

EMS 2

6 720 812 361-13.20

User interface **CR 400 | CW 400 | CW 800**



Installation instructions for contractors



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1 Explanation of symbols and safety instructions

1.1 Key to symbols

Warnings



Warnings in this document are identified by a warning triangle printed against a grey background.

Keywords at the start of a warning indicate the type and seriousness of the ensuing risk if measures to prevent the risk are not taken.

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

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

Important information



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

Additional symbols

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

Table 1

1.2 General safety instructions

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

- Read 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 in single-family or multi-family homes.

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 a qualified electrician.

- Before starting electrical work:
 - Isolate all poles of the mains voltage and secure against reconnection.
 - Make sure the mains voltage is disconnected.
- Never connect the product to mains voltage.
- Also observe the 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 solar system, with particular emphasis on all safety-related actions.
- Explain that conversions and maintenance must only be carried out by an authorised contractor.
- Point out the need for inspections and maintenance for safe and environmentally friendly operation.
- The installation and operating instructions must be given to the user for keeping.

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 antiseizing protection, the system should always be left on.
- Correct any faults immediately.

2 Product information

2.1 Product description

- The purpose of the C 400 user interface is to control up to a maximum of 4 heating circuits (CW 800: up to a maximum of 8 heating circuits). In addition 2 cylinder charging circuits, one solar DHW heating as well as one solar central heating backup can be controlled.
- The user interface has time programs:
 - Heating systems: for each heating circuit 2 time programs with 6 switching times per day are available (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 user interface displays information about the heat source 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 interface.
 - On a wall with BUS connection to a heat source with a 2-wire BUS interface or EMS 2.
- After operating for ½ 1 hour, the user interface 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 retained.
- The functional scope and thus the menu structure of the user interface are determined by the configuration of the system. These instructions describe the maximum functional scope of the equipment. Your attention is drawn to the dependency on the system configuration in the relevant places. The adjustment ranges and default settings may differ from the information in these instructions. Depending on the software version of the user interface, the texts shown in the display may differ from the texts 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 main 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 a user interface 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 a user interface 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 (\rightarrow Control types, page 34).

2.1.2 Application options in different heating systems

In a BUS system, only one node can carry out the calculations for a heating circuit. Consequently, only one C 400 or one C 800 user interface may be installed in each heating system. The user interface serves as controller in:

- Systems with one heating circuit, e.g. in a single-family home
- Systems with two or more heating circuits, e.g.:
 - underfloor heating system on one floor, panel radiators on the other
 - Apartment in combination with a workshop
 (→ Fig. 1, [1])
- Systems with several heating circuits with remote controls, e.g.:
 - House with annexe with CW 400/CW 800 as controller and CR 100 as remote control (installation of CR 400 in the reference room of the house, CR 100 in the reference room of the annexe, → Fig. 1, [2])
 - House with several apartments (CW 400/CW 800 as controller and CR 100 as remote control, installation of CW 400/CW 800 in the heat source).



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

- [1] C 400/C 800 as controller for several (in this case two) heating circuits (HK 1 and HK 2).
- [2] CR 100 as the remote control for the second heating circuit (HK 2) and C 400/C 800 as the controller for the first heating circuit (HK 1).

2.2 Important information on use

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 switch.
- The user interface may be connected only to heat sources with a 2-wire BUS interface or EMS 2 (Energy Management System).
- Only products with EMS2 BUS may be used within the BUS system.
- The installation room must be appropriate for the IP20 rating.

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



Fig. 2 Scope of delivery

- [1] Wall-mounting plate
- [2] User interface
- [3] Technical documentation
- [4] Outside temperature sensor (only CW 400/CW 800)
- [5] Installation frame for installation in the heat source (only with CW 400/CW 800)

2.5 Specifications



Fig. 3 Dimensions in mm

Scope of delivery	→ Chapter 2.4, page 6		
Measurements	123 × 101 × 25 mm		
	(→ Fig. 3)		
Rated voltage	1024 V DC		
Rated power (excluding	9 mA		
illumination)			
BUS interface	EMS 2		
Control range	5 ℃ 30 ℃		
Permitted ambient temp.	0 ℃ 50 ℃		
Protection class	Ш		
Protection			
For wall-mounted installation	• IP20		
In case of installation in the	• IPX2D		
heat source			
	(6		

Table 2 Specifications

2.6 Product data on energy consumption

The product data on energy consumption can be found in the operating instructions for the user.

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

For precise information regarding suitable accessories, refer to the catalogue.

Function modules and user interfaces of the control system **EMS 2**:

- User interface CR 10 as simple remote control
- User interface CR 100 as comfortable remote control
- MC 400: module for a cascade of several heat sources
- **MM 100**: module for one heating circuit with mixer, cylinder charging circuit or constant heating circuit
- **MM 200**: module for 2 heating circuits with mixer, cylinder charging circuits or constant heating circuits
- MS 100: module for solar DHW heating

8 | Installation

• **MS 200**: module for advanced solar systems (wallmounted installation only).

Combination is not possible with the following products:

• FR..., FW..., TF..., TR..., TA...

Applicability of these instructions to EMS 2-capable modules

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

Additional setting options may be found in some menus, if your heating system is equipped with alternative modules (e.g. MS 100 solar module, 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, heating controllers or the 2-wire BUS apply also to the present user interface.

2.10 Disposal

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

3 Installation

The detailed system schematics for mounting the hydraulic assemblies and components and the associated control devices can be found in the planning documents or tender specifications.



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 nodes from the mains voltage across all poles.

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 (\rightarrow Section 2, page 4).

3.2 Installation location of the user interface

If the weather-compensated control (without room temperature influence) is active, for a direct and easy accessible operation we recommend the installation of the user interface in the living space. Alternatively, in case of this control type the user interface can also be installed at the heat source.

The room in your home where the user interface (as controller) is installed is the reference room. If the room temperature-dependent control is active, the room temperature in this room serves as the reference variable for the entire system.

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

In case of room temperature-dependent control and weathercompensated 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).
- · The user interface must be installed on an interior wall.
- If remote controls are used for all heating circuits, the user interface can be installed in the heat source.

When using manual valves with factory default in the reference room:

 Set the output of the radiators as low as possible. In this way, the reference room will be heated identically as the remaining rooms.

When using thermostatic valves in the reference room:

 Open the thermostatic 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 mere weather-compensated control instead.



Fig. 4 Installation location in the reference room

3.3 Installation in the reference room



The installation surface on the wall must be flat.

When installing on a wall box:

- Fill the wall box with thermal insulation material to prevent falsification of the room temperature measurement by drafts.
- Install plinth on a wall (\rightarrow Fig. 5).

3.4 Electrical connection

Power is supplied to the user interface via the BUS cable.

The leads may be connected to either pole.



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

Maximum total length of BUS connections:

- 100 m with 0.50 mm² conductor cross-section
- 300 m with 1.50 mm² conductor cross-section.
- If several BUS nodes are installed, maintain a minimum clearance of 100 mm between the individual BUS nodes.
- ► If several BUS nodes are installed, connect the BUS nodes in series or in a star pattern.
- To avoid inductive interference: make sure all low-voltage cables are routed separately to 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 earth lead terminal in the module.
- Establish a BUS connection to the heat source. Depending on the installed heat source the terminal designation is different there.



Fig. 6 Connection of the user interface to a heat source



Fig. 5 Installation of plinth

The **outside temperature sensor** (included in the scope of

- delivery of CW 400/CW 800/) 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 lead cross-sections:

- Up to 20 m with 0.75 $\rm mm^2$ to 1.50 $\rm mm^2$ conductor cross-section
- 20 m up to 100 m with 1.50 mm² conductor crosssection.

3.5 Attaching or removing the user interface

Attaching the user interface

- Hook in the user interface at the top.
- Click in the user interface at the bottom.



Fig. 7 Attaching the user interface

Removing the user interface

- Press the button on the underside of the plinth.
- Pull the bottom of the user interface away from the plate.
- Remove the user interface by lifting upward.



Fig. 8 Removing the user interface

3.6 Installation in the heat source

The installation of the user interface directly in the heat source is for example appropriate with weather-compensated control.

When installing the user interface:

Prepare user interface for installation in the heat source:



Fig. 9 Loosen the cover at the back of the user interface



Fig. 10 Remove the cover at the back of the user interface



Fig. 11 Mount installation frame at the back of the user interface

• Observe the installation instructions of the heat source.

3.7 Installation of a outside temperature sensor

If the user interface is used as a weather-compensated control unit, an outside temperature sensor is required.

▶ Observe the points represented in Fig. 12 when selecting the correct installation location of the outside temperature sensor.

N 🗸 </NW NE 🗸 ſċ - 🗇 (min т т Т 1/2 H (min 2m) 6 720 812 360-07.10

Fig. 12 Installation location for the outside temperature sensor (for weather-compensated control with or without room temperature influence)

To correctly record the outside temperature:

4 Basic principles of operation

4.1 Overview of control elements



Fig. 13 Control elements

- [1] fav key (favourites functions)
- [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



If the backlighting of the display is off, the operating step is executed and the backlighting is turned on by actuating a control element. Pressing the selector for the first time only activates the backlighting. If no control element is actuated, the backlighting turns off automatically.

ightarrow Fig.	13, page 14			
ltem	Element	Designation	Explanation	
1		fav key	 Press to call up the favourites functions for heating circuit 1. 	
	fav		 Press and hold to individually adjust the favourites menu 	
			$(\rightarrow$ user interface operating instructions).	
2		man key	 Press to activate manual operation for a permanent room temperature set value. 	
	man		 Hold to activate the input field for the duration of the manual operation (maximum 	
			48 hours from current time).	
3	t	auto key	Press to activate the automatic mode with the time program.	
	auto			
4		monu hutton	Drocs to open the main many	
4	menu			
	menu		Find to open the service menu.	
5		Info kev	If a menu is open:	
-	info		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 higher menu level or discard a changed value.	
			If the need for a service or a fault is displayed:	
			 Press to switch between standard display and fault display. 	
			 Hold to switch from a menu to the standard display. 	
7		Selector	► Turn to change a setting value (e. g. temperature) or select from among the menus or	
	$ \langle \rangle \rangle$	$ \langle \rangle \rangle$		menu items.
	\mathbb{N}		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 crose a pop-up window.	
			If the standard display is active:	
			r ress to activate the hiput height of selecting the heating circuit III the stational display (only systems with at least two heating circuits \rightarrow operating instructions of	
			the user interface).	

Table 5 Control elements





Fig. 14 Example for a standard display of a system with more than one heating circuit

ightarrow Fig.	14, page 16		
ltem	Symbol	Designation	Explanation
1	19 ^{°C}	Value display	 Display of current temperature: Room temperature for wall-mounted installation Heat source temperature for installation in heat source.
2	-	Information line	Display of time of day, day of the week and date.
3	¦ি 3.0°	Additional temperature display	Display of an additional temperature: outside temperature, temperature of the solar collector or a DHW system (for further information \rightarrow operating instructions of the user interface).
4	-	Text information	E.g. the designation of the temperature currently displayed (\rightarrow Fig. 14, [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	*	Information graphic	Solar pump is in operation.
	<u>.</u>]	DHW heating is active
	×		DHW heating is switched off
	٥		Burner is on (flame)
	В		Heat source is blocked (e.g. by an alternative heat source).
6		Time 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	18	Time marker	The time marker ■ indicates the current time of day in the time program in 15 minute increments (= division of time scale).

Table 6Symbols on the standard display

ightarrow Fig.	→ Fig. 14, page 16					
ltem	Symbol	Designation	Explanation			
8	auto	Operating mode	System 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 (\rightarrow operating instructions of the user interface).			
	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 (\rightarrow operating instructions of the user interface).			
	HC2Holiday until 10/6/2015		The holiday program is active in the displayed heating circuit and possibly for DHW systems (\rightarrow operating instructions of the user interface). The standard display refers only to the displayed heating circuit.			
	Ж		Heating is completely off (all heating circuits)			
	ł		Chimney sweep mode is active (if the user interface is installed in the heat source, simultaneously press and hold the info and return keys for a longer time to activate the chimney sweep mode).			
	<u>_</u>		Emergency operation is active			
	E		External heat requirement			
9	())	User interface status	A communication module is available in the system and a connection to the Bosch server is active.			
	-0		The key block is active (hold down the auto key and the selector to activate or deactivate the key block).			

Table 6Symbols on the standard display

4.3 Operating the service menu



If the backlighting of the display is off, the operating step is executed and the backlighting is turned on by actuating a control element. Pressing the selector for the first time only activates the backlighting. If no control element is actuated, the backlighting turns off automatically.

Closing and opening the service menu

Opening the	Opening the service menu				
menu	•	Hold the menu key until the service menu is displayed.			
Closing the s	erv	ice menu			
>	•	If no sub-menu is open, press the Back key to switch to the standard display.			
-7		-or-			
		Press and hold the Back key for a few seconds to switch to the standard display.			
	-				

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.
2	•	Press the Back key to return to the higher menu level.

Changing setting values



between minimum and maximum.



Confirming or rejecting the change





Press the Back key to reject the change.

4.4 Overview of the service menu

Menu		Purpose of the menu	
Commissionin	g	Check and, if necessary, adjust Start configuration wizard and the most important system configuration settings.	
Central System data heating settings ¹⁾		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 I are available in this menu (if directly connected to the heat source).	
	Boiler data ²⁾	Product-specific settings for the installed heat source, e.g. pump characteristic map or pump run-on time.	31
	Heating circuit 1 8	Heating circuit-specific settings of the installed heating circuits 1 to 8, e.g. frost protection and heating curve.	32
	Screed drying	Configurable program for drying new screed with underfloor heating system.	39
DHW settings1)DHW system I or IISeparate setting options for two DHW systems, e.g. maximum DHW tempera time for the thermal disinfection and configuration of the DHW circulation put		41	
Solar settings		If a solar system is installed: see technical documentation for solar modules.	
Hybrid setting	S	If a hybrid system is installed: see technical documentation for hybrid system.	44
Cascade settings		If a cascade module is installed to control several heat sources: see technical documentation for cascade module.	
Diagnosis ¹⁾		 System diagnosis: Perform function test of individual actuators (e.g. pumps). Compare set and actual values. Display current faults and the fault history. Display the software versions of all BUS nodes. Additional functions: Define maintenance intervals. Reset different settings. 	44

Table 7Overview of the service menu

1) Limited use depending on the heat source used.

2) Only available if no cascade module (e.g. MC 400) is installed.

5 Commissioning

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L		

System schematics are available in the installation and maintenance instructions of the MM 100/MM 200 and MS 100/MS 200 modules. Other examples can be found in the technical guide.

5.1 Overview of the commissioning steps

- 1. Mechanical design of the system (observe instructions for all assemblies and components)
- 2. Initial charging with fluids and tightness test
- 3. Electrical wiring
- 4. Coding of the modules (observe instructions of the modules)
- 5. Switch on the system
- 6. Vent the system
- 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 C 400/C 800 user interface
 (→ Chapter 5.2, page 20)
- 10. Commissioning the system with the user interface (→ Chapter 5.3, page 20)
- 11. Check and, if necessary, adjust the settings in the service menu of the C 400/C 800 user interface and perform configuration (e.g. solar) (→ Chapter 5.4, page 23)
- 12. Remedy warning and fault displays, if necessary, and reset fault history
- 13. Fill in commissioning reports
 - $(\rightarrow$ Chapter 10 from page 53 and operating instructions)
- 14. System handover (\rightarrow Chapter 5.7, page 23).

5.2 General commissioning of the user interface

The adjustment is performed according to the description in the operating instructions, if necessary also through direct time correction.

	Setting language			
$(\mathbf{\Omega})$	 Turn the selector to select a language and 			
	press the selector.			
8	Setting the date			
\frown	 Turn the selector to set the day, month and 			
()	year.			
	Continue is highlighted.			
	► If the date is set correctly, press the selector			
	to apply the date.			
	Setting the time			
	 Turn the selector to set the hours and the 			
	minutes.			
	Continue is highlighted.			
	► If the time is set correctly, press the selector			
	to apply the time.			
	Low loss header			
	 Turn the selector to set whether a low loss 			
\checkmark	header is installed (temperature sensor			
e	→ Tab. 9) or not (No low-loss header).			
	System configuration			
()	► Turn and press the selector to start (Yes) or			
	to skip the configuration wizard (No).			
	 When the configuration wizard is started, the 			
	user interface automatically recognises			
	which BUS nodes are installed in the system			
	(system analysis) and adjusts the menu and			
	the factory defaults to the current system.			
	 Perform system commissioning 			
	$(\rightarrow$ Chapter 5.3).			

Table 8General settings at commissioning

5.3 System commissioning with the configuration wizard

The configuration wizard automatically recognises which BUS nodes 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 always 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.

For further information on the settings refer to Chapter 7 from page 24.

Menu item		Question	Answer / setting Yes No	
Start configuration wizard		 Check before starting the configuration wizard: Module installed and address set? Remote control installed and set? Temperature sensor installed? Start the configuration wizard? 		
System data Low loss hdr. sensr. instll.		Is a low loss header installed? If yes, is a temperature sensor installed? If yes, where is it electrically connected? No low-loss header At boiler At the module o sensor		
	Config. DHW at boiler	How is DHW connected to the heat source (boiler)? No DHW 3-way valve F pump		
	Config. of HC1 at boiler	Is heating circuit 1 connected to the heat source (boiler)? If yes, does it have a separate heating circuit pump?	No heating circuit No own heating circuit pump Own pump	
Min. outdoor temperature		With weather-compensated control: what is the minimum outside temperature at the location on average over the last few years?	- 35 10 °C	
	Type of building	To what type of building is the heated building? Light Medium Heavy		
Boiler data Pump type Pump run-on time		Is the pump operated depending on the burner output or the differential pressure?	Output-compensated Delta P- compensated 14	
		How long must the pump run on after the shutdown of the burner to discharge the heat from the heat source?	24h 1 60 min	
Heating circuit	Heating circuit installed	Is heating circuit 1 installed? If yes, where is heating circuit 1 electrically connected?	No At the boiler At the module	
	Ctrl type h. circ. 1	How should the temperature influenced by heating circuit 1 be controlled?	Outdoor-tempcompensated Outside temp. with low end Room-tempcompensated Room temperature output Constant	
User interface Heating system heat circ. 1		What user interface is installed?	CR400 CW400 CW800 CR100 CR10	
		What type of heating does heating circuit 1 operate?	Radiator Convector heater Underfloor	
	Set point constant	If heating circuit 1 is configured as constant heating circuit: To which temperature should the heating be controlled?	30 85 °C	
Max. flow temperature Set heating curve		What is the maximum flow temperature that should be set?	E.g. 30 85 °C	
		Should the heating curve for heating circuit 1 be set? (For further sub-settings \rightarrow Chapter 7.1.3, from page 32)	→ page 35, Tab. 16	
	Setback type	Which setback type should be used?	Reduced mode Outside temperature threshold Room temperature threshold	

 Table 9
 Commissioning with the configuration wizard

Menu item		Question	Answer / setting		
	Reduced mode below	When Setback type = Outside temperature threshold : below what temperature should the reduced mode be activated?	- 10 20 °C		
Outdoor temp. Mixer		Is frost protection set? At what temperature should the Room and outdoor temp frost protection be activated? temperature Frost prot			
		Is heating circuit 1 a heating circuit with mixer?	Yes No		
	Mixer runtime	How long does it take until the mixer in heating circuit 1 rotates from one stop to the other?			
	DHW priority	Should the heating be deactivated during DHW Yes No heating?			
Heating circuit circuit 8	2,, heating	See Heating circuit 1			
DHW system I	DHW system I install.	Is a DHW system installed? Where is DHW system I electrically connected?	No At the boiler At the module		
	Config. DHW at boiler	How is the DHW system I integrated hydraulically? No DHW 3-way valve I pump			
DHW		What DHW temperature should be set?	E.g. 15 60 °C		
	DHW reduced	What reduced DHW temperature should be set?	E.g. 15 60 °C		
	DHW circ. pump installed	Is an additional DHW circulation pump installed in the DHW system?	No Yes		
	DHW circulation pump	If a DHW circulation pump is installed: is this pump controlled by the heat source?	On Off		
DHW system II		See DHW system I			
Solar Solar thermal sys installed		Is a solar system installed? If a solar system is installed (Yes), there are additional menu items in the menu Solar (\rightarrow technical documentation of the solar system).	No Yes		
Start solar thermal system		 Charge 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: Solar thermal system charged and vented? Parameters of the solar thermal system checked or adjusted to the installed solar thermal system? Has the solar thermal system been commissioned? 	Yes No		
Confirm config	uration	Do the settings match the installed system?	Confirm Back		

Table 9Commissioning with the configuration wizard

5.4 Commissioning other settings

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

5.4.1 Checklist: adjusting settings to customer requirements

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

Menu item	Customer requirement/setting
Fast heat-up	Setting value in percentage or switch off (\rightarrow Tab. 16, from page 35)
Start frequency DHW circ. (DHW circulation pump)	Permanently, $1 \times 3 \dots 6 \times 3$ minutes/h (\rightarrow page 42)
DHW priority	Yes No (→ page 34)
Time program (times)	Adjust default settings/own time program according to customer requirements (\rightarrow user interface operating instructions).

 Table 10
 Checklist: important settings, clarifying customer requirements

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

5.4.2 Important heating settings

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

- ► Check settings in the system data menu (→ Chapter 7.1.1, page 29).
- ► Check settings in the boiler data menu (→ Chapter 7.1.2, page 31).
- Check settings in the menu Heating circuit 1 ... 4 or 1 ... 8 (→ Chapter 7.1.3, page 32).

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 make sure the DHW heating is working properly.

Check the settings in the DHW system I ... II menu
 (→ Chapter 7.2, page 41).

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.

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 44 to ensure proper functioning.

5.4.6 Important settings for cascades

Observe technical documentation (e.g. MC 400) and Chapter 7.5, page 44 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 following can be tested, for example: **Burner: On/Off** (\rightarrow Chapter 7.6.1, page 44).

5.6 Check monitored values

Monitored values are shown in the **Diagnosis** menu $(\rightarrow$ 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. Only under this condition can the C 400/C 800 user interface control the DHW and flow temperatures.
- Explain to the customer how the user interface and the accessories work and how to operate them.
- Inform the customer about the selected settings.

i

We recommend to hand over these installation instructions to the end user.

6 Shutting down/Switching off

The programming unit 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 from the power supply.



After a prolonged power failure or shutdown, the date and time might have to be reset. All other settings are retained permanently.

7 Service menu

The menu of the user interface is adapted to your system automatically. Some menu items are only available if the system has been set up accordingly and the user interface 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.

If a CR 100 is assigned to a heating circuit as remote control, the available setting options at C 400/C 800 for the corresponding heating circuit are limited. Some settings that can be changed via CR 100 are not displayed in the C 400/ C 800 menu. Further information about the affected settings is available in the operating instructions for CR 100.

Information about the operation of the service menu is summarised in Chapter 4, from page 14.



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



Fig. 15 Overview of the service menu 1/4

- 1) Only available if no cascade module (e.g. MC 400) is installed.
- 2) Only available with constant heating circuits.
- 3) Only available with DHW system I.



Fig. 16 Overview of the service menu 2/4

1) Only available if no cascade module (e.g. MC 400) is installed.



Fig. 17 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.

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Fig. 18 Overview of the service menu 4/4

1) Only available if no cascade module (e.g. MC 400) is installed.

7.1 Heating settings

\ll > Central heating settings	5
System data	>
Boiler data	>
Heating circ. 1	>
Heating circ. 2	>
Heating circ. 3	>

Fig. 19 Heating 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 can be set here. Additional settings for heating circuit 1 and DHW system I are available in this menu (if directly connected to the heat source).

Menu item	Adjustment range	Description		
Low loss hdr. sensr.	No low-loss header	No low loss header is installed		
instll.	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		
	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	No DHW	Hydraulic connection of DHW system I to heat source (boiler)		
boiler	3-way valve			
	Primary pump			
Config. of HC1 at		Hydraulic and electrical connection of heating circuit 1 to heat source (boiler)		
boiler	No heating circuit	Heating circuit 1 not directly connected to heat source (boiler)		
(only with heat source with EMS 2)	No own heating circuit pump	Internal boiler pump serves also as heating pump in heating circuit 1		
	Own pump	Heating circuit 1 is supplied by a separate heating pump (connected to a wall mounted boiler)		
Boiler circuit pump	None	The heat source pump operates purely as a heating circuit pump.		
	System pump	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 - 10 10 ℃	With weather-compensated control the minimum outside temperature affects the heating curve (\rightarrow Minimum outside temperature, page 30 and Menu for setting of the heating curve, page 35).		
Damping	Yes	The set building type affects the measurement of the outside temperature. The outside temperature is delayed (adjusted).		
	No	The measured outside temperature is included unadjusted in the weather- compensated control.		
Type of building		Measure of the thermal storage capacity of the heated building $(\rightarrow$ Type of building, page 30).		
	Heavy	High storage capacity		
	Medium	Medium storage capacity		
	Light	Low storage capacity		

Table 11 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. 12.

 Set the minimum outside design temperature for the heating system.

Location	Minimum outside temperature in °C
Brisbane	4
Canton	15
Chongqing	3
Hong Kong	6
Melbourne	0
Shanghai	- 1
Sydney	5

Table 12 Minimum outside temperatures

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 of the building mass 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 also affects the quick heat-up.

Adjustment	Туре	Eff	fect
Light	for example prefabricated building,	•	low adjustment of the outside temperature
	wood-frame construction	•	short excess of the flow temperature in case of quick heat-up.
Medium	for example house made of hollow	•	medium adjustment of the outside temperature
	blocks (default setting)	•	excess of the flow temperature with quick heat-up of medium duration.
Heavy	for example brick house	•	high adjustment of the outside temperature
		•	long excess of the flow temperature in case of quick heat-up.

Table 13 Building types



Fig. 20 Example for adjusted outside temperature:

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

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

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 delay of three hours at the latest 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 > Room and outdoor temp. > Outdoor temp. curve menu

7.1.2 Boiler data menu

Heat source-specific settings, e.g. the maximum heat output or the used heating pump, can be made in this menu. With these settings e.g. the operating times and the energy consumption of the pump can be optimised. Here, it can be set which pump characteristic map is used and how long the pump run-on time is. Further information is available in the technical documentation of the used heat source and, if installed, the module. This 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	Output- compensated	The heating pump is operated with reference to the burner output.
	Delta P- compensated 14	The heating pump is operated with reference to the differential pressure.
Pump run-on time	24 h 0 3 60 min	Pump run-on time after the burner is off to discharge the heat from the heat source
Pump logic temperature	0 47 65 ℃	Below this temperature the pump is off to protect the heat source from condensate formation (only available in non-condensing appliances).
Pump control mode	Saving energy Heat request	The pump is either running during every heat requirement (set flow temperature > 0 °C) or in an energy-efficient mode.
Pump rate min. output	0100%	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	0 60s	Pump blocking time with external 3-way valve in seconds
Maximum output	0 100 %	Maximum released heat output of the heat source
Upper limit max. output	0 100 %	Upper limit of the maximum heat output
Max. DHW output	0 100 %	Maximum released DHW output
Top limit max DHW output	0 100 %	Upper limit of the maximum DHW output
Top limit max flow temp.	30 82 ℃	Upper limit of the flow temperature
Min. appliance output	0 100 %	Minimum nominal heat output (heating and hot water)
Time interv (stdby period)	3 10 45 min	Time interval between switching the burner off and back on in minutes
TempInterv (StdbyPeriod)	0 6 30 K	Temperature differential for stopping and restarting the burner
Duration of heat retention	0 1 30 min	Heating mode is blocked after DHW heating, in minutes
Venting function	Off	Venting function, e.g. following maintenance.
	Auto	
	On	
Trap filling program	Off	Program for charging the siphon in the heat source at minimum output
	One boiler minimum	

Table 14 Settings in the boiler data menu

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Menu item	Adjustment range	Description
Signal ext. heat req.	On/Off	An additional on/off temperature controller is connected to the heat source (e.g. in a building control system).
	0-10V	An additional 0-10 V temperature controller is connected to the heat source (e.g. in a building control system).
Set value ext. heat req.	Flow temperature	The 0-10 V signal that is present at the connection for an external heat
	Output	requirement signal is interpreted as a requested flow temperature or heat
		output.
${\it AirCorrFact}\ {\rm min}\ {\rm fan}\ {\rm power}$	-9 0 9	Air correction at minimum fan output rate
AirCorrFact max fan pow.	-9 0 9	Air correction at maximum fan output rate
3 WV centre pos.	Yes	3-way valve in centre position
	No	
Emerg. altern. op.	Yes	If the DHW cylinder takes a long time to charge, alternating operation
	No	between DHW heating and CH is started to ensure that heating is supplied
		despite the fact that DHW priority is set.
Turbine signal delay time	0.5 4 s	Turbine signal delay in seconds

Table 14Settings in the boiler data menu

7.1.3 Menu Heating circuit 1...8

Settings for the single heating circuits can be made in this menu. For the selected heating circuit, for instance, it can be set here which heating system is installed. In addition it can be set whether a remote control is available and which control type is used. There is also the possibility to optimise the heating curves 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.

Adjustment range	Description
No	Heating circuit is not installed. If no heating circuit is installed, the heat source is only used for 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 a MM 100/MM 200 module.
Outdoor-temp compensated	Further information on the control type \rightarrow Control types, page 34
Outside temp. with low end	
Room-tempcompensated	
Room temperature output	
Constant	
CR400	C 400/C 800 controls the selected heating circuit without remote control.
CW400	
CW800	
CR100	CR 100 is installed as remote control for the selected heating circuit
CR10	CR 10 is installed as remote control for the selected heating circuit
	Adjustment range No At the boiler At the module Outdoor-temp compensated Outside temp. with low end Room-tempcompensated Room temperature output Constant CR400 CW400 CW400 CW400 CR100 CR100

Table 15 Check settings in the menu Heating circuit 1 ... 8

Menu item	Adjustment range	Description
Use minimum value	Yes	A C 400/C 800 user interface in combination with a CR 10 or CR 100 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 in order to reliably record the room temperature with room temperature-dependent control, room frost protection, room influence,).
	No	A C 400/C 800 user interface in combination with a CR 10 or CR 100 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	Radiator	Factory default of the heating curve according to heating type, e.g.
circ. 1	Convector heater	curvature and design temperature
	Underfloor	
Set point constant	30 75 85 ℃	Flow temperature for constant heating circuit (only available with Constant control type)
Max. flow temperature	30 75 85 ℃	The maximum flow temperature can only be adjusted with a room- temperature dependent control type (section of the heating curve with weather-compensated control). 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 (\rightarrow Set the heating system and heating curves for weather-compensated control, page 35)
Setback type	Reduced mode	Further information on the setback type for the selected heating circuit
	Outside temperature threshold	(→ Setback types, page 38)
	Room temperature threshold	-
Reduced mode below	– 20 5 10 °C	Temperature for the setback type Outside temperature threshold $(\rightarrow$ Setback types, page 38)
Heat constantly below	Off	The heating system operates independent from the the adjusted outside temperature in the active operating mode (\rightarrow Heat constantly below a certain outside temperature, page 38).
	- 30 10 ℃	If the adjusted outside temperature falls below the value set here, the heating system automatically changes from the setback mode to the heating mode (\rightarrow Heat constantly below a certain outside temperature, page 38).
Outdoor temp.		Notice : to ensure frost protection for a constant heating circuit or the entire heating system, set outside temperature-dependent frost protection. This setting is independent of the set control type.
	Room and outdoor temp.	Frost protection is deactivated/activated on the basis of the temperature
	Room temperature	selected here (\rightarrow Frost protection limit temperature (outside temperature
	Frost protect	threshold), page 39)
	Off	Frost protection off
Frost prot. limit temp.	– 20 5 10 °C	→ Frost protection limit temperature (outside temperature threshold), page 39
Mixer	Yes	Selected heating circuit with mixer
	No	Selected heating circuit without mixer

 Table 15
 Check settings in the menu Heating circuit 1 ... 8

Menu item	Adjustment range	Description
Mixer runtime	10 120 600 s	Elapsed time of mixer in the selected heating circuit
Mixer increase	0 5 20 K	Enter heat production increase for mixer
DHW priority	Yes	DHW heating is activated, the heat requirement of the heating system is interrupted
	No	DHW heating is activated, the heat requirement of the heating system is met simultaneously if hydraulically possible
Shown in standard display	Yes	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 C 400/C 800 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.
Pump economy mode	Yes	Optimised pump operation active: the heating pump runs as little as possible depending on the burner operation (available only with Ctrl type h. circ. 1 Room-tempcompensated).
	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 must be deactivated.
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.
	Off	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
	medium	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 systems (large heating water quantity) and low operating temperatures

Table 15 Check settings in the menu Heating circuit 1 ... 8

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 weathercompensated control types.
- Outdoor-temp.-compensated
- 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 adapting 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 adapting 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 200heating circuit module.
- **Ctrl type h. circ. 1 > Constant**: the flow temperature in the selected heating circuit is independent of the outside and room temperature. The available setting options in the corresponding heating circuit are highly limited. Setback type, holiday function and remote control, 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, e.g. 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 MD1. 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-temperaturedependent and the DHW priority must be activated.
- The electrical integration of a constant heating circuit into the system is performed via a MM 100/MM 200 module.
- The MC1 terminal in the MM 100/MM 200 module must be bridged according to the technical documentation of the module.
- The TO temperature sensor can be connected to the MM 100/MM 200 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 curves for weathercompensated control

- Set the heating type (radiator, convector or underfloor heating system) in the Central heating settings > Heating circuit 1...8 > Heating system heat circ. 1 menu.
- Set the control type (weather-compensated or weathercompensated 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 item	Adjustment range	Description
Design temperature or End point	Design 30 75 85 °C (radiator/convector) or 30 45 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 at the minimum outside temperature and therefore affects the steepness/ inclination of the heating curve.
End point		The end point is only available with weather-compensated control with base point. The end point is the flow temperature reached when the outside temperature is at the minimum and, thus, affects the steepness/inclination of the heating curve. When the base point is to above 30°C, the base point is the minimum value.
Base point	e.g. 20 25 °C End point	The base point of the heating curve is only available with weather-compensated control with a simple heating curve.

Menu for setting of the heating curve

Table 16 Set heating curve menu

Menu item	Adjustment range	Description
Max. flow temperature	30 75 85 °C (radiator/convector) 30 48 60 °C (underfloor heating system)	Maximum flow temperature
Solar influence	– 5 – 1 K	Within certain limits, the solar irradiation influences the weather-compensated control (the additional heat from the sun lowers the required heat output).
	Off	The solar irradiation is not considered by the control.
Room influence	Off	The weather-compensated control operates independently of the room temperature.
	1 3 10 К	Deviations in the room temperature to the extent set are set off by parallel displacement of the heating curve (only available if the user interface is installed in a suitable reference room). The higher the setting value, the greater the weighting of the room temperature deviation and the maximum possible influence of the room temperature on the heating curve.
Room temperature offset	– 10 0 10 K	Parallel displacement of the heating curve (e.g. when the room temperature measured with a thermometer deviates from the set value)
Fast heat-up	Off	No excessive increase in the flow temperature and the end of a setback phase
	0 100 %	The quick heat-up accelerates the heating-up after a setback phase. The higher the setting value, the greater the excess flow temperature and the end of a setback phase. The set building type affects the duration of the excess (\rightarrow Type of building, page 30). This setting is only available if the room influence is switched off.

Table 16 Set heating curve menu

The heating curve is the decisive basic factor for an economic and convenient operation of the heating system with weathercompensated control. To calculate the 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 is an internal operand based on the desired room temperature (set room temperature) and the room influence factor.

This allows the end customer to influence the heating curve directly 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 (\rightarrow Fig. 21 and 22) 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 course of the heating curve (inclination/steepness) is determined by the parameters **minimum outside temperature** (\rightarrow page 30) and **design temperature** (the flow temperature at minimum outside temperature) (\rightarrow Fig. 21 and 22. left).

$\left[\right]$	i

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

The heating curve can be shifted up or down parallel to the original curve by adjusting the room temperature offset and/or the set room temperature (\rightarrow Fig. 21 and 22, right).



Fig. 21 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 (base curve), limit at $T_{VL,max}$ = 48 °C
- [2] Setting: $T_{AL} = 40 \degree C$, $T_{A,min} = -10 \degree C$
- [3] Setting: $T_{AL} = 35 \,^{\circ}\text{C}$, $T_{A,\text{min}} = -20 \,^{\circ}\text{C}$
- [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





- T_A Outside temperature
- T_{VL} Flow temperature
- [1] Setting: T_{AL} = 75 °C, $T_{A,min}$ = -10 °C (base curve), limit at $T_{VL,max}$ = 75 °C
- [2] Setting: $T_{AL} = 80 \degree$ C, $T_{A,min} = -10 \degree$ C, limit at $T_{VL,max} = 80 \degree$ 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_{VI.max} = 75 °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_{VI.max} = 75 °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	– 10 °C	– 10 °C
temperature T _{A,min}		
Base point	25 °C	25 °C
End point	45 °C	75°C
Maximum flow temperature	48 °C	75℃
T _{VL,max}		
Room temperature offset	0.0 K	0.0 K

Table 17 Basic settings of the simple heating curve

Setback types

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

In the service menu Central heating settings > Heating circuit 1 ... 8 > Setback type the following setback types are available to suit the differing needs of the user:

- Reduced mode: The temperature of the rooms continues to be adjusted 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
 - only available if the outside temperature is recorded
 - without outside temperature sensor same as reduced mode.
- **Room temperature threshold**: if the room temperature falls below the desired temperature for the setback mode, the heating system works in the same way 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 a separate 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. In such cases DIN-EN 12831 requires that heat emitters and heat sources are designed for a certain output. This serves to maintain a comfort heat.

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

Fig. 23 and 24 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. 24 Effect with setting – 15 °C

Key to fig. 23 and 24:

- T_A Outside temperature
- T_{VL} Flow temperature
- [1] Standby mode (\rightarrow 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 °C, the heating system changes from reduced mode to heating mode[3]. This allows smaller heat emitters 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.**, **Room and outdoor temp.** or **Frost protect** is set in the menu.



NOTICE: Domestic hot water carrying parts may be damaged beyond repair if the frost protection limit temperature is set too low and in prolonged periods with outside temperature below 0 °C.

- Adjust frost protection limit temperature (default setting = 5 °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 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 **room temperature** setting does not offer absolute frost protection, because pipework installed in façades, for instance, can freeze. This can happen even though the temperature in the reference room is considerably higher than 5 °C as the result of outside heat sources. 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 Outdoor temp. menu, set either Room and outdoor temp. or Frost protect.

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 the heating system automatically runs the screed drying program once.



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

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

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



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 instructions of the manufacturer.
- In spite of the screed drying function, visit the system daily and keep the prescribed records.

Menu item	Adjustment range	Description	
Activated	Yes	The required settings for the screed drying are displayed.	
	No	The screed drying is not active and the settings are not displayed (default setting).	
Dwell time before start	No dwell time	The screed drying program starts after the set waiting time (selected heating	
	1 50 days	circuits are switched off during the waiting time, frost protection is active; default setting: no waiting time, \rightarrow Fig. 25, time before day 0)	
Start phase duration	No start phase	Time delay between the beginning of the start phase and the next phase	
	1 3 30 days	$(\rightarrow$ Fig. 25, [1])	
Start phase temperature	20 25 55 ℃	Flow temperature during the start phase (\rightarrow Fig. 25, [1])	
Heat-up phase step width	No heat-up phase	Time delay between the steps (increment) in the heat-up phase	
	1 10 days	$(\rightarrow$ Fig. 25, [3])	
Heat-up phase temp. diff	1 5 35 K	Temperature differential between the steps in the heat-up phase (\rightarrow Fig. 25, [2])	
Holding phase duration	1 7 99 days	Time delay between the beginning of the holding phase (duration of the maximum temperature for screed drying) and the next phase $(\rightarrow$ Fig. 25, [4])	
Holding phase temp.	20 55 °C	Flow temperature during the holding phase (maximum temperature, \rightarrow Fig. 25, [4])	
Cool-dn phase step wdth	No cool-down phase	Time delay between the steps (increment) in the cooling phase	
	1 10 days	$(\rightarrow$ Fig. 25, [5])	
Cool-down phase t.diff	1 5 35 K	Temperature differential between the steps in the cooling phase $(\rightarrow$ Fig. 25, [6])	
Endphase duration	No end phase	Time delay between the beginning of the end phase (last temperature step)	
	Permanently	and the end of the screed drying program (\rightarrow Fig. 25, [7])	
	1 30 days		
End phase temperature	20 25 55 ℃	Flow temperature during end phase (\rightarrow Fig. 25, [7])	
Max. interruption time	2 12 24 h	Maximum duration of a screed drying interruption (e.g. by stopping the screed drying or power failure) until a fault display is output.	
Screed dry. system	Yes	Screed drying is active for all heating circuits of the system	
		Notice : single heating circuits cannot be selected. DHW heating is not possible. The display of menus and menu items with settings for DHW is switched off.	
	No	Screed drying is not active for all heating circuits	
		Notice: 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	Yes	Screed drying in the selected heating circuit is active/not active	
Screed dry h. circ. 8	No		
Start	Yes	Start screed drying now	
	No	Screed drying not yet started or terminated	
Interrupt	Yes	Temporarily stop screed drying. If the maximum interruption duration has	
	No	been exceeded, a fault display is output.	
Continue	Yes	Continue screed drying after stop.	
	No		

 Table 18
 Settings in the Screed drying menu (Fig. 25 shows the default setting of the screed drying program)



Fig. 25 Screed drying process with default settings

- t Time in days
- T_{VL} Flow temperature

7.2 DHW settings



Fig. 26 DHW settings menu

DHW system I ... II

Settings of the DHW systems can be adapted in this menu. For instance, the maximum DHW temperature that can be specified by the user and whether or not there is circulation in the DHW

system is set here. The time and the temperature for the thermal disinfection are also set here.



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.)	No	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/MM 200 modules
Config. DHW at		Hydraulic connection DHW system I to heat source (boiler).
boiler	No DHW	No DHW system installed
	3-way valve	DHW system I is supplied via 3-way valve
	Primary pump	DHW system I is supplied via cylinder primary pump
Max. DHW temp.	60 80 ℃	Maximum DHW temperature in the selected DHW cylinder
DHW	e.g. 15 60 °C (80 °C)	Required DHW temperature for the DHW operating mode; the adjustment range depends on the installed heat source.

Table 19 Settings in the DHW system I ... II

Menu item	Adjustment range	Description
DHW reduced	e.g. 15 45 60 ℃ (80 ℃)	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 - 5 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 – 5 – 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 the stop temperature differential, the DHW cylinder is not heated further (only if MS 200 is used as a stratification cylinder primary module).
Flow temp. increase	0 40 К	Excess 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.
Start cyl. primary		Only available with DHW heating via a MM 100/MM 200 module
pump	temp compensated	Only if the temperature in the low loss header is higher than the temperature in the DHW cylinder, is the cylinder primary pump switched on in case of a cylinder load (no withdrawal of residual heat from the cylinder).
	immed.	In case of a cylinder load the cylinder primary pump is switched on immediately independent of the flow temperature.
Min. temp. difference	0 6 10 K	Temperature differential between low loss header and cylinder at the start of the cylinder primary pump (only available if Start cyl. primary pump tempcompensated is selected in the menu).
DHW circ. pump installed	Yes	DHW circulation lines and a DHW circulation pump are installed in the DHW system (system I or II).
	No	No circulation for DHW 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	Off	Circulation off
mode	On	Circulation permanently on (by taking the start frequency into account)
	As DHW system I (As DHW system II)	Activate the same time program for circulation as for DHW heating. Further information and settings of the customised time program (\rightarrow user interface operating instructions).
	Own time program	Activate customised time program for circulation. Further information and settings of the customised time program (\rightarrow user interface operating instructions).
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 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.

Table 19 Settings in the DHW system I ... II

Menu item	Adjustment range	Description
Automat. therm. disinfect.	Yes	The thermal disinfection is started automatically at the set time (e.g. on Mondays at 02:00 a.m., \rightarrow Thermal disinfection, page 43)
	No	The thermal disinfection is not started automatically.
Therm. disinfection	Monday	The weekday on which thermal disinfection is performed.
day	Tuesday Sunday	
	Daily	Thermal disinfection is performed daily.
Therm. disinfection	00:00	Time of day for the start of thermal disinfection at the set day.
time	02:00 23:45	
Therm. disinfection	e.g. 65	Temperature to which the entire DHW volume is heated during thermal disinfection.
temp.	75 80 ℃	The adjustment range depends on the installed heat source.
Start now manually / Cancel now		Starts the thermal disinfection manually/cancels the thermal disinfection.
manually		
Daily heat-up	Yes	The daily heat-up is only available for DHW heating with 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	Time for the start of the daily heat-up.
	02:00 23:45	

Table 19 Settings in the DHW system I ... II

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 at 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 (\rightarrow 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 if according to the setting.
 - The thermal disinfection starts automatically at the set time according to the time set in the user interface.
 - 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. 27 Solar settings menu

If a solar system is integrated into the heating system via a module, corresponding menus and menu items are available. Extension of the menus by the solar system is described in the operating instructions of the used module.

In the **Solar settings** menu the sub-menus listed in Tab. 20 are available **with all solar systems**.



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 installed solar collector area is incorrectly set, the solar yield displayed in the

info menu will also be incorrect.

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

Table 20General 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 with several heat sources, the **Cascade settings** menu is available. Depending on the used system architecture various settings can be made. Observe the detailed information in the technical documentation for the cascade module.

7.6 Diagnosis menu

> Diagnosis	
Function test	>
Monitored values	>
Fault displays	>
System information	>
Maintenance	>

Fig. 28 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 setting the setting values of the listed component 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.

Particularly this function of the burner test is only available if the system is designed and configured accordingly (e.g. in systems without cascade module).

7.6.2 Monitored values menu

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

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

Information in the Heating circuit 1...8 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).
- Req met: heat requirement met; room temperature at least at set value.
- Scrd dry: screed drying is active for the heating circuit (→ Chapter 7.1.4, from page 39).
- **Chim.**: flue gas inspector function is active.
- **Fault**: there is a fault (\rightarrow Chapter 8, from page 48).
- Frost: frost protection for the heating circuit is active (→ Tab. 15, from page 32).
- Run-on: overrun 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 circuit.

- **On**: with a heat requirement the constant heating circuit may be heated (enabled).
- Off: also in case of a heat requirement the constant heating circuit is not heated (disabled).

The **MD status** shows whether a heat requirement is present for the constant heating circuit via the MD1 terminal of the MM 100/MM 200 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 check is active.
- AntBProt: anti-seizing function is active; pump is regularly switched on briefly.
- No req.: no heat requirement.
- **Conden.**: condensation protection of the heat source is active.
- NoHeat: no heat delivery possible, e.g. if there is a fault.
- **DHW pre**: DHW priority is active (→ Tab. 15, from page 32).
- Ht req.: a heat requirement is present.
- **Frost**: frost protection for the heating circuit is active (→ Tab. 15, from page 32).
- **Prg.off**: no heat requirement release via the time program of the constant heating circuit (→ Control types, page 34)

In addition, in the **Heating circuit 1...8** 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 visible.
- 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 39).
- **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).
- Br. 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. 19, starting on page 41).

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.
- Bir.cold: Temperature of the heat source is too low.
- Scrd dry: Screed drying is active (→ Chapter 7.1.4, starting on page 39).
- **Cyl.Ht.T**: Cylinder charging in progress.

The ${\bf Status}$ menu item under ${\bf Circulation}$ shows why the circulation is ${\bf On}$ or ${\bf Off}.$

- Scrd dry: Screed drying is running for the entire system (→ Chapter 7.1.4, starting on page 39).
- **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 shortly.
- 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 $(\rightarrow$ Chapter 7.6.6, page 48).

Table 21 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 in this menu. The user interface shows a service display with fault codes. The end customer can notify you to arrange an appointment (\rightarrow 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	After expiry of the burner runtime (hours run with switched-on burner) a service display will appear.

Table 22Settings in the maintenance menu

7.6.6 Reset menu

You can delete different 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, it is immediately entered again.
Service displays	The maintenance and service displays are reset.
Hours run/ burner starts	The counters for the burner runtime and burner starts are reset.
Heating circuits time prog	The time programs of all heating circuits are reset to the default setting. This menu item has no effect on those heating circuits with a CR 100 assigned as remote control.
Time prog. DHW	All time programs of all DHW systems (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 23 Resetting the settings

7.6.7 Calibration menu

Menu item	Description
Room temp. sen. adj.	 Position a suitable precision instrument near the user interface. The precision instrument must not transfer any heat to the user interface. Keep away from heat sources such as sunlight, body heat, etc. for 1 hour. Adjust the displayed room temperature correction value (- 3 0 + 3 K).
Time correction	 This correction (- 20 0 + 20 s) is automatically carried out once a week. Example: deviation of the time by approximately -6 minutes per year -6 minutes per year is equal to - 360 seconds per year 1 year = 52 weeks -360 seconds: 52 weeks -6.92 seconds per week Correction factor = +7 s/week.

Table 24Settings in the Calibration menu

8 Troubleshooting

A fault in the system is indicated on the display of the user interface. The cause can be a fault on the user interface, in a component, in an assembly or on the heat source. The instructions belonging to the affected component, assembly or heat source used and especially the service manual with detailed fault descriptions contain additional information on troubleshooting. Many heat source faults do not appear on the display of the user interface. They are described in the documents for the heat source used.

The user interface saves the faults that have most recently occurred with a time stamp (\rightarrow fault history, page 47).



Use only original spare parts. Damage resulting from spare parts, which are not supplied by the manufacturer, is excluded from liability.

If a fault cannot be corrected, contact the service technician responsible for your area or the nearest Bosch office.

Fault code	Sub-code	Cause or fault description	Test procedure / Cause	Action
A01	808	DHW heating: DHW temp. sensor 1 faulty.	No DHW system installed	Deactivate DHW system in the service menu
		If the DHW function is not needed, deactivate it in the	Check connecting lead between control unit and DHW temperature sensor	If there is a defect, replace the sensor
		user interface	Check the electrical connection of the connecting lead in the control unit	If a screw or plug is loose, rectify the contact problem
			Check the hot water temperature sensor as shown in table	If values do not match, replace the sensor
			Check the voltage at the terminals of the hot water temperature sensor in the control unit according to table	If the sensor values matched, but the voltage values do not match, replace the control unit
A01	809	DHW heating: DHW temp. sensor 2 faulty.	No DHW system installed	Deactivate DHW system in the service menu
		If the DHW function is not needed, deactivate it in the	Check connecting lead between control unit and DHW temperature sensor	If there is a defect, replace the sensor
		user interface	Check the electrical connection of the connecting lead in the control unit	If a screw or plug is loose, rectify the contact problem
			Check the hot water temperature sensor as shown in table	If values do not match, replace the sensor
			Check the voltage at the terminals of the hot water temperature sensor in the control unit according to table	If the sensor values matched, but the voltage values do not match, replace the control unit
A01	810	Domestic hot water remains 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, the boiler output may not be sufficient	Set DHW heating to "priority"
			Check whether the heating coil in the cylinder has been vented completely	Vent if necessary
			Check the connection pipes between the heat source (boiler) and cylinder, and with the aid of the installation instructions, ensure they are connected properly	Rectify any faults in the pipework
			Using the technical documentation, check whether the installed cylinder primary pump can deliver the required output	Replace the pump if there are deviations
			Excessive losses in the DHW circulation line	Check DHW circulation line
			according to table	deviations from the table values

Table 25 Fault displays

Fault code	Sub-code	Cause or fault description	Test procedure / Cause	Action
A01 A41 A42	811 4051 4052	11DHW heating: thermal051disinfection failed052(A41/4051 = DHW system I:	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
		A42/4052 = DHW system II)	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, the boiler output may not be sufficient	Set DHW heating to "priority"
			Check whether the heating coil in the cylinder has been vented completely	Vent if necessary
			Check the connection pipes between the heat source (boiler) and cylinder, and with the aid of the installation instructions, ensure they are connected properly	Rectify any faults in the pipework
			Using the technical documentation, check whether the installed cylinder primary pump can deliver the required output	Replace the pump if there are deviations
			Excessive losses in the DHW circulation line	Check DHW circulation line
			Check the hot water temperature sensor according to table	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 incorrectly	Rectify wiring faults and switch controller off and on again
			Check whether BUS cable is defective. Remove extension module from EMS-BUS and switch control unit off and back on. Check whether the cause of the fault is a module or module wiring	Repair or replace the BUS cable. Replace the defective EMS-BUS node

Table 25 Fault displays

Fault code	Sub-code	Cause or fault description	Test procedure / Cause	Action
A11 A61 A62 A63 A64 A65 A66	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.	If an outside temperature sensor is not desired. Select the room temperature-dependent configuration in the controller.
			Check the connecting lead between the control unit and outside temperature sensor for continuity	If there is no continuity, rectify the fault
A67 A68		A65 = Heating circuit 5; A66 = Heating circuit 6; A67 = Heating circuit 7;	Check the electrical connection of the connecting lead in the outside temperature sensor or on the plug in the control unit	Clean corroded terminals in the outside sensor housing.
		A68 = heating circuit 8)	Check outside temperature sensor according to table	If values do not match, replace the sensor
			Check the voltage at the terminals of the outside temperature sensor in the control unit according to table	If the sensor values matched, but the voltage values do not match, replace the control unit
A11	1038	Invalid time/date	Date/time not yet set	Set date/time
			Prolonged loss of power supply	Avoid voltage failures
A11	3061 3062 3063	No communication with heating circuit module (3061 = Heating circuit 1;	Check configuration (set address at the module). The selected setting requires a heating circuit module	Change configuration
	3064 3065 3066 3067	3062 = Heating circuit 2; 3063 = Heating circuit 3; 3064 = Heating circuit 4; 3065 = Heating circuit 5;	Check the EMS connecting lead to the heating circuit module for damage. BUS voltage at the heating circuit module must be between 12-15 V DC.	Replace damaged cables
	3068	3066 = Heating circuit 6; 3067 = Heating circuit 7; 3068 = heating circuit 8)	Heating circuit module defective	Replace heating circuit module
A11	3091 3092 3093 3094	Room temperature sensor faulty (3091 = Heating circuit 1;	Install C 400/C 800 in the living space (not at the heat source (boiler)) or	Replace the system controller or the remote control.
	3095 3096 3097 3098	3092 = Heating circuit 2; 3095 3093 = Heating circuit 3; 3096 3095 = Heating circuit 4; 3097 3096 = Heating circuit 6; 3097 = Heating circuit 7; 3098 = heating circuit 8)	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	Check configuration (set address at the module). The selected setting requires a solar module	Change configuration
			Check the EMS connecting lead 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

Table 25 Fault displays

Fault code	Sub-code	Cause or fault description	Test procedure / Cause	Action
A31 3021 A32 3022		21 Heating circuit flow temp.22 sensor	Check configuration. The selected setting requires a flow temperature sensor	Change configuration.
A33 A34 A35	3023 3024 3025	faulty - standby mode active (A31/3021	Check the connecting lead between heating circuit module and flow temperature sensor	Establish a connection properly
A36 A37	3026 3027	= Heating circuit 1; A32/3022	Check flow temperature sensor according to table	If values do not match, replace the sensor
A38	3028	 Heating circuit 2; A33/3023 Heating circuit 3; A34/3024 Heating circuit 4; A35/3025 Heating circuit 5; A36/3026 Heating circuit 6; A37/3027 Heating circuit 7; A38/3028 heating circuit 8;) 	Check the voltage at the terminals of the flow temperature sensor at the heating circuit module according to table	If the sensor values matched, but the voltage values do not, replace the heating circuit module
A51	6021	Collector temperature sensor faulty	Check configuration. The selected setting requires a collector temperature sensor	Change configuration.
			Check connecting lead between solar module and collector temperature sensor	Establish a connection properly
			Check collector temperature sensor according to the table	If values do not match, replace the sensor
			Check the voltage at the terminals of the collector temperature sensor on the solar module according to the table	If the sensor values matched, but the voltage values do not, replace the solar module
A51	6022	Bottom temp. sensor cylinder 1 faulty. Standby mode active	Check configuration. The selected setting requires a bottom cylinder temperature sensor	Change configuration
			Check connecting lead between solar module and bottom cylinder 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 the bottom cylinder temperature sensor according to the table	If values do not match, replace the sensor
			Check the voltage at the connecting terminals of the bottom cylinder temperature sensor at the solar module according to table	If the sensor values matched, but the voltage values do not match, replace the module

Table 25 Fault displays

Fault code	Sub-code	Cause or fault description	Test procedure / Cause	Action
A61	1081 1082	Two master user interfaces in the system	Check parameter settings at the installation	Register the user interface for beating circuit $1 - 4$ (8) as master
A62 A63 A64 A65 A66 A67 A68	1082 1083 1084 1085 1086 1087 1088	ule system.	(In the BUS system in addition to the C 400/ C 800 user interface further user interfaces are configured as control unit)	(Configure CR 10/CR 100 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 25 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.

10 Commissioning report



Table 26 During installation enter the ID number of the user interface here.

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

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.

< > System data

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

Table 27 Settings at commissioning in the System data menu

< > Boiler data

Menu item	Adjustment	
Pump type	Output-compensated	
	Delta P-compensated 18 (set number)	
Pump run-on time	Set time (in minutes)	min
Pump logic temperature	Set temperature	
Pump control mode	Saving energy	
	Heat request	
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)	%
Upper limit max. output	Setting value (in percent)	%

Table 28 Settings at commissioning in the Boiler data menu

Menu item	Adjustment	
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 (StdbyPeriod) TempInterv (StdbyPeriod)	Set temperature (in Kelvin)	К
Duration of heat retention	Set time (in minutes)	min
Venting function	Off	
	Auto	
	On	
Trap filling program	On	
	One boiler minimum	
Signal ext. heat req.	On/Off	
	0-10V	
Set value ext. heat req.	Flow temperature	
	Output	
AirCorrFact min fan power	Setting value	
AirCorrFact max fan pow.	Setting value	
Emerg. altern. op.	Yes	
	No	
Turbine signal delay time	Set time (in seconds)	s

 Table 28
 Settings at commissioning in the Boiler data menu

> Heating circuit 1 ... 8

		Heating circuit							
Menu item	Adjustment	1	2	3	4	5	6	7	8
Heating circuit 1	No								
installed	At the boiler		-	-	-	-	-	-	-
	At the module								
Ctrl type h. circ. 1	Outdoor-tempcompensated								
	Outside temp. with low end								
	Room-tempcompensated								
	Room temperature output								
	Constant								
User interface	CR400 (no remote control installed)					-	-	-	-
	CW400 (no remote control installed)					-	-	-	-
	CW800 (no remote control installed)								
	CR100 (remote control installed)								
	CR10 (remote control installed)								
Use minimum value	Yes								
	No								
Heating system heat	Radiator								
circ. 1	Convector heater								
	Underfloor								
Set point constant	Set temperature								
Max. flow temperature	Set temperature								
Set heating curve	→ Tab. 30								
Setback type	Reduced mode								
	Outside temperature threshold								
	Room temperature threshold								
Reduced mode below	Set temperature								
Heat constantly below	Set temperature								
	Off								
Outdoor temp.	Room and outdoor temp.								
	Room temperature								
	Frost protect								
	Off								
Frost prot. limit temp.	Set temperature								

 Table 29
 Settings during commissioning in the menu Heating circuit 1 ... 8

		Heating circuit							
Menu item	Adjustment	1	2	3	4	5	6	7	8
Mixer	Yes								
	No								
Mixer runtime	Set time (in seconds)								
		S	S	S	S	S	S	S	S
Mixer increase	Set temperature (in Kelvin)								
		K	K	K	K	K	K	K	K
DHW priority	Yes								
	No								
Shown in standard	Yes								
display	No								
Pump economy mode	Yes								
	No								
Open-window	On								
detection	Off								
PID charact.	fast								
	medium								
	slow								

Table 29 Settings during commissioning in the menu Heating circuit 1 ... 8

Set heating curve (Heating circuit 1 ... 8)

		Heating circuit							
Menu item	Adjustment	1	2	3	4	5	6	7	8
Design temperature End point	Set temperature								
Base point	Set temperature								
Max. flow temperature	Set temperature								
Solar influence	Set temperature (in Kelvin)	ĸ	ĸ	ĸ	ĸ	ĸ	ĸ	ĸ	ĸ
	Off								
Room influence	Set temperature (in Kelvin)								
		K	K	K	K	K	K	K	K
	Off								
Room temperature offset	Set temperature (in Kelvin)								
		K	K	K	K	K	K	K	K
Fast heat-up	Setting value (in percent)								
		%	%	%	%	%	%	%	%
	Off								

Table 30 Settings when commissioning in the Set heating curve menu

关 > DHW system I ... II

		DHW system	
Menu item	Adjustment	1	I
DHW system I install.	No		
DHW system II install.	At the boiler		-
	At the module		
Config. DHW at boiler	No DHW		-
	3-way valve		-
	Primary pump		-
Max. DHW temp.	Set temperature		
DHW	Set temperature		
DHW reduced	Set temperature		
Start temp. differential	Set temperature (in Kelvin)	К	к
Switch-off temp. diff.	Set temperature (in Kelvin)	К	-
Flow temp. increase	Set temperature (in Kelvin)	к	К
DHW start delay	Set time (in seconds)	S	-
Start cyl. primary pump	tempcompensated		
	immed.		
Min. temp. difference	Set temperature (in Kelvin)	К	K
DHW circ. pump installed	Yes		
	No		
DHW circulation pump	On		-
	Off		-
DHW circ. pump mode	Off		
	On		
	As DHW system I		-
	As DHW system II	-	
	Own time program		
Start frequency DHW circ.	Set start frequency		
	(x-times for three minutes per hour)		
	Democrathy	× 3 min	× 3 min
Automatic theory disinfort			
Automat. therm. disinfect.	Yes		
	NO		ш

Table 31 Settings when commissioning in the menu DHW system I ... II

		DHW system	1
Menu item	Adjustment	1	11
Therm. disinfection day	Monday		
	Tuesday		
	Wednesday		
	Thursday		
	Friday		
	Saturday		
	Sunday		
	Daily		
Therm. disinfection time	Set time		
		:	:
Therm. disinfection temp.	Set temperature		
Daily heat-up	Yes		
	No		
Daily heat-up temp.	Set temperature		
Daily heat-up time	Set time	:	:

Table 31 Settings when commissioning in the menu DHW system I ... II

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