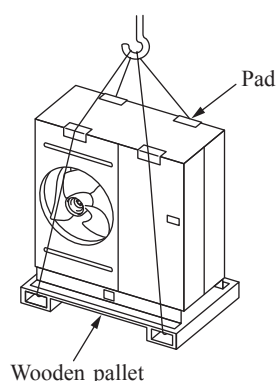


Delivery and handling

1. Transport

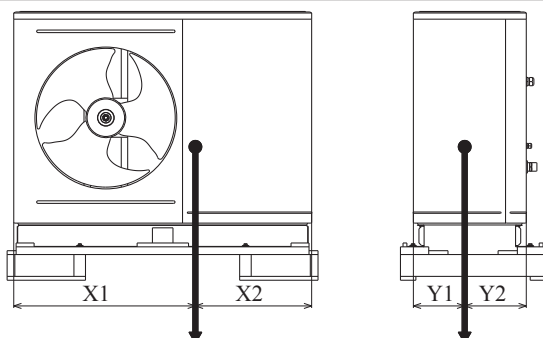
1.1 FDCM60/71VNX-P

- 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



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 PT300/PT300-V2

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

2. Selection of installation location for the outdoor unit

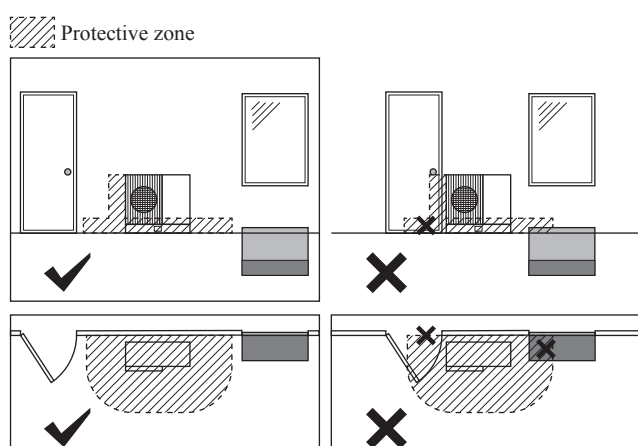
Be sure to select a suitable installation place in consideration of following conditions.

- 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).

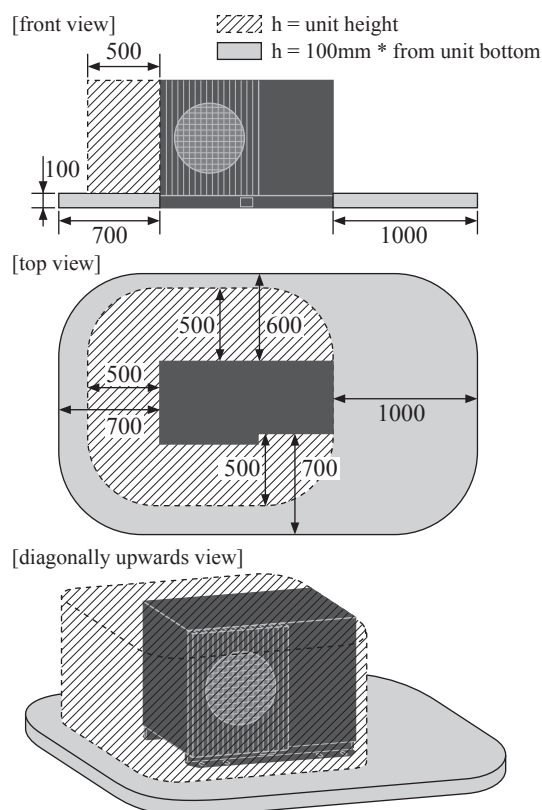
3. Protective zone

3.1. FDCM60/71VNX-P

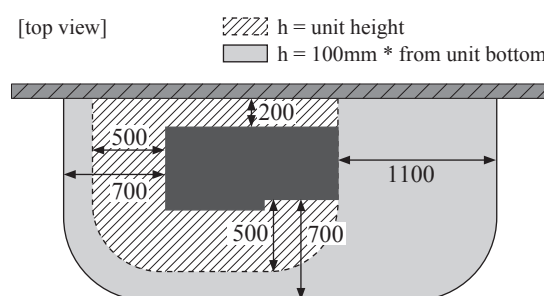
- This outdoor unit is filled with R290 (Higher flammable gas, safety A3 group per ISO 817).
- Great care must be taken when installing and servicing the unit which must be installed/serviced by a competent electrician, with the requisite professional qualifications to install this unit in your jurisdiction.
- 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.).



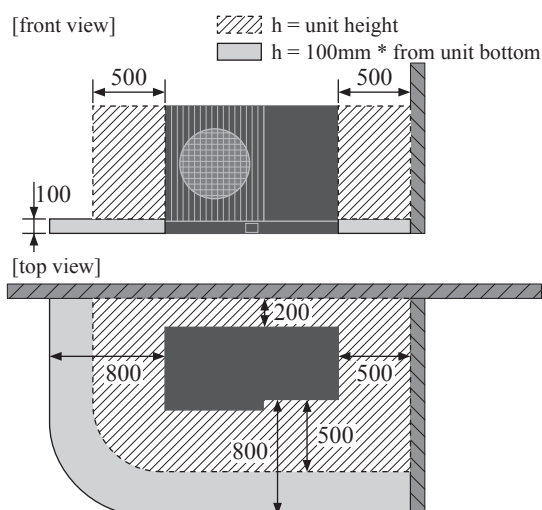
- 1) Protective zone for ground installation (or flat-roof installation) at the open areas



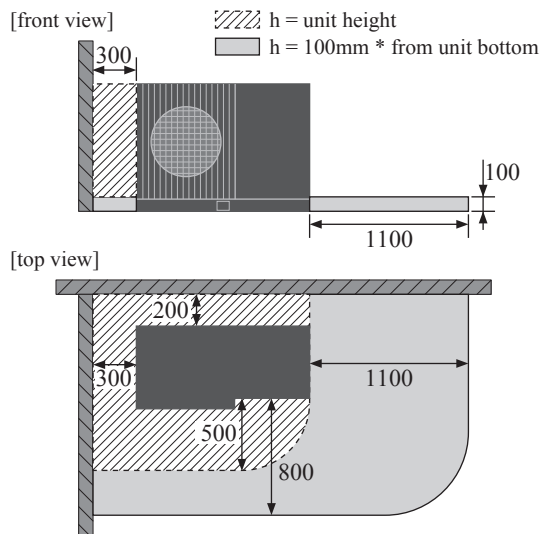
- 2) Protective zone for ground installation in front of a building wall



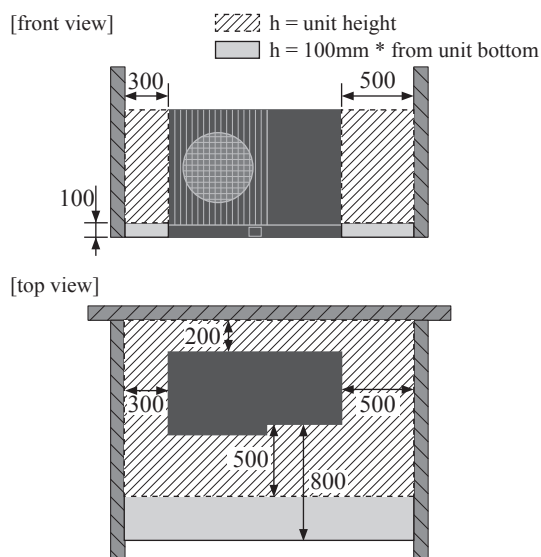
- 3) Protective zone for ground installation in a building right corner



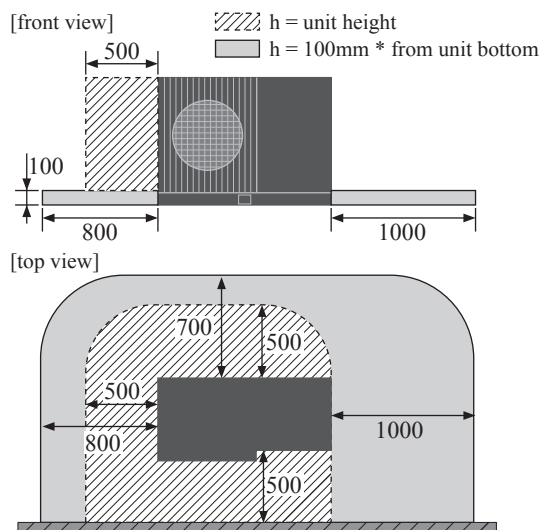
4) Protective zone for ground installation in a building left corner



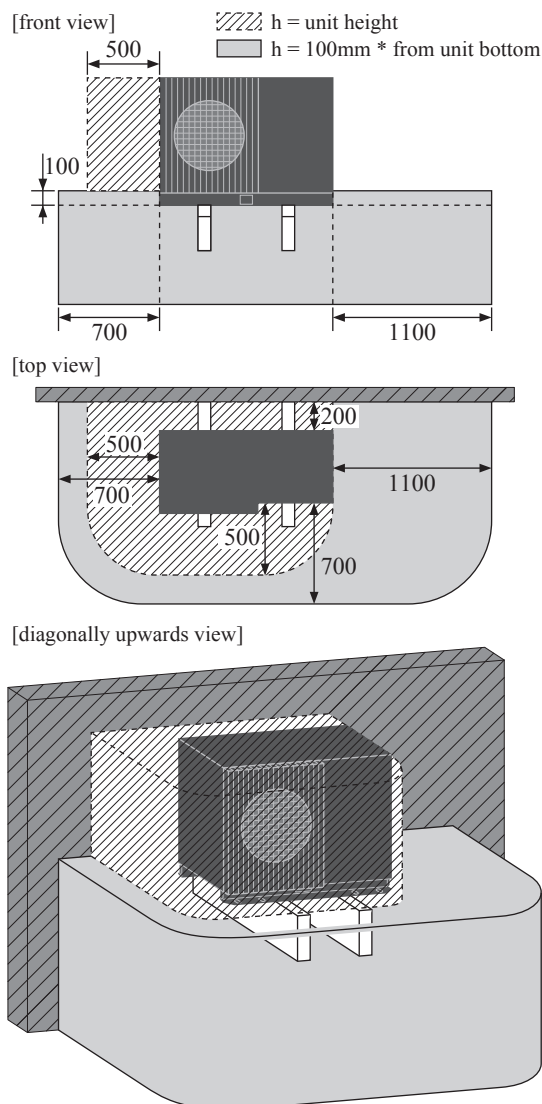
5) Protective zone for ground installation surrounded by three-sided wall



6) Protective zone for ground installation facing a building wall



7) Protective zone away from ground installation



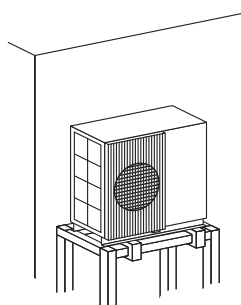
4. Caution about selection of installation location

4.1 FDCM60/71VNX-P

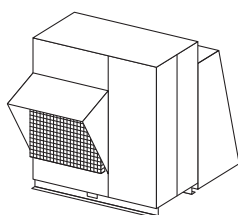
(1) If the unit is installed in the area where the snow will accumulate, following measures are required.

The bottom plate of unit and intake, outlet may be blocked by snow.

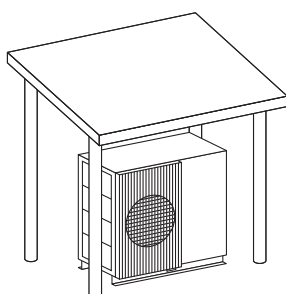
A. Install the unit of the base so that the bottom is higher than the snow cover surface.



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.

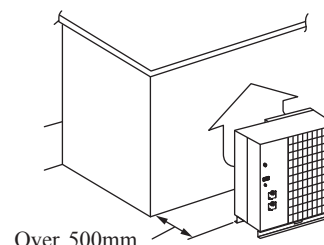


Since drain water generated by defrost control may freeze, the following measures are required.

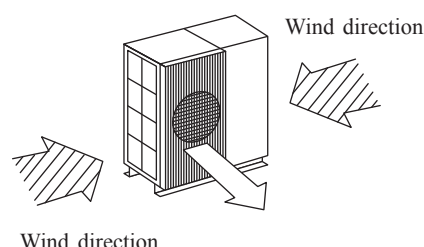
- Don't execute drain piping work without pipe heater.
- Recommend setting Defrost Control (SW2-1) and Snow Guard Fan Control (SW2-2). [Refer to Setting SW2-1, SW2-2.]

(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.

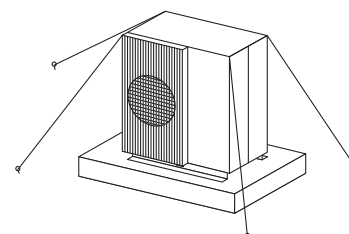
A. Install the outlet air blow side of the unit to face a wall of the building or provide a fence or a windbreak screen.



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.

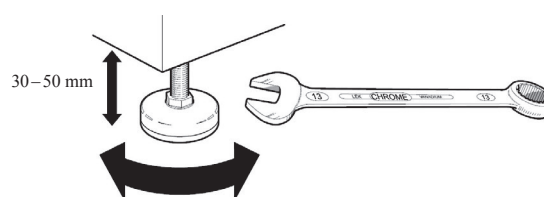


D. Use a wind guard in case the outdoor unit is installed where the ambient temperature drops below -10°C and natural wind blows into the outdoor unit directly.

4.2 HMM100

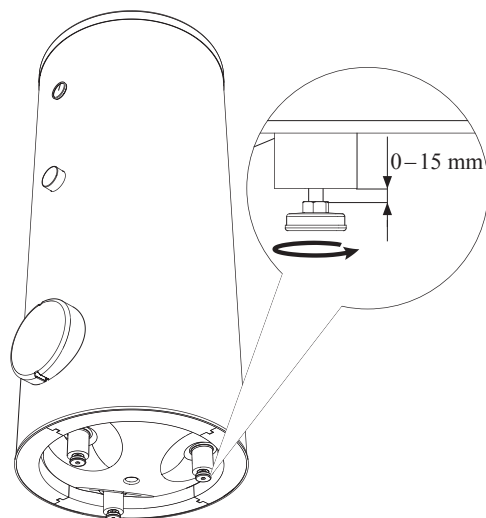
HMM100 must be set on a solid waterproof base that would keep the weight of the indoor unit.

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 PT300/300-V2



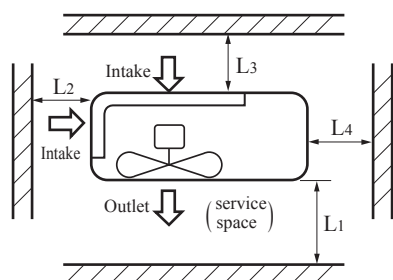
- Install tank unit indoors in order to avoid icing.
- Ensure free space described in the following figures for future maintenance.
- Tank unit must be set on a solid waterproof base that would keep the weight of the unit. The height-adjusting legs allow for levelling and stable setting.

5. Installation space (Service space)

5.1 FDCM60/71VNX-P

The installation space for the outdoor unit:

- Walls surrounding the unit in the four sides are not acceptable.
- There must be a 1m 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 piling 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.



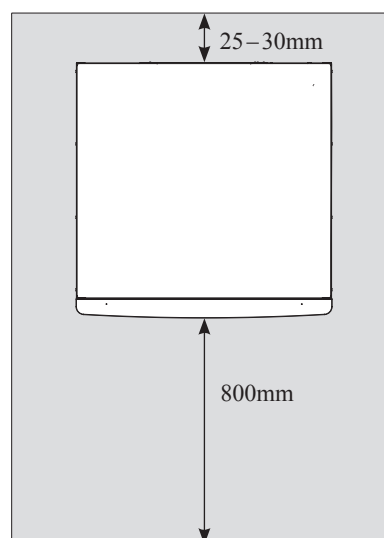
The table below shows some installation examples

FDCM60/71VNX-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

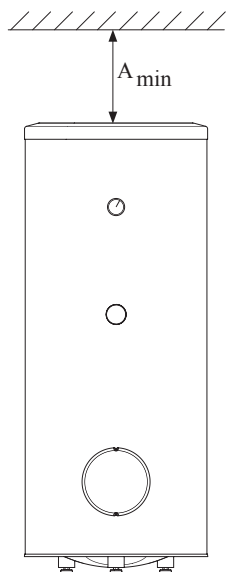
Leave 800 mm free space at the front of the heat pump. All maintenance works on HMM100 can be done from the front.



NOTE

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

5.3 PT300/300-V2



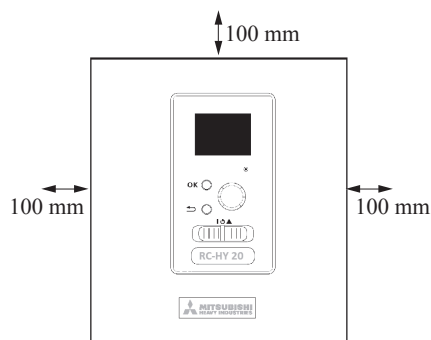
$A_{\min}$ is required on top to replace anode bar, and 500mm is required in front to replace immersion heater if equipped.

Application	Connector pipe diameter	Type of anode	$A_{\min}$
PT300	1"	Chain $\phi 26 \times 8$	150mm
	$\frac{3}{4}$ "	Titanium anode	200mm
PT300-V2	1"	Chain $\phi 26 \times 8$	150mm
	$\frac{3}{4}$ "	Titanium anode	200mm

5.4 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 100mm free space around the controller for service and maintenance.



6. Outdoor unit installation

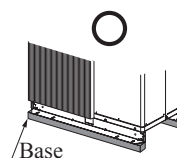
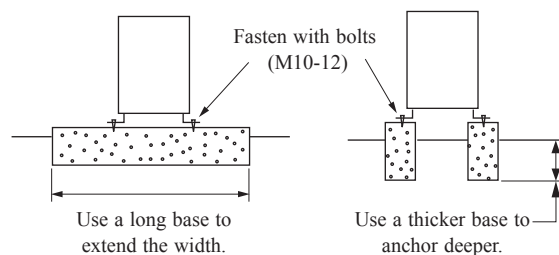
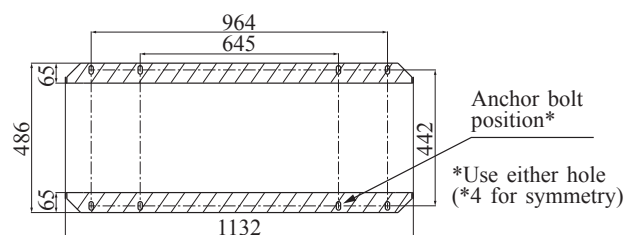
- When installing the unit, fix the unit legs with bolts as shown right.
 - When installing the unit, fix the unit's legs with bolts specified on the right.
 - The protrusion of an anchor bolt on the front side must be kept within 20mm.
 - Securely install the unit so that it does not fall over during 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 5mm 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.

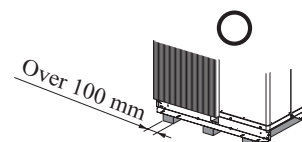
NOTE

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.

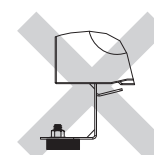
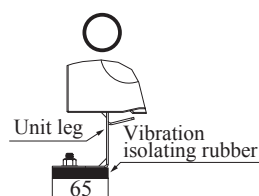
Do not install an outdoor unit in such a manner that a part of the bottom area of its anchoring leg is off a vibration isolating rubber.



Normally, it is desirable that a base as specified in the drawing at the above is provided.



Use this it for renewal installation. Add a base on the center. It is necessary to prevent from sagging.

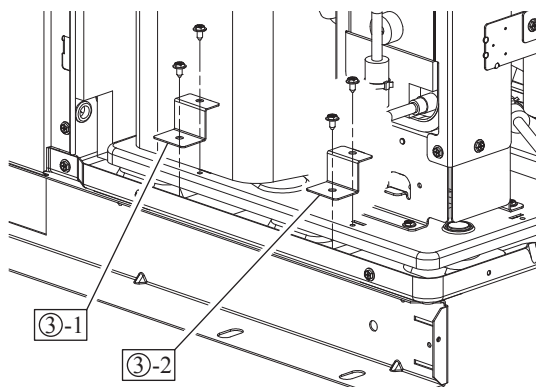
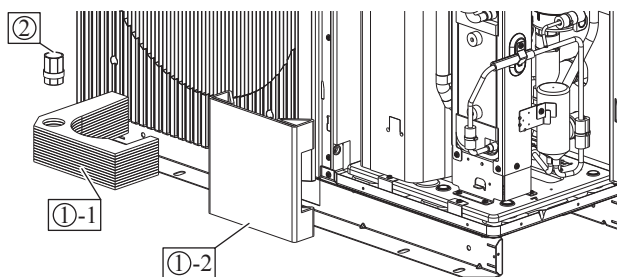
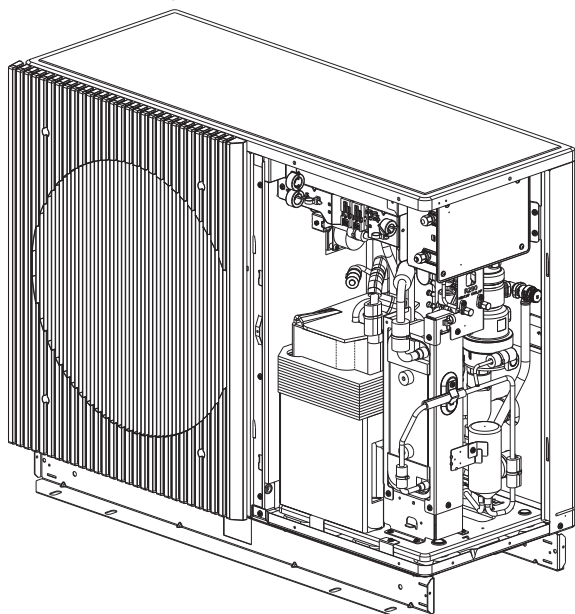


7. Accessories to be attached or removed before commissioning

7.1 To remove transportation parts

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

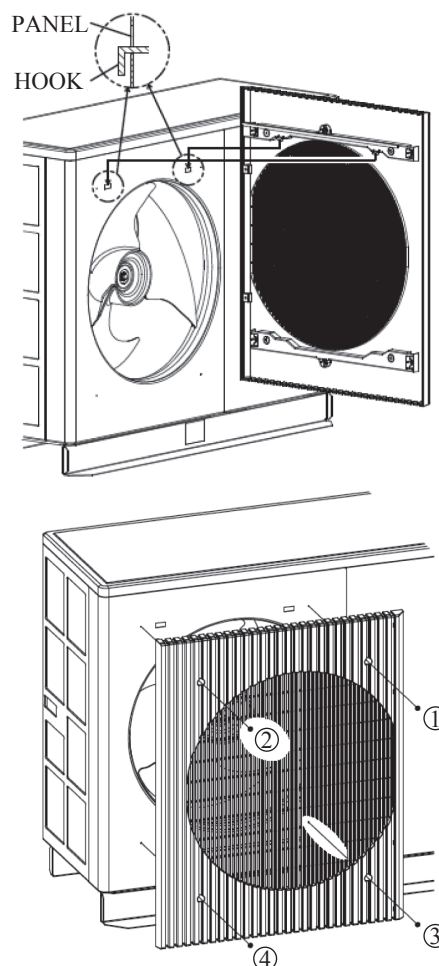
- ① Two carton parts (①-1, ①-2) to be removed are shown on the diagram below.
- ② Remove the check valve ② from the carton parts ①-1
- ③ It is also necessary to remove the transportation brackets that come fixed on the compressor anti-vibration plate ③-1, ③-2 (2 brackets, 4 screws).



7.2 To attach fan guard

Before starting the unit operation, 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

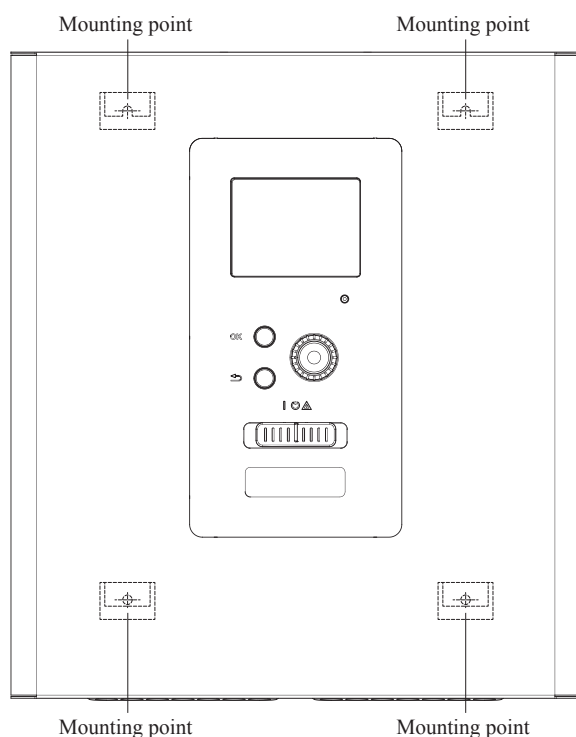
All these works must be done without any power source on the outdoor unit.

NOTE

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

8. Hanging control unit

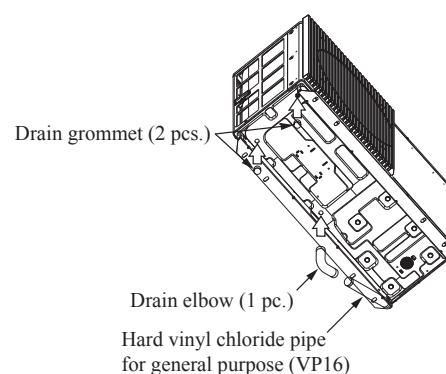
Use all mounting points and install control unit upright against a flat wall. Make sure whole back surface faces the wall.



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 option 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 injuries 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 mgCl ⁻ /L
	Sulphate ion	≤ 30 mgSO ₄ ²⁻ /L
	Acid consumption (pH4.8)	≤ 50 mgCaCO ₃ /L
	Sulphide ion/acid consumption	≤ 0.5
	Total hardness	≤ 70 mgCaCO ₃ /L
	Calcium hardness	≤ 50 mgCaCO 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 mgCl/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

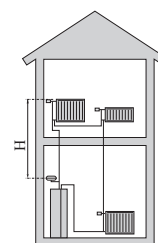
Recommended maximum height difference between expansion vessel and the highest point in the system is 5m.

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 5m.

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.

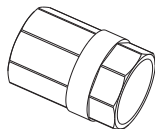


Recommended installation order

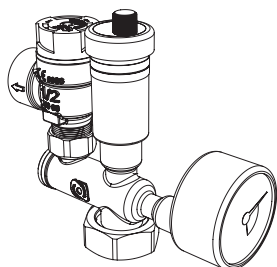
1. Place outdoor unit and hang control unit to appropriate position.
2. Connect outdoor unit to climate system, cold and hot water lines as well as any external heat sources. See page 79.
3. Connect current limiter, any centralised load control and external contacts as well as the cable between controller and outdoor unit.
4. Connect incoming electricity to outdoor unit. See page 98.
5. Follow the commissioning instructions on pages 99–118.

Supplied components

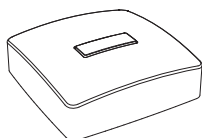
Outdoor unit
FDCM60/71VNX-P
Check valve



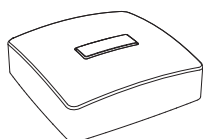
Indoor unit
HMM100



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



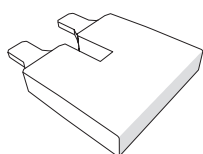
Outdoor temperature sensor



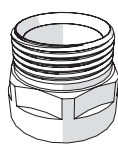
Room sensor



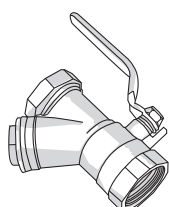
Current sensor



230V connection jumper



Connector 1"



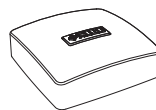
Particle filter



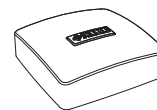
Temperature sensor BT

Controller

RC-HY20/40-W



Outdoor temperature sensor



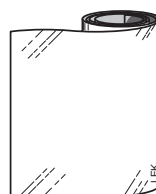
Room sensor (RC-HY40-W only)



Insulation tape



Temperature sensor



Aluminium tape



Cable ties

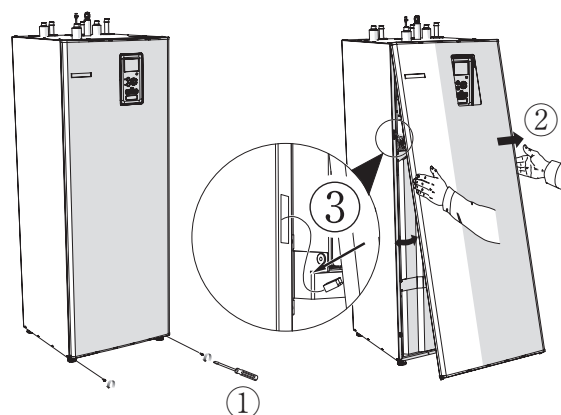


Heating pipe paste



Current sensor (RC-HY40-W only)

Removal of the covers



1. Remove screws at the bottom edge of the front cover.
2. Open the cover at the lower edge, taking care to not damage the connecting cables, and then remove the front cover by lifting it up.
3. Disconnect the cable connecting the front cover to the unit.

The side covers and rear wall of the housing are permanently attached, therefore it is not possible to dismantle them.

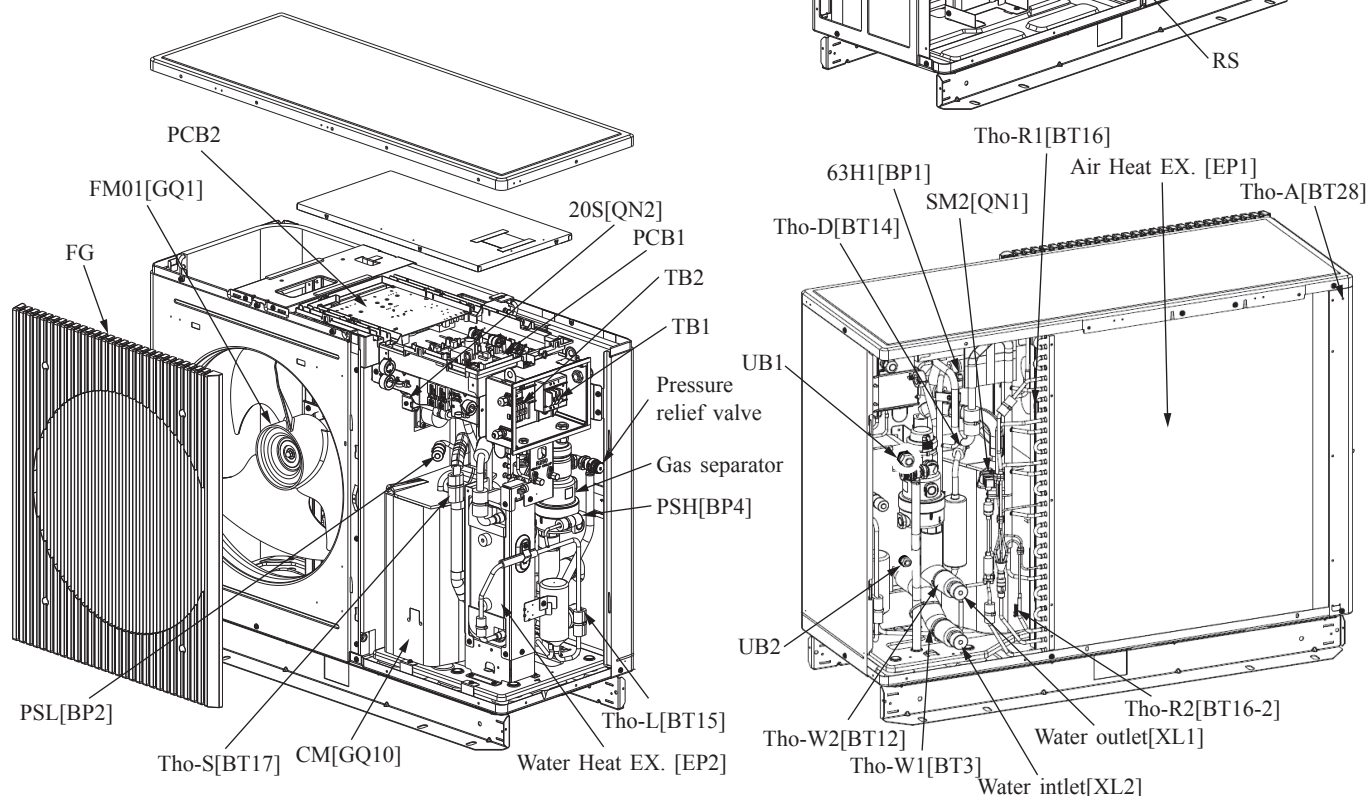
NOTE

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

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 return
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, outdoor
RS	Refrigerant sensor

Electrical components

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

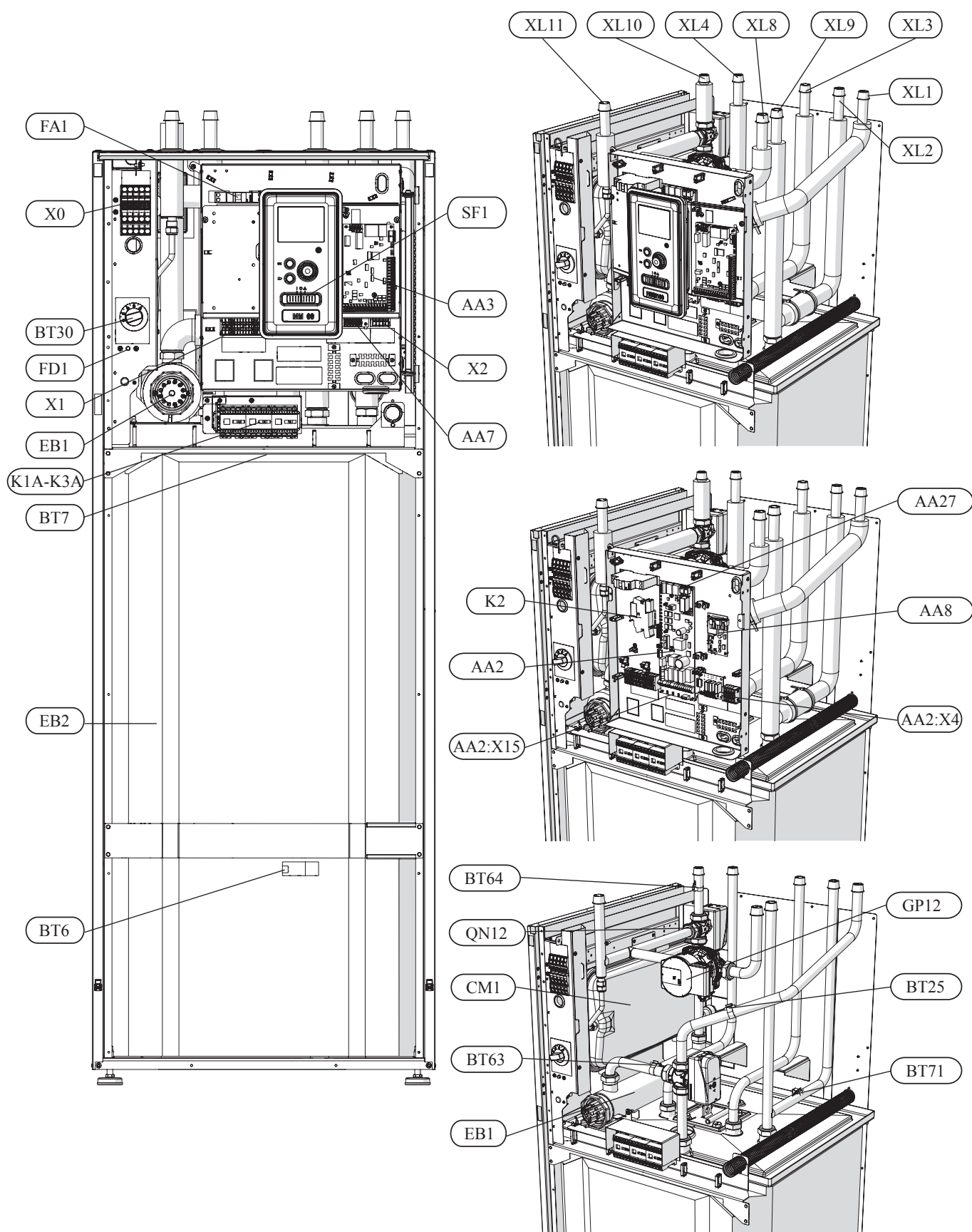
Cooling components

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 source
UB2	Cable gland, communication
FG	Fan guard

HMM100



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

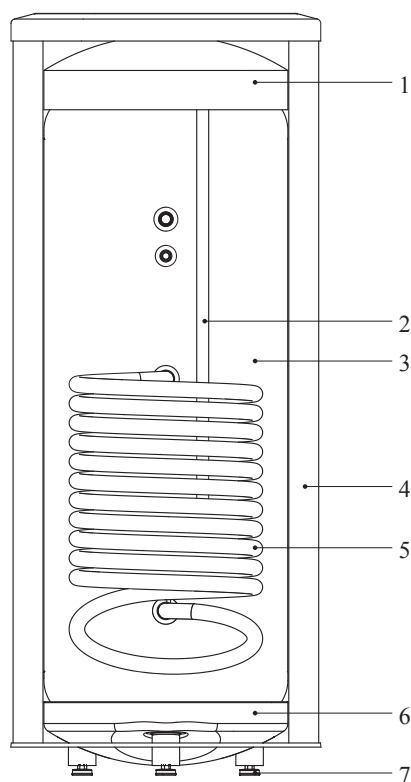
BT6	Temperature sensor, hot water loading
BT7	Temperature sensor, top of the hot water heater
BT25	Temperature sensor, heating medium supply
BT63	Temperature sensor, heating medium supply downstream the submersible heater
BT64	Temperature sensor, cooling medium supply
BT71	Temperature sensor, heating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

Electrical elements

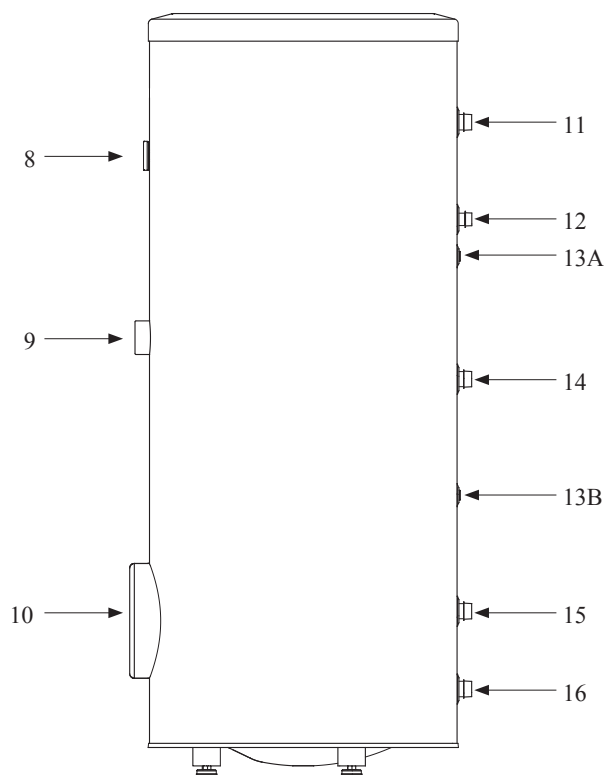
X0	High voltage terminal block 400V–/230V–
X1	Low voltage terminal block 230V–
X2	Low voltage terminal block 230V–
AA2:X4	Low voltage terminal block
AA2: X15	Low voltage terminal block
K1A-K3A	Submersible heater switch
K2	Alarm relay
BT30	Thermostat - emergency mode
AA2	Main card
AA3	Sensor card
AA7	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

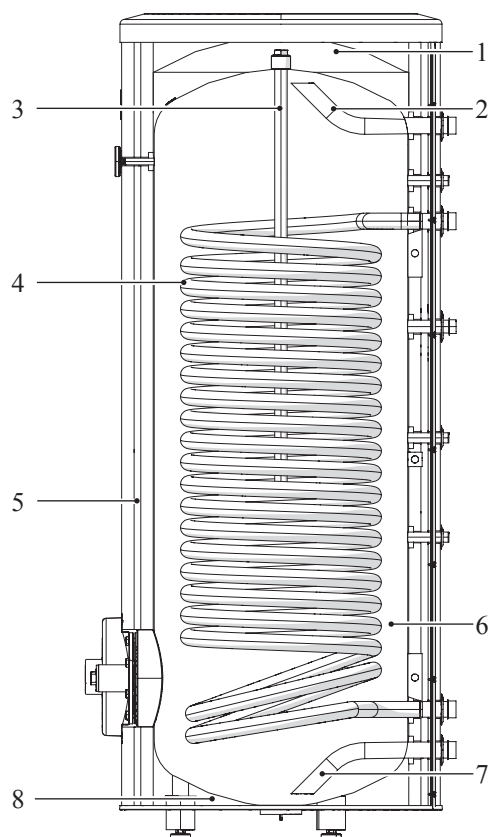
PT300**Section of the PT300 storage tank**

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 storage tank**

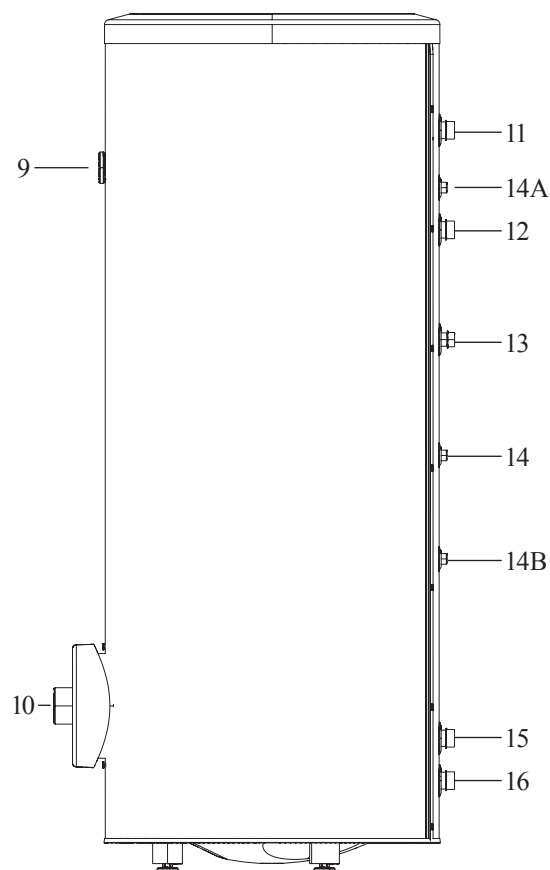
8. Thermometer
9. Connector pipe for mounting electric heating unit
10. Inspection opening
11. Hot water intake connector pipe
12. Hot water circulation connector pipe
- 13A. BT7 temperature sensor cover
- 13B. BT6 temperature sensor cover
14. Coil supply connector pipe
15. Connection of return line from the coil
16. Cold water supply connector pipe

PT300-V2



Section of the PT300-V2 storage tank

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



Side view of the PT300-V2 storage tank

9. Thermometer
10. Inspection opening with 1 1/2" 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
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
Min. volume, climate system during underfloor cooling	80L	80L
Max. flow, climate system	0.42L/s	0.5L/s
Min. flow, climate system (only heating mode)	0.08L/s	0.12L/s
Min. flow, climate system (with cooling mode)	0.11L/s	0.15L/s
Nominal system flow (heating mode)	0.26L/s	0.40L/s
Nominal system flow (cooling mode)	0.36L/s	0.43L/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.

Pipe installation

General

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

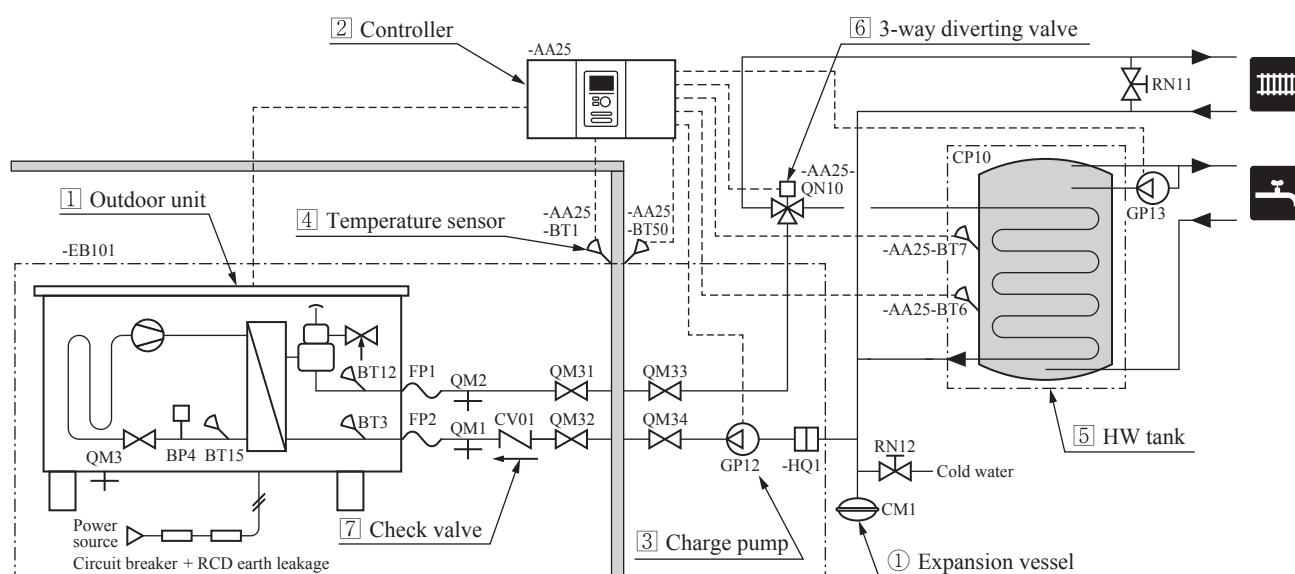
This heat pump is designed for low (35°C) and medium (55°C) temperature space heating systems but it is possible to reach an outgoing temperature of 75°C with the compressor.

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	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	Indirect domestic hot water storage tank PT300/PT300-V2 - 300 L(1coil)
⑥	3-way diverting valve [QN10]	VST05M VST11M	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 cooled 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)

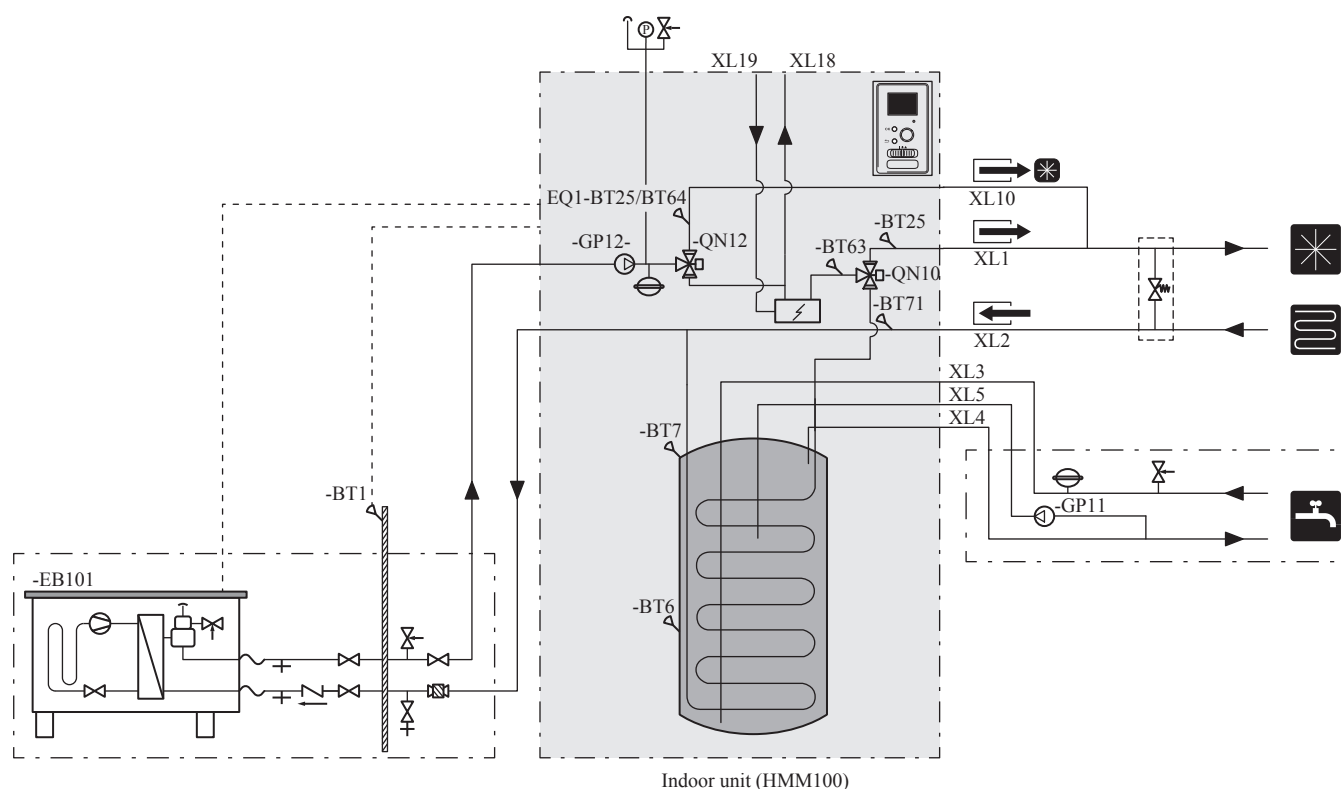
Outdoor unit	With under floor cooling application	Without under floor cooling application
FDCM60VNX-P FDCM71VNX-P	80	50

If these values are not fulfilled, 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



	Cut-off valve		Circulation pump		Domestic hot water
	Non-return valve		Electric heating		Relief valve
	3-way valve		Compressor		Additional heat source
	Safety valve		Plate heat exchanger		Buffer vessel
	Temperature sensor		Cooling operation		Fan coil
	Expansion vessel		Central heating system (under floor heating systems)		Option components
	Pressure gauge				
	Automatic air vent				
	Filterball valve				
	Drain valve				

Overflow valve

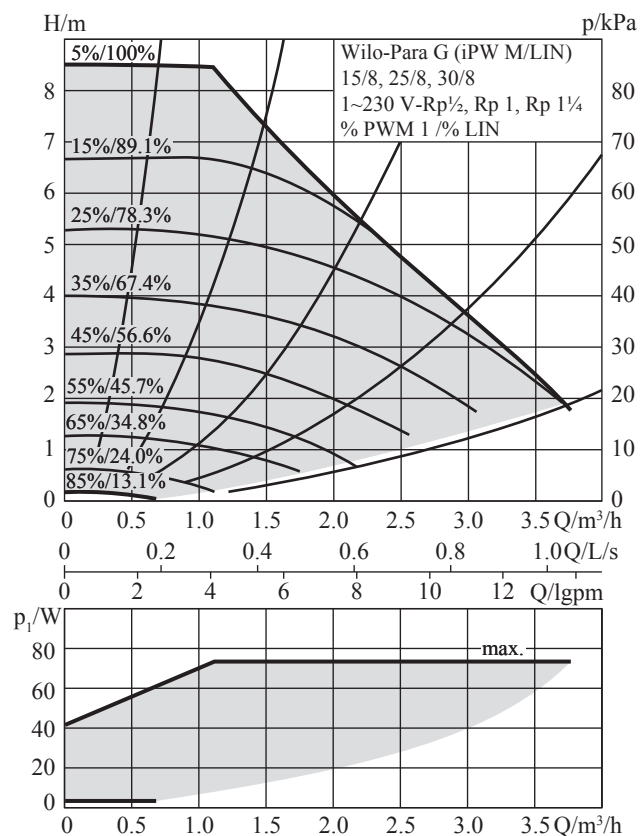
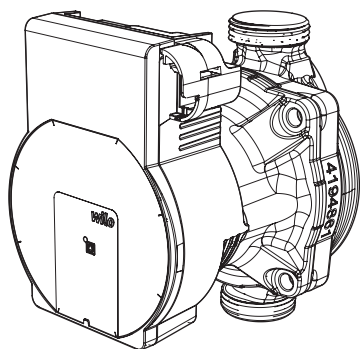
NOTE

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

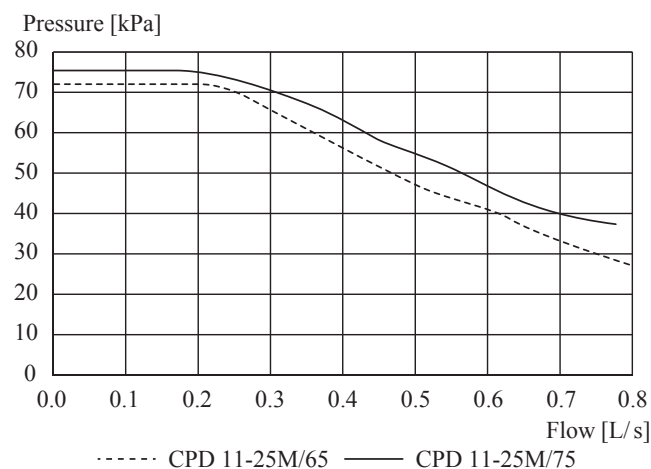
HMM100

The circulation pump in HMM100 is controlled by frequency and is automatically regulated via control and based on the heating / hot water demand.



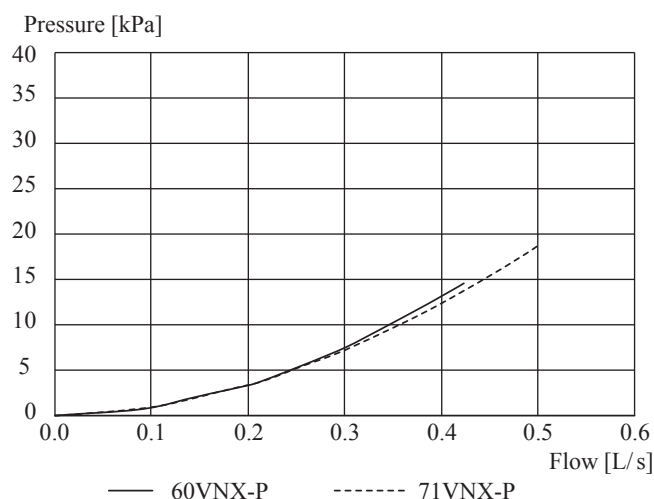
CPD11-25M/65, 75

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



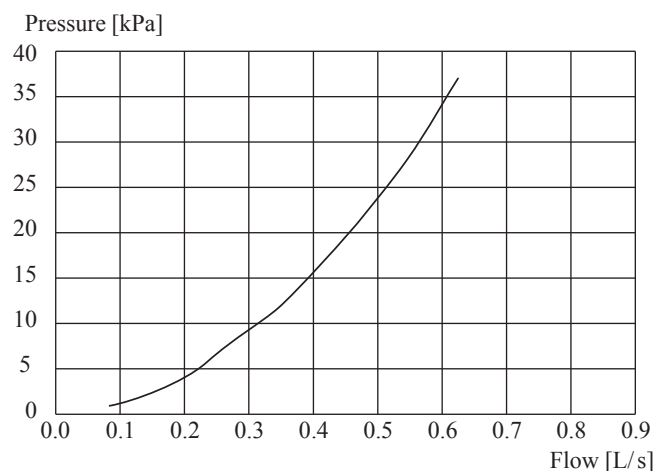
Pressure drop on the outdoor unit

FDCM60/71VNX-P



Pressure drop on the indoor unit

HMM100



Connection of extra circulation pump

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

NOTE

Non-return valve must be installed in case extra circulation pump is used.

The circulation pump may become damaged.

Water circuit

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, 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 79).*

- Anti-freeze valves: it is recommended to install anti-freeze valves in case of cold climate application to protect the system from freezing in case of temporary power failure.

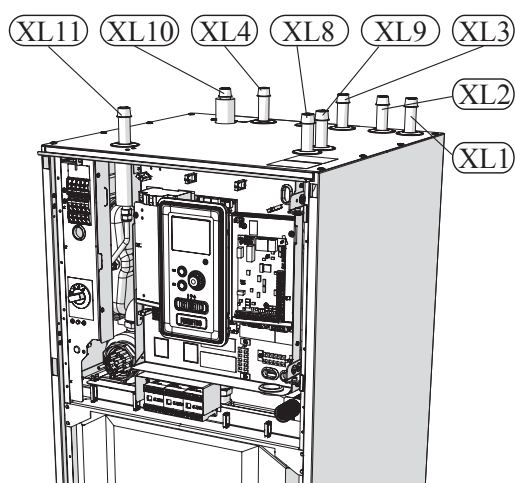
* included in HMM model

For further details about options and required system components generate your drawing using the selection software tools. These are provided by your local distributor.

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 FDCM60/71VNX-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 XL11 and XL4. 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 FDCM60/71 VNX-P outdoor unit, it is necessary to connect PT300/300-V2 tank unit applying 3-way valve in order to use domestic hot water function.

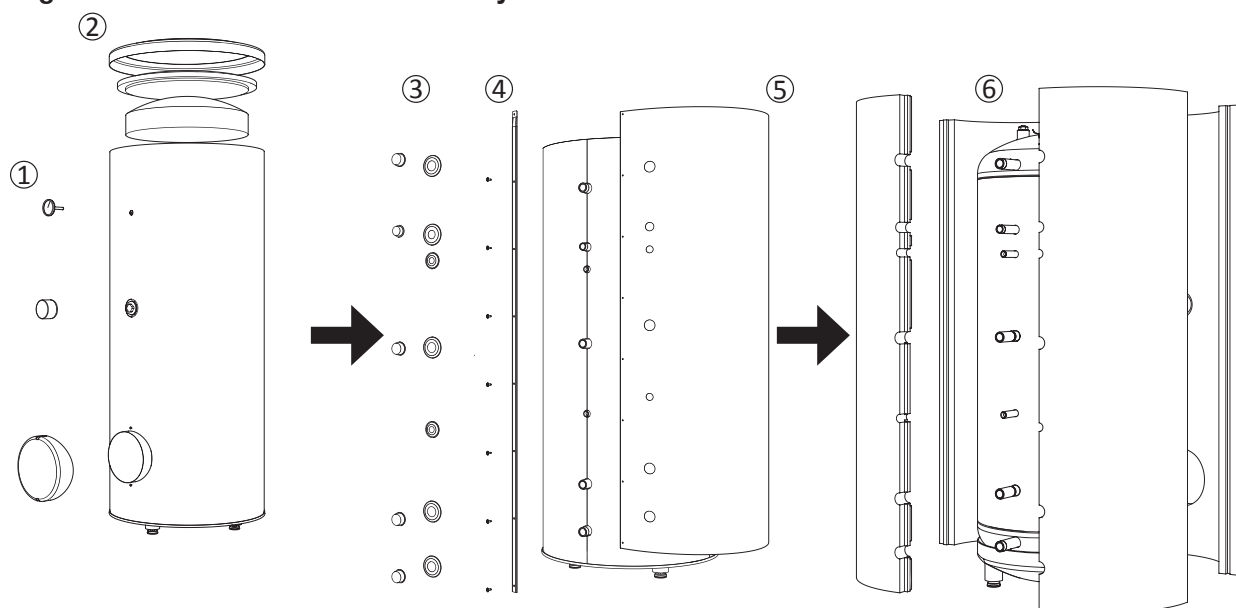
Housing disassembly of tank unit

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 information on its safe use.

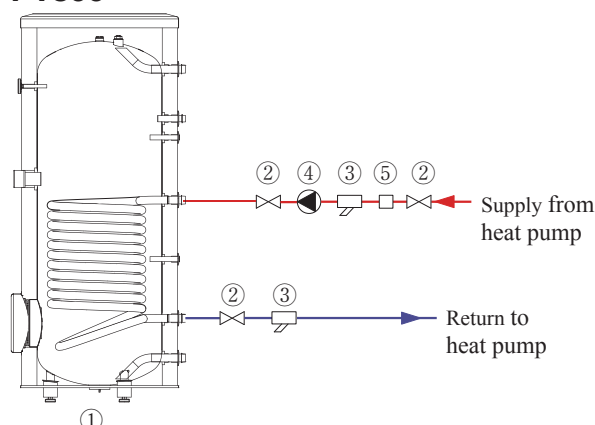
Information

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

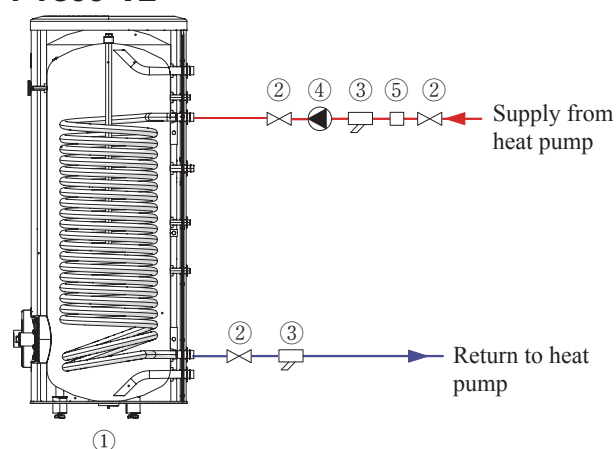
- Maximum piping length between outdoor unit and tank is 10 m.
- Tank unit should be placed on firm, preferably a concrete floor or foundation.
- Tank unit can be aligned using the adjustable feet.
- Protection against overpressure shall be made in accordance with the relevant regulations.
- Connect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

Installation diagram of the PT storage tank with one coil.

PT300



PT300-V2



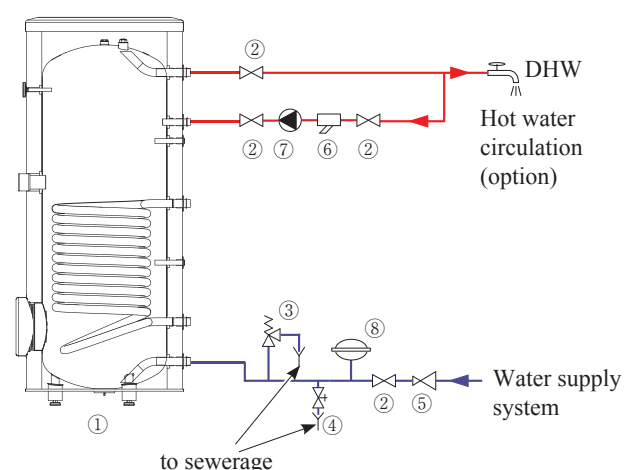
- ① PT storage tank
- ② Cut-off valve
- ③ Strainer
- ④ C/H circulating pump
- ⑤ Vent valve

Connecting hot water tank to water main

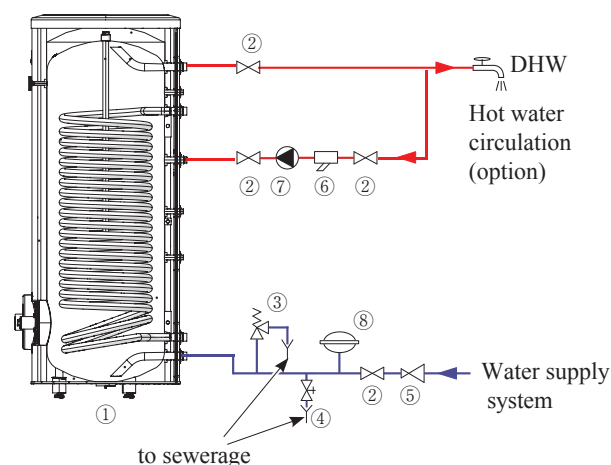
- Install a mixing valve if the temperature exceeds 60 °C.
- It is recommended to install a thermostatic mixing valve for stable temperature hot water supply.
- Connect the storage tank to the water supply system of water pressure at least 1 bar and max. 10 bar. Install a pressure reducer if the pressure 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



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 pages 38,39.)

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

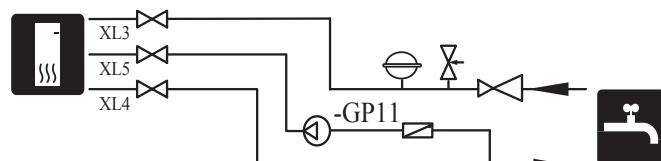
Hot water circulation function is available for PT300/300-V2 and for HMM100.

DHW circulation

NOTE

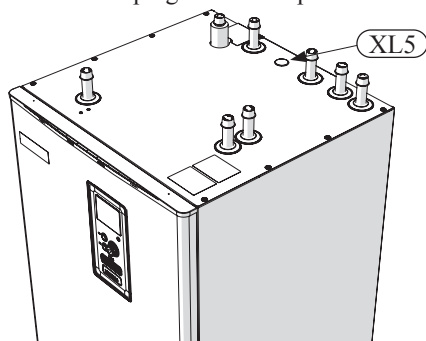
If connection AA3: X7 is used for another purpose, an additional AXC30M is required to connect the hot water circulation pump control.

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

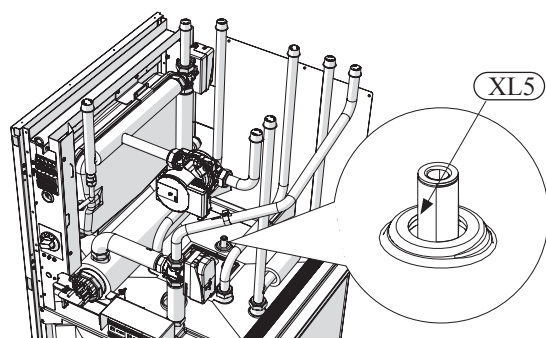
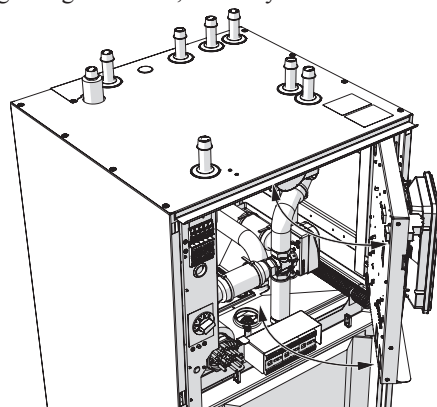


To connect the circulation:

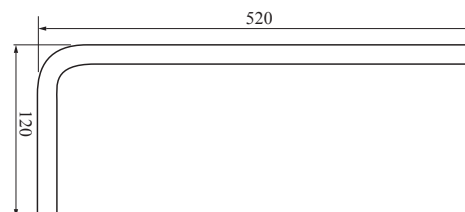
1. Remove the XL5 plug from the top of the housing.



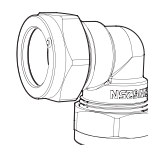
2. Remove the front panel, then move the control box to the right to gain access, to the hydraulic connections.



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

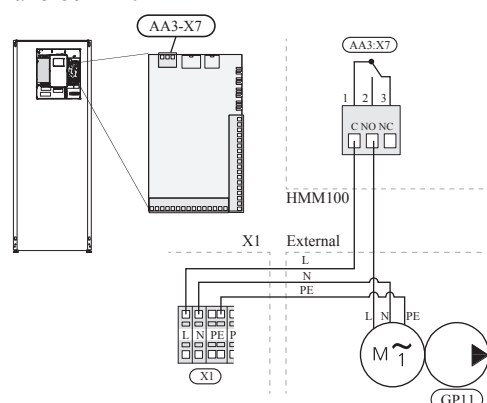


Elbow 15x15

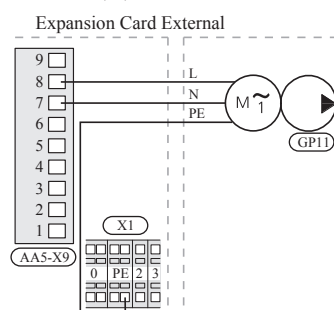
Connecting the control of the hot water circulation pump

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



AA5 card is included in the accessory card AXC30M. See AXC 30M installation manual for more information.

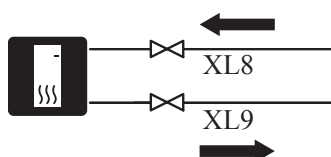
HMM100

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 particulate filter.

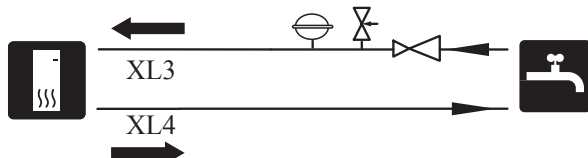
Docking without heat pump

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.

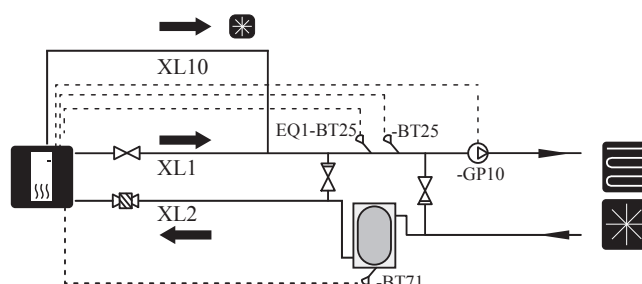
Docking the climate system

When connecting to a system with thermostatic valves on all radiators/under floor heating circuits, use the appropriate hydraulic solutions which ensure the proper heating medium volume and minimum, undisturbed flow. See the subsection "Buffer vessel".



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 like the diagram below with buffer tank/valve.

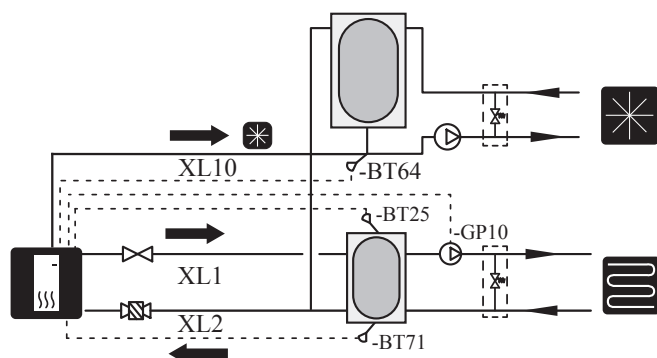


NOTE

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 BT64.

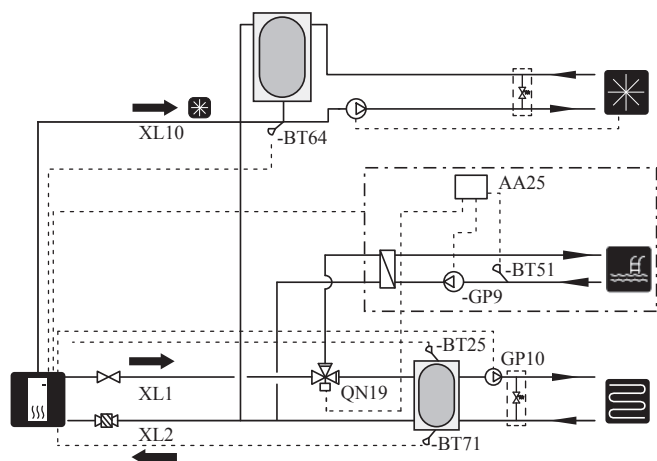


NOTE

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

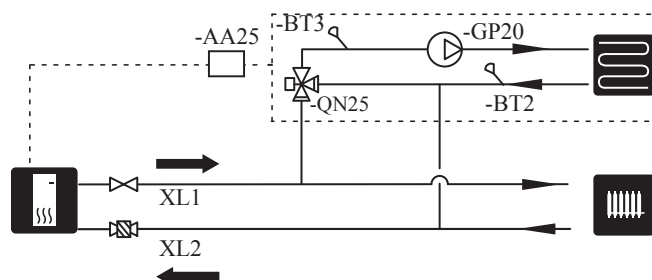
Connecting the 4-pipe cooling operation system and pool heating

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 AXC30M card or ready-to-use ECS40M/41M kit has been put into use, an additional heating/cooling circuit can be activated using the controller.

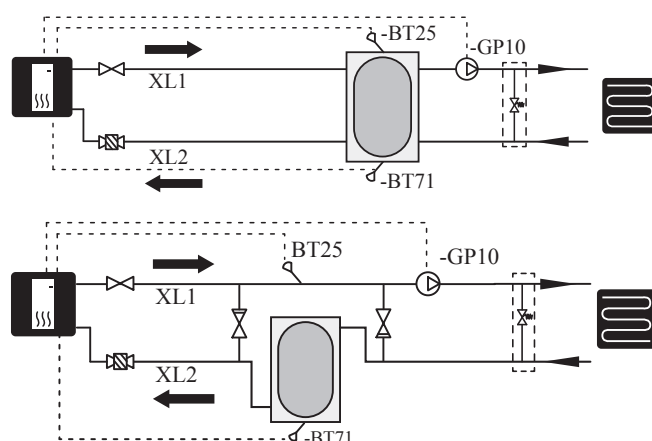


Additional accessories and the connection options and methods for these are described in the instructions for AXC30M and ECS40M/41M.

Buffer circuit

When connecting to a system with thermostatic valves on all radiators/under floor heating pipes, use the appropriate hydraulic solutions which ensure the proper heating medium volume and minimum, undisturbed flow. See the sub-section “Buffer vessel” and “Minimum system 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.

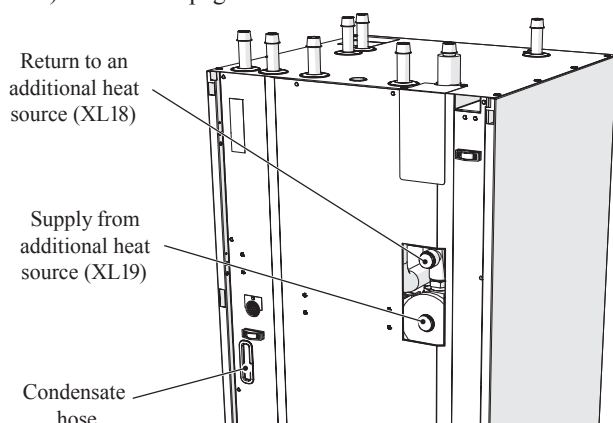


Connection of external heat source

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). Scheme on page 37.



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 source 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 pressurisation 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 0.5mm² up to 50m, for example EKKK, LiYY or equivalent.
- Use 3 cores cable for communication between controller (RC-HY20/40-W) and outdoor unit (FDCM60/71VNX-P). Same applies for communication between outdoor units (cascade connection). Never use a shield cable.
- 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

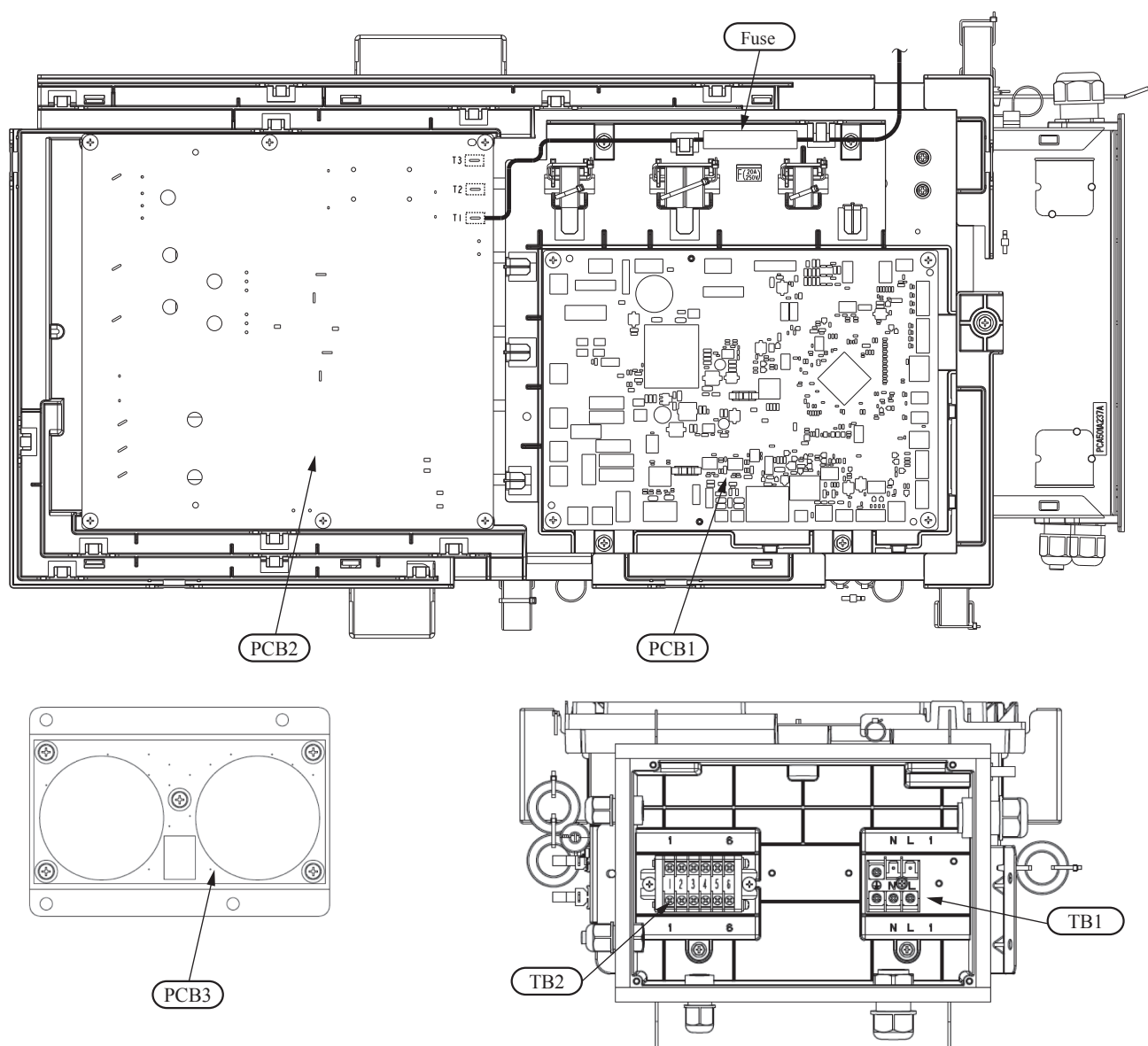
Electrical installation work must be performed by an electrical installation service provider qualified by a power provider of the country.

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 IEC51),
 - ordinary tough rubber sheathed cord (code designation 60245 IEC53)
 - flat twin tinsel cord (code designation 60227 IEC41);
- 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 source 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.
- 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.)
- 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.
- Fasten cables so that they may not touch the piping, etc.

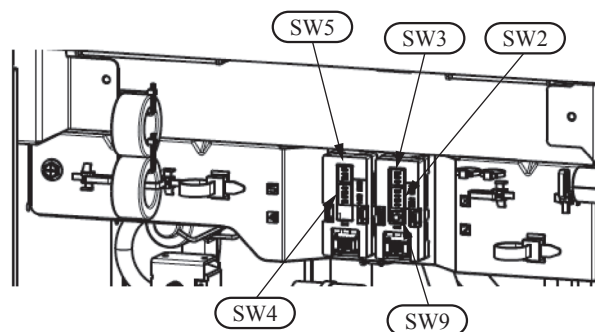
Electrical components

FDCM60/71VNX-P

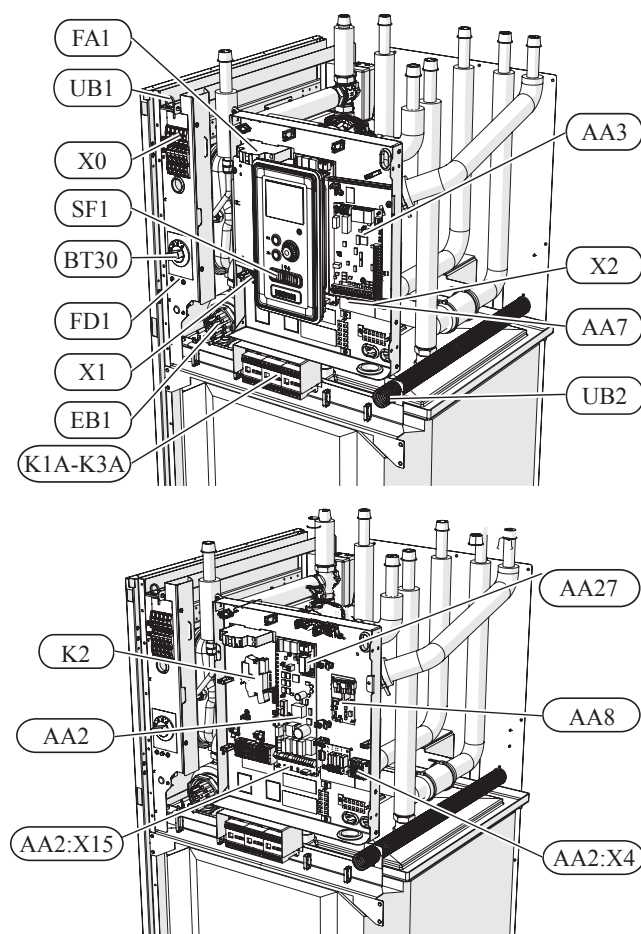


Explanation

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



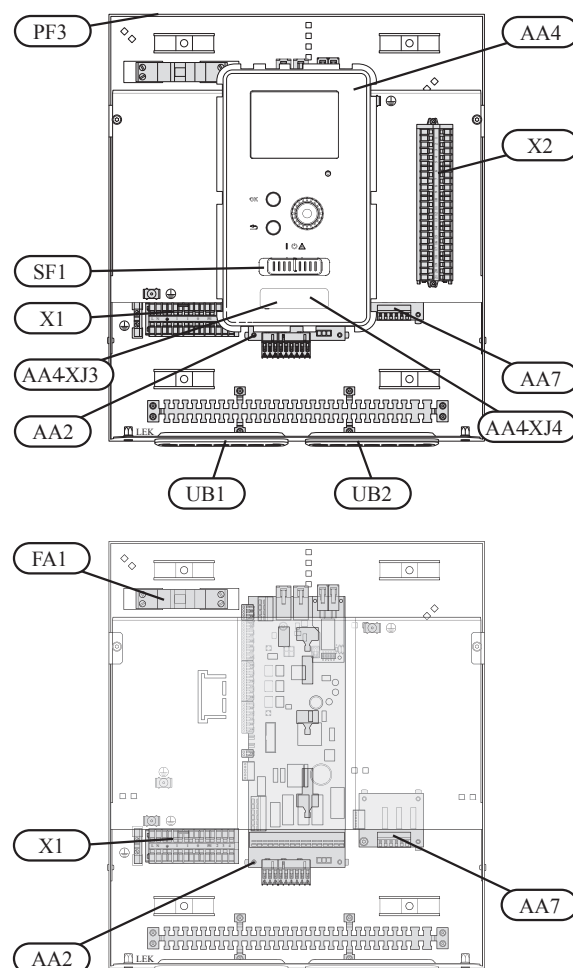
HMM100



Explanation

X0	Power terminal 400V-/230V-
X1	Control panel terminal block
X2	Control panel terminal block
FA1	Miniature circuit breaker (protecting the control system of indoor unit)
K1A-K3A	Electric additional heat contactor
BT30	Thermostat, emergency mode
AA3	Sensor card
AA7	Relay card
FD1	Thermal circuit breaker
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

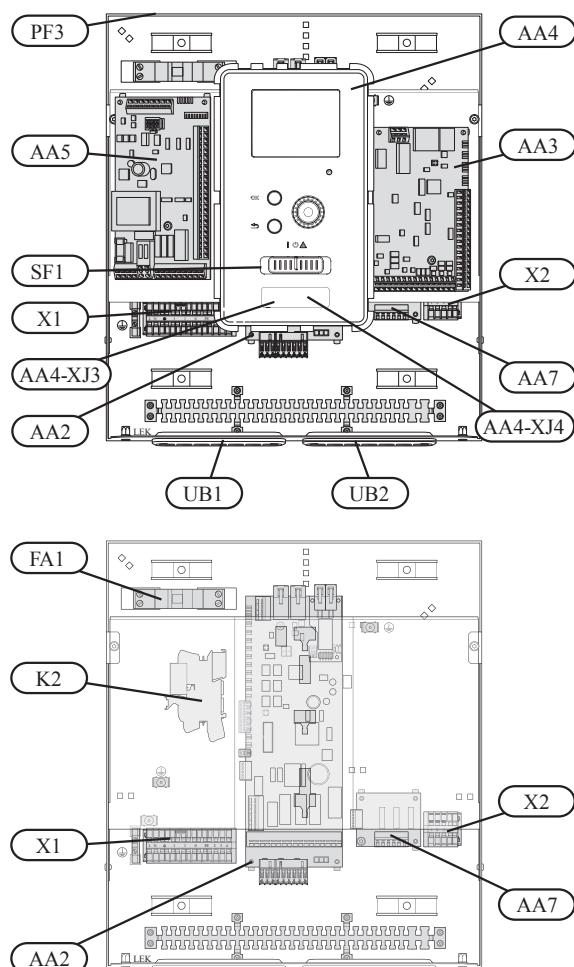
RC-HY20-W



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

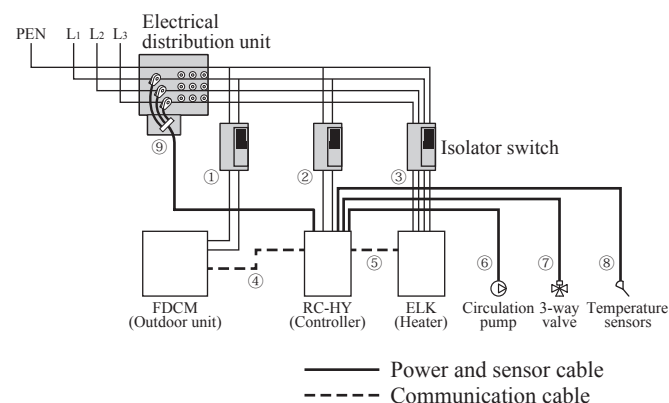
RC-HY40-W



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	3cores, 2.5mm ² (Power cable)
②	Power - Controller	3cores, 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 mm ² (Communication cable)
⑤	Controller <-> Electrical heater	4cores, 0.5mm ² (Communication cable)
⑥	Controller <-> Circulation pump	3 cores, 0.75 mm ² (Power cable) 2 cores, 0.5 mm ² (Communication cable)
⑦	Controller <-> 3-way valve	3 cores, 0.75 mm ² (Power cable)
⑧	Controller <-> Temperature sensors	2 cores, 0.5 mm ² (Each sensor)
⑨	Current sensor (RC-HY40-W only)	6cores, 0.5mm ²

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

NOTE

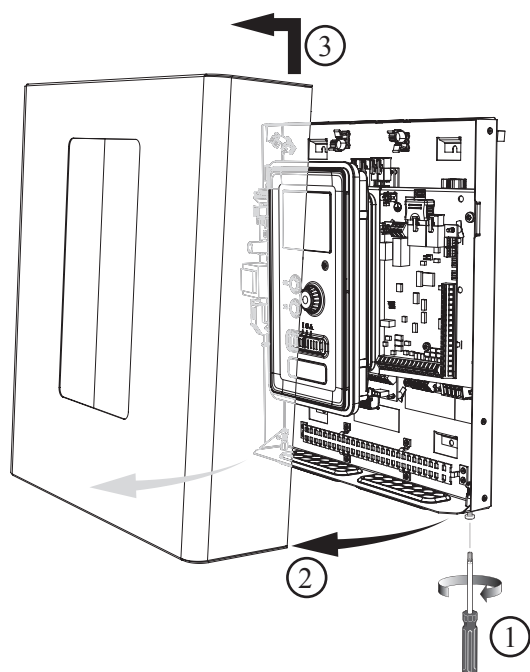
When laying cables into the controllers, make sure that the cables are groomed to avoid excessive resistance to the terminal blocks.

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

Accessibility, electrical connection

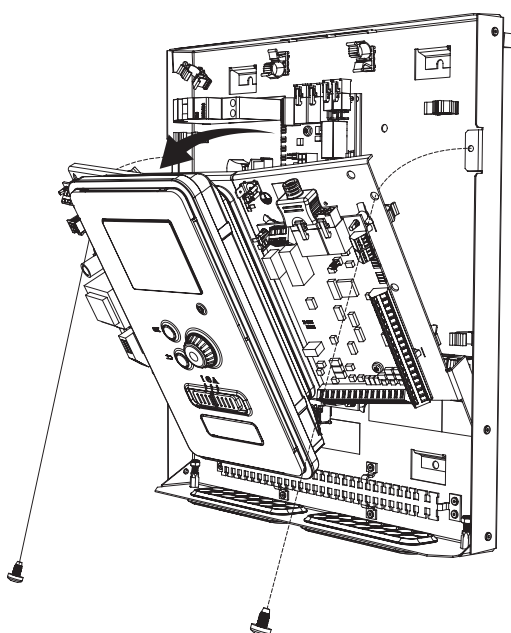
RC-HY20/40-W

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

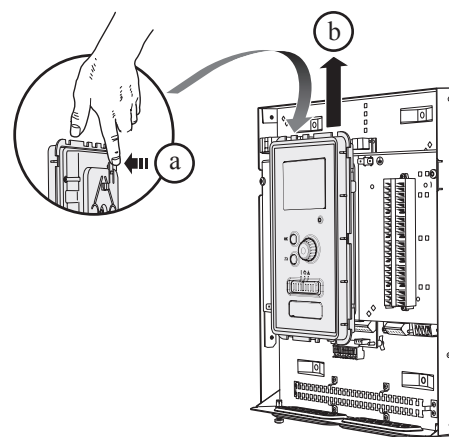


NOTE

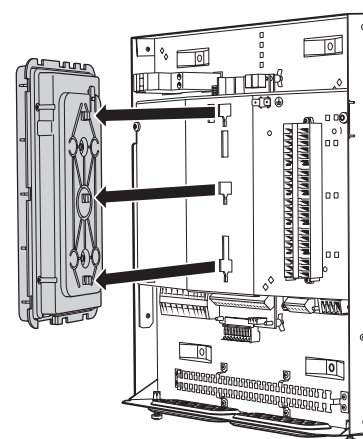
The cover to access the base board is opened using a Torx 25 screwdriver.



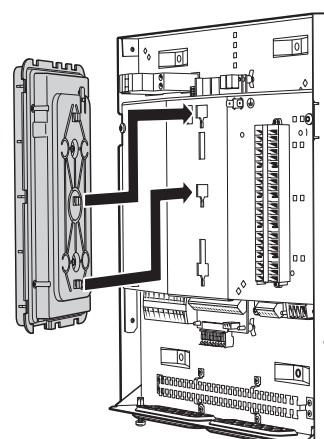
The display may need to be moved for easier access when connecting electrics. This is easily done by following these steps.



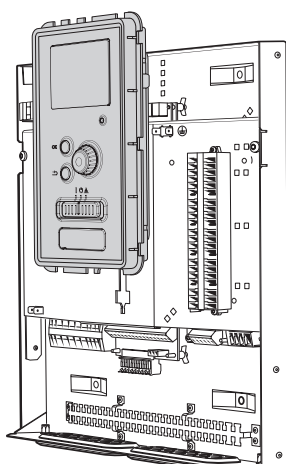
1. Press in the catch on the upper rear side of the display unit towards you (a) and move the display unit upwards (b) so that the mountings unhook from the panel.



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 -HMM100

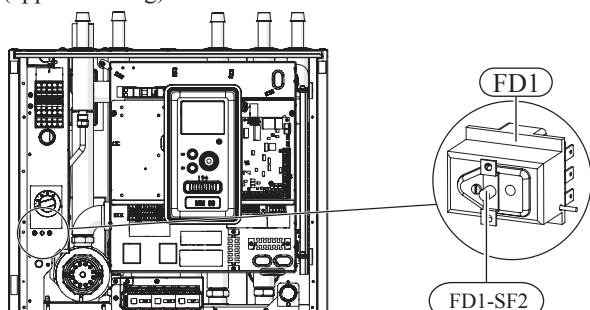
Temperature limiter (FD1) cuts off the power source of the electrical heating module if the temperature increases to the range of approximately 96°C or decreases below -8°C.

NOTE

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

Resetting -HMM100

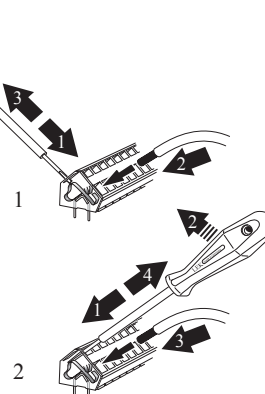
The thermal circuit breaker (FD1) is accessible behind the front cover. It is reset by pressing firmly on the button (FD1-SF2) using a small screwdriver. Press the button using max. force 15 N (approx. 1.5 kg).



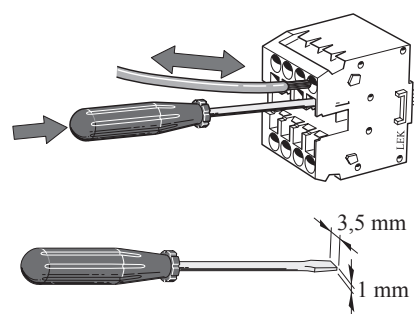
Cable lock

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

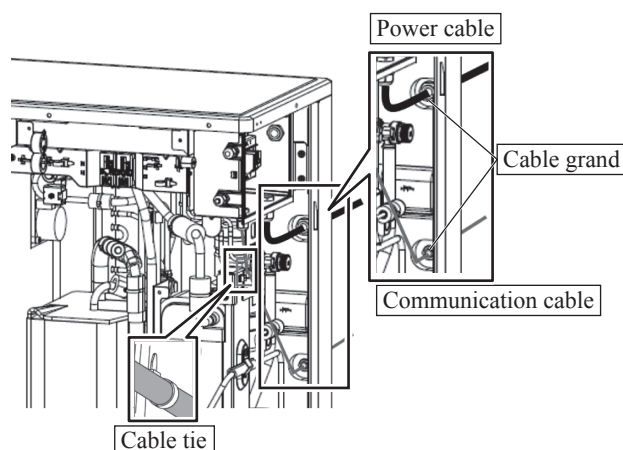
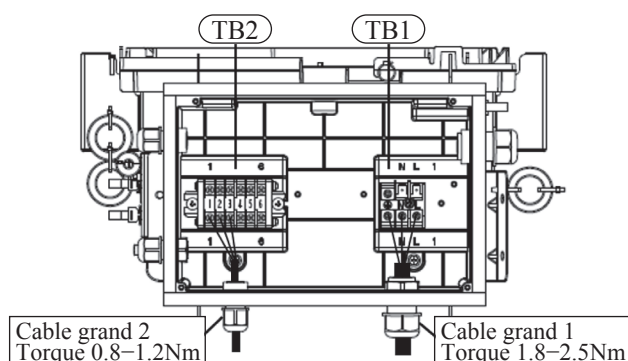
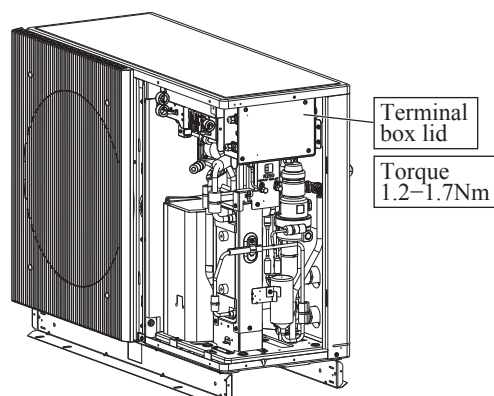
To connect the cable, you need to remove the terminal box lid.

For outdoor unit, power source 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 grand 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 not exceeding 40 m. 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.

Power source

Indoor unit

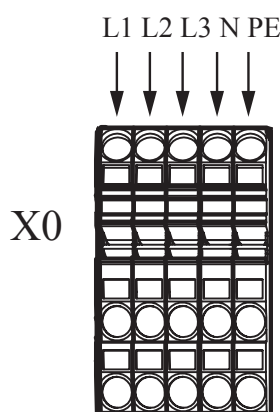
HMM100

Power source connection 400 V

The power source 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.

Diagram - connecting power source 400 V



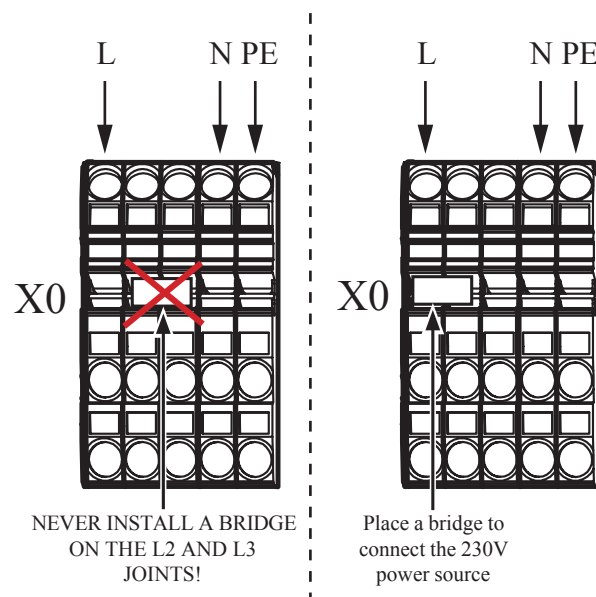
NOTE

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

Power source connection 230 V

The power source connection is connected to terminal block (X0) through the input on the back of the unit (UB1). The 230V connection allows for a maximum power of 6.0kW to the additional heating.

Diagram - connecting power source 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.

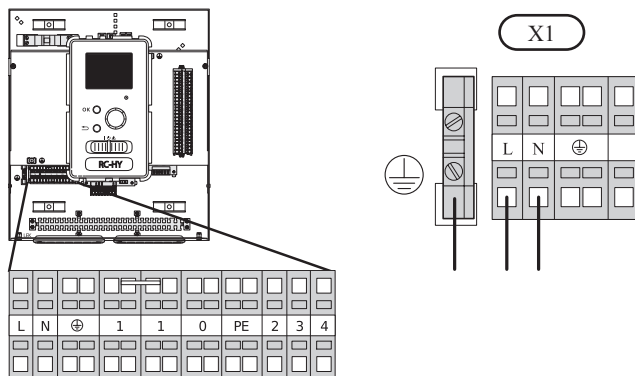
Recommended fuse size

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

	Recommended fuse size
FDCM60/71VNX-P	20A/230V 1AC 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

Controller (RC-HY20/40-W)

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



RC-HY20/40-W X1

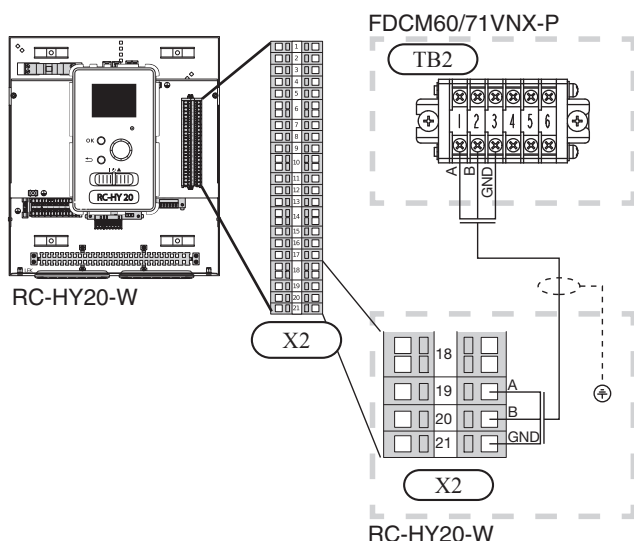
For RC-HY20-W detailed connection on communications, (communication, circulation pump, sensors, etc.) refer to contents from next chapter "RC-HY20-W - Connections".

For RC-HY40-W detailed connection on communications, (communication, charge pump, sensors, etc.) refer to page 106.

RC-HY20-W Connections

Communication with outdoor unit

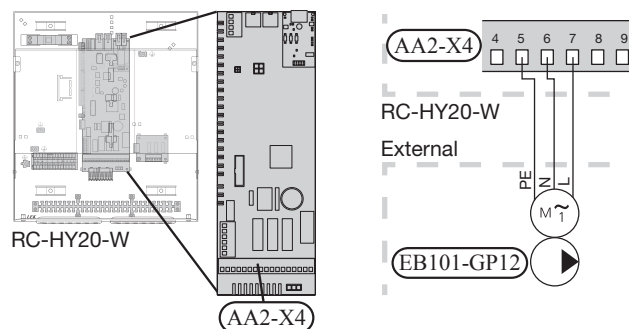
It is necessary to connect a signal cable to enable the communication between the controller and the outdoor unit. Connect the outdoor unit (EB101) with a screened three core cable to terminal block X2:19 (A), X2:20 (B) and X2:21 (GND) as illustrated.



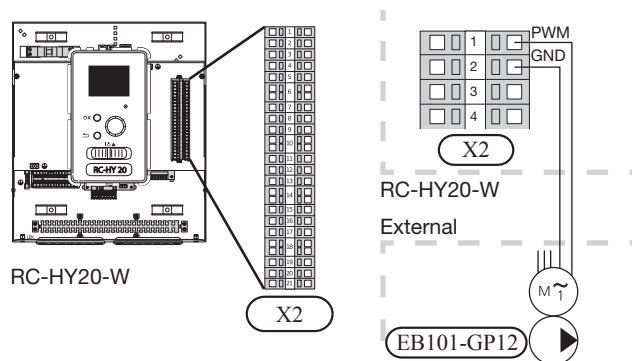
Circulation pump (GP12)

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 source to the terminal block X4:5 (PE), X4:6 (N) and X4:7 (L) on AA2 board as illustrated.



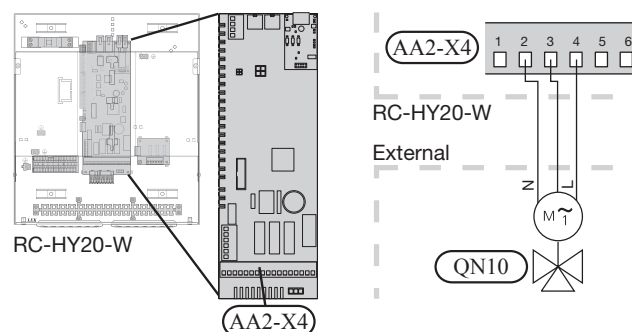
Connect the control signal cable to the terminal block X2:1 (PWM), X2:2 (GND) as illustrated.



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 cores cable with a minimum 0.5 mm² cross section.

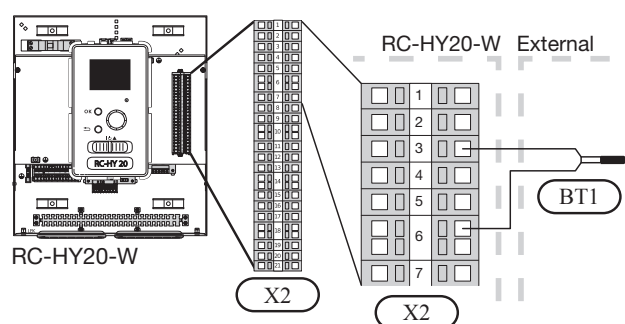
If any temperature sensor is not mentioned below, refer to option connection.

• Outdoor temperature sensor (BT1)

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

Connect the sensor to 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.

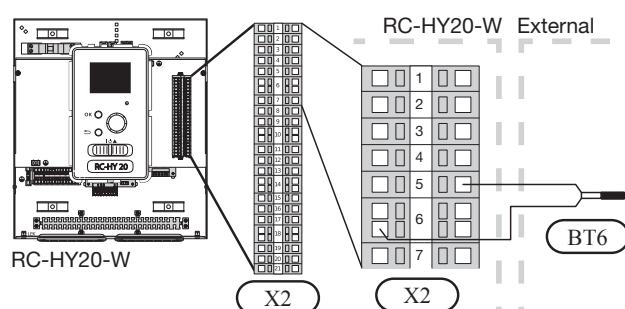


• Temperature sensor, hot water charging (BT6)

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.

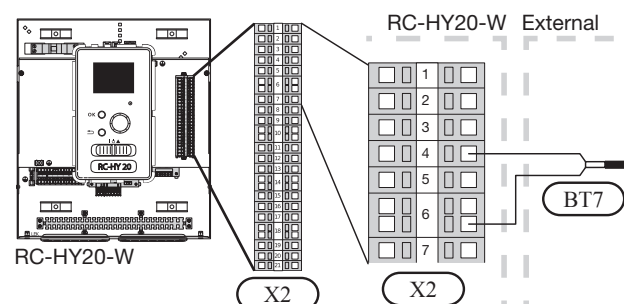
Hot water production is activated in menu 5.2 in the start guide or service menu.



• 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.

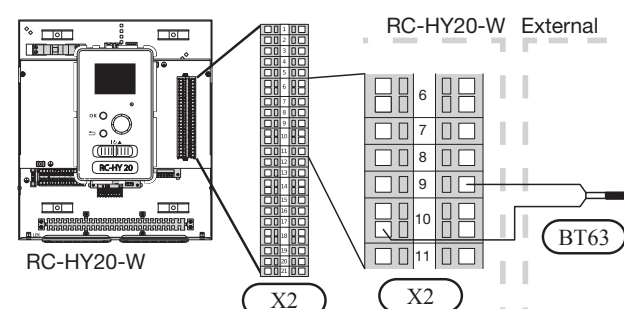
Connect the sensor to the terminal block X2:4 and X2:6 as illustrated.



• 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).

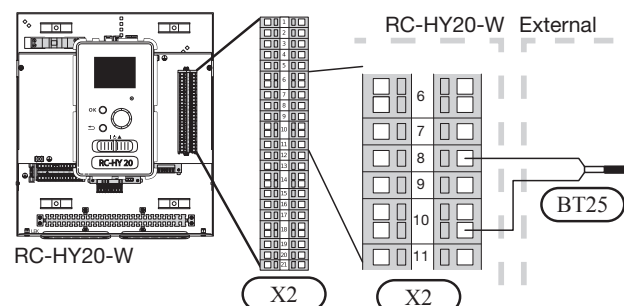
Connect the sensor to the terminal block X2:9 and X2:10 as illustrated.



• 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.



Option 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.

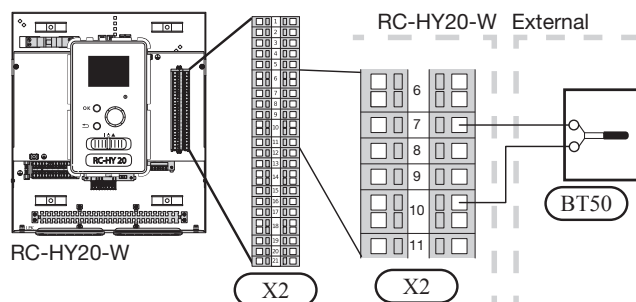
Do not install the room sensor where correct room temperature cannot be detected such as in a recess, between shelves, behind a curtain, above or close to a heat source, in a draft from an external door or in direct sunlight. Closed radiator thermostats can also cause problems.

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 indicative 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 under floor heating will not give a noticeable difference in room temperature.

• Step controlled additional heat

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). Alternatively two relays (2-step linear or 3-step binary) can be used for step controlled additional heat, which means that the third relay can be 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.

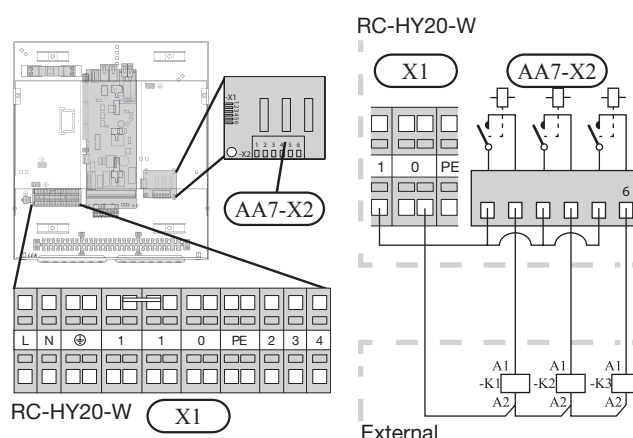
Step 1 is connected to terminal block X2:2 on the additional relay board (AA7).

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.

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.



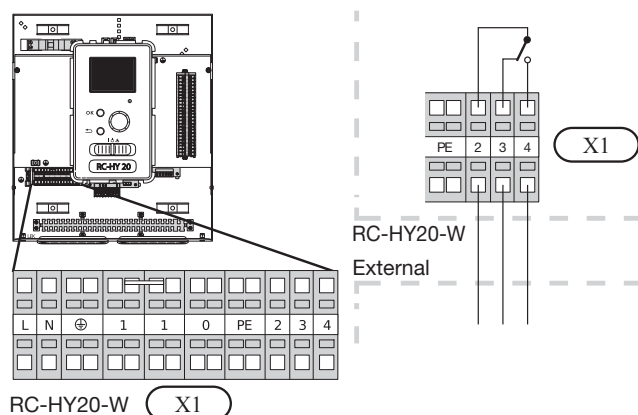
NOTE

Mark up any junction boxes with warnings for external voltage.

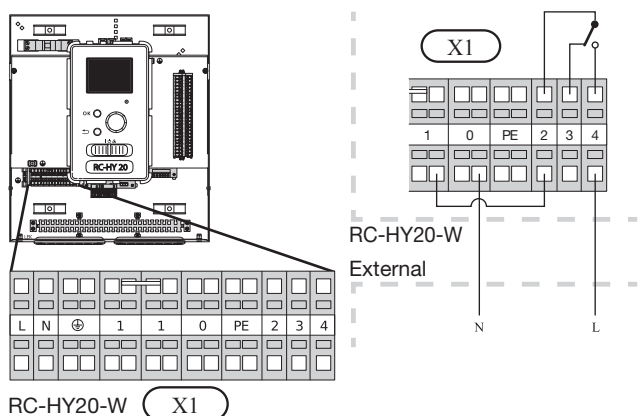
• Emergency mode

When the switch (SF1) is in "Δ" 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

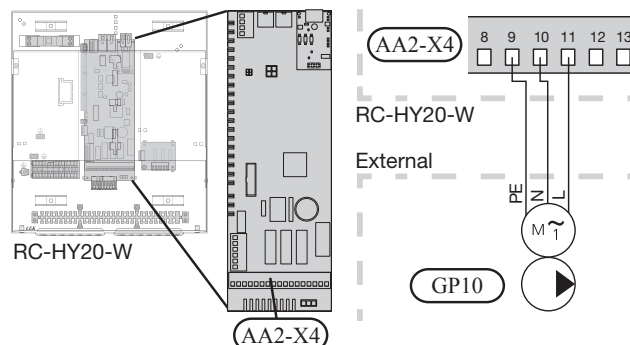
No hot water is produced when emergency mode is activated.

NOTE

Mark up any junction boxes with warnings for external voltage.

• External circulation pump (GP10)

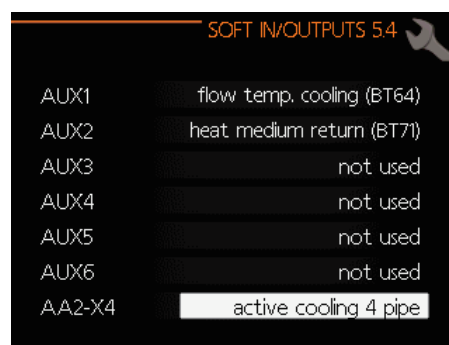
Connect the external circulation pump (GP10) to terminal block X4:9 (PE), X4:10 (N) and X4:11 (230V) on the AA2 board as illustrated.



• AUX inputs

On terminal block X2, RC-HY20-W has software controlled auxiliary (AUX) inputs and outputs for connecting the external switch function or sensor.

This means that when an external switch function or sensor is connected to one of the six available inputs, this function must be selected in menu 5.4:



The available external inputs are:

- Temperature sensor, cooling/heating (BT74)
Additional room sensor (BT74) is applied in case user wants to determine the operation mode (cooling/heating) with a temperature in a particular room.
This option can be chosen only in case cooling function is available.
- Temperature sensor, external return line (BT71)
Temperature sensor BT71 is applied in case additional heater is placed after 3-way valve.
- Temperature sensor, flow line cooling (BT64)
Temperature sensor BT64 is required in case 4-pipe system is used for cooling operation. This option can be chosen only in case cooling function is activated.

■ Contact for external tariff blocking

In cases where external tariff blocking is required it must be connected to terminal block X2.

Tariff blocking means that the additional heat, the compressor, heating and cooling are disconnected by connecting a potential-free switch function to the input selected in menu 5.4.

A closed contact results in the electrical output being disconnected.

■ Switch for “SG ready”

NOTE

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

This function can only be used in power source networks that support the “SG Ready” standard. “SG Ready” requires two AUX inputs.

“SG Ready” is a smart tariff management scheme in which electricity supplier can affect indoor and hot water temperature or simply prohibits additional heat and/or the compressor operation in heat pump at certain period of the day. You can choose which operation mode is affected by this function in menu 4.1.5 after the function is activated.

Choose two external input circuits and connect potential-free switches, and set “SG Ready A” and “SG Ready B” in menu 5.4. The system works differently according to the combination of the circuit open/closed.

- Blocking (A: Closed, B: Open)

“SG Ready” is active. Compressor operation and additional heat is prohibited.

- 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 operates to provide higher capacity than normal mode by using lower tariff electricity. You can select the operation mode (heating/hot water/cooling) affected by this function in menu 4.1.5.

- Overcapacity mode (A: Closed, B: Closed)

“SG Ready” is active. The system supplies higher capacity than Low price mode since the electricity price is supposed to be very low in this mode. You can select the operation mode (heating/hot water/cooling) affected by this function in menu 4.1.5.

■ Contact for activation of “temporary lux”

Temporary hot water production function “temporary lux” is activated with this signal. Connect the terminals with a potential-free switch and choose the function in menu 5.4. “Temporary lux” is activated only when the switch is closed.

■ Contact for activation of “external adjustment”

Target temperature offset for supply temperature or room temperature can be done with this signal.

When a room sensor is connected and activated, the target room temperature is offset in °C if the switch is closed.

When a room sensor is not connected, target supply water temperature (heat curve) is offset instead.

The degree of offset can be set in menu 5.4.

■ Switch for external alarm

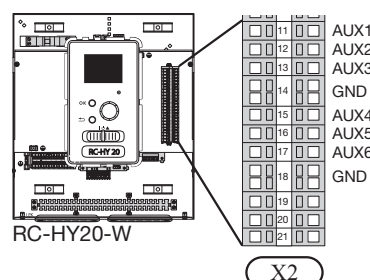
Alarms from external devices can be connected to the control and appear as an info alarm. Potential-free signal of NO or NC type can be connected.

■ Switch for external blocking

This function is used in case certain operation mode needs to be prohibited. The operation at selected operation mode is prohibited when the switch is closed. Following functions can be managed.

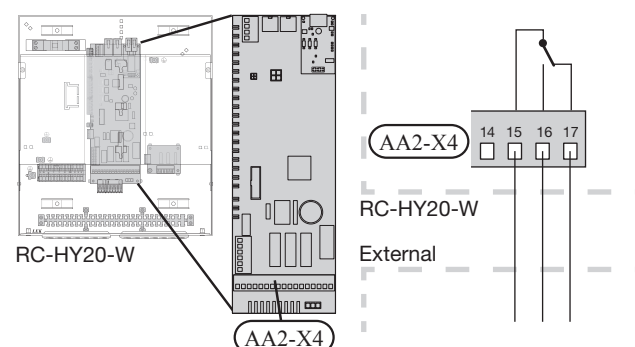
- Additional heat
- Compressor operation
- Heating mode
- Cooling mode
- Hot water mode

Connect the auxiliary inputs to the terminal block X2:11-17 and X2:14 or X2:18 (GND) as illustrated. X2:14 and X2:18 are common to all auxiliary circuits.



• AUX outputs

External output is available on the port 15 to 17 on X4 terminal on AA2 board on RC-HY20-W. The relay output can have a max. load of 2A at resistive load.



The following functions are available. Select the function in menu 5.4.

■ Indication of buzzer alarm

When an alarm occurs, the circuit becomes closed between the port 15 and 16. During normal operation, the port 15 and 17 is closed.

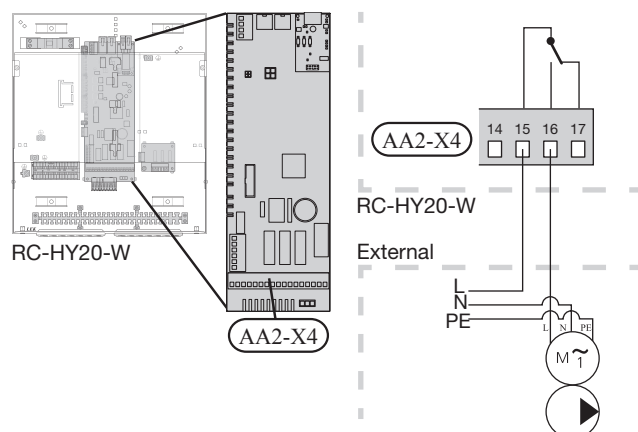
■ Cooling mode indication / Active cooling mode (4-pipe cooling)

When the system turns into cooling mode, the circuit becomes closed between the port 15 and 16. By using this signal, it is possible to switch 3-way valve for 4-pipe cooling (QN12) or to assemble a display circuit indicating cooling mode.

■ External pump control (GP10)

External pump (GP10) is used in case additional heater is placed after 3-way valve that switches heating/hot water.

Connect the circulation pump as shown below using the port 15 and 16 on X4 terminal.



■ Hot water circulation pump control (GP11)

In case the distance between hot water tap and hot water storage tank is far, the hot water supply line temperature is likely to drop and it may take time to supply hot water from the tap. In that case, hot water circulation pump (GP11) is applied to maintain hot water supply line temperature warm. (refer to page 81 for diagram.)

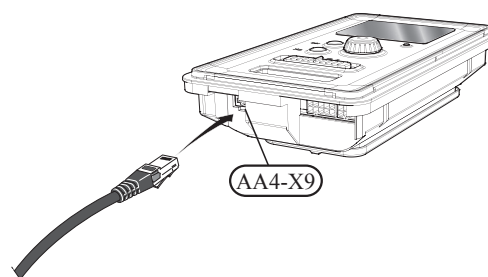
For details of connecting the pump, refer to External pump control (GP10).

NOTE

Mark up any junction boxes with warnings for external voltage.

• 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.



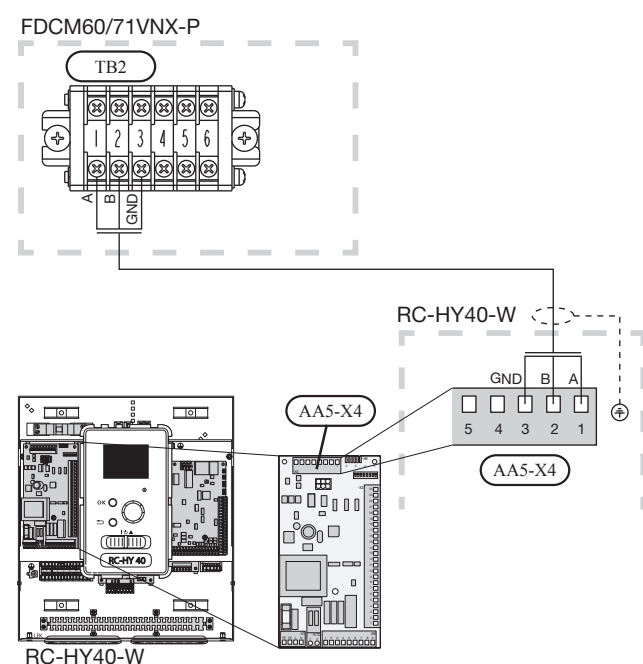
RC-HY40-W

Connections

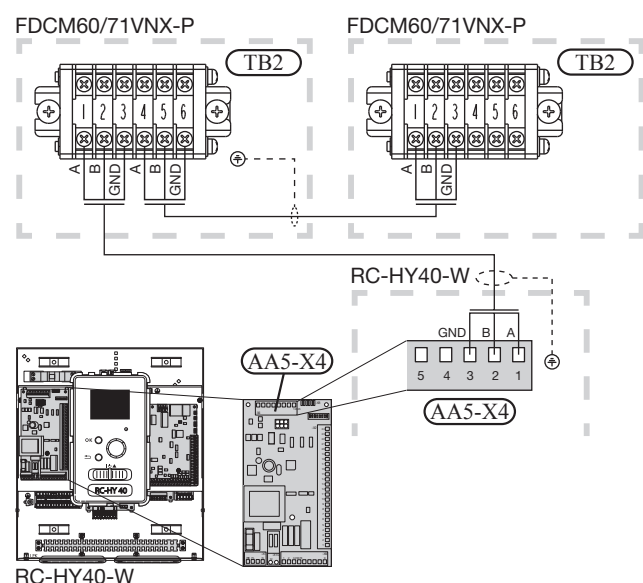
This chapter shows all the necessary and available connections with RC-HY40-W.

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 block in the 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 the side of outdoor unit controller 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

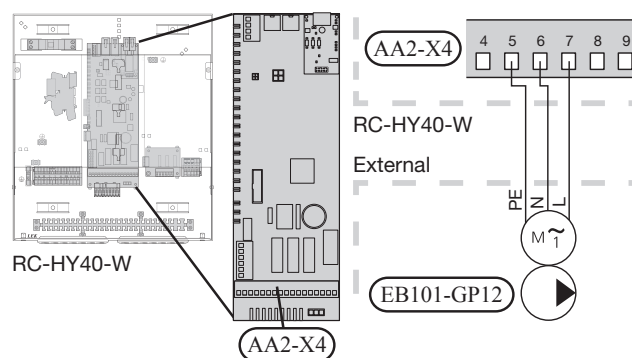
Circulation pump (GP12)

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

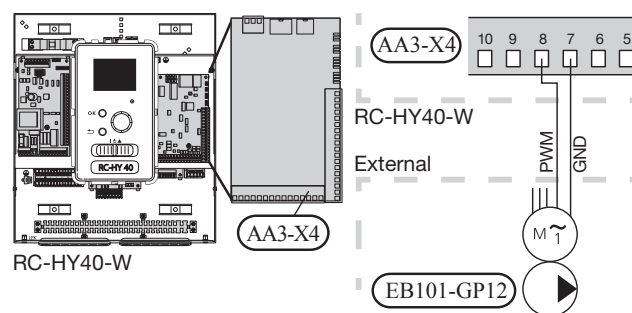
With RC-HY40-W it is possible to connect up to 2 circulation pumps, one for outdoor unit 1 (EB101) and outdoor unit 2 (EB102).

• GP12 for unit 1 (EB101)

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

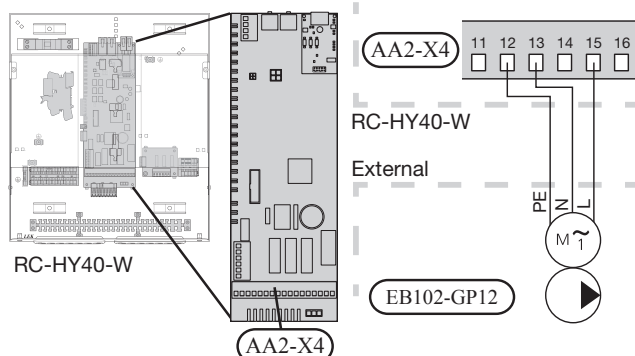


Connect the control signal cable to the terminal block X4:7 (PWM), X4:8 (GND) on AA3 board as illustrated.

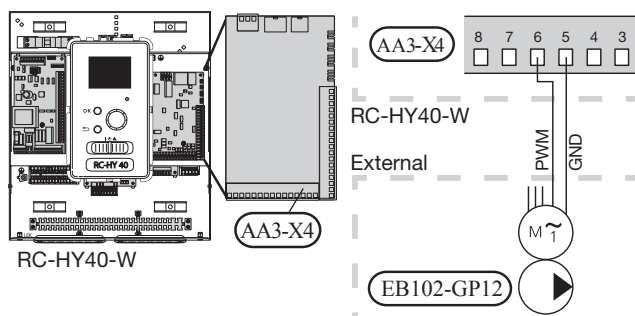


• GP12 for unit 2 (EB102)

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



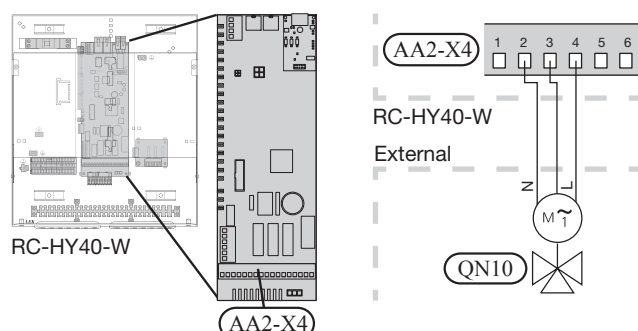
Connect the control signal cable to the terminal block X4:5 (PWM), X4:6 (GND) on AA3 board as illustrated.



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 cores cable with a minimum 0.5 mm² cross section.

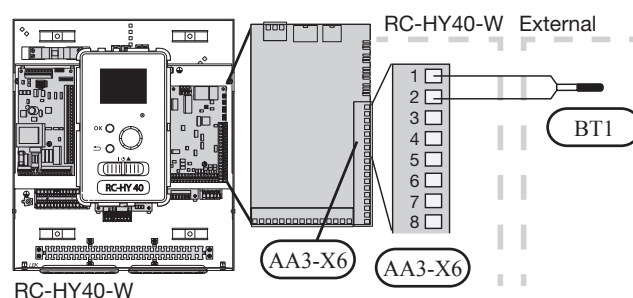
If any temperature sensor is not mentioned below please refer to option connection.

• Outdoor temperature sensor (BT1)

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

Connect the sensor to 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.

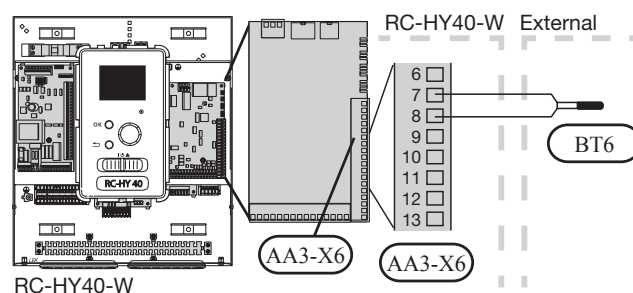


• Temperature sensor, hot water charging (BT6)

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.

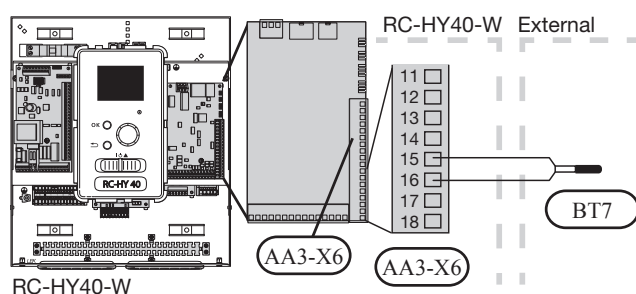
Hot water production is activated in menu 5.2 in the start guide or service menu.



• 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.

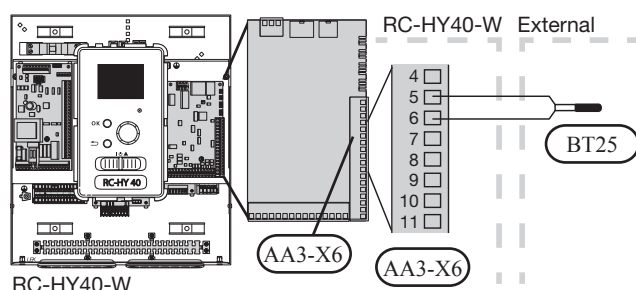
Connect the sensor to the terminal block X6:15 and X6:16 on AA3 board as illustrated.



• 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).

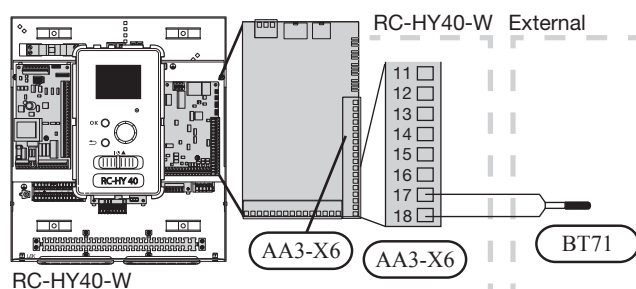
Connect the sensor to the terminal block X6:5 and X6:6 on AA3 board as illustrated.



• 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

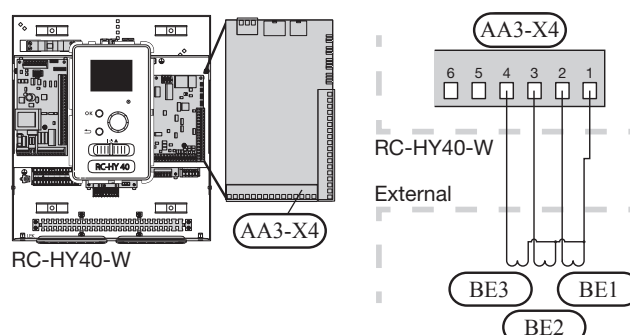
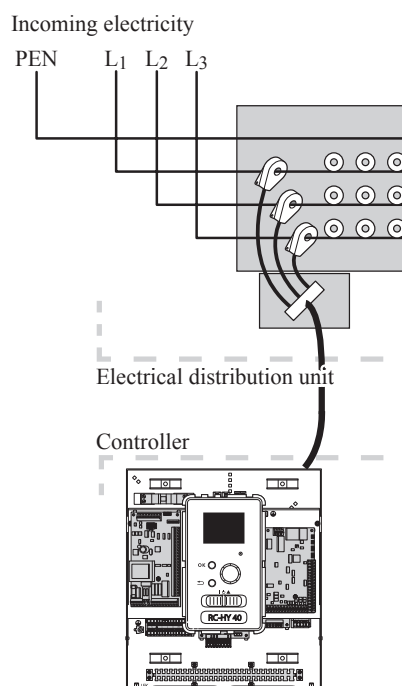
A current sensor (BE1 - BE3) should be installed on each incoming phase conductor in to the electrical distribution unit to measure the current. This is best done in the electrical distribution unit.

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.



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.

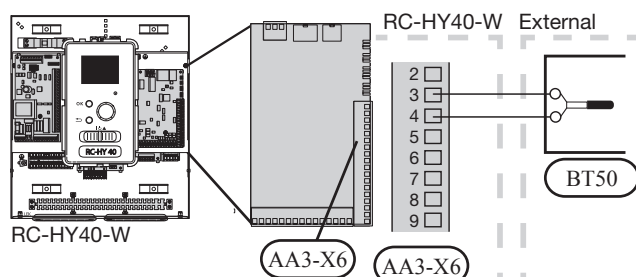
Do not install the room sensor where correct room temperature cannot be detected such as in a recess, between shelves, behind a curtain, above or close to a heat source, in a draft from an external door or in direct sunlight. Closed radiator thermostats can also cause problems.

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 indicative 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 under floor 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 linear 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 linear or 7 binary steps.

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

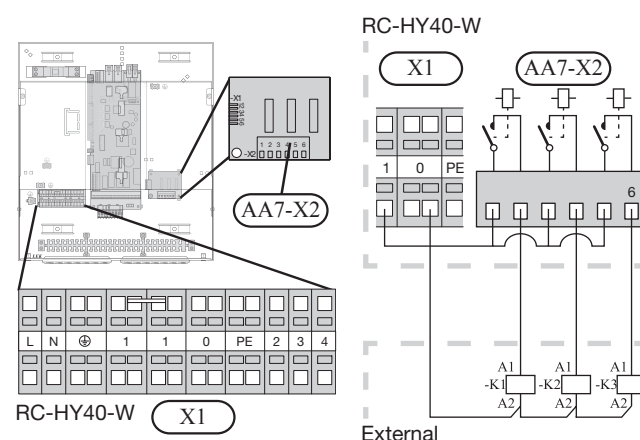
Step 1 is connected to terminal block X2:2 on the additional relay board (AA7).

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 boiler or district heating exchanger to aid with heating.

RC-HY40-W controls a shunt valve and start the signal for the additional heat using three relays. If the installation cannot manage to maintain the correct supply temperature, the additional heat starts. When the boiler sensor (BT52) shows approx. 55°C, RC-HY40-W send a 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 theoretically calculated set point value. When the heating demand drops sufficiently so that additional heat is no longer required, the shunt valve (QN11) closes completely.

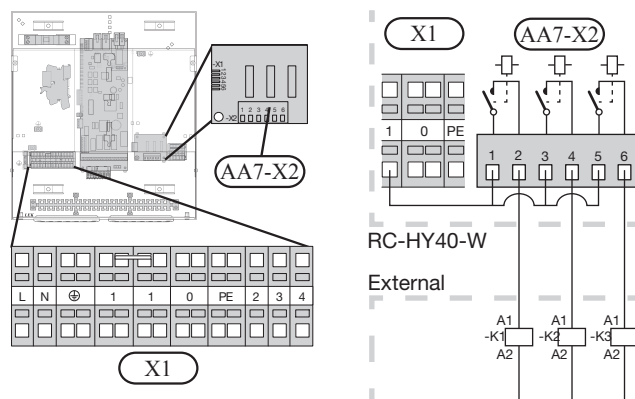
Factory setting minimum operating time for the boiler is 12 hours (can be adjusted in menu 5.1.12).

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

The boiler sensor (BT52) is connected 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 relay board (AA7) and terminal 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).



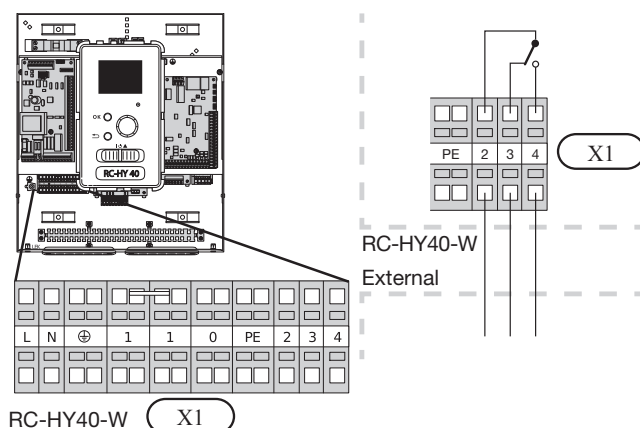
NOTE

Mark up any junction boxes with warnings for external voltage.

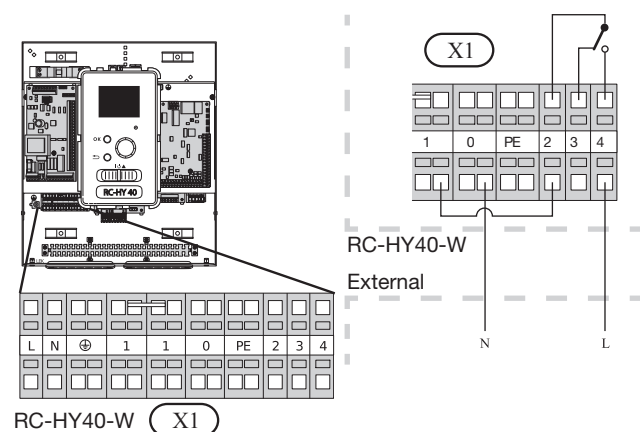
• Emergency mode

When the switch (SF1) is in “Δ” 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).



NOTE

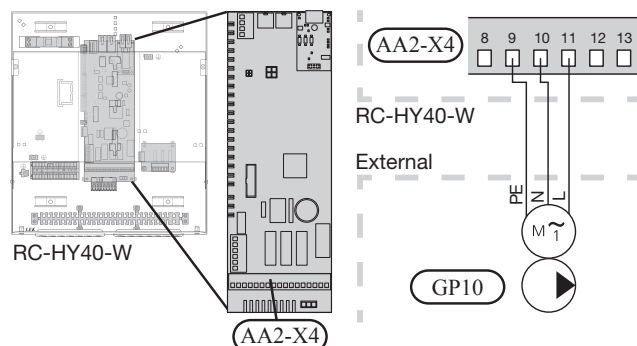
Mark up any junction boxes with warnings for external voltage.

CAUTION

No hot water is produced when emergency mode is activated.

• External circulation pump (GP10)

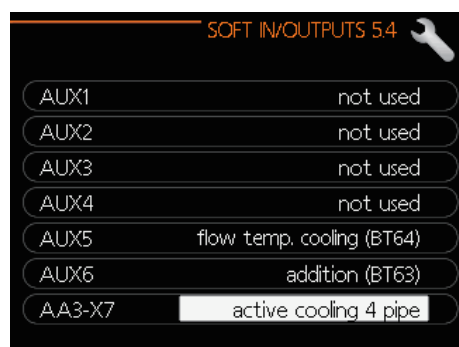
Connect the external circulation pump (GP10) to terminal block X4:9 (PE), X4:10 (N) and X4:11 (230V) on the AA2 board as illustrated.



• AUX inputs

On terminal block X6 on AA3 board and on X2, RC-HY40-W has software controlled auxiliary (AUX) inputs and outputs for connecting the external switch function or sensor.

This means that when an external switch function or sensor is connected to one of the six available inputs, this function must be selected in menu 5.4:



The available external inputs are:

- Temperature sensor, cooling/heating (BT74)
Additional room sensor (BT74) is applied in case user wants to determine the operation mode (cooling/heating) with a temperature in a particular room.
This option can be chosen only in case cooling function is available.
- Temperature sensor, additional heating (BT63)
Temperature sensor BT63 is applied in case additional heater is placed before 3-way valve.
- Temperature sensor, boiler (BT52)
Temperature sensor BT52 is applied in case shunt control additional heat function is enabled on addition menu.
- Temperature sensor, flow line cooling (BT64)
Temperature sensor BT64 is required in case 4-pipe system is used for cooling operation. This option can be chosen only in case cooling function is activated.
- Contact for external tariff blocking
In cases where external tariff blocking is required it must be connected to auxiliary inputs.

Tariff blocking means that the additional heat, the compressor, heating and cooling are disconnected by connecting a potential free switch function to the input selected in menu 5.4.

A closed contact results in the electrical output being disconnected.

■ Switch for "SG ready"

NOTE

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

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

"SG Ready" is a smart tariff management scheme in which electricity supplier can affect indoor and hot water temperature or simply prohibits additional heat and/or the compressor operation in heat pump at certain period of the day. You can choose which operation mode is affected by this function in menu 4.1.5 after the function is activated.

Choose two external input circuits and connect potential-free switches, and set "SG Ready A" and "SG Ready B" in menu 5.4. The system works differently according to the combination of the circuit open/closed.

- Blocking (A: Closed, B: Open)
"SG Ready" is active. Compressor operation and additional heat is prohibited.
- 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 operates to provide higher capacity than normal mode by using lower tariff electricity. You can select the operation mode (heating/hot water/cooling) affected by this function in menu 4.1.5.
- Overcapacity mode (A: Closed, B: Closed)
"SG Ready" is active. The system supplies higher capacity than Low price mode since the electricity price is supposed to be very low in this mode. You can select the operation mode (heating/hot water/cooling) affected by this function in menu 4.1.5.
- Contact for activation of "temporary lux"
Temporary hot water production function "temporary lux" is activated with this signal. Connect the terminals with a potential-free switch and choose the function in menu 5.4.
"Temporary lux" is activated only when the switch is closed.
- Contact for activation of "external adjustment"
Target temperature offset for supply temperature or room temperature can be done with this signal.
When a room sensor is connected and activated, the target room temperature is offset in °C if the switch is closed.
When a room sensor is not connected, target supply water temperature (heat curve) is offset instead. The degree of offset can be set in menu 5.4.

■ Switch for external alarm

Alarms from external devices can be connected to the control and appear as an info alarm. Potential-free signal of NO or NC type can be connected.

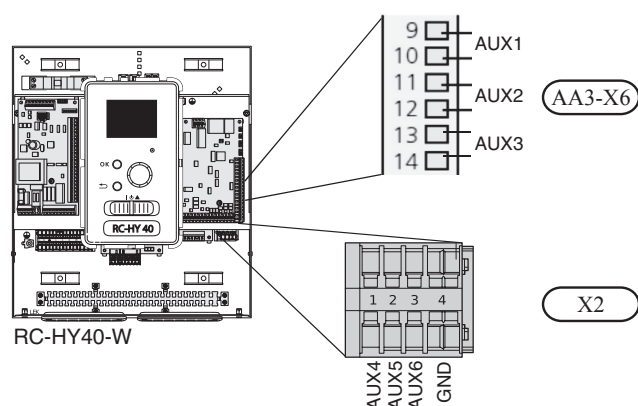
■ Switch for external blocking

This function is used in case certain operation mode needs to be prohibited. The operation at selected operation mode is prohibited when the switch is closed. Following functions can be managed.

- Additional heat
- Compressor operation
- Heating mode
- Cooling mode
- Hot water mode

Connect the auxiliary inputs 1 to 3 to the terminal block X6:9-10, 11-12, 13-14 of AA3 board as illustrated.

Auxiliary inputs 4 to 6 are connected to terminal block X2:1-4, 2-4 and 3-4. X2:4 is common to all auxiliary circuits (GND).



• AUX outputs

External output is available on the port NC, NO and C on X7 terminal on AA3 board on RC-HY40-W. The relay output can have a max. load of 2A at resistive load.

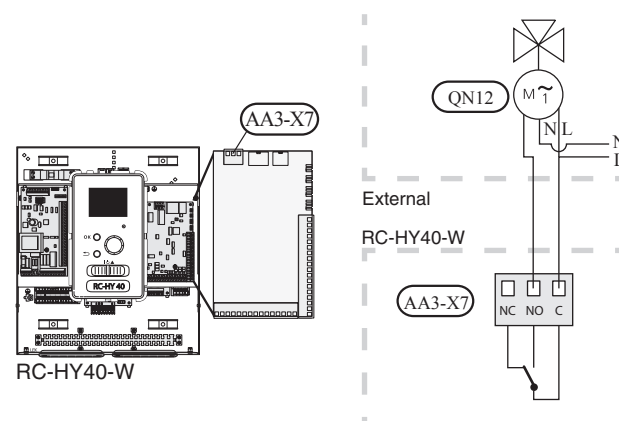
Following functions are available. Select the function in menu 5.4.

• Indication of buzzer alarm

When an alarm occurs, the circuit becomes closed between the port NO and C. During normal operation, the port NC and C is closed.

• Cooling mode indication / Active cooling mode (4-pipe cooling)

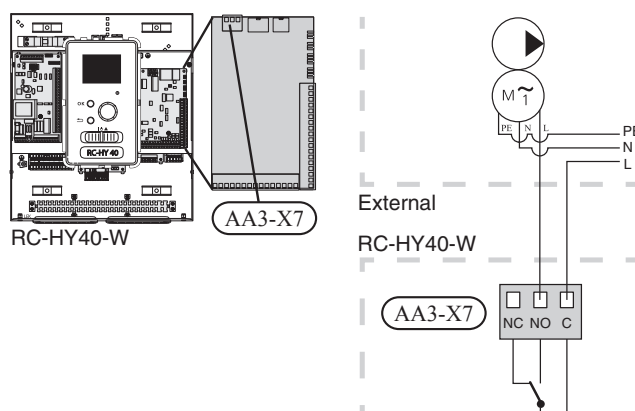
When the system turns into cooling mode, the circuit becomes closed between the port NO and C. By using this signal, it is possible to switch 3-way valve for 4-pipe cooling or to assemble a display circuit indicating cooling mode.



■ External pump control (GP10)

External pump (GP10) is used in case additional heater is placed after 3-way valve that switches heating/hot water.

Connect the circulation pump as shown below using the NO, C on X7 terminal on AA3 board on RC-HY40-W.



■ Hot water circulation pump control (GP11)

In case the distance between hot water tap and hot water storage tank is far, the hot water supply line temperature is likely to drop and it may take time to supply hot water from the tap. In that case, hot water circulation pump (GP11) is applied to maintain hot water supply line temperature warm. (refer to page 81 for diagram.)

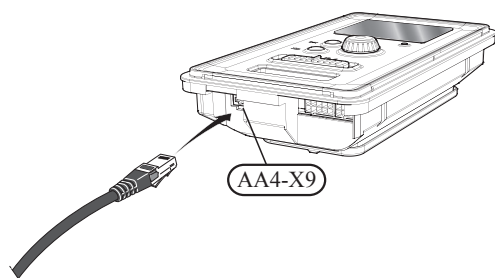
For details of connecting the pump, refer to External pump control (GP10).

NOTE

Mark up any junction boxes with warnings for external voltage.

• 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)

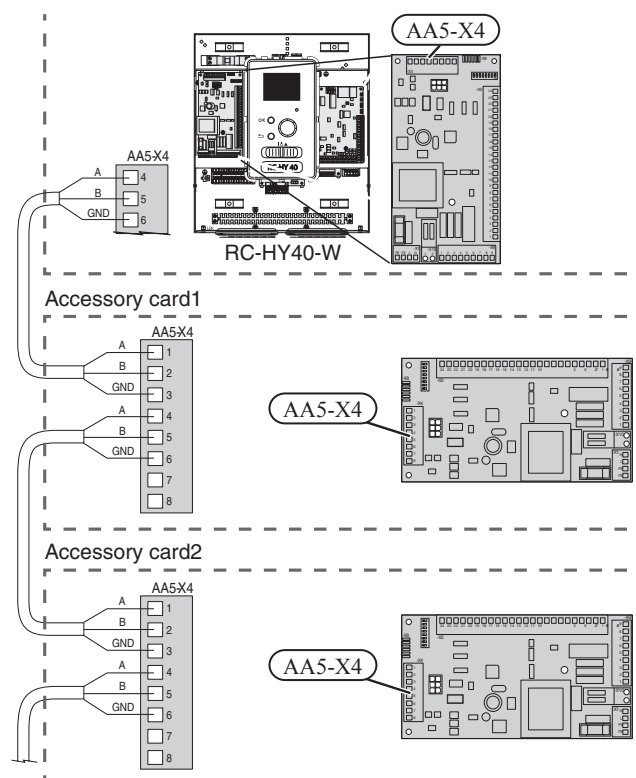
Accessories with accessory board (AA5) are connected to the control module's terminal block X4:4-6 on the input board AA5 (included on RC-HY40-W).

If several accessories are to be 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.

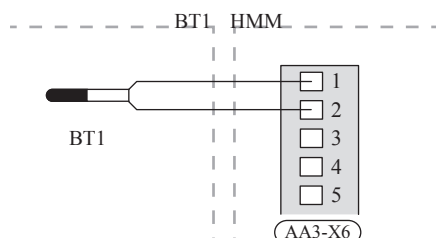
Refer to the accessory manual for further instructions.



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.

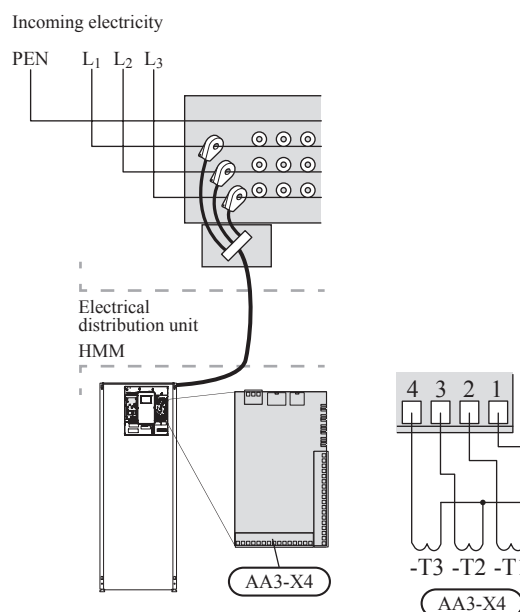
A current sensor must be installed on each incoming phase conductor into the electrical distribution unit, to measure the current. The electrical distribution unit is an appropriate installation point.

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.

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 $\triangle$) 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

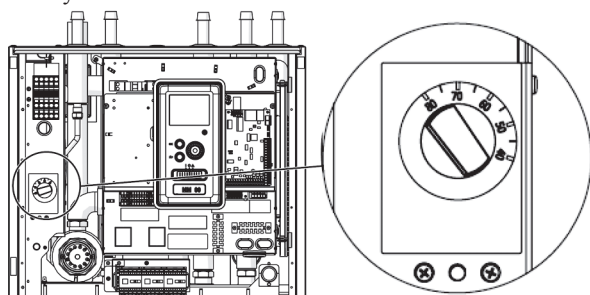
While on emergency mode, it is not possible to heat hot water.

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 circuits in operation.

The adjustment range is 6–67°C. Please note, however, that for under floor 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.

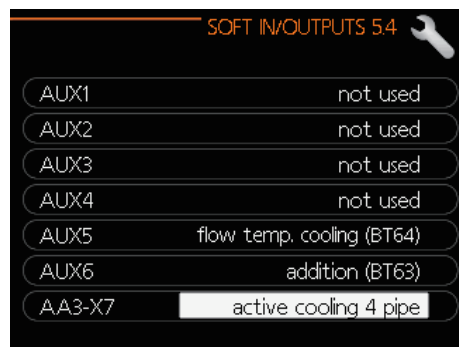
NOTE

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

On terminal block X6 on AA3 board and on X2, HMM100 has software controlled auxiliary (AUX) inputs and outputs for connecting the external switch function or sensor.

This means that when an external switch function or sensor is connected to one of the six available inputs, this function must be selected in menu 5.4:



The available external inputs are:

- Temperature sensor, cooling/heating (BT74)
Additional room sensor (BT74) is applied in case user wants to determine the operation mode (cooling/heating) with a temperature in a particular room.
This option can be chosen only in case cooling function is available.
- Temperature sensor, additional heating (BT63)
Temperature sensor BT63 is applied in case additional heater is placed before 3-way valve.
- Temperature sensor, boiler (BT52)
Temperature sensor BT52 is applied in case shunt control additional heat function is enabled on addition menu.
- Temperature sensor, flow line cooling (BT64)
Temperature sensor BT64 is required in case 4-pipe system is used for cooling operation. This option can be chosen only in case cooling function is activated.
- Contact for external tariff blocking
In cases where external tariff blocking is required it must be connected to auxiliary inputs.
Tariff blocking means that the additional heat, the compressor, heating and cooling are disconnected by connecting a potential-free switch function to the input selected in menu 5.4.
A closed contact results in the electrical output being disconnected.
- Switch for "SG ready"

NOTE

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

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

"SG Ready" is a smart tariff management scheme in which electricity supplier can affect indoor and hot water temperature or simply prohibits additional heat and/or the compressor operation in heat pump at certain period of the day. You can choose which operation mode is affected by this function in menu 4.1.5 after the function is activated.

Choose two external input circuits and connect potential-free switches, and set "SG Ready A" and "SG Ready B" in menu 5.4. The system works differently according to the combination of the circuit open/closed.

- Blocking (A: Closed, B: Open)
"SG Ready" is active. Compressor operation and additional heat is prohibited.
- 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 operates to provide higher capacity than normal mode by using lower tariff electricity. You can select the operation mode (heating/hot water/cooling) affected by this function in menu 4.1.5.
- Overcapacity mode (A: Closed, B: Closed)
"SG Ready" is active. The system supplies higher capacity than Low price mode since the electricity price is supposed to be very low in this mode. You can select the operation mode (heating/hot water/cooling) affected by this function in menu 4.1.5.
- Contact for activation of "temporary lux"
Temporary hot water production function "temporary lux" is activated with this signal. Connect the terminals with a potential-free switch and choose the function in menu 5.4. "Temporary lux" is activated only when the switch is closed.
- Contact for activation of "external adjustment"
Target temperature offset for supply temperature or room temperature can be done with this signal.
When a room sensor is connected and activated, the target room temperature is offset in °C if the switch is closed. When a room sensor is not connected, target supply water temperature (heat curve) is offset instead. The degree of offset can be set in menu 5.4.

■ Switch for external alarm

Alarms from external devices can be connected to the control and appear as an info alarm. Potential-free signal of NO or NC type can be connected.

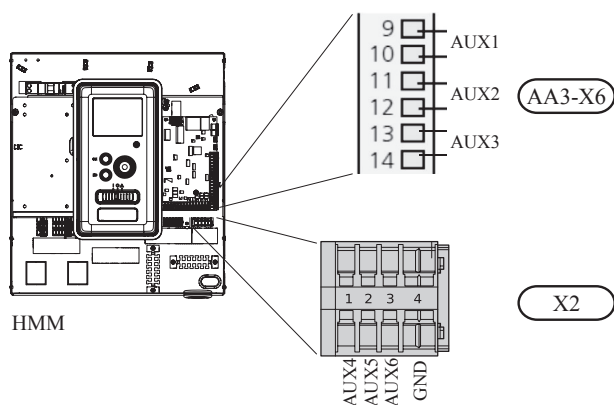
■ Switch for external blocking

This function is used in case certain operation mode needs to be prohibited. The operation at selected operation mode is prohibited when the switch is closed. Following functions can be managed.

- Additional heat
- Compressor operation
- Heating mode
- Cooling mode
- Hot water mode

Connect the auxiliary inputs 1 to 3 to the terminal block X6:9-10, 11-12, 13-14 of AA3 board as illustrated.

Auxiliary inputs 4 to 6 are connected to terminal block X2:1-4, 2-4 and 3-4. X2:4 is common to all auxiliary circuits (GND).



• AUX outputs

External output is available on the port NC, NO and C on X7 terminal on AA3 board on HMM100. The relay output can have a max load of 2A at resistive load.

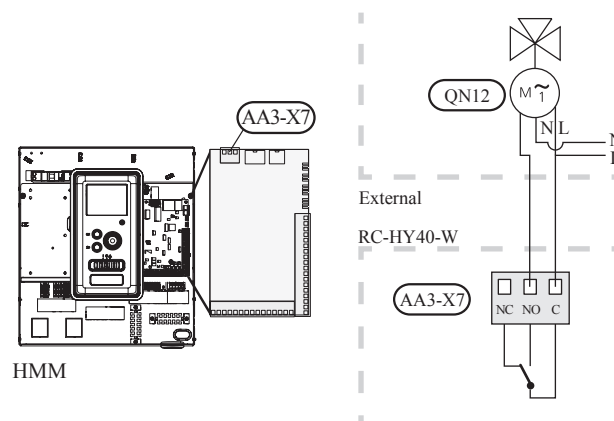
Following functions are available. Select the function in menu 5.4.

■ Indication of buzzer alarm

When an alarm occurs, the circuit becomes closed between the port NO and C. During normal operation, the port NC and C is closed.

■ Cooling mode indication / Active cooling mode (4-pipe cooling)

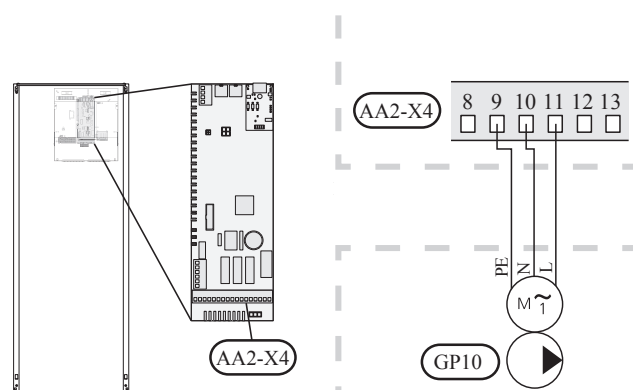
When the system turns into cooling mode, the circuit becomes closed between the port NO and C. By using this signal, it is possible to switch 3-way valve for 4-pipe cooling or to assemble a display circuit indicating cooling mode.



■ External pump control (GP10)

External pump (GP10) is used in case additional heater is placed after 3-way valve that switches heating/hot water.

Connect the circulation pump as shown below using the NO, C on X4 terminal on AA2 board on HMM100.



■ Hot water circulation pump control (GP11)

In case the distance between hot water tap and hot water storage tank is far, the hot water supply line temperature is likely to drop and it may take time to supply hot water from the tap. In that case, hot water circulation pump (GP11) is applied to maintain hot water supply line temperature warm. (refer to page 81 for diagram.)

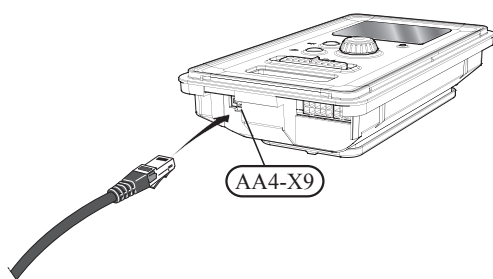
For details of connecting the pump, refer to External pump control (GP10).

NOTE

Mark up any junction boxes with warnings for external voltage.

• 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)

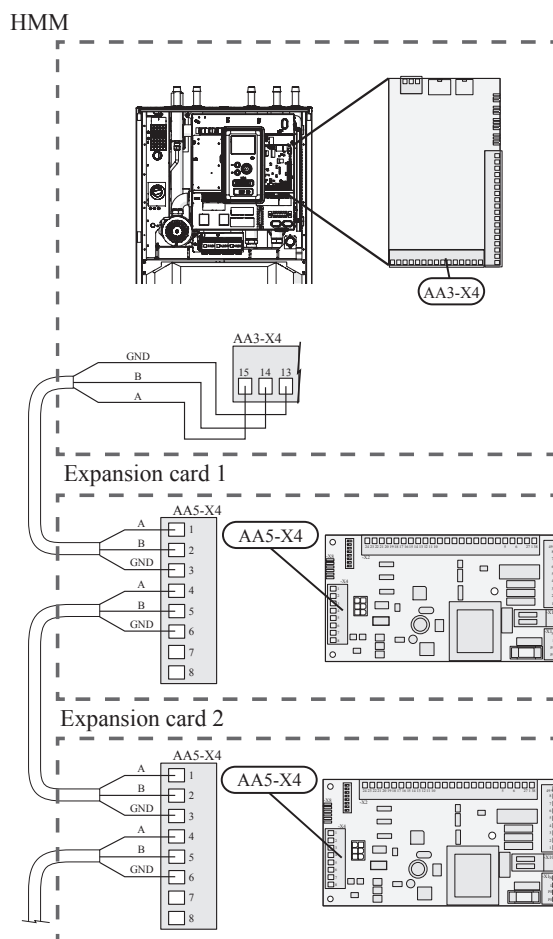
Accessories with accessory board (AA5) are connected to the HMM100 to the AA3 card according to the diagram below.

If several accessories are to be 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 accessory manual for further instructions.



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