2 Delivery and handling

Available models

BA-SVM 20-200 units include the following separate models:

- BA-SVM 20-200/6 E /E EM – unit intended for use with the AMS 20-6 / AMS 10-6 heat pump, has an enamel tank equipped with a titanium anode, EM version - built-in energy meter.
- BA-SVM 20-200/12 E /E EM – unit intended for use with the AMS 20-10 / AMS 10-8 / AMS 10-12 heat pump, has an enamel tank equipped with a titanium anode, EM version - built-in energy meter

Compatibility

The BA-SVM 20-200 unit can be used with Split type outdoor units. The compatible NIBE SPLIT heat pumps are:

Indoor unit	Compatibility
BA-SVM 20-200/6 E BA-SVM 20-200/6 E EM	AMS 20-6, AMS 10-6
BA-SVM 20-200/12 E BA-SVM 20-200/12 E EM	AMS 20-10, AMS 10-8, AMS 10-12

More information on NIBE SPLIT heat pumps available at www.nibe.eu and in dedicated installation and user manuals. See section „Accessories" for the list of accessories to be used with BA-SVM 20-200.

Transport

The BA-SVM 20-200 indoor unit should be transported and stored vertically or horizontally on the rear wall with the display facing up. Storage location must be dry. BA-SVM 20-200 can be transported into the building vertically or carefully placed on the rear wall with the display facing up.

Assembly

REQUIREMENTS FOR INSTALLATION SPACE „(R32)"

For systems with a total refrigerant amount less than 1.84 kg R32, there is no space requirement.

BA-SVM 20-200/6 + AMS 20-6

BA-SVM 20-200 with the AMS 20-6 unit is filled with 1.3 kg of refrigerant from the factory and therefore has no specific requirements regarding installation space. If the pipe length exceeds 15 m (max. 30 m), refrigerant must be charged at 0.02 kg/m (max. 0.3 kg). The total refrigerant amount is always below the limit value of 1.84 kg.

BA-SVM 20-200/12 + AMS 20-10

with the AMS 20-10 unit is filled with 1.84 kg of refrigerant from the factory. When the pipe length is longer than 15 m, the refrigerant must be filled to max. 0.02 kg/m. Because the total refrigerant amount then exceeds 1.84 kg, the accessory AGS 10 (automatic gas separator) must be installed and consideration must be given to the size of the indoor unit's installation space with regard to the total amount of refrigerant. A total refrigerant amount exceeding 2.54 kg R32 is not permitted in the system. See table „Minimum floor area BA-SVM 20-200/12 + AMS 20-10".

Pipe-length (m)	Fill amount (kg)	m_c (kg)[1]	Minimum floor area (A_{min} h_{inst}) (m^2)	
			H^2=1,0 m	H=1,8 m
≤15	0,00	1,84	No requirements for installation space	
16	0,02	1,86	8,10	4,50
17	0,04	1,88	8,19	4,55
18	0,06	1,90	8,28	4,60
19	0,08	1,92	8,37	4,65
20	0,1	1,94	8,45	4,70
21	0,12	1,96	8,54	4,74
22	0,14	1,98	8,63	4,79
23	0,16	2,00	8,71	4,84
24	0,18	2,02	8,80	4,89
25	0,2	2,04	8,89	4,94
26	0,22	2,06	8,98	4,99
27	0,24	2,08	9,06	5,04
28	0,26	2,10	9,15	5,08
29	0,28	2,12	9,24	5,13
30	0,3	2,14	9,32	5,18
31	0,32	2,16	9,41	5,23
32	0,34	2,18	9,50	5,28
33	0,36	2,20	9,59	5,33
34	0,38	2,22	9,67	5,37
35	0,4	2,24	9,76	5,42
36	0,42	2,26	9,85	5,47
37	0,44	2,28	9,93	5,52
38	0,46	2,30	10,02	5,57
39	0,48	2,32	10,11	5,62
40	0,5	2,34	10,20	5,66

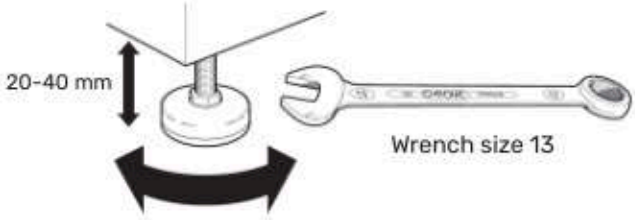
[1] – Total refrigerant amount

[2] – H = installation height to bottom edge of AGS 10 and ventilation holes BA-SVM 20-200.

NOTE!

When installing AGS 10 below 1.0 m, the minimum floor area should be calculated based on the PN-EN 378-1 standard.

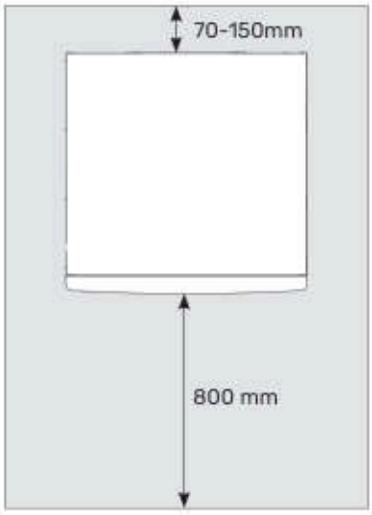
- BA-SVM 20-200 must be placed on a solid, waterproof surface that will support the weight of the filled indoor unit. Use the adjustable feet of the indoor unit for horizontal and stable positioning of the appliance.



- Since BA-SVM 20-200 has condensation water drainage, the set-up location of the indoor unit should be equipped with a floor drain leading to the sewage system.

Installation location

Leave a free space of 800 mm in front of the indoor unit. There must be a minimum free space of 70 mm behind the indoor unit, however the recommended distance is 150 mm. All servicing of BA-SVM 20-200 can be carried out from the front.



CAUTION!
If connecting an additional heat source, leave sufficient space behind the appliance for problem-free completion of the connections and future maintenance.

Removing the cover



1. Remove the screws from the lower edge of the front cover.
2. Tilt back the cover at the lower edge paying special attention not to damage the connecting cables, then remove the front cover by lifting it upwards.
3. Disconnect the cable connecting the front cover to the unit.

Supplied components



Safety group with safety valve (3 bar), pressure gauge and automatic air vent (1 pc.)



Indoor temperature sensor (1 pc.) - see subsection "Additional Connections".



Outdoor temperature sensor (1 pc.) - see subsection "Additional Connections".



Current sensor (3 pcs)



230V connection jumper (1 pc.)



Connector 1" (1 pc.)



Reduction 3/8" na 1/4" (1 pc.) (BA-SVM 20-200/12 E / BA-SVM 20-200/12 E EM ONLY)

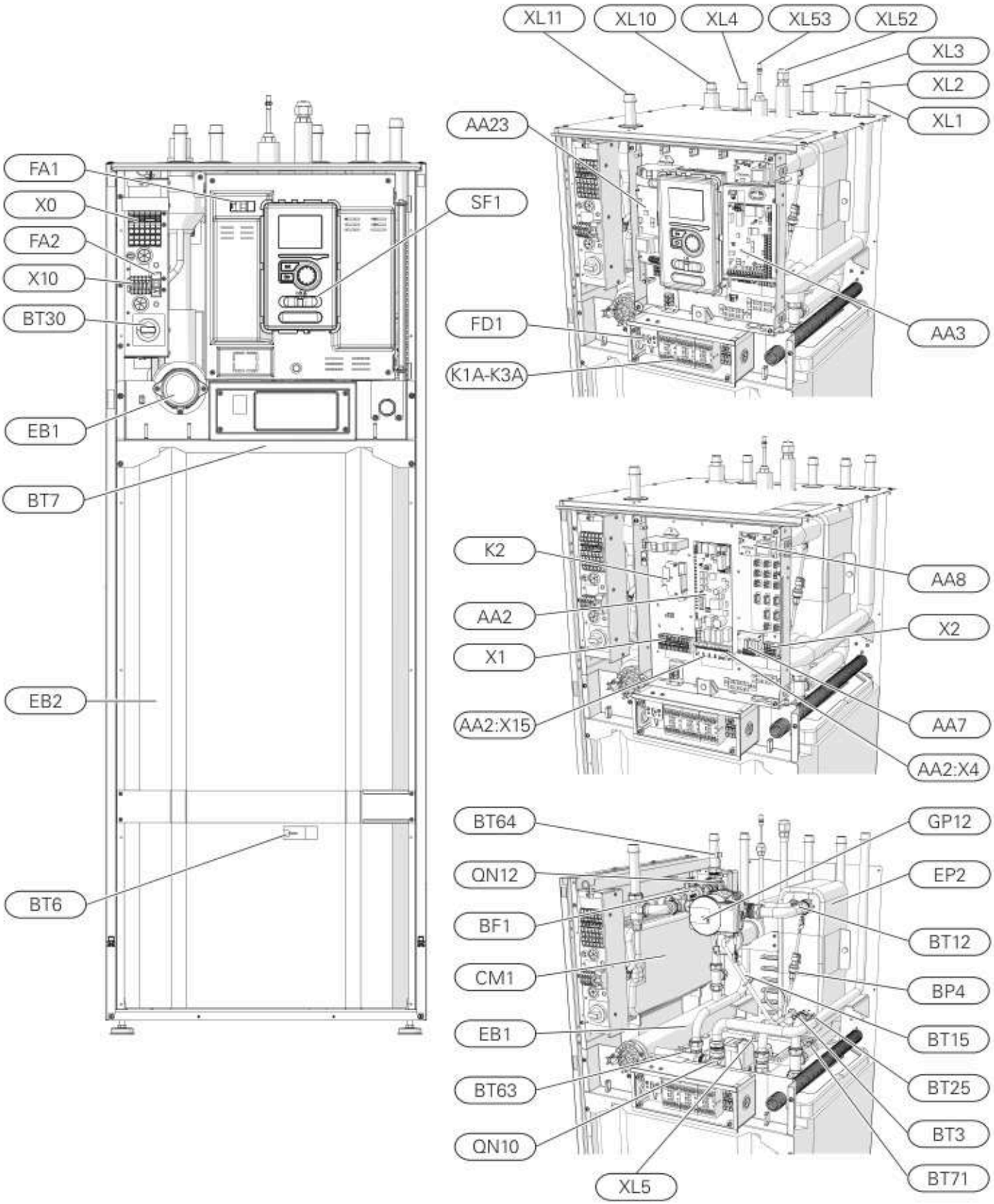


Instalation and user manual (1 pc.)

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

3 Design of the indoor unit

BA-SVM 20-200



Pipe connections

XL1	Connection, heating medium, supply
XL2	Connection, heating medium, return
XL3	Connection, domestic cold water
XL4	Connection, domestic hot water
XL5	Connection, hot water circulation
XL10	Connection, cooling operation
XL11	Connection, safety assembly, pressure gauge
XL52	Connection, gas refrigerant
XL53	Connection, liquid refrigerant

HVAC components

CM1	Expansion vessel, closed
QN10	Reversing valve, hot water/climate system
QN12	Isolation valve, cooling/heating
GP12	Circulation pump
EP2	Heat exchanger

Sensors

BP4	Pressure sensor, high pressure
BT3	Temp. sensor, heating medium, return
BT6	Temp. sensor, hot water charging
BT7	Temp. sensor, hot water heater top
BT12	Temp. sensor, condenser out
BT15	Temp. sensor, liquid refrigerant
BT25	Temp. sensor, heating medium supply
BT63	Temp. sensor, supply heating medium behind immersion heater
BT64	Temp. sensor, cooling operation system supply
BT71	Temp. sensor, heating medium return

Electrical components

X0	Power terminal - 230V~ / 400V~
X1	Control panel terminal block
X2	Control panel terminal block
X10	Outdoor unit connection terminal - 230 V~
AA2:X4	Terminal block - low voltage
AA2:X15	Terminal block - low voltage
K1A-K3A	Contactors for electric additional heat
K2	Alarm relay
BT30	Standby mode thermostat
AA2	Main board
AA3	Input board
AA23	Communication board
AA7	Extension card
AA8	Titanium anode board
FD1	Thermal circuit breaker
FA1	Miniature circuit breaker (protecting the control system of indoor unit)
FA2	Miniature circuit breaker (protecting the outdoor unit)
EB1	Electric additional heat

Miscellaneous

BF1	Energy meter (EM only)
SF1	Controller switch
EB2	Hot water tank

4 Pipe connections

General information

Pipe installation must be carried out in accordance with the current standards and directives.
The pipe dimensions should not be less than the recommended pipe diameter according to the table below. However, in order to achieve the recommended flow, each installation must be dimensioned individually.

> CAUTION!
>
> The name „AMS" - applies to SPLIT outdoor units and refers to the AMS 10 and AMS 20 models. Detailed information about the devices is available in the external heat pump manual.

Minimum system flow

The installation must be dimensioned at least to the extent required to manage the minimum defrosting flow at 100% circulation pump operation, see table.

Air/water heat pump	Minimum flow during defrosting (100% pump capacity [l/s])	Minimum recommended pipe dimension (DN)	Minimum recommended pipe dimension (mm)
BA-SVM 20-200/6 E /E EM + AMS 20-6	0,19	20	22
BA-SVM 20-200/12 E /E EM + AMS 20-10			
BA-SVM 20-200 /6 E /E EM + AMS 10-6			
BA-SVM 20-200/12 E /E EM + AMS 10-8			
BA-SVM 20-200/12 E /E EM + AMS 10-12	0,29	20	22

> CAUTION!
>
> An incorrectly dimensioned climate system can result in damage to the appliance and lead to malfunctions.

The system can be used with a low- and medium-temperature climate system. The recommended temperature of the heating medium at the dimensioned outdoor temperature DOT must not exceed 55°C on the supply and 45°C on the return circulation from the climate system. BA-SVM 20-200 can reach up to 70°C when using the electric additional heat or another peak heat source.

An overflow pipe must be routed from the safety valve to a suitable drain. The entire length of the overflow pipe must be inclined towards the floor drain to prevent water pockets and must also be frost-proof. In order to reach maximum system efficiency, we recommend installing BA-SVM 20-200 as close as possible to the outdoor heat pump.

The BA-SVM 20-200 unit is not equipped with a shut-off valve for the climate system. In order to facilitate future servicing, the shut-off valves should be installed on the outside of the indoor unit.

The BA-SVM 20-200 unit can be docked to the central heating, cooling operation and hot water systems. It is absolutely necessary to install the safety assembly on connection XL11.

> CAUTION!
>
> Ensure that incoming heating medium is without pollution. When using a private well, it maybe necessary to supplement with an extra water filter.

> CAUTION!
>
> In the installation before the BA-SVM 20-200, a particulate filter should be used, dedicated for heating installations. The filter will protect the unit against pollution.

> CAUTION!
>
> All high points in the climate system must be equipped with air vents.

> CAUTION!
>
> The pipelines need to be flushed out before the indoor unit is connected so that any debris cannot damage component parts.

> CAUTION!
>
> Until the system's heating/cooling circuit has been filled with heating medium, the switch (SF1) in the controller must not be set to "I" or „⚠". If you do not comply with the above instructions, many components of the BA-SVM 20-200 unit may be damaged.

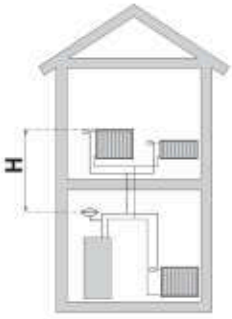
Expansion vessel

The expansion vessel's volume must be at least 5% of the system's total volume. BA-SVM 20-200 appliances have been equipped with an expansion vessel with a 10l volume. If the capacity of the built-in expansion vessel is insufficient, an additional expansion vessel meeting the above requirements should be added to the installation.
The expansion vessel should be selected in accordance with current standards.

Table with examples:

Total volume [l] (indoor unit and climate system)	Volume [l], expansion vessel
500	10+15
750	10+25
1000	10+40

BA-SVM 20-200 is equipped with an expansion vessel with a 10l capacity. The pressure setting in the level vessel should be set according to the maximum height (H) between the vessel and the highest-positioned radiator, see drawing. An initial pressure of 0.5 bar (5 mvp) means a maximum permissible height difference of 5 m. The maximum volume of the system without a boiler is 220 l at the above initial pressure.



If the standard initial pressure in the expansion vessel is too low, this can be increased by filling it via the installed valve. The expansion vessel's standard initial pressure must be entered in the checklist on page 5.

Any change in the initial pressure affects the ability of the expansion vessel to handle the expansion of the heating medium.

Buffer vessel

The heat pump installation requires an appropriate volume of heating medium (approx. 10l/kW heat pump power) and a minimum, undisturbed flow.

In case of an insufficient amount of heating medium in the installation, an additional buffer vessel must be used, which will ensure adequate system volume, see subsection "Minimum climate system volumes".

An insufficient flow in the central heating system will cause malfunction of the heat pump installation and could lead to serious damage of the product.

CAUTION!
In order to obtain the minimum undisturbed flow in the climate system, use the appropriate hydraulic solutions (e.g. parallel buffer, overflow valve, low loss header and/or open heating loops). Remember to always maintain the minimum required flow in the system - see the subsection "Minimum system flow".

NOTE!
It is recommended to have an expansion vessel in the hot water system. However, it is required to install a safety valve with the required opening pressure.

Minimum climate system volumes

AMS 20	-6	-10
Minimum climate system volume during heating/cooling	50 l	80 l

AMS 10	-6	-8	-12
Minimum climate system volume during heating/cooling	50 l	80 l	100 l

System diagram

The BA-SVM 20-200 indoor unit is equipped with a storage tank with a hot water coil, expansion vessel, safety group, electric additional heat, reversing valves, plate heat exchanger, energy meter, electronic circulation pump and controller. Combined together with the NIBE SPLIT (AMS) outdoor air heat pump unit, it forms a complete climate system. The AMS outdoor unit supplies thermal energy for heating domestic water, powering the climate system, heating swimming pools and cooling operation, using free energy contained in the air outside, working efficiently in the low temperature range, as low as -20°C.

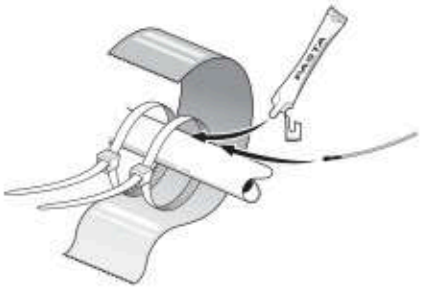
The connection of the outdoor unit and the indoor unit BA-SVM 20-200, with a system of pipes filled with refrigerant, protects the connection against freezing in the event of interruptions in the electric power supply to appliances. The system's operations are controlled using an advanced controller.

The control mechanism of BA-SVM 20-200 allows for two cooling operation systems to be used:
- 2-pipe cooling system,
- 4-pipe cooling system.

NOTE!
BA-SVM is equipped with all temperature sensors as standard. In some system layouts, the sensors must be transferred to other parts of the system. For location of the sensors, see the relevant point on docking the system.

NOTE!
In the event that the water volume of the central heating system is increased using a buffer vessel, you will need to check the system volume and possibly increase the volume of the existing expansion vessel.

Temperature sensor installation on pipe

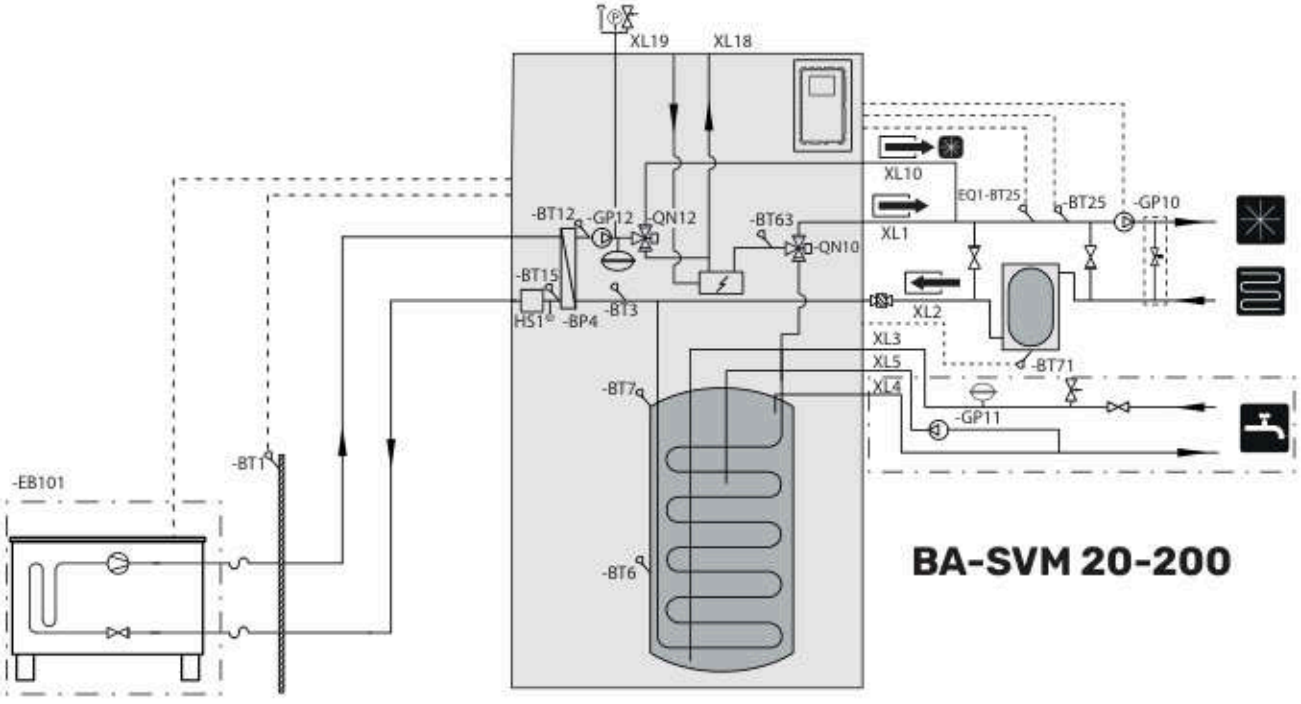


The temperature sensors are fitted using heat conducting paste, cable ties (the first cable tie is secured to the pipe in the middle of the sensor and the other cable tie is mounted approx. 5 cm after the sensor) and aluminium tape. After putting on the ties and the aluminium tape, the sensor should be carefully insulated with insulating tape.

- Shut-off valve
- Non-return valve
- Shunt valve
- Safety valve
- Temperature sensor
- Expansion vessel
- Manometer
- Filterball
- Automatic air vent
- Circulation pump
- Electric additional heat
- Cooling system filter
- Compressor
- Plate heat exchanger
- BA-SVM
- Cooling operation
- Central heating system (radiator)
- Central heating system (under floor heating systems)
- Domestic hot water
- Overflow valve
- Additional heat source
- Buffer vessel
- Fan coil
- Optional components

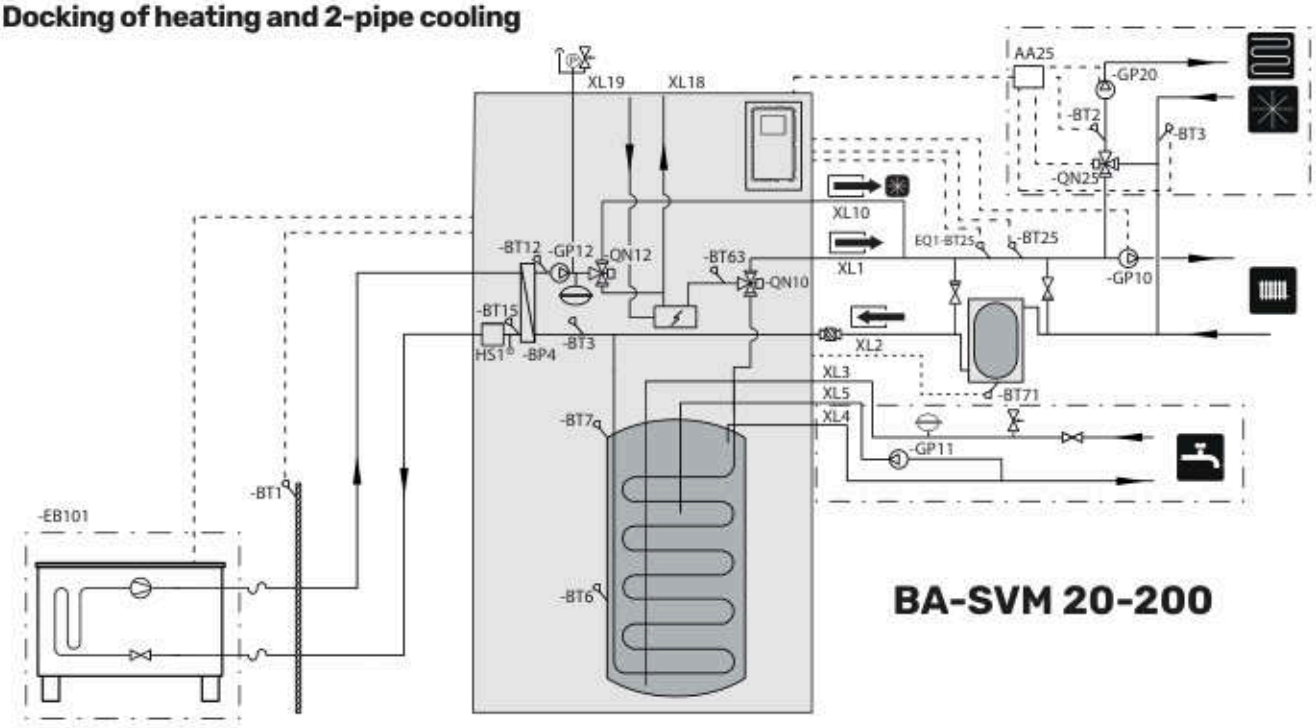
NOTE!
The installation dockings presented in the manual are examples and do not include all system components. They do not replace the design of the building's central heating system.

Basic docking



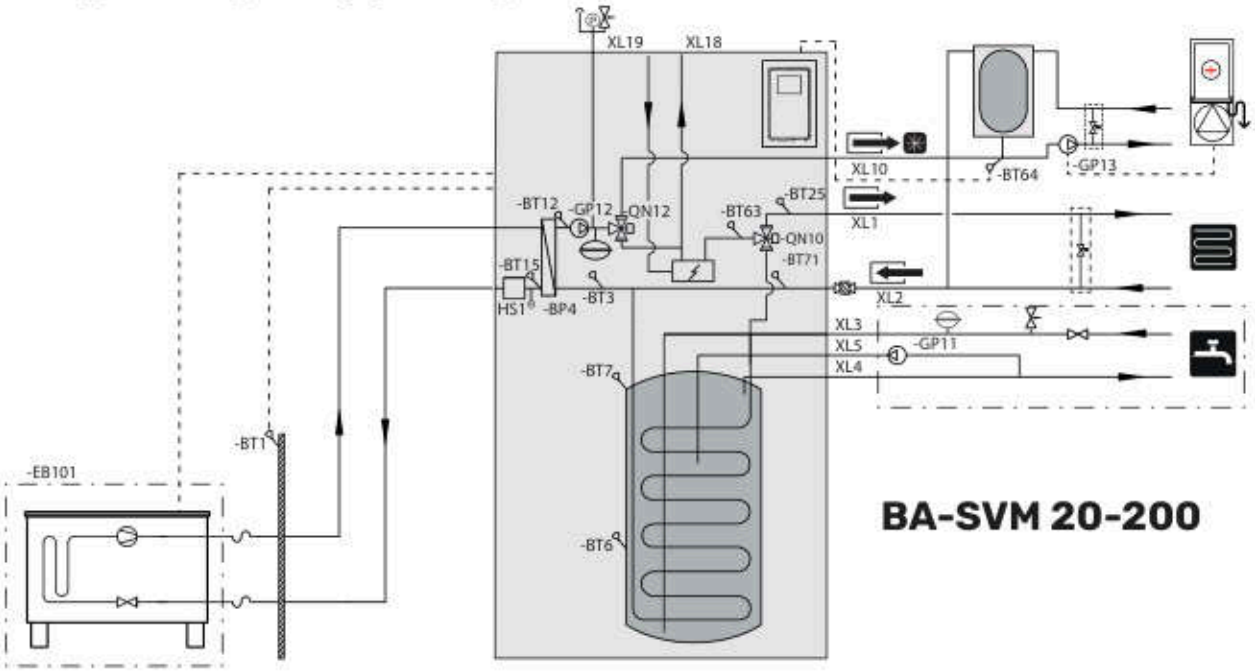
The diagram above is a basic 2-pipe diagram with a buffer. If a buffer is used in the installation, remember to transfer the BT25 sensor to the installation in accordance with the diagram. In a 2-pipe system, the controller supports all system components, i.e. GP12, extension modules (additional heating/cooling circuits), etc. The 2-pipe system can be selected in the SERVICE section, menu 5.2.4. Cooling must be activated in menu 5.11.1.1.

Docking of heating and 2-pipe cooling



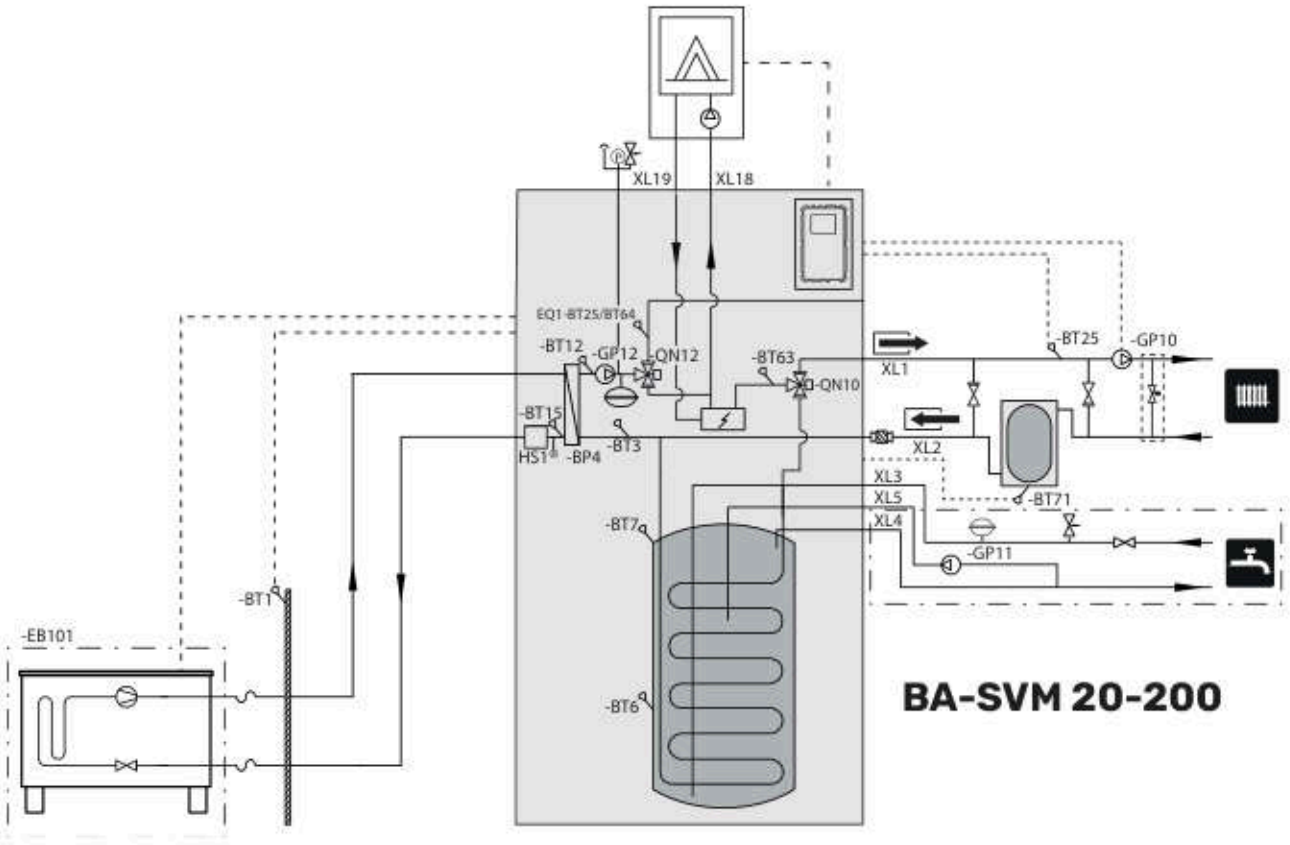
If a buffer is used in the installation, remember to transfer the BT25 sensor to the installation in accordance with the diagram. The principle of operation of the 2-pipe system is to use the same installation for cooling as for heating (diagram of a 2-pipe cooling operation). In a 2-pipe system, the controller supports all system components, i.e. GP12, extension modules (additional heating/cooling circuits), etc. The 2-pipe system can be selected in the SERVICE section, menu 5.2.4. Cooling must be activated in menu 5.11.1.1.

Docking of heating and 4-pipe cooling



The operating principle of the 4-pipe system is to use separate heating and cooling circuits. In the 4-pipe system, a cooling tank is required. The BT64 sensor should be placed in the buffer vessel or on the cooling flow pipeline. BT64 is connected at the AUX inputs. Selection of the 4-pipe system can be found in the SERVICE section, menu 5.2.4. Cooling must be activated in menu 5.11.1.1.

Docking with the connection of an additional heat source



NOTE!

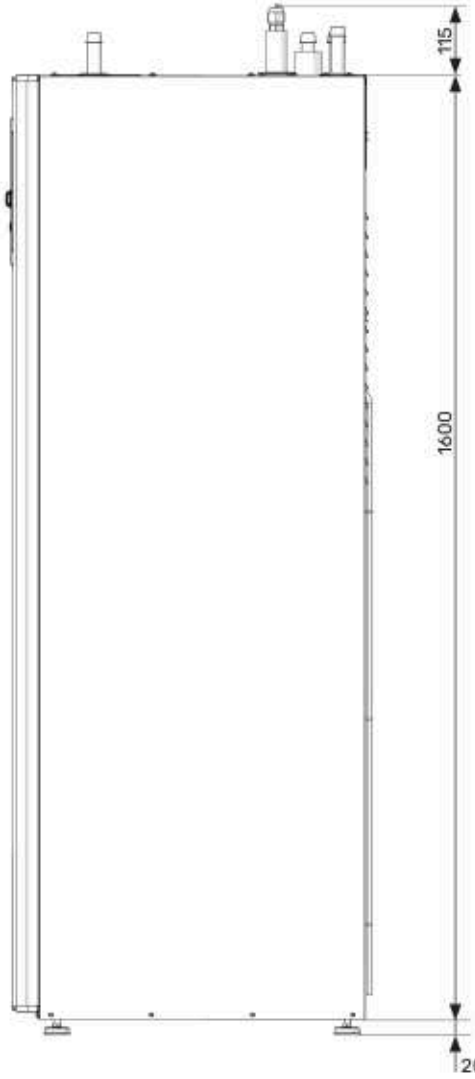
The maximum recommended power of the additional heat source cannot exceed 15kW.

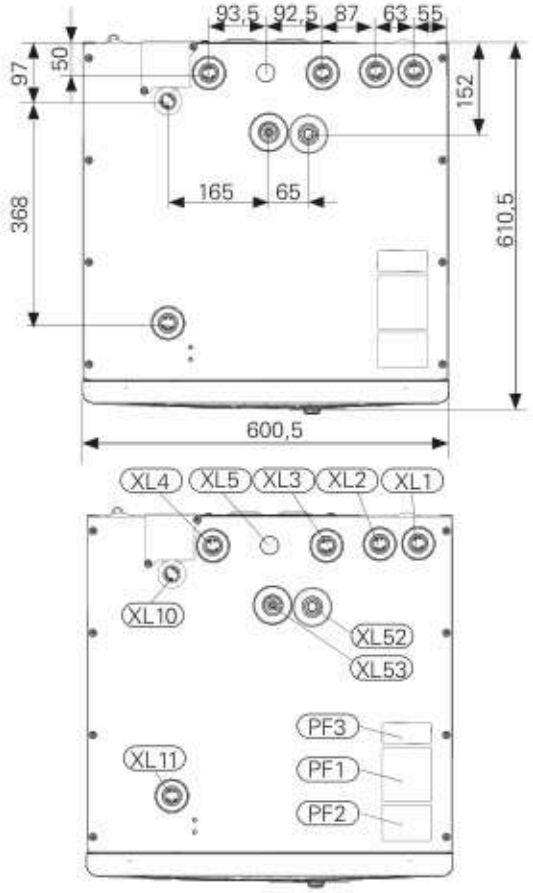
- It is recommended that you install the BA-SVM 20-200 unit in a room which is equipped with a floor drain and protected against freezing.
- The ground should be of a sufficient load capacity, preferably concrete.
- The BA-SVM 20-200 unit must be positioned with its back against a building wall. The device should not be placed against the walls of rooms in use where noise could be a problem.
- The appliance can be levelled using the adjustable feet.
- Route pipes so they are not adjacent to the wall of a bedroom or living room where noise could be a problem.
- Ensure that there is approx. 800 mm free space in front of and 500 mm above the appliance to facilitate any future servicing.

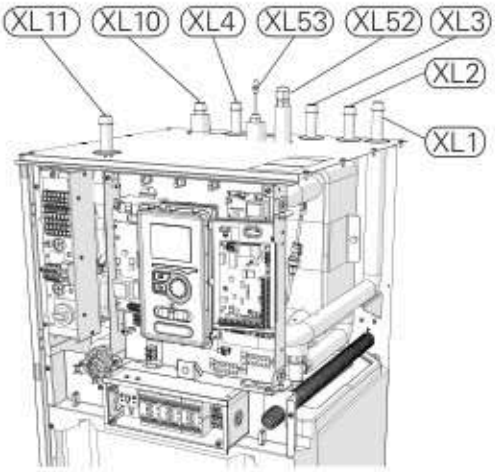
Recommended order of assembly

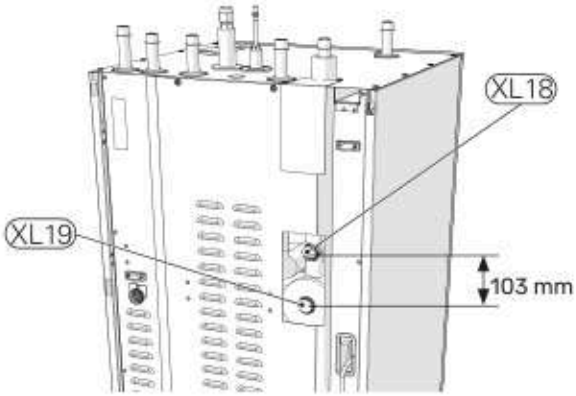
1. Dock the BA-SVM 20-200 unit to the central heating system as well as the cold and hot water pipelines.
2. Install refrigerant pipes.
3. Connect the current sensors, outdoor temperature sensor, the lines between BA-SVM 20-200 and AMS 20, as well as the communication and power supply.
4. Connect the electric power supply (230V or 400V) to the BA-SVM 20-200 unit.
5. Proceed according to the commissioning instructions in the section Commissioning and adjusting.

Pipe connections









Pipe connections

XL1	Connection, Heating medium supply Ø22 mm
XL2	Connection, Heating medium return Ø22 mm
XL3	Connection, cold water Ø22 mm
XL4	Connection, hot water Ø22 mm
XL5	Connection, circulation Ø15 mm
XL10	Connection, cooling Ø22 mm
XL11	Connection, safety group Ø22 mm, manometer
XL52	Gas cooling medium Connection 1/2" (BA-SVM 20-200/6) Connection 5/8" (BA-SVM 20-200/12)
XL53	Liquid cooling medium Connection 1/4" (BA-SVM 20-200/6) Connection 3/8" (BA-SVM 20-200/12) - 1/4" adapter for AMS 20-10 units included.
XL18	Connection, return to an additional heat source Ø22 mm
XL19	Connection, supply from additional heat source Ø22 mm

Other information

PF1	Serial number
PF2	Plate with the designation of the hydraulic connections
PF3	Warning plate

Docking the indoor unit

Docking the climate system

The pipe connections of the climate system are made from the top of the appliance.

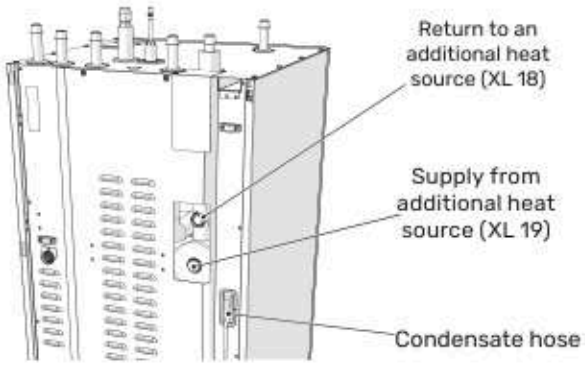
- All required safety devices and shut-off valves must be fitted as close to the BA-SVM 20-200 unit as possible.
- Vent valves must be installed when necessary.
- The safety group with the pressure gauge and air vent on the central heating circuit, as well as the safety valve on the hot water system must be fitted to the appropriate connections XL 11 and XL 3. To prevent air pockets from forming, the overflow pipe must be inclined in its entire length from the safety valve and must also be frost proof.
- When connecting to the installation (where all radiators / underfloor heating circuits are equipped with thermostatic valves or solenoid valves), appropriate hydraulic solutions should be used to obtain a minimum undisturbed flow in the heating system (e.g. excess-relief valve, low loss header, buffer in parallel or open heating loops). Remember to always keep the minimum required flow and volume of the system - see the sections "Minimum system flow" and "Buffer vessel".

CAUTION!
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 BA-SVM 20-200 module for heating or cooling purposes.

NOTE!
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 of the external heat source

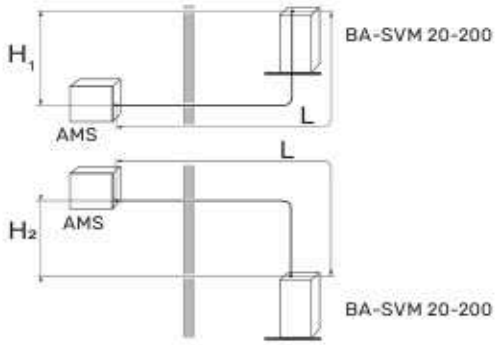
An external heat source with a maximum power of 15 kW, e.g. a gas or solid fuel boiler, can be connected to the back of the BA-SVM 20-200 unit after removing the plate blocking access to the connection sockets (picture below). See subsection System diagram.



Condensate elimination

The BA-SVM 20-200 unit has a condensate hose to drain the condensation water from the drip tray located under the hot water tank. The pipe drains all of the condensation water away from the appliance, minimizing the risk of damage. This pipe can be extended or replaced if needed.

Connecting refrigerant pipes (not supplied)



NOTE!
The outdoor unit, filled with refrigerant at the factory, allows for the use of refrigerant pipes (size L) between the outdoor unit and the indoor unit measured with a pipe length of L = 15m. For maximum allowable refrigerant piping lengths, see the tables below.

To properly top up the refrigerant, see the section "Filling the system with refrigerant".

AMS 20

Refrigerant pipes must be installed between the external module AMS 20 and BA-SVM 20-200.
The installation must be executed according to the applicable standards and directives.

PARAMETERS

		BA-SVM 20-200	
		6	12
Max. length, refrigerant pipe, one way (L)	m	30	40
Max height difference, when BA-SVM 20 -200 is placed higher than AMS 20 (H_1)	m	20	15
Max height difference, when BA-SVM 20-200 is placed lower than AMS 20 (H_2)	m	20	30

The connection between the outdoor unit and the indoor unit must ensure free flow of the refrigerant.

AMS 10

The refrigerant pipes must be installed between the AMS 10 outdoor unit and the BA-SVM 20-200 indoor unit. Installation must be carried out in accordance with the current standards and directives.

PARAMETERS

		BA-SVM 20-200	
		6	12
Max. length, refrigerant pipe, one way (L)	m	30	
Max height difference (H)	m	7	

The connection between the outdoor unit and the indoor unit must ensure free flow of the refrigerant.

Refrigerant connection pipeline specification

AMS 20-6

	Gas pipe (Ø ext.)	Liquid line (Ø ext.)
Pipe dimensions	Ø12,7 mm (1/2")	Ø6,35 mm (1/4")
Connection	Connection – (1/2")	Connection – (1/4")
Material	Copper quality SS-EN 12735-1 or C1220T, JIS H3300	
Minimum wall thickness	1,0 mm	0,8 mm

AMS 20-10

	Gas pipe (Ø ext.)	Liquid line (Ø ext.)
Pipe dimensions	Ø15,88 mm (5/8")	Ø6,35 mm (1/4")
Connection	Connection – (5/8")	Connection – (1/4")
Material	Copper quality SS-EN 12735-1 or C1220T, JIS H3300	
Minimum wall thickness	1,0 mm	0,8 mm

AMS 10-6

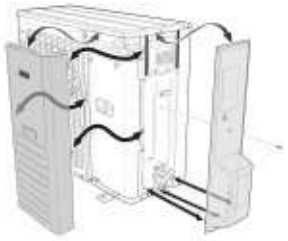
	Gas pipe (Ø ext.)	Liquid line (Ø ext.)
Pipe dimensions	Ø12,7 mm (1/2")	Ø6,35 mm (1/4")
Connection	Connection – (1/2")	Connection – (1/4")
Material	Copper quality SS-EN 12735-1 or C1220T, JIS H3300	
Minimum wall thickness	1,0 mm	0,8 mm

AMS 10-8 / AMS 10-12

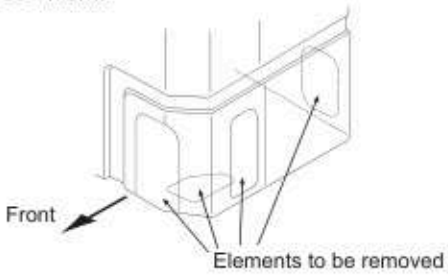
	Gas pipe (Ø ext.)	Liquid line (Ø ext.)
Pipe dimensions	Ø15,88 mm (5/8")	Ø9,52 mm (3/8")
Connection	Connection – (5/8")	Connection – (3/8")
Material	Copper quality SS-EN 12735-1 or C1220T, JIS H3300	
Minimum wall thickness	1,0 mm	0,8 mm

Execution of the pipe connection of the refrigerant circuit - AMS

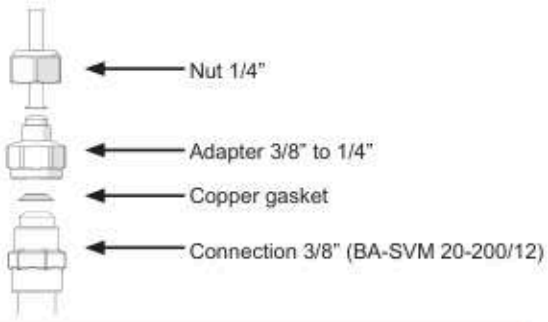
- Carry out the pipe installation when the service valves (QM35, QM36) are closed.
- AMS 10-6 / AMS 10-8 / AMS 20-6 / AMS 20-10: Remove the side panel from AMS 20 during installation to facilitate access.



- AMS 10-12: Remove the "punch-out" part from the external panel on the AMS 10 unit, where the pipes are to be routed. The drawing below shows the pipe outlets to choose from.



- Take care to ensure no water or pollutants enter the refrigerant connection pipe. Pollutants in the pipes risks damage to the heat pump.
- Bend the pipes with the maximum bending radius (at least R100-R150). Do not bend the pipes repeatedly. Use a bending machine.
- The connection of refrigerant pipes to the outdoor unit and the indoor unit should be made with flared connections after removing the production ends.
- AMS 20-10: Use the 3/8" to 1/4" adapter included with BA-SVM 20-200/12 not forgetting to put the gasket on. The drawing below shows how to install the adapter.



NOTE!

The BA-SVM 20-200/12 unit is equipped with a 3/8" to 1/4" liquid connection adapter (XL53). The adapter should be used when the control panel is connected to the AMS 20-10 outdoor unit.

- Make and connect the flare-connection and tighten with the appropriate torque using a torque wrench. Use the appropriate tightening angle, if a torque wrench is not available.

External diameter, copper pipe (mm)	Tightening torque (Nm)	Tightening angle (°)	Recommended tool length (mm)
Ø6,35	14–18	45–60	100
Ø9,52	34–42	30–45	200
Ø12,7	49–61	30–45	250
Ø15,88	68–82	15–20	300



CAUTION!
Gas shielding must be used when soldering.

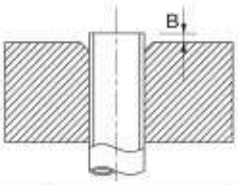
Flare connections

Expansion:



External diameter, copper pipe	A (mm)
Ø 6,35 (1/4")	9,1
Ø 9,52 (3/8")	13,2
Ø 12,7 (1/2")	16,6
Ø 15,88 (5/8")	19,7

Ejection:



External diameter, copper pipe (mm)	B, using the tool R410A (mm)	B, using the conventional tool (mm)
Ø 9,52 (3/8")	0,0–0,5	0,7–1,3
Ø 15,88 (5/8")		
Ø 6,35 (1/4")		1,0–1,5
Ø 12,7 (1/2")		

Pressure test and leak test

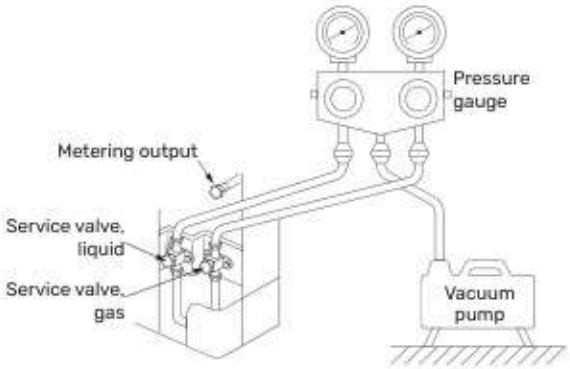
Both BA-SVM 20-200 and AMS are factory tested for pressure and leakage, but the refrigeration pipe connections between appliances should be checked for leakage after installation.

When connecting the pipes, carrying out pressure tests and leak tests, and creating the vacuum, remember to keep the service valves (QM35, QM36) closed. In order to fill the pipes of BA-SVM 20-200 with refrigerant, they must be re-opened.

CAUTION!
The pipe connection between the indoor unit and the outdoor unit must be leak tested. Then create a vacuum for the completed pipeline after finishing installation, in accordance with the applicable regulations. Only nitrogen should be used for pressure testing of the completed pipeline.

Vacuum pump

Use a vacuum pump to remove all air. Apply suction for at least one hour and end pressure after evacuation must be 1mbar (100 Pa, 0.75 Torr or 750 micron) absolute pressure. If the system is still damp or leaking, the vacuum will decrease after the draining has finished.



TIP!
To achieve a better end result and speed up creation of the vacuum, please follow the below points:
- The pipelines must have the correct diameter and length.
- Drain the system to 4 mbar and fill it with dry nitrogen to atmospheric pressure.

Filling the system with refrigerant

AMS is delivered complete with the refrigerant required for the installation of refrigerant pipes with lengths of up to 15 m on either side.

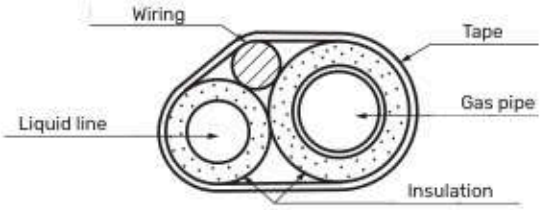
- AMS 10: If the length of the refrigerant pipes exceeds 15 m, extra refrigerant must be added in the amount of 0.02kg/m for BA-SVM 20-200/6 or 0.06 kg/m for BA-SVM 20-200/12 see the subsection „Connecting the refrigerant pipe").
- AMS 20: If the length of the refrigerant pipes exceeds 15 m, extra refrigerant must be added in the amount of 0.02kg/m (applies to BA-SVM 20-200/6 and BA-SVM 20-100/12) (see the subsection „Assembly" and „Connecting the refrigerant pipe").

NOTE!
For installations with refrigerant pipes up to 15 m in length, no extra refrigerant in addition to the provided amount needs to be added.

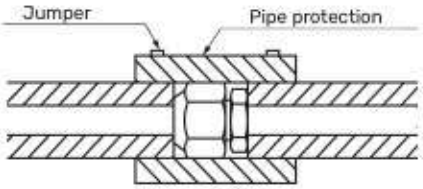
Insulating refrigerant pipes

- Refrigerant pipes (both liquid and gas) must be insulated for the purpose of thermal insulation and in order to avoid condensation.
- Use insulation that can withstand at least 120°C.

Principle:



Connections:



NOTE!
All connections and work related to the refrigeration system must be carried out by a person with the proper authorisations and certificates.

INSTALLATION REQUIREMENTS

Indoor unit BA-SVM	BA-SVM 20-200/6 E /E EM	BA-SVM 20-200/12 E /E EM	
Compatible outdoor module	AMS 10-6 AMS 20-6	AMS 10-8 AMS 20-10	AMS 10-12
Maximum pressure, climate system	0,3 MPa (3 Bar)		
Minimum pressure, climate system	0,05 MPa (0,5 Bar)		
Highest recommended supply / return temperature at dimensioned outdoor temperature	+55/+45°C		
Max. supply temperature in the BA-SVM	+70°C		
Minimum temperature ext. operation of the unit	-20°C		
Minimum temperature ext. cooling operation	+10 °C		
Max flow line temperature with compressor	+58°C		
Min supply temperature cooling	+7°C		
Max supply temp. cooling	+25°C		
Min flow, climate system, 100 % circulation pump speed (defrosting flow)	0,19 l/s		0,29 l/s
Minimum operating temperature in heating mode operation	Compliant with the guidelines and working range for the outdoor unit**		
Min volume, climate system during under floor cooling*	50 l	80 l	100 l
Max flow, climate system	0,29 l/s	0,38 l/s	0,57 l/s
Min flow, heating system	0,09 l/s	0,12 l/s	0,15 l/s
Min flow, cooling system	0,11 l/s	0,16 l/s	0,20 l/s

* Refers to volume associated with undisturbed flow.

** Guidelines and working range available in the Installer Manual of the outdoor unit.

Connection options

Docking the indoor unit

The BA-SVM 20-200 unit is not equipped with a shut-off valve for the central heating system or no additional heat source, 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.

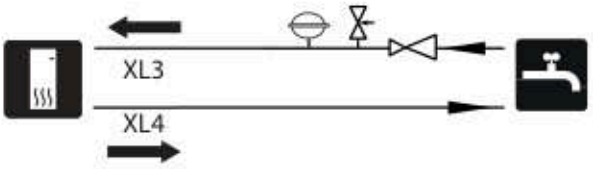
Docking without heat pump

It is not necessary to change the configuration of the hydraulic connections for the indoor unit to work independently without the outdoor unit. The unit is equipped with an additional heater that can be used as the main heat source when there is no outdoor unit.



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".



CAUTION!
It is absolutely necessary to install a properly selected safety valve.

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

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

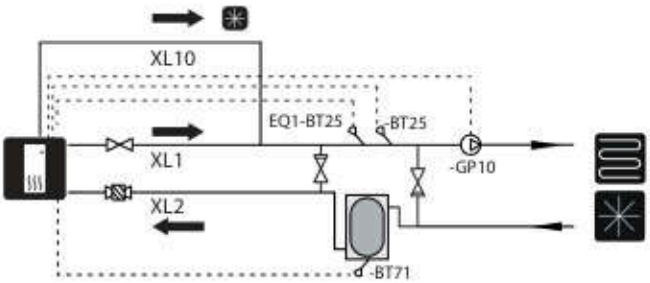
Docking the climate system

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



Connecting the 2-pipe cooling operation system

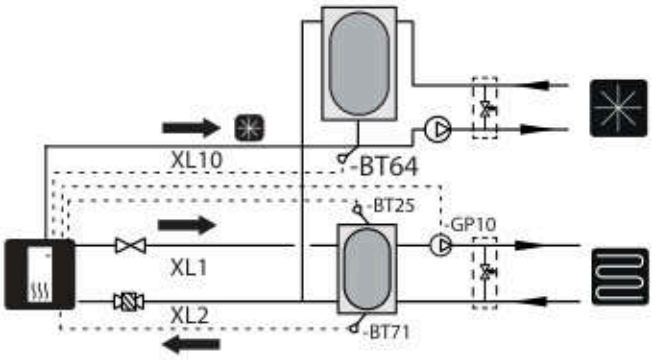
In the 2-pipe cooling operation system, the sensor BT64 / EQ1-BT25 assumes the function of sensor BT25. Degree minutes are counted according to EQ1-BT25. The BT25 and EQ1-BT25 sensors should be moved to the installation according to the diagram.



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

Connecting the 4-pipe cooling operation system

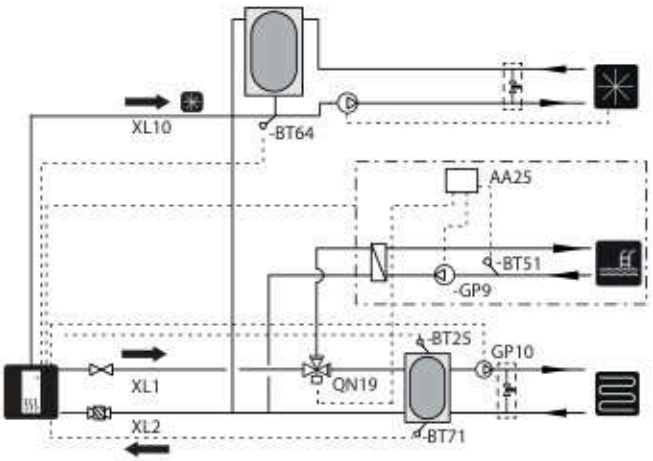
The 4-pipe system requires an additional cooling buffer vessel. Sensor BT64 must be transferred to the buffer vessel. Degree minutes for heating are counted according to BT25. Degree minutes for cooling operation are counted according to BT 64.



CAUTION!
The heat pump should have cooling insulation and the operating mode of the GP12 circulation pump should be set to 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)



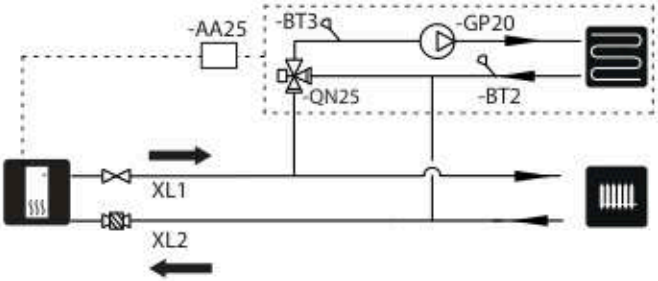
and the scheme according to menu 5.2.3:



The connection of the QN19 valve is described in the manual of the POOL 40 accessory.

Docking an additional climate system

The system can be expanded to include additional heating/cooling circuits, provided an additional accessory board is used. Once the AXC 40 card or ready-to-use ECS 41 kit has been put into use, an additional heating/cooling circuit can be activated using the controller.

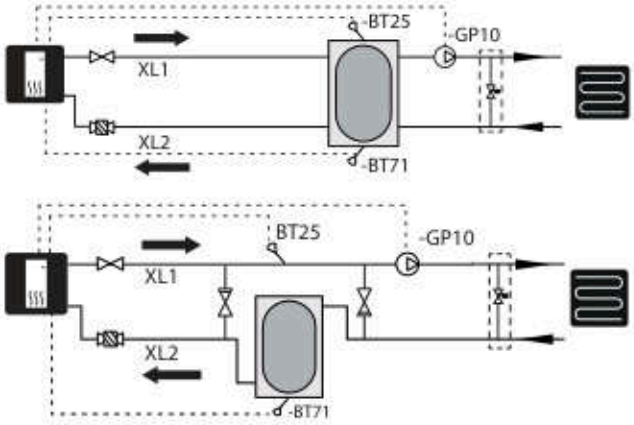


Additional accessories and the connection options and methods for these are described in the instructions for AXC 40 and ECS 41.

Buffer circuit

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

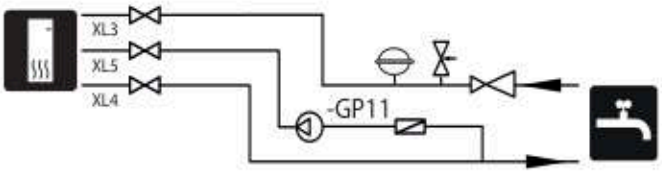
In the case of a system equipped with a buffer installed in parallel, the BT25 sensor should be installed in the buffer or in a place that ensures a correct reading of the supply temperature to the heating system. In order to correctly read the return temperature, it is recommended to move the BT71 sensor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



DHW circulation

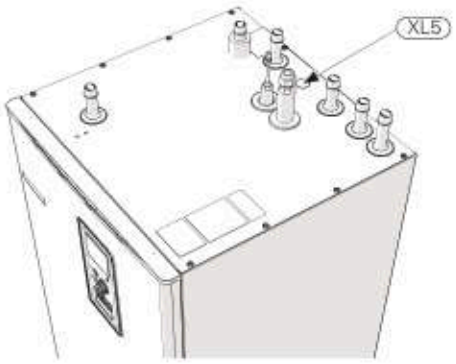
> CAUTION!
> If connection AA3: X7 is used for another purpose, an additional AXC 40 is required to connect the hot water circulation pump control.

The BA-SVM 20-200 have possibility to connect DHW circulation. The circulation connection (XL5) is located at the top of the tank.

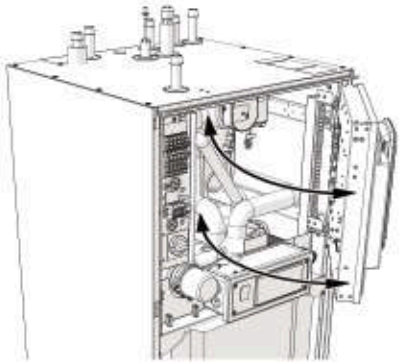


To connect the circulation:

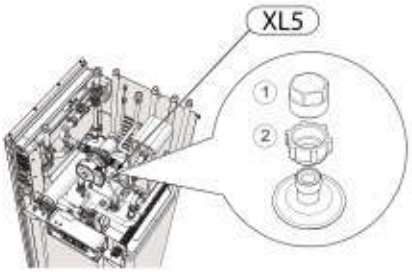
1. Remove the XL5 plug from the top of the housing.



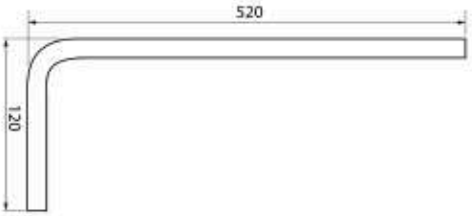
2. Remove the front panel, then move the control box to the right to gain access, to the hydraulic connections.



3. Remove the plug from the circulation pipe (XL5).
4. Install the elbow (not included in the BA-SVM 20-200 device) facing the rear housing, on the circulation pipe.



5. Connect the pipe to the elbow, with the dimensions shown in the figure below, leading pipe in the top of the housing, in place of the XL5 plug.
6. Install the circulation pump on the pipe outlet of the BA-SVM 20-200 device, and then connect its control to the controller or AA5 card.
7. Install the control box and the front panel.



Dimensions of the pipe for circulation

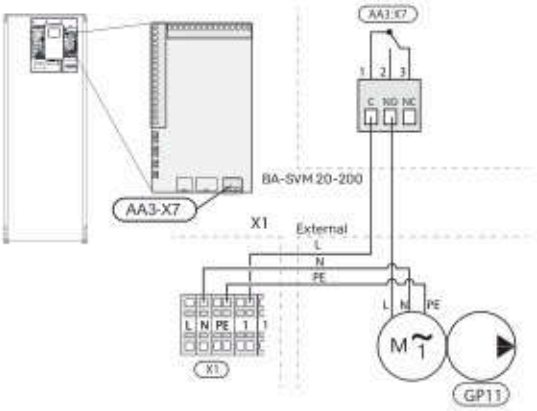


Elbow 15x15

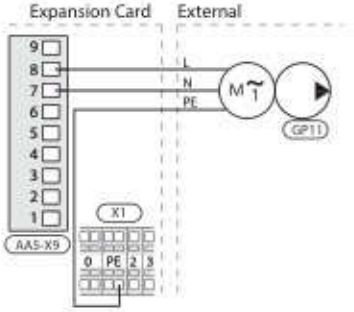
Connecting the control of the hot water circulation pump

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 BA-SVM 20-200) on block AA5-X9:8 (230V), AA5-X9:7 (N) and X1:PE



See the AA5 expansion card manual for more information.

5 Outdoor unit AMS

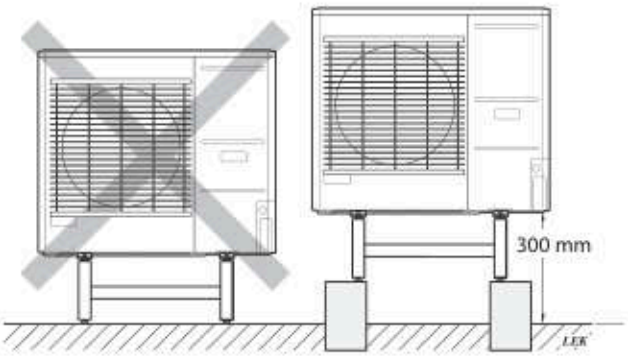
Transport and storage

AMS must be transported and stored vertically.

> CAUTION!
> Ensure that the heat pump cannot fall overduring transport.

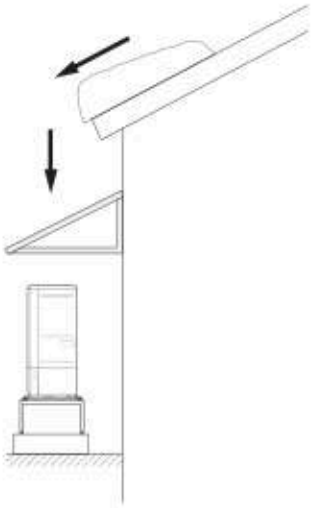
Assembly

- Place AMS outdoors on a solid level base that can take the weight, preferably a concrete foundation. If concrete slabs are used they must rest on asphalt or shingle.
- The concrete foundation or slabs must be positioned so that the lower edge of the evaporator is at the level of the average local snow depth; however, a minimum of 300 mm. Stands and attachments on the page are available in the AMS instruction in the „Accessories" chapter.
- AMS should not be positioned next to noise sensitive walls, for example, next to a bedroom.
- Also ensure that the placement does not inconvenience the neighbours.
- AMS must not be placed so that recirculation of the outdoor air can occur. This causes lower output and impaired efficiency.
- The evaporator should be sheltered from direct wind, which negatively affects the defrosting function. Place AMS protected from wind against the evaporator
- Large amounts of condensation water, as well as melt water from defrosting, can be produced. Condensation water must be led off to a drain or similar (see subsection „Condensation water drain").
- Care must be exercised so that the heat pump is not damaged during installation.



Do not place the AMS heat pump directly on the lawn or other unstable surface.

For details on installing the outdoor unit, refer to the installer manual of the outdoor unit.

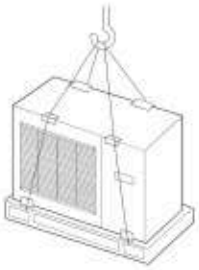


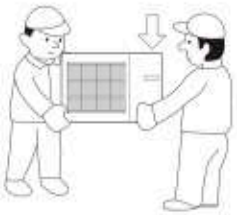
If there is a risk of snow slip from roof, a protective roof or cover must be erected to protect the heat pump,pipes and wiring.

Lift from the street to the set up location

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

> CAUTION!
> The centre of gravity is offset to one side (seep print on the packaging).





If AMS needs to be transported across soft ground, such as a lawn, we recommend that a crane truck is used that can lift the unit to the installation location. When AMS is lifted with a crane, the packaging must be undamaged and the load distributed with a boom,see the illustration above.

If a crane cannot be used AMS can be transported using an extended sack truck. AMS must be used on the side marked „heavy side" and two people are required to get the AMS up.

Lift from the pallet to final positioning

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

Place lifting straps around each foot of the appliance.

Lifting from the pallet to the base requires four persons, one for each lifting strap.

It is not permitted to lift the appliance by anything other than the feet

Scrapping

In case of scrapping, the product is dismantled by performing the above actions in reverse order. Lift by the bottom panel instead of a pallet!

Condensation water drain

Condensation drains out on to the ground below AMS.
To avoid damage to the house and heat pump, the condensation must be gathered and drained away.

> CAUTION!
> Condensation drainage is important for the operation of the heat pump. The condensation drain must be routed such that it cannot damage the building.

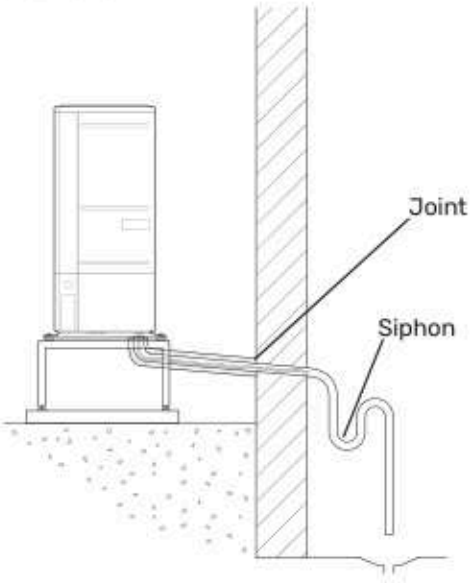
> CAUTION!
> Do not connect heating cables with automatic adjustment.

> CAUTION!
> The electrical installation and wiring must be carried out under the supervision of an authorised electrician.

- Condensate (50 l / 24 hours) is drained off via the hose to the appropriate drain. It is recommended that the route outside for the condensate is as short as possible.
- The section of the pipe that may be affected by frost must be heated by the heating cable to prevent freezing.
- Route the pipe downward from the AMS heat pump.
- The outlet of the condensation pipe must be at a depth that is frost-free or, alternatively, indoors (subject to local rules and regulations).
- Use a siphon for installations where air circulation may occur in the condensation water drainage pipe.
- The insulation must be tightly fitted to the bottom of the condensation water trough.

Recommended for leading off condensation water

Indoor drain

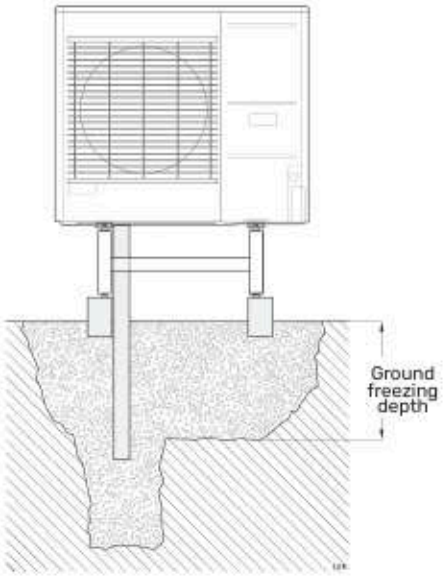


The condensation water is discharged to an indoor drain (subject to local rules and regulations).

Route the pipe downward from the air/water heat pump.

The condensation water drainage pipe must have a water seal to prevent air circulation in the pipe.

Stone caisson

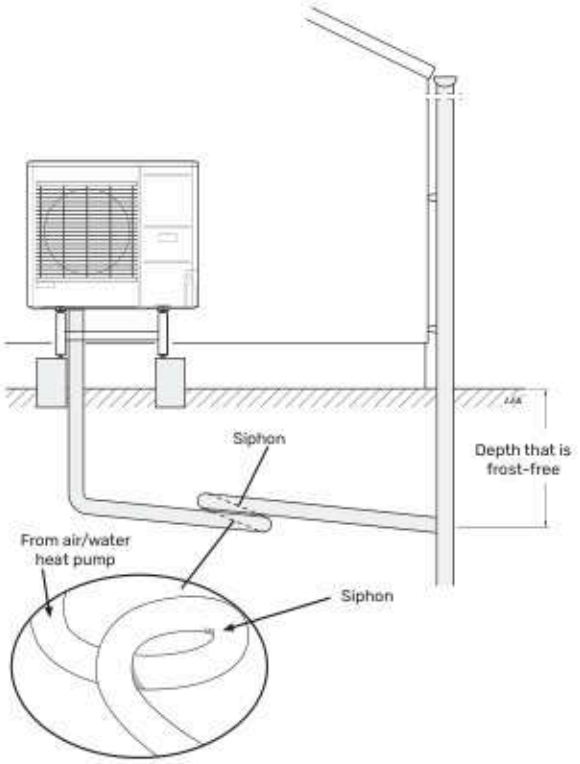


If the building has a basement, use a stone caisson to prevent condensation from damaging the building. Otherwise, the stone caisson can be positioned directly under the heat pump.

The outlet of the condensation water drainage pipe must be at a depth that is frost-free.

Odpływ do rynny

CAUTION!
Bend the hose to create a siphon, see illustration.



- The outlet of the condensation water drainage pipe must be at a depth that is frost-free.
- Route the pipe downward from the air/water heat pump.
- The condensation water drainage pipe must have a siphon to prevent air circulation in the pipe.
- The installation length can be adjusted by the size of the siphon.

NOTE!
If none of the recommended options will be used, proper drainage of condensate must be ensured.

Maintenance of AMS

REGULAR CHECKS

Your SPLIT box only requires minimal maintenance. The condensation hose should be checked to ensure that condensation can run out to a drain. If there is any suspicion of leakage, pipe connections on AMS should be checked.

Checking grilles and bottom panel on AMS

Check that the inlet grille is not clogged by leaves, snow or anything else regularly throughout the year.

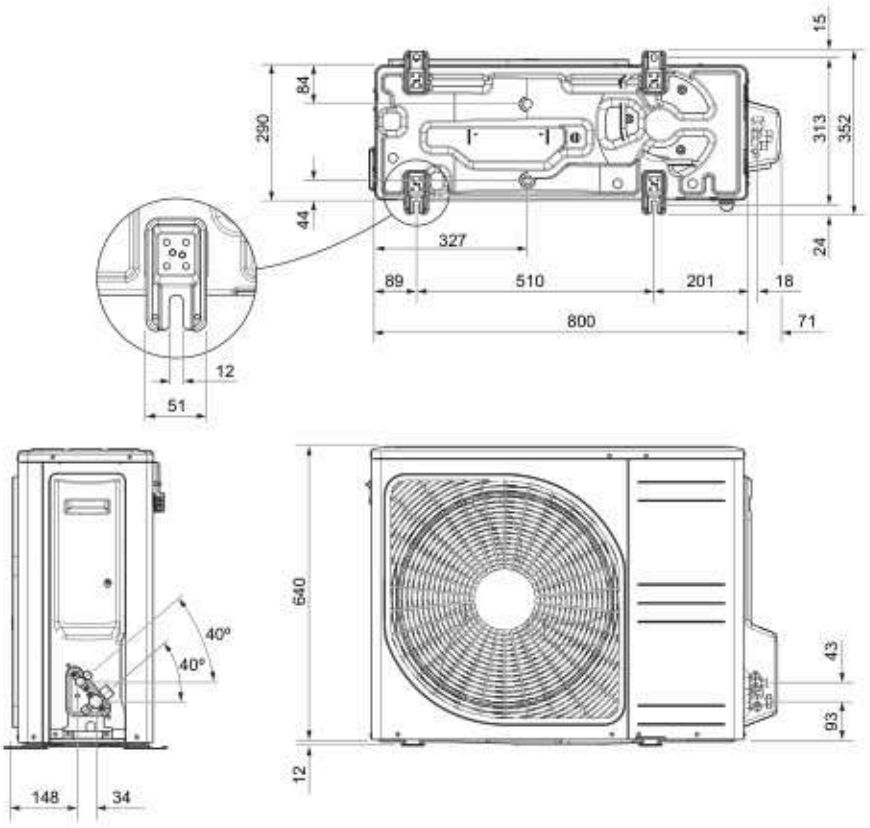
You should be vigilant during windy conditions and/or in the event of snow as the grilles can become blocked.

Also check that the drain holes in the bottom panel (three) are free from dirt and leaves.

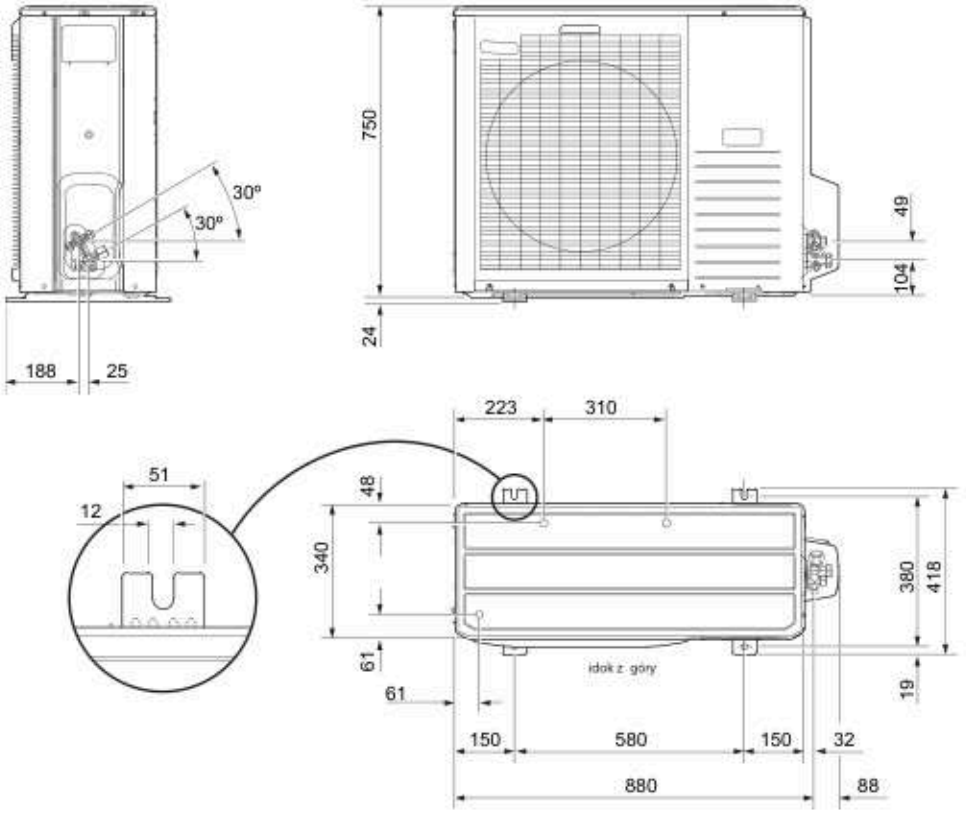
Regularly check that condensation is routed away correctly through the condensation pipe. Ask your installer for assistance if required.

Dimensions

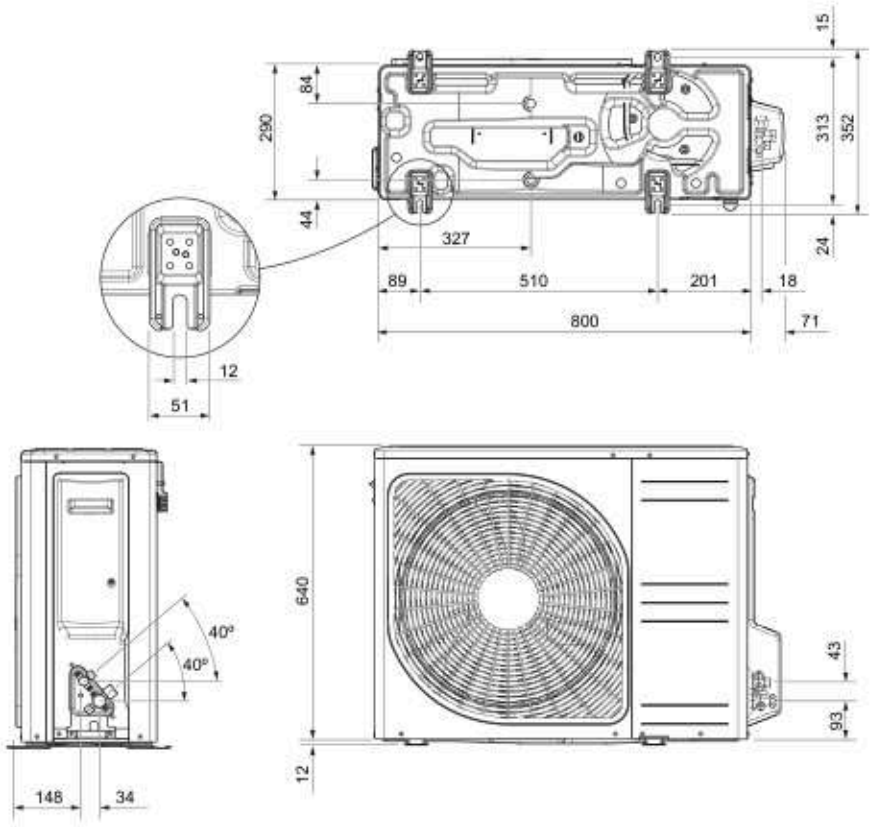
AMS 20-6



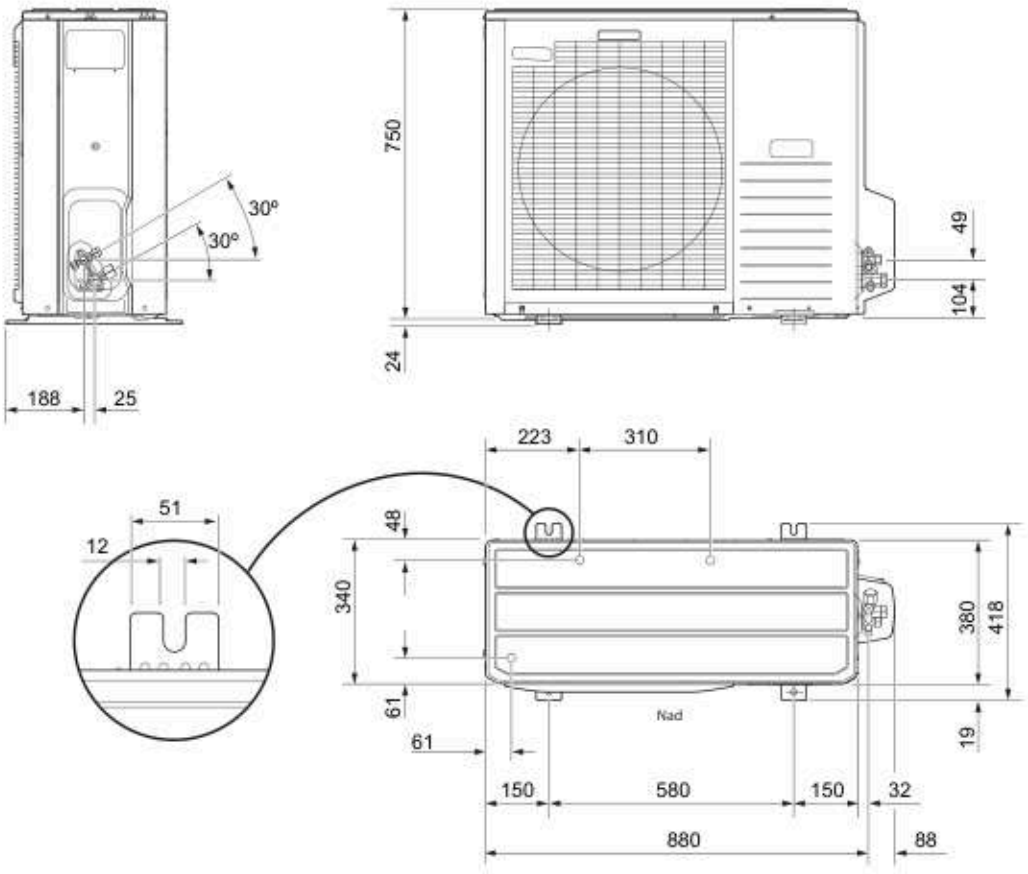
AMS 20-10



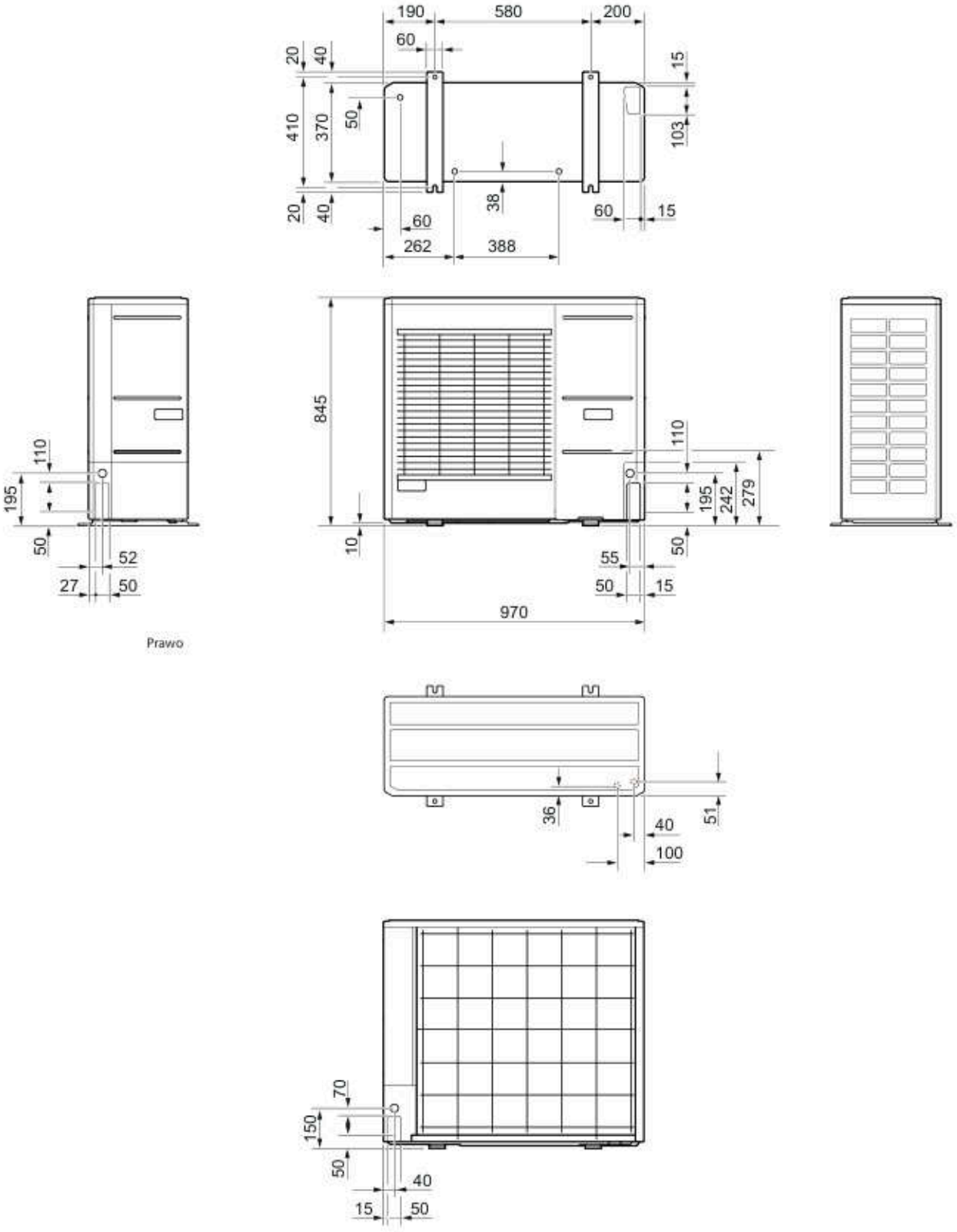
AMS 10-6



AMS 10-8

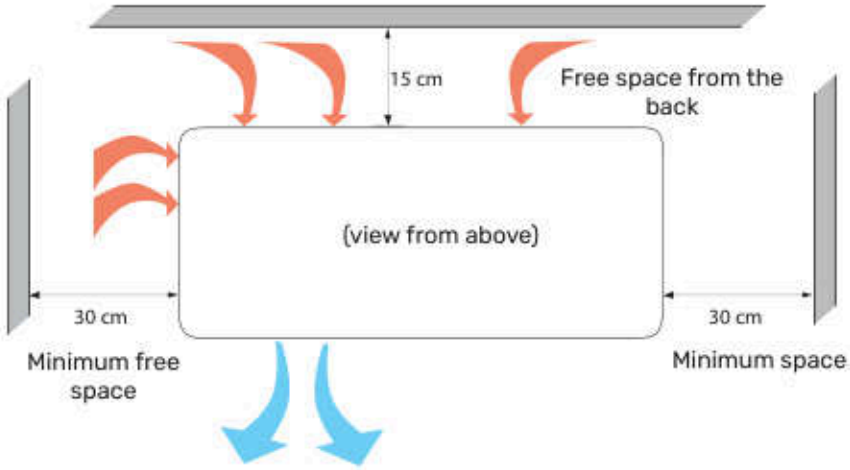


AMS 10-12


190
580
200
60
20
40
15
410
370
50
103
38
60
15
262
388
845
110
195
242
279
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150
40
15
50
Prawo

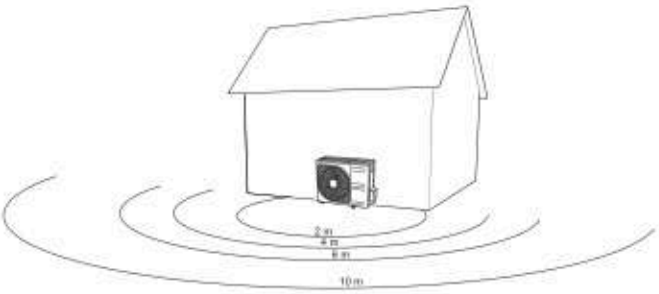
Installation location

The recommended distance between AMS and the building wall should be at least 15 cm. Free space above AMS should be at least 100 cm. However, the free space from the front must be 100 cm for future servicing.



However, the free space from the front must be 100 cm for future servicing.

Sound power levels



AMS is usually placed next to a house wall, which gives a directed sound distribution that should be considered. Accordingly, you should always attempt to find a placement on the side that faces the least sound sensitive neighbouring area.

The sound pressure levels are further affected by walls, bricks, differences in ground level, etc and should therefore only be seen as guide values.

		Sound power[1]	Sound pressure at distance (m)[2]									
			1	2	3	4	5	6	7	8	9	10
AMS 20-6	Nominal sound value	54	49,0	43,0	39,5	37,0	35,0	33,5	32,1	31,0	29,9	29,0
	Max. sound value	62	57,0	51,0	47,5	45,0	43,0	41,5	40,1	39,0	37,9	37,0
	Max. sound value, silent mode	54	48,0	42,0	38,5	36,0	34,0	32,5	31,1	30,0	28,9	28,0
AMS 20-10	Nominal sound value	54	49,0	43,0	39,5	37,0	35,0	33,5	32,1	31,0	29,9	29,0
	Max. sound value	65	60,0	54,0	50,5	48,0	46,0	44,5	43,1	42,0	40,9	40,0
	Max. sound value, silent mode 60 Hz	54	49,0	43,0	39,5	37,0	35,0	33,5	32,1	31,0	29,9	29,0

[1] Sound power level, LW(A), according to EN12102
[2] Sound pressure calculated according to directivity factor Q=4

Noise		AMS 10-6	AMS 10-8	AMS 10-12
Sound power levels, according to EN12102 at 7/35°C (rated value)[3]	L_W(A)	51	55	58
Sound power level at a distance of 2m (rated value)[3]	dB(A)	37	41	44

[3] Free space

6 Electrical connections

General information

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

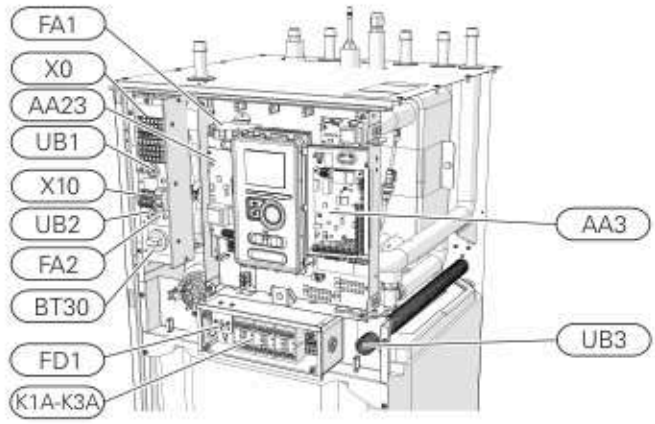
- Disconnect the indoor module before performing tests of electrical system insulation in the building.
- If the building is equipped with a differential switch, BA-SVM 20-200 must be equipped with a separate switch.
- The diagram of indoor module connections can be found in section „Diagram of electrical connections".
- Do not lay communication and signal cables to external contacts near voltage cables.
- Minimum cross-section of communication and signal cables to external contacts must total 0.5mm² with the length of up to 50 m, for example EKKX or LiYY, or similar.
- The power supply cable should be dimensioned according to the current standards.
- Use the UB1 cable grommet (as marked in the illustration) to lead the cables to the BA-SVM 20-200. In the UB1 grommet, the cables are routed through the entire indoor unit from the rear wall towards the front.

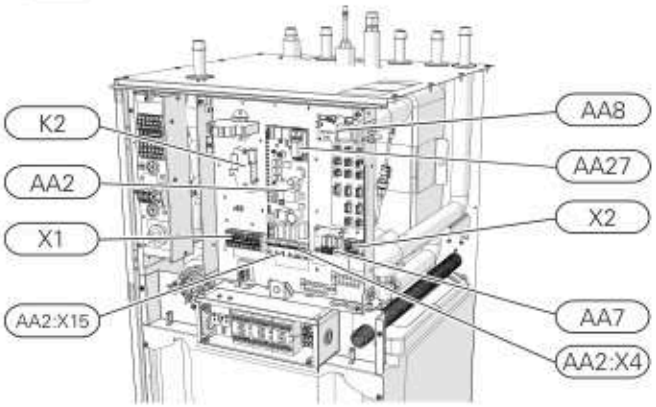
CAUTION!
The switch (SF1) for the controller must not be set to "I" or "⚠" until the climate system has been filled with heating medium and vented. Otherwise, the thermal circuit breaker, thermostat and the electric additional heat may be damaged.

CAUTION!
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.

CAUTION!
When SF1 is set to „⚠" - the BA-SVM 20-200 unit switches the QN10 valve to the central heating and heating takes place according to thermostat BT30. Hot water is not heated while the switch is set to „⚠".

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





X0	Power terminal - 400 V~/230 V~
X1	Control panel terminal block
X2	Control panel terminal block
X10	Outdoor unit connection terminal - 230 V~
FA1	Miniature circuit breaker (protecting the control system of indoor unit)
K1A-K3A	Electric additional heat contactor
BT30	Standby mode thermostat
AA3	Sensor card
AA23	Communication card
AA7	Extension card
FA2	Miniature circuit breaker (protecting the outdoor unit)
FD1	Thermal circuit breaker STB
UB1-UB3	Cable grommet
K2	Alarm relay
AA2	Main board
AA2:X15	Terminal block - low voltage
AA2:X4	Terminal block - low voltage
AA8	Titanium anode card
AA27	Relay board

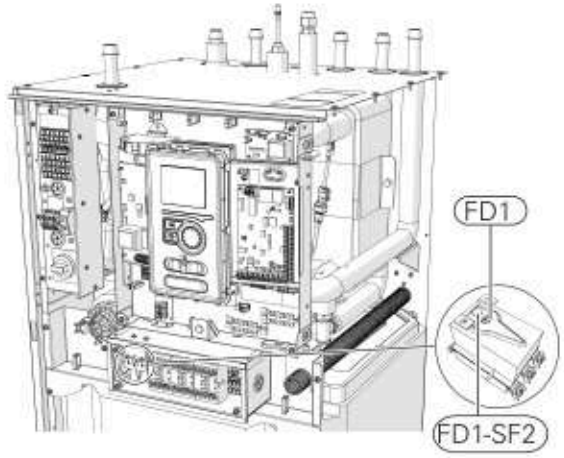
Thermal circuit breaker STB

Temperature limiter STB (FD1) cuts off the power supply of the electrical heating module if the temperature increases to the range of approximately 92-6°C.

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

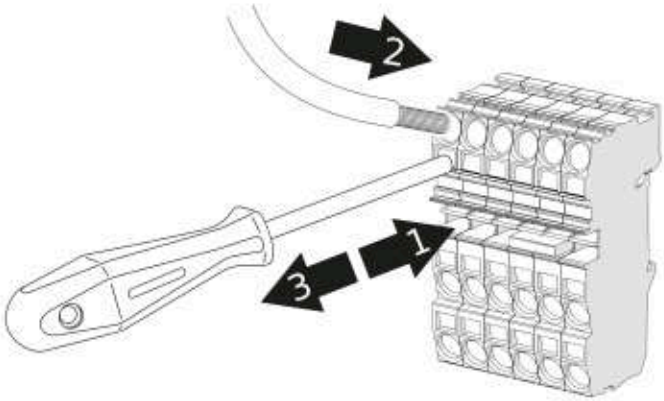
Resetting

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 key lock

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



Connections

> CAUTION!
> 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.

> CAUTION!
> 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.

> CAUTION!
> 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.

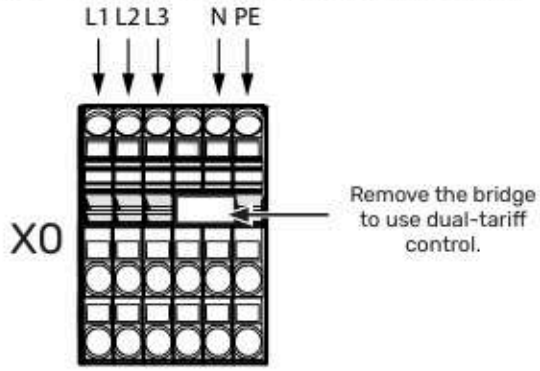
> CAUTION!
> The electrical system to which the device will be connected should be built in accordance with current regulations.

Power supply connection 400 V

The power supply connection is connected to terminal block (X0) through the input on the back of the unit (UB1). The cable must be dimensioned according to the applicable standards.
The 400V connection allows for a maximum power of 9kW to the electric additional heat. The connection should be made according to the diagram in the user manual.

Detailed electrical diagram - see subsection "Electrical wiring diagrams".

Diagram - connecting power supply 400 V



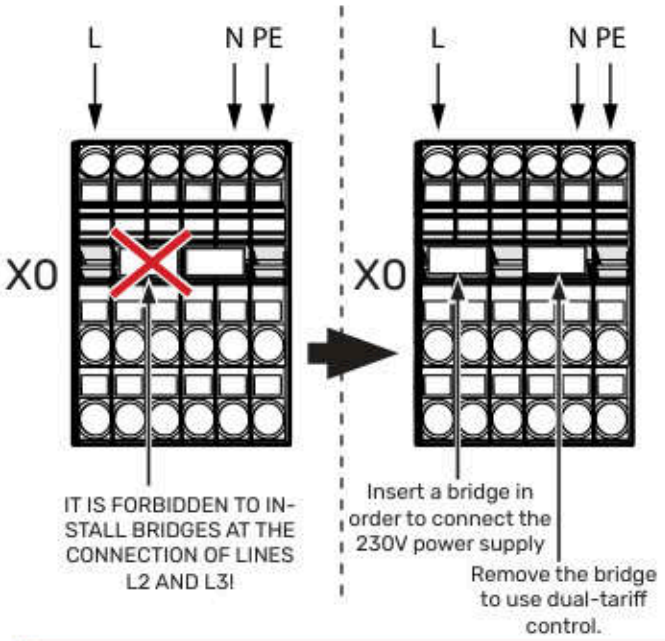
> CAUTION!
> If a 400V connection is used, the maximum power of the electric additional heater placed in the BA-SVM 20-200 unit is 9 kW.

CAUTION!
In the case of dual-tariff control by the power company, it is recommended to connect the neutral wire from the power circuit (meter).

Power supply connection 230 V

The power supply connection is connected to terminal block (X0) through the input on the back of the unit (UB1). The 230V connection allows for a maximum power of 4,5 kW to the additional heating. The connection should be made according to the diagram in the Installation and user manual.
Detailed electrical diagram - see subsection "Electrical wiring diagrams".

Diagram - connecting power supply 230 V



CAUTION!
When a 230V connection is used, the maximum power of the additional heat used in the BA-SVM 20-200 unit is 4.5kW.

CAUTION!
In the case of a dual tariff power supply by the power company, it is advisable to connect the neutral wire from the power supply circuit (meter) - particularly when using a 230 V connection.

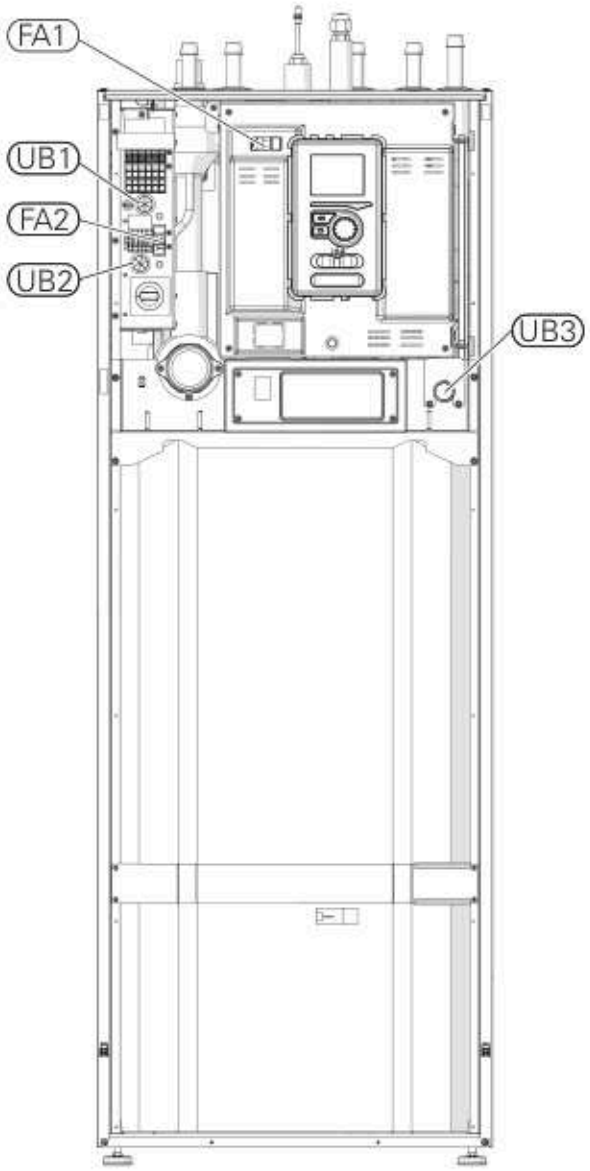
CAUTION!
It is forbidden to install bridges at the connection of lines L2 and L3. Otherwise, the appliance and the electrical system may be damaged.

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

Miniature circuit breaker

The automatic heating control system, the circulation pump and their wiring in BA-SVM 20-200 are internally protected by miniature circuit breaker C10 (FA1). The AMS outdoor unit and accessories are internally protected in BA-SVM 20-200 by miniature circuit breaker B20 (FA2).

CAUTION!
The electrical installation should also have an additional power switch to disconnect the main power supply to the unit.



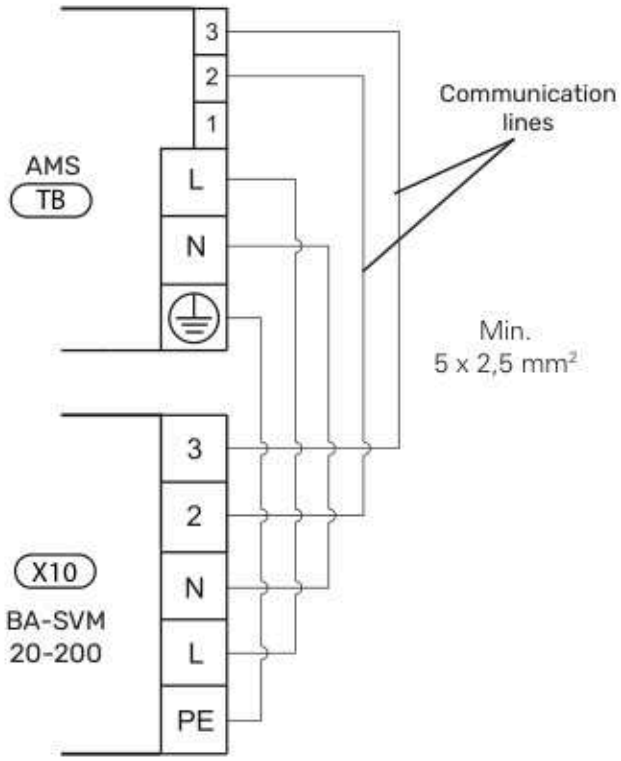
Connecting BA-SVM 20-200 and AMS

The device connecting cable should be connected to the power supply terminal block (TB) in AMS and to the terminal block (X10) in BA-SVM 20-200.

> CAUTION!
> Wiring must be secured so that the terminal block is not under tension. The end of the wire should be 8 mm long without insulation.

AMS

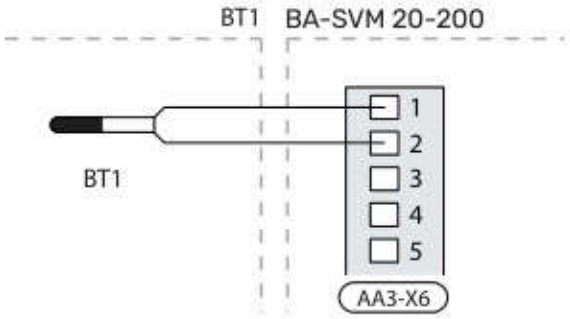
Connect the phase (brown), neutral (blue), communication (black and grey) and protective (yellow-green) conductors as shown in the drawing:



Additional connections

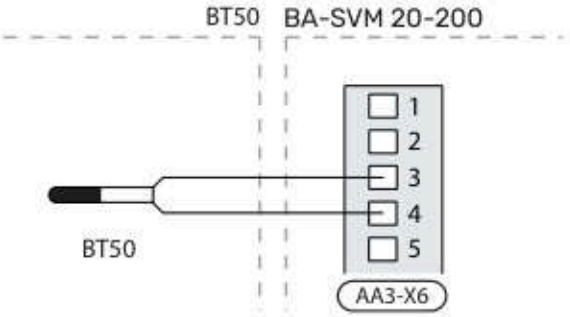
Connecting the outdoor temperature sensor

The outdoor temperature sensor BT1 (included) should be connected to the BA-SVM 20-200 unit via terminal block AA3-X6:1 and AA3-X6:2.



Connecting the indoor temperature sensor

The indoor temperature sensor BT50 (included) should be connected to the BA-SVM 20-200 unit via terminal block AA3-X6:3 and AA3-X6:4.



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. BA-SVM 20-200 comes with current meters that controls the power steps for the electric additional heat by disconnecting step by step in event of overload in a phase. Reconnection occurs when other current consumption is reduced.

> NOTE!
> If current meters are installed, full functionality is obtained by enabling ‚detect phase sequence' and setting the required fuse size in menu 5.1.12.

Connecting current sensors

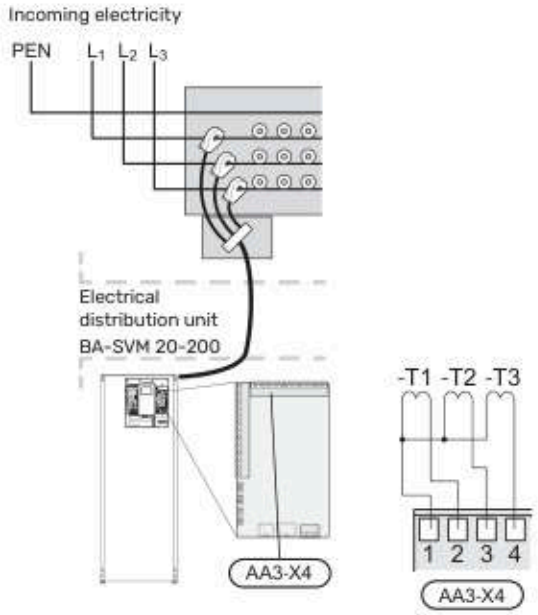
> CAUTION!
> If the current value (MENU 5.1.12) is set too low, it may cause the additional heat to be switched off, reduce the heat pump capacity and may affect the efficiency of the compressor.

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 meters should be connected to the four-wire cable in the distribution box. Between the housing and BA-SVM 20-200, use a four-wire cable with a cross-section of min. 0.5mm².

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

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



Settings

Electric additional heat- maximum power

The electric additional heat has a maximum power of 9 kW (400 V) / 4,5 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 4,5 kW (230 V). The maximum power step of the immersion heater can be set using menu 5.1.12.

Emergency mode

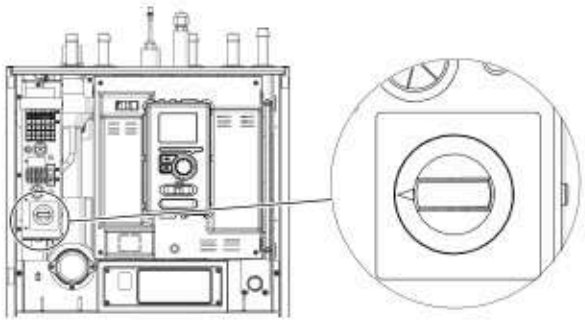
When the controller is set to emergency mode (SF1 is set to ⚠) only the most necessary functions are activated.

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

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

Emergency mode thermostat

The supply temperature in emergency mode is set using a thermostat (BT30). It should be set according to the demands of the heating/cooling circuits in operation.
The adjustment range is 5 - 65°C. Please note, however, that for underfloor heating the setting should be min. 20°C, max. 35-45°C to maintain comfort in the room and efficient operation of the system.



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

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

7 Commissioning and adjusting

Preparations

1. Check that the switch for the control module is in position „ ⏻ ".
2. Check whether the drain valve has been completely closed, and whether the temperature limiter has not been activated (FD1).
3. Compatible NIBE air/water heat pumps have been listed in the Connection Options section.

Filling and venting

Filling the DHW heater at BA-SVM 20-200

1. Open the hot water tap in the building to the tank.
2. Open the valve cutting off cold water. When doing so, the valve should be completely open.
3. When water starts to flow from the intake point with hot water without air bubbles, the HW tank is full and you can close the intake point.

Filling and venting the climate system and BA-SVM 20-200

1. Open the vent valves at the highest point of the climate system.
2. Set all mixing valves to a position which allows flow in all heating/cooling circuits.
3. Open the valve for filling the climate system and fill it with the heating medium, vent the system.
4. Check the pressure gauge, on which an increase in pressure will be visible. Fill the system to the required pressure (1,5 - 2), then close the filling valve. The maximum operating pressure of the system is 3 bar.
5. Start the climate system circulation pump. The automatic vent valves located on the heating/cooling circuit will begin venting the system.
6. If during venting the pressure falls below 1 bar, extra heating medium must be added to the climate system.

Draining the climate system

To make it easier to carry out servicing on the climate system, drain the system first using the filling / draining valve. The unit is not fitted with a climate system drainage valve. This valve must be installed external from the product.

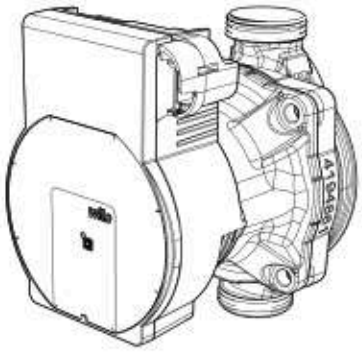
> ⚠ CAUTION!
> There may be some hot water when draining the heating medium side/climate system. There is a risk of scalding.

1. Connect a pipe to the system's external draining valve.
2. Then open the draining valve in order to drain the heating installation.

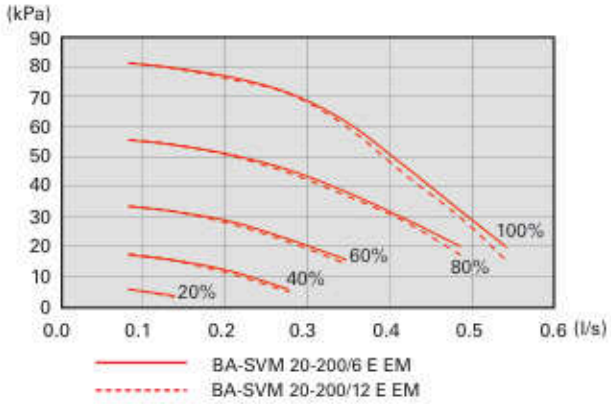
Circulation pump

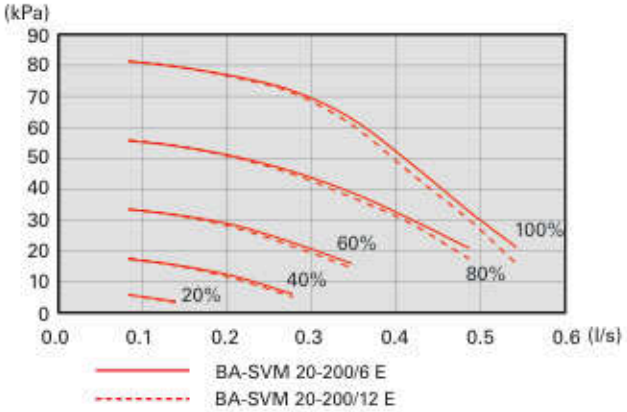
Pump speed

The circulation pump in BA-SVM 20-200 is PWM controlled and regulates itself by control and based on heating/hot water demand.



Available pressure, circulation pump GP12.





Post-adjustment, venting

Initially, air is released from the heating medium and venting may be necessary. If gurgling sounds can be heard from the climate system, the entire system will require additional venting. The system is vented via the vent valves. During venting, BA-SVM 20-200 must be switched off.

Commissioning

CAUTION!
Commissioning of the system must be carried out by a person with appropriate authorizations and manufacturer's authorization!

For commissioning of the heat pump:
1. Switch on the power supply to BA-SVM 20-200 making sure that the AMS 20 unit is properly connected to the power supply.
2. Follow the instructions displayed in the controller start guide.

Start Guide

CAUTION!
The climate system must be filled with water and vented before setting the switch to "I".

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

TIP!
For more detailed information on the plant controls (operations, menus, etc.) refer to Chapter 8 Control - Introduction.

Commissioning

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

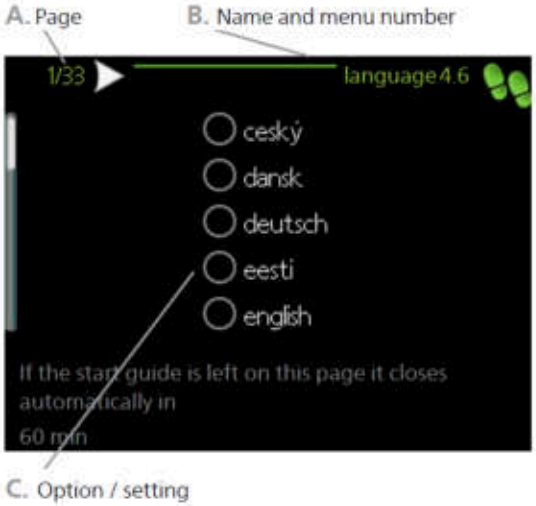
The start guide ensures that start-up is carried out correctly. The start guide can be started later in menu 5.7.

After running the start guide, the reversing valves are open in both directions to help vent the heat pump.

NOTE!
As long as the start guide is active, no function in the controller will start automatically.
The guide will appear at each controller restart until it is disabled on the last page.

NOTE!
If starting up the system in low outdoor temperatures and a low heating medium temperature in the central heating system, the central heating system should be warmed up first, using the additional heat, to a temperature of about 20 - 25 °C.

Operating the start guide



A. Page
Here you can see the menu level in the start guide. Scroll between the pages of the start guide as follows:
1. Turn the control knob until one of the arrows in the top left corner (at the page number) has been selected.
2. Press the OK button to skip between the pages in the start guide.

B. Name and menu number
Information about the menu page, to which the start guide refers, can be found in the control system. The digits refer to the menu number in the control system.
If you want to read more about a particular menu, either consult the help menu or read the user manual.

C. Option / setting
Enter settings for the system here.

Commissioning without heat pump

The indoor unit can be used without a heat pump only as an electric boiler, to produce heat and hot water before the heat pump is installed, for example.
Go to menu 5.2 System settings and turn off the heat pump.

> CAUTION!
> Select the auto or manual operating mode when the indoor unit is to be used again with the heat pump.

Overflow valve

The overflow valve adjustment procedure applies to units with a flow meter installed. It should be carried out during system commissioning as follows:

1. Fully open the pressure overflow valve.
2. Close the flow on all heating circuits downstream of the pressure overflow valve.
3. Go to menu 5.6 Forced control and manually set the feed pump speed to 100%.
4. Go to menu 3.1.12.
5. At quarter turn intervals of one minute, close the overflow valve while checking the flow reading in menu 3.1.12. When the „Minimum flow during defrosting" value has been reached - see table in chapter 4, subchapter „Minimum flow in the system", complete the valve closure.
6. You can then reopen the heating circuits and set the circulation pump to automatic mode in menu 5.6 Forced control.

12 Accessories

Automatic gas separator AGS 10

Intended for NIBE AMS 20-10 / BA-SVM 20-200/12.
An automatic air separator must be installed when the length of the pipe between NIBE AMS 20-10 and BA-SVM 20-200/12 air/water heat pump exceeds 15 m.

Part no. 067 829

Room sensor RTS 40

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

Part no. 067 065

Extra shunt group ECS 40/ECS 41

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

ECS 40 (max 80m²)	ECS 41 (max 250m²)
Part no. 067 287	Part no. 067 288

Accessory card AXC 40

An accessory board is required in case of active cooling (4-pipe system), an additional climate system, or if more than four feed pumps are to be connected to the controller. It can also be used in case of additional heat controlled by a shunt valve (e.g. wood/oil/gas/pellet boiler). An accessory board is required if, for example, a hot water circulation pump is to be connected to the controller where the AA3-X7 output is activated for the QN12 valve.

Part no. 067 060

Communications module MODBUS 40

MODBUS 40 enables controller to be controlled and monitored using a BMS (building management system) in the building. Communication is then performed using MODBUS-RTU.

Part no. 067 144

Room unit RMU 40

RMU 40 means that control and monitoring of the controller can be carried out in a different part of your home to where it is located.

Part no. 067 064

Pool unit POOL 40

POOL 40 is used to enable swimming pool heating with BA-SVM 20-200.

Part no. 067 062

Air/water heat pump

AMS 20-6	AMS 20-10
Part no. 064 235	Part no. 064 319

AMS 10-6	AMS 10-8	AMS 10-12
Part no. 064 205	Part no. 064 033	Part no. 064 110

Auxiliary relay HR 10

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

Part no. 067 309

Condensation water drainage pipe

KVR10-10

Length - 1 meter
Part no. 067 614

KVR10-30

Length - 3 metres
Part no. 067 616

KVR10-60

Length - 6 meters
Part no. 067 618

Communication module for solar panels EME 20

The EME 20 is used to enable communication and control between NIBE solar cell inverters and the BA-SVM indoor unit.

Part no. 057 188

ERS RECUPERATION SYSTEMS

This accessory is used to supply the building with recovered energy from the ventilation air. The device ventilates the building and heats the supply air if necessary.

ERS 10-400	ERS 20-250
Part no. 066 115	Part no. 066 068

More accessories are available on the website https://www.nibe.eu

Connecting the KVR accessory

The KVR 10 accessory is used to safely drain off most of the condensate from the air/water heat pump to a frost-free collection point.

HYDRAULIC CONNECTION

For information on hydraulic connection of the KVR 10 accessory, see the instructions for the KVR accessory.

ELECTRICAL CONNECTION

In order to connect the electric KVR accessory:

1. Open the control panel and knock out the notched plate in the control panel housing under the residual current device. Remove the panel housing.
2. Disconnect the wires and remove the cube.

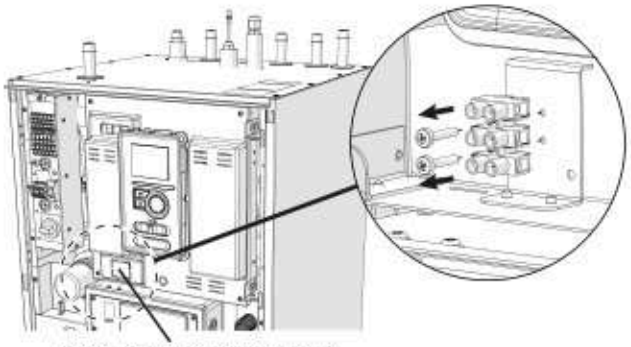
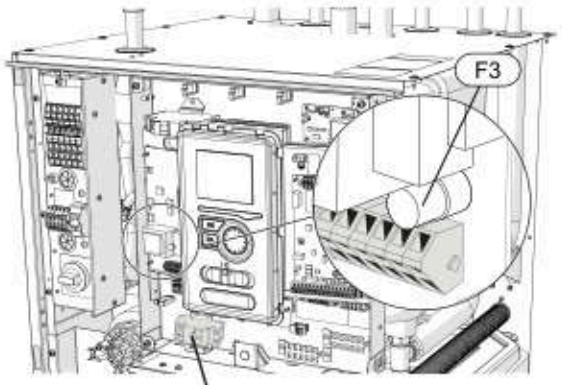


Plate to be punched-out

3. Attach the residual-current device RCD.



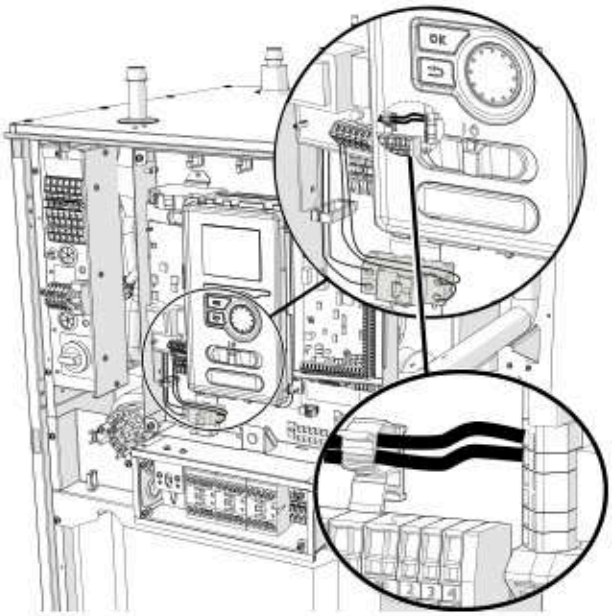
Residual-current device RCD

4. Use fuse (F3) depending on the length of the KVR cable in accordance with the below table.

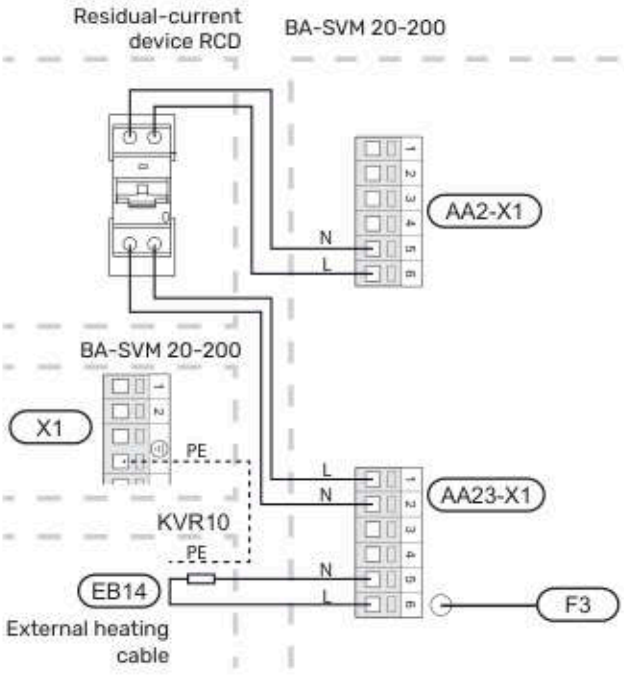
Length (m)	P_{tot} (W)	Fuse (F3)	Part no.
1	15	T100mA/250V	718 085
3	45	T250mA/250V	518 900*
6	90	T500mA/250V	718 086

*Fitted at the factory

5. Connect a residual-current device to terminal AA2-X1 under terminal block 5(N) and 6(L).
6. Connect a residual-current device to terminal AA23-X1 to terminal blocks 1 (L) and 2 (N).



7. Connect an external heating cable (EB14) to terminal AA23-X1 to terminal blocks: 4 (PE), 5 (N), 6 (L).



Connecting an additional heat source

The BA-SVM 20-200 can be connected to an additional heat source (e.g. a gas boiler, solid fuel boiler).

NOTE!
When using an additional heat source (e.g. gas boiler, solid fuel boiler), the built-in electric auxiliary heater will not be used.

Additional heat source connected before QN10 (replacing the built-in auxiliary heater) must not have a power greater than 15 kW and should be connected to the contactor K1A. Short-circuit of potential-free contacts K1A gives a signal to switch on an additional heat source.

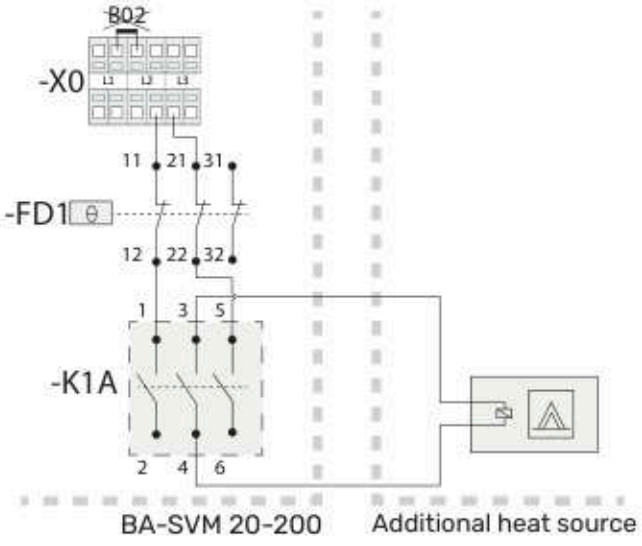
HYDRAULIC CONNECTION

The hydraulic connection should be made to connections XL 18 and 19 in accordance with „Diagram showing connection of an additional heat source" in section 4 Pipe connections.

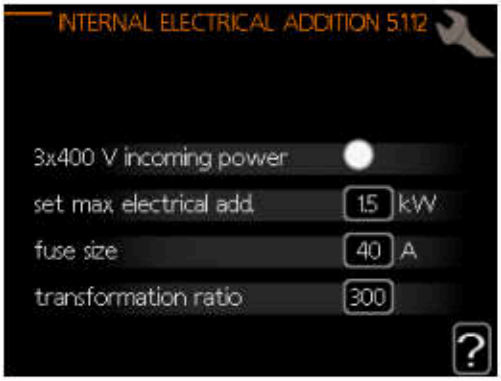
ELECTRICAL CONNECTION

In order to make a correct electrical connection to the control (potential-free):

1. Disconnect the device from the power supply.
2. In the case of connecting the unit to 400V, convert the connection to 230V.
3. Disconnect the B02 jumper as shown in the drawing below (detailed diagram in the subsection „Wiring diagrams").
4. Connect the wires from the additional heat source (e.g. gas boiler) to the terminals of the K1A: 3 and K1A: 4 relay as shown in the figure below.



5. Connect the device to the power supply and start the BA-SVM unit.
6. In menu 5.1.12, change the setting according to the screenshot and description below.



Description of settings:
3x400 V incoming power: off
set max electrical add.: 1.5 kW
fuse size: 40A (recommended value)
tranformation ratio: 300

CAUTION!
Setting the fuse size too low may result an wrong operation in additional heat source and/or compressor power limitation.

NOTE!
To run an additional heat source (e.g. a gas boiler), the fuse size must be set at least 7A higher than the required compressor run value

In the absence of current limitation, the recommended fuse size is 40A.

Connecting the expansion card

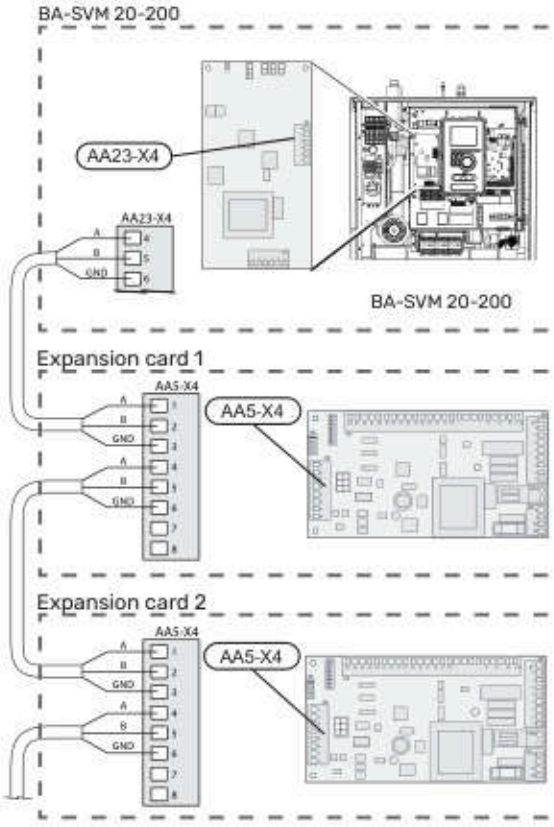
Communication connection

The expansion card communication should be connected directly to the BA-SVM 20-200 to the AA23 card according to the diagram below.

When connecting or installing more than one accessory, observe the following.

The first expansion card should be connected directly to the AA23-X4 terminal block on the BA-SVM 20-200, and the following cards should be connected in series with the previous one.

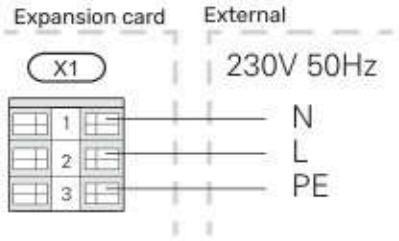
Use cables type LiYY, EKKX or similar.



For detailed information on using the expansion card, see the installer manual for the AXC 40 accessory.

Power connection

Connect the power to terminal X1 as shown in the figure.



Connection of an additional GP10 pump

To connect an additional GP10 circulation pump, proceed as follows:

- connect wire L to the terminal block AA2-X4: 11
- connect wire N to the terminal block AA2-X4: 10
- connect wire PE to the terminal AA2-X4: 9

All connections should be made in accordance with the figure below.

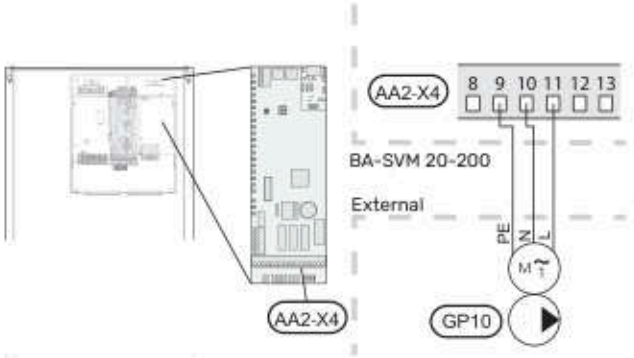
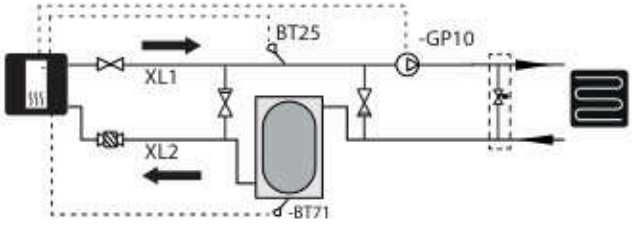
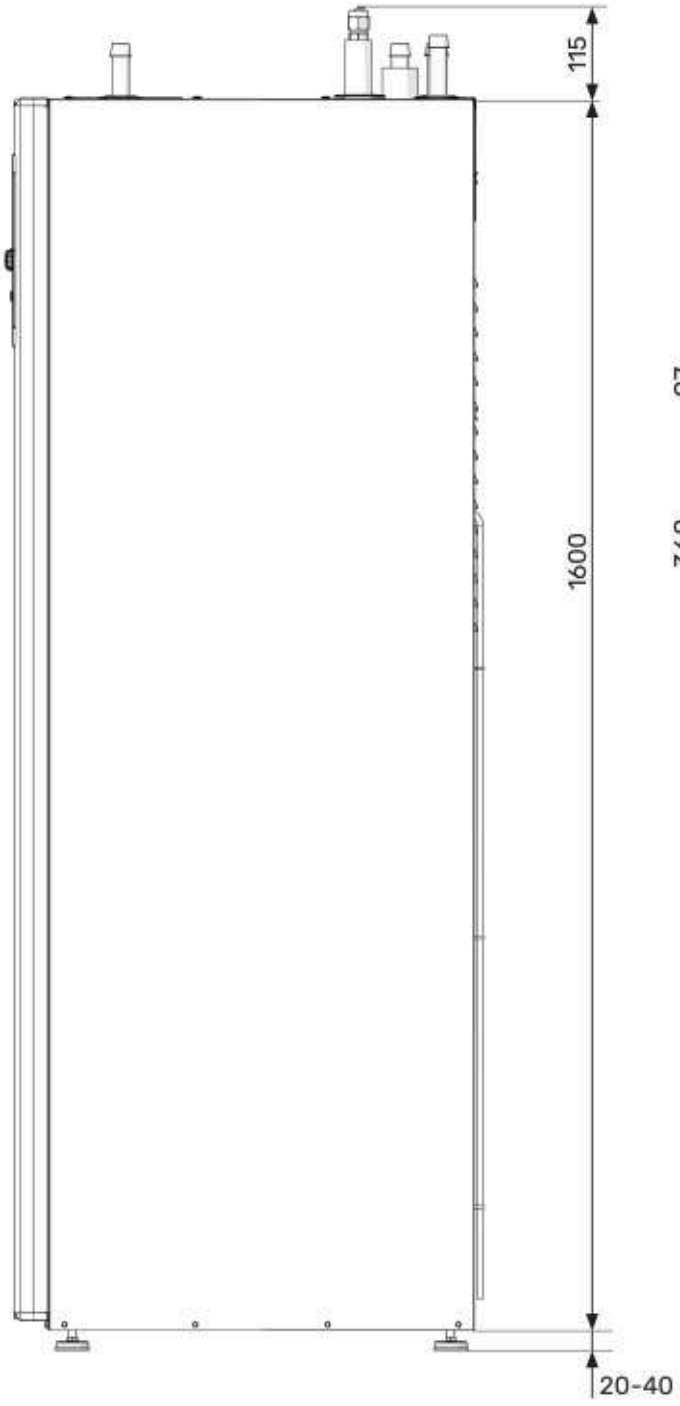
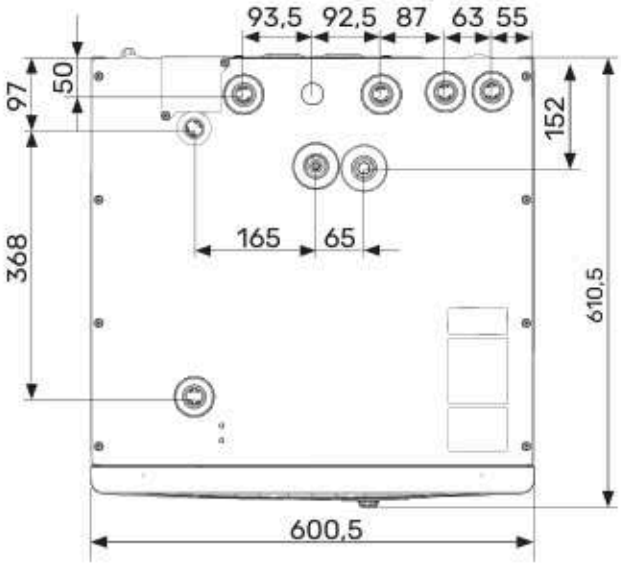


Diagram with buffer tank connected in series-parallel and additional circulation pump GP10.



13 Technical data





Technical data

BA-SVM 20-200

Product type	Unit	BA-SVM 20-200/6 E/E EM	BA-SVM 20-200/12 E/E EM
Height	mm	1720	
Required room height	mm	2100	
Width	mm	600	
Depth	mm	610	
Weight	kg	155	165
Maximum operating pressure of central heating system	bar	3	
Minimum operating pressure of central heating system	bar	0,5	
Maximum hot water pressure	bar	10	
Minimum hot water pressure	bar	2	
Hot water tank volume	l	180	
Maximum operating temperature of central heating	°C	70	
Low-energy circulation pump clim. sys.	-	Yes	
Safety valve. climate system	-	Yes, in the safety assembly	
Expansion vessel	l	10	
Additional heat	kW	4,5 (230 V) / 9 (400 V)	
Plate heat exchanger power	kW	6	9
Rated voltage	V	1x230 / 3x400	
Hot water tank corrosion protection	-	Enamel + titanium anode	
Refrigerant type	-	R410A / R32	
Maximum hot water capacity in accordance with EN16147	-	230 l 40°C	
Energy class (acc. to ErP, at supply temp. 55°C) (Applies to AMS 20-12 + BA-SVM 20-200/12 i AMS 20-6 + BA-SVM 20-200/6	-	A++	
Performance class / Load profile (DHW)	-	A/XL	

AMS 20

Outdoor module	Unit	AMS 20-6	AMS 20-10
Output data according to EN 14 511, partial load [1]			
Heating Capacity / power input / COP (kW/kW/-) at nominal flow Outdoor temp. / Supply temp.	-7 / 35°C	5.55 / 2.05 / 2.71	7.18 / 2.93 / 2.45
	2 / 35°C	2.31 / 0,56 / 4.13	3.46 / 0.83 / 4.17
	2 / 45°C	2.02 / 0.67 / 3.01	3.24 / 1.12 / 3.24
	7 / 35°C	2.64 / 0.49 / 5.42	4.00 / 0.75 / 5.33
	7 / 45°C	2.43 / 0.65 / 3.74	5.00 / 1.28 / 3.91
Cooling Capacity / power input / EER (kW/kW/-) at maximum flow Outdoor temp: / Supply temp.	35 / 7 °C	5.32 / 1.94 / 2.74	7.07 / 2.40 / 2.95
	35 / 18 °C	7.55 / 2.11 / 3.58	10.79 / 3.00 / 3.60
SCOP according to EN 14825			
Nominal heat output ($P_{designh}$) average climate 35 °C / 55 °C (Europe)	kW	5.20 / 5.60	6.3 / 6.5
Nominal heat output ($P_{designh}$) cold climate 35 °C / 55 °C	kW	5.80 / 5.70	6.5 / 6.2
Nominal heat output ($P_{designh}$) warm climate 35 °C / 55 °C	kW	5.57 / 5.48	6.9 / 6.6
SCOP average climate, 35 °C / 55 °C (Europe)		5.08 / 3.58	4.6 / 3.4
SCOP cold climate, 35 °C / 55 °C		4.10 / 3.05	3.9 / 2.9
SCOP warm climate, 35 °C / 55 °C		6.76 / 4.55	6.4 / 4.4
Energy rating, average climate [2]			
The product's room heating efficiency class 35 C / 55 C [3]		A++ / A++	
The system's room heating efficiency class 35 C / 55 C [4]		A+++ / A++	
Electrical data			
Rated voltage		230 V 50 Hz, 230 V 2 AC 50 Hz	
Max operating current, heat pump	A_{rms}	15	16
Max operating current, compressor	A_{rms}	14	15
Max. power, fan	W	50	86
Drain pan heating (integrated)	W	110	100
Fuse	A_{rms}	16	
Starting current	A_{rms}	5	
Enclosure class		IP24	
Refrigerant circuit			
Type of refrigerant		R32	
GWP refrigerant		675	
Volume	kg	1.3	1.84
Type of compressor		Twin Rotary	
CO_2-equivalent (The cooling circuit is hermetically sealed.)	t	0.88	1.24
Cut-out value pressure switch HP (BP1)	MPa (bary)	-	4,15 (41,5)
Cut-out value pressure switch LP (BP2)	MPa (bary)	-	0,079 (0,79)
Max. length, refrigerant pipe, one way	m	30	50
Max height difference, when AMS 20 is placed higher than BA-SVM	m	20	30
Max height difference, when AMS 20 is placed lower than BA-SVM	m	20	15

Dimensions, refrigerant pipes, Gas pipe/Liquid pipe [5]	mm	12.7 (1/2") / 6.35 (1/4")	15.88 (5/8") / 6.35 (1/4")
Airflow			
Max airflow	m^3/h	2,530	3,000
Working area			
Min./max. air temperature, heating	°C	-20 / 43	
Min./max. air temperature, cooling	°C	15 / 43	
Defrosting system		Reverse cycle	
Pipe connections			
Pipe connection option		Right-hand side	
Pipe connections		Flare	
Dimensions and weight			
Width	mm	800	880 (+67 valve cover)
Depth	mm	290	340 (+ 110 with foot rail)
Height with stand	mm	640	750
Weight	kg	46	60
Miscellaneous			
Part no.		064 235	064 319

[1] Power statements including defrosting according to EN 14511 at heating medium supply corresponding to DT=5 K at 7 / 45.
[2] Reported efficiency for the system also takes the temperature regulator into account. If the system is supplemented with an external auxiliary boiler or solar heating, the total efficiency of the system must be recalculated.
[3] Scale for the product's room heating efficiency class A++ to G. Control module model SMO S.
[4] Scale for the system's room heating efficiency class A+++ to G. Control module model SMO S
[5] If the length of the refrigerant pipes exceeds 15 metres, extra refrigerant must be added at 0.02 kg/m. Use the enclosed label to re-mark the unit with the new amount of refrigerant.

AMS 10

Outdoor module	Unit	AMS 10-6	AMS 10-8	AMS 10-12
Output data according to EN14511 ΔT5K	Outdoor temp./ Supply temp.			
Heating Capacity / power input / COP (kW/kW/-) at nominal flow	7/35°C (floor)	2,67/0,5/5,32	3,86/0,83/4,65	5,21/1,09/4,78
	2/35°C (floor)	2,32/0,55/4,2	5,11/1,36/3,76	6,91/1,79/3,86
	-7/35°C (floor)	4,60/1,79/2,57	6,60/2,46/2,68	9,00/3,27/2,75
	7/45°C	2,28/0,63/3,62	3,70/1,00/3,70	5,00/1,31/3,82
	2/45°C	1,93/0,67/2,88	5,03/1,70/2,96	6,80/2,24/3,04
Cooling Capacity / Power input / EER (kW/kW/-) at maximum flow	27/7°C	5,87/1,65/3,56	7,52/2,37/3,17	9,87/3,16/3,13
	27/18°C	7,98/1,77/4,52	11,20/3,20/3,50	11,70/3,32/3,52
	35/7°C	4,86/1,86/2,61	7,10/2,65/2,68	9,45/3,41/2,77
	35/18°C	7,03/2,03/3,45	9,19/2,98/3,08	11,20/3,58/3,12
Electrical data				
Rated voltage		230 V 50 Hz, 230 V 2 AC 50 Hz		
Max. current	A_{rms}	15	16	23
Recommended fuse rating	A_{rms}	16	16	25
Starting current	A_{rms}	5		
Max fan flow (heating, nominal)	m^3/h	2 530	3 000	4 380
Fan rating	W	50	86	

Drain pan heater (integrated)	W	110	100	120
Defrosting		Reverse cycle		
Enclosure class		IP 24		
Refrigerant circuit				
Type of refrigerant		R410A		
GWP refrigerant		2 088		
Compressor		Twin Rotary		
Refrigerant quantity	kg	1,5	2,55	2,90
CO_2 equivalent	t	3,13	5,32	6,06
Cut-out value, pressure switch, high pressure	MPa (bar)	-	4,15 (41,5)	
Breaking value high pressure	MPa (bar)	4,5 (45)	-	
Cut-out value, pressure switch, lowpressure (15 s)	MPa (bar)	-	0,079 MPa (0,79)	
Max. length, refrigerant pipe, one way	m	30*		
Max height difference, refrigerant pipe	m	7		
Dimensions, refrigerant pipe		Gas pipe: OD12,7 (1/2") Fluid pipe: OD 6,35 (1/4")	Gas pipe: OD 15,88 (5/8") Fluid pipe: OD 9,52 (3/8")	
Pipe connections				
Pipe connection option		Right-hand side	Right-hand side	Right / bottom / reverse
Pipe connections		Flare		
Dimensions and weight				
Width	mm	800	880 (+67 valve protection)	970
Depth	mm	290	340 (+110 with foot rail)	370 (+80 with foot rail)
Height	mm	640	750	845
Weight	kg	46	60	74
Miscellaneous				
Part no.		064 205	064 033	064 110

* If the length of the refrigerant pipes exceeds 15 m, extra refrigerant must be added in the amount of 0.02kg/m for BA-SVM 20-200/6 or 0.06 kg/m for BA-SVM 20-200/12.

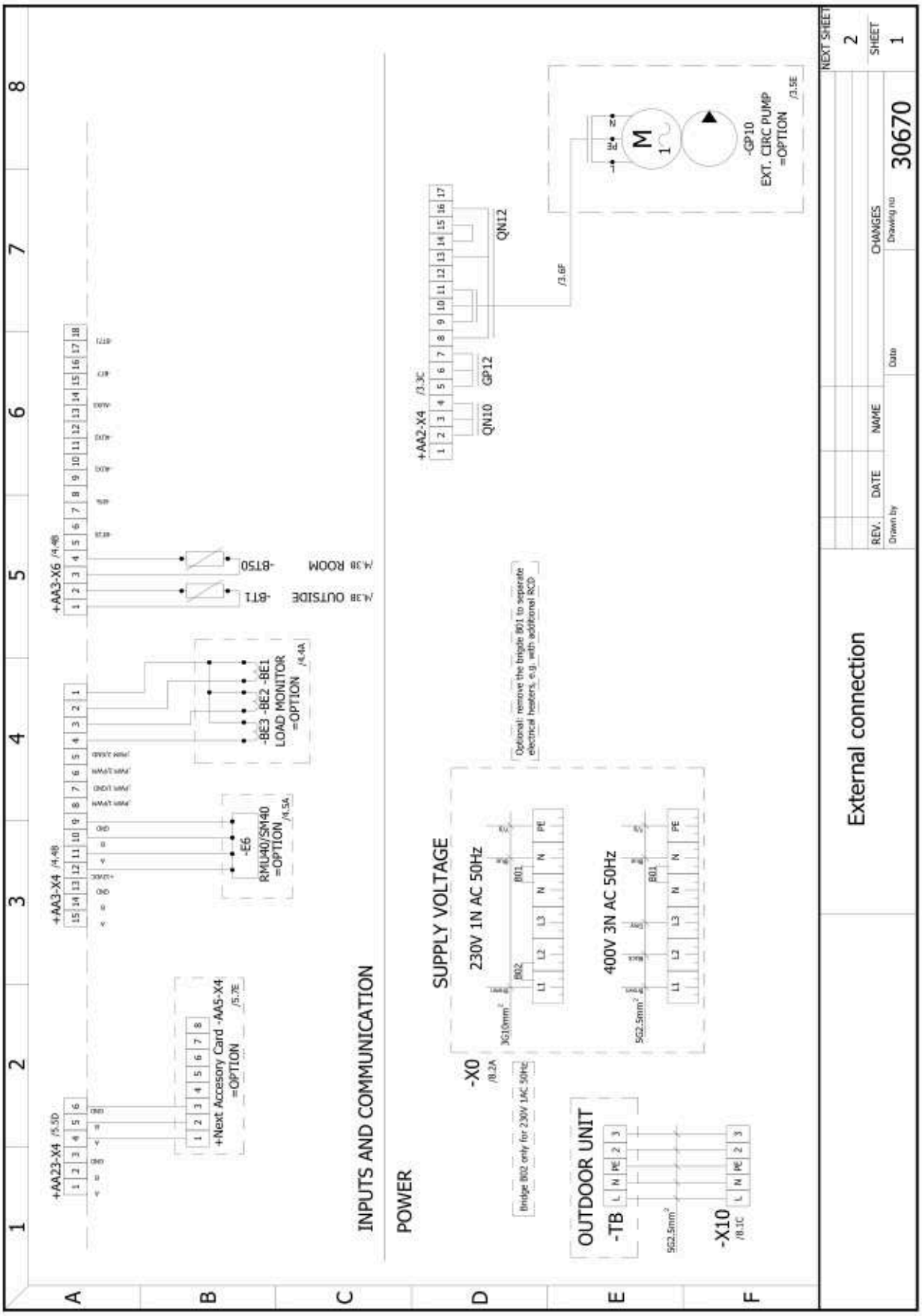
Max. operating current and recommended fuse rating for 3x400 V connection	Unit	BA-SVM 20-200/6 E/E EM + AMS 20-6	BA-SVM 20-200/12 E/E EM + AMS 20-10
Max. operating current, compressor	A	16	16
Max. operating current of heat pump including 3 kW immersion heater, compressor running and contactor K1 connected (recommended fuse rating)	A	16 (16)	16 (16)
Max. operating current of heat pump including 6 kW immersion heater, compressor running and contactor K1+K2 connected (recommended fuse rating)	A	16 (16)	16 (16)
Max. operating current of heat pump including 9 kW immersion heater, compressor running and contactor K1+K2+K3 connected (recommended fuse rating)	A	20 (20)	20 (20)
Max. operating current of 9 kW immersion heater, contactor K1+K2+K3 connected, compressor not running (recommended fuse rating)	A	20 (20)	20 (20)

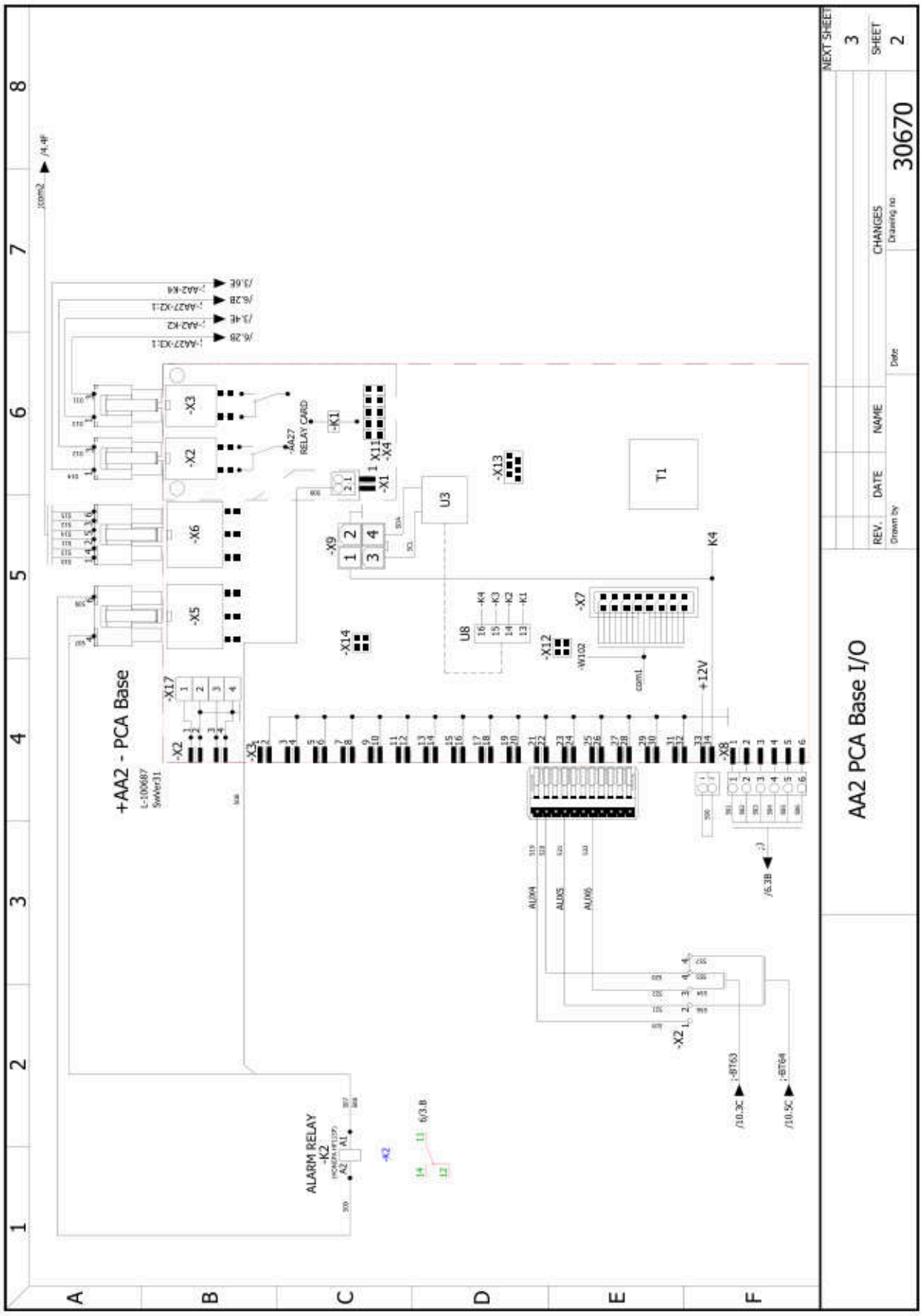
Max. operating current and recommended fuse rating for 1x230 V connection	Unit	BA-SVM 20-200/6 E/E EM + AMS 20-6	BA-SVM 20-200/12 E/E EM + AMS 20-10
Max. operating current. compressor	A	16	16
Max. operating current of heat pump including 1.5 kW immersion heater. compressor running and contactor K1 connected (recommended fuse rating)	A	22,5 (25)	22,5 (25)
Max. operating current of heat pump including 3 kW immersion heater. compressor running and contactor K1+K2 connected (recommended fuse rating)	A	29 (32)	29 (32)
Max. operating current of heat pump including 4.5 kW immersion heater. compressor running and contactor K1+K2+K3 connected (recommended fuse rating)	A	35,5 (32)	35,5 (32)
Max. operating current of 4.5 kW immersion heater. contactor K1+K2+K3 connected. compressor not running (recommended fuse rating)	A	19,5 (20)	19,5 (20)

Max. operating current and recommended fuse rating for 3x400 V connection	Unit	BA-SVM 20-200/6 E/E EM + AMS 10-6	BA-SVM 20-200/12 E/E EM + AMS 10-8	BA-SVM 20-200/12 E/E EM + AMS 10-12
Max. operating current, compressor	A	16	16	20
Max. operating current of heat pump including 3 kW immersion heater, compressor running and contactor K1 connected (recommended fuse rating)	A	16 (16)	16 (16)	20 (20)
Max. operating current of heat pump including 6 kW immersion heater, compressor running and contactor K1+K2 connected (recommended fuse rating)	A	16 (16)	16 (16)	20 (20)
Max. operating current of heat pump including 9 kW immersion heater, compressor running and contactor K1+K2+K3 connected (recommended fuse rating)	A	20 (20)	20 (20)	20 (20)
Max. operating current of 9 kW immersion heater, contactor K1+K2+K3 connected, compressor not running (recommended fuse rating)	A	20 (20)	20 (20)	20 (20)

Max. operating current and recommended fuse rating for 1x230 V connection	Unit	BA-SVM 20-200/6 E/E EM + AMS 10-6	BA-SVM 20-200/12 E/E EM + AMS 10-8	BA-SVM 20-200/12 E/E EM + AMS 10-12
Max. operating current. compressor	A	16	16	20
Max. operating current of heat pump including 1.5 kW immersion heater. compressor running and contactor K1 connected (recommended fuse rating)	A	22,5 (25)	22,5 (25)	26,5 (25)
Max. operating current of heat pump including 3 kW immersion heater. compressor running and contactor K1+K2 connected (recommended fuse rating)	A	29 (32)	29 (32)	33 (32)
Max. operating current of heat pump including 4.5 kW immersion heater. compressor running and contactor K1+K2+K3 connected (recommended fuse rating)	A	35,5 (32)	35,5 (32)	39,5 (40)
Max. operating current of 4.5 kW immersion heater. contactor K1+K2+K3 connected. compressor not running (recommended fuse rating)	A	19,5 (20)	19,5 (20)	19,5 (20)

Electrical wiring diagrams




AA2 PCA Base I/O
+AA2 - PCA Base
ALARM RELAY
-K2
-X1
-X2
-X3
-X4
-X5
-X6
-X7
-X8
-X9
-X12
-X13
-X14
-X17
-K1
-K2
-K3
-K4
-AA27
RELAY CARD
T1
U3
U8
K4
+12V
com1
-W102
AUX4
AUX5
AUX6
-BT63
-BT64
/10.3C
/10.5C
/6.3B
/4.4F
/3.6E
/6.2B
/3.4E
/6.2B
NEXT SHEET
SHEET
CHANGES
REV.
DATE
NAME
Date
Drawn by
Drawing no.
30670