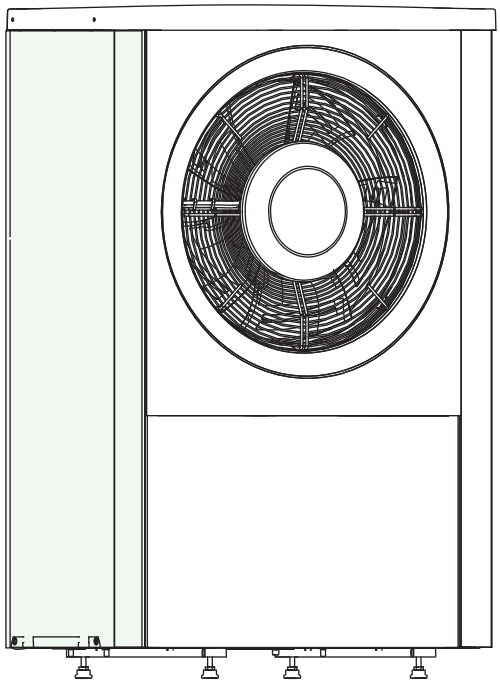
AirX

230V 1N~ / 400V 3N~



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Installer Guide

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IVT

Table of Contents

1 Key to symbols and safety instructions

1.1 Key to symbols

Warnings

Warnings in this document are identified by a warning triangle printed against a grey background.
Keywords at the start of a warning indicate the type and seriousness of the ensuing risk if measures to prevent the risk are not taken.

The following keywords are defined and can be used in this document:

- **NOTICE** indicates a situation that could result in damage to property or equipment.
- **CAUTION** indicates a situation that could result in minor to medium injury.
- **WARNING** indicates a situation that could result in severe injury or death.
- **DANGER** indicates a situation that will result in severe injury or death.

Important information

This symbol indicates important information where there is no risk to people or property.

Additional symbols

Symbol	Explanation
▶	Step in an action sequence
→	Cross-reference to another part of the document
•	List entry
–	List entry (second level)

Table 1

1.2 General safety instructions

These installation instructions are intended for plumbers, heating engineers and electricians.

- ▶ Read any installation instructions (heat pump, heating controls, etc.) carefully before starting the installation.
- ▶ Observe the safety instructions and warnings.
- ▶ Observe national and regional regulations, technical rules and guidelines.
- ▶ Record all work carried out.

Intended use

This heat pump must only be used as a heat appliance in a sealed hot water heating system for domestic purposes.

Any other use is considered inappropriate. Any damage that results from such use is excluded from liability.

Installation, commissioning and servicing

Installation, commissioning and servicing must only be carried out by an authorised contractor.

- ▶ Only use original spares.

Electrical work

Electrical work must only be carried out by a qualified electrician.

- ▶ Before starting electrical work:
  - – Isolate the mains electrical supply and secure against unintentional reconnection.
  - – Check for zero potential.
- ▶ Also observe connection diagrams of other system components.

Handover to the user

When handing over, instruct the user how to operate the heating system and inform him about its operating conditions.

- ▶ Explain how to operate the heating system and draw the user's attention to any safety-relevant action.
- ▶ Explain that modifications and repairs must only be carried out by an authorised contractor.
- ▶ Point out the necessity of inspection and servicing for safe and environmentally compatible operation.
- ▶ Leave the installation instructions and the operating instructions with the user.

2 Standard delivery

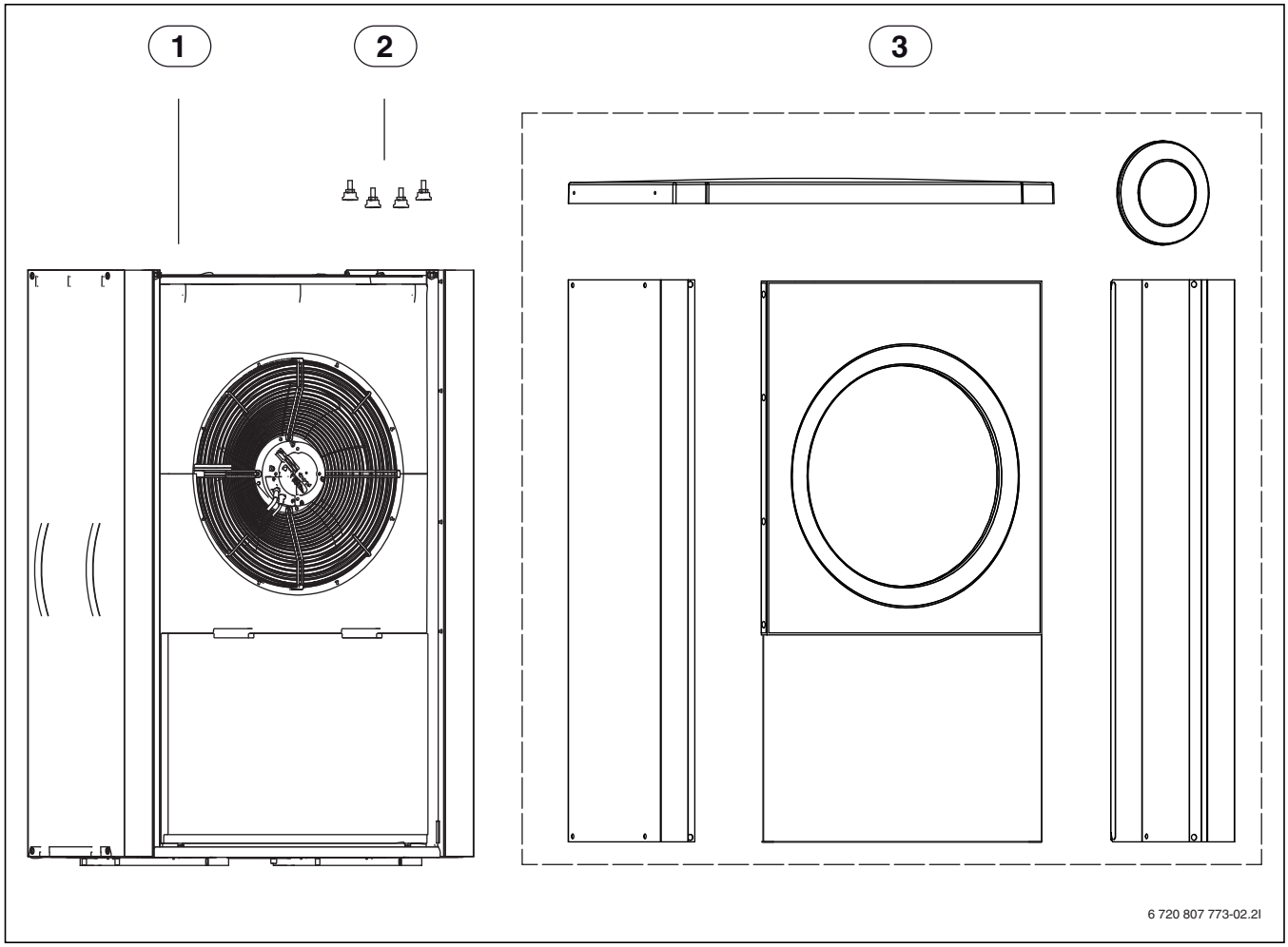


Fig. 1 Standard delivery

[1] Heat pump
[2] Legs
[3] Roof and side panels

3 General

The language of the original manual is Swedish, other languages are a translation of the original manual.

Only trained personnel may perform this installation. The installer must comply with local rules and regulations as well as the information in the installation and operating instructions.

Cooling is disabled in the UK model to comply with the regulations for RHI.

3.1 Information about the heat pump

AirX are heat pumps intended for outdoor use and connection with heat pump AirModule or Airbox indoors.

The following combinations are possible:

AirModule/Airbox	AirX
E9 or 50-90 E/S	50
E9 or 50-90 E/S	70
E9 or 50-90 E/S	90
E15 or 130-170 E/S	130
E15 or 130-170 E/S	170

Table 2

AirModule E9 and E15 has a built-in immersion heater.

Airbox E has a built-in immersion heater.

Airbox S is intended for an immersion heater with mixing valve with an electric, oil, or gas boiler.

3.2 Application area

The heat pump must only be used in a closed hot water heating system according to BS EN 12828.
Other forms of use are not permitted. We take no responsibility for damage occurring due to non-permitted use.

3.3 Heating system minimum volume and operation

To avoid multiple start/stop cycles, incomplete defrosting or unnecessary alarms, a sufficient amount of energy stored in the system is required. Energy is stored in the heating system water volume, as well as in the system components (radiators) and in the concrete foundation (underfloor heating system).

Since the requirements vary for different heat pump installations and heating systems, no general minimum volume is stated. Please refer to the following prerequisites for all heat pump sizes instead:

Underfloor heating system without a buffer cylinder
To ensure that a sufficient amount of energy is available for defrosting, the largest room should not contain room thermostats but room controllers should be used instead. At least 30 m^2 floor surface should be regulated by a room controller, since the heat pump then will adjust flow temperature automatically.

Radiator system without a buffer cylinder
To ensure that a sufficient amount of energy is available for defrosting, there should be at least 4 water radiators of 500 W/unit in one system without mixing valve. A room controller is recommended, since the heat pump then will automatically adjust flow temperature.

Radiator and underfloor heating systems on different circuits without a buffer cylinder
To ensure that a sufficient amount of energy is available for defrosting, there should be at least 4 water radiators of 500 W/unit in the circuit without mixing valve. No minimum floor surface is required for the underfloor heating system circuit with mixing valve. A room controller is recommended, since the heat pump then will automatically adjust flow temperature.

Only circuits with mixing valve
To ensure that a sufficient amount of energy is available for defrosting, a buffer cylinder of at least 50L is required for size 5-9 and of 100L for size 13-17.

Fan convector
To ensure that a sufficient amount of energy is available for defrosting, a buffer cylinder of at least 10L is required.

3.4 Type plate

The type plate is located on the rear side of the heat pump. It contains information on the heat pump's heating output, article number, serial number and date of manufacture.

3.5 Transport and storage

The heat pump must always be transported and stored upright. The heat pump may slightly lean temporarily, but it cannot be laid down.

The heat pump cannot be stored in temperatures below – 20 °C.

The heat pump can be carried by the strap handles.

3.6 Connection principle

The principle is based on floating condensation and an integrated/ external booster from the heat pump module. The user interface manages the heat pump according to a set heating curve.

When the heat pump is not able to heat the house on its own, the heat pump module automatically starts the booster and produces together with the heat pump the desired temperature in the house, and the water heater (if applicable).

Heating and DHW mode when heat pump is inactive:

At outside temperatures below app. –20 °C, the heat pump stops automatically and cannot produce hot water. The booster in the heat pump module will automatically take over both the heating mode and the DHW production.

3.7 Defrosting method

The defrosting method varies depending on the prerequisites.

If the outside temperature is above +5 °C the fan in the heat pump will be operating at max. speed while the compressor speed is limited until the defrosting is finished. This enables continued heat production during defrosting (SSD).

If the outside temperature is below +5 °C, hot gas defrosting will take over the defrosting in the heat pump. This means that the refrigerant circuit will change direction through a 4-way valve during defrosting.

During hot gas defrosting, the comprised gas from the compressor is transferred into the evaporator and melts the ice. The heating system cools down a bit in the process. Defrosting time depends on how much ice there is and the current outside temperature.

4 Technical information

Range for air and water heat pump without booster heater

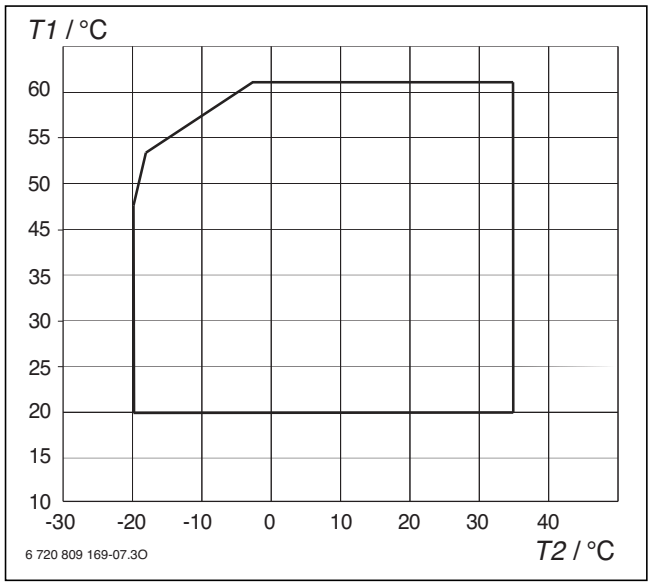


Fig. 2 Heat pump without booster heater

[T1] Maximum flow temperature
[T2] Outside temperature

4.1 Single phase heat pump

Single phase	Unit	50	70	90
Air/water operation				
Heating output at partial load of A2/W351	kW	2.94	3.90	5.11
COP at A2/W35[1)]		4.02	4.13	4.22
Heating output at partial load of A7/W35[1)]	kW	2.15	2.96	3.43
COP at A7/W35[1)]		4.88	4.84	5.06
Heating output at A-7/W35[1)] max	kW	4.57	6.18	8.43
COP at A-7/W35[1)]		2.89	2.82	2.92
Electrical data				
Power supply			230V 1N AC 50Hz	
IP rating			IP X4	
Fuse size if heat pump is supplied directly from distribution board[2)]	A	10	16	16
Max. added heating output	kW	2.3	3.2	3.6
Heating installation				
Nominal flow rate	L/s	0.32	0.33	0.43
Internal pressure drop	kPa	9.7	7.8	10.5
Air and noise data				
Fan motor (DC inverter) max. heating output	W		180	
Maximum air current	m^3/h		4500	
Sound pressure level at a distance of 1 m	dB(A)		40	
Sound output[3)]	dB(A)		53	
General information				
Refrigerant[4)]			R410A	
Refrigerant volume	kg	1.7	1.75	2.35
Maximum flow temperature, heat pump only	°C		62	
Dimensions (WxHxD)	mm		930x1370x440	
Weight	kg	67	71	75

Table 3 Heat pump

1) Output data in accordance with EN 14511
2) Fuse characteristics gL / C
3) Sound output level in accordance with EN 12102 (A7/W35)
4) GWP_{100} = 1980

4.2 Three phase heat pump

Three phase	Unit	130	170
Air/water operation			
Heating output at A2/W35[1] partial load	kW	7.11	7.40
COP at A2/W35[1]		4.05	4.03
Heating output at partial load of A7/W35[1]	kW	5.11	5.20
COP at A7/W35[1]		4.90	4.99
Heating output at A-7/W35[1] max	kW	10.99	12.45
COP at A-7/W35[1]		2.85	2.55
Electrical data			
Power supply		400V 3N AC 50Hz	
IP rating		IP X4	
Fuse size[2]	A	13	13
Max. added heating output	kW	7.2	7.2
Heating installation			
Nominal flow rate	L/s	0.62	0.81
Internal pressure drop	kPa	15.8	22.9
Air and noise data			
Fan motor (DC inverter) max. heating output	W	280	
Maximum air current	m^3/h	7300	
Sound pressure level at a distance of 1 m	dB(A)	40	
Sound output[3]	dB(A)	53	
General information			
Refrigerant[4]		R410A	
Refrigerant volume	kg	3.3	4.0
Maximum flow temperature, heat pump only	°C	62	
Dimensions (WxHxD)	mm	1200x1680x580	
Weight	kg	130	132

Table 4 Heat pump

1) Output data in accordance with EN 14511

2) Fuse characteristics gL / C

3) Sound output level in accordance with EN 12102 (A7/W35)

4) GWP_{100} = 1980

4.3 Refrigerant circuit

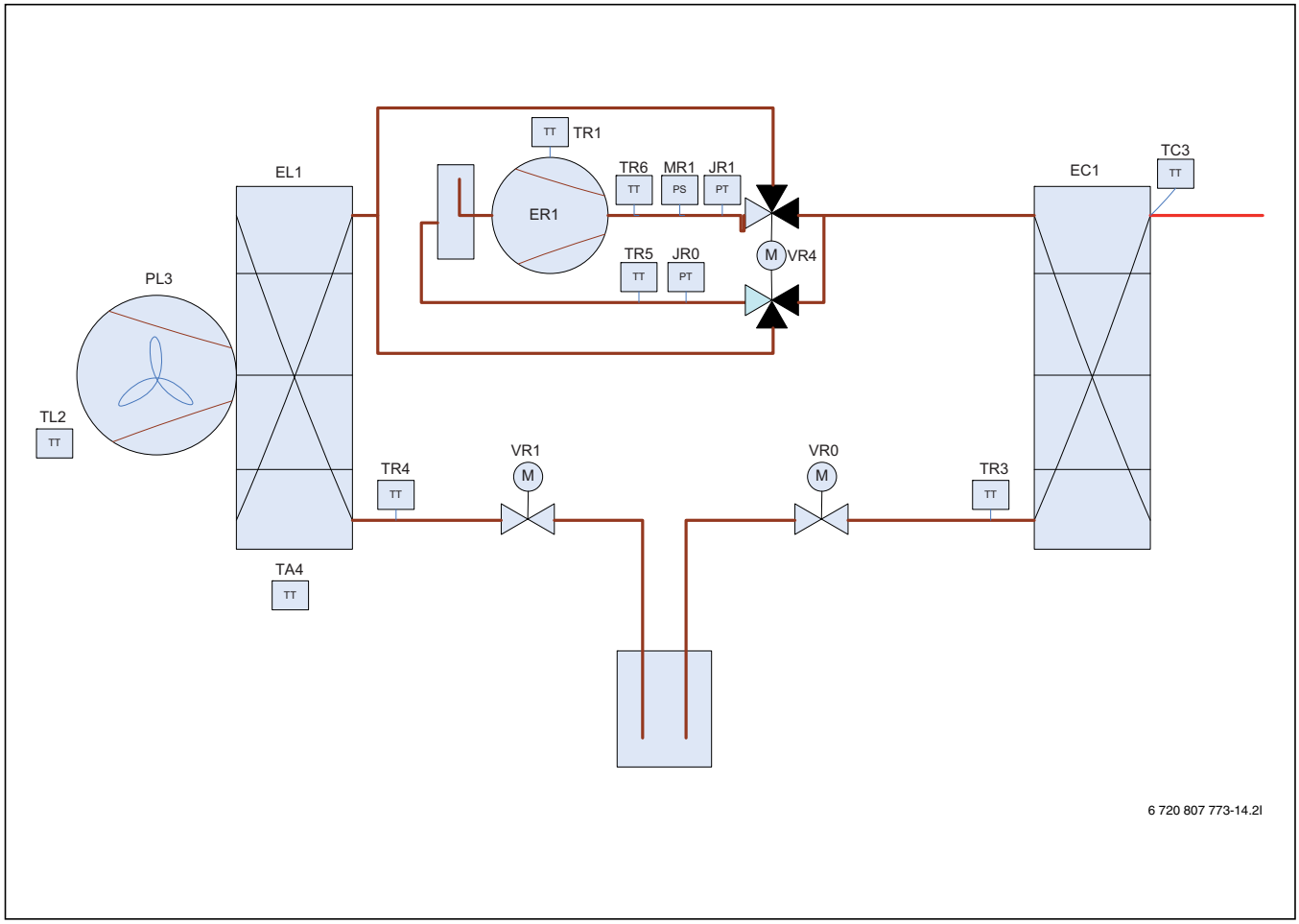


Fig. 3 Refrigerant circuit

[EC1] Heat exchanger (condenser)
[EL1] Evaporator
[ER1] Compressor
[JR0] Low pressure sensor
[JR1] High pressure sensor
[MR1] High pressure switch
[PL3] Fan
[TA4] Temperature sensor collection tray
[TC3] Temperature sensor heat transfer medium out
[TL2] Temperature sensor air intake
[TR1] Temperature sensor compressor
[TR3] Temperature sensor condenser return (fluid) heating mode
[TR4] Temperature sensor evaporator return (fluid) cooling mode
[TR5] Temperature sensor suction gas
[TR6] Temperature sensor hot gas
[VR0] Electronic expansion valve 1 (condenser)
[VR1] Electronic expansion valve 2 (evaporator)
[VR4] 4-way valve

4.4 Specific parts of the heat pump

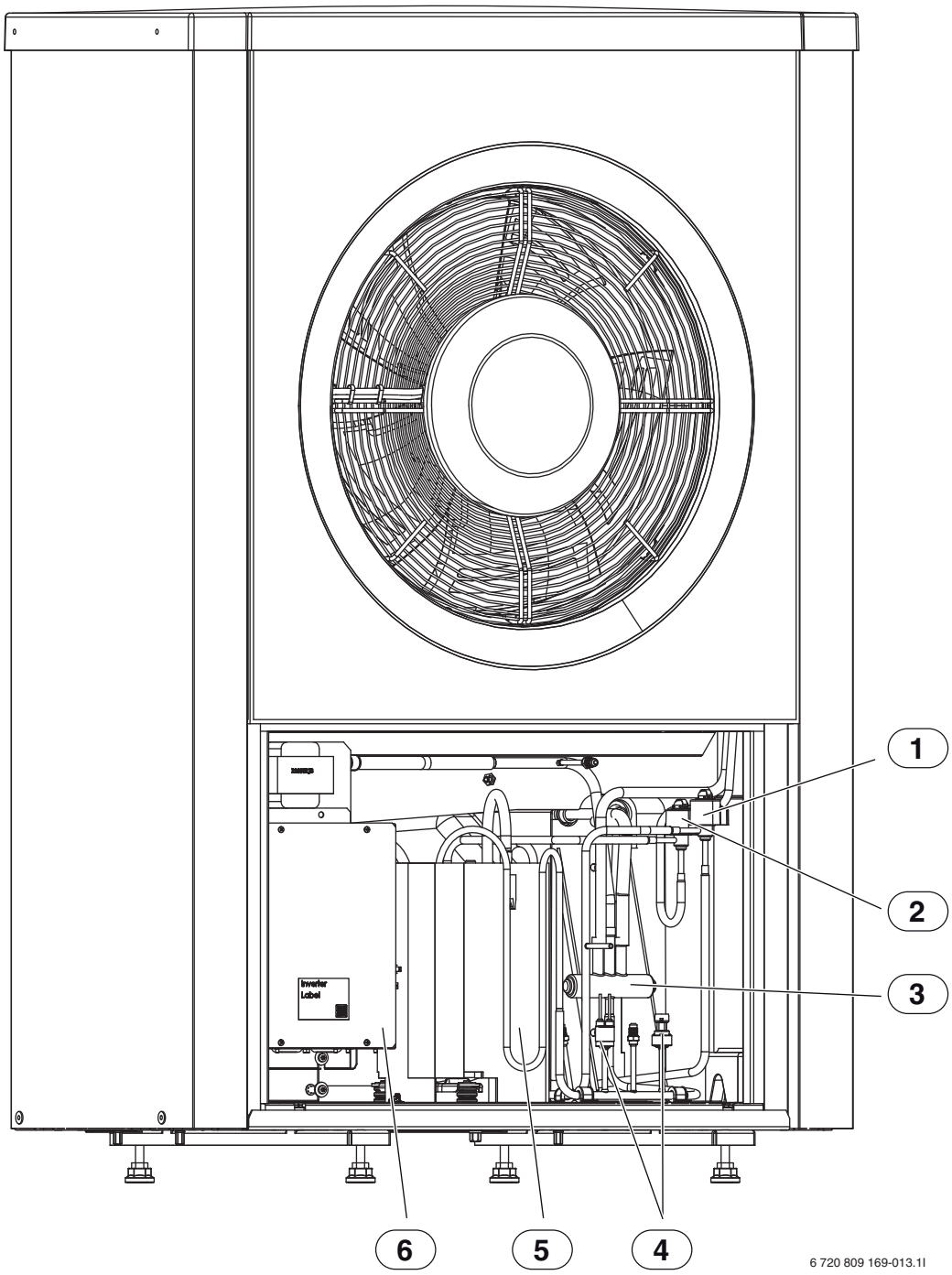


Fig. 4 Specific parts in heat pump

[1] Electronic expansion valve VR0
[2] Electronic expansion valve VR1
[3] 4-way valve
[4] Pressure switch/pressure sensor
[5] Compressor
[6] Inverter

The description applies to all sizes.

5 Measurements, positioning distance, and pipe connections

5.1 Heat pump dimensions model 50, 70, 90

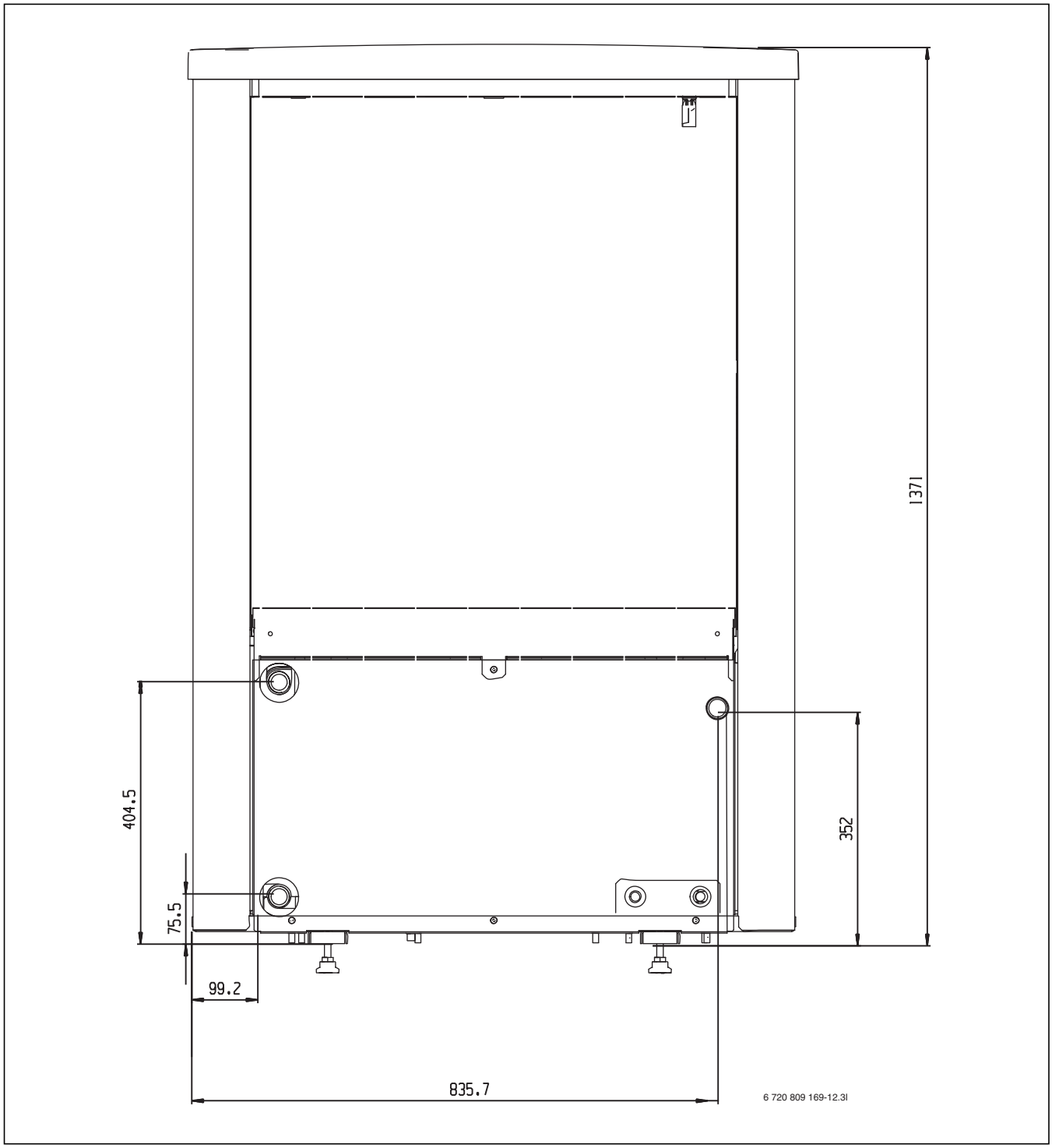


Fig. 5 Heat pump dimensions and connections, rear size 50-90

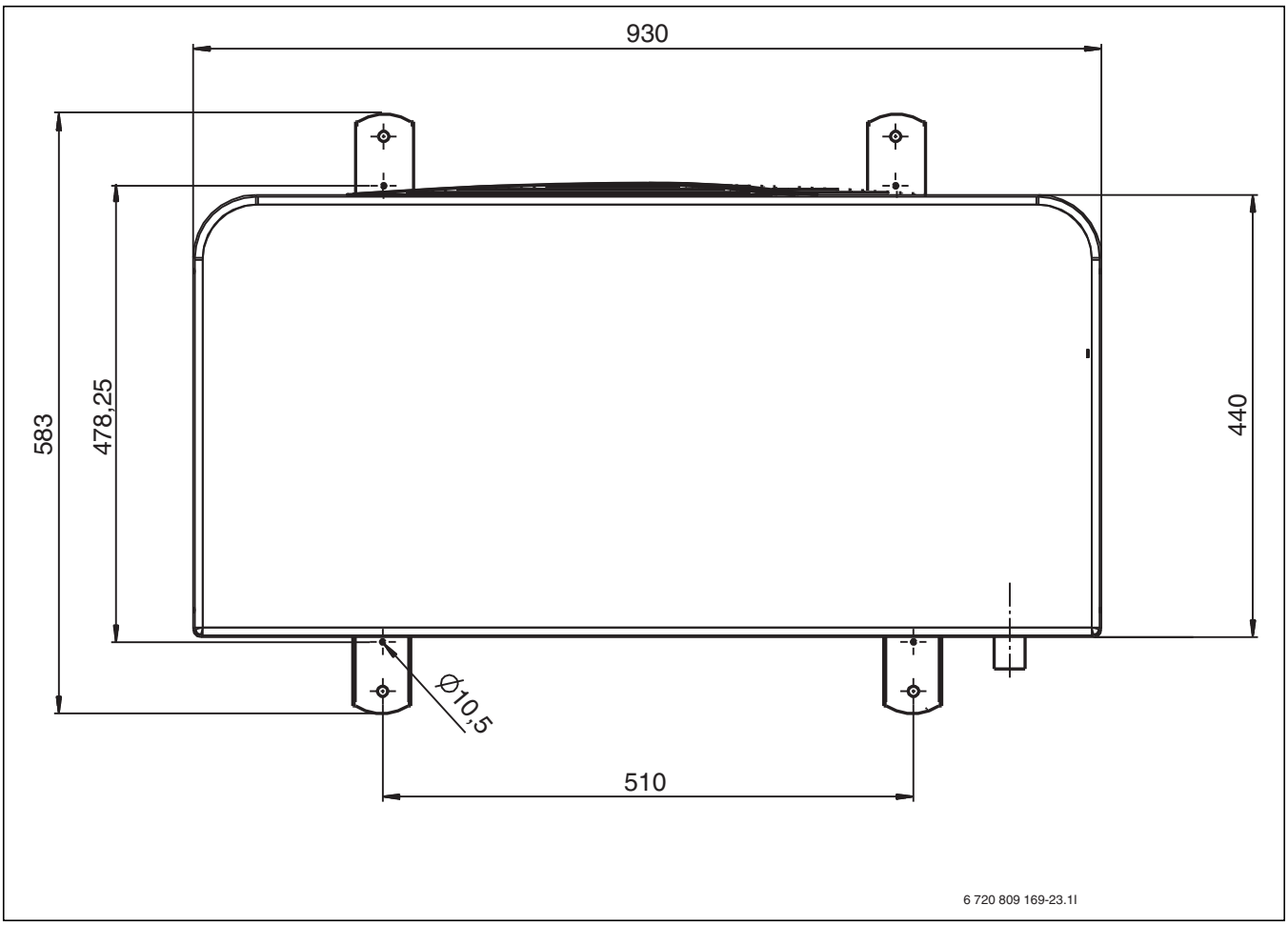


Fig. 6 Heat pump dimensions, top size 50-90

5.2 Heat pump dimensions model 130, 170

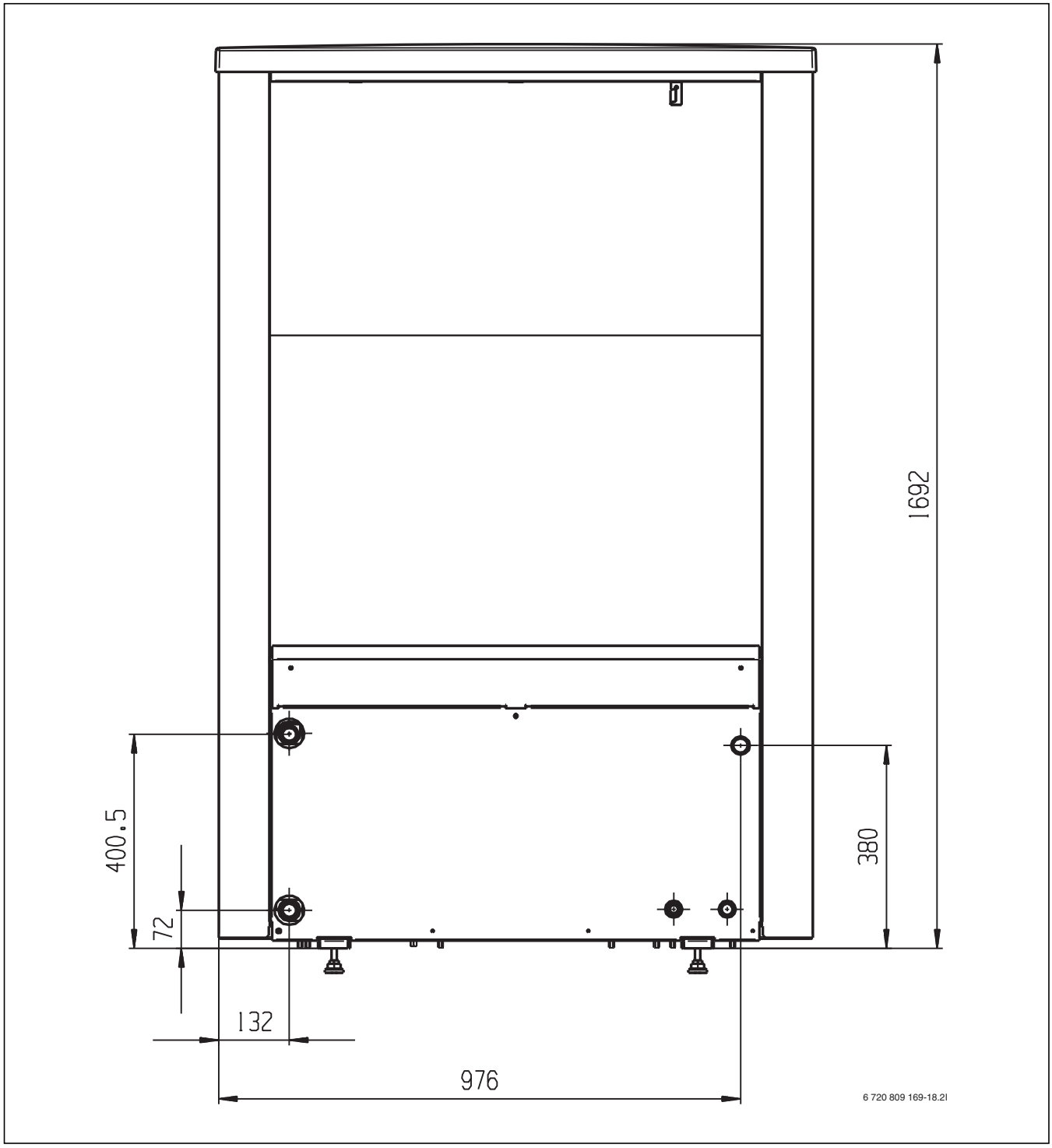


Fig. 7 Heat pump dimensions and connections, rear size 130-170

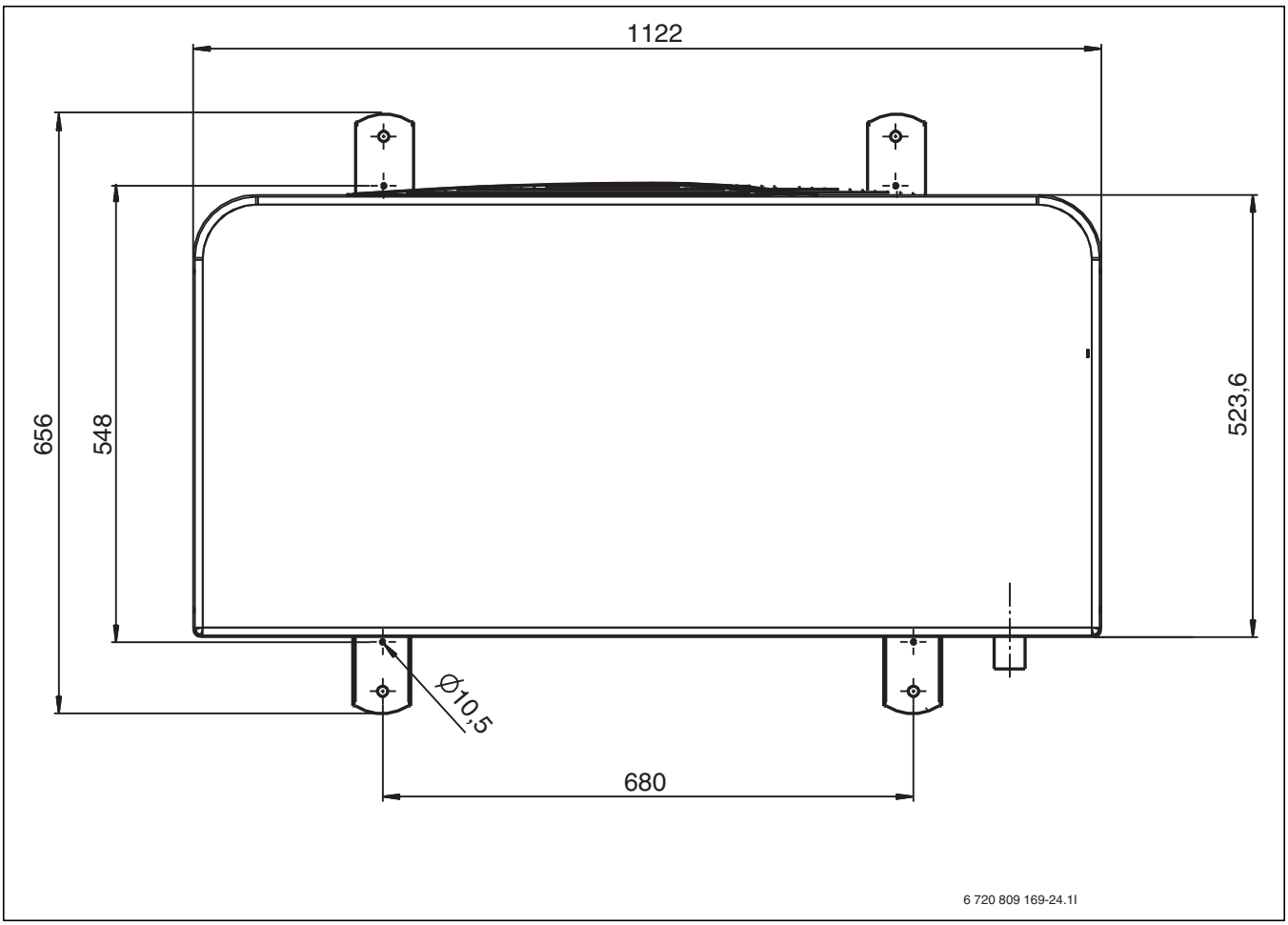


Fig. 8 Heat pump dimensions, top size 130-170

5.3 Installation location

- The heat pump is placed outside, on a flat and solid surface. The heat pump must stand on a flat surface before the roof and side panels metal is installed.
- The heat pump must be anchored to prevent it from tipping over (→ Fig. 9).
- Attention in connection with placement must be paid to the heat pump's sound pressure level, for example, in order to prevent neighbours from exposure to disturbing sounds.
- Avoid placing the heat pump outside sound-sensitive rooms.
- Do not install the heat pump in a corner where it is surrounded by walls on 3 sides (→ Fig. 10).
- The heat pump must be placed in such a way as not to obstruct air flow through the evaporator (→ Fig. 11).
- The heat pump must not be positioned so that the recirculation of cold air can occur.
- Avoid positioning the heat pump so that it is exposed to wind directly from the front.
- Condensation should be drained from the heat pump through a frost free drain, installed with a heating cable (optional). The runoff must fall from a sufficient distance to prevent water from staying in the pipe.
- The heat pump must not be positioned where there is a risk of snow and rain drops from eaves. If this is not possible, install a protective roof.

NOTICE: The unit may malfunction if placed on a leaning surface!
Condensation drain and heat pump function decrease if it is not placed on a flat surface.
▶ Ensure that the heat pump does not lean more than 1% sideways and lengthwise.

CAUTION: Pinching or crushing danger!
The heat pump can tip over if it not correctly anchored.
▶ Anchor the heat pump legs in the foundation with bolts intended for the foundation material.

If a safety roof is installed above the heat pump, please keep in mind that there must be enough room to lift up the heat pump insulation.
▶ Install roof at least 500 mm above heat pump model 50-90.
▶ Install roof at least 600 mm above heat pump model 130-170.
▶ If the roof is detachable, min. height is 400 mm above the heat pump regardless of model.

Placement in a corner or with surrounding walls may lead to raised sound levels and abnormal soiling of the evaporator (→ Fig. 10).

As regards stand-alone heat pumps (not situated in the vicinity of houses):

- ▶ Do not install the heat pump in such a way that the fan side faces directly to the south.

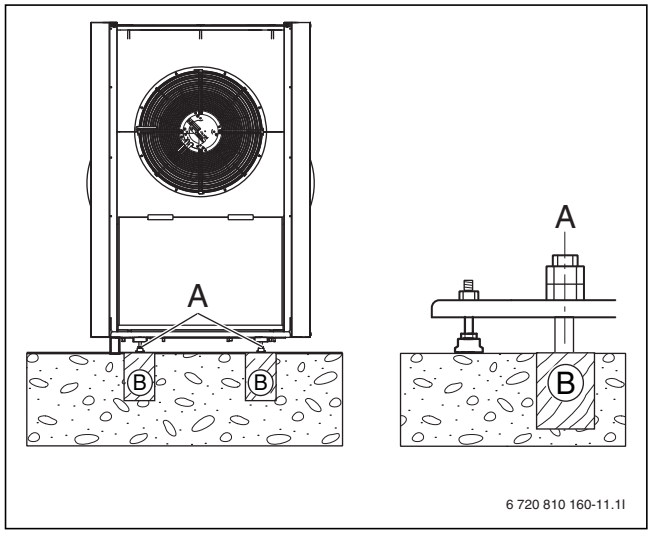


Fig. 9 Dimensions in mm

[A] 4 pieces M10 X 120 mm (not included)
[B] Flat and strong surface, e.g. concrete plinths

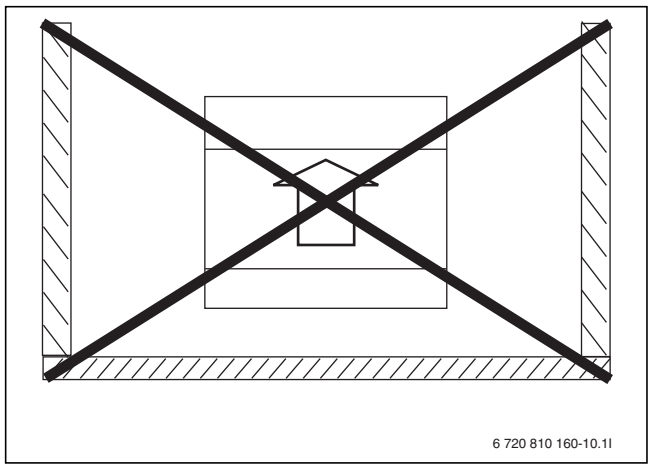


Fig. 10 Avoid placement with surrounding walls

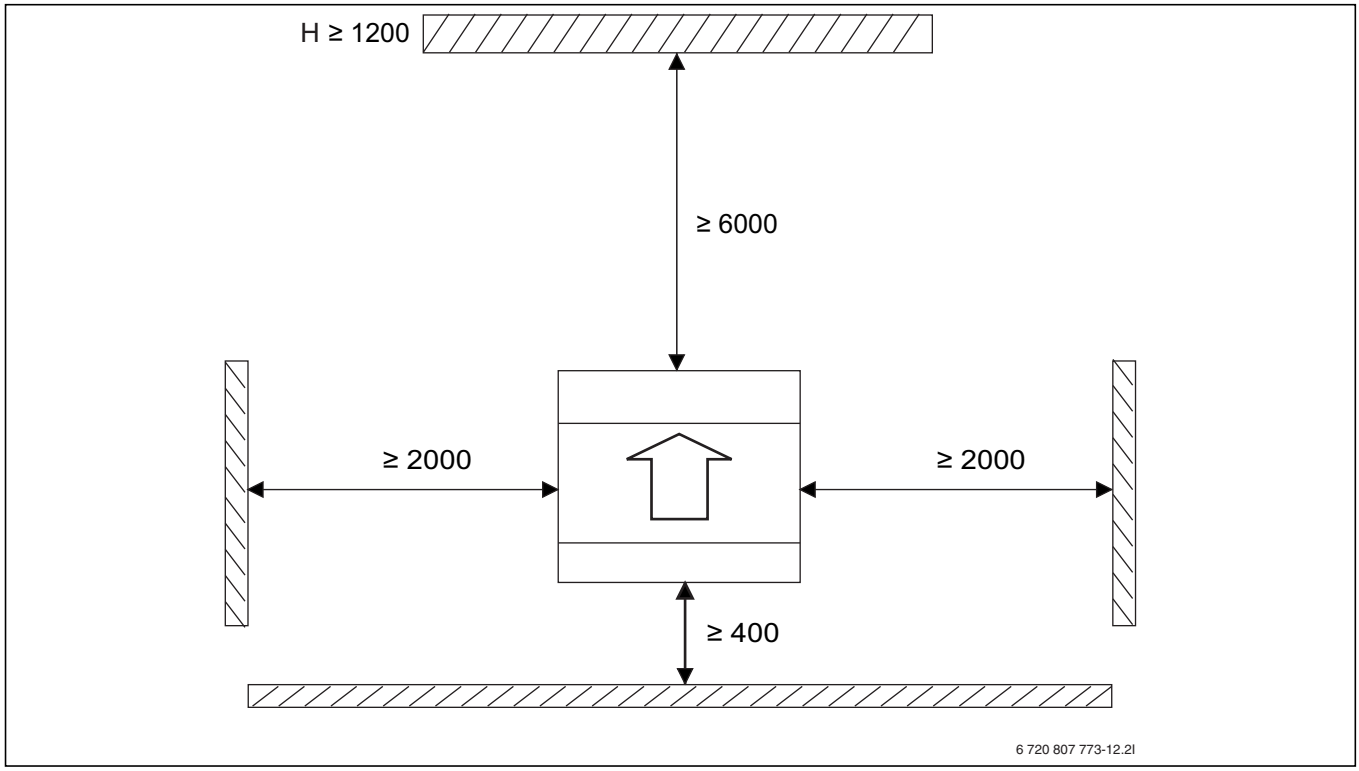


Fig. 11 Minimum clearances heat pump - surroundings (mm)

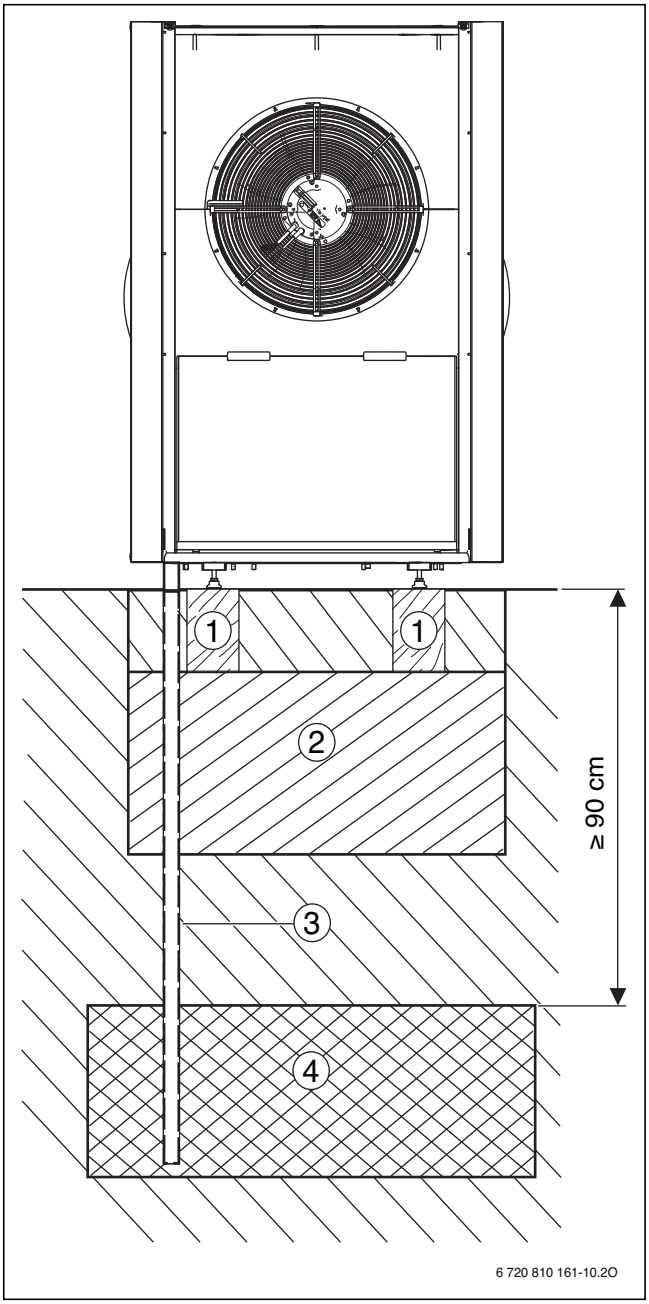


Fig. 12 Condensation drain in gravel bed

[1] Concrete plinths
[2] Single 300 mm
[3] Condensation water pipe 40 mm
[4] Gravel bed

The condensation water can drain into a gravel bed or a culvert (→ Fig. 12) or into a surface water pipe (→ Chapter 12).

Damage due to freezing!
The evaporator may suffer damage if the condensation water freezes and cannot be drained from the heat pump. Installing a heating cable is always a good idea.

- ▶ Install a heating cable in the condensation water pipe if there is a risk of icing.
- ▶ Always install a heating cable in the condensation water pipe if the drain drains into a gravel bed/ culvert.

5.4 Pipework

NOTICE: Risk of operating problems due to pipe contamination!
Any contamination in the pipe will clog up the heat exchanger (condenser) in the heat pump.

- ▶ Avoid splicing the heat transfer pipes to minimise pressure drop.
- ▶ Use PEX-pipes for the entire connection between the heat pump and the heat pump module.

NOTICE: Risk of operating problems due to pipe contamination!
If a different material than PEX is used, the following is required:

- ▶ Install a particle filter intended for outside use on the heat pump return, directly on the heat exchanger (→[2], Fig. 13).
- ▶ Insulate the particle filter as other connections.
- ▶ Devibrate the heat pump connection with a hose intended for outside use and insulate it.

NOTICE: Damage due to freezing and UV rays!
In case of a longer power outage, the water in the pipes may freeze. UV rays can weaken the insulation so that it eventually breaks.

- ▶ Use UV resistant and non absorbent insulation.
- ▶ Use at least 19 mm insulation for outside pipework and connections.
- ▶ Use at least 12 mm insulation for inside pipework and connections.
- ▶ Install drain valves so that both the filling and drain pipes to the heat pump can be emptied of water during longer periods of inactivity when they are exposed to a risk of freezing.

Use only material (pipes and connections) from the same PEX distributor to avoid leakage.

Pre-insulated AluPEX pipes are recommended since they make installation easier and prevent gaps in the insulation. PEX or AluPEX pipes also devibrate and insulate against noise transfer to the heating system.

Please refer to the heat pump module installation instructions for information on pipe dimensions for heat transfer medium between heat pump and heat pump module.

All heat conducting lines must have suitable heat insulation according to applicable norms.

Insulate pipes and connections against condensation if cooling is to be used.

Recommended heat transfer pipework:

- ▶ Design the pipes according to the instructions (→ heat pump module installation instructions).
- ▶ Lay uninterrupted AluPEX pipes all the way from the heat pump to the heat pump module.
- ▶ Insulate pipes inside with 12 mm insulation.

▶ Insulate pipes outside and through the wall with 19 mm insulation.

▶ Insulate the wall insertion.

6 Regulations

The following regulations and requirements must be observed:

- Local rules and regulations, including special rules, of the responsible power supply company
- National building regulations
- **EN 50160** (Voltage properties in power grids for public distribution)
- **EN 12828** (Heating systems in buildings - Design and installation of water-based heating systems)
- **EN 1717** (Water supply - Protection against pollution of potable water).

7 Installation

Only qualified installers may carry out the installation. The installer must follow applicable rules and regulations and recommendations from the supplier.

7.1 Positioning

▶ Remove the packaging according to the instructions on the packaging.

▶ Remove the supplied accessories.

7.2 Checklist

Each installation is different. The following check list will provide a general description of the installation process.

1. Place the heat pump on a solid surface (→Chapter 5.3) and anchor it.
2. Install the heat pump's flow and return pipes (→Chapter 7.5).
3. Install the heat pump condensation water pipe and heating cable (optional) (→Chapter 12).
4. Connect the heat pump and heat pump module (→Heat pump module installation instructions).
5. Connect the CAN-BUS wire between the heat pump and the heat pump module (→Chapter 8.1).
6. Install electricity to the heat pump (→Chapter 8).
7. Install the heat pump side panels and roof (→Chapter 9).

7.3 Water quality

Heat pumps operate with lower temperatures than other heating systems, which means that the thermal degassing is not as effective and the oxygen content will never be as low as in an electric/oil/gas system. This means that the heating system will be more sensitive to rust with aggressive water.

Do not use any water additives except for pH-enhancer and keep the water clean.

Recommended pH level is 7.5 – 9.

7.4 Heating system flushing

NOTICE: System damage due to objects in the pipes!
Objects in the pipes will decrease the flow and cause operational problems.

▶ Flush out the system to remove all dirt residues.

The heat pump is a part in a heating system. Faults in the heat pump can be caused by poor water quality in the radiators/floor loops or air penetrating the system continuously.

Oxygen causes corrosion products in the form of magnetite and sediment.

Magnetite has a grinding effect on the heating system's pumps, valves and components with turbulent flows such as the condenser.

Heating systems which require regular filling or where the heating water is not clear when drained, require remedial measures before the installation of a heat pump, for example that the heating system must be fitted with filters and vents.

7.5 Connecting the heat pump

NOTICE: Damage due to excessive torque!
Connections that are tightened too much can damage the heat exchanger.

▶ Use max. 150 Nm torque during installation of connections.

Short connections outside reduce heat loss. Pre-insulated pipes are recommended.

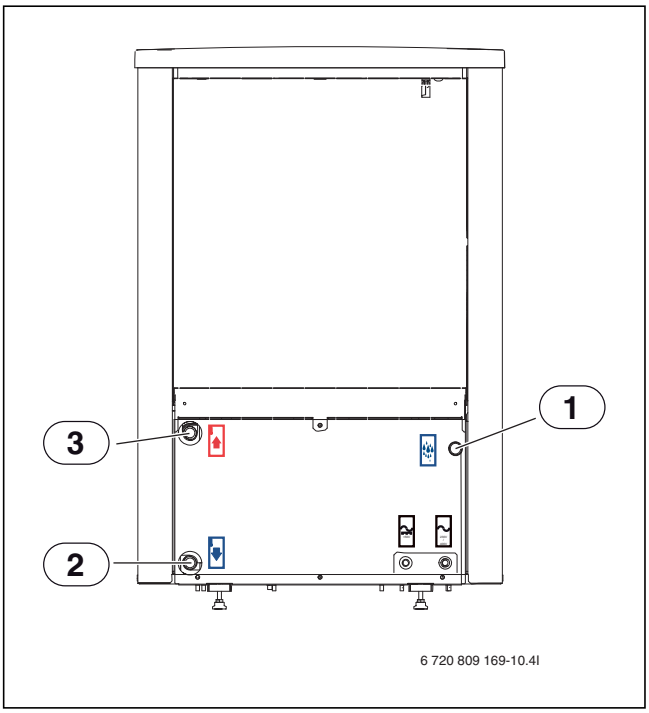


Fig. 13 The heat pump connection description applies to all sizes.

[1] Condensation water pipe connection
[2] Heat transfer medium in (return from heat pump module) DN25
[3] Heat transfer medium out (flow to heat pump module) DN25

The following heat pump connections are installed:

- ▶ Use pipes according to Chapter 5.4.
- ▶ Install 32 mm plastic pipes from the condensation water drain to a drain. For heating cable, see → Chapter 12.
- ▶ Connect heat transfer medium pipes in from the heat pump module (→ [2], fig. 13).
- ▶ Connect heat transfer medium pipes out to the heat pump module (→ [3], fig. 13).
- ▶ Tighten the heat transfer medium pipe connections with a 120 Nm torque. Push down according to fig. 14 to avoid sideways pressure on the condenser.

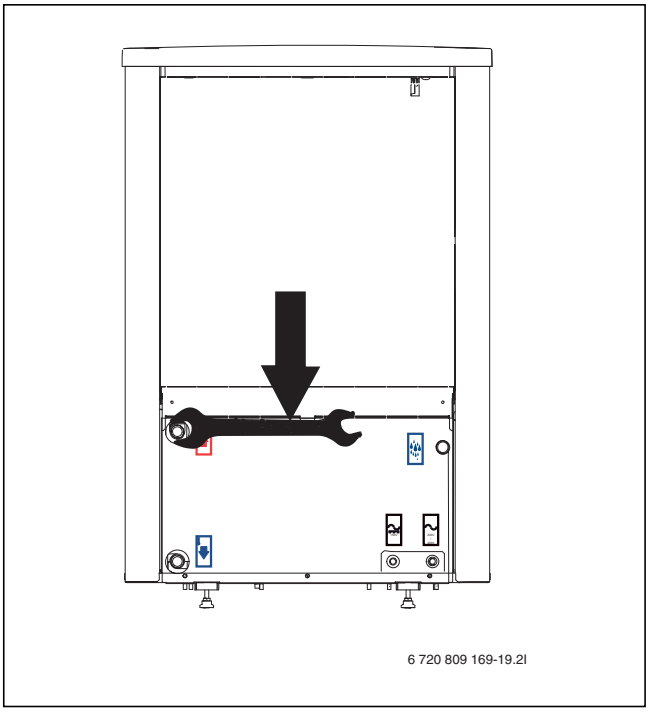


Fig. 14 Heat pump connections torque.

If the connection does not seal properly, it can be tightened with a max. 150 Nm torque. If the connection still does not seal properly, this is indicative of damage to a gasket or connecting pipes.

7.6 Filling the heating system

First flush the heating system. If a water heater is connected to the system, it must be filled with water first. The heating system is then filled.

For complete instructions on how to fill the heating system, please refer to the heat pump module installation instructions.

8 Electric installation

DANGER: Risk of electric shock!
Components in the heat pump conduct electricity and the condenser in the heat pump must be discharged after disconnecting it from the power.

- ▶ Disconnect the main power.
- ▶ Wait at least five minutes before any electrical work.

NOTICE: The installation will get damaged if the power is connected without water.
Components in the heating system can overheat if the power is connected before it has been filled up with water.

- ▶ Fill and pressurize the water heater and the heating system **before** connecting the installation to power.

The heat pump electrical connection must be disconnected safely and according to applicable rules.

- ▶ Install a separate safety switch that disconnects all power to the heat pump if it is not supplied through the heat pump module. In case of separate power supplies you will need one safety switch for each supply.

- ▶ Choose cable area and type that represent the fuse protection and wire mode.
- ▶ Connect the heat pump according to the circuit diagram. Never connect any other consumers.
- ▶ If the heat pump is connected through a circuit breaker, then a separate circuit breaker for the heat pump must be used. Please observe current regulations.
- ▶ Observe the colour coding when replacing circuit boards.

8.1 CAN-BUS

NOTICE: Malfunction due to electrical disturbances!
High voltage lines (230/400 V) close to a communications line can cause the heat pump module to malfunction.

- ▶ Install screened CAN-BUS wire away from a power cord. Minimum distance 100 mm. Cabling together with bus lines is allowed.

NOTICE: The system will be damaged if the 12 V- and the CAN-BUS connections are confused!
The communication circuits are not designed for 12 V constant voltage.

- ▶ Check that the four cables are connected to plugs with corresponding rating on the printed circuit board.

The heat pump and the heat pump module are connected by a communications wire, CAN-BUS.

A suitable cable for external cable installation is wire LIYCY (TP) 2x2x0.75, or equivalent. An alternative cable should have a cross section area of at least 0.75 mm^2, and be a duplex cable, screened and approved for outside use. The screen should only be grounded in one end and to the chassis.

Maximum cable length is 30 m.

The connection between the circuit boards is by four wires, because the 12V-supply between the circuit boards must also be connected. The circuit boards have markings for both the 12V and CAN-BUS connections.

Switch Term is used to mark the beginning and the end of a CAN BUS loop. The heat pump I/O module card should be terminated.

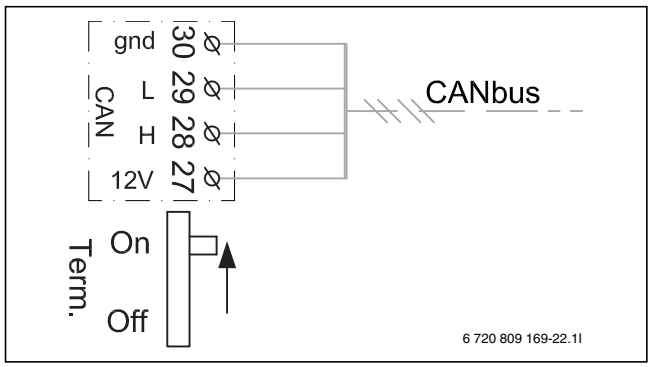


Fig. 15 Termination CAN-BUS

8.2 Printed circuit board handling

Circuit boards with control electronics are sensitive to discharges of static electricity (ESD – ElectroStatic Discharge) when handled. To prevent damaging the components, special care is therefore required when handled.

CAUTION: Damage due to static electricity!
- ▶ Wear a grounded antistatic wrist strap when handling unenclosed printed circuit boards.

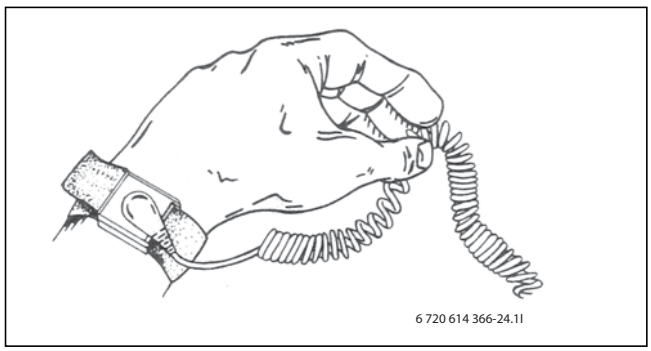


Fig. 16 Antistatic wrist strap

Damage is usually latent, and a circuit board can operate correctly during commissioning but show signs of problems later. Charged objects may only be problematic if they are in close proximity to the electronics. Keep a distance of at least one metre from expanded polystyrene, protective plastic and other packaging, synthetic material (e.g. fleeces) and similar before starting work.

A method for good ESD protection is a ground-connected bracelet when handling electronics. This bracelet must be put on before opening the screened metal bag/packaging or before exposing an installed board. The bracelet must be worn until the circuit board is enclosed in its screen packaging or closed electric box. Replaced, returned circuit boards must be handled in the same way.

8.3 Heat pump connection

Install a CAN-BUS signal cable between the heat pump module and the heat pump with a min. dimension of 4 x 0.75 mm^2 and a max. length of 30 m.

- ▶ Loosen the strap (Velcro).
- ▶ Remove the electric box cover.
- ▶ Feed the connection cables through the cable feed (→ [1] and [2], fig. 17 and 18). Use an extension spring, where needed.
- ▶ Connect the cables according to the circuit diagram.
- ▶ Tighten all the cable attachments if required.
- ▶ Put the cover back on the electric box.
- ▶ Put the strap back.

————	Delivered connected
– — — — –	Connected during installation/ accessories

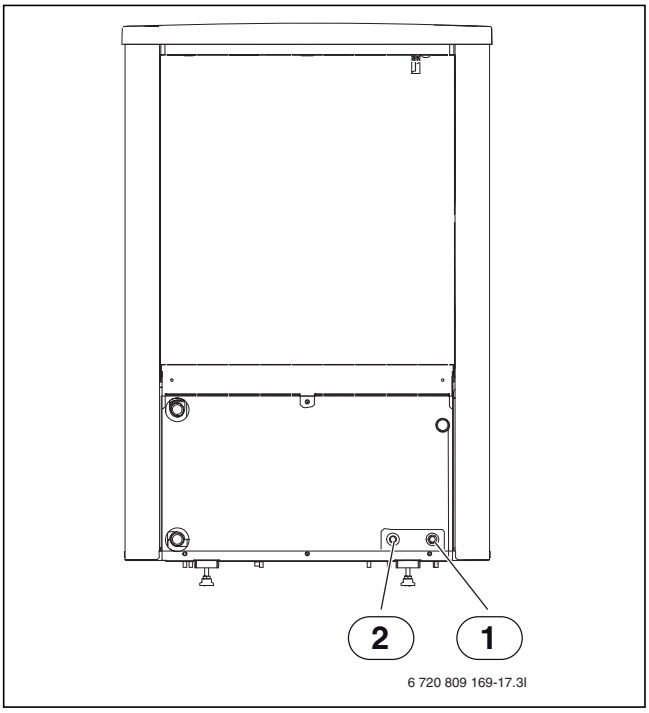


Fig. 17 Heat pump rear cable BUS

[1] Cable feed power cord
[2] Cable feed CAN-BUS

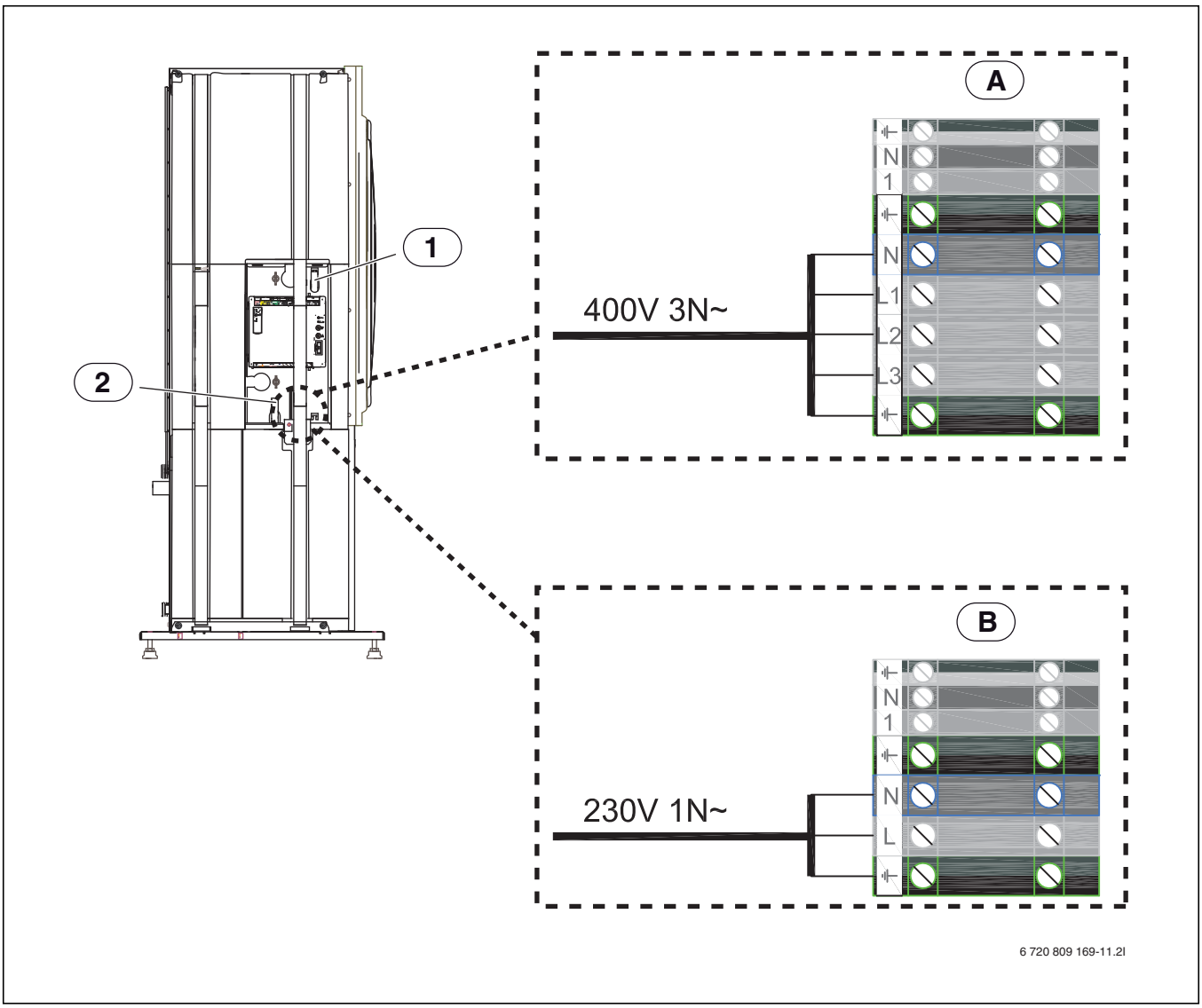


Fig. 18 Heat pump electric box cable BUS and electric connection

[1] Cable feed CAN-BUS
[2] Cable feed power cord
[A] Size 130/170
[B] Size 50/70/90

8.4 Circuit diagram inverter Single/Three phase

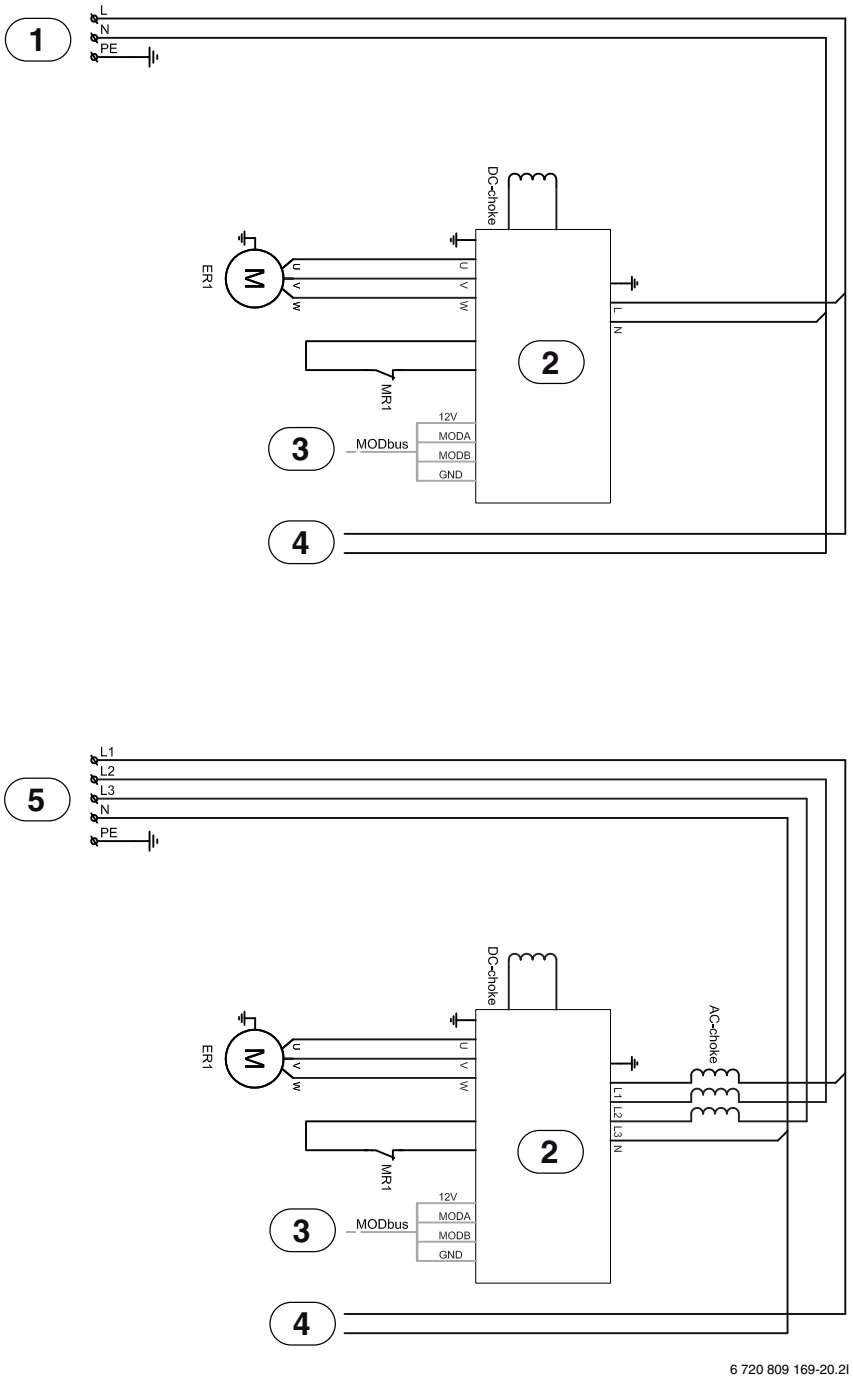


Fig. 19 Inverter power supply

[1] Input 230 V ~1N (5-13 kW)
[2] Inverter
[3] MOD BUS to I/O module card ([2] Fig. 20)
[4] Power supply to I/O module card ([1] Fig. 20)
[5] Input 400 V ~3N (13-17 kW)
[ER1] Compressor
[MR1] High pressure switch

8.5 Circuit diagram I/O module card

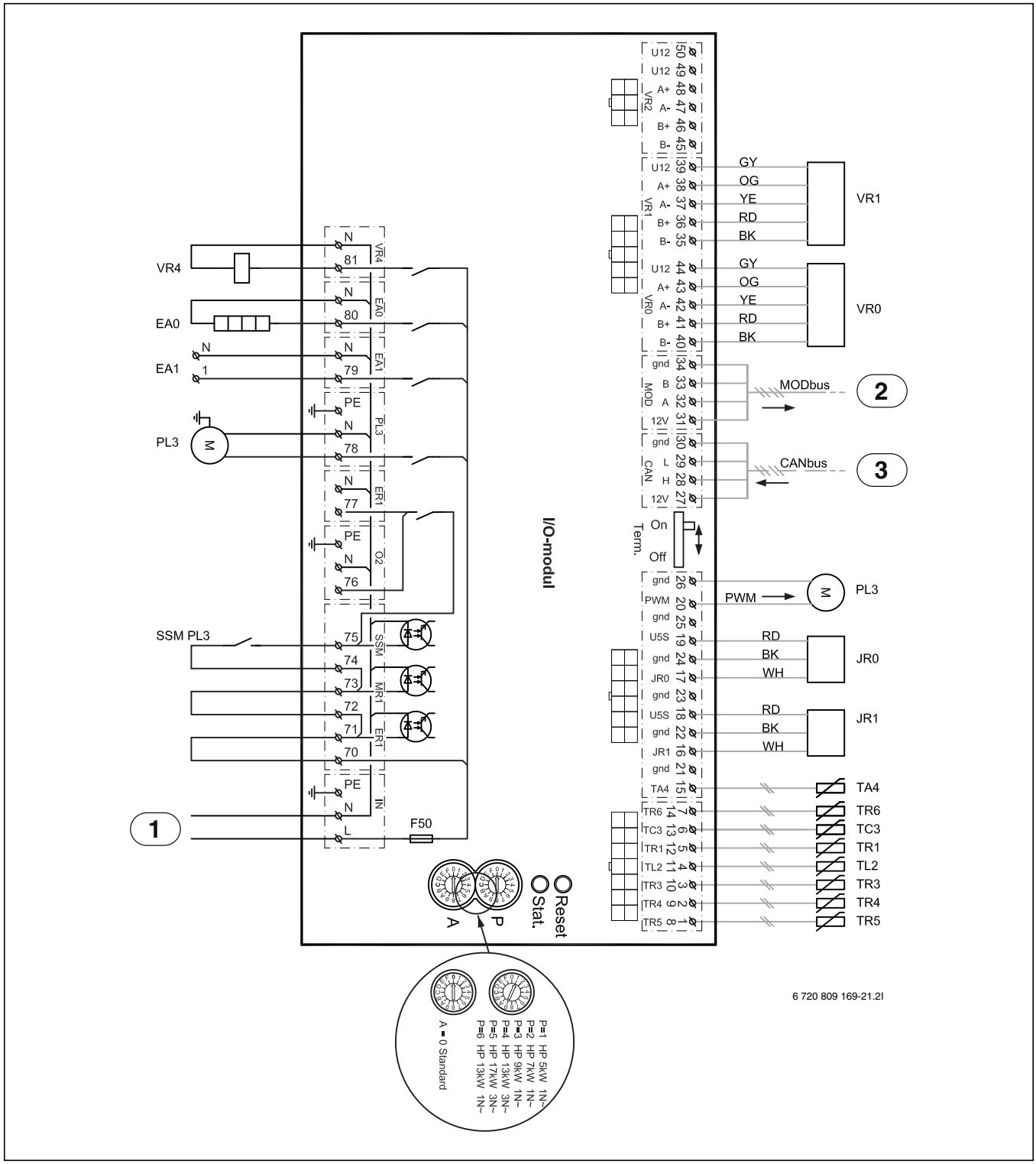


Fig. 20 Circuit diagram I/O module card

[JR0] Low pressure sensor
[JR1] High pressure sensor
[PL3] Fan, PWM signal
[TA4] Drip tray temperature sensor
[TC3] Heat transfer medium temperature sensor out
[TL2] Air inlet temperature sensor
[TR1] Compressor temperature sensor
[TR3] Condenser temperature sensor return
[TR4] Evaporator temperature sensor return (cooling mode)
[TR5] Suction gas temperature sensor
[TR6] Hot gas temperature sensor
[VR0] Electronic expansion valve 1
[VR1] Electronic expansion valve 2
[EA0] Drip tray heater
[EA1] Heating cable (accessories)
[F50] Fuse 6.3 A
[PL3] Fan
[SSM] Fan motor protection
[VR4] 4-way valve
[1] 230 V~ operating voltage ([4] Fig. 19)
[2] MOD BUS from Inverter ([3] Fig. 19)
[3] CAN BUS from heat pump module Installer module card

9 Install the heat pump's side panels and roof

Tighten the side panels and roof screws manually.
- ▶ Do not use a screw gun!

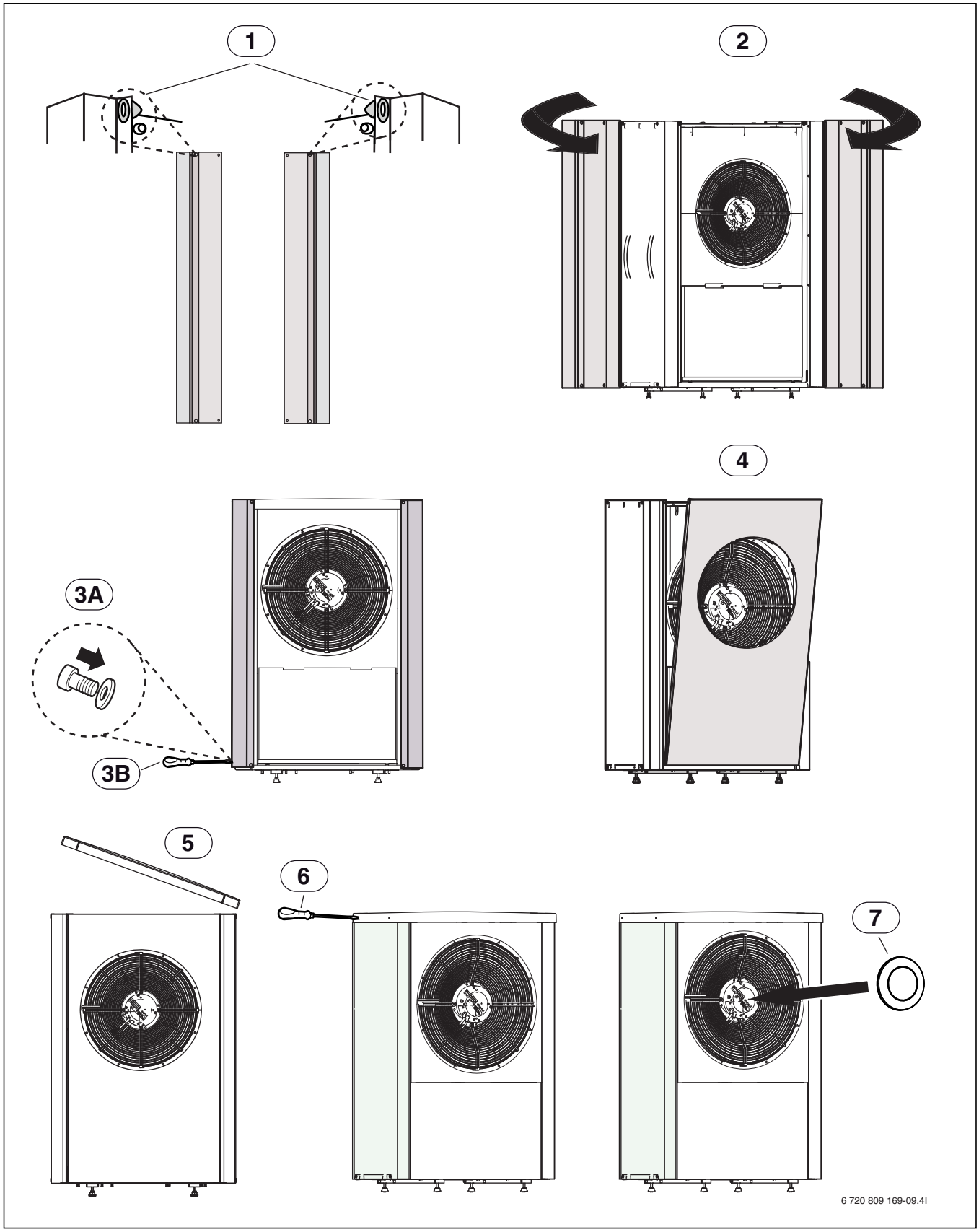


Fig. 21 Install panels and roof

10 Environmental protection

Environmental protection is one of the Bosch group main pillars. Results quality, efficiency and environmental protection are equally important objectives for us. Environmental laws and regulations are strictly adhered to.
To protect the environment we will, subject to economical aspects, use the best possible technology and materials.

Packaging
The packaging has been labelled with country specific information about waste disposal to facilitate optimal recycling.
All of our packaging materials are environmentally friendly and recyclable.

Waste products
The products contain recyclable material which should be extracted and disposed of separately.
The components are easy to take apart, and the plastic is labelled. This allows for sorting and recycling, incineration or other disposal of the different components.

11 Maintenance

DANGER: Risk of electric shock!
Components in the heat pump conduct electricity and the condenser in the heat pump must be discharged after disconnecting it from the power.
- ▶ Disconnect the main power.
- ▶ Wait at least five minutes before any electrical work.

DANGER: Risk of poisonous gas leakage!
The refrigerant circuit contains substances that can be transformed into poisonous gas if they come into contact with air or open fire. Even small concentrations of these gases can cause respiratory arrest.
- ▶ The room must immediately be evacuated and carefully aired out in case of refrigerant circuit leakage.

NOTICE: Malfunction due to damage!
The electronic expansion valves are very sensitive to electric shock.
- ▶ Never hit or pound on an expansion valve.

NOTICE: Malfunction due to damage!
The electronic expansion valves are sensitive to magnetism.
- ▶ Only use the manual valve magnet tool (accessories) to open/close the valves during control of the expansion valves.

NOTICE: Risk of deformation due to heat!
The heat pump insulation material (EPP) will deform if it is exposed to high temperatures.
- ▶ Remove as much of the insulation (EPP) as possible prior to any soldering work.
- ▶ Use flame retardant cloth or wet cloth to protect the insulation material while performing soldering work on the heat pump module.

Only a refrigerant expert can perform work on the refrigerant circuit.

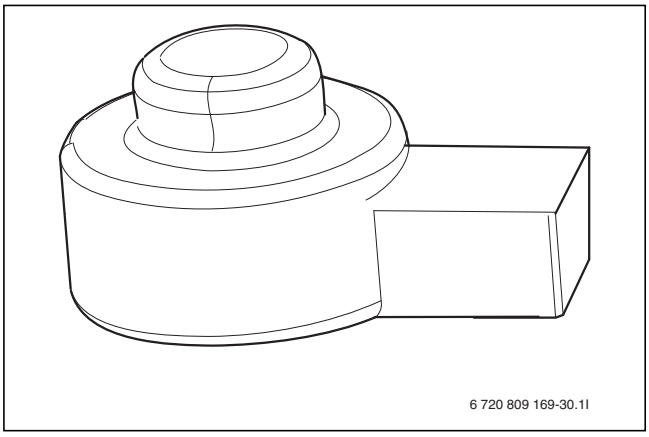


Fig. 22 Manual magnet tool

- ▶ Only use genuine spare parts!
- ▶ Refer to the spare parts list when ordering spare parts.
- ▶ Always renew seals and O-rings removed during servicing or repair work.

During service, the activities described below should be conducted.

Show alarms
- ▶ Check the alarm log.

Function check
- ▶ Function check (→Heat pump module installation instructions).

Electric cabling
- ▶ Check the cable for mechanical damage. Replace damaged cables.

Temperature sensor measured values
Temperature sensors in, or connected to, the heat pump (TA4, TC3, TL2, TR1, TR3, TR4, TR5, TR6) contain measurements according to table 5 – 7.

°C	$\Omega_{T...}$	°C	$\Omega_{T...}$	°C	$\Omega_{T...}$
–40	154300	5	11900	50	1696
–35	111700	10	9330	55	1405
–30	81700	15	7370	60	1170
–25	60400	20	5870	65	980
–20	45100	25	4700	70	824
–15	33950	30	3790	75	696
–10	25800	35	3070	80	590
–5	19770	40	2510	85	503
0	15280	45	2055	90	430

Table 5 Sensor TA4, TL2, TR4, TR5

°C	Ω	°C	Ω	°C	Ω	°C	Ω
– 20	96358	**15**	15699	**50**	3605	**85**	1070
– 15	72510	**20**	12488	**55**	2989	**90**	915
– 10	55054	**25**	10001	**60**	2490	–	–
– 5	42162	**30**	8060	**65**	2084	–	–
± 0	32556	**35**	6536	**70**	1753	–	–
5	25339	**40**	5331	**75**	1480	–	–
10	19872	**45**	4372	**80**	1256	–	–

Table 6 Sensor TC3, TR3

°C	Ω	°C	Ω	°C	Ω	°C	Ω
– 20	198500	**15**	31540	**50**	6899	**85**	2123
– 15	148600	**20**	25030	**55**	5937	**90**	1816
– 10	112400	**25**	20000	**60**	4943	95	1559
– 5	85790	**30**	16090	**65**	4137	100	1344
± **0**	66050	**35**	13030	**70**	3478	105	1162
5	51220	**40**	10610	**75**	2938	110	1009
10	40040	**45**	8697	**80**	2492	115	879

Table 7 Sensor TR1, TR6

11.1 Evaporator

If there is dirt or dust on the outside of the evaporator or the aluminium fins, it must be removed.

WARNING: The thin aluminium fins are fragile and can be damaged if careless. Never wipe the delicate fins with a cloth.

- ▶ Hard objects may not be used.
- ▶ Use protective gloves to protect your hands from cuts.
- ▶ Do not use a too powerful water jet.

Using the wrong cleaning product may damage the installation!

- ▶ Do not use acid or chlorine based products since they contain abrasives.
- ▶ Do not use corrosive alkaline cleaning products, e.g. sodium hydroxide.

To clean the evaporator:

- ▶ Turn off the heat pump using the main switch (ON/OFF).
- ▶ Spray the fins with a liquid dish soap solution.
- ▶ Rinse away the soap with water.

In some regions, it is prohibited to let dish soap drain into the ground. If the condensation water pipe drains into a gravel bed:

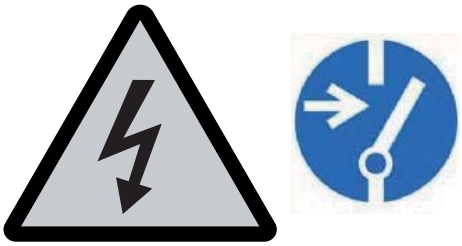
- ▶ Remove the flexible condensation water pipe from the drain before cleaning.
- ▶ Drain the dish soap into a container.
- ▶ Reconnect the condensation water pipe after cleaning.

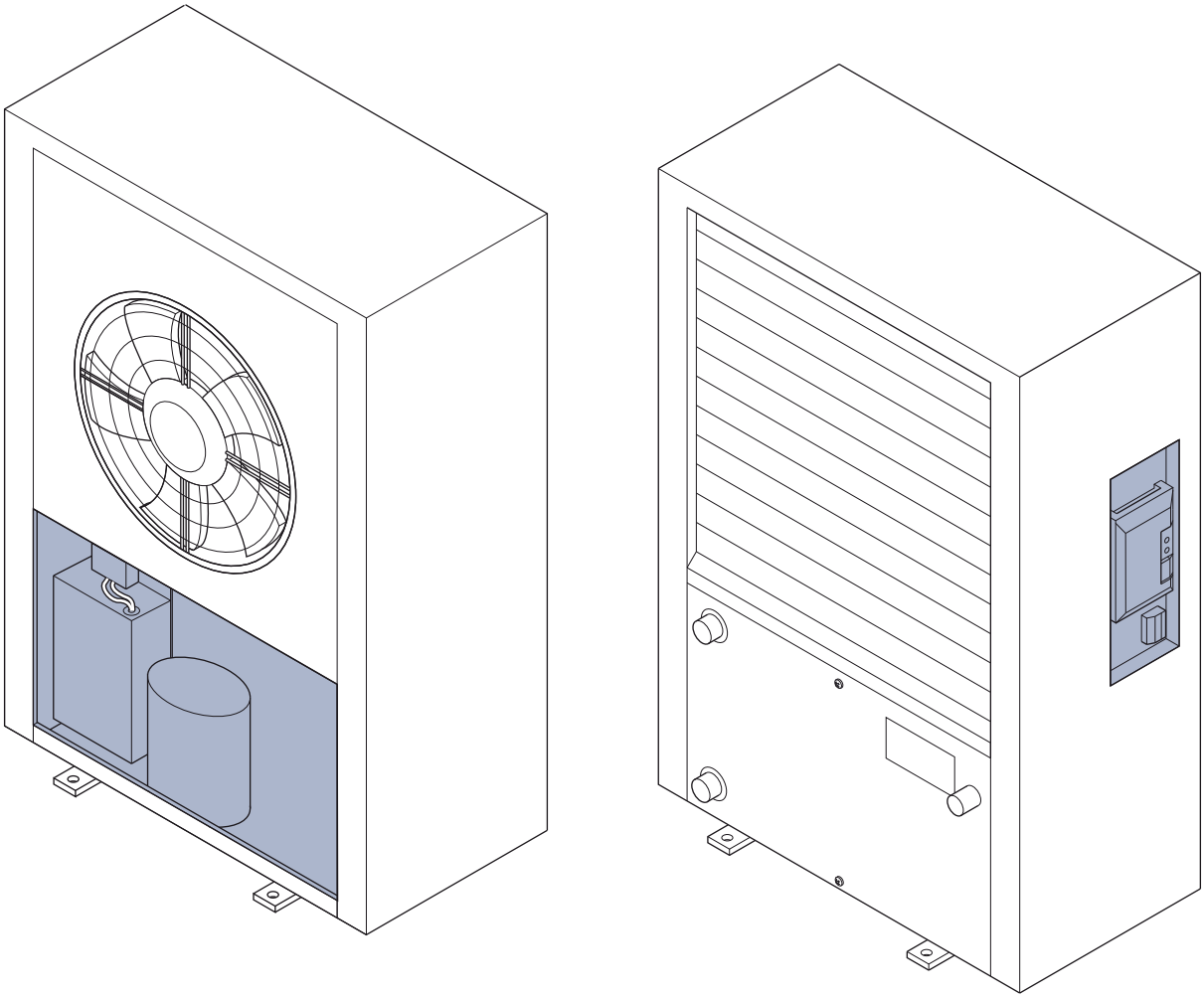
11.1.1 Snow and ice

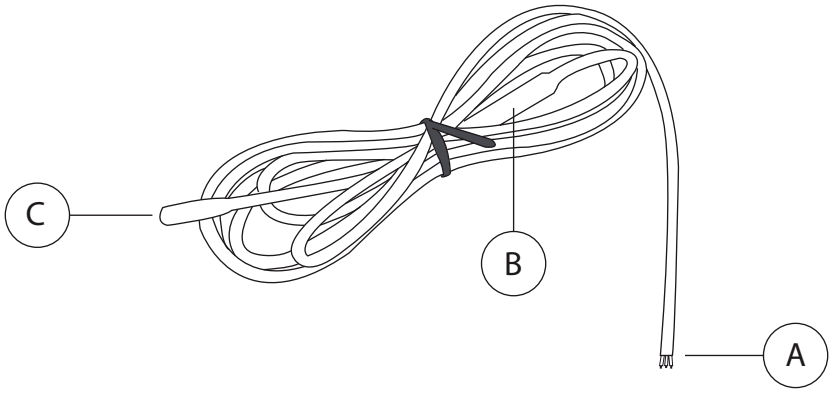
In some geographical regions or during periods of heavy snow, snow can get stuck on the back and the roof of the heat pump. Since it leads to icing, the snow should be removed.

- ▶ Carefully brush the snow off the fins.
- ▶ Keep the roof snow-free.
- ▶ Hot water can be used to rinse off the ice.

12 Heating cable installation (accessories)







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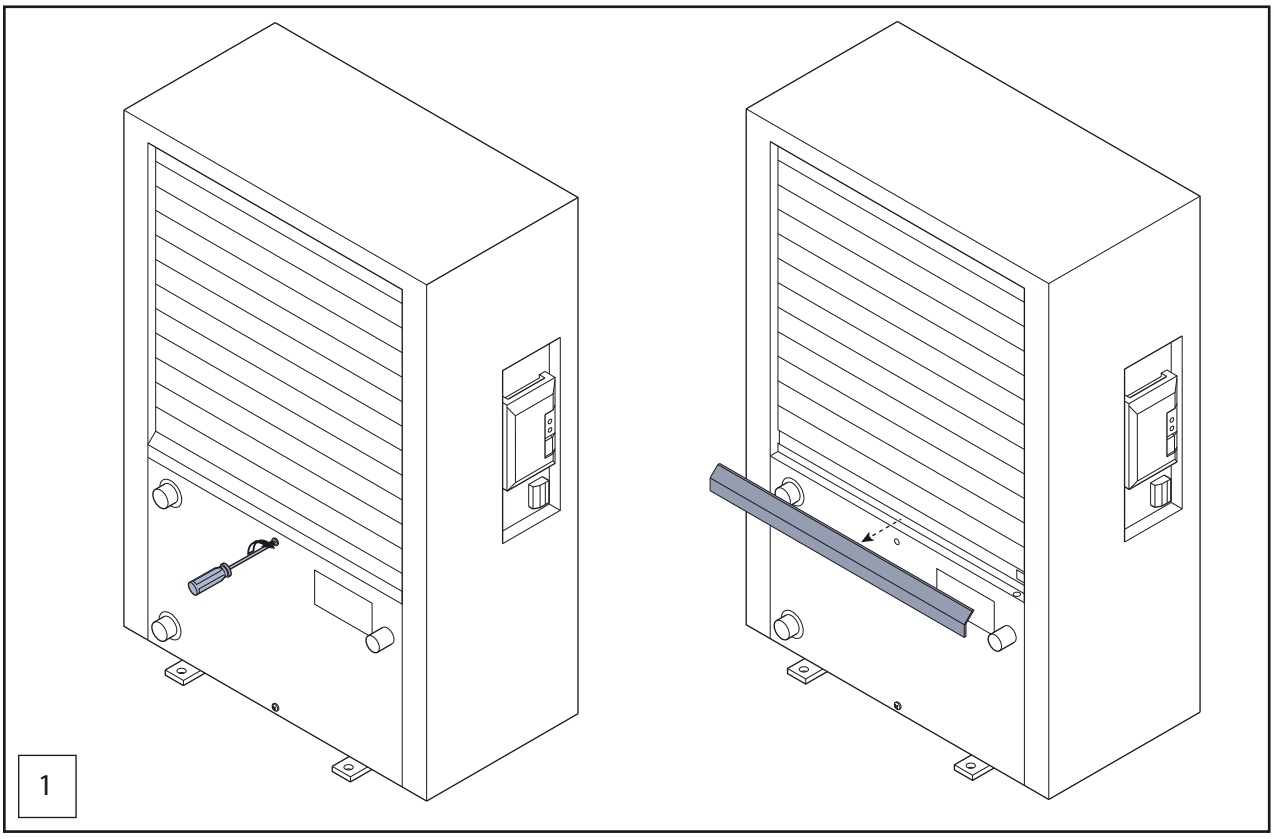

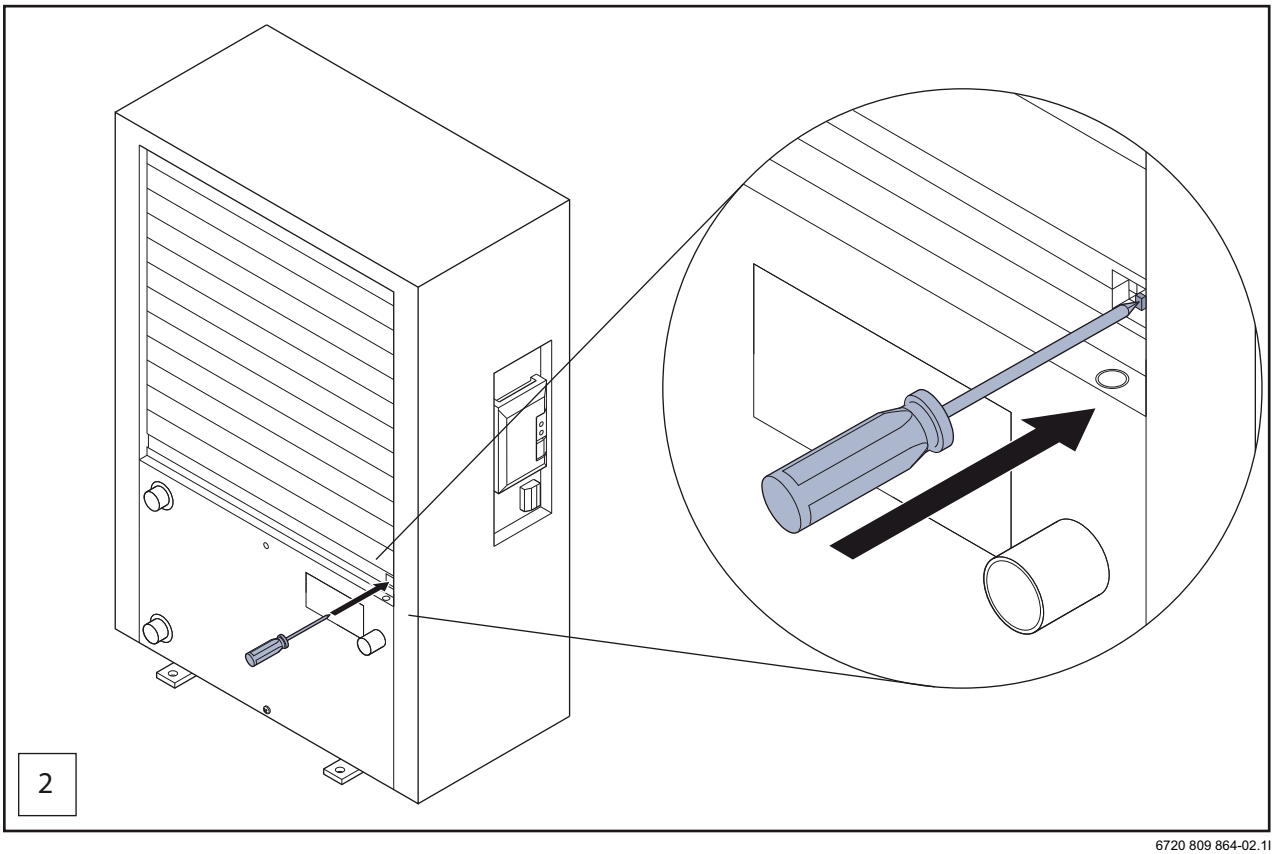

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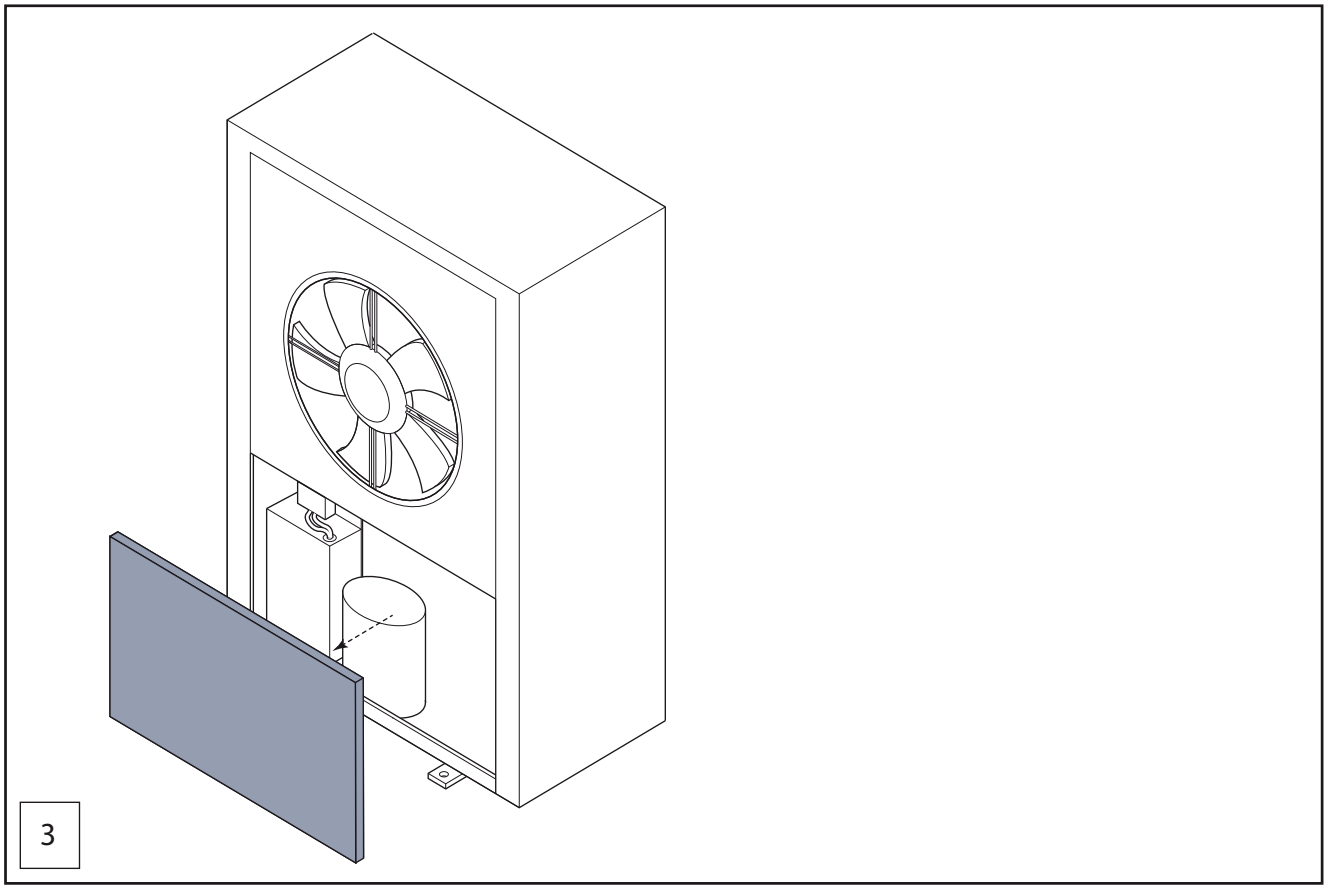

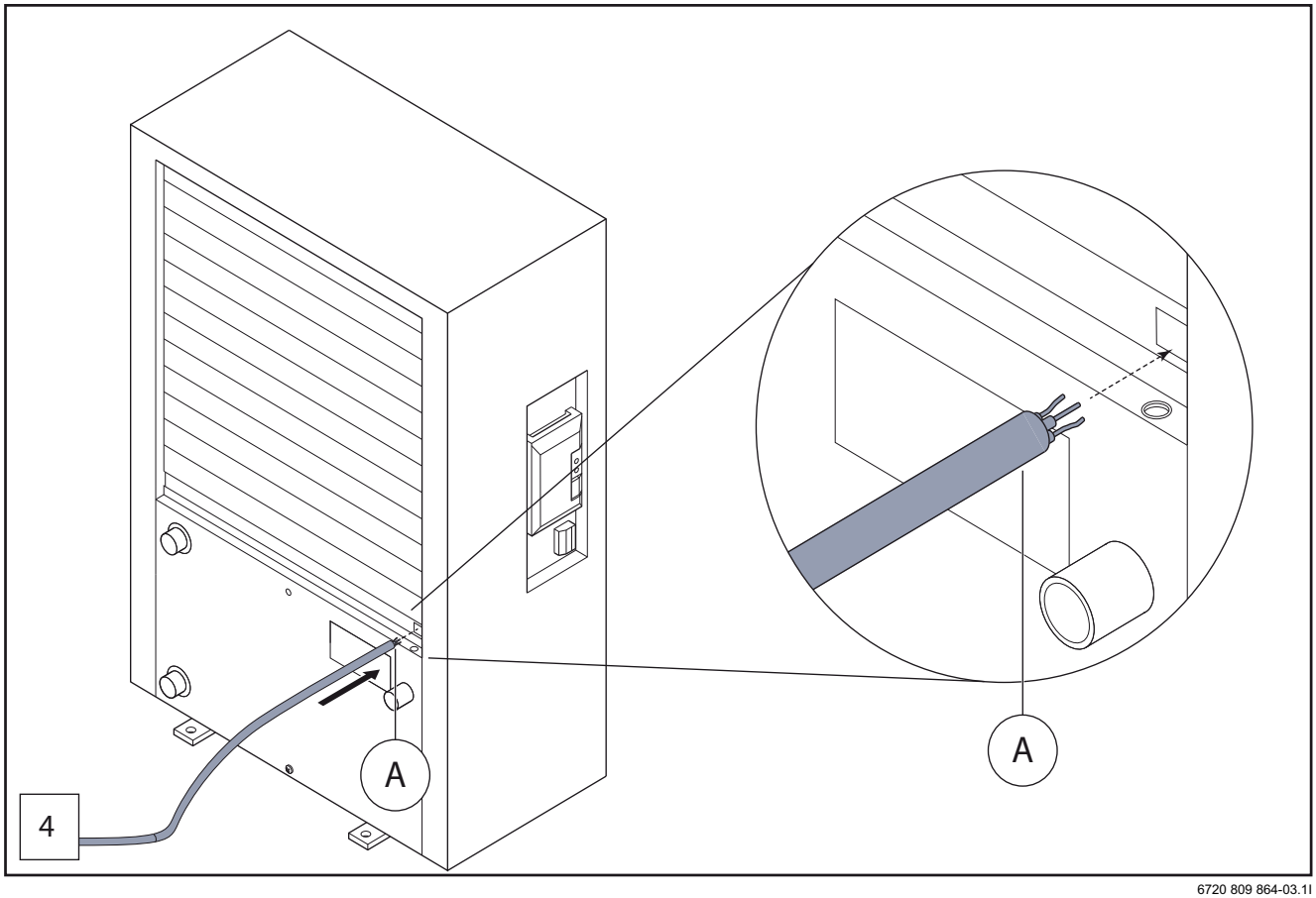

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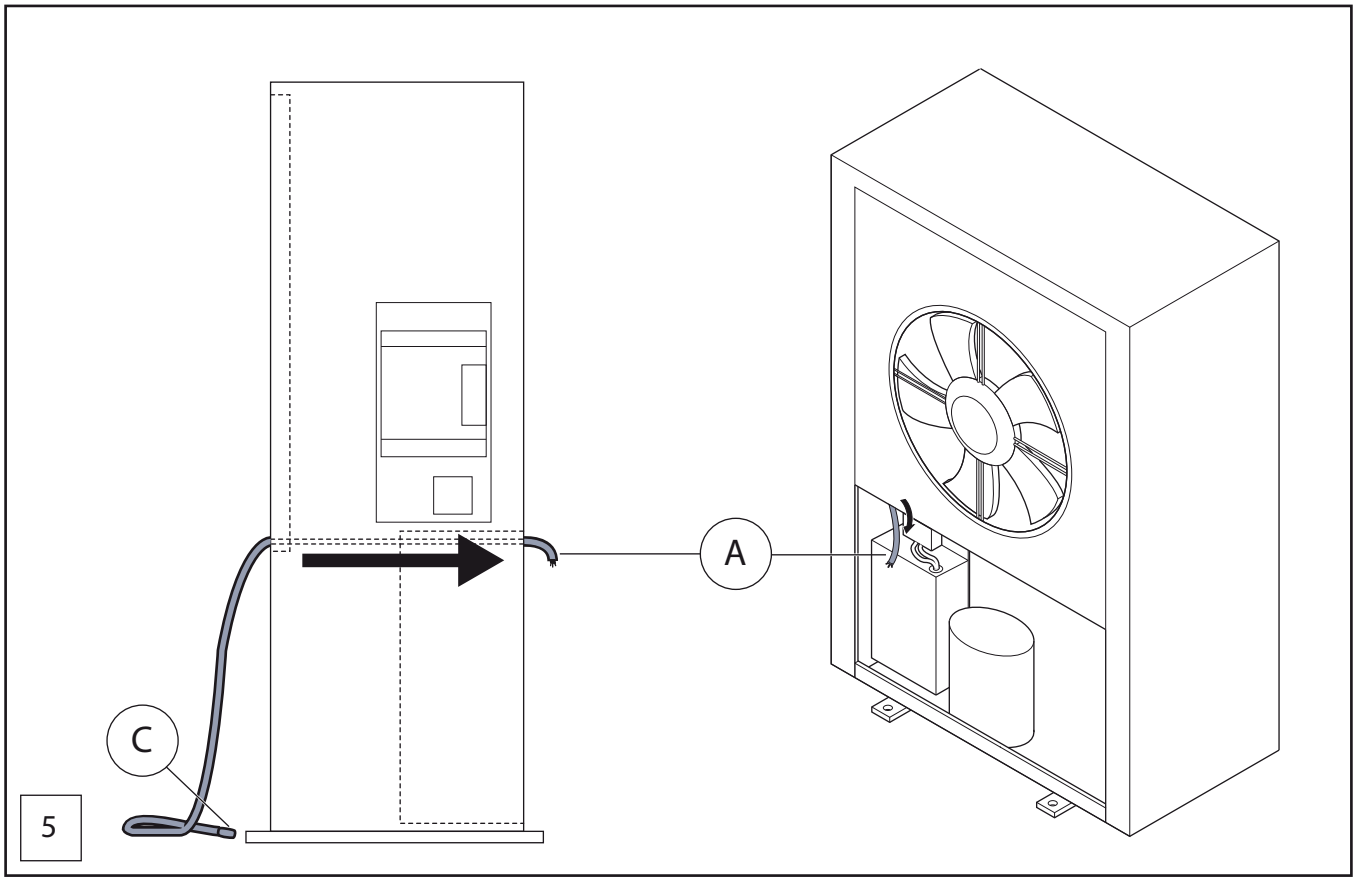

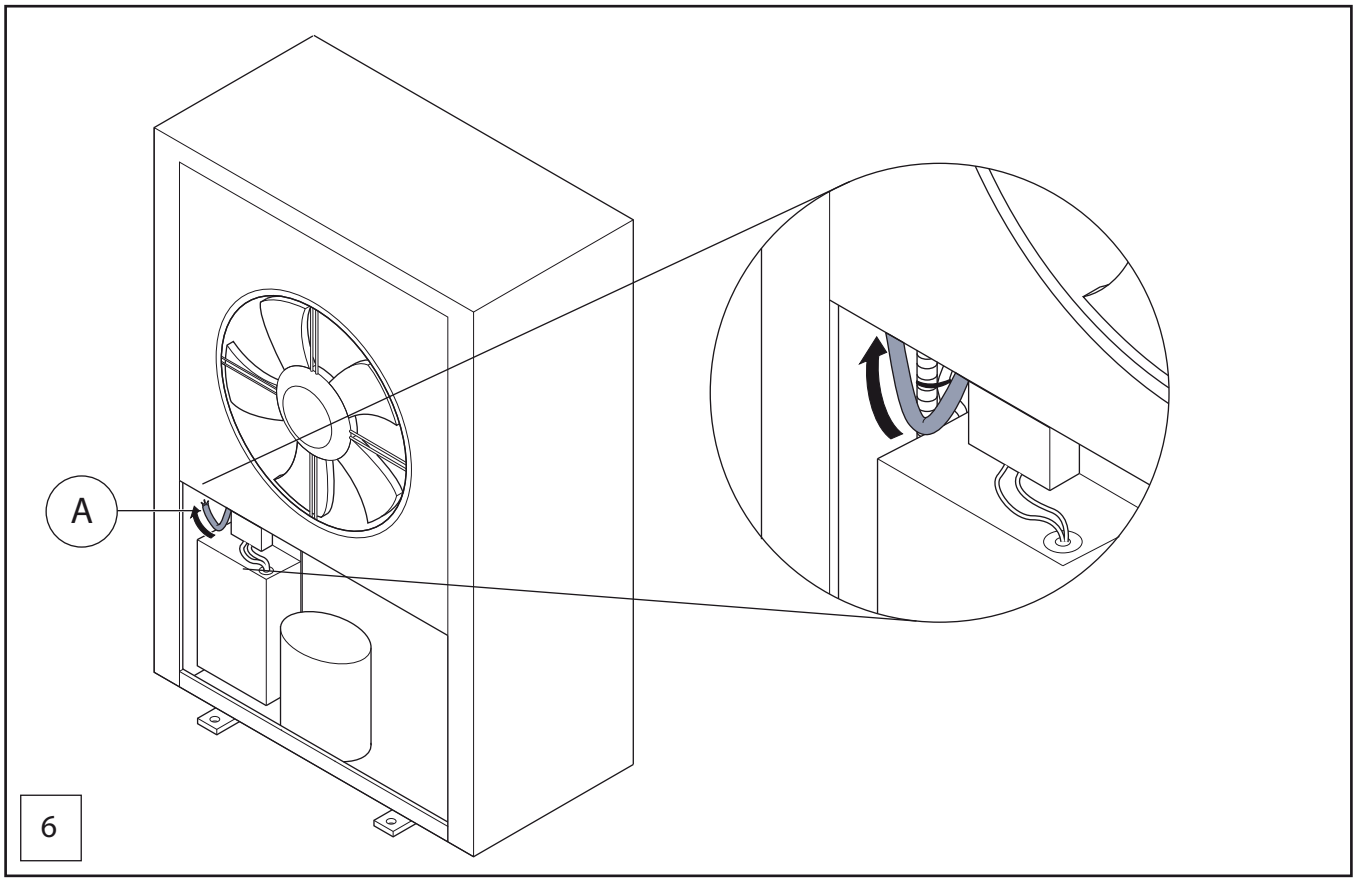

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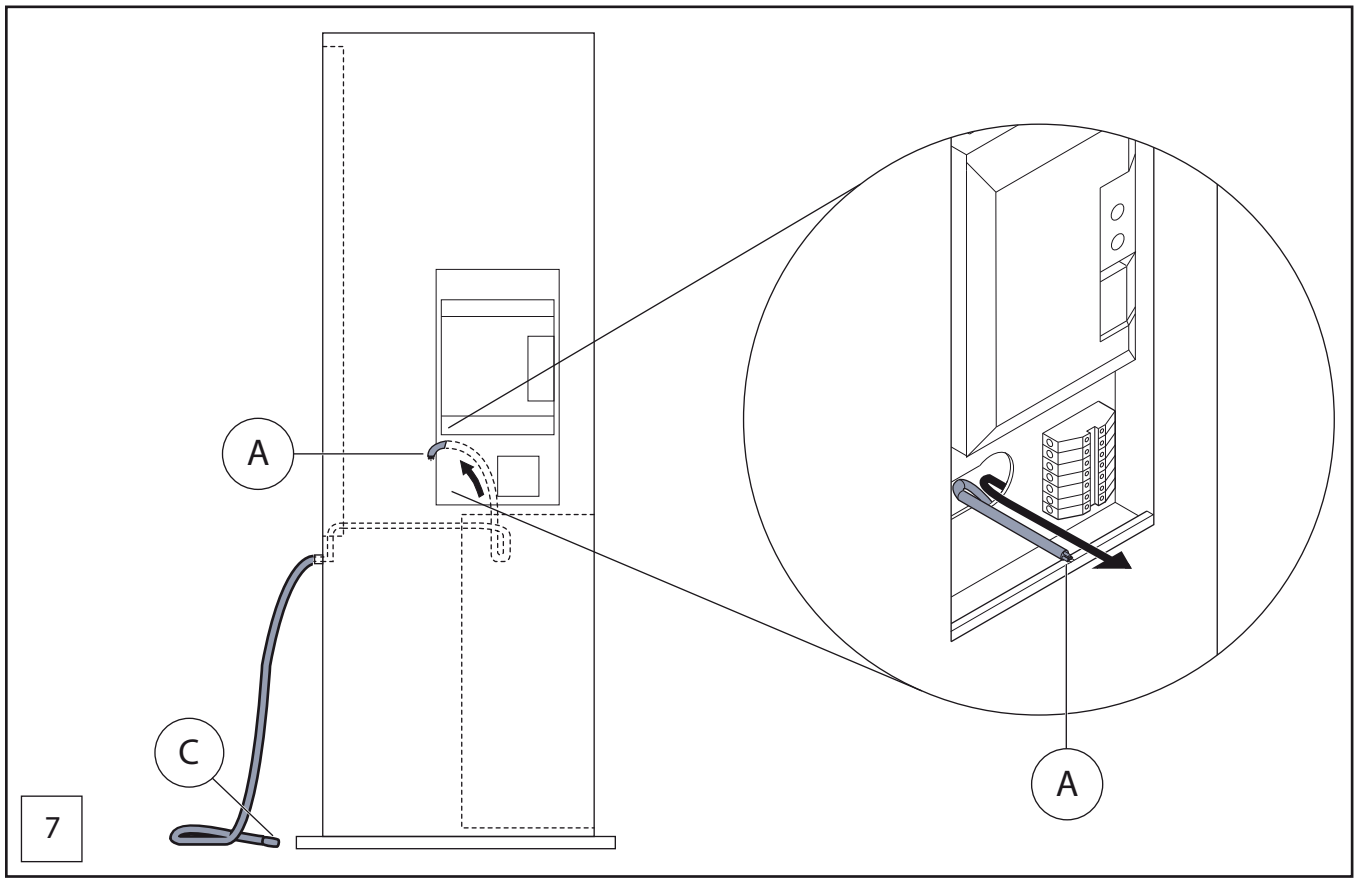

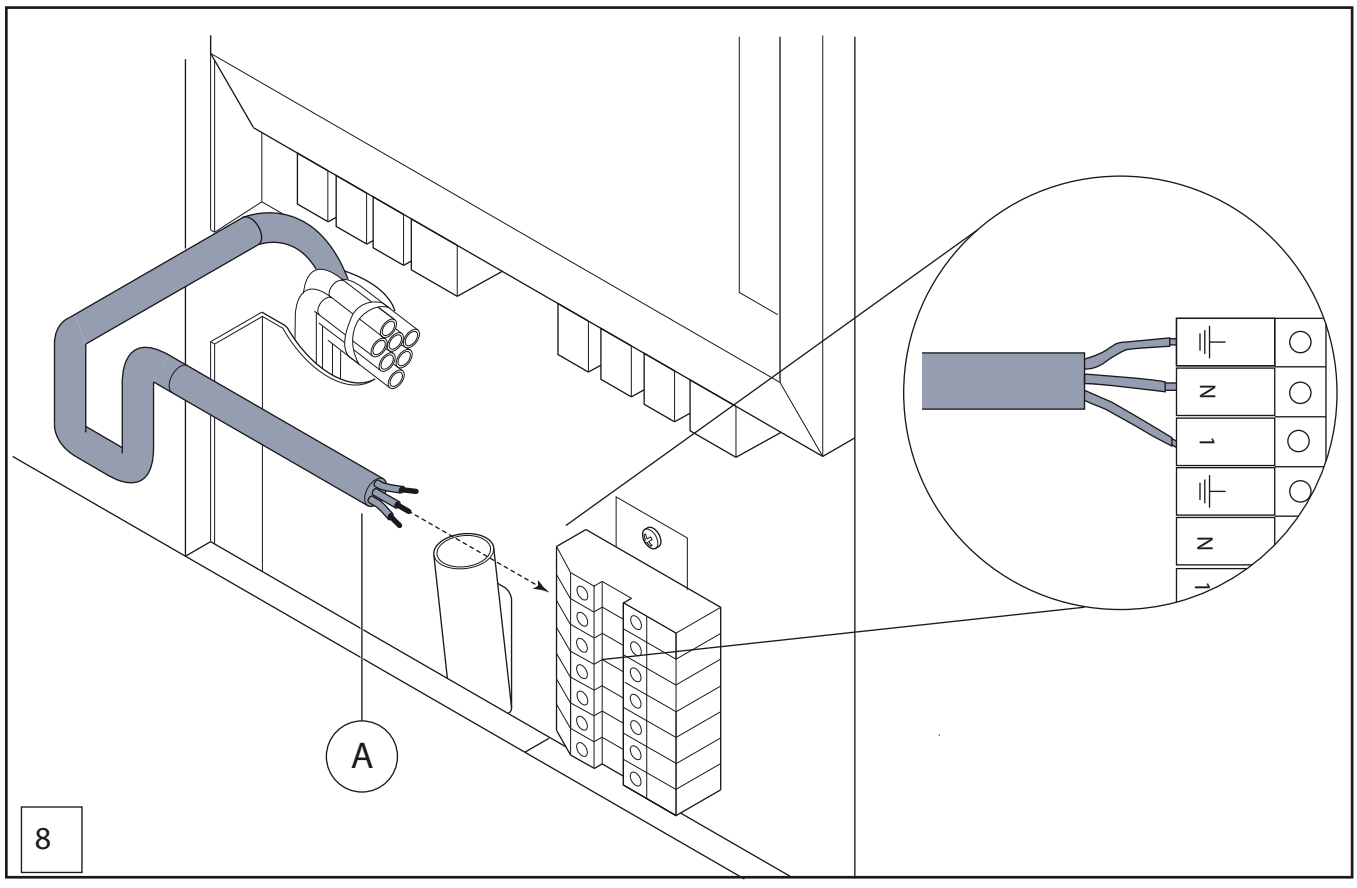

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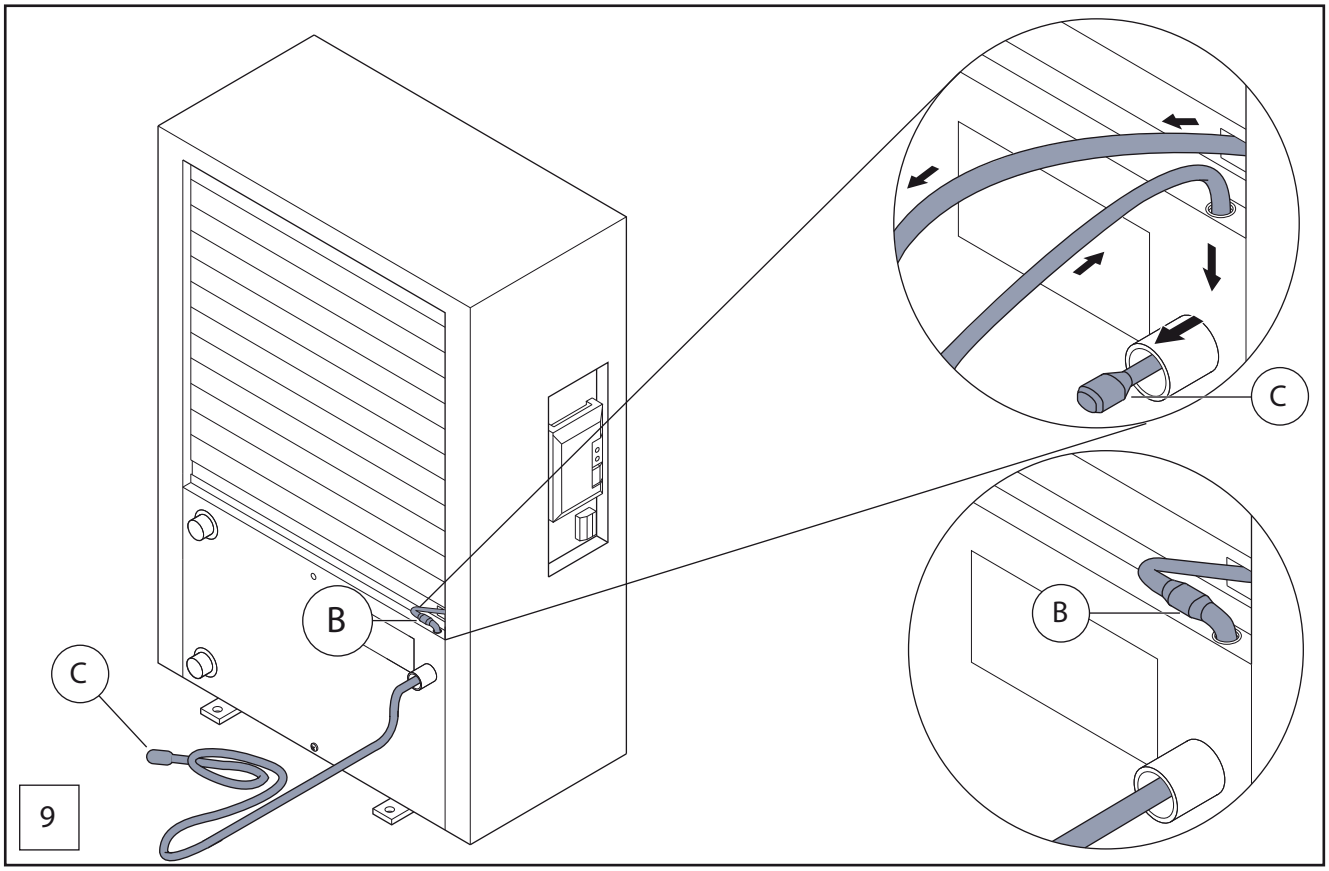

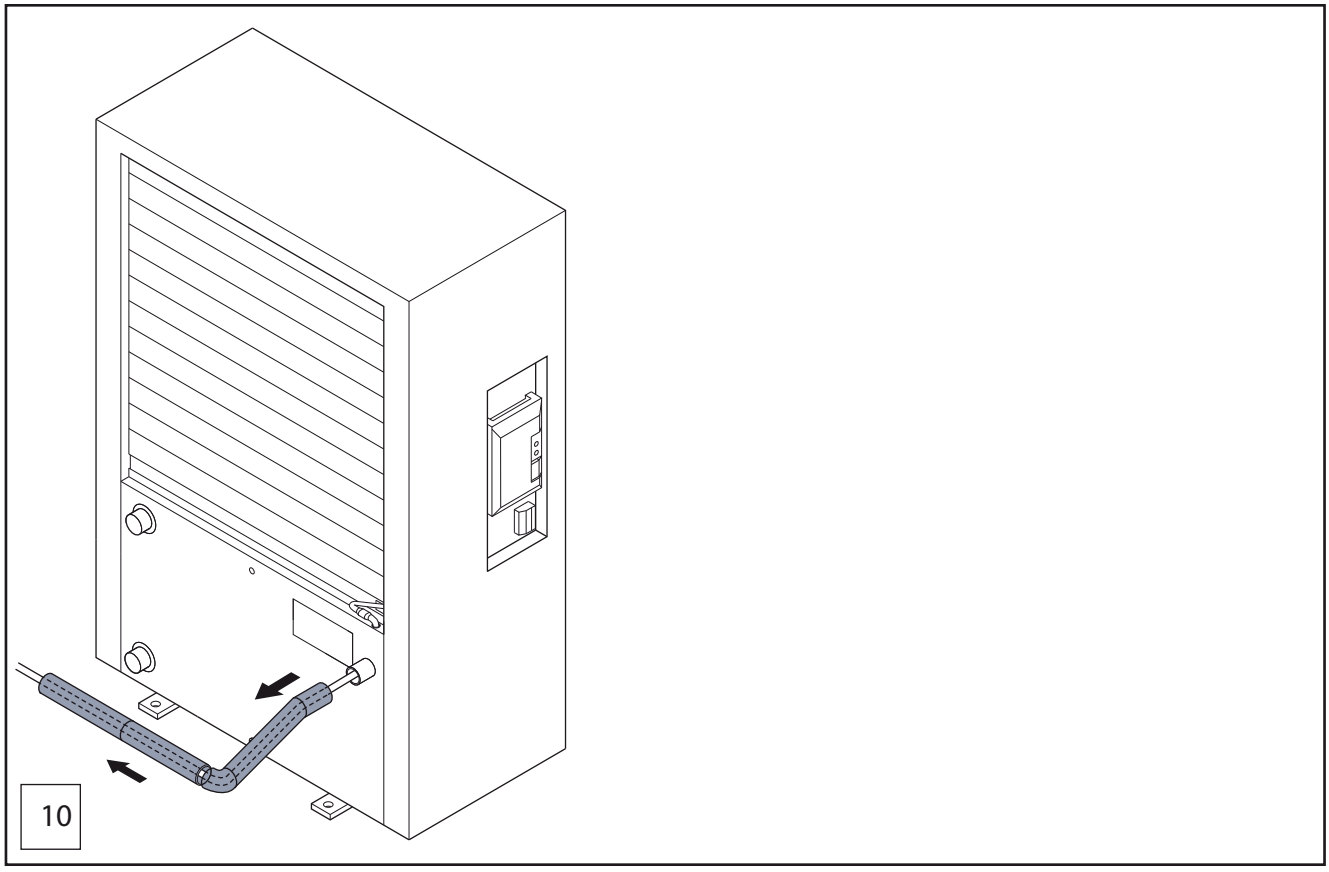

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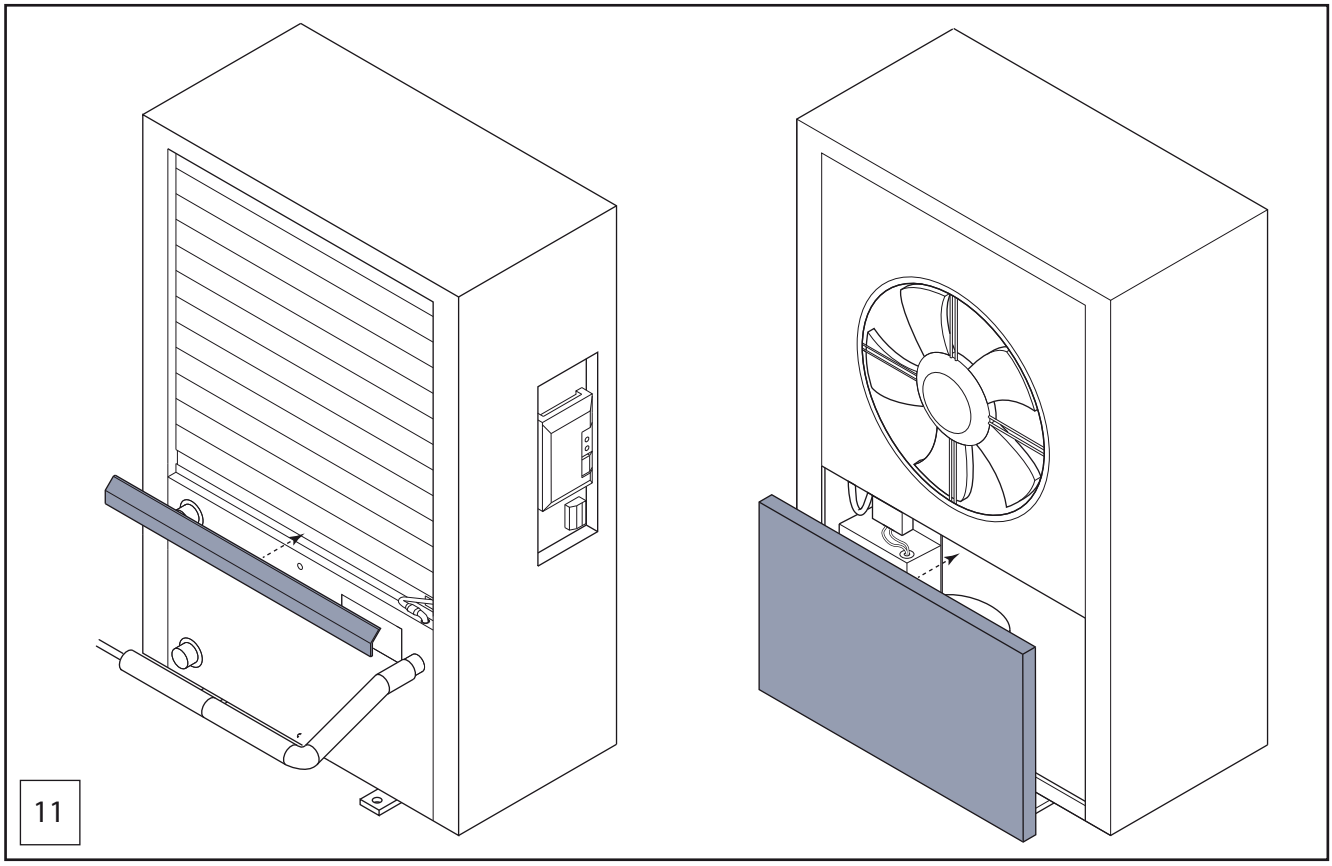

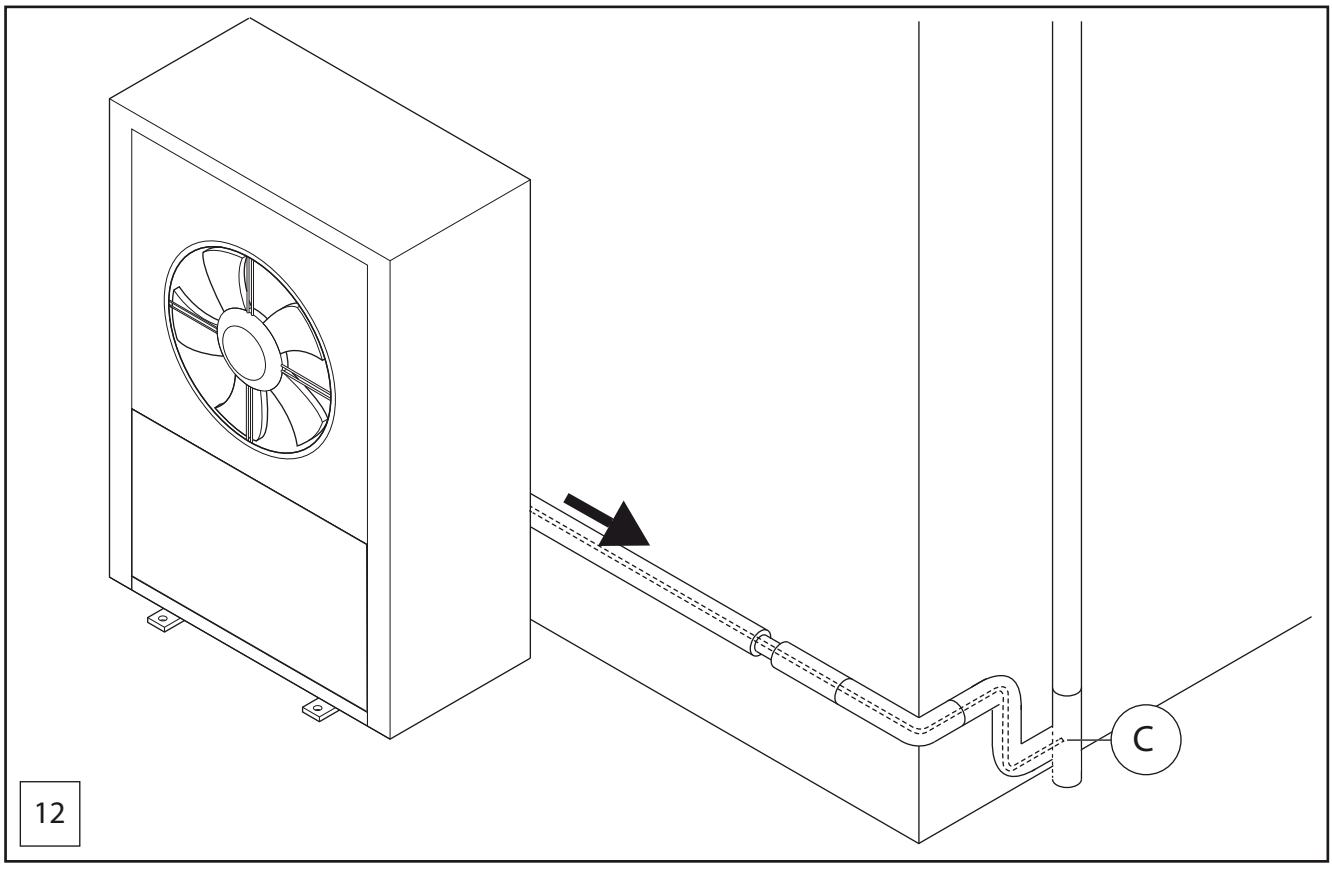

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