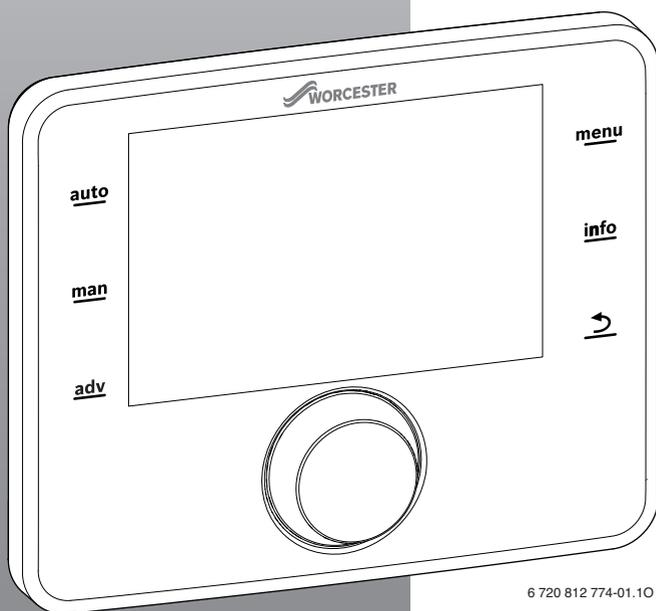


# Installation instructions

## Advanced Weather Compensation Controller

# Sense II



UK/IE

  
**WORCESTER**  
Bosch Group

# Contents

<b>1</b>	<b>Explanation of symbols and safety instructions</b>	<b>3</b>
1.1	Explanation of symbols	3
1.2	General safety instructions	3
<b>2</b>	<b>Product information</b>	<b>4</b>
2.1	Product description	4
2.1.1	Control types	4
2.1.2	Application options in different heating systems	4
2.2	Important notices on usage	5
2.3	Declaration of Conformity	5
2.4	Scope of delivery	6
2.5	Technical data	7
2.6	Energy efficiency	7
2.7	Temperature sensor characteristics	7
2.8	Additional accessories	7
2.9	Applicability of the technical documentation	8
2.10	Disposal	8
<b>3</b>	<b>Installation</b>	<b>8</b>
3.1	Types of installation	8
3.2	Installation location of the user interface	8
3.3	Installation in the reference room	10
3.4	Electrical connection	10
3.5	Fitting/Removing the controller	11
3.6	Installation in the heat source	11
3.7	Installing the connector with link	12
3.8	Installing the blue connector	13
3.9	Installation of an outside temperature sensor	14
<b>4</b>	<b>Basic principles of operation</b>	<b>15</b>
4.1	Overview of the control elements	15
4.2	Overview of the symbols in the display	17
4.3	Operating the service menu	19
4.4	Overview of the service menu	20
<b>5</b>	<b>Commissioning</b>	<b>21</b>
5.1	Overview over the commissioning steps	21
5.2	General commissioning of the Sense II	21
5.3	System commissioning with the configuration wizard	21
5.4	Commissioning other settings	24
5.4.1	Checklist: Adjusting settings to customer requirements	24
5.4.2	Important settings for the heating system	24
5.4.3	Important settings for the DHW system	24
5.4.4	Important settings for the solar system	24

5.4.5	Important settings for the hybrid system	24
5.4.6	Important settings for cascades	24
5.5	Perform function tests	24
5.6	Check monitored values	24
5.7	System handover	24

## 6 Shutting down/Switching off 25

## 7 Service menu 25

7.1	Heating system settings	29
7.1.1	System data menu	30
7.1.2	Boiler data menu	31
7.1.3	Heating circuit 1 – 4	33
7.1.4	Screed drying menu	40
7.2	DHW settings	42
7.3	Solar system settings	44
7.4	Settings for hybrid systems	45
7.5	Settings for cascade systems	45
7.6	Diagnosis menu	45
7.6.1	Function test menu	45
7.6.2	Monitored values menu	45
7.6.3	Fault display menu	47
7.6.4	System information menu	47
7.6.5	Maintenance menu	47
7.6.6	Reset menu	48
7.6.7	Calibration menu	48

## 8 Eliminate fault 48

## 9 Environment / disposal 52

## 10 Commissioning report 52

## Index 58

# 1 Explanation of symbols and safety instructions

## 1.1 Explanation of symbols

### Warnings



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

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

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

### Important information



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

### Additional symbols

Symbol	Meaning
▶	Action step
→	Cross-reference to another part of the document
•	List/list entry
–	List/list entry (second level)

Table 1 Additional symbols

## 1.2 General safety instructions

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

- ▶ Read the installation instructions (heat appliances, modules, etc.) before installation.
- ▶ Observe safety instructions and warnings.
- ▶ Observe national and regional regulations, technical rules and guidelines.
- ▶ Keep a record of any work carried out.

### Determined use

- ▶ The product must only be used for controlling heating systems.

Any other use is considered inappropriate. Any damage that may result is excluded from liability.

### Installation, commissioning and maintenance

Installation, commissioning and maintenance must only be carried out by a competent person .

- ▶ Never install the product in wet rooms.
- ▶ Only install genuine spare parts.

### Electrical work

Electrical work must only be carried out by qualified electricians.

- ▶ Before carrying out electrical work:
  - Isolate all poles of the mains voltage and secure against reconnection.
  - Using suitable means, test that the power supply is disconnected.
- ▶ Never connect the product to mains voltage.
- ▶ Also observe connection diagrams of other system components.

### Handover to the user

When handing over the heating system, explain the operating conditions to the user.

- ▶ Explain how to operate the heating system, with particular emphasis on all safety-related actions.
- ▶ Explain that conversions and maintenance must only be carried out by a competent person.
- ▶ Highlighted the need for inspections and maintenance for safe and environmentally friendly operation.
- ▶ The installation and operating instructions must be given to the user for safekeeping.

### Damage caused by frost

The system can freeze if it is switched off:

- ▶ Observe the notices regarding frost protection.
- ▶ Due to the additional functions, e.g. DHW heating or pump anti-seizure protection, the system should always be left switched on.
- ▶ Correct any faults immediately.

## 2 Product information

### 2.1 Product description

- The Sense II controller controls up to a maximum of 4 heating circuits. In addition 2 cylinder primary circuits, one solar Domestic Hot Water (DHW) heating as well as one solar circuit for central heating backup can be controlled.
- The controller has time programs:
  - Heating systems: For each heating circuit, 2 time programs with 6 switching times per day can be set (exception: for one constant heating circuit there is only 1 time program).
  - Domestic hot water: A time program for DHW heating and a time program for the DHW circulation pump for each hot water circuit, each with 6 switching times per day.
- The controller displays information about the heat source (i.e. boiler) and heating system and is used to change the settings.
- Installation possibilities:
  - In a heat source with an EMS 2 BUS interface (Energy Management System) or a 2-wire BUS cable.
  - On a wall with BUS connection to a heat source with a 2-wire BUS interface or EMS 2.
- After operating for 1.5 hours, the controller has a power reserve of at least 8 hours. If the power failure lasts longer than the power reserve, the time and date will be deleted. All other settings are saved.
- The functionality and menu structure of the controller is determined by the type of heating system that the controller is connected to. These instructions describe the controller's full functionality. Your attention is drawn to the importance of the system structure in the relevant places. The adjustment ranges and default settings may differ from the information in these instructions.

### 2.1.1 Control types



There are heat sources that have integrated weather-compensated control. In such heat sources, the integrated weather-compensated control must be deactivated.

The following control types are available:

- **Room temperature-dependent:** Automated control of the flow temperature or the heat output of the heat source based on the room temperature. Installation of the controller in the reference room is required.
- **Weather-compensated:** Automated control of the flow temperature based on the outside temperature.
- **Weather-compensated with the influence of the room temperature:** Automated control of the flow temperature based on the outside temperature and room temperature. Installation of the controller in the reference room is required.
- **Constant:** Automated control of the flow temperature for the heating of swimming pool or ventilation unit with constant temperature. This control type is independent of the room or outside temperature.

For further information on the control types (→ Control types, page 35).

### 2.1.2 Application options in different heating systems

In a BUS system, only one controller can carry out the calculations for a heating circuit. Consequently, only one Sense II programming unit may be installed in each heating system. The controller serves as controller in:

- Systems with one heating circuit, e.g. in a detached house
- Systems with two or more heating circuits, e.g.:
  - underfloor heating system on one floor, panel radiators on the other
  - Living space in combination with an area used for commercial usage. (→ Fig. 1, [1])
- Systems with several heating circuits with remote controls, e.g.:
  - House with annex with Sense II as controller and Sense I as remote control (installation of Sense II in the reference room of the house, Sense I in the reference room of the annex, → Fig. 1, [2])
  - House with several annexes or wings (Sense II as controller and Sense I as remote control, installation of Sense II in the heat source).

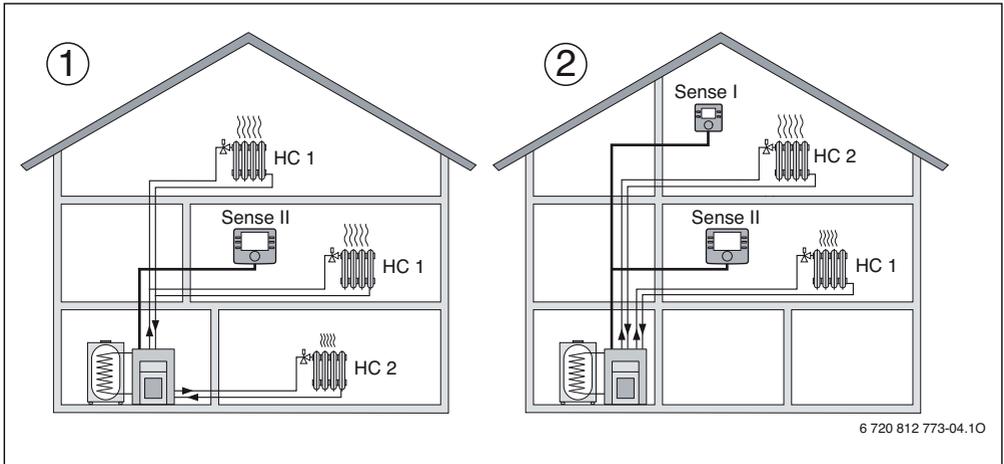


Fig. 1 Example for heating systems with one or two heating circuits

- [1] Sense II as controller for several (in this case two) heating circuits (HC 1 and HC 2).
- [2] Sense I as the remote control for the second heating circuit (HC 2) and Sense II as the controller for the first heating circuit (HC 1).

## 2.2 Important notices on usage



### WARNING: Risk of scalding!

- ▶ If DHW temperatures above 60 °C are set or thermal disinfection is switched on, a mixer must be installed.



### NOTICE: Floor damage!

- ▶ Underfloor heating systems must only be operated with an additional temperature limiting switch.

- The controller may be connected only to heat sources with an EMS 2 BUS interface (Energy Management System) or a 2-wire BUS interface, such as compatible Greenstar boilers.
- Only products with EMS 2 BUS may be used within the BUS system.
- The installation room must be appropriate for protection level IP20.

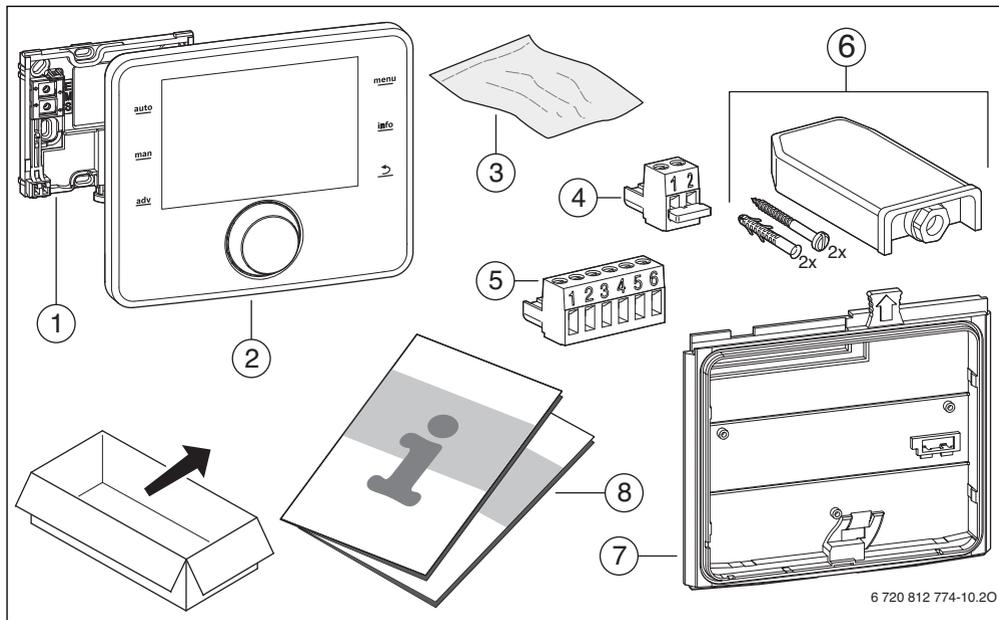
## 2.3 Declaration of Conformity



The design and operation of this product comply with European Directives and the supplementary national requirements. Its conformity is demonstrated by the CE marking.

You can ask for a copy of the declaration of conformity for this product. For this see the contact address on the back cover of these instructions.

## 2.4 Scope of delivery



6 720 812 774-10.20

Fig. 2 Scope of delivery

- [1] Wall mounting plate
- [2] Sense II controller
- [3] Installation material
- [4] Connector with link (to be installed into some heat sources)
- [5] blue connector
- [6] Outside sensor
- [7] Installation frame for installation in the heat source
- [8] Technical documentation

## 2.5 Technical data

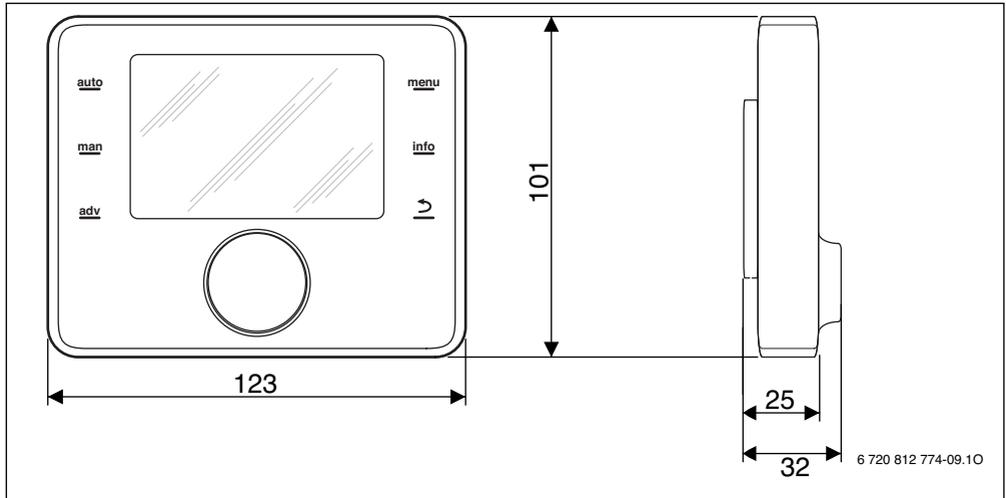


Fig. 3 Dimensions in mm

<b>Scope of delivery</b>	→ Chapter 2.4, page 6
<b>Measurements</b>	123 × 101 × 25 mm (→ Fig. 3)
<b>Nominal voltage</b>	10 – 24 VDC
<b>Rated power</b> (excluding illumination)	9 mA
<b>BUS interface</b>	EMS 2
<b>Control range</b>	5 °C – 30 °C
<b>Permitted ambient temp.</b>	0 °C – 50 °C
<b>IP rating</b>	III
<b>IP rating</b>	<ul style="list-style-type: none"> <li>• For wall-mounted installation</li> <li>• in case of installation in the heat source</li> </ul>
	<ul style="list-style-type: none"> <li>• IP20</li> <li>• IPX2D</li> </ul>

Table 2 Technical data

## 2.6 Energy efficiency

The ErP and energy efficiency related product data can be found in the operating instructions.

## 2.7 Temperature sensor characteristics

When measuring temperature sensors, observe the following requirements:

- Isolate the system before measuring.
- Measure the resistance at the cable ends.
- The resistance values represent average values and are subject to tolerances.

°C	Ω	°C	Ω	°C	Ω	°C	Ω
-20	2392	-8	1562	4	984	16	616
-16	2088	-4	1342	8	842	20	528
-12	1811	±0	1149	12	720	24	454

Table 3 Resistance values for outside temperature sensors

°C	Ω	°C	Ω	°C	Ω	°C	Ω
8	25065	32	9043	56	3723	80	1704
14	19170	38	7174	62	3032	86	1421
20	14772	44	5730	68	2488	-	-
26	11500	50	4608	74	2053	-	-

Table 4 Resistance values for flow and DHW temperature sensors

## 2.8 Additional accessories

- **Sense I** as simple remote control
- **MC 400**: Module for a cascade of several heat sources
- **MM 100**: Module for one heating circuit with mixer, cylinder primary circuit or constant heating circuit
- **MM 200**: Module for 2 heating circuits with mixer, cylinder primary circuits or constant heating circuits
- **Greenstar Wiring Centre**: Module for systems with two port valve (S-plan) or mid-position valve (Y-plan).
- **MS 100**: Module for solar DHW heating
- **MS 200**: Module for advanced solar systems (wall-mounted installation only).

**Combination is not possible** with the following products:

- FR10, FR10, FW100, RC25, RC35, ISM or SC controls

**Applicability of these instructions to EMS 2-capable modules**

These instructions also apply to the controller when used in conjunction with the heating circuit module MM 100/MM 200 (accessory).

Additional setting options may be found in some menus, if your heating system is equipped with alternative modules (e.g. solar module MS 100 (accessory)). These setting options are explained in the technical documentation of the modules.

**2.9 Applicability of the technical documentation**

Information in the technical documentation about heat sources, additional controls or modules also apply to the Sense II.

**2.10 Disposal**

- ▶ Dispose of packaging in an environmentally responsible manner.
- ▶ When replacing a product or a component, dispose of the old product or component in an environmentally responsible manner.

**3 Installation**

The detailed system schematics for mounting the hydraulic assemblies and components and the associated controls can be obtained from your Local Commercial Sales Manager (Commercial installations only).



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



**DANGER:** Risk of electric shock!  
▶ Before installing this product: Disconnect the heat source and all other BUS controls and modules from the mains voltage across all poles. Guard against unintentional reconnection.

**3.1 Types of installation**

The use of the programming unit and the structure of the overall system determine how the programming unit should be installed (→ Section 2, page 4).

**3.2 Installation location of the user interface**

If the weather-compensated control (without room temperature influence) is active, for direct and easy access we recommend the installation of the controller in the living space. Alternatively, the controller can also be installed at the heat source.

The room in your home where the controller is installed is known as the reference room. If the room temperature-dependent control is active, the room temperature in this room serves as the target temperature for the entire system.

If the weather-compensated control with influence of the room temperature is active, the room temperature functions as an additional temperature input.

In case of room temperature-dependent control and weather-compensated control with influence of the room temperature the control quality depends on the installation location.

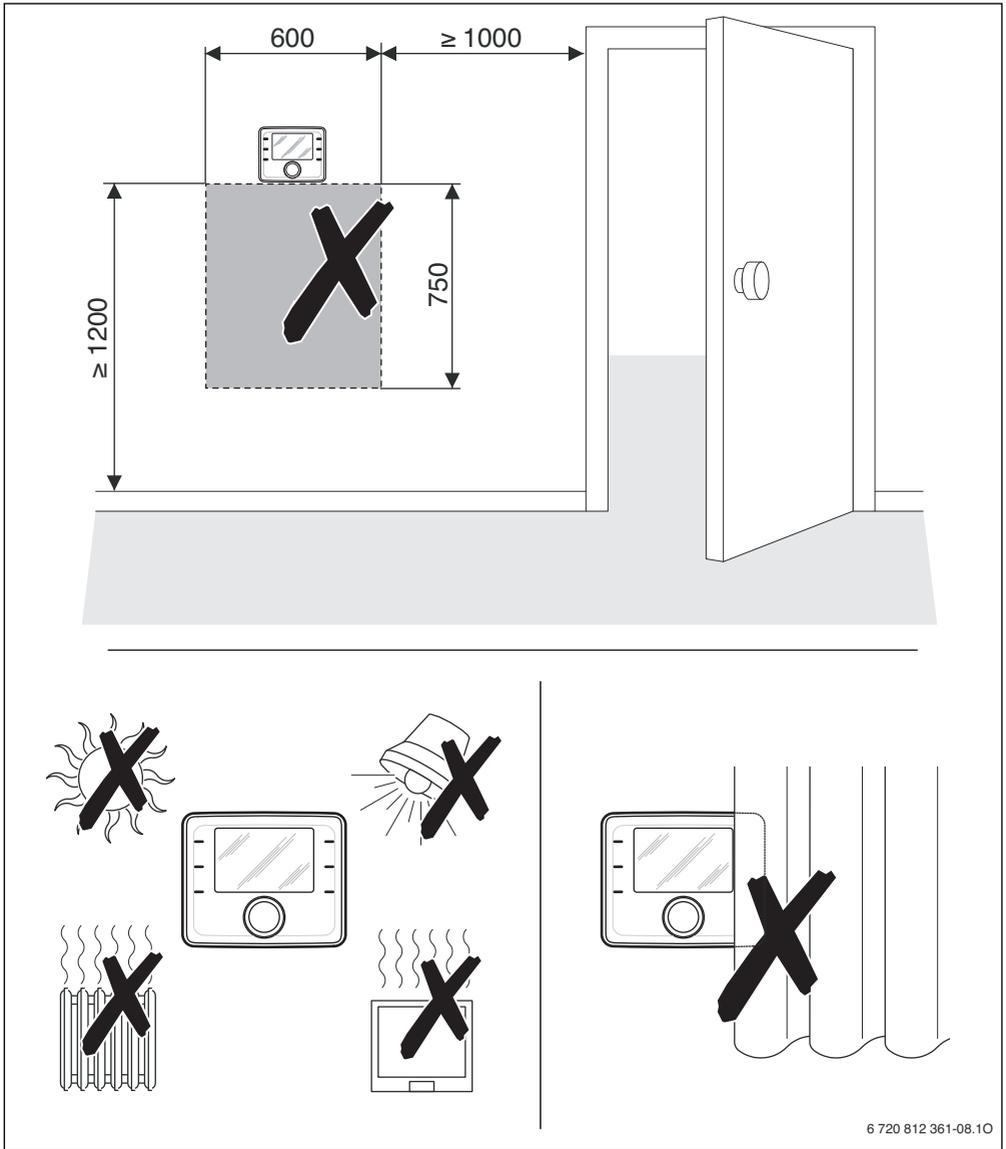
- The installation location (= reference room) must be suitable for controlling the heating system (→ Fig. 4, page 9).
- If remote controls are used for all heating circuits e.g. Sense I, the main controller can be installed in the heat source.

When using thermostatic radiator valves in the reference room:

- ▶ Open the thermostatic radiator valves completely and set the output of the radiators as low as possible using adjustable return fittings.  
In this way, the reference room will be heated identically as the remaining rooms.



If there is no suitable reference room, we recommend converting the system to weather-compensated control instead.



6 720 812 361-08.10

Fig. 4 Installation location in the reference room

### 3.3 Installation in the reference room



The surface of the wall must be flat.  
When installing on to a wall box:

- ▶ Fill the wall box with thermal insulation material to prevent drafts affecting the true room temperature.
- ▶ Install plate on a wall (→ Fig. 5).

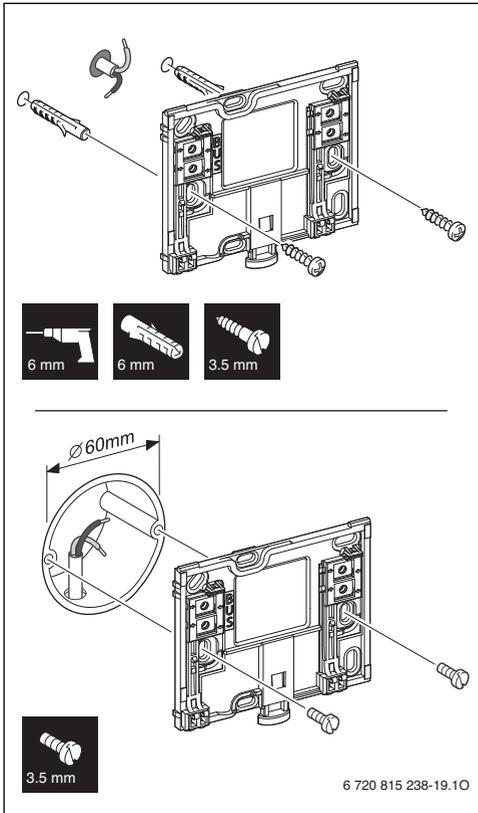


Fig. 5 Installation of Wall mounting plate

### 3.4 Electrical connection

Power is supplied to the controller via 2 core electrical cable.  
Existing electrical room thermostat cable is suitable.

Polarity is irrelevant for the two wires.



Under no circumstances must the controller be connected to the boiler's 230 volt connections or external 230 volt supply



If the maximum total length of the cable between all BUS devices is exceeded or the BUS system has a ring structure, commissioning of the system is not possible.

Maximum total length of cable to the BUS connections:

- 100 m at 0.50 mm<sup>2</sup> conductor cross-section
- 300 m at 1.50 mm<sup>2</sup> conductor cross-section.
- ▶ If several BUS devices are installed, maintain a minimum clearance of 100 mm between the individual BUS devices.
- ▶ If several BUS devices are installed, connect the BUS devices in series or in a star pattern.
- ▶ To avoid inductive interference: make sure all low-voltage cables are routed separately from mains voltage cables (min. clearance 100 mm).
- ▶ In the case of external inductive interferences (e.g. from photovoltaic systems), use shielded cables (e.g. LIYCY) and earth the shield on one side. The shield should be connected to the building's earthing system, e.g. to a free earth conductor terminal or water pipes, and not to the grounded terminal in the module.
- ▶ Establish a BUS connection to the heat source. Depending on the installed heat source the terminal reference may be different.

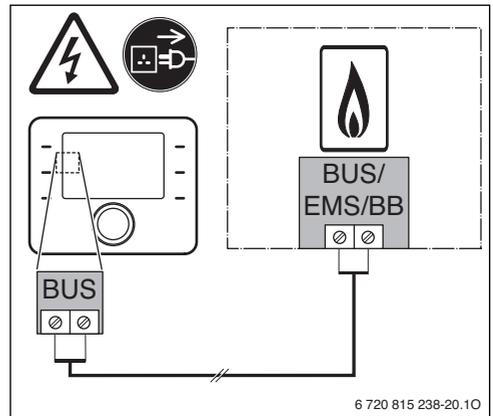


Fig. 6 Connection of the controller to a heat source

### 3.5 Fitting/Removing the controller

#### Fitting the controller

- ▶ Hook the controller in at the top.
- ▶ Click in the controller at the bottom.

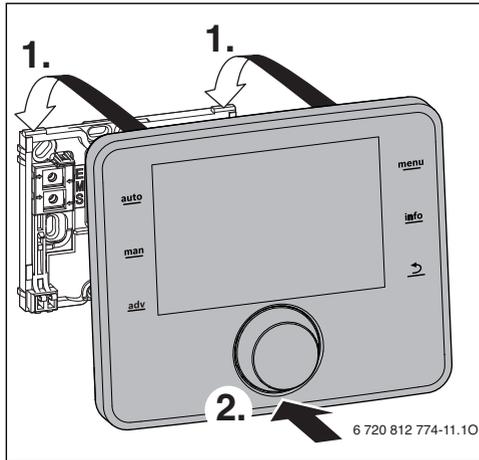


Fig. 7 Fitting the controller

#### Removing the controller

- ▶ Press the button on the underside of the plate.
- ▶ Pull the bottom of the controller towards you.
- ▶ Remove the controller by lifting upwards.

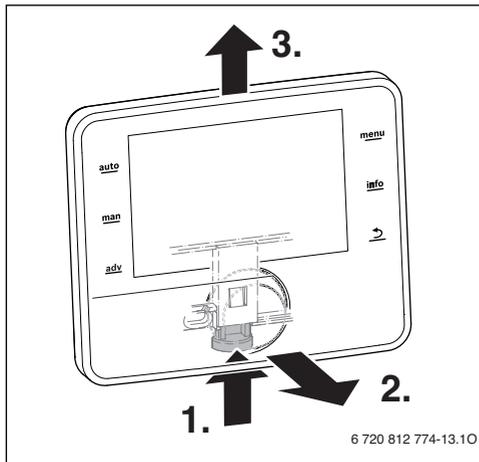


Fig. 8 Removing the controller

### 3.6 Installation in the heat source

- ▶ To prepare the controller for installation in the heat source:

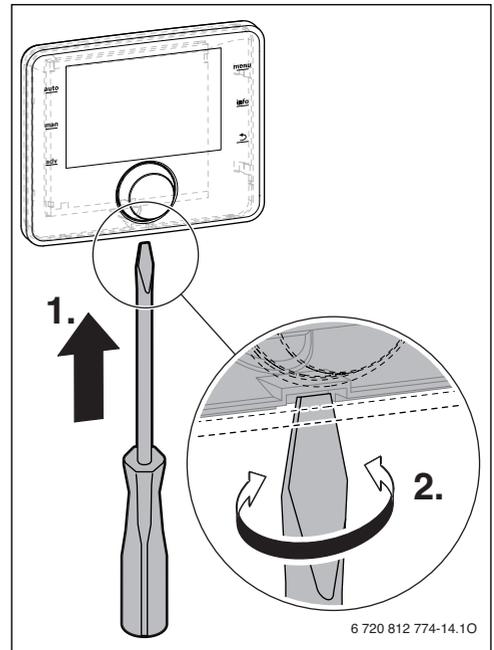


Fig. 9 Loosen the cover at the back of the controller

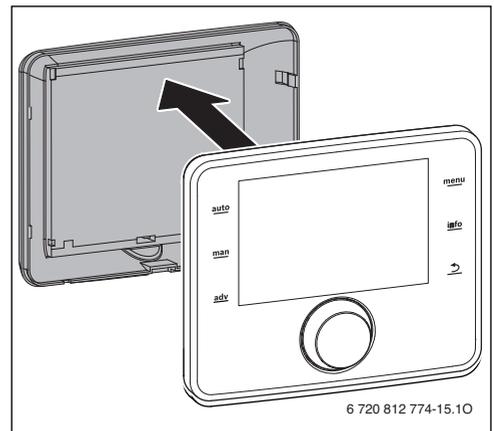


Fig. 10 Remove the controller from its back cover

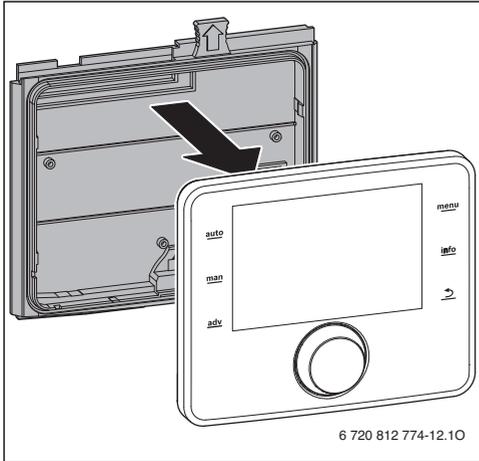


Fig. 11 Mount installation frame to the back of the controller

- Observe the installation instructions of the relevant heat source.

### 3.7 Installing the connector with link

The advanced weather compensated controller only works properly, when the connector with link (→ fig 2, [4], page 6) is installed correctly in the heat source.

The plug with jumper must be installed in all heat sources with HT4i electronics (e.g. Greenstar Compact) (→ fig 12).

- Observe the installation instructions of the relevant heat source.

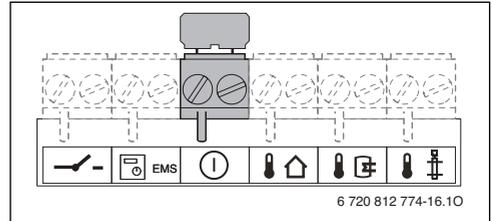


Fig. 12 Low voltage connectors of a heat source

#### Key to fig. 12

	Low voltage room thermostat input (NOT USED)
	EMS/EMS 2 BUS connection
	External cut off switch (NOT USED) – plug in connector with link (→ fig 2, [4], page 6) here
	Outdoor temperature sensor
	Cylinder sensor (NOT USED on Combi boilers)
	Low loss header sensor (NOT USED)

Table 5 Low Voltage terminal strip



Failure to install the connector with link into the required heat source will stop the CH from coming on.

### 3.8 Installing the blue connector

The weather-compensated controller only functions, if the outside temperature sensor is correctly installed at the heat source.

If no plug is enclosed with the heat source (e.g. Greenstar i), the blue plug is to be installed (→ fig. 13).

- Observe the instructions for the heat sources concerned.

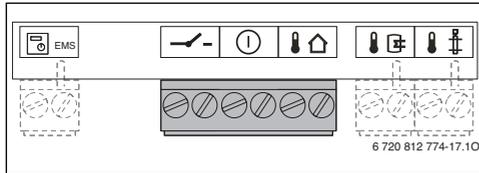


Fig. 13 Low-voltage connections for a heat source

Key to fig. 13	
	EMS/EMS 2 BUS connection
	Room thermostat input with low voltage (NOT USED)
	External switching contact (NOT USED)
	Outside temperature sensor
	Temperature sensor for DHW cylinder (NOT USED with combi boilers)
	Flow temperature sensor on the low loss header (NOT USED)

Table 6 Low-voltage terminal strip

### 3.9 Installation of an outside temperature sensor

If the controller is to be used as a weather-compensated controller, the outside temperature sensor, supplied, is required.

To correctly record the outside temperature:

- ▶ Observe the points represented in Fig. 14 when selecting the correct installation location of the outside temperature sensor.

The **outside temperature sensor** is connected to the heat source.

- ▶ Observe the instructions for the heat source when connecting the electrical supply.

When sensor leads are extended, apply the following cable cross-sections:

- Up to 20 m with 0.75 mm<sup>2</sup> to 1.50 mm<sup>2</sup> conductor cross-section
- 20 m up to 100 m with 1.50 mm<sup>2</sup> conductor cross-section.

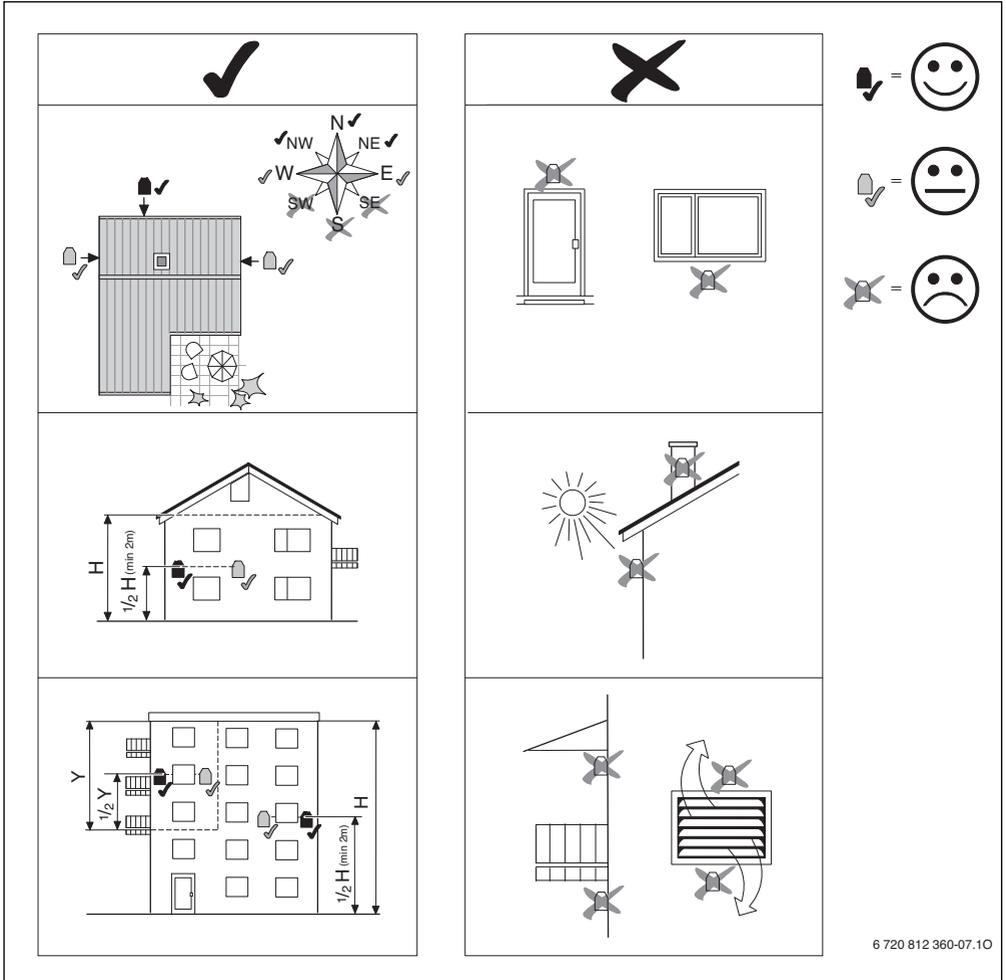


Fig. 14 Installation location for the outside temperature sensor (for weather-compensated control with or without room temperature influence)

## 4 Basic principles of operation

### 4.1 Overview of the control elements

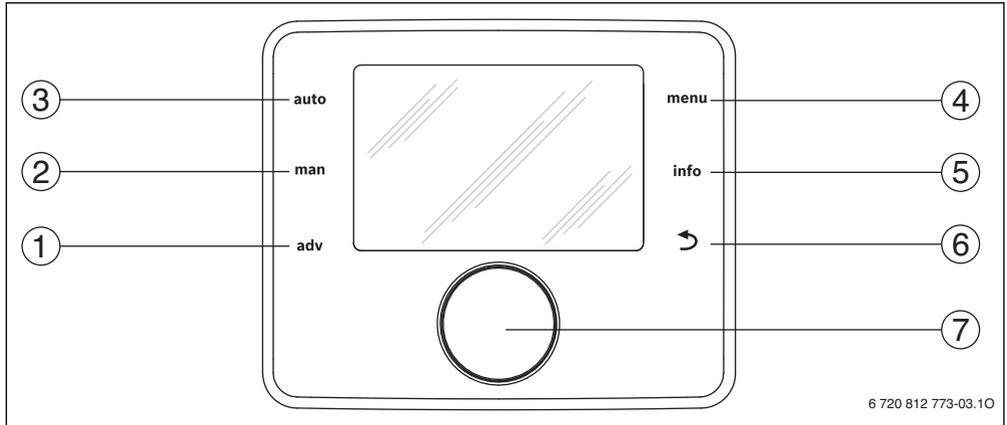


Fig. 15 Control elements

- [1] adv key (bringing forward the next heating on time)
- [2] man key (manual operation)
- [3] auto key (automatic mode)
- [4] menu key (to call up menus)
- [5] info key (info menu and help)
- [6] Back key
- [7] Selector



The first press of any Key or adjustment of the Selector will only switch on the backlight of the display. The keys/selector must therefore be pressed/adjusted again to make a change.

→ Fig. 15, page 15			
Item	Element	Designation	Explanation
1	<b>adv</b>	Advance key	If automatic mode with time program is active: ▶ Press to bring forward the next switching (heating on) time.
			If automatic mode with time program is active and the next switching time has already been brought forward: ▶ Press again to undo the change to the next switching time.
2	<b>man</b>	Manual key	▶ Press to activate manual operation for a permanent room temperature set value.
			▶ Hold down to select the duration of the manual operation (maximum 48 hours from current time).
3	<b>auto</b>	auto key	▶ Press to activate the automatic mode with the time program.
4	<b>menu</b>	menu key	▶ Press to open the main menu.
			▶ Hold to open the service menu.
5	<b>info</b>	Info key	If a menu is open: ▶ Press to call up more information about the current selection.
			If the standard display is active: ▶ Press to open the info menu.
6		Back key	▶ Press to return to the previous menu level or discard a changed value.
			If a service or a fault is displayed: ▶ Press to switch between standard display and fault/service display.
			▶ Hold to switch from a menu to the standard display (home screen).
7		Selector	▶ Turn to change a setting's value (e. g. temperature) or select from among the menus or menu items.
			If the backlighting is turned off: ▶ Press to turn on the backlighting.
			If the backlighting is turned on: ▶ Press to open a selected menu or menu item, confirm a set value (e. g. temperature) or a message or to close a pop-up window.
			If the standard display is active: ▶ Press to select the heating circuit in the standard display (systems with at least two heating circuits only, → operating instructions of the user interface).

Table 7 Control elements

## 4.2 Overview of the symbols in the display

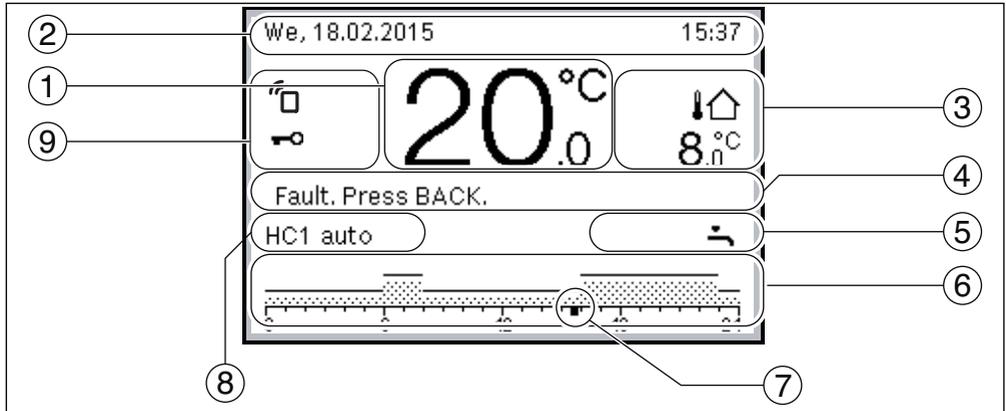


Fig. 16 Example for a standard display of a system with more than one heating circuit

→ Fig. 16, page 17

Item	Symbol	Designation	Explanation
1	19.5°C	Value display	Display of current temperature: <ul style="list-style-type: none"> <li>Room temperature for wall-mounted installation</li> <li>Heat source flow temperature for installation in heat source.</li> </ul>
2	-	Information line	Display of time of day, day of the week and date.
3	3.0°C (with house icon)	Additional temperature display	Display of an additional temperature: outside temperature, temperature of the solar collector or a DHW system (for further information → operating instructions of the controller).
4	-	Text information	E.g. the designation of the temperature currently displayed (→ Fig. 16, [1]); a designation for the room temperature is not displayed. If a fault is present, corresponding information will be displayed here until the fault has been rectified.
5	(with house and sun icon)	Information graphic	Solar circuit pump is in operation.
	(with house and water tap icon)		DHW heating is active
	(with house and crossed water tap icon)		DHW heating is switched off
	(with flame icon)		Burner is on (flame)
	B		External cut off switch is activated (NOT USED), or connector with link (supplied) is not installed within the heat source (→ Fig. 12, page 12)
6	(with bar chart)	Time & temperature program	Graphical display of the active time program for the heating circuit displayed. The height of the bars represents roughly the desired room temperature in the different time slots.
7	(with bar chart and marker)	Time marker	The time marker ■ indicates the current time of day in the time program in 15 minute increments.

Table 8 Symbols on the standard display

→ Fig. 16, page 17

Item	Symbol	Designation	Explanation
8	auto	Mode	Display with one heating circuit in automatic mode (heating controlled by time program).
	HC2auto		The displayed heating circuit operates in automatic mode. The standard display refers only to the displayed heating circuit. Pressing the man key, the auto key and changing the required room temperature only affects the heating circuit displayed.
			Heating mode active in automatic mode in the displayed heating circuit.
			Setback mode active in automatic mode in the displayed heating circuit.
	Summer (off)		System with one heating circuit in summer mode (heating off, DHW heating active)
	HC2 Summer (off)		The displayed heating circuit operates in summer mode (heating off, DHW heating active). The standard display refers only to the displayed heating circuit (→ operating instructions of the controller).
	manual		System with one heating circuit in manual operation.
	HC2manual		The displayed heating circuit operates in manual operation. The standard display refers only to the displayed heating circuit. Pressing the man key, the auto key and changing the required room temperature only affects the heating circuit displayed.
	Holiday until 10/6/2015		Holiday program active in system with one heating circuit (→ operating instructions of the controller).
	HC2Holiday until 10/6/2015		The holiday program is active in the displayed heating circuit and possibly for DHW systems (→ operating instructions of the user interface). The standard display refers only to the displayed heating circuit.
			Heating is completely off (all heating circuits)
			Emissions test mode is active (if the controller is installed in the heat source, simultaneously press and hold the info and return keys for a longer time to activate the emissions test mode).
	Emergency operation is active		
E	External heat requirement		
9		Controller status	A communication module is available in the system and a connection to the Worcester server is active.
			The key lock is active (hold down the auto key and the selector to activate or deactivate the key lock).

Table 8 Symbols on the standard display

### 4.3 Operating the service menu



The first press of any Key or adjustment of the Selector will only switch on the backlight of the display. The keys/selector must therefore be pressed/adjusted again to make a change.

#### Opening and closing the service menu

Opening the service menu	
	▶ Hold the menu key until the service menu is displayed.
Closing the service menu	
	▶ If no sub-menu is open, press the Back key to switch to the standard display (home screen). -or- ▶ Press and hold the Back key for a few seconds to switch to the standard display (home screen).

Table 9

#### Navigating through the menu

	▶ Turn the selector to highlight a menu or a menu item.
	▶ Press the selector. The menu or the menu item is displayed.
	▶ Press the Back key to return to the previous menu level.

#### Changing setting values

Selection	
	▶ Turn the selector to highlight an entry and set the setting value between minimum and maximum.

Table 10

	<b>Setting a value with a slider</b> (slider shown in display)
&	▶ Turn the selector to highlight an entry. ▶ Press the selector to confirm the selection. The input field and the slider are enabled.
	▶ Turn the selector to move the slider (change setting value) between minimum and maximum, e. g. for DHW temperature.
Multiple selection	
	▶ Turn the selector to highlight an entry. ▶ Press the selector to select the entry. ▶ Press the selector again to cancel the selection. ▶ Repeat the action steps until the desired entries are selected.
Time program	
	▶ Turn the selector to highlight a switching time or the corresponding operating mode. ▶ Press the selector to activate the input field for the switching time or the operating mode. ▶ Turn the selector to change the setting value.

Table 10

#### Confirming or rejecting the change

Rejecting the change	
	▶ Press the selector to activate the marked entry or to confirm the change.
&	▶ Turn the selector to highlight <b>Continue</b> and press the selector. The Display switches to the higher menu level. The user interface operates with the modified setting.
Rejecting the change	
	▶ Press the Back key to undo the change.

Table 11

#### 4.4 Overview of the service menu

Menu		Purpose of the menu	page
<b>Commissioning</b>		Check and, if necessary, adjust <b>Start configuration wizard</b> and the most important settings for the heating system configuration.	21
<b>Central heating settings<sup>1)</sup></b>	<b>System data</b>	The settings that apply to the entire heating system, e.g. minimum outside temperature and building type. Additional settings for heating circuit 1 and DHW system are available in this menu (if directly installed in the heat source).	30
	<b>Boiler data<sup>2)</sup></b>	Product-specific settings for the installed heat source, e.g. pump characteristic map or pump over-run time.	31
	<b>Heating circuit 1 – 4</b>	Heating circuit-specific settings of the installed heating circuits 1 to 4, e.g. frost protection and heating curve.	33
	<b>Screed drying</b>	Configurable program for screed drying with underfloor heating system.	40
<b>DHW settings<sup>1)</sup></b>	<b>DHW system I or II</b>	Separate settings options for two DHW systems, e.g. maximum DHW temperature, time for the thermal disinfection and configuration of the DHW circulation and charge (loading) pumps.	42
<b>Solar settings</b>		If a solar system is installed: see technical documentation for solar modules.	44
<b>Hybrid settings</b>		If a hybrid module is installed: see technical documentation for hybrid system.	45
<b>Cascade settings</b>		If a cascade module is installed for the control of several heat sources: see technical documentation for cascade module (MC 400).	45
<b>Diagnosis<sup>1)</sup></b>		System diagnosis: <ul style="list-style-type: none"> <li>• Perform function test of individual components (e.g. pumps and valves).</li> <li>• Compare set and actual values.</li> <li>• Call up current faults and the fault history.</li> <li>• Call up the software versions of all BUS devices.</li> </ul> Additional functions: <ul style="list-style-type: none"> <li>• Define maintenance intervals.</li> <li>• Enter installer contact details.</li> <li>• Reset different settings.</li> <li>• Calibrate room temperature sensor and clock.</li> </ul>	45

Table 12 Overview of the service menu

1) Limited use depending on the heat source used.

2) Not available if cascade module (e.g. MC 400) is installed.

## 5 Commissioning



System schematics are available in the installation and maintenance instructions of the MM 100/MM 200 and MS 100/MS 200 modules.

### 5.1 Overview over the commissioning steps

1. Mechanical structure of the system (observe instructions for all assemblies and components)
2. System fill, treatment and pressure test
3. Electrical wiring
4. Setting coding addresses of the modules (observe instructions of the modules)
5. Switch on the system
6. Vent the system
7. Set the maximum flow and DHW temperature at the heat source (observe the operating instructions of the heat source)
8. Commissioning of the remote controls (observe the operating instructions of the remote control)
9. Commissioning the Sense II controller (→ Chapter 5.2, page 21)
10. Commissioning the system with the controller (→ Chapter 5.3, page 21)
11. Check and, if necessary, adjust the settings in the service menu of the Sense II controller and perform configuration (e.g. solar) (→ Chapter 5.4, page 24)
12. Remedy warning and fault displays, if necessary, and reset fault history
13. Name heating circuits (→ operating instructions)
14. Complete commissioning reports (→ Chapter 10 starting on page 52 and operating instructions)
15. System handover to the end user (→ Chapter 5.7, page 24).

### 5.2 General commissioning of the Sense II

In the delivered condition of the Sense II the automatic 1-hour changeover between summer and winter time is activated.

 & 	<b>Setting language</b>
	<ul style="list-style-type: none"> <li>▶ Turn the selector to select a language and press the selector.</li> </ul>
 & 	<b>Setting the date</b>
	<ul style="list-style-type: none"> <li>▶ Turn the selector to set the day, month and year. <b>Continue</b> is highlighted.</li> <li>▶ If the date is set correctly, press the selector to apply the date.</li> </ul>
 & 	<b>Setting the time</b>
	<ul style="list-style-type: none"> <li>▶ Turn the selector to set the hours and the minutes. <b>Continue</b> is highlighted.</li> <li>▶ If the time is set correctly, press the selector to apply the time.</li> </ul>
 & 	<b>Low loss header</b>
	<ul style="list-style-type: none"> <li>▶ Turn the selector to set whether a low loss header is installed or not (temperature sensor → Tab. 14) or not (<b>No low-loss header</b>).</li> </ul>
 & 	<b>System configuration</b>
	<ul style="list-style-type: none"> <li>▶ Turn and press the selector to start (<b>Yes</b>) or to skip the configuration wizard (<b>No</b>).</li> <li>▶ When the configuration wizard is started, the controller automatically recognises which BUS nodes are installed in the system (system analysis) and adjusts the menu and the factory defaults to the current system.</li> <li>▶ Perform system commissioning (→ Chapter 5.3).</li> </ul>

Table 13 General settings at commissioning

### 5.3 System commissioning with the configuration wizard

The controller automatically recognises which BUS devices (modules e.g. MS100) are installed in the system. The configuration wizard adjusts the menu and the factory defaults.

The system analysis may take up to one minute.

After the configuration wizard has performed the system analysis, the **Commissioning** menu is opened. The sub-menus and settings must be checked here and, if necessary, adjusted and finally confirmed.

If the system analysis is skipped, the **Commissioning** menu is opened. The sub-menus and settings listed here must be carefully adjusted according to the installed system. Finally, the settings must be confirmed.

Further information on the settings refer to Chapter 7 starting on page 25.

Menu item		Question	Answer/setting
<b>Start configuration wizard</b>		Check before starting the configuration wizard: <ul style="list-style-type: none"> <li>• Module installed and coding address set (E.g. MS100)?</li> <li>• Remote control installed and set (E.g. Sense I)?</li> <li>• Temperature sensor installed (e.g. solar collector, low loss header or DHW sensor)?</li> </ul> Start the configuration wizard?	<b>Yes   No</b>
<b>System data</b>	<b>Low loss hdr. sensr. instll.</b>	Is a low loss header installed? If yes, is a temperature sensor installed? If yes, where is it electrically connected to?	<b>No low-loss header   At the boiler   At the module   Header w/ o sensor</b>
	<b>Config. DHW at boiler</b>	How is DHW connected to the heat source (boiler)?	<b>No DHW   3-way valve   Primary pump</b>
	<b>Config. of HC1 at boiler</b>	Is heating circuit 1 connected to the heat source (boiler)? If yes, does the heating circuit rely on the boiler pump (no own heating circuit pump) or a separate, dedicated heating circuit pump (own pump)?	<b>No heating circuit   No own heating circuit pump   Own pump</b>
	<b>Min. outdoor temperature</b>	With weather-compensated control: What is the minimum outside temperature at the location averaged over the last years?	<b>- 35 - 10 °C</b>
	<b>Type of building</b>	How well insulated is the building?	<b>Light   Medium   Heavy</b>
<b>Boiler data</b>	<b>Pump type</b>	Is the pump operated depending on the burner output or by differential pressure?	<b>Output-compensated   Delta P-compensated 1 - 4</b>
	<b>Pump run-on time</b>	How long should the pump over-run be in order to discharge the heat from the heat source?	<b>24h   1 - 60 min</b>
<b>Heating circuit 1</b>	<b>Heating circuit installed</b>	Is heating circuit 1 installed? If yes, where is heating circuit 1 electrically connected?	<b>No   At the boiler   At the module</b>
	<b>Ctrl type h. circ. 1</b>	How should the temperature influencing heating circuit 1 be controlled?	<b>Outdoor-temp.-compensated   Outside temp. with low end   Room-temp.-compensated   Room temperature output   Constant</b>
	<b>Prog. unit heat. circ. 1</b>	What controller is installed?	<b>Sense II   Sense I</b>
	<b>Heating system heat circ. 1</b>	What type of heat emitter does heating circuit 1 operate with?	<b>Radiator   Convector heater   Underfloor</b>
	<b>Set point constant</b>	If heating circuit 1 is configured as constant heating circuit: To what temperature should the heating be controlled?	<b>30 - 85 °C</b>
	<b>Max. flow temperature</b>	What is the maximum flow temperature that should be set?	For example <b>30 - 85 °C</b>
	<b>Set heating curve</b>	Should the heating curve for heating circuit 1 be set? (For further sub-settings → Chapter 7.1.3, starting on page 33)	→ page 36, Tab. 21

Table 14 Commissioning with the configuration wizard

Menu item		Question	Answer/setting
	<b>Setback type</b>	Which setback type should be used ? (for further information → Setback types)	<b>Reduced mode   Outside temperature threshold   Room temperature threshold</b>
	<b>Reduced mode below</b>	When <b>Setback type = Outside temperature threshold</b> : Below what temperature should the reduced mode be activated?	<b>- 10 - 20 °C</b>
	<b>Frost protect</b>	Is frost protection set? What temperature should the frost protection be activated by?	<b>Outdoor temp.   Room temperature   Room and outdoor temp.   Off</b>
	<b>Mixer</b>	Does Heating Circuit 1 have a mixer installed?	<b>Yes   No</b>
	<b>Mixer runtime</b>	How long does it take until the mixer in heating circuit 1 rotates from one stop to the other? (fully closed to fully open)	<b>10 - 600 s</b>
	<b>DHW priority</b>	Should the heating system be deactivated during DHW heating?	<b>Yes   No</b>
<b>Heating circuit 2, ..., Heating circuit 4</b>		See <b>Heating circuit 1</b>	
<b>DHW system I</b>	<b>DHW system I install.</b>	Is a DHW system installed? Where is DHW system I electrically connected?	<b>No   At the boiler   At the module</b>
	<b>Config. DHW at boiler</b>	How is the DHW system I hydraulically connected?	<b>No DHW   3-way valve   Primary pump</b>
	<b>DHW</b>	What DHW temperature should be set?	For example <b>15 - 60 °C</b>
	<b>DHW reduced</b>	What reduced DHW temperature should be set?	For example <b>15 - 60 °C</b>
	<b>DHW circ. pump installed</b>	Is an additional DHW circulation pump installed in the DHW system?	<b>No   Yes</b>
	<b>DHW circulation pump</b>	If a DHW circulation pump is installed: Is this pump controlled by the heat source?	<b>On   Off</b>
<b>DHW system II</b>		See <b>DHW system I</b>	
<b>Solar</b>	<b>Solar thermal sys installed</b>	Is a solar system installed? If a solar system is installed ( <b>Yes</b> ), there are additional menu items in the menu <b>Solar</b> (→ technical documentation of the solar system).	<b>No   Yes</b>
<b>Start solar thermal system</b>		Fill and vent the solar thermal system. Check the parameters for the solar thermal system and, if necessary, adjust them to suit the installed solar thermal system. Check the following before starting the solar thermal system: <ul style="list-style-type: none"> <li>• Solar thermal system filled and vented?</li> <li>• Parameters of the solar thermal system checked or adjusted to the installed solar thermal system?</li> </ul> Commissioning the solar thermal system?	<b>Yes   No</b>
<b>Confirm configuration</b>		Do the settings match with the installed system?	<b>Confirm   Back</b>

Table 14 Commissioning with the configuration wizard

## 5.4 Commissioning other settings

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

### 5.4.1 Checklist: Adjusting settings to customer requirements

When commissioning the device, ensure the satisfaction of the customer is met, 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 requirement/setting
Fast heat-up	Setting value in percentage or switch off (→ Tab. 21, starting on page 36)
Start frequency DHW circ. (DHW circulation pump)	Permanently, 1 x 3 ..., 6 x 3 minutes/h (→ page 43)
DHW priority	Yes   No (→ page 34)
Time program	Adjust default settings/own time program according to customer requirements (→ operating instructions of the controller).

Table 15 Checklist: Important settings, clarifying customer requirements

- ▶ Adjust settings to customer requirements in the main menu (→ operating instructions).

### 5.4.2 Important settings for the heating system

In any case, the settings in the heating menu must be checked and, if necessary, adjusted during commissioning. This is important to ensure the optimum functioning of the heating system. It is useful to check all displayed settings.

- ▶ Check settings in the system data menu (→ Chapter 7.1.1, page 30).
- ▶ Check settings in the boiler data menu (→ Chapter 7.1.2, page 31).
- ▶ Check settings in the heating circuit 1 – 4 (→ Chapter 7.1.3, page 33).

### 5.4.3 Important settings for the DHW system

The settings in the DHW menu must be checked and, if necessary, adjusted during commissioning. This is important to ensure the proper functioning of the DHW heating.

- ▶ Check the settings in the DHW system I, II menu (→ Chapter 7.2, page 42).

### 5.4.4 Important settings for the solar system

These settings are only available if the solar system is designed and configured accordingly. For further details see technical documentation for MS 100/MS 200 modules.

- ▶ Check the settings in the Solar menu (→ Chapter 7.3, page 44 and installation instructions MS 100 or MS 200)

### 5.4.5 Important settings for the hybrid system

Observe technical documentation of the hybrid system and Chapter 7.4, page 45 to ensure proper functioning.

### 5.4.6 Important settings for cascades

Observe technical documentation (e.g. MC 400) and Chapter 7.5, page 45 to ensure proper functioning.

## 5.5 Perform function tests

The function tests can be accessed via the diagnosis menu. The available menu items are strongly dependant on the installed system. Under this menu the system components can be tested, for example: **Burner: On/Off** (→ Chapter 7.6.1, page 45).

## 5.6 Check monitored values

Monitored values are shown in the **Diagnosis** menu (→ Chapter 7.6.2, page 45).

## 5.7 System handover

- ▶ Ensure that no temperature limits for heating and DHW have been set at the heat source and that DHW preheat is enabled on the boiler. Only under this condition can the Sense II controller control the DHW and flow temperatures.
- ▶ Enter the contact details of the responsible contractor in the **Diagnosis > Maintenance > Contact address** menu, e.g. company name, phone number and address or e-mail address (→ Chapter 7.6.5, page 47).
- ▶ Explain to the customer how the controller and the accessories work and how to operate them.
- ▶ Inform customer about the selected settings.



We recommend to hand over these installation instructions to the customer after commissioning the heating system.

## **6 Shutting down/Switching off**

The Sense II controller is powered via the BUS connection and remains permanently on. The system is only switched off for maintenance work, for example.

- ▶ Disconnect the entire system and all BUS subscribers (e.g. modules) from the power supply.



After a prolonged power failure or shutdown of more than 8 hours, the date and time might have to be reset. All other settings are retained permanently. Date and time will be retained only after the controller has been initially powered for more than 12 hours.

---

## **7 Service menu**

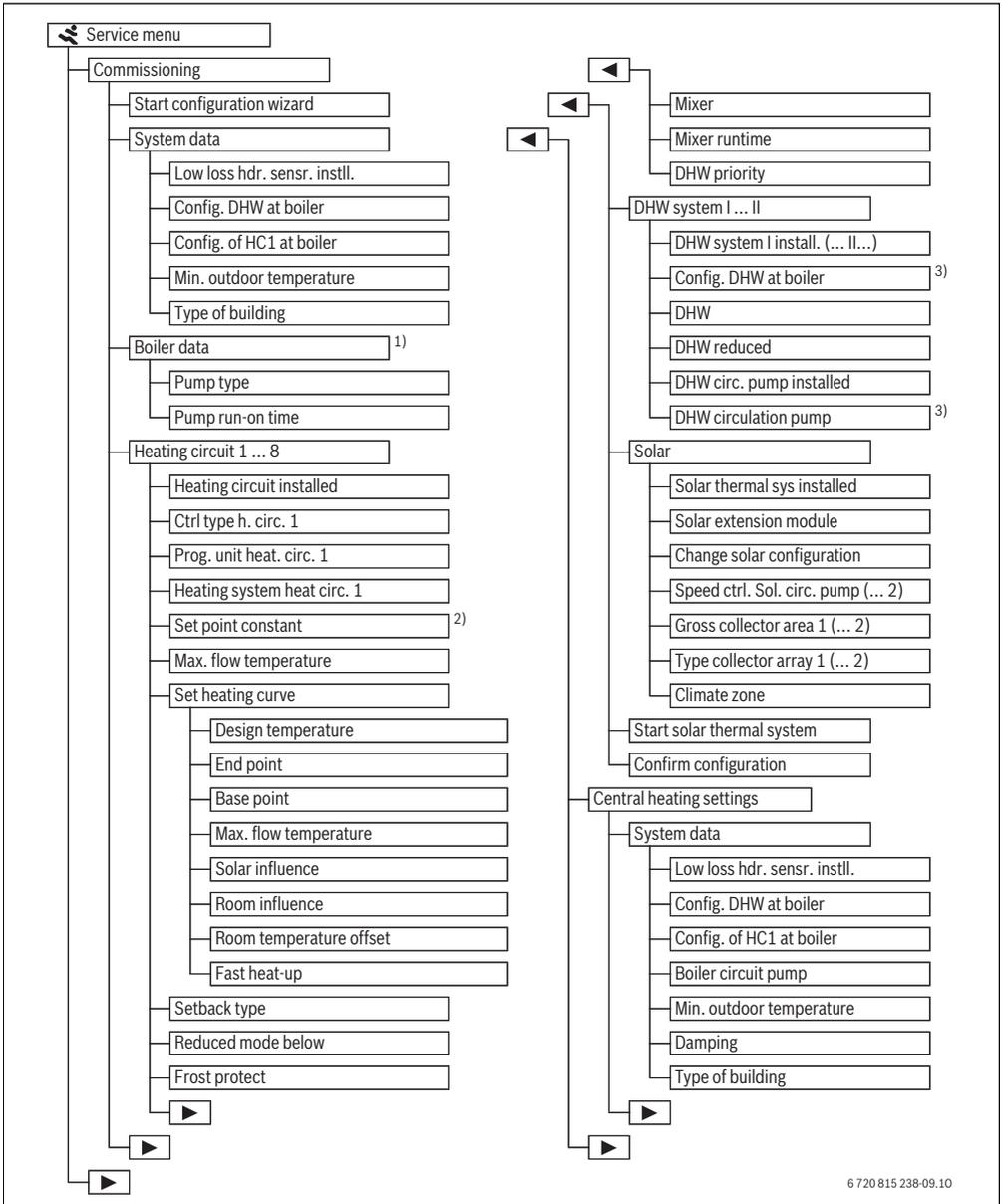
The menu of the controller is adapted to your system automatically. Some menu items are only available if the system has been set up accordingly and the controller has been set correctly. The menu items are only displayed in systems in which the corresponding system components are installed, e.g. a solar system or a heat pump. The corresponding menu items and settings can be found in the respective operating instructions.

Information about the operation of the service menu are summarised in Chapter 4, starting on page 15.



The default settings are highlighted in the adjustment range column (→ Chapter 7.1 to 7.6).

---



6 720 815 238-09.10

Fig. 17 Overview of the service menu 1/4

- 1) Not available if cascade module (e.g. MC 400) is installed.
- 2) Only available with constant heating circuits.
- 3) Only available with DHW system I.

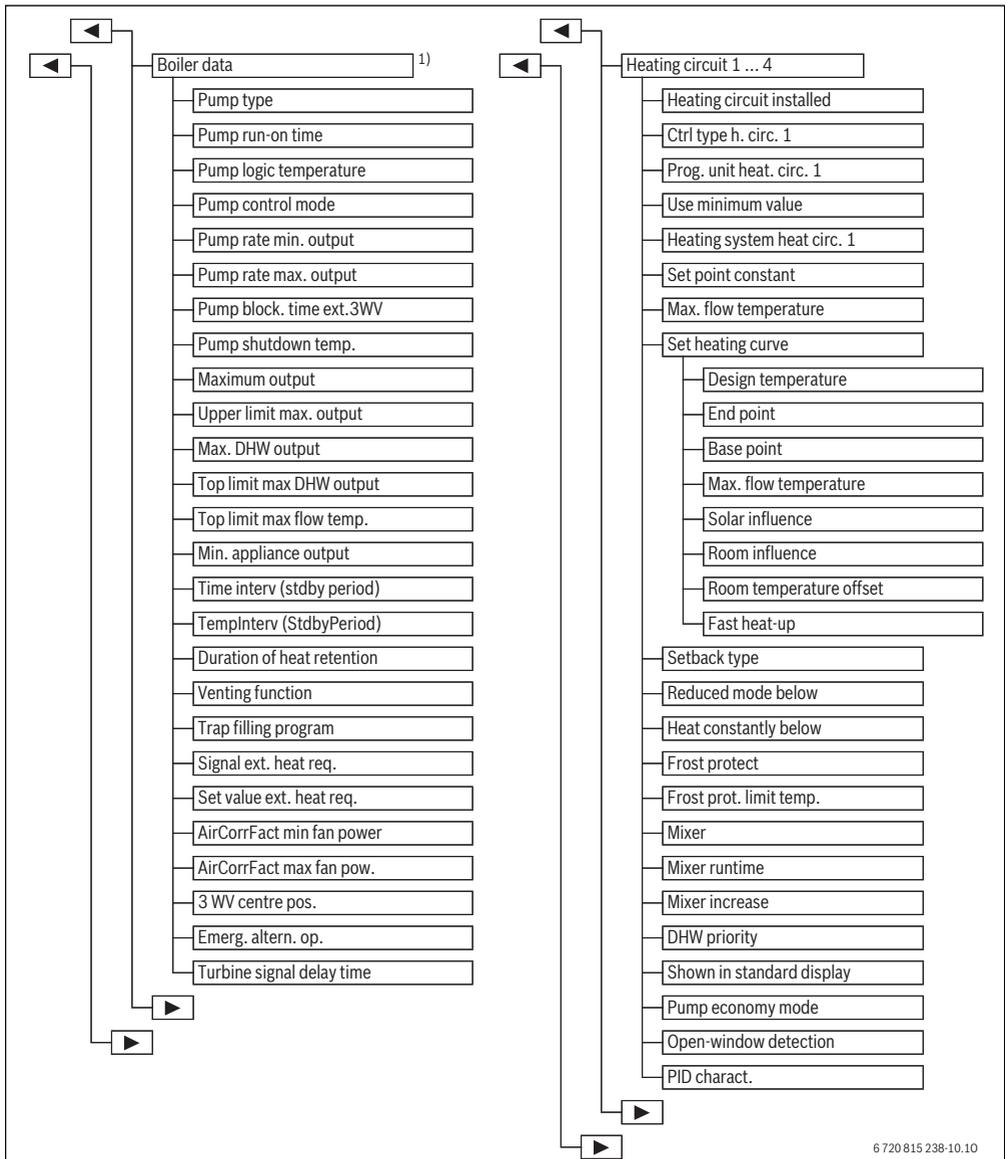
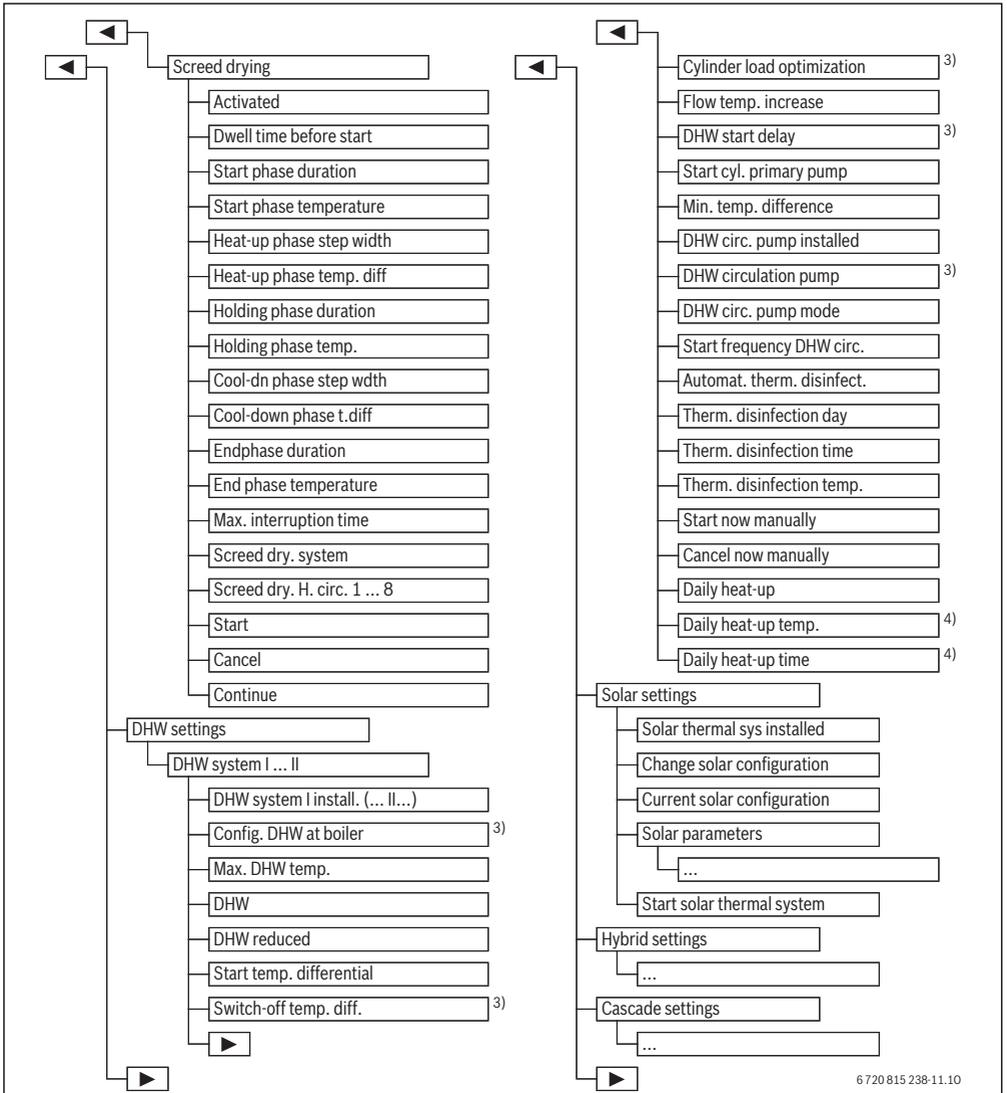


Fig. 18 Overview of the service menu 2/4

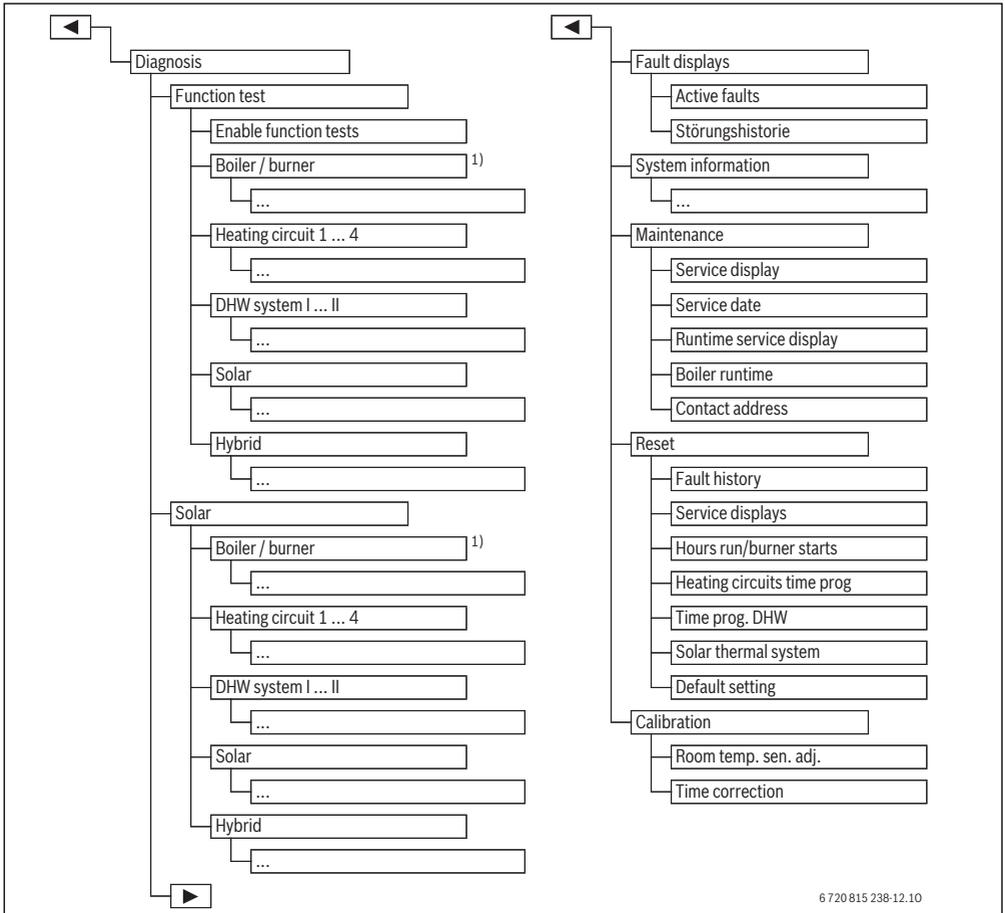
- 1) Not available if cascade module (e.g. MC 400) is installed.



6 720 815 238-11.10

Fig. 19 Overview of the service menu 3/4

- 3) Only available with DHW system I.
- 4) Only available with heat source with EMS 2 or with MM 100/MM 200 module.



6 720 815 238-12.10

Fig. 20 Overview of the service menu 4/4

1) Not available if cascade module (e.g. MC 400) is installed.

### 7.1 Heating system settings

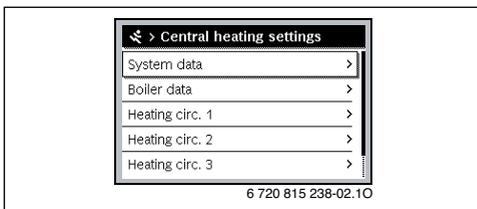


Fig. 21 Heating system settings menu

**7.1.1 System data menu**

Settings for the entire heating system can be made in this menu. For example, the value for the minimum outside temperature or the thermal storage capacity of the heated

building. Additional settings for heating circuit 1 and DHW system 1 are available in this menu (if directly installed at the heat source).

Settings in **bold** represent factory default settings

Menu item	Adjustment range	description
Low loss hdr. sensr. instll.	<b>No low-loss header</b>	No low loss header is installed
	At the boiler	Low loss header installed, temperature sensor connected to heat source (boiler)
	At the module	Low loss header installed, temperature sensor connected to module (i.e. MM 100/MM 200)
	Header w/o sensor	Low loss header installed, no temperature sensor is connected. If a heat requirement is present, the heating pump is in permanent operation.
Config. DHW at boiler	No DHW	Hydraulic connection of DHW system I to heat source (boiler)
	<b>3-way valve</b>	
	Primary pump	
Config. of HC1 at boiler  (only with heat source with EMS 2)		<b>Information:</b> Configure hydraulic and electrical connection of heating circuit 1 made at the heat source (boiler)
	No heating circuit	Heating circuit 1 not directly connected to heat source (boiler)
	<b>No own heating circuit pump</b>	Internal boiler pump serves also as pump in heating circuit 1
	Own pump	Heating circuit 1 is supplied by a dedicated heating pump (connected to heating appliance or module (MM 100/MM 200))
Boiler circuit pump	None	The heat source pump serves as a heating circuit pump.
	<b>System pump</b>	The pump in the heat source must be running for every heat requirement. If a low loss header is present, the internal pump is always a system pump.
Min. outdoor temperature	- 35 ... - <b>3 (UK)</b> ... 10 °C	With weather-compensated control the minimum outside temperature affects the heating curve (→ Minimum outside temperature, page 30 and Menu for setting of the heating curve, page 36).
Damping	<b>Yes</b>	The set building type affects the measurement of the outside temperature. The outside temperature influence is delayed (dampened) depending on insulation levels of the building.
	No	The measured outside temperature influence is not delayed and its impact on meeting the target room temperature is immediate in weather compensation mode.
Type of building		Measure of the thermal storage capacity (insulation) of the heated building (→ Type of building, page 31).
	Heavy	High storage capacity
	<b>Medium</b>	Medium storage capacity
	Light	Low storage capacity

Table 16 Settings in the system data menu

**Minimum outside temperature**

The minimum outside temperature is the average value of each of the coldest outside temperatures or recent years, and it has an influence on the heating curve. The value for the region can be taken from the required heat load calculation that should be done for every building or from the climate zone chart or from Tab. 17.

- ▶ Set the minimum outside design temperature for the heating system (UK default is -3 °C).

Minimum outside temperature in °C			
<b>Amsterdam</b>	- 10	<b>Marseilles</b>	- 6
<b>Athens</b>	- 2	<b>Moscow</b>	- 30
<b>Berlin</b>	- 15	<b>Naples</b>	- 2
<b>Brussels</b>	- 10	<b>Nice</b>	± 0
<b>Budapest</b>	- 12	<b>Paris</b>	- 10
<b>Bucharest</b>	- 20	<b>Prague</b>	- 16

Table 17 Minimum outside temperatures for Europe

Minimum outside temperature in °C			
<b>Hamburg</b>	- 12	<b>Rome</b>	- 1
<b>Helsinki</b>	- 24	<b>Sevastopol</b>	- 12
<b>Istanbul</b>	- 4	<b>Stockholm</b>	- 19
<b>Copenhagen</b>	- 13	<b>Valencia</b>	- 1
<b>Lisbon</b>	± 0	<b>Vienna</b>	- 15
<b>London</b>	- 1	<b>Zurich</b>	- 16
<b>Madrid</b>	- 4		

Table 17 Minimum outside temperatures for Europe

### Type of building

If damping is activated, the adjustment of the outside temperature fluctuations can be set with the building type. By adjusting the outside temperature, thermal inertia (responsiveness of heat-up times depending on outside temperature) of the building is taken into account. Thus, by setting the building type, the control can be adapted to suit the characteristics of the building.

The building type affects the heat-up times.

Adjustment	Type	Effect
Light	for example, prefabricated building, wood-frame construction	<ul style="list-style-type: none"> <li>low adjustment of the outside temperature</li> <li>Where heat-up times are quick the flow temperature from the heat source (boiler) is maintained for a short period of time.</li> </ul>
Medium	for example, uninsulated cavity wall construction (default setting)	<ul style="list-style-type: none"> <li>medium adjustment of the outside temperature</li> <li>Where heat-up times are quick the flow temperature from the heat source (boiler) is maintained over a normal period of time.</li> </ul>
Heavy	for example, fully insulated brick house	<ul style="list-style-type: none"> <li>high adjustment of the outside temperature</li> <li>Where heat-up times are quick the flow temperature from the heat source (boiler) is maintained for a long period period of time.</li> </ul>

Table 18 Building types

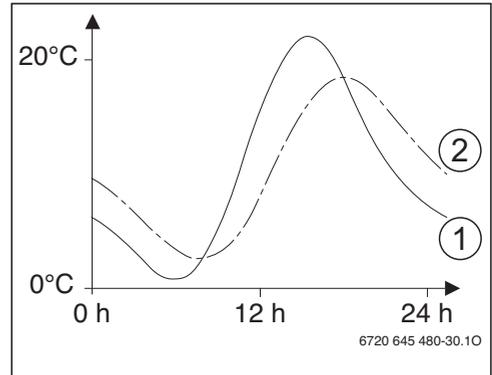


Fig. 22 Example for adjusted outside temperature:

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

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

The current values of the adjusted and the measured outside temperature



In the default setting any changes in the outside temperature have an effect after a maximum delay of three hours on the calculation of the weather-compensated control.

- ▶ To monitor the adjusted and the measured outside temperature: open the **Diagnosis > Monitored values > Boiler / burner** menu (only current values).
- ▶ To view the course of the outside temperature of the last 2 days: open the **Info > Outdoor temp. > Outdoor temp. curve** menu

### 7.1.2 Boiler data menu

Heat source-specific settings, e.g. the maximum heat output or the pump logic, can be made in this menu. Further information is available in the technical documentation of the relevant heat source or control module. These settings are only available if the system is designed and configured accordingly (e.g. in systems without cascade module).

Menu item	Adjustment range	description
Pump type	<b>Output-compensated</b>	The heating pump operation is dependent on the burner output. In particular this means that the pump runs at the lowest possible modulation while the burner is off and a heat request is present (flow temperature setpoint > 0 °C) or frost protection is active.
	Delta P-compensated 1...4	The heating pump operation is dependent on the differential pressure.
Pump run-on time	24 h	Pump over-run time after the burner is off in order to discharge the heat from the heat source
	0 ... <b>3</b> ... 60 min	
Pump logic temperature	0 ... <b>47</b> ... 65 °C	Below this temperature the pump is off to protect the heat source from condensate formation ( <b>only available in non-condensing appliances</b> ).
Pump control mode	Saving energy	The pump is either running at every heat demand (set flow temperature > 0 °C) or in an energy-efficient mode (default value depends on heating appliance control unit).
	Heat request	
Pump rate min. output	0 ... 100 %	Pump rate at minimum heat output (pump output proportional to heat output)
Pump rate max. output	0 ... 100 %	Pump rate at maximum heat output (pump output proportional to heat output)
Pump block. time ext.3WV	<b>0</b> ... 60 s	Pump blocking time with external 3-way valve in seconds
Maximum output	0 ... 100 %	Maximum available heat output of the heat source
Upper limit max. output	0 ... 100 %	Defines the maximum possible value of the previous setting (upper limit for Maximum output).
Max. DHW output	0 ... 100 %	Maximum released DHW output
Top limit max DHW output	0 ... 100 %	Defines the maximum possible value of the previous setting (upper limit for Max. DHW output).
Top limit max flow temp.	30 ... <b>82</b> °C	Defines the maximum possible value (upper limit) of the flow temperature.
Min. appliance output	0 ... 100 %	Minimum rated output (heating and DHW)
Time interv (stdby period)	3 ... <b>10</b> ... 45 min	Time interval between starting and stopping the burner in minutes
TempInterv (StdbyPeriod)	0 ... <b>6</b> ... 30 K	Temperature differential for stopping and restarting the burner
Duration of heat retention	0 ... <b>1</b> ... 30 min	Heating mode is blocked after DHW heating, in minutes
Venting function	<b>Off</b>	Venting function, e.g. after a maintenance.
	Auto	
	On	
Trap filling program	<b>Off</b>	Program for filling the heat source siphon at minimum output
	One boiler minimum	
Signal ext. heat req.	On/Off	An additional on/off temperature controller is connected to the heat source (e.g. existing 230V controls).
	<b>0-10V</b>	An additional 0-10 V temperature controller is connected to the heat source (e.g. in a Building Management System).
Set value ext. heat req.	Flow temperature	The 0-10 V signal that is present at the connection for an external heat requirement signal is interpreted as a requested flow temperature ( °C) or heat output (%).
	Output	
AirCorrFact min fan power	-9 ... <b>0</b> ... 9	With this setting the air correction at minimum fan output rate can be adjusted.
AirCorrFact max fan pow.	-9 ... <b>0</b> ... 9	With this setting the air correction at maximum fan output rate can be adjusted.

Table 19 Settings in the boiler data menu

Menu item	Adjustment range	description
3 WV centre pos.	<b>Yes</b>	3-way valve in centre position
	No	
Emerg. altern. op.	<b>Yes</b>	If the DHW cylinder takes a long time to charge, alternating operation between DHW heating and CH occurs to ensure that central heating demand is met despite the fact that DHW priority is set.
	No	
Turbine signal delay time	<b>0.5 ... 4 s</b>	DHW Flow Turbine signal delay in seconds

Table 19 Settings in the boiler data menu

### 7.1.3 Heating circuit 1 – 4

Settings for individual heating circuits can be made in this menu. For example, it can be set whether a remote control is available and which control type is used e.g. Sense I. There is also the possibility to optimise the heating curve of the heating circuits.



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

- ▶ If an underfloor heating system is used, the max. flow temperature recommended by the manufacturer of the system should be observed. A temperature limiting device must be used.

Menu item	Adjustment range	description
Heating circuit installed	<b>No</b>	Heating circuit is not installed. If no heating circuit is installed, the heat source only serves DHW heating.
	At the boiler	Electrical assemblies and components of the selected heating circuit are directly connected to the heat source (only available with heating circuit 1).
	At the module	Electrical assemblies and components of the selected heating circuit are connected to an MM 100/MM 200 module.
Ctrl type h. circ. 1	<b>Outdoor-temp.-compensated</b>	Further information on the control type → Control types, page 35
	Outside temp. with low end	
	Room-temp.-compensated	
	Room temperature output	
	Constant	
Prog. unit heat. circ. 1	<b>Sense II</b>	Sense II controls the selected heating circuit without remote control.
	<b>Sense I</b>	Sense I is installed as remote control unit for the selected heating circuit.
Use minimum value	<b>Yes</b>	A Sense II controller in combination with a Sense I (Sense I set to “remote control”) is installed in the living space. The heating system is operated according to the lower room temperature value (measured at the internal temperature sensor at both user interfaces) (e.g. in large rooms for a safe recording of the room temperature with room temperature-dependent control, room frost protection, room influence, ...).
	No	A Sense II controller in combination with a Sense I (Sense I set to “remote control”) is installed in the living space. The heating is always operated according to the room temperature value of the remote control.
Heating system heat circ. 1	<b>Radiator</b>	Factory default of the heating curve adjusted depending on heat emitter type
	Convector heater	
	Underfloor	
Set point constant	30 ... <b>75</b> ... 85 °C	Flow temperature for constant heating circuit (only available with Constant control type)

Table 20 Check settings in the heating circuit 1 – 4

Menu item	Adjustment range	description
Max. flow temperature	30 ... <b>75</b> ... 85 °C	The maximum flow temperature can only be adjusted in room-temperature dependent control mode (via weather-compensated part of the heating curve). The adjustment range depends on the selected heating system.
Set heating curve		Fine adjustment of the heating curve that is preset via the heating system (→ Set the heating system and heating curve for weather-compensated control, page 36)
Setback type	Reduced mode	Further information on the setback type for the selected heating circuit (→ Setback types, page 38)
	<b>Outside temperature threshold</b>	
	Room temperature threshold	
Reduced mode below	- 20 ... <b>5</b> ... 10 °C	Temperature for the setback type Outside temperature threshold (→ Setback types, page 38)
Heat constantly below	<b>Off</b>	The heating system operates independently of the adjusted outside temperature in the active operating mode (→ Heat constantly below a certain outside temperature, page 39).
	- 30 ... 10 °C	If the adjusted outside temperature falls below the value set here, the heating system automatically changes from the setback mode into the heating mode (→ Heat constantly below a certain outside temperature, page 39).
Frost protect		<b>Notice:</b> To ensure frost protection for a constant heating circuit or the entire heating system, select outside temperature-dependent frost protection mode. This setting is independent of the set control type.
	Outdoor temp.	Frost protection is deactivated/activated on the basis of the temperature selected here (→ Frost protection limit temperature (outside temperature threshold), page 39)
	<b>Room temperature</b>	
	Room and outdoor temp.	
Off	Frost protection off	
Frost prot. limit temp.	- 20 ... <b>5</b> ... 10 °C	→ Frost protection limit temperature (outside temperature threshold), page 39
Mixer	<b>Yes</b>	Selected heating circuit with mixer
	No	Selected heating circuit without mixer
Mixer runtime	10 ... <b>120</b> ... 600 s	Mixer running time from fully closed to fully open for the relevant heating circuit
Mixer increase	0 ... <b>5</b> ... 20 K	Enter heat production increase for mixer
DHW priority	<b>Yes</b>	DHW heating is activated, the central heating requirement of the heating system is interrupted
	No	DHW heating is activated, the central heating requirement of the heating system is being met simultaneously (if the installed hydraulic arrangement allows)
Shown in standard display	<b>Yes</b>	The selected heating circuit is visible in the standard display. The change between automatic mode and manual operation in the corresponding heating circuit is possible from the Sense II as well (with or without remote control).
	No	The selected heating circuit is not visible in the standard display. The change between automatic mode and manual operation is not possible. If there is no remote control installed for the selected heating circuit, settings can be made as usual through the main menu, e.g. temperature levels of the operating modes and time programs.

Table 20 Check settings in the heating circuit 1 – 4

Menu item	Adjustment range	description
Pump economy mode	<b>Yes</b>	Optimised pump operation active: The heating pump runs as little as possible when dependent on the burner operation (available only with Ctrl type h. circ. 1 Room-temp.-compensated). When the burner stops the pump switches off after the overrun period (Pump run-on time).
	No	If the system has more than one heat source installed (e. g. a solar system or a hybrid system) or a buffer cylinder is installed, this function <b>must be deactivated</b> .
Open-window detection	On	If the room temperature suddenly drops when venting with completely opened windows, the room temperature measured before the drop in the temperature remains valid for one hour in the affected heating circuit. This prevents unnecessary heating spikes.
	<b>Off</b>	No open window detection (only possible with "room temperature-dependent" control)
PID charact. (only with room temperature-dependent control)	fast	Fast control characteristics, e. g. when the installed heat output is high and/or in the case of high operating temperatures and a small heating water quantity
	<b>medium</b>	Medium control characteristics, e. g. with radiator heating (moderate heating water quantity) and medium operating temperatures
	slow	Slow control characteristics, e.g. with underfloor heating system (large heating water quantity) and low operating temperatures

Table 20 Check settings in the heating circuit 1 – 4

### Control types



**NOTICE:** System damage!

In case of non-observance of the permissible operating temperatures of plastic pipes (on the secondary side) system parts can be damaged.

- ▶ Do not exceed the permissible set value.

- With **weather-compensated control** only summer mode, setback mode (depending on the selected setback type), DHW priority or adjustment of the outside temperature (through reduced heat energy demand due to good thermal insulation) can lead to a switching-off of the heating pump.
  - The room influence can be set in the **Set heating curve** menu. The room influence affects both weather-compensated control types.
  - **Outdoor-temp.-compensated** (Default setting)
  - **Outside temp. with low end:** → Simple heating curve, page 38.
- With **room temperature-dependent control** the heating reacts directly to changes of the required or measured room temperature.
  - **Room-temp.-compensated:** The room temperature is controlled by an adaptation of the flow temperature. This control behaviour is suitable for apartments and buildings with major load fluctuations.
  - **Room temperature output:** The room temperature is controlled by an adaptation of the heat output of the

heat source. This control behaviour is suitable for apartments and buildings with minor load fluctuations (e.g. open-plan houses). This control type is only possible in heating systems with one heating circuit (heating circuit 1) without MM 100/MM 200 heating circuit module.

- **Ctrl type h. circ. 1 > Constant:** The flow temperature in the selected heating circuit is independent from the outside and room temperature. The available setting options in the corresponding heating circuit are highly limited. Setback type and holiday function, for example, are not available. Settings for a constant heating circuit are only possible via the service menu. The constant heating serves to supply heat to a swimming pool or a ventilation unit.
  - Heat is supplied only if **On** (constant heating circuit permanently heated) or **Auto** (constant heating circuit, heated at times according to a time program) is selected as operating mode and if a heat requirement is present at the MM 100/MM 200 module via the MD1 connection. If one of the two conditions is not fulfilled, the constant heating circuit is off.
  - A heating circuit, for which **Ctrl type h. circ. 1 > Constant** is set, is not displayed in the standard display.
  - To operate the constant heating circuit without time program the operating mode must be set to (permanent) **On** or (permanent) **Off**.

- The frost protection must be outside-temperature-dependent and the DHW priority must be activated.
- The electrical integration of a constant heating circuit into the system is performed via an MM 100/MM 200 module.
- The MC1 connecting terminal in the MM 100/MM 200 module must be bridged (factory-fitted) according to the technical documentation of the module.
- The T0 temperature sensor can be connected to the MM 100 module for the constant heating circuit.
- Further information on the connection is available in the technical documentation of the MM 100/MM 200 module.

**Set the heating system and heating curve for weather-compensated control**

- ▶ Set the heating emitter type (radiator, convector or underfloor heating system) in the **Central heating settings > Heating circuit 1 ... 4 > Heating system heat circ. 1** menu.
- ▶ Set the control type (weather-compensated or weather-compensated with base point) in the **Ctrl type h. circ. 1** menu.  
Menu items that are not required for the selected heating system and control type are disabled. The settings only apply for the selected heating circuit, if available.

**Menu for setting of the heating curve**

Menu item	Adjustment range	description
Design temperature or End point	30 ... <b>75</b> ... 85 °C (radiator/convector) 30 ... <b>45</b> ... 60 °C (underfloor heating system)	The design temperature is only available with weather-compensated control without base point. The design temperature is the flow temperature that is reached when the outside temperature is at the minimum and, thus, affects the steepness of the heating curve. The end point is only available with weather-compensated control with base point. The end point is the flow temperature that is reached when the outside temperature is at the minimum and, thus, affects the steepness of the heating curve. When the base point is above 30 °C, the base point is the minimum value.
Base point	e.g. 20 ... <b>25 °C</b> ... End point	The base point of the heating curve is only available with weather-compensated control with a simple heating curve.
Max. flow temperature	30 ... <b>75</b> ... 85 °C (radiator/convector) 30 ... <b>48</b> ... 60 °C (underfloor heating system)	Maximum flow temperature
Solar influence	- 5 ... - 1 K <b>Off</b>	Within certain limits, the solar irradiation influences the weather-compensated control (the additional heat from the sun lowers the required heat output). The solar irradiation is not considered by the control.
Room influence	<b>Off</b> 1 ... <b>3</b> ... 10 K	The weather-compensated control functions independently of the room temperature. The difference between set room temperature and measured room temperature leads to a parallel shift of the heating curve. The higher the set value for Room influence the bigger is the shift of the heating curve for a given temperature difference (only available if the controller is installed in a suitable reference room).
Room temperature offset	- 10 ... <b>0</b> ... 10 K	Heating curve adjustment based on deviation between temperature measured at the controller and thermometer (see section 7.6.7, page 48)
Fast heat-up	<b>Off</b> 0 ... 100 %	No flow temperature excess at the end of a setback temperature phase The quick heat-up accelerates the heating-up time after a setback temperature phase. The higher the setting value, the greater the excess of the flow temperature at the end of a setback phase. The set building type affects the duration of the excess (→ Type of building, page 31). This setting is only available if the room influence is switched off.

Table 21 Set heating curve menu

The heating curve is the decisive basic factor for economic and convenient operation of the heating system with weather-compensated control. To calculate the heating curve, the control system requires you to enter a number of parameters for the heating system, from which it automatically calculates the optimum heating curve by means of a mathematical formula.

This calculation takes into account the adjusted outside temperature and the room control temperature. The room control temperature based on the desired room temperature (set room temperature) and the room influence factor.

This allows the end customer to influence the heating curve indirectly by modifying the set room temperature.

The most important settings are the design temperature, maximum flow temperature, room temperature offset (parallel displacement) and minimum outside temperature.

The heating curve (→ Fig. 23 and 24) is mainly determined by the base point and end point. The base point is located at 25 °C

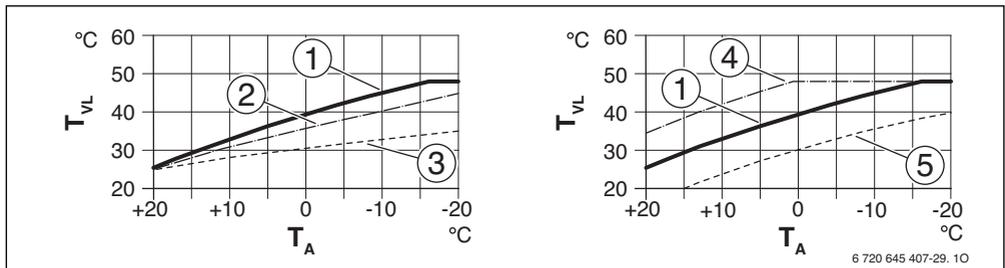
flow temperature at a room temperature of 21 °C with an adjusted outside temperature of 20 °C. The end point of the heating curve must be set according to the design temperature of the heating system.

The steepness heating curve is determined by the parameters **minimum outside temperature** (→ page 30) and **design temperature** (the flow temperature at minimum outside temperature) (→ Fig. 23 and 24. left).



The heating curve that is graphically represented in the display refers to a range from + 20 °C to the minimum set outside temperature under **System data**.

The heating curve can be shifted up or down parallel to the original curve by adjusting the room temperature offset parameter and/or the set room temperature (→ Fig. 23 and 24, right).



**Fig. 23** *Setting the Heating curve for underfloor heating system*  
 Left: gradient above design temperature  $T_{AL}$  and minimum outside temperature  $T_{A,min}$   
 Right: parallel displacement via room-temperature offset or via required room temperature

$T_A$  Outside temperature

$T_{VL}$  Flow temperature

[1] Setting:  $T_{AL} = 45$  °C,  $T_{A,min} = -10$  °C, limit at  $T_{VL,max} = 48$  °C

[2] Setting:  $T_{AL} = 40$  °C,  $T_{A,min} = -10$  °C

[3] Setting:  $T_{AL} = 35$  °C,  $T_{A,min} = -20$  °C

[4] Parallel displacement of the base curve [1] by changing the offset +3 or by increasing the desired room temperature, limit at  $T_{VL,max} = 48$  °C

[5] Parallel displacement of the base curve [1] by changing offset -3 or by reducing the desired room temperature

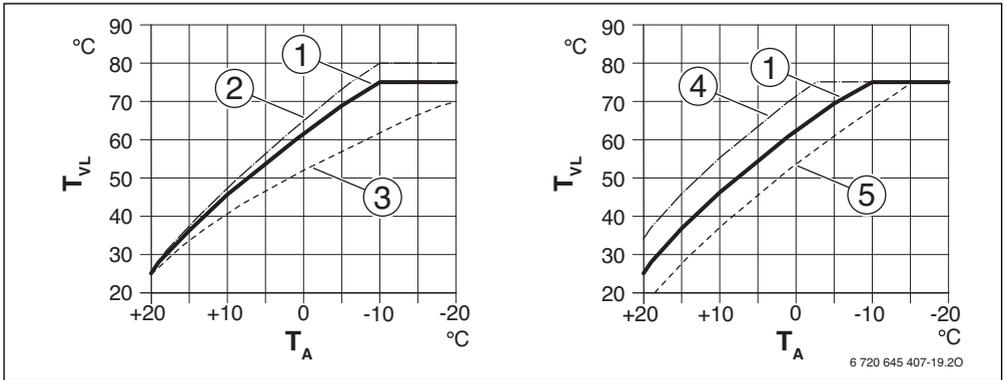


Fig. 24 Setting the Heating curve for radiators/convectors  
 Left: gradient above design temperature  $T_{AL}$  and minimum outside temperature  $T_{A,min}$   
 Right: parallel displacement via room temperature offset or required room temperature

- $T_A$  Outside temperature
- $T_{VL}$  Flow temperature
- [1] Setting:  $T_{AL} = 75^\circ\text{C}$ ,  $T_{A,min} = -10^\circ\text{C}$ , limit at  $T_{VL,max} = 75^\circ\text{C}$
- [2] Setting:  $T_{AL} = 80^\circ\text{C}$ ,  $T_{A,min} = -10^\circ\text{C}$ , limit at  $T_{VL,max} = 80^\circ\text{C}$
- [3] Setting:  $T_{AL} = 70^\circ\text{C}$ ,  $T_{A,min} = -20^\circ\text{C}$
- [4] Parallel displacement of the base curve [1] by changing the room temperature offset +3 or by increasing the desired room temperature, limit at  $T_{VL,max} = 75^\circ\text{C}$
- [5] Parallel displacement of the base curve [1] by changing the room temperature offset -3 or by reducing the desired room temperature, limit at  $T_{VL,max} = 75^\circ\text{C}$

**Simple heating curve**

The simple heating curve (weather-compensated control with base point) is a simplification of the curved heating curve as a straight line. This straight line is described by two points: the base point (starting point of the heating curve) and the end point.

	Underfloor heating system	Radiators, convectors
Minimum outside temperature $T_{A,min}$	- 3 °C	- 3 °C
Base point	25 °C	25 °C
End point	45 °C	75 °C
Maximum flow temperature $T_{VL,max}$	48 °C	75 °C
Room temperature offset	0.0 K	0.0 K

Table 22 Basic settings of the simple heating curve

**Setback types**

The setback type determines in the automatic mode how the heating system works in setback phases.

In the service menu **Central heating settings > Heating circuit 1 ... 4 > Setback type** the following setback types are available to suit the differing needs of the end user:

- **Reduced mode:** The rooms are kept tempered in setback mode. This setback type is:
  - very comfortable
  - recommended for underfloor heating systems.
- **Outside temperature threshold:** If the adjusted outside temperature falls below the value of a set outside temperature threshold, the heating system will operate as in reduced mode. Above this threshold the heating system is off. This setback type is:
  - suitable for buildings with several living spaces where no user interface is installed
  - less comfortable than the reduced mode
  - more economical than the reduced mode
  - with a broken outside temperature sensor this setback type has the same behaviour as reduced mode.

- **Room temperature threshold:** If the room temperature falls below the desired temperature for the setback mode, the heating system works as in the reduced mode. If the room temperature exceeds the desired temperature, the heating system is off. This setback type is:
  - suitable for open-plan buildings with few adjoining rooms without own user interface
  - less comfortable than the reduced mode
  - more economical than the reduced mode
  - only available if the room temperature is recorded.

If the heating system should be off in the setback phases (frost protection remains active), set the following main menu option: **Heating > Temperature settings > Setback > Off** (standby mode).

### Heat constantly below a certain outside temperature

The heating system can cool down under a certain value due to the setback mode. This serves to maintain a comfort heat.

In **Heat constantly below** mode you can set at what outside temperature the setback mode is interrupted (in reference to the adjusted outside temperature).

Fig. 25 and 26 show how the frost protection function works, with and without this parameter activated. Selected settings: **Setback type: Outside temperature threshold** and **Reduced mode below: 5 °C**.

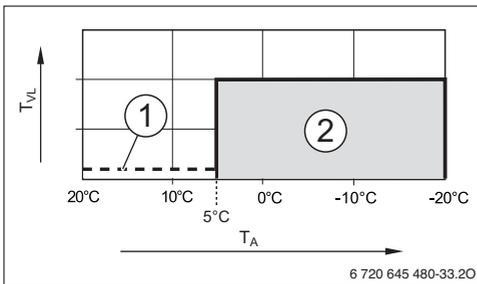


Fig. 25 Effect at setting **Off** (default setting)

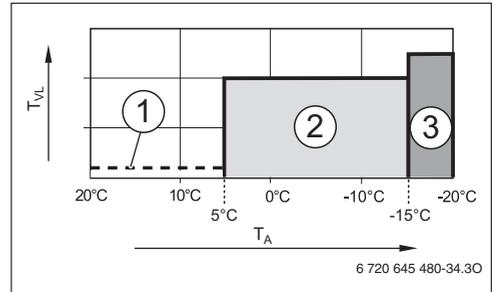


Fig. 26 Effect at setting **-15 °C**

### Key to Fig. 25 and 26:

$T_A$  Outside temperature

$T_{VL}$  Flow temperature

[1] Standby mode (→ Setback types)

[2] Reduced mode (desired room temperature for setback mode)

[3] Heating mode (desired room temperature for heating mode)

If the outside temperature falls below  $-15\text{ °C}$ , the heating system goes out of the reduced mode into the heating mode[3]. This allows smaller heating surfaces to be utilised.

### Frost protection limit temperature (outside temperature threshold)

Under this menu item the limit temperature for the frost protection (outside temperature threshold) is set. It is only effective if **Outdoor temp.** or **Room and outdoor temp.** is set in the **Frost protect** menu.



**NOTICE:** Domestic hot water pipework may freeze if the frost protection limit temperature is set too low and in prolonged periods with outside temperature below  $0\text{ °C}$ .

- ▶ Adjust frost protection limit temperature (default setting =  $5\text{ °C}$ ) to the heating system.
- ▶ Do not set the frost protection limit temperature too low. Damage caused by a low frost protection limit temperature is not covered by the product warranty.
- ▶ Set frost protection limit temperature and frost protection for **all heating circuits**.
- ▶ To ensure frost protection for the entire heating system, set either **Outdoor temp.** or **Room and outdoor temp.** in the **Frost protect** menu.

- If the outside temperature exceeds the frost protection limit temperature by 1 K ( °C) and there is no heat requirement from the heating system, the heating pump switches off.
- If the outside temperature drops below the frost protection limit temperature, the heating pump switches on.

the heating system automatically runs the screed drying program once.



The **Room temperature** setting does not offer absolute frost protection, because pipework installed in poorly insulated outbuildings or voids, can freeze. This can happen even though the temperature in the reference room is considerably above 5 °C . If an outside temperature sensor is installed, frost protection can be assured for the entire heating system regardless of the control type set:

- ▶ In the **Frost protect** menu, set either **Outdoor temp.** or **Room and outdoor temp.**



Before using the screed drying program reduce the DHW temperature at the heat source to "min".

In case of a voltage failure the controller automatically continues with the screed drying program. The voltage failure, however, may not last longer than the power reserve of the controller or a maximum duration of an interruption.

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



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

- ▶ With multi-circuit systems this function can be used in combination with a heating circuit with mixer.
- ▶ Set the screed drying according to the manufacturer's instructions.
- ▶ In spite of the screed drying function, check the system daily.

### 7.1.4 Screed drying menu

A screed drying program is set for the selected heating circuit or the entire heating system in this menu. To dry a new screed

Menu item	Adjustment range	description
Activated	Yes	The required settings for the screed drying are displayed.
	<b>No</b>	The screed drying is not active and the settings are not displayed (default setting).
Dwell time before start	<b>No dwell time</b>	The screed drying program starts after the set waiting time (selected heating circuits are switched off during the waiting time, frost protection is active; default setting: no waiting time, → Fig. 27, time before day 0)
	1 ... 50 days	
Start phase duration	No start phase	Time lag between the beginning of the start phase and the next phase (→ Fig. 27, [1])
	1 ... <b>3</b> ... 30 days	
Start phase temperature	20 ... <b>25</b> ... 55 °C	Flow temperature during the start phase (→ Fig. 27, [1])
Heat-up phase step width	No heat-up phase	Time lag between the steps (step width) in the heat-up phase (→ Fig. 27, [3])
	<b>1</b> ... 10 days	
Heat-up phase temp. diff	1 ... <b>5</b> ... 35 K	Temperature differential between the steps in the heat-up phase (→ Fig. 27, [2])
Holding phase duration	1 ... <b>7</b> ... 99 days	Time lag between the beginning of the holding phase (duration of the maximum temperature for screed drying) and the next phase (→ Fig. 27, [4])
Holding phase temp.	20 ... <b>55</b> °C	Flow temperature during the holding phase (→ Fig. 27, [4])
Cool-dn phase step wdth	No cool-down phase	Time lag between the steps (step width) in the cooling phase (→ Fig. 27, [5])
	<b>1</b> ... 10 days	
Cool-down phase t.diff	1 ... <b>5</b> ... 35 K	Temperature differential between the steps in the cooling phase (→ Fig. 27, [6])

Table 23 Setting in the Screed drying menu (Fig. 27 shows the default setting of the screed drying program)

Menu item	Adjustment range	description
Endphase duration	No end phase	Time lag between the beginning of the end phase (last temperature step) and the end of the screed drying program (→ Fig. 27, [7])
	Permanently	
	1 ... 30 days	
End phase temperature	20 ... 25 ... 55 °C	Flow temperature during end phase (→ Fig. 27, [7])
Max. interruption time	2 ... 12 ... 24 h	Maximum duration of a screed drying interruption (e.g. through stop of the screed or power failure) until a fault display is output.
Screed dry. system	Yes	Screed drying is active for all heating circuits of the system <b>Notice:</b> Single heating circuits cannot be selected. DHW heating is not possible. The menus and menu items with settings for DHW are disabled.
	No	Screed drying is not active for all heating circuits <b>Notice:</b> Single heating circuits can be selected. DHW heating is possible. The menus and menu items with settings for DHW are enabled.
Screed dry. H. circ. 1 ... Screed dry. H. circ. 4	Yes	Screed drying in the selected heating circuit is active/not active
	No	
Start	Yes	Start screed drying now
	No	Screed drying not yet started or terminated
Cancel	Yes	Temporarily stop screed drying. If the maximum interruption duration has been exceeded, a fault display is output.
	No	
Continue	Yes	Continue screed drying after stop.
	No	

Table 23 Setting in the Screed drying menu (Fig. 27 shows the default setting of the screed drying program)

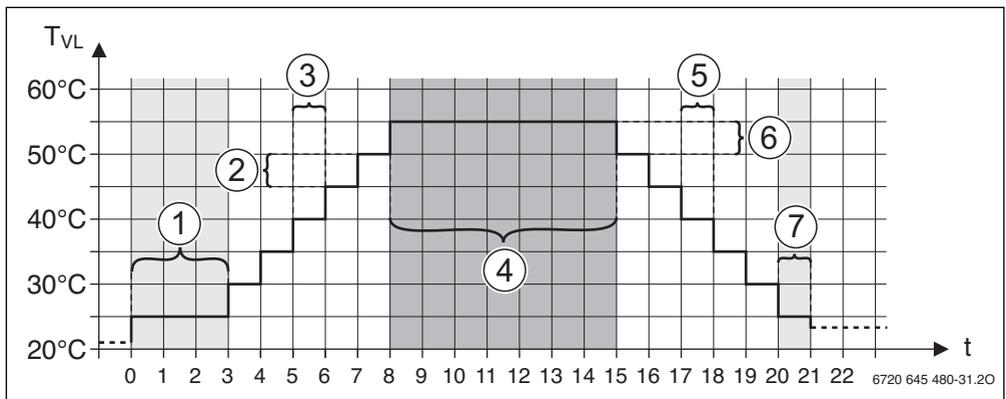


Fig. 27 Screed drying process with default settings

t Time in days  
T<sub>VL</sub> Flow temperature

## 7.2 DHW settings

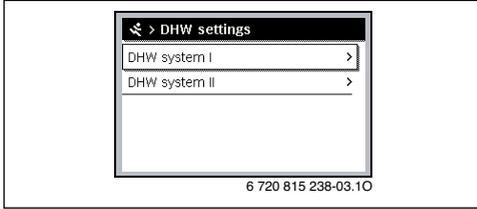


Fig. 28 DHW settings menu

### DHW system I – II menu

DHW system settings can be adapted in this menu. For example, maximum DHW temperatures, circulation pump logic and thermal disinfection settings are made within this menu.



**WARNING:** Risk of scalding!

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

- ▶ Inform all people concerned and make sure that a mixer is installed.

Menu item	Adjustment range	description
DHW system I install. (DHW system II install.)	<b>No</b>	DHW system not installed
	At the boiler	Electrical assemblies and components for the selected DHW cylinder are directly connected to the heat source (only available with DHW system I)
	At the module	Electrical assemblies and components for the selected DHW cylinder are connected to the MS 100/MS 200 or MM 100 modules
Config. DHW at boiler		Hydraulic connections of DHW system I made to heat source (boiler).
	No DHW	No DHW system installed
	<b>3-way valve</b>	DHW system I is supplied via 3-way valve
	Primary pump	DHW system I is supplied via cylinder primary pump
Max. DHW temp.	<b>60</b> ... 80 °C	Maximum DHW temperature in the selected DHW cylinder
DHW	e.g. 15 ... <b>60 °C</b> (80 °C)	Required DHW temperature for the DHW operating mode; the adjustment range depends on the installed heat source.
DHW reduced	e.g. 15 ... <b>45</b> ... 60 °C (80 °C)	The required DHW temperature for DHW reduced operating mode is only available if a DHW cylinder is installed. The adjustment range depends on the installed heat source.
Start temp. differential	e.g. – 20 ... – <b>5</b> ... – 3 K	If the temperature in the DHW cylinder is lower than the required DHW temperature and differs by the start temperature differential, the DHW cylinder is heated up. The adjustment range depends on the installed heat source.
Switch-off temp. diff.	e.g. – 20 ... – <b>5</b> ... – 3 K	If the DHW temperature at the lower temperature sensor of the stratification cylinder is lower than the desired DHW temperature and differs by more than the switch-off temperature differential, the DHW cylinder is not heated any further (only available if MS 200 is used as cylinder primary module for stratification cylinder).
Flow temp. increase	0 ... 40 K	Excess of the flow temperature required by the heat exchanger for heating up the DHW cylinder. The default setting depends on the installed heat source.
DHW start delay	0 ... 50 s	The start of the burner for DHW heating is delayed by the set duration, since water preheated by the solar system is supplied to the heat exchanger ("solar heat") and the heat requirement can possibly be met without burner operation.

Table 24 Settings in the DHW system I – II menu

Menu item	Adjustment range	description
Start cyl. primary pump		Only available with DHW heating via an MM 100/MM 200 module
	temp.-compensated	Only if the temperature in the low loss header is higher than the temperature in the DHW cylinder, the cylinder primary pump is switched on in case of a cylinder load (no withdrawal of residual heat from the cylinder).
	<b>immed.</b>	In case of a cylinder load the cylinder primary pump is switched on immediately, independent of the flow temperature.
Min. temp. difference	0 ... <b>6</b> ... 10 K	Temperature differential between low loss header and cylinder temperature at the start of the cylinder primary pump (only available if Start cyl. primary pump temp.-compensated is selected in the menu).
DHW circ. pump installed	Yes	In the DHW system DHW circulation pipework and a DHW circulation pump are installed (system I or II).
	<b>No</b>	No DHW circulation installed.
DHW circulation pump	On	If the DHW circulation pump is to be controlled by the heat source, the DHW circulation pump must be activated here as well. The default setting depends on the installed heat source.
	Off	The DHW circulation pump cannot be controlled by the heat source.
DHW circ. pump mode	Off	Circulation off
	On	Circulation permanently on (by taking the start frequency into account)
	<b>As DHW system I</b> (As DHW system II)	Activate the same time program for circulation through the secondary DHW system as for DHW heating. For further information and settings of the customised time program (→ operating instructions of the user interface).
	Own time program	Activate customised time program for circulation. For further information and settings of the customised time program (→ operating instructions of the user interface).
Start frequency DHW circ.		If the DHW circulation pump is active via the time program for the DHW circulation pump or if it is permanently switched on (DHW circulation pump operating mode: On), this affects the settings for the DHW circulation pump operation.
	1 x 3 minutes/h ... 6 x 3 minutes/h	The DHW circulation pump goes into operation once up to 6 times per hour for 3 minutes. The default setting depends on the installed heat source.
	Permanently	The DHW circulation pump is in permanent operation.
Automat. therm. disinfect.	Yes	The thermal disinfection is started automatically at the set time (e.g. on Mondays at 02:00 a.m., → Thermal disinfection, page 44)
	<b>No</b>	The thermal disinfection is not started automatically.
Therm. disinfection day	Monday ... <b>Tuesday</b> ... Sunday	The day at which thermal disinfection is performed.
	Daily	Thermal disinfection is performed daily.
Therm. disinfection time	00:00 ... <b>02:00</b> ... 23:45	Time of day for the start of thermal disinfection at the set day.
Therm. disinfection temp.	e.g. 65 ... <b>75</b> ... 80 °C	Temperature to which the entire DHW volume is heated during thermal disinfection. The adjustment range depends on the installed heat source.
Start now manually / Cancel now manually		Starts the thermal disinfection manually/cancels the thermal disinfection.

Table 24 Settings in the DHW system I – II menu

Menu item	Adjustment range	description
Daily heat-up	Yes	The daily heat-up is only available for DHW heating with an MM 100/MM 200 module or EMS 2 heat source. The entire DHW volume is automatically heated up daily at the same time to the temperature that has been set via Daily heat-up temp. The heat-up is not performed, if within 12 h before the set time, the DHW volume was already heated up at least once to the set temperature (e.g. due to solar yield).
	No	No daily heat-up.
Daily heat-up temp.	60 ... 80 °C	Temperature to which the DHW volume is heated up during the daily heat-up.
Daily heat-up time	00:00 ... 02:00 ... 23:45	Time for the start of the daily heat-up.

Table 24 Settings in the DHW system I – II menu

**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.

Perform thermal disinfection to kill off pathogens (e.g. legionella) on a regular basis. For larger DHW systems, there may be legal requirements (→ regulation on drinking water) for thermal disinfection. Observe the instructions in the technical documentation of the heat source.

- **Yes:**
  - The entire DHW volume is heated to the set temperature once a week or once a day according to the settings.
  - The thermal disinfection starts automatically at the set time according to the time set in the controller.
  - It is possible to cancel and to manually start the thermal disinfection.
- **No:** The thermal disinfection is not started automatically. It is possible to manually start the thermal disinfection.

**7.3 Solar system settings**

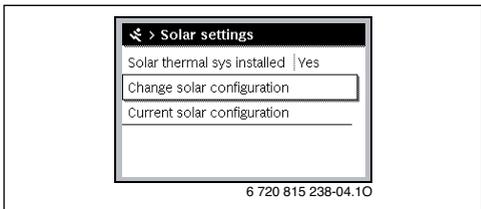


Fig. 29 Solar settings menu

If a solar system is integrated into the heating system via an MS module, corresponding menus and menu items are available. An extension of the menus by the solar system is described in the operating instructions of the relevant solar module.

In the **Solar settings** menu **with all solar systems** the sub-menus listed in Tab. 25 are available.

**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 system prior to commissioning.

If the area of the installed solar collectors is incorrectly set, the solar yield displayed in the info menu is wrong as well.

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 representation 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 started.

Table 25 General settings for the solar system

## 7.4 Settings for hybrid systems

If a hybrid system or a hybrid appliance is installed, the **Hybrid settings** menu is displayed. Depending on which hybrid system or hybrid appliance is being used and the associated assemblies or components, various settings can be made. Observe the detailed information in the technical documentation for the hybrid system or hybrid appliance.

## 7.5 Settings for cascade systems

If the system is installed as a cascade system, including several heat sources, the **Cascade settings** menu is available. Observe the detailed information in the technical documentation for the cascade module.

## 7.6 Diagnosis menu

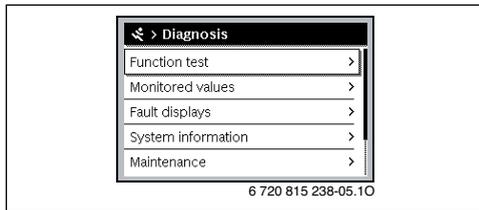


Fig. 30 Diagnosis menu

The **Diagnosis** service menu contains a number of tools for diagnosis. Note that the menu items shown will vary depending on the heating system.

### 7.6.1 Function test menu

This menu can be used to test active heating system components individually. If **Enable function tests** is set to **Yes** in this menu, the normal heating mode is interrupted in the entire system. All settings are saved. The settings in this menu are only temporary and revert to the respective default 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 by selecting the listed components accordingly. You can check whether the burner, mixer, pump or valve responds appropriately by inspecting the behaviour of the corresponding component.

The **Burner** can be tested, for instance:

- **Off:** The flame in the burner extinguishes.
- **On:** The burner goes into operation.

The boiler function test is not available when a cascade module is installed.

## 7.6.2 Monitored values menu

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

The information and values that are provided depend on the system that has been installed. The technical information pertaining to modules and other system units must be observed.

### Information in the Heating circuit 1...4 menu

The **Status** menu item under **Set flow temp.** shows the status of the heating system. This status is decisive for the flow temperature set value.

- **Heating:** Heating circuit is in heating mode.
- **Summer:** Heating circuit is in summer mode.
- **No req.:** No heat requirement (set room temperature = off).
- **Reqmet:** Heat requirement met; room temperature at least at set value.
- **Scrd dry:** Sced drying is active for the heating circuit (→ Chapter 7.1.4, starting on page 40).
- **Chim.:** Chimney sweep function is active.
- **Fault:** There is a fault (→ Chapter 8, starting on page 48).
- **Frost:** Frost protection for the heating circuit is active (→ Tab. 20, starting on page 33).
- **Run-on:** Over-run time is active for the heating circuit.
- **Em. op.:** Emergency operation is active.

The **Time program status** menu item shows the status of the constant heating system.

- **On:** With a heat requirement the constant heating circuit may be heated (release).
- **Off:** Also in case of a heat requirement the constant heating circuit is not heated (block).

The **MD status** menu item shows whether a heat requirement is present for the constant heating circuit via the MD1 terminal of the MM 100 module.

- **On:** Heat requirement via the MD1 terminal of the module
- **Off:** No heat requirement via the MD1 terminal of the module

The **Status** menu item under **Set room temp.** shows the current operating mode of the heating system. This status determines the set room temperature.

- **Heating, Setback** (setback), **Off:** → operating instructions.
- **Setb. off:** Heating is switched off due to **Setback type** (→ page 38).
- **Manual:** → operating instructions.
- **Man.lim:** Manual operation with limited duration is active for the heating circuit (→ operating instructions).

- **Const.:** Constant set value; holiday program is active for the heating circuit.
- **Hold:** Switch-on optimisation is active for the heating circuit (→ operating instructions).

The **Pump status** menu item under **Heating circuit pump** shows why the heating circuit pump is **On** or **Off**.

- **Test:** Function test is active.
- **AntBProt:** Anti-seize protection is active; pump is regularly switched on for short intervals.
- **No req.:** No heat requirement.
- **Conden.:** Condensation protection of the heat source is active (non-condensing appliances only).
- **NoHeat:** No heat delivery possible, e.g. if there is a fault.
- **DHW pre:** DHW priority is active (→ Tab. 20, starting on page 33).
- **Ht req.:** A heat requirement is present.
- **Frost:** Frost protection for the heating circuit is active (→ Tab. 20, starting on page 33).
- **Prg.off:** No heat requirement release via the time program of the constant heating circuit (→ Control types, page 35)

In addition, in the **Heating circuit 1...4** menu the following is displayed:

- The holiday program for the heating circuit is active (**Holiday**).
- The **Cut-in optimisation** function (switch-on optimisation time program) affects the current set room temperature.
- The open window detection (**Open wndw detec.**) affects the current set room temperature.
- The temperature has fallen below the threshold for **Contin. heat**.
- The values for **Solar influence**, **Room influence** and **Fast heat-up** may be enabled.
- The **Actual flow temp.** shows the current value of the flow temperature.
- The value for **Actual room temp.** shows the current room temperature.
- The **3-way valve** is either set to **DHW** or to **Heating** (only heating circuit 1 at the heat source).
- The **Mixer position** shows the status of the mixer.
- The **Boiler pump** function shows if the heating pump is either **On** or **Off** (only heating circuit 1 at the heat source).
- The **Heating circuit pump** function shows if the heating circuit pump is either **On** or **Off**.

### Information in the DHW system I...II menu

The **Status** menu item under **Set DHW temperature** shows the status of the DHW heating. This status determines the set DHW temperature.

- **Scrd dry:** Screed drying is running for the entire system (→ Chapter 7.1.4, starting on page 40).

- **Ht once:** Heating once is active (→ operating instructions).
- **Man off, Man.red., ManDHW:** Operating mode without time program (→ operating instructions).
- **Hol.off, Hol.red.:** "Holiday off" or "Holiday reduced"; a holiday program is active and the DHW system is switched off or set to the reduced temperature level.
- **Auto off, Auto red, AtDHW:** Operating mode with active time program (→ operating instructions).
- **Sol. red.:** Solar reduction of set DHW value (only available with solar system, → technical documents of the solar system).
- **Therm.d.:** Thermal disinfection is active (→ operating instructions).
- **DayHtUp:** Daily heat-up is active (→ Tab. 24, starting on page 42).

The **Status** menu item under **Cylinder primary pump** shows why the cylinder primary pump is **On** or **Off**.

- **Test:** Function test is active.
- **AntBProt:** Anti-seize protection is active; pump is regularly switched on shortly.
- **No req.:** No heat requirement; DHW at least at set temperature.
- **Conden.:** Condensation protection of the heat source is active.
- **no DHW:** No DHW heating possible, e.g. if there is a fault.
- **Blr.cold:** Temperature of the heat source is too low.
- **Scrd dry:** Screed drying is active (→ Chapter 7.1.4, starting on page 40).
- **Cyl.Ht.T:** Cylinder charging in progress.

The **Status** menu item under **Circulation** shows why the circulation is **On** or **Off**.

- **Scrd dry:** Screed drying is running for the entire system (→ Chapter 7.1.4, starting on page 40).
- **Ht once: Heating once** is active (→ operating instructions).
- **Man. on, Man off:** operating mode without time program **On** or **Off** (→ operating instructions).
- **Hol.off:** A holiday program is active and the DHW circulation pump is switched off.
- **Auto on, Auto off:** operating mode with active time program (→ operating instructions).
- **Test:** Function test is active.
- **AntBProt:** Anti-seize protection is active; pump is regularly switched on for short intervals.
- **No req.:** No requirement.
- **On, Off:** Operating conditions of the DHW circulation pump.

- **Therm.d.:** Thermal disinfection is active (→ operating instructions).

In addition, in the **DHW system I...II** menu the following is displayed:

- The set **Actual boiler water temp.**
- The current **System flow temperature**
- The current temperature in the heat exchanger **Heat exchanger temp.**
- The current **Actual DHW temp.**
- The **Act DHW temp cyl bottom** function shows the current value of the DHW temperature of the DHW cylinder in the lower part. The current **DHW flow**
- The current **Inlet temperature** of the water when a stratification cylinder is installed
- The current **Outlet temperature** of the water when a stratification cylinder is installed
- The power consumption of the **Prim. cylinder pump** and the **Sec. cylinder pump** with an external stratification cylinder via MS 100/MS 200
- The **3-way valve** is either set to **DHW** or to **Heating**.
- the **Therm. disinf. DHW cyl.** function shows whether the automatic thermal disinfection of the DHW cylinder is active.

### 7.6.3 Fault display menu

The current faults and the fault history can be called up in this menu.

Menu item	description
Active faults	All current faults that are present in the system are displayed here according to their severity.
Fault history	The last 20 faults are displayed here, sorted in order of the time of occurrence. The fault history can be deleted in the Reset menu (→ Chapter 7.6.6, page 48).

Table 26 Information in the fault display menu

### 7.6.4 System information menu

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

### 7.6.5 Maintenance menu

You can set a maintenance interval and add installer contact details in this menu. The controller shows a service display with fault codes and the added address. The end customer can notify the installer to arrange an appointment (→ Chapter 8, page 48).

Menu item	description
Service display	How are service displays triggered: no service display, by burner runtime by date or by elapsed time? If available, maintenance intervals can be set at the heat source.
Service date	A service display will appear on the date set here.
Runtime service display	After expiry of the number of months set here (elapsed time), in which the heat source was supplied with power, a service display will appear.
Boiler runtime	When the target number of burner operating hours is met a service display will appear.
Contact address	→ Contact address, page 47.

Table 27 Settings in the maintenance menu

#### Contact address

The contact address is automatically displayed to the end user if a fault occurs.

#### Entering company name and telephone number

The current cursor position will flash (marked by |).



Fig. 31 Entering contact address

- ▶ Turn the selector to move the cursor.
- ▶ Press the selector to activate the input field.
- ▶ Turn the selector to enter characters.
- ▶ Press the Back key when you have finished making entries.
- ▶ Press the Back key again to return to the next higher menu. Further information on the text input are contained in the operating instructions of the controller (→ Renaming heating circuit).

### 7.6.6 Reset menu

You can delete settings or lists or reset them to the default setting in this menu.

Menu item	description
Fault history	The fault history is deleted. If currently a fault is present, the fault history is recorded again.
Service displays	The maintenance and service displays are reset.
Hours run/ burner starts	The counters for the burner runtime and the burner starts of the burner are reset.
Heating circuits time prog	The time programs of all heating circuits are reset to the default setting.
Time prog. DHW	All time programs of all DHW system (including the time programs for the DHW circulation pump) are reset to the default setting.
Solar thermal system	All settings referring to the solar system are reset to the default setting. The solar system must be recommissioned after this reset!
Default setting	All settings are reset to the corresponding default setting. The system must be recommissioned after this reset!

Table 28 Resetting settings

### 7.6.7 Calibration menu

Menu item	description
Room temp. sen. adj.	<ul style="list-style-type: none"> <li>▶ Position a precision instrument near the user interface. The precision instrument must not transfer any heat to the controller.</li> <li>▶ Keep away from heat sources such as sunlight, body heat, etc. for 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 automatically carried out once a week.</p> <p>Example: Deviation of the time by approximately -6 minutes per year</p> <ul style="list-style-type: none"> <li>• -6 minutes per year is equal to -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 29 Settings in the calibration menu

## 8 Eliminate fault

A fault in the system is indicated on the display of the controller. The cause can be a fault on the controller, in a component, or on the heat source. The instructions belonging to the affected component or heat source, in particular the servicing instructions, should be referred to. Many heat source faults do not appear on the display of the controller. They are described in the documents for the heat source used.

The controller saves the last faults occurred with a time stamp (→ fault history, page 47).



Only use genuine spare parts. Damage resulting from spare parts not supplied by the manufacturer is not covered under warranty.

<b>Fault code</b>	<b>Sub-code</b>	<b>Cause or fault description</b>	<b>Test procedure/Cause</b>	<b>Corrective measure</b>
A01	808	DHW heating: DHW temp. sensor 1 faulty.  If the hot water function is not needed, deactivate it on the controller	No hot water system installed	Deactivate hot water system in the service menu
			Check connecting lead between controller and hot water temperature sensor	If there is a defect, replace the sensor
			Check the electrical connection of the connecting lead in the controller	If a screw or plug is loose, rectify the contact problem
			Check the hot water temperature sensor according to table (→ page 7)	If values do not match, replace the sensor
A01	809	DHW heating: DHW temp. sensor 2 faulty.  If the hot water function is not needed, deactivate it on the controller	No hot water system installed	Deactivate hot water system in the service menu
			Check connecting lead between controller and hot water temperature sensor	If there is a defect, replace the sensor
			Check the electrical connection of the connecting lead in the controller	If a screw or plug is loose, rectify the contact problem
			Check the hot water temperature sensor according to table (→ page 7)	If values do not match, replace the sensor
A01	810	DHW stays cold	Check if water is possibly being drawn from the DHW cylinder constantly due to a leak or taps being open	If water is being drawn constantly, take action to stop this
			Check the position of the hot water temperature sensor; it may be attached incorrectly or suspended in the air	Position the hot water temperature sensor correctly
			If the DHW priority was deselected and heating and DHW are running in parallel, it is possible that the boiler's output is not sufficient	Set DHW to "priority"
			Check whether the heating coil in the cylinder has been completely vented	Vent if necessary
			Check the pipework between the heat source (boiler) and cylinder, and with the aid of the installation instructions, ensure that it is connected properly	Rectify any faults in the pipework
			Using the technical documentation, check whether the installed cylinder primary pump is providing the required output	Replace the pump if there are deviations
			Excessive losses in DHW circulation circuit	Check DHW circulation circuit
			Check the hot water temperature sensor according to table (→ page 7)	Replace the sensor if there are deviations from the table values

Table 30 Fault displays

Fault code	Sub-code	Cause or fault description	Test procedure/Cause	Corrective measure
A01 A41 A42	811 4051 4052	DHW heating: thermal disinfection failed  (A41/4051 = DHW system I; A42/4052 = DHW system II)	Check if water is possibly being drawn from the DHW cylinder constantly due to a leak or taps being open  Check the position of the hot water temperature sensor; it may be attached incorrectly or suspended in the air  If the DHW priority was deselected and heating and DHW are running in parallel, it is possible that the boiler's output is not sufficient  Check whether the heating coil in the cylinder has been completely vented  Check the pipework between the heat source (boiler) and cylinder, and with the aid of the installation instructions, ensure that it is connected properly  Using the technical documentation, check whether the installed cylinder primary pump is providing the required output  Excessive losses in DHW circulation circuit  Check the hot water temperature sensor according to table (→ page 7)	If water is being drawn constantly, take action to stop this  Position the hot water temperature sensor correctly  Set water heating to "priority"  Vent if necessary  Rectify any faults in the pipework  Replace the pump if there are deviations  Check DHW circulation circuit  Replace the sensor if there are deviations from the table values
A11	1000	System configuration not confirmed	System configuration not completed	Configure system completely and confirm
A11	1010	No communication via BUS connection EMS 2	Check whether BUS cable was connected correctly between the boilers EMS/BB connections and the wall plate  Check whether BUS cable is defective. Remove expansion modules from BUS system and switch controller off and on again. Check whether the cause of the fault is a module or module wiring	Rectify wiring faults and switch controller off and on again  Repair or replace the BUS cable. Replace the defective BUS node
A11 A61 A62 A63 A64	1037	Outdoor temperature sensor faulty, heating standby mode active  (A61 = Heating circuit 1; A62 = Heating circuit 2; A63 = Heating circuit 3; A64 = Heating circuit 4;)	Check configuration. The selected setting requires an outside temperature sensor.  Check the connecting lead between the controller and outside temperature sensor for continuity  Check the electrical connection of the connecting lead in the outside temperature sensor or on the plug in the controller  Check outside temperature sensor according to table (→ page 7)	If an outside temperature sensor is not desired. Select the room temperature-dependent configuration in the controller.  If there is no continuity, rectify the fault  Clean corroded connecting terminals in the outside sensor housing.  If values do not match, replace the sensor

Table 30 Fault displays

<b>Fault code</b>	<b>Sub-code</b>	<b>Cause or fault description</b>	<b>Test procedure/Cause</b>	<b>Corrective measure</b>
A11	1038	Invalid time/date	Date/time not yet set	Set date/time
			Prolonged loss of power supply for more than 8 hours	Avoid voltage failures
A11	3061 3062 3063 3064	No communication with mixer module (MM 100/MM 200) (3061 = Heating circuit 1; 3062 = Heating circuit 2; 3063 = Heating circuit 3; 3064 = Heating circuit 4;)	Check configuration (set address at the module). The selected setting requires a heating circuit module	Change configuration
			Check the BUS connection to the heating circuit module for damage. BUS voltage at the heating circuit module must be between 12-15 V DC.	Replace damaged cables
			Heating circuit module defective	Replace heating circuit module
A11	3091 3092 3093 3094	Room temperature sensor faulty (3091 = Heating circuit 1; 3092 = Heating circuit 2; 3093 = Heating circuit 3; 3094 = Heating circuit 4;)	Install Sense II in the living space (not at the heat source (boiler)) or	Replace the system controller or the remote control.
			Change the control type of the heating circuit from room temperature-dependent to weather-compensated	
			Change frost protection from room temperature-dependent to outside temperature-dependent, if necessary	
A11	6004	No communication w. solar module (MS 100/MS 200)	Check configuration (set address at the module). The selected setting requires a solar module	Change configuration
			Check the BUS connection to the solar module for damage. BUS voltage at the solar module must be between 12-15 V DC.	Replace damaged cables
			Solar module defective	Replace the module
A31 A32 A33 A34	3021 3022 3023 3024	Heating circuit flow temp. sensor faulty - standby mode active (A31/3021 = Heating circuit 1; A32/3022 = Heating circuit 2; A33/3023 = Heating circuit 3; A34/3024 = Heating circuit 4;)	Check configuration. The selected setting requires a flow temperature sensor	Change configuration.
			Check the connecting lead between heating circuit module and flow temperature sensor	Establish a connection properly
			Check flow temperature sensor according to table (→ technical documentation for solar modules)	If values do not match, replace the sensor

Table 30 Fault displays

Fault code	Sub-code	Cause or fault description	Test procedure/Cause	Corrective measure
A51	6021	Collector temperature sensor faulty	Check configuration. The selected setting requires a collector sensor	Change configuration.
			Check connecting lead between solar module and collector temperature sensor	Establish a connection properly
			Check collector sensor according to table (→ technical documentation for solar modules)	If values do not match, replace the sensor
A51	6022	Bottom temp. sensor cylinder 1 faulty. Standby mode active	Check configuration. The selected setting requires a cylinder sensor at the bottom	Change configuration
			Check connecting lead between solar module and collector temperature sensor	Establish a connection properly
			Check the electrical connection of the connecting lead at the solar module	If a screw or plug is loose, rectify the contact problem
			Check bottom cylinder temperature sensor according to table (→ technical documentation for solar modules)	If values do not match, replace the sensor
A61 A62 A63 A64	1081 1082 1083 1084	Two master programming units in the system.	Check parameterisation at the installation level (In the BUS system, further user interfaces are configured as the controller in addition to the Sense II)	Register the user interface for heating circuit 1 – 4 as master (Configure Sense I as remote control)
Hxx		No system fault.	For instance, service interval of heat source elapsed.	Service required; see technical documents for the heat source.

Table 30 Fault displays

## 9 Environment / disposal

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

The quality of our products, their efficiency and environmental safety are all of equal importance to us and all environmental protection legislation and regulations are strictly observed. We use the best possible technology and materials for protecting the environment taking into account of economic considerations.

### Packaging

We participate in the recycling programmes of the countries in which our products are sold to ensure optimum recycling.

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

### Old electrical and electronic appliances



Electrical or electronic devices that are no longer serviceable must be collected separately and sent for environmentally compatible recycling (in accordance with the European Waste Electrical and Electronic Equipment Directive).

To dispose of old electrical or electronic devices, you should use the return and collection systems put in place in the country concerned.

## 10 Commissioning report

--	--	--	--

Table 31 During installation enter the ID number of the user interface here.

- ▶ Complete the commissioning report during commissioning. It is intended to provide information.


**> System data**

Menu item	Adjustment	
Low loss hdr. sensr. instll.	No low-loss header	<input type="checkbox"/>
	At the boiler	<input type="checkbox"/>
	At the module	<input type="checkbox"/>
	Header w/o sensor	<input type="checkbox"/>
Config. DHW at boiler	No DHW	<input type="checkbox"/>
	3-way valve	<input type="checkbox"/>
	Primary pump	<input type="checkbox"/>
Config. of HC1 at boiler	No heating circuit	<input type="checkbox"/>
	No own heating circuit pump	<input type="checkbox"/>
	Own pump	<input type="checkbox"/>
Boiler circuit pump	None	<input type="checkbox"/>
	System pump	<input type="checkbox"/>
Min. outdoor temperature	Set temperature	
Damping	Yes	<input type="checkbox"/>
	No	<input type="checkbox"/>
Type of building	Light	<input type="checkbox"/>
	Medium	<input type="checkbox"/>
	Heavy	<input type="checkbox"/>

Table 32 Settings at commissioning in the System data menu


**> Boiler data**

Menu item	Adjustment	
Pump type	Output-compensated	<input type="checkbox"/>
	Delta P-compensated 1...8 (set number)	
Pump run-on time	Set time (in minutes)	..... min
Pump logic temperature	Set temperature	
Pump control mode	Saving energy	<input type="checkbox"/>
	Heat request	<input type="checkbox"/>
Pump rate min. output	Setting value (in percent)	..... %
Pump rate max. output	Setting value (in percent)	..... %
Pump block. time ext.3WV	Set time (in seconds)	..... s
Maximum output	Setting value (in percent)	..... %

Table 33 Settings at commissioning in the Boiler data menu

Menu item	Adjustment	
Upper limit max. output	Setting value (in percent)	..... %
Max. DHW output	Setting value (in percent)	..... %
Top limit max DHW output	Setting value (in percent)	..... %
Top limit max flow temp.	Set temperature	
Min. appliance output	Setting value (in percent)	..... %
Time interv (stdby period)	Set time (in minutes)	..... min
TempInterv (StdbbyPeriod)	Set temperature (in Kelvin)	..... K
Duration of heat retention	Set time (in minutes)	..... min
Venting function	Off	<input type="checkbox"/>
	Auto	<input type="checkbox"/>
	On	<input type="checkbox"/>
Trap filling program	On	<input type="checkbox"/>
	One boiler minimum	<input type="checkbox"/>
Signal ext. heat req.	On/Off	<input type="checkbox"/>
	0-10V	<input type="checkbox"/>
Set value ext. heat req.	Flow temperature	<input type="checkbox"/>
	Output	<input type="checkbox"/>
AirCorrFact min fan power	Setting value	
AirCorrFact max fan pow.	Setting value	
Emerg. altern. op.	Yes	<input type="checkbox"/>
	No	<input type="checkbox"/>
Turbine signal delay time	Set time (in seconds)	..... s

Table 33 Settings at commissioning in the Boiler data menu

 > Heating circuit 1 – 4

Menu item	Adjustment	Heating circuit			
		1	2	3	4
Heating circuit 1 installed	No	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	At the boiler	<input type="checkbox"/>	-	-	-
	At the module	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Ctrl type h. circ. 1	Outdoor-temp.-compensated	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Outside temp. with low end	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Room-temp.-compensated	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Room temperature output	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Constant	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Prog. unit heat. circ. 1	Sense II ( <b>no</b> remote control installed)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Sense I (remote control installed)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Use minimum value	Yes	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	No	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Heating system heat circ. 1	Radiator	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Convector heater	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Underfloor	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Set point constant	Set temperature				
Max. flow temperature	Set temperature				
Set heating curve	→ Tab. 35				
Setback type	Reduced mode	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Outside temperature threshold	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Room temperature threshold	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Reduced mode below	Set temperature				
Heat constantly below	Set temperature				
	Off	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Frost protect	Outdoor temp.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Room temperature	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Room and outdoor temp.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Off	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Frost prot. limit temp.	Set temperature				
Mixer	Yes	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	No	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Mixer runtime	Set time (in seconds)	..... S	..... S	..... S	..... S
Mixer increase	Set temperature (in Kelvin)	..... K	..... K	..... K	..... K

Table 34 Settings at commissioning in the Heating circuit 1 – 4

Menu item	Adjustment	Heating circuit			
		1	2	3	4
DHW priority	Yes	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	No	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Shown in standard display	Yes	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	No	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Pump economy mode	Yes	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	No	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Open-window detection	On	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Off	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
PID charact.	fast	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	medium	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	slow	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Table 34 Settings at commissioning in the Heating circuit 1 – 4

 > Set heating curve (Heating circuit 1 – 4)

Menu item	Adjustment	Heating circuit			
		1	2	3	4
Design temperature   End point	Set temperature				
Base point	Set temperature				
Max. flow temperature	Set temperature				
Solar influence	Set temperature (in Kelvin)	..... K	..... K	..... K	..... K
	Off	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Room influence	Set temperature (in Kelvin)	..... K	..... K	..... K	..... K
	Off	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Room temperature offset	Set temperature (in Kelvin)	..... K	..... K	..... K	..... K
Fast heat-up	Setting value (in percent)	..... %	..... %	..... %	..... %
	Off	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Table 35 Settings at commissioning in the Set heating curve menu


**> DHW system I – II menu**

Menu item	Adjustment	DHW system	
		I	II
DHW system I install.   DHW system II install.	No	<input type="checkbox"/>	<input type="checkbox"/>
	At the boiler	<input type="checkbox"/>	-
	At the module	<input type="checkbox"/>	<input type="checkbox"/>
Config. DHW at boiler	No DHW	<input type="checkbox"/>	-
	3-way valve	<input type="checkbox"/>	-
	Primary pump	<input type="checkbox"/>	-
Max. DHW temp.	Set temperature		
DHW	Set temperature		
DHW reduced	Set temperature		
Start temp. differential	Set temperature (in Kelvin)	..... K	..... K
Switch-off temp. diff.	Set temperature (in Kelvin)	..... K	-
Flow temp. increase	Set temperature (in Kelvin)	..... K	..... K
DHW start delay	Set time (in seconds)	..... S	-
Start cyl. primary pump	temp.-compensated	<input type="checkbox"/>	<input type="checkbox"/>
	immed.	<input type="checkbox"/>	<input type="checkbox"/>
Min. temp. difference	Set temperature (in Kelvin)	..... K	..... K
DHW circ. pump installed	Yes	<input type="checkbox"/>	<input type="checkbox"/>
	No	<input type="checkbox"/>	<input type="checkbox"/>
DHW circulation pump	On	<input type="checkbox"/>	-
	Off	<input type="checkbox"/>	-
DHW circ. pump mode	Off	<input type="checkbox"/>	<input type="checkbox"/>
	On	<input type="checkbox"/>	<input type="checkbox"/>
	As DHW system I	<input type="checkbox"/>	-
	As DHW system II	-	<input type="checkbox"/>
	Own time program	<input type="checkbox"/>	<input type="checkbox"/>
Start frequency DHW circ.	Set start frequency (x-times for three minutes per hour)	..... × 3 min	..... × 3 min
	Permanently	<input type="checkbox"/>	<input type="checkbox"/>
Automat. therm. disinfect.	Yes	<input type="checkbox"/>	<input type="checkbox"/>
	No	<input type="checkbox"/>	<input type="checkbox"/>

*Table 36 Settings at commissioning in the DHW system I – II menu*

Menu item	Adjustment	DHW system	
		I	II
Therm. disinfection day	Monday	<input type="checkbox"/>	<input type="checkbox"/>
	Tuesday	<input type="checkbox"/>	<input type="checkbox"/>
	Wednesday	<input type="checkbox"/>	<input type="checkbox"/>
	Thursday	<input type="checkbox"/>	<input type="checkbox"/>
	Friday	<input type="checkbox"/>	<input type="checkbox"/>
	Saturday	<input type="checkbox"/>	<input type="checkbox"/>
	Sunday	<input type="checkbox"/>	<input type="checkbox"/>
	Daily	<input type="checkbox"/>	<input type="checkbox"/>
Therm. disinfection time	Set time	.....:.....	.....:.....
Therm. disinfection temp.	Set temperature		
Daily heat-up	Yes	<input type="checkbox"/>	<input type="checkbox"/>
	No	<input type="checkbox"/>	<input type="checkbox"/>
Daily heat-up temp.	Set temperature		
Daily heat-up time	Set time	.....:.....	.....:.....

Table 36 Settings at commissioning in the DHW system I – II menu

<b>Index</b>	
<b>A</b>	
Accessories .....	7
Adjusted outside temperature .....	31
Adjusting outside temperature .....	31
Ambient temperature .....	7
Application options .....	4
<b>B</b>	
Backlighting .....	15, 19
Boiler data .....	31
BUS cable .....	10
BUS connection .....	10
<b>C</b>	
Cable .....	10
Calibrate room temperature display .....	48
Calibrate time .....	48
Calibration	
– Room temperature display .....	48
– Time of day .....	48
Cascade .....	45
Cascade systems .....	45
Checklist	
– Cascade settings .....	24
– Commissioning .....	24
– DHW settings .....	24
– Function test .....	24
– Heating system settings .....	24
– Hybrid settings .....	24
– Monitored values .....	24
– Satisfaction of the customer .....	24
– Solar settings .....	24
Circulation .....	42
Commissioning	
– general settings .....	21
– other settings .....	24
– Overview .....	21
– System configuration .....	21
– with configuration wizard .....	21
Commissioning report .....	52
Configuration wizard .....	21
Connection .....	10
– BUS connection .....	10
– on the heat source .....	10
– Outside sensor .....	14
Constant heating .....	35
Control elements .....	15
– Keys .....	16
– Selector .....	16
Control range .....	7

Control types .....	4, 35	<b>I</b>	
Cylinder primary circuit .....	4	Installation .....	8, 10
<b>D</b>		– Electrical connection .....	10
DHW circulation pump .....	42	– in the heat source .....	11
DHW system .....	42	– in the reference room .....	10
Diagnosis .....	45	– on the wall .....	10
Disposal .....	52	– Options .....	4
Domestic hot water .....	42	– Outside sensor .....	14
<b>E</b>		– Wall mounting plate .....	10
Electrical connection .....	10	Installation location .....	9
EMS 2 .....	8	– for weather-compensated control .....	8, 11
Energy consumption .....	7	– In the case of room temperature-dependent control .....	8
Energy efficiency .....	7	<b>K</b>	
Enter company name and telephone number .....	47	Keys .....	15
Entering contact address .....	47	<b>L</b>	
Environment / disposal .....	52	Limitation at heat source	
<b>F</b>		– DHW temperature .....	24
Fault		– Flow temperature .....	24
– Cause .....	48	<b>M</b>	
– Eliminate .....	48	Mains power supply .....	25
– Fault code .....	48	Maintenance .....	25, 47
– Fault displays .....	47	– by burner runtime .....	47
– Sub-code .....	48	– by date .....	47
Fault history .....	47	– by runtime .....	47
Frost protect		Manual valve .....	8
– Heat constantly below .....	39	Measurements .....	7
– Limit temperature .....	39	Minimum clearances .....	9
Function module .....	7, 21	Minimum outside temperature .....	30
– Heating circuit module .....	8	Mode .....	17
– Solar module .....	8	Monitored values .....	45
Function test .....	45	<b>O</b>	
<b>H</b>		Old appliance .....	52
Heat constantly below .....	39	Outside sensor .....	14
Heat sources .....	31	Outside temperature .....	30
Heating circuit .....	4, 33	– adjusted .....	31
– Control type .....	35	Outside temperature threshold .....	38
– quantity .....	30	Overview	
– Settings .....	33	– Commissioning .....	21
– with mixer .....	40	– Diagnosis .....	20
Heating circuit with mixer .....	40	– Service menu .....	20
Heating curve		– Settings .....	20
– for convectors .....	38	<b>P</b>	
– for radiators .....	38	Packaging .....	52
– for underfloor heating systems .....	37	Power failure .....	25
– set .....	36	Power reserve .....	4, 25
Heating system .....	4, 36	Priority DHW .....	34
Hot air heating system .....	35	Pump characteristic map .....	31
Hybrid systems .....	45		

**Q**

Quick heat-up .....31, 36

**R**

Range of functions ..... 4  
 Recycling ..... 52  
 Reduced mode ..... 38  
 Reference room ..... 9  
 Remote control ..... 7, 25, 33  
 Removing the controller from the wall mounting plate ..... 11  
 Reset ..... 48  
 Risk of scalding ..... 44  
 Room temperature sensor calibration ..... 48  
 Room temperature threshold ..... 38  
 Room temperature-dependent control ..... 4  
 – via the flow temperature ..... 35  
 – via the heat output ..... 35

**S**

Scope of delivery ..... 6  
 Screed drying ..... 40  
 Selector ..... 15  
 Sensor characteristics ..... 7  
 Service ..... 47  
 Service interval ..... 47  
 Service menu ..... 19  
 – Changing setting values ..... 19  
 – close ..... 19  
 – Introduction ..... 19  
 – Menu structure ..... 25  
 – navigating through the menu ..... 19  
 – open ..... 19  
 – Operating the appliance ..... 19  
 – Overview ..... 20  
 – Settings ..... 25  
 Setback types ..... 38  
 – Outside temperature threshold ..... 38  
 – Reduced mode ..... 38  
 – Room temperature threshold ..... 38  
 Shutting down ..... 25  
 Software versions ..... 47  
 Solar ..... 44  
 Sources of external heat ..... 9  
 Standard display  
 – Mode ..... 17  
 – Symbols ..... 17  
 Sub-code ..... 48  
 Swimming pool as heating circuit ..... 35  
 Switching off ..... 25  
 System configuration (automatic) ..... 21  
 System data ..... 30  
 System handover ..... 24

**T**

Technical data .....7  
 Temperature sensor  
 – Characteristics .....7  
 Test active components (e.g. pumps) .....45  
 Test mixer .....45  
 Test pump .....45  
 Test valve .....45  
 Thermal disinfection .....44  
 Thermostatic valve .....8  
 Time correction .....48  
 Type of building .....31

**U**

Use as a controller .....4  
 Use as a remote control .....4  
 Used appliances .....52  
 Used heat source .....31

**W**

Weather-compensated control  
 – with base point .....35  
 – with optimised heating curve .....35  
 – with room temperature influence .....4, 35  
 – without room temperature influence .....4

## Notes







**WORCESTER, BOSCH GROUP:**

TECHNICAL SUPPORT:	0330 123 3366
APPOINTMENTS:	0330 123 9339
SPARES:	0330 123 9779
LITERATURE:	0330 123 9119
TRAINING:	0330 123 0166
SALES:	0330 123 9669

Worcester, Bosch Group  
Cotswold Way, Warndon, Worcester WR4 9SW.  
Tel. 0330 123 9559  
Worcester, Bosch Group is a brand name of  
Bosch Thermotechnology Ltd.

[worcester-bosch.co.uk](http://worcester-bosch.co.uk)

6 720 818 367

