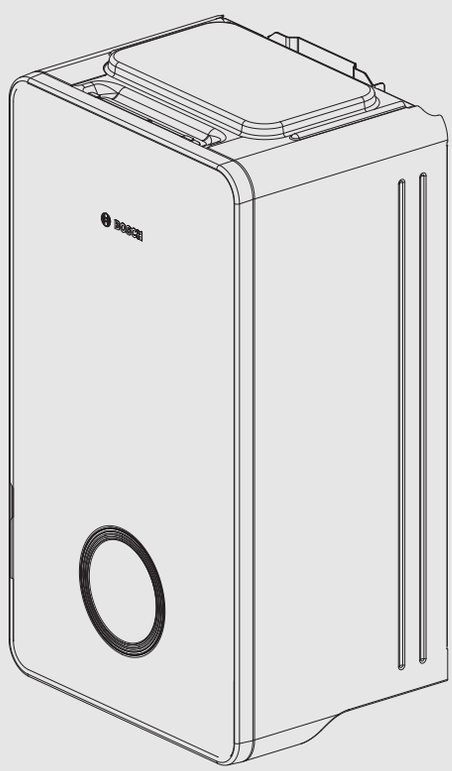
BOSCH

Installation Instructions

Indoor unit for air to water heat pump

Compress 5800i AW

CS5800iAW 12 E G3



6721862724 (2023/06) UK

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1 Explanation of symbols and safety instructions

1.1 Explanation of symbols and safety instructions

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.

⚠ 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 description

2.1 Standard delivery

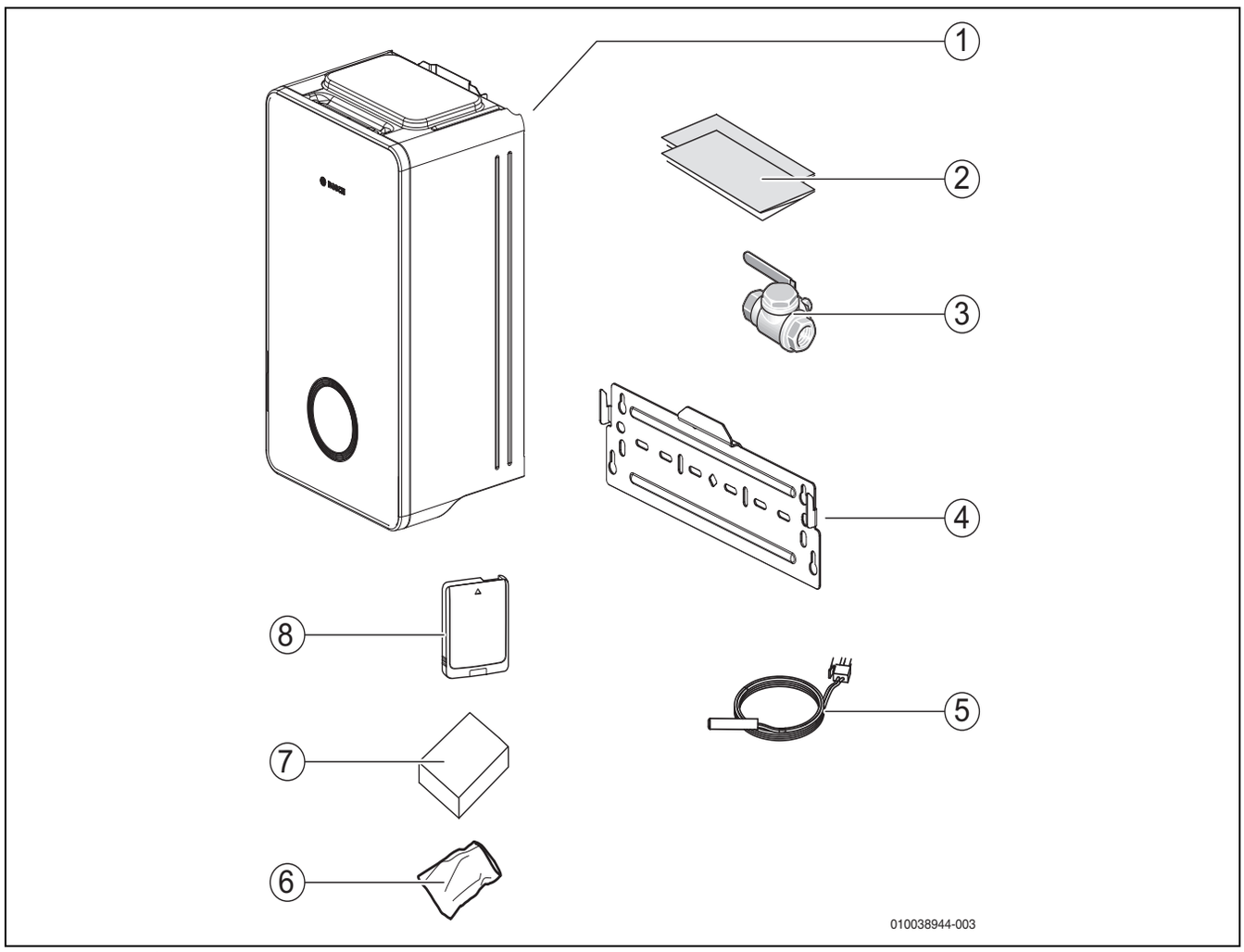

Fig. 1 Standard delivery

[1] Indoor unit
[2] Documentation
[3] Particle filter with strainer
[4] Guide rail for wall installation
[5] Flow temperature sensor
[6] Bag with screws
[7] Outside temperature sensor
[8] Connect-Key

2.2 Declaration of Conformity

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

UK CA CE The UKCA and CE markings declare that the product complies with all the applicable British and European legislation, which is stipulated by attaching these markings.

You can request the complete text of the Declaration of Conformity from the UK address indicated in this document.

2.3 Regulations

In order to ensure installation and operation of the product in accordance with the regulations, please observe all the applicable national and regional regulations as well as all technical rules and guidelines.

You can find a list of the most relevant British and European directives and regulations in the table below.

EU legislation	UK legislation
Electromagnetic Compatibility - Directive 2014/30/EU	Electromagnetic Compatibility Regulations 2016
Low Voltage Directive 2014/35	Electrical Equipment (Safety) Regulations 2016
Radio Equipment - Directive 2014/53/EU	Radio Equipment Regulations 2017
Pressure Equipment - Directive 2014/68/EU	Pressure Equipment (Safety) Regulations 2016
Gas Appliances - Regulation (EU) 2016/426	Regulation 2016/426 on gas appliances as brought into UK law and amended
Machinery Directive 2006/42/EC	Supply of Machinery (Safety) Regulations 2008
Ecodesign Directive 2009/125/EC	The Ecodesign for Energy-Related Products Regulations 2010
Energy Labelling Regulation (EU) 2017/1369	Energy Labelling Regulation (EU) 2017/1369 (as retained in UK law and amended)

EU legislation	UK legislation
Restriction of the Use of certain Hazardous Substances in Eletrical and Electronic Equipment (RoHS) - Directive 2002/95/EC	The Restriction of the Use of Certain Hazardous Substances in Eletrical and Electronic Equipment Regulations 2012
European Directive 2012/19/EC on old electronic and electrical appliances	(UK) Waste Electrical and Electronic Equipment Regulations 2013 (as amended)

Table 2

2.4 Simplified UK/EU Declaration of conformity regarding radio equipment

Bosch Thermotechnik GmbH hereby declares, that the product Compress 5800i AW described in these instructions complies with the Directive UK S.I. 2017/1206 (UK) 2014/53/EU.

You can request the complete text of the UK/EU Declaration of Conformity from the UK address indicated in this document.

2.5 Information about the indoor unit

The indoor unit CS6800iAW 12 E are intended for connection to a AW OR-S or AW OR-T heat pump.

CS6800iAW 12 E has an integrated booster heater and a diverter valve for heating/hot water.

2.6 Dimensions and minimum clearances

The indoor unit is installed at a height above the floor that is convenient for use of the control unit. Also consider pipework and connections under the indoor unit.

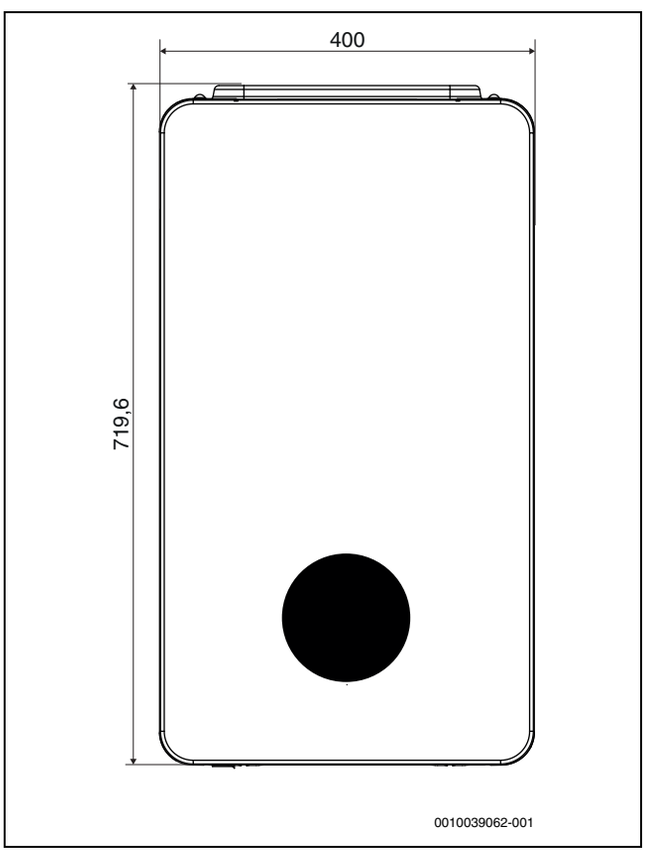

Fig. 2 Dimensions front view (mm)

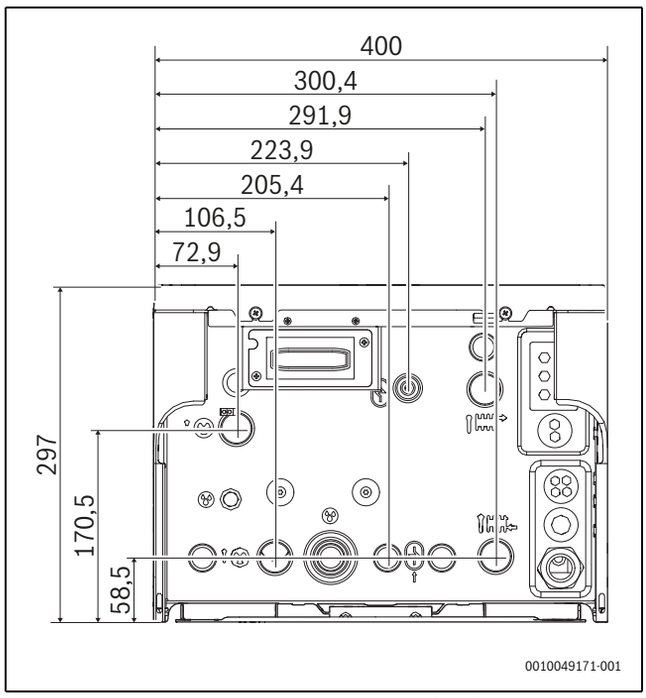

Fig. 3 Dimensions connections, bottom view (mm)

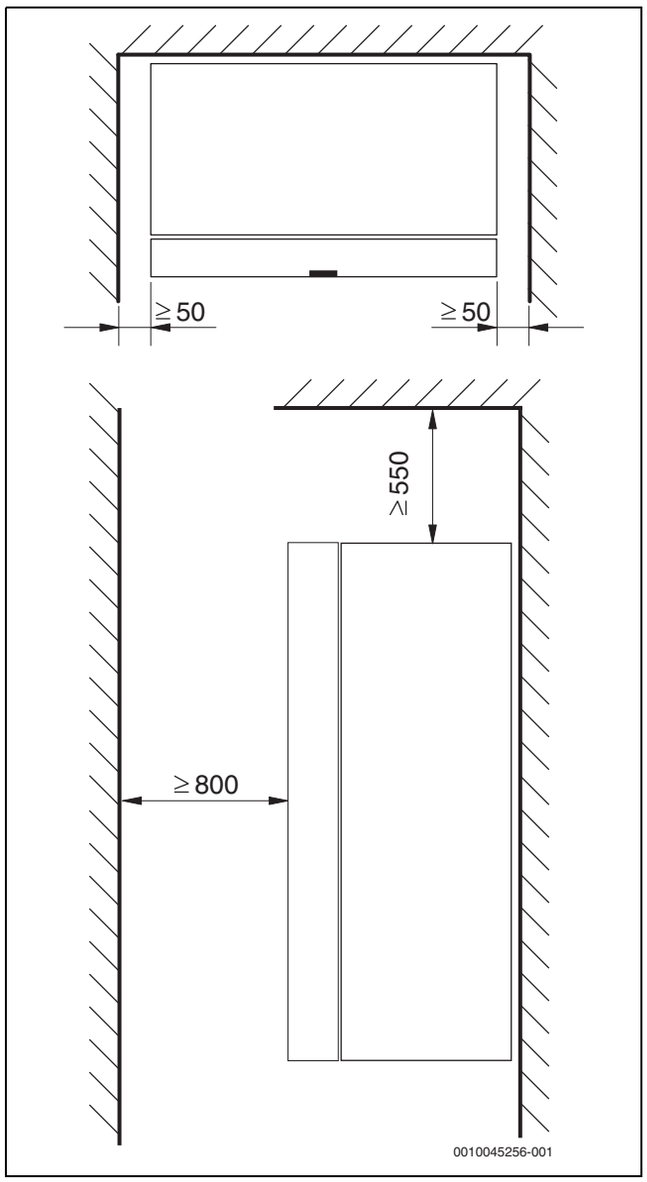

Fig. 4 Minimum clearances to surrounding walls or parts (mm)

2.7 Product Overview

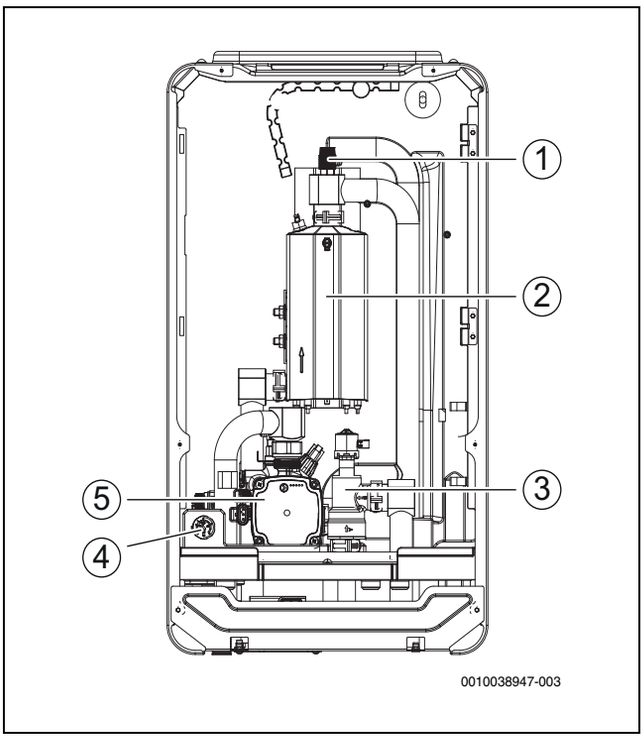

Fig. 5 Component parts

[1] Manual purge valve
[2] Electric heater
[3] Heating/DHW 3-way valve
[4] Compound gauge
[5] Circulation pump

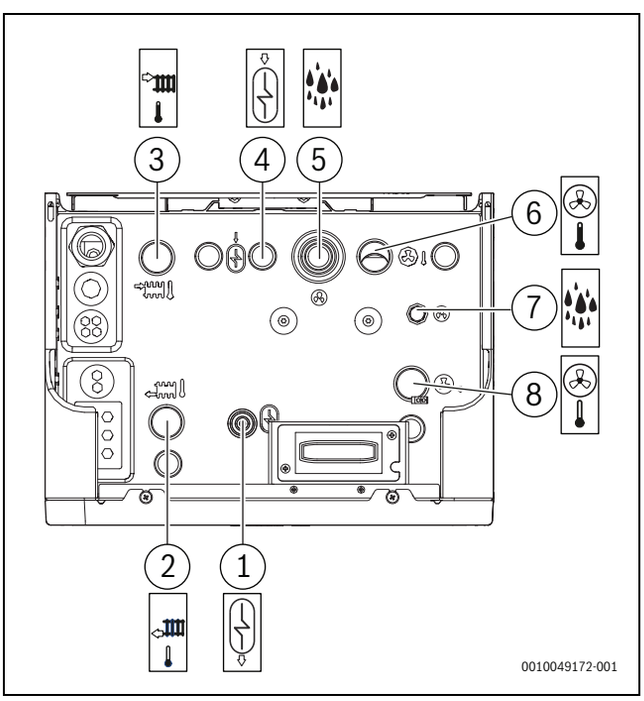

Fig. 6 Pipework connections

[1] Return line from water heater
[2] Return line from the heating system
[3] Flow line to the heating system
[4] Flow line to the water heater
[5] Condensation drain
[6] Heat transfer medium in from heat pump
[7] Overpressure discharge of the pressure relief valve
[8] Heat transfer medium out to heat pump

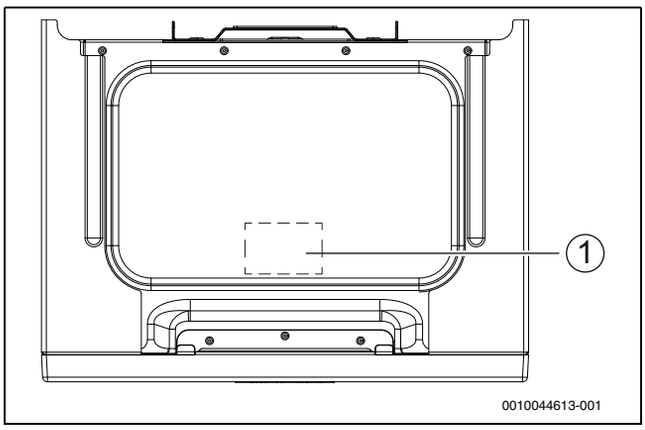

Fig. 7 Type plate position, inside of the appliance

[1] Type plate*

*The type plate contains information on the part number and serial number and also the date of manufacture of the device.

2.8 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)

2.9 Accessories

2.9.1 Required system components

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

Heating system:

- Heating system circulation pump
- Buffer cylinder
- Membrane expansion vessel
- Cap valve for the expansion vessel
- Automatic air vent valve [VL1] for buffer cylinder
- Magnetite filter/separator (not necessary if the system only consists of newly installed underfloor heating)
- Equipment for filling of the heating system

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.

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

Parallel setup:

- Non-return valve if the buffer cylinder is installed in a parallel setup and the cooling mode is active.

2.9.2 Optional accessories

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

- DHW cylinder (water heater)
- Automatic air ventilation valve for the DHW cylinder
- Thermostatic valve hot water
- Pressure relief valve DHW
- DHW circulation pump
- Filling equipment DHW
- Incoming cold water check valve
- Room controller
- Connect-Key K30RF
- Safety thermostat for under floor heating

2.9.3 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

The particle filter is installed horizontally in the return of the heating system. Note the direction of flow of the filter.

The drain pipe of the pressure relief valve in the indoor unit must be installed so that it is protected against frost, and the drain pipe must be routed to the drain.

- ▶ Run the connector pipes for the heating system and cold/domestic hot water in the building up to the installation location of the indoor unit.

3.1 Placement of the indoor unit

NOTICE

Risk of damaging the product!

The product may be damaged if it is exposed to moisture. Do not install the product in a bathroom or kitchen.

- ▶ Install the product in a dry area.

- 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 3 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 3 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[1)] – 10.0
	• Low-salt operation < 100 µS/cm	7.0[1)] – 10.0

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

Table 4 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

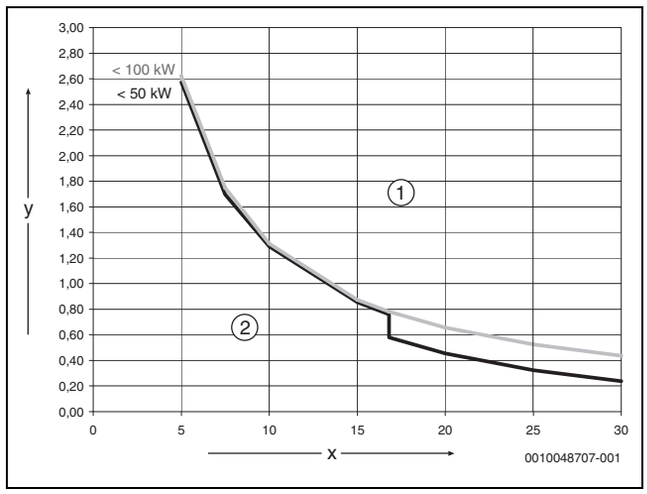

Fig. 8 Heat generators < 50 kW-100 kW

[x] Total hardness in °dH
[y] Maximum possible water volume over the service life of the heat source in m^3
[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 CaCO3 (USA)	0,056	0,07	0,1	1	0,01
1mmol/l=	5,6	7,02	10	100	1

Table 5 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[1)] for treatment of water in domestic hot water heating systems.

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

Table 6

3.3 Minimum volume and execution of the heating system

Normally the energy for the defrost cycle is drawn form 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.

1) Only applicable in the United Kingdom

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.

A small amunt of water residue may be present inside the appliance due to factory testing.

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 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 applicable (→ see required accessories chapter in 2.9.1)
3. Install the leakage drain hoses.
4. Connect heat pump to the indoor unit.
5. Connect the indoor unit to the buffer cylinder.
6. Install particle filter and magnetite separator (magnetite separator is only optional for new building with only under-floor heating system).
7. Connect the indoor unit to the water heater and the pressure-relief valve.
8. Mount the outside temperature sensor and any room controller.
9. Install and place the flow temperature sensor T0 at the buffer cylinder.
10. Connect the CAN-BUS cable to the heat pump and the indoor unit.
11. Install any accessories.
12. Connect the EMS-BUS cable to accessories if needed.
13. Fill and vent the water heater.
14. Fill and vent the heating system before commissioning.
15. Establish the electrical connection of the system.

4.3 Dimensioning of the DHW circulation pipes

If the following conditions are met, there is no need for a time-consuming calculation for one- to four-family houses:

- Circulation, individual and collecting pipes with an internal diameter of at least 10 mm
- Circulation pump DN 15 with a flow rate of max. 200 l/h and a delivery pressure of 100 mbar
- Length of DHW pipes max. 30 m

- Length of the circulation pipe max. 20 m
- The temperature drop must not exceed 5 K

For easy compliance with these specifications:

▶ Install regulation valve with thermometer.

In order to save electrical and thermal energy, do not run the circulation pump in continuous operation.

4.4 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.

On the side of the holder there is a lever that locks the module in place when it has been mounted. The lever is closed at delivery.

1. Open the lever (→[2], figure 9).
2. Place the module in the holder (→[1], figure 9).
3. Close the lever.

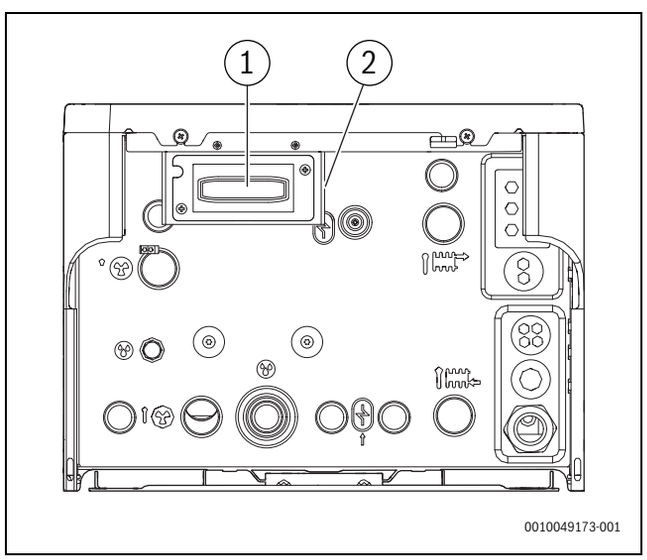

Fig. 9 Connect-Key K30RF placement

[1] Holder
[2] Lever

4.4.1 External connections

Maximum load at relay outputs: 5A, 400W, cosφ > 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.

4.4.2 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.

4.4.3 Several heating circuits (with heating circuit module)

In the default setting, a heating circuit without mixer can be controlled via the controller. If other circuits are installed, a heating circuit module is required for each one.

▶ Install the heating circuit module, mixer, pump and other components according to the selected system solution.
▶ Before commissioning the system, make the setting for the heating circuit at the heating circuit module, if required (→ manual for heating circuit module).
▶ Make the settings for several heating circuits as described in the controller manual.

4.4.4 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).

4.5 Installation with cooling mode

4.5.1 Condensing cooling mode with fan convectors

It is required to install a non-return valve if the buffer cylinder is installed in a parallel setup and the cooling mode is active.(→ see required accessories chapter in 2.9.1).

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.

4.6 Remove the front

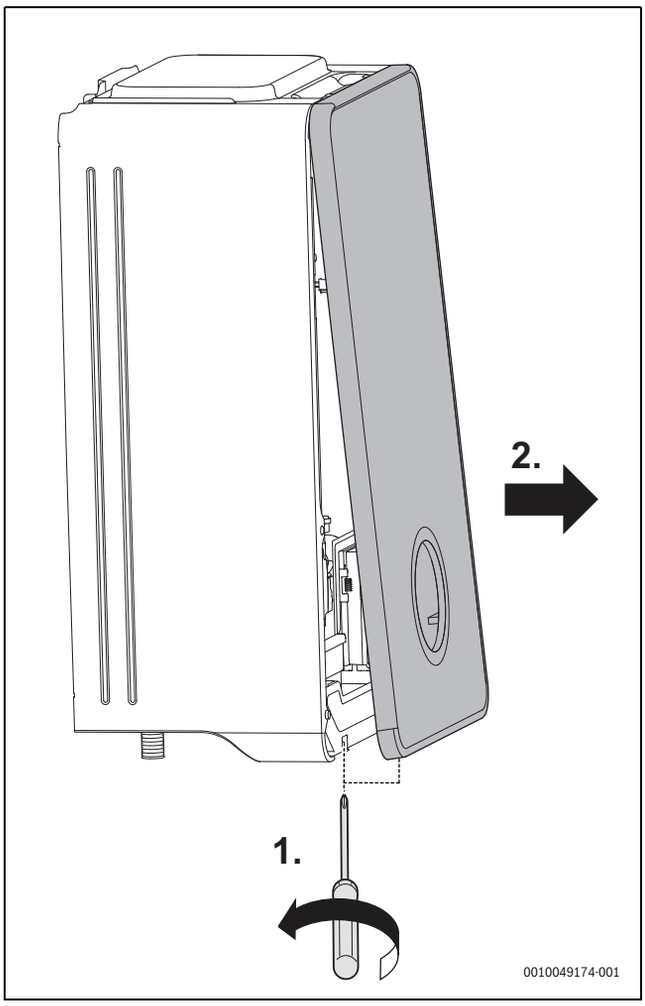

Fig. 10 Remove the front

4.7 Remove the side cover and lower plate

For easier access to the piping, the lower plate can be detached. Please note the cable on the back of the plate.

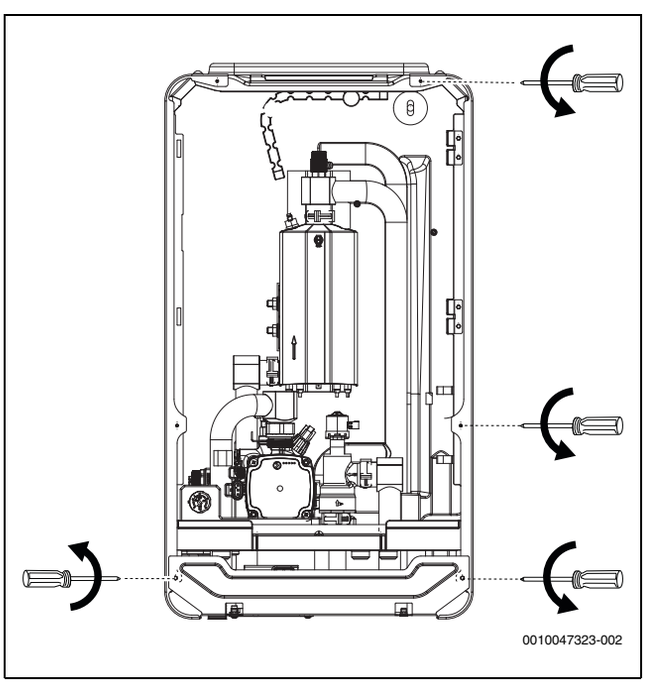

Fig. 11

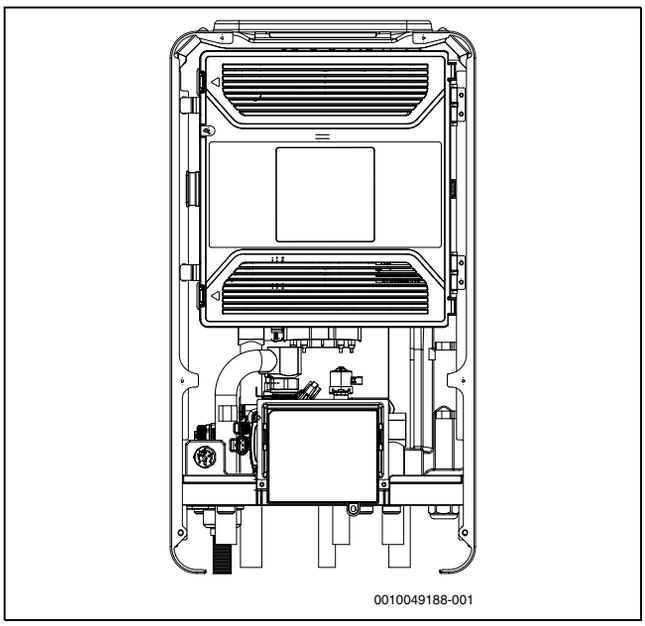

Fig. 12

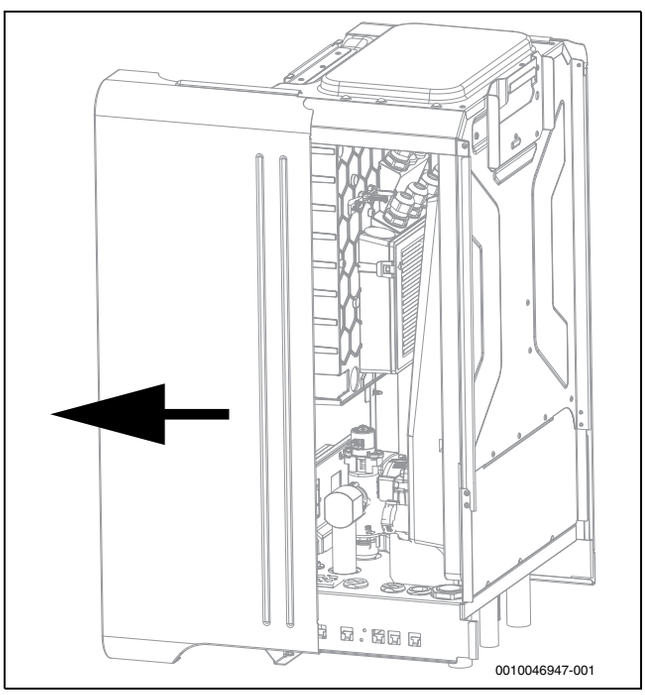

Fig. 13 Remove the side cover

5 Pipework 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.

For easier access, it is recommended to connect the **rear** pipes first.

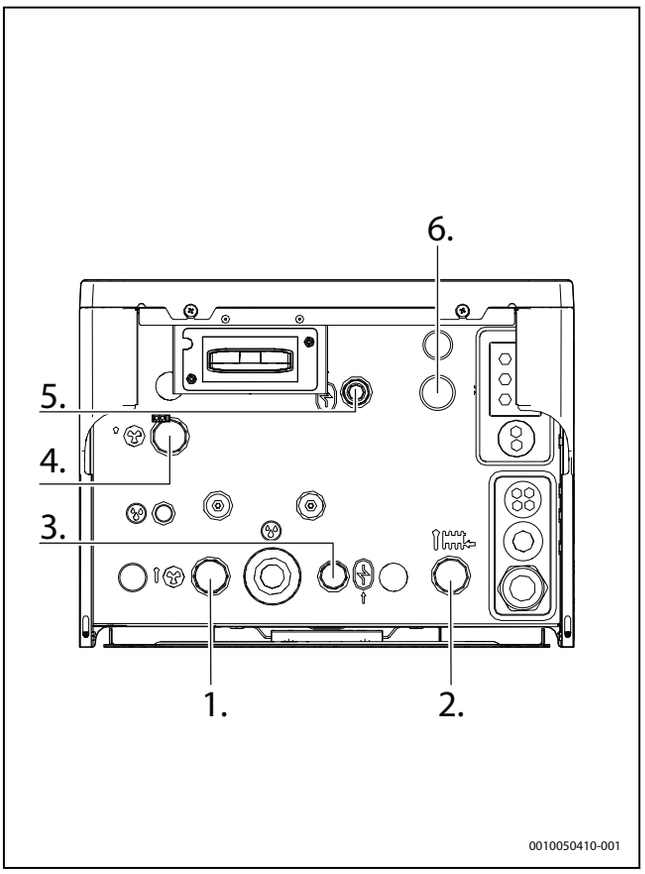

Fig. 14 Pipe connections

If Installation is done without a DHW cylinder, the pipes need to be capped.

- ▶ Put caps on the flow- and return DHW pipes.

If no DHW cylinder is connected, then the backup electric heater needs to be activated to ensure active defrost.

In accordance with good installer practice it may be required to install additional air vent valves at the highest point of installation.

5.1 Insulation

NOTICE

Material damage from frost!

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

- ▶ Use insulation with a thickness of at least 19 mm for pipework outdoors.
- ▶ 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 7).

- ▶ 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.

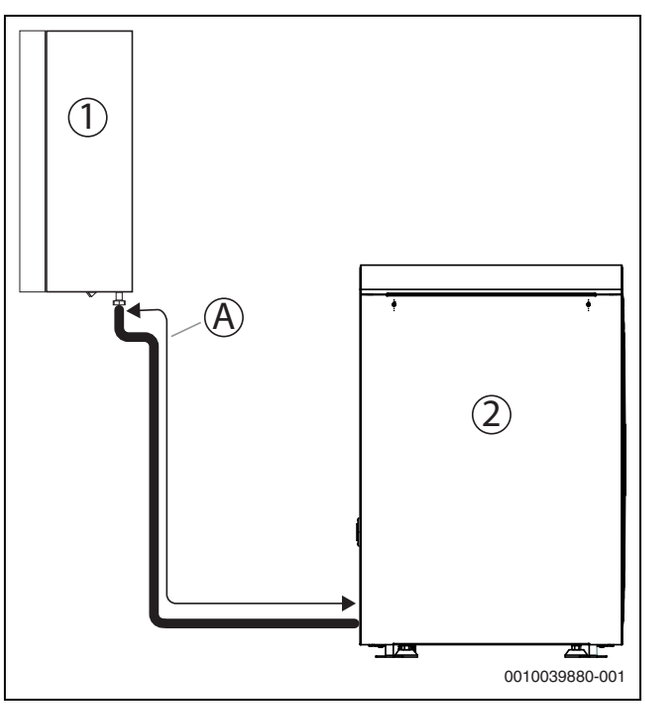

Fig. 15 Pipe length A

[1] Indoor unit, wall-mounted
[2] Heat Pump

Heat Pump	Heat transfer fluid delta (K)[1)]	Nominal flow (L/min)	Δp (mbar)[2)]	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 15] PEX (m)			
4	4	15[3)]	437	9	23	30	
5	5	17,3	376	5	15	30	

Heat Pump	Heat transfer fluid delta (K)[1]	Nominal flow (L/min)	Δp (mbar)[2]	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 15] PEX (m)			
7	5	20,2	286		7	30	
10	5	27,4	284			22	30
12	6	28,8	231			13	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 7 Pipe dimensions and maximum pipe lengths (one-way) for connecting a heat pump to indoor unit CS6800iAW 12 E with integrated immersion heater

5.3 Connect the indoor unit to the heat pump

- Select pipe size according to the heat pump manual.
- Connect heat transfer medium pipes in from the heat pump. Install a drain valve [VA0] in this pipe.
- Connect heat transfer medium pipes out to the heat pump. Install the fill valve (VW2) on the same connection on the indoor unit.

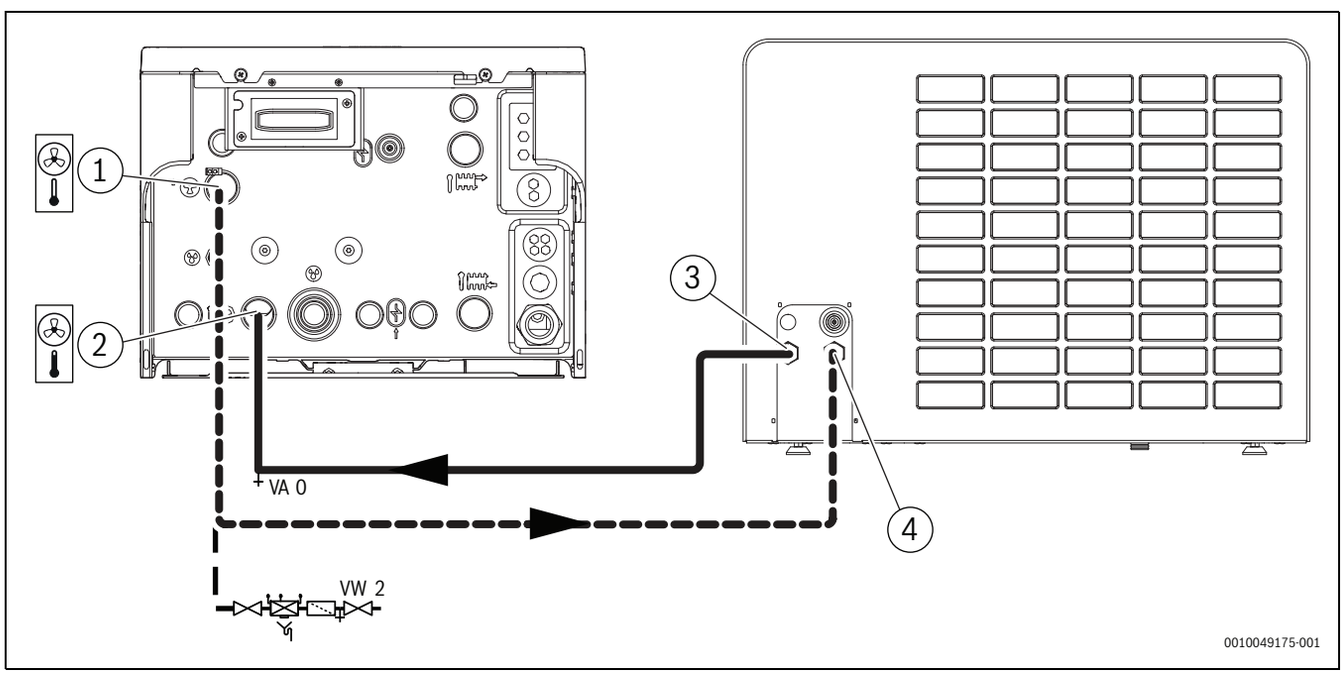

Fig. 16 Connection of the indoor unit to the heat pump

[1] Heat transfer medium out to heat pump
[2] Heat transfer medium in from heat pump
[3] Flow line from the heat pump
[4] Return line to the heat pump

5.4 Connect the indoor unit to the heating system

For easy service of the expansion vessel a cap valve must be install ed at the connection.

- Run the leakage drain hose down to a frost protected drain.
- Connect the particulate filter [SC1], expansion vessel, magnetite separator and the return line from the heating system.
- Connect the flow line to the heating system.

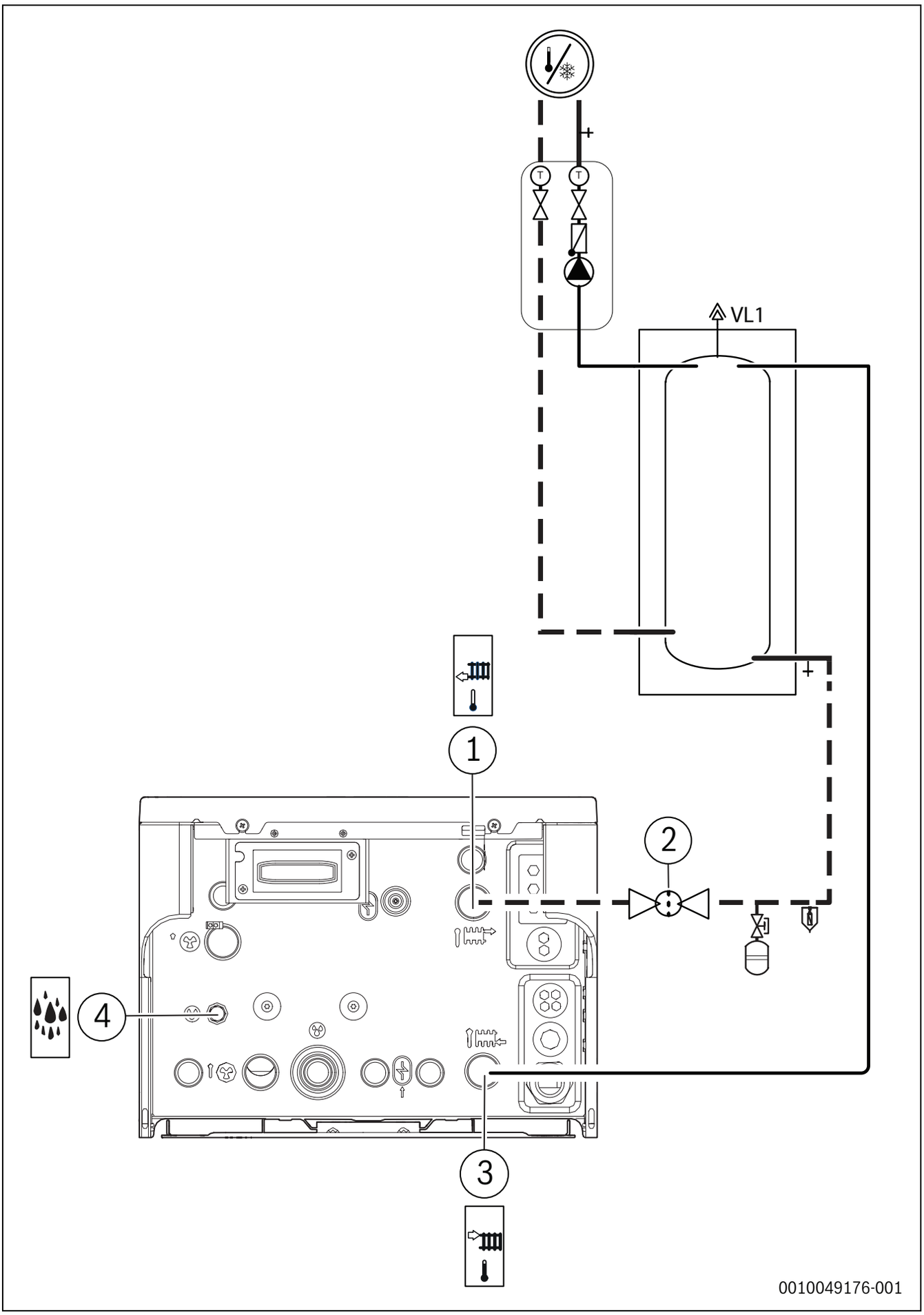

Fig. 17 Connection of the indoor unit to the heating system

[1] Return line from the heating system
[2] Particle filter [SC1]
[3] Flow line to the heating system
[4] Drain connection from the safety valve

5.5 Heating system pump (PC1)

Depending on the configuration of the heating system, a heating pump is needed that is selected depending on the flow and pressure drop requirements.

PC1 must always be connected to the indoor unit as per the wiring diagram.

Maximum load relay output for pump PC1: 6A cosφ >0.4. If the load is higher, install an intermediate relay.

5.6 Connect the indoor unit to hot 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.

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). Check the documentation supplied with the DHW cylinder for connection instructions.

To avoid collection of air an automatic air vent valve must be installed on the flow line at the inlet to the DHW cylinder (not included in the scope of delivery).

- Install the pressure relief valve and cold water valve with a non-return valve for tap DHW.
- Connect cold water in to the water heater.
- Run the leakage drain water line from the pressure relief valve to a frost protected outlet.
- Connect hot water out from the water heater.
- Connect optional circulation pump for domestic hot tap water (accessory).
- Connect the return line [4] with valve VC4 from the water heater.
- Connect the flow line [3] with automatic air vent valve [2] to the water heater.
- The domestic tap water system must be protected from pollution at the installation.

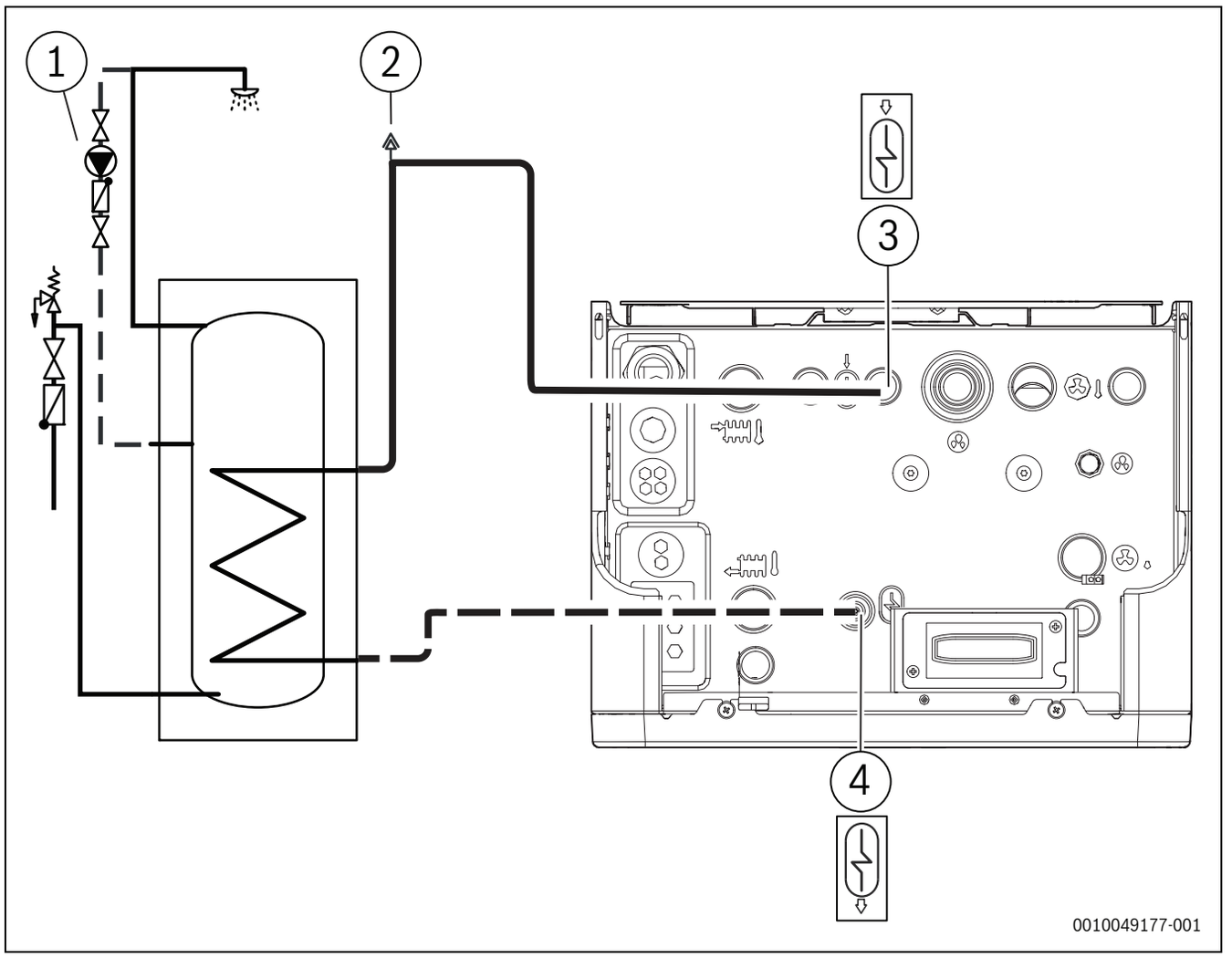

Fig. 18 Indoor unit connections tap water

[1] Circulation pump for hot tap water PW2 (accessory)
[2] Automatic air vent valve
[3] Flow line to the water heater
[4] Return line from the water heater

5.7 Outdoor unit, 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.

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.

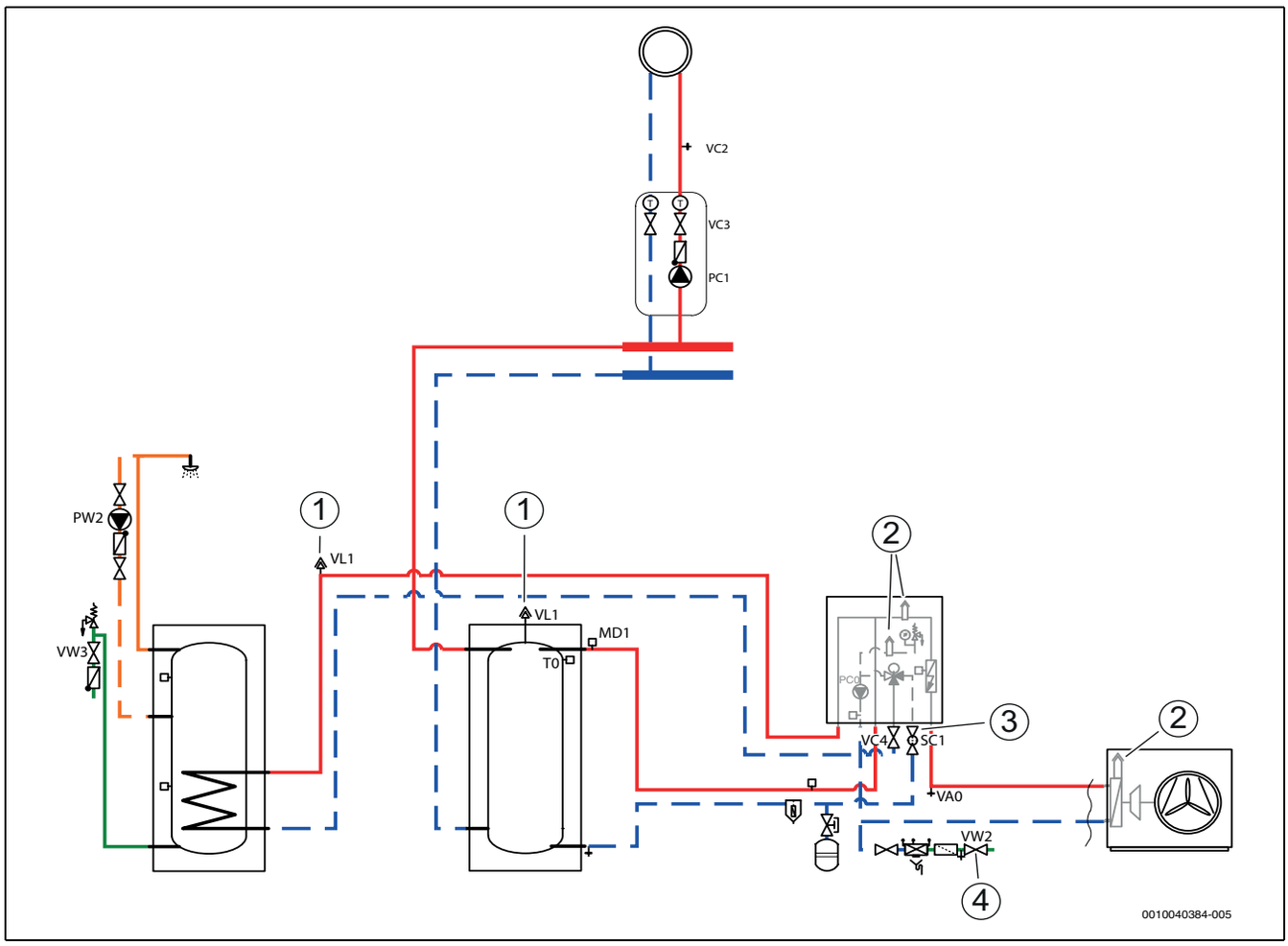

Fig. 19 Indoor unit, heat pump, DHW cylinder and heating system with buffer

[1] Automatic purge valve
[2] Manual purge valve
[3] Particle filter SC1
[4] Fill valve VW2

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 off 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 to the DHW cylinder coil VC4.
4. Connect a hose to the drain valve VA0 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 drain hose and there are no more bubbles in the heat pump.
7. Close the drain valve VA0 and the fill valve VW2.
8. Open the cold water valve VW3.
9. Open a hot water tap to fill the DHW cylinder. Close the tap when only water is emerging.

Step 2: Filling the heating system

10. Move the drain hose to the heating system drain valve VC2.
11. Open the particle filter SC1, the valve to the DHW cylinder coil VC4, the drain valve VC2 and the fill valve VW2 to fill the heating system.
12. Continue filling until only water comes out of the drain hose and there are no more bubbles in the heating system.
13. Open the valve VC3.
14. Close the drain valve VC2 and remove the hose.
15. Open the manual air vent valves and close them when only water is emerging.
16. Continue filling until target pressure (→ table 11) is displayed at the GC1 pressure gauge.
17. 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.

⚠ Danger to life from electric shock!

Touching live parts can lead to electric shock.

- ▶ Before working on any electrical part, interrupt all poles of the power supply (230 V AC and 400 V 3P) to the indoor unit (by fuse or circuit breaker).
- ▶ Secure against unintentional switching on again.
- ▶ Check that there is no voltage.

⚠ Malfunctions caused by electrical interference!

High-voltage cables (230/400 V) in the vicinity of communication- and sensor cables can cause the indoor unit to malfunction.

- ▶ Route communication- and sensor cables with a minimum distance of 100 mm separately to power cables. The communication cable can be routed together with sensor cables.

6.2 General information

- ▶ Observe protective measures according to national and international regulations.
- ▶ Do not connect any other consumers to the mains connection of the device.
- ▶ Provide fuses according to the specifications:
  three-phase mains power supply (400 V) for booster heater stage 9 kW →Section 6.10.1
  one-phase mains power supply (230 V) for booster heater stages 3 kW and 6 kW →Section 6.10.1.
- ▶ Select cable diameter and type according to fuse size and wiring type.
- ▶ Connect the indoor unit according to the wiring diagram. Do not connect any other consumers.
- ▶ Always connect the three-phase indoor unit directly to the main distribution board via a three-pole automatic circuit breaker.
- ▶ Pay attention to the color 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 6.10.4 – 6.10.6. 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.

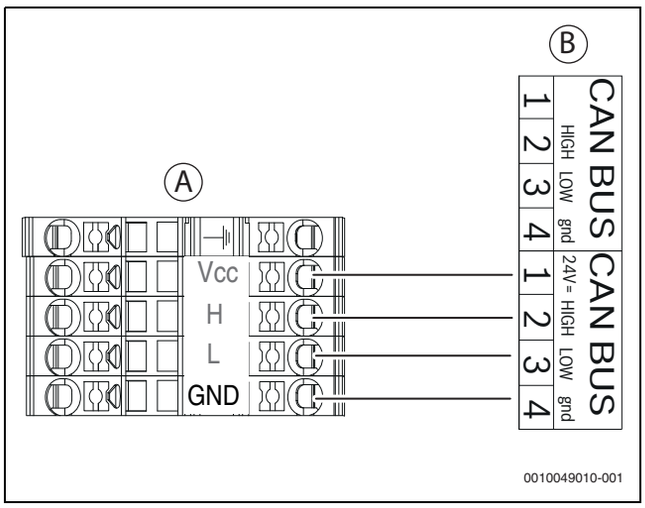

Fig. 20 CAN-BUS heat pump - indoor unit

[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^2 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 striping length for all cables is 120mm. Maximum wire striping is between 8-10mm.

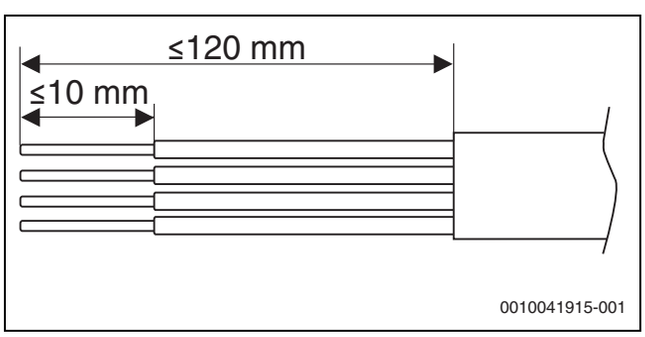

Fig. 21 Wire striping CAN-BUS

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^2.
- 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. 22.

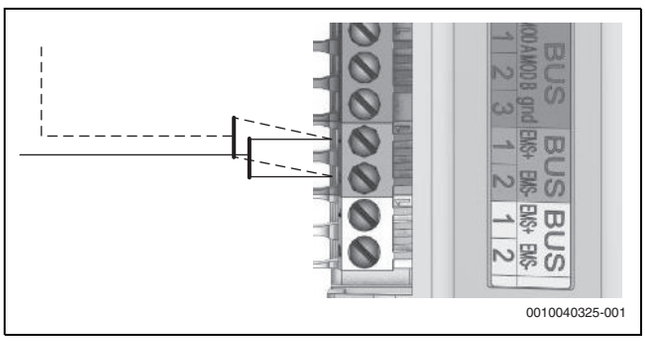

Fig. 22 EMS connection

6.5 Installation of the temperature sensor

In the default setting, the controller automatically regulates the flow temperature depending on the outside temperature. A room temperature-dependent controller can be installed for greater comfort.

6.6 Flow temperature sensor T0

The sensor is included in the scope of delivery.

- Install the sensor at the buffer cylinder according to the installation manual for the cylinder.
- Connect the flow temperature sensor to terminal T0 in the electric box of the indoor unit.

6.7 DHW cylinder temperature sensor TW1/TW2

When a DHW cylinder is installed, a temperature sensor TW1 must be connected to the system. For some cylinders an additional TW2 sensor is also needed.

- Connect the hot water temperature sensor TW1/TW2 to terminal TW1/TW2 on the XCU-THH (XCU HY) module in the indoor unit.

6.8 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.

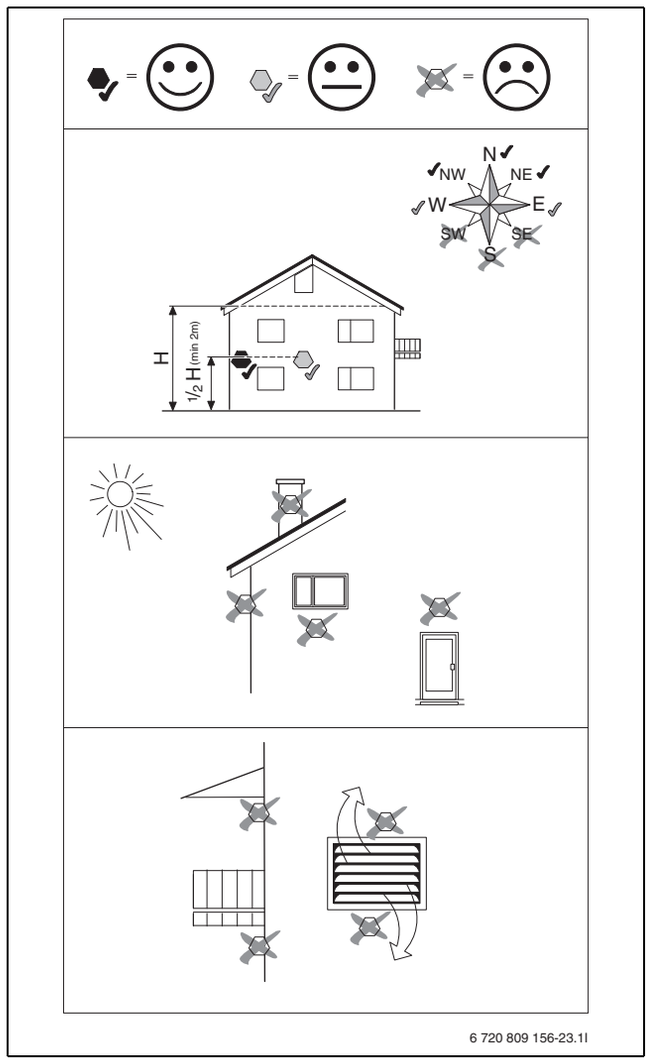

Fig. 23 Position of the outdoor temperature sensor

6.9 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.

6.10 Establishing the power supply connection

6.10.1 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 *Terminals allow use of fine-stranded or solid core wire*	According to local rules and regulations If fine-stranded wires are used: ▶ ⚠ for ambient temperature <30 °C: use cables with temperature resistance ≥ 80 °C! ▶ ⚠ for ambient temperature ≥ 30 °C[1]: use cables with temperature resistance ≥ 85 °C!	According to local rules and regulations If fine-stranded wires are used: ▶ ⚠ for ambient temperature <30 °C: use cables with temperature resistance ≥ 80 °C! ▶ ⚠ for ambient temperature ≥ 30 °C[2]: use cables with temperature resistance ≥ 85 °C!
Cable diameter	5 x 2,5 mm^2	3 x 2,5 mm^2
Fuse and maximum external load[3]	3x16A: max. 210W 3x20A: max. 500W	1x16A: max. 135W 1x20A: max. 500W

1) Please note that the maximum ambient temperature of the appliance must not exceed 35 °C

2) Please note that the maximum ambient temperature of the appliance must not exceed 35 °C

3) External load to outputs

Table 8 Cable area and cable type

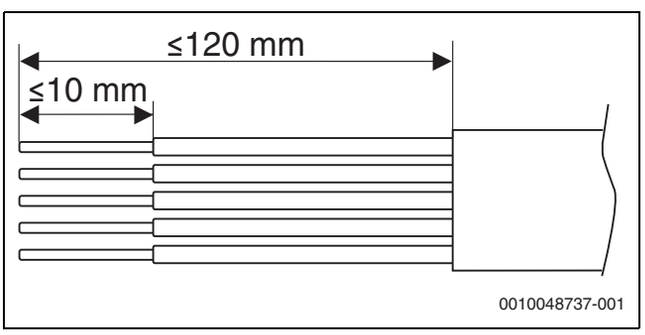

Fig. 24 Wire striping mains feed connection

6.10.2 Connect the indoor unit

NOTICE

Risk of material damage due to a short circuit!

The insulation can melt on cables that touch hot surfaces and then cause a short circuit.

▶ The cable routing must be done in such a way that the cables don't touch hot surfaces like pipes or the booster heater.

Cable ties must be used to fix the cables to the given fixing points.

1. Remove the electrical box cover.
2. Route the cables from the cable inlets to the electric box:
   – Feed the connecting cables over the cable feeds on the bottom of the indoor unit. See figure 25 for the correct order of the cables.
   – Fix the cables with cable ties at the fixing points (→Figure 25 [3], Figure 26 [2], [4]). Avoid crossing the cables.
   – Route and fix the cables inside the indoor unit (→Figure 26).
   – After inserting the cable, tighten the cable gland (→Figure 25 [1])
3. Feed the cables into the electric box (→Figure 27).
4. Connect the cables according to the chapters 6.10.4 – 6.10.4.
5. Reattach the cover of the electric box.

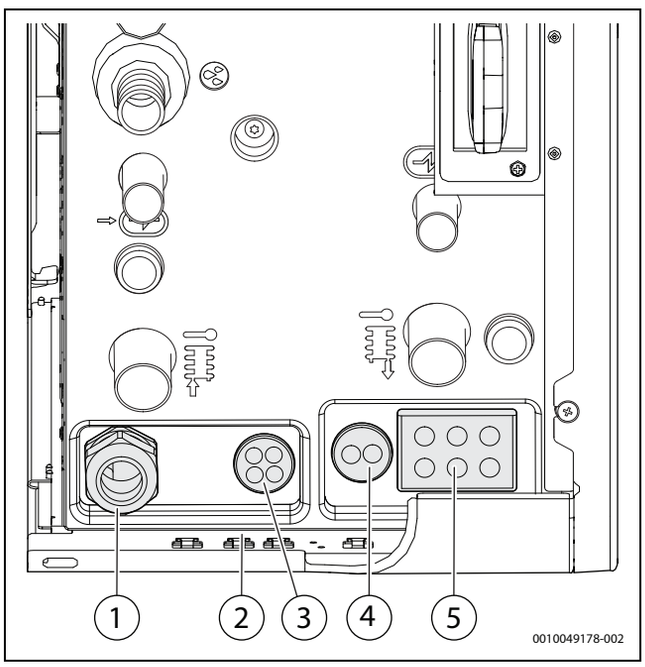

Fig. 25 Cable inlets to the indoor unit

[1] 400V~3N, input to indoor unit (booster heater)
[2] Fixing points on sheet metal plate for fixing the cables with cable ties
[3] 230V~1N, output to DHW circulation pump PW2
230V~1N, output from PK2, cooling season
230V~1N, relay output for circulation pump PC1, heating circuit
230V~1N, output to accessory module
[4] CAN-BUS cables
[5] T0: Temperature sensor, flow
T1: Temperature sensor, outdoor
TW1: Temperature sensor, DHW
TW2: Temperature sensor, DHW
MD1: Condensation sensor (accessory for cooling mode)
I1-I4: External inputs
EMS-BUS cable for accessory

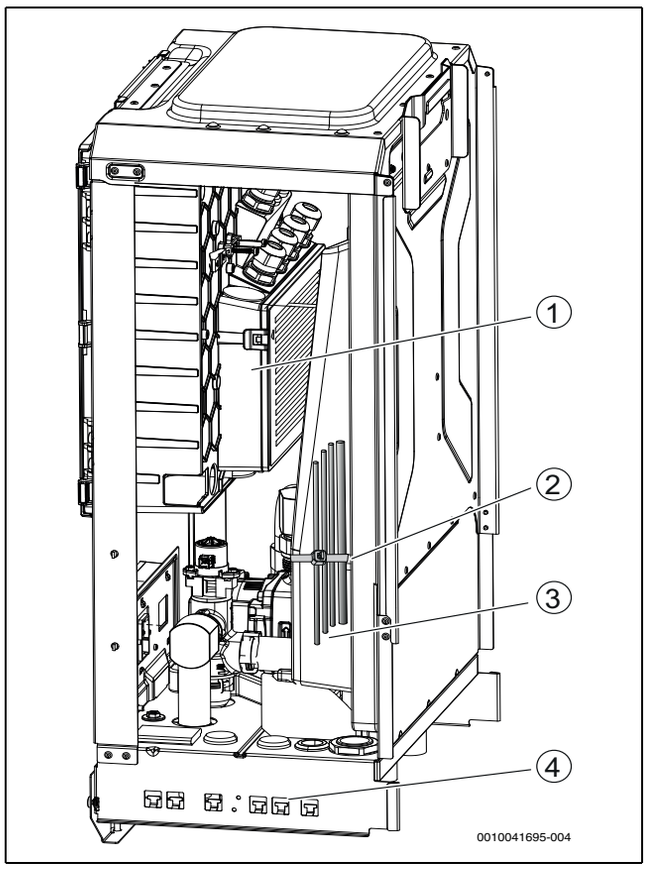

Fig. 26 Cable routing

[1] Electric box
[2] Fixing point for fixing the power cables with cable ties. The cables has to fitted on this side of the separation.
[3] Electric heater and pipe behind insulation
[4] Fixing points on sheet metal plate for fixing the cables with cable ties

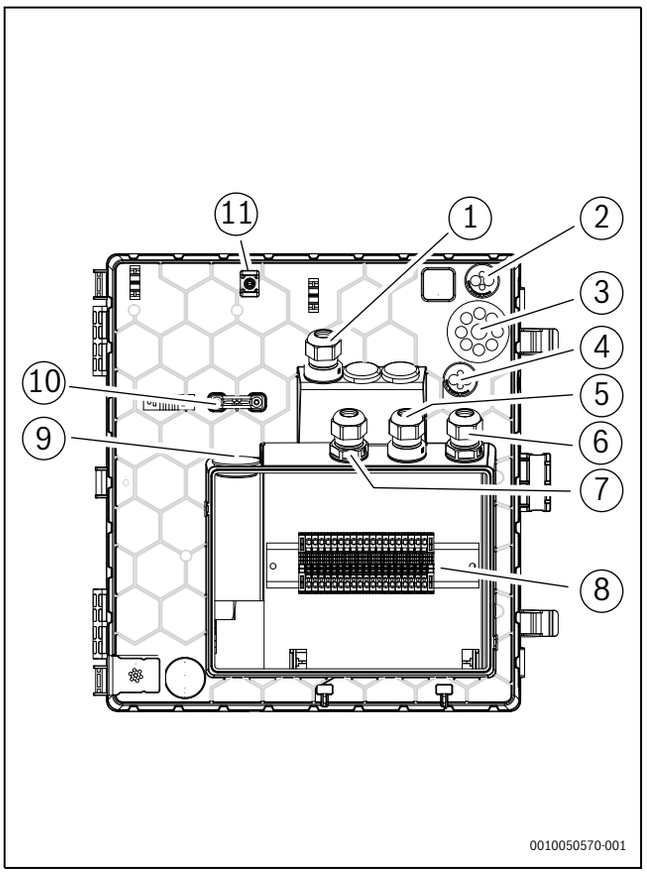

Fig. 27 Cable feeds to electric box

[1] 230V~1N, output to accessory module
[2] CAN-BUS cables
[3] T0: Temperature sensor, flow
T1: Temperature sensor, outdoor
TW1: Temperature sensor, DHW
TW2: Temperature sensor, DHW
I1-I4: External inputs
MD1: Condensation sensor (accessory for cooling mode)
[4] EMS-BUS: accessory
[5] 230V~1N, relay output for circulation pump PC1, heating circuit
[6] 230V~1N, output to DHW circulation pump PW2
[7] 230V~1N, output PK2, cooling season
[8] Terminals in electric box
[9] 400V~3N, power input to the indoor unit. The cable must be fixed with the strain relief →[11].
[10] Strain relief
[11] Fixing points for sensor-/communication cables

For cable feeds (→Figure 27 [2], [3], [4], [10]) 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 27 [1], [5], [6], [7], [8]).
- Use the defined fixing points [12] to fix the cables that was inserted through the entries (→Figure 27 [2], [3], [4]).

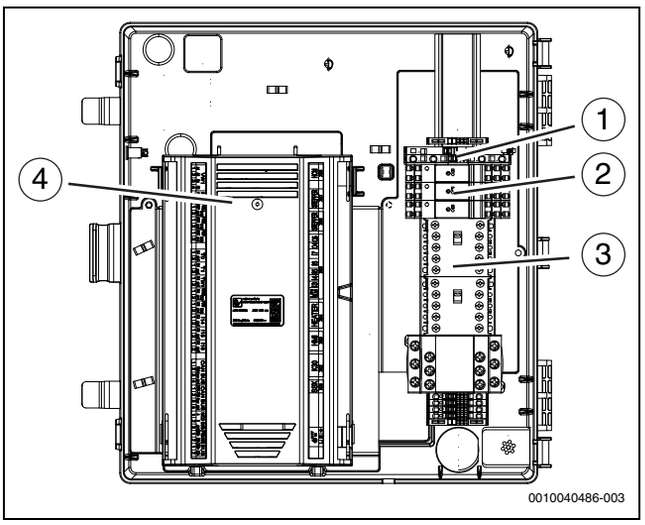

Fig. 28 Arrangement of components in the electric box

[1] Melting fuse for external circulation pumps PC1, PW2 and PK2
Type: cartridge fuse 250V; 5x20mm; 5A speed T
[2] Relays: outputs for PC1, PW2 and PK2
[3] Contactors for switching booster heater
[4] XCU-THH (XCU HY) module

6.10.3 Mount the side cover

▶ Slide the side cover in place, when all connections are done.

6.10.4 Terminal connections in electric box

Please note the jumper arrangement.

▶ Make sure that no cables are squeezed between the side cover and the structure (→Figure 29 [1]).

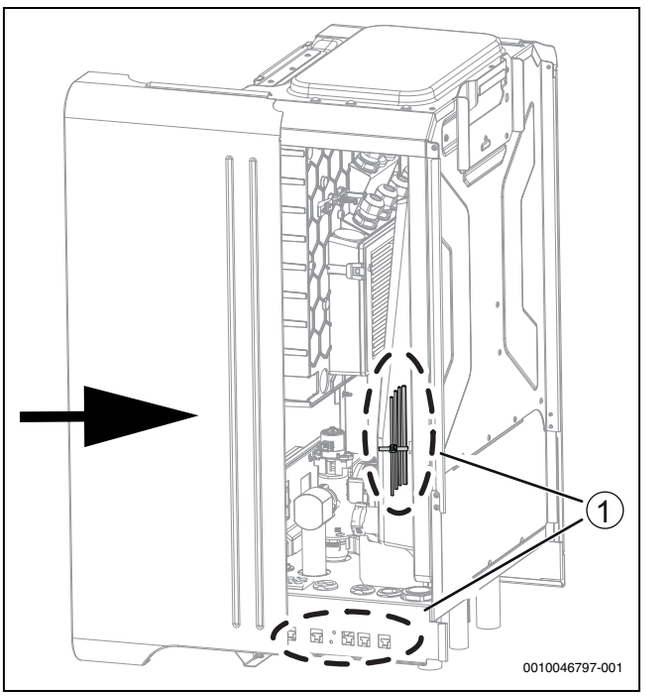

Fig. 29 Slide the side cover in place

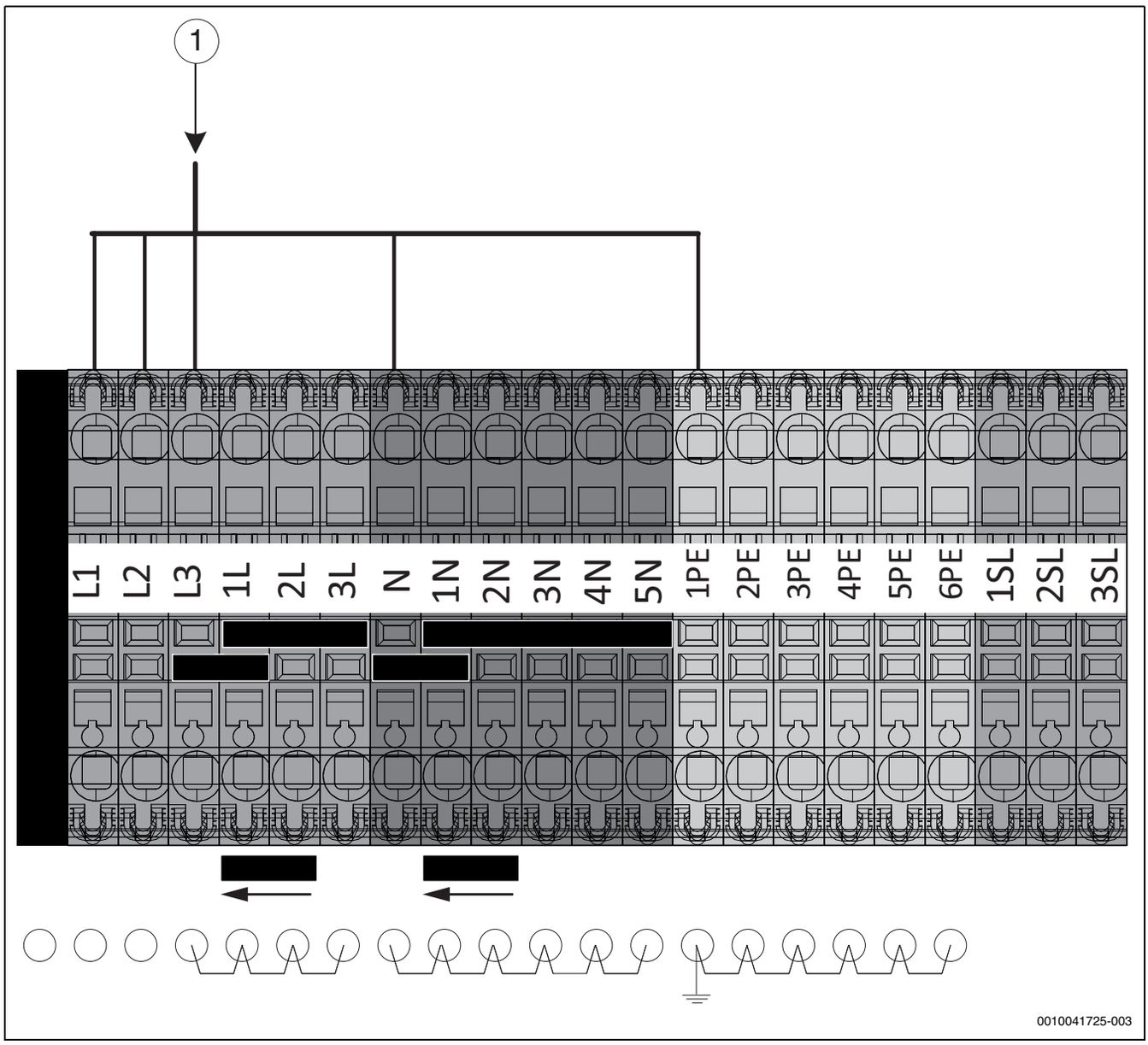

Fig. 30 Electrical connections

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

6.10.5 Terminal connections in electric box

Please note the jumper arrangement.

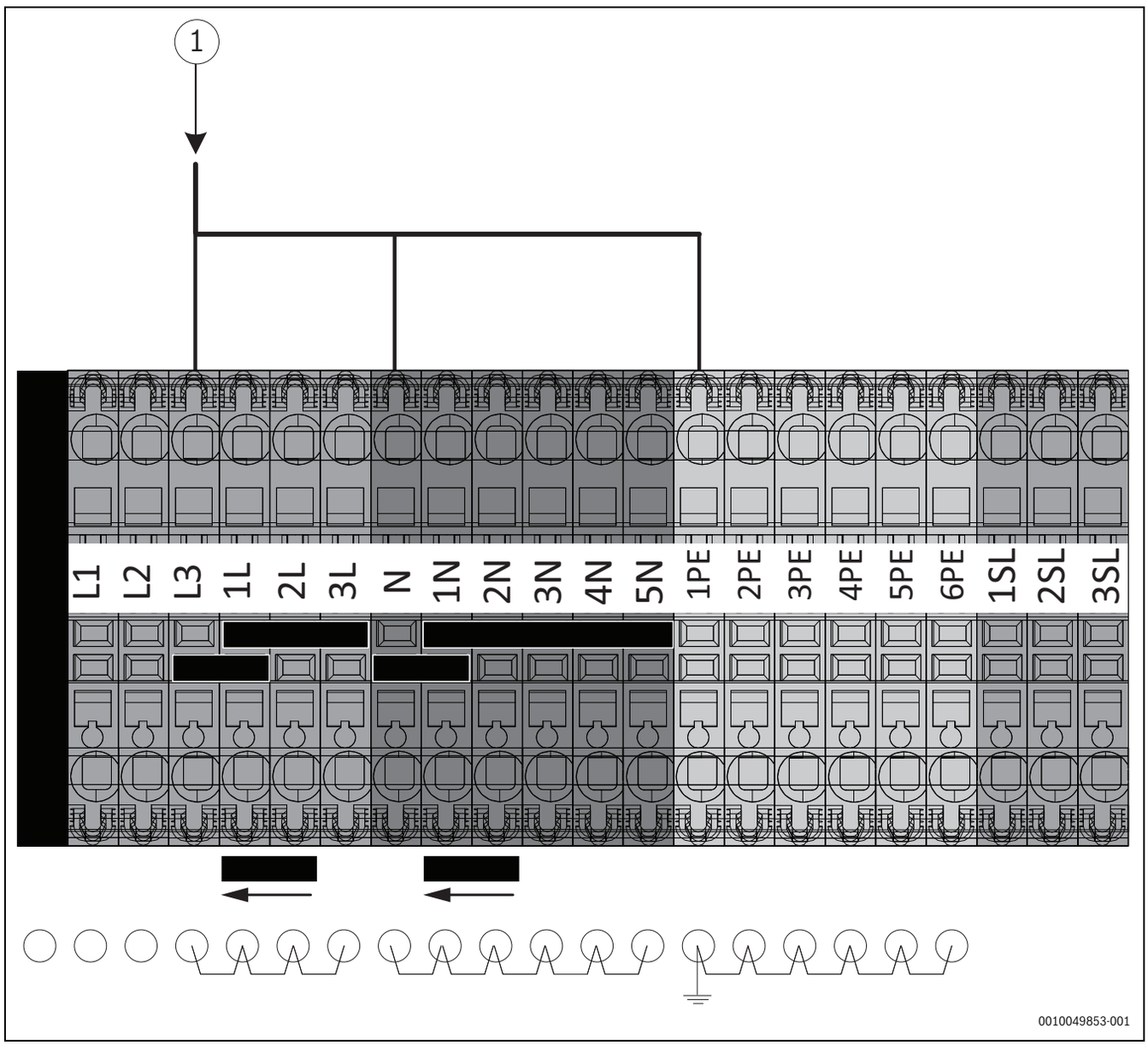

Fig. 31 Electrical connection for single-phase, 3kW only

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

6.10.6 Terminal connections of accessories in electric box

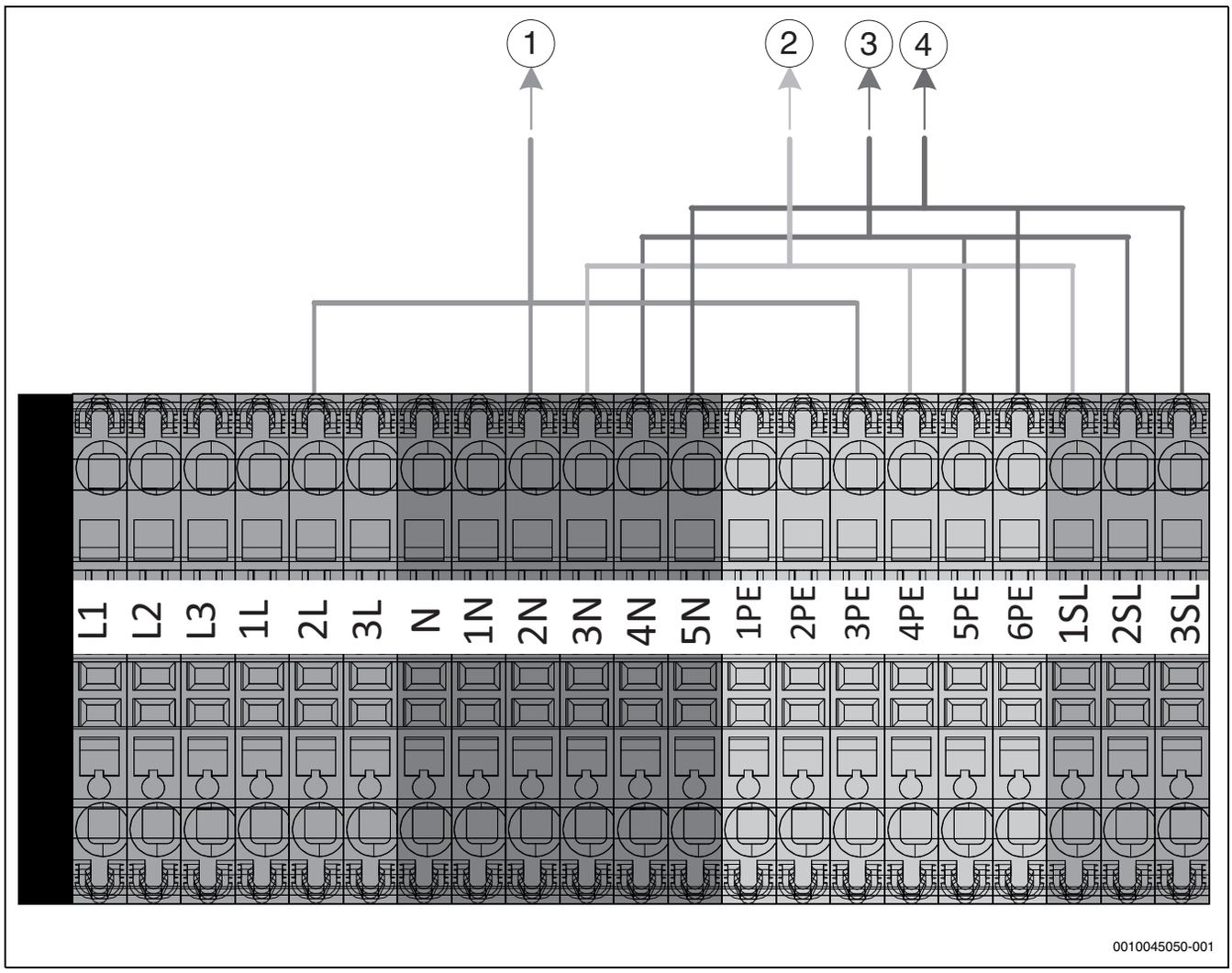

Fig. 32 Electrical connections for accessories

[1] 230V ~1N output to accessory
[2] 230V ~1N relay output for circulation pump PC1, heating circuit
[3] 230V ~1N relay output to circulation pump PW2, DHW circulation
[4] 230V ~1N relay output PK2, cooling season

6.10.7 Connections XCU-THH (XCU HY) module

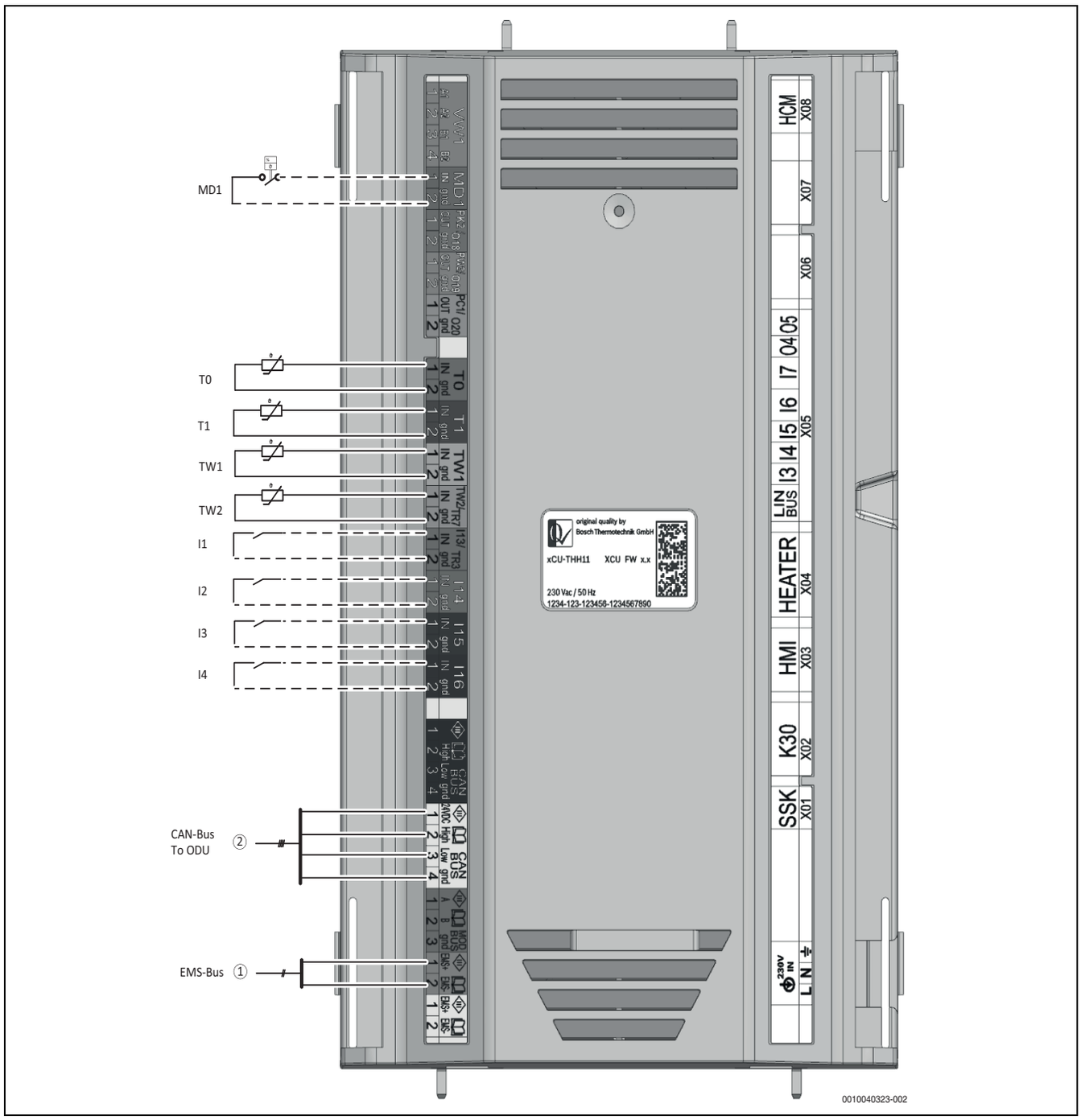

Fig. 33 Connections

[I1] External input 1:
[I2] External input 2: Block heating or DHW
[I3] External input 3: Heating circuit overheat protection (safety thermostat)
[I4] External input 4: SmartGrid (SG) / Photovoltaic (PV)
[MD1] Condensation sensor (cooling mode accessory)
[T0] Temperature sensor, flow
[T1] Temperature sensor, outdoor
[TW1] Temperature sensor DHW
[TW2] Temperature sensor DHW
[1] EMS-BUS to accessory
[2] CAN-BUS to heat pump (ODU)

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

▶ Place a cable tie in front of each XCU-THH (XCU HY) connector.

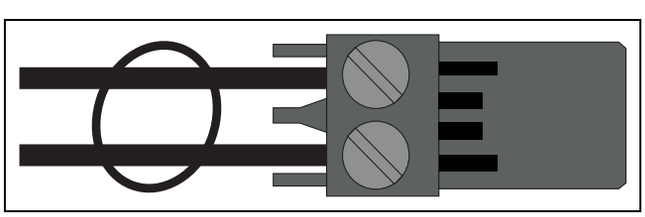

Fig. 34 Cable tie on connector

7 Commissioning

WARNING

Material damage from frost!

The 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. Activate the power.
2. Commission the heating system by managing necessary settings in the control unit (→ control unit manual).
3. Vent entire heating system following commissioning.
4. Check that all sensors show expected values.
5. Check and clean particulate filters.
6. Check the functionality of the heating system.

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.

In every system installation, only the menus of the installed modules and components are displayed. The available menu options can be different depending on the country or market.

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.
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 unit 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.
System buffer storage tank	Select [Yes] if a buffer cylinder is installed. Otherwise select [No]. Select [Next] to continue with the configuration **-or-** [Back] to go back.
Bypass installed	This menu is shown if no buffer cylinder is installed. Select [Yes] if a bypass is installed in the system.Otherwise select [No]. Select [Next] to continue with the configuration **-or-** [Back] to go back.
Fuse[1)]	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.

Menu item	Description
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. • Single-family home. With this setting, all functions are available in the remote control. • 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. 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.
Dew pt. HCXXX[2] The setting is related to the heating circuit.	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 **-or-** [Back] to go back.
Heat. system type HC1	Set the maximum flow temperature for heating circuit 1 and confirm.[3] Radiators / Convectors [30…**65**…75] °C Radiant floor heating [30…**40**…60] °C Select [Next] to continue with the configuration **-or-** [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 [30…**65**…75] °C Radiant floor heating [30…**40**…60] °C Select [Next] to continue with the configuration **-or-** [Back] to go back.
If several heating circuits are installed, follow this action by making the settings for the other heating circuits.	
Hot water	Set the type of hot water preparation. Not installed | Heat pump | Freshwa.
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 **-or-** 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 radiator or convector and Cooling or Heating + Cooling function has been selected for the heating circuit.

3) The maximum temperature setting is depending on the variant of the indoor unit.

Table 9 Configuration wizard

7.3 Outdoor unit, 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. 19).
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 10 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

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 11 Operating pressure

- If the pressure does not remain constant, check whether the heating system and the expansion vessel are tight.

7.5 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 12). This setting can be changed in the Electrical auxiliary heater menu.

Countries
France
Great Britain
Ireland
Italy

Table 12 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.

7.6 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.

7.7 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.

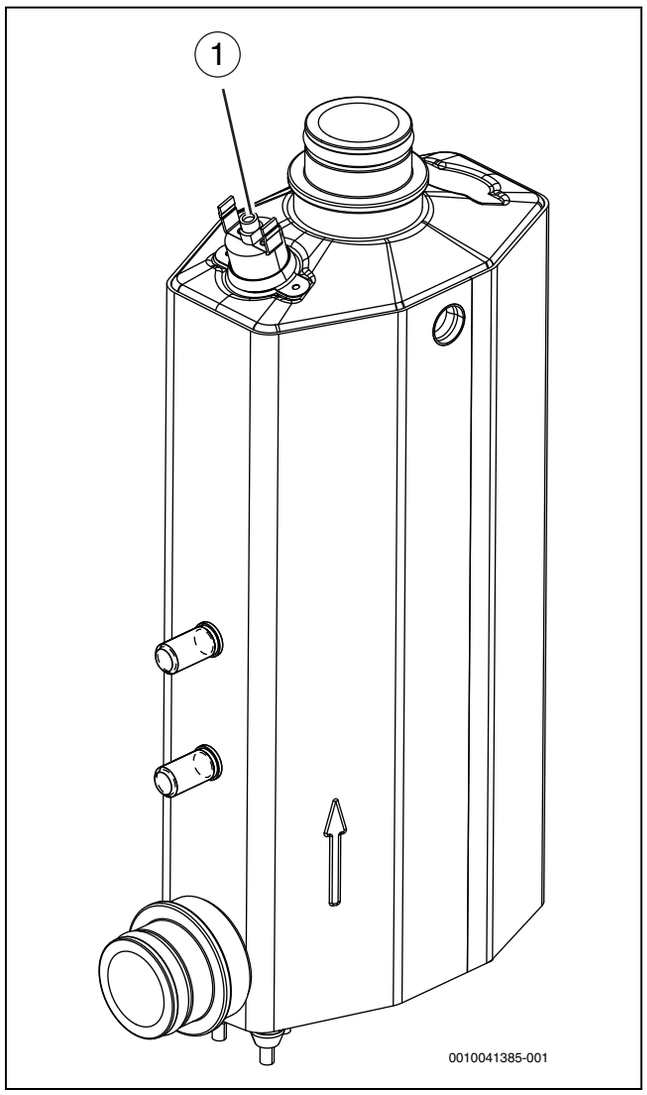

Fig. 35 Electrical heater

[1] Reset over heat protection

8 Maintenance

DANGER

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).

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).

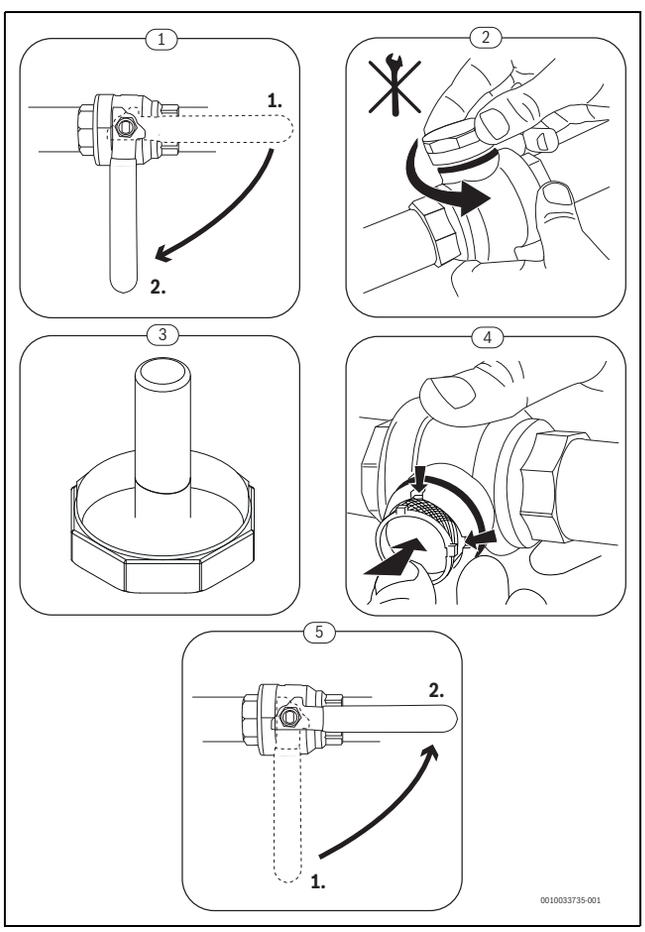

Fig. 36 Cleaning the strainer

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 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 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.

8.3 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.

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9 Environmental protection and disposal

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

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

10.1 Specifications indoor unit with booster heater

CS6800iAW 12 E	Unit	3	9
Electrical information			
Power supply	V	230 1N~50Hz	400[1)]
Recommended fuse size, class B	A	→ Chapter 6.10.1	
Booster heater	kW	3	3/6/9

CS6800iAW 12 E	Unit	3	9
Heating system			
Connection heating (flow and return)	mm	Ø 28	
Connection heat pump (flow and return)	mm	Ø 28	
Maximum operating pressure	kPa/bar	300/3	
Minimum operating pressure	kPa/bar	70/0,7	
Nominal flow		Table 13	
Maximum externally available pressure at nominal flow		3)	
Expansion vessel	l	N/A	
Maximum water temperature (flow), booster heater only	°C	75	
Minimum water temperature (if cooling is available)2)	°C	7	
Minimum flow (defrosting)	l/min	15	
Hot water cylinder (DHW)			
Connection flow and return	mm	Ø 22	
Heat transfer medium			
Pressure drop available for pipes and components between indoor and outdoor unit	kPa	3)	
Circulation pump type PC0		Grundfos UPM4L K	
General			
Waste water connection	mm	Ø 24	
IP-Rating	IP	X4D	
Dimensions (width x depth x height)	mm	400 x 300 x 710	
Weight	kg	26	
Installation height		Up to 2000 m above sea level	

1) 3N AC, 50 Hz

2) Lowest value only possible in combination with external tank with cooling below dew point

3) The flow rate and available pressure depend on the connected heat pump and the installed external circulation pump (→ 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 13 Nominal flow heating system

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.

Certain system solutions require accessories (buffer cylinder, diverter valve, mixer, heating pump). The heating pump PC1 is activated by the controller in the indoor unit.

10.2.1 Explanations of the system solutions

	General
XCU-THH (XCU HY)	Installation module integrated in the heat pump module
UI800	Control unit
CR10H	Room controller (accessories)
T1	Outdoor sensor
MK2	Humidity sensor (accessory)
WP/WD/WH	DHW cylinder (accessory)
VW1	Diverter valve (accessory)
PW2	DHW circulation pump (accessory)
TW1	Hot water temperature sensor

	Heating circuit without mixer
PC1	Circulation pump, heating circuit
T0	Flow temperature sensor

	Heating circuit with mixer
MM100	Heating circuit module (control unit for circuit)
PC1	Pump for heating circuit 2
VC1	Mixer
TC1	Flow temperature sensor, heating circuit 2, 3 ...
MC1	Thermal shut-off valve, heating circuit 2, 3 ...

10.2.2 Heat pump with indoor unit, buffer cylinder and water heater

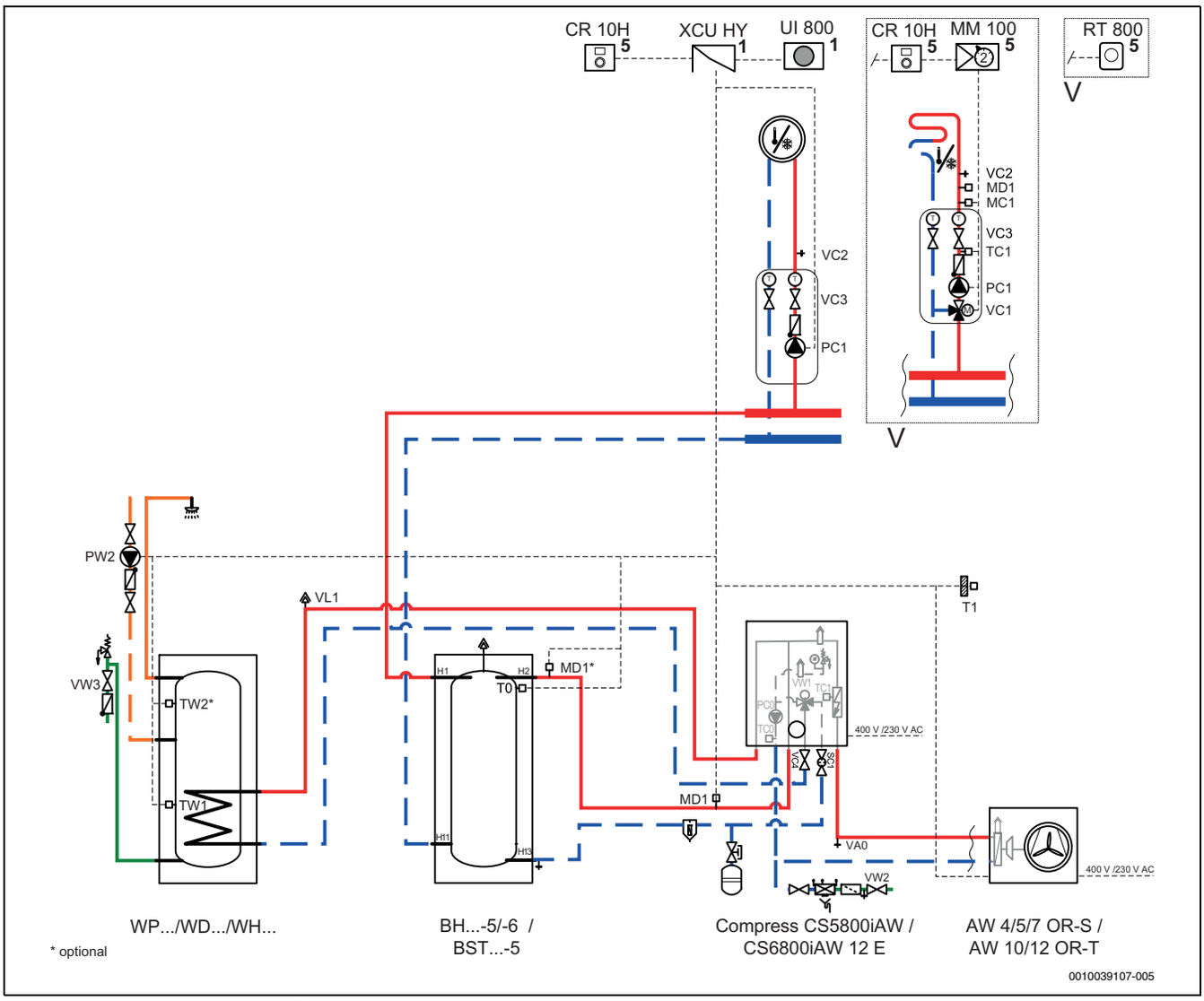

Fig. 37 Heat pump, indoor unit, buffer cylinder and water heater

[1] Mounted in indoor unit
[5] Mounted on wall
[*] Optional

10.2.3 Heat pump with two heating circuits, indoor unit, buffer cylinder and DHW cylinder

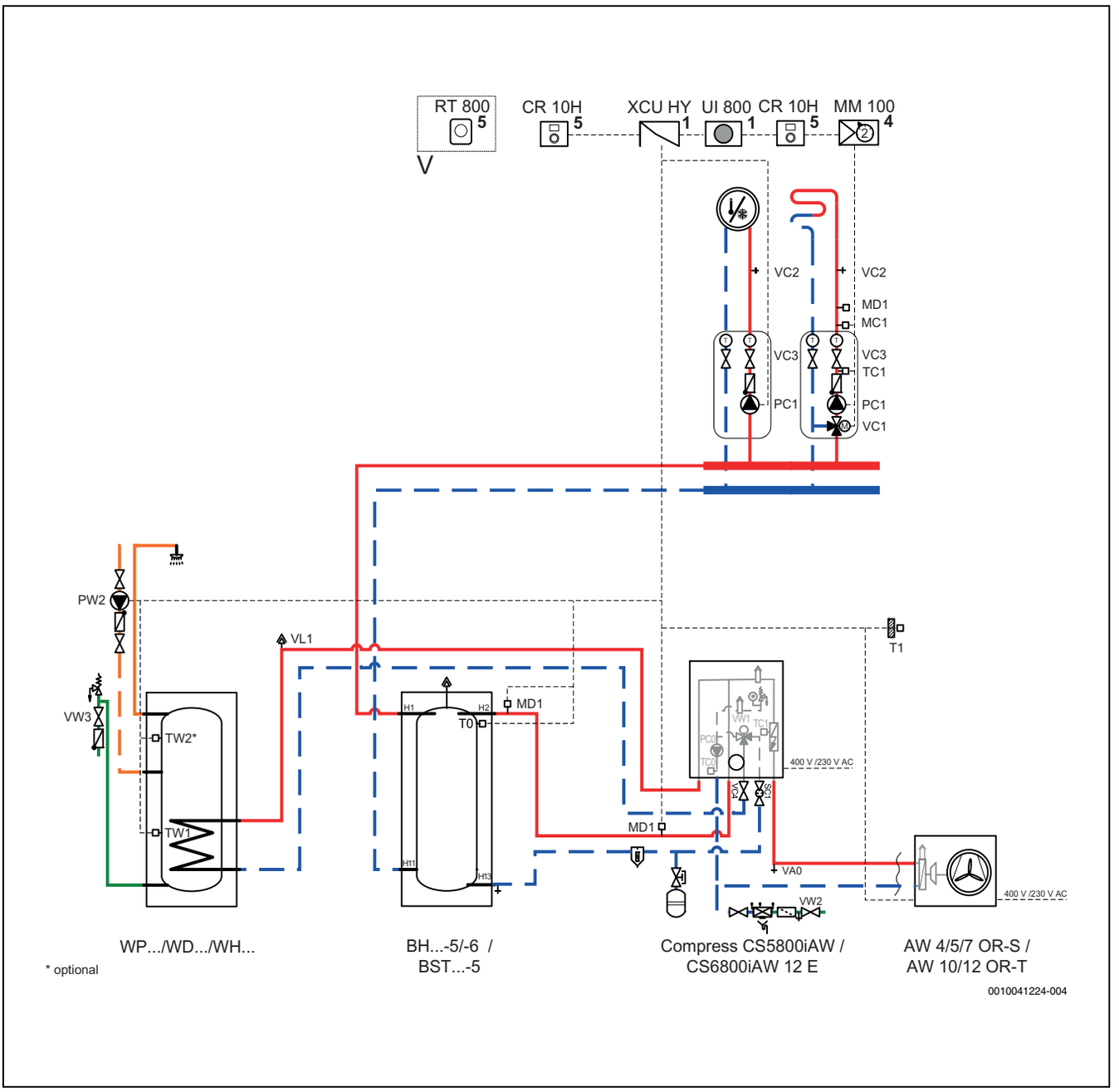

Fig. 38 Heat pump, two heating circuits, indoor unit, buffer cylinder and DHW cylinder

[1] Mounted in indoor unit
[4] Mounted in indoor unit or on wall
[5] Mounted on wall
[*] Optional

10.2.4 Performance charts for circulation pumps

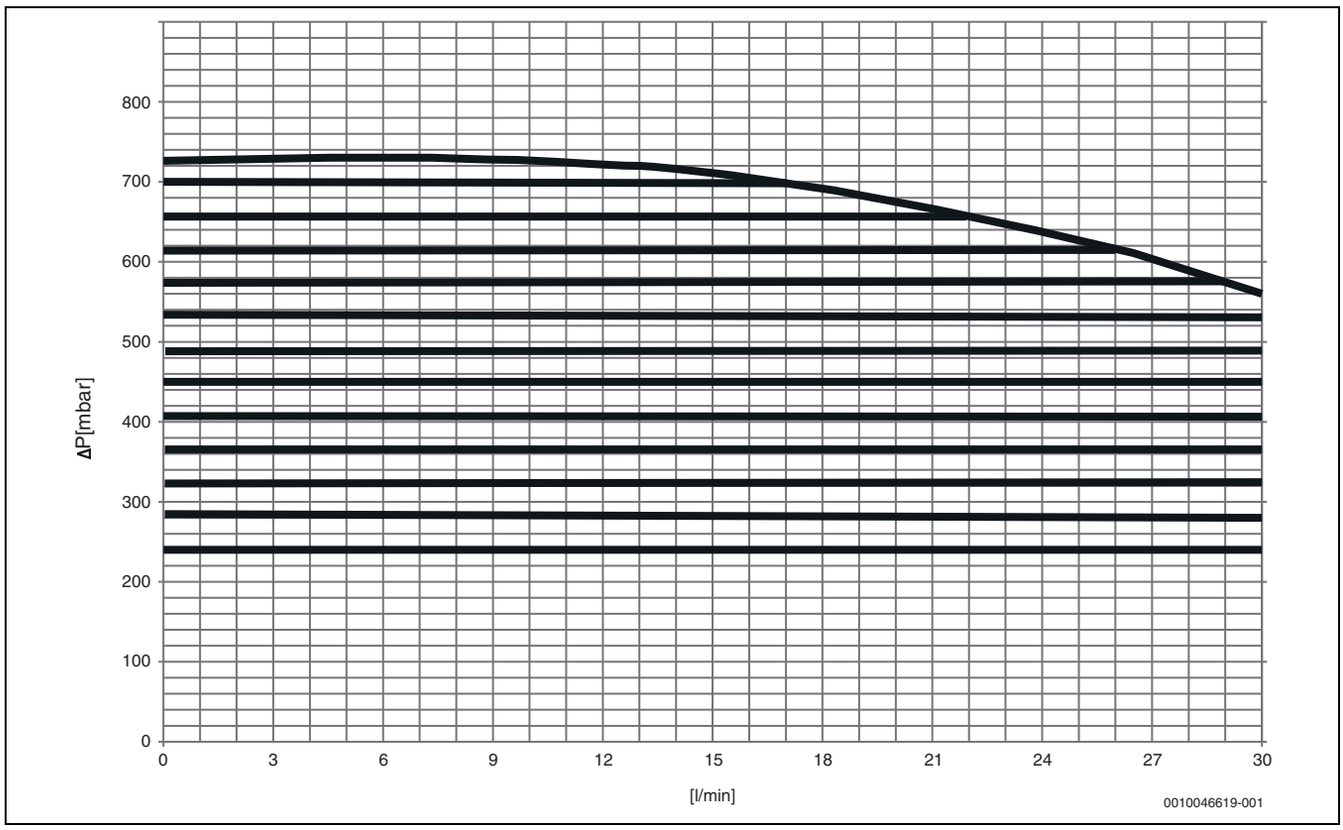

Fig. 39 Performance chart for PC0

10.2.5 Explanation of symbols

Symbol	Description	Symbol	Description	Symbol	Description
Pipework/cables					
	Flow - heating/solar		Brine circuit out		DHW circulation
	Return - heating/solar		Potable water		Electrical Wiring
	Brine flow		Hot water		Electrical wiring with break
Mixing valves/valves/temperature sensors/pumps					
	Valve		Differential pressure regulator		Pump
	Revision bypass		Water pressure relief valve		Non-return valve
	Flow regulating valve		Safety assembly		Temperature sensor / switch
	Overcurrent valve	M	3-way mixing valve (mixing/distribution)		High limit safetycut-out
	Filter shut-off valve	T	DHW mixer, thermostatic		Flue gas temperature sensor/ switch
T	Cap valve	M	3-way mixing valve (changeover)		Flue gas temperature limiter
M	Valve, motorized	I M II III	3-way mixing valve (change over, de-energised when closed to II)		Outdoor ambient temperature sensor
T	Valve, thermal	AB M A B	3-way mixing valve (change over, de-energised when closed to A)		Wireless outside temperaturesensor
	Shut-off valve, magnetically controlled	M	4-way mixing valve		...wireless...
Miscellaneous					
T	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 ratemeasuring device
	Water filter		Magnetite separator		Water sink
000	Heat meter		Air separator		Heat. circ.
	DHW outlet		Automatic air vent valve		Underfloor heating circuit
R	Relay		Expansion joint		Low-loss header
	Immersion heater				

Table 14 Hydraulic symbols

10.3 Wiring diagram

10.3.1 Wiring diagram XCU-THH (XCU HY)

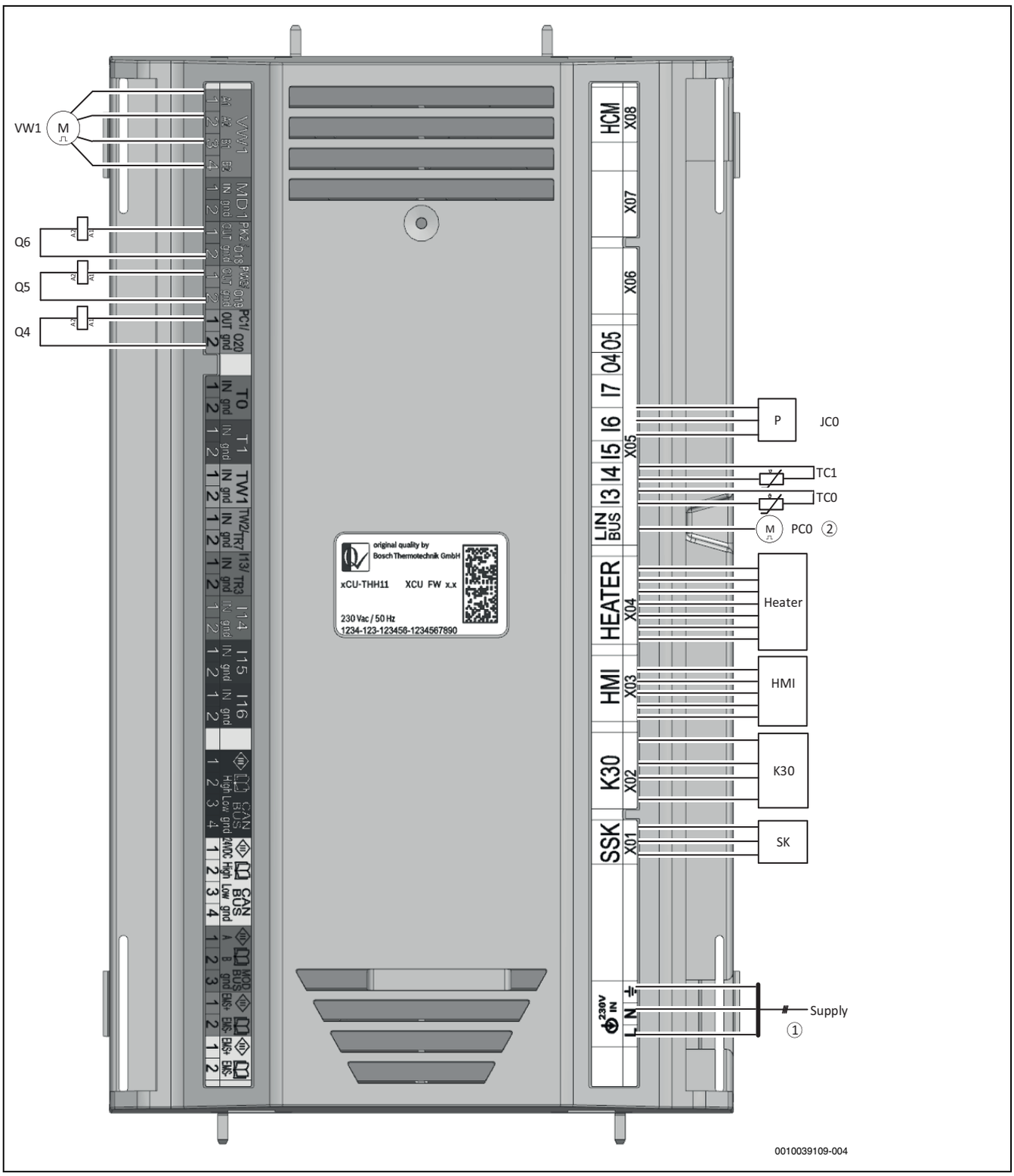

Fig. 40 Wiring diagram XCU-THH (XCU HY)

[SK] Service key
[K30] Connect-Key K30RF
[HMI] Control unit UI800
[TC0] Temperature sensor, heat transfer medium return
[TC1] Temperature sensor, heat transfer medium flow
[JC0] Pressure sensor
[Q4] Contactor for circulation pump, heating circuit (PC1)
[Q5] Contactor for DHW circulation pump (PW2)
[Q6] Contactor for circulation pump, cooling circuit (PK2)
[VW1] 3-way valve
[1] 230V~1N supply to XCU-THH (XCU HY)
[2] LIN-Bus to circulation pump (PC0)

10.3.2 Power supply indoor unit, standard

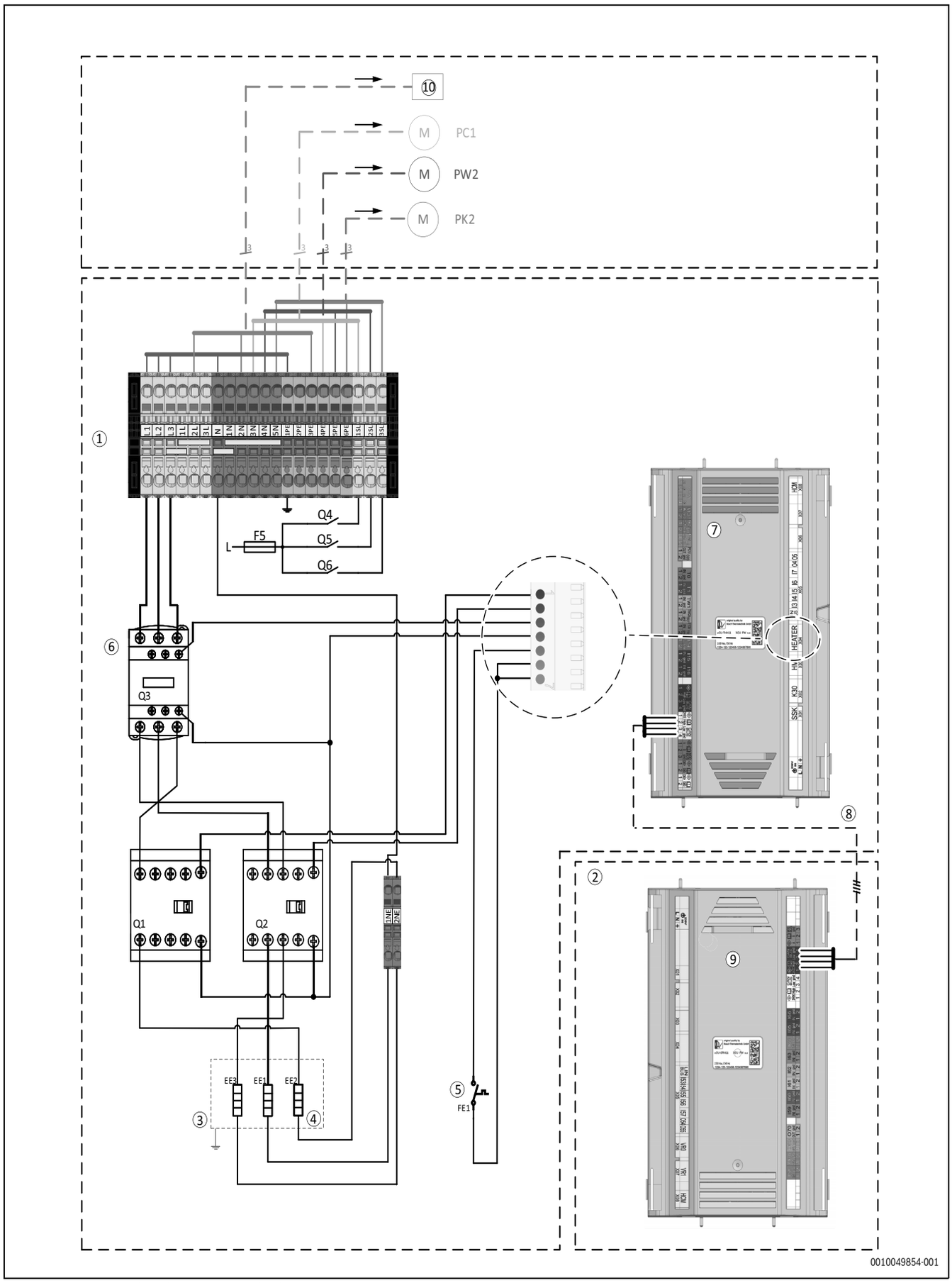

Fig. 41 Power supply indoor unit, standard

[1] Indoor unit
[2] Outdoor unit
[3] Electrical heater
[4] Heating element 3 x 3kW (3 x 17,6 Ω)

[5] Overheting 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 (MCB: 3x16A)
[PC1] Circulation pump, heating circuit
[PK2] Circulation pump, cooling circuit
[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 CS6800iAW 12 E	5 x 2,5 mm² (9kW)	H07V2 5G2,5 →Table 16		L1 / L2 / L3 / N / 1PE	→Table 16
		3 x 2,5 mm² (3kW)	→ Table 16		L3/N/1PE	→ Table 16
MM100	Heating circuit module (control unit for circuit)	3 x 1,5 mm² (minimum)	PVC - rubber cable (H07) or H05VV-F 3G1,5		2L / 2N / 3PE	IDU
PC1	Circulation pump, heating circuit	3 x 1,5 mm² (minimum)	PVC - rubber cable (H07) or H05VV-F 3G1,5		1SL / 3N / 4PE	IDU
PW2	Circulation pump DHW	3 x 1,5 mm² (minimum)	PVC - rubber cable (H07) or H05VV-F 3G1,5		2SL / 4N / 5PE	IDU
PK2	Circulation pump, cooling mode	3 x 1,5 mm² (minimum)	PVC - rubber cable (H07) or H05VV-F 3G1,5		3SL / 5N / 6PE	IDU

Table 15 Connections to IDU CS6800iAW 12 E

	Option 1: 9kW	Option 2: (3kW only)
Function	Indoor unit	Indoor unit
Cable type *Terminals allow use of fine-stranded or solid core wire*	According to local rules and regulations If fine-stranded wires are used: ▶ ⚠ for ambient temperature <30 °C: use cables with temperature resistance ≥ 80 °C! ▶ ⚠ for ambient temperature ≥ 30 °C[1]: use cables with temperature resistance ≥ 85 °C!	According to local rules and regulations If fine-stranded wires are used: ▶ ⚠ for ambient temperature <30 °C: use cables with temperature resistance ≥ 80 °C! ▶ ⚠ for ambient temperature ≥ 30 °C[2]: use cables with temperature resistance ≥ 85 °C!
Cable diameter	5 x 2,5 mm²	3 x 2,5 mm²
Fuse and maximum external load[3]	3x16A: max. 210W 3x20A: max. 500W	1x16A: max. 135W 1x20A - 25A: max. 500W

1) Please note that the maximum ambient temperature of the appliance must not exceed 35 °C
2) Please note that the maximum ambient temperature of the appliance must not exceed 35 °C
3) External load to outputs

Table 16 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
T0	Flow temperature sensor	0,75 mm²	LiYY 2 x 0,75		T0: 1 / 2	
T1	Temperature sensor outdoor	< 20m: 0,75 mm² >20m: 1mm²	< 20m: LiYY 2x 0,75 >20m: LiYY 2x1	30	T1: 1 / 2	

Sensor/Bus	General	Minimum cross section	Cable type	Maximum length (m)	Connection to XCU-THH (XCU HY) pin	Power supply
TW1	Temperature sensor DHW	0,75 mm²	LiYY 2 x 0,75		TW1: 1 / 2	
TW2	Temperature sensor DHW	0,75 mm²	LiYY 2 x 0,75		TW2: 1 / 2	
MD1	Condensation sensor	0,5 mm²	LiYY 2 x 0,5		MD1: 1 / 2	
CAN-BUS	Communication line: IDU - ODU	0,75 mm²	LiYCY (TP) 2 x 2 x 0,75 shielded	30	CAN BUS: 1 / 2 / 3 / 4	
EMS-BUS	EMS-BUS: Accessory	0,5 mm²	LiYY 2 x 0,5 LiYCY 2 x 0,5 shielded		PWR BUS: EMS+ / EMS-	
Smart Grid		0,5 mm²	LiYY 2 x 0,5		I16: 1 / 2	

Table 17 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 18 Sensor T0, TC0, TC1, TW1, TW2

This table applies if both TW1 and TW2 are connected.

°C	Ω	°C	Ω	°C	Ω	°C	Ω
20	14768	40	6650	60	3242	80	1703
25	11977	45	5521	65	2744	85	1463
30	9783	50	4606	70	2332	90	1262
35	8045	55	3855	75	1989	-	-

Table 19 Sensor TW1

This table applies if only TW1 is connected.

°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 20 Sensor T1

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www.bosch-homecomfortgroup.com

GB Importer:
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Cotswold Way, Warndon
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