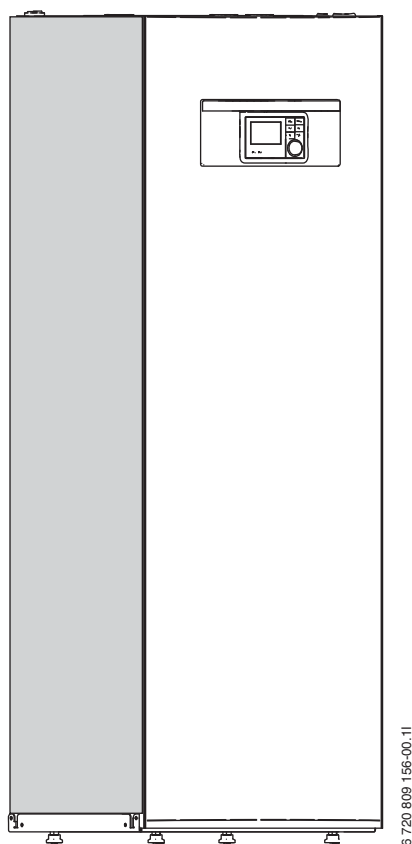


# *AirModule E 9/15*

**230V 1N~ / 400V 3N~**



## **Installer Guide**

6 720 813 268(2014/10)



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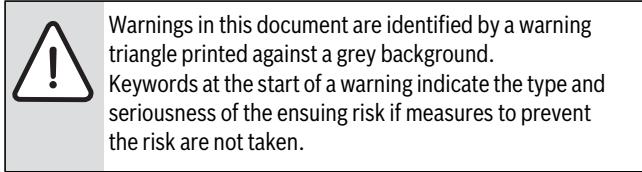
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## 1 Key to symbols and safety instructions

### 1.1 Key to symbols

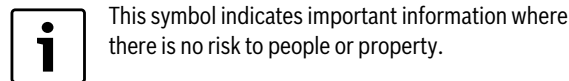
#### Warnings



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

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

#### Important information



#### Additional symbols

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

Table 1

### 1.2 General safety instructions

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

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

#### Intended use

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

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

#### Installation, commissioning and servicing

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

- ▶ Only use original spares.

#### Electrical work

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

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

#### Handover to the user

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

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

## 2 Standard delivery

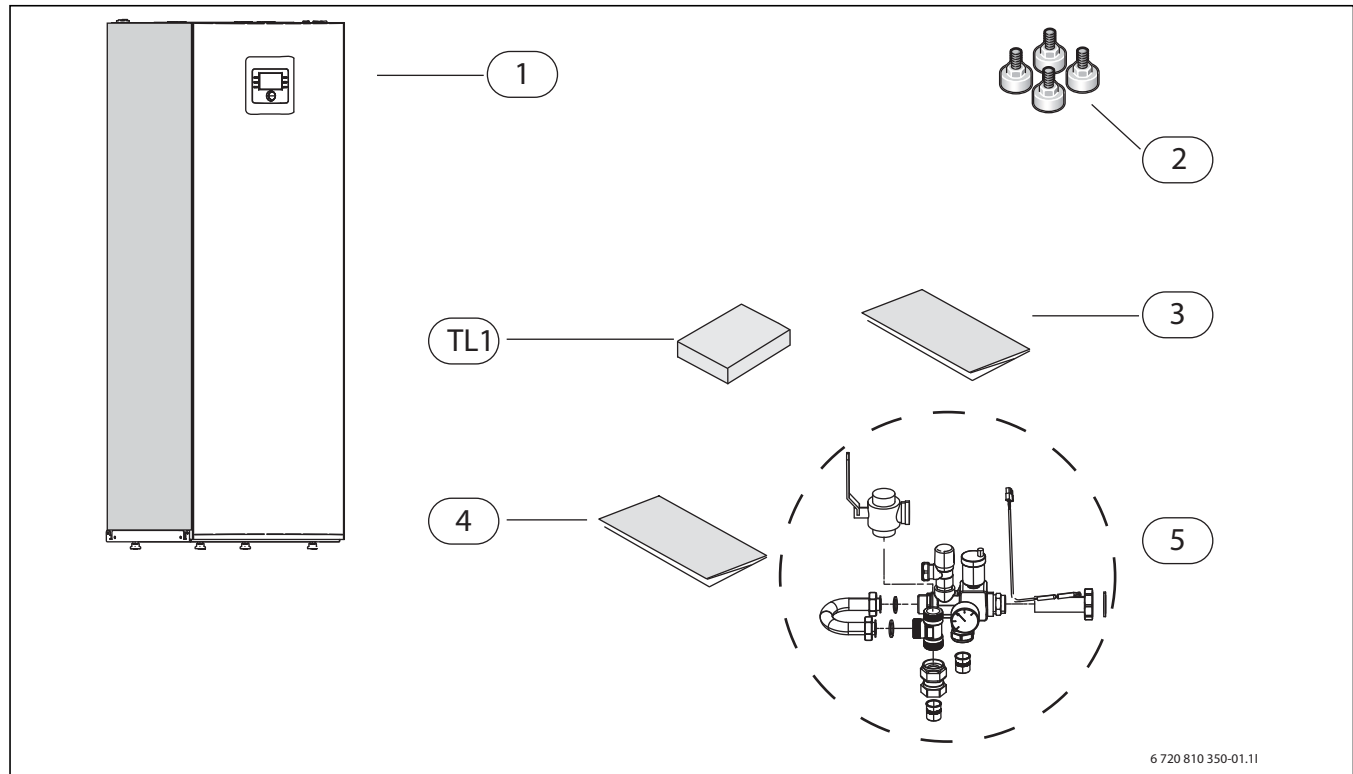


Fig. 1 Standard delivery

- [1] Heat pump module
- [2] Legs
- [3] Operating Instructions
- [4] Installation instructions
- [5] Safety assembly in loose parts
- [T1] Outside temperature sensor

### 3 General

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



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

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

#### 3.1 Information about the heat pump

AirModule are heat pump modules that are intended for indoor use and for connection with outdoor AirX heat pumps.

The following combinations are possible:

AirModule	AirX
E9	50
E9	70
E9	90
E15	130
E15	170

Table 2

The AirModule heat pump module has a built-in immersion heater.

#### 3.2 Application area

The heat pump module may only be used in closed heating systems in accordance with EN 12828.

Other usage is prohibited. Any damage resulting from prohibited usage is excluded from liability.

#### 3.3 Heating system minimum volume and operation



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

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

##### Under floor heating system without a buffer cylinder

To ensure that a sufficient amount of energy is available for defrosting, the largest room should not contain room thermostats but room controllers should be used instead. At least 30 m<sup>2</sup> floor surface should be regulated by a room controller, since the heat pump then will adjust flow temperature automatically.

##### Radiator system without a buffer cylinder

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

##### Radiator and under floor heating systems on different circuits without a buffer cylinder

To ensure that a sufficient amount of energy is available for defrosting, there should be at least 4 water radiators of 500 W/unit in the circuit without mixing valve. No minimum floor surface is required for the



underfloor heating system circuit with mixing valve. A room controller is recommended, since the heat pump then will automatically adjust flow temperature.

#### **Only circuits with mixing valve**

To ensure that a sufficient amount of energy is available for defrosting, a buffer cylinder of at least 50L is required for heat pump sizes 5-9 and of at least 100L for heat pump sizes 13-17.

#### **Fan convector**

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

### **3.4 Type plate**

The data plate is found on the module roof plate.

### **3.5 Transport and storage**

The heat pump module must always be transported and stored upright. If needed, it may be leaned temporarily.

The heat pump module may not be stored or transported in temperatures below  $-10^{\circ}\text{C}$ .

### **3.6 Heat pump module positioning**

- The heat pump module is placed indoors. Pipework between the heat pump and the heat pump module should be as short as possible. The pipes must be insulated (→ Chapter 7.16).
- Leakage drain water from the pressure relief valve should be drained from the heat pump module to a frost protected outlet.
- The space where the heat pump module is placed must have a floor drain.

### **3.7 Checks before installation**

- ▶ Check that all pipe connections are intact and have not shaken loose during transportation.
- ▶ Before operation of the heat pump module, the heating system and the water heater, including the heat pump module, must be filled and depressurized.
- ▶ Wiring should be kept as short as possible to protect the system from downtime, for example during a thunderstorm.
- ▶ Low voltage wiring must be separated from high voltage wiring by at least 100 mm.

### **3.8 Connection principle**

The principle is based on floating condensation and a immersion heater in the heat pump module. The user interface manages the heat pump and the heat pump module according to a set heating curve.

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

DHW is prioritized and is managed by a sensor TW1 in the hot water cylinder. While the heater is heated, the heating system heating mode is temporarily disconnected by a 3-way valve. When the hot water cylinder is heated, the heat pump heating mode continues.

#### **Heating and DHW mode when heat pump is inactive:**

At outside temperatures below app.  $-20^{\circ}\text{C}$  (adjustable value) the heat pump stops automatically and cannot produce hot water. The booster heater in the heat pump module will in this case take over both the heating mode and the DHW production. The heat pump will restart when the temperature gets above  $-17^{\circ}\text{C}$ .

## 4 Technical information

### 4.1 Technical information - heat pump module

	Unit	E9	E15
<b>Electrical information</b>			
Power supply	V	400 <sup>1)</sup> / 230 <sup>2)</sup>	400 <sup>1)</sup>
Recommended fuse size	A	16 <sup>1)</sup> / 50 <sup>2)</sup>	25 <sup>1)</sup>
Immersion heater in steps	kW	3/6/9	3/6/9/12/15
<b>Heating installation</b>			
Connection <sup>3)</sup>		Cu 28	Cu 28
Maximum operating pressure	kPa	250	250
Minimum operating pressure	kPa	50	50
Expansion vessel	L	14	14
External available pressure	kPa	4)	4)
Minimum flow	L/s	0.36	0.59
Circulation pump model		Grundfos UPM2 25-75 PWM	Wilo Stratos Para 25/1-11 PWM
Flow max. temperature, booster only	°C	85	85
<b>General</b>			
Hot water cylinder volume	L	190	190
Maximum operating pressure on tap DHW circuit	MPa		1
Material		Stainless steel 1.4521	
IP rating		IP X1	
Dimensions (WxDxH)	mm	600x660x1800	
Weight	kg	135	

Table 3 heat pump module with immersion heater

1) 3N AC 50 Hz

2) 1N AC 50 Hz

3) See Connections in safety assembly

4) This depends on the type of heat pump, see tab. 11

## 4.2 System configurations



The heat pump and heat pump module may be installed only in accordance with the official system solutions provided by the manufacturer. Other system solutions are not allowed. Any damage and problems resulting from prohibited installation are excluded from liability.

### 4.2.1 System configuration explanations

General	
Installer module	Installer module integrated into the heat pump module
ProControl 600	User interface
CR10H	Room controller (accessories)
T1	Outside temperature sensor
CC1	Buffer cylinder (accessories)
MK2	Condensation sensor (accessories)
VCO	3-way valve (accessories)
PW2	DHW circulation pump hot water (accessories)

Table 4 General

Z1 Heating circuit without mixing valve	
PC1	Circulation pump, heating circuit
T0	Flow temperature sensor (placed in the safety assembly or in the buffer cylinder)

Table 5 Z1

Z2/Z3 Heating circuit with mixing valve (accessories)	
MM100	Mixing valve module (controller for circuit)
PC1	Circulation pump, heating circuit 2
VC1	Mixing valve
TC1	Flow temperature sensor, heating circuit 2,3..
MC1	Thermal shut-off valve, heating circuit 2,3...

Table 6 Z2

### 4.2.2 Non-return valve in heating circuit

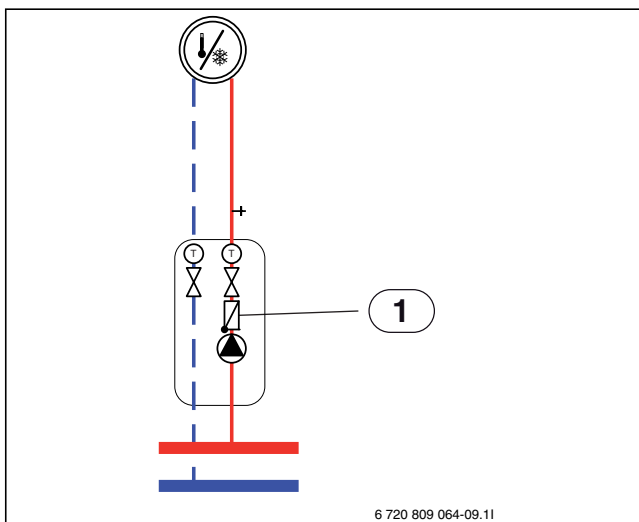


Fig. 2 Heating circuit

[1] Non-return valve

One non-return valve in each heating circuit is required for preventing natural circulation in the heating system in summer mode. Natural circulation may arise as the domestic hot water 3-way valve is open to the heating system when the heat pump prepares DHW heating.

Circulation pump PC1 is controlled by the control unit in the heat pump module.

If a fresh water station is installed, it must have its own control unit.

If a buffer cylinder is used, a 3-way valve VCO must be installed in accordance with the system solution. The 3-way valve replaces the T-unit in the safety assembly (→ Chapter 5.1.1) and is connected electrically to terminal VCO on the installer module.

4.2.3 Heat pump with heat pump module system configuration

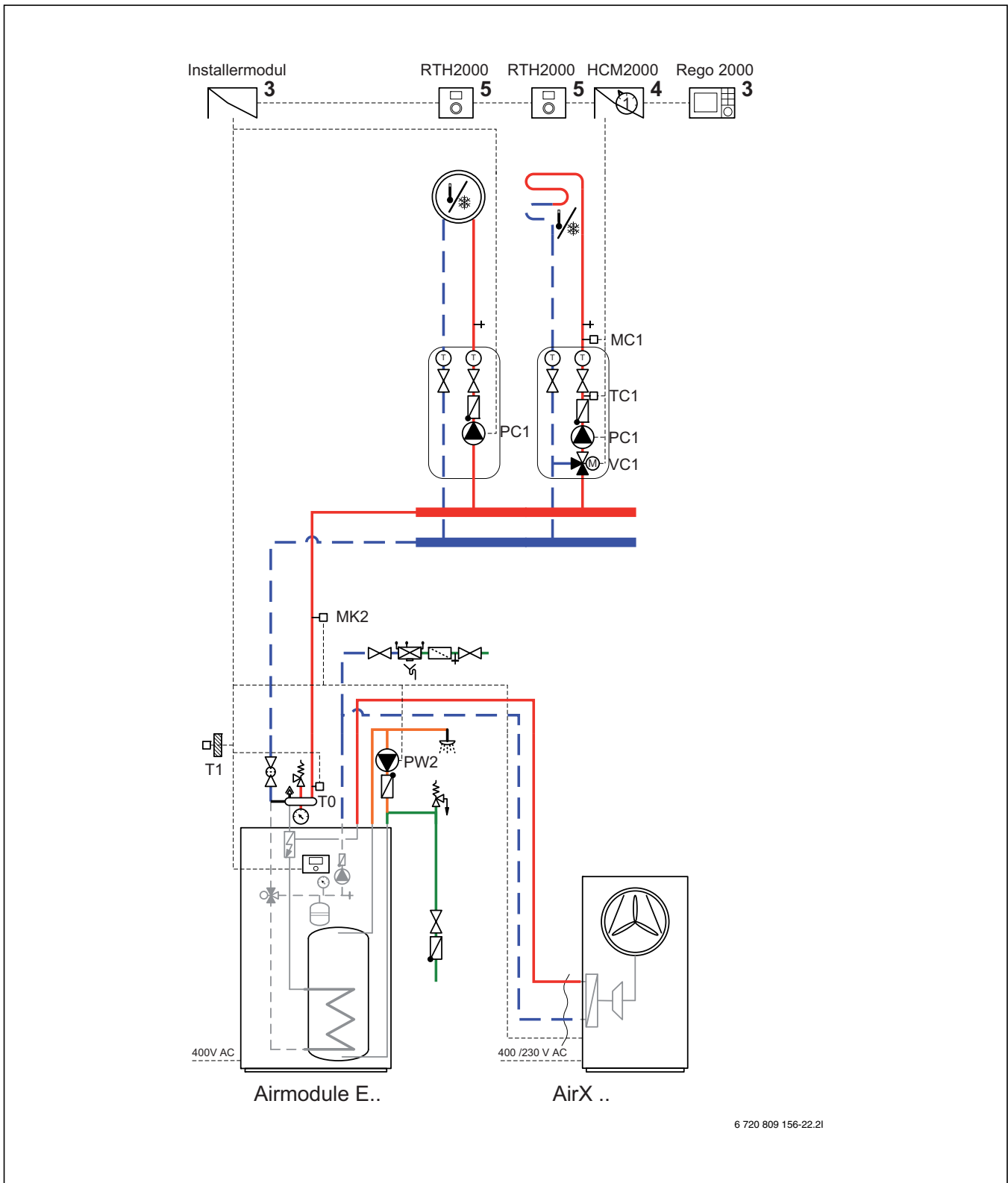
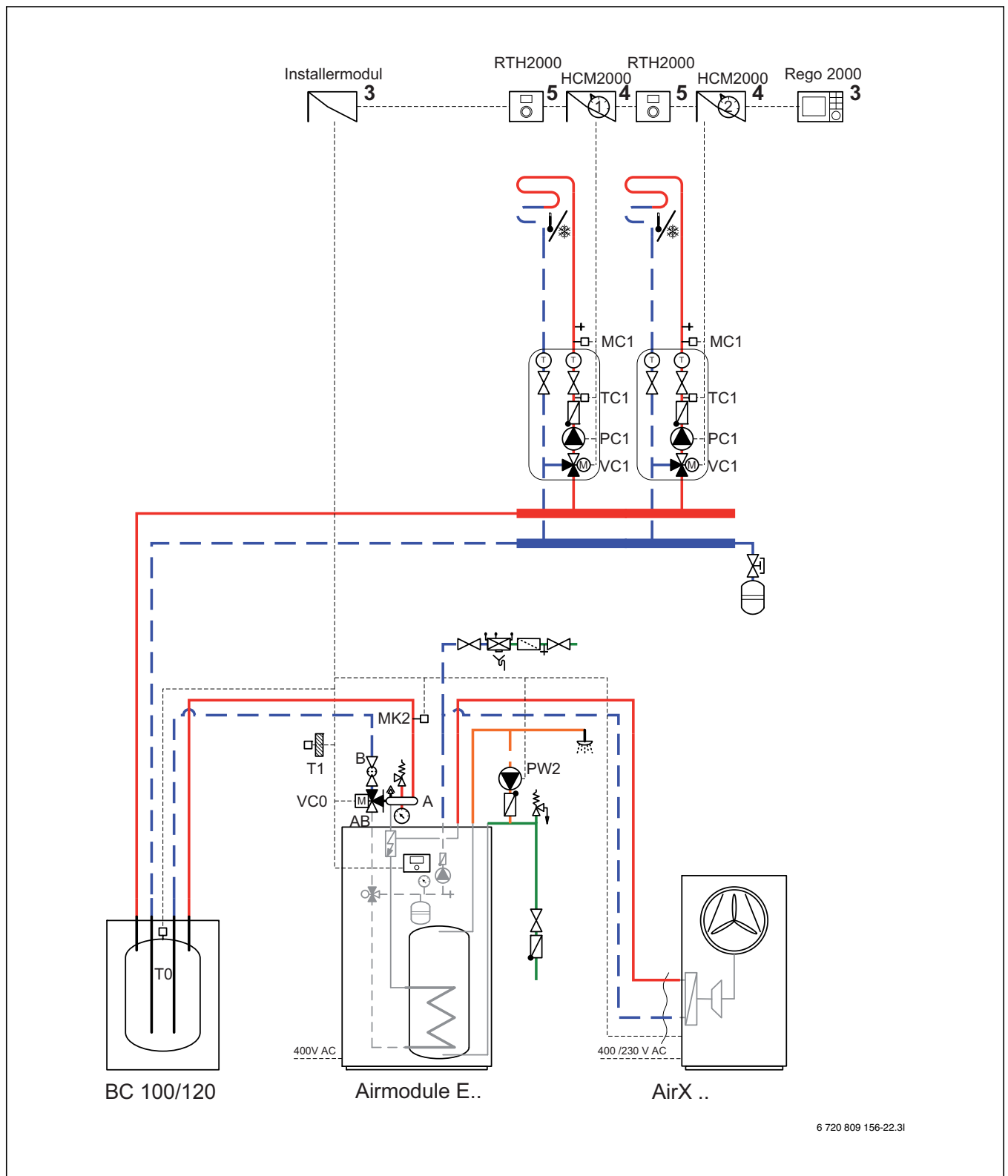


Fig. 3 Heat pump with heat pump module

- [3] Installed in the heat pump module.
- [4] Installed either in the heat pump module or mounted to the wall.
- [5] Installed on the wall

4.2.4 Heat pump, heat pump module and buffer cylinder system configuration



6 720 809 156-22.3i

Fig. 4 Heat pump with heat pump module and buffer cylinder

- [3] Installed in the heat pump module.
- [4] Installed either in the heat pump module or mounted to the wall.
- [5] Installed on the wall



The extra expansion vessel for the heating system is designed primarily for the volume of the buffer cylinder.

4.2.5 General symbol explanation

Symbol	Designation	Symbol	Designation	Symbol	Designation
<b>Pipework/Wiring</b>					
	Flow - heating/solar circuit		DHW		Electric wire
	Return - heating/solar circuit		Potable water		Electric wire disconnected
			DHW circulation		
<b>Actuators/Valves/Temperature sensors/Pumps</b>					
	Valve		Differential pressure regulator		DHW circulation pump
	Revision bypass		Pressure relief valve		Non-return valve
	Adjustment valve		Safety assembly		Temperature sensor/switch
	Overcurrent valve		3-way mixing valve (mixing/distributing)		Overheating protection (temperature)
	Filter valve (particle filter)		Thermal DHW mixing valve		Outside temperature sensor
	Shut-off valve with unintentional closure control		3-way valve (change)		Wireless outside temperature sensor
	Valve, motorized		3-way valve (changing, normally closed to II)		...Radio (wireless)...
	Valve, thermal		3-way valve (changing, normally closed to A)		
	Shut-off valve, magnetic		4-way valve		
<b>Other</b>					
	Thermometer		Funnel with siphon		Low loss header with sensor
	Pressure gauge		Return flow safety module in accordance with EN1717		Heat exchanger
	Fill / drain valve		Expansion vessel with shut-off valve with closure		Flow meter
	Water filter		Collector		Heat meter
	Air separator		Heating circuit		DHW outlet
	Automatic air vent valve		Underfloor heating circuit		Relay
	Compensator (devibration)		Low loss header		Immersion heater

Table 7 Symbols key

## 5 Measurements, positioning distance, and pipe connections

### 5.1 Heat pump module dimensions and connections

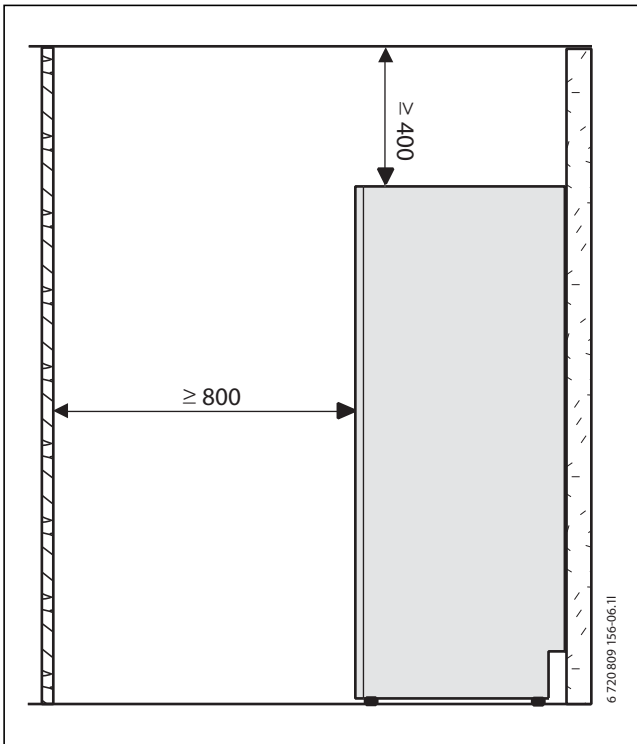


Fig. 5 Heat pump module minimum distance

There should be at least 50 mm between the heat pump module sides and other fixed installations (walls, sinks, etc.). Ideal positioning is by an outer wall or a middle wall.

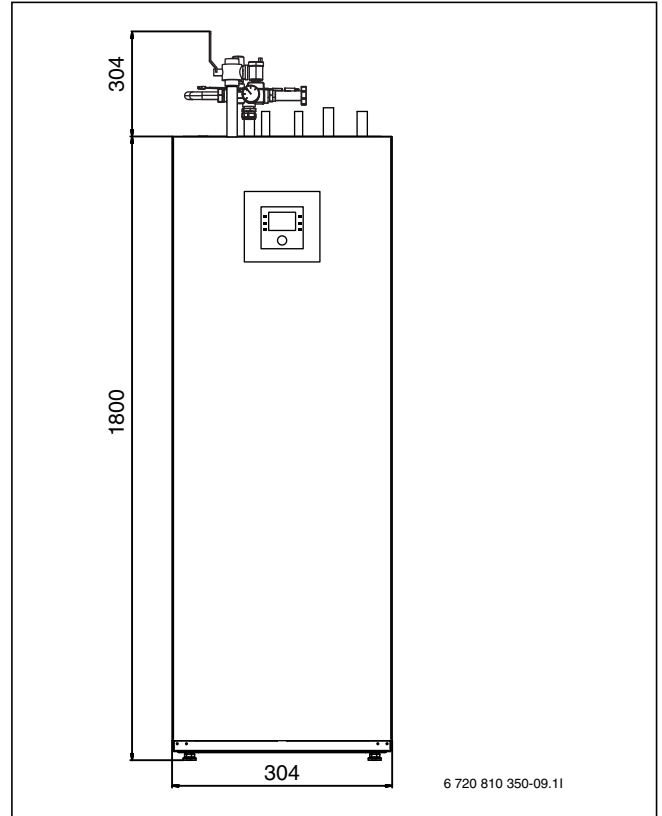


Fig. 6 Heat pump module dimensions (mm)

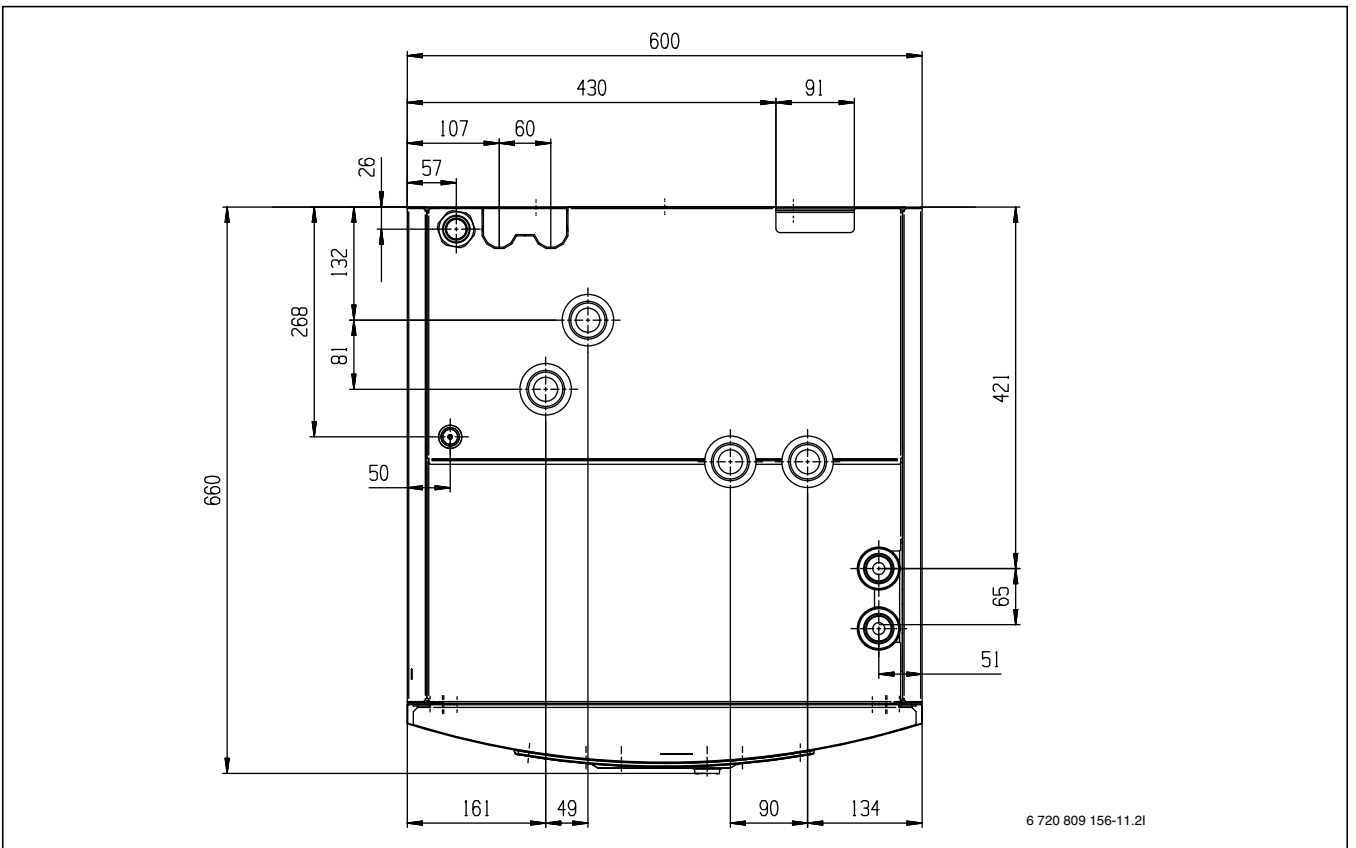
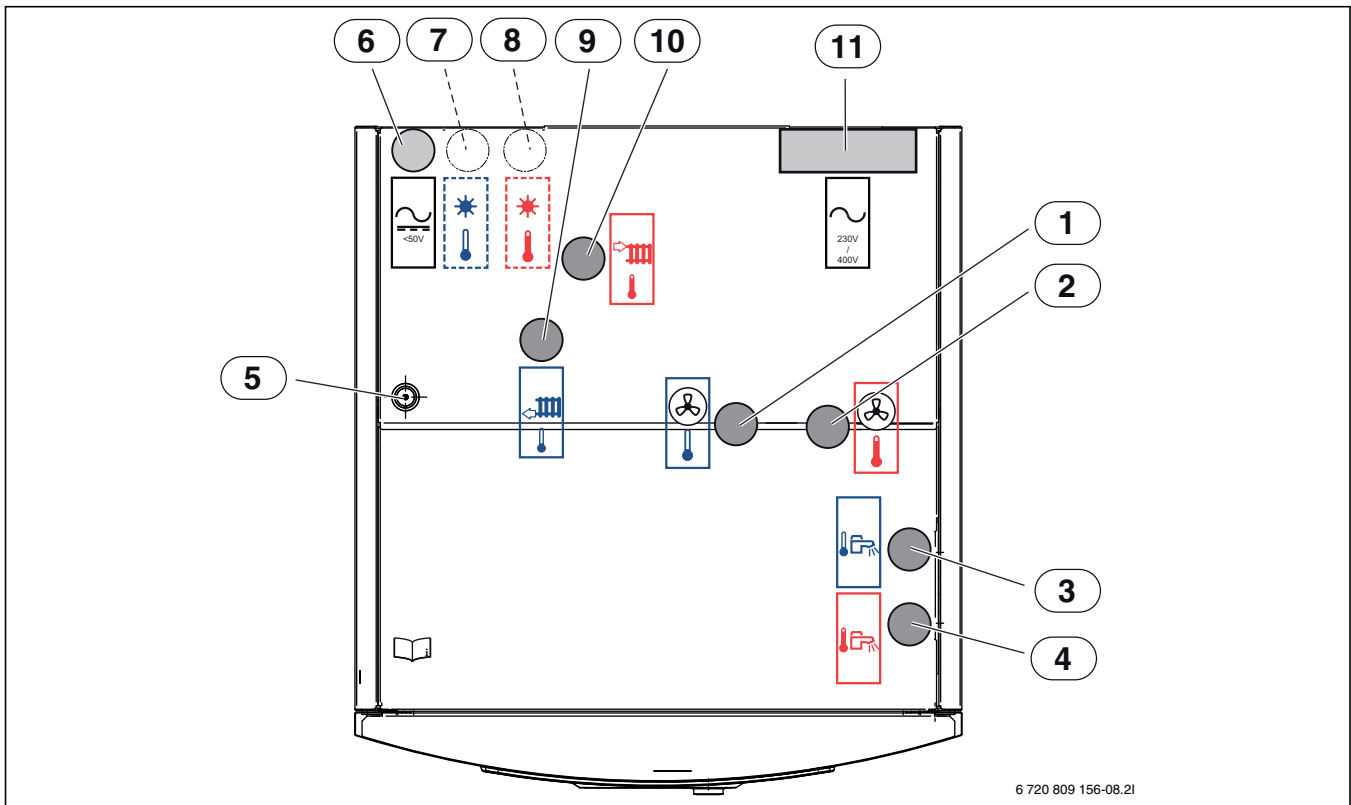


Fig. 7 Roof view dimensions

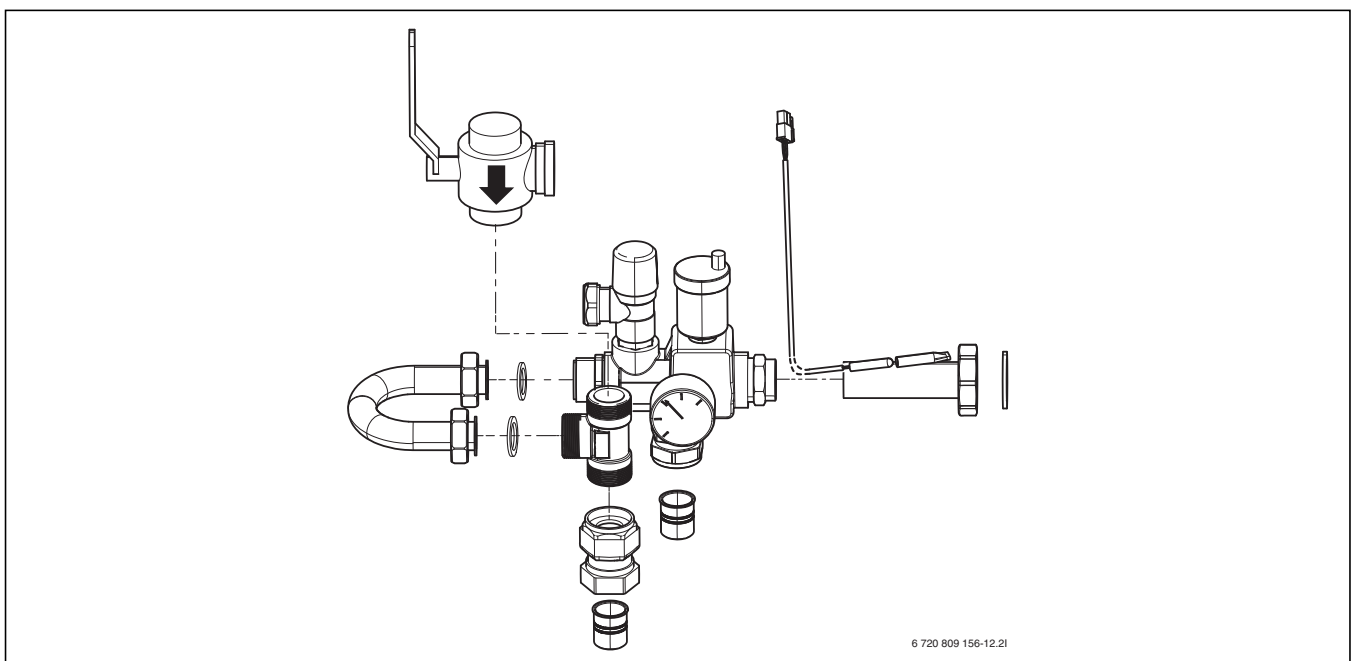


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Fig. 8 Heat pump module connections

- [1] Heat transfer medium out (to the heat pump)
- [2] Heat transfer medium in (from the heat pump)
- [3] Cold water inlet connection
- [4] DHW outlet connection
- [5] Cable feed to IP module
- [6] Cable bus CAN-BUS and sensor
- [7] Return to solar thermal system (only on the solar models)
- [8] Flow from solar thermal system (only on the solar models)
- [9] Return from safety group
- [10] Flow to safety group
- [11] Cable bus electrical connection

**5.1.1 Safety assembly**



6 720 809 156-12.21

Fig. 9 Safety assembly delivery



Assemble the safety assembly:

- ▶ First install the particle filter ([SC1], figure 10) on the T-unit.
- ▶ Install the other parts, but do not tighten the nuts completely on the bypass ([4], figure 10).
- ▶ Place the flow temperature sensor in the sensor pocket ([T0], figure 10), and secure the sensor with a cable tie.
- ▶ Fit the safety assembly on the heat pump module.
- ▶ Tighten the nuts completely on the bypass ([4], figure 10).

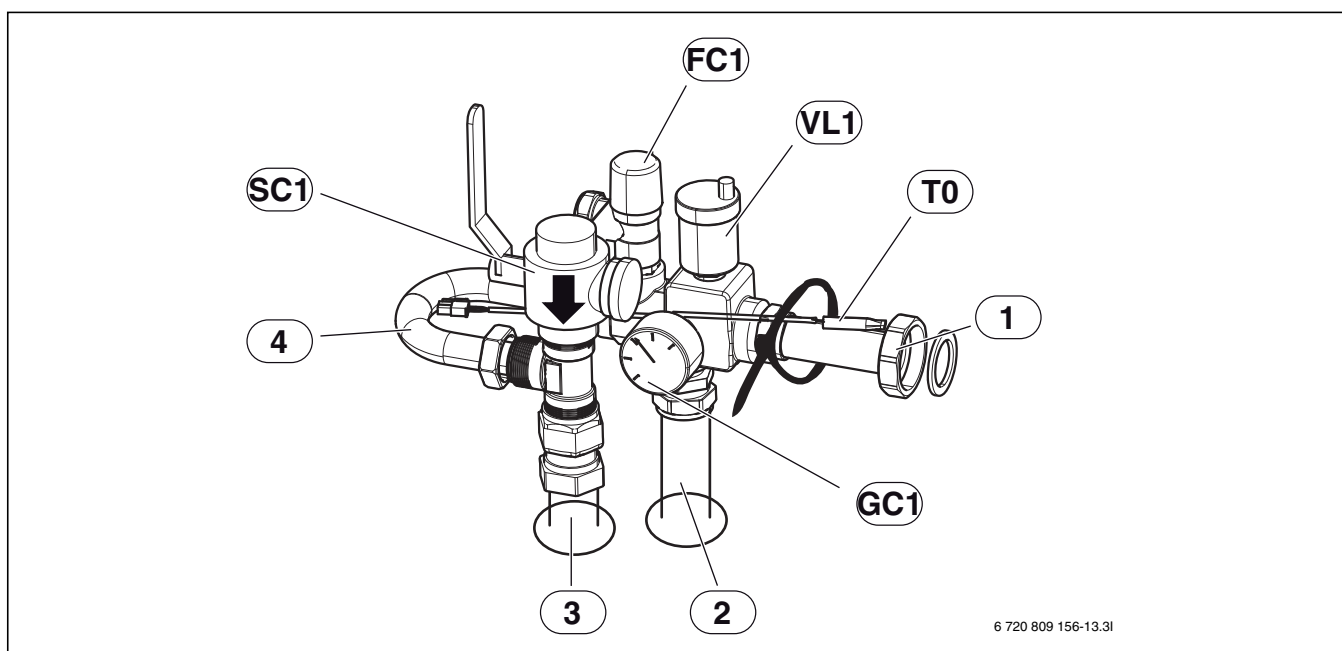


Fig. 10 Safety assembly fitted

- [1] Circulation pump heating system connection (PC1), G1  
½ (40R) adapter to heating system flow
- [2] Flow to safety group
- [3] Return from safety group
- [4] Bypass
- [SC1] Particle filter, connection G1 internal thread from heating system return
- [FC1] Pressure relief valve
- [VL1] Automatic air vent valve
- [T0] Flow temperature sensor
- [GC1] Pressure gauge

## 5.2 Pipework

Pipe dimensions (mm)	Heat pump module
Heating installation	
Spring clip connection Cu	Ø 28 <sup>1)</sup>
<i>Cold and hot water</i>	
Stainless spring clip connection	Ø 22
<i>Heat transfer medium</i>	
Spring clip connection Cu	Ø 28
Leakage drain water/drain in both	Ø 32

Table 8 Pipe dimensions

- 1) See Connections in safety assembly

## 6 Regulations

The following regulations and requirements must be observed:

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

## 7 Installation



**NOTICE:** Risk of operating problems due to pipe contamination!

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

- ▶ Avoid particulates in the pipework.
- ▶ Do not leave pipe parts and connections directly on the ground.
- ▶ Ensure that no filings remain in the pipes following deburring.



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

### 7.1 Detailed discharge pipe installation requirements (Combi model)

The discharge pipework must be routed in accordance with part G3 of schedule 1 of the building Regulations.

The tundish should be vertical, located in the same space as the unvented hot water cylinder and be as close as possible and within 600mm of the safety device e.g. the temperature relief valve. The discharge pipe from the tundish should be:

- made of metal
- at least one pipe size larger than the nominal outlet size of the safety device (larger sizes may be required if the equivalent hydraulic resistance exceeds that of a straight pipe 9m long - refer to BS6700)
- terminate in a safe place where there is no risk to persons in the vicinity of the discharge, and position safely from electrical devices
- have a vertical section of pipe at least 300mm long below the tundish before any elbows or bends in the pipework.

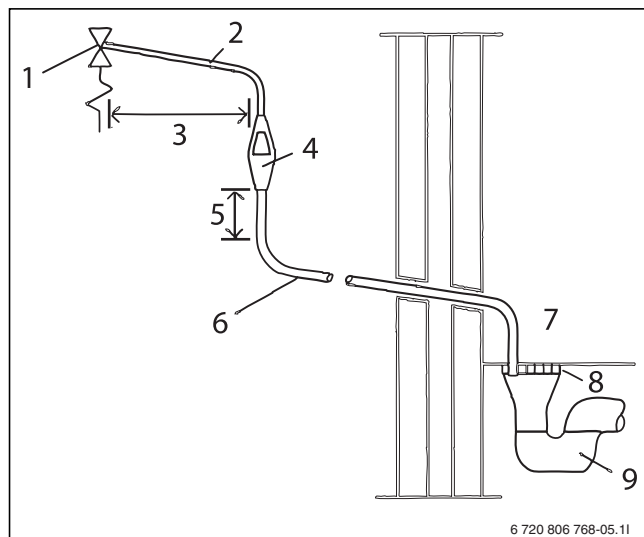


Fig. 11 Typical discharge pipe arrangement

- [1] Safety device (e.g. temperature relief valve)
- [2] Metal discharge pipe (D1) from temperature relief valve to tundish
- [3] 600mm maximum
- [4] Tundish
- [5] 300mm minimum
- [6] Metal discharge pipe (D2) from tundish, with continuous fall
- [7] Discharge below fixed grating
- [8] Fixed grating
- [9] Trapped gully

Valve outlet size	Size of discharge pipework D1	Size of discharge pipework D2	Maximum length of straight pipe (no bends or elbows)	Deduct the figure below from the maximum length for each bend or elbow in the discharge pipe
		22 mm	Up to 9 m	0.8 m
G1/2	15 mm	28 mm	Up to 18 m	1.0 m
		35 mm	Up to 27 m	1.4 m
		28 mm	Up to 9 m	1.0 m
G3/4	22 mm	35 mm	Up to 18 m	1.4 m
		42 mm	Up to 27 m	1.7 m
		35 mm	Up to 9 m	1.4 m
G1	28 mm	42 mm	Up to 18 m	1.7 m
		54 mm	Up to 27 m	2.3 m

Table 9

### 7.2 Preparatory pipework



The safety valve drain in the heat pump module should be secured against frost and the drain pipe should lead to a drain.

- ▶ Fit heating system and cold/hot water connector pipes in the space up to the heat pump module position.

### 7.3 Positioning

- ▶ Remove the packaging according to the instructions on the packaging.
- ▶ Remove the supplied accessories.

### 7.4 Checklist



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

1. Install the heat pump module safety assembly (→Chapter 5.1.1) and fill valve.
2. Fit the heat pump module leakage water hose(s).
3. Connect the heat pump and the heat pump module (→Chapter 7.11).
4. Connect the heat pump module to the heating system (→Chapter 7.12).
5. Install the outside temperature sensor (→Chapter 7.19.3) and room controller (optional).
6. Connect the CAN-BUS wire between the heat pump and the heat pump module (→Chapter 8.1).
7. Install any accessory (mixing module, solar module, pool module, etc).
8. Connect EMS-BUS wire (optional) to accessories (→Chapter 8.2).
9. Fill up and bleed the hot water cylinder.
10. Fill up and vent the heating system before commissioning (→Chapter 7.20).
11. Connect the heating system to the electrical system (→Chapter 8).
12. Commission the heating system by managing necessary settings in the user interface (→Chapter 11).
13. Vent the heating system (→Chapter 14).
14. Check that all sensors show reasonable values (→Chapter 12.9.2).
15. Check and clean out the particle filter (→Chapter 18).
16. Check the heating system function following commissioning (→Chapter 12.9).

## 7.5 Water quality

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

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

Recommended pH level is 7.5 – 9.

Water quality	
Hardness	< 3°dH
Oxygen content	< 1 mg/L
Carbon dioxide, Co <sub>2</sub>	< 1 mg/L
Chloride ions, Cl <sup>-</sup>	< 250 mg/L <sup>1)</sup>
Sulphate, So <sub>4</sub> <sup>2-</sup>	< 100 mg/L
Conductivity	< 350 µs/cm

Table 10 Water quality

- 1) Electric anode (accessory) in the water heater is recommended for higher chloride content. If electric anode is used, it has to be purchased in connection with commissioning.

## 7.6 Heating system flushing



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

- ▶ Flush out the system to remove all dirt residues before connecting the heat pump and heat pump module.

The heat pump module is a part of a heating system. Problems in the heat pump module can be caused by poor water quality in the radiators/floor loops or by constant system oxygenation.

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

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

Heating systems which require regular filling or where the heating water does not produce clear water during water sampling require measures prior to the installation of the heat pump, e.g. supplementing the heating system with magnetite filters and air vent valves.

## 7.7 Operation without heat pump (stand-alone)

The heat pump module can be put into operation without a connected heat pump, for example, if the heat pump is installed at a later date. This is called "stand-alone" operation.

In stand-alone mode, the heat pump module uses only the integrated immersion heater for heating and DHW production.



If the heat pump module and the heating system are filled before the heat pump is connected, then the heat transfer medium in and out to / from the heat pump must be connected to secure circulation (→ [1] and [2], Fig. 13).

- ▶ Open shut-off valves on the heat transfer circuit, if applicable.

In connection with commissioning of stand-alone operation:

- ▶ Set **Stand-alone mode** in the service menu **Heat pump** (→ Chapter 12.1).

## 7.8 Installation with cooling

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



Using cooling mode requires the installation of a room controller (accessory).



Installation of a room controller with integrated humidity sensor (accessory) makes cooling mode more secure as the user interface automatically adjusts the flow temperature in relation to the current dew point.

- ▶ Insulate all connections and pipes from condensation.
- ▶ Install a room controller, with or without an integrated moisture sensor (→ manual for the respective room controller).
- ▶ Install condensation sensors (→ Chapter 7.18).
- ▶ Select automatic mode heating/cooling (→ Chapter 12.3.2.)
- ▶ Make the necessary cooling mode settings: start temperature, start delay, room temperature and dew point differential (offset), as well as lowest flow (→ Chapter 12.3.2).
- ▶ Set the temperature differential (delta) over the heat pump (→ Chapter 12.1.1)

## Installation

- ▶ Turn off floor circuits in moist rooms (e.g. bathrooms and kitchens) and use relay outputs PK2 in order to govern this (→ Chapter 8.4).

### 7.9 Installation with solar heater (only solar model)



Using solar additional heating requires installation of a solar module (accessory).



The solar energy coil in the cylinder is intended for maximum added heating output of 4.5 kW. Only DHW heating is possible with the integrated coil.

- ▶ Install solar panels (→ panel manual).
- ▶ Insulate all connections and pipes.
- ▶ Install solar module (→ solar module manual).
- ▶ Select **Yes** to the question **Solar thermal sys installed** during commissioning (→ Chapter 11.2).
- ▶ Make the necessary settings for the installed solar thermal system (→ Chapter 12.6)

### 7.10 Installation with pool



**NOTICE:** Risk of malfunction!

Cooling mode is not possible if the mixing valve for the pool is placed in a wrong position in the system. Even other functional disturbances might arise. The mixing valve for the pool must not be positioned so that it can block the safety valve on the flow line.

- ▶ Install the mixing valve for pool on the return pipe to the heat pump module (→ [VC1] Bild 12).
- ▶ Install the T-pipe on the flow line from the heat pump module, before the bypass in the safety assembly.
- ▶ The pool mixing valve may not be installed as a heating circuit.



Installation of a pool module (accessory) is demanded to use pool heating.

- ▶ Install the pool (→ instructions for the pool).
- ▶ Install the mixing valve for pool.
- ▶ Isolate all pipes and connections.
- ▶ Install the pool module (→ instruction for the pool module). Please observe that the hydraulic solution that is presented in that can not be used.
- ▶ Set the mixing valve running time at commissioning (→ Chapter 11.2).
- ▶ Make necessary settings for the pool heating (→ Kapitel 12.5).

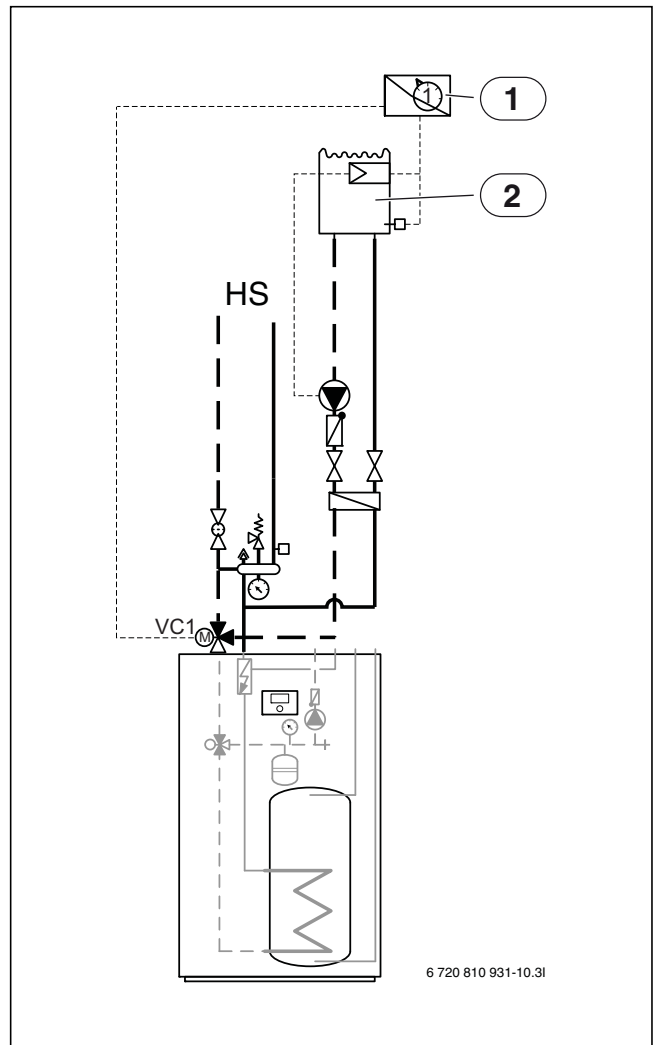


Fig. 12 Pool installation example

- [1] Pool module
- [2] Pool
- [VC1] Pool mixing valve
- [HS] Heating system

### 7.11 Connecting the heat pump module to the heat pump

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

► Select pipe size according to table 11.

- Connect the return to the heat pump [4] to the heat transfer medium out [1] figure 13.
- Connect the flow from the heat pump [3] to the heat transfer medium in [2] Figure 13.

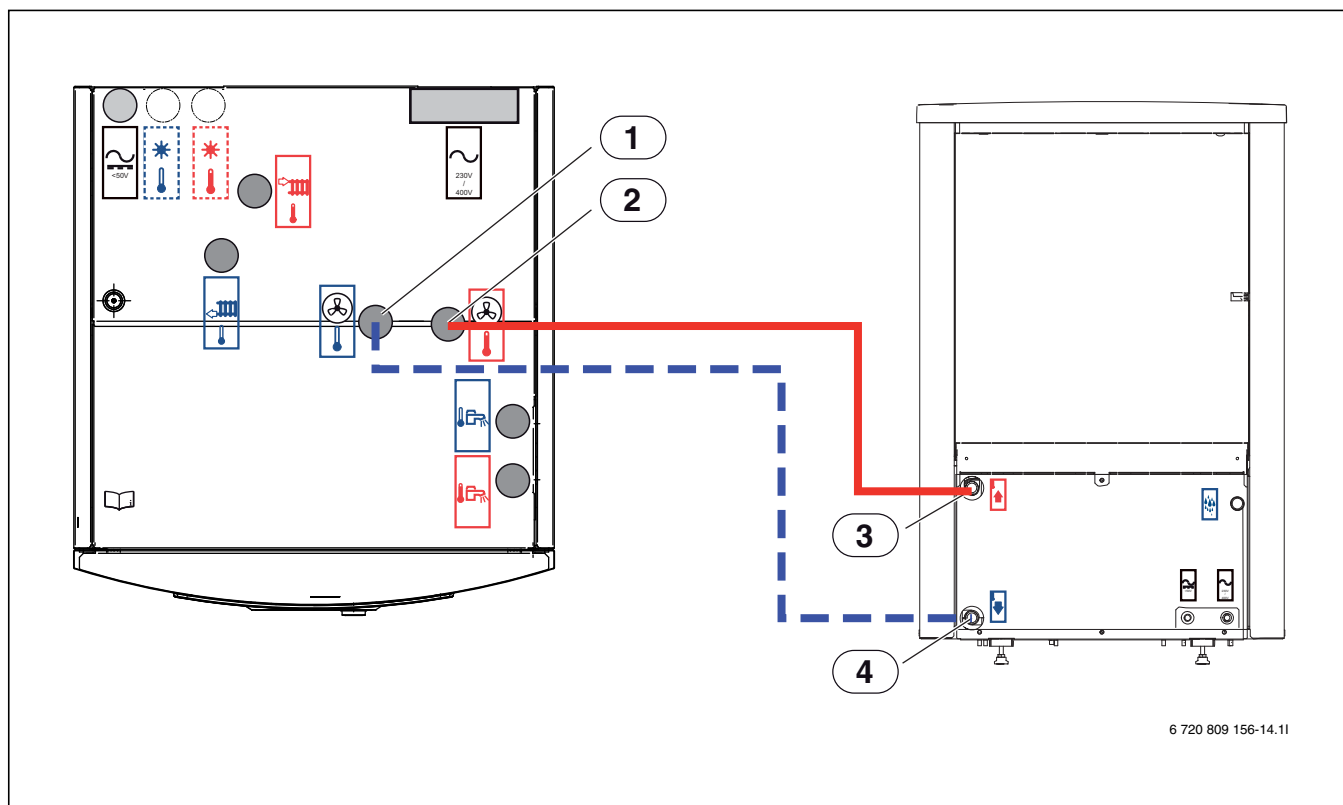


Fig. 13 Heat pump connections heat pump module

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

Heat pump output (kW)	Heat transfer fluid delta (K)	Nominal flow (L/s)	Maximum pressure drop (kPa) <sup>1)</sup>	AX20	AX25	AX32	AX40
				inner-Ø 15 (mm)	inner-Ø 18 (mm)	inner-Ø 26 (mm)	inner-Ø 33 (mm)
				Maximum pipe length PEX (m)			
5	5	0.32	68	28	60		
7	5	0.33	55	14	33	60	
9	5	0.43	40	8	21	60	
13	5	0.62	56		14	60	60
17	5	0.81	18			15	60

Table 11 Pipe dimensions and max. pipe length for connection of heat pump to heat pump module

1) For pipes and components between the heat pump module (indoor unit) and heat pump (outdoor unit).

### 7.12 Connecting the heat pump module to the heating system and tap water



Pressure relief valve, non-return valve, and fill valve must be installed on the tap DHW circuit (not included).

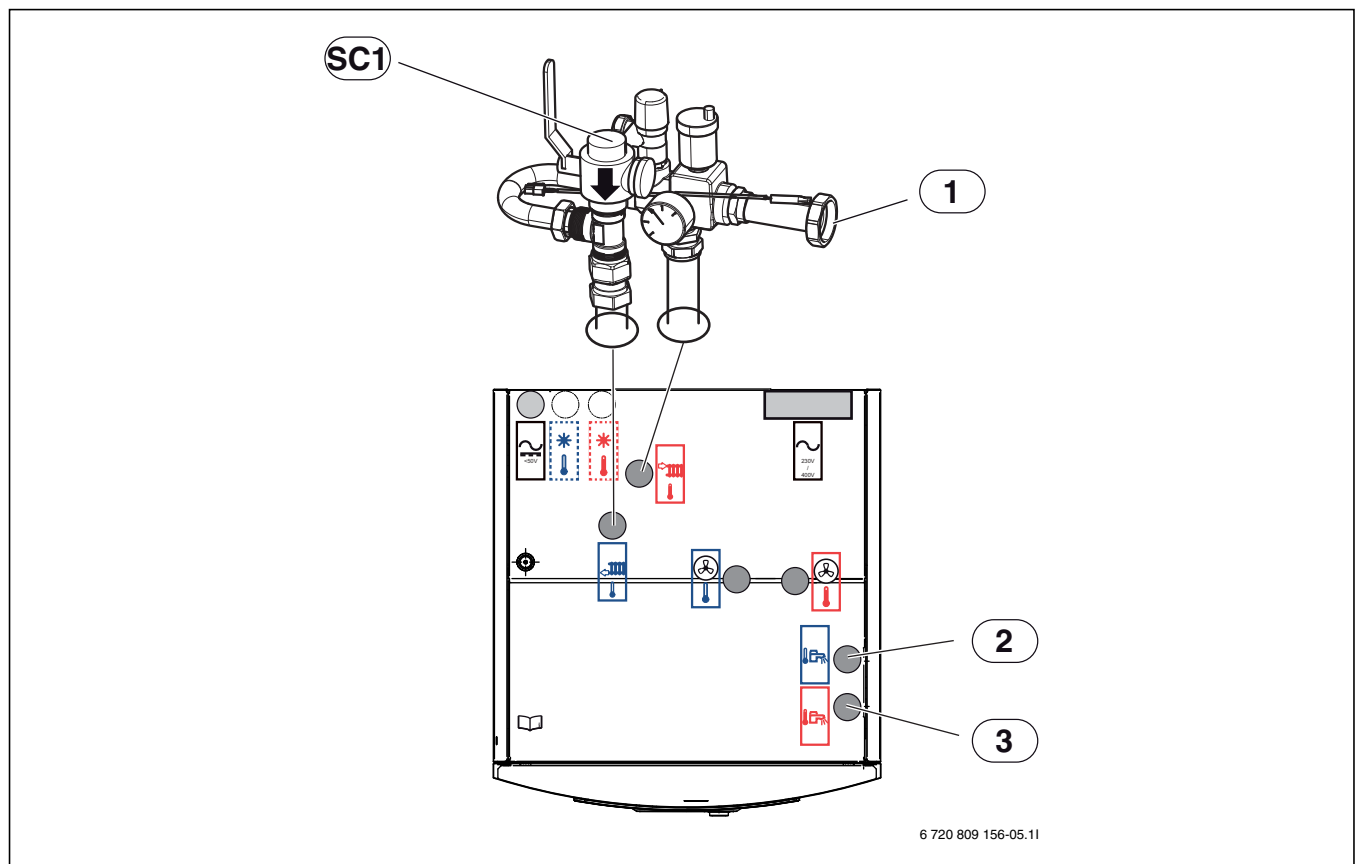


If there is not enough room to install the safety assembly directly on the heat pump module connections:

- ▶ Extend the connections by max. 50 cm.
- ▶ Do not angle the connections downwards.
- ▶ Do not install any shut-off valves between the safety assembly and the heat pump module.
- ▶ The particle filter can be installed at a bend to the left.
- ▶ Bends can be installed between the safety group and the connection for the circulation pump.

Insulate the connections and pipes to the heating system from condensation if cooling is used.

- ▶ Install the safety assembly (→ Chapter 5.1.1).
- ▶ Install the pressure relief valve and non-return valve with a fill valve for tap DHW.
- ▶ Drain leakage drain hoses from the pressure relief valves into a frost protected drain.
- ▶ Connect the heating system circulation pump to [1] figure 14.
- ▶ Connect the heating system return to the particle filter [SC1] figure 14.
- ▶ Connect cold water inlet to [2] figure 14.
- ▶ Connect DHW outlet to [3] figure 14.
- ▶ Connect the heating system flow to the circulation pump.



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Fig. 14 Heating system and DHW connections heat pump module

- [1] Connection for circulation pump PC1 (flow to heating system)
- [2] Cold water inlet connection
- [3] DHW outlet connection
- [SC1] Particle filter (return from heating system connection)

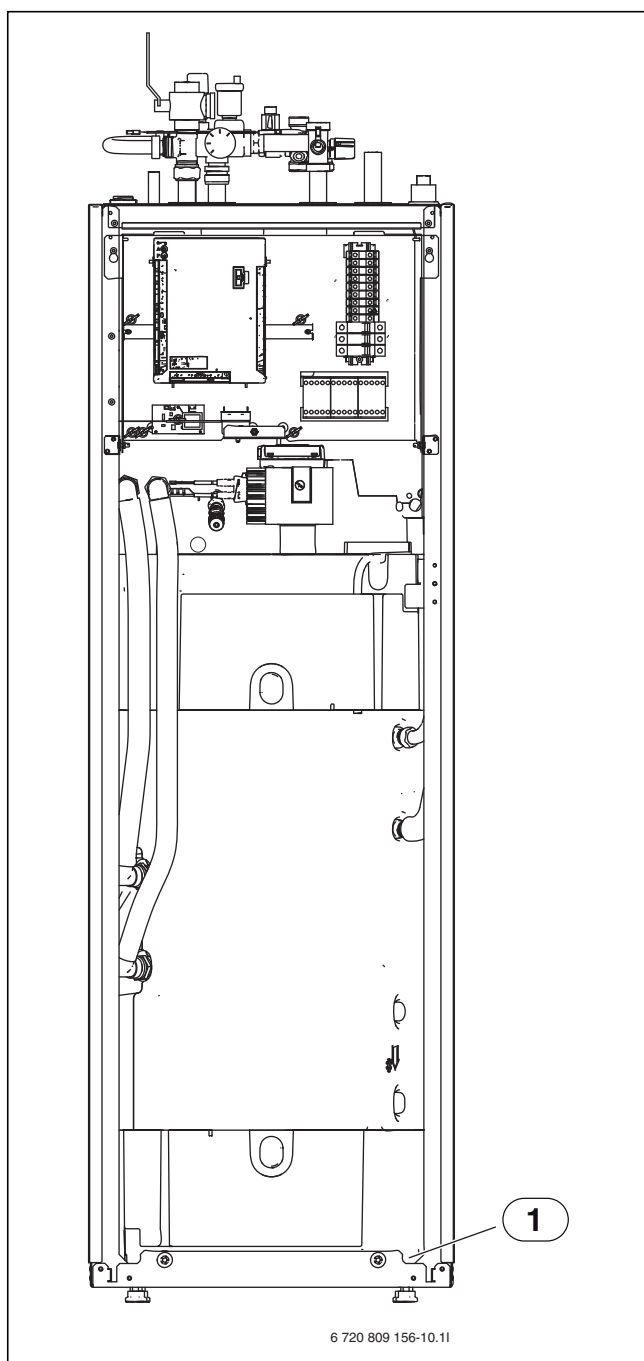


Fig. 15 Drain hose

[1] Drain hose

- ▶ Connect the drain hose with a leakage drain hose to a frost protected drain.

### 7.13 Low energy pump for heat transfer medium (PC0)

PC0 heat transfer pump is PWM operated (RPM controlled). The pump settings are managed on the heat pump module control panel.

Circulation pump speed is automatically adjusted for optimal operation.

### 7.14 Circulation pump for the heating system (PC1)



**NOTICE:** Damage due to deformation!

The circulation pump connecting pipe in the safety assembly may bend if it is subject to heavy weight pressure for an extended period of time.

- ▶ Use appropriate mounting installation for the heating system pipes and DHW circulation pump to support the safety assembly connection.



The heating system circulation pump is required and selected based on the system pressure drop and flow requirements.



PC1 must always be connected to the installer module in the heat pump module according to the circuit diagram.



Relay output max. load for circulation pump PC1: 2 A,  $\cos\phi > 0.4$ . Higher load requires installation of an intermediate relay.

### 7.15 DHW circulation pump PW2 (accessory)

Settings for the circulation pump PW2 is done in the control unit (→Chapter 12.4).

### 7.16 Insulation



**NOTICE:** Damage due to freezing!

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

- ▶ Use at least 19 mm insulation for outside pipework.
  - ▶ Use at least 12 mm insulation for inside pipework.
- This is important for safe and efficient DHW heating.

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

During cooling, all connections and lines must be condensation insulated according to applicable norms.

### 7.17 Several heating circuits (mixing valve module accessory, see separate instructions)

The user interface can handle a heating circuit without a mixing valve in standard configuration. A mixing valve module is required for each circuit if additional circuits are installed.

- ▶ Install the mixing valve module, mixing valve, circulation pump and other components in accordance with the selected system solution.
- ▶ Connect the mixing valve module to terminal EMS on the installer module in the heat pump module electric box.
- ▶ Make settings for several heating circuits in accordance with Chapter 12.3.2.

If there is already a connection on the EMS terminal, the connection is made parallel to the same terminal in accordance with Fig. 16. If several EMS modules are installed in the system, these must be connected in accordance with Fig. 33, Chapter 8.12.

### 7.18 Installation of condensation sensor (accessories)



**NOTICE:** Damage due to moisture!

Cooling below dew point will result in condensation on the surrounding material (floor).

- ▶ Do not use the underfloor heating system for cooling below dew point.
- ▶ Correctly adjust the flow temperature as described in Chapter 12.3.2.

The condensation guard function will stop the cooling if condensation develops on the heating system pipes. Condensation will develop during cooling if the heating system temperature is lower than current 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.

The condensation sensors will send a signal to the operating system when they sense condensation and stop the cooling.

Instructions for installation and handling are included with the condensation sensor.

### 7.18.1 Condensation monitoring, fan coils only

**NOTICE:** Damage due to moisture!  
Moisture may be transferred to surrounding materials if there are gaps in the condensation insulation.

- ▶ Apply condensation insulation to all pipes and connections up to the fan element for cooling.
- ▶ Use condensation insulation material that is intended for condensation cooling systems.
- ▶ Connect the drain to the drain outlet.
- ▶ Do not use condensation guard.

If only fan elements with drainage and condensation insulated pipes are used, the flow temperature can be set to 7 °C. The lowest recommended temperature is 10 °C for balanced cooling as the freeze guard is activated at 5 °C.

### 7.19 Temperature sensor installation

The user interface in the delivery configuration automatically regulates the flow temperature based on the outdoor temperature. A room controller can be installed for greater comfort. If cooling mode is used, a room controller is a must.

#### 7.19.1 Room controller (accessories, see separate instructions)

**i** If the room controller is installed after the system has been put into operation, it must be selected as room controller for heating circuit 1 in the start-up menu (→ Chapter 11.2).

- ▶ Install the room controller in accordance with its instruction.
- ▶ Connect the room controller to a terminal EMS on the installer module in the heat pump module electric box.
- ▶ Set room controller CR10 as remote control before the installation is put into operation (→ Room controller's instruction). CR10H does not have this option.
- ▶ Make circuit settings on the room controller before the installation is put into operation (→ Room controller's instruction).
- ▶ Indicate when the installation is put into operation that room controller (CR10 or CR10H) has been installed (→ Chapter 11.2) as a user interface for heating circuit 1.
- ▶ Make room temperature settings according to Chapter 12.3.2.

If there is already a connection on the EMS terminal, the connection is made parallel to the same terminal in accordance with Fig. 16. If several EMS modules are installed in the system, these must be connected in accordance with Fig. 33, Chapter 8.12.

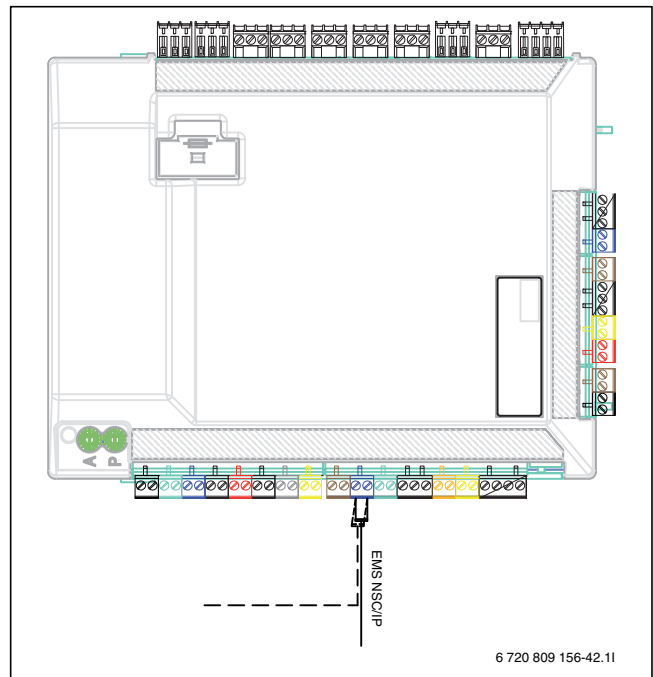


Fig. 16 EMS connection on installer module

#### 7.19.2 Flow temperature sensor T0

The sensor is delivered with the heat pump module.

- ▶ Fit the sensor in the pocket on the safety assembly (→ figure 10) or on the buffer cylinder if one is installed.
- ▶ Connect flow temperature sensor T0 to terminal T0 on the installer module in the heat pump module electric box.

#### 7.19.3 Outside temperature sensor T1

**i** A screened cable must be used if the outside temperature sensor cable is longer than 15 m. The screened cable must be grounded in the inside unit. The max. length of a screened cable is 50 m.

The outside temperature sensor cable must meet the following minimum requirements:

Cable diameter: 0.5 mm<sup>2</sup>  
Resistance: max. 50 ohm/km  
No. of conductors: 2

- ▶ Install the sensor on the cold side of the house, normally north facing. It must be protected from direct sunlight, ventilation air or anything that can affect the temperature measurement. The sensor must not be installed directly beneath the roof.
- ▶ Connect outdoor temperature sensor T1 to terminal T1 on the installer module in the heat pump module electric box.



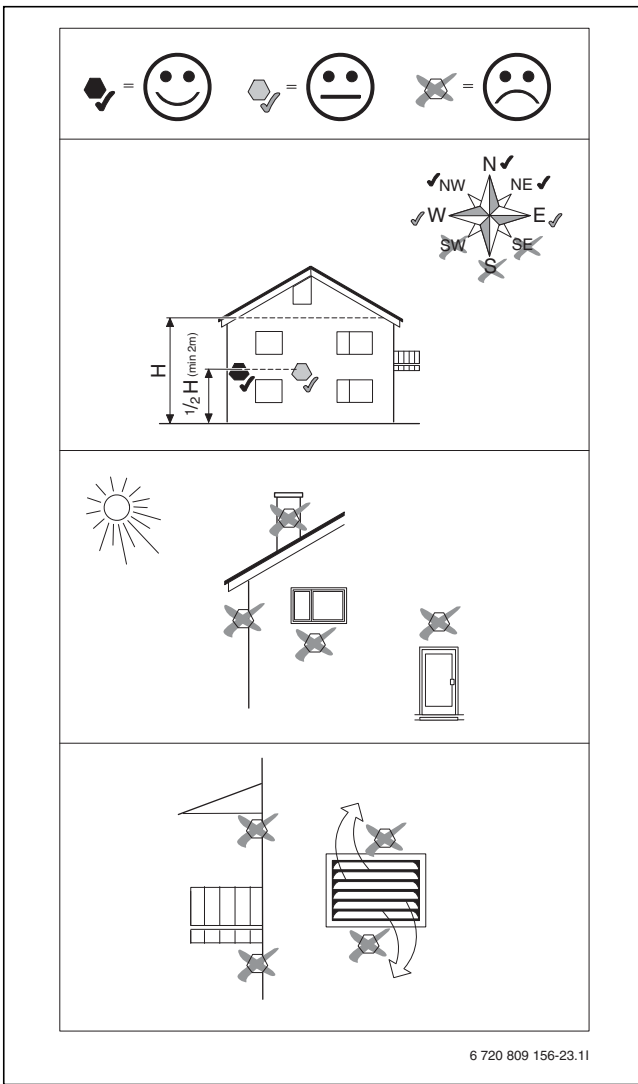


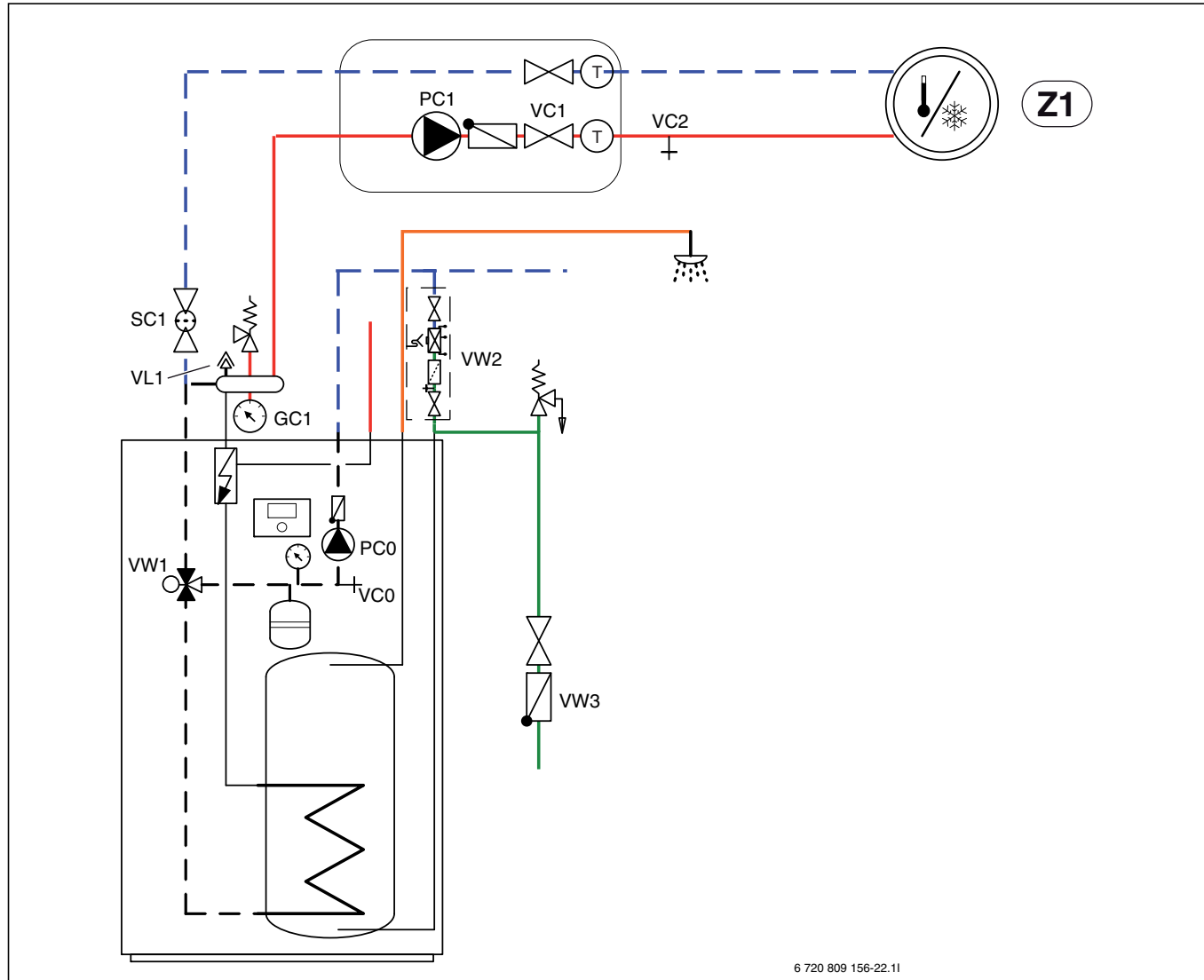
Fig. 17 Outside temperature sensor positioning

## 7.20 Heat pump and heat pump module filling



When filled, the system has to be thoroughly vented.

- ▶ Fill the system according to these instructions.
- ▶ Connect the system to power as described in Chapter 8.
- ▶ System commissioning as described in Chapter 11.
- ▶ Vent the system as described in Chapter 14.



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Fig. 18 Heat pump module and heating system

1. Disconnect the heat pump and heat pump module power.
2. Activate automatic venting of VL1 by unscrewing the screw a couple of turns without removing it.
3. Close the heating system valves; particle filter SC1 and VC1.
4. Connect one end of a hose to VC0 and the other end to a drain. Open the drain valve VC0.
5. Open the cold water valve VW3 and the fill valve VW2 to fill the heat pump pipes.
6. Continue filling until only water comes out of the hose by the drain and the outdoor unit does not form bubbles any more.
7. Close the drain valve VC0 and fill valve VW2.
8. Move the hose to the heating system drain valve VC2.
9. Open the particle filter SC1, the drain valve VC2 and the fill valve VW2 to fill the heating system.
10. Continue filling until only water comes out of the hose by the drain and the heating system does not form bubbles any more.
11. Close the drain valve VC2.
12. Open the heating system fill valve VW2 and keep filling until the pressure gauge GC1 shows 2 bar.
13. Close the fill valve VW2.
14. Remove the hose from VC2.
15. →chapter 14.

## 8 Electric installation



**DANGER:** Risk of electric shock!

The heat pump module components conduct electricity.

- ▶ Turn off the main power before any electrical work.



**NOTICE:** The installation will get damaged if the power is connected without water.

Components in the heating system can overheat if the power is connected before it has been filled up with water.

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



The heat pump module electrical connection must be disconnected safely in accordance with the wiring rules.

- ▶ Install a separate safety switch that disconnects all power to the heat pump module. In case of separate power supplies you will need one safety switch for each supply.



The compressor warms up before it starts. This can take up to 2 hours, depending on the outside temperature. The requirement is that the compressor temperature (TR1) is 10 K above the air intake temperature (TL2). The temperatures are visible in the Diagnostics menu (→ Chapter 12.9).



For recommended fuse sizes, see Technical information (→Chapter 4.1).

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

### 8.1 CAN-BUS



**NOTICE:** Malfunction due to electrical disturbances!

High voltage lines (230/400 V) close to a communications line can cause the heat pump module to malfunction.

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



**NOTICE:** The system will be damaged if the 12 V- and the CAN-BUS connections are confused!

The communication circuits are not designed for 12 V constant voltage.

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

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

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

Maximum cable length is 30 m.

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

**Switch Term** is used to mark the start and end of a CAN-BUS loop. Ensure that the correct circuit board is terminated and that all other switches are in the opposite position.

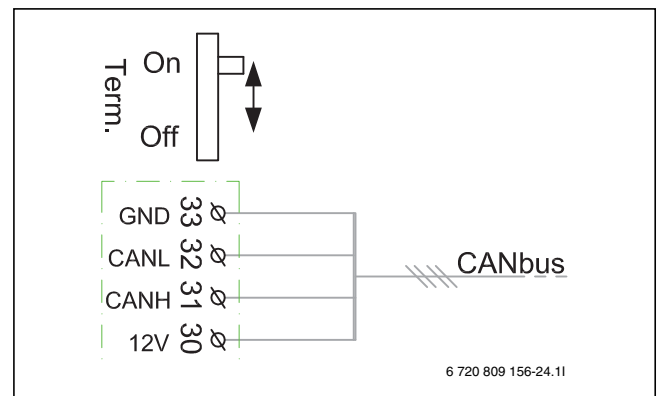


Fig. 19 Termination CAN-BUS

[On] Terminated CAN-BUS

[Off] Not terminated CAN-BUS

### 8.2 EMS-BUS



**NOTICE:** Malfunction due to electrical disturbances!

High voltage lines (230/400 V) close to a communications line can cause the heat pump module to malfunction.

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



EMS-BUS and CAN-BUS are not compatible.

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

The user interface HPC400 and the installer module in the heat pump module are connected by EMS-BUS.


The user interface is powered via the BUS cable. Polarity is not important for the two cables in the EMS-BUS.

In case of EMS-BUS accessories it is important to note that (please also refer to the installation instructions for each accessory):

- ▶ If several BUS units are installed, they must be separated by at least 100 mm.
- ▶ If several BUS units are installed, they must be connected in a series or a star network.
- ▶ Use a cable with a cross section area of at least 0.5 mm<sup>2</sup>.
- ▶ In case of external inductive interferences (e.g. from PV systems), use screened cables. The screen should only be grounded in one end and to the chassis.

### 8.3 Printed circuit board handling

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

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

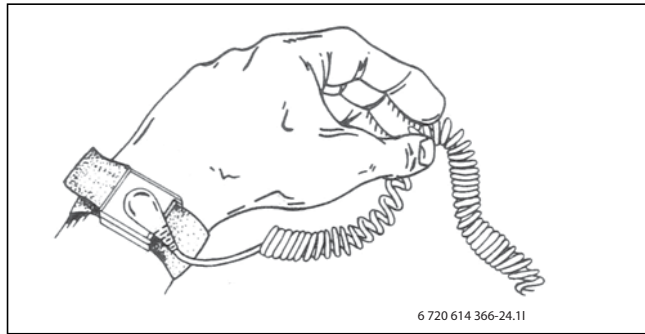


Fig. 20 Antistatic wrist strap

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

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

### 8.4 External connections


To avoid inductive interference, all low voltage conductors (measure current) should be installed with a minimum distance of at least 100 mm from the conducting 230V- and 400V cables.

If the temperature sensor conductor has to be extended, the following conductor diameters should be used:


- Up to 20 m long cable: 0.75 to 1,50 mm<sup>2</sup>
- Up to 30 m long cable: 1.0 to 1,50 mm<sup>2</sup>

The relay output PK2 is active during cooling and can be used to manage the exchange between cooling /heating of a fan convector or a circulation pump or to regulate floor heating circuits in moist rooms.

Output VCO is active during cooling and is used to manage a 3-way valve to recirculation, to facilitate the exchange between DHW heating and cooling.

 Relay output max. load: 2A, cosφ>0.4. Higher load requires installation of an intermediate relay.

### 8.4.1 External outputs

 **NOTICE:** Damage due to incorrect connection!  
 Connections intended for a different voltage or current can damage electrical components.

- ▶ Only add connections to the heat pump module external outputs that are compatible with 5 V and 1 mA.
- ▶ If an intermediate relay is required, use only relays with gold-plated plugs.

External inputs I1, I2, I3 and I4 can be used to remotely manage certain functions in the user interface.

The functions that are activated by the external inputs are described in chapter 12.1.2.

The external input is connected either to a power switch for manual activation or to operating equipment with a relay output for 5 V.

### 8.5 Accessories

CAN-BUS connected accessories, e.g. power guard, are connected to the installer card in the heat pump module parallel on the CAN-BUS connection to the heat pump. They can also be connected in series with other CAN-BUS connected units.

### 8.6 Connecting the heat pump module

- ▶ Remove the front panel.
- ▶ Remove the electric box cover.
- ▶ Feed the connecting cables through the cable feed in the ceiling and to the electric box. Use an extension spring, if required.
- ▶ Feed the cables so that the electric box can be tilted forward.
- ▶ Connect the cables according to the circuit diagram.
- ▶ Put the electric box cover and the heat pump module front panel back.

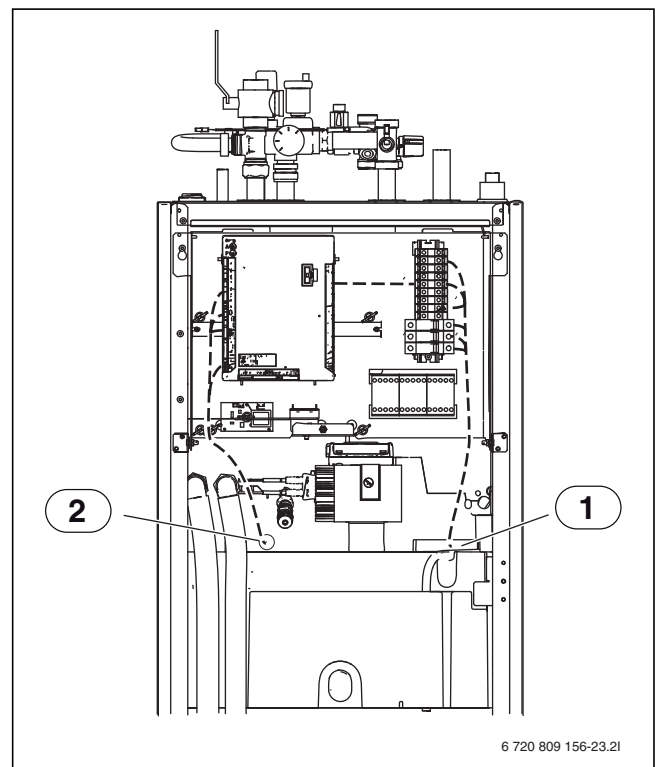


Fig. 21 Cable feed

- [1] Cable bus electrical connection
- [2] Cable bus CAN-BUS and sensor

8.7 Electric box layout

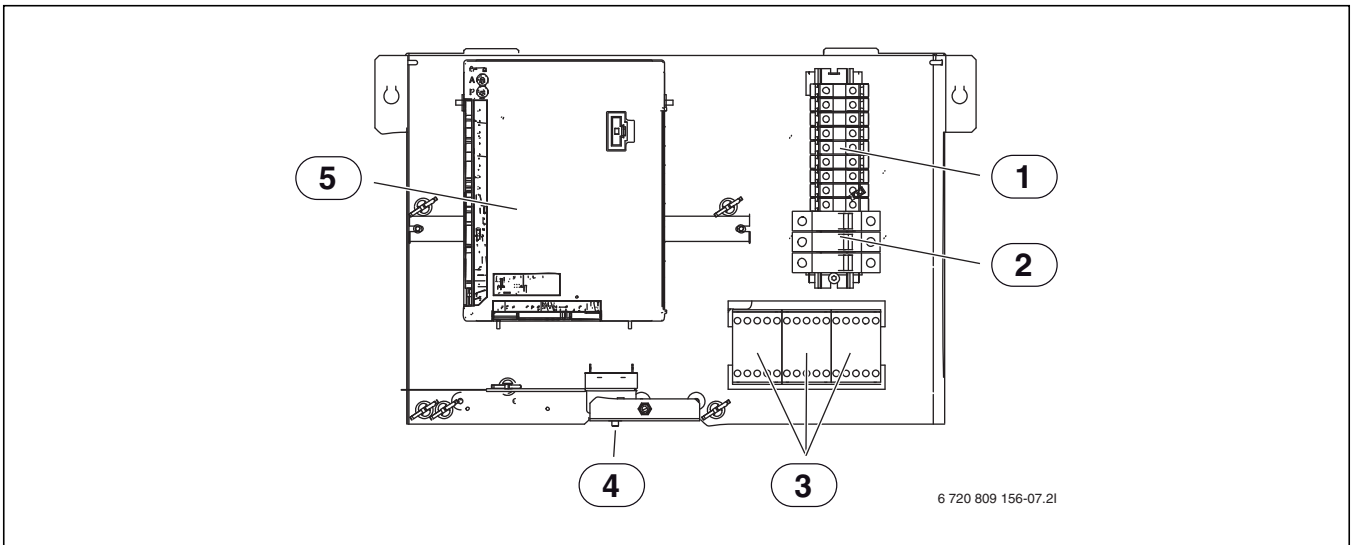


Fig. 22 Electric box layout

- [1] Terminals
- [2] Automatic fuses (only 15 kW model)
- [3] Contactors K1, K2, K3
- [4] Overheating protection reset
- [5] Installer module

8.7.1 Terminal connections in electric box 9 kW immersion heater 3N~, standard setting

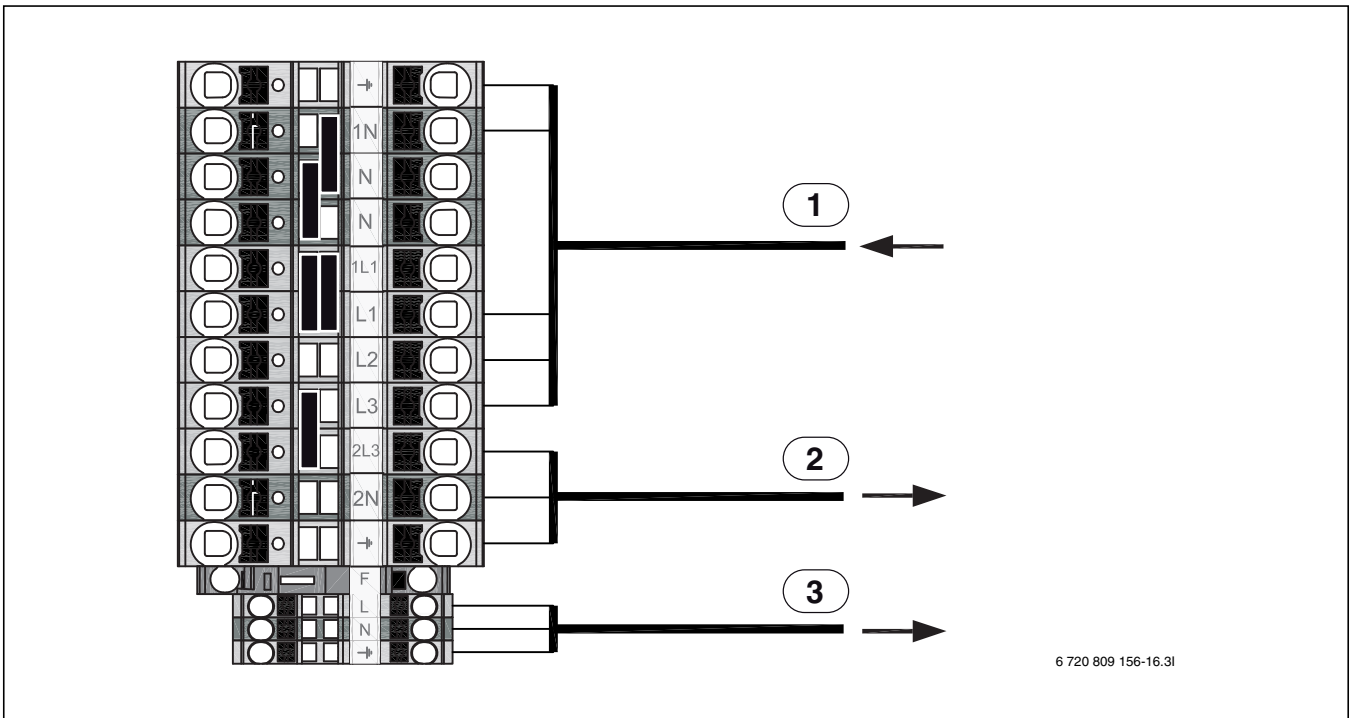


Fig. 23 Terminal connections in electric box

- [1] 400 V 3 N~ 16 A, input
- [2] 230 V 1 N~, heat pump 5/7/9
- [3] 230 V 1 N~, EMS Plus accessories



Immersion heater only on L1 and L2 during heat pump mode. Otherwise the heat pump must have a separate power supply from the distribution board.

8.7.2 Terminal connections in electric box 9 kW immersion heater 1N~, see bridge placement

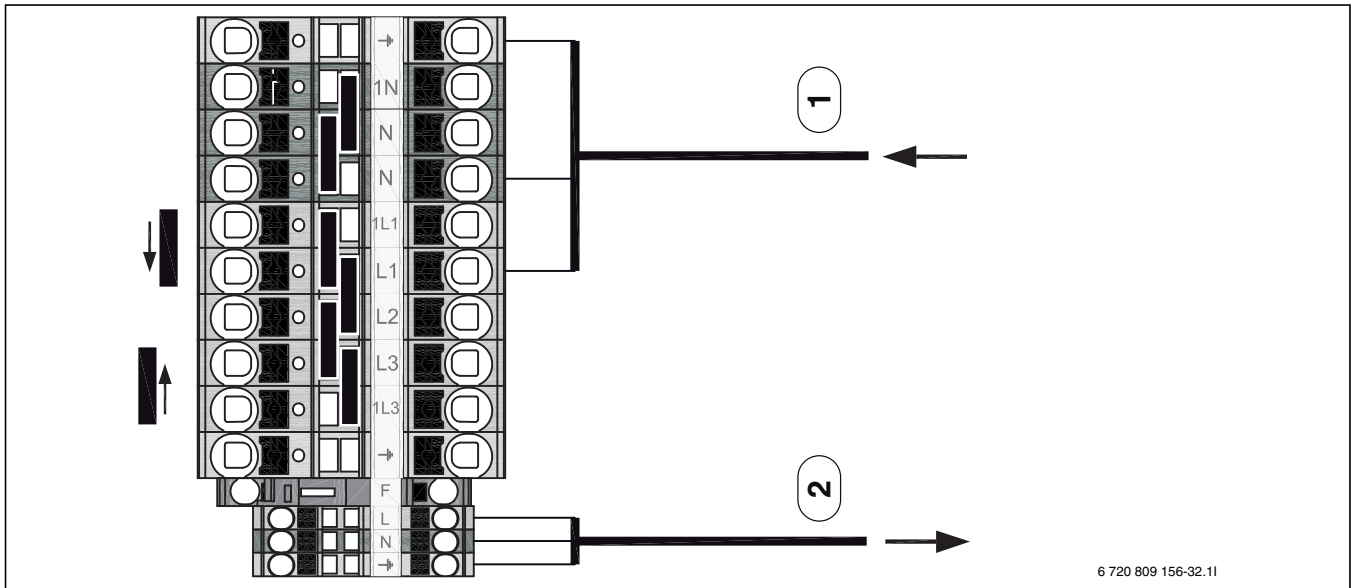


Fig. 24 Terminal connections in electric box

- [1] 230 V 1 N~ 50 A, input
- [2] 230 V 1 N~, EMS Plus accessories



The heat pump has a separate power supply from the distribution board 230 V 1 N~ 16 A.

8.7.3 Terminal connections in electric box 15 kW immersion heater 3N~, standard setting

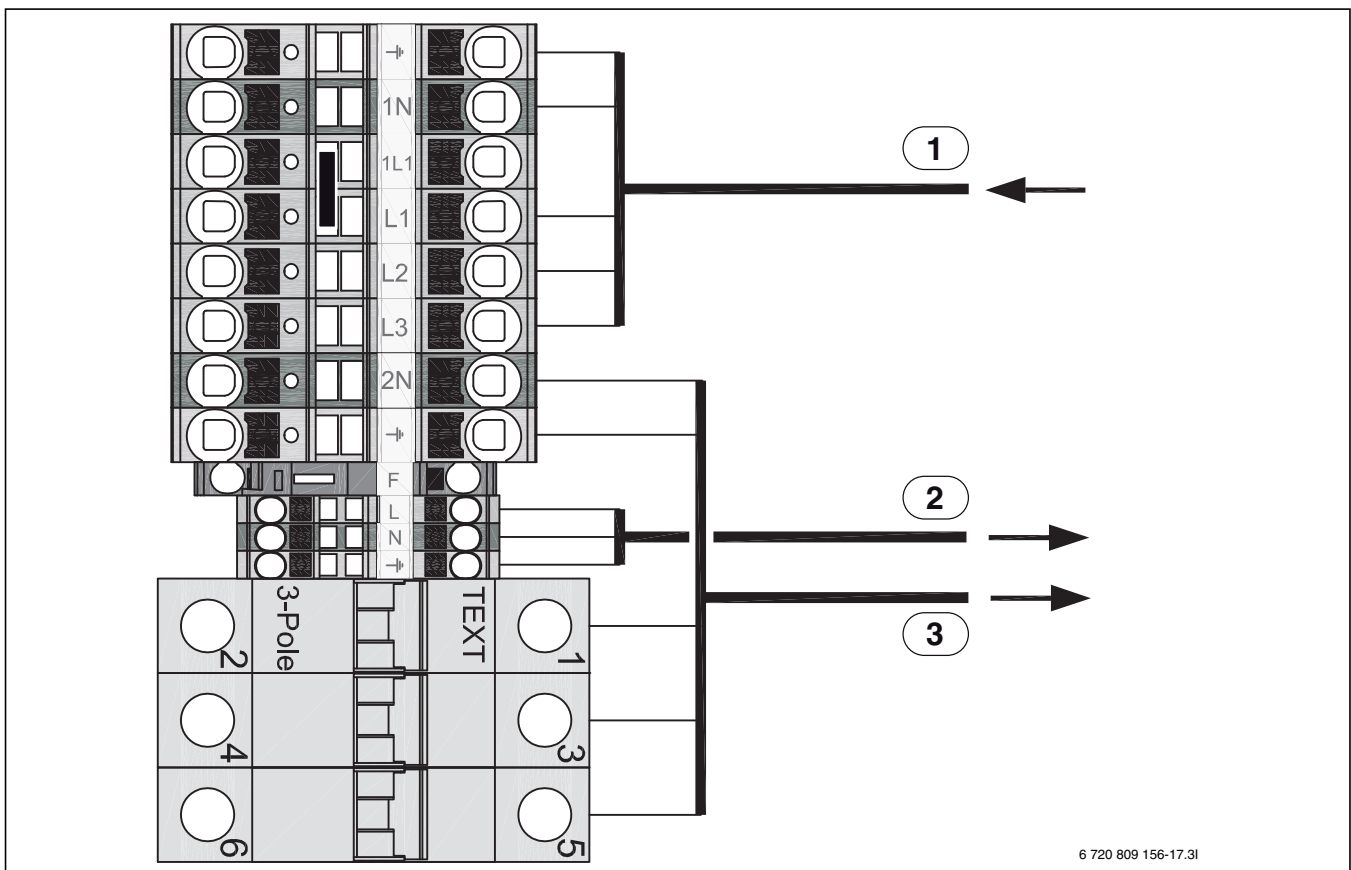


Fig. 25 Terminal connections in electric box

- [1] 400 V 3 N~ 25 A, input
- [2] 230 V 1 N~, EMS Plus accessories
- [3] 400 V 3 N~, heat pump 13/17



Max. 9 kW immersion heater during heat pump mode. Otherwise the heat pump must have a separate power supply from the distribution board.

8.7.4 Circuit diagram 9 kW immersion heater 3N~, standard setting

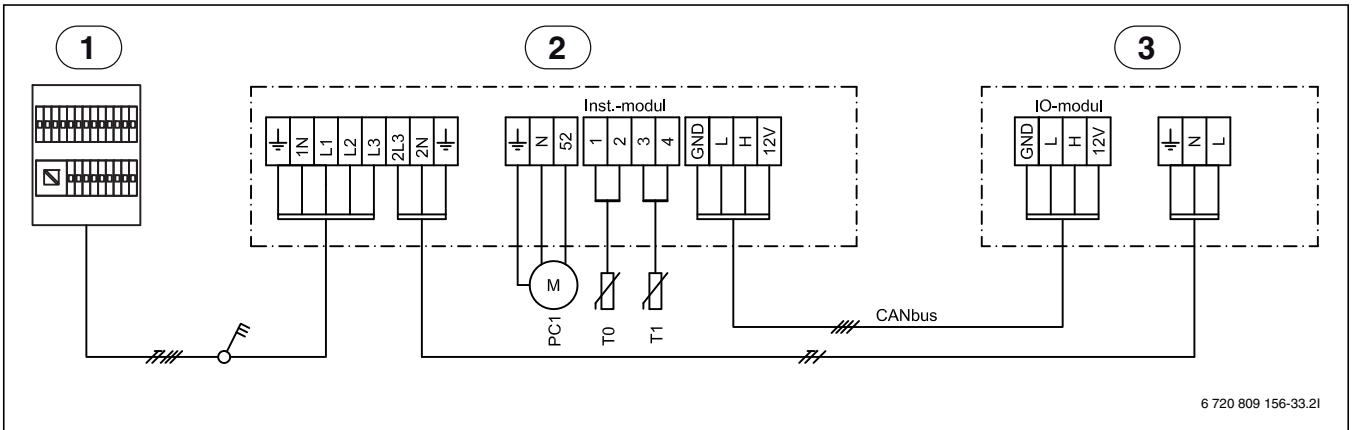


Fig. 26 Circuit diagram 9 kW 3N~

- [1] Distribution board
- [2] Heat pump module 9 kW, 400 V 3 N~
- [3] Heat pump 5/7/9, 230 V 1 N~
- [PC1] Heating system circulation pump
- [T0] Flow temperature sensor
- [T1] Outside temperature sensor



Immersion heater L1-L2, heat pump L3. Immersion heater L3 blocked during heat pump mode.

8.7.5 Circuit diagram 9 kW immersion heater 1N~

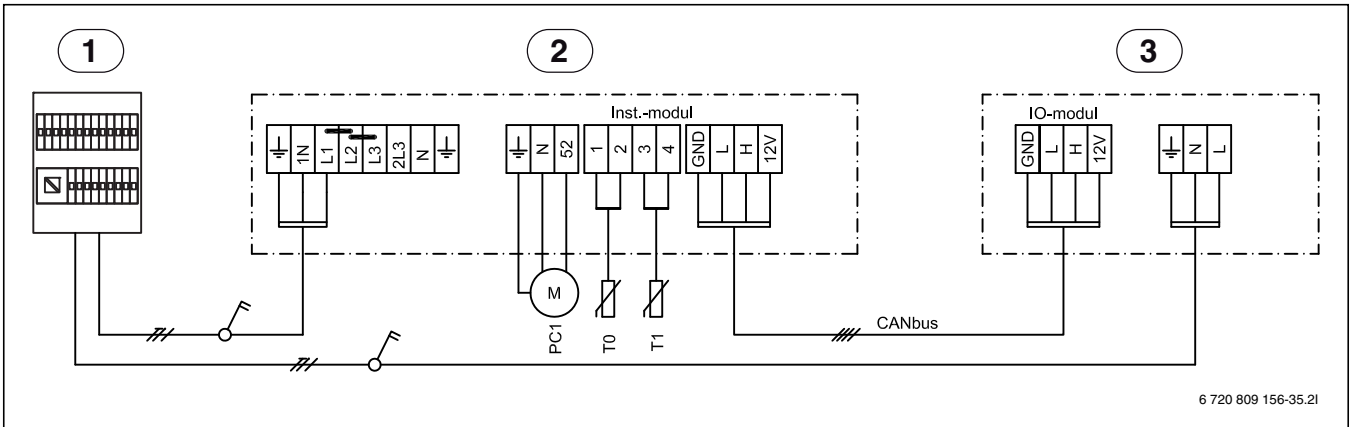


Fig. 27 Circuit diagram 9 kW 1N~

- [1] Distribution board
- [2] Heat pump module 9 kW, 230 V 1 N~
- [3] Heat pump 5/7/9/13, 230 V 1 N~
- [PC1] Heating system circulation pump
- [T0] Flow temperature sensor
- [T1] Outside temperature sensor

8.7.6 Circuit diagram 15 kW immersion heater 3N~, standard setting

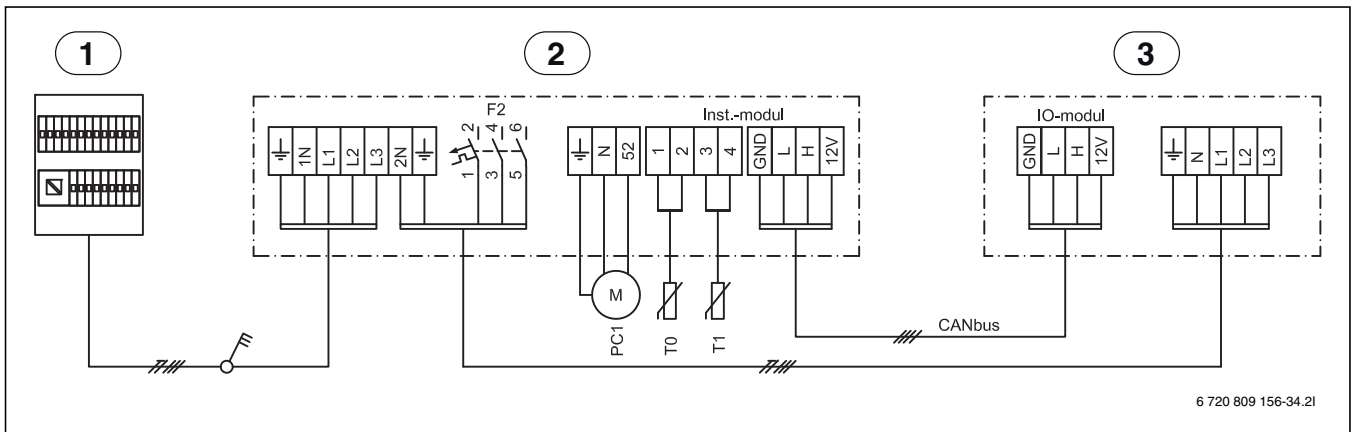
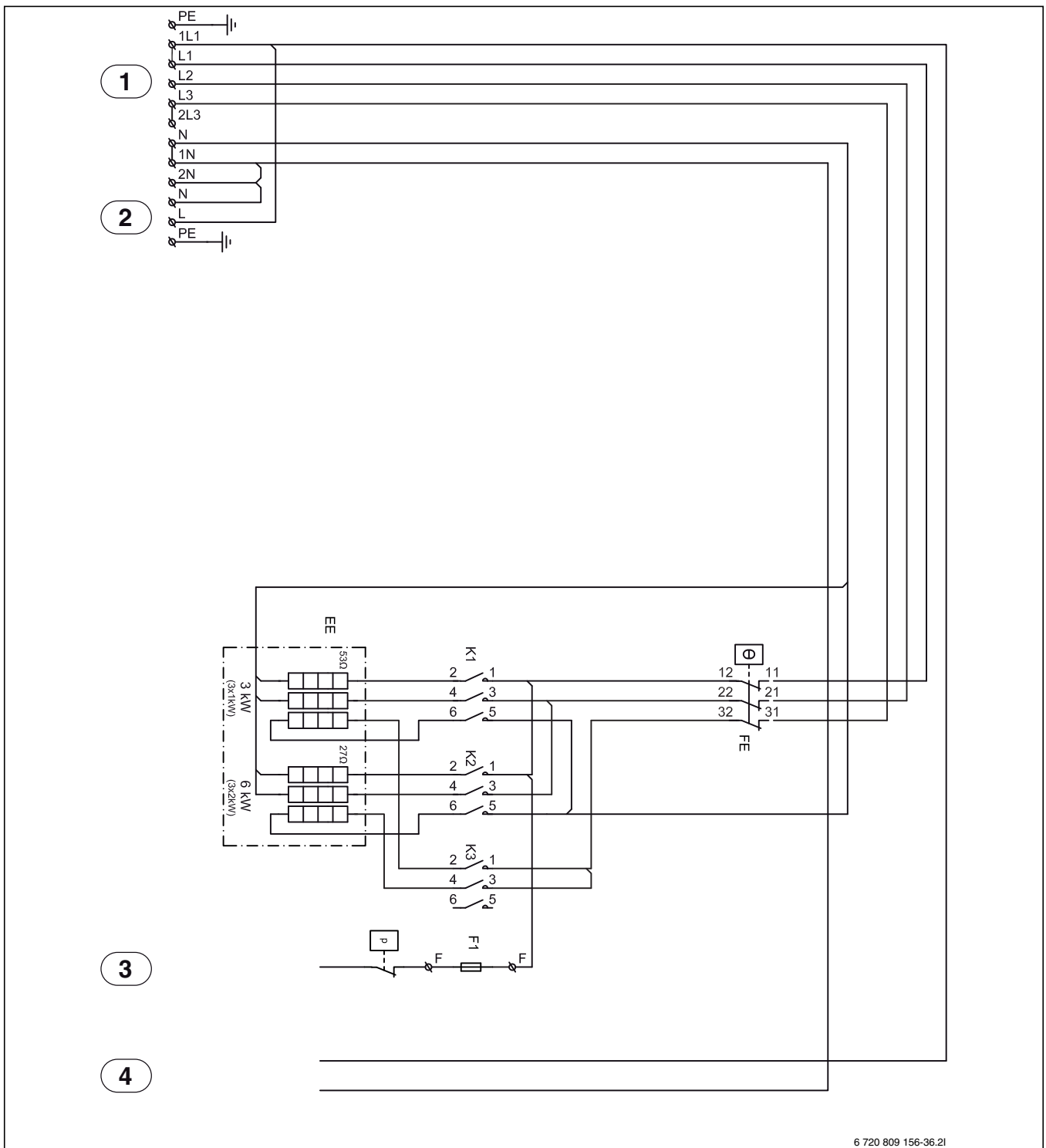


Fig. 28 Circuit diagram 15 kW 3N~

- [1] Distribution board
- [2] Heat pump module 15 kW, 400 V 3 N~
- [3] Heat pump 13/17, 400 V 3 N~
- [PC1] Heating system circulation pump
- [T0] Flow temperature sensor
- [T1] Outside temperature sensor



## 8.8 Power supply heat pump and heat pump module 9 kW 3N~



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Fig. 29 Power supply heat pump and heat pump module 9 kW

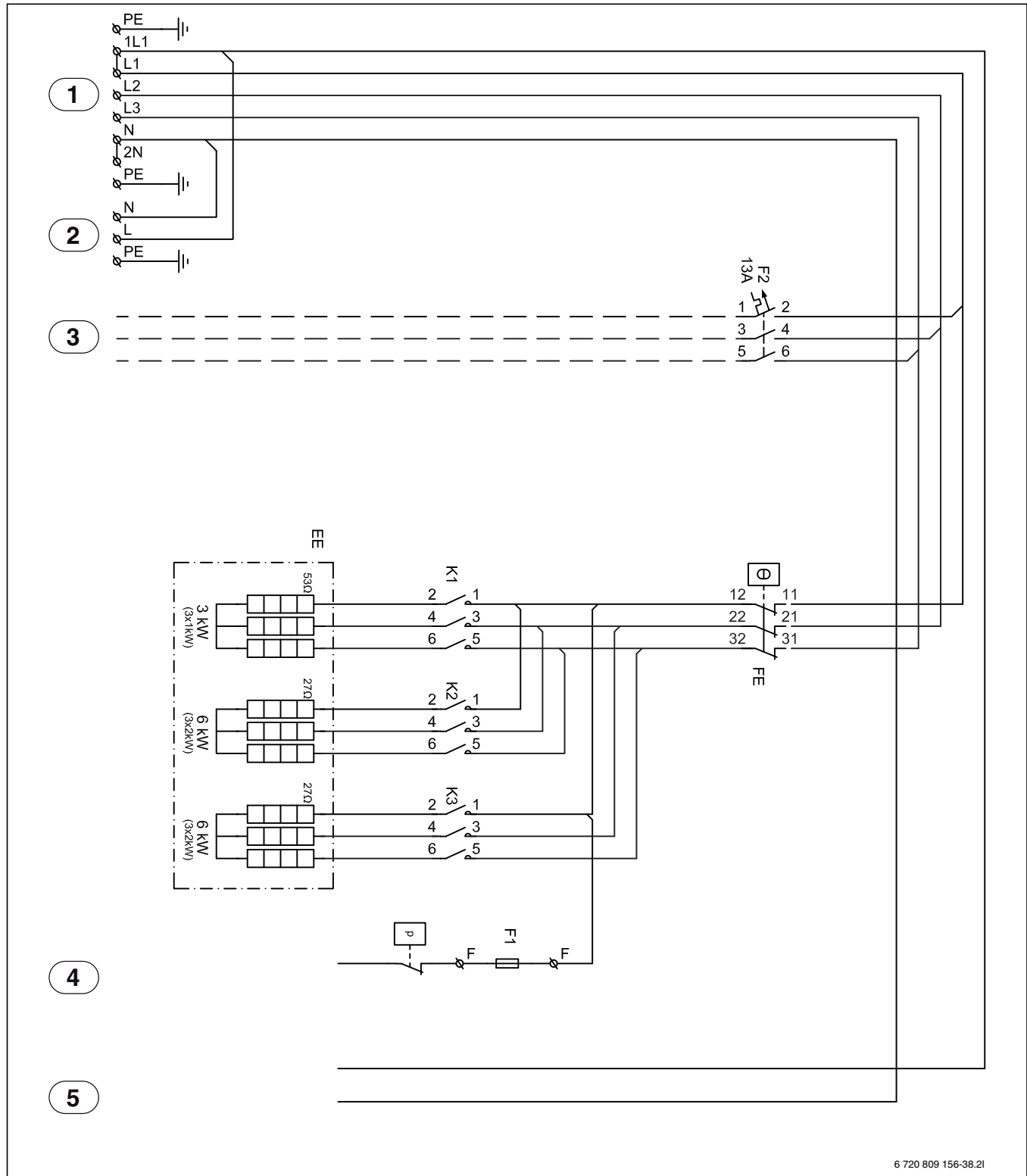
- [1] Input 400 V 3 N~  
 [2] User interface  
 [3] Immersion heater alarm output ([2] Fig. 31)  
 [4] Installer module operating voltage ([1] Fig. 31)  
 [EE] Immersion heater  
 [FE] Immersion heater overheating protection  
 [F1] Terminal fuse  
 [P] Pressure switch  
 [K1] Contactor step 1  
 [K2] Contactor step 2  
 [K3] Contactor step 3



Connection on: L1-L2-L3-1N-PE.  
 Feed heat pump: 2L3-2N-PE.  
 User interface: L-N-PE

- Immersion heater during compressor mode: 2-4-6 kW (K3 blocked)
- Only immersion heater, compressor off: 3-6-9 kW

8.9 Power supply heat pump and heat pump module 15 kW



6 720 809 156-38.21

Fig. 30 Power supply heat pump and heat pump module 15 kW

- [1] Input 400 V 3 N~
- [2] User interface
- [3] Heat pump
- [4] Immersion heater/pressure switch alarm output ([2] Fig. 31)
- [5] Installer module operating voltage ([1] Fig. 31)
- [F1] Terminal fuse
- [F2] Heat pump fuse
- [EE] Immersion heater
- [FE] Immersion heater overheating protection
- [P] Pressure switch

- [K1] Contactor step 1
- [K2] Contactor step 2
- [K3] Contactor step 3
- Immersion heater: 3-6-9-12-15 kW

	Delivered connected
	Connected during installation/ accessories

8.10 Installer module circuit diagram

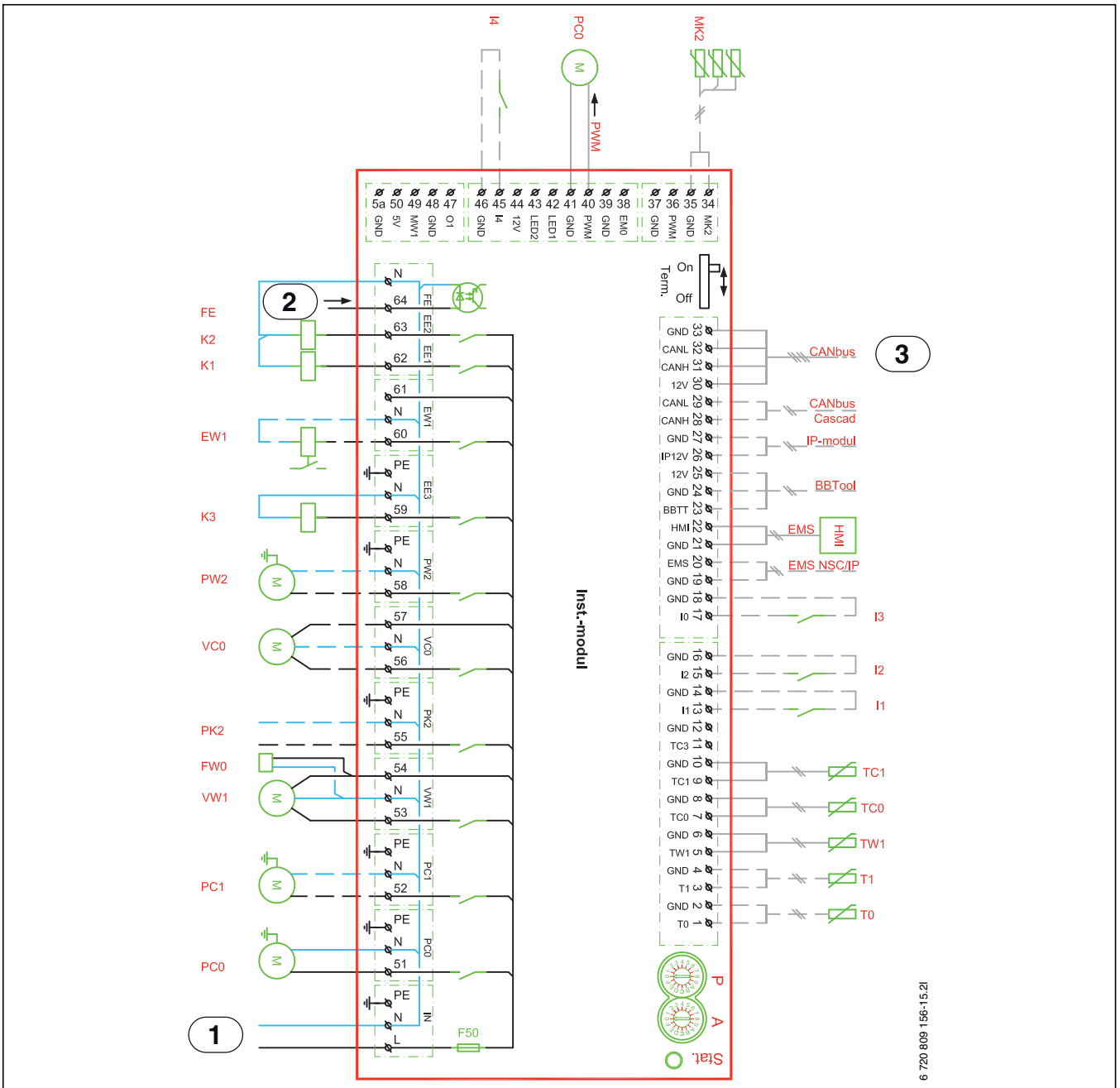


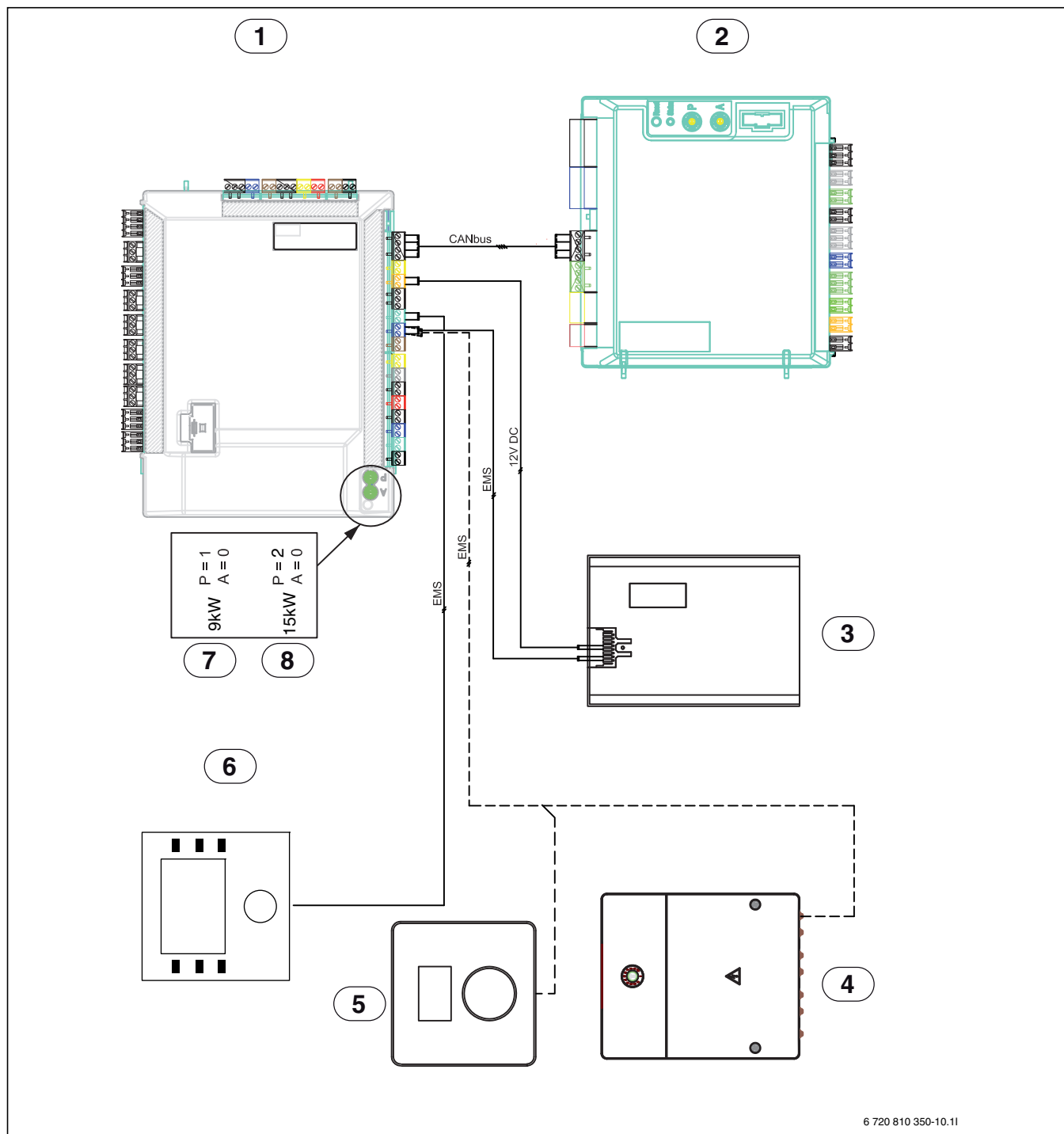
Fig. 31 Installer module circuit diagram

- |       |  |       |  |
|-------|--|-------|--|
| [I1]  | External input 1   | [PC1] | Heating system circulation pump  |
| [I2]  | External input 2   | [PK2] | Cooling season relay output 230 V  |
| [I3]  | External input 3   | [PW2] | Hot water DHW circulation pump   |
| [I4]  | External input 4   | [VCO] | Recirculation exchange valve   |
| [MK2] | Condensation sensor  | [VW1] | Heating/DHW exchange valve   |
| [PC0] | Circulation pump PWM signal                                    | [1]   | 230 V~ operating voltage ([5] Fig. 30 or [4] Fig. 29)                      |
| [T0]  | Flow temperature sensor  | [2]   | Immersion heater/pressure switch alarm output ([4] Fig. 30 or [3] Fig. 29) |
| [T1]  | Outside temperature sensor                                     | [3]   | CAN BUS to heat pump (I/O module card)                                     |
| [TW1] | DHW temperature sensor   |       |  |
| [TC0] | Return heat transfer medium temperature sensor                 |       |  |
| [TC1] | Flow heat transfer medium temperature sensor                   |       |  |
| [EW1] | Immersion heater start signal in hot water cylinder (external) |       |  |
| [FE]  | Overheating protection alarm                                   |       |  |
| [FW0] | Anode 230 V (accessories)                                      |       |  |
| [K1]  | Immersion heater contactor EE1                                 |       |  |
| [K2]  | Immersion heater contactor EE2                                 |       |  |
| [K3]  | Immersion heater contactor EE3                                 |       |  |
| [F50] | Fuse 6.3 A   |       |  |
| [PC0] | Heat transfer medium circulation pump                          |       |  |

**i** Relay output max. load PK2: 2 A, cosφ>0.4. Higher load requires installation of an intermediate relay.

—	Delivered connected
- - -	Connected during installation/ accessories

8.11 Heat pump/heat pump module circuit diagram



6 720 810 350-10.11

Fig. 32 Heat pump/heat pump module circuit diagram

- [1] Heat pump module
- [2] Heat pump
- [3] IP module
- [4] Accessories (extra heating circuit, pool, sun, etc.)
- [5] Room controller (accessories)
- [6] User interface
- [7] Addressing with 9 kW immersion heater (standard setting)
- [8] Addressing with 15 kW immersion heater (standard setting)

	Delivered connected
	Connected during installation/ accessories

8.12 Connection option EMS bus

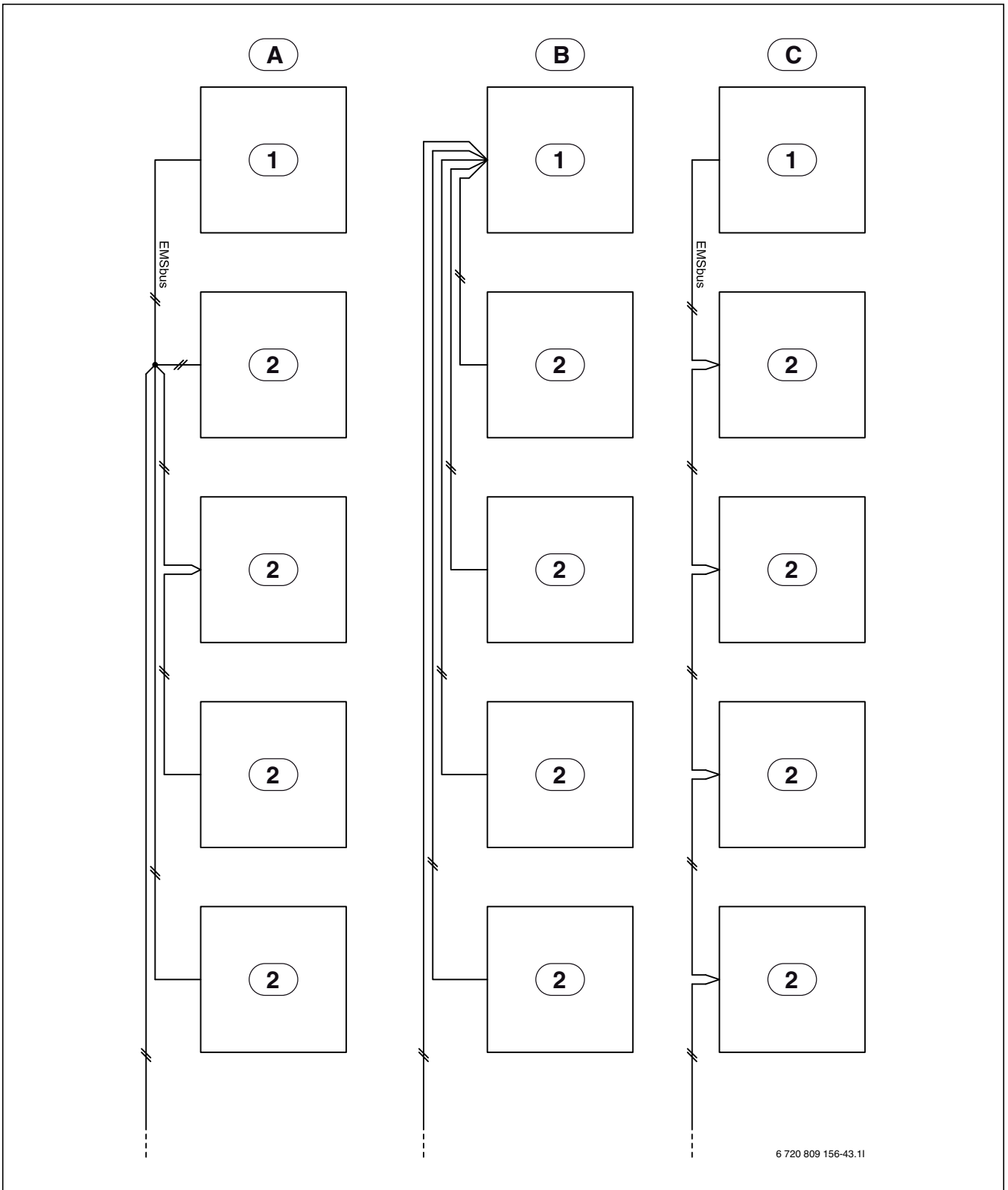


Fig. 33 Connection option EMS bus

- [A] Star network or serial connection with external coupling box
- [B] Star network
- [C] Serial connection
- [1] Installer module
- [2] Accessory modules (for example: Room Controller, Mixing Valve Module, Solar Module)

## 9 User interface

### 9.1 Product description

- The user interface will manage a heating system with max. four heating/cooling circuits, DHW heating with solar energy and heating from solar power.
- In heat pump mode, optimized operation without time program will provide the lowest energy consumption.
- The user interface can also operate according to a time program:
  - Heating: 2 time programs for each heating circuit with two break points per day. Heat circuits 2 to 4 can only change to heating mode when heating circuit 1 is in heating mode if there is no buffer cylinder installed.
  - DHW: a time program for DHW heating.
- The user interface shows information from the heat pump module and the heating system. It is also used to modify settings.
- After 1½ hour of operation the user interface has a battery life of at least 8 hours. If a power outage lasts longer than the battery life, the time and date settings will be erased. All other settings are saved.
- The functional scope and thus the menu structure of the user interface are determined by the structure of the system. Reference to the importance of the system structure to the functions will be made in relevant places. Setting ranges and standard settings may not correspond with the information in these instructions.

#### 9.1.1 Control modes


The following main control modes are available for heating:

- **Outside temperature compensated control:** automatic flow temperature control based on outside temperature.
- **Outside temperature compensated control influenced by room temperature:** automatic flow temperature control based on outside temperature and room temperature. A room controller must be installed in the reference room.

If the cooling mode is active, it will be set to an adjustable constant temperature.


Further information on control modes and settings that influence control (→ chapter 12.3, page 44).

### 9.2 Important notices on usage



**WARNING:** Risk of scalding!  
If thermal disinfection has been activated to avoid legionella, the hot water is heated once to in excess of 65 °C. The factory setting for the hot water temperature is 60 °C. There is a risk of scalding at the draw-off points if the temperature is set higher than this.

- ▶ Make sure that a mixing device that prevents scalding is installed. If in doubt, ask your contractor.



**NOTICE:** Floor damage!

- ▶ If using underfloor heating, ensure that the floor type max. temperature is not exceeded.
- ▶ Optionally, install an extra temperature switch, and connect it to one of the external inputs.

- Only products from the same distributor may be used within the EMS BUS system.

### 9.3 Optional accessories

For details regarding suitable accessories, please refer to the catalogue/price list.

Function modules and user interfaces in the control system **EMS plus:**

- **Room controller CR10** as a separate room controller

- **Room controller CR10H** as a separate room controller, which measures relative humidity (for heating/cooling circuits)
- **MM100:** Module for heating and cooling circuits with mixing valve
- **MP100:** Module for heat pump heated pool
- **MS100:** Module for solar energy DHW heating
- **MS200:** Module for extended solar thermal systems

#### Instructions validity for modules supporting EMS plus

These instructions also apply to the user interface in combination with heating/cooling circuit module MM100 (accessories).

Additional setting options may be found in some menus, if your heating system is equipped with other modules (e.g. solar module, accessories). These setting options are described in the module technical information.

## 10 Basic principles of operation

### 10.1 Key and symbol overview

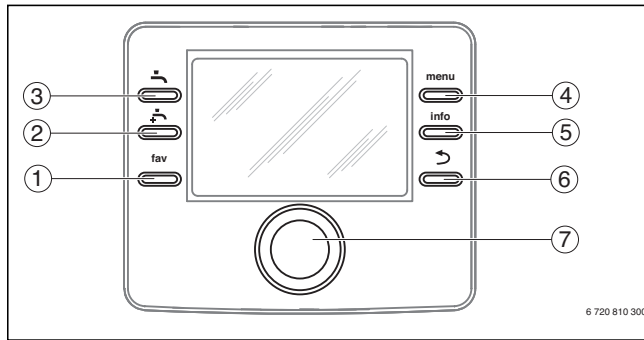


Fig. 34 Keys



If the display is turned off, it will turn on when a key is used and a function executed. Quickly press the selector to turn on the display. If you don't use any keys, the display will turn back off.

Pos.	Section	Designation	Explanation
1		Favourites key	<ul style="list-style-type: none"> <li>▶ Press this key to show favourite functions for heating/cooling circuit 1.</li> <li>▶ Keep this key pressed down to change Favourites menu settings (→ User interface operating instructions).</li> </ul>
2		Extra DHW key	<ul style="list-style-type: none"> <li>▶ Press this key to activate the extra DHW function (→ user interface operating instructions).</li> </ul>
3		DHW key	<ul style="list-style-type: none"> <li>▶ Press this key to activate the DHW operating mode (→ user interface operating instructions).</li> </ul>
4		Menu key	<ul style="list-style-type: none"> <li>▶ Press this key to enter the main menu (→ user interface operating instructions).</li> </ul>
5		Info key	When a menu is shown: <ul style="list-style-type: none"> <li>▶ Press this key for more information about the selected item.</li> </ul> When standard display is active: <ul style="list-style-type: none"> <li>▶ Press this key to enter the information menu (→ user interface operating instructions).</li> </ul>
6		Return key	<ul style="list-style-type: none"> <li>▶ Press this key to return to the previous menu or to cancel changes.</li> </ul> For maintenance or when an error has been detected: <ul style="list-style-type: none"> <li>▶ Press this key to switch between standard display and error message.</li> <li>▶ Keep this key pressed down to switch between a menu and the standard display.</li> </ul>
7		Selector	<ul style="list-style-type: none"> <li>▶ Turn the selector to change a set value (e.g. the temperature) or to select a menu or item.</li> </ul> When the display is off: <ul style="list-style-type: none"> <li>▶ Press the selector to turn on the display.</li> </ul> When the display is on: <ul style="list-style-type: none"> <li>▶ Press the selector to open a selected menu or item, or confirm a set value (e.g. temperature) or a message, or to close a pop-up window.</li> </ul> When standard display is active and the display is on: <ul style="list-style-type: none"> <li>▶ Press the selector to activate the input window for heating/cooling circuit options in the standard display (only valid for systems with at least two heating/cooling circuits, → User interface operating instructions).</li> </ul>

Table 12 Keys

10.2 Display symbols overview

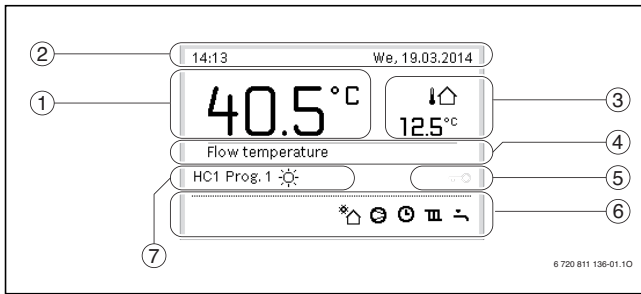


Fig. 35 An example of what the standard display might look like in a system with several heating/cooling circuits






















Pos.	Symbol	Designation	Explanation
1		Temperature	Shows current flow temperature (heat pump module temperature)
2	-	Information line	Displays time of day, day of the week and date.
3	 3.0 °C	Other temperature indicator	Displays an additional temperature, e.g. outside temperature, solar panel temperature, or the DHW system temperature (→ user interface operating instructions).
4	-	Text information	E.g. the designation of the currently displayed temperature (→ [1]). No designation is displayed for room temperature. If an error occurs, corresponding information will be displayed here until the error has been addressed.
5		Key lock	If key lock is enabled, the key symbol appears on the display.
6		Information graphic	Displays information symbols, showing the user what functions are currently active in the system.
			DHW heating active
			Thermal disinfection (DHW) active
			Extra DHW function active
			Basin/pool is being heated
			Heating active
			Cooling active
			Power outage caused by energy supply company
			Closed external input (remote control)
			Holiday function active
			Time program – heating program 1 or 2 active
			Smart Grid (intelligent network) function activated
			Screed drying active
			Immersion heater active
			Extra heat source (booster heater with mixing valve) active
			Defrosting active
			Heat pump active
			Solar pump active
7	<b>Optimised</b>	Operating mode	Energy efficient operation with a constant set room temperature.
	<b>Program 1</b>		The heating is controlled according to the time program active in the current heating circuit. At set times, the heating will switch between heating mode and setback mode.
	<b>Program 2</b>		
			Heating mode in displayed heating circuit active
			Setback mode in displayed heating circuit active

Table 13 Symbols on the standard display



### 10.3 Using the service menu



If the display is turned off, it will turn on when a key is used and a function executed. Quickly press the selector to turn on the display. If you don't use any keys, the display will turn back off.

#### Opening and closing the service menu



Opening the service menu	
	▶ Keep the menu key pressed down until the service menu appears.
Closing the service menu	
	▶ If there is no open submenu, you can return to the standard display by pressing the Return key. -or- ▶ Press the Return key and keep it pressed down for a few seconds to return to the standard display.

Table 14

#### Navigating the menu




	▶ Turn the selector to highlight a menu or an item.
	▶ Press the selector. The menu or the item is displayed.
	▶ Use the Return key to go back one step in the menu.

Table 15

#### Change settings






	<b>Selection</b>
	▶ Turn the selector to highlight a post.
	<b>Slide bar</b>
	▶ Turn the selector to set the value between the min. and max. value.
	<b>Selection with slide bar</b> (the slide bar is visible on the display)
	▶ Turn the selector to highlight a post.
	▶ Push the selector to confirm the selection. The input window and the slide bar are active.
	<b>Multiple selection</b>
	▶ Turn the selector to highlight a post. ▶ Press the selector to select the post. ▶ Press the selector again to cancel the selection. ▶ Repeat the steps until you have selected desired posts.
	<b>Time program</b>
	▶ Turn the selector to highlight a switching time or an associated operating mode.
	▶ Press the selector to activate the input window for switching time or operating mode. ▶ Turn the selector to modify the setting value.

Table 16

#### Confirm or ignore a change




Confirm a change	
	▶ Push the selector to activate the highlighted post or confirm the change.
<b>&amp;</b>	▶ Turn the selector to highlight <b>Continue</b> and press the selector. The display returns to the menu one level up. The user interface operates with the modified setting.
	
Ignore a change	
	▶ Press the Return key to ignore a change.

Table 17

#### Quick start process




Activate Quick start	
	▶ Open the service menu.
	▶ Press the menu and info key until a popup window appears on the display. The heat pump as soon as there is a heating or DHW need.
Return to the service menu	
	▶ Press the selector. The menu or the item is displayed.

Table 18

### 10.4 Service menu overview

Menu	Purpose of the menu	Page	
<b>Startup</b>	Start the configuration wizard and configure the system by checking/modifying the most important settings.	38	
<b>Heat pump</b>	Configure the heat pump by checking/modifying the most important settings.	42	
<b>Set booster heater</b>	Configure the booster by checking/modifying the most important settings.	43	
<b>Set heating/cooling</b>	<b>System data</b>	Settings that apply to the entire system, e.g. min. outside temperature and type of building. In this menu you can further select settings for heating/cooling circuit 1 and the DHW system (if it is directly connected to the heat pump module).	44
	<b>Heating circuit 1 ... 4</b>	Specific settings for installed heating/ cooling circuits 1 to 4, e.g. frost protection and heating curve.	46
	<b>Screed drying</b>	Configurable program for screed drying of a new floor plate with an underfloor heating system.	50
<b>DHW settings</b>	DHW system settings, e.g. max. hot water temperature, time of thermal disinfection and configuration of the hot water DHW circulation pump.	52	
<b>Pool settings</b>	Configure the pool heating by checking/modifying the most important settings.	53	
<b>Solar settings</b>	If solar heating is installed: please refer to the solar module technical information.	53	
<b>Hybrid system</b>	Set energy price relationship.	53	
<b>Anti-seizing protection</b>	Determine a start time for short term activation of pumps and valves, to prevent these components from seizing (motion operation).	53	
<b>Diagnosis</b>	System diagnostics: <ul style="list-style-type: none"> <li>• Perform function test of separate actuators (e.g. pumps).</li> <li>• Compare set values and actual values.</li> <li>• Show current operating errors and error history.</li> <li>• Display EMS BUS unit software version.</li> </ul> Other functions: <ul style="list-style-type: none"> <li>• Enter contact address.</li> <li>• Reset different settings.</li> <li>• Calibrate the clock.</li> </ul>	54	

Table 19 Service menu overview

## 11 Commissioning



The compressor in the heat pump warms up before it starts. This can take up to 2 hours, depending on the outside temperature. The requirement is that the compressor temperature is 10 K above the air intake temperature. The temperatures are visible in the Diagnostics menu (→ Chapter 12.9).

### 11.1 General user interface commissioning



 & 	<b>Setting the language</b>
	▶ Turn the selector to select a language and press the selector to confirm.
	<b>Setting the date</b>
	▶ Turn the selector and press it to set day, month, and year. The word <b>Continue</b> is highlighted.
	▶ When the date is correctly set, press the selector to save the date.
	<b>Setting the time</b>
	▶ Turn the selector and press it to set hours and minutes. The word <b>Continue</b> is highlighted.
	▶ When the time is correctly set, press the selector to save the time.
	<b>Setting the country</b>
	▶ Turn the selector and press it to set in which country the heat pump has been installed.
<b>Setting buffer cylinder installation</b>	
▶ Turn the selector and press it to set if a buffer cylinder/ storage cylinder has been installed.	
<b>System configuration</b>	
▶ Turn and press the selector to start the <b>(Yes)</b> or skip the <b>(No)</b> configuration wizard.	
▶ If the configuration wizard starts, the user interface will automatically detect the BUS units installed in the system (system analysis) and adjust the menu and standard settings accordingly.	
▶ System commissioning (→ Chapter 11.2).	

Table 20 Commissioning general settings

## 11.2 System commissioning via configuration wizard

The configuration wizard will automatically detect the BUS units installed in the system. It will adjust menu and standard settings accordingly.

System analysis could last up to a minute.

When the configuration wizard has performed the system analysis, the **Startup** menu opens. These settings must be checked and if required modified, and confirmed.

If system analysis is skipped, the **Startup** menu opens. These settings must be carefully checked and modified according to the installed system. Then the settings must be confirmed.

Please note further information on settings in Chapter 12.

Menu Item	Question	Answer/setting
<b>Country information</b>	In which country is the heat pump installed?	Select corresponding country
<b>Storage cylinder</b>	Is there a storage cylinder installed in the system?	<b>No   Yes</b>
<b>Start configuration wizard</b>	Would you like to start the configuration wizard?	<b>Yes   No</b>
<b>Select an external heat source</b>	What other heat source is used?	<b>Not installed   Serial immersion heater   Boost. heater with mixing valve/heat pump alt.   Parallel booster heater with mixing valve   Hybrid</b>
<b>Heating circuit 1 installed</b>	Is heating/cooling circuit 1 installed? Where is heating circuit 1 connected electrically?	<b>No   On the heat source   At the module</b>
<b>Config. VK1 on the heat source</b>	Is heating/cooling circuit 1 a heating circuit without mixing valve connected to the heat pump module?	<b>No integrated VK1   No own heating circuit pump   Via circulation pump PC1</b>
<b>Mixer heating circuit 1</b>	Is heating/cooling circuit 1 a heating/cooling circuit with mixing valve?	<b>Yes   No</b>
<b>Mixer runtime heat circ. 1</b>	How long until the mixing valve in heating/cooling circuit 1 moves from one end position to the other?	<b>0 ... 600 s</b>
<b>Heating system heat circ. 1</b>	What type of heating does heating/cooling unit 1 use?	<b>Radiator   Convective heater   Underfloor</b>
<b>Ctrl type h. circ. 1</b>	How will the temperature influenced by heating circuit 1 be regulated?	<b>Outdoor-temp.-compensated   Outside temp. with low end</b>
<b>Prog. unit Heat. circ. 1</b>	Which user interface or room controller is installed for heating/cooling circuit 1?	<b>HPC400   RC10</b>
<b>Heating circuit 2 installed, ...</b>	equates to heating circuit 1	
<b>Heating circuit 3 installed, ...</b>	equates to heating circuit 1	
<b>Heating circuit 4 installed, ...</b>	equates to heating circuit 1	
<b>DHW system (DHW heat pump 1   DHW heat pump 2)</b>	Is a DHW system installed? How is the DHW system connected?	<b>Off   On</b>
<b>DHW circulation pump installation</b>	Is a DHW circulation pump installed in the DHW system?	<b>No   Yes</b>
<b>Solar thermal sys installed</b>	Is a solar heating system installed?	<b>No   Yes</b>
<b>Pool 3-way valve</b>	Is there a mixing valve installed for heating of basin/pool? How long does it take the valve to reach its end positions?	<b>10 s – 6000 s</b>
<b>Electr. anode in cylinder</b>	Is there an electric inert anode installed and connected to the DHW cylinder?	<b>Yes   No</b>
<b>Fuse size</b>	Indicate the main fuse of the house	<b>16A   20A   25A   32A</b>
<b>Confirm configuration</b>	Do all the settings correspond with the installed system?	<b>Confirm   Back</b>

Table 21 System commissioning via configuration wizard



The DHW system is delivered activated. If the DHW system is activated, but there is no DHW system installed, the user interface will indicate an operating error.

- ▶ If there is no DHW system installed in the system, then the DHW system must be deactivated in the commissioning or DHW menu.

### 11.3 Commissioning other settings

If some functions are not activated, and modules, units or components are not installed, the non relevant items are hidden, while other settings are selected.

#### 11.3.1 Checklist: adjust settings according to customer requirements

When commissioning a device, ensure the satisfaction of both parties, making sure that the heating system meets the customer's needs and will not give cause for complaints. In our experience, the following settings are very important for the satisfaction of the system user:

Menu Item	Customer requirements/settings
Control type	Outside temp. compensated (→ page 47)
Adjusting the heating curve	Adjust the heating curve (→ page 47). The displayed heating curve applies to a room temperature of 21 °C.
Building type (adjustment)	Light, Medium, Heavy (→ page 45)
Operating mode	Adjust the standard settings/own time program according to the customer's requirements (→ User interface operating instructions).

Table 22 Checklist: important settings identify customer requirements

- ▶ Adjust other settings in the main menu according to the customer's requirements (→ Operating instructions).

#### 11.3.2 Important system settings



If relative humidity is not measured in a cooled room (e.g. with a CR10H), condensation might form. In this case, it is required to set the minimum flow temperature to a suitable value to prevent condensation.

The service menu settings must under all circumstances be checked and if necessary modified during commissioning. Otherwise the system function cannot be ensured. It is best to check all displayed settings. It is possible that the set values must be verified by the system user, e.g. the cooling settings.

### 11.4 Performing the function test

The function test is located in the Diagnostics menu. The available items depend on the installed system. In this menu, you can test e.g. the: **DHW circulation pump: On/Off** (→ Chapter 12.9.1, page 54).

### 11.5 Check monitored values

Monitored values are shown in the **Diagnosis** menu (→ Chapter 12.9.2, page 54).

### 11.6 System handover

- ▶ Ensure that there are no temperature restrictions for heating and DHW set on the heat pump module. Otherwise the user interface cannot control the DHW or flow temperature.
- ▶ Explain to the customer how the user interface and the accessories work and how to operate them.
- ▶ Inform the customer about the selected settings.

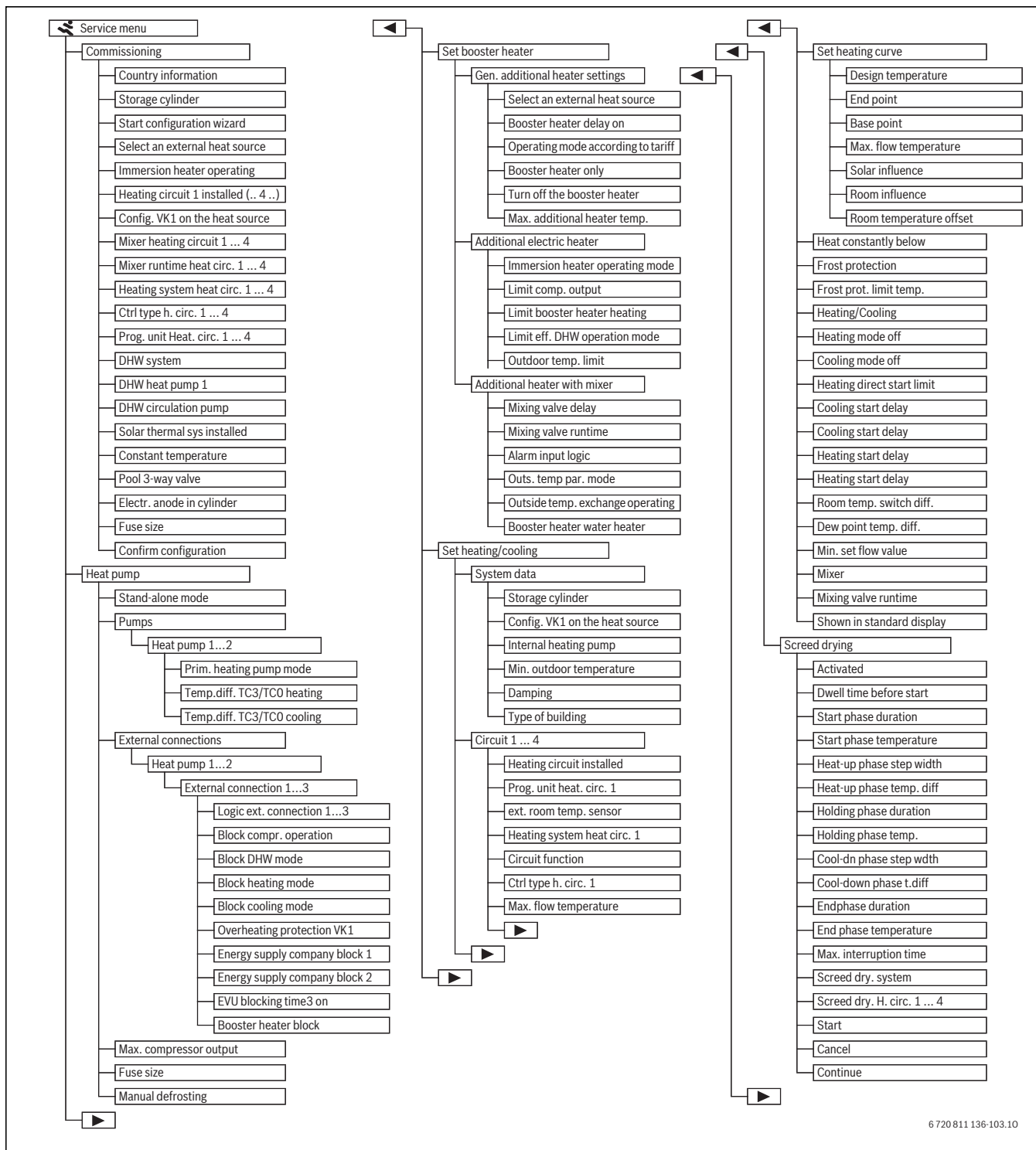
## 12 Service menu

The user interface menu is automatically adjusted to the system. Some items are only displayed if they correspond with the system construction and the user interface is correctly set. Items are only displayed in systems where corresponding units are installed, e.g. a solar heating system. You will find corresponding menu posts and settings in the associated instructions.

For information on how to use the service menu, see Chapter 10 starting on page 35.

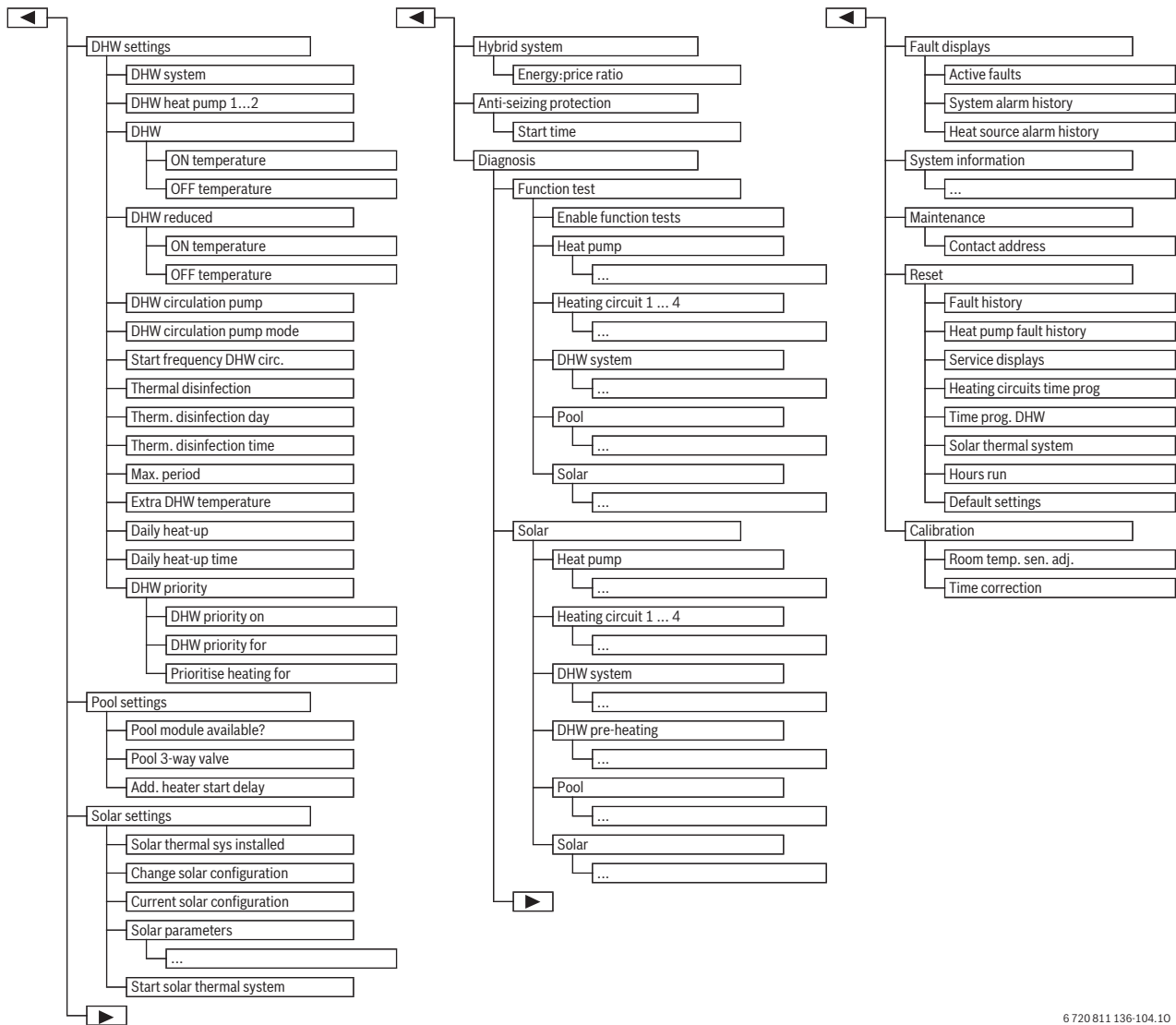


Standard settings are marked in bold in the column Setting range (→ Chapter 12.1 to 12.9).



6 720 811 136-103.10

Fig. 36 Service menu overview 1/2



6720 811 136-104.10

Fig. 37 Service menu overview 2/2

1) Available only for heat sources with EMS plus.

## 12.1 Heat pump settings

This menu contains the heat pump settings.

Menu Item	Setting range	Description
Stand-alone mode	Yes	The heat pump is turned off. Heat is only produced by the booster heater.
	No	Heat is produced by the heat pump and the booster heater.
Pumps		(→ Chapter 12.1.1)
External connections		(→ Chapter 12.1.2)
Max. compressor output	30 ... 100 %	Limitation of the heat pump max. compressor heating output.
Fuse size	16 ... 32 A	The installation must be fitted with a fuse. Here you have to indicate the installed fuse (16   20   25   32 A).
Manual defrosting	Off	The evaporator is not defrosted.
	On	The evaporator is defrosted automatically, as needed.

Table 23 Settings in the heat pump menu

### 12.1.1 Heat transfer pump settings (PC0)

The heat transfer pump in the heat pump module pumps heated water from the condenser in the heat pump to the hot water cylinder or directly to the heating system, alternatively to a buffer cylinder.

Menu Item	Setting range	Description
Prim. heating pump mode	Automatic	The heat transfer pump operates when the compressor operates. When the compressor is turned off, the pump is too.
	On	The heat transfer pump operates continuously.
Temp.diff. TC3/TC0 heating	3 ... 15 K	Permitted temperature differential between the heat pump flow and return in heating mode (→ Chapter 16.3).
Temp.diff. TC3/TC0 cooling	2 ... 10 K	Permitted temperature differential between the heat pump flow and return in cooling mode. 3 K is the recommended setting for all heating systems prepared for cooling mode.

Table 24 Settings for the pumps in the heat pump

### 12.1.2 Settings for external inputs to the heat pump module.

In this menu it is possible to set how the voltage in the external inputs to the heat pump module are interpreted. It is possible to select several

alternatives simultaneously. Depending on the system construction, heat pump 1 or 2 must be selected.

Menu Item	Setting range	Description
Logic ext. connection 1 ... 3	High input	High voltage in external input 1–3 is interpreted as “On” and activates the corresponding function.
	Low input	Low voltage in external input 1–3 is interpreted as “On”.
Block compr. operation	Off	Compressor mode is possible.
	On	Compressor mode is blocked when input is active.
Block DHW mode	Off	DHW heating is possible when the input is active.
	On	DHW heating is blocked when the input is active.
Block heating mode	Off	Heating mode is possible when the input is active.
	On	Heating mode is blocked when the input is active.
Block cooling mode	Off	Cooling mode is possible when the input is active.
	On	Cooling mode is blocked when the input is active.
Overheating protection VK1	Off	No temperature restriction (thermostat) for heating/cooling circuit 1 (underfloor heating system).
	On	Thermostat for temperature restriction for heating/cooling circuit 1 is connected to external inputs 1-3. When the thermostat is activated, the heat pump module aborts the heating mode and turns off the heating/cooling circuit.
Booster heater block	Off	Booster heater mode is possible when the input is active.
	On	Booster heater mode is blocked when the input is active.

Table 25 Settings for external inputs to the heat pump.

## 12.2 Booster heater settings

Booster heater settings are selected in this menu. Booster heater heating is required if the heat pump e.g. in the winter is not able to produce sufficient heating or if the hot water demand cannot be satisfied as quick as required.

### 12.2.1 General settings menu for a booster heater



Always set **Serial immersion heater** when you install heat pump module with integrated immersion heater.

Booster heater settings are selected in this menu. These settings apply to all booster heater models. Here you can choose settings for e.g. how heating with booster heater is managed and when the booster heater is used.

Menu Item	Setting range	Description
Select an external heat source	<b>Not installed</b>	No booster heater connected.
	Serial immersion heater	An immersion heater is connected in a series circuit with the heat pump. The booster heater delivers extra heating when the desired temperature cannot be reached by the heat pump alone.
	Boost. heater with mixing valve/heat pump alt.	A booster heater (gas, oil, electric) is connected in parallel to the heat pump. The heat from the booster heater is regulated by a mixing valve. The heat pump and the booster heater operate in exclusive operation. This means that either the heat pump operates, or the booster heater.
	Parallel booster heater with mixing valve	A booster heater (gas, oil, electric) is connected in parallel to the heat pump. The heat from the booster heater is regulated by a mixing valve. The heat pump and the booster heater can work in parallel. In this case, the booster heater delivers extra heating when the desired temperature cannot be reached by the heat pump alone.
Booster heater delay on	0 ... 900 K × min	The booster heater turns on with delay. Only the heat pump is active during the delay. The setting means number of degrees K below the set value multiplied by number of minutes = K x min.
Booster heater only	<b>Yes</b>	Only the booster heater is used for heat production. The heat pump is turned off.
	No	Both the heat pump and the booster heater can be used for heat production.
Turn off the booster heater	<b>Yes</b>	Only the heat pump is used for heating. The booster heater will only start for the following functions: extra DHW, thermal disinfection or alarm operation.
	No	Both the heat pump and the booster heater can be used for heat production.

Table 26 General settings for one booster heater

### 12.2.2 Immersion heater menu

Immersion heater settings are selected in this menu. This menu is only displayed if an immersion heater has been set as an additional heat source in the General settings menu for the booster heater.

Menu Item	Setting range	Description
Limit comp. output	0 ... 15 kW	The booster heater max. heating output in compressor mode is limited to the value set here (2   3   4   6   9   12   15 kW).
Limit booster heater heating output	0 ... 15 kW	The booster heater max. heating output is limited in general to the value set here (2   3   4   6   9   12   15 kW).
Limit eff. DHW operation mode	0 ... 15 kW	The booster heater max. DHW heating output is limited to the value set here (2   3   4   6   9   12   15 kW).
Outdoor temp. limit		When outside temperature is below the value set here, the booster heater can turn on.

Table 27 General settings for one booster heater

### 12.3 Settings for heating/cooling

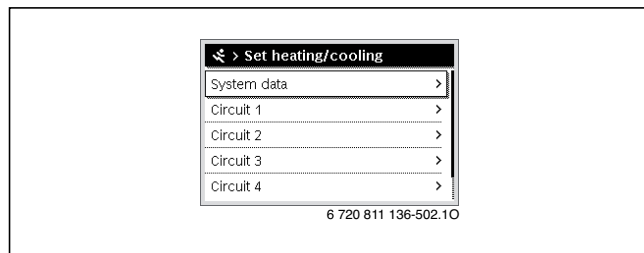


Fig. 38 Central heating settings menu

#### 12.3.1 System data menu

System settings are selected in this menu. In this menu you can e.g. set minimum outside temperature or the heat storage capacity. In this menu you can further select settings for heating/cooling circuit 1 (if it is directly connected to the heat pump module).



If there is a buffer cylinder installed in the system, but heating/cooling circuit 1 is without mixing valve:

- ▶ The temperature setting for VK1 determines the highest temperature for all the circuits.



If there is a buffer cylinder installed in the system, and all heating/cooling circuits have mixing valves:

- ▶ The circuit with the highest temperature setting determines the highest temperature for all the circuits.

Menu Item	Setting range	Description
Storage cylinder (Buffer cylinder)	<b>Yes</b>	There is a buffer cylinder installed in the system.
	No	There is no buffer cylinder installed in the system. Heating/cooling circuit 1 is without mixing valve.
Config. VK1 on the heat source		Heating/cooling circuit 1 is directly connected to the heat pump module as a heating circuit without mixing valve.
	No integrated VK1	This menu is shown if Yes was selected in the previous menu. Heating/cooling circuit 1 is not directly connected to the heat pump module. In this case, a buffer cylinder must be installed in the system. Heating/cooling circuit 1 has a mixing valve and are electrically connected to the system with a module.
	Via circulation pump PC1	Heating/cooling circuit 1 is directly connected to the heat pump module and is without mixing valve with or without buffer cylinder installed. The circulation pump PC1 in heating/cooling circuit 1 is electrically connected to the heat pump module.
Min. outside temperature	- 35 ... - 10 ... 10 °C	The lowest outside temperature influences the heating curve in outside temperature control mode (→ Minimum outside temperature, page 44 and Menu for setting the heating curve, page 47).
Damping	<b>Yes</b>	The set type of building will influence the measured outside temperature value. Outside temperature influence is delayed (adjusted).
	No	The measured outside temperature is not adjusted before it is sent to the outside temperature compensated control.
Building type		Heat storage capacity of the heated building (→ Type of building, page 45).
	<b>Heavy</b>	High heat storage capacity and strong adjustment of the outside temperature, e.g. brick houses
	<b>Medium</b>	Medium high heat storage capacity and medium strong adjustment of the outside temperature, e.g. hollow concrete block houses
	<b>Light</b>	Low heat storage capacity and weak adjustment of the outside temperature, e.g. prefabricated houses and wood frame constructions

Table 28 System data menu settings

#### Minimum outside temperature

The lowest outside temperature is the average value of the coldest outside temperatures of recent years, and it has an influence on the heating curve. The value for the region can be borrowed from the VPW calculation or the like.

- ▶ Set the lowest outside temperature for proportioning of the heating.



Minimal outside temperature °C					
Aten	- 2	Köpenhamn	- 13	Paris	- 10
Berlin	- 15	Lissabon	± 0	Prag	- 16
Bryssel	- 10	London	- 1	Rom	- 1
Budapest	- 12	Madrid	- 4	Sevastopol	- 12
Bukarest	- 20	Marseille	- 6	Stockholm	- 19
Hamburg	- 12	Moskva	- 30	Valencia	- 1
Helsingfors	- 24	Neapel	- 2	Wien	- 15
Istanbul	- 4	Nice	± 0	Zürich	- 16

Table 29 Minimal outside temperature

### Type of building

When adjustment is activated, the type of building can be used to set the adjustment (equalisation) of variations in the outside temperature. The outside temperature adjustment takes into consideration the building type's thermal inertia. By setting the type of building you can thereby adjust the control to the characteristics of the building.

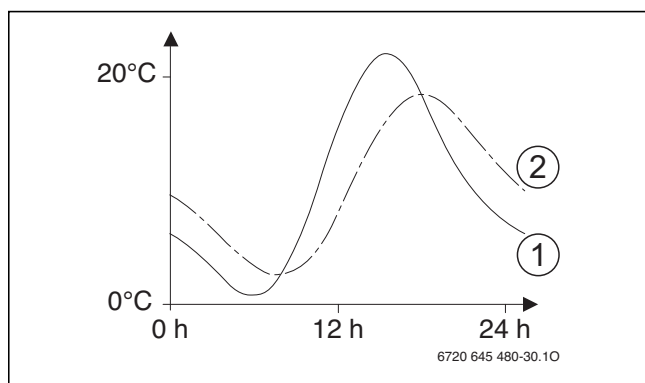


Fig. 39 Example of adjusted outside temperature

- [1] current outside temperature
- [2] adjusted outside temperature

This greatly simplified example shows how the adjusted outside temperature follows the current outside temperature, but does not reach its extreme values.




In the standard settings, the outside temperature influence on the control is delayed by three hours.

- ▶ The development of the outside temperature over the past two days is displayed in the following menu:  
**Info > Outside temp. > Outside temp. curve**

12.3.2 Circuit 1 to 4 menu

Settings for each separate heating/cooling circuit are selected in this menu. Here you can set the type of heating system installed for the selected heating/cooling circuit. You can also set whether there is a room controller or not, and which type of control mode to use. It is also possible to optimise the heating/cooling circuit heating curves.

	<p><b>NOTICE:</b> Risk of damaging the screed!</p> <p>► If an underfloor heating system is used, the max. flow temperature recommended by the manufacturer of the system should be observed.</p>
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Menu Item	Setting range	Description
Heating circuit installed	<b>No</b>	A heating/cooling circuit is not installed. If there is no heating/cooling circuit installed, the heat pump module is used for DHW heating only.
	On the heat source	Electrical units and components in the selected heating/cooling circuit are directly connected to the heat pump module (only possible with heating circuit 1).
	At the module	Electrical units and components in the selected heating/cooling circuit are directly connected to a MM100 module.
Programming unit	<b>HPC400</b>	HPC400 independently regulates the selected heating/cooling circuit. No room controller installed.
	CR10	CR10 installed as a room controller for selected heating/cooling circuit
	CR10H	CR10H installed with humidity sensor as a room controller for selected heating/cooling circuit
ext. room temp. sensor	<b>Yes</b>	An extra room temperature sensor has been connected to the room controller (CR10 / CR10H). It enables the control of a second circuit from the same room controller.
	No	No additional room temperature sensor has been installed.
Heating system	<b>Radiator</b>	Preset of the heating curve, taking type of heat into consideration, e.g. curve characteristics and system temperature
	Convector heater	
	Underfloor	
Circuit function	Heating	The selected circuit has a heating function only.
	Cooling	The selected circuit has a cooling function only.
	Heating and cooling	The selected circuit has both heating and cooling functions.
Control type	<b>Outdoor-temp.-compensated</b>	For more information on controlling the selected heating circuit (→ Heating control mode, page 47)
	Outside temp. with low end	
Max. flow temperature	30 ... <b>75</b> ... 85(radiator)	Maximum flow temperature from the heat pump module (booster heaters are used for temperatures above the heat pump's maximum flow temperature).
	30 ... <b>48</b> ... 60 °C (underfloor heating system/convector)	
Adjusting the heating curve		Fine tuning the heating curve that has been preset through the heating system (→ Setting the heating system and the heating curves for outside temperature compensated control, page 47)
Heat constantly below	<b>Off</b>	The heating operates independently from the adjusted outside temperature in the active operating mode (→ Constant heating below a certain outside temperature, page 49).
	- 30 ... 10 °C	If the adjusted outside temperature goes down below this set value, the heating will automatically change from setback mode to heating mode (→ Constant heating below a certain outside temperature, page 49).
Frost protection		<b>Instruction:</b> Set outside temperature controlled frost protection to ensure the frost protection of the entire system. This setting is independent of the set operating mode.
	Outside temp.	Frost protection is activated/deactivated depending on the temperature set here
	<b>Room temperature</b>	(→ Temperature limit for frost protection (outside temperature threshold value), page 50)
	Room and outside temp.	
	Off	Frost protection off
Frost prot. limit temp. (outside temperature threshold)	- 20 ... <b>5</b> ... 10 °C	→ Temperature limit for frost protection (outside temperature threshold value), page 50
Heating/Cooling	Off	
	Automatic mode	The heat pump will automatically switch between heating and cooling mode depending on the outside temperature.
	Constant heating	The heat pump is only active in heating mode.
	Constant cooling	The heat pump is only active in cooling mode.
Heating mode off	10 ... <b>17</b> ... 30 °C	When the outside temperature is below the value set here, the heating mode will turn on.
Cooling mode on off	- 20 ... <b>28</b> ... 35 °C	When the outside temperature is above the value set here, the cooling mode will turn on.
Heat immediately temperature differential	1 ... <b>1</b> ... 10 K	When the outside temperature goes down below the heating deactivation temperature (setting value for Heating mode off) with the value set here, heating mode will start immediately.
Cooling switch-off delay	1 ... <b>4</b> ... 48 h	Cooling shutdown delay.
Cooling switch-on delay	1 ... <b>8</b> ... 48 h	Cooling start delay.
Heating switch-on delay	1 ... <b>1</b> ... 48 h	Heating shutdown delay

Table 30 Settings in the Heating/cooling circuit 1 to 4 menu

Menu Item	Setting range	Description
Heating switch-on delay	1 ... 4 ... 48 h	Heating start delay
Room temperature changeover diff.	- 5 ... 2 ... 5 K	If the measured room temperature is above the set room temperature by the value set here, the cooling mode is activated (e.g. at 2 K: set room temperature = 23 °C, measured room temperature = 25 °C – cooling is activated)
Dew point temp. diff.	2 ... 5 ... 10 K	Determines the safety distance to the calculated dew point. The flow set temperature is thereby above the calculated dew point by at least the value set here.
Min. set flow value	10 ... 10 ... 35 °C	If a humidity sensor is installed for the heating/cooling circuit: the lowest set flow temperature value.
	10 ... 17 ... 35 °C	If no humidity sensor is installed for the heating/cooling circuit: the lowest set flow temperature value.
Mixer	Yes	Selected heating/cooling circuit is with mixing valve
	No	Selected heating/cooling circuit is without mixing valve
Mixer runtime		Selected heating/cooling circuit mixing valve operating time
Shown in standard display	Yes	Selected heating/cooling circuit is show in the standard display.
	No	Selected heating/cooling circuit is not show in the standard display.

Table 30 Settings in the Heating/cooling circuit 1 to 4 menu

### Heating control mode

	<p><b>NOTICE:</b> System damage!</p> <p>If the approved operating temperature for plastic pipes (secondary circuit) are disregarded, parts of the system can get damaged.</p> <p>▶ Do not exceed approved set values.</p>
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- In **Outside temperature compensation control mode** only summer mode, setback mode (depending on the selected type of setback) and adjustment of the outside temperature (by reduced heating requirements due to good insulation) can result in shutdown of the heating circuit pump.
  - Room adjustment can be set in the **Adjusting the heating curve** menu. Room adjustment influences the two outside temperature

controlled operating modes. Room influence is only available if a room controller is installed in a suitable reference room.

- **Outdoor-temp.-compensated** (optimised heating curve, standard setting)  
Used mainly for radiators and underfloor heating system.
- **Outside temp. with low end:** → Simple heating curve, page 49.  
Used mainly for fan convectors.

### Setting the heating system and the heating curves for outside temperature compensated control

- ▶ Setting the heating type (radiator, convector or underfloor heating) in the **Set heating/cooling > Circuit 1 menu ... 4 Setting**.
- ▶ Setting the control mode (outside temperature controlled or outside temperature controlled with a base point) in the **Control type** menu. The items not relevant to the selected heating system and the selected operating mode are hidden. The settings only apply to the selected heating circuit.

### Menu for setting the heating curve

Menu Item	Setting range	Description
Design temperature (Flow temperature at lowest outside temperature)	30 ... 60 ... 85 °C (radiator)	The system temperature only applies during outside temperature compensated control without base point. The system temperature is the flow temperature that is reached at the lowest outside temperature and will therefore influence the slope of the heating curve.
	30 ... 45 ... 60 °C (underfloor heating system/ convector)	The end point only applies during outside temperature compensated control with base point. The end point is the flow temperature that is reached at the lowest outside temperature and will therefore influence the slope of the heating curve. When the base point has been set to a value above 30°C the base point is the minimum value.
or End point $T_0$		
Low end (Flow temperature at an air temperature of 20 °C)	e.g. 20 – 25 °C ... End point	The heating curve base point only applies during outside temperature compensated control with simple heating curve.
Max. flow temperature $T_{0max}$	30 ... 75 ... 85 °C (radiator)	Maximum flow temperature
	30 ... 48 ... 60 °C (underfloor heating system/ convector)	
	- 5 ... - 1 K	Sunshine will to a certain extent influence outside temperature compensated control (the solar thermal energy decreases the required heat output).
	Off	The control does not take sunshine into consideration.
Room influence	Off	The outside temperature compensated control will operate independently from the room temperature.
	1 ... 3 ... 10 K	Room temperature deviation equivalent to the setting is adjusted by a parallel offset of the heating curve (only if a room controller is installed in a suitable reference room). The higher the setting value, the greater is the max. room temperature influence on the heating curve.
Room temperature offset	- 10 ... 0 ... 10 K	Parallel offset of the heating curve (e.g. if the room temperature measured by a thermometer deviates from the selected set value)

Table 31 Heating curve settings menu

### Outside temperature compensated (optimised heating curve)

The heating curve provides an economic and convenient operation of the heating system with outside temperature compensated control. The

operating system will based on the settings automatically calculate the best possible heating curve. This results in a curve that is slightly bent to

compensate for the heating system's increased heating output capacity in higher temperatures.

This calculation takes into account the adjusted outside temperature and the room control temperature. The room control temperature consists of the desired room temperature (set room temperature value) and the room influence.

This way, the user can influence the heating curve directly by changing the room temperature set value.

The most important settings are: system temperature, maximum flow temperature, room temperature offset (parallel offset) and minimum outside temperature.

The heating curve (→ fig. 40 and 41) is in principle determined by the curve base and end points. At an outside temperature of 20 °C the base

point is 25 °C flow temperature. The heating curve end point must be set according to the heating system's system temperature.

Decisive to the course of the heating curve (slope/gradient) are the two parameters **minimum outside temperature** (→ page 44) and **system temperature** (the flow temperature that should be reached at minimum outside temperature) (→ fig. 40 and 41, left).



The heating curve shown on the display represents the range + 20 °C to the minimum outside temperature set in **System data**.

The heating curve can also be parallel offset up or down (→ fig. 40 and 41, right) by adjusting the room temperature offset parameter and/or the set room temperature.

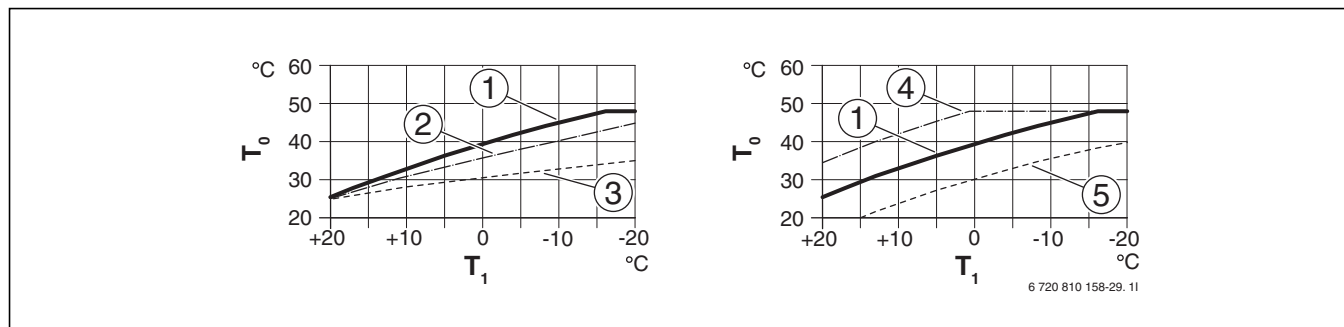


Fig. 40 Setting of Heating curve for underfloor heating systems/convectors  
 Left: increase with system temperature  $T_1$  and minimum outside temperature  $T_{1,min}$   
 Right: parallel offset with room temperature offset or desired temperature

- $T_1$  Outside temperature
- $T_0$  Flow temperature
- [1] Setting:  $T_0 = 45\text{ °C}$ ,  $T_{1,min} = -10\text{ °C}$  (basic curve), Limit at  $T_{0,max} = 48\text{ °C}$
- [2] Setting:  $T_0 = 40\text{ °C}$ ,  $T_{1,min} = -10\text{ °C}$ , Limit at  $T_{0,max} = 48\text{ °C}$
- [3] Setting:  $T_0 = 35\text{ °C}$ ,  $T_{1,min} = -20\text{ °C}$ , Limit at  $T_{0,max} = 48\text{ °C}$
- [4] Parallel offset of standard curve [1] by changing the offset +3 or by increasing the desired room temperature, limit at  $T_{0,max} = 48\text{ °C}$
- [5] Parallel offset of standard curve [1] by changing the offset -3 or by decreasing the desired room temperature, limit at  $T_{0,max} = 48\text{ °C}$

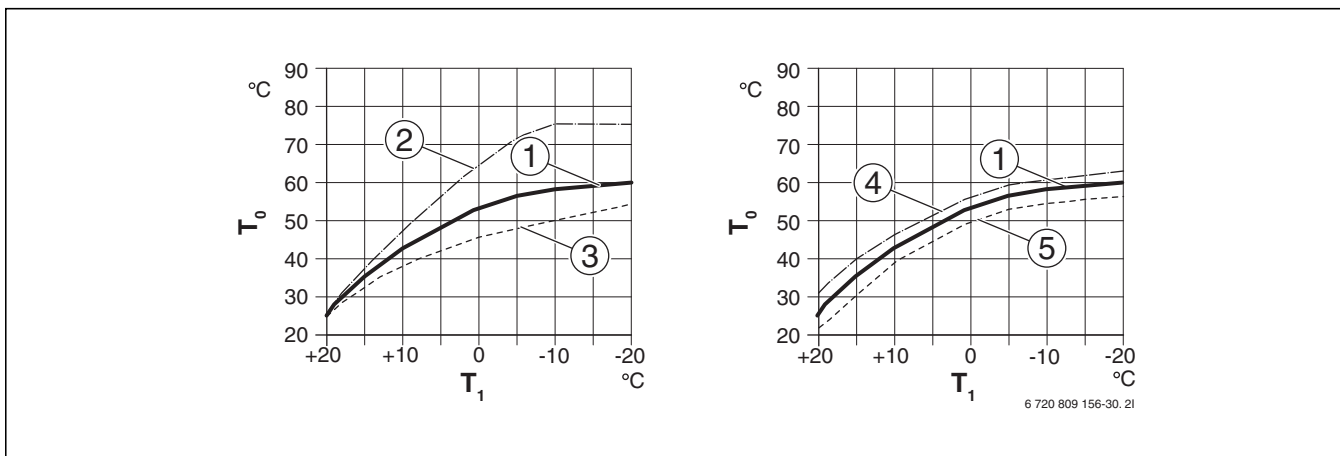


Fig. 41 Setting of The heating curve for radiators

Left: increase with system temperature  $T_0$  and minimum outside temperature  $T_{1,min}$   
 Right: parallel offset with room temperature offset or desired temperature

- $T_1$  Outside temperature
- $T_0$  Flow temperature
- [1] Setting:  $T_0 = 60\text{ }^\circ\text{C}$ ,  $T_{1,min} = -20\text{ }^\circ\text{C}$ , Limit at  $T_{0,max} = 75\text{ }^\circ\text{C}$
- [2] Setting:  $T_0 = 75\text{ }^\circ\text{C}$ ,  $T_{1,min} = -10\text{ }^\circ\text{C}$ , Limit at  $T_{0,max} = 75\text{ }^\circ\text{C}$
- [3] Setting:  $T_0 = 55\text{ }^\circ\text{C}$ ,  $T_{1,min} = -20\text{ }^\circ\text{C}$ , Limit at  $T_{0,max} = 75\text{ }^\circ\text{C}$
- [4] Parallel offset of standard curve [1] by changing the offset +3 or by increasing the desired room temperature, limit at  $T_{0,max} = 75\text{ }^\circ\text{C}$
- [5] Parallel offset of standard curve [1] by changing the room temperature offset -3 or by decreasing the desired room temperature, limit at  $T_{0,max} = 75\text{ }^\circ\text{C}$

straight heating curve is described by two points: the base point (the heating curve starting point) and the end point.

	Underfloor heating system, convector	Radiator
Minimum outside temperature $T_{A,min}$	-10 °C	-10 °C
Base point	25 °C	25 °C
End point	45 °C	60 °C
Maximum flow temperature $T_{VL,max}$	48 °C	75 °C
Room temperature offset	0,0 K	0,0 K

Table 32 Simple heating curve basic settings

**Simple heating curve**

The simple heating curve (outside temperature compensated control with base point) is a simplified representation of the heating curve. This

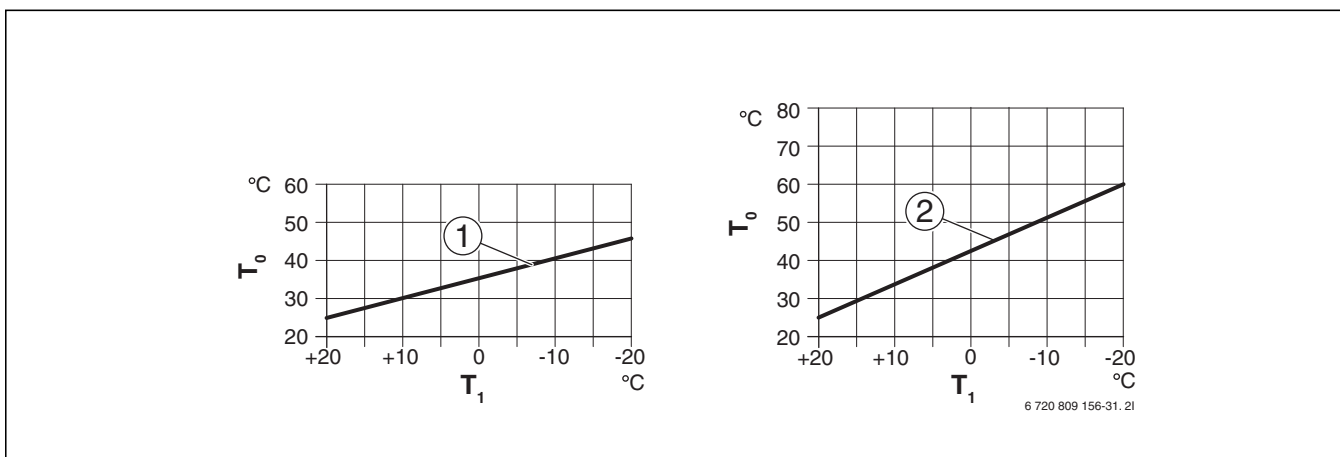


Fig. 42 Setting of simple heating curve

- $T_A$  Outside temperature
- $T_{VL}$  Flow temperature
- [1] Underfloor heating system or convector
- [2] Radiator

Fig. 43 and fig. 44 show the function effects without and with activated parameters. Selected settings: ; ; 5.

**Constant heating below a certain outside temperature**

SS-EN 12831 (Heating systems in buildings - Method for calculation of the design heat load) shows how heating surfaces and heat sources are dimensioned for a certain output to maintain a comfortable heating. In setback mode, the heating system can be cooled down more than what is required for this.

With the **Heat constantly below** parameter it is possible to set an outside temperature threshold value at which the temperature setback mode is shut off (applies to adjusted outside temperature). This allows smaller heating surfaces to be utilised.

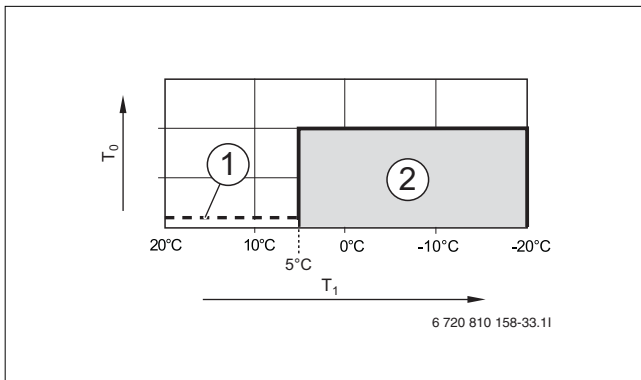


Fig. 43 Effect from setting **Off** (standard settings)

**Key to fig. 43:**

- T<sub>1</sub> Outside temperature
- T<sub>0</sub> Flow temperature
- [1] Setback mode
- [2] Frost protection mode

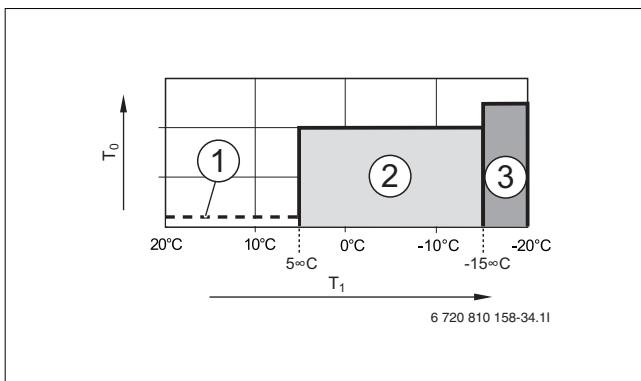


Fig. 44 Effect from setting **-15°C**

**Key to fig. and 44:**

- T<sub>1</sub> Outside temperature
- T<sub>0</sub> Flow temperature
- [1] Setback mode
- [2] Frost protection mode
- [3] Heating mode

If the outside temperature goes below **-15°C** the heating system will switch from frost protection mode to heating mode [3].

**Temperature limit for frost protection (outside temperature threshold value)**

You can use this item to set the temperature limit for the frost protection (threshold value for outside temperature). It is only active if either **Outside temp.** or **Room and outside temp.** are set in the **Frost protection** menu.

**NOTICE:** Water bearing system components can be destroyed if the frost protection temperature limit is too low and the outside temperature is below 0 °C for an extended period of time!

- ▶ The temperature limit for frost protection (standard setting = 5 °C) should take system prerequisites into consideration.
- ▶ Do not set the frost protection temperature limit too low. The warranty will not cover damages due to the frost protection temperature limit set too low!
- ▶ Set frost protection and a frost protection temperature limit for all heating/cooling circuits.
- ▶ In the **Frost protection** menu, set either **Outside temp.** or **Room and outside temp.** to ensure frost protection of the entire heating system.

- If the outside temperature exceeds the frost protection temperature limit by 1 K (°C) and there is no heating requirement, the heating circuit pump will be shut off.
- If the outside temperature is below the frost protection temperature limit, the heating circuit pump will be turned on.



The setting **Room temperature** will provide no frost protection at all since e.g. pipes in walls can freeze. This is possible even if external heat sources keep the temperature in the reference room well above 5 °C. When an outside temperature sensor is installed, the entire heating system can be frost protected:

- ▶ Set either or **Room and outside temp.** in the **Frost protection** menu.

**12.3.3 Screed drying menu**

A floor plate screed drying program is set in this menu for the selected heating circuit or the entire system. The heating system will automatically execute the floor plate screed drying program once to dry a new floor plate.

In case of a power outage, the user interface will automatically resume the floor plate screed drying program, as long as the outage does not outlast the user interface battery power or the max. outage time.

This menu is only displayed if at least one underfloor heating system circuit is installed and set up in the system.



**NOTICE:** Risk of damaging the screed!

- ▶ In multiple circuit systems, this function is only available together with a heating circuit with mixing valve.
- ▶ Set the floor plate screed drying program according to the screed manufacturer instructions.
- ▶ Even if the drying program is ongoing, the system should be inspected daily and the prescribed protocol observed.

Menu Item	Setting range	Description
Activated	Yes	Required drying program settings are displayed.
	No	The drying program is not active and the settings are not displayed (standard settings).
Dwell time before start	No dwell time	The floor plate screed drying program starts after set delay (selected heating circuits are disconnected during the delay, the frost protection is active, standard setting: no delay, → fig. 45, time before day 0)
	1 ... 50 days	
Start phase duration	No start phase	Time period between the beginning of the start phase and the next phase (→ fig. 45, [1])
	1 ... 3 ... 30 days	
Start phase temperature	20 ... 25 ... 55 °C	Flow temperature during the start phase (→ fig. 45, [1])
Heat-up phase step width	No heat-up phase	Time period between the steps (stage length) in the warm-up phase (→ fig. 45, [3])
	1 ... 10 days	
Heat-up phase temp. diff	1 ... 5 ... 35 K	Temperature differential between the steps in the warm-up phase (→ fig. 45, [2])
Holding phase duration	1 ... 7 ... 99 days	Time period between the beginning of the maintenance phase (maintenance of max. temperature during screed drying) and the next phase (→ fig. 45, [4])
Holding phase temp.	20 ... 55 °C	Flow temperature during the maintenance phase (maximum temperature) (→ fig. 45, [4])
Cool-dn phase step width	No cool-down phase	Time period between the steps (stage length) during the cooling phase (→ fig. 45, [5])
	1 ... 10 days	
Cool-down phase t.diff	1 ... 5 ... 35 K	Temperature differential between the steps in the cooling phase (→ fig. 45, [6])
Endphase duration	No end phase	Time period between the beginning of the end phase (the last temperature step) and the end of the drying program (→ fig. 45, [7])
	Permanently	
	1 ... 30 days	
End phase temperature	20 ... 25 ... 55 °C	Flow temperature during the end phase (→ fig. 45, [7])
Max. interruption time	2 ... 12 ... 24 h	Max. duration of an interruption of the drying program (e.g. by a screed drying pause or a power outage) before an error message is displayed.
Screed dry. system	Yes	Screed drying active for all system heating circuits. <b>Instruction:</b> It is not possible to select single heating circuits. DHW heating is not possible. The menus and items with DHW settings are hidden.
	No	Screed drying is not active for all system heating circuits. <b>Instruction:</b> It is possible to select single heating circuits. DHW heating is possible. The menus and items with DHW settings are displayed.
Screed dry. H. circ. 1 ...	Yes	Screed drying active/not active in the selected heating circuit
Screed dry. H. circ. 4	No	
Start	Yes	Start screed drying now
	No	Screed drying has not yet started or is finished
Cancel	Yes	Pause the screed drying temporarily. An error message is displayed if max. time for an interruption is exceeded.
	No	
Continue	Yes	Resume screed drying after screed drying pause.
	No	

Table 33 Settings in the Screed drying menu (fig. 45 shows floor board screed drying program standard settings)

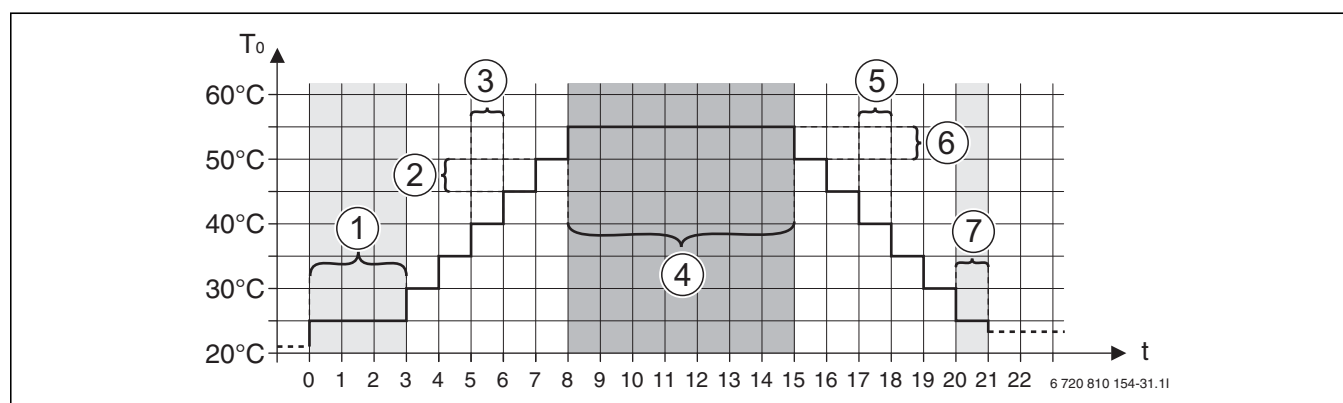


Fig. 45 Screed drying process with standard settings

t Time in days  
 $T_0$  Flow temperature



## 12.4 DHW settings

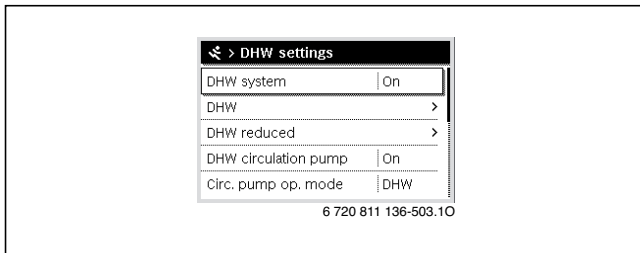


Fig. 46 DHW settings menu

This menu contains the DHW system settings. The menu is used to e.g. set maximum DHW temperature. You will also set thermal disinfection time and temperature here.



The DHW system is delivered activated. If the DHW system is activated, but there is no DHW system installed, the user interface will indicate an operating error.

- ▶ If there is no DHW system installed in the system, then the DHW system must be deactivated in the commissioning or DHW menu.



**WARNING:** Risk of scalding!

Maximum DHW temperature (**Max. DHW temp.**) can be set above 60 °C and during thermal disinfection the DHW will be heated to above 60 °C.


- ▶ Inform the customer and ensure that there is a thermostatic DHW mixer or a similar appliance installed to prevent scalding.

Menu Item	Setting range	Description
DHW system	Off	If there is a DHW system installed, it will be deactivated with this setting.
	On	If the DHW system has been deactivated with the above item, it can be reactivated here.
DHW	e.g. 15 – <b>60 °C</b> ... 80 °C	ON temperature and OFF temperature for operation DHW; the setting range depends on the installed heat source. Comfort mode, which provides more/hotter DHW. Select this operating mode when DHW recirculation is used, to maintain the temperature in the DHW circuit.
DHW reduced	e.g. 15 – <b>45</b> ... 60 °C (80 °C)	ON temperature and OFF temperature for mode DHW reduced; the setting range depends on the installed heat source. ECO mode allows the DHW to cool down more before the heating starts and stops at a lower stop temperature than comfort mode. This decreases energy consumption.
DHW circulation pump	On	If the DHW circulation pump is controlled by the heat source, the DHW circulation pump must be activated here too. The standard settings depend on the installed heat source.
	Off	The DHW circulation pump cannot be controlled by the heat source.
DHW circulation pump mode	Off	DHW circ. OFF
	On	Circulation is permanently activated (connection frequency is followed)
	DHW circulation pump mode	Activate the same time program for circulation as for DHW heating. More information about this and about how you set your own time program (→ user interface operating instructions).
	Own time program	Activate own time program for circulation. More information about this and about how you set your own time program (→ user interface operating instructions).
Start frequency DHW circ.		If the DHW circulation pump is activated or works continuously according to the DHW circulation pump time program (operating mode DHW circulation pump: On), this setting affects the operation of the DHW circulation pump.
	1 x 3 minutes/h ... 6 x 3 minutes/h	Circulation is started 1 to 6 times per hour for operation with a duration of 3 minutes. The standard settings depend on the installed heat source.
	Permanently	The DHW circulation pump is continuously in operation.
Thermal disinfection	Yes	Thermal disinfection starts automatically at the same time (e.g. Mondays at 02:00, → Thermal disinfection, page 53)
	No	Thermal disinfection does not start automatically.
Therm. disinfection day	Monday ... <b>Tuesday</b> ... Sunday	The day that thermal disinfection is executed.
	Daily	Thermal disinfection is executed daily.
Therm. disinfection time	00:00 ... <b>02:00</b> ... 23:45	Time that the thermal disinfection starts on the set day.
Max. period	60 min ... 240 min	Maximum time of thermal disinfection. Setting range depends on the installed heat pump module.
Extra DHW temperature	50 ... 70 °C	Switch-off temperature for extra DHW.
Daily heat-up	Yes	The entire DHW volume is automatically heated to 60 °C daily at the same time.
	No	No daily heating
Daily heat-up time	00:00 ... <b>02:00</b> ... 23:45	Time when daily heating to 60 °C starts.
DHW heat pump 1 (DHW heat pump 2)	On	The selected heat pump is used for DHW heating. The menu is displayed only if the system is connected in series.
	Off	The selected heat pump is not used for DHW heating. The menu is displayed only if the system is connected in series.
DHW priority		Heating need is interrupted by DHW need (→ Chapter 12.4.2 page 53).

Table 34 DHW menu settings



### 12.4.1 Thermal disinfection



**WARNING:** Risk of scalding!  
During thermal disinfection, the domestic hot water is heated to above 60 °C.

- ▶ Only carry out thermal disinfection outside normal hours of use.
- ▶ Inform all parties concerned and make sure that a mixer is installed.

Execute thermal disinfection regularly to eliminate pathogens (e.g. legionella). Regulations might apply to larger DHW systems ( → e.g. Drinking water regulations and standards) for thermal disinfection.

- **Yes:**
  - The entire volume of DHW is heated up to the temperature that has been set once.
  - Thermal disinfection starts automatically at the set time according to the user interface settings.
  - It is possible to interrupt the process and start thermal disinfection manually.
- **No:** Thermal disinfection is not executed automatically. It is possible to start thermal disinfection manually.

### 12.4.2 DHW priority

This menu allows you to indicate if DHW heating should be prioritised or for how long DHW heating or heating must continue without any

Menu: **DHW priority**

Menu Item		Description
DHW priority on	Yes	The controls alternate between heating mode and DHW operation in accordance with the settings below.
	No	Heating operation is always aborted, where necessary, by DHW heating.
DHW priority for	0 ... <b>30</b> ... 120 min	A DHW need aborts the heating requirement from the heating system after the period for which it has been set here.
Prioritise heating for	5 ... <b>20</b> ... 120 min	A heating need aborts the DHW requirement from the heating system after the period for which it has been set here.

Table 35 DHW heating operating mode

interruptions. Only DHW heating is active for DHW heating with DHW priority.

## 12.5 Pool settings

In this menu it is possible to set the pool mixing valve runtime and the booster heater start delay for pool heating.

Menu Item	Setting range	Description
Pool module available?	Yes	A pool module is installed in the installation.
	No	Pool heating is managed without a pool module.
Pool 3-way valve	10 ... 6000 s	Time for pool mixing valve to move from end mode to end mode.
Add. heater start delay	60 ... 1200 K*min	Booster heater start delay for pool heating.

Table 36

## 12.6 Solar system settings

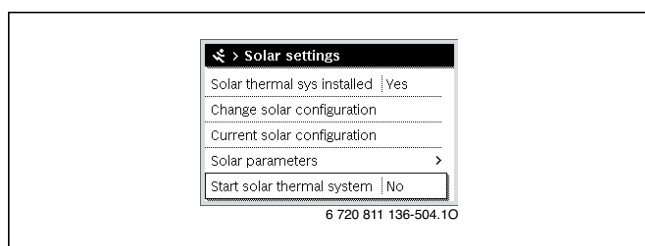




Fig. 47 Solar settings menu

If there is a solar heating system connected to the system via a module, corresponding menus and items are displayed. The extended menu for the solar system is described in the instructions for the utilised module.

**On all solar systems** in the **Solar settings** menu there are submenus as listed in tab. 37.



**WARNING:** Risk of scalding!  
▶ If DHW temperatures above 60 °C are set or thermal disinfection is switched on, a mixer must be installed.



**NOTICE:** System damage  
▶ Fill and vent the solar heating system prior to commissioning.



If the installed collector surfaces are set incorrectly, the solar power production in the information menu will be misleading!

Menu Item	Purpose of the menu
Solar thermal sys installed	If Yes is set here, the other settings are displayed.
Change solar configuration	Graphical configuration of the solar system
Current solar configuration	Graphical display of the configured solar system
Solar parameters	Settings for the installed solar system
Start solar thermal system	Once all the required parameters have been set, the solar system can be commissioned.

Table 37 General settings for the installed solar system

## 12.7 Hybrid system settings

The energy price relationship can be set in the **Hybrid system** menu. Additional information is available in the instructions accompanying the installation parts of the hybrid system.

## 12.8 Anti-seizing protection settings

In the **Anti-seizing protection** menu it is possible to set when the anti-seizing protection should be activated. It is possible to set the start time at 1-hour intervals between 00:00 and 23:00.



Remember not to set the time for at least one hour after Thermal disinfection. The functions may otherwise interfere with each other.

## 12.9 Diagnostics menu

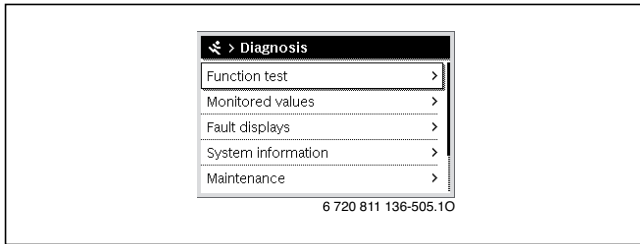


Fig. 48 Diagnostics menu

The **Diagnosis** service menu contains a number of diagnostics tools. Keep in mind that the installed system determines which items are displayed.

### 12.9.1 Function test menu (manual mode)

Active components in the heating system can be tested with the help of this menu. If **Enable function tests** is set to **Yes** in this menu, normal heating mode for the entire system is shut off. All settings are saved. The settings in this menu are only temporary and are reset to standard settings as soon as **Enable function tests** is set to **No** or the **Function test** menu is closed. The available functions and the possible settings vary depending on the system installed.

A function test is performed, where the set values for specified components are tested. You can check whether the mixing valve, pump or 3-way valve respond appropriately by inspecting the behaviour of the corresponding component.

E.g. test the DHW circulation pump:

- **Off:** Pump stops.
- **On:** Pump starts.

There is an automatic test sequence for the heat pump that tests by turns the functions of the components of the heat pump. Activating **Outdoor unit test** turns on and off the fan, the heating cable, the drip pan heater, the 4-way valve and both expansion valves. Each component is active for 10 to 20 seconds.

The **Evacuate/fill** function activates a special operating mode for evacuation/filling of the cooling circuit in the heat pump that is used if the amount of refrigerants needs adjustments.

### 12.9.2 Monitored values menu

This menu contains the heat system settings and measured values. E.g. the flow temperature or current DHW temperature is displayed.

Here, you can also find detailed information about system units, e.g. the heat pump module temperature. The information and values that are provided depend on the system that has been installed. The technical information of accessory modules and other system units must be observed.

### 12.9.3 Error messages menu

This menu displays current operating errors and error history.

Menu Item	Description
Active faults	All the current operating errors are displayed here, by order of severity. Here you can unlock blocking errors (→ Cancel blocking alarms, page 54).
System alarm history	The last 20 operating errors for the entire system are displayed here, sorted by date of occurrence. A snapshot of the relevant installation data when the error occurred exists for each stored error (→ Status log (Snapshot), page 54). Error history can be erased in the Reset menu (→ Chapter 12.9.5, page 54).
Heat source alarm history	The last 20 operating errors for the heat pump are displayed here, sorted by date of occurrence. Error history can be erased in the Reset menu (→ Chapter 12.9.5, page 54).

Table 38 Information in the error messages menu

### Cancel blocking alarms

- ▶ Open menu **Service menu > Diagnosis > Fault displays > Active faults**.
- ▶ Turn the selector until the blocking alarm is displayed.
- ▶ Push and hold the menu and info buttons until a pop-up window is shown on the display.
- ▶ Select **Yes** in order to cancel the blocking.

### Status log (Snapshot)

In order to get more information about taking care of errors that occur:

- ▶ Open the **Service menu > Diagnosis > Fault displays > Heat source alarm history** menu.
- ▶ Turn the selector until the desired error is displayed.
- ▶ Push and hold the info button until a list is displayed with the data registered when the selected error occurred.
- ▶ Turn the selector to call up additional data in the list.

### 12.9.4 System information menu

The software versions of installed BUS units in the system are displayed in this menu.

### 12.9.5 Reset menu (Reset)

Settings or lists can be erased in this menu or reset to standard settings.

Menu Item	Description
Fault history	Error history is erased. If an operating error occurs right now, it will be displayed in the error history again.
Heat pump fault history	Heat pump error history is erased. If an operating error occurs right now, it will be displayed in the error history again.
Service displays	Service messages are reset.
Heating circuits time prog	All time programs for all heating circuits are reset to standard settings.
Time prog. DHW	All time programs in the DHW system (including the circulation pump time program) are reset to standard settings.
Solar thermal system	All settings that include the solar heating system are reset to standard settings. The solar heating system must be recommissioned after this reset!
Hours run	The heat pump hours run counter is reset.
Default setting	All settings are reset to standard settings. The system must be recommissioned after this reset!

Table 39 Reset settings

12.9.6 Calibration menu

Menu Item	Description
Room temp. sen. adj.	<ul style="list-style-type: none"> <li>▶ Place a suitable precision measuring instrument close to the user interface. The precision measuring instrument may not give off any heat to the user interface.</li> <li>▶ Keep heat sources such as, e.g. direct sun, body heat and the like away for a period of 1 hour.</li> <li>▶ Adjust the displayed room temperature correction value ( - 3 ... 0 ... + 3 K).</li> </ul>
Time correction	<p>This correction ( - 20 - 0 ... + 20 s) is performed automatically once every week.</p> <p>Example: the clock is offset by ca. -6 minutes per year</p> <ul style="list-style-type: none"> <li>• -6 minutes per year -360 seconds per year</li> <li>• 1 year = 52 weeks</li> <li>• -360 seconds: 52 weeks</li> <li>• -6.92 seconds per week</li> <li>• Correction factor = +7 s/week.</li> </ul>

Table 40 Calibration menu settings

13 Troubleshooting

A system error is displayed on the user interface display. The cause can be an error in the user interface, in a component, in a module, the heat pump or the heat pump module. You can find further information in the instructions on how to solve errors, especially in the service manual, which contains detailed descriptions of errors, for each separate part and unit and the installed heat pump.

The user interface saves the latest error messages with a time stamp (→ Error history, page 54).



Use only original spare parts. Any damage resulting from use of spare parts not supplied by the manufacturer is excluded from liability. If an error cannot be solved, please contact your local service technician or Bosch service.

Error code	Sub code	Cause or error description	Test procedure/cause	Solution
A11	1000	System configuration not confirmed	System configuration incomplete	Configure the system completely and confirm
A11	1010	No communication via BUS connection EMS plus	<p>Check if the BUS connection is correctly connected.</p> <p>Check if the BUS connection is defect. Disconnect modules from the EMS-BUS and restart the user interface. Check if a module or the module wiring is causing the error.</p>	<p>Correct the wiring and restart the user interface.</p> <p>Repair or replace the BUS wires.</p> <p>Replace defect EMS-BUS unit</p>
A11	1038	Invalid time/date	<p>Date/time not yet set.</p> <p>Prolonged power outage</p>	<p>Set date/time.</p> <p>Set date/time.</p>
A11	3061 3062 3063 3064	<p>No communication with mixing valve module</p> <p>(3061 = Heating circuit 1; 3062 = Heating circuit 2; 3063 = Heating circuit 3; 3064 = Heating circuit 4)</p>	<p>Check configuration (set address on the module). The selected setting requires a mixing valve module.</p> <p>Check if the EMS connecting wire to the mixing valve module is damaged. BUS voltage to the mixing valve module must be between 12 and 15 V DC.</p> <p>Defect mixing valve module</p>	<p>Modify configuration</p> <p>Replace damaged cables.</p> <p>Replace the mixing valve module</p>
A11	3091 3092 3093 3094	<p>Defect room temperature sensor</p> <p>(3091 = Heating circuit 1; 3092 = Heating circuit 2; 3093 = Heating circuit 3; 3094 = Heating circuit 4)</p>	<p>Reset the heating circuit control mode from room temperature mode to outside temperature compensated control.</p> <p>Reset the frost protection from room to outside.</p>	Replace the system regulator or room controller.
A11	6004	No communication w. solar module	<p>Check configuration (set address on the module). The selected setting requires a solar module.</p> <p>Check if the EMS connecting wire to the solar module is damaged. BUS voltage to the solar module must be between 12 and 15 V DC.</p> <p>Defect solar module</p>	<p>Modify configuration</p> <p>Replace damaged cables.</p> <p>Replace the module.</p>
A31 A32 A33 A34	3021 3022 3023 3024	<p>Defect flow temperature sensor in the heating circuit</p> <p>(A31/3021 A32/3022 A33/3023 A34/3024 = Heating circuit 4)</p>	<p>Check configuration. The selected setting requires a flow temperature sensor.</p> <p>Check the connecting cable between the mixing valve module and the flow temperature sensor.</p> <p>Check the connecting cable according to the diagram.</p> <p>Check the flow temperature sensor connecting terminal voltage on the mixer valve module according to the diagram.</p>	<p>Modify configuration.</p> <p>Establish a correct connection.</p> <p>Replace the sensor if the values are incorrect.</p> <p>If the sensor values are correct but the voltage is incorrect, the mixing valve module should be replaced.</p>

Table 41 Error messages

Error code	Sub code	Cause or error description	Test procedure/cause	Solution
A51	6021	Defect collector temperature sensor	Check configuration. The selected setting requires a collector sensor.	Modify configuration.
			Check the connecting cable between the solar module and the collector sensor.	Establish a correct connection.
			Check the collector sensor according to the diagram.	Replace the sensor if the values are incorrect.
			Check the collector sensor connecting terminal voltage on the solar module according to the diagram.	If the sensor values are correct but the voltage is incorrect, the solar module should be replaced.
A51	6022	Cylinder 1 bottom temperature sensor defect Standby mode active	Check configuration. The selected setting requires a bottom buffer cylinder sensor.	Modify configuration.
			Check the connecting cable between the solar module and the bottom buffer cylinder sensor.	Establish a correct connection.
			Check the connecting cable electrical connection to the solar module.	Tighten screws or connections.
			Check the bottom buffer cylinder sensor according to the diagram.	Replace the sensor if the values are incorrect.
			Check the buffer cylinder sensor connecting terminal voltage on the solar module according to the diagram.	If the sensor values are correct but the voltage is incorrect, the module should be replaced.
A61 A62 A63 A64	1081 1082 1083 1084	Two master user interfaces in the system.	Check the installation level parameters. (Several user interfaces besides HPC400 have been configured as REGO in the BUS system)	Register the user interface as Master for heating circuit 1 to 4. (Configure CR10 as remote control)
H01 A61 A62 A63 A64	5203	Alarm E10 outside temperature sensor TO error <i>(A61 = Heating circuit 1; A62 = Heating circuit 2; A63 = Heating circuit 3; A64 = Heating circuit 4)</i>	Check the connecting wire between the user interface and the outside temperature sensor.	If there is no connection, correct the error.
			Check the connecting cable electrical connection to the outside temperature sensor and/or the user interface terminal.	Clean corroded terminals in the outside temperature sensor assembly.
			Check the outside temperature sensor according to the diagram.	Replace the sensor if the values are incorrect.
			Check the outside temperature sensor connecting terminal voltage on the user interface according to the diagram.	If the sensor values are correct but the voltage is incorrect, the user interface should be replaced.
H01	5239	DHW temperature sensor alarm TW1 error If no DHW function is required, the DHW system should be deactivated in the user interface.	No DHW system installed	Deactivate the DHW system in the service menu
			Check the connecting wire between the user interface and the DHW temperature sensor.	If it is defect, the sensor should be replaced.
			Check the connecting cable electrical connection to the user interface.	Tighten screws or plugs if they are loose.
			Check the DHW temperature sensor according to the diagram.	Replace the sensor if the values are incorrect.
			Check the DHW temperature sensor connecting terminal voltage on the user interface according to the diagram.	If the sensor values are correct but the voltage is incorrect, the user interface should be replaced.
H01 A41	5284 4051	Warning: Last thermal disinfection failed	Check for leakage or if water is possibly being drawn from the water heater constantly due to taps being open.	Stop such continuous hot water consumption, or change the time for thermal disinfection.
			Check the DHW temperature sensor position. It might be incorrectly installed or hanging in the air.	Position the DHW temperature sensor correctly.
			Check if the heating loop in the cylinder has been completely vented.	Vent if required.
			Inspect the connecting pipes to the cylinder and check that they are connected correctly.	Correct possible errors in the pipework.
			Check if the installed DHW circulation pump capacity is sufficient.	If there are errors, the pump should be replaced.
			Excessive DHW circulation pipe loss	Check the DHW circulation pipes
			Check the DHW temperature sensor according to the diagram.	If the sensor values do not correspond with the diagram values, it should be replaced.

Table 41 Error messages

## 14 Heat pump and heat pump module venting

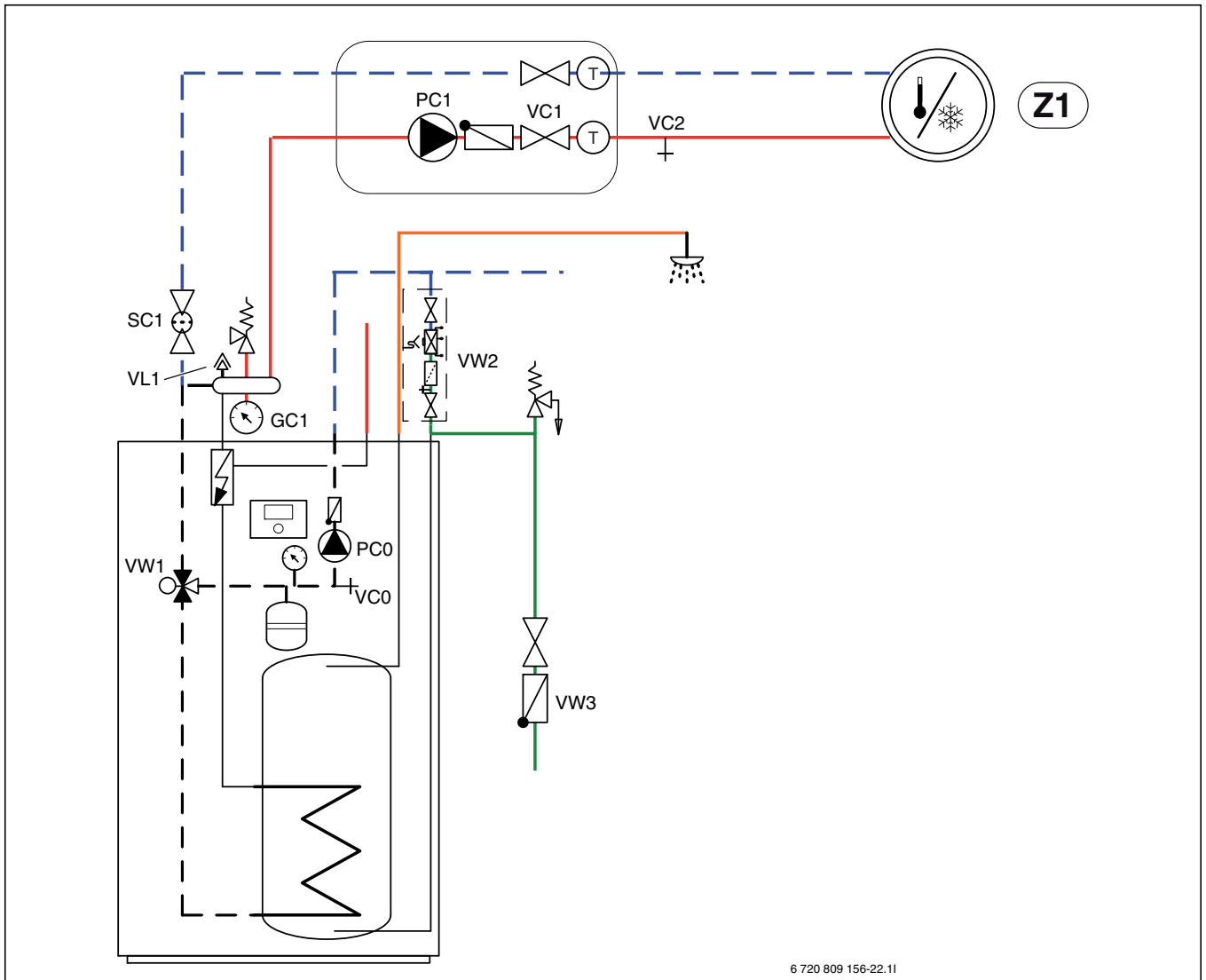


Fig. 49 Heat pump module and heating system

1. Connect the heat pump and heat pump module to the power.
2. Ensure that the circulation pump PC1 is running.
3. Remove the PC0 PWM plug from the circulation pump PC0 so that it operates at maximum speed.
4. Activate the booster heater only.
5. Only deactivate the booster heater when the pressure has not dropped in 10 minutes.
6. Connect the PC0 PWM plug to the circulation pump.
7. Clean the particle filter SC1.
8. Check the pressure on the pressure gauge GC1 and add more with the fill valve VW2 if the pressure is below 2 bar.
9. Check that the heat pump is running and that there are no alarms.
10. Also vent via the other air vent valves of 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 VL1.

## 15 Heat pump module components replacement

1. Disconnect the heat pump and heat pump module power.
2. Check that automatic ventilation is active on VL1.
3. Close the heating system valves; particle filter SC1 and VC1.
4. Connect one end of a hose to VCO and the other end to a drain. Open the drain valve VCO.
5. Wait until the water has stopped flowing to the drain.
6. Replace the components.
7. Open the fill valve VW2 to fill the heat pump pipes.
8. Continue filling until only water comes out of the hose by the drain and the outdoor unit's condenser does not form bubbles any more.
9. Close the drain valve VCO and continue filling until the pressure gauge GC1 shows 2 bar.
10. Close the fill valve VW2.
11. Connect the heat pump and heat pump module power.
12. Remove the hose from the drain valve VC1.
13. Activate the booster heater only and ensure that the DHW circulation pump PC1 is running.
14. Remove the PCO PWM plug from the circulation pump PCO so that it operates at maximum speed.
15. Only deactivate the booster heater when the pressure has not dropped in 10 minutes.
16. Connect the PCO PWM plug to the circulation pump.
17. Clean the particle filter SC1.
18. Open the heating system valve: VC1 and particle filter SC1.
19. Check the pressure after a while and add more with the fill valve VW2 if the pressure is below required pressure.

## 16 Function check



The compressor in the heat pump warms up before it starts. This can take up to 2 hours, depending on the outside temperature. The requirement is that the compressor temperature is 10 K above the air intake temperature. The temperatures are visible in the Diagnostics menu (→ Chapter 12.9).

- ▶ System commissioning as described in Chapter 11.
  - ▶ Vent the system as described in Chapter 14.
  - ▶ Test active system components as described in Chapter 12.9.1.
  - ▶ Check that the heat pump commissioning requirements have been fulfilled.
  - ▶ Check that there is a heating or a DHW demand.
- or-
- ▶ Create a demand either by running the hot water or by raising the heating curve (if the outside temperature is high, you can optionally also modify the setting for **Heating mode from**).
  - ▶ Check that the heat pump starts.
  - ▶ Check that there are no Current alarms according to Chapter 12.9.3.
- or-
- ▶ Solve operating errors according to Chapter 13.
  - ▶ Check operating temperatures according to Chapter 16.3.

### 16.1 Set heating system operating pressure

Indication on pressure gauge	
1 bar	Minimum system pressure (when cold)
2.5 bar	Maximum filling pressure at max. temperature of the heating water: may not be exceeded (safety valve opens).

Table 42 Operating pressure

- ▶ Fill to 2 bar unless stated otherwise.
- ▶ If there is a pressure drop: check the expansion vessel and heating system for leaks.

### 16.2 Pressure switch and overheating protection

The pressure switch and the overheating protection are connected in serial, so that a tripped alarm or information in the user interface means either that the system pressure is too low, or that the immersion heater temperature is too high.



**NOTICE:** Risk of damage due to dry run!

The heat transfer pump PCO can get damaged if it operates for a longer period of time with insufficient pressure in the system.

- ▶ Repair any leaks in the system if the pressure switch is tripped.



Tripped pressure switch only blocks the immersion heater. The circulation pump PCO and the heat pump can continue to operate in case of risk of freezing.

### Pressure switch

The heat pump module is equipped with a pressure switch, which is tripped when the heating system pressure is below 0.5 bar. The pressure switch will reset itself when the pressure is above 0.5 bar.

- ▶ Check that the expansion vessel and the pressure relief valve have the required pressure for the installation.
- ▶ Check for leaks in the system.
- ▶ Slowly increase the heating system pressure by adding water through the fill valve.

### Overheating protection

The overheating protection is tripped if the immersion heater temperature is above 95 °C.

- ▶ Check the system pressure.
- ▶ Check the heating and DHW settings.
- ▶ Reset the overheating protection by pressing the button at the bottom of the electric box (→ [3], fig. 22).

### 16.3 Operating temperatures



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

For optimal operation of the installation it is important that the heat pump and heating system flow is checked. This check should be performed after 10 minutes heat pump operating time and during high compressor heating output.

The temperature differential over the heat pump should be set for different heating systems (→ Chapter 12.1.1),

- ▶ For underfloor heating system; set the heating temp. diff. to 5 K.
- ▶ For radiators; set the heating temp. diff. to 8 K.

These settings are optimal for the heat pump.

Check the temperature differential during high compressor heating output:

- ▶ Go to the Diagnostics menu.
- ▶ Select Monitored values.
- ▶ Select Heat pump.
- ▶ Select Temperatures.



- ▶ Check Primary flow temperature. (heat transfer medium out sensor TC3) and Return temperature (heat transfer medium in sensor TC0) in heating mode. The flow should have a higher temperature than the return.
- ▶ Calculate the differential by  $TC3 - TC0$ .
- ▶ Check that the differential corresponds with the set heat transfer fluid delta.

If the temperature differential is too large:

- ▶ vent the heating system.
- ▶ Clean the filters / strainers.
- ▶ check pipe dimensions.

## 17 Environmental protection

Environmental protection is one of the Bosch group main pillars. Results quality, efficiency and environmental protection are equally important objectives for us. Environmental laws and regulations are strictly adhered to.

To protect the environment we will, subject to economical aspects, use the best possible technology and materials.

### Packaging

The packaging has been labelled with country specific information about waste disposal to facilitate optimal recycling.

All of our packaging materials are environmentally friendly and recyclable.

### Waste products

The products contain recyclable material which should be extracted and disposed of separately.

The components are easy to take apart, and the plastic is labelled. This allows for sorting and recycling, incineration or other disposal of the different components.

## 18 Maintenance



### **DANGER:** Electric shock!

- ▶ Switch off the main power supply before starting work on the electrical part.



### **NOTICE:** Risk of deformation due to heat!

The heat pump module insulation material (EPP) will deform if it is exposed to high temperatures.

- ▶ Only use heat protection cloth or wet cloth to protect the insulation material while performing soldering work on the heat pump module.

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

During service, the activities described below should be conducted.

### Show alarms

- ▶ Check the alarm log.

### Function check

- ▶ Perform function checks (→ Chapter 16).

### Electric cabling

- ▶ During service, the electric box may be tilted forward for easier access.
- ▶ Check the cable for mechanical damage. Replace damaged cables.

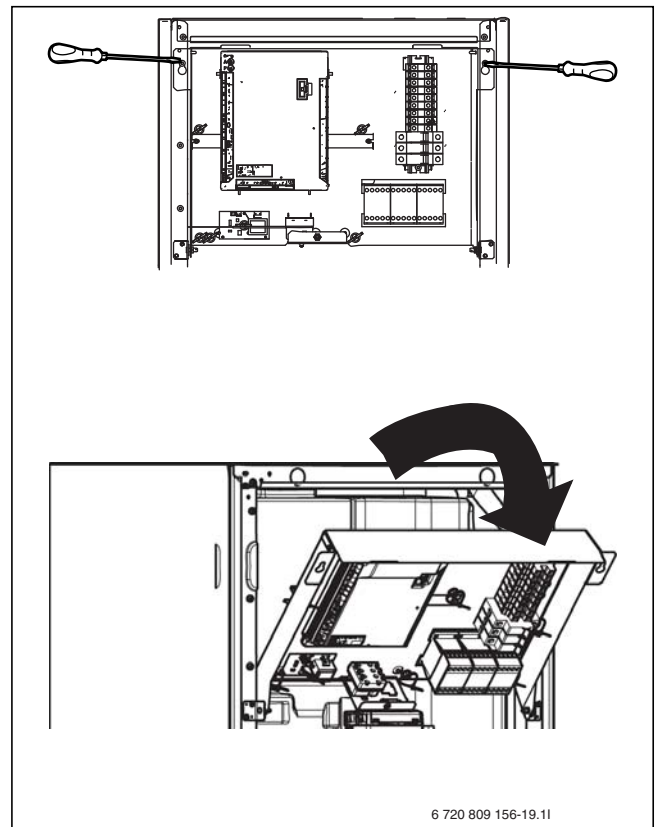


Fig. 50 Electric box

### Check the heating system particle filters (in the safety assembly)

The filters will prevent dirt from entering the system. Operating problems might occur if these are blocked.



It is not necessary to empty the installation in order to clean the filters. Filter and shut-off valve are integrated.

### Cleaning the strainer

- ▶ Close the valve (1).
- ▶ Screw off the hood (by hand), (2).
- ▶ Take out the strainer and clean it by running water over it or by pressure cleaning.
- ▶ Put the strainer back; it has rails that fit into the groove in the valve to avoid incorrect installation (3).

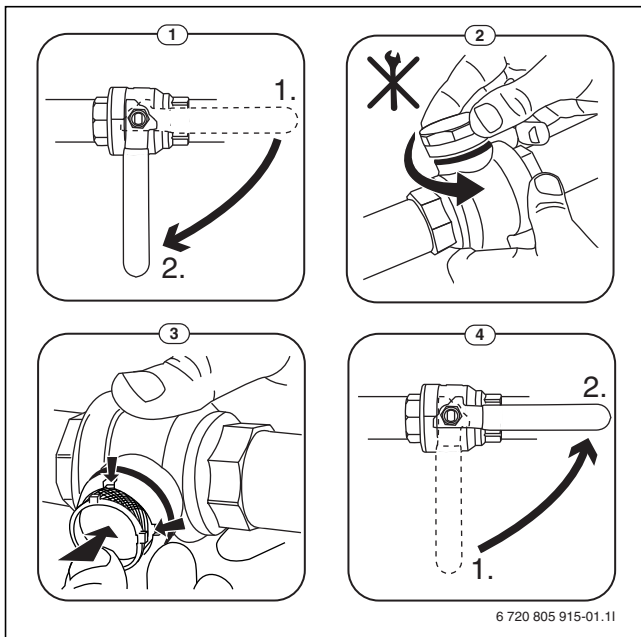


Fig. 51 Filter version without circlip

- ▶ Screw back the hood (by hand).
- ▶ Open the valve (4).

Temperature sensor measured values

Heat pump module

Temperature sensor in, or connected to, the heat pump module (T0, T1, TW1, TC0, TC1) contains measured values according to fig. 43 and 44.

°C	Ω	°C	Ω	°C	Ω	°C	Ω
20	12488	40	5331	60	2490	80	1256
25	10001	45	4372	65	2084	85	1070
30	8060	50	3605	70	1753	90	915
35	6536	55	2989	75	1480	-	-

Table 43 Flow and DHW temperature sensor T0, TW1, TC0, TC1

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

Table 44 Outside temperature sensor T1



## 19 Connection for IP module

The heat pump module contains an IP module, which can be used to manage and monitor the heat pump module from a mobile unit. It is used as an interface between the heating system and a network (LAN) and enables the SmartGrid function.



Use of all the functions requires an internet connection and a router with an available RJ45 output. This may incur additional costs. Managing the installation from a cell phone requires the free app **IVT Anywhere**.

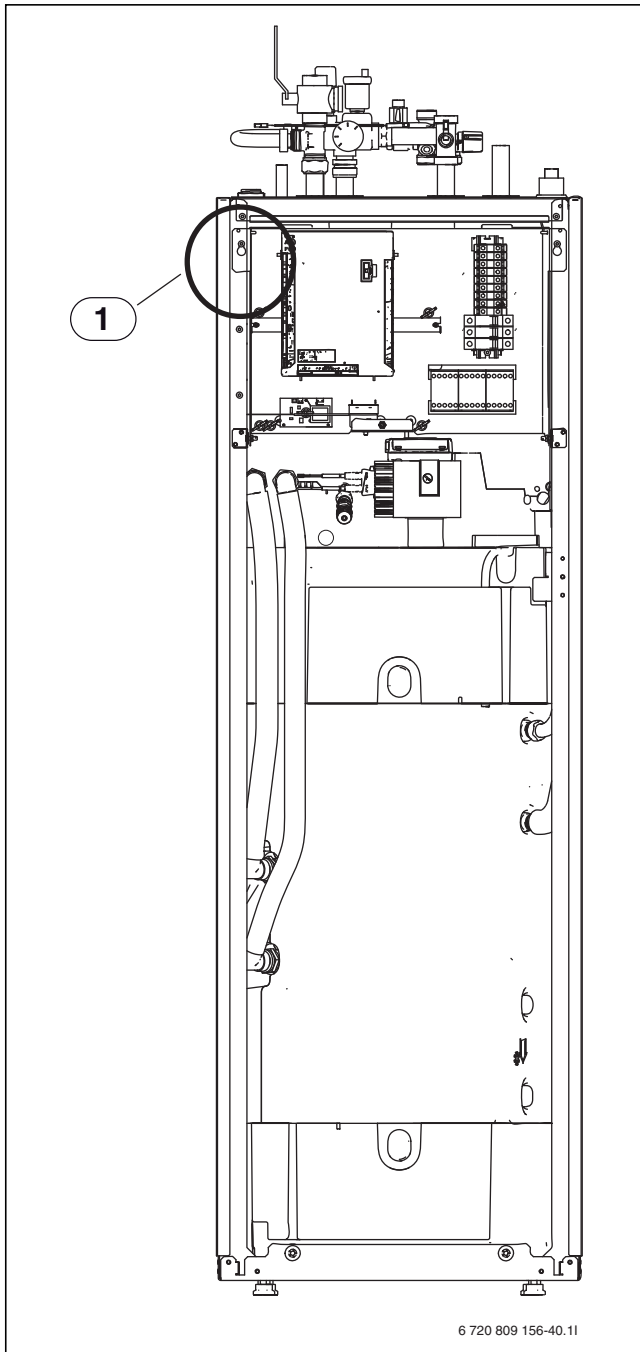


Fig. 52 IP module installation

- [1] IP module installation. Tilt the electric box forward to access it and feed the network cable through the roof (→ [5] Fig. 15).

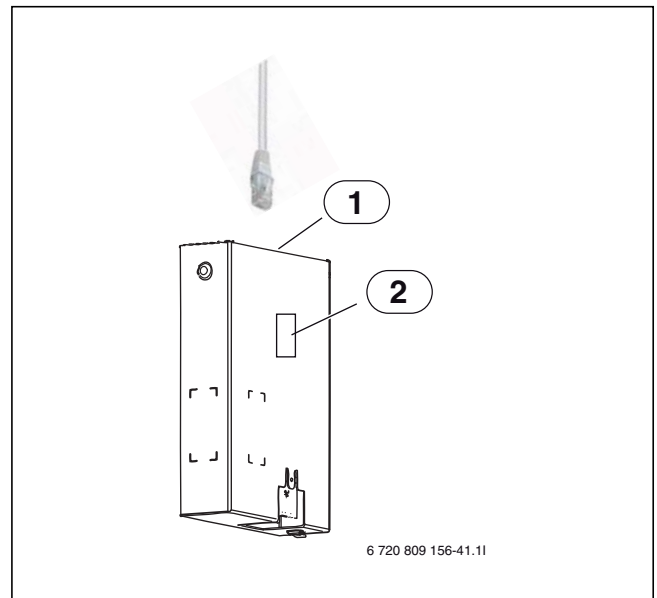


Fig. 53 IP module

- [1] Connection RJ45  
[2] IP module data plate

### Commissioning



Please refer to the router documentation during commissioning.

The router must be configured as follows:

- DHCP enabled
- Ports 5222 and 5223 may not be blocked from outgoing traffic.
- Free IP address available
- The address filter (MAC filter) must not filter out the module.

During commissioning of the IP module, the following is possible:

- Internet  
The module automatically obtains an IP address from the router. The name and address of the target server are stored in the standard settings of the module. As soon as an internet connection is established, the module automatically logs on to the server.
- Local network  
The module does not have to be connected to the internet. It can also be used in a local network. In this case, however, the module cannot be reached via the internet, and the IP-module software cannot automatically update.
- The app **IVT Anywhere**  
When the app is opened for the first time, the predefined login name and password must be entered. The login information can be found on the IP-module data plate.



**NOTICE:** You will lose your login information when you change IP-module!

- Each IP-module has its own unique login information.
- ▶ Enter your login information after commissioning in the appropriate field in your operating instructions.
  - ▶ Change the information according to the new IP-module if it has been changed.
  - ▶ Inform the user.



You can also change the password in the user interface.

## 20 Commissioning protocol

Commissioning date:	
<b>Customer address:</b>	Surname, Given name:
	Address:
	City:
	Telephone:
<b>Installation company:</b>	Surname, Given name:
	Street address:
	City:
	Telephone:
<b>Product information:</b>	Product model:
	TTNR:
	Serial number:
	FD-no.:
<b>Installation components:</b>	Receipt/value
Room controller	<input type="checkbox"/> Yes   <input type="checkbox"/> No
Room controller with condensation sensor	<input type="checkbox"/> Yes   <input type="checkbox"/> No
Solar energy	<input type="checkbox"/> Yes   <input type="checkbox"/> No
Buffer cylinder	<input type="checkbox"/> Yes   <input type="checkbox"/> No
Model/volume (L):	
Hot water cylinder	<input type="checkbox"/> Yes   <input type="checkbox"/> No
Model/volume (L):	
Other components	<input type="checkbox"/> Yes   <input type="checkbox"/> No
Which?	
<b>Minimum clearances heat pump:</b>	
Is the heat pump positioned on a solid and flat surface?	<input type="checkbox"/> Yes   <input type="checkbox"/> No
Is the heat pump stably anchored?	<input type="checkbox"/> Yes   <input type="checkbox"/> No
Minimum distance to wall? ..... mm	
Minimum side panel clearance? ..... mm	
Minimum distance to roof? ..... mm	
Minimum distance in front of the heat pump? ..... mm	
Is the heat pump positioned so that no snow or rain can slide or drip down from the roof?	<input type="checkbox"/> Yes   <input type="checkbox"/> No
<b>Heat pump condensation water hose</b>	
Has the condensation water hose been fitted with a heating cable?	<input type="checkbox"/> Yes   <input type="checkbox"/> No
<b>Heat pump connections</b>	
Have the connections been professionally installed?	<input type="checkbox"/> Yes   <input type="checkbox"/> No
Who laid/delivered the power cable?	
<b>Heat pump module minimum distance:</b>	
Minimum distance to wall? ..... mm	
Minimum distance in front of the heat pump module? ..... mm	
<b>Heating:</b>	
Has the expansion vessel pressure been established? ..... bar	
Has the heating system been flushed before installation?	<input type="checkbox"/> Yes   <input type="checkbox"/> No
The heating system has according to the established expansion vessel prepressure been filled to ..... bar?	<input type="checkbox"/> Yes   <input type="checkbox"/> No
Has the particle filter been cleaned?	<input type="checkbox"/> Yes   <input type="checkbox"/> No
<b>Electric connection:</b>	
Are the low voltage wires at a distance of at least 100 mm from the 230 V/ 400 V wires?	<input type="checkbox"/> Yes   <input type="checkbox"/> No
Have the CAN BUS connections been installed correctly?	<input type="checkbox"/> Yes   <input type="checkbox"/> No
Has a power guard been connected?	<input type="checkbox"/> Yes   <input type="checkbox"/> No
Is the outside temperature sensor T1 positioned correctly on the coldest side of the house?	<input type="checkbox"/> Yes   <input type="checkbox"/> No

Table 45 Commissioning log

<b>Power supply connection:</b>	
Is the phase order L1, L2, L3, N and PE in the heat pump and heat pump module correct?	<input type="checkbox"/> Yes   <input type="checkbox"/> No
Has the power been connected according to the installation instructions?	<input type="checkbox"/> Yes   <input type="checkbox"/> No
Heat pump and booster heater fuse, trip characteristics?	
<b>Manual mode:</b>	
Has a function test been performed of separate component assemblies (circulation pump, mixing valve, 3-way valve, etc.)?	<input type="checkbox"/> Yes   <input type="checkbox"/> No
Notes:	
Have the temperature values in the menu been checked and documented?	<input type="checkbox"/> Yes   <input type="checkbox"/> No
T0	_____ °C
T1	_____ °C
TW1	_____ °C
TL5	_____ °C
TC0	_____ °C
TC1	_____ °C
<b>Booster heater settings:</b>	
Start delay	
Booster heater time delay	
Block booster heater	<input type="checkbox"/> Yes   <input type="checkbox"/> No
Immersion heater connected load settings	
Booster heater max. temperature	_____ °C
Electrical output (shows actual value)	
<b>Protective functions:</b>	
Block the heat pump during low outside temperature _____ °C	
<b>Has the commissioning been performed correctly?</b>	<input type="checkbox"/> Yes   <input type="checkbox"/> No
<b>Are there further actions required by the installer?</b>	<input type="checkbox"/> Yes   <input type="checkbox"/> No
Notes:	
<b>Installer signature:</b>	
<b>Customer or installer signature:</b>	

Table 45 Commissioning log



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