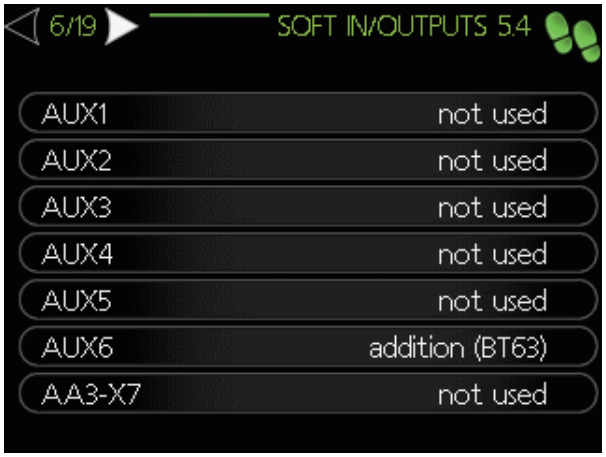


Activate or search for connected accessories here.

Hot water production is enabled from factory and cannot be disabled.

Some accessories require DIP Switch configuration on their AA5 board.

6/19 – Soft in/outputs



Set the function of each input and output for each terminal (if connected).

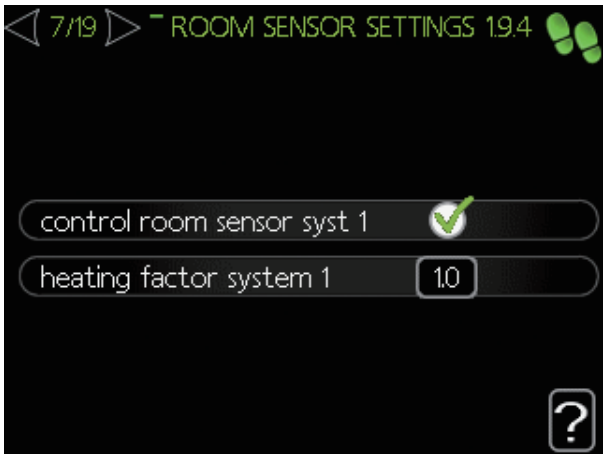
Setting range:

- AUX 1-6
  - Temperature sensor, cooling/heating (BT74)
  - Temperature sensor, additional heating (BT63)
  - Temperature sensor, flow line cooling (BT64)
  - Temperature sensor, boiler (BT52)
  - Contact for external tariff blocking
  - Switch for “SG ready”
  - Contact for activation of “external adjustment”
  - Switch for external alarm
  - Switch for external blocking
- AA3-X7
  - Alarm output
  - Cooling mode indication
  - Active cooling 4 pipe
  - External heating medium pump (GP10)
  - Hot water circulation (GP11)
  - Holiday output

Note: BT63 sensor is connected on AUX6 and BT64 is connected on AUX5.

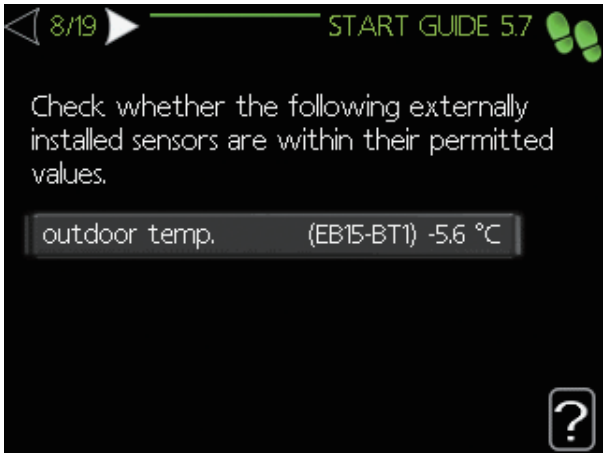
During commissioning BT63 is automatically shown on this menu. BT64 will appear once cooling mode is enabled (if this operation mode is required).

7/19 – Room sensor settings



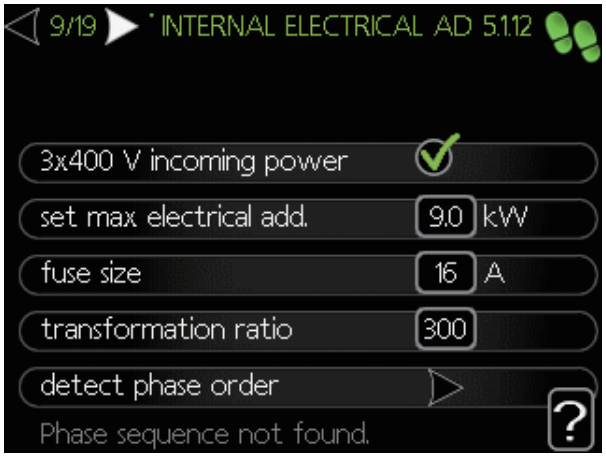
Activate and set the room temperature sensor RTS40M settings for the climate system 1 (if connected).

8/19 – Start guide



Check if the values shown on the screen are correct. If they are not correct, please check your connections.

9/19 – Internal electrical addition



Here you set the max. electrical output out of the internal addition in HMM100 and the fuse size for the installation.

Here you can also check which current sensor is installed on which incoming phase to the property (this requires current sensors to be installed).

Do this by marking “detect phase order” and pressing the OK button.

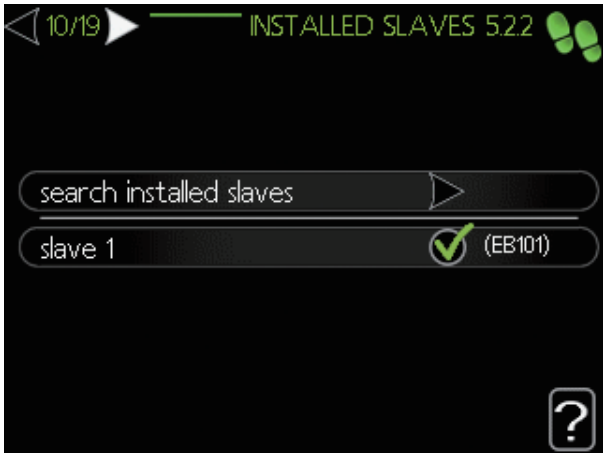
Factory setting:

- **3 x 400 V incoming power:** ON
- **Set max electrical add:** 9 kW
- **Fuse size:** 16 A
- **Transformation ratio:** 300

Setting range:

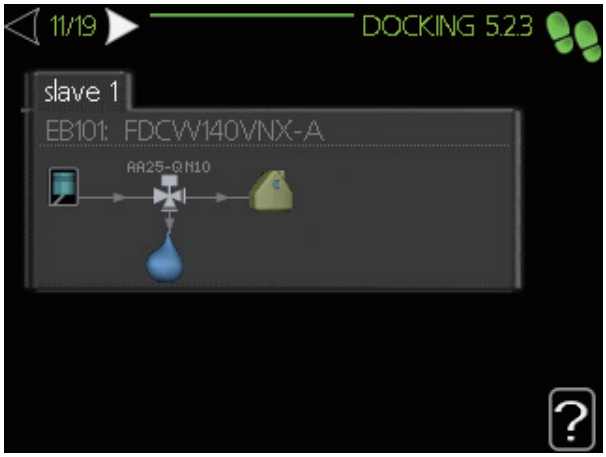
- **3 x 400 V incoming power:**
  - OFF
  - ON
- **Set max electrical add:**
  - **If 3 x 400 V incoming power is ON:** 3, 6, 9 kW
  - **If 3 x 400 V incoming power is OFF:** 1.5, 3, 6 kW
- **Fuse size:** 1 - 200 A
- **Transformation ratio:** 300-3000

10/19 – Installed slaves



Search for installed slave and enable it (if connected) here. If everything is correct, the unit is automatically selected after searching for installed slaves.

11/19 – Docking

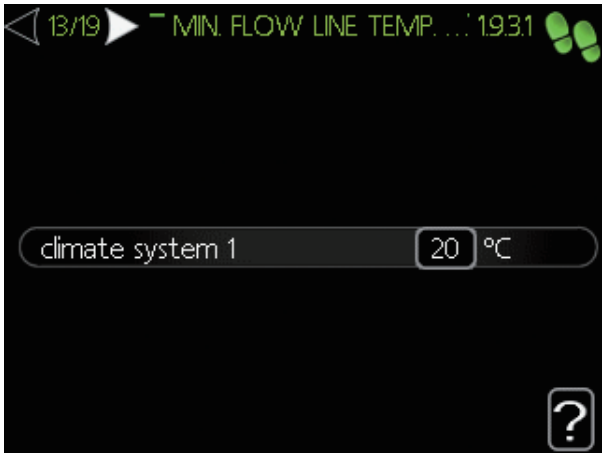


From factory docking comes pre-set as shown above – heating and hot water only. If necessary, docking needs to adjust manually according to installation type.

12/19 – Time and date

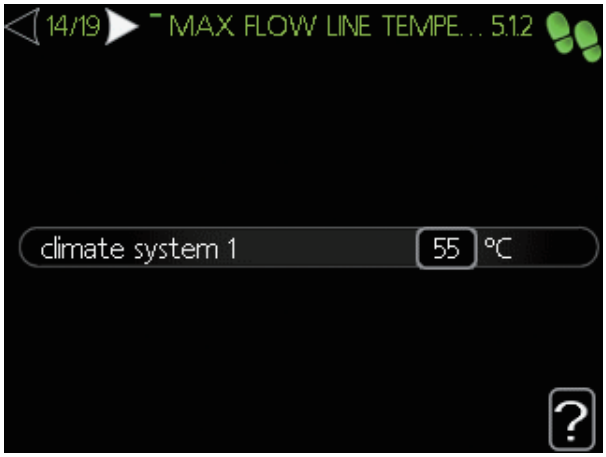
Set time and date here.
If the system is connected to myUplink then time and date are set automatically.

13/19 – Min. flow line temperature



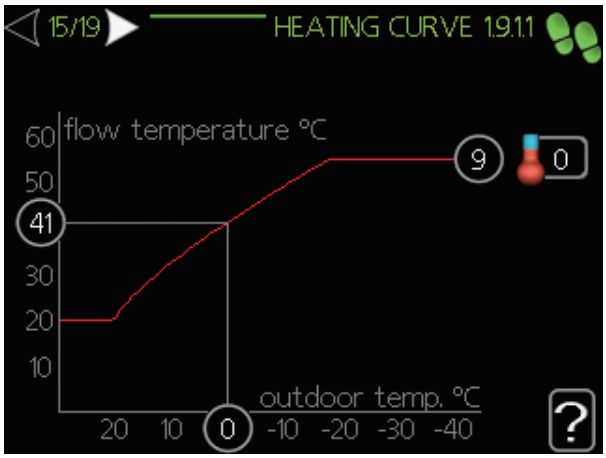
Set the minimum flow line temperature of the climate system.
Factory setting: 20°C
Setting range: 5.0 – 70.0°C

14/19 – Max. flow line temperature



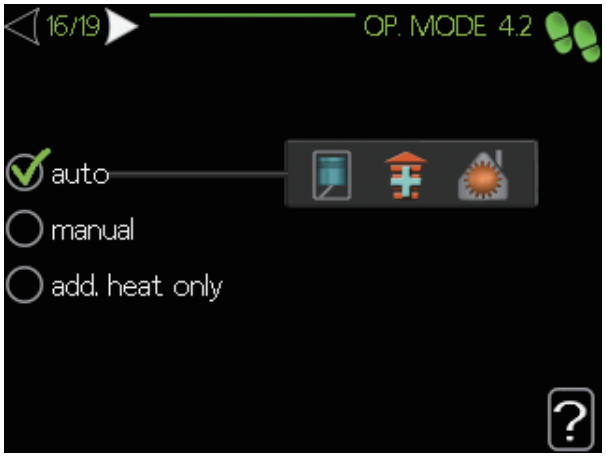
Set the maximum flow line temperature of the climate system.
Factory setting: 55°C
Setting range: 5.0 – 70.0°C

15/19 – Heating curve



View and set (if desired) the space heating curve here.

16/19 – Op. mode



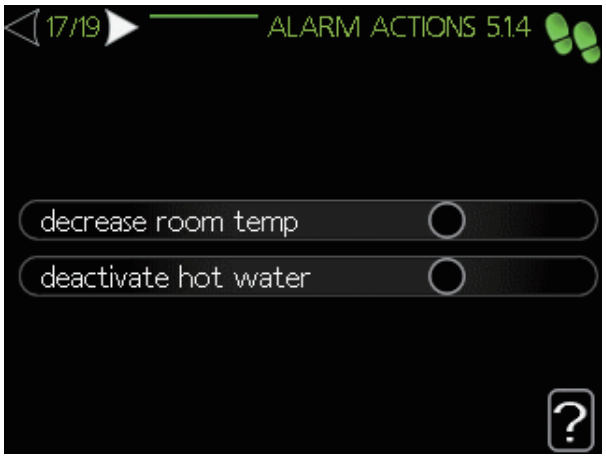
Set the operation mode of the heat pump system.

Factory setting: Auto

Setting range:

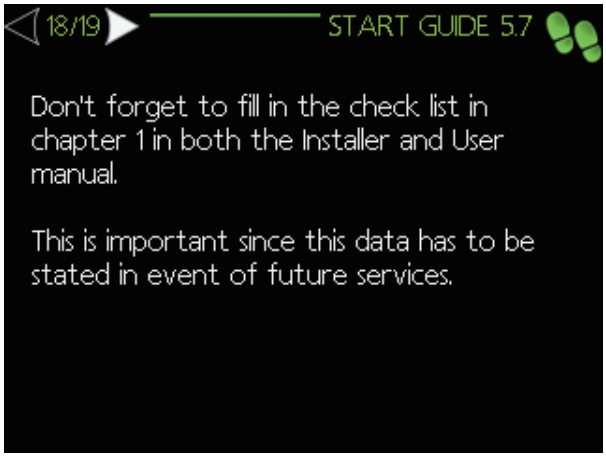
- Auto
- Manual
  - Heating
  - Cooling (only if permitted)
  - Add. Heat only
- Add. Heat only
  - Heating

17/19 – Alarm actions



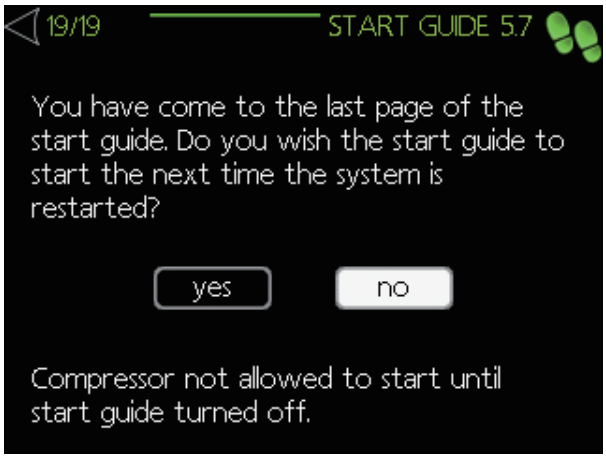
Set how to control the heat pump system in case of alarm.

18/19 – Start guide



No action needed.

19/19 – Start guide



Commissioning guide finishes here. It is possible to set it to open again upon restart of the controller or do not open it anymore.

Other adjustments

Venting the climate system

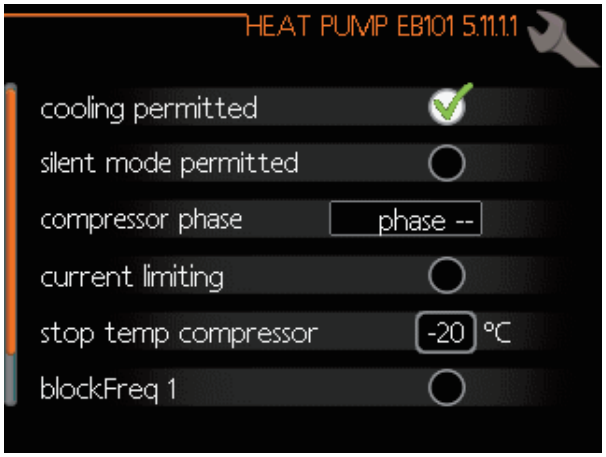
It is necessary to confirm that there is no air on the installation upon commissioning. In order to do that start the circulation pump and rotate other connected accessories such as 3 way valve (QN10) to make sure that the air bubles are removed from all the circuits.
Procedure:

1. Access menu 5.6
2. Activate forced control
3. Activate circulation pump (GP12) and rotate any valves (QN10, QN12) if necessary. For GP12 it is also possible to adjust circulation pump speed.

Cooling mode

From factory cooling mode is locked. If cooling is required it is necessary to enable this function on heat pump settings.
Procedure:

1. Access menu 5.11.1.1
In case of cascade system it is necessary to do this configuration per unit.
2. Tick “cooling permitted”



Start guide – HBM140/140H

CAUTION

The Start Guide can only be edited by qualified personnel. Entering incorrect parameters may damage the heat pump.

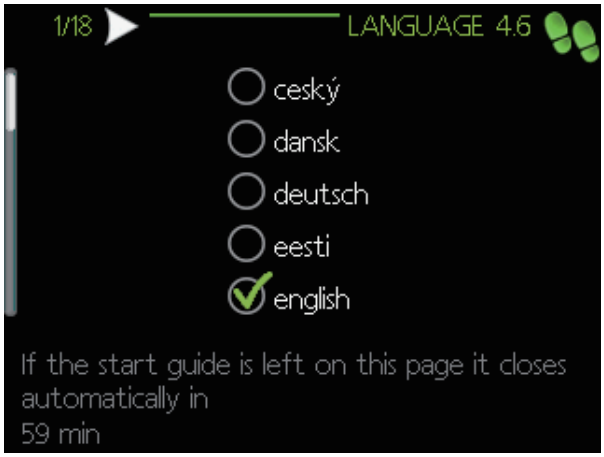
The start guide appears when you first start the HBM140 / HBM140H. You can also enable the start guide in menu 5.7.
The individual settings for the start guide factory settings are described below.

1/18 - Language

In this menu, select the operating language of the controller.

Factory setting: english

Available languages: Czech, Danish, German, Estonian, English, Spanish, French, Croatian, Icelandic, Italian, Latvian, Lithuanian, Hungarian, Dutch, Norwegian Polish, Portuguese, Romanian, Russian, Slovenian, Finnish, Swedish, Turkish, Polish, Bulgarian, Ukrainian.



2/18 Information

This menu displays information about the start guide.

3/18 Country

Select where the product is to be installed here.

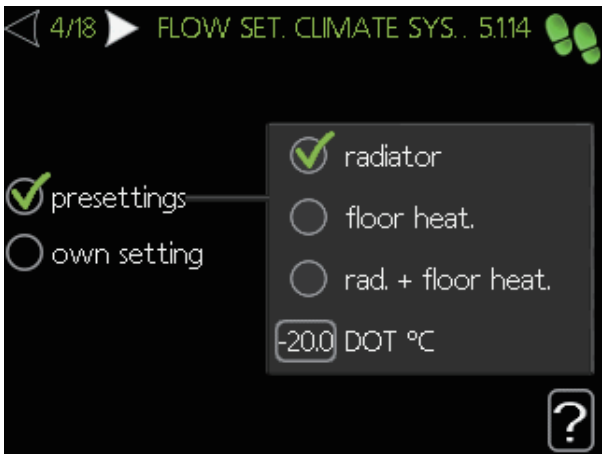
4/18 Flow. set. climate sys.

In this menu there is possibility to change settings for the essential settings of the heating system. More information after selecting "?".

Factory setting: presettings

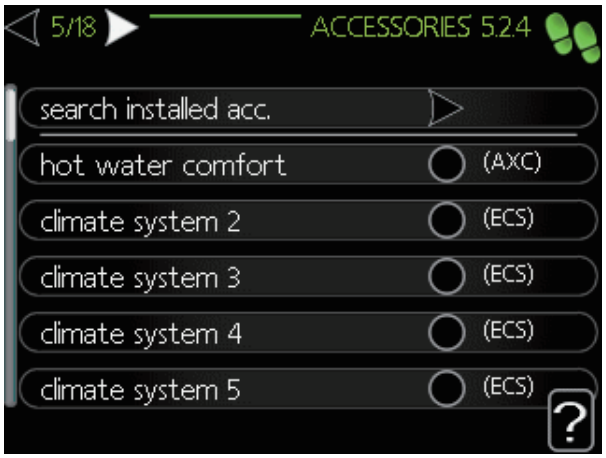
Factory setting: radiator

Factory setting: -20.0 DOT C



5/18 Accessories

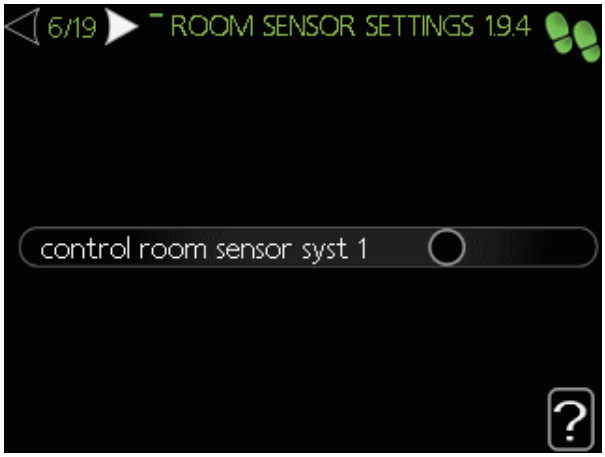
In this menu it is possible to activate additional connected accessories. More information after selecting "?".



6/18 Room sensor settings

In this menu you can activate and change settings for the room sensor. More information after selecting "?".

Factory setting: inactive



7/18 Control of external sensors

In this menu we have the possibility to check the allowed values for external sensors. More information after selecting "?".

8/18 Internal electrical ad

In this menu we have the option to change settings for the additional heat (built-in electric additional heat). More information after selecting "?".

Factory setting:

- 3x400 V incoming power: active (for 3 phases) set max electrical add.: 9,0 kW
- fuse size: 20A
- transformation ratio: 300 detect phase order (displayed if 3x400 V incoming power is activated.)

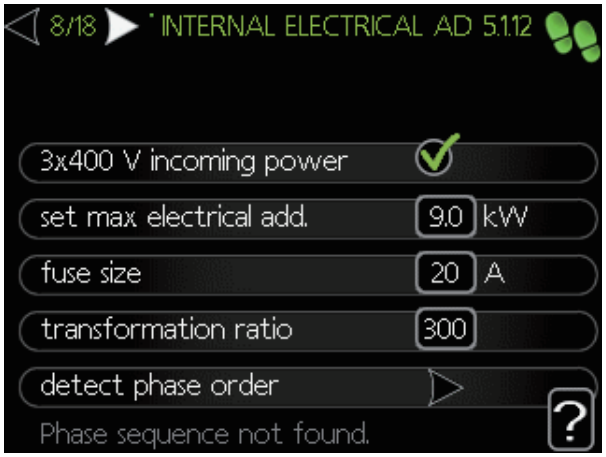
CAUTION

In the case of a fuse rating with a smaller value (applies to the main fuse rating in the house) you should set this value lower than 20 A. Note, this will reduce the power of the appliance.

You cannot set a value higher than 20 A for 400 V connection or 40 A for 230 V connection.

NOTE

If the 3x400 V incoming power is active and current sensors are connected, the detect phase order function must be activated.



9/19 Installed slaves

The menu has an informative function. You can select one device.

To view more information, select "?".

Factory setting:

- slave 1: active (EB101)

CAUTION

The HBM140/140H unit cannot be cascaded with heatpumps.

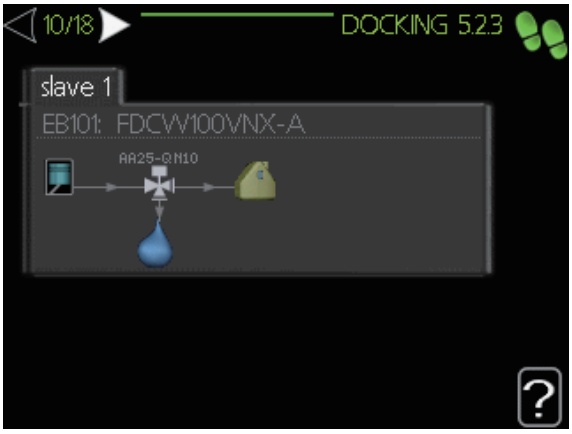
10/19 Docking

In this menu it is possible to edit the device operation scheme. More information after selecting "?".

CAUTION

Changing the diagram will cause the device to operate incorrectly.

Factory setting:



11/18 Time & date

In this menu, set the current date and time. In addition, we have the ability to choose the display format and time zone.

12/18 Min. flow line temp.

In this menu it is possible to edit the minimum flow temperature of the heating system. More information after selecting "?".

Factory setting:

- climate system 1: 20 C

13/18 Max flow line temp.

In this menu it is possible to edit the maximum flow temperature of the heating system. More information after selecting "?".

Factory setting:

- climate system 1: 55 C

Recommended setting values are:

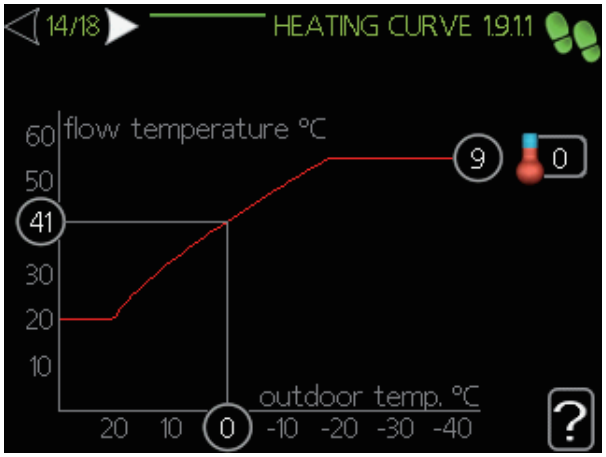
- + 35 for surface heating,
- + 55 for radiator heating.

14/18 Heating curve

In this menu it is possible to edit the heating curve specified for the HBM140/140H unit. More information after selecting "?".

Factory setting:

- Heating curve: 9

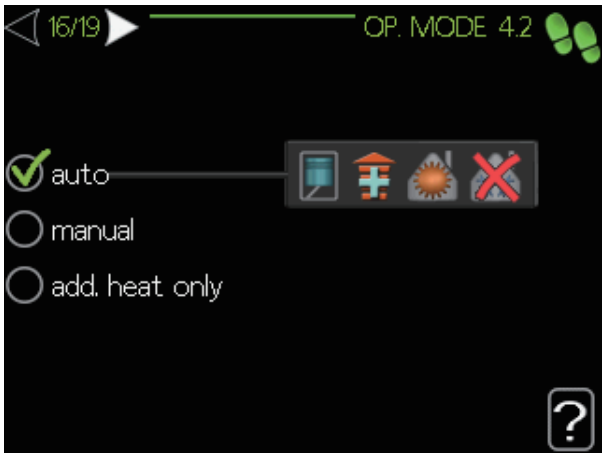


Detailed information on curve settings - see pt. „User settings".

15/18 Op. mode

In this menu, you can select the operating mode for the HBM140/140H unit. More information after selecting "?".

Factory setting: auto



NOTE

Recommended „auto" operating mode. Editing isonly possible by qualified personnel.

16/18 Alarm actions

In this menu it is possible to activate alarm actions. More information after selecting "?".

Factory setting:

- decrease room temp: inactive
- deactivate hot water: inactive

17/18 Reminder

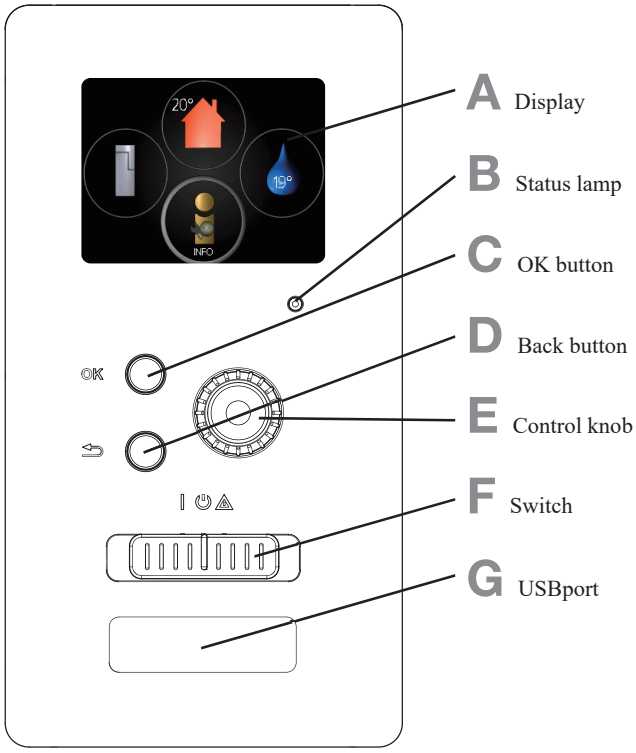
Reminder to complete the checklist in the first chapter of the user manual.

18/18 Start guide

In this menu, we can decide whether the start guide will run again the next time the system is started.

Control

Display unit



A - Display

Instructions, settings and operational information are shown on the display. You can easily navigate between the different menus and options to set the comfort or obtain the information you require.

B - Status lamp

The status lamp indicates the status of the controller.
It:
- Lights green during normal operation
- Lights yellow in emergency mode
- Lights red in the event of an alarm

C - OK button

The OK button is used to:
- Confirm selections of sub menus/options/set values/page in the start guide.

D - Back button

The back button is used to:
- Go back to the previous menu
- Change a setting that has not been confirmed

E - Control knob

The control knob can be turned to the right or left. You can:
- Scroll in menus and between options
- Increase and decrease values
- Change pages in multiple page instructions

F - Switch

The switch shows three positions:
- On (|)
- Standby (⏻)
- Emergency mode (⚠)

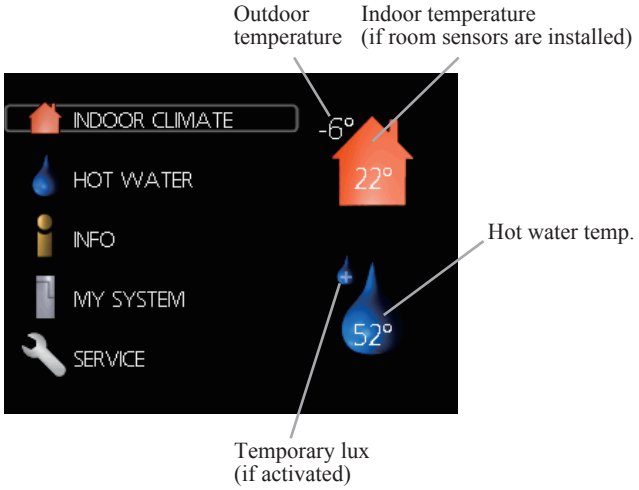
Emergency mode must only be used in the event of a fault on the controller. In this mode, the compressor in the heat pump is turned off and the immersion heater is activated.
The controller display is not illuminated and the status lamp lights yellow.

G - USB port

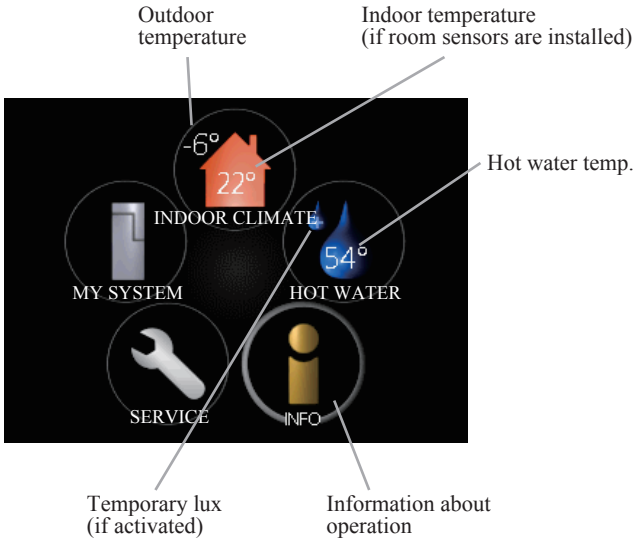
The USB port is hidden behing the plastic badge of the product name.
The USB is used to update the system software.

Menu system

RC-HY20-W



RC-HY40-W, HMM100, HBM140/140H



Menu 1 - Indoor climate

Setting and scheduling the indoor climate. See information in the help menu or user manual.

Menu 2 - Hot water

Setting and scheduling hot water production. See information in the help menu or user manual.

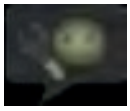
This menu only appears if a water heater is installed in the system.

Menu 3 - Info

Display the temperature and other operating information and access the alarm log.

Symbols in the display

The following symbols can appear in the display during operation.

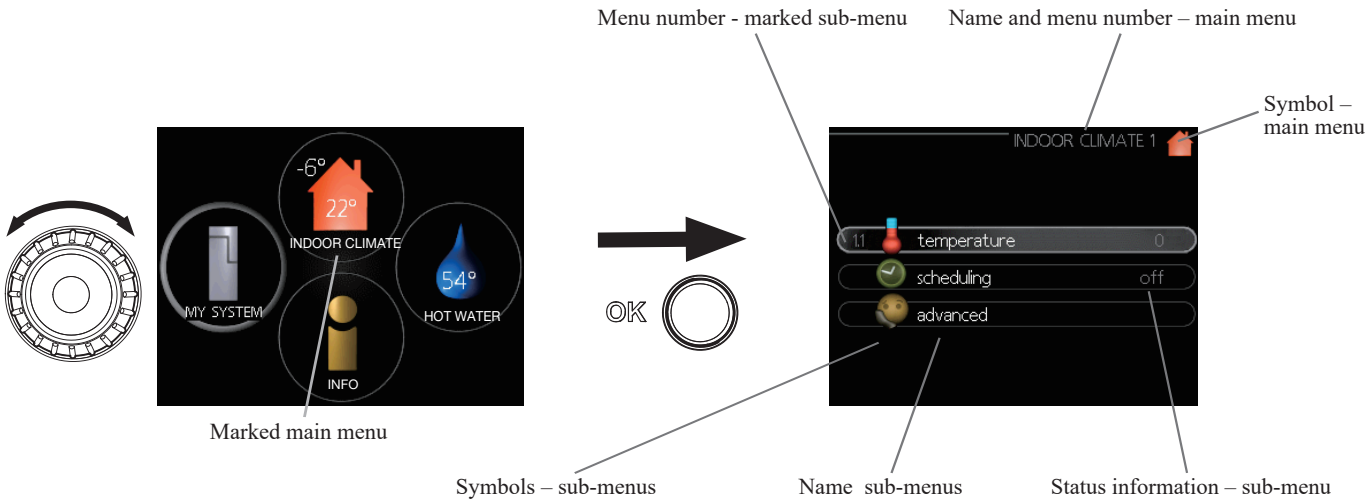
Symbol	Description
	This symbol appears when there is information to be noticed on meny 3.1.
	These two symbols indicate whether the compressor in the outdoor unit or additional heat in the installation is blocked via controller. These functions will be blocked fox example when either of the operation mode is blocked in the menu 4.2, when blocking of either function is scheduled in menu 4.9.4, or when an alarm for blocking the operaton occurs.  Blocking the compressor  Blocking additional heat
	This symbol appears if periodic increase or lux mode for hot water is activated.
	This symbol indicates if "holiday setting" is active in menu 4.7.
	This symbol indicates if the controller has contact with myUplink.
	This symbol indicates if the cooling is active.
	This symbol indicates where pool heating is active. Accessory required - RC-HY40-W, HMM100 and HBM140/140H only.
	This symbol is visible in installations with active solar accessories.

Menu 4 - My System

Setting time, date, language, display, operating mode, etc. See information in the help menu or user manual.

Menu 5 - Service

Advanced settings. These settings are not available to the end user. The menu is made visible by pressing the Back button for 7 seconds in the top screen.



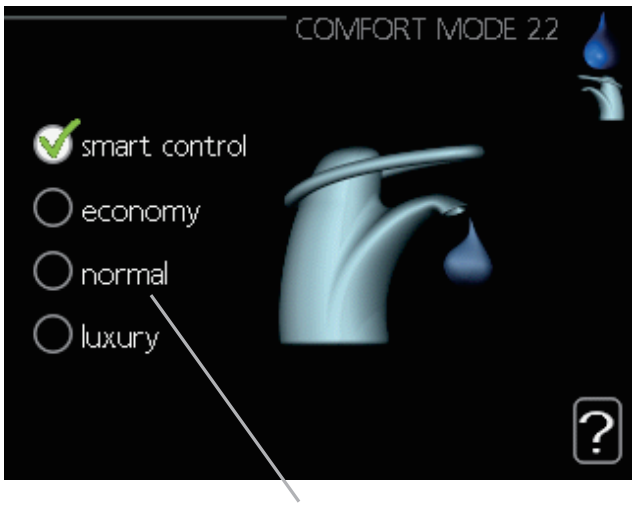
Operation

To move the cursor, turn the control knob to the left or the right. The marked position is brighter and/or has a light frame.

Selecting menu

To advance in the menu system, select a main menu by marking it and then pressing the OK button. A new window opens with sub menus.
Select one of the submenus by marking it and then pressing the OK button.

Selecting options



Alternative

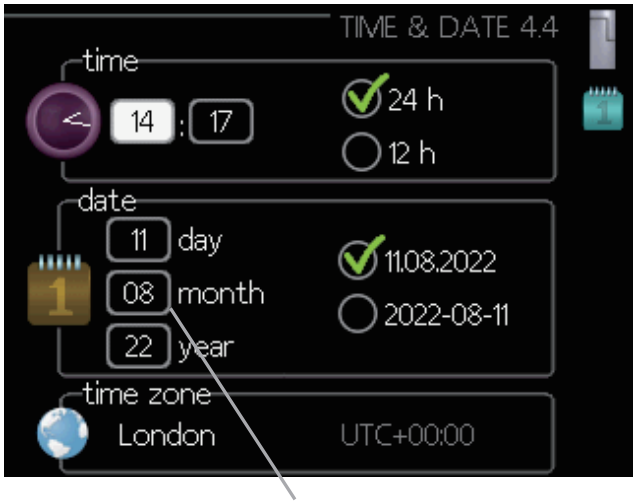
In an options menu the current selection option is indicated by a green tick.

To select another option:

1. Mark the applicable option. One of the options is preselected (white).

2. Press OK button to confirm the selected option. The selected option has a green tick.

Setting a value



Values to be changed

To set a value:

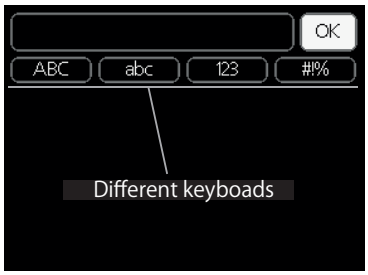
1. Mark the value you want to set using the control knob.

2. Press the OK button. The background of the value becomes green, which means that you have accessed the setting mode.

3. Turn the control knob to the right to increase the value and to the left to reduce the value.

4. Press OK button to confirm the value you have set. To change and return to the original value, press the Back button.

Use the virtual keyboard



In some menus where text may require entering, a virtual keyboard is available.

Depending on the menu, you can gain access to differ-ent character sets which you can select using the control knob. To change character table, press the Back button. If a menu only has one character set the keyboard is displayed directly.
When you have finished writing, mark "OK" and press the OK button.

Scroll through the windows

A menu can consist of several windows. Turn the control knob to scroll between the windows.

Currentmenu window — Number of windows inthemenu

Scroll through the windows in the start guide

Arrows to scroll through window in start guide

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

Help menu

In many menus there is a symbol that indicates that extra help is available.

To acess the help text:
1. Use the control knob to select the help symbol.
2. Press the OK button.

The help text often consists of several windows that you can scroll between using the control knob.

Menu list

Menu			RC-HY20-W	RC-HY40-W***
1. Indoor climate				
1.1. Temperature	1.1.1. Heating		○	○
	1.1.2. Cooling **		○	○
1.3. Scheduling	1.3.1. Heating		○	○
	1.3.2. Cooling **		○	○
1.9. Advanced	1.9.1. Curve	1.9.1.1 Heating curve	○	○
		1.9.1.2 Cooling curve **	○	○
	1.9.2. External adjustment		○	○
	1.9.3. Min. flow line temp.	1.9.3.1 Heating	○	○
		1.9.3.2 Cooling **	○	○
	1.9.4. Room sensor settings		○	○
	1.9.5. Cooling settings		○	○
	1.9.7. Own curve	1.9.7.1 Heating	○	○
		1.9.7.2 Cooling **	○	○
	1.9.8. Point offset		○	○
2. Hot water				
2.1. Temporary lux			○	○
2.2. Comfort mode			○	○
2.3. Scheduling			○	○
2.9. Advanced	2.9.1. Periodic increase		○	○
	2.9.2. Hot water recirc		○	○
3. Info				
3.1. Service info			○	○
3.2. Compressor info			○	○
3.3. Add. heat info			○	○
3.4. Alarm log			○	○
3.5. Indoor temp. log			○	○
3.6. Energy log			○	○
4. My system				
4.1. Plus functions	4.1.1. Pool 1		—	○
	4.1.2. Pool 2		—	○
	4.1.3. internet	4.1.3.1. myUplink	○	○
		4.1.3.8. tcp/ip settings	○	○
		4.1.3.9. proxy settings	○	○
	4.1.5. SG Ready		○	○
	4.1.6. Smart price adaption™		○	○
	4.1.8. Smart energy source™	4.1.8.1. settings	—	○
		4.1.8.2. Set. Price	—	○

Menu			RC-HY20-W	RC-HY40-W***
	4.1.8. Smart energy source™	4.1.8.3. CO2 impact	—	○
		4.1.8.4. Ttariff periods, electricity	—	○
		4.1.8.6. Tariff per, ext. shunt add	—	○
		4.1.8.7. Tariff per, ext. step add	—	○
	4.1.10. Solar electricity		○	○
4.2. Op. mode			○	○
4.3. My icons			○	○
4.4. Time & date			○	○
4.6. Language			○	○
4.7. Holiday setting			○	○
4.9. Advanced	4.9.1. Op. prioritisation		○	○
	4.9.2. Auto mode setting		○	○
	4.9.3. Degree minute setting		○	○
	4.9.4. Factory setting user		○	○
	4.9.5. Schedule blocking		○	○
	4.9.6. Schedule silent mode		○	○
5. Service				
5.1. Operating settings	5.1.1. Hot water settings *		○	○
	5.1.2. Max flow line temperature		○	○
	5.1.3. Max diff flow line temp.		○	○
	5.1.4. Alarm actions		○	○
	5.1.12. Addition		○	○
	5.1.14. Flow set. climate system		○	○
	5.1.22. Heat pump testing		○	○
	5.1.23. Compressor curve		○	○
5.2 System settings	5.2.2. Installed slaves		○	○
	5.2.3. Docking		○	○
	5.2.4. Accessories		○	○
5.3 Accessory settings	5.3.2. Shunt controlled add. heat		—	○
	5.3.3. Extra climate system		—	○
	5.3.4. Solar heating		—	○
	5.3.8. Hot water comfort		—	○
	5.3.10. Modbus		—	○
	5.3.20. Flow sensor		—	○
5.4. Soft in/outputs			○	○
5.5. Factory setting service			○	○
5.6. Forced control			○	○
5.7. Start guide			○	○
5.8. Quick start			○	○

Menu			RC-HY20-W	RC-HY40-W***
5.9. Floor drying function			○	○
5.10. Change log			○	○
5.11. Slave settings	5.11.1. EB101	5.11.1.1. Heat pump	○	○
		5.11.1.2. Charge pump (GP12)	○	○
	5.11.2. EB102		—	○
	5.11.3. EB103		—	○
	5.11.4. EB104		—	○
	5.11.5. EB105		—	○
	5.11.6. EB106		—	○
	5.11.7. EB107		—	○
	5.11.8. EB108		—	○
5.12. Country			○	○

*Accessory required

** Cooling function required

*** RC-HY40-W controller functions are the same as HMM100 and HBM140/140H.

Sub-menus

Menu SERVICE has orange text and is intended for the advanced user. This menu has several sub-menus.

Status information for the relevant menu can be found on the display to the right of the menus.

operating settings: operation settings for the controller.

system settings: system settings for the controller,

activating accessories, etc.

soft in/outputs: setting software controlled in and outputs on the input card AA3 (RC-HY40-W, HMM100 and HBM140/140H) and terminal block X2.

factory setting service: total reset of all settings (including setting available to the user) to default values.

forced control: forced control of the different components in the indoor module.

start guide: manual start of the start guide which run the first time when the controller is started quick start: quick starting of the compressor.

accessory settings Operational settings for different accessories.

quick start Quick starting the compressor.

NOTE

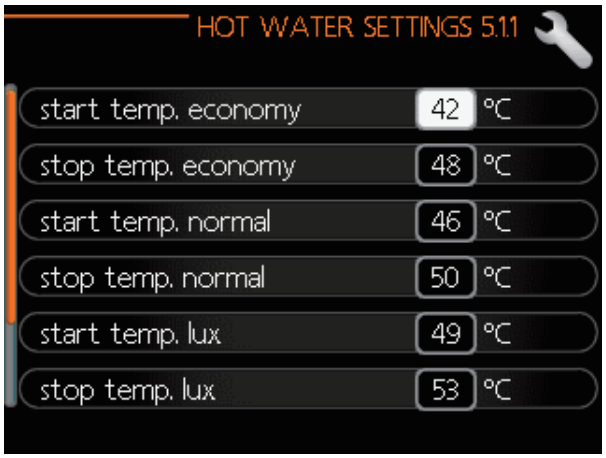
Incorrect settings in the service menus can damage the installation.

Menu 5.1 - Operating settings

Operating settings can be made for the controller in the sub-menus.

Menu 5.1.1 - Hot water settings

The hot water settings require that hot water production is activated in menu 5.2.4 - accessories.



NOTE

The factory set tap water temperatures specified in the manual can vary due to the directives in force in different countries. From this menu, you can check the relevant settings for the system.

Economy

Setting range start temp. economy: 5 – 55 °C
Factory setting start temp. economy: 42 °C
Setting range stop temp. economy: 5 – 60 °C
Factory setting stop temp. economy: 48 °C

Normal

Setting range start temp. normal: 5 – 60 °C
Factory setting start temp. normal: 46 °C
Setting range stop temp. normal: 5 – 65 °C
Factory setting stop temp. normal: 50 °C

Luxury

Setting range start temp. lux: 5 – 70 °C
Factory setting start temp. lux: 49 °C
Setting range stop temp. lux: 5 – 70 °C
Factory setting stop temp. lux: 53 °C

Stop temp.per.increase

Setting range: 55 – 70 °C
Factory setting: 55 °C

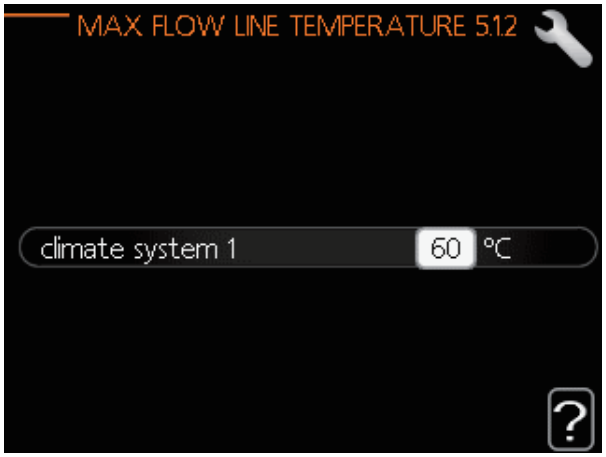
Charge method

Setting range: target temp, delta temp
Factory setting: delta temp

Here you set the start and stop temperature of the hot water for different comfort options in menu 2.2 as well as the stop temperature for periodic increase.
Depending on the outside temperature and temperature settings additional heating might be required.
When using backup heating, the system must be operated in luxury mode.
If you need a higher temperature setting than what is listed in the table, you should set it as the stop temperature in luxury mode.
The charge method for hot water is selected here. "delta temp" is recommended for heaters with charge coil (PT300/300-V2/PT500), "target temp" for heaters with domestic coil.

Menu 5.1.2 - max flow line temperature

The hot water settings require that hot water production is activated in menu 5.2.4 - accessories.



Climate system

Setting range: 5 - 80°C
Default value: 60°C

Set the maximum supply temperature for the climate system here. If the installation has more than one climate system, individual maximum supply temperatures can be set for each system. Climate systems 2 – 8 cannot be set to a higher max supply temperature than climate system 1.

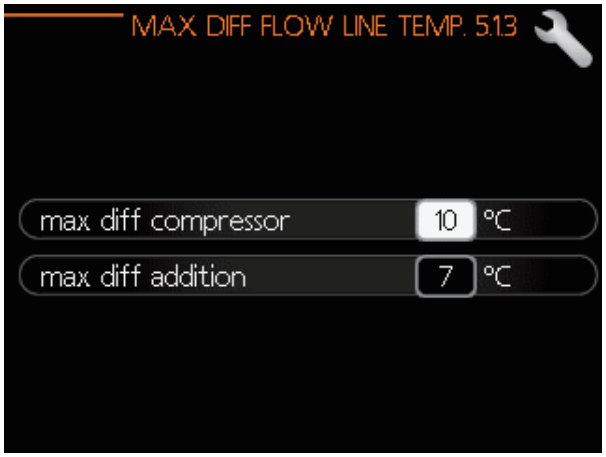
CAUTION

Underfloor heating systems are normally max flow line temperature between 35 and 45°C.

Be careful not to cause low temperature if it is set at 35°C or higher.

Check the max floor temperature with your floor supplier.

Menu 5.1.3 - max diff flow line temp.



max diff compressor

Setting range: 1 - 25°C
Default value: 10°C

max diff addition

Setting range: 1 - 24°C
Default value: 7°C

Here you set the maximum permitted difference between the calculated and actual supply temperature during compressor and additional heat mode. Max. diff additional heat can never exceed max. diff. compressor.

max diff compressor

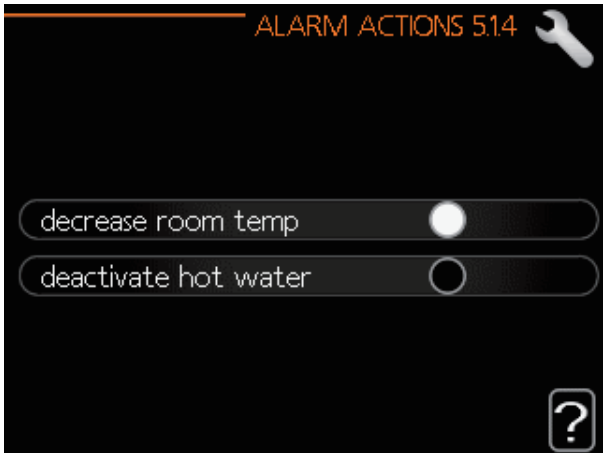
When the current supply temperature deviates from the set value compared to that calculated, the heat pump is forced to stop irrespective the degree minute value.

If the current supply temperature exceeds the calculated flow temperature plus the set value, the degree minute value is set to 0. The compressor in the heat pump stops when there is only a heating demand.

max diff addition

If "addition" is selected and activated in menu 4.2 and the present supply temperature exceeds the calculated temperature plus the set value, the additional heat is forced to stop.

Menu 5.1.4 - Alarm actions



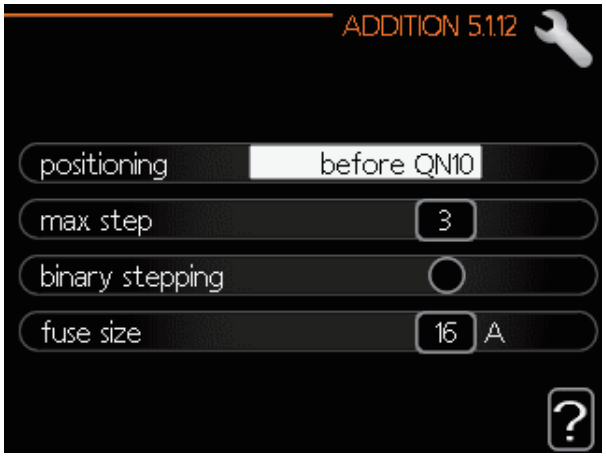
Select how you want the controller to alert you that there is an alarm in the display here. The different alternatives are: the heat pump stops producing hot water and/or reduces the room temperature.

CAUTION

If no alarm action is selected, it can result in higher energy consumption in the event of an alarm.

Menu 5.1.12 - Addition

RC-HY20-W



Here you select whether the step controlled additional heat is positioned before or after the reversing valve for hot water charging (QN10).

You can also set the maximum permitted number of additional steps and binary or linear stepping.

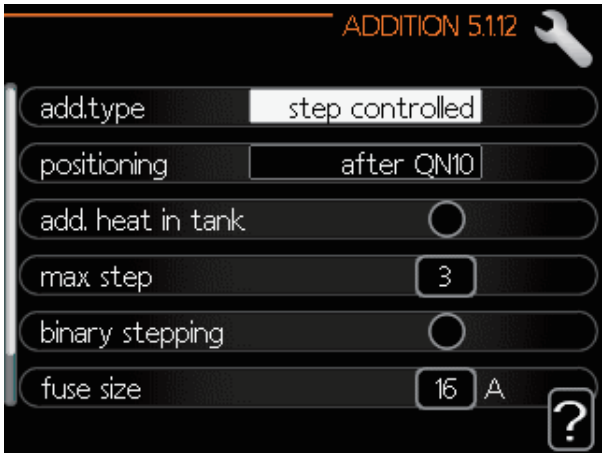
If hot water production is activated and additional heat is selected "after QN10", the number of steps are restricted to 2 steps linear or 3 steps binary because the AA7:X2:6 output is reserved for additional heat in the hot water tank (ex: ME1030M connected to PT tank).

RC-HY40-W, HBM140/140H

Make settings for connected additional heat (step controlled or shunt controlled additional heat) here.

Select whether step controlled or sunt controlled additional heat is connected. Then you can make settings for the different alternatives.

add. type: step controlled



max step

Setting range (binary stepping deactivated): 0 - 3
Setting range (binary stepping activated): 0 - 7
Default value: 3

fuse size

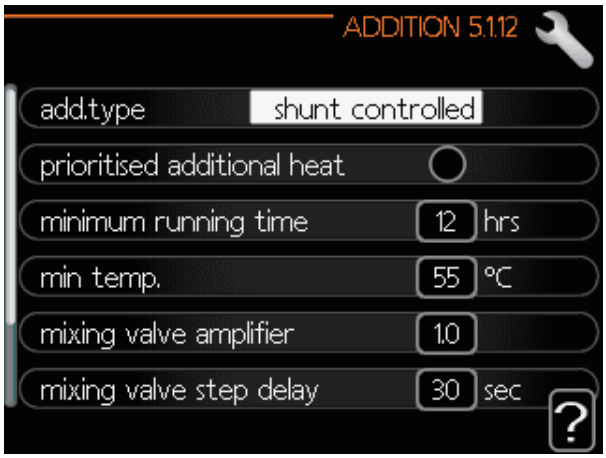
Setting range: 1 - 200 A
Default value: 16 A

transformation ratio

Setting range: 300 - 3000
Default value: 300

You can set the maximum number of permitted steps, if there is internal additional heat in the tank (only accessible if the additional heat is positioned after QN10), whether binary stepping is to be used and the size of the fuse.

add. type: shunt controlled



prioritised additional heat

Setting range: ON/OFF
Factory setting: OFF

minimum running time

Setting range: 0 - 48 h
Default value: 12 h

min temp.

Setting range: 5 - 90°C
Default value: 55°C

mixing valve amplifier

Setting range: 0.1 - 10.0
Default value: 1.0

mixing valve step delay

Setting range: 10 - 300 s
Default value: 30 s

fuse size

Setting range: 1 - 200 A
Default value: 16 A

transformation ratio

Setting range: 300 - 3000
Default value: 300

Select this option if shunt controlled additional heat is connected.

Set when the addition is to start, the minimum run time and the minimum temperature for external addition with shunt here.

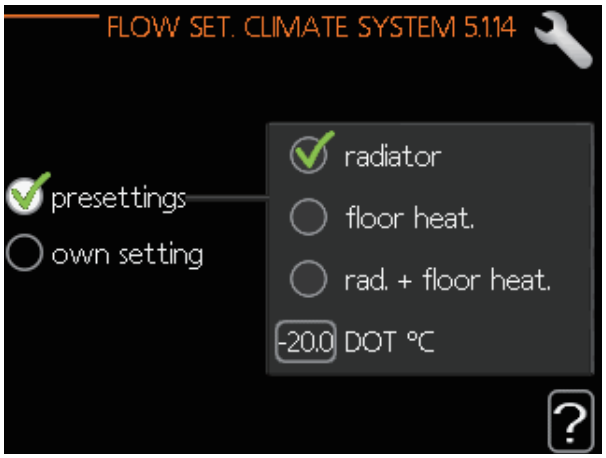
External addition with shunt is for example a wood/oil/gas/pellet boiler.

You can set the shunt valve amplification and shunt valve waiting time.

Selecting "prioritised additional heat" uses the heat from the external additional heat instead of the heat pump.

The sunt valve is regulated as long as heat is available, otherwise the shunt valve is closed.

Menu 5.1.14 - flow set. climate system



presettings

Setting range: radiator, floor heat., rad. + floor heat.
Default value: radiator
Setting range DOT: -40.0 - 20.0°C
The factory setting DOT value depends on the country that has been given for the product's location.

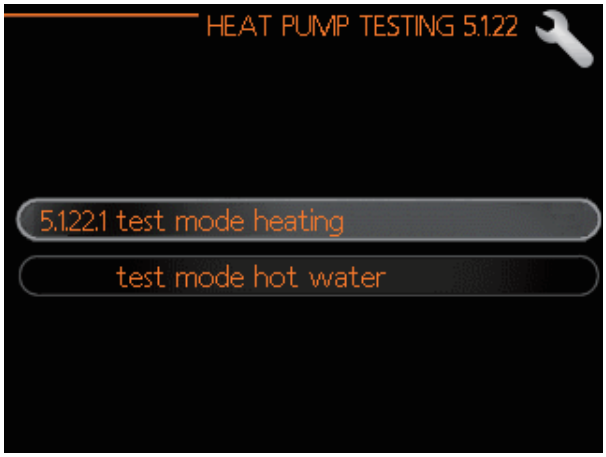
own setting

Setting range dt at DOT: 0.0 - 25.0°C
Factory setting dt at DOT: 10.0°C
Setting range DOT: -40.0 - 20.0°C
Factory setting DOT: -20.0°C

Select the type of heating distribution system.

dT at DOT is the difference in degrees between flow and return temperature at dimensioned outdoor temperature.

Menu 5.1.22 - heat pump testing

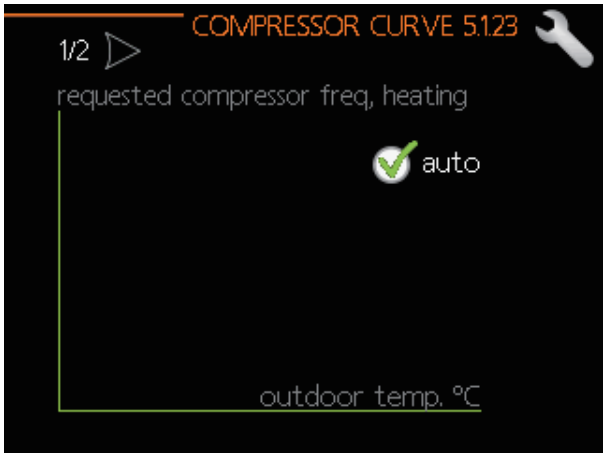


NOTE

This menu is intended for testing the heat pump according to different standards.
Use of this menu for other reasons may result in your installation not functioning as intended.

This menu contains several sub-menus, one for each standard.

Menu 5.1.23 - compressor curve



Set wether the compressor in the heat pump should work to a particular curve under specific requirements or if it should work to predefined curves.

You can set a curve for each operation mode (heat, hot water, cooling, etc.) by unclicking "auto", turning the control knob until a temperature is marked and pressing OK. You can set at what temperature max-min frequencies will occur.

This menu consists of several windows (one for each operation mode). Use the navigation arrow in the top left corner to change between windows.

CAUTION

The compressor curves can only be edited by qualified personnel

CAUTION

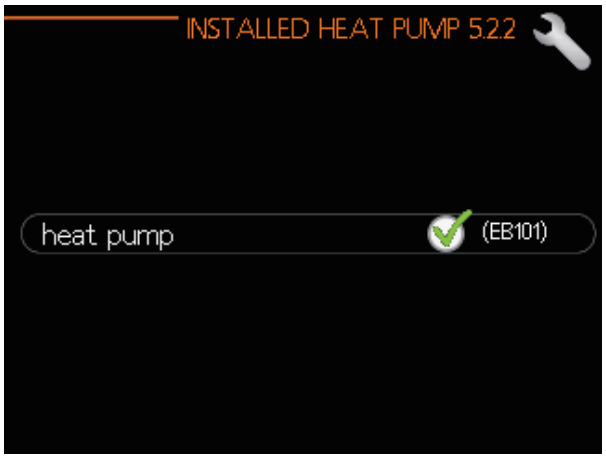
This menu is only displayed if HMM100 is connected to a heat pump with inverter controlled compressor

Menu 5.2 - System settings

Make different settings for your installation here, e.g activate the connected heat pump and which accessories are installed.

Menu 5.2.2 - Installed heat pump

RC-HY20-W



RC-HY40-W, HMM100, HBM140/140H

If a heat pump is connected to the master installation, set it here.

For RC-HY40-W is it possible to select more than one slave (if connected). For HMM100 and HBM140/140H is it possible to select only one slave.

There are two was of activating connected slaves. You can either mark the alternative on the list or use the automatic function “search installed slaves”.

Menu 5.2.3 - docking (RC-HY40-W, HMM100, HBM140/140H)

Enter how your system is docked regarding pipes, for example to hot water heating and heating the building.

This menu as a docking memory which means the control system remembers how a particular reversing valve is docked and automatically enters the correct docking the next time you use the same reversing valve.

Slave: here you select for which heat pump the docking is to be made.

Compressor: select if the compressor in the heat pump is blocked (factory setting), or standard (docked for example to pool heating, hot water charging and heating the building).

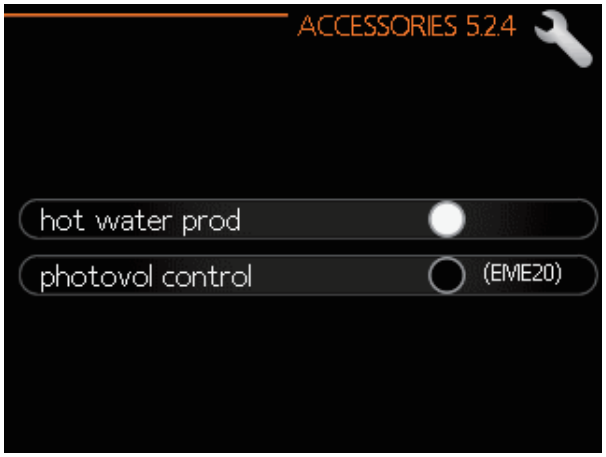
Marking frame: move around the marking frame using the control knob. Use the OK button to select what you want to change and to confirm setting is the options box that appears to the right.

Workspace for docking: the system docking is drawn here.

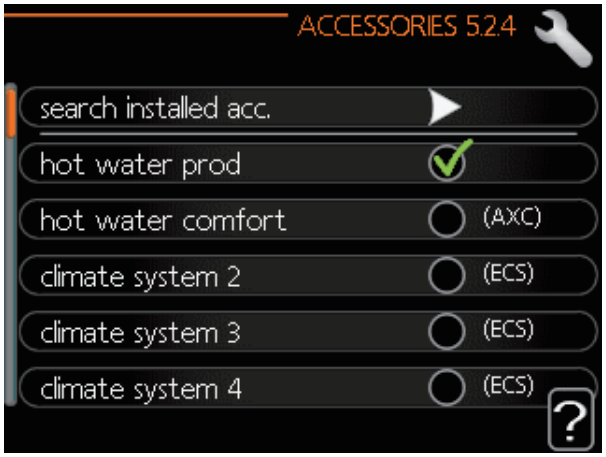
Symbol	Description
	Compressor (blocked)
	Compressor (standard)
	Reversing valves for hot water, cooling or pool heating. The designations above the reversing valve indicate whre is electrically connected (EB101 = Slave 1, etc).
	Hot water charging
	Pool 1
	Pool 2
	Heating (heating the building, includes any extra climate system)
	Cooling

Menu 5.2.4 - Accessories

RC-HY20-W



RC-HY40-W, HMM100, HBM140/140H



Set which accessories are installed on the installation here.

If the water heater is connected, hot water charging must be activated here.

You can either mark the alternative in the list or use the automatic function “search installed acc.”.

Mark “search installed acc.” and press the OK button to automatically find connected accessories.

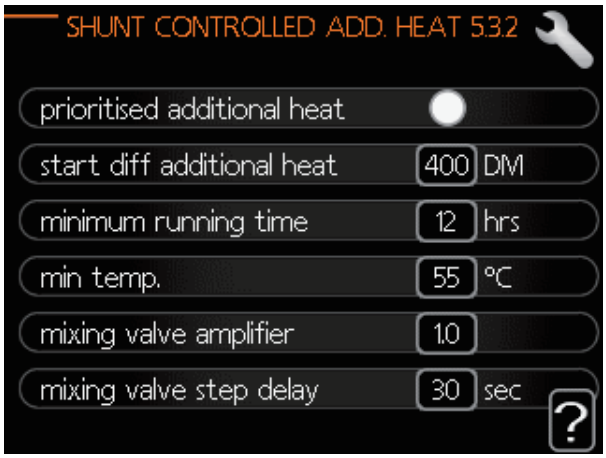
In case of HMM100, "hot water prod" function is hidden

or this menu as if needs to be always enabled.

Menu 5.3 - Accessories (RC-HY40-W, HMM100, HBM140/140H)

The operating settings for accessories that are installed and activated are made in the sub-menus for this.

Menu 5.3.2 - Shunt controlled additional heat



prioritised additional heat

Setting range: ON/OFF
Factory setting: OFF

minimum running time

Setting range: 0 - 48 h
Default value: 12 h

min temp.

Setting range: 5 - 90°C
Default value: 55°C

mixing valve amplifier

Setting range: 0.1 - 10.0
Default value: 1.0

mixing valve step delay

Setting range: 10 - 300 s
Default value: 30 s

Set when the addition is to start, the minimum run time and the minimum temperature for external addition with shunt here. External addition with shunt is for example a wood/oil/gas/pellet boiler.

You can set shunt valve amplification and shunt valve waiting time.

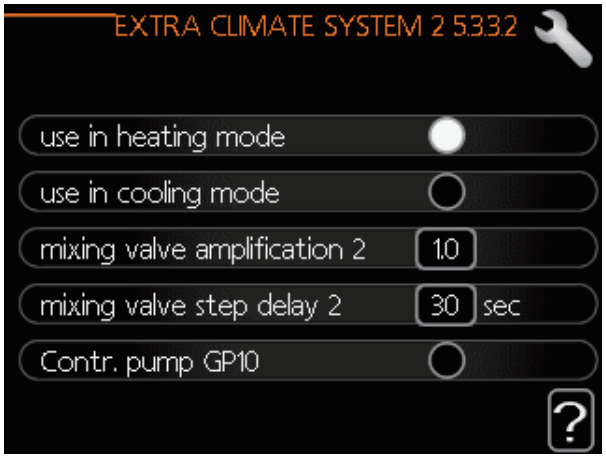
Selecting "prioritised additional heat" uses the heat from the external additional heat instead of the heat pump.

The shunt valve is regulated as long as heat is available,

otherwise the shunt valve is closed.

See accessory installation instructions for function description.

Menu 5.3.3 - Extra climate system



use in heating mode

Setting range: ON/OFF
Factory setting: ON

use in cooling mode

Setting range: ON/OFF
Factory setting: OFF

mixing valve amplifier

Setting range: 0.1 - 10.0
Default value: 1.0

mixing valve step delay

Setting range: 10 - 300 s
Default value: 30 s

Here you can select which climate system (2-8) you wish to set. In the next menu you can make settings for the climate system that you have selected. if this function is activated, you can set "cooling flow temp. at +20°C" and "cooling flow temp. at +40°C" for each climate system where the function is activated.

CAUTION

This setting option only appears if "cooling permitted" is activated in menu 5.11.1.1.

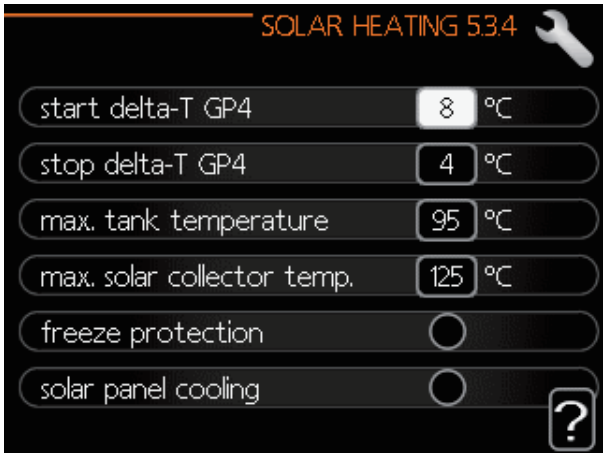
The shunt amplification and shunt waiting time for the different extra climate systems that are installed are also set here.

Activation/deactivation of "Contr. pump GP10" does not affect"extra climate system" because the accessory's circulation pump is controlled manually.

There is the option to set a speed on the accessory's circulation pump GP10.

See the accessory installation instructions for function description.

Menu 5.3.4 - Solar heating



start delta-T GP4

Setting range: 1 - 40°C
Default value: 8°C

stop delta-T GP4

Setting range: 1 - 40°C
Default value: 4°C

max. tank temperature

Setting range: 5 - 110°C
Default value: 95°C

max. solar collector temp.

Setting range: 80 - 200°C
Default value: 125°C

freeze protection

Setting range: ON/OFF
Factory setting: OFF

solar panel cooling

Setting range: ON/OFF
Factory setting: OFF

start delta-T, stop delta-T: Here you can set the temperature difference between solar panel and solar tank at which the circulation pump (GP4) will start and stop.

max. tank temperature, max. solar collector temp.:

Here you can set the maximum temperatures in the tank and solar panel respectively at which the circulation pump will stop. This is to protect against excess temperatures in the solar tank.

If the unit has an anti-freeze function and/or solar panel cooling you can activate them here. When the function has been activated, you can make settings for them.

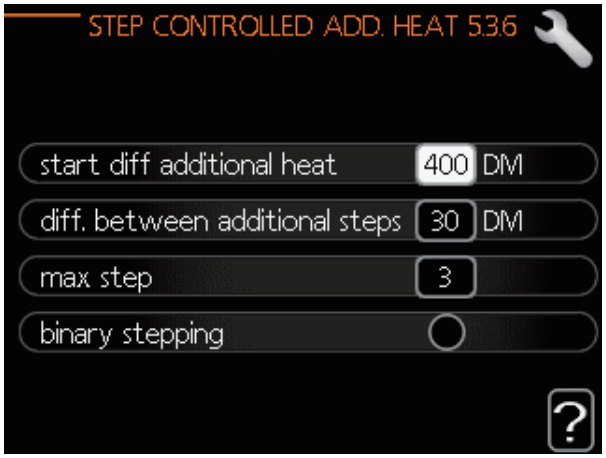
freeze protection

anti-freeze temperature: Here you can set the temperature in the solar panel at which the circulation pump is to start prevent freezing.

solar panel cooling

start solar collector cooling: If the temperature in the solar panel is higher than this setting, at the same time as the temperature in the solar tank is higher than the set maximum temperature, the external function for cooling is activated.

Menu 5.3.6 - Step controlled add. heat



start diff. additional heat

Setting range: 0 - 2000 DM
Default value: 400 DM

diff. between additional steps

Setting range: 0 - 1000 DM
Default value: 30 DM

max step

Setting range (binary stepping deactivated): 0 - 3
Setting range (binary stepping activated): 0 - 7
Default value: 3

binary stepping

Setting range: ON/OFF
Factory setting: OFF

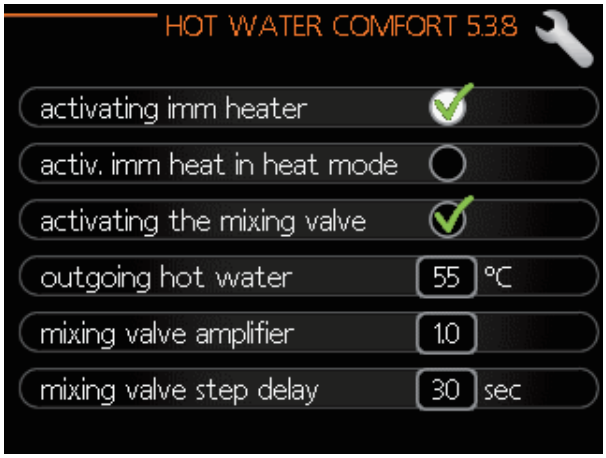
Make settings for step controlled addition here. Step controlled addition is for example an external electric boiler.

It is possible, for example, to select when the additional heat is to start, to set the maximum number of permitted steps and whether binary stepping is to be used.

When binary stepping is deactivated (OFF), the settings refer to linear stepping.

See the accessory installation instructions for function description.

Menu 5.3.8 - Hot water comfort



activating imm heater

Setting range: ON/OFF
Factory setting: OFF

activating imm heat in heat mode

Setting range: ON/OFF
Factory setting: OFF

activating the mixing valve

Setting range: ON/OFF
Factory setting: OFF

outgoing hot water

Setting range: 40 - 65°C
Default value: 55°C

mixing valve amplifier

Setting range: 0.1 - 10.0
Default value: 1.0

mixing valve step delay

Setting range: 10 - 300 s
Default value: 30 s

Make settings for hot water comfort here.

activating imm heater: The immersion heater is activated here if installed in the water heater.

activating imm heat in heat mode: Activate here whether the immersion heater in the tank (required if the alternative above is activated) will be permitted to charge hot water, if the compressors in the heat pump prioritise heating.

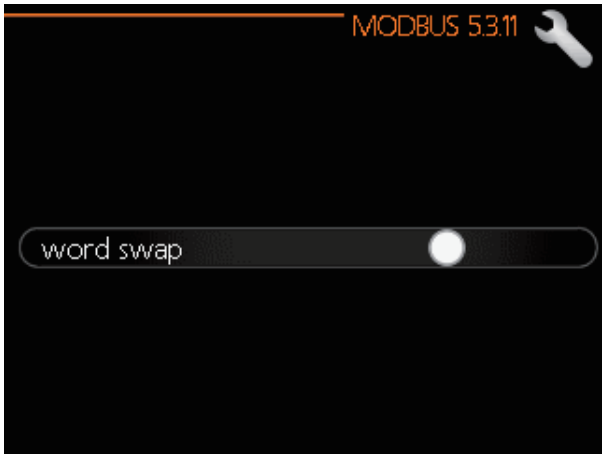
activating the mixing valve: Activate here whether a mixer valve for limiting the temperature of hot water from the water heater is installed.

If this alternative has been activated, you can set the outgoing hot water temperature, shunt amplification and shunt waiting time for the mixer valve.

outgoing hot water: Set the temperature at which the mixing valve is to restrict hot water from the water heater.

See the accessory installation instructions for function description.

Menu 5.3.11 - Modbus



address

Factory setting: address 1

word swap

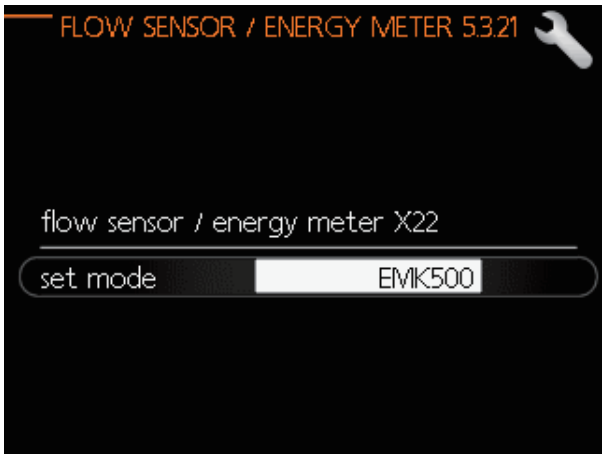
Factory setting: not activated

As from MODBUS40M version 10, the address can be set between 1-247. Earlier versions have a fixed address (address 1).

If you select "word swap", you will get "word swap" instead of the preset standard "big endian".

See the accessory installation instructions for function description.

Menu 5.3.21- Flow sensor/energy meter



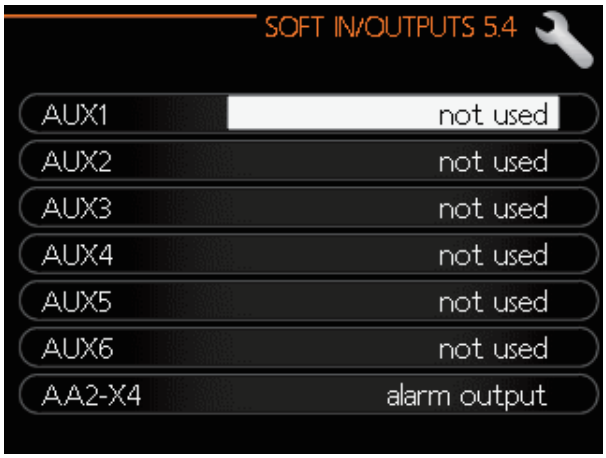
flow sensor

See option: EMK500, EMK310/300, EMK150
Factory setting: EMK310/300

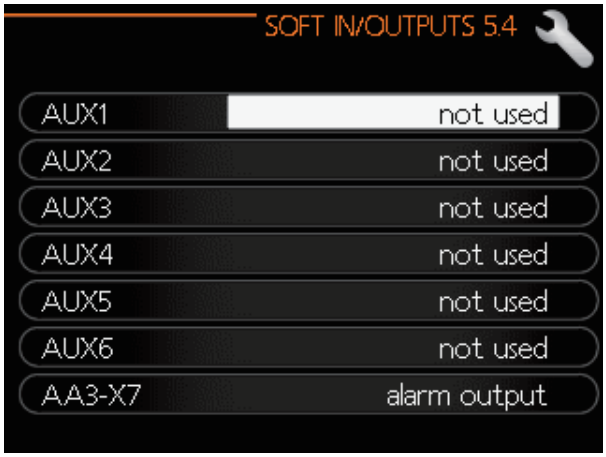
Here you select which flow sensor is used for the energy measurement.

Menu 5.4 – Soft in/outputs

RC-HY20-W



RC-HY40-W, HMM100, HBM140/140H



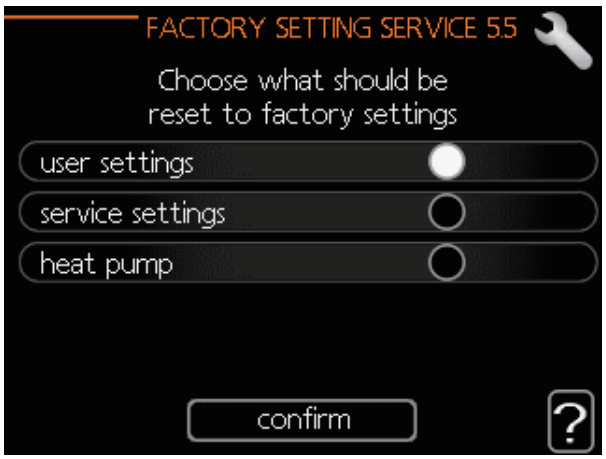
You can set the function of in/output for each terminal (AUX1-6 and output).

Position of the terminal depends on the type of controller.

RC-HY20-W: port 11-18 on X2 terminal (AUX 1-6), X4 terminal on AA2 board (output).

RC-HY40-W, HMM100, HBM140/140H: port 9-14 on terminal X6 and port 1-4 on X2 terminal on AA3 board (AUX 1-6), X7 terminal on AA3 board (output).

Menu 5.5 - Factory setting service

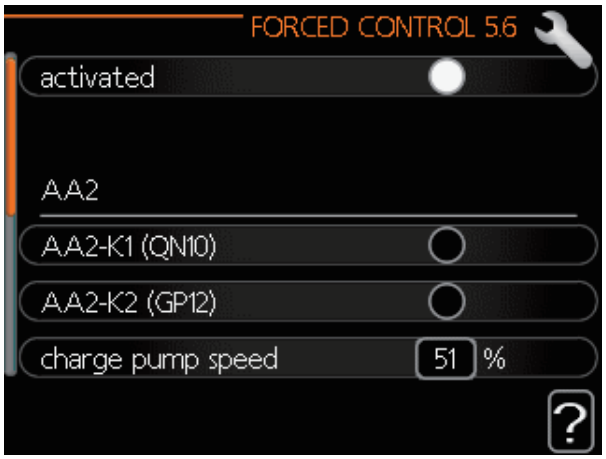


All settings can be reset (including settings available to the user) to default values here.

NOTE

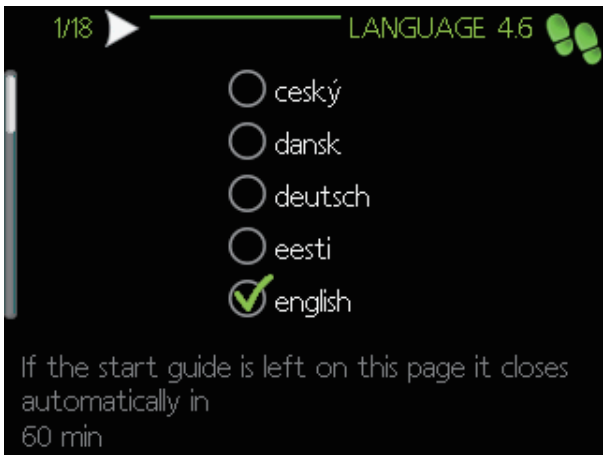
When resetting, the start guide is displayed the next time the controller is restarted.

Menu 5.6 - Forced control



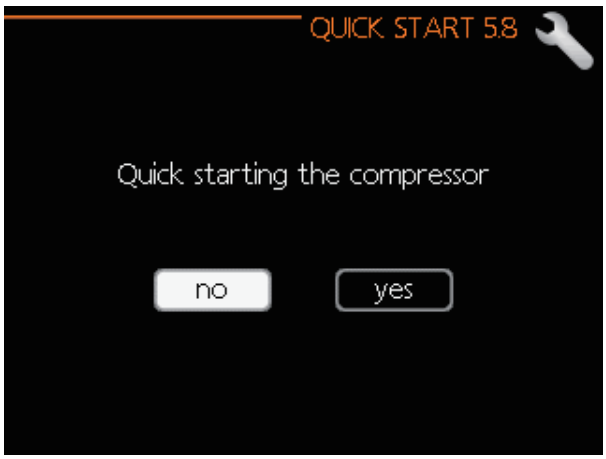
You can force control the different components in the controller and any connected accessories here.

Menu 5.7 - Start guide



When the controller is started for the first time the start guide starts automatically. Start it manually here.

Menu 5.8 - Quick start



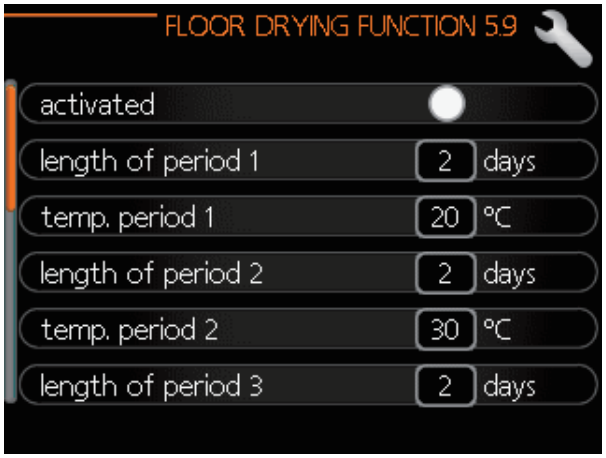
It is possible to start the compressor from here.

CAUTION

There must be heating or hot water demand to start the compressor.

Do not quick start the compressor too many times over a short period of time as this may damage the compressor and its surrounding equipment.

Menu 5.9 - floor drying function



length of period 1-7

Setting range: 0-30 days
Factory setting, period 1-3, 5-7: 2 days
Factory setting, period 4: 3 days

temp. period 1-7

Setting range: 15-70°C
Default value:

Temp. period 1	20°C
Temp. period 2	30°C
Temp. period 3	40°C
Temp. period 4	45°C
Temp. period 5	40°C
Temp. period 6	30°C
Temp. period 7	20°C

Set the function for underfloor drying here.

You can set up to seven period times with different calculated flow temperatures. If less than seven periods are used, set remaining period times to 0 days.

Mark the active window to activate the underfloor drying function. A counter at the bottom shows the number of days the the function has been active.

TIP

If operating mode "add. heat only" is to be used, select it in menu 4.2.

Menu 5.10 - change log

Read off any previous changes to the control system here.

The date, time and ID no. (unique to certain settings) and the new set value is show for every change.

NOTE

The change log is saved at restart and remains unchanged after factory settings.

Menu 5.11 - Heat pump settings

Settings for installed heat pumps can be made in the sub-menus.

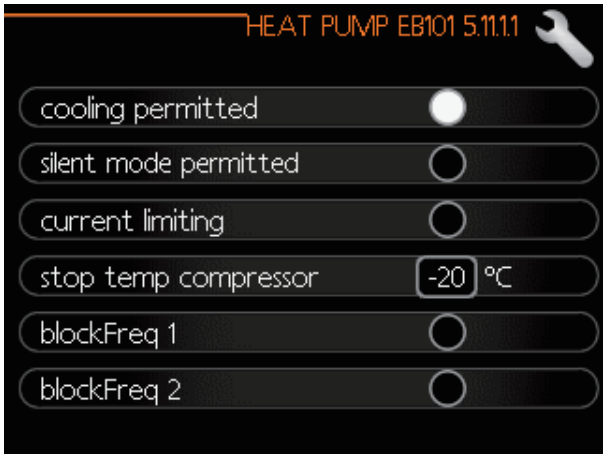
Menu 5.11.1 - EB101 - 5.11.8 - EB101

Make settings for the installed slaves here.

NOTE

The HMM100 unit cannot be cascaded with heat pumps.

Menu 5.11.1.1- Heat pump EB101



Make settings for the heat pump installed here.

Cooling permitted: Here you can set whether the cooling function is to be activated for the heat pump.

Silent mode permitted: Set whether silent mode is to be activated for the heat pump.

Current limit: Set whether the current limiting function is to be activated for the heat pump here. During the active function you can limit the value of maximum current.

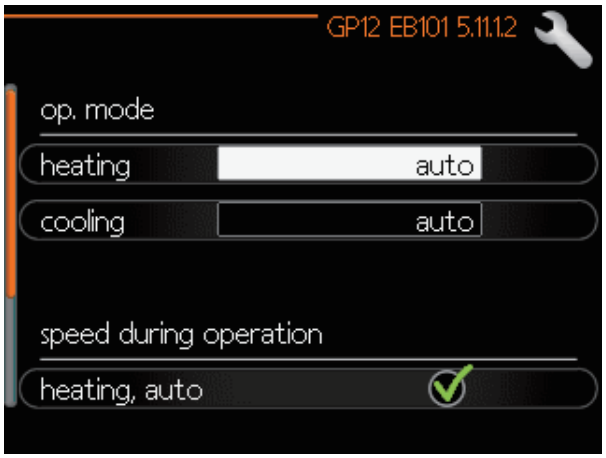
Setting range: 6 - 32 A
Factory setting: 32 A

Stop temperature compressor: Here you can limit the value for the set outdoor temperature down to teh value the heat pump is to work.

Setting range: -25 - -2°C
Factory setting: -25°C

BlockFreq1/2: Set a frequency range within the heat pump may work here.

Menu 5.11.1.2 - GP12 EB101



op. mode

Heating, cooling
Setting range: auto/intermittent
Default value: auto

Set the operating mode for the charge pump here.

Auto: runs according to the current operating mode for RC-HY20/40-W.

Intermittent: starts and stops 20 seconds before and after the compressor in the heat pump.

speed during operation

Heating, hot water, pool, cooling
Setting range: auto/manual
Default value: auto

Manual setting

Setting range: 1 - 100%
Default value: 70%

Speed in wait mode

Setting range: 1 - 100%
Default value: 30%

Max. allowed speed

Setting range: 80 - 100%
Default value: 100%

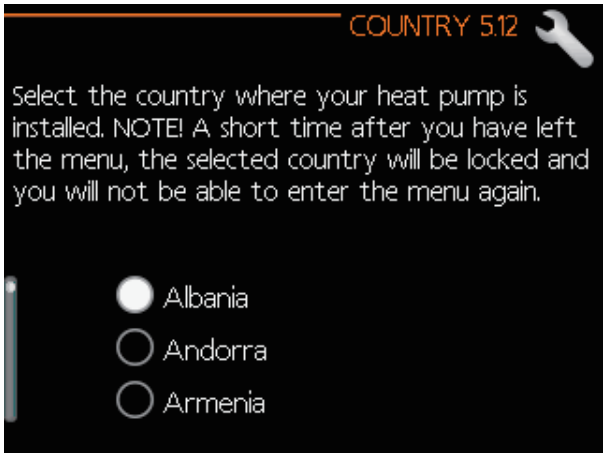
Set the speed at which the charge pump is to operate in the present operating mode. Select "auto" if the speed of the charge pump is to be regulated automatically (factory setting) for optimal operation.

If "auto" is activated for heating operation, you can also make the setting "max. allowed speed" which restricts the charge pump and does not allow it to run at a higher speed than the set value.

For manual operation of the charge pump deactivate "auto" for the current operating mode and set the value to between 1 and 100 % (the previously set value for "max. allowed speed" no longer applies).

Speed in standby mode (only used if "auto" has been selected for "Operating mode") means the charge pump operates at the set speed during the time when there is neither a need for compressor operation or additional Control heat.

Menu 5.12 - Country



Select here where the product was installed. This allows access to country specific settings in your product.

Language settings can be made regardless of this selection.

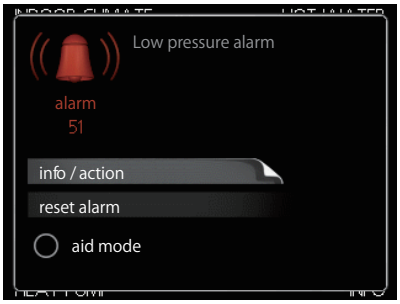
NOTE

This option locks after 24 hours, restart of display or program updating.

Disturbance in comfort

In most cases, the control module notes a malfunction and indicates this with alarms and shows instructions to rectify it in the display. See "Manage alarm" for information about managing alarms. If the malfunction does not appear in the display, or if the display is not lit, the following troubleshooting guide can be used.

Manage alarm



In the event of an alarm, some kind of malfunction has occurred, which is indicated by the status lamp changing from green continuously to red continuously. In addition, an alarm bell appears in the information window.

Alarm

In the event of an alarm with a red status lamp a malfunction has occurred that the heat pump and/or control module cannot remedy itself. In the display, by turning the control knob and pressing the OK button, you can see the type of alarm it is and reset it. You can also choose to set the installation to aid mode.

info / action Here you can read what the alarm means and receive tips on what you can do to correct the problem that caused the alarm.

reset alarm In most cases it is enough to select "reset alarm" to correct the problem that caused the alarm. If a green light illuminates after selecting "reset alarm" the alarm has been remedied. If a red light is still visible and a menu called “alarm” is visible in the display, the problem that caused the alarm remains. If the alarm disappears and then returns, see the troubleshooting section.

aid mode “aid mode” is a type of emergency mode. This means that the installation produces heat and/or hot water despite there being some kind of problem. This can mean that the heat pump's compressor is not running. In this case any electrical addition produces heat and/or hot water.

NOTE

To select aid mode an alarm action must be selected in the menu 5.1.4.

CAUTION

Selecting "aid mode” is not the same as correcting the problem that caused the alarm. The status lamp will therefore continue to be red.

NOTE

When reporting a fault, always enter the serial number of the product (14 digits) found on the nameplate (PF1).

Troubleshooting

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

Basic actions

Start by checking the following possible fault sources:

- The switch's (SF1) position.
- Group and main fuses of the accommodation.
- The property's earth circuit breaker.
- The control module's miniature circuit breaker (FA1).
- Correctly set load monitor (if installed).

Low hot water temperature or a lack of hot water

This part of the fault-tracing chapter only applies if the water heater is installed in the system.

- Closed or choked filling valve for the hot water heater.
  – Open the valve.
- Mixing valve (if there is one installed) set too low.
  – Adjust the mixer valve.
- Control module in incorrect operating mode.
  – If mode "manual" is selected, select "addition".
- Large hot water consumption.
  – Wait until the hot water has heated up. Temporarily increased hot water capacity (temporary lux) can be activated in menu 2.1.
- Too low hot water setting.
  – Enter menu 2.2 and select a higher comfort mode.
- Too low or no operating prioritisation of hot water.
  – Enter menu 4.9.1 and increase the time for when hot water is to be prioritised.

Low room temperature

- Closed thermostats in several rooms.
  – Set the thermostats to max, in as many rooms as possible. Adjust the room temperature via menu 1.1, instead of choking the thermostats.
- Control module in incorrect operating mode.
  – Enter menu 4.2. If mode "auto" is selected, select a higher value on "stop heating" in menu 4.9.2.
  – If mode "manual" is selected, select "heating". If this is not enough, select "addition".
- Too low set value on the automatic heating control.
  – Enter menu 1.1 "temperature" and adjust the offset heating curve up. If the room temperature is only low in cold weather the curve slope in menu 1.9.1 "heating curve" needs adjusting up.
- Too low or no operating prioritisation of heat.
  – Enter menu 4.9.1 and increase the time for when heating is to be prioritised.
- "Holiday mode" activated in menu 4.7.
  – Enter menu 4.7 and select "Off".
- External switch for changing the room heating activ- ated.
  – Check any external switches.
- Air in the climate system.
  – Vent the climate system.
- Closed valves to the climate system.
  – Open the valves.
- Incorrectly adjusted flow across the heat pump.
  – Check whether alarm high condenser in (163) or high condenser out (162) is in the alarm log. Follow the instructions for adjusting charge flow.

High room temperature

- Too high set value on the automatic heating control.
  – Enter menu 1.1 (temperature) and reduce the offset heating curve. If the room temperature is only high in cold weather the curve slope in menu 1.9.1 "heating curve" needs adjusting down.
- External switch for changing the room heating activated.
  – Check any external switches.

Low system pressure

- Not enough water in the climate system.
  – Top up the water in the climate system.

The compressor does not start

- There is no heating requirement.
  – The heat pump does not call on heating nor hot water.
- Temperature conditions tripped.
  – Wait until the temperature condition has been re- set.
- Minimum time between compressor starts has not been reached.
  – Wait 5 minutes and check if the compressor has started.
- Alarm tripped.
  – Follow the display instructions.

Additional heating only

If you are unsuccessful in rectifying the fault and are unable to heat the house, you can, whilst waiting for assistance, continue running the heat pump in “add. heat only”. This means that additional heating only is used to heat the house.

Set the installation to additional heat mode

1. Go to menu 4.2 op. mode.
2. Mark “add. heat only” using the control knob and then press OK button.

   Return to the main menus by pressing the Back button.

CAUTION

When commissioning without MTH air/water heat pump an alarm communication error may appear in the display.

The alarm is reset if the relevant heat pump is deactivated in menu 5.2.2 ("installed heat pump").

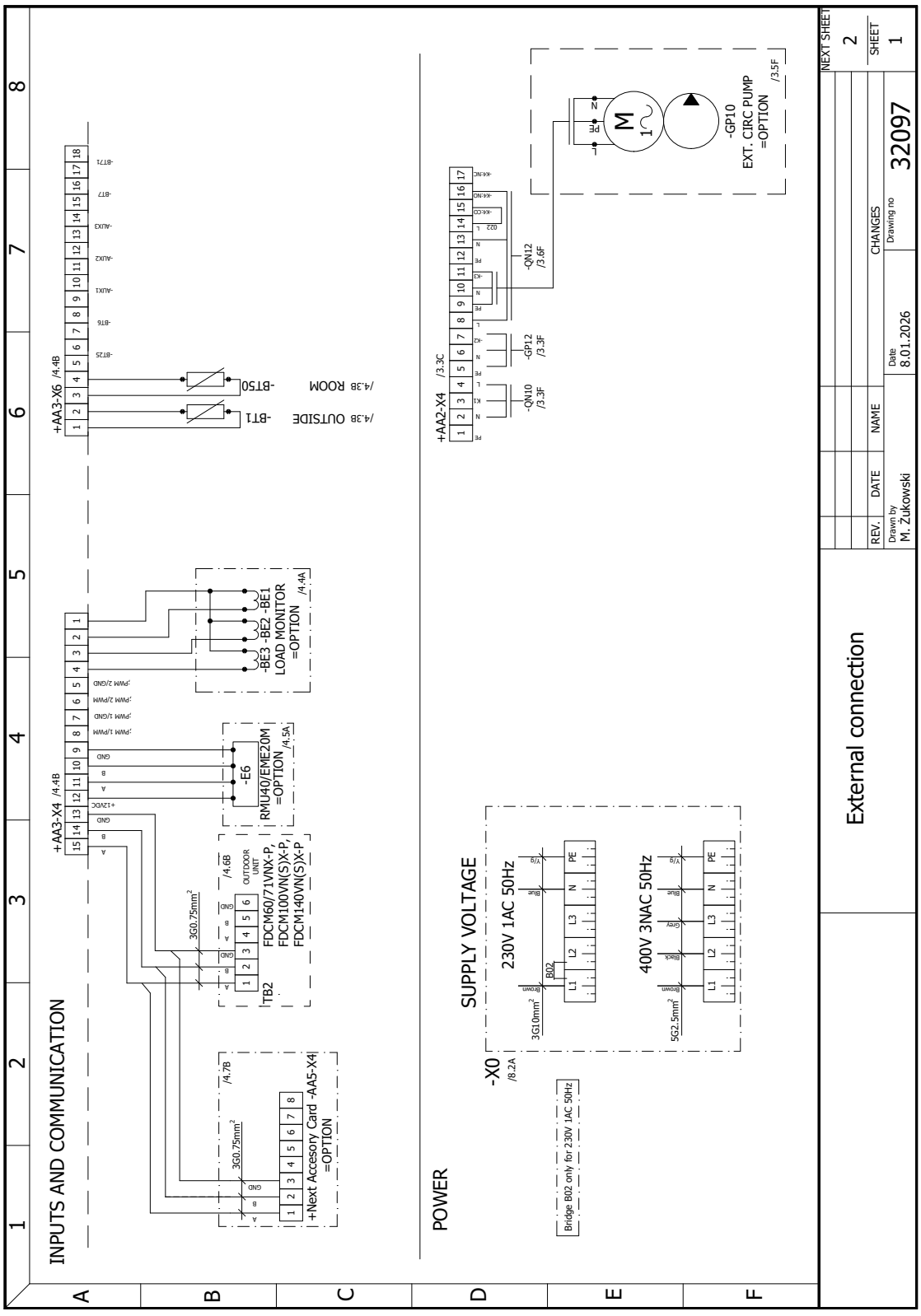
Electric circuit diagram

Outdoor unit - FDCM60/71VNX-P, FDCM100VN(S)X-P, FDCM140VN(S)X-P

The wiring diagram is delivered with the unit, located at the inside of service panel.

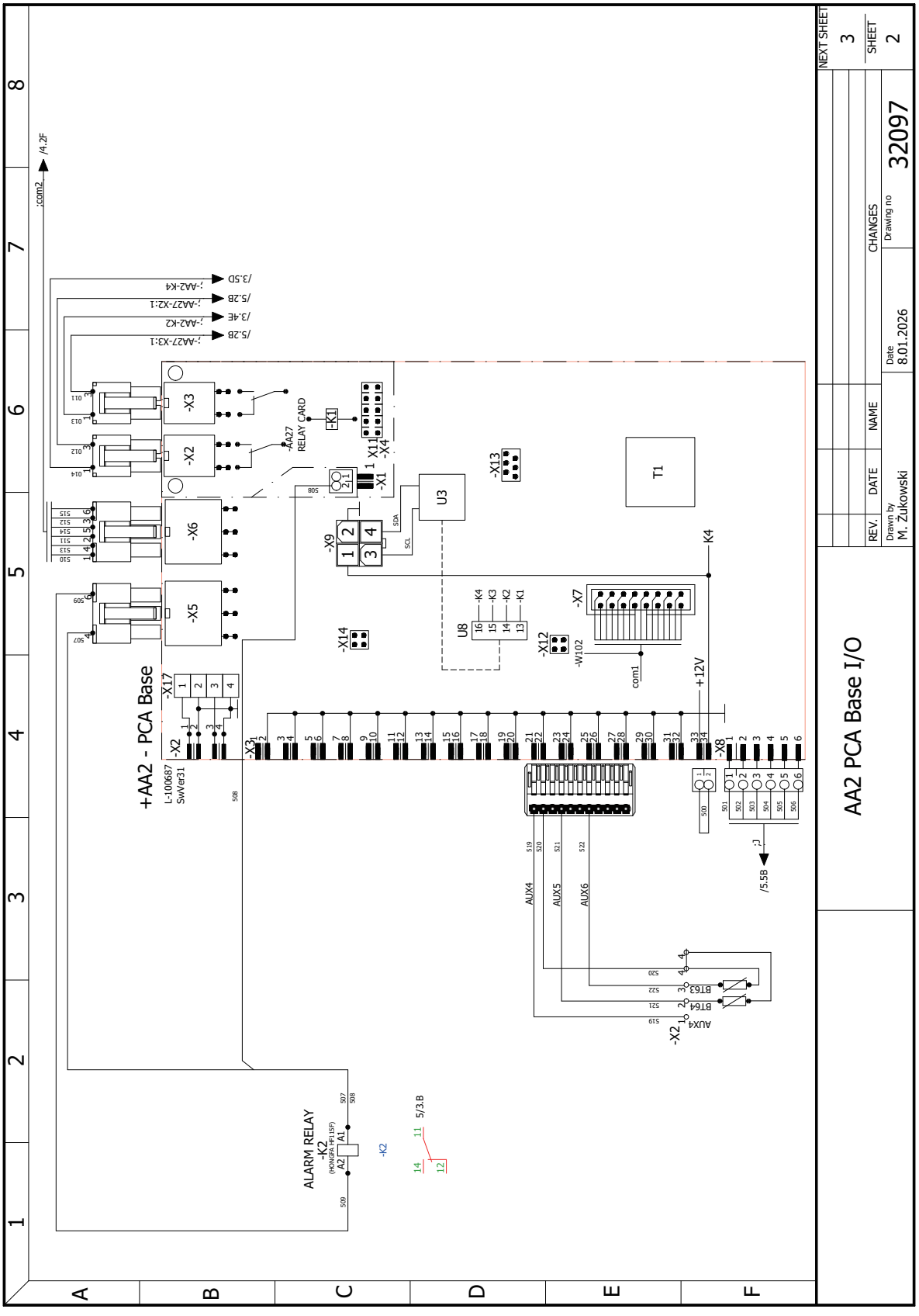
HMM100

sheet 1



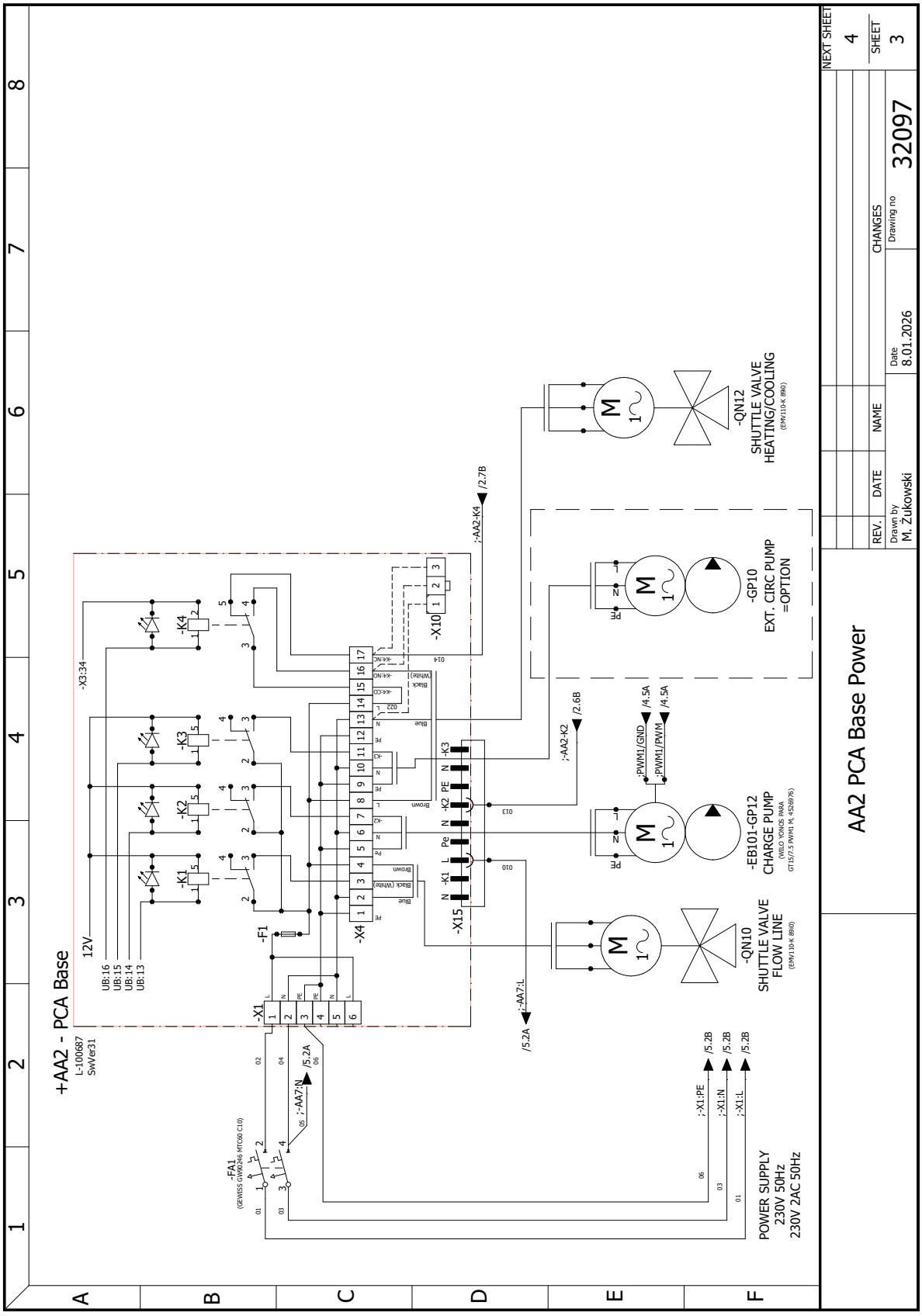
HMM100

sheet 2



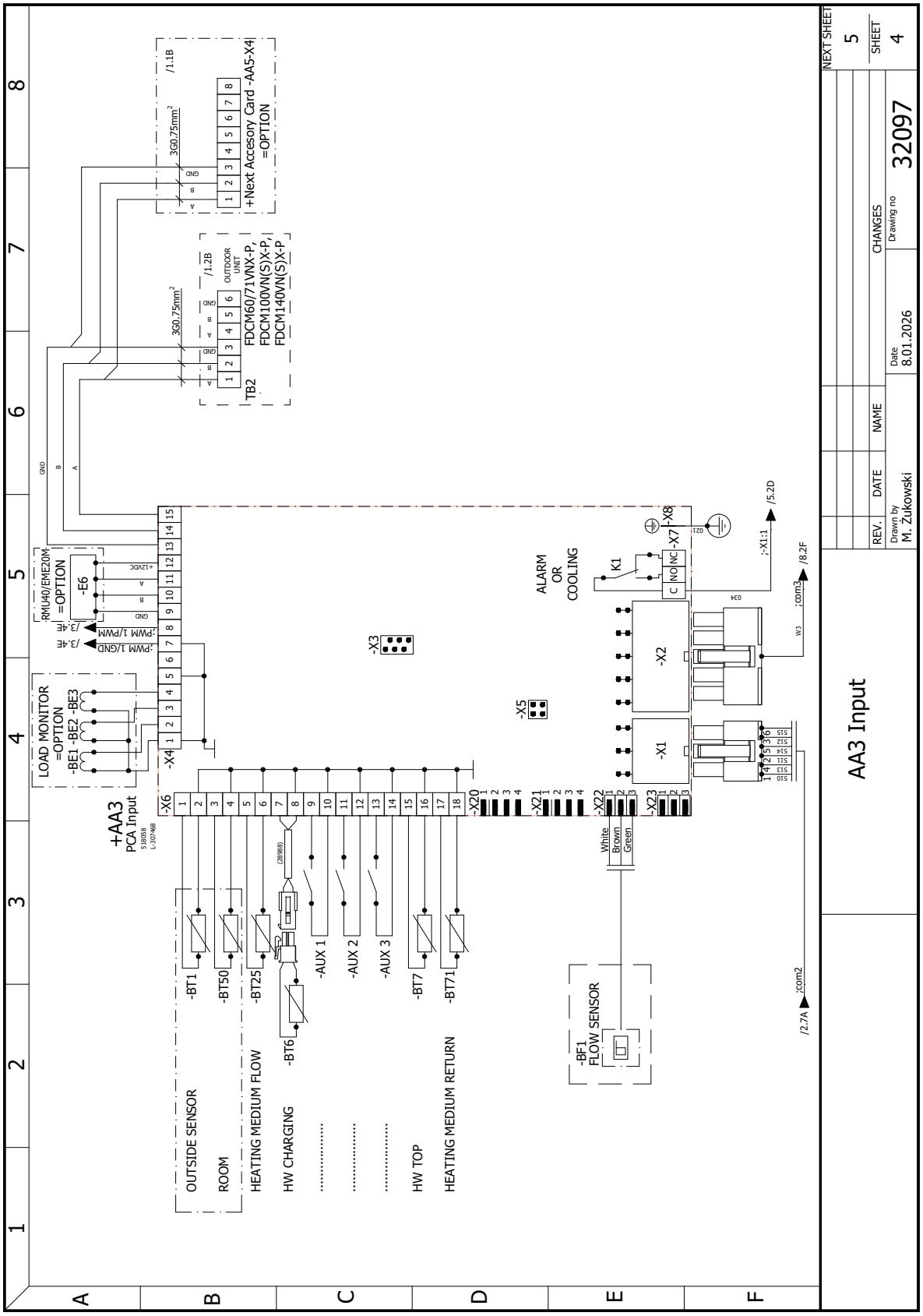
HMM100

sheet 3



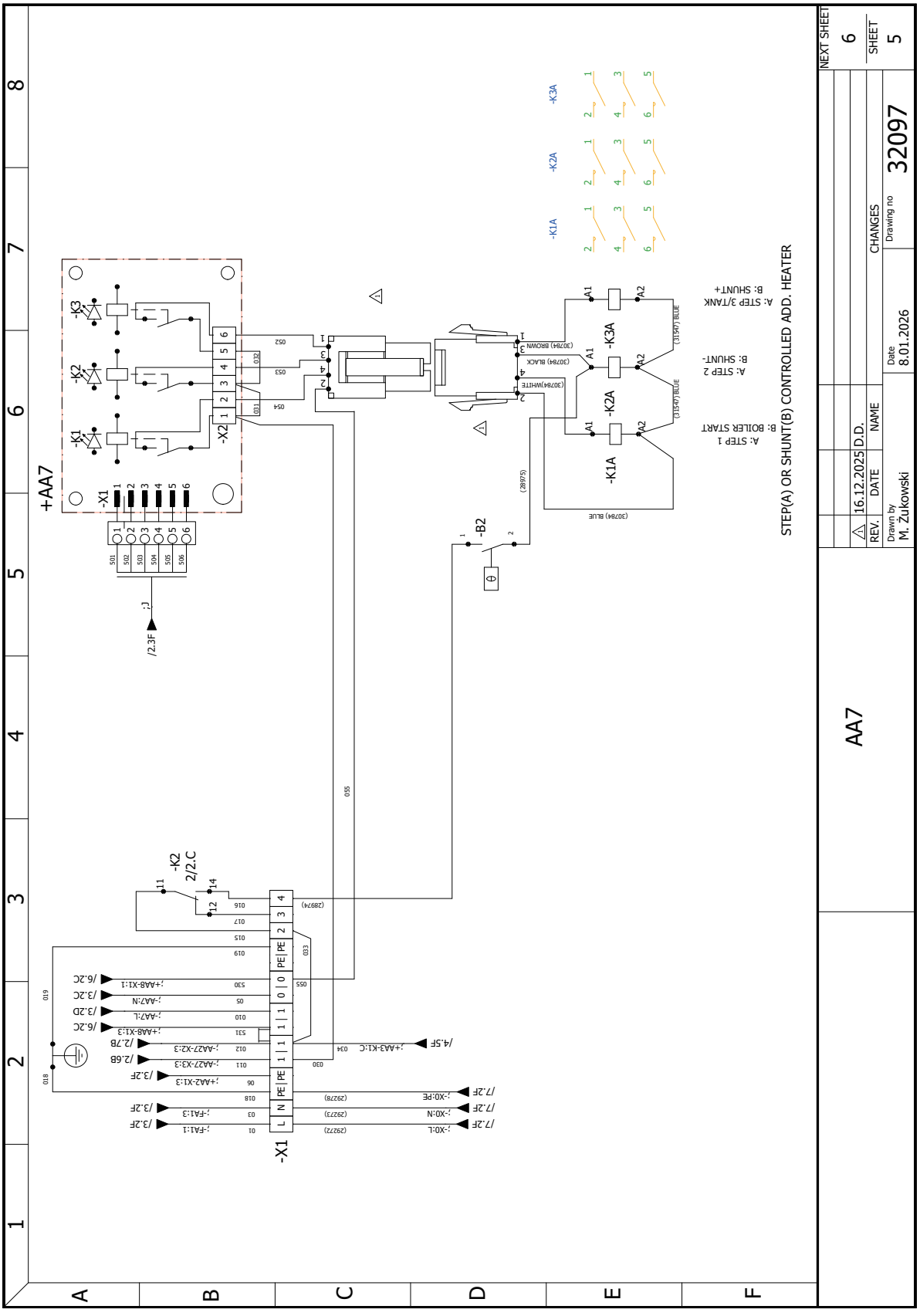
HMM100

sheet 4



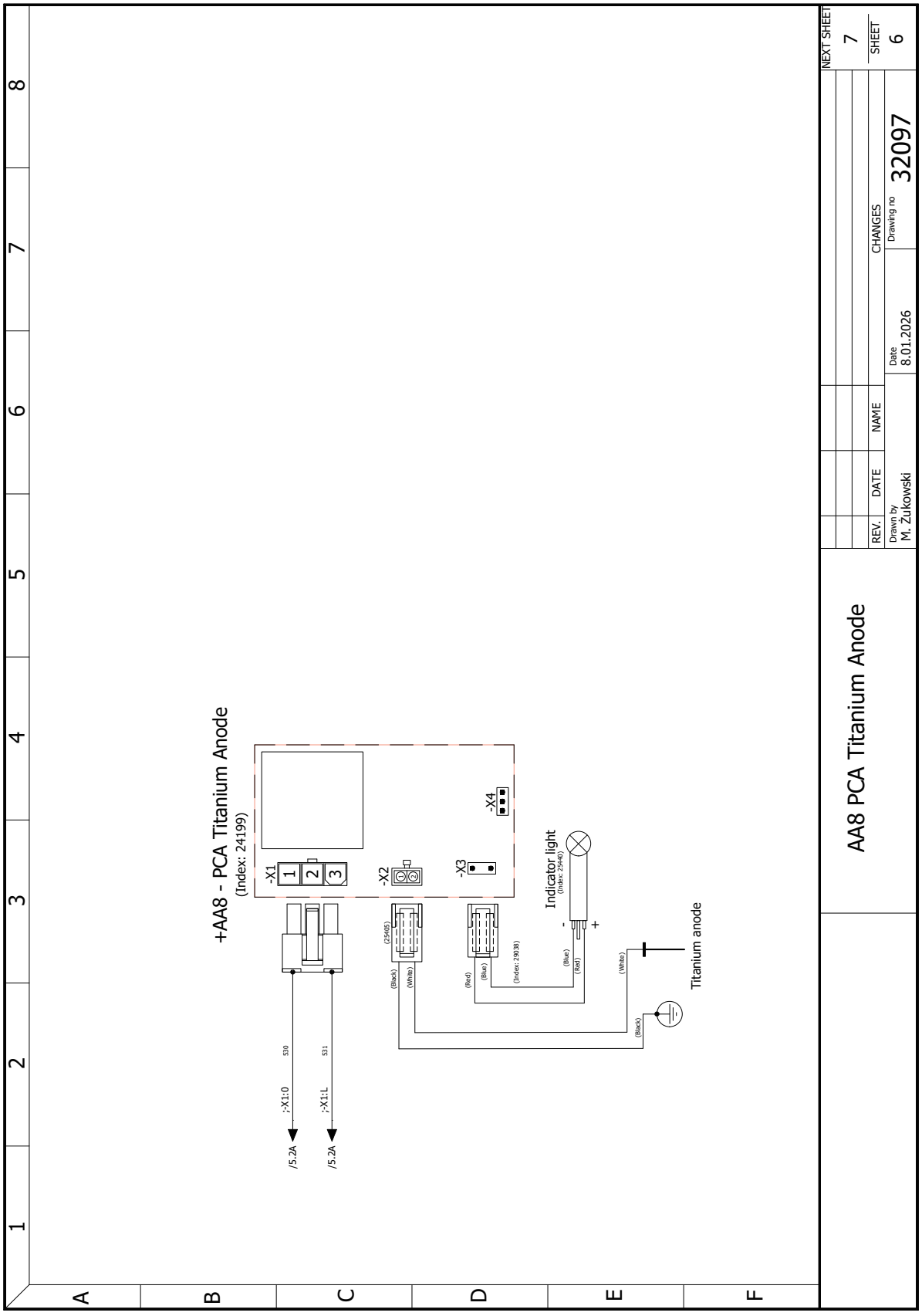
HMM100

sheet 5



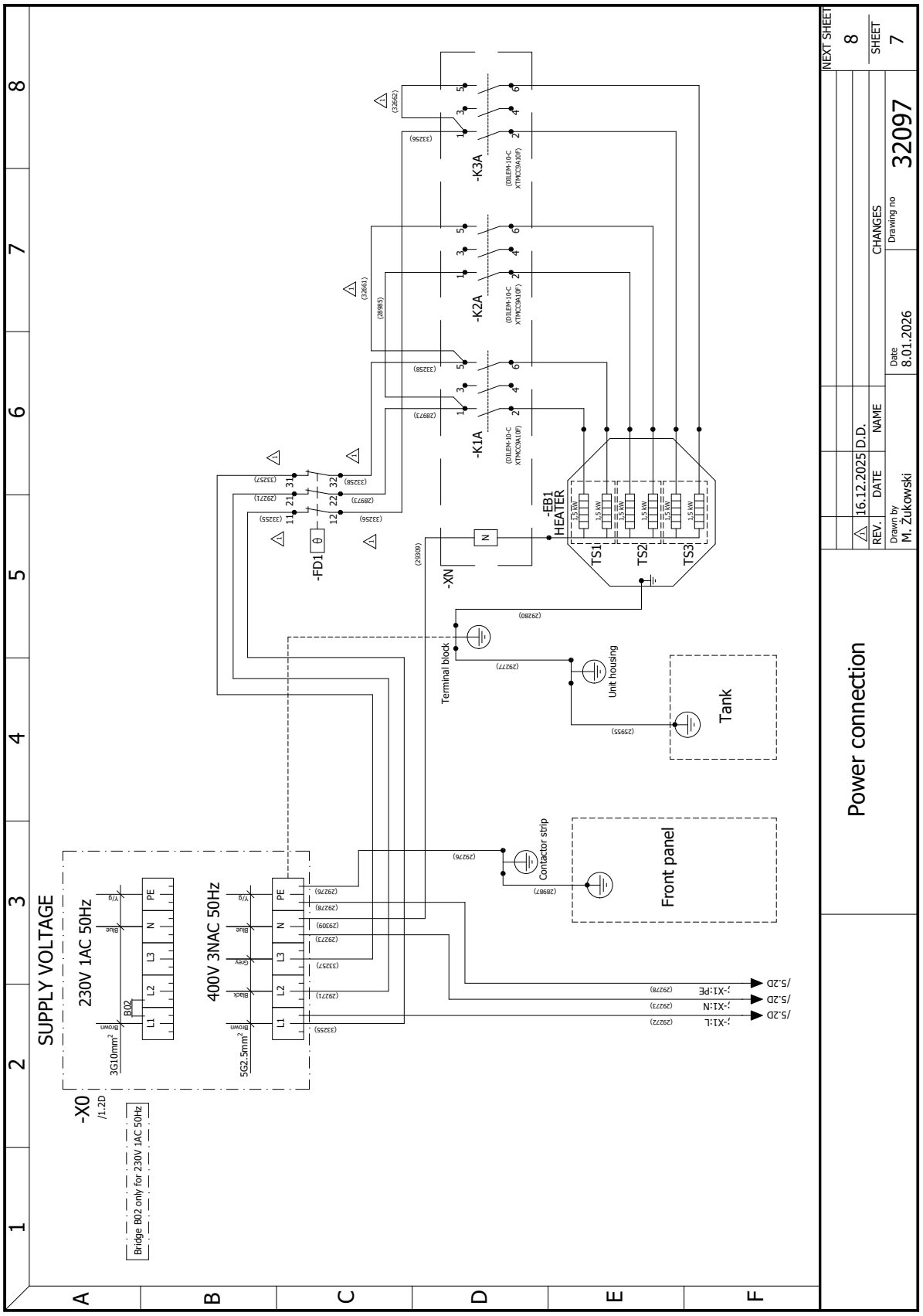
HMM100

sheet 6



HMM100

sheet 7



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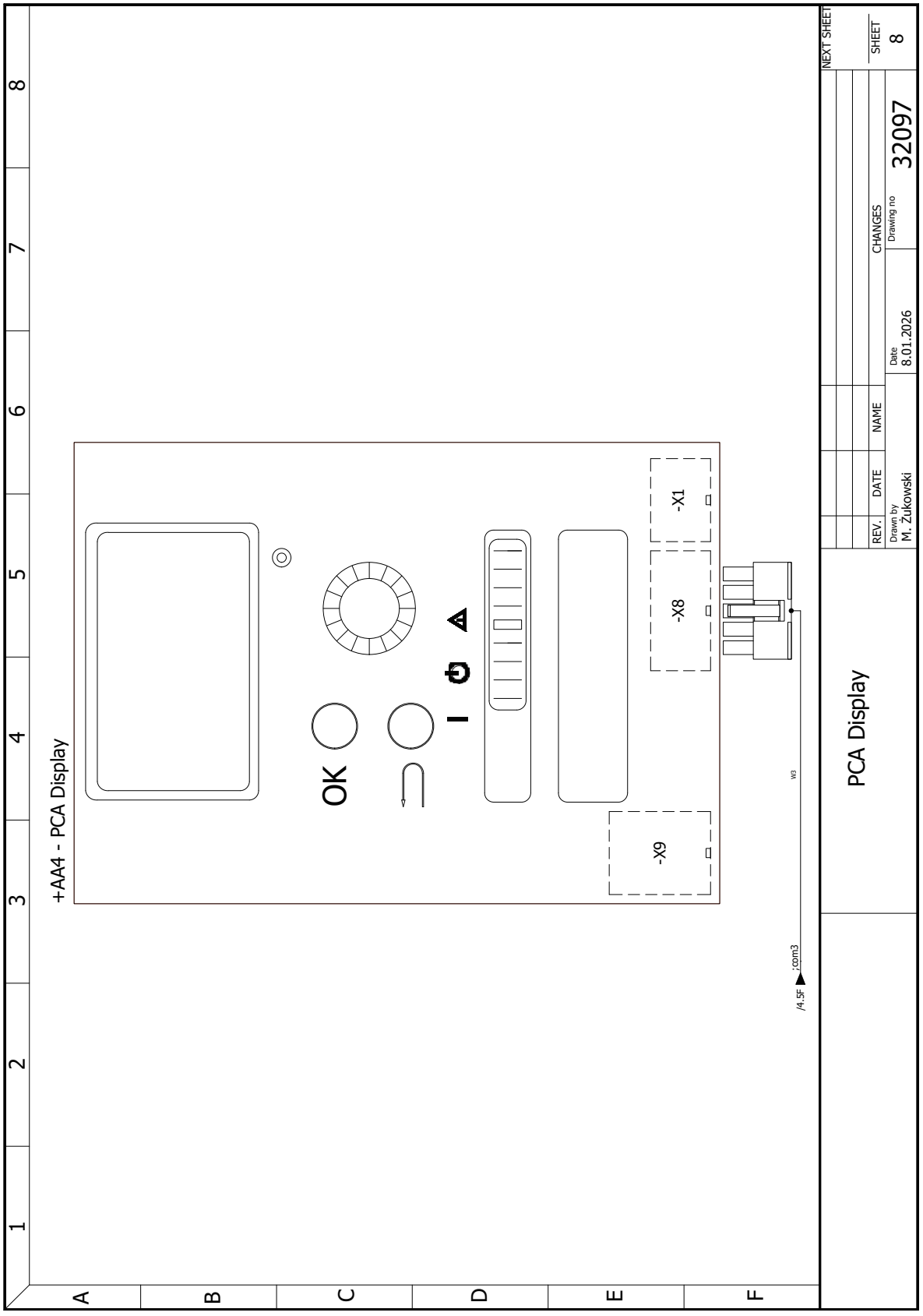
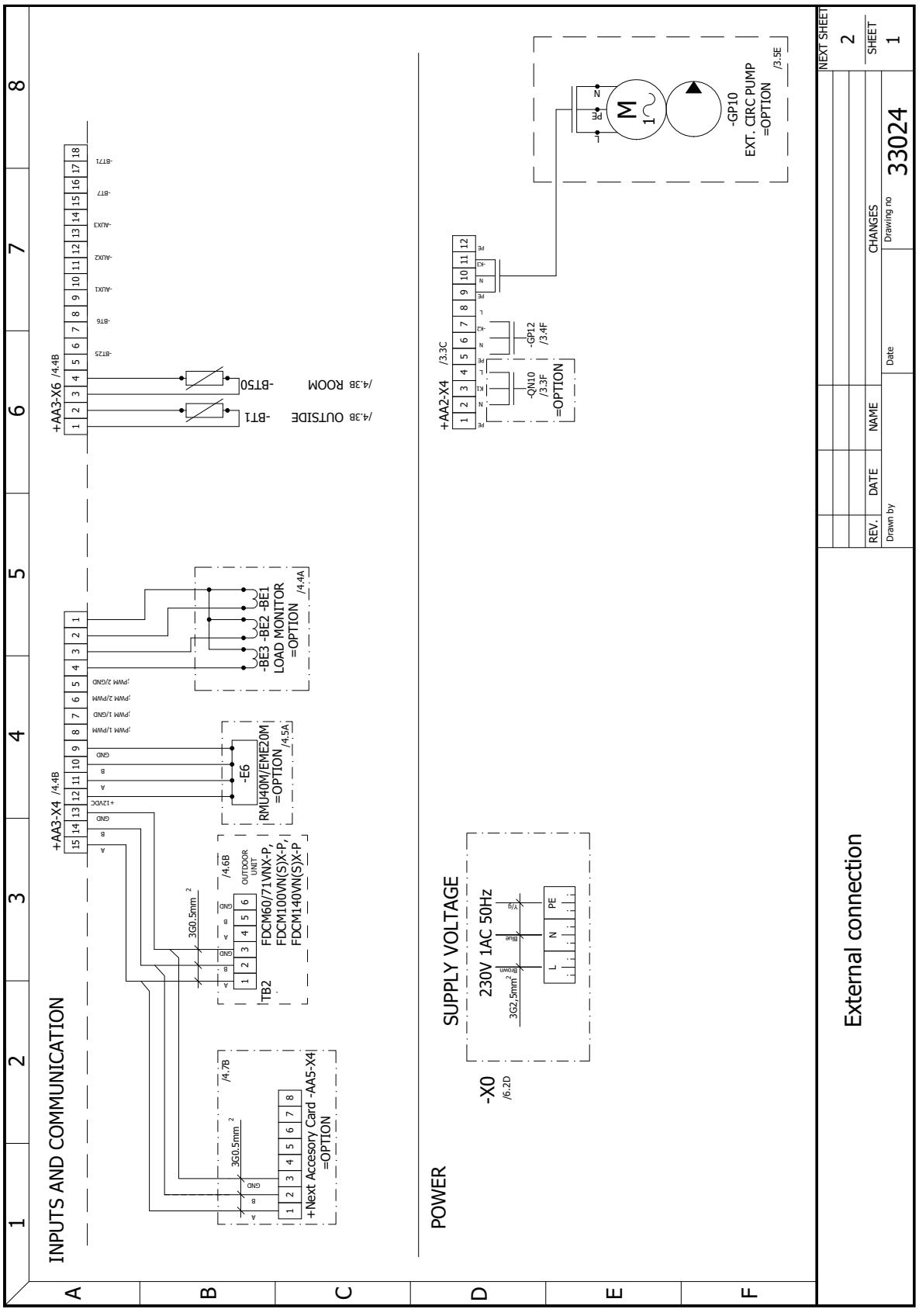
sheet 8



HBM140

sheet 1



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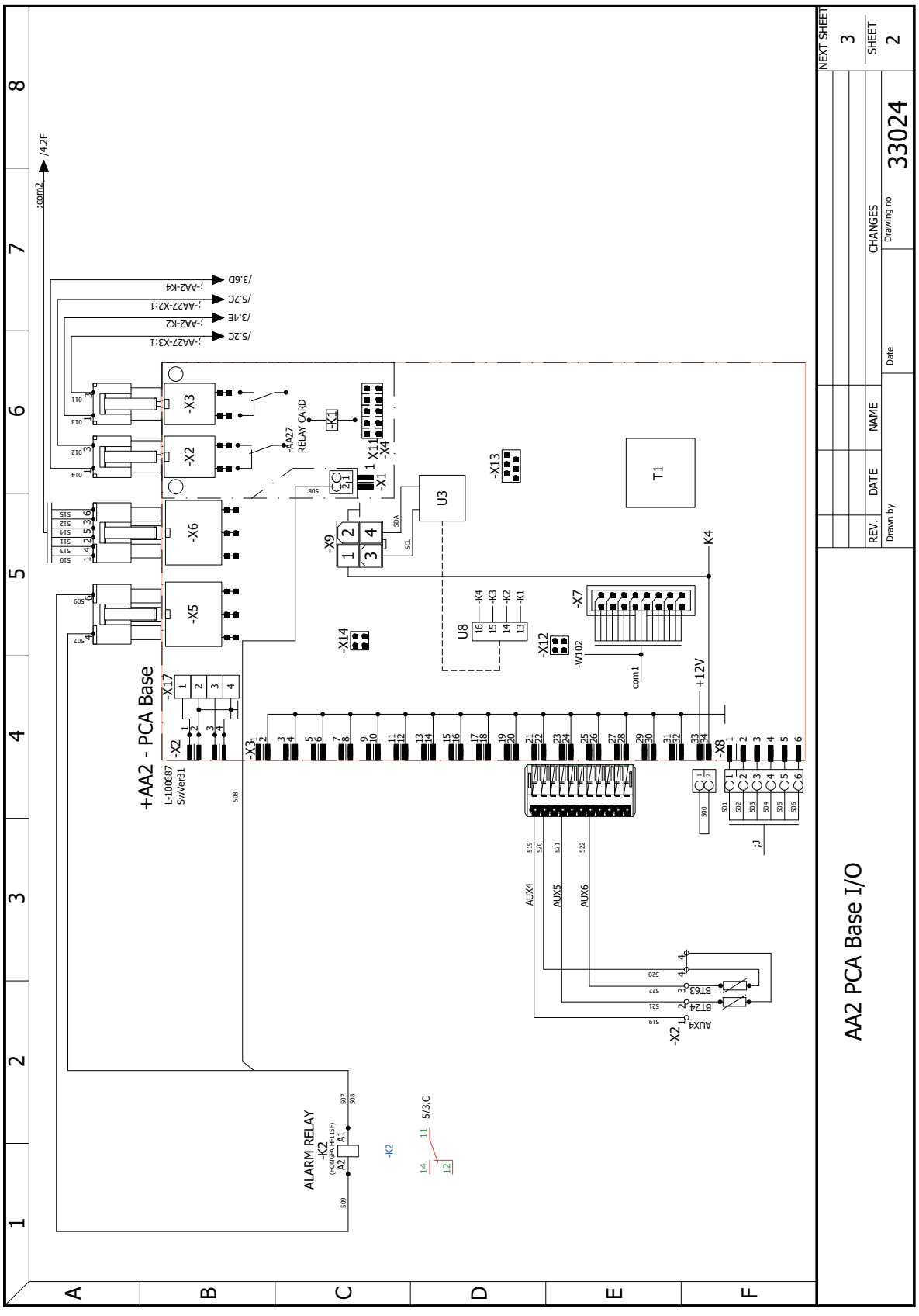
sheet 2



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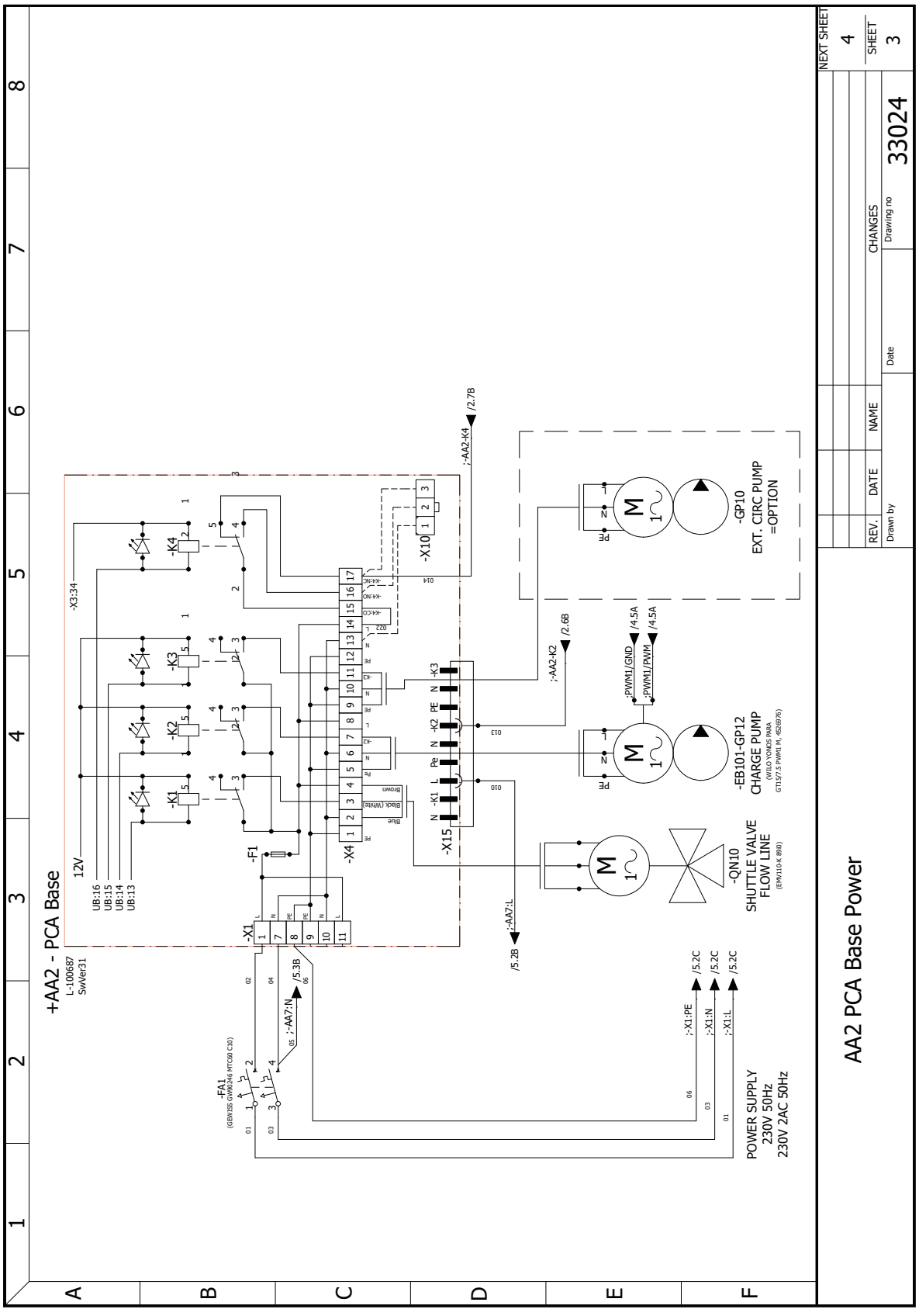

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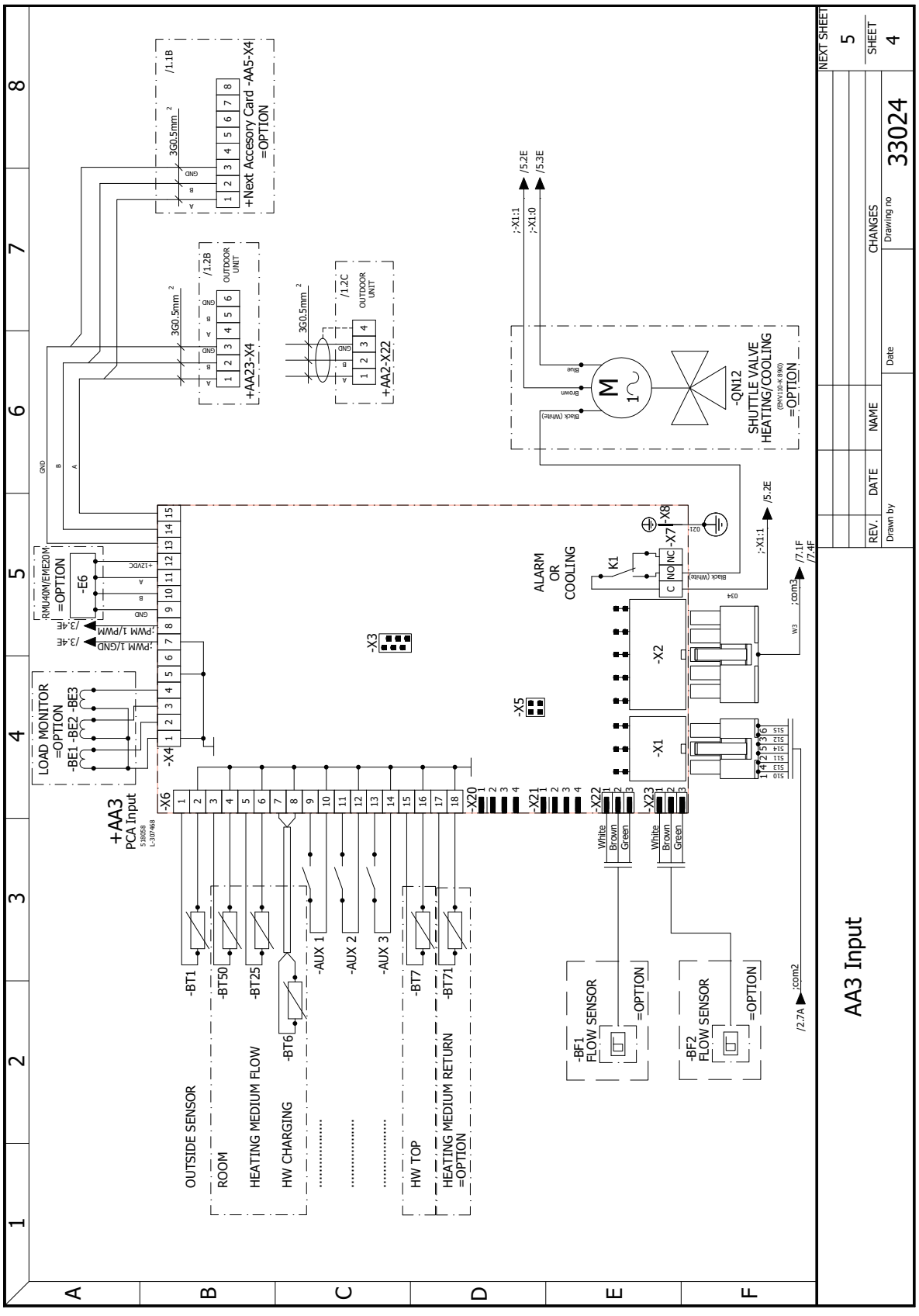
sheet 4



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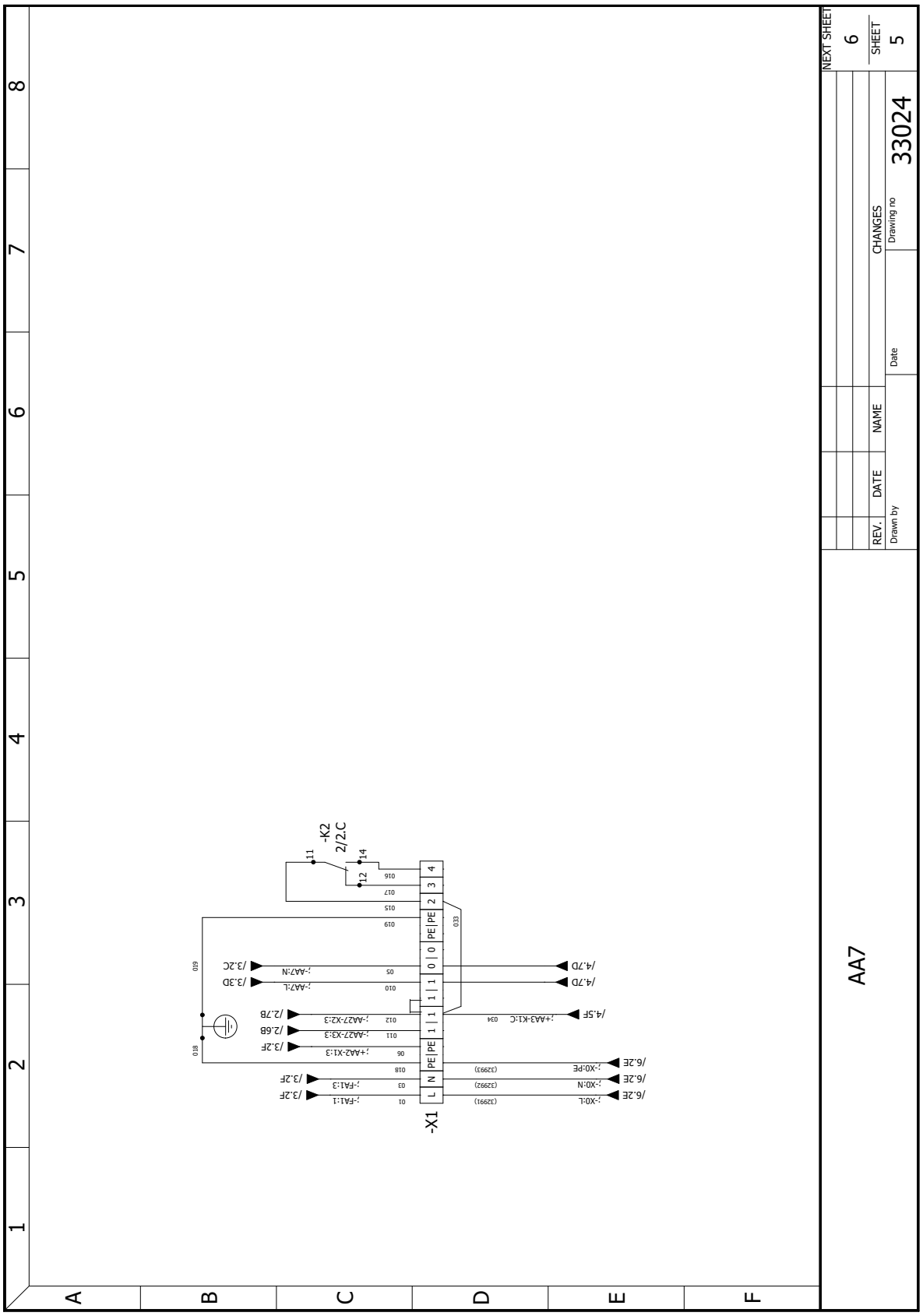

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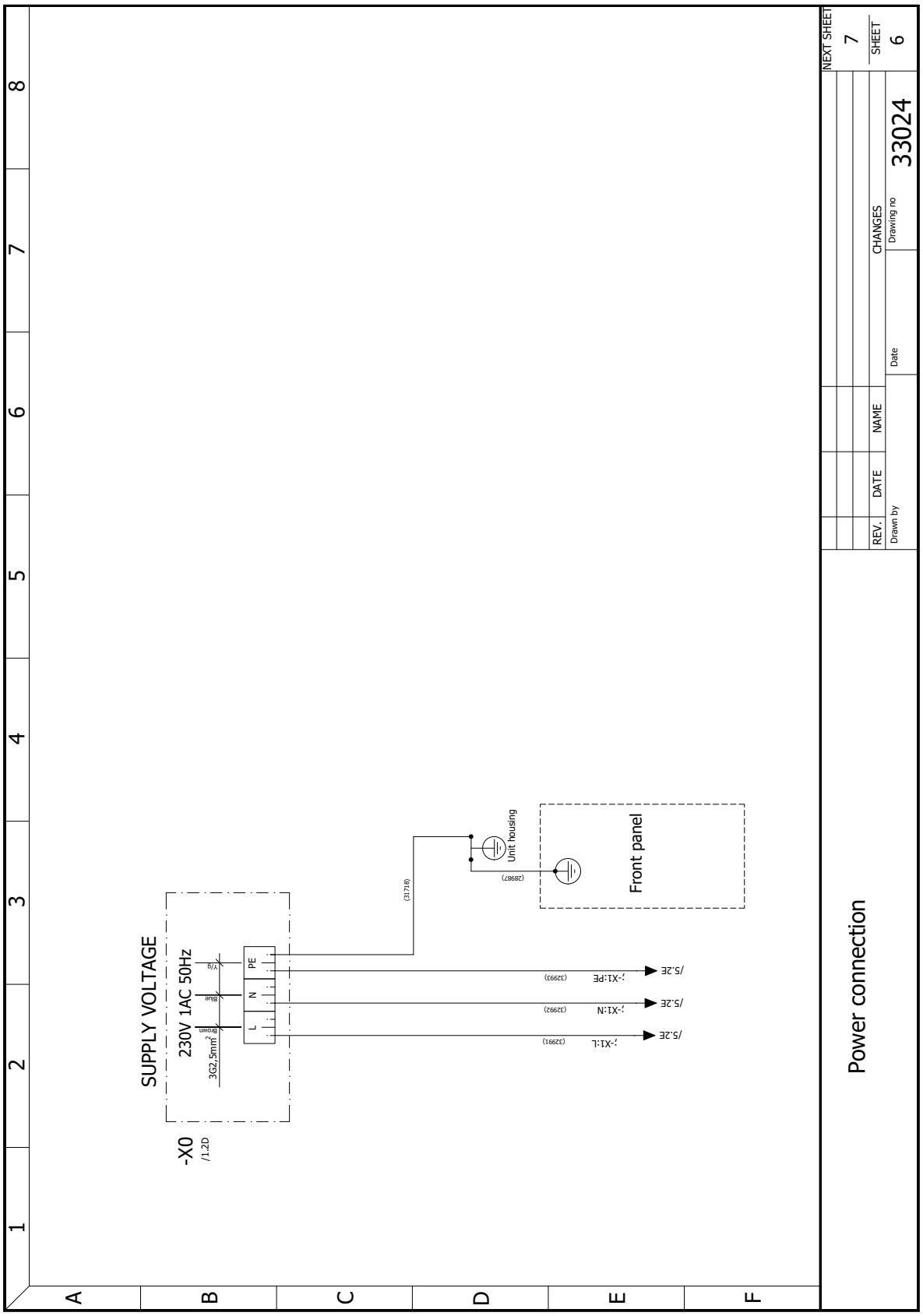

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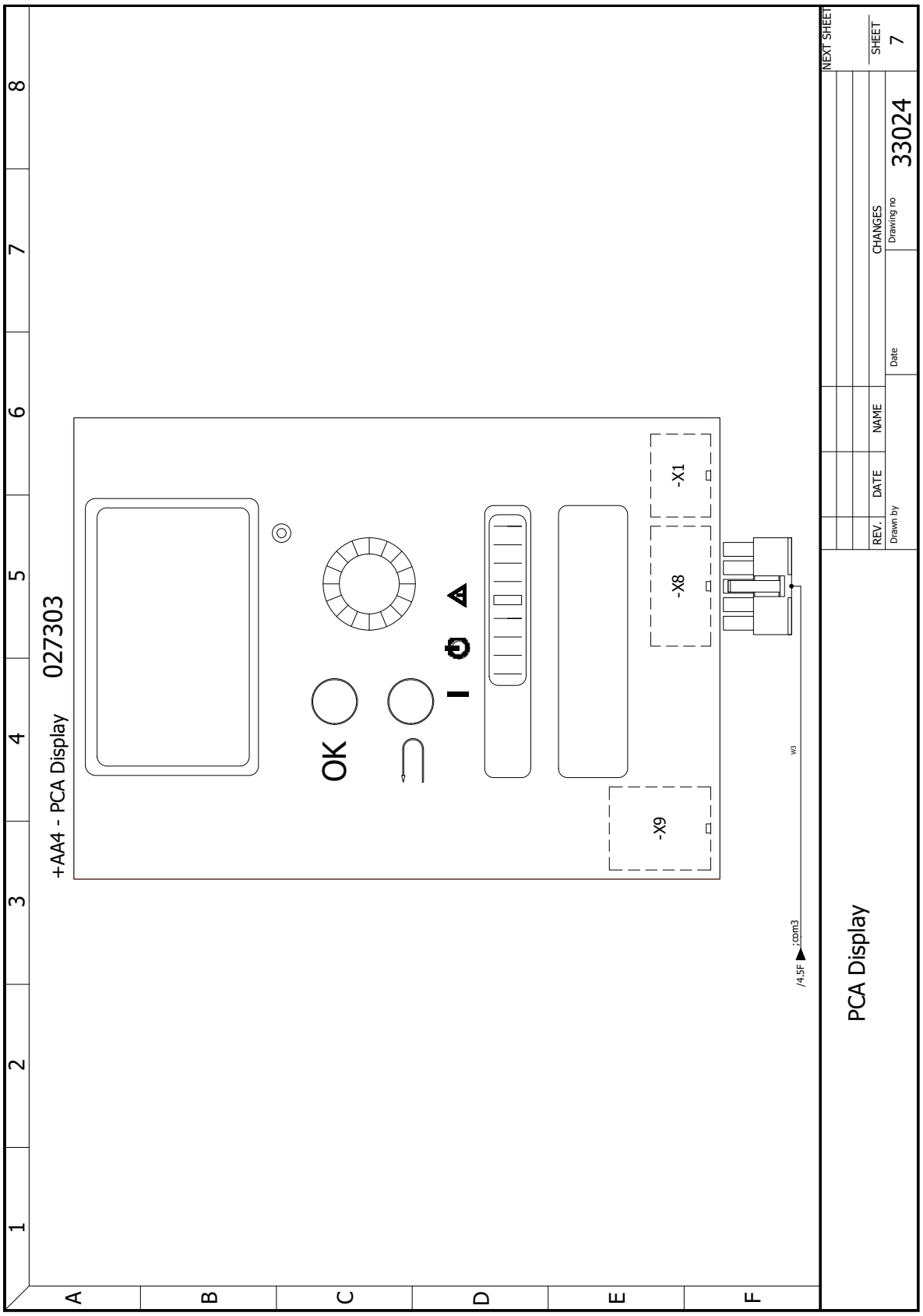
sheet 7



HBM140H

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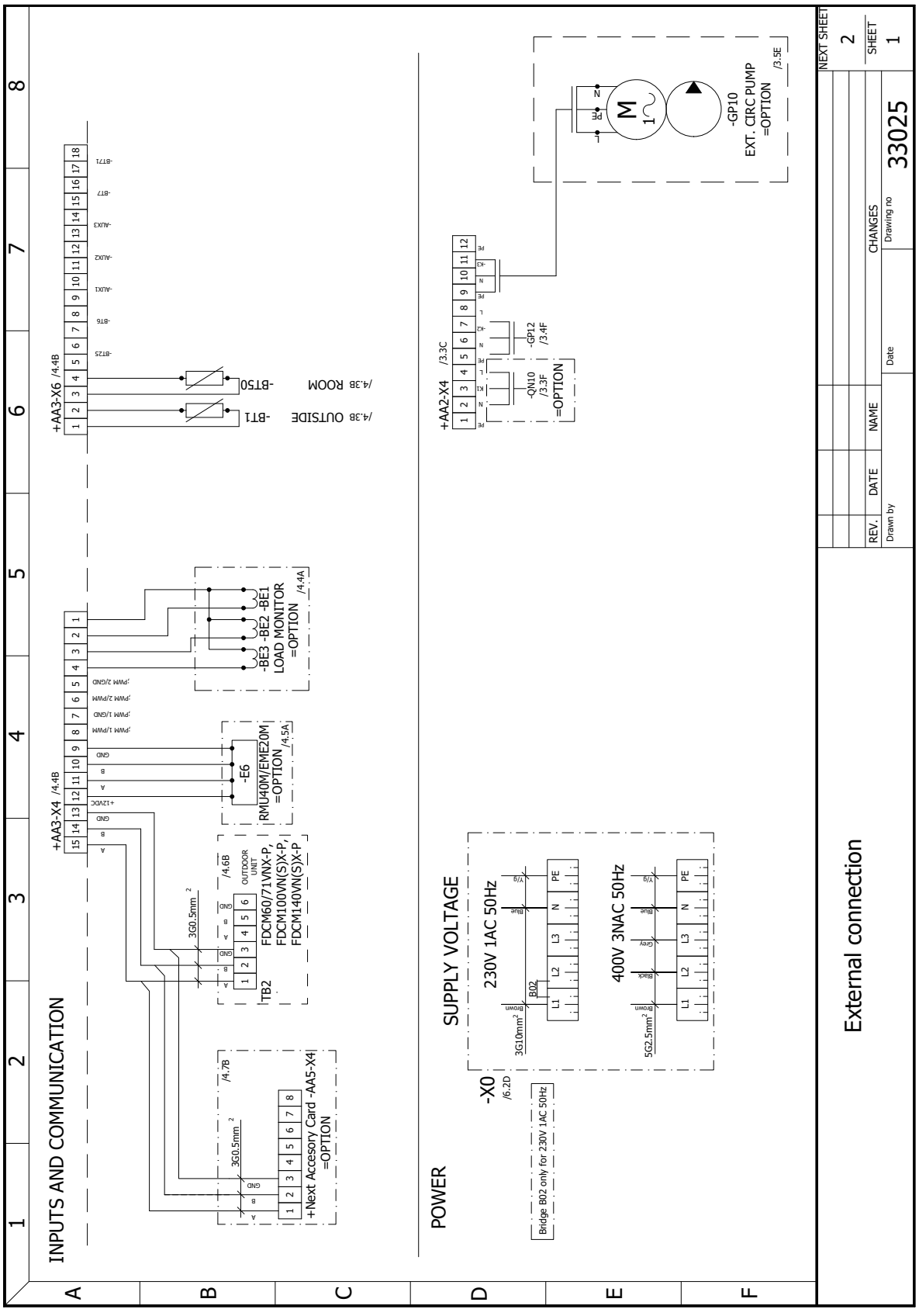

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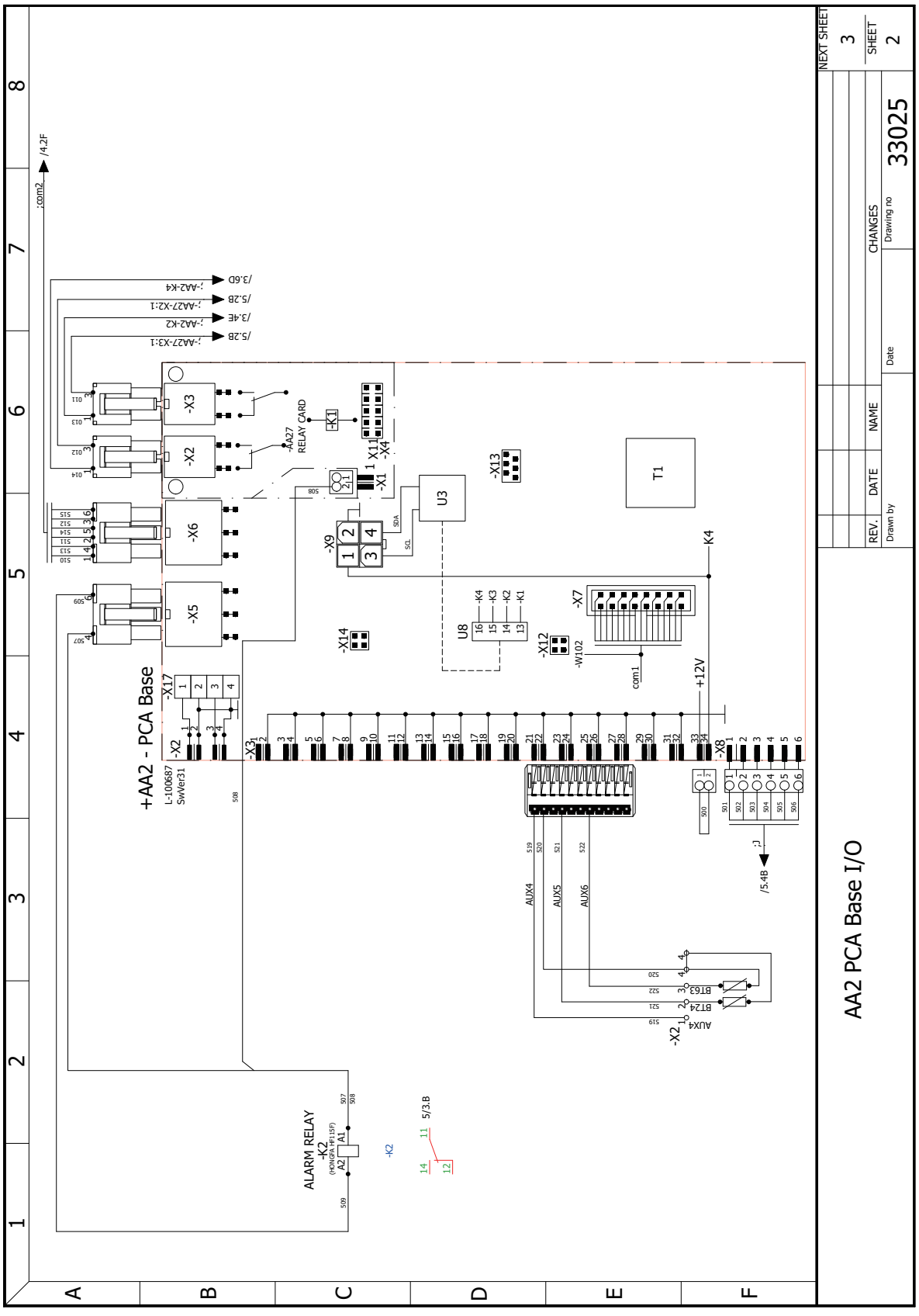
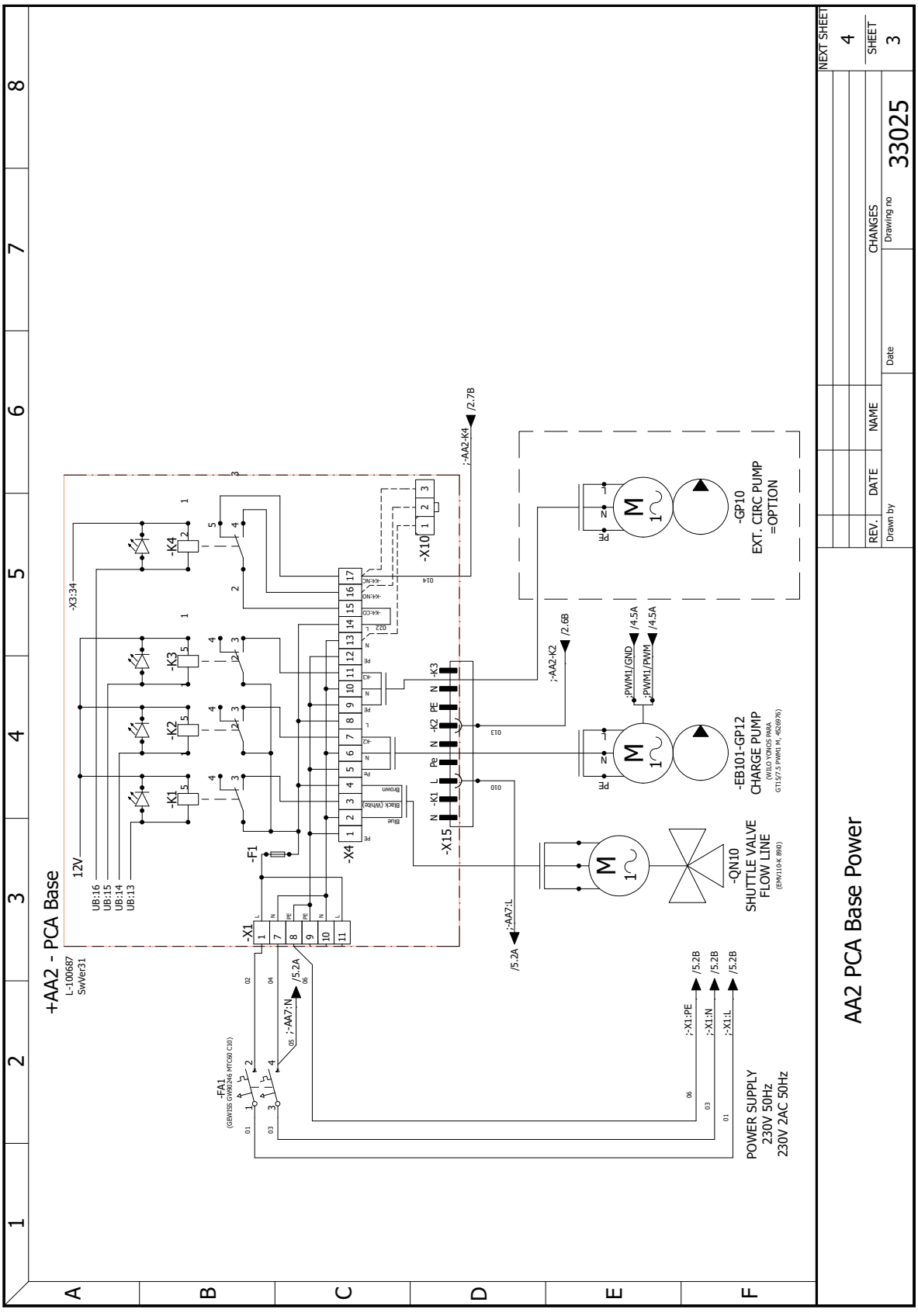
sheet 2



HBM140H

sheet 3



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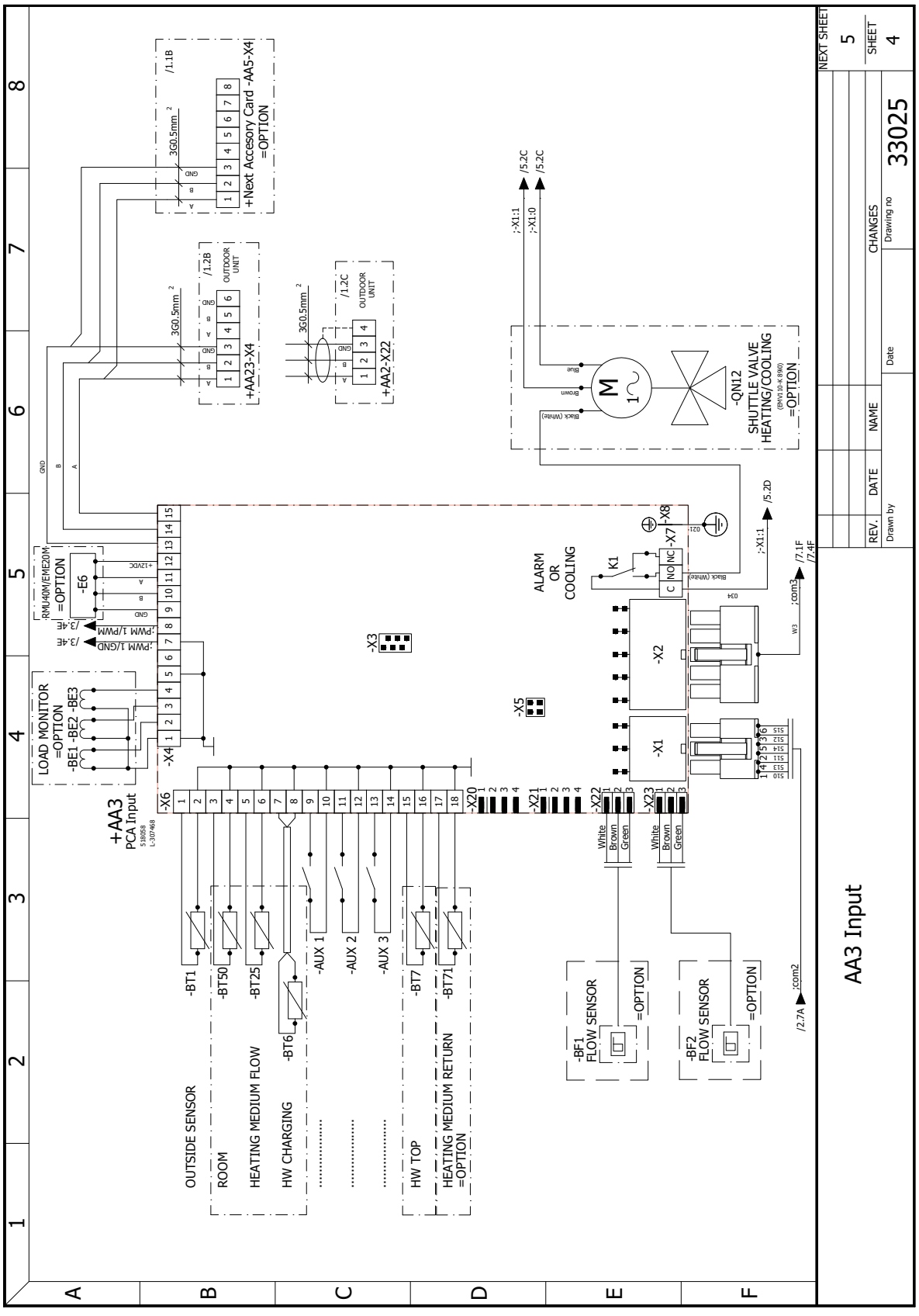
sheet 4



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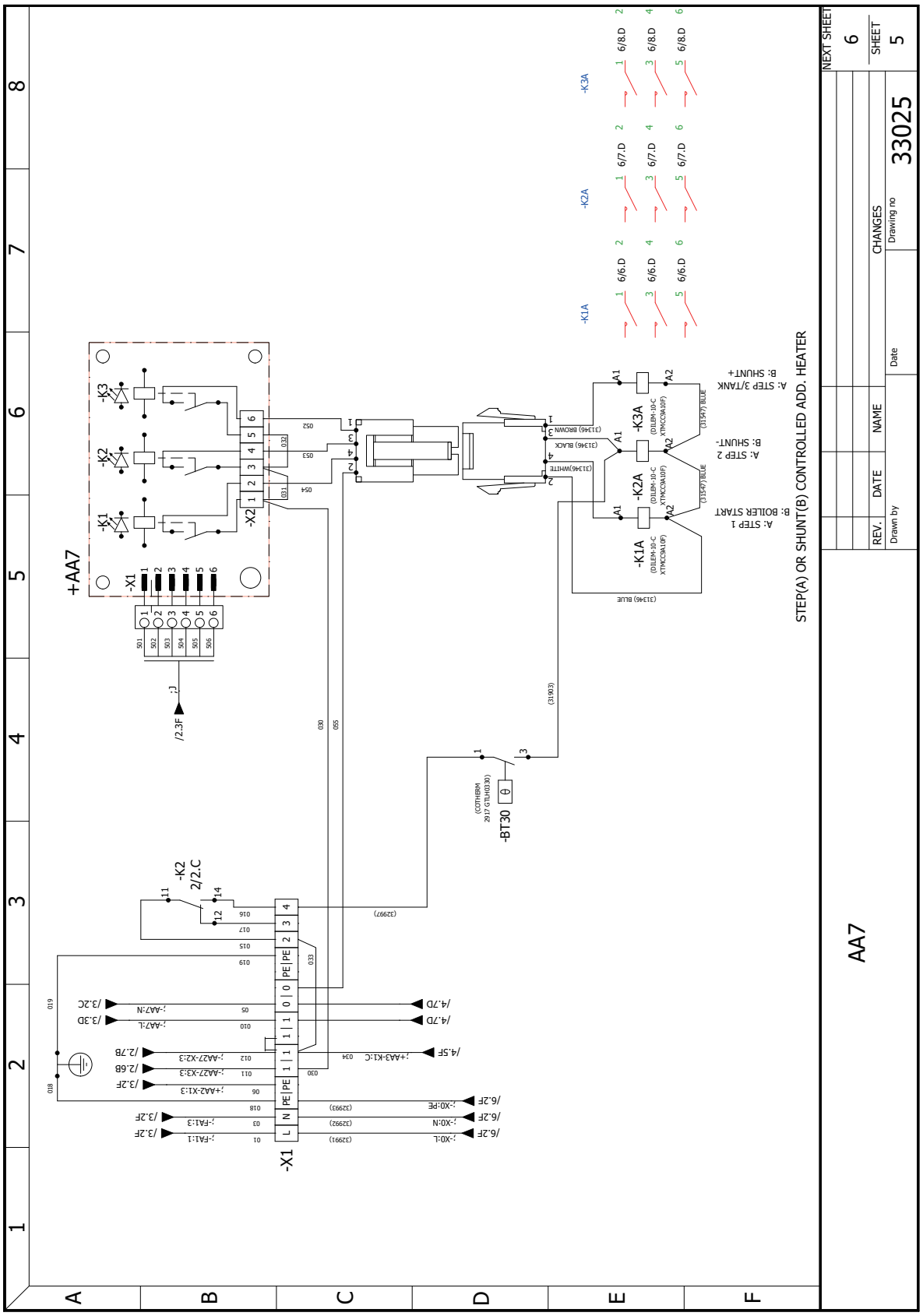
sheet 5



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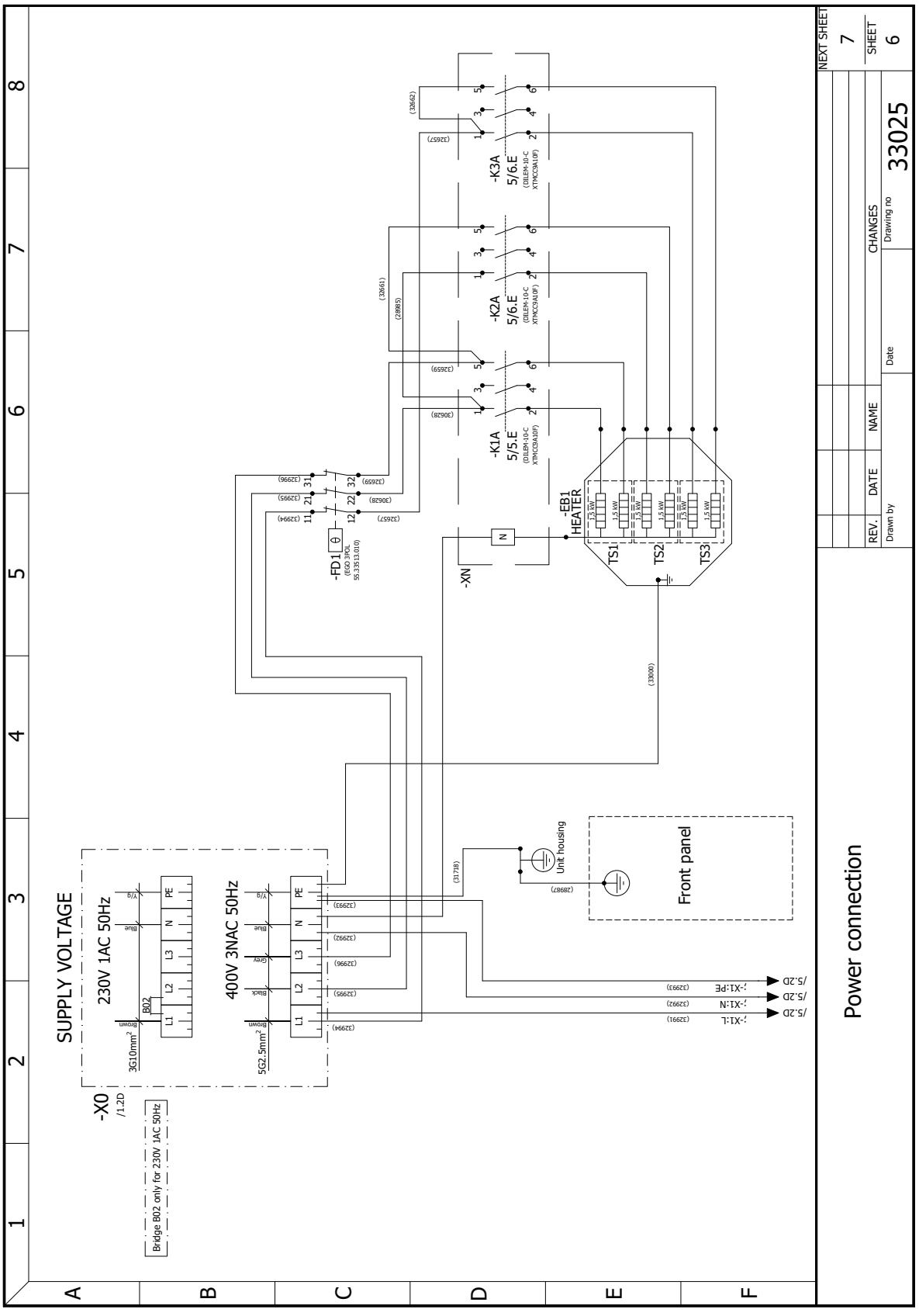
sheet 6



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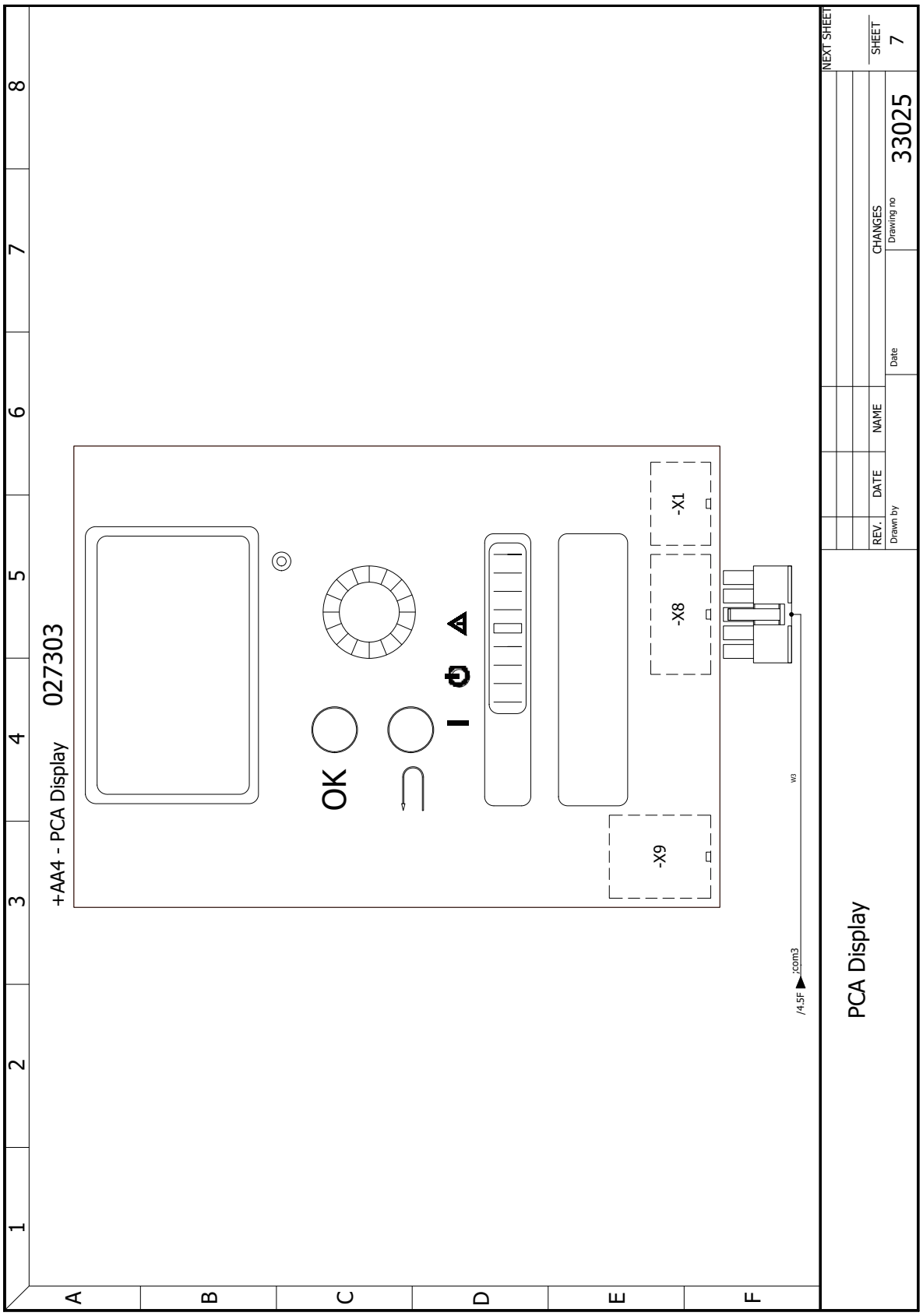
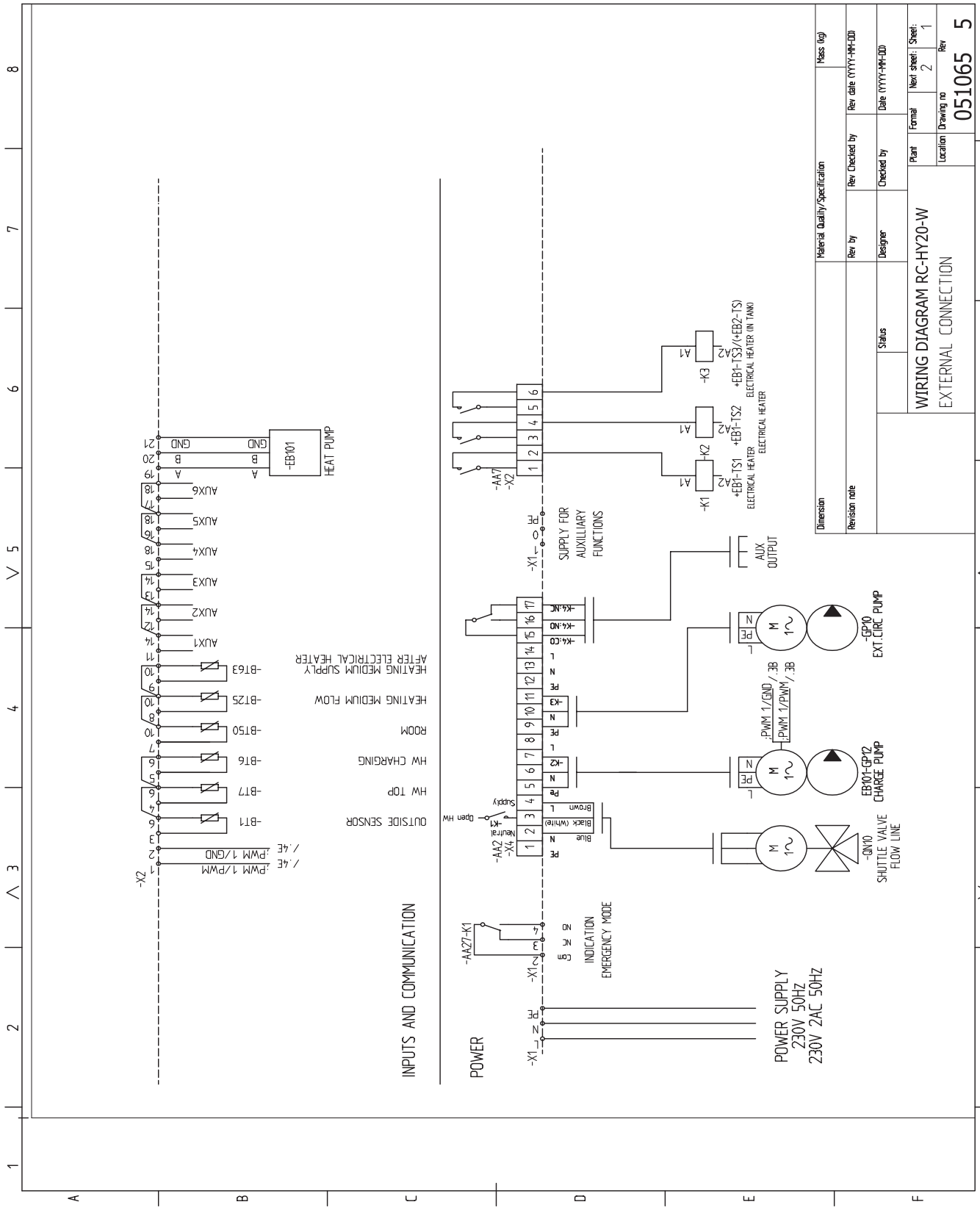
sheet 7



RC-HY20-W

sheet 1



RC-HY20-W

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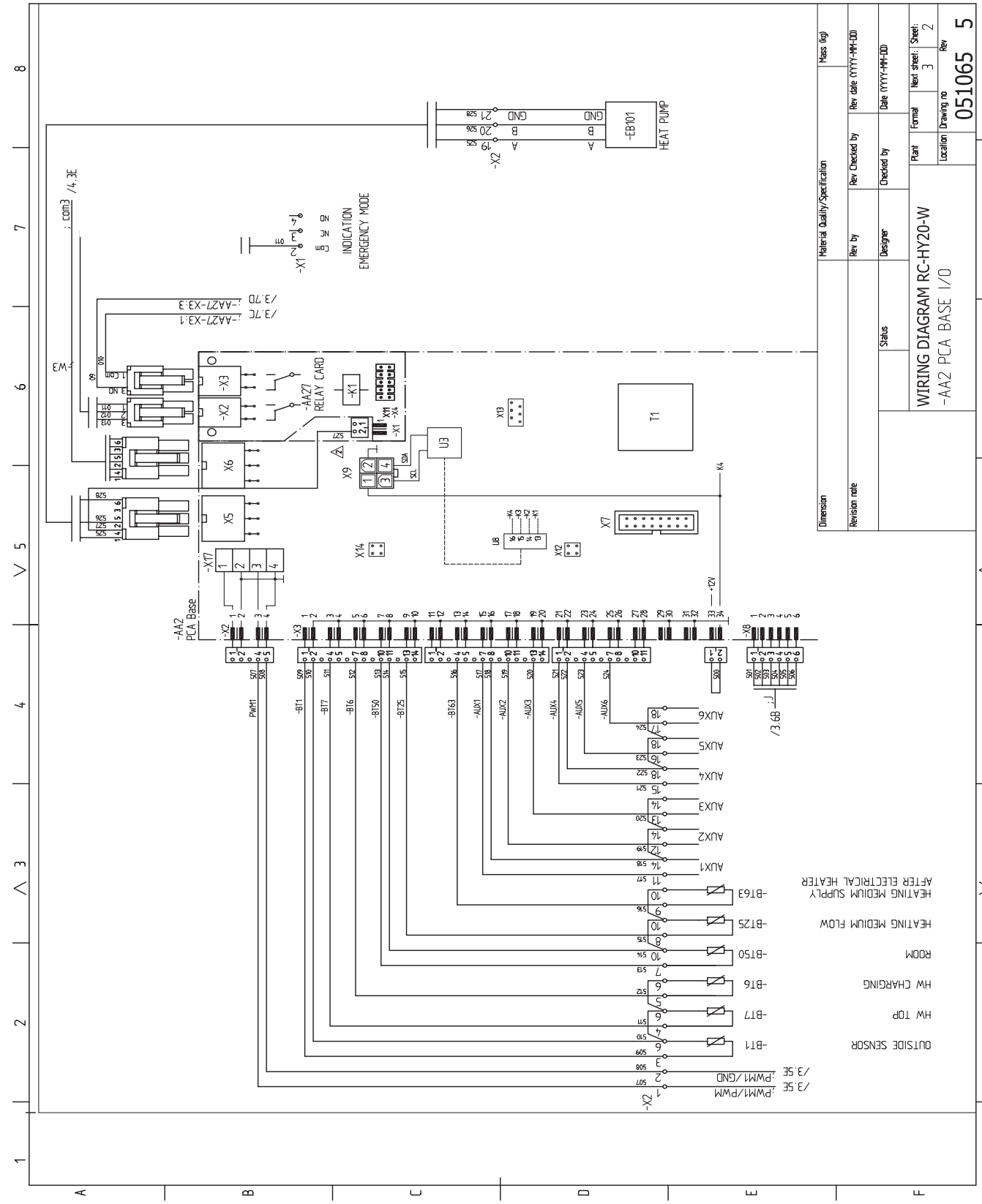
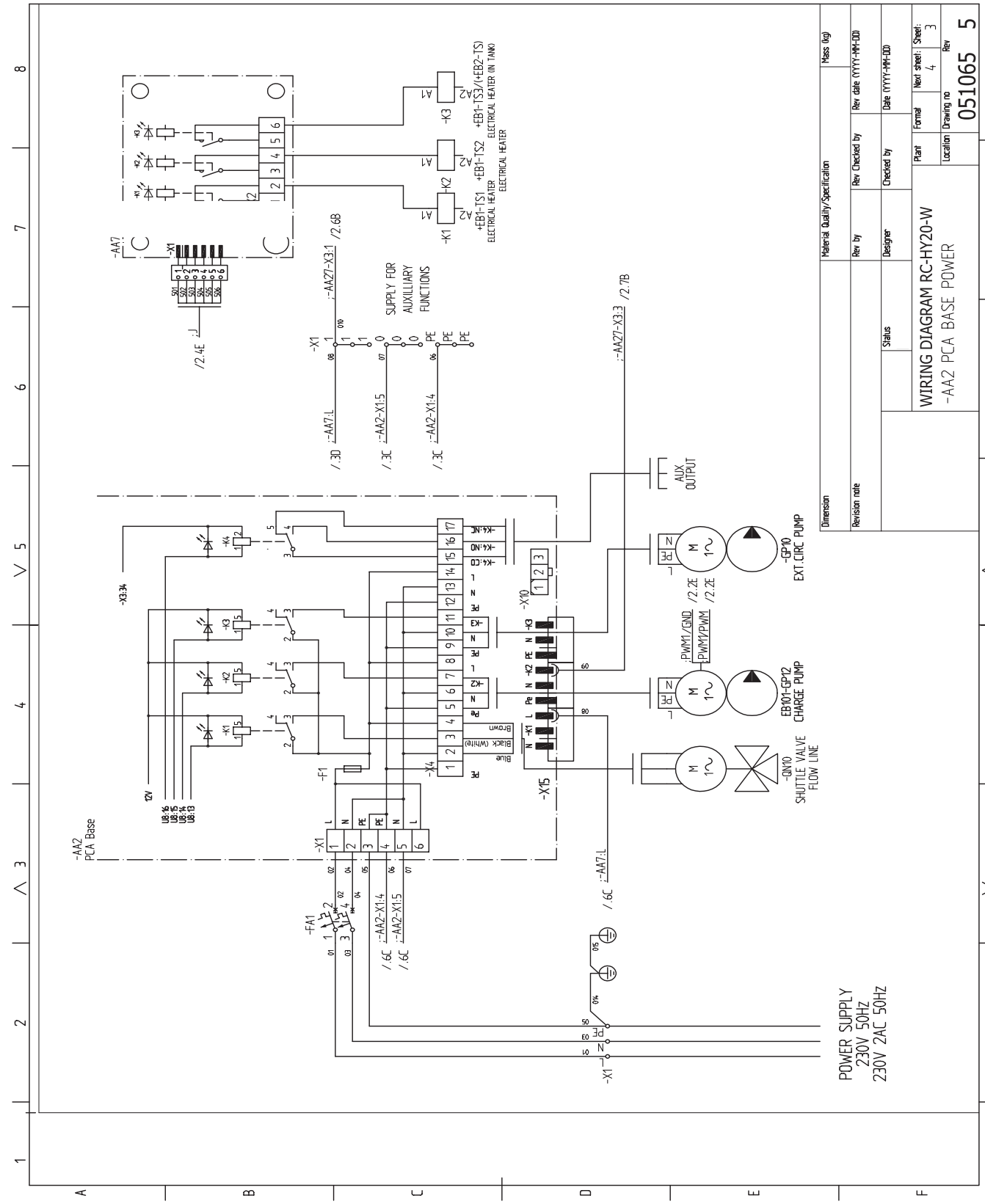


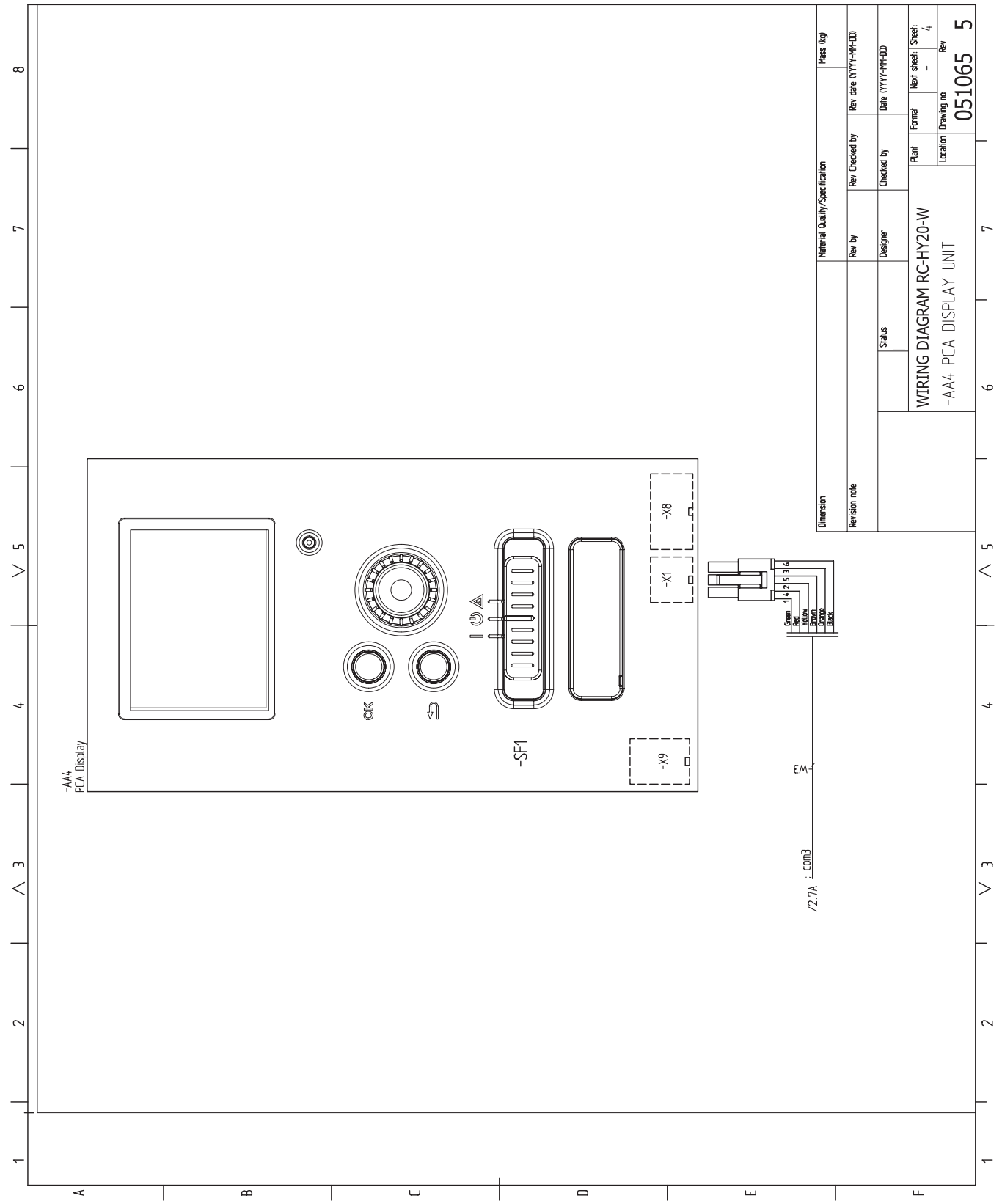
RC-HY20-W

sheet 3



RC-HY20-W

sheet 4



RC-HY40-W

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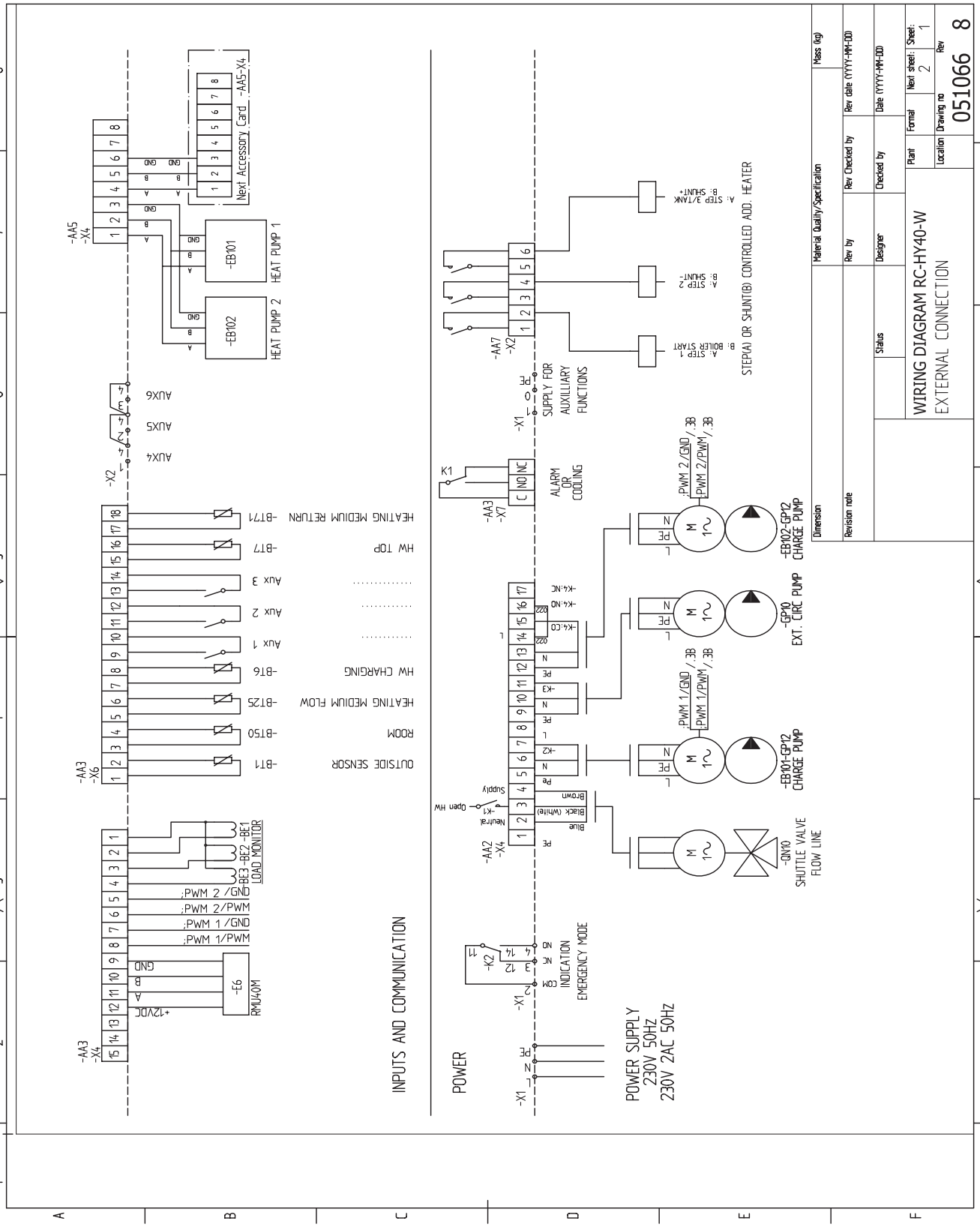

RC-HY40-W

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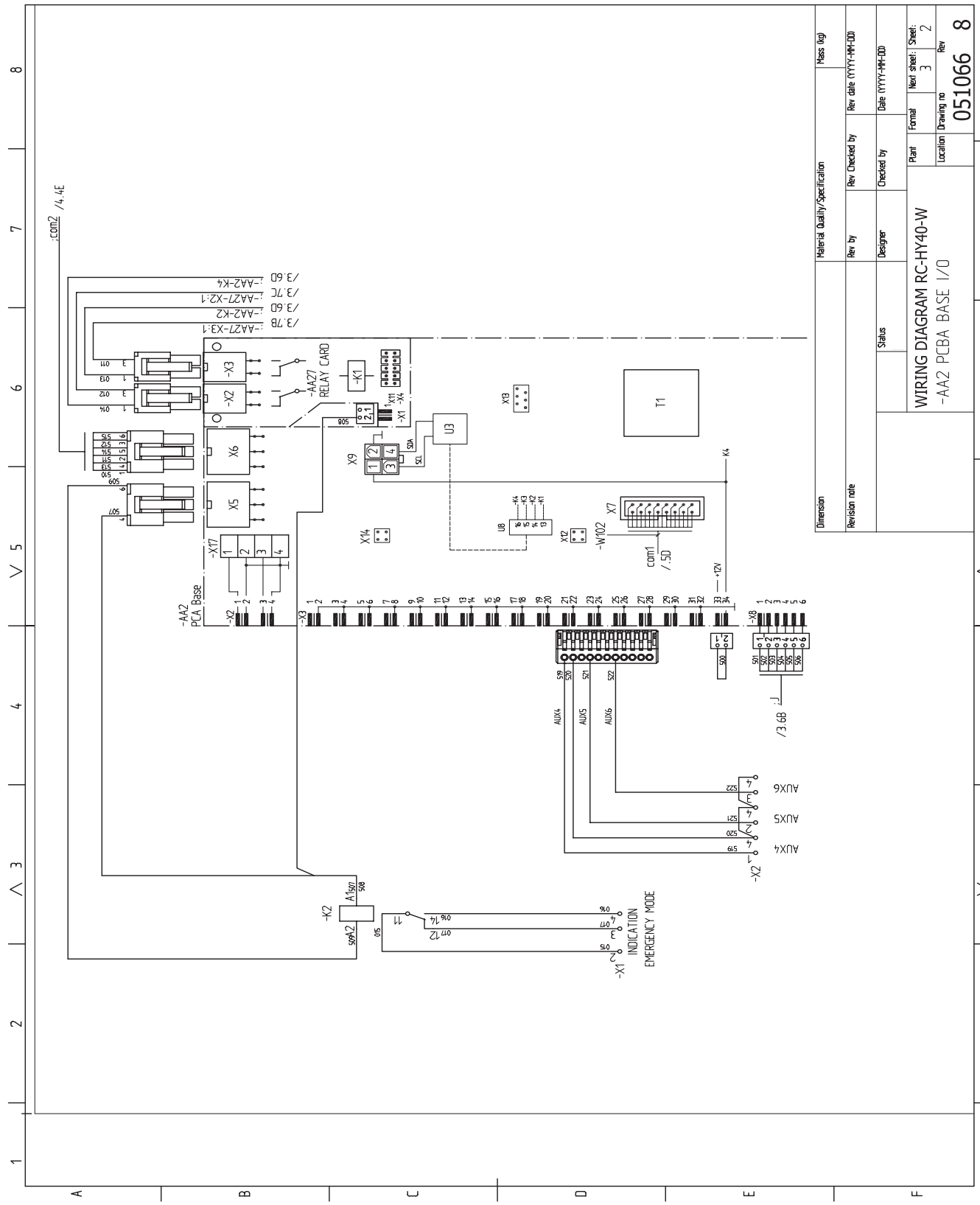

RC-HY40-W

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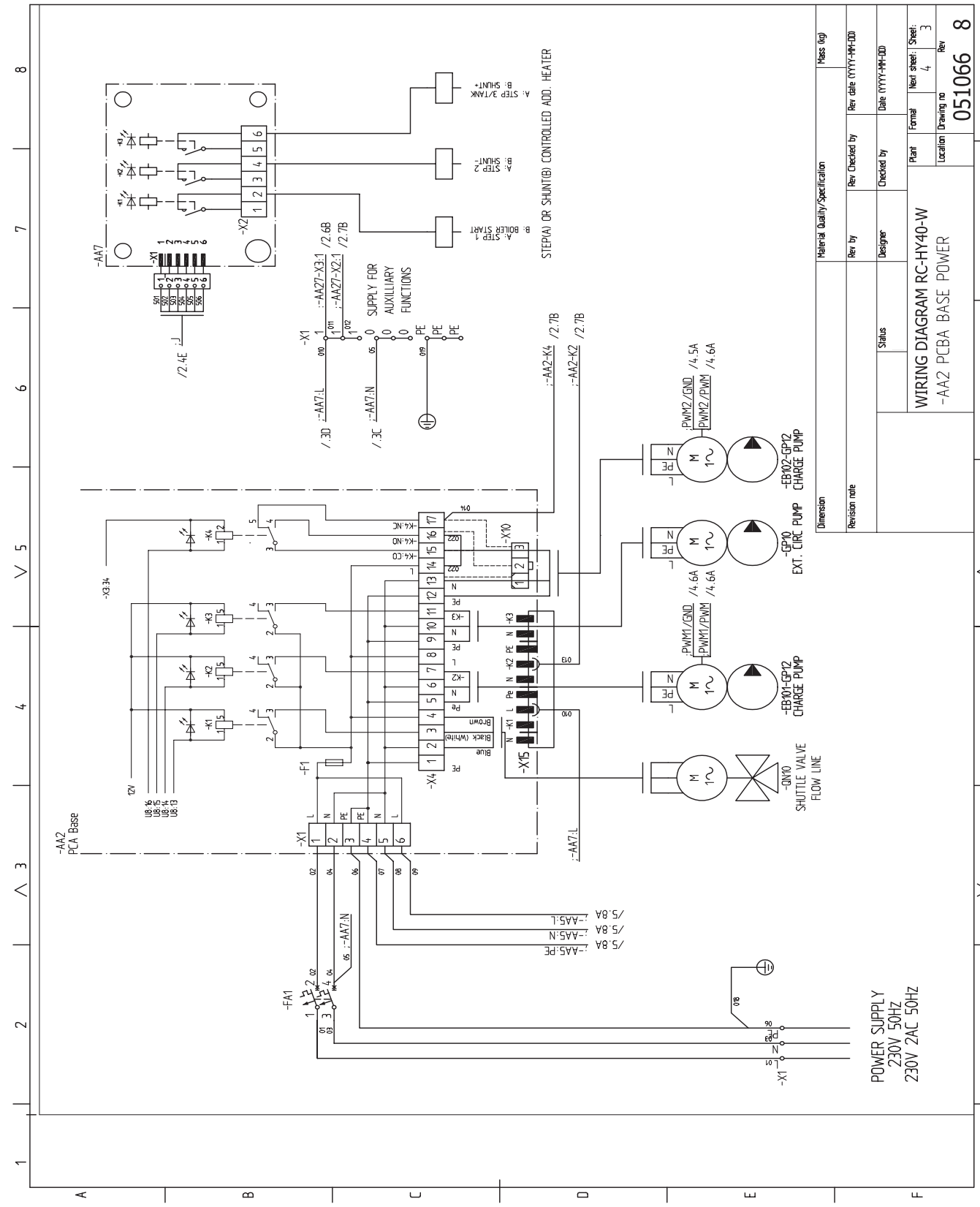

RC-HY40-W

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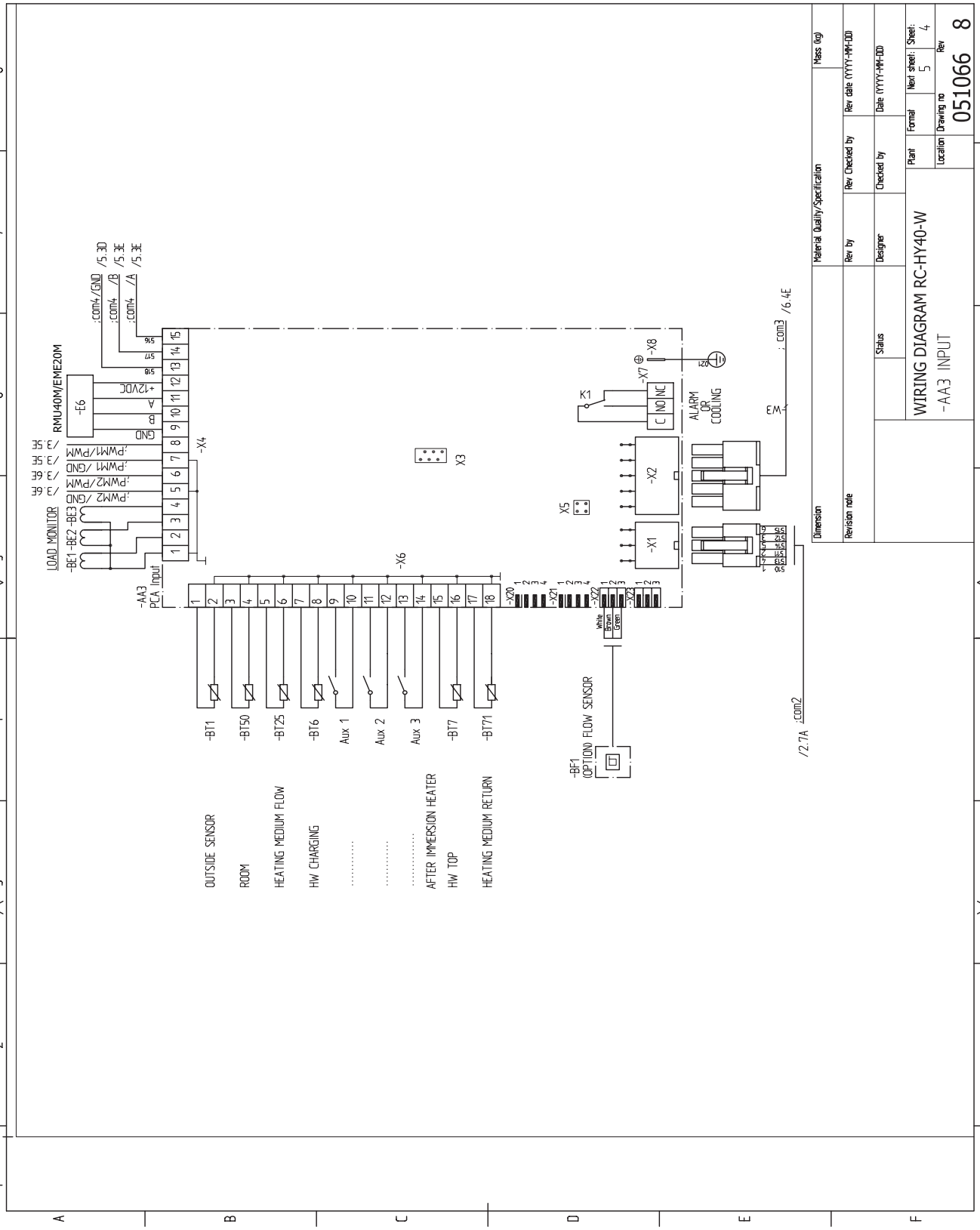
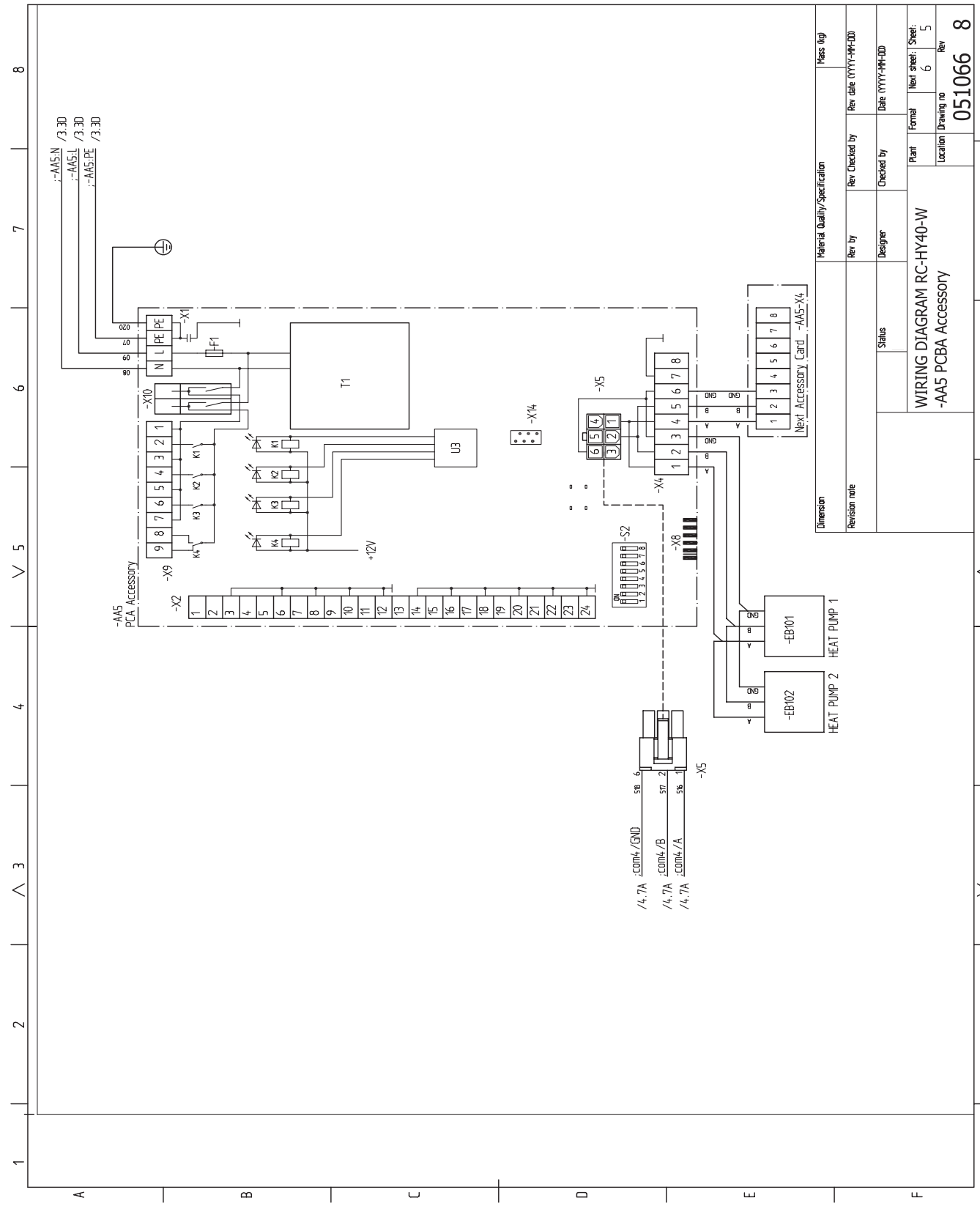


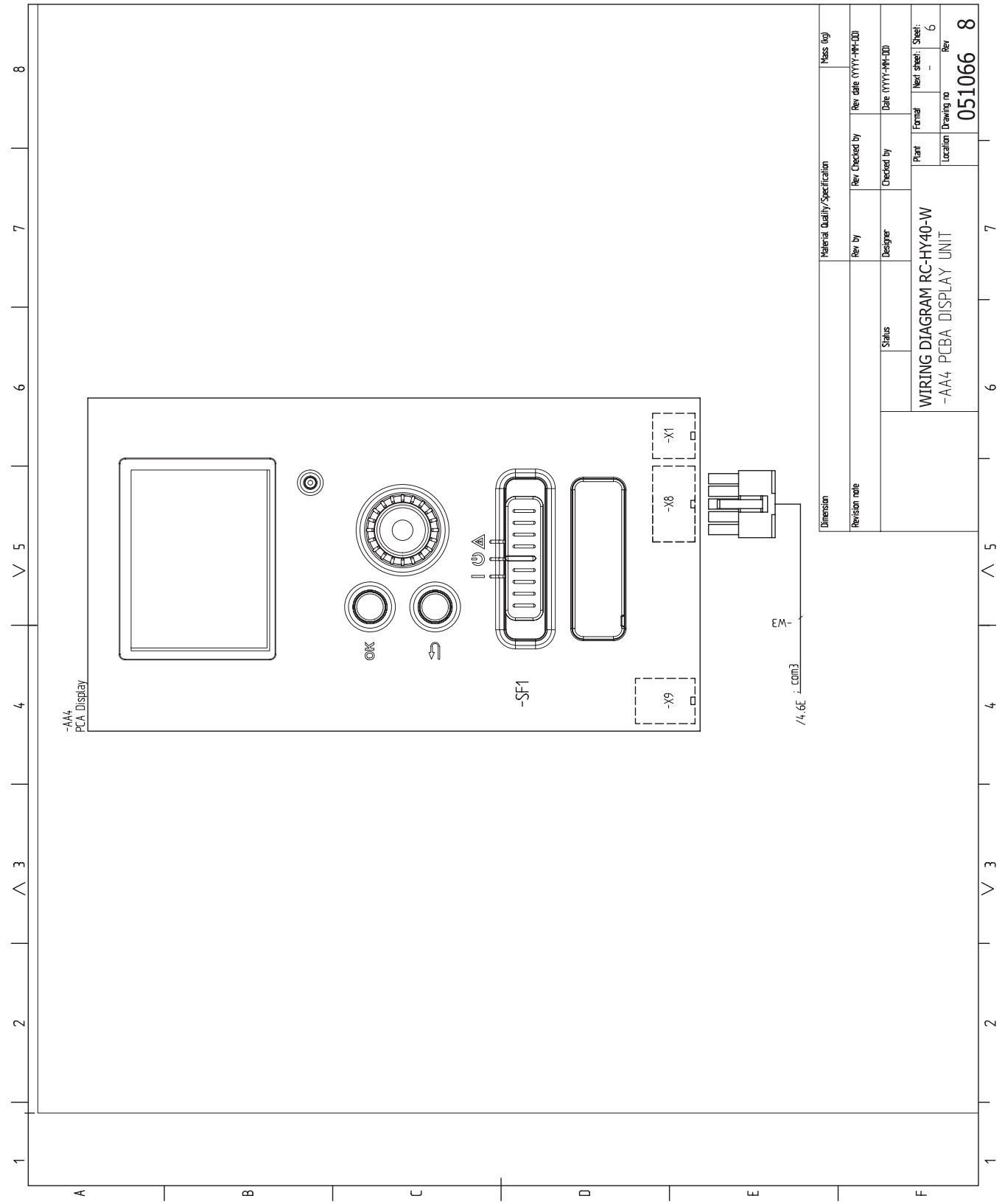
RC-HY40-W

sheet 5



RC-HY40-W

sheet 6



MITSUBISHI HEAVY INDUSTRIES THERMAL SYSTEMS, LTD.
2-3, Marunouchi 3-chome, Chiyoda-ku, Tokyo, 100-8332, Japan
https://www.mhi-mth.co.jp/en/

MITSUBISHI HEAVY INDUSTRIES AIR-CONDITIONING EUROPE, LTD.
5 The Square, Stockley Park, Uxbridge, Middlesex, UB11 1ET, United Kingdom
Tel : +44-333-207-4072
Fax: +44-333-207-4089
https://www.mhiae.com/

MHIAE SERVICES B.V.
(Wholly-owned subsidiary of MITSUBISHI HEAVY INDUSTRIES AIR-CONDITIONING EUROPE, LTD.)

Herikerbergweg 238, Luna ArenA, 1101 CM Amsterdam, Netherlands
P.O.Box 23393 1100 DW Amsterdam, Netherlands
Tel : +31-20-406-4535
https://www.mhiaeservices.com/