

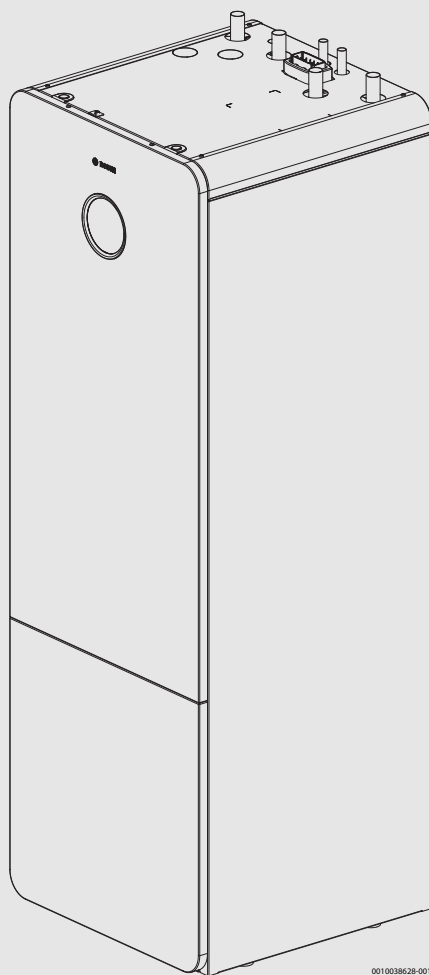


Installation Instructions

Indoor unit for air to water heat pump

# Compress 5800i AW

CS5800iAW 12 M SST



0010038628-001



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# 1 Explanation of symbols and safety instructions


## 1.1 Explanation of symbols


### Warnings

In warnings, signal words at the beginning of a warning are used to indicate the type and seriousness of the ensuing risk if measures for minimizing danger are not taken.

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


 **DANGER**  
**DANGER** indicates that severe or life-threatening personal injury will occur.

 **WARNING**  
**WARNING** indicates that severe to life-threatening personal injury may occur.

 **CAUTION**  
**CAUTION** indicates that minor to medium personal injury may occur.

**NOTICE**  
**NOTICE** indicates that material damage may occur.

### Important information

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

### Additional symbols

Symbol	Meaning
▶	a step in an action sequence
→	a reference to a related part in the document
•	a list entry
–	a list entry (second level)

Table 1

## 1.2 General safety instructions

### Notices for the target group

These installation instructions are intended for gas, plumbing, heating and electrical contractors. All instructions must be observed. Failure to comply with instructions may result in material damage and personal injury, including danger to life.

- ▶ Read the installation, service and commissioning instructions (heat source, heating controller, pumps, etc.) before installation.
- ▶ Observe the safety instructions and warnings.
- ▶ Follow national and regional regulations, technical regulations and guidelines.
- ▶ Record all work carried out.

### Intended use

The indoor unit is intended for use in closed heating systems in residential buildings.

Any other use - including the use exclusively for heating domestic hot water without connection to a heating system - is considered improper use. Any resulting damages are excluded from liability.

### Installation, commissioning and service

The product may only be installed, brought into operation and maintained by trained personnel.

- ▶ Use only original spare parts.

### Electrical work

Electrical work must only be carried out by electrical installation contractors.

Before starting electrical work:

- ▶ Isolate all poles of the mains voltage and secure against reconnection.
- ▶ Make sure the main voltage is disconnected.
- ▶ Before touching live parts: Wait at least 5 minutes to discharge the capacitors.
- ▶ Observe the wiring diagrams of other system components as well.

### Connection to supply mains

Means to safely disconnect the unit from supply mains must be incorporated.

- ▶ Install a safety switch that disconnects all poles from supply mains. The safety switch shall be an over voltage category III appliance.

### Supply cord

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

### Connection to the water supply

This unit is designed to be permanently connected to the water supply. The connection must not be established with a hose set.

The maximum inlet pressure of the water is 10 bar.

The minimum permissible inlet pressure of the water is 2 bar.

### Handover to the user

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

- ▶ Explain how to operate the heating system and draw the user's attention to any safety relevant action.
- ▶ In particular, point out the following:
  - Modifications and repairs must only be carried out by an approved contractor.
  - Safe and environmentally compatible operation requires inspection at least once a year and proper cleaning and maintenance.
- ▶ Point out the possible consequences (personal injury, including danger to life or material damage) of non-existent or improper inspection, cleaning and maintenance.
- ▶ Leave the installation instructions and the operating instructions with the user for safekeeping.

## 2 Product Information

### 2.1 Standard delivery

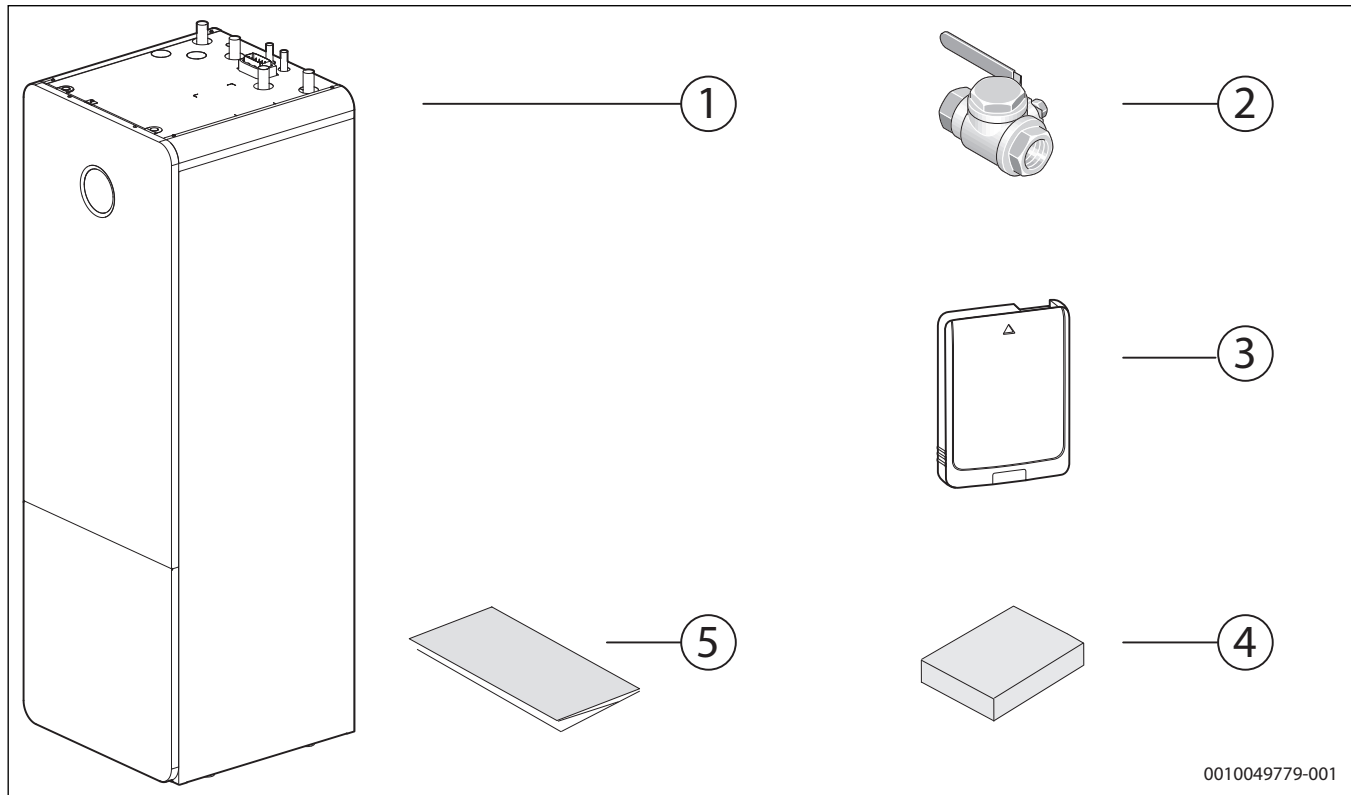



Fig. 1 Standard delivery

- [1] Indoor unit
- [2] Particle filter
- [3] Connect-Key K30RF
- [4] Outside temperature sensor
- [5] Documentation

### 2.2 Declaration of conformity

The design and operating characteristics of this product comply with the European and national requirements.

 The CE marking declares that the product complies with all the applicable EU legislation, which is stipulated by attaching this marking.

The complete text of the Declaration of Conformity is available on the Internet: [Please select a unique language-country combination from attribute "Language-Country" @ <LanguagePart>..](#)

### 2.3 Information about the indoor unit

The indoor units CS5800iAW 12 M are intended for connection to AW OR-S and AW OR-T heat pumps.

CS5800iAW 12 M has an integrated booster heater, DHW cylinder and a small size buffer cylinder.

### 2.4 Dimensions and minimum clearances



There should be at least 50 mm between the indoor unit's sides and other fixed installations (walls, sinks, etc.). Ideal positioning is by an external wall or a partition wall.

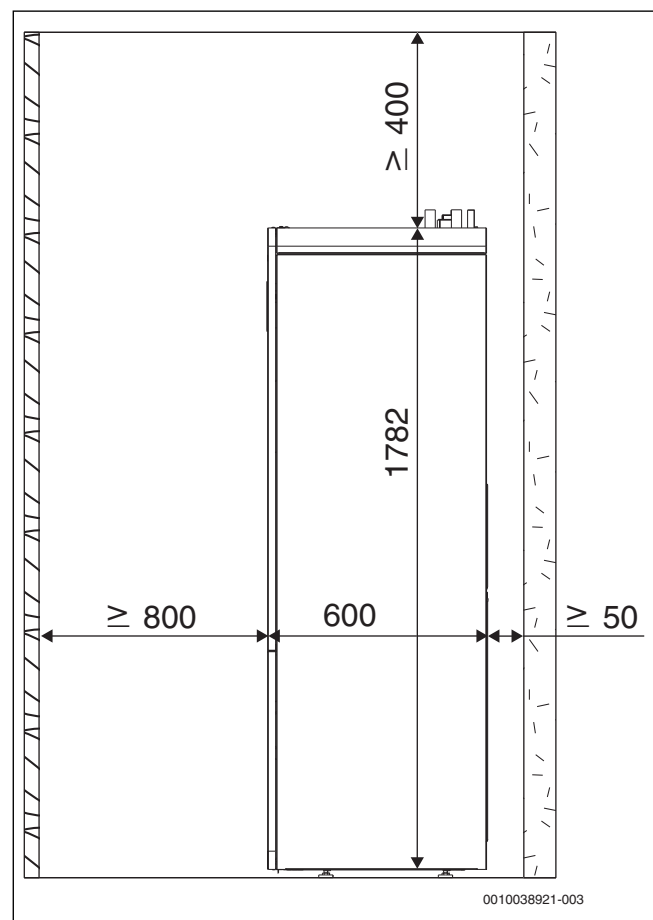


Fig. 2 Minimum distance (mm)

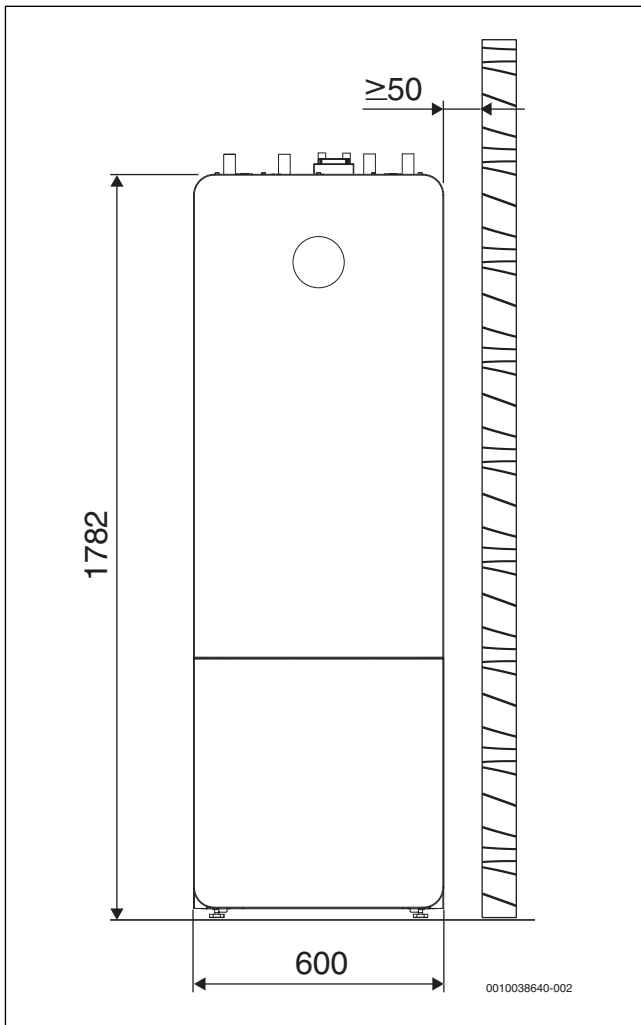


Fig. 3 Dimensions (mm)

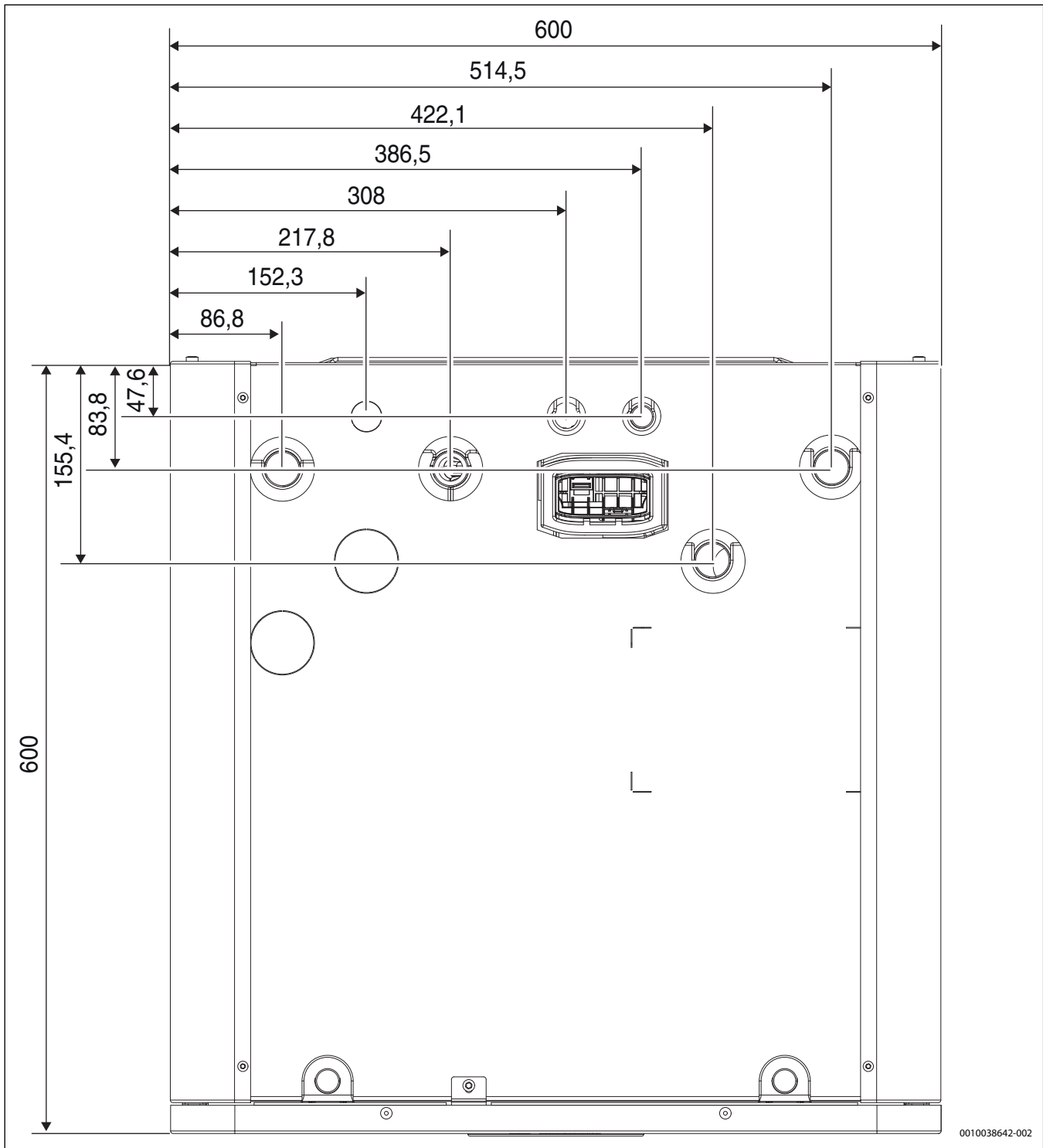
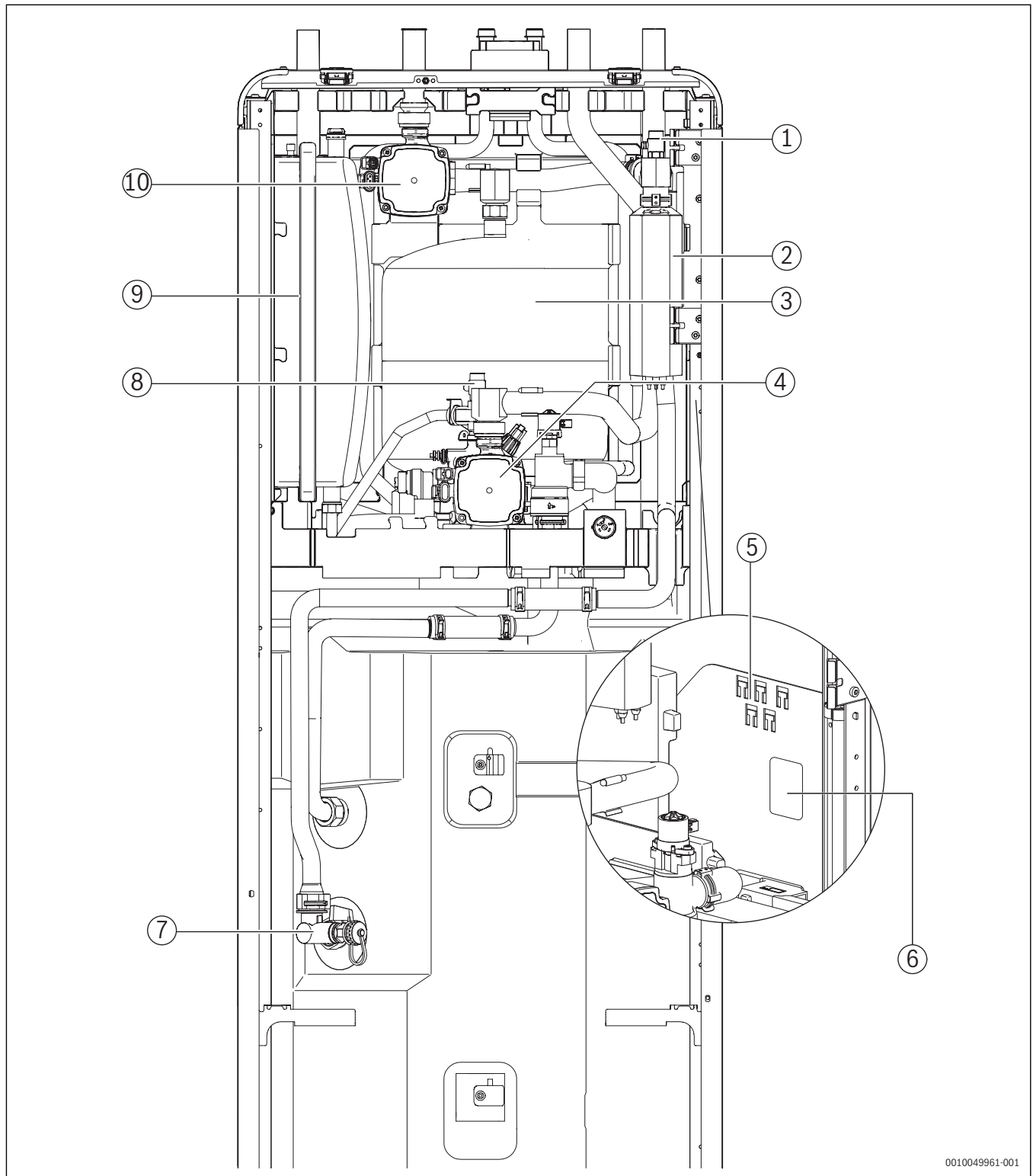


Fig. 4 Dimensions, connections, top view

**2.5 Product Overview**



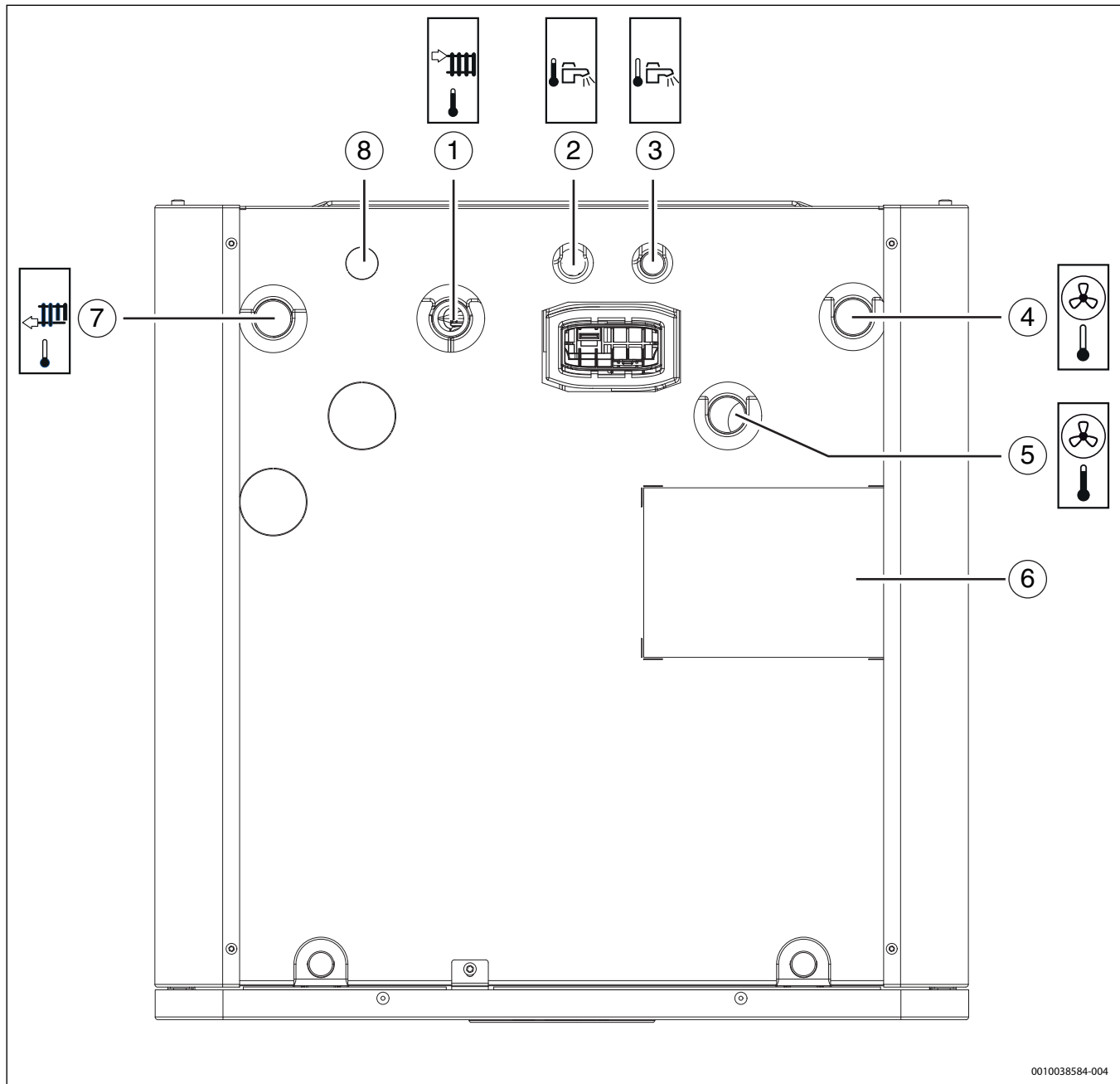
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Fig. 5 Product overview, front and top view

- [1] Manual purge valve
- [2] Electric heater
- [3] Buffer cylinder
- [4] Heat carrier pump PC0
- [5] Manometer
- [6] Drain valve heating water (CH)
- [7] Manual purge valve
- [8] Expansion vessel
- [9] Heating system primary pump PC1
- [10] Type plate\*

\*The type plate of the indoor unit can be found inside the appliance. It contains information on the part number and serial number and also the date of manufacture of the device.

## 2.6 Roof panel



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Fig. 6 Product overview top view

- [1] Flow to heating system
- [2] DHW outlet connection
- [3] Cold water inlet connection
- [4] Heat transfer medium out (to the heat pump)
- [5] Heat transfer medium in (from heat pump)
- [6] Label for pipe connections
- [7] Return from heating system
- [8] DHW circulation connection (accessory)

## 2.7 Regulations

Follow the directives and regulations given below:

- Local provisions and regulations of the electricity supplier and corresponding special rules
- 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** (Protection of potable water against pollution in potable water installations)
- **EN 378** (Refrigerating systems and heat pumps - Safety and environmental requirements)
- **EN60335-2-40** (Particular requirements for electrical heat pumps, air-conditioners and dehumidifiers)
- **PED, 2014/68/EU** (Pressure equipment directive)

## 2.8 Accessories

### 2.8.1 Required system components

The following components are not included in the standard delivery but are required for the initial startup and operation of the system.

Heating system:

- Automatic air vent valve [VL1]
- Magnetite filter/separator (not necessary if the system only consists of newly installed underfloor heating)
- Equipment for filling of heating and DHW system
- Non-return valve if the cooling mode is to be used.





A non-return valve may be necessary to prevent self-circulation in the heating system. This can mainly arise in the following situations:

- ▶ Heating system with radiators.
- ▶ The indoor unit is installed below the heating system (basement or multi-story building).
- ▶ The outdoor unit is installed on the same height or below the indoor unit.

Hot tap water:

- Non-return valve for incoming cold water
- Pressure relief valve cold water

Heat pump:

- Manual valve [VC4] between the indoor unit and the heat pump. The valve is used when filling and venting the system. It is not allowed to completely disconnect the heat pump from the indoor unit, therefore only one valve is required.

### 2.8.2 Optional accessories

The following accessories can be added on and are not required for operation of the system.

- Room controller
- Connect-Key K30RF wireless module
- Thermostatic valve hot water
- DHW circulation pump
- Safety thermostat for under floor heating
- Condensation sensor for non-condensing cooling mode

### 2.8.3 Room controller

For higher system efficiency, it is recommended to integrate room controllers instead of thermostatic radiator valves in the heating system. The room controller provides feedback that will automatically adjust the heating curve to control the room temperature. This ensures that the heat pump will only operate when there is heating or cooling demand.

## 3 Preparing for installation

- ▶ Run the connector pipes for the heating system and cold water/DHW in the building up to the installation location of the indoor unit.
- ▶ Mount and align adjustable feet provided so that the indoor unit is level.

### 3.1 Placement of the indoor unit

- The indoor unit is placed in the building. The pipework between the heat pump and indoor unit must be as short as possible. Use insulated pipes.
- The installation location for the indoor unit must have a drain.
- The ambient temperature around the indoor unit shall be between +10 °C and +35 °C.

### 3.2 Water quality

#### 3.2.1 Quality requirements for the heating water

The quality of the fill and top-up water is an essential factor for increased efficiency, functional reliability, long service life and for maintaining the operational readiness of a heating system.



Unsuitable water can damage the heat exchanger or cause a fault in the heat generator or DHW supply!

Unsuitable or contaminated water can lead to sludge formation, corrosion or scaling. Unsuitable antifreeze or hot water additives

(inhibitors or anti-corrosion agents) can damage the heat generator and heating system.

- ▶ Only fill the heating system with potable water. Do not use well or groundwater.
- ▶ Determine the water hardness of the filling water, before filling the system.
- ▶ Flush the heating system prior to filling.
- ▶ If magnetite (iron oxide) is present, anti-corrosion measures are required and the installation of a magnetite separator and a de-airing valve in the heating system is recommended.
- ▶ The limit values in table 2 must not be exceeded, even if national directives contain higher limits.

Water quality	Unit	Value
Conductivity	µS/cm	≤ 2500
pH		≥ 6,5... ≤ 9,5
Chloride	ppm	≤ 250
Sulphate	ppm	≤ 250
Sodium	ppm	≤ 200

Table 2 Boundary conditions for potable water (filling water)

- ▶ Check the pH value after > 3 months of operation. Ideally at the first service.

Material of heat generator	Heating water	pH value range
Copper brazed heat exchangers	• Untreated potable water • Fully softened water	7.5 <sup>1)</sup> – 10.0
	• Low-salt operation < 100 µS/cm	7.0 <sup>1)</sup> – 10.0

1) If pH value is < 8.2 an on-site test for ferrous corrosion is necessary

Table 3 pH value ranges after > 3 months of operation

- ▶ Treat the fill and top up water according to the instructions in the following section.

Depending on the hardness of the filling water, the system water volume and the maximum heat output of the heat generator, water treatment may be required to avoid a damage in water heating installations, due to the formation of lime scale.

**Requirements on the fill and top-up water**

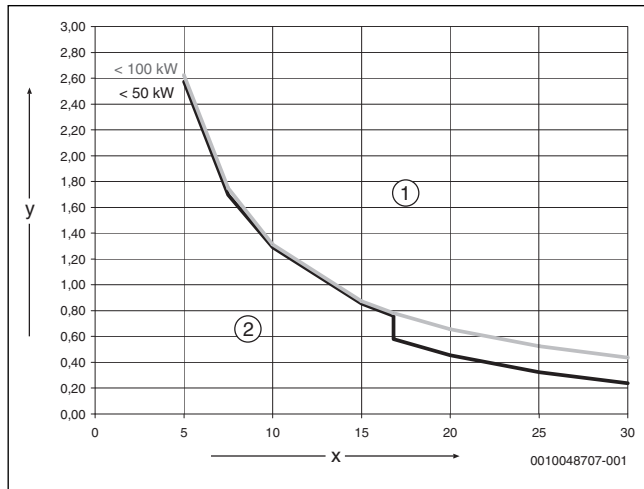


Fig. 7 Heat generators < 50 kW-100 kW

- [x] Total hardness in °dH
- [y] Maximum possible water volume over the service life of the heat source in m<sup>3</sup>
- [1] Above the curve, only use desalinated fill and top-up water, with a conductivity of ≤ 10 µS/cm
- [2] Below the curve, untreated fill and top-up water according to drinking water regulation can be used



For systems with a specific system water content >40 l/kW, water treatment is mandatory. If there are several heat generators in the heating system, then the system water volume must be related to the heat generator with the lowest output.

Water hardness unit conversion					
	°dH	°e	°fH	ppm	mmol/l
1°dH=	1	1,25	1,8	17,8	0,1783
1°e=	0,798	1	1,4	14,3	0,142
1°fH=	0,56	0,7	1	10	0,1
1 ppm CaCO <sub>3</sub> (USA)	0,056	0,07	0,1	1	0,01
1mmol/l=	5,6	7,02	10	100	1

Table 4 Water hardness unit conversion

A recommended and approved method for water treatment is desalination of the fill and top-up water to a conductivity of ≤ 10 µS/cm.

**Prevention of corrosion**

In most cases, corrosion plays only a minor role in heating systems. However, a precondition for this is that the system is a corrosion-sealed water heating installation. This means that there is practically no access of oxygen to the system during operation.

Continuous introduction of oxygen leads to corrosion and can thus cause rusting and rust sludge formation. Sludge formation can not only cause blockages and therefore a diminished heat supply but also deposits (similar to lime scale deposits) on the hot surfaces of the heat exchanger.

The amount of oxygen introduced by the fill- and top-up water are generally very small and can therefore be ignored.

To avoid oxygenation, connection pipes must be diffusion-tight! The use of rubber hoses should be avoided.

The intended connection accessories should be used in the installation.

During operation, pressure maintenance with regard to oxygen ingress and in particular the function, correct sizing and correct setting (pre-

charge pressure) of the expansion vessel is of highest importance. Check the pre-charge pressure and function annually.

Furthermore, the function of automatic air vents should also be checked during maintenance.

It is also important to check and document the top-up water quantities via a water meter. Larger and regularly required water top-up quantities indicate insufficient pressure maintenance, leaks or continuous oxygen input.

**Antifreeze**



Unsuitable antifreeze can damage the heat exchanger or cause a fault in the heat source or DHW supply.

Unsuitable antifreeze can damage the heat source and heating system. Only use antifreeze as listed in the document 6720841872, which contains antifreeze products approved by us.

- ▶ Only use antifreeze according to the specifications of the manufacturer, e.g with regard to the minimum concentration.
- ▶ Follow the instructions of the manufacturer of the antifreeze about regular checking of the concentration and corrective measures.
- ▶ The use of antifreeze reduces the efficiency.

**Heating water additives**



Unsuitable heating water additives can cause damage to the heat source and heating system or cause a fault in the heat source or DHW supply.

The use of a heating water additive, e.g. corrosion inhibitor, is only allowed, if the manufacturer of the heating water additive certifies its suitability for all materials in the heating system.

- ▶ Only use heating water additives in accordance with the instructions of its manufacturer about concentration, regular checking of the concentration and corrective measures.

Sealants in the heating water can cause deposits in the heat generator, therefore it is not advisable to use it.

**Suitable water treatment products (inhibitors/cleaners) can be obtained from the following manufacturers:**



Follow the guidance of BS7593:2019<sup>1)</sup> for treatment of water in domestic hot water heating systems.

ADEY	www.adey.com
FERNOX	www.fernox.com
SENTINEL	www.sentinelprotects.com/uk

Table 5

**Quality requirements for the heating water**

The quality of the fill and top-up water is an essential factor for increased efficiency, functional reliability, long service life and for maintaining the operational readiness of a heating system.



Unsuitable water can damage the heat exchanger or cause a fault in the heat generator or DHW supply!

Unsuitable or contaminated water can lead to sludge formation, corrosion or scaling. Unsuitable antifreeze or hot water additives

1) Only applicable in the United Kingdom

(inhibitors or anti-corrosion agents) can damage the heat generator and heating system.

- ▶ Only fill the heating system with potable water. Do not use well- or groundwater.
- ▶ Determine the water hardness of the filling water, before filling the system.
- ▶ Flush the heating system prior to filling.
- ▶ If magnetite (iron oxide) is present, anti-corrosion measures are required and the installation of a magnetite separator and a de-airing valve in the heating system is recommended.

For German market:

- ▶ The fill and top-up water must meet the requirements of the German Drinking Water Ordinance (TrinkwV).

For markets outside Germany:

- ▶ The limit values in table 6 must not be exceeded, even if national directives contain higher limits.

Water quality	Unit	Value
Conductivity	µS/cm	≤ 2500
pH		≥ 6,5... ≤ 9,5
Chloride	ppm	≤ 250
Sulphate	ppm	≤ 250
Sodium	ppm	≤ 200

Table 6 Boundary conditions for potable water

- ▶ Check the pH value after > 3 months of operation. Ideally at the first service.

Material of heat generator	Heating water	pH value range
Ferrous, Copper, copper brazed heat exchangers	• Untreated potable water	7.5 <sup>1)</sup> – 10.0
	• Fully softened water	
Aluminium	• Low-salt operation < 100 µS/cm	7.0 <sup>1)</sup> – 10.0
	• Untreated potable water	7.5 <sup>1)</sup> – 9.0
	• Low-salt operation < 100 µS/cm	7.0 <sup>1)</sup> – 9.0

1) If pH value is < 8.2 an on-site test for ferrous corrosion is necessary

Table 7 pH value ranges after > 3 months of operation

- ▶ Treat the fill and top-up water according to the instructions in the following section.

Depending on the hardness of the filling water, the system water volume and the maximum heat output of the heat generator, water treatment may be required to avoid a damage in water heating installations, due to the formation of lime scale.

**Requirements on the fill and top-up water for heat generators made of aluminium and Heat pumps.**

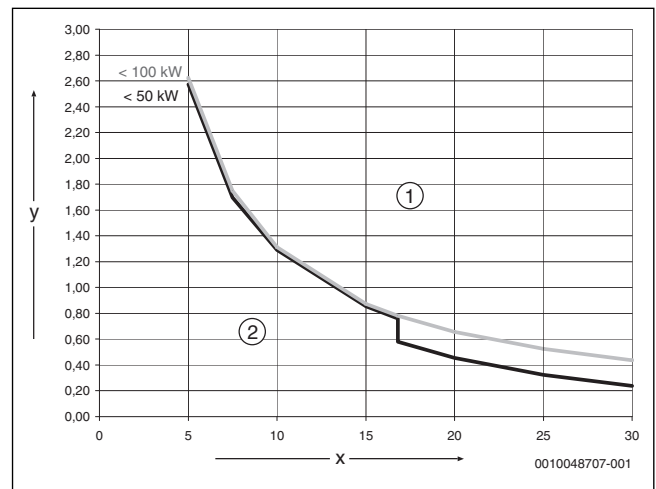


Fig. 8 Heat generators < 50 kW-100 kW

- [x] Total hardness in °dH
- [y] Maximum possible water volume over the service life of the heat source in m<sup>3</sup>
- [1] Above the curve, only use desalinated fill and top-up water, with a conductivity of ≤ 10 µS/cm
- [2] Below the curve, untreated fill and top-up water according to drinking water regulation can be used



For systems with a specific system water content >40 l/kW, water treatment is mandatory. If there are several heat generators in the heating system, then the system water volume must be related to the heat generator with the lowest output.

A recommended and approved method for water treatment is desalination of the fill and top-up water to a conductivity of ≤ 10 µS/cm. Instead of water treatment, system separation with a heat exchanger, directly after the heat generator, can be provided.

**Prevention of corrosion**

In most cases, corrosion plays only a minor role in heating systems. However, a precondition for this is that the system is a corrosion-sealed water heating installation. This means that there is practically no access of oxygen to the system during operation. Continuous introduction of oxygen leads to corrosion and can thus cause rusting and rust sludge formation. Sludge formation can not only cause blockages and therefore a diminished heat supply but also deposits (similar to lime scale deposits) on the hot surfaces of the heat exchanger.

The amount of oxygen introduced by the fill- and top-up water are generally very small and can therefore be ignored.

To avoid oxygenation, connection pipes must be diffusion-tight! The use of rubber hoses should be avoided. The intended connection accessories should be used in the installation.

During operation, pressure maintenance with regard to oxygen ingress and in particular the function, correct sizing and correct setting (pre-charge pressure) of the expansion vessel is of highest importance. Check the pre-charge pressure and function annually.

Furthermore, the function of automatic air vents should also be checked during maintenance.

It is also important to check and document the top-up water quantities via a water meter. Larger and regularly required water top-up quantities indicate insufficient pressure maintenance, leaks or continuous oxygen input.

**Antifreeze**



Unsuitable antifreeze can damage the heat exchanger or cause a fault in the heat source or DHW supply.

Unsuitable antifreeze can damage the heat source and heating system. Only use antifreeze listed in the document 6720841872, which contains antifreeze products approved by us.

- ▶ Only use antifreeze according to the specifications of the manufacturer, e.g with regard to the minimum concentration.
- ▶ Follow the instructions of the manufacturer of the antifreeze about regular checking of the concentration and corrective measures.

**Heating water additives**



Unsuitable heating water additives can cause damage the heat source and heating system or cause a fault in the heat source or DHW supply.

The use of a heating water additive, e.g. corrosion inhibitor, is only allowed, if the manufacturer of the heating water additive certifies its suitability for all materials in the heating system.

- ▶ Only use heating water additives in accordance with the instructions of its manufacturer about concentration, regular checking of the concentration and corrective measures.

Heating water additives, e.g. corrosion inhibitors, are only required in the case of constant oxygen permeation, which cannot be prevented through other means.

Sealants in the heating water can cause deposits in the heat generator, therefore it is not advisable to use it.

**Water quality for potable water (DHW)**

The integrated domestic hot water cylinder is constructed to heat and store potable water. Follow country-specific regulations, directives and standards for potable water. The water quality in the cylinder has to comply with the framework of the EU directive 2020/2184.

To protect the DHW system against increased lime scale and resulting service work on domestic hot water tanks:

Water hardness	Recommendation
≥ 15°dH/25°FH/2,5 mmol/l	Set DHW temperature < 55 °C
≥ 21°dH/37°FH/3,7 mmol/l	Install a water treatment system

Table 8 Recommendation for hard domestic water

**3.3 Minimum volume and execution of the heating system**



Normally the energy for the defrost cycle is drawn from the buffer cylinder and the heating system, but in small systems with low flow the controller may switch to draw energy from the DHW cylinder instead. Even the electrical heater may be activated to ensure a proper defrost.

**3.4 Check size of expansion vessel**

**Characteristic diagram for expansion vessel (17 l)**

The following graph can be used to estimate whether the installed expansion vessel will be sufficient or whether an additional expansion vessel will be required (not for underfloor heating).

For the curves shown, the following parameters were taken into account:

- 1 % water seal in the expansion vessel or 20 % of the rated volume in the expansion vessel
- Working pressure differential of the pressure relief valve of 0.5 bar

- Pre-charge pressure of the expansion vessel corresponds to the static system height above the appliance.
- Max. operating pressure: 3 bar

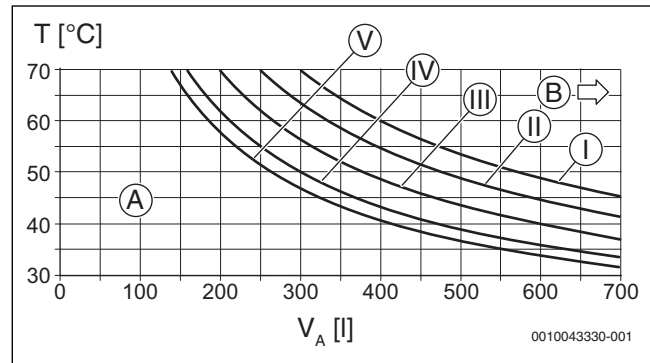


Fig. 9 Curves for the expansion vessel (17 l)

**Legend to fig. 9:**

- I Pre-charge pressure 0.5 bar
- II Pre-charge pressure 0.75 bar (default setting)
- III Pre-charge pressure 1.0 bar
- IV Pre-charge pressure 1.2 bar
- V Pre-charge pressure 1.3 bar
- A Operating capacity of the expansion vessel
- B Additional expansion vessel required
- T Flow temperature
- V System content in litres

- ▶ If results are borderline: determine precise vessel size in accordance with country-specific regulations.
- ▶ If the intersection is on the right beside the curve: install an additional expansion vessel.

**4 Installation**



**CAUTION**

**Risk of injury!**

During transport and installation there is a risk of crushing injury. During maintenance, internal parts of the appliance may become hot.

- ▶ The installer is obliged to wear gloves during transport, installation and maintenance.

**NOTICE**

**Risk of material damage!**

Particles in the pipework of the heating system can damage the heat pump system.

- ▶ Installation of a particle filter is mandatory for all systems.

**4.1 Transport and storage**

The indoor unit must always be transported and stored in an upright position. If needed, it may be leaned temporarily.

The indoor unit may not be stored or transported at temperatures below - 10 °C.

**4.2 Moving the appliance to the installation place**

- ▶ Unscrew the bolts from the pallet and remove the brackets.

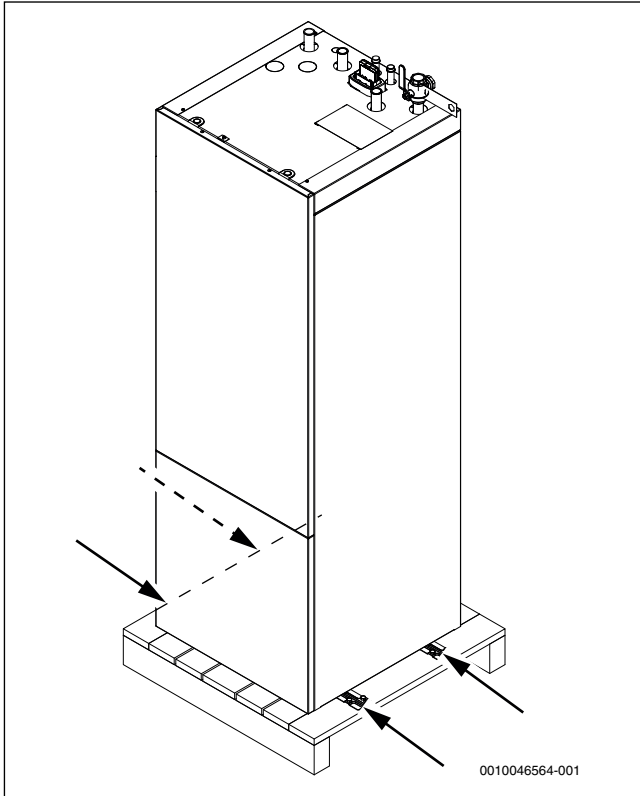


Fig. 10 Remove the bolts and the brackets

- ▶ Remove the front panel.
- ▶ Two persons are needed to lift the appliance from the pallet.
- ▶ Use the two brackets in the front and the long bracket in the back of the appliance to lift it.

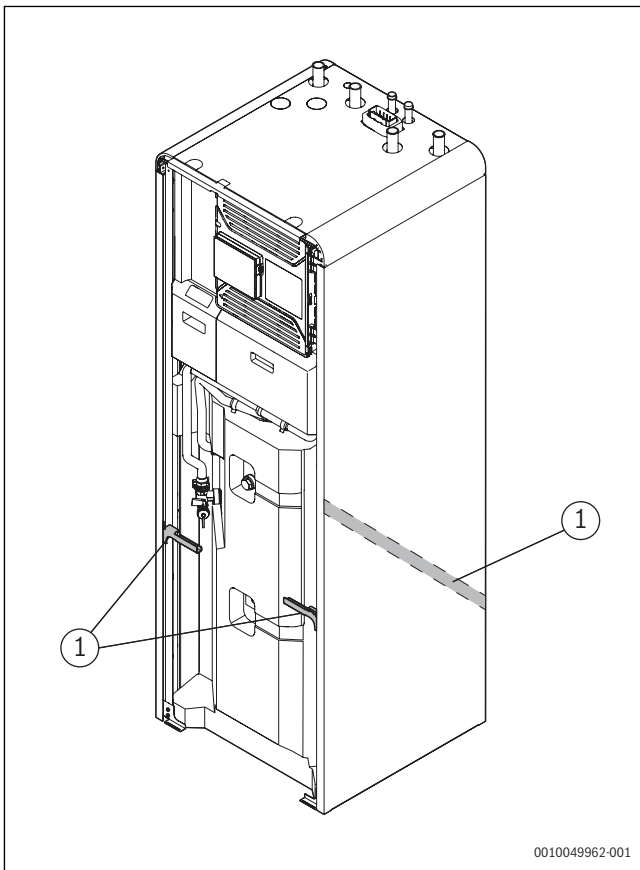


Fig. 11 Brackets for carrying

- ▶ Use a transport trolley to move the appliance to its installation place.

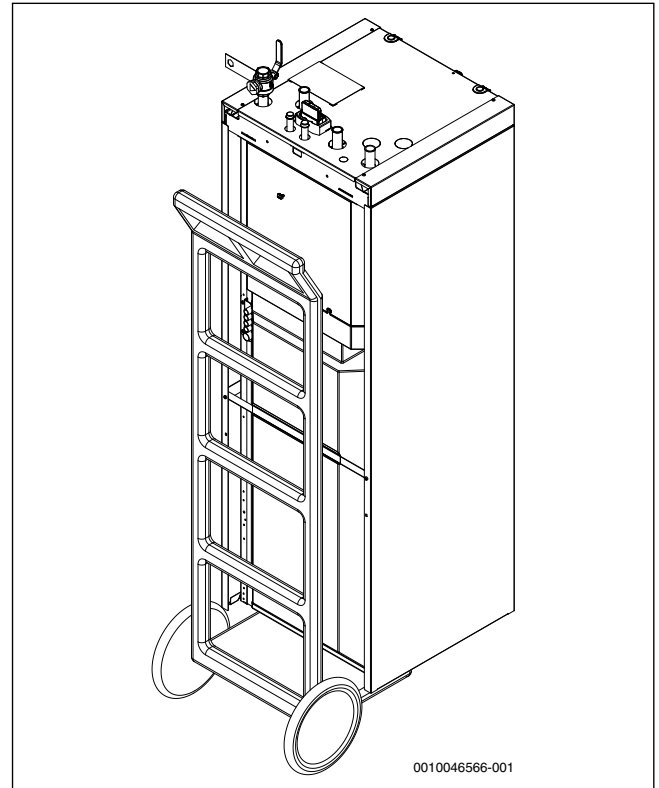


Fig. 12 Transport trolley with appliance

- ▶ Remove the screw indicated by a label at the back of the appliance before finally placing it at the installation place. This will allow dismantling of the side cover.

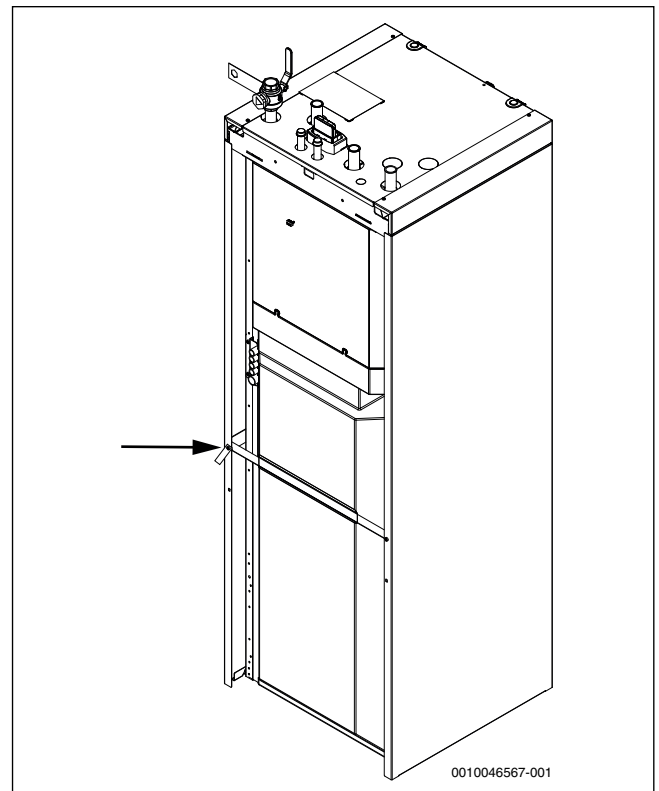


Fig. 13 Remove screw and label

**Alternative method to carry the appliance**

The wooden parts, metal brackets and straps from the outdoor unit CS5800iAW can be reused to carry the indoor unit.

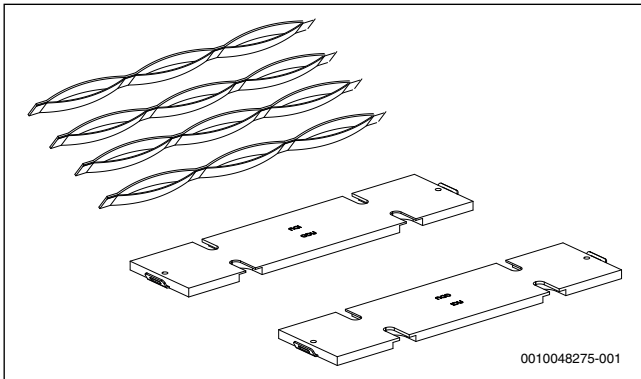


Fig. 14 Wooden parts, metal brackets and straps

- ▶ Make sure the text “IDU” on the wooden parts is facing upwards. Then the cut-outs will fit over the feet on the indoor unit.

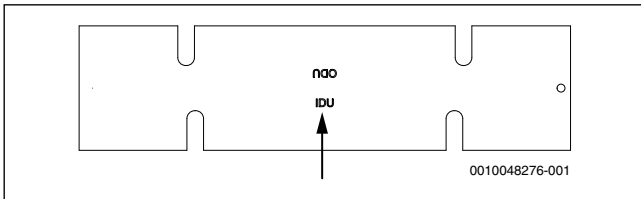


Fig. 15 Wooden part

- ▶ Place the wooden parts and metal brackets under the indoor unit and attach the straps.

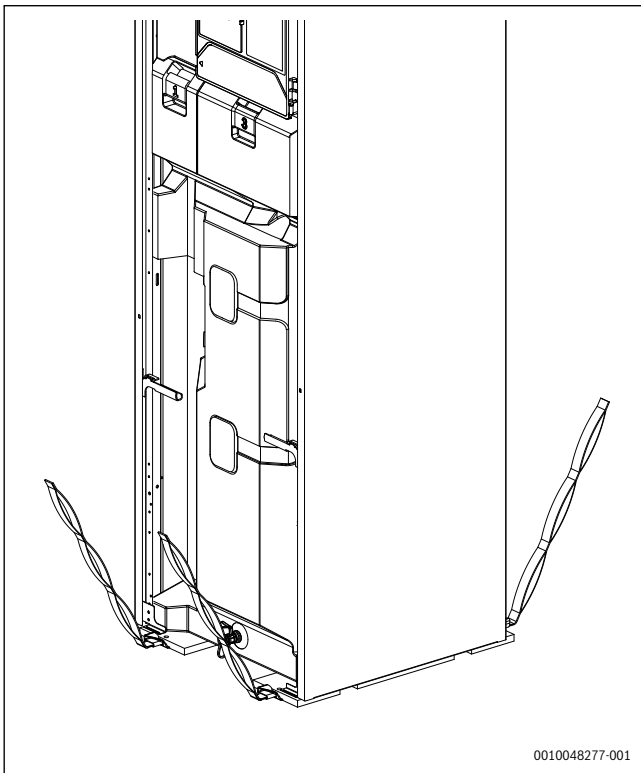


Fig. 16 Brackets and straps attached to indoor unit

**NOTICE**

**Risk of damage!**

The metal brackets and the wooden parts are not firmly attached to the appliance, there is thus a risk that it can slide while carrying. The bracket and wooden part are only intended for transporting the

appliance vertically, as there is a risk of losing the stability due to high center of gravity.

- ▶ Be at least two persons while carrying the appliance.
- ▶ Do not use the brackets and wooden parts for horizontal transport, e.g. staircase.

**4.3 Remove the front**

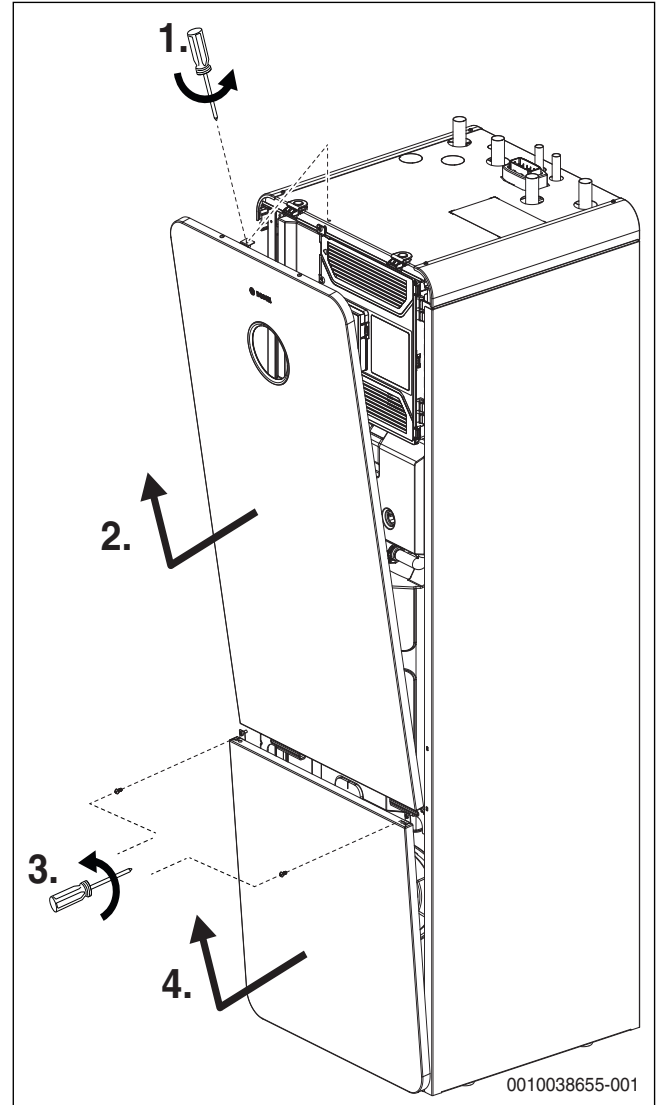


Fig. 17 Remove the front

**4.4 Installation checklist**



Each installation is unique. The following checklist provides a general description of how the installation should be performed.

1. Install the fill valve.
2. Install the non-return valve (if the cooling mode is to be used).
3. Install the leakage drain hoses.
4. Connect heat pump to the indoor unit.
5. Connect the indoor unit to the heating system.
6. Install particle filter and magnetite separator (magnetite separator is only optional for new building with only under-floor heating system).
7. Connect the tap water to the indoor unit and the pressure-relief valve.
8. Mount the outside temperature sensor and any room controller.
9. Connect the CAN-BUS cable to the heat pump and the indoor unit.
10. Install any accessories.

11. Connect the EMS-BUS cable to accessories if needed.
12. Fill and vent the DHW cylinder.
13. Fill and vent the heating system before commissioning.
14. Establish the electrical connection of the system.
15. Commission the system.
16. Vent the heating system also during the commissioning.

#### 4.5 Sizing the gas DHW circulation lines

If the following conditions are observed, an extensive calculation can be omitted for one to four-family houses:

- DHW circulation, single and common lines with an internal diameter of at least 10 mm
- DHW circulation pump DN 15 with a flow max. of at most 200 l/h and a flow pressure of 100 mbar
- Length of the DHW lines max. 30 m
- Length of the DHW circulation line max. 20 m
- The temperature drop must not exceed 5 K



To easily observe these specifications:

- ▶ Install a control valve with thermometer.



To save electrical and thermal energy, do not run the DHW circulation pump continuously.

#### 4.6 Installation of accessories

##### Placement of the Connect-Key K30RF



You can find information on the Connect-Key K30RF, the WIFI connection, establishing the connection with the Internet and integration of accessories in the corresponding app and in the packaging of the Connect-Key K30RF.

- ▶ Place the module in the holder (→ [1], figure 18). A LED will flash when properly inserted.

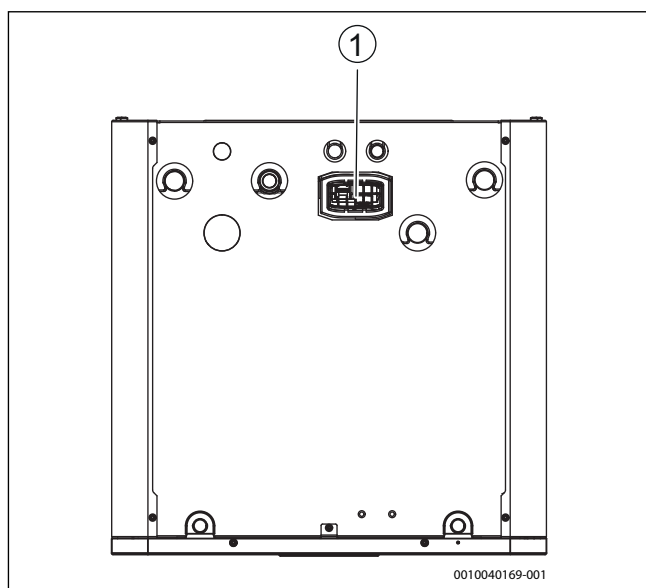


Fig. 18 Connect-Key K30RF placement

#### 4.6.1 External connections



Maximum load at relay outputs: 5A, 400W,  $\cos\phi > 0,4$ . At a higher load an intermediate relay must be installed.

- Relay output PK2 is active in cooling mode. Possible application areas:
  - Changing between cooling/heating for fan coils. This requires that the fan convector's control unit has this feature.
  - Pump control in a separate circuit which is exclusively intended for cooling mode.
  - Underfloor heating system control in damp rooms.

#### 4.6.2 Safety thermostat

In some countries, a safety thermostat is required to be installed in under floor heating circuits. The safety temperature limiter is connected to external input 3. Set the operation for external input (→ control unit manual).

It is recommended to use a safety thermostat with automatic reset.



If the switching temperature of the safety thermostat is set too low or the thermostat is placed too close to the indoor unit, this may lead to a temporary blockage of the heating circuit pump PC1 and the heat sources after DHW charging.

- ▶ Set a temperature that is suited for the floor.
- ▶ Place the thermostat at least >1m from the indoor unit.

#### 4.6.3 Summary alarm (with accessory module)

The appliance has no output for summary alarm. If there is a need for a summary alarm this has to be accomplished by installing of an accessory module MU100.

- ▶ Install the accessory module and do the settings for summary alarm before commissioning of the system (→ manual for accessory module).

#### 4.7 Installation with cooling mode

##### 4.7.1 Installation with non-condensing cooling mode



A room temperature-dependent control unit must be installed for cooling mode.



Installing room temperature-dependent control units with an integrated condensation sensor increases the safety of cooling mode since the flow temperature in this case is automatically controlled via the control unit in accordance with the current dew point.

- ▶ Insulate all connections and pipes from condensation.
- ▶ Install a non-return valve.
- ▶ Install the room temperature-dependent control unit (→ instructions for the respective room temperature-dependent control unit).
- ▶ Mount the condensation sensor.
- ▶ Make necessary settings for the cooling mode in the service menu, section **Heating circuit settings** (→ instructions for control unit).
  - Select **Cooling** or **Heating and cooling**.
  - If necessary, set switch-on temperature, switch-on delay, difference between room temperature and dew point and minimum flow temperature.

- ▶ Turn off the underfloor heating circuits in damp areas (e.g. bathroom and kitchen), and if necessary control via relay output PK2.

#### 4.7.2 Mounting the condensation sensor

##### NOTICE

##### Material damage due to moisture!

If the system is operated below the dew point in cooling mode, this causes moisture to precipitate on adjacent materials (floor).

- ▶ Do not operate underfloor heating systems in cooling mode below the dew point.
- ▶ Set the correct flow temperature.

Condensation sensors are mounted on the pipes of the heating system and send a signal to the control unit as soon as they detect condensate formation. Installation instructions are enclosed with the sensors.

The control unit deactivates the cooling mode as soon as it receives a signal from the condensation sensors. Condensate forms in cooling mode when the temperature of the heating system is below the corresponding dew point temperature.

The dew point will vary depending on temperature and humidity. The higher the humidity, the higher flow temperature is required to remain above dew point and avoid condensation.

#### 4.7.3 Condensing cooling mode with fan convectors



It is mandatory to install a non-return valve to use the cooling mode (→ see required accessories chapter in 2.8.1).

##### NOTICE

##### Material damage due to moisture!

Without full insulation against condensation, moisture can attack neighbouring materials.

- ▶ Provide all pipes and connections up to the fan convector with condensation insulation.
- ▶ Use an insulating material designed for cooling systems with condensate formation.
- ▶ Connect condensate pipes to the drain.
- ▶ Do not use a condensation sensor when in cooling mode below the dew point.
- ▶ Do not use a room temperature-dependent control unit with integrated condensation sensor when in cooling mode below the dew point.

When exclusively fan convectors with a drain and insulated pipes are used, the flow temperature can be reduced to 7 °C.

##### NOTICE

##### Thermal breach!

When the cooling mode is used below dew point, the resulting condensation may damage other components of the appliance.

- ▶ To avoid thermal breach, the installer should insulate the thermal pipes (see → Fig. 19 "Pipes that require insulation, when the cooling mode is used below dew point").

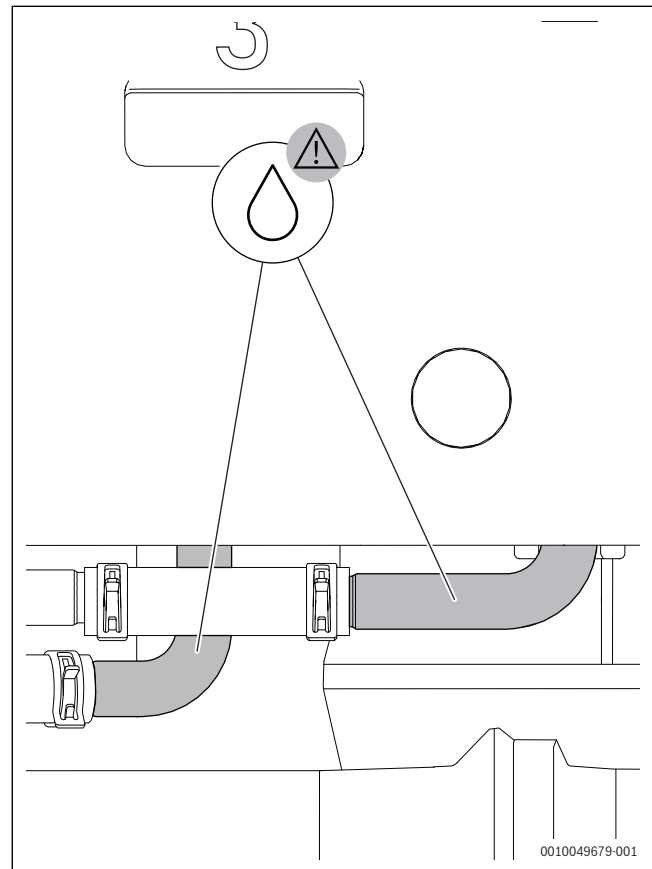


Fig. 19 Pipes that require insulation, when the cooling mode is used below dew point

## 5 Hydraulic connections

##### NOTICE

##### Residue in the pipework can damage the system.

Solids, metal/plastic filings, flux and thread tape residue and similar material can get stuck in pumps, valves and heat exchangers.

- ▶ Keep foreign bodies from entering the pipework.
- ▶ Do not leave pipe parts and connections directly on the ground.
- ▶ When deburring, make sure that no residue remains in the pipe.
- ▶ Before connecting the heat pump and indoor unit, rinse the pipe system to remove any foreign bodies.

### 5.1 Insulation

##### NOTICE

##### Material damage due to frost and UV radiation!

In case of a power outage the water in the pipes may freeze.

The insulation may become brittle due to UV radiation and crack after some time.

- ▶ Use insulation with a thickness of at least 19 mm for pipework and connections outdoors.
- ▶ Install drain valves so that the water can be drained out of the lines to and from the heat pump if it is not going to be used for some time or if there is a risk of frost.
- ▶ Use UV and moisture-resistant insulation.
- ▶ Insulate the wall insertion.
- ▶ In buildings, use insulation with a thickness of at least 12 mm for pipework. This is also important for safe and efficient DHW mode.



All heat-conducting pipework must be provided with suitable thermal insulation according to applicable regulations.

In cooling mode, all connections and lines must be insulated according to applicable standards to prevent condensation.

**5.2 Pipe connections, general**



Dimension the pipes according to the instructions (→table 9).

- ▶ Avoid pipe joints in the heat transfer pipes to minimise pressure drop.
- ▶ Use PEX pipes for all connections between the heat pump and indoor unit.
- ▶ 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.



If a different material than PEX is used, the following is required:

- ▶ Install a particulate filter intended for outdoor use on the heat pump return line, directly on the heat exchanger.
- ▶ Insulate the particle filter as other connections.
- ▶ Devibrate the heat pump connection with a hose intended for outside use and insulate it.

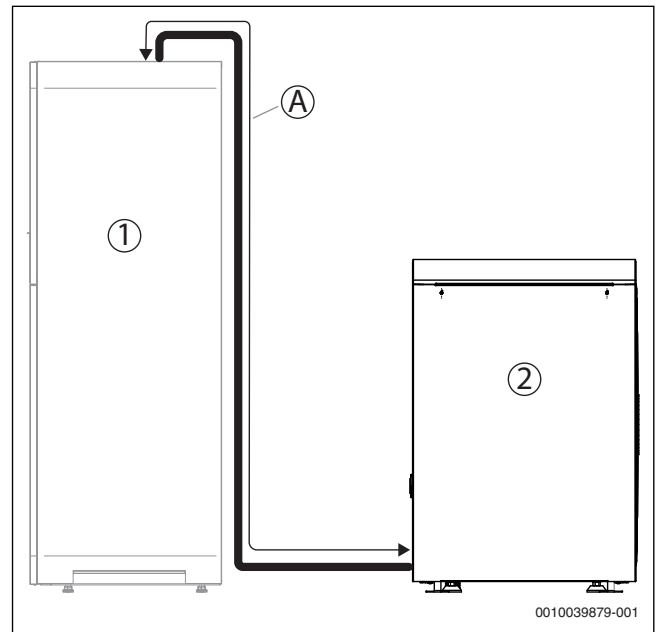


Fig. 20 Pipe length A

- [1] Indoor unit, floor standing
- [2] Heat Pump

Heat Pump	Heat transfer fluid delta (K) <sup>1)</sup>	Nominal flow (L/min)	$\Delta p$ (mbar) <sup>2)</sup>	AX20 inner Ø 15 (mm)	AX25 inner Ø 18 (mm)	AX32 inner Ø 26 (mm)	AX40 inner Ø 33 (mm)
				Maximum pipe length [A, Figure 20] PEX (m)			
4	4	15 <sup>3)</sup>	420	9	24	30	
5	5	17,3	355	6	15	30	
7	5	20,2	263		8	30	
10	5	27,4	255			30	30
12	6	34,6	201			21	30

- 1) Minimum dT at rated power and maximum pipe length. A lower dT can be achieved with lower heat requirements or short pipe lengths.
- 2) For pipes between the heat pump and indoor unit.
- 3) A flow rate of 15 l/min must be guaranteed on the primary side.

Table 9 Pipe dimensions and maximum pipe lengths (one-way) for connecting a heat pump to indoor unit CS5800iAW 12 M

**5.3 Connect the indoor unit to the heat pump**

- ▶ Connect the flow line from the heat pump to the heat transfer medium in. Install an automatic air vent valve (VL1) in this line.
- ▶ Connect the return line to the heat pump to the heat transfer medium out. Install a valve (VC4) in this line. Install the fill valve (VW2) on the same connection on the indoor unit.

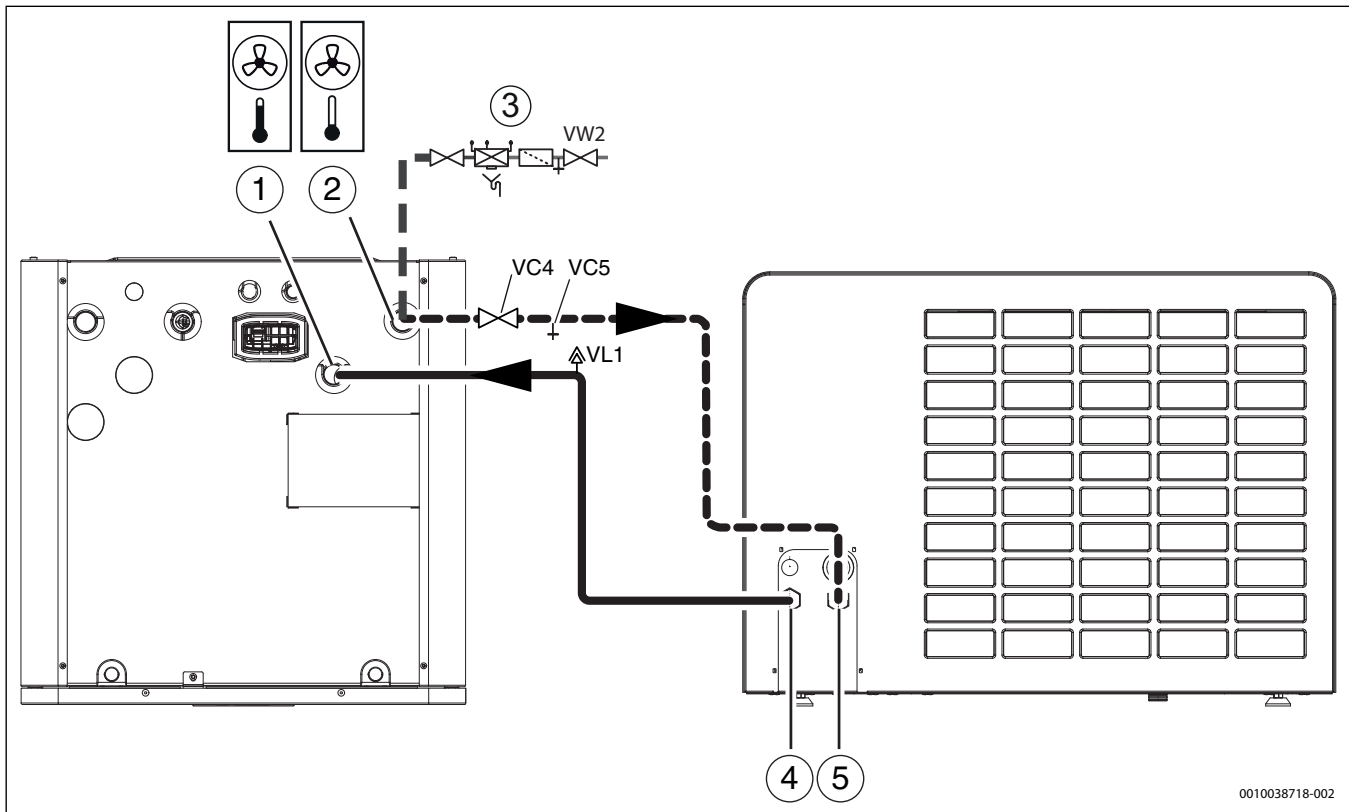


Fig. 21 Connect the indoor unit to the heat pump

- [1] Heat transfer medium in (from heat pump)
- [2] Heat transfer medium out (to the heat pump)
- [3] Filling equipment and fill valve VW2
- [4] Flow line from the heat pump
- [5] Return line to the heat pump

#### 5.4 Connect the indoor unit to the heating system

1. Route drain hoses from the pressure relief valves into a frost protected drain.
2. Connect the heating system return line. Install the particle filter (SC1) and magnetite filter in this line.
3. Connect the heating system flow line.

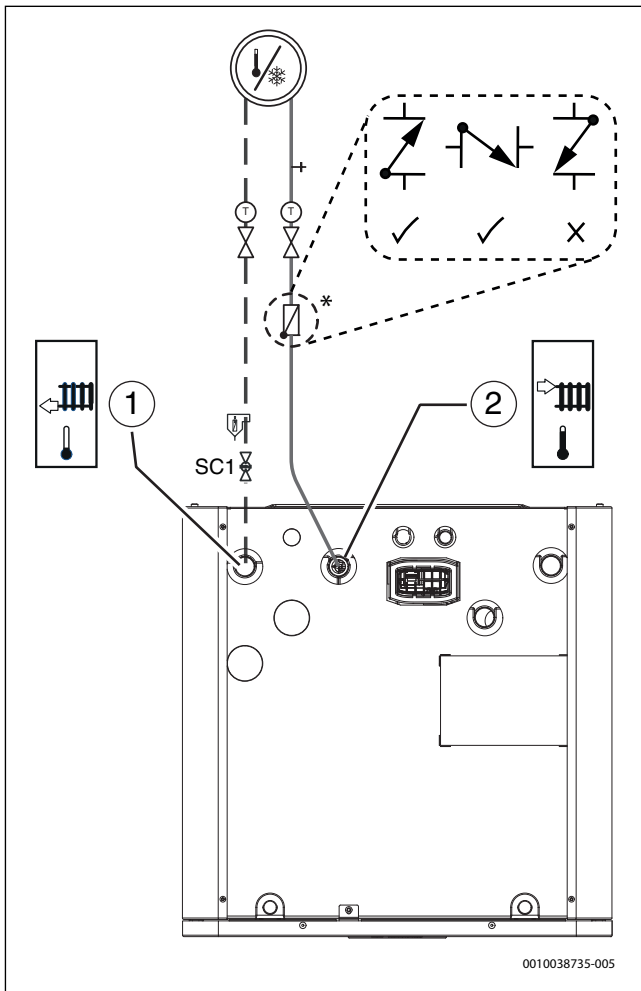


Fig. 22 Indoor unit connections to the heating system

- [1] Heating system return line
- [2] Heating system flow line
- [\*] It is mandatory to install a non-return valve to use the cooling mode (see required accessories chapter in → 2.8.1).

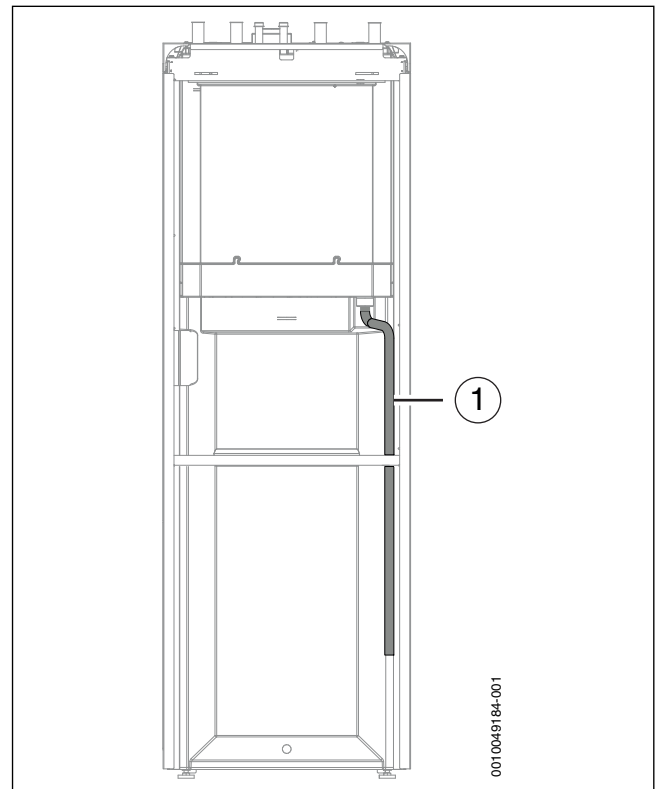


Fig. 23 Indoor unit backside

- [1] Drain hose

### 5.5 Connect the indoor unit to the tap water

**WARNING**

**Risk of system damage**

If the function of the pressure-relief valve cannot be guaranteed, excessive pressure occurs in the system.

- ▶ **WARNING** – Make sure that the pressure relief valve outlet is never plugged or shut off.

**WARNING**

**Risk of scalding!**

If the installation requires DHW temperatures >65 °C (i.e for solar thermal systems, combination with wood boilers or similar), a temperature mixing device must be installed.

**i**

The pressure relief valve, the non-return valve for incoming cold water, the fill valve and the DHW mixer must be installed in the tap water circuit (not included in the scope of delivery).

- ▶ Install the pressure relief valve and cold water valve (VW3) with a non-return valve for tap DHW.
- ▶ Pull the leakage drain water line from the pressure relief valve to a frost protected outlet.
- ▶ Connect optional pump for domestic hot tap water (accessory).
- ▶ Connect domestic hot water out [1].
- ▶ Connect cold water in [2].
- ▶ The domestic tap water system must be protected from pollution at the installation

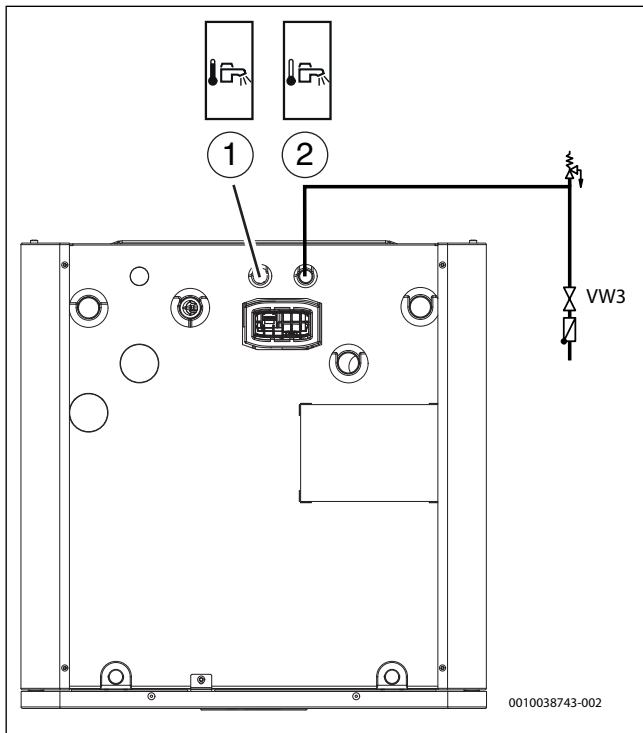


Fig. 24 Heat pump connections tap water

- [1] Domestic hot water out
- [2] Cold water inlet

## 5.6 Heat pump, indoor unit and heating system filling

### NOTICE

**The system will be damaged if it is powered up without water.**

The system may be damaged if it is powered up without water.

- ▶ Fill the DHW cylinder and heating system **before** powering on the heating system, and establish the correct pressure.

### NOTICE

**If the system is not correctly ventilated (purged), this will damage the indoor unit!**

The auxiliary heater may overheat or be damaged if it has not been fully vented prior to activation.

- ▶ Carefully vent the system when filling.
- ▶ Carefully vent the system once again during commissioning.



### CAUTION

**Health risk caused by pollution of drinking water !**

Prior to tap water filling:

- ▶ Flush tank and tap water hydraulic.
- ▶ Perform tap water system tightness test.



Tightness test must be done with tap water only. Test pressure at warm water side shall not exceed 10 bar.



Vent also by other ventilation valves in the heating system, e.g. radiators.



Fill preferably to a higher pressure than the final one so that there is a margin when the temperature of the heating system rises and the air that has been dissolved in the water is vented out via the venting valves.



At delivery the default position of the three-way valve VW1 is in middle position.

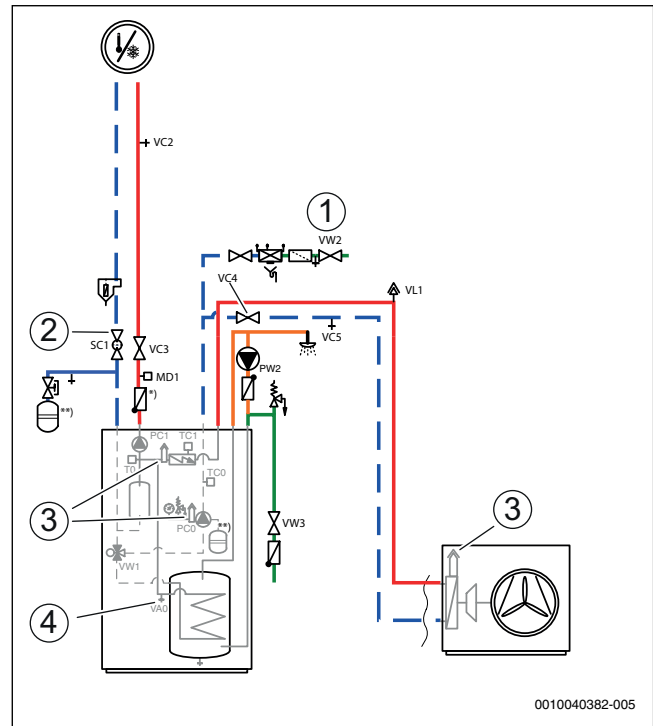


Fig. 25 Indoor unit, heat pump and heating system

- [1] Fill valve VW2
- [2] Particle filter SC1
- [3] Manual air vent valves
- [4] Drain valve VA0

- [\*] The non-return valve is required for heating systems.
- [\*\*] Expansion vessel (external expansion vessel, if it is not integrated)



This filling procedure is valid for all systems, also where the heat pump is placed above the indoor unit. For a less complex system the procedure may be simplified.

### Step 1: Filling the heat pump and the DHW cylinder

1. Switch of the power to the heat pump and the indoor unit.
2. Ensure that all temperature regulation valves in the heating system are fully open.
3. Close the valves to the heating system, VC3 and particle filter SC1, and the valve VC4 between IDU and ODU.
4. Connect a hose to the drain valve VC5 and the other end to an outlet. Open the valve.
5. Open the fill valve VW2 to fill the heat pump.
6. Continue filling until only water comes out of the hose by the drain and there are no more bubbles in the heat pump.
7. Open the valve VC4.
8. Close the drain valve VC5 and the fill valve VW2.
9. Open the cold water valve VW3.

10. Open a hot water tap to fill the DHW cylinder. Close the tap when only water is emerging.

**Step 2: Filling the heating system and the micro buffer**

- 11. Move the drain hose to the heating system drain valve VC2.
- 12. Open the particle filter SC1, the drain valve VC2 and the fill valve VW2 to fill the heating system.
- 13. Continue filling until only water comes out of the drain hose.
- 14. Open the valve VC3 to fill the buffer cylinder.
- 15. Continue filling until only water comes out of the drain hose and there are no more bubbles in the heating system.
- 16. Close the drain valve VC2 and remove the hose.
- 17. Open the manual air vent valves and close them when only water is emerging.
- 18. Continue filling until target pressure (→ table 7.4) is displayed at the GC1 pressure gauge.
- 19. Close the fill valve VW2.

**6 Electrical connection**

**6.1 Safety instructions**

**⚠ Danger to life from electric shock**

Means to safely disconnect the unit from supply mains must be incorporated.

- ▶ Install a safety switch that disconnects all poles from supply mains. The safety switch shall be an over voltage category III appliance.
- ▶ If there are several main connections, provide a safety switch of over voltage category III for each connection.

**⚠ Risk to life due to electric shock!**

Touching live parts can result in an electric shock.

- ▶ Before working on the electrical part, disconnect all poles of the power supply (230 V AC and 400 V 3P) of the indoor unit (fuse, miniature circuit breaker)
- ▶ Secure against unintentional reconnection
- ▶ Check to ensure that the power is disconnected.

**⚠ Malfunction due to electrical disturbances!**

Power cable (230/400 V) close to a control and sensor cables can cause the indoor unit to malfunction.

- ▶ Route the control and sensor cables at a minimum distance of 100 mm from the power cables. Control and sensor cables can be routed together.

**6.2 General notes**

- ▶ Observe safety measures according to national and international regulations.
- ▶ Do not connect any additional consumers to the mains power supply of the device.
- ▶ Provide fuses as specified:  
3-phase mains connection (400 V) for booster heater stage 9 kW →Section 6.9.1  
1-phase mains connection (230 V) for booster heater stage 3 kW and 6 kW →Section 6.9.1.
- ▶ Choose cable area and type that represent the fuse protection and wire mode.
- ▶ Connect the indoor unit according to the wiring diagram. Never connect any other consumables.
- ▶ Always connect three-phase indoor units directly to the distribution board via three-pole miniature circuit breakers.
- ▶ Observe the colour coding when replacing circuit boards.



It must be possible to safely interrupt the power supply to the device.

- ▶ Install a separate safety switch that completely de-energizes the indoor unit. When the power supply is separate, a separate safety switch is needed for each supply line.
- ▶ Select the appropriate conductor cross-sections and cable types for the respective fuse protection and routing method.
- ▶ Connect the unit according to the chapters 6.9.3 – 6.9.5. No additional consumers may be connected.

When extending temperature sensor cables, use the conductor diameters given in the cable plan (→ Chapter 10.3.3).

**6.3 CAN-BUS**

**NOTICE**

**The system will be damaged if the 24VDC- and the CAN-BUS connections are incorrectly connected!**

The communication circuits are not designed for 24VDC constant voltage.

- ▶ Check to ensure that the cables are connected to the contacts with the corresponding markings on the modules.

**NOTICE**

**Malfunction due to mixed up connections!**

If the “High” (H) and “Low” (L) connections are mixed up, there is no communication between the heat pump and the indoor unit.

- ▶ Check to ensure that the cables are connected to the connections with the corresponding markings in both ends of the CAN-BUS cable.

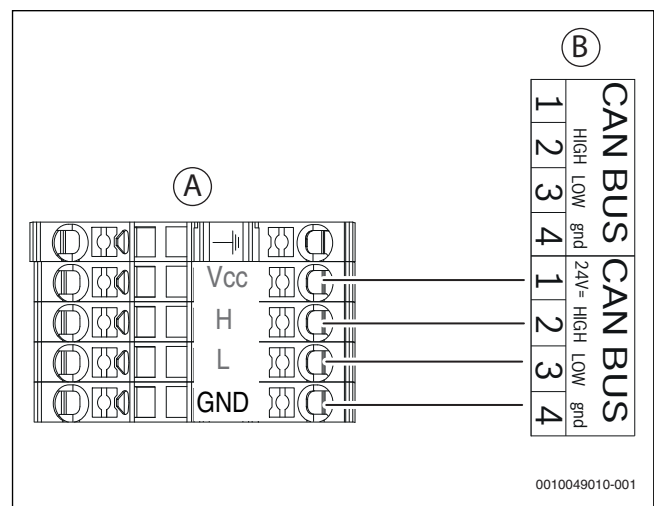


Fig. 26 CAN-BUS heat pump - indoor unit

- [A] Heat pump
- [B] Indoor unit
- [Vcc] 24V= (24VDC)
- [H] HIGH
- [L] LOW
- [GND] gnd

The heat pump and indoor unit are connected to each other by a communication line, the CAN-BUS [24VDC, class III (SELV)].

A LIYCY cable (TP) 2 x 2 x 0.75 (or equivalent) **is suitable as an extension cable outside of the unit.** Alternatively, twisted pair cables approved for outdoor use with a minimum cross-section of 0.75 mm<sup>2</sup> can be used.

The maximum permissible cable length is 30 m.

The connection is made with four wires, as the 24VDC supply is also connected. The 24VDC and CAN-BUS connections are marked on the module.



The CANBUS cable has two pairs of twisted wires. Vcc and GND is one pair, H and L is the second pair. Maximum cable insulation stripping length for all cables is 120mm. Maximum wire stripping is between 8-10mm.

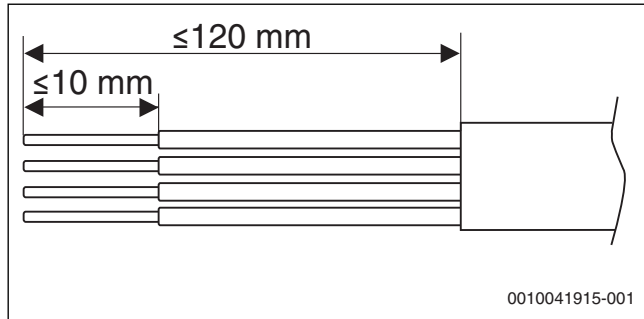


Fig. 27 Wire stripping CAN-BUS

#### 6.4 EMS-BUS for accessories



EMS-BUS and CAN-BUS are not compatible.

- ▶ Do not connect EMS-BUS units to CAN-BUS units.

The following applies to accessories that are connected to the EMS-BUS [15VDC, class III (SELV)] (see also the installation instructions for the respective accessories):

- ▶ If several BUS units are installed, there must be a minimum spacing of 100 mm between them.
- ▶ If several BUS units are installed, connect them in series or in a star configuration.
- ▶ Use cable with a conductor cross section of at least 0.5 mm<sup>2</sup>.
- ▶ In case of external inductive interferences (e.g. from PV systems), use screened cables.
- ▶ Connect the cable to the EMS-BUS terminal at the indoor unit.

If there is already a connection on the EMS terminal, the connection is made parallel to the same terminal in accordance with Fig. 28.

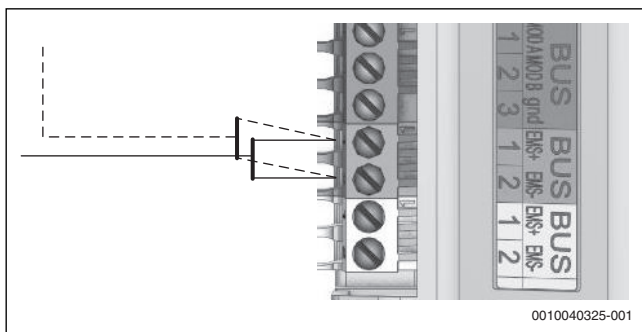


Fig. 28 EMS connection

#### 6.5 Installation of the temperature sensor

The user interface in the delivery configuration automatically regulates the flow temperature based on the outdoor temperature. A room temperature-dependent controller can be installed for greater comfort.

#### 6.6 Flow temperature sensor T0

The sensor is already installed in the indoor unit.

#### 6.7 Outdoor temperature sensor T1

The cable to the outdoor temperature sensor must meet the following minimum requirements:

- Number conductors: 2
  - Maximum length 30 m
- ▶ Install the sensor on the coldest side of the house, normally facing north. The sensor must be protected against direct sunlight, air vents or other factors which could affect the temperature measurement. The sensor must not be installed directly under the roof.
  - ▶ Connect the outdoor temperature sensor T1 to the terminal T1 on the XCU-THH (XCU HY) module within the electric box of the indoor unit.

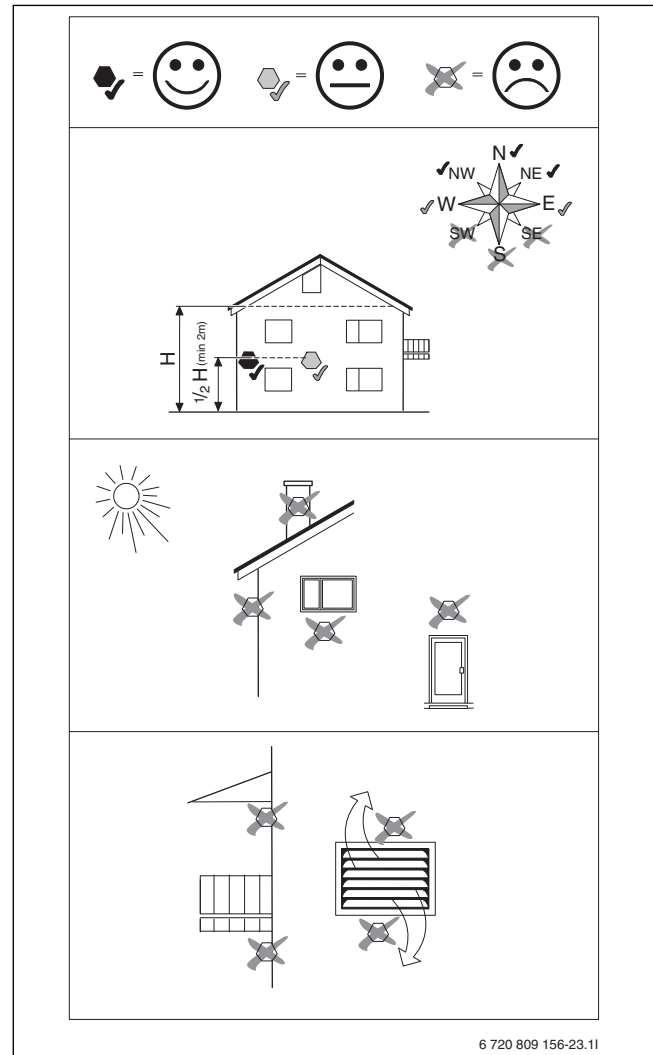


Fig. 29 Position of the outdoor temperature sensor

#### 6.8 External inputs

##### NOTICE

##### Damage due to incorrect connection!

Connections intended for a different voltage or current can damage electrical components.

- ▶ Only perform connections to the heat pump's external inputs which are designed for 3,3V and 1 mA.
- ▶ If an intermediate relay is required, use only relays with gold-plated terminals.

The external inputs can be used for the remote control of certain functions in the user interface.

Those functions which are activated by the external inputs are described in the operating manual for the user interface.

The external inputs are connected either to a circuit breaker for manual activation or a control device with a potential free relay output.

## 6.9 Establishing the power supply connection

### 6.9.1 Main supply



Observe local rules and regulations when choosing the correct cross-section of the cables and cable types, however the cross-section specified here must be adhered to.

	Option 1: 9kW	Option 2: (3kW only)
Function	Indoor unit	Indoor unit
Cable type <i>Terminals allow use of fine-stranded or solid core wire</i>	According to local rules and regulations	According to local rules and regulations
Cable diameter	5 x 2,5 mm <sup>2</sup>	3 x 2,5 mm <sup>2</sup>
Fuse and maximum external load <sup>1)</sup>	3x16A: max. 135W 3x20A - 25A: max. 500W	1x16A: max. 135W 1x20A - 25A: max. 500W

1) External load to outputs

Table 10 Cable area and cable type

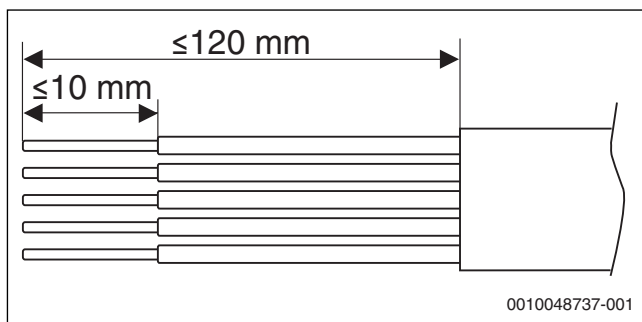


Fig. 30 Wire stripping mains feed connection

### 6.9.2 Cable feeds in the indoor unit

- Remove the electrical box cover.
- Route the cables from the cable inlets to the electric box:
  - Feed the connecting cables over the cable glands on the back through the corrugated hoses. Use an extension string. See figure 31 for the correct order of the hoses.
  - Fix the cables with cable ties at the fixing points (→Figure 32 [7] and [9]). Avoid crossing the cables.
  - The cable routing must be done in such a way that the cables don't touch hot surfaces like pipes or the booster heater.
- Feed the cables into the electric box.
- Connect the cables according to the chapters 6.9.3 – 6.9.4.
- Reattach the cover of the electric box.

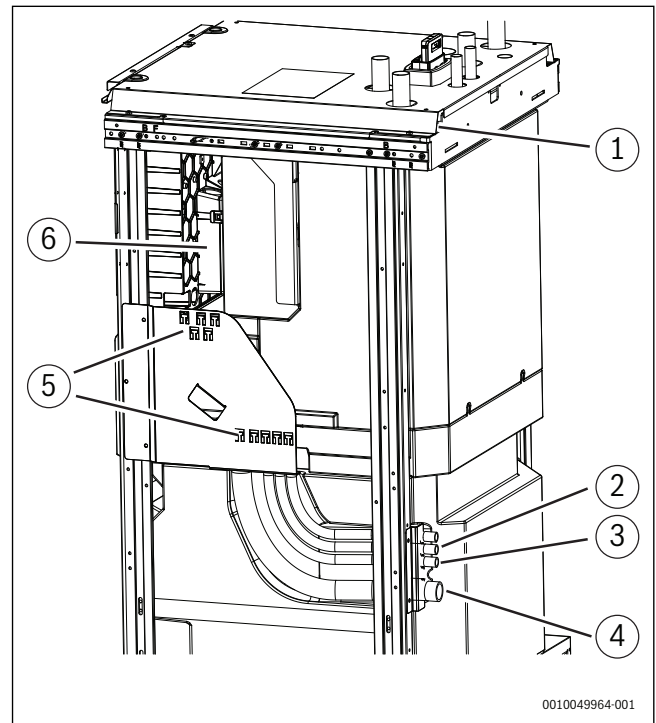


Fig. 31 Cable inlets to the indoor unit

- [1] I1-I4: External inputs  
T1: Temperature sensor outdoor  
MD1: Condensation sensor (accessory for cooling mode)  
CAN-BUS cables  
EMS-BUS cable for accessory
- [2] 230V~1N, output from PK2, cooling season
- [3] 230V~1N, output to DHW circulation pump PW2
- [4] 400V~3N, input to indoor unit (booster heater)
- [5] Fixing points on sheet metal plate for fixing the cables with cable ties
- [6] Electric box

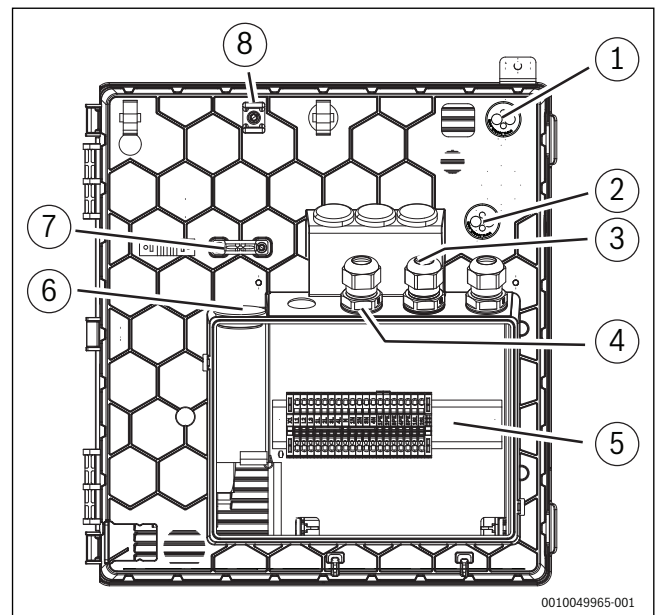


Fig. 32 Cable feeds to electric box

- [1] CAN-BUS cables
- [2] I1-I4: External inputs  
T1: Temperature sensor outdoor

MD1: Condensation sensor (accessory for cooling mode)

EMS-BUS: Accessory

- [3] 230V~1N, output to DHW circulation pump PW2
- [4] 230V~1N, output PK2, cooling season
- [5] Terminals in electric box
- [6] 400V~3N, power input to the indoor unit. The cable must be fixed with the strain relief →[8].
- [7] Strain relief
- [8] Fixing point for sensor-/communication cables



For cable feeds (→Figure 32 [1], [2], [7]) a small prick in the membrane is enough, then the lines can be pushed through.

- ▶ After the cable has been inserted, make sure the cable is completely enclosed by the membrane.
- ▶ After inserting the cables, tighten the cable glands (→Figure 32 [3], [4], [5]).
- ▶ Use the defined fixing points [9] to fix the cables that was inserted through the entries (→Figure 32 [1], [2]).

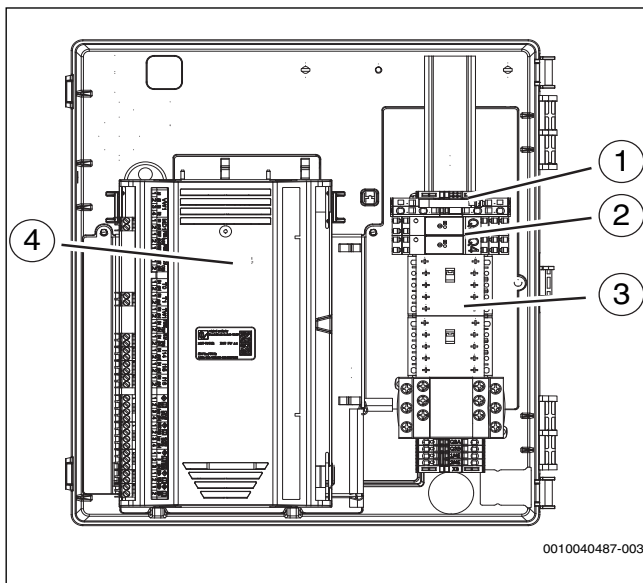


Fig. 33 Arrangement of components in the electric box

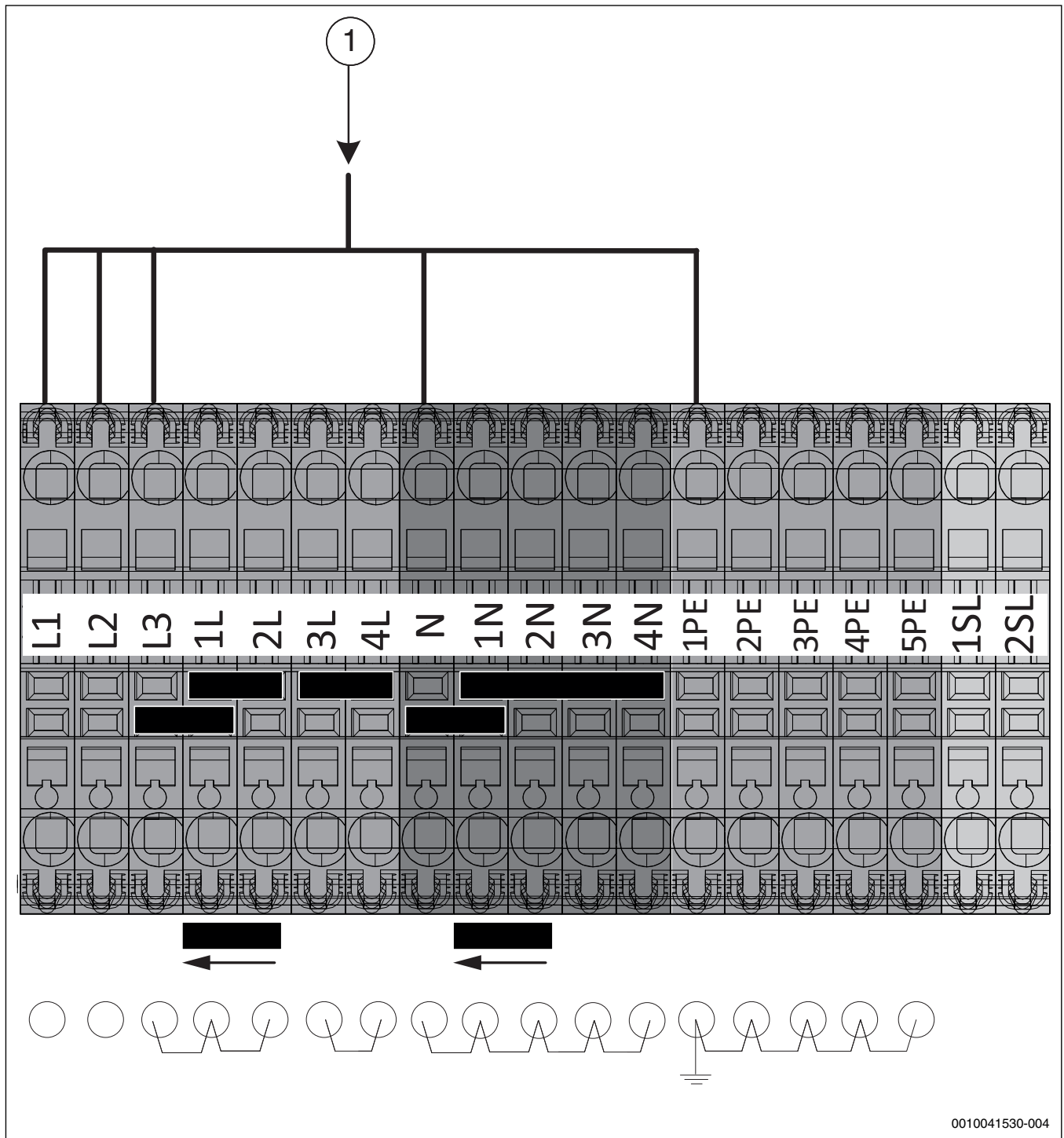
- [1] Melting fuse for external circulation pumps PW2 and PK2  
Type: cartridge fuse 250V; 5x20mm; 5A speed T
- [2] Relays: outputs for PW2 and PK2
- [3] Contactors for switching booster heater
- [4] XCU-THH (XCU HY) module

### 6.9.3 Terminal connections in electric box



Please note the jumper arrangement.





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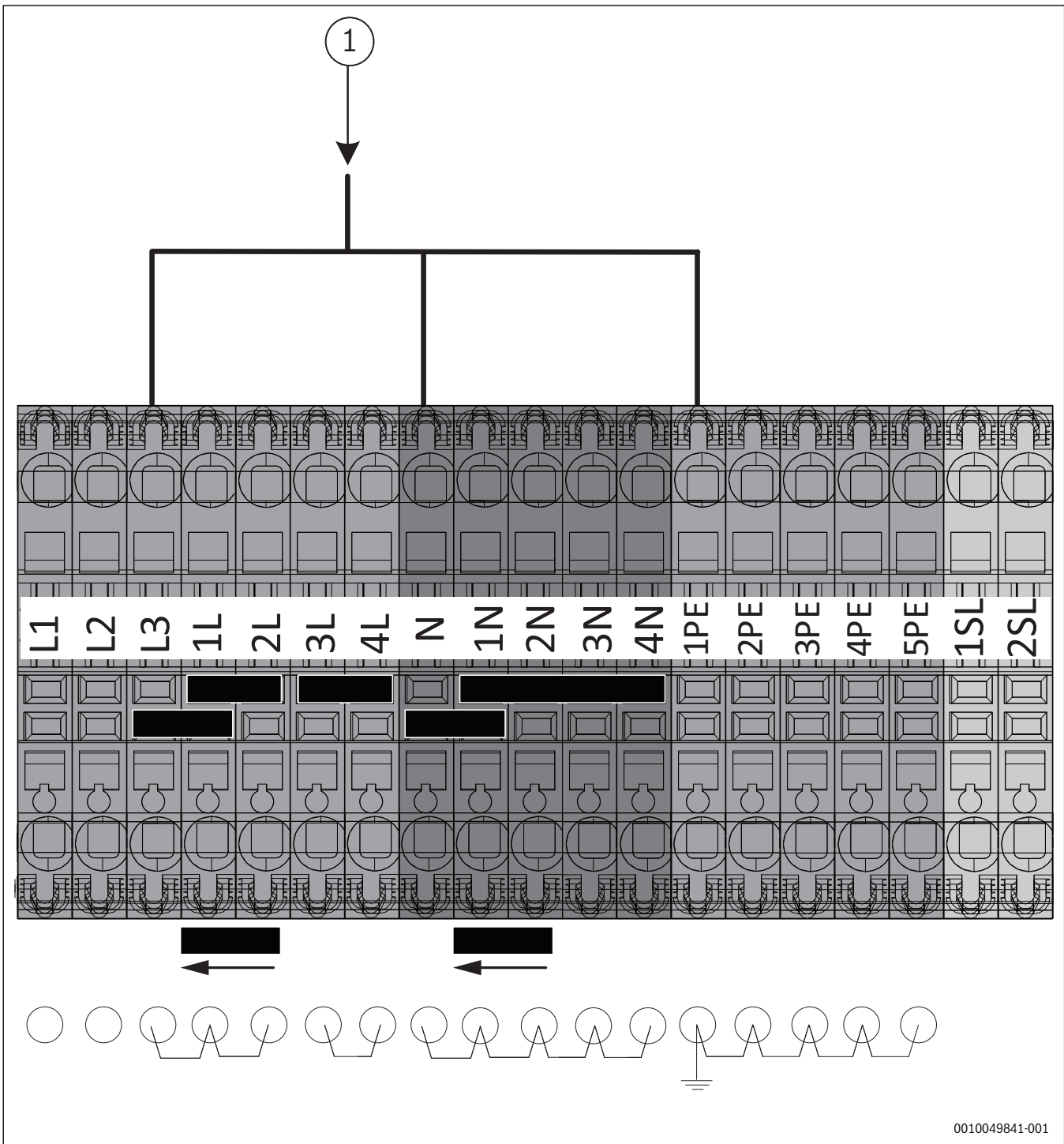
Fig. 34 Electrical connections

[1] 400V ~3N input to indoor unit

**6.9.4 Terminal connections in electric box**



Please note the jumper arrangement.



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Fig. 35 Electrical connection for single-phase, 3kW only

[1] 230V ~1N input to indoor unit (booster heater)

**6.9.5 Terminal connections of accessories in electric box**

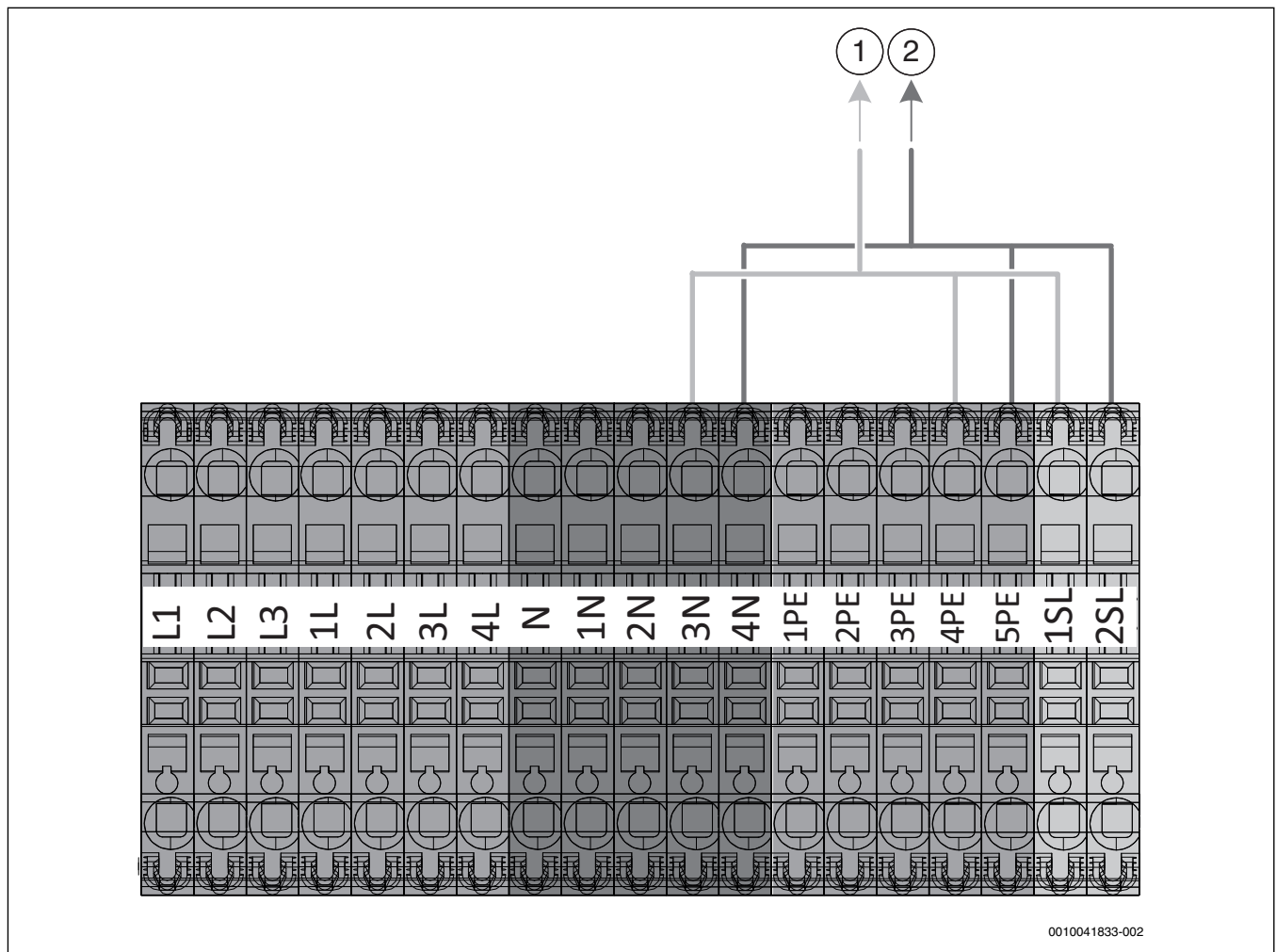


Fig. 36 Electrical connections for accessories

- [1] 230V ~1N relay output to circulation pump PW2, DHW circulation
- [2] 230V ~1N relay output PK2, cooling season

### 6.9.6 Connections XCU-THH (XCU HY) module

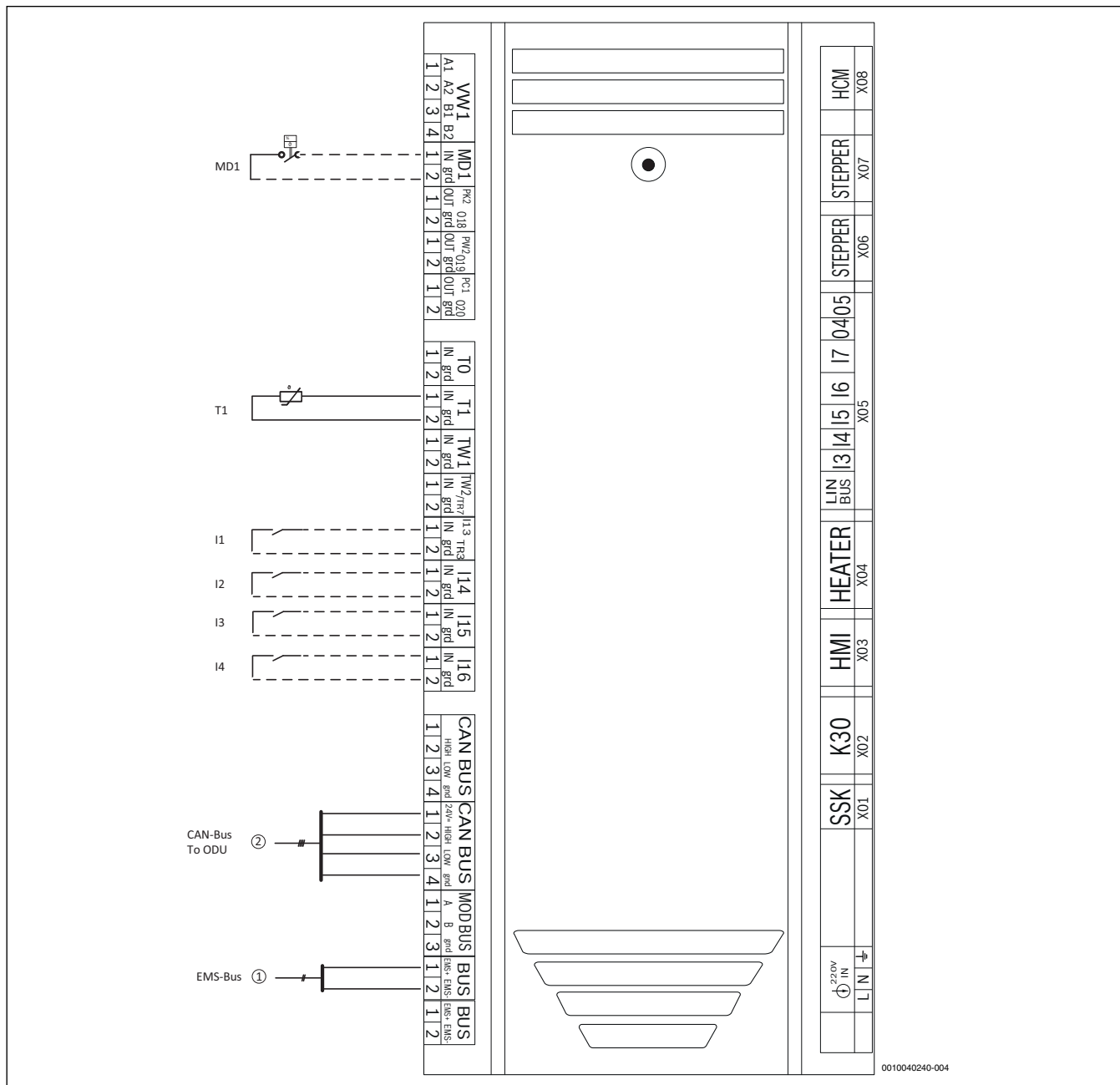


Fig. 37 Connections XCU-THH (XCU HY)

- [I1] External input 1
- [I2] External input 2: Blocks heating or DHW
- [I3] External input 3: Heating circuit overheat protection (safety thermostat)
- [I4] External input 4: Smart Grid (SG)/ Photovoltaic (PV)
- [MD1] Condensation sensor (accessory for cooling mode)
- [T1] Temperature sensor outdoor
- [1] EMS-BUS accessory
- [2] CAN-BUS to heat pump



The tightening torque of the screws for the connectors of the XCU-THH (XCU HY) must be 0.5Nm.

## 7 Commissioning



### WARNING

#### Material damage from frost!

The heating or auxiliary heater may be irreparably damaged by frost.

- ▶ Do not start the indoor unit if there is a possibility of the heating or auxiliary heater being frozen.

#### ⚠ The system will be damaged if it is commissioned without water

- ▶ Only operate the device when it is filled with water and at the correct operating pressure.



Do not turn on the indoor unit in case that existing valves to the heating system or to the heat pump are closed.

- ▶ Check that all valves in the system are opened.

When powering up the device, a dry-run check is performed to check if it is filled with water. To avoid false alarms, at least one heating zone must be open when powering on the appliance. The compressor and electric heater is blocked during the dry-run check. The duration of the check is 2 minutes.

- ▶ Check if the valves to, at least, one heating zone are open before powering on the appliance.



If the power of the electrical heater is restricted by settings or installation (i.e. 1-phase only), certain features of this appliance might be limited. This applies to, for example, the Thermal disinfection feature. To avoid limitations for this feature specifically, the duration of this operation can be increased in the Maximum time setting (in the Thermal disinfection menu). Similar solutions might be available for other features (→ see HMI documentation).



Before you turn on the appliance please check that all external connected devices are well earth connected.

### 7.1 Commissioning checklist

1. Power on the unit.
2. Commission the heating system. Use the control unit to make the necessary settings (→ instructions for control unit).
3. Vent the entire heating system after commissioning.
4. Check that all sensors display the appropriate values.
5. Check and clean the particle filter.
6. Check the operation of the heating system after startup (→ instructions for control unit).

### 7.2 Commissioning of the control panel

When the control panel is connected to the power supply for the first time, a configuration wizard is launched. Once the wizard is complete, you can either switch to the Start menu or make additional settings in the service menu.



Several functions are only displayed if they have been activated or if the relevant accessories have been installed.

Menu item	Description
Language	Set the language. Press [Next].
Date format	Set the date format. Choose between [DD.MM.YY], [MM/DD/YY] -or- [YY-MM-DD]. Select [Next] to continue with the configuration -or- [Back] to go back.
Date	Set the date. Select [Next] to continue with the configuration -or- [Back] to go back.
Time of Day	Set the time. Select [Next] to continue with the configuration -or- [Back] to go back.

Menu item	Description
Check installation	Check: are all modules and the remote control installed and addressed? Select [Next] to continue with the configuration -or- [Back] to go back.
Configuration wizard	Start system analysis. The control panel does a check of the system and all connected accessory modules. Select [Next] to continue with the configuration -or- [Back] to go back.
Country	Set the country. Select [Next] to continue with the configuration -or- [Back] to go back.
Min. outside temp.	Set dimensioning outdoor temperature of the system. This is the lowest average outside temperature in the relevant region. The setting affects the slope of the heating curve as it is the point where the heat source reaches the highest flow temperature. Select [Next] to continue with the configuration -or- [Back] to go back.
Fuse <sup>1)</sup>	Select the main fuse that protects the heat pump. [16 A]   [20 A]   [25 A]   [32 A]. Select [Next] to continue with the configuration -or- [Back] to go back.
Auxiliary heater	Choose which booster heater type is used. [None]   [El. aux ht.]. Select [Next] to continue with the configuration -or- [Back] to go back.
Fitting situation	Select the type of house for the system installation. This influences the display of "Away" functions in the system control unit and in the remote control unit (display of system functions outside of the assigned heating circuit). The multi-family house setting prevents, for example, the absence or vacation of one party in the house from influencing the control behaviour of the other party in the house. <ul style="list-style-type: none"> <li>• Single-family home. With this setting, all functions are available in the remote control.</li> <li>• Apartment building. The functions that affect all residents are hidden in the remote control, e.g. settings for hot water, 2nd heating circuit, solar system, the "Away", holiday program.</li> </ul> Select [Next] to continue with the configuration -or- [Back] to go back.
Heating system HC1	Select the type of heat distribution in heating circuit 1 [Radiators]   [Convectors]   [Radiant floor heating]. Select [Next] to continue with the configuration -or- [Back] to go back.
System function HC1	Select the function for heating circuit 1. [Heating]   [Cooling]   [Heating + Cooling]. Select [Next] to continue with the configuration -or- [Back] to go back.

Menu item	Description
Dew pt. HCXXX <sup>2)</sup>	Set if the cooling function should be controlled by the dew point temperature. When activated, the controller maintains the set flow temperature by this value above the calculated dew point. A remote control with humidity sensor is required for this function. [Yes]   [No]. Select [Next] to continue with the configuration <b>-or-</b> [Back] to go back.
Heat. system type HC1	Set the maximum flow temperature for heating circuit 1 and confirm. <sup>3)</sup> Radiators / Convectors Select [Next] to continue with the configuration <b>-or-</b> [Back] to go back.
Design temperature HC1	Set the design flow temperature for heating circuit 1 and confirm. The design temperature is the desired flow temperature at minimum outside temperature. Radiators / Convectors Select [Next] to continue with the configuration <b>-or-</b> [Back] to go back.
System analysis	The configuration wizard has been successfully completed. Save settings and switch to main screen or continue with further settings?. select Save and close if the commissioning is done <b>-or-</b> select Detailed settings to make further settings.

- 1) This menu is only shown if a power guard is installed.
- 2) This menu is only shown if the function Cooling or Heating + Cooling has been selected.
- 3) The maximum temperature setting is depending on the variant of the indoor unit.

Table 11 Configuration wizard

### 7.3 Heat pump, indoor unit and heating system ventilation

#### NOTICE

**If the system is not correctly ventilated (purged), this will damage the indoor unit!**

The auxiliary heater may overheat or be damaged if it has not been fully vented prior to activation.

- ▶ Carefully vent the system when filling.
- ▶ Carefully vent the system once again during commissioning.



Vent also by other ventilation valves in the heating system, e.g. radiators.

1. Connect the power supply to the heat pump and indoor unit.
2. Activate the venting program: > **Service** > **System settings** > **Heat pump** > **Air-purge mode**.
3. Vent by all manual venting valves in the heat pump, indoor unit and heating system (→ Fig. 25).
4. Return to normal operation by closing the function test menu.
5. Clean the particle filter SC1.
6. Check the pressure on the pressure gauge GC1 and add more water with the fill valve if the pressure is below 2 bar.
7. Check that the heat pump is running and that there are no active alarms.

Total duration	1,5 minutes					
Duration (s)	15	15	15	15	15	15
PC1	X	X	X			
PC0 (100%)	X	X		X	X	
VW1					X	X
PK2		X				

Table 12 Venting program. X = active component

- [PC1] Circulation pump for the heating circuit
- [PC0] Primary circulation pump (heat carrier)
- [VW1] three-way valve heating/DHW cylinder. X= open towards the DHW cylinder
- [PK2] Cooling season relay

### 7.4 Adjusting the operating pressure of the heating system

The pre-charge pressure of the expansion vessel is 0.75 bar.

Display on the pressure gauge	
1.3-1.5 bar	Minimum charge pressure. When the heating system is cold, the filling pressure should be 0.2-0.5 bar above the pre-charge pressure of the expansion vessel.
2.5 bar	Maximum charge pressure at maximum heating water temperature: must not be exceeded (the pressure relief valve will open).

Table 13 Operating pressure

- ▶ Top up to 2 bar unless otherwise specified.
- ▶ If the pressure does not remain constant, check whether the heating system and the expansion vessel are tight.

### 7.5 Operating temperatures



The operating temperature check must be performed in heating mode (not in DHW or cooling mode).

For optimum system operation, the flow rate in the heat pump and heating system must be monitored. This check should be performed after 10 minutes heat pump operating time and during high compressor heating output.

The temperature differential for the heat pump must be set for the different heating systems.

- ▶ With underfloor heating system: set a temperature difference of 4.5 K.
- ▶ With radiators: set a temperature difference of 7.5 K.

These settings are optimal for the heat pump.

Check the temperature differential at high compressor heating output:

- ▶ Tap on the Heat Pump symbol on the display.
- ▶ On the **System overview**, notice the temperatures to and from the heat pump (outdoor unit).
- ▶ Check whether the temperature difference corresponds to the delta value set for heating mode.

If the temperature differential is too large:

- ▶ Vent the heating system.
- ▶ Clean filters / strainers.
- ▶ Check pipe dimensions.

### 7.6 Adjusting the Electrical auxiliary heater

The appliance can be operated either with a single-phase or a 3-phase connection. The default setting for specific countries will be the 3kW single-phase connection (→ see table 14). This setting can be changed in the Electrical auxiliary heater menu.

Countries
France
Great Britain
Ireland
Italy

Table 14 Countries with single-phase connection set by default

To change the default setting, follow the steps below:

- ▶ In the Service menu: System settings > Auxiliary heater > Electrical auxiliary heater.

#### Temperature differential in the heating system

- ▶ Set the output at the heating pump PC1 so that the following difference is achieved:
  - ▶ With underfloor heating system: 4.5 K.
  - ▶ With radiators: 7.5 K.

### 7.7 Function test



The compressor is preheated before starting. This can take up to 30 minutes, depending on the outdoor temperature. The prerequisite for starting is that the compressor temperature (TR1) is 20K higher than the supply air temperature (TL2) and 20K lower than the flow temperature from the heat pump (TC3). The set point is limited between 20 °C and 45 °C. The temperatures are displayed in the diagnosis menu of the control unit.

Quick start of the heat pump is only possible when there is an active heat demand.

The manual defrost of the heat pump is only possible when the compressor is running with the 4-way valve in heating mode and the outdoor temperature is below 15 °C.



When the function test menu is activated on the control panel, software restrictions are deactivated (i. e. high temperature protection for under floor heating).

- ▶ Test active components of the system.
- ▶ Check if there is a heating or hot water demand.
- or-
- ▶ Draw off DHW or increase the heating curve to generate demand (→ instructions for control unit).
- ▶ Check whether the heat pump starts.
- ▶ Make sure that no alarms are currently active.
- or-
- ▶ Troubleshooting.
- ▶ Check the operating temperatures (→ instructions for the control unit).

#### 7.7.1 Overheating protection (OHP)

The overheating protection triggers when the temperature of the electric booster heater rises above 88 °C.

- ▶ Make sure that the particle filter is not blocked and that the flow through the heat pump and heating system is unimpeded.
- ▶ Check the operating pressure.
- ▶ Check the heating and DHW settings.

- ▶ Reset the overheating protection. To do this, press the button on the electrical heater.

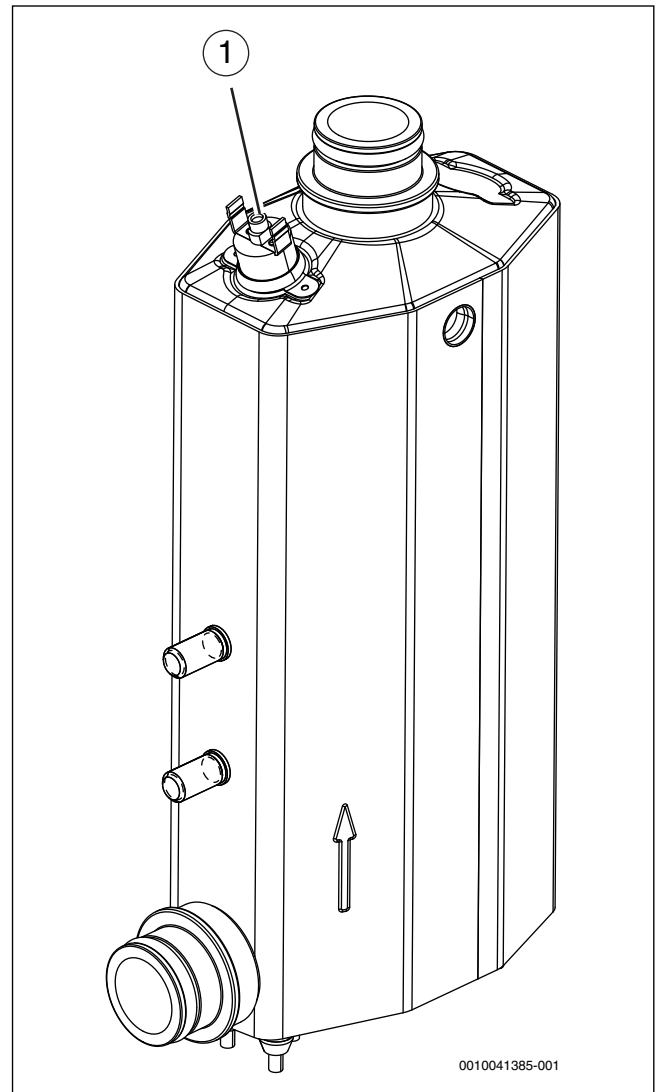


Fig. 38 Electrical heater

- [1] Reset over heat protection

## 8 Maintenance



### Electrical shock!

- ▶ Before working on the electrics, the main power supply must be switched off.

### NOTICE

#### Deformation due to heat!

If the temperature is too high, the insulation (EPP) in the indoor unit deforms.

- ▶ When carrying out brazing work in the heat pump, protect the insulation with a heat resistant cloth or damp cloth.

- ▶ Only use original spare parts!
- ▶ Refer to the spare parts list when ordering spare parts.
- ▶ Replace removed gaskets and O-rings with new ones.

The tasks described below must be carried out during an inspection.

In case of renovation (exchange installation) and a previously dirty system, more frequent cleaning/service may be necessary in the first weeks after installation.

#### Display activated alarm

- ▶ Check the alarm log (→ instructions for the control device).

#### Function test

- ▶ Carry out function check (→ Chap. 7.7).

#### Check the magnetite indicator

After installation and startup the magnetite indicator must be checked at more frequent intervals. If a lot of magnetic dirt is clinging to the magnetic bar in the particulate filter and that dirt frequently causes an alarm related to the poor flow (e.g., low or poor flow, high flow supply or HP alarm) a magnetite filter must be installed to avoid regular draining of the indicator. A filter also increases the longevity of components in the heat pump as well as the remaining parts of the heating system.

### 8.1 Particle filter



#### WARNING

##### Strong magnet!

Can be harmful to pacemaker wearers.

- ▶ Do not clean the filter or check the magnetite indicator if you are a pacemaker wearer.

The filter prevents particles and contamination from entering the heat pump. Over time, the filter may become blocked and must be cleaned.



The system does not need to be emptied to clean the filter. The filter is integrated into the shut-off valve.

#### Cleaning the strainer

- ▶ Close the valve (1).
- ▶ Unscrew the cap (manually) (2).
- ▶ Take out the strainer and clean it with running water over it or by pressure cleaning.
- ▶ Check attached debris on the cap's magnet (3) and clean it.
- ▶ Reinstall the strainer (4). For proper assembly, make sure that the guide bumps fit into the recesses in the valve.
- ▶ Screw the cap back on (hand tight).
- ▶ Open the valve (5).

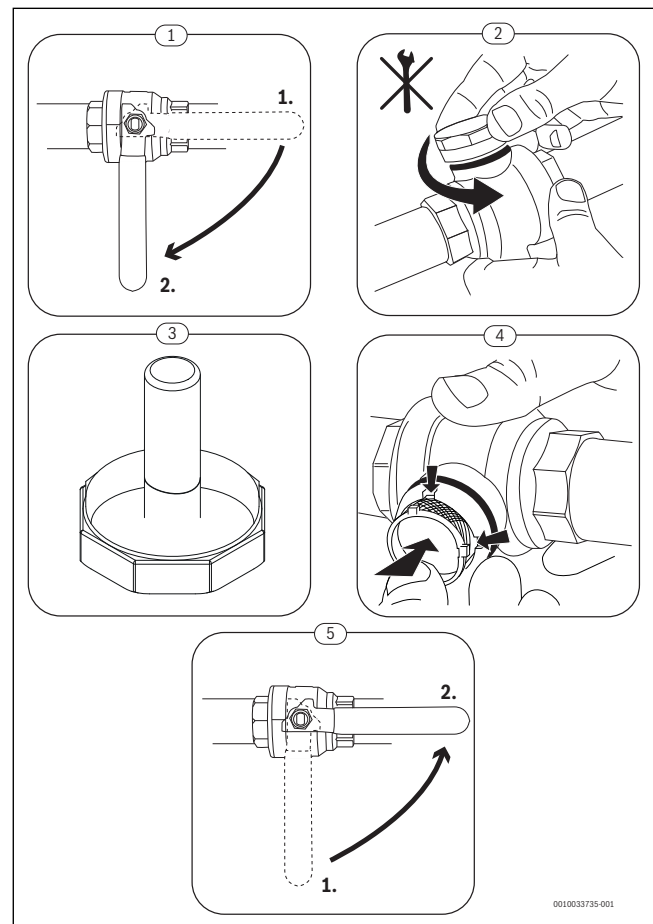


Fig. 39 Cleaning the strainer

#### Check and clean the magnetite filter

Check and clean the magnetite filter 1-2 times a year, but directly after installation and commissioning the filter should be checked and cleaned more frequently. See the instruction that is supplied with the filter for correct procedure.

### 8.2 Service of expansion vessel

#### NOTICE

##### Material damage due to negative pressure!

Negative pressure can occur during drainage of the appliance.

- ▶ In case the outdoor unit is placed above the indoor unit: vent the outdoor unit during drainage, if the pipework between outdoor unit and indoor unit does not allow negative pressure.
- ▶ Close the valves SC1 and VC3 to the heating system prior to drainage or vent the heating system during drainage.



Regular service of the expansion vessel is important to avoid air in the heating system.

1. Close valves to the heating system, SC1 and VC3, as well as valve VC4 between indoor unit and outdoor unit.
2. Close automatic air vent valves that are connected to the indoor unit.
3. Connect a drainage hose to the manual air vent valve at PCO.
4. Open the manual air vent valve and let the water drain until no more water comes out of the appliance.
5. Keep manual air vent valve at PCO open.



6. Fill up the expansion vessel with nitrogen to target pressure.
  - Depending on building height: 0.1 bar per meter height difference between top of indoor unit and highest position of the heating system + 0.2 bar.
7. Close the manual air vent valve.
8. Fill the appliance with water to target pressure.
9. Open automatic air vent valves.
10. Open valves to the heating system, SC1 and VC3, as well as valve VC4 between indoor unit and outdoor unit.
11. Vent the appliance and the heating system to remove any air from the system.

### 8.3 Draining of appliance

**NOTICE**

**Material damage due to negative pressure!**

Negative pressure can occur during drainage of the appliance.

- ▶ In case the outdoor unit is placed above the indoor unit: vent the outdoor unit during drainage, if the pipework between outdoor unit and indoor unit does not allow negative pressure.
- ▶ Close the valves SC1 and VC3 to the heating system prior to drainage or vent the heating system during drainage.

1. Set the 3-way valve in middle position: > **System settings > Heat pump > 3-way valve in centre pos..**
2. Disconnect the appliance from power.
3. Connect a hose to the drain valve VA0.
4. Open the drain valve and manual air vent valves at the electrical heater and at PC0.

### 8.4 Shut down the heating system

If the heating system is shut down, there is no frost protection for the appliance.

If the appliance is not in a frost-free room and not in operation, it can freeze in the event of frost.

- ▶ If possible, leave the heating system switched on at all times.
  - or -
- ▶ Drain the primary circuit as well as the heating circuit and drinking water pipes at the lowest point.
  - or -
- ▶ Drain domestic hot water pipes at the lowest point.
- ▶ Mix antifreeze into the heating water and the heat transfer medium.
- ▶ Check if frost protection is ensured by antifreeze according to the instruction of the manufacturers.

## 9 Environmental protection and disposal

Environmental protection is a fundamental corporate strategy of the Bosch Group.

### 10.1 Technical specifications

	Unit	3	9
<b>Electrical information</b>			
Rated voltage	V	230 1N~50Hz	400 3N~50Hz
Fuse class B	A	→ Chapter 6.9.1	
Booster heater in steps	kW	3	3/6/9
<b>Hot water</b>			
Volume of domestic hot water cylinder	l	174	
Maximum permissible operating pressure in the DHW circuit	kPa/bar	1000/10	
Connection	mm	Ø 18	
Material in the cylinder	-	Stainless steel	
<b>Heating system</b>			

The quality of our products, their economy and environmental safety are all of equal importance to us and all environmental protection legislation and regulations are strictly observed.

We use the best possible technology and materials for protecting the environment taking account of economic considerations.

#### Packaging

Where packaging is concerned, we participate in country-specific recycling processes that ensure optimum recycling.

All of our packaging materials are environmentally compatible and can be recycled.

#### Used appliances

Used appliances contain valuable materials that can be recycled.

The various assemblies can be easily dismantled. Synthetic materials are marked accordingly. Assemblies can therefore be sorted by composition and passed on for recycling or disposal.

#### Old electrical and electronic appliances



This symbol means that the product must not be disposed of with other waste, and instead must be taken to the waste collection points for treatment, collection, recycling and disposal.

The symbol is valid in countries where waste electrical and electronic equipment regulations apply, e.g. "(UK) Waste Electrical and Electronic Equipment Regulations 2013 (as amended)". These regulations define the framework for the return and recycling of old electronic appliances that apply in each country.

As electronic devices may contain hazardous substances, it needs to be recycled responsibly in order to minimize any potential harm to the environment and human health. Furthermore, recycling of electronic scrap helps preserve natural resources.

For additional information on the environmentally compatible disposal of old electrical and electronic appliances, please contact the relevant local authorities, your household waste disposal service or the retailer where you purchased the product.

You can find more information here:  
[www.weee.bosch-thermotechnology.com/](http://www.weee.bosch-thermotechnology.com/)

#### Batteries

Batteries must not be disposed together with your household waste. Used batteries must be disposed of in local collection systems.



## 10 Technical information and reports

	Unit	3	9
Integrated buffer cylinder volume	l	16	
Type of circulation pump PC1	–	Grundfos UPM4L K	
Low energy pump		EEI ≤ 0.20 <sup>1)</sup>	
Nominal flow rate	l/s	2)	
Residual head	kPa	2)	
Minimum flow during defrosting	l/min	15	
Maximum operating pressure	kPa/bar	300/3	
Minimum operating pressure	kPa/bar	70/0,7	
Maximum water temperature (flow), booster heater only	°C	60	
Minimum water temperature if cooling is available	°C	7	
Connection (Cu)	mm	Ø 28	
Connection heat transfer medium (Cu)	mm	Ø 28	
Expansion vessel	l	17	
<b>Heat transfer medium</b>			
Circulation pump type PC0	–	Grundfos UPM4L K	
Low energy pump		EEI ≤ 0.20 <sup>1)</sup>	
Nominal flow rate	l/s	3)	
<b>General</b>			
Waste water connection	mm	Ø 22	
IP-Rating	IP	X1D	
Dimensions (width x depth x height)	mm	600 x 600 x 1787	
Weight excluding packaging	kg	156	
Installation height	m	Up to 2000 m above sea level	

1) Recommended value for the most effective pumps: EEI ≤ 0.20

2) The flow rate and residual head depend on the connected heat pump or in case of hydraulic separation. See table 15 and the circulation pump diagram.

3) The flow rate and residual head depend on the connected heat pump and pipe dimensions ( → chapter 5.2).

Heat pump	Nominal flow underfloor heating (l/s)	Nominal flow radiator (l/s)
4	0,21	0,15
5	0,29	0,17
7	0,34	0,20

Table 15 Nominal flow heating system

	Heating circuit without mixing valve
PC1	Circulation pump for heating circuit
MC1	Safety thermostat

## 10.2 Hydraulic configuration



The product must only be installed according to the manufacturer's official system solutions. Other system solutions are not permitted. Liability is voided in the case of damage and problems resulting from impermissible installation.

### 10.2.1 Explanations to the hydraulic configuration

	General
XCU-THH (XCU HY)	Installer module integrated into the indoor unit
UI800	User interface
CR10	Room controller (accessories)
WP/WD/WH	Buffer cylinder (accessories)
MD1	Condensate sensor (accessories)
T1	Outside temperature sensor
PW2	DHW circulation pump (accessories)
TW1	DHW temperature sensor

**10.2.2 Heating circuit without mixer**

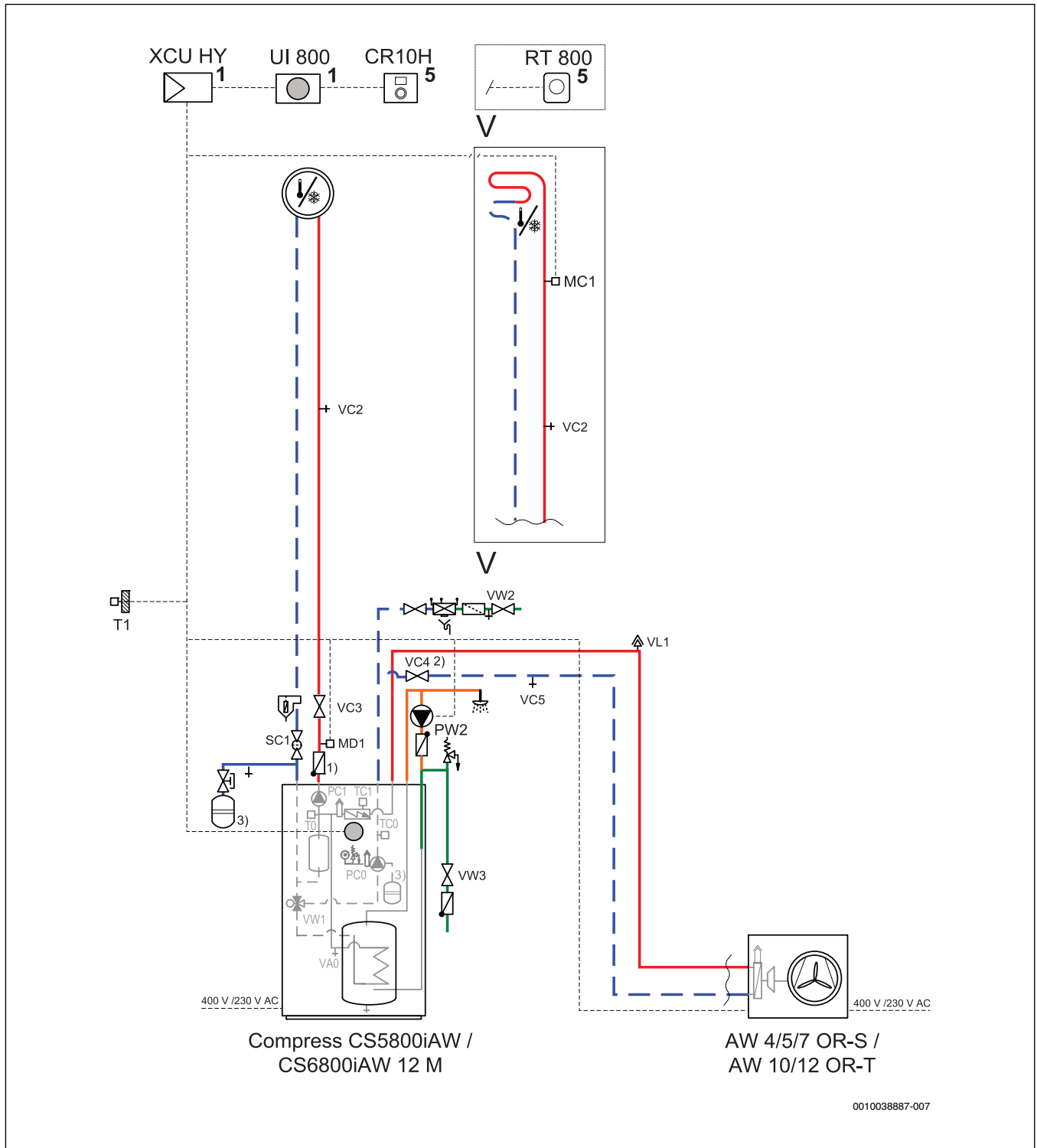


Fig. 40 Indoor unit Tower, Heat pump (ODU), one unmixed heating circuit

- [1] Mounted in the indoor unit
- [5] Mounted on the wall
- 1) Non-return valve: it is mandatory to install a non-return valve to use the cooling mode (see required accessories chapter in → 2.8.1).
- 2) VC4 is required for the recommended filling procedure
- 3) Expansion vessel (external expansion vessel, if it is not integrated)

**10.2.3 Explanation of symbols**



























































Symbol	Description	Symbol	Description	Symbol	Description
<b>Pipework/cables</b>					
	Flow - heating/solar		Brine circuit out		DHW circulation
	Return - heating/solar		Potable water		Electrical Wiring
	Brine flow		Hot water		Electrical wiring with break
<b>Mixing valves/valves/temperature sensors/pumps</b>					
	Valve		Differential pressure regulator		Pump
	Revision bypass		Water pressure relief valve		Non-return valve
	Flow regulating valve		Safety assembly		Temperature sensor / switch
	Overcurrent valve		3-way mixing valve (mixing/distribution)		High limit safety cut-out
	Filter shut-off valve		DHW mixer, thermostatic		Flue gas temperature sensor / switch
	Cap valve		3-way mixing valve (changeover)		Flue gas temperature limiter
	Valve, motorized		3-way mixing valve (change over, de-energised when closed to II)		Outdoor ambient temperature sensor
	Valve, thermal		3-way mixing valve (change over, de-energised when closed to A)		Wireless outside temperature sensor
	Shut-off valve, magnetically controlled		4-way mixing valve		...wireless...
<b>Miscellaneous</b>					
	Thermometer		Drain outlet with siphon		Low loss header with sensor
	Pressure gauge		System separation according to EN1717		heat exchanger
	Filling/draining		Expansion vessel with cap valve		Volumetric flow rate measuring device
	Water filter		Magnetite separator		Water sink
	Heat meter		Air separator		Heat. circ.
	DHW outlet		Automatic air vent valve		Underfloor heating circuit
	Relay		Expansion joint		Low-loss header
	Immersion heater				

Table 16 Hydraulic symbols

**10.2.4 Performance charts for circulation pumps**

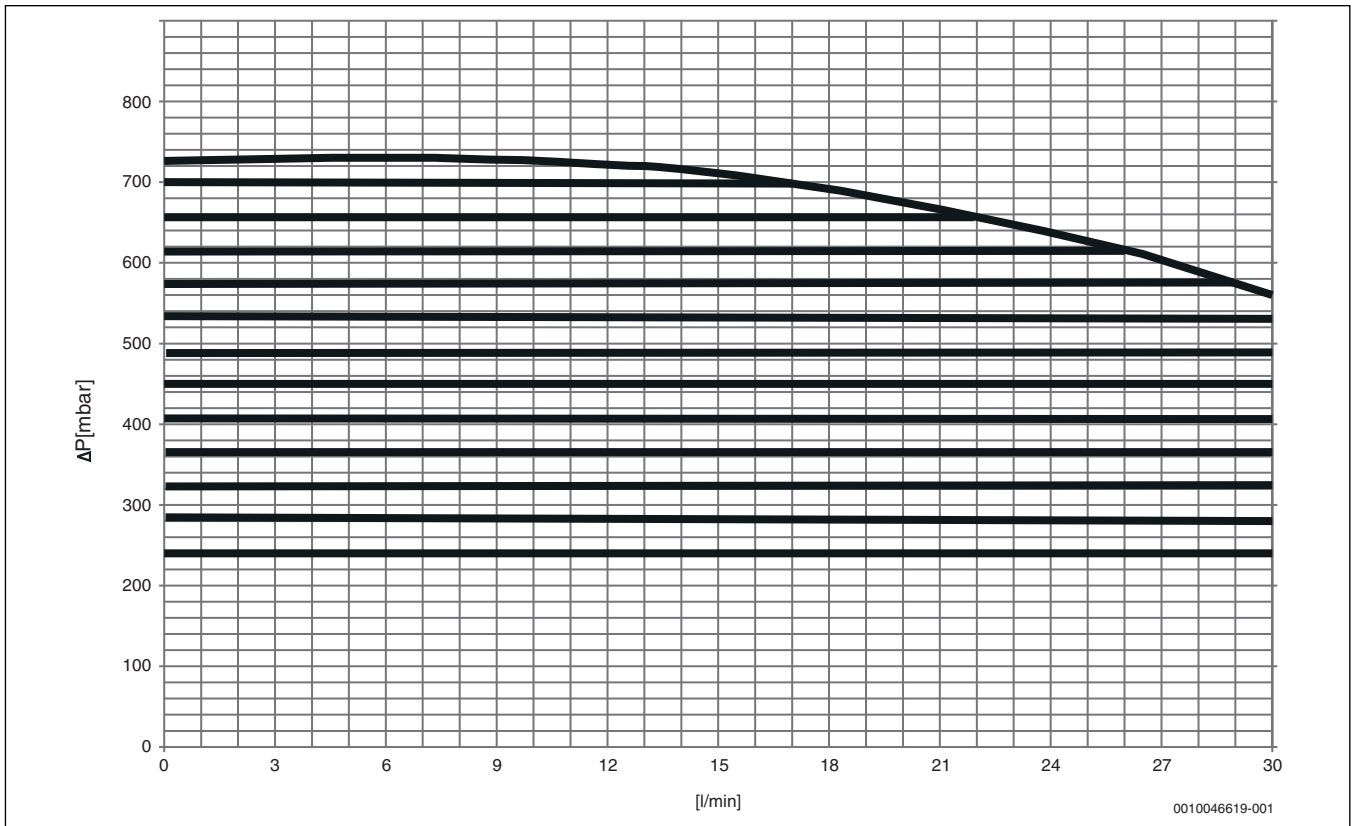


Fig. 41 Performance chart for PC1

### 10.3 Wiring diagram

#### 10.3.1 Wiring diagram XCU-THH (XCU HY) module

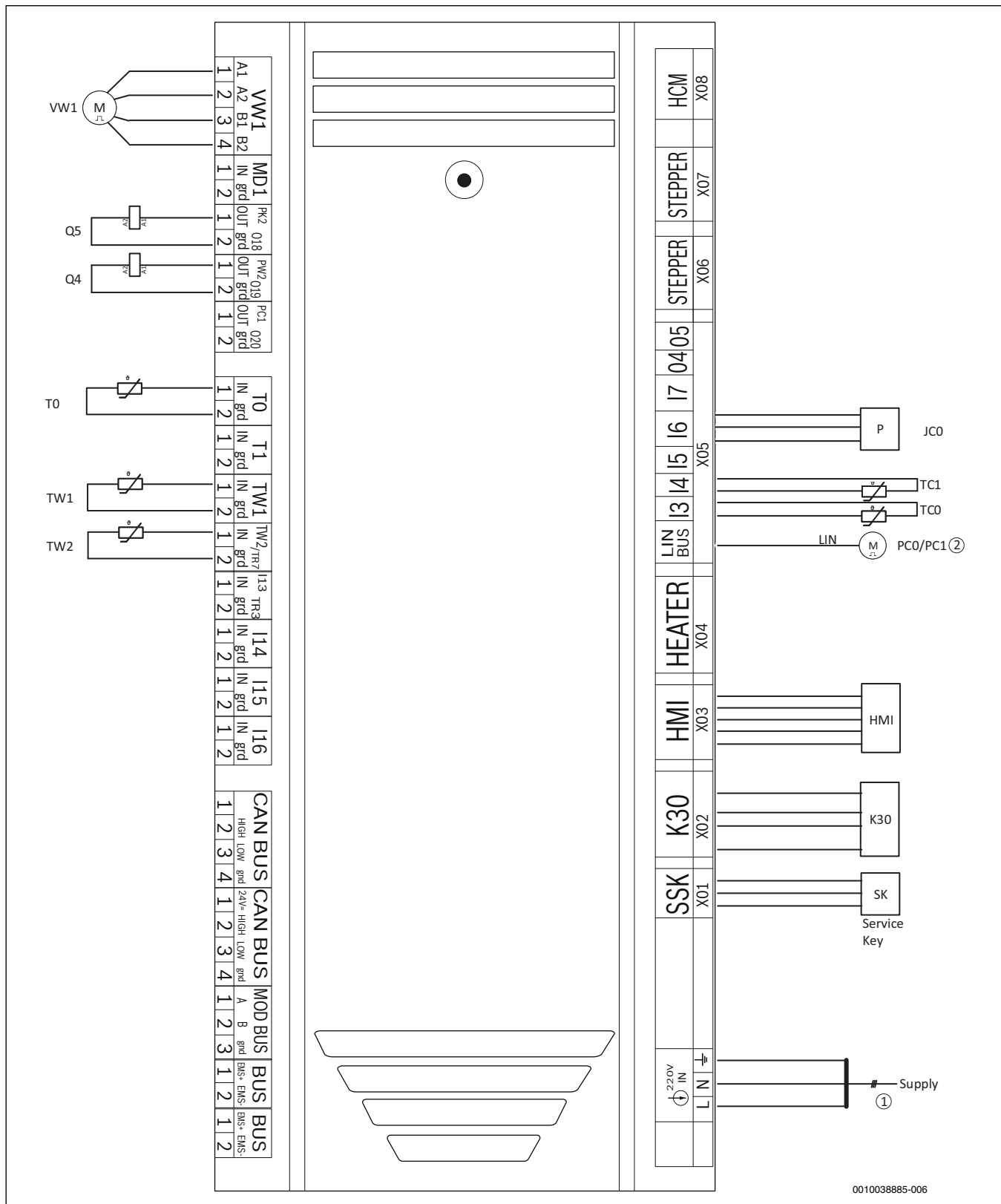


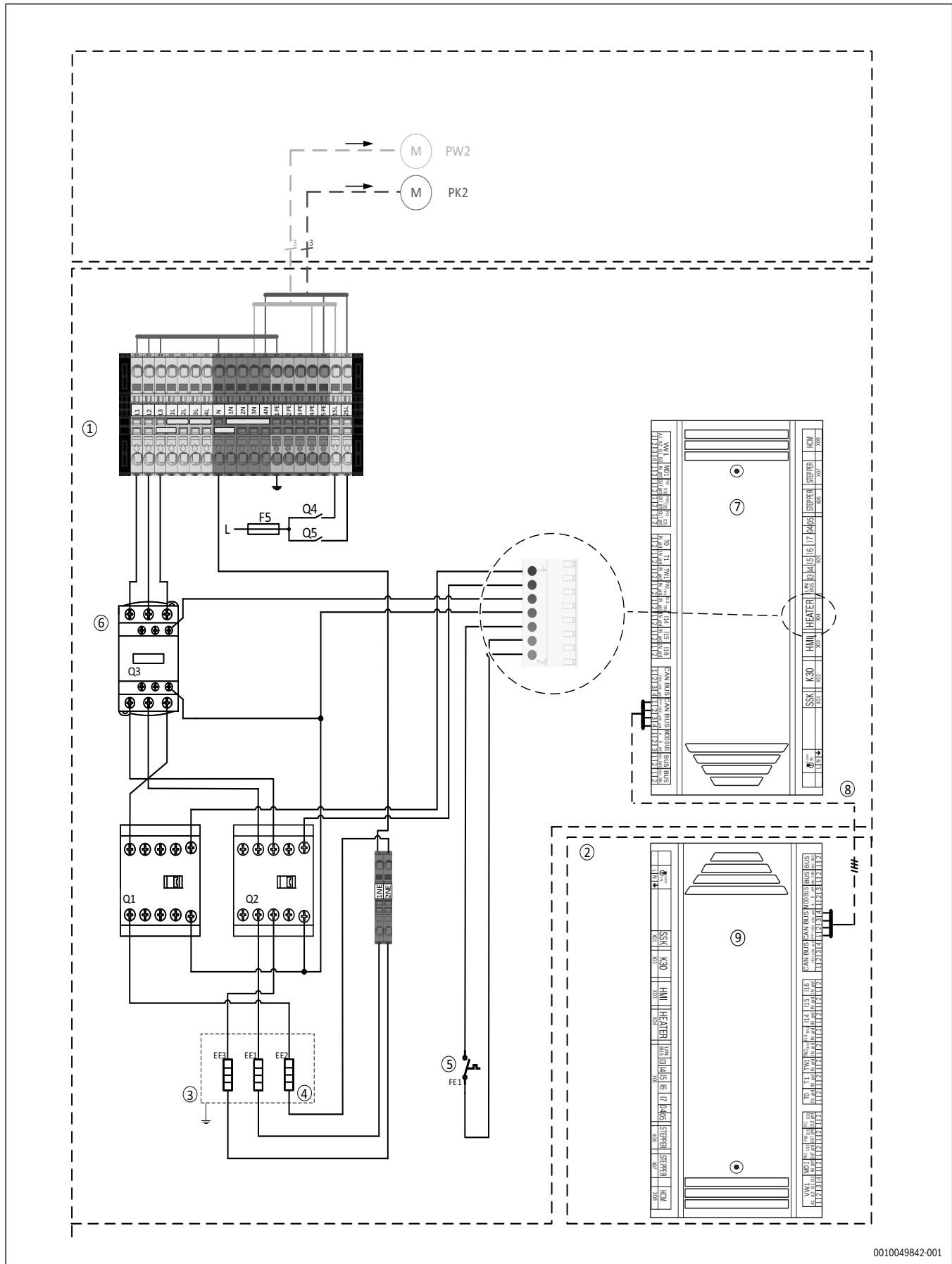
Fig. 42 Wiring diagram XCU-THH (XCU HY) module

- [VW1] 3-way valve (heating/DHW)
- [Q5] Contactor circulation pump cooling (PK2)
- [Q4] Contactor DHW circulation pump (PW2, accessory)
- [T0] Temperature sensor flow (heating circuit)
- [TW1] Temperature sensor DHW
- [TW2] Temperature sensor DHW top
- [PC0] Circulation pump heat carrier (primary circuit)

- [PC1] Circulation pump heating circuit
- [JC0] Pressure sensor
- [TC1] Temperature sensor heat carrier flow (from heat pump)
- [TC0] Temperature sensor heat carrier return (to heat pump)
- [HMI] Control unit UI800
- [K30] Connect-Key K30RF (only in scope for the Netherlands and Denmark)

- [SK] Service Key
- [1] 230V~1N supply to XCU-THH (XCU HY)
- [2] LIN-Bus for circulation pumps (PC0/PC1)

**10.3.2 Power supply indoor unit, standard**



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Fig. 43 Power supply indoor unit

- [1] Indoor unit
- [2] Outdoor unit

- [3] Electrical heater
- [4] Heating element 3 x 3kW (3 x 17,6 Ω)



- [5] Overheating protection (OHP)
- [6] Safety contactor
- [7] XCU-THH (XCU HY) - Indoor unit
- [8] CAN-BUS
- [9] XCU-SRH (XCU HP) - Outdoor unit
- [10] Miniature circuit breaker (3x16A)
- [11] Tariff counter
- [12] External electrical installation
- [PK2] Circulation pump, cooling mode
- [PW2] Circulation pump DHW

### 10.3.3 Cable plan

When extending cables, use the cable types defined in the following tables. All cables must be designed for a temperature range of up to 70 °C.

230V/400V	General	Cross section	Cable type	Maximum length (m)	Connection to terminal	Power supply
Eheater	Power input to the indoor unit IDU CS5800iAW 12 M	5 x 2,5 mm <sup>2</sup> (9kW)	→ Table 18		L1 / L2 / L3 / N / 1PE	→ Table 18
		3 x 2,5 mm <sup>2</sup> (3kW)	→ Table 18		L3/N/1PE	→ Table 18
PW2	Circulation pump DHW	3 x 1,5 mm <sup>2</sup> (minimum)	PVC - rubber cable (H07) or H05VV-F 3G1,5		1SL / 4N / 4PE	IDU
PK2	Circulation pump, cooling mode	3 x 1,5 mm <sup>2</sup> (minimum)	PVC - rubber cable (H07) or H05VV-F 3G1,5		2SL / 5N / 5PE	IDU

Table 17 Connections to IDU CS5800iAW 12 M

	Option 1: 9kW	Option 2: (3kW only)
Function	Indoor unit	Indoor unit
Cable type <i>Terminals allow use of fine-stranded or solid core wire</i>	According to local rules and regulations	According to local rules and regulations
Cable diameter	5 x 2,5 mm <sup>2</sup>	3 x 2,5 mm <sup>2</sup>
Fuse and maximum external load <sup>1)</sup>	3x16A: max. 135W 3x20A - 25A: max. 500W	1x16A: max. 135W 1x20A - 25A: max. 500W

1) External load to outputs

Table 18 Cable area and cable type

Sensor/Bus	General	Minimum cross section	Cable type	Maximum length (m)	Connection to XCU-THH (XCU HY) pin	Power supply
T1	Temperature sensor outdoor	< 20m: 0,75 mm <sup>2</sup> >20m: 1mm <sup>2</sup>	< 20m: LiYY 2x 0,75 >20m: LiYY 2x1	30	T1: 1 / 2	
MD1	Condensation sensor	0,5 mm <sup>2</sup>	LiYY 2 x 0,5		MD1: 1 / 2	
CAN-BUS	Communication line: IDU - ODU	0,75 mm <sup>2</sup>	LiYCY (TP) 2 x 2 x 0,75 shielded	30	CAN BUS: 1 / 2 / 3 / 4	
EMS-BUS	EMS-BUS: Accessory	0,5 mm <sup>2</sup>	LiYY 2 x 0,5 LiYCY 2 x 0,5 shielded		PWR BUS: EMS+ / EMS-	
Smart Grid		0,5 mm <sup>2</sup>	LiYY 2 x 0,5		I13 / I14 / I15 / I16 Depends on HMI configuration	

Table 19 Cable plan for sensors and bus cables

### 10.3.4 Measurements from temperature sensors



#### CAUTION

#### Physical injury or material damage due to incorrect temperature

If sensors with incorrect characteristics are used, the temperatures may be too high or too low.

► Make sure that the temperature sensors used comply with the specified values (see tables below).

°C	Ω	°C	Ω	°C	Ω	°C	Ω
20	12500	40	5323	60	2489	80	1259
25	9999	45	4366	65	2085	85	1073
30	8053	50	3601	70	1754	90	918.7
35	6527	55	2986	75	1483	-	-

Table 20 Sensor T0, TC0, TC1, TW1, TW2

°C	Ω	°C	Ω	°C	Ω
-40	162100	5	12000	50	1686
-35	116600	10	9393	55	1398
-30	84840	15	7405	60	1165
-25	62370	20	5879	65	975.3
-20	46320	25	4700	70	820.7
-15	34740	30	3782	75	693.9
-10	26290	35	3063	80	589.4
-5	20080	40	2496	85	502.9
0	15460	45	2046	90	430.8

Table 21 Sensor T1

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73249 Wernau, Germany

[www.bosch-homecomfortgroup.com](http://www.bosch-homecomfortgroup.com)

