



Installation and maintenance instructions for the contractor

Floor standing condensing boiler

Uni Condens 8000 F

UC8000F 800...1200 kW



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1 Explanation of symbols and safety instructions

1.1 Explanation of symbols

Warnings

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

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



DANGER

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



WARNING

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



CAUTION

CAUTION indicates that minor to medium personal injury may occur.

NOTICE

NOTICE indicates that material damage may occur.

Important information



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

Additional symbols

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

Table 1

1.2 General safety instructions

Notices for the target group

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

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

⚠ General safety instructions

Failure to observe the safety instructions can result in serious personal injury and a risk to life as well as material losses and damage to the environment.

- ▶ Carry out service work at least once a year. As part of this, check that the entire system is working correctly. Defects must be remedied immediately.
- ▶ Never put your life at risk. Your own safety is paramount.
- ▶ Before commissioning the heating system, read these instructions carefully.

⚠ Risk of damage from operating errors

Operator errors can result in personal injury and material damage.

- ▶ Ensure that only personnel who can operate this appliance correctly have access to it.
- ▶ Installation and commissioning as well as servicing and maintenance must only be carried out by an approved contractor.
- ▶ Only operate the system when it contains a sufficient volume of water (operating pressure). Operation without a sufficient volume of water is not permitted.

⚠ Risk through oil leaks

If using oil as fuel, country-specific regulations hold the operator responsible for asking a contractor to correct any oil leaks the moment they are discovered.

⚠ If you smell gas

- ▶ Close gas isolation valve.
- ▶ Open windows and doors
- ▶ Do not touch any electrical switch, telephone, and do not use outlets.
- ▶ Extinguish any naked flames.
- ▶ Do not smoke!
- ▶ Do not use lighters!
- ▶ Warn all occupants in the building, but do not ring doorbells.
- ▶ **From outside the building**, call your gas supplier and licensed contractor.

⚠ Danger if you smell flue gas

- ▶ Switch off the boiler.
- ▶ Open windows and doors
- ▶ Notify an approved contractor.

⚠ Risk of electrical shock

- ▶ Electrical work must only be carried out by a qualified electrician.
- ▶ Before carrying out any work on the heating system, disconnect the heating system from the power supply across all poles (for example, press the heating system emergency stop switch outside the boiler room). It is not enough to switch off at the control unit.
- ▶ Secure the heating system against unintentional reconnection.
- ▶ Observe the country-specific rules and regulations when making the electrical connection, during initial commissioning, servicing and carrying out maintenance.
- ▶ Also observe the connection diagrams of other system components.

⚠ Risk of scalding/burning

Temperatures > 60 °C may be reached in the heating system.

- ▶ Prior to inspection and maintenance, let the floor standing boiler cool down.

⚠ Installation, conversion and operation

Insufficient ventilation may cause dangerous flue gas leaks.

- ▶ Only have the boiler installed or modified by an approved contractor.
- ▶ Never modify any parts through which flue gas is routed.
- ▶ Make sure that the vent pipes and gaskets are not damaged.
- ▶ **With open flue operation:** do not cover or reduce the size of ventilation apertures in doors and walls.

- ▶ The following applies in countries where use of windows as combustion air vents is permitted:
Make sure that windows that are used as combustion air vents cannot be shut accidentally. Attach a warning sign near the window. If draft-proof windows are installed, ensure an adequate supply of combustion air.
- ▶ If the supply air is via mechanical ventilation, combustion must only start when the supply air flap is fully open (voltage free checkback signal to the boiler controller via failsafe limit switch). Provide for control of supply air flaps.
- ▶ Make sure the boiler installation location is frost-proof.
- ▶ The heating system must be installed and operated in accordance with the applicable rules of technology as well as national, regional and local regulations.

⚠ Combustion/room air

- ▶ Keep the combustion/ambient air free of corrosive substances (e.g. halogenated hydrocarbons that contain chlorine or fluorine compounds). This will help to prevent corrosion.
- ▶ Keep the combustion air supply free of dust.

⚠ Danger posed by explosive and easily flammable materials

- ▶ Never use or store easily flammable materials (e.g. paper, thinners, paints, etc.) near the appliance.

⚠ Risk of damage to the system from frost

When the heating system is not in operation (e.g. controller switched off, fault shutdown), there is a risk of it freezing when there is frost.

In order to protect the heating system from freezing when shutting down or switching off for extended periods:

- ▶ Drain the heating system and DHW pipework at the lowest point.

⚠ Inspection and servicing

- ▶ **Recommendation for customers:** Arrange a maintenance and inspection contract with an approved contractor, covering an annual inspection and responsive maintenance.
- ▶ The user is responsible for ensuring the heating system is safe and environmentally compatible.
- ▶ Immediately correct all faults to prevent system damage!
- ▶ Use only genuine spare parts from the manufacturer. Losses caused by the use of spare parts and accessories not supplied by the manufacturer are excluded from the manufacturer's warranty.

⚠ Handover to the user

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

- ▶ Explain how to operate the heating system and draw the user's attention to any safety relevant action.
- ▶ In particular, point out the following:
 - Alterations and repairs must only be carried out by an approved contractor.
 - Safe and environmentally compatible operation requires inspection at least once a year and responsive cleaning and maintenance.
 - The heat generator may only be operated with the casing fitted and closed.
- ▶ Point out the possible consequences (personal injury, including danger to life or material damage) of non-existent or improper inspection, cleaning and maintenance.
- ▶ Point out the dangers of carbon monoxide (CO) and recommend the use of CO detectors.
- ▶ Leave the installation instructions and the operating instructions with the user for safekeeping.

2 Product Information

2.1 Declaration of Conformity

The design and operation of this product conform to European Directives and the supplementary national requirements. Its conformity is demonstrated by the CE designation.

You can view the Declaration of Conformity on the internet (→ back cover).

2.2 Determined use

The product may only be used for the heating of central heating water and for DHW heating in closed-loop DHW and heating systems.

The product is only approved for open-flue mode.

Any other use is considered inappropriate. We take no responsibility for damage caused through incorrect use.

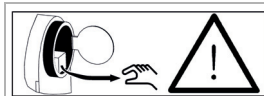
When installing and operating the heating system observe the following:

- Standards, regulations and directives of the relevant country
- Data plate of boiler
- Requirements for the control unit (→ chapter 7.1, page 25).
- Requirements for the burner (→ chapter 4.2, page 13)
- Requirements for the safety equipment (→ chapter 2.10, page 10)
- Requirements for the water quality of the heating water (→ chapter 4.6, page 14)

2.3 Symbols at the boiler



This symbol is used to point out that the installation and operating instructions must be read prior to installation operation or maintenance in order to prevent damage to the system.



This symbol is used to point out that the accessories package must be taken out of the combustion chamber before work starts.

2.4 Scope of delivery

- ▶ After delivery, check that all packaging is undamaged.
- ▶ Check the scope of delivery for completeness:
 - Boiler body with casing
 - Front cover
 - Control unit retainer and cable conduit (in the combustion chamber)
 - Sound insulation strips
 - Siphon in the combustion chamber
 - Insulating rings for blast tube in the combustion chamber
 - Technical documents

2.5 Necessary accessories

The following accessories are not included in the scope of delivery, but are required to operate the boiler:

- Burner
- Burner plate, drilled or undrilled
- Fitting assembly/boiler safety assembly
- Devices used as safety equipment
- Condensate neutraliser (if required by regulations)
- Cleaning brushes
- Control unit



Further possible accessories are listed in the catalogue or website of the manufacturer.

2.6 Data plate



If you contact the manufacturer with any questions about this product, always provide the details on the data plate. If we have these details, we can quickly answer your specific query.

The details on the data plate are binding and must be observed!

You will find information such as the serial number, output and approval details on the data plate.



The serial number can be found in the upper section of the data plate and is labelled with the number 2.

The data plate is located on the boiler casing at the rear.

The data plate contains abbreviations, pictograms and language-dependent texts.

Abbreviation	Meaning
Qn (Hi)	Maximum rated heat input / rated heat load of the boiler
Pn 50/30 °C	Rated heat output of the boiler at an operating temperature of 50/30 °C
Pn 80/60 °C	Rated heat output of the boiler at an operating temperature of 80/60 °C
PMS	Permissible operating pressure
P(Test)	Test pressure of boiler
Tmax	Permissible flow temperature
V	Water content of boiler
Cat.	Gas group classification according to EN 437 Tables B.1 and B.2. The gas group classification according to EN 437 states for the individual countries which gas qualities the devices were verified to be suitable for during type testing.
P(mbar)	Gas supply pressure for the gas group classification specified in EN 437. EN 437 differentiates between wall mounted gas boilers based on gas type, corresponding gas family and the permissible gas supply pressure during operation, which depends on the country.

Table 2 Abbreviations used on the data plate

Pictogram	Meaning
	based on natural gas as fuel
	based on fuel oil as fuel
	Burner symbol

Table 3 Pictograms used on the data plate

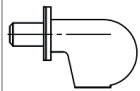
Pictogram	Meaning
	 Necessary approval for mounted burner based on the use of natural gas as fuel: EN 676
	 Necessary approval for mounted burner based on the use of fuel oil as fuel: EN 267

Table 4 Example of pictograms used on the data plate

All language-dependent texts are labelled with numbers. The translations can be found on an additional data plate.

- Attach additional data plate next to the data plate (→ Chapter 6.11, page 22).

Remarks in relation to the approval data stated:

- Standards are stated to indicate which standards are satisfied as a minimum requirement (e.g. EN 303-1, EN 303-3).
- 2016/426 stands for the European Gas Appliances Directive which the floor standing condensing boiler complies with. More details → EU Declaration of Conformity.
- In the European guideline CEN/TR 1749, wall mounted gas boilers (boilers) are classified according to the type of flue gas routing. "B23" means that the wall mounted gas boiler is intended for connection to a flue system that routes flue gas to outside the installation location, takes combustion air from the installation location directly and is equipped with an air blower located in front of the boiler (e.g. at the burner).

2.7 Product description

The Uni Condens 8000 F 800...1200 is a floor standing condensing boiler with a slim, compact design and a small footprint, comprising a combustion chamber located at the top and a condensation heating surface located at the bottom.

With the Uni Condens 8000 F 800...1200 floor standing condensing boilers, all parts that come into contact with products of combustion or condensate are made from high grade stainless steel. This makes operation possible without limitations on the flow and return temperature, the flow rate or the burner low load.

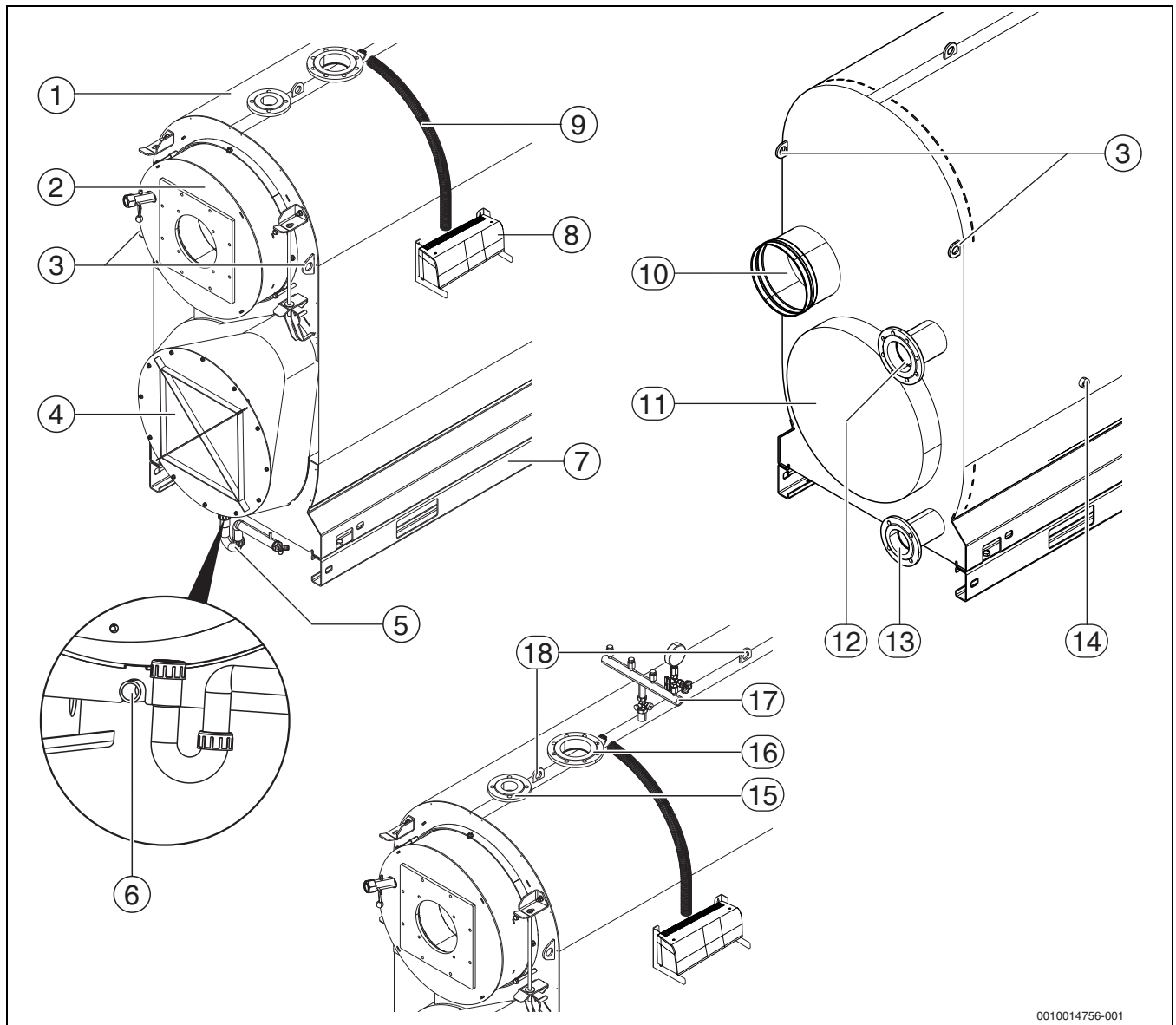
The Uni Condens 8000 F 800...1200 is also referred to in this manual as UC8000F 800...1200, boiler or heat source.

The boiler has two thermohydraulic separate return connections for the high and low temperature heating circuits (→ Figure 1, page 7).

The Uni Condens 8000 F 800...1200 must be equipped with a burner that is suitable for the boiler.

The main components of the boiler are (→ Figure 1, page 7):

- Boiler shell [1] in conjunction with a burner
The boiler block transfers the heat produced by the burner to the heating water.
- Thermally-insulated casing
The boiler shell and thermal insulation reduce energy losses.
- Control unit (accessory) [8]
The control unit monitors and controls all electrical boiler components.



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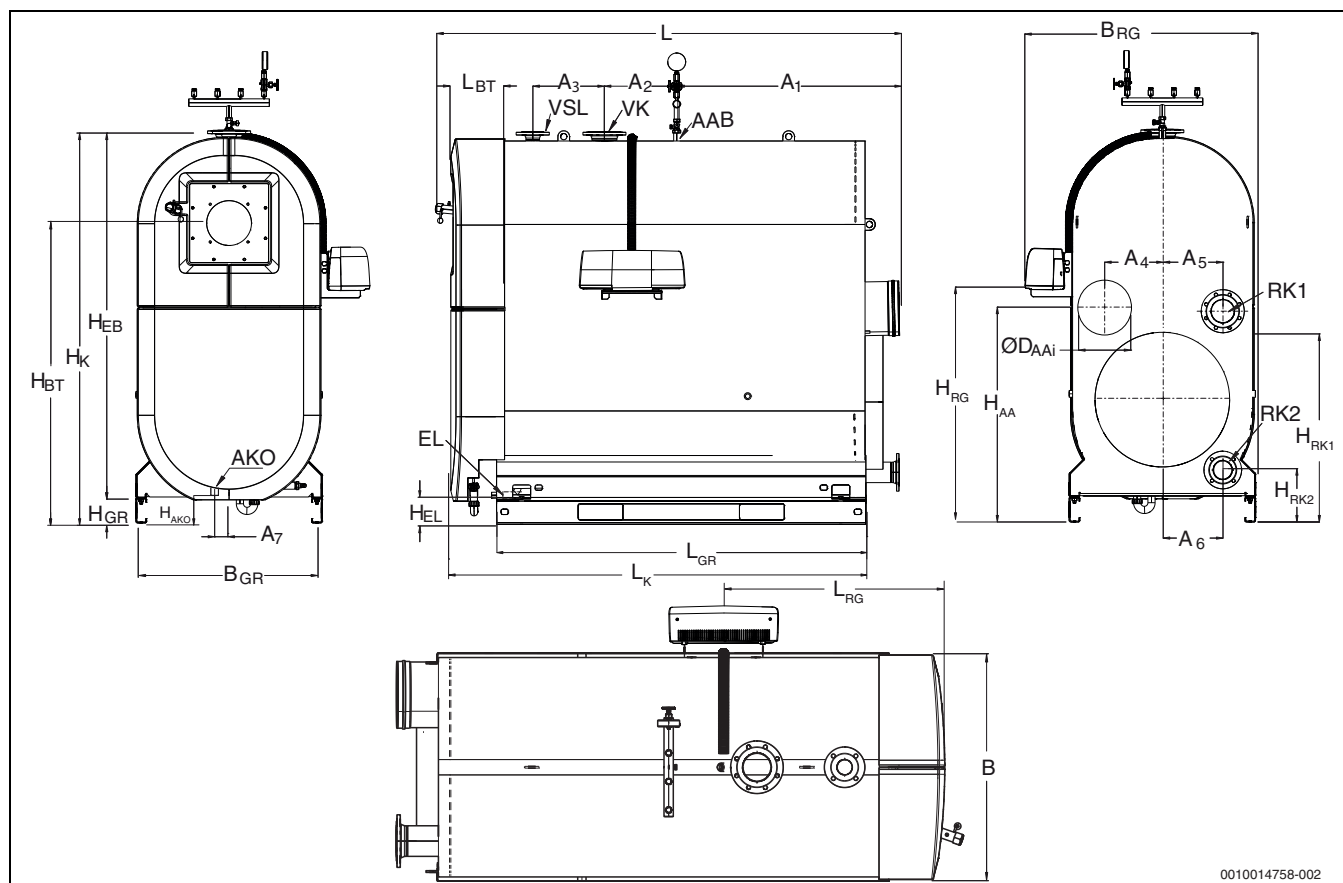
Fig. 1 Boiler overview

- [1] Boiler shell
- [2] Burner door
- [3] Locking lug for load securing during transport (no crane eyelet)
- [4] Flue gas collector
- [5] Condensate, siphon
- [6] Draining
- [7] Base frame rail
- [8] Control unit (accessory)
- [9] Cable conduit
- [10] Flue connection
- [11] Inspection aperture of condensation heating surface
- [12] Return connection 1 (RK1) low temperature return (main return)
- [13] Return connection 2 (RK2), high temperature return
- [14] Inspection aperture on the DHW side (both sides)
- [15] Safety pipe flow
- [16] Heating flow
- [17] Fitting assembly / boiler safety assembly (accessory)
- [18] Lifting eyes

2.8 Connections and dimensions



You can find additional specifications in Chapter 15.1, page 41.



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Fig. 2 Connections and dimensions

	Abbreviation	Unit	Boiler type		
			800	1000	1200
Boiler rating	–	kW	800	1000	1200
Length	L	mm	2545	2580	2580
	L_K	mm	2360	2395	2395
Length with burner	L_{BR}	mm	Depending on the respective burner		
Width	B	mm	960	1040	1040
Width with control unit	B_{RG}	mm	1220	1330	1330
Height	H_K	mm	2014	2192	2192
Height of base frame ¹⁾	H_{GR}	mm	140	140	140
Installation clearance control unit, cable conduit	L_{RG}	mm	906	906	906
Installation height, control unit right/left	H_{RG}	mm	1300	1300	1300
Installation surface base frame	L_{GR}	mm	2060	2060	2060
	B_{GR}	mm	960	1040	1040
Flue gas outlet	$\varnothing D_{AAinside}$	mm	253	303	303
	H_{AA}	mm	1064	1193	1193
	A_4	mm	299	348	348
Combustion chamber	Length	mm	1904	1954	1954
	$\varnothing_{internal}$	mm	630	688	688
Burner door	L_{BT}	mm	227	227	227
	H_{BT}	mm	1508	1653	1653
Blast tube	Minimum depth	mm	210	210	210

	Abbreviation	Unit	Boiler type		
			800	1000	1200
Boiler flow ²⁾	Ø VK	DN	100	125	125
	A ₂	mm	403	405	405
Boiler return (RK1) ²⁾	Ø RK1	DN	100	125	125
	H _{RK1}	mm	1007	1148	1148
	A ₅	mm	320	380	380
Boiler return (RK2) ²⁾	Ø RK2	DN	80	100	100
	H _{RK2}	mm	300	263	263
	A ₆	mm	320	390	390
Pressure relief valve/flow safety pipe ³⁾	Ø VSLP	DN	65	65	65
	A ₃	mm	400	400	400
Boiler safety assembly connection	Ø AAB	inch	G1	G1	G1
	A ₁	mm	1200	1245	1245
Condensate discharge	Ø AKO	DN	40	40	40
	H _{AKO}	mm	180	180	180
	A ₇	mm	71	70	70
Draining	dia. EL	inch	R1	R1	R1
	H _{EL}	mm	161	164	164
Fitting clearance width	B	mm	960	1040	1040
Fitting clearance height ¹⁾	H _{EB}	mm	1874	2052	2052
Fitting clearance length ⁴⁾	–	mm	2405	2455	2455

1) The transport height can be reduced by removing the base frame rails.

2) According to EN 1092-1 PN 6.

3) According to EN 1092-1 PN 16.

4) Following disassembly of burner door.

Table 5 Boiler dimensions

2.9 Operation conditions



Observe the maximum rated heat input Q_n (H_i) specified on the data plate when setting the burner output.

Operation conditions	Unit	Value
Maximal permissible temperature of high limit safety cut-out /(STB)	°C	110
Maximum operating pressure	bar	Dependent on boiler size
Maximum number of burner starts	per annum	15 000

Table 6 Operation conditions

Operation conditions	Uni Condens 8000 F 800...1200 with modulating operation	Uni Condens 8000 F 800...1200 with constant boiler temperature
Volumetric flow rate	None –	None
Min. boiler water temperature	In conjunction with a CFB/CC control unit for modulating operation (CFB 840; CFB 810; CFB 830 or CC 8311; CC 8312).	In conjunction with a CFB/CC control unit for constant boiler temperature CFB 810 or CC 8312, or when supplemented by a third party control unit.
Operating Interruption (complete boiler shut-down)		
Heating circuit control unit with heating mixer		
Minimum return temperature		
Miscellaneous	1)2)	1)

1) Maximum 15,000 burner starts per year. In order not to exceed the number of burner starts, observe the information on setting the control unit and burner in the technical guide or installation instructions. If this value is still however exceeded, please contact the customer service of the manufacturer.

2) The number of burner starts per year is influenced by the boiler system's operating settings (control parameters in the boiler control and the combustion setting) and by the design of the boiler system with regard to the consumer's heat requirement. To avoid exceeding the number of burner starts per year as a result of operating settings that have not been optimised, the manufacturer offers complete commissioning and regular system inspections for boilers, burners and boiler controls (CFB/CC controllers with function modules).

Table 7 Operation conditions



It must be possible to check the number of burner starts, e.g. at the user interface, third-party control unit, building control system or burner control unit.

2.10 Safety equipment

To ensure safe operation, the boilers must be equipped with safety equipment:

- The safety equipment must at least meet the requirements of BS EN 12828:2012 (→ chapter 14.1, page 39). These requirements also apply in countries where EN 12828:2012 does not apply!
- Also observe country-specific regulations if these specify further requirements.
- If the temperature limit (110 °C) varies in other countries, observe the country-specific limit.

Equipment examples are included in chapter 14, page 39. The components comprising the safety equipment are available as accessories.

2.11 Permissible fuels

The boiler must only be operated with the specified fuels. Only burners that are suitable for the specified fuels may be used.

Gas burner

Permissible fuels:

- Natural gas from the public gas supply in accordance with national regulations with a total sulphur content < 50 mg/m³.
- LPG in accordance with national regulations with a content of elementary sulphur < 1.5 ppm and volatile sulphur < 50 ppm.
- Natural gas with a hydrogen content of 20 % by volume, if the burner has a respective approval according to DVGW CERT ZP 3502. (Details are to be requested from the gas supplier and the service organisation if required.)
- Hydrogen mixtures with a share of up to 100 % when using a separate burner with the respective approval.
- Biogas with a sulphur content < 50 ppm

Oil burner

Oil burners used must be suitable for low-sulphur fuel oil. Observe the manufacturer's oil burner selection list and the burner manufacturer's instructions.

Permissible fuels:

- Low-sulphur extra-light fuel oil with a sulphur content < 50 ppm and a proportion of bio-oil (FAME) ≤ 20 %.

Existing residual amounts of fuel oil with a sulphur content ≥ 50 ppm must be pumped out and the oil tank cleaned.



Type tested dual burners can also be used. The requirements for the gas side and the oil side described above also apply here. All products subsequently described apply equally for the gas side and oil side.

2.12 Tools, materials and assembly aids

For boiler installation and maintenance you will need the following:

- Standard tools used by heating system installers and for gas and water installations

The following may also prove useful:

- 1 torque wrench.

3 Transport



CAUTION

Risk to life from inadequately secured boiler.

- ▶ Use suitable means of transportation (e.g. several pallet trucks, a forklift truck, crane or heavy duty rollers).
- ▶ Observe the weight of the boiler and the maximum shipping weight of the means of transport.
- ▶ When transporting, secure the boiler to the means of transport to prevent it from slipping.

Securing the load

To secure the load during transportation:

- ▶ **Never** pull retaining straps (fixing straps, chains) [2] over the boiler insulation [3].



The maximum tensile strength of each chain is 2 kN.

- ▶ **Only secure retaining straps to the locking lugs [1].**

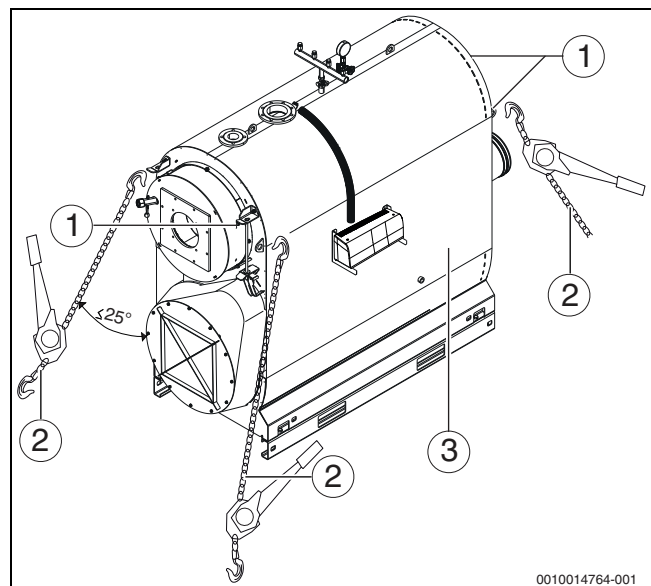


Fig. 3 Securing the load

- [1] Locking lugs
- [2] Retaining straps (fixing straps, chains)
- [3] Boiler insulation

3.1 Transporting the boiler

The boiler can be transported by crane, forklift truck, several pallet trucks or on heavy duty rollers.

3.1.1 Transporting the boiler with a crane

! DANGER

Danger to life from falling load.

- ▶ Only use lifting ropes of the same length.
- ▶ Only use lifting ropes that are in perfect condition.
- ▶ Hook only into the intended holes in the gusset plates on the top of the boiler.
- ▶ **Never hook lifting tackle into the locking lugs on the front and back of the boiler, or into the connectors.**
- ▶ Lift the boiler with a crane only if you are suitably qualified to operate the crane.
- ▶ Do not transport the boiler by crane when positioned horizontally or vertically.



Never use the locking lugs (→ Figure 4, [3], page 11) for lifting.

- ▶ Insert the hooks of the lifting tackle into the eyes in both gusset plates of the boiler shell (→ Figure 4, [2], page 11).
- ▶ Attach the lifting hook [1] of the crane to the lifting rope.



The tilt angle of the end stop must be $\leq 90^\circ$.

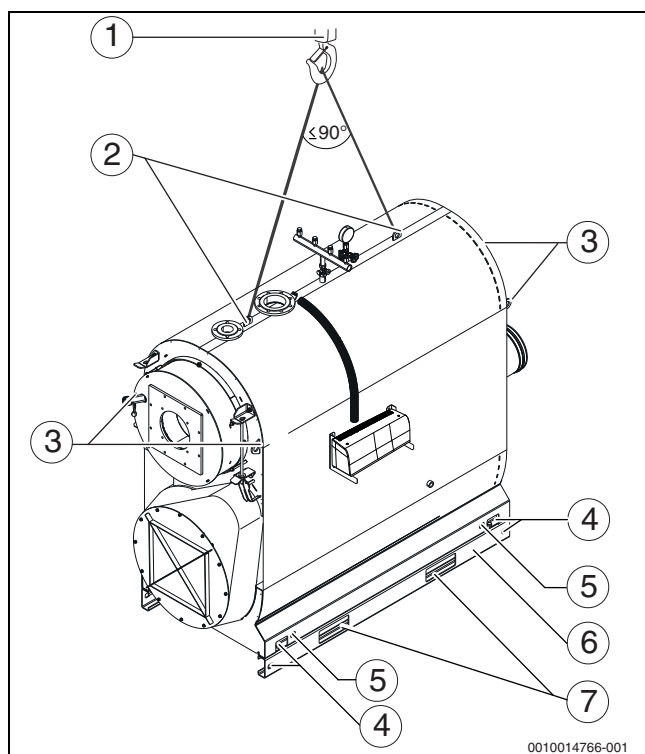


Fig. 4 Lifting the boiler with a crane

- [1] Crane hook
- [2] Lifting eyes
- [3] Locking lugs (not suitable for transport by crane)
- [4] Attachment points for tow ropes
- [5] Attachment points for lifting with a trolley jack
- [6] Base frame rail
- [7] Attachment points for lifting with a forklift truck

3.1.2 Transporting the boiler with a forklift truck

! DANGER

Danger to life from falling load.

- ▶ Distribute the boiler weight evenly across the forklift truck when lifting and moving the boiler.
- ▶ Observe the weight of the boiler and the maximum shipping weight of the means of transport.
- ▶ When transporting, secure the boiler to prevent it from falling.

NOTICE

System damage due to damaged boiler shell.

Only transport the boiler with a forklift truck if the forks are long enough to reach right under the boiler.

- ▶ Before lifting the boiler, check that the front and back panels of the boiler are supported by the forks of the forklift truck.
- ▶ Pass the forks of the forklift truck through both braces on the base frame. (→ Figure 5, page 11).
- ▶ Observe the dimensions of the transport apertures (→ Table 8, page 11).
- ▶ Slowly lift the boiler with the forklift truck.

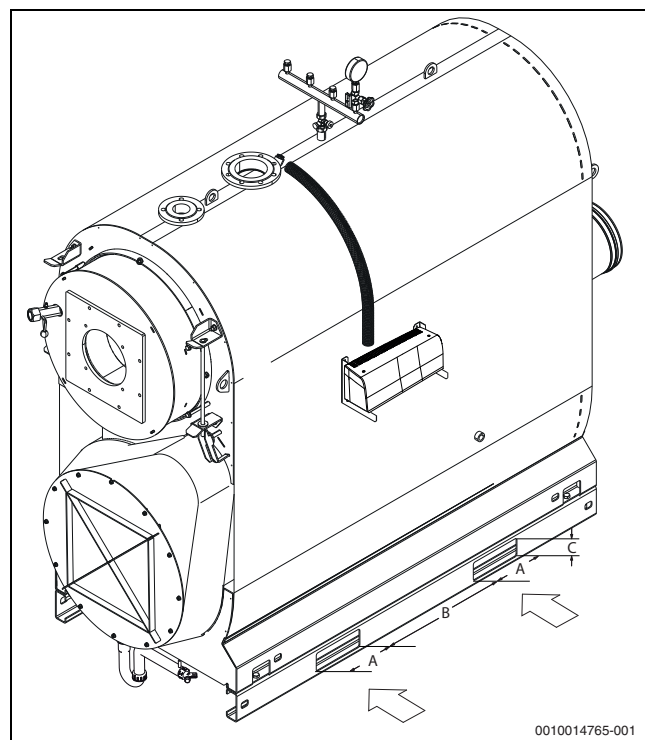


Fig. 5 Transporting the boiler with a forklift truck

	Abbreviation	Dimensions in mm
Width	A	200
Space	B	700
Height	C	90

Table 8 Dimensions of the transport apertures

3.1.3 Moving the boiler with 2 pallet trucks

DANGER

Danger to life from falling load.

- ▶ Distribute the boiler weight evenly across the pallet truck when lifting and moving the boiler.
 - ▶ Observe the weight of the boiler and the maximum load capacity of the means of transport.
 - ▶ When transporting, secure the boiler to prevent it from falling.
-
- ▶ Push 2 pallet trucks under the base frame.
 - ▶ Lift the boiler evenly with the pallet trucks.

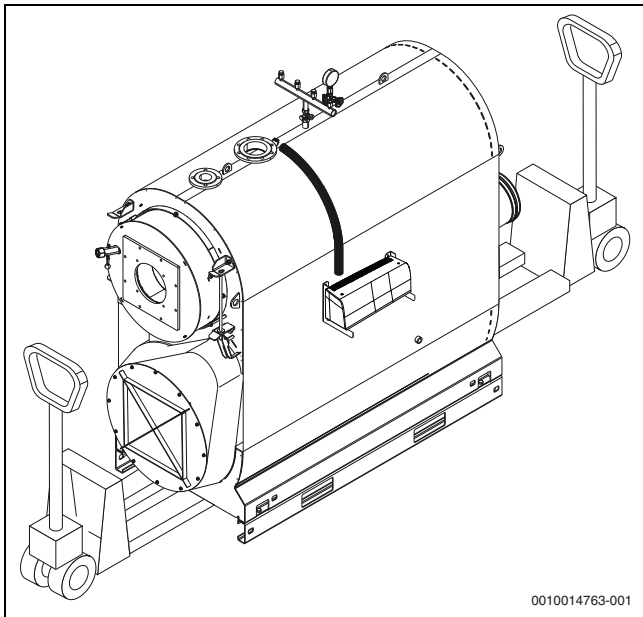


Fig. 6 Moving the boiler with 2 pallet trucks



Note the position of the drain connector and condensate pipe (→ Figure 1, [5], page 7).

3.1.4 Transporting the boiler with heavy duty rollers

DANGER

Danger to life from falling load.

- ▶ Distribute the boiler weight evenly across the heavy duty rollers when lifting and moving the boiler.
 - ▶ Observe the weight of the boiler and the maximum shipping weight of the means of transport.
 - ▶ When transporting, secure the boiler to prevent it from falling.
-
- ▶ Position one heavy duty roller at each corner.

3.1.5 Disassemble the base frame

The transport height can be reduced by removing the base frame rails (→ Figure 7, [1], page 12) with the cross beams.

- ▶ Lift the complete boiler with a pallet truck (→ Chapter 3.1.3, page 12) or from one side with a trolley jack (→ Figure 4, [5], page 11).
- ▶ Undo screws (→ Figure 7, [3], page 12).
- ▶ Remove a base frame rail [1].
- ▶ Remove 2 cross beams [2].
- ▶ Remove base frame rail [1] on the other side.
- ▶ Lower the boiler

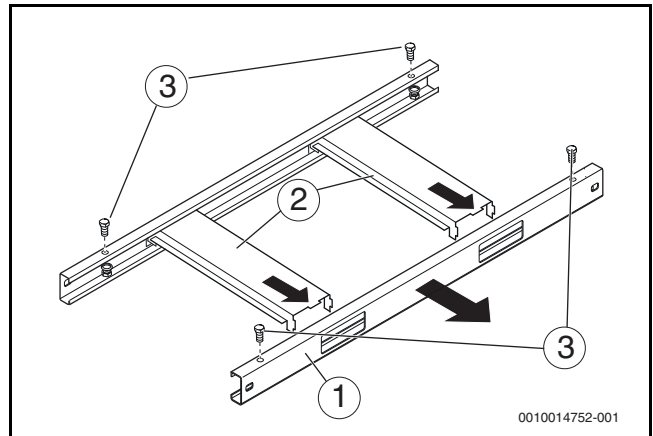


Fig. 7 Disassemble the base frame

- [1] Base frame rails
- [2] Cross beam
- [3] Screw

- ▶ Carry out the assembly of the base frame at the installation location in the reverse order.

4 Requirements

4.1 Installation location requirements



The design of installation locations and the installation of the boiler must comply with local regulations.

The installation location must meet the following requirements:

- In the boiler installation location, an ambient temperature of between 5 °C and 35 °C must be ensured.
- The installation location must be dry and free from the risk of frost.
- The installation location must be equipped with the required combustion air vents.
- An adequate supply of fresh air must be ensured.
- The installation surface must provide sufficient load-bearing capacity and solidity.
- The installation surface must be flat and level.
- The size of the installation location must be adequate to ensure correct operation.

For open-flue mode, we recommend designing the internal diameter of the combustion air vent in accordance with the following table. The details apply to one boiler.



Take into account additional consumers of supply air (e.g. compressors) when sizing.

When using burners that are operated with a higher volume of excess air (e.g. premix gas burners), the clear cross-sections must be increased.

- $\lambda = 1.3$: increase values by 20 %
- $\lambda = 1.5$: increase values by 40 %

Floor standing condensing boiler	Clear cross-section of smallest aperture [cm ²]
UC8000F 800	2175
UC8000F 1000	2675
UC8000F 1200	3175

Table 9 Internal cross-section of the vent

Regarding the size of the combustion air vent, it is essential that the system installer seeks the agreement of the responsible approval or building regulations body.

- ▶ Never install system components that could be damaged by frost near the combustion air vents.
- ▶ If necessary, install a device to preheat the supply air (e.g. a heating battery in the combustion air vent).
- ▶ Never position objects in front of these vents. Keep the combustion air vents free at all times.
- ▶ Never store flammable materials or liquids in the immediate vicinity of the heat source.

Supply air flaps

If the supply air flaps are adjustable, combustion must only start when the supply air flap is fully open (volt free checkback signal to the boiler controller via failsafe limit switch).

- ▶ Provide for control of supply air flaps.

4.2 Burner requirements



Only use specified pressure-jet gas burners with floor standing gas condensing boilers.

Use specified pressure-jet burners or dual fuel burners for floor standing gas/oil condensing boilers.

The boiler must be equipped with a burner that is suitable for the boiler.

NOTICE

Risk of system damage from use of incorrect burner.

- ▶ Only use burners that satisfy the technical requirements of the boiler (→ Chapter 15.1, page 41).

Any pressure-jet gas burner type-tested according to EN 676 can be used if its operating range matches the boiler specifications. When using gaseous fuels with a hydrogen content of up to 20 % by volume, a certification in accordance with DVGW CERT ZP 3502 must also be available. Oil burners type-tested to EN 267 can be used if they have been approved by the manufacturer for low sulphur fuel oil ($s < 50$ ppm) and if their operating ranges match the specification of the boiler. Only burners that have been tested and approved for electromagnetic compatibility (EMC) may be used.

Furthermore, the following points must be observed when selecting burner or burner control unit:

- Gas burners must be modulating and have modulating control.
- Oil burners used with boilers with an output of 70 kW or more must be implemented as 2-stage burners and have at least a 2-stage control.
- The control range of the burner on a boiler from a thermal output of > 90 kW must be at least 1:1.8 (i.e. the low load of the burner must not exceed 55 %). The ignition load of the burner must also not exceed 55 %.
- The burner control must ensure that the burner is switched to low load before a controlled shutdown.
- The output of the burner must only be controlled by the control unit. Automatic start up of the burner at full load following a burner demand without taking the requested load into account is not permitted!

Burner selection and settings

The sizing and settings of the burner have a significant influence on the service life of the heating system. Every load cycle (burner on/off) causes thermal stresses (loads on the boiler shell). **The number of burner starts must therefore not exceed 15,000 per year.**

The following recommendations and settings are designed to meet this criterion (→ chapter 5.5, page 15 and chapter 7, page 25).

If this figure is however exceeded:

- ▶ Get in touch with the sales or customer service department of the manufacturer.



It must be possible to check the number of burner starts, e.g. at the user interface, third-party control unit, building control system or burner control unit.

- ▶ Set the burner output as low as possible. **Set the burner to the rated heat input QN (Hi) specified on the data plate as a maximum.** Never overload the boiler!
- ▶ Take fluctuating net calorific values of the gas into account; check the maximum value with the gas supply utility.
- ▶ Calculate the gas throughput at the burner based on the maximum net calorific value and set accordingly at the burner.

- ▶ Only use burners that are suitable for the specified fuels.
- ▶ Ensure that the oil burner used is suitable for low sulphur fuel oil (otherwise corrosion from metal dusting may occur). Observe the burner manufacturer's instructions.
- ▶ Burners must only be adjusted by a competent contractor.

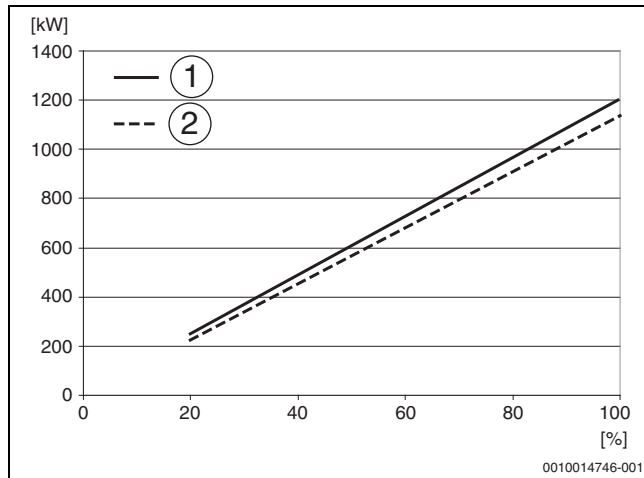


Fig. 8 Graph

- [1] Boiler output at 50/30 °C in kW
 [2] Combustion output in kW



To be able to adjust the fuel throughput, install a fuel meter (gas and/or oil flow meter) that can be checked even in the lower load range of the burner. The fuel meter should be installed near the boiler and only measure the quantity of fuel used by the corresponding boiler.

4.3 Requirement for the control unit

- ▶ For requirements and settings, see chapter 7.1, page 25.

4.4 Minimum requirement for safety equipment

- ▶ For requirements, see chapter 2.10, page 10 and chapter 14, page 39.



These requirements also apply in countries where EN 12828:2012 does not apply!

4.5 Combustion air quality

- ▶ To avoid corrosion, keep the supply of combustion air free of corrosive substances (e.g. halogenated hydrocarbons that contain chlorine or fluorine compounds).
- ▶ Never use or store chlorinated cleaning agents or halogenated hydrocarbons (as contained in spray cans, solvents or cleaning agents, paints and adhesives, for example) in the installation location.
- ▶ Keep the combustion air supply free of dust.
- ▶ If building work is taking place in the installation location and creating a lot of dust, shut the boiler down and cover it. A burner contaminated during building work must be cleaned before commissioning.

4.6 Water quality for heating water

The quality of the fill and top-up water is an essential factor for increased efficiency, functional reliability, long service life and for maintaining the operational readiness of a heating system. If the system is filled with water that has a high calcium hardness, this will be deposited on the heat exchanger surfaces and will restrict the transfer of heat to the heating water. As a result, the wall temperatures of the stainless steel heat exchanger surfaces will rise resulting in an increase in thermal stresses (loads on the boiler shell).

The quality of the fill and top-up water must therefore satisfy the specifications in the enclosed operator's log. The water quality must be documented in the operator's log.

If the operator's log is not maintained or is missing, the warranty will be invalidated.

If the operator's log is not included in the scope of delivery, contact the address on the back of these instructions.

Water treatment must generally be carried out for boilers with a total output (system output) of > 600 kW irrespective of water hardness and the fill and top-up water quantity.

4.7 Using antifreeze



Chemical additives that are not certified as harmless by the manufacturer must not be used.

Antifreeze based on glycol has been used in heating systems for many years, for example Antifrogen N manufactured by Clariant.

The use of other types of antifreeze should not be a cause for concern if the product is comparable with Antifrogen N.

Observe the antifreeze manufacturer's instructions. Follow the manufacturer's details regarding mixing ratios.

The specific thermal capacity of Antifrogen N antifreeze is lower than the specific thermal capacity of water. To enable the transfer of the required heat output, increase the required flow rate accordingly. This should be taken into account when sizing the system components (e.g. pumps) and the pipework.

As the heat transfer medium has a higher viscosity and density than water, take the higher pressure drop through the pipework and other system components into account.

Check the resistance of all plastic or non-metallic components in the system separately.

5 Notes on installation and operation

5.1 Standards, regulations and directives

Observe all applicable technical guidelines, country-specific regulations and standards during installation and operation. These include:

- The local building regulations regarding the installation conditions.
- The local building regulations regarding air supply and venting systems and the chimney connection.
- The local regulations regarding chimneys. At least according to EN 13084.
- The requirements for the electrical connection to the power supply (e.g. VDE, EN and RGIE/AREI standards).
- The technical regulations of the gas supplier regarding the connection of the gas burner to the local gas main.
- The regulations and standards relating to the safety equipment of the water-filled heating system.
- The safety equipment must at least meet the requirements of EN 12828:2012. Also observe country-specific regulations if these specify further requirements.

5.2 Regulations for oil systems

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

The electronically available document 6720820428 contains information about the applicable regulations. You can use the document search on our website to display this. You will find the website address on the back cover of these instructions.

5.3 Regulations

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The document 6720807972 contains information about the applicable regulations. You can use the document search on our website to display this. You will find the address of the website on the back of these instructions.

5.4 Duty to obtain a permit and provide notification

In several countries, areas or regions, certain notifications, approvals and/or rights may be required. Prior to installation, check the approval requirements, e.g.:

- ▶ Make sure that the local gas supplier has been notified about the gas boiler installation and that this has been approved.
- ▶ Make sure that the regional approvals required for the flue system and condensate connection to the public sewage system have been obtained.
- ▶ Make sure that prior to commencing installation the relevant bodies (e.g. the local flue gas inspector) and the water board have been informed.

5.5 Hydraulic connection to the heating system

- ▶ If the operating temperatures are different, use both return connectors RK1 (top) and RK2 (bottom).
- ▶ Connect heating circuits with low return temperatures to connector RK1.
- ▶ Connect heating circuits with high return temperatures to connector RK2.



For an optimum energy yield, we recommend supplying a flow rate of > 10 % of the total nominal flow rate via connector RK1. In this case, the return temperature must be below the dew point.



If there are no varying return temperatures, the return at connector RK1 needs to be connected.

- ▶ Restrict the flow rate in the boiler to a temperature spread of at least 7 K.



Restriction of the temperature spread is not necessary if the system is equipped with a sludge separator.

- ▶ Size the pump correctly.



High flow rates and oversized pumps can result in the accumulation of sludge or deposits on the heat exchanger surfaces.

- ▶ Before connecting the boiler, flush sludge and dirt out of the heating system.
- ▶ Ensure that no oxygen enters the heating water during operation.
- ▶ Only operate the boiler in sealed unvented systems.

If the boiler is nonetheless used in an open vented heating system, additional measures are required to protect against corrosion and prevent sludge entering the boiler. The technical safety devices also require to be matched (equipment and settings).

- ▶ Consult the manufacturer's sales or service department.

Notes regarding cascade systems:

- ▶ Carry out the fitting of the boiler circulation pumps (volume flow) in accordance with the set boiler output.
- ▶ In the case of parallel switching of the boilers, maintain the same temperature difference for all boilers.

5.6 Pressure maintenance

If using pump-controlled pressure maintaining systems, pressure fluctuations will result. They can occur very frequently depending on the design of the system and the appliance settings. Even if these pressure fluctuations appear small, if they occur very frequently they may cause considerable damage to the boiler, as it is designed for a predominantly static pressure load.

To protect against damage:

- Size the expansion vessels correctly.
- Ensure that every heat source is equipped with an individual expansion vessel (individual protection).
- Do not connect expansion vessel only to a return connection (e.g. in systems where a heating circuit is not connected to the connector RK2).
- Connect expansion vessel as shown in fig. 42, page 39.
- Set the pre-charge pressure of the expansion vessel according to p₀ of the automatic pressure maintaining system.

Floor standing condensing boiler	Diaphragm expansion vessel [l]
UC8000F 800	120
UC8000F 1000	140
UC8000F 1200	180

Table 10 Recommended minimum volumes of expansion vessels



To guarantee the pressure relief valve is used as determined, there must be a 10 % difference between the excess pressure of the pressure relief valve and the final pressure of the pressure maintaining system, and this must not be set to less than 0.5 bar.

6 Installation



When installing and operating the heating system:

- Comply with standards, regulations and directives of the relevant country.
- Observe the information on the data plate of the boiler.

6.1 Positioning the appliance



DANGER

Risk to life through poisoning!

Insufficient ventilation can lead to dangerous flue gas leaks!

- Never close off or reduce the size of ventilation and extract air vents.
- Never operate the boiler unless faults are rectified immediately.
- Inform the operator in writing of any faults and their associated risks.



DANGER

Risk of fire through flammable materials or liquids.

- Never store flammable materials or liquids in the immediate vicinity of the heat source.

NOTICE

Risk of damage to the system from frost!

- Install the heating system in a room protected from the risk of frost.

Minimum clearances

Observe the specified minimum wall clearances for the foundations or installation surface (→ fig. 9, page 16 and tab. 11, page 16).

The surface on which the boiler is to be positioned must be of load-bearing capacity, even and level. The front edge of the boiler should be flush with the edge of the plinth.

The burner door can be fitted to open from right to left or vice-versa (→ chapter 6.9.1, page 20).



Allow extra space if a flue gas silencer or control unit are to be installed on the side of the boiler.

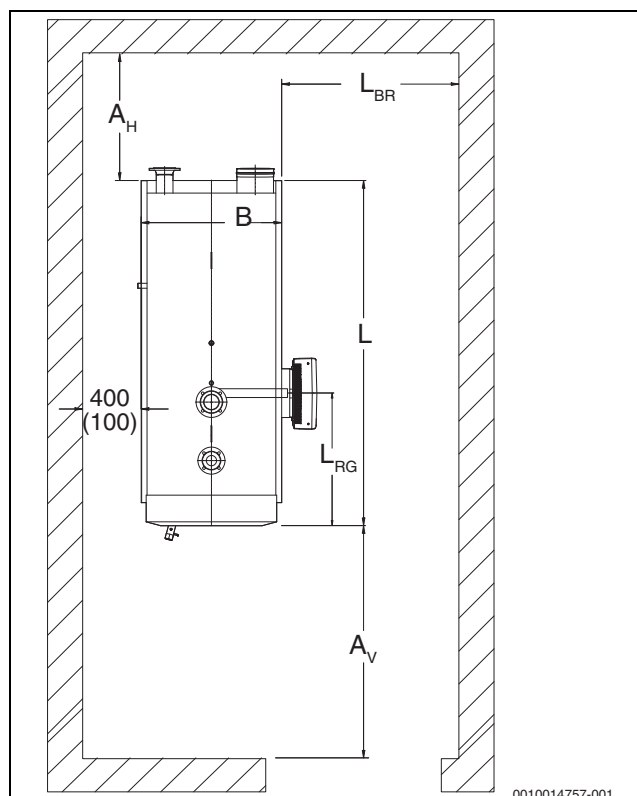


Fig. 9 Installation location with boiler (with door opening to the right)

Boiler size	800 W	1000 kW	1200 kW
A _H [mm] ¹⁾	1000 (800)	1000 (800)	1000 (800)
A _V [mm] ²⁾³⁾	1800 (900)	1800 (900)	1800 (1100)
L _{BR} in mm	Burner length + 800 (200)	Burner length + 800 (200)	Burner length + 800 (200)
L _{RG} [mm]			
Installation clearance control unit	906	906	906
Cable conduit			
Length (L) foundations	2300	2300	2300
Width (B) foundations	1060	1140	1140

1) If using a flue gas silencer, take its installation dimensions into account.

2) Factor in dimension L_{BR} (burner length) subject to burner overhang.

3) Dimensions also subject to the burner length LBR

Table 11 Specified wall clearances (dimensions in brackets are minimum clearances)

6.2 Fitting sound insulation strips



CAUTION

Injury from crushing.

- ▶ When lowering, do not reach under the boiler.
- ▶ When lowering, make sure that nobody is in the danger zone.



Consider additional sound insulation measures before installing the boiler.

To reduce the noise, place the sound insulation strips provided below the base frame, flush with the front and back of the boiler.

- ▶ Position the boiler at its installation site.
- ▶ Place sound insulation strips lengthways below the boiler frame at all four corners.
- ▶ Carefully set the boiler down.

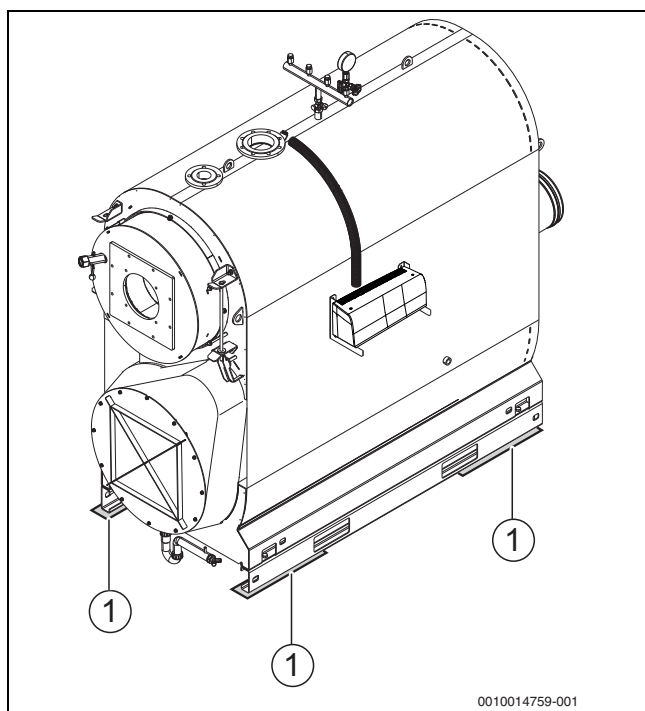


Fig. 10 Positioning the sound insulation strips

[1] Sound insulation strips

6.3 Levelling the boiler



Use metal shims to level the boiler.

To prevent air collecting in the boiler, level the boiler horizontally.

- ▶ Open the burner door (→ chapter 6.9.1, page 20).
- ▶ Place a spirit level on the combustion chamber floor.
- ▶ Level the boiler horizontally using the spirit level in the combustion chamber.

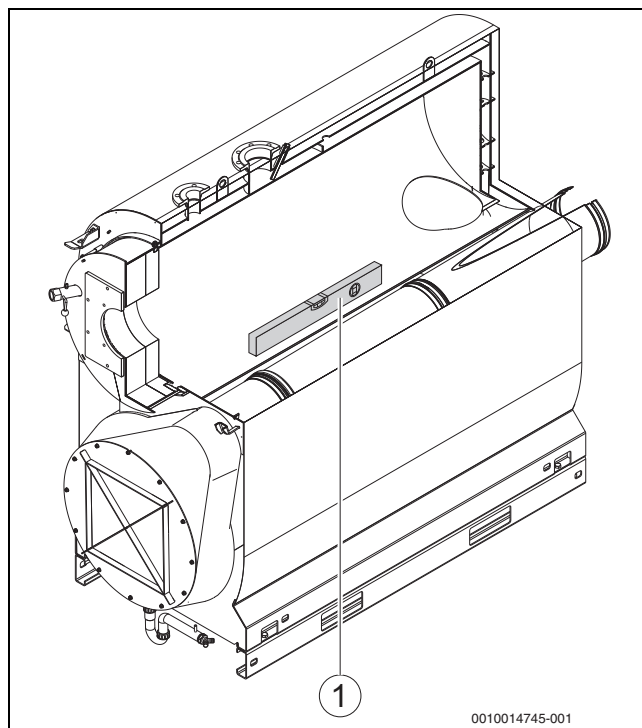


Fig. 11 Levelling the boiler

[1] Spirit level

6.4 Flue gas and water connections for heating system

6.4.1 General requirements for the flue system



DANGER

Danger to life due to poisoning!

Insufficient ventilation may cause dangerous flue gas leaks.

- ▶ Never close off or reduce the size of supply and extract air apertures.
- ▶ If the fault is not rectified immediately, do not operate the boiler.
- ▶ Inform the operator in writing about the fault and associated risks.

Follow these recommendations for the installation of flue systems to guarantee trouble-free operation of the combustion system. Failure to observe these rules can result in substantial operating problems during combustion and may even result in hard ignitions.

These problems frequently include acoustic disturbances, compromised combustion stability or excessive vibrations of assemblies or their components.

Low NOx combustion systems are to be viewed as being more sensitive to these operating faults on account of their combustion control.

Therefore, plan and implement the flue system with particular care.

Commonly, the flue system comprises a connection piece between the heat source and vertical flue system itself (chimney).

Due to utilization of the flue gas condensate in the heat source, the flue system must be adapted to the characteristics of the flue gas.

When sizing and implementing the flue system, comply with the following requirements:

- The flue system must be made of corrosion resistant material.
- The flue system must have the necessary approval for operation with a floor standing condensing boiler.
- Size flue systems in accordance with the respective national and local regulations and applicable standards.
- The flue system must be sized according to the modulation range of the burner.

- When selecting the material for the flue system, take into account the composition and temperatures of the flue gas to prevent damage and contamination of the system components that are in contact with flue gas.
- Only flue systems which are approved for a flue gas temperature of at least 120 °C, may be used.
- Route the flue gas as directly as possible to the chimney considering the best possible flow characteristics (e.g. short, rising, and with the fewest possible bends). Provide a separate flue resistance for each boiler. Take the thermal expansion of the system into account.
- Deflections in the connection pieces should whenever possible be beneficial to the flow characteristics by using bends or deflector plates. Connection pieces with several deflections should be avoided, as they could increase air-borne and structure-borne noise as well as the start-up pressure hammer. Prevent sharp-edged joints between rectangular connection flanges and the connection pipe. Likewise with any reductions/expansions that may be required, the transition angle should not exceed 30°.
- Where possible, connection pieces should be joined to the chimney in such a way as to optimise the flow and have as steep an incline as possible (at an angle less than 45°). Existing terminal pieces at the chimney outlets must ensure the free discharge of flue gas into the open air.
- Any condensate must be able to drain off freely over the entire length and be treated and disposed of in accordance with local regulations.
- The inspection apertures must be provided in accordance with local regulations. Consult with the local authorising body (e.g. flue gas inspector), if necessary.
- To prevent the transmission of structure-borne noise, the chimney must be separated from the boiler system (e.g. with expansion joint).
- If a flue gas damper is installed in the flue system, an "OPEN" limit switch must be integrated into the boiler control system for safety reasons. Combustion must only be able to start when the feedback from the limit switch confirms that the flue damper is fully open. A temperature drop inside the boiler is possible on account of the time it takes the actuator to move the damper into position. Set the "CLOSE" limit position at the flue gas damper in such a way that it never closes fully. This prevents damage to the fitted burner through heat build up.
- To avoid problems with combustion (start behaviour), the negative pressure at the flue gas connection of the boiler must not exceed 15 Pa. Fittings in the flues (e.g. secondary air devices) may need to be provided.

Multiple assignment

Several items of combustion equipment may only be connected to a common flue system (chimney, flue) if they are suitably designed for this mode of operation and that the following requirements are met:

- The system is sized so that flue gas can be removed without problems in every operating condition.
- Flue gas is prevented from flowing into combustion equipment that is currently not in operation during pressurised operation (e.g. by using gas-tight flue gas dampers).
- Unchanging combustion chamber pressure ratios in each of the connected heat sources under all operating conditions.
- Take minimum flue gas velocity W_{min} according to EN 13084-1 Annex A into account, or to simplify $W_{min} = 0.5 \text{ m/s}$
- Negative pressure must prevail at the merging points of the combustion equipment under every operating condition.

Merging of flue gas flows should however be avoided whenever possible to ensure reproducible exhaust gas ratios for each boiler system. If merging of flue gas flows cannot be avoided, they must be routed along a short section of the flue system parallel to and isolated from one another by a baffle plate to prevent reciprocal effects.

The following must not be connected to flue systems to which several items of combustion equipment are connected:

- Combustion systems operated using LPG.
- Combustion equipment equipped with fan, if not all items of combustion equipment are installed in the same room.

6.4.2 Connecting the venting system

- ▶ Connect the connection piece onto the flue outlet and the flue system (chimney).
- ▶ Support the connection piece if necessary.

6.4.3 Fitting a sealing collar (accessory)

- ▶ Fit the sealing collar in accordance with the installation instructions supplied.

6.4.4 Connecting the boiler to the pipework

NOTICE

Risk of system damage due to leaking connections!

- ▶ Connect pipes without stress at the boiler connections.



Boiler contamination on the water side is not permissible.

If required to prevent contamination, install a dirt separator in the boiler return.

Connecting the heating return

The boiler has two inlet options for the return water. If separate system returns for differing return temperatures are used (e.g. underfloor heating, DHW heating), these can be routed to the boiler via separate return connections.

- RK1 = low return temperature (e.g. underfloor heating system)
- RK2 = high return temperature (e.g. DHW heating)

The boiler return is closed with a dummy flange in its as-delivered condition. If using connection RK2:

- ▶ Remove the dummy flange.

If there are no varying return temperatures, return connection RK1 is used.

- ▶ Connect the heating system return to the appropriate boiler return connection RK1/RK2.
- ▶ Close off unused connections with a plug or dummy flange.

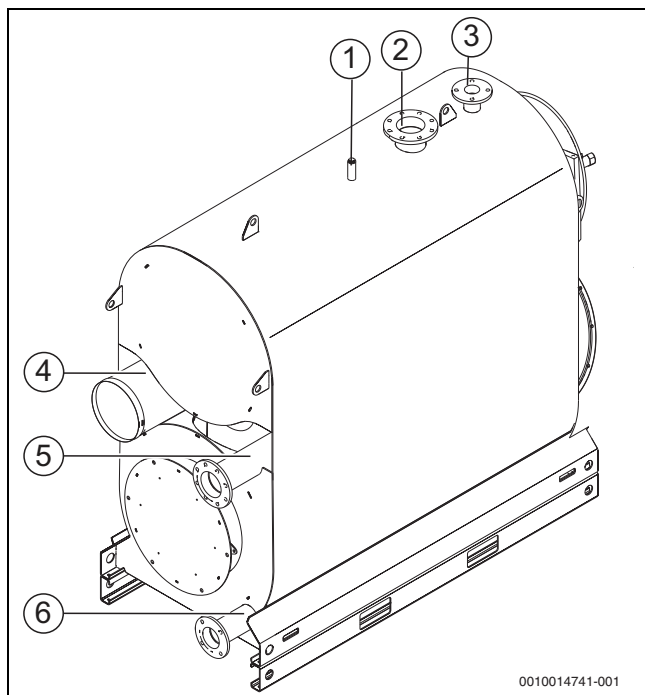


Fig. 12 Boiler connections

- [1] Connection of fittings manifold/boiler safety assembly
- [2] Boiler flow connection
- [3] Safety valve/flow pressure relief valve (VSL) connection
- [4] Flue connection
- [5] Heating return connection 1 (RK1)
- [6] Heating return connection 2 (RK2)

Connecting the heating flow

- ▶ Connect the heating flow to the flow connection [VK] of the boiler (→ Figure 12, [2], page 19).

Connect the fitting assembly / boiler safety assembly

- ▶ Connect the fitting assembly (accessory) to the boiler safety assembly [1] connection.

6.5 Connecting the pressure relief valve

NOTICE

Risk of system damage by connecting the wrong assemblies to the flow safety pipe.

- ▶ Never connect a DHW cylinder or other heating circuit to the flow safety pipe.
- ▶ Connect the pressure relief valve to the flow safety pipe connection [VSL] (→ Fig. 12, page 19).



Countries in which open vented systems are permitted: in open-vented systems, the flow safety pipe is connected to the connection [VSL] (→ Chapter 5.5, page 15).

6.6 Installing the low water indicator (accessory)

- ▶ For boilers > 300 kW, install a low water indicator or minimum pressure limiter.
- ▶ For installation, adjustment and operation, refer to the documents provided by the manufacturer.
- ▶ Install the low water indicator in the supply flow adaptor piece or in the flow pipe directly downstream of the boiler in a vertical pipe.

6.7 Installing the condensate hose and condensate neutraliser



DANGER

Risk to life through poisoning!

Open connections and siphons that are not filled with water can allow flue gas to discharge and cause a danger to life.

- ▶ Filling the siphon with water.
- ▶ Ensure that the siphon and flue gas connections are sealed.
- ▶ Ensure that the sealing washer with gasket is seated in the cap.

NOTICE

System damage through condensate!

- ▶ Ensure that the condensate pipes and condensate neutraliser are working.

Installing the siphon

- ▶ Fit the siphon provided to the condensate pipe (→ fig. 1, [5], page 7).
- ▶ Install connection elbow with slight slope.

If the siphon cannot be installed vertically:

- ▶ Tilt the siphon so it is at a maximum angle of 45°.
- ▶ Always lay condensate hose with a slope!
- ▶ Unscrew cap and fill siphon with around 2 litres of water.



You must ensure that the condensate generally runs via the flue pipe into the boiler. If this is not possible, use only stainless steel or plastic tees in the separate hose line. With ceramic flue systems, fit a sludge separator (sludge trap).

Installing the condensate neutraliser

During installation and maintenance of the condensate neutraliser:

- ▶ Install the condensate neutraliser according to the installation instructions!
- ▶ Connect the drain hose to the condensate drain with a hose clip.

Installing the condensate line

When installing the condensate hose, observe the following:

- ▶ Carefully and correctly route the accumulated condensate inside the boiler and flue.
- ▶ Discharge the condensate into public waste water systems in accordance with the country-specific regulations.
- ▶ Observe regional regulations.

6.8 Filling the boiler and checking connections for leaks



DANGER

Risk of injury and/or system damage through excess pressure when testing for leaks!

Pressure, control and safety equipment may be damaged through excessive pressure.

- ▶ When carrying out the tightness test, ensure that no pressure, control or safety equipment is fitted that cannot be isolated from the boiler water chamber.



The test pressure level is subject to the system components and to the heating system. Observe country-specific regulations and standards.

Before commissioning, check the heating system for tightness to ensure that no leaks will occur during operation.

- ▶ Fill the heating system with water (→ chapter 8.1, page 32 and chapter 8.3, page 32).
- ▶ Check all connections for leaks.
- ▶ Pressure test the heating system.
- ▶ Check flange connection and boiler connections for leaks.
- ▶ Check the pipework for leaks.
- ▶ After the tightness test, reinstate all components that were taken out of operation.
- ▶ Ensure that all pressure, control and safety equipment is functioning correctly.

6.9 Opening and reversing the burner door



WARNING

Risk of injury through falling burner door.

- ▶ Never undo all 4 screws on the burner door.
- ▶ Retighten the nuts that secure the burner door 2 weeks after commissioning.

The burner door can be moved from the right-hand side (factory-set) to the left-hand side.

The following instructions assume the factory-set pivoting direction.

6.9.1 Opening and closing the burner door

Opening the burner door

- ▶ Undo 4 screws on the burner door.
- ▶ Pivot the burner door open.

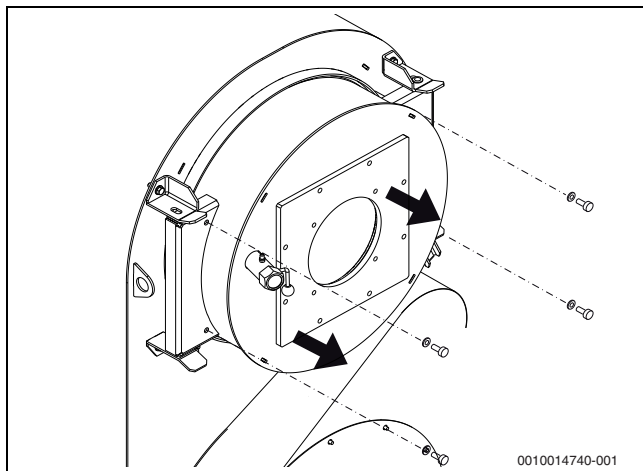


Fig. 13 Opening the burner door

Closing the burner door

- ▶ Close the burner door.

The complete gasket must be pressed centrally onto the middle of the combustion chamber. You can check whether the installation has been performed correctly by carrying out a tightness test (e.g. chalk).

- ▶ Fit the 4 screws in the burner door with washers.
- ▶ Tighten the screws diagonally with a torque of 40 Nm.

6.9.2 Converting the door hinges



WARNING

Personal injury from falling parts.

While the door hinges are being converted, there is a risk of the burner door falling.

- ▶ Convert the door hinges before mounting the burner.
- ▶ Ensure that the burner door is closed and secured with the four screws.

As standard, the burner door pivots open from left to right (RH). The following instructions assume the standard pivoting direction.

If required due to space restrictions, the burner door can be converted to open to the left.

Before commencing work:

- ▶ Open the burner door (→ Chapter 6.9.1, page 20).
- ▶ When closing the burner door, insert the washer (can be found in the pouch of the technical documents) between the burner door and the lower l.h. door stay.
- ▶ Ensure that the hole for the hinge pin is in line with the hole in the washer.
- ▶ Close the burner door.
- ▶ Fit the four screws in the burner door.
- ▶ Tighten the compression spring with the Allen screw until the rocker arm to the hinge pin has some play (→ Figure 14, page 20).
- ▶ Remove retaining split pin [2] on hinge pins [1].

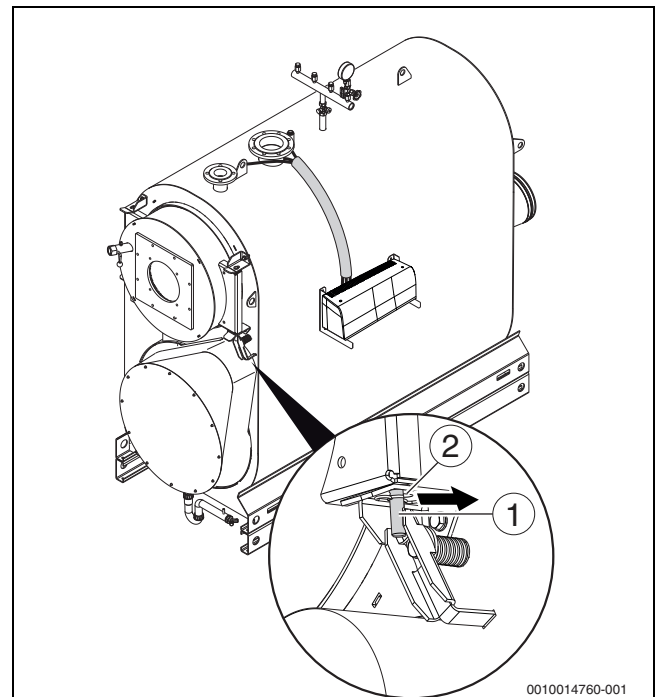


Fig. 14 Loosen retaining split pin

- [1] Hinge pins
- [2] Retaining split pin

- ▶ Pull the hinge pin (→ Figure 14, [1], page 20) upwards out of the hinge hole.
- ▶ Unhook the rocker arm (→ Figure 15, [3], page 21).
- ▶ Release the compression spring [1] with Allen screw [4].
- ▶ Remove compression spring.
- ▶ Fit the compression spring on the left-hand side.
- ▶ Fit the washer [2].
- ▶ Fit the Allen screw.
- ▶ Pre-tension the Allen screw until the washer has a dimension of 60 mm to the front wall of boiler.
- ▶ Attach the rocker arm.
- ▶ Swivel the rocker arm above the compression spring.

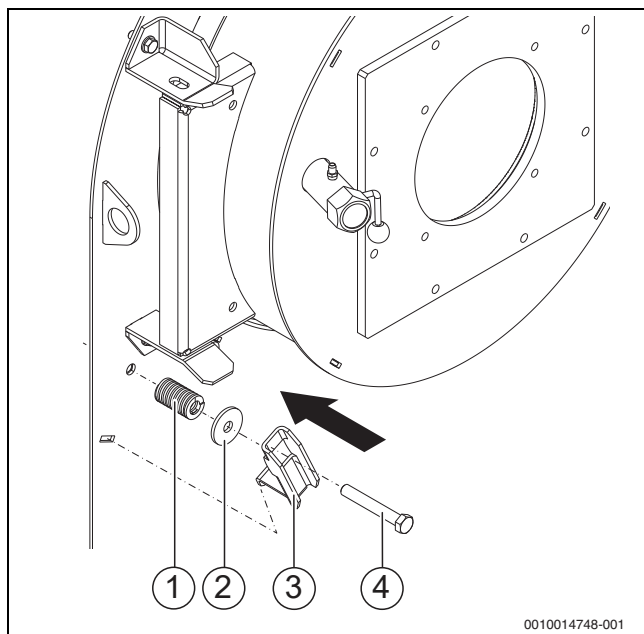


Fig. 15 Assembly

- [1] Spring
- [2] Washer
- [3] Rocker arm
- [4] Screw

- ▶ Slightly loosen the screws for the door stay on the left-hand side until the door stay can be moved in the slot.
- ▶ Push the hinge pin on the left side from above through the hinge holes of the door stay and the door up to the rocker arm.
- ▶ Fit the retaining split pin through the hinge pin below the lower door stay (→ Figure 14, page 20).
- ▶ Slide the upper door stay on the left side to the left and tighten the screws.
- ▶ Slide the lower door stay on the left side to the right and tighten the screws.
The hinge pin has no more play and the burner door will not drop when opened.
- ▶ Unscrew four door screws.
- ▶ Pivot the burner door open by 90°.
- ▶ Release the compression spring with Allen screw until the hinge pin in the lower door stay rests against the front end of the slot.
The burner door is hanging straight in the hinge.

6.10 Fitting the burner (accessory)

NOTICE

System damage through the use of an incorrect burner.

- ▶ Only use burners which meet the technical boiler requirements.

6.10.1 Fitting the burner plate



Predrilled and undrilled burner plates are available from the manufacturer (accessories). The installation method depends on the particular burner used.

Preparing undrilled burner plate



Undrilled burner plates must be adapted to the burner used on site.

- ▶ Never work on the burner plate once installed.
- ▶ Drill or cut the burner plate to match the required blast tube diameter.
- ▶ Drill holes for fastening the boiler according to the hole pattern of the burner connecting flange.

Fitting the burner plate

- ▶ Remove the protective plate from the burner door.
- ▶ Fit burner plate (→ Figure 16, [3], page 21) and gasket [2] to the burner door [1] with hexagon bolts and washers [4].

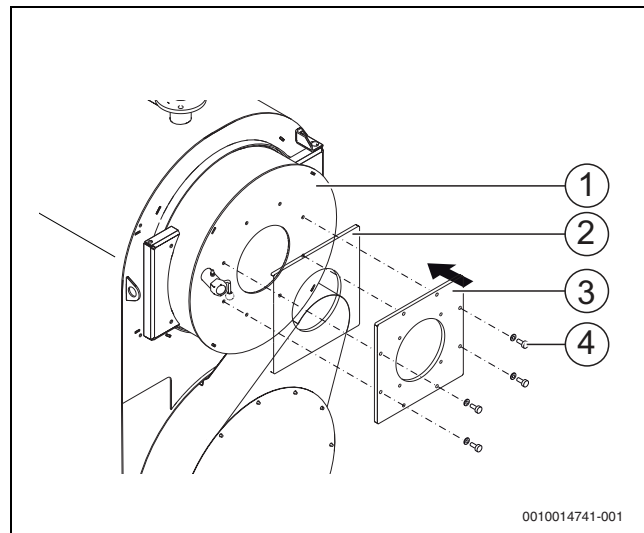


Fig. 16 Fitting the burner plate

- [1] Burner door
- [2] Gasket
- [3] Burner plate
- [4] Hexagon bolts and washers

6.10.2 Fitting the burner to the burner plate



! DANGER

Personal injury/system damage due to heavy loads.

- ▶ Use suitable lifting gear to mount the burner.



! WARNING

Personal injury, including skin and eye irritation, as a result of inhaling or coming into contact with fibre dust.

There is a risk of fibre dust inhalation when working on the thermal insulation and insulating rings.

- ▶ Wear a breathing mask and protective glasses with side shields when working on the thermal insulation.
- ▶ Wear gloves and protective clothing that is loose-fitting around the neck and wrists. Clean soiled clothing before removing or changing it (e.g. by vacuuming, but never with compressed air).

NOTICE**Risk of system damage due to incorrect or missing insulating rings.**

- Only use the insulating rings supplied.



For installation and connection:

- Observe the installation instructions of the relevant burner.

As standard, the thermal insulation in the burner door has an aperture of 270 mm for the blast tube. If the burner tube is larger than this diameter, the diameter can be increased to maximum 360 mm.

If the hole in the thermal insulation of the burner door is increased, the insulating rings supplied will no longer fit (→ Figure 18, [4], page 22).

If the diameter of the blast tube is greater than 360 mm, speak to your supplier. If the blast tube is not long enough to reach the inner edge of the thermal insulation, a 45° chamfer can be applied to the thermal insulation.

To mount the burner:

- Observe the installation instructions of the relevant burner.
- Open the burner door (→ Chapter 6.9.1, page 20).
- Push a gasket (→ Figure 17, [1], page 22) onto the burner connector.

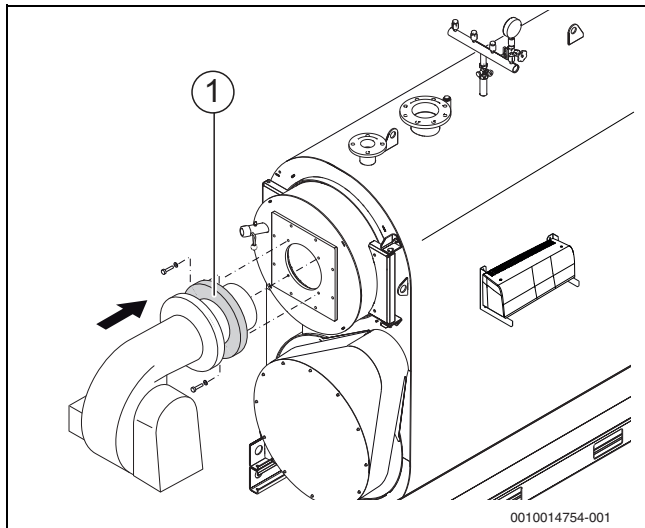


Fig. 17 Remove the gasket

- [1] Gasket

- Screw the burner to the burner plate (→ Figure 18, [2], page 22).
- Cut out insulating rings [4] according to the diameter of burner tube [5].
- Fill the resulting gap on the inside of the burner door between the burner door thermal insulation [3] and burner tube [5] with adapted insulating rings [4].

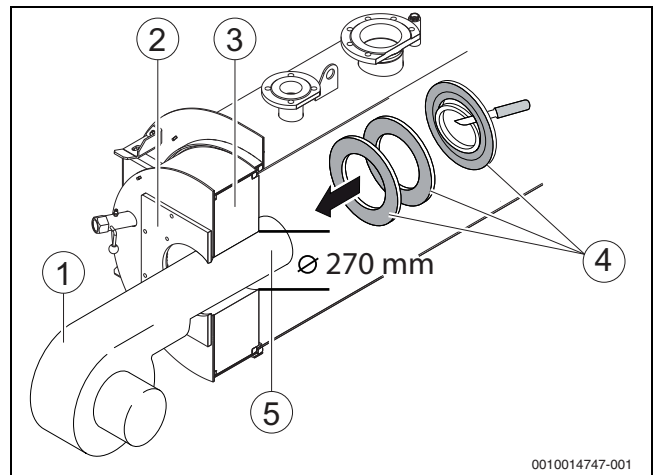


Fig. 18 Installing the burner

- [1] Burner
[2] Burner plate
[3] Thermal insulation for burner door
[4] Insulating rings
[5] Blast tube



Fitting the insulating rings omitted if this is stipulated in the installation instructions of the burner manufacturer.

- Close the burner door and tighten the hexagon bolts (→ Chapter 6.9.1 page 20).

6.11 Attaching the data plate

The data plate can consist of up to three parts:

- Data plate containing the brand and product type of the boiler
- Data plate containing the technical data
- Data plate containing explanations of the abbreviations in the language of the country concerned

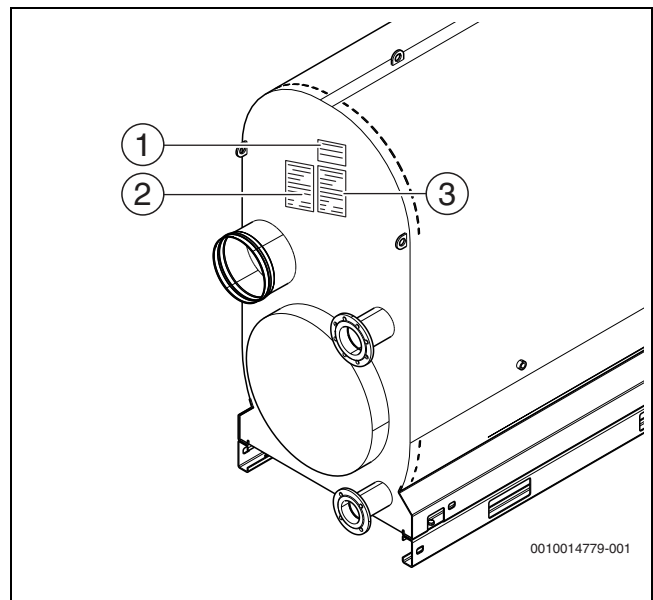


Fig. 19 Attaching the data plate

- [1] Data plate containing the brand and product type of the boiler
[2] Type plate containing the technical data
[3] Data plate containing explanations of the abbreviations in the language of the country concerned

6.12 Mounting the removing the front cover

- ▶ Hook lower front cover (→ Figure 20, [3], page 23) into the holders on the right-hand and left-hand side of the boiler casing.
- ▶ Hook the right upper front cover [2] into the holders on the boiler casing.
- ▶ Hook the left upper front cover [1] into the holders on the boiler casing.

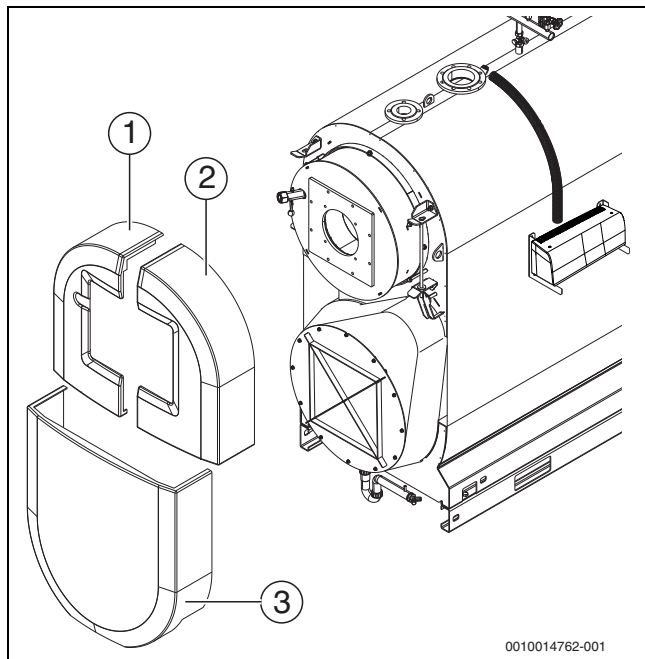


Fig. 20 Fitting the front cover

- [1] Upper left front cover
- [2] Upper right front cover
- [3] Lower front cover

- ▶ For removal of the front cover, proceed in the reverse order.

6.13 Fitting the control unit support and cable conduit

For on-site cables:

- ▶ Install separate cable holder systems.



We recommend fitting the control unit to the same side as the door hinges (factory-fitted on the right).

- ▶ Mark the installation height of the control unit support (→ Figure 2, Table 5, page 8).
- ▶ Trim and mark the cable conduit (→ Figure 2, page 8).
- ▶ Drill holes (Ø 5 mm).
- ▶ Fasten the cable conduit with the self-tapping screws supplied.
- ▶ Secure the control unit support (→ Figure 21, [1], page 23) with the self-tapping screws supplied.

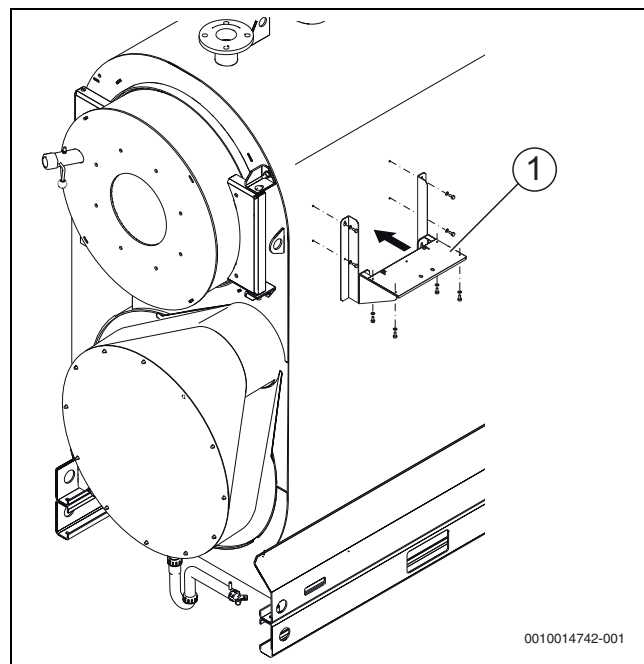


Fig. 21 Installing the control unit support

- [1] Control unit support

6.14 Installing the temperature sensor

NOTICE

System damage through damaged capillaries or incorrectly fitted temperature sensor.

- ▶ Ensure that the capillaries are neither kinked nor squashed when uncoiling and routing them.
- ▶ Always push the temperature sensor right to the bottom of the sensor pocket.

NOTICE

System damage due to incorrect sensor position!

The sensors of the high limit safety cut-out (STB) and of the thermostat (TR) must be fitted at the installation location (→ fig. 23, page 24) on the top of the boiler.

- ▶ In the case of third party control units, match the sensor immersion sleeve to the diameter of the sensors used.
- ▶ Do not change the length of the immersion sleeve.

The boiler test point is at the top of the boiler shell (→ fig. 23, [1], page 24).

- ▶ Measure the depth of the sensor pocket $\frac{3}{4}$ ".
- ▶ Mark the depth on the temperature sensor set (cable).
- ▶ **Insert the temperature sensor set as far as it will go into the test point (to the bottom).**
Use the mark to check whether the temperature sensors are correctly fitted.
- ▶ Secure the temperature sensor set in the test point with a sensor retainer [3] (→ fig. 22, page 24).

The plastic coil [2] for keeping the temperature sensors together is pushed back automatically when it is inserted (→ fig. 22, page 24).



Insert compensating spring [1] between the temperature sensors to ensure a good contact between sensor pocket [4] and sensor surfaces, and thereby a reliable temperature transfer (→ fig. 22, page 24).

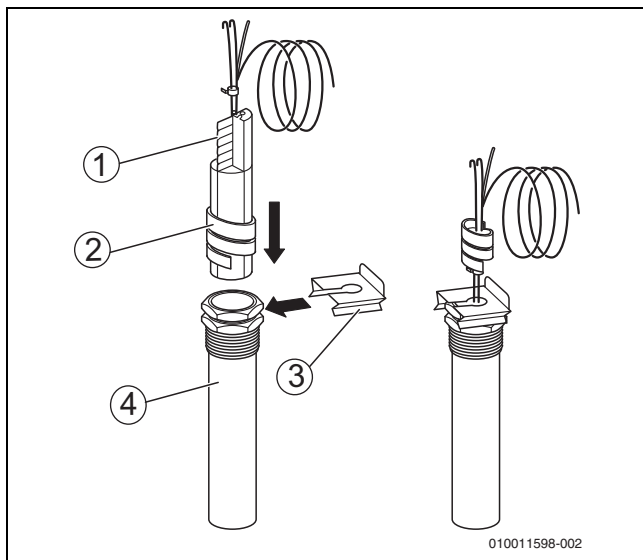


Fig. 22 Inserting the plastic coil into the sensor pocket

- [1] Compensating spring
- [2] KPlastic coil
- [3] Sensor retainer
- [4] Sensor well

- ▶ Never kink excess lengths of capillaries.
- ▶ Route the sensor lead to the control unit.
- ▶ Connect the sensor lead to the control unit.

6.15 Routing the burner cable



Route the burner cable along the door hinge side (factory-fitted on the right).

- ▶ Route the burner cable [5] from below, behind the control unit support, to the control unit.
- ▶ Connect burner cable [5] to control unit [3].
- ▶ Secure the burner cable with the external strain relief.
- ▶ Route the burner cable from the control unit to the burner.
- ▶ Connect burner cable [5] to the burner using the burner plug.

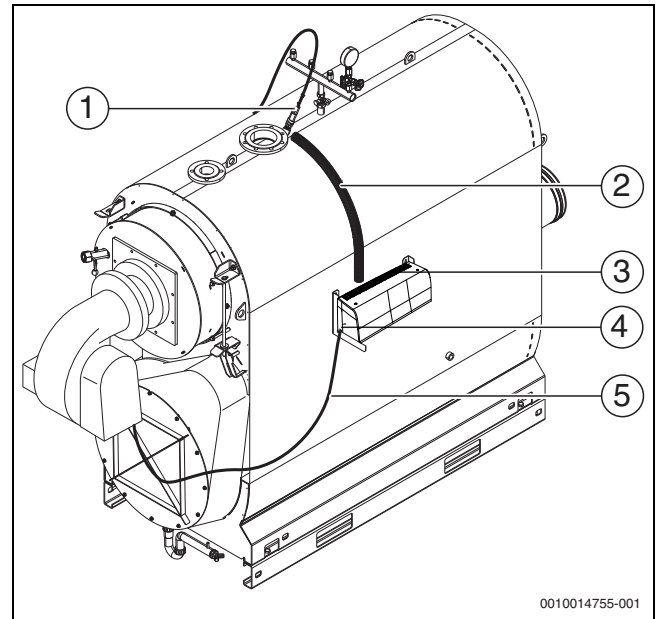


Fig. 23 Fitting the burner cable

- [1] Temperature sensor immersion sleeve
- [2] Cable conduit
- [3] Control unit
- [4] Strain relief
- [5] Burner cable

7 Control unit



DANGER

Danger to life and of system damage through faulty connections.

- ▶ Only carry out electrical work if you are properly qualified.
- ▶ Observe the local installation regulations.
- ▶ The system installer must issue a wiring diagram which records the interfaces between heating output elements, burner, control unit (CFB/CC) and additional safety equipment.
- ▶ Make sure that the electrical installations are suitable for wet areas.



DANGER

Danger to life due to electric shock!

- ▶ Before opening the control unit or boiler, isolate the heating system across all poles and secure against unintentional reconnection.
- ▶ Carefully route the cables/leads and capillary tubes.
- ▶ Ensure that the capillaries are never kinked.
- ▶ Create a permanent connection in accordance with the applicable international installation standards and local regulations.

7.1 Requirements for the control unit



We recommend using a control unit from the CFB 800/CFB 900 or CC 8000 series.

The purpose of optimum control unit settings is to achieve long burner runtimes and avoid rapid temperature changes in the boiler. Gentle temperature changes result in a longer service life of the heating system. The control strategy of the control unit must therefore be prevented from becoming ineffective, i.e. through the boiler temperature controller switching the burner on and off.

Observe the following points when selecting the control unit.

- The control unit must ensure that the maximum internal boiler water temperature and the high limit safety cut-out are at least 5 K apart.
- It must also be ensured that the control electronics rather than the boiler temperature controller switch the burner on and off.
- The control unit must ensure that the burner is switched to low load before a controlled shutdown. If this is not observed, the safety shut-off valve (SAV) in the gas train may lock out.
- Select and adjust the control unit so as to allow a gentle start-up of the boiler with a time delay when the system is cold. The heat energy demand must only be switched on with time delay.
- After the burner demand, an automatic timer (for example) should limit the burner to low load for a period of approx. 150 seconds. A restricted heat demand will prevent uncontrolled starting and stopping of the burner.
- It must be possible to show the number of burner starts at the control unit used (or alternatively at the burner control unit).
- The maximum number of burner starts must be monitored. There should be a maximum of 6 burner starts per hour (averaged over burner runtime on one day). If the number of starts is higher, the user should be notified. The system must be checked to find out whether the number of burner starts can be reduced. The customer service of the manufacturer can provide assistance with optimisation of the system.
- ▶ Maintain the minimum differential between the selected shutdown temperature of the high limit safety cut-out, the temperature controller, the maximum boiler temperature and the maximum temperature demand (→ CFB 800/CFB 900: tab. 12, page 27; CC 8000: tab. 14, page 31).



The maximum boiler temperature can be selected in the user interface of the control unit in the "Boiler parameters" menu, under the menu item "Max. shutdown temperature".

- ▶ Select set temperatures for the heating circuits that are as low as possible.
- ▶ Start heating circuits at 5 minute intervals (e.g. when starting up in the mornings).

7.2 Control unit of series 4000 (accessories)



The position of the terminal strip in control units of the CFB 800/CFB 900 series varies, depending on the control unit, but the labelling of the terminal strips is identical. The terminal strip is easy to identify after the control unit has been opened.

You can use the following control units with the boiler:

- CFB 840
- CFB 810
- CFB 810
- CFB 830

The control unit can be fitted either on top of the boiler or, with the control unit holder (accessory), onto the boiler side.

When using the side-mounted control unit holder:

- ▶ Observe the attached installation instructions.

7.2.1 Installing the control unit

Figure 24, page 26 shows the control unit and the front cover hood [1] from the back.

- ▶ Undo both screws in the cover hood [1].
- ▶ Lift off the cover hood.
- ▶ Fit the control unit at the front by inserting the alignment tabs [4] into the oval holes in the front boiler cover [5].
- ▶ Pull the control unit forwards and then tip backwards. The flexible hooks [2] must engage with the rectangular openings at the rear of the front boiler cover [3].
- ▶ Screw the base of the control unit to the control unit holder with 2 sheet-metal screws.

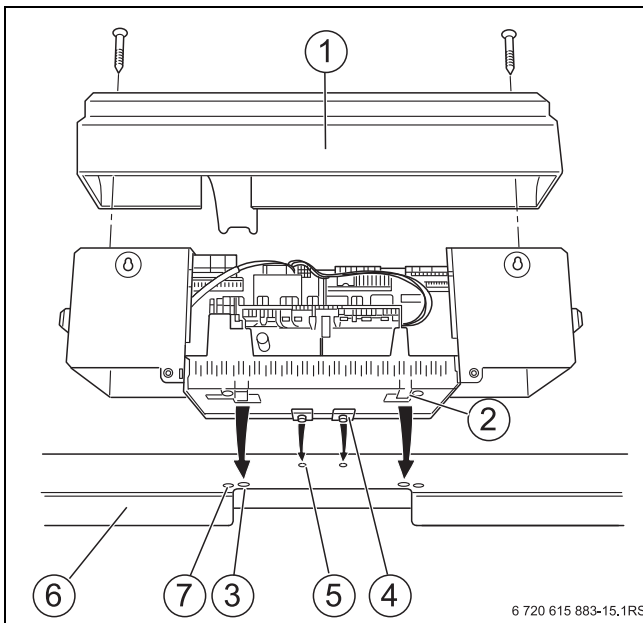


Fig. 24 Installing the control unit

- [1] Cover hood
- [2] Flexible hooks
- [3] Openings in the front boiler cover/control unit holder
- [4] Alignment tabs
- [5] Oval holes in the front boiler cover
- [6] Cable feed in the front boiler cover
- [7] Holes for self-tapping screws

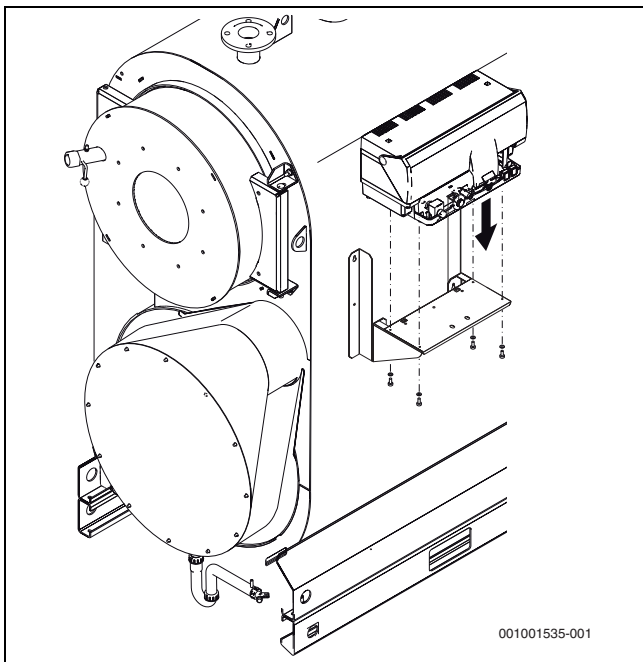


Fig. 25 Installing the control unit

7.2.2 Electrical connection of the control unit

- If necessary, make knock-outs [1] in the rear panel of the cable duct or remove the rear panel section [2].

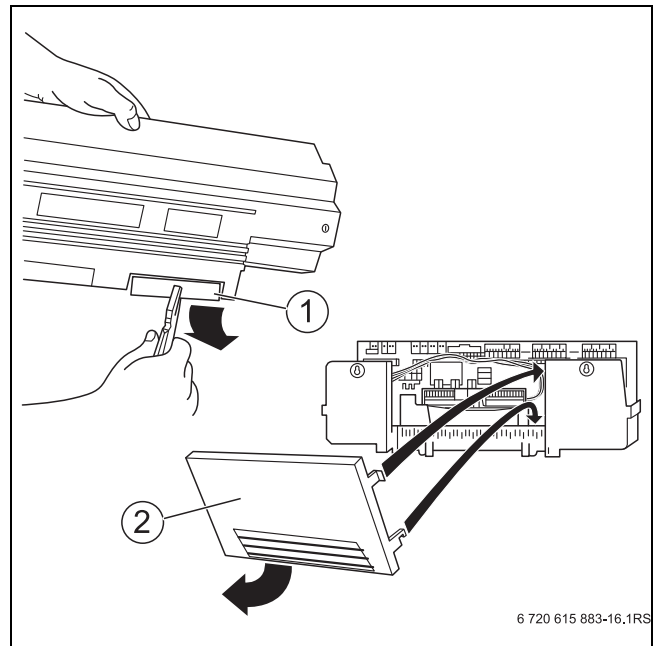


Fig. 26 Preparing the cable entry

- [1] Knock-outs
- [2] Back panel section

- Route the sensor lead separately from other cables.
- Make the plug-in connection in the control unit in accordance with the labelling on the terminal strip.
- Route the burner cable through the cable feed in the front boiler cover to the control unit.
- Connect the burner cable to the control unit in accordance with the labelling on the plug-in strip.
- Make all electrical connections to the appropriate plug-in connectors according to the wiring diagram.
- Secure all cables with cable clips (supplied with the control unit):
 - Insert the cable clip together with the cable from above into the slots in the frame (→ fig. 27, page 26).
 - Slide the cable clip downwards.
 - Counterhold.
 - Flip the lever up.

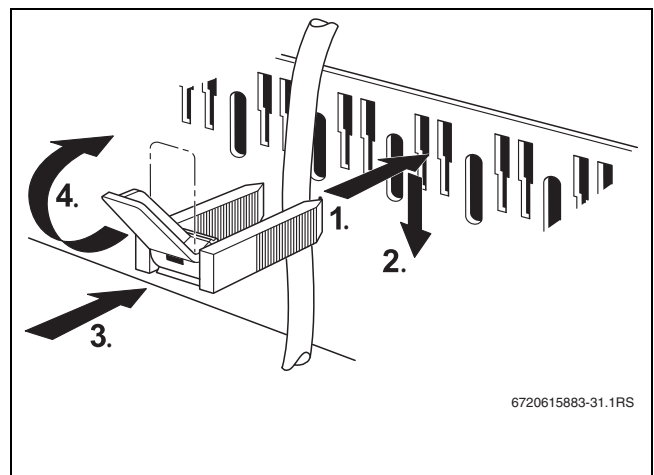


Fig. 27 Securing a cable with a cable clip

- Refit the cover hood on the control unit (→ fig. 7.2.1, page 26).
- Secure the control unit cover hood by tightening the screws (→ fig. 25, page 26).

7.2.3 Control unit settings

Adjust the control unit to the operating conditions of the existing boiler and system components (e.g. burner, safety equipment).



If a control unit from the CFB 800/CFB 900 series is used, burner modulation in standard mode is not enabled for 2.5 minutes.

- Avoid fast upwards modulation.

Regulator settings

Adjustable parameter (max. temperature)	CFB 810	CFB 840	
High limit safety cut-out (STB) ¹⁾	110 °C ↓ ↑ at least 5 K ↓ ↑	110 °C	
Temperature controller (TR) ¹⁾	105 °C ↓ ↑ at least 6 K ↓ ↑	90 °C	↑ at least 18 K
Max. boiler temperature	99 °C ↓ ↑ at least 7 K ↓ ↑	84 °C	↓
Max. temperature demand ²⁾ of heating circuit ³⁾ and DHW ⁴⁾	92 °C	77 °C	

- 1) Set the high limit safety cut-out and temperature controller as high as possible, but ensure the settings are at least 5 K apart.
- 2) Both temperature demands must always be at least 7 K under the maximum boiler temperature.
- 3) The temperature demand of heating circuits equipped with a mixing valve comprises the set flow temperature and the "return temperature increase" parameter in the heating circuit data menu.
- 4) The temperature demand of the DHW heating consists of the set DHW temperature and "return temperature increase" parameter in the DHW menu.

Table 12 Adjustable parameters CFB 810 and CFB 840

Set boiler temperature controller and maximum boiler temperature

The boiler temperature controller ensures emergency operation with an adjustable boiler temperature if the control electronics fail. In standard control mode, the maximum boiler temperature adopts the function of the boiler temperature controller. The maximum boiler temperature can be selected in the control unit in the "Boiler data" menu, under the menu item "Max. shutdown temperature".

Control unit settings

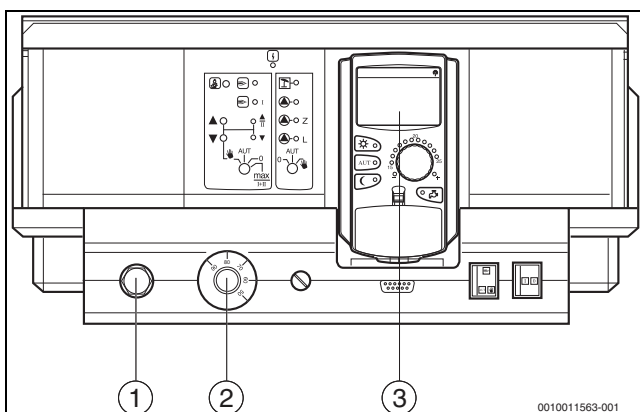


Fig. 28 Control unit settings

- [1] High limit safety cut-out
- [2] Temperature controller
- [3] MEC2

- Select temperatures (→ Table 12, page 27) at high limit safety cut-out [1] in the control unit and at temperature controller [2].
- Set the maximum boiler temperature at the MEC2 [3].



The maximum temperature demand is not a value that is set directly. The maximum temperature demand consists of the set temperature and the rise.

Example DHW demand:

Sum of the set DHW temperature (60 °C) and the parameter "return temperature increase" (20 °C) in the "DHW" menu:
60 °C + 20 °C = maximum temperature demand 80 °C.

Example heating circuits:

Sum of the set temperature of the heating circuit with mixer with the highest temperature demand (70 °C) and the parameter "return temperature increase" (5 °C) in the "Heating circuit data" menu:
70 °C + 5 °C = maximum temperature demand 75 °C.



All maximum temperature demands must always be 7 K below the maximum selected boiler temperature.

7.2.4 Setting control unit parameters

The controller settings listed in tab. 13, page 27 apply for the control units CFB 810 and CFB 830.



To ensure that the control unit operates correctly if burner type "dual fuel burner" is selected, connect a volt-free contact to terminal "ES" to change the fuel type.

Burner	Burner type for fuel		Control unit setting
Burner	Gas	Oil	Burner type to be selected
Single fuel burner	Modulating		Modulating
	2-stage		2-stage
		Modulating	2-stage
		2-stage	2-stage
Dual-fuel burner	Modulating	2-stage	Dual-fuel burner

Table 13 Controller settings for CFB 810 and CFB 830 control units

7.3 Control unit of series 5000 (accessories)



The position of the terminal strip in control units of the CC 8000 series varies, depending on the control unit, but the labelling of the terminal strips is identical. The terminal strip is easy to identify after the control unit has been opened.

You can use the following control units with the boiler:

- CC 8311
- CC 8312

The control unit can be fitted either on top of the boiler or, with the control unit holder (accessory), onto the boiler side.

When using the side-mounted control unit holder:

- Observe the attached installation instructions.

7.3.1 Installing the control unit

In figure 36, page 31, the control unit is shown from the front.

- ▶ Undo both screws in the cover hood.
- ▶ Lift off the cover hood.
- ▶ Separate the back panel from the base of the housing.
- ▶ Fit the base of the casing at the front by inserting the locking tabs into the oval holes [4] in the boiler cover [3].
- ▶ Pull the base of the casing forwards and then tip back. The flexible hooks must engage with the rectangular openings at the rear of the boiler cover [3].
- ▶ Screw the base of the casing to the control unit holder with 2 sheet-metal screws [1].

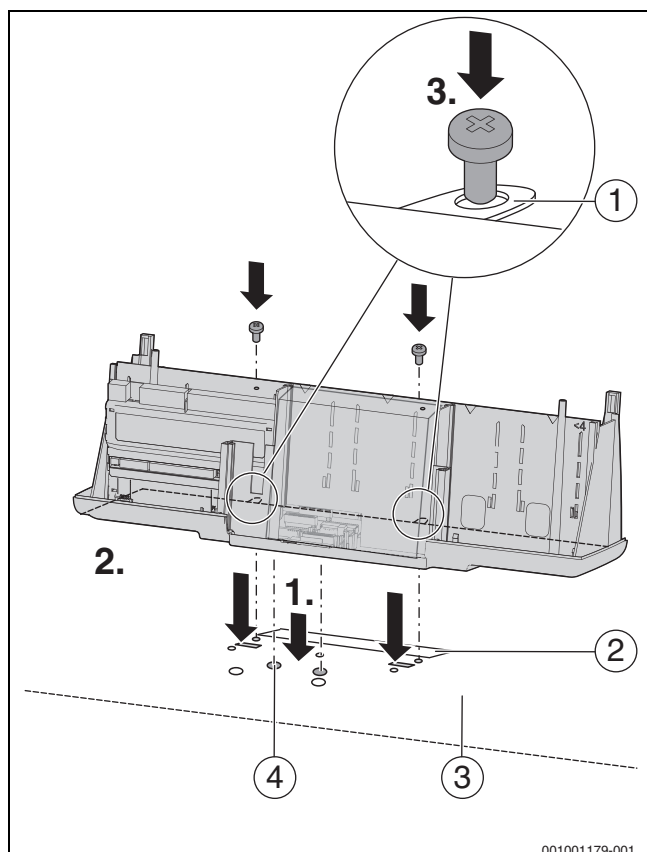


Fig. 29 Installing the control unit

- [1] Self-tapping screws
- [2] Wire passing-hole
- [3] Boiler cover
- [4] Oval holes

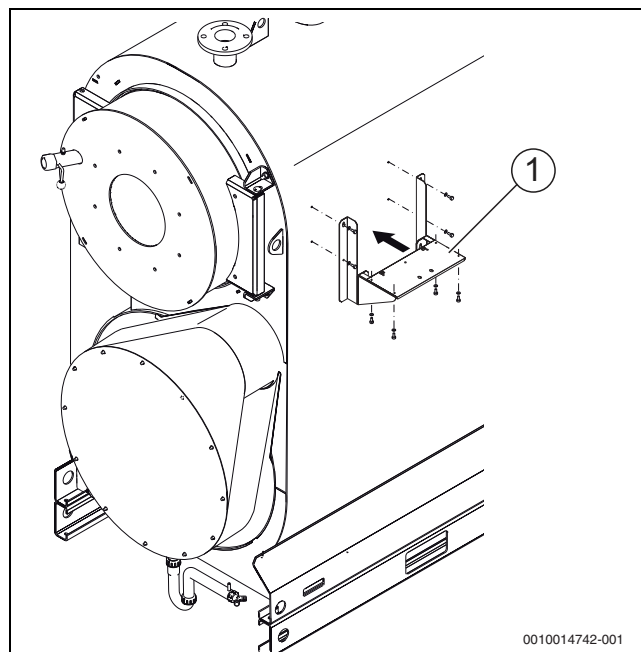


Fig. 30 Installing the control unit support

[1] control unit support

- ▶ Route the sensor lead separately from other cables.
- ▶ Route the burner cable through the cable feed in the boiler cover to the control unit.
- ▶ Route on site electrical connections under the boiler casing to the control unit.
- ▶ Secure all cables with cable clips (included in control unit scope of delivery).

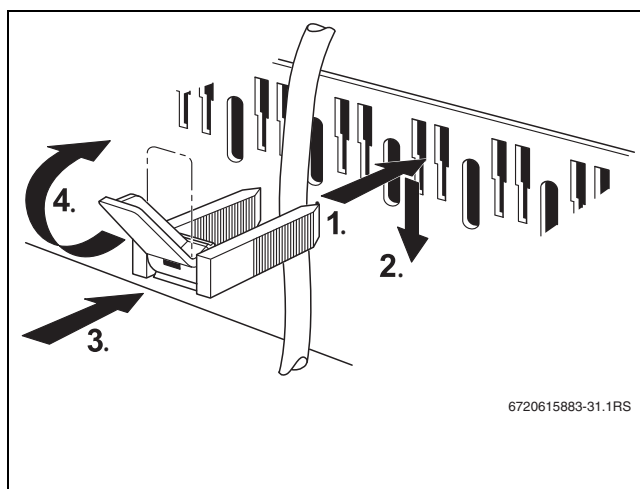


Fig. 31 Securing a cable with a cable clip

7.3.2 Establish the electrical connection to the control unit



To avoid impaired performance of the control unit due to heat:

- Only knock out as many openings as are required.
- Make knock-outs (→ Figure 32, [1], page 29) in the back panel of the cable entry.

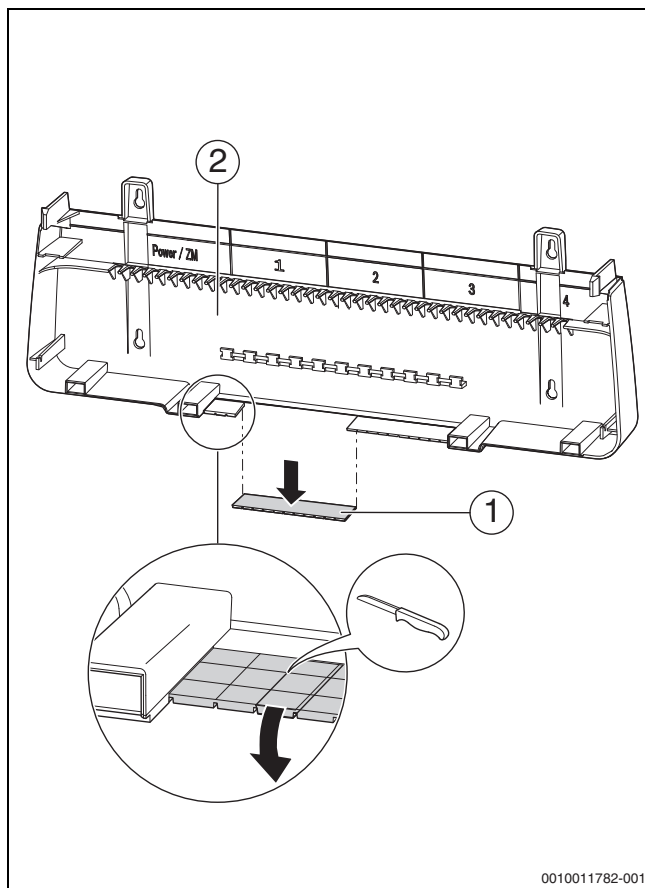


Fig. 32 Prepare the conduit

- [1] Knock-outs
[2] Rear panel

- If available, affix module label to the back panel.
- Observe service instructions of the control unit.
- Fasten back panel (→ Figure 33, [4], page 29) to the base of the casing [3].

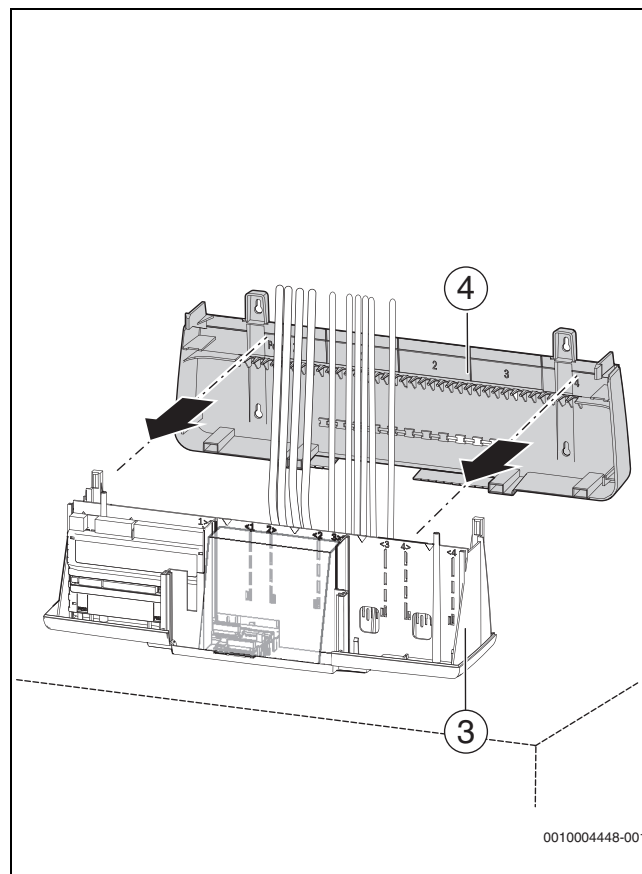


Fig. 33 Fasten back panel to the base of the casing.

- [3] Separate the back panel from the base of the casing.
[4] Rear panel

- Establish the plug-in connection in the control unit according to the labelling on the terminal strip.
- Connect the burner cable to the control unit in accordance with the labelling on the plug-in strip.
- Establish the electrical connections on site to the plug-in connections according to the wiring diagram.
- If available, connect communication ports of the user interface.
- Set the control unit address

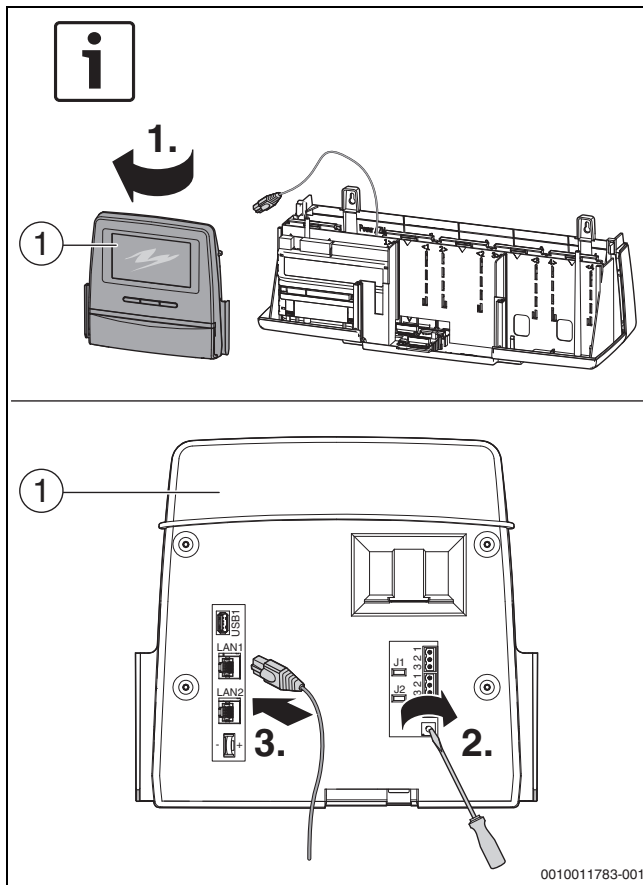


Fig. 34 Set the control unit address

[1] Control unit

- Plug the control unit [1] into the base of the casing.

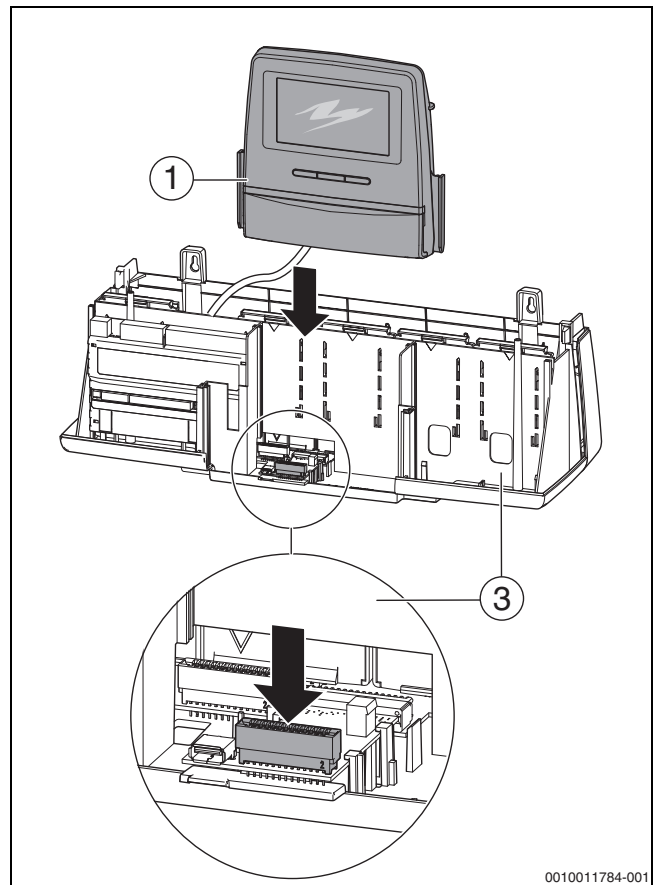


Fig. 35 Plug the user interface into the base of the casing

[1] Control unit

[3] Separate the back panel from the base of the casing.

- Mount the cover hood [2] on the control unit (→ Figure 36, page 31).
- Secure the control unit cover hood [2] by tightening the screws (→ Figure 35, page 30).

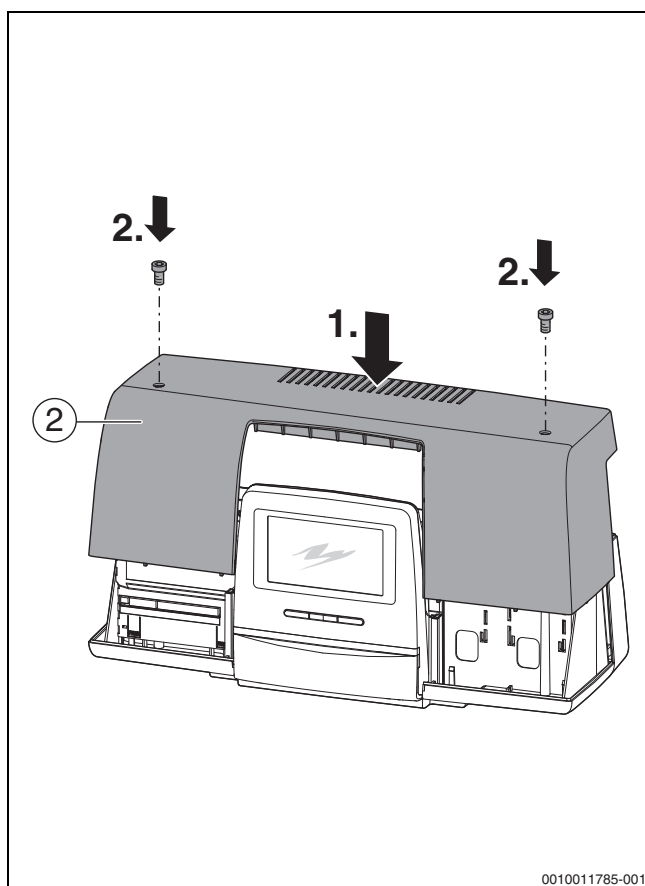


Fig. 36 Fit the cover hood to the control unit

Adjusting the high limit safety cut-out for the CC 8000

The default setting of the high limit safety cut-out is 99 °C. This can be set to 110 °C.

- The service instructions for the control unit must be observed.

7.3.3 Control unit settings

Adjust the control unit to the operating conditions of the existing boiler and system components (e.g. burner, safety equipment).



If a control unit from the CC 8000 series is used, burner modulation in standard mode is not enabled for 2.5 minutes.

Controller settings

Adjustable parameter (max. temperature)	CC 8311/8312	CC 8311/8312
High limit safety cut-out (STB) ¹⁾	99 °C	110 °C
	↓ ↑ at least 5 K ↓ ↑	
Max. boiler temperature	94 °C	105 °C
	↓ ↑ at least 7 K ↓ ↑	
Max. temperature demand of heating circuit ²⁾ and DHW ³⁾	87 °C	98 °C

- 1) Set the high limit safety cut-out as high as possible.
- 2) The temperature demand of heating circuits equipped with a mixing valve is composed of the set flow temperature and the "boiler temperature increase" parameter in the heating circuit data menu.
- 3) The temperature demand of DHW heating is composed of the set DHW temperature and parameter "boiler temperature increase" in the DHW menu.

Table 14 Adjustable parameters CC 8311 and CC 8312

Control unit settings

- Select temperatures (→ Tab. 14, page 31) at high limit safety cut-out and in the control unit.



The maximum temperature demand is not a value that is set directly. The maximum temperature demand consists of the set temperature and the rise.

Example DHW demand:

Sum of the set DHW temperature (60 °C) and the parameter "boiler temperature increase" (20 °C) in the "DHW" menu: 60 °C + 20 °C = maximum temperature demand 80 °C.

Example heating circuits:

Sum of the set temperature of the heating circuit with mixer with the highest temperature required (70 °C) and the parameter "boiler temperature increase" (5 °C) in the "Heating circuit data" menu: 70 °C + 5 °C = maximum temperature demand 75 °C.



All maximum temperature demands must always be 7 K below the maximum selected boiler temperature.

7.3.4 Setting control unit parameters

The controller settings listed in tab. 15, page 31 apply for the control units CC 8311 and CC 8312.



To ensure that the control unit operates correctly if burner type "dual fuel burner" is selected, connect a volt-free contact to terminal "ES" to change the fuel type.

Burner	Burner type for fuel		Control unit setting Burner type to be selected
	Gas	Oil	
Single fuel burner	Modulating		Modulating
	2-stage		2-stage
		Modulating	2-stage
		2-stage	2-stage
Dual-fuel burner	Modulating	Modulating	Dual-fuel burner
Dual-fuel burner	Modulating	2-stage	Dual-fuel burner

Table 15 Controller settings for CC 8311 and CC 8312 control units

7.4 Settings with third party control units

NOTICE

System damage due to incorrect sensor position!

The sensors of the high limit safety cut-out (STB) and the temperature controller (TR) must be fitted at the installation location on the top of the boiler (→ fig. 23, page 24).

- ▶ In the case of third party control units, match the sensor immersion sleeve to the diameter of the sensors used.
- ▶ Do not change the length of the immersion sleeve.



Observe the operating conditions in chapter 2.9, page 9 and observe chapter 6.14, page 23 when installing sensors.

- The third party control unit (building management system or PLC controllers) must ensure a sufficient difference between the maximum internal boiler water temperature and the high limit safety cut-out.

The purpose of optimum control unit settings is to achieve long burner runtimes and avoid rapid temperature changes in the boiler. Gentle temperature changes result in a longer service life of the heating system. The control strategy of the control unit must therefore be prevented from becoming ineffective, i.e. through the boiler temperature controller switching the burner on and off.

Observe the following points when selecting the control unit.

- The control unit must ensure that the maximum internal boiler temperature and the high limit safety cut-out are at least 5 K apart.
- It must also be ensured that the control electronics rather than the boiler temperature controller switch the burner on and off.
- The control unit must ensure that the burner is switched to low load before a controlled shutdown. If this is not observed, the safety shut-off valve (SAV) in the gas train may lock out.
- Select and adjust the control unit so as to allow a gentle start-up of the boiler with a time delay when the system is cold. The heat energy demand must only be switched on with time delay.
- After the burner demand, an automatic timer (for example) should limit the burner to low load for a period of approx. 150 seconds. A restricted heat demand will prevent uncontrolled starting and stopping of the burner.
- It must be possible to show the number of burner starts at the control unit used (or alternatively at the burner control unit).
- The maximum number of burner starts must be monitored. There should be a maximum of 6 burner starts per hour (averaged over burner runtime on one day). If the number of starts is higher, the user should be notified. The system must be checked to find out whether the number of burner starts can be reduced. The customer service of the manufacturer can provide assistance with optimisation of the system.

	Unit	Value
Time constant on temperature controller, max.	s	40
Time constant on temperature switch/limiter, max.	s	40
Minimum difference between burner on and off temperatures	K	7

Table 16 Operation conditions

8 Commissioning

NOTICE

System damage through incorrect burner adjustment (overloading)!

- ▶ Make sure that the value set does not exceed the rated heat output $Q_n(H_i)$ stated on the data plate.

NOTICE

Risk of boiler damage through contaminated combustion air!

- ▶ Never operate the boiler in very dusty conditions, e.g. if building work is taking place at the installation location.
- ▶ Ensure adequate air supply.
- ▶ Never use or store chlorinated cleaning agents or halogenated hydrocarbons (as contained in spray cans, solvents or cleaning agents, paints and adhesives, for example) at the installation location.
- ▶ A burner contaminated during building work must be cleaned before commissioning.

- ▶ Complete the commissioning report (→ chapter 15.4, page 42).

8.1 Purge the heating system



If the heating system contains several heating circuits, these must be purged one after the other.

To prevent contamination in the boiler, flush the heating system prior to commissioning.

- ▶ Purge the system prior to connection to the boiler.

-or-

- ▶ Isolate the heating flow and return at the boiler.
- ▶ Connect the heating flow to a water connection.
- ▶ Connect hose to the heating return of the heating system.
- ▶ Route hose from the heating return to a drain.
- ▶ Open connected consumers (e.g. radiators).
- ▶ Purge the heating system with potable water until clear water emerges from the heating return.
- ▶ Drain the heating system down.

8.2 Carrying out a leak test

The test pressure depends on the actual pressure in the heating system and should be 1.3 times the prevailing pressure or at least 1 bar.

- ▶ Carry out a leak test according to locally applicable regulations.

8.3 Filling the heating system



CAUTION

Health risk through contaminated drinking water!

- ▶ Observe all country-specific regulations and standards regarding the prevention of drinking water contamination. In Europe, observe standard EN 1717.

NOTICE

System damage due to temperature stresses!

- ▶ Only fill the heating system when cold (the flow temperature must not exceed 40 °C).
- ▶ During operation, only fill the heating system via the filling facility in the heating system pipework (return).



Open the automatic air vent valve only briefly for ventilation.

The fill and top-up water quality must comply with the specifications in the operator's log supplied (→ chapter 4.6, page 14).

The pH value of the heating water increases after the heating system has been filled.

- ▶ During initial maintenance (after three to six months) check whether the pH value of the heating water has settled down.
- ▶ Adjust the pre-charge pressure of the expansion vessel to the required pressure (only for sealed unvented systems).
- ▶ Open the mixing and shut-off valve on the hot water side.
- ▶ Fill the heating system slowly using an on-site filling device and observe the pressure gauge whilst doing so.
- ▶ Vent the heating system via the radiator air vent valves.

If the operating pressure drops as a result of venting the system:

- ▶ Top up the system with water.
- ▶ Carry out a tightness test in accordance with locally applicable regulations.
- ▶ After the tightness test, reinstate all components that were taken out of operation.
- ▶ Ensure that all pressure, control and safety equipment is functioning correctly.

Once the boiler has been tested for tightness and no leaks have been found:

- ▶ Set the correct operating pressure.
- ▶ Close the automatic air vent valve.

8.4 Setting the minimum and maximum pressure limiters (accessories)

8.4.1 Setting the maximum pressure limiter

The maximum pressure limiter must be set in such a way that the pressure relief valve is prevented from responding. To achieve this, a safety margin of 0.2 bar compared to the excess pressure of the pressure relief valve must be maintained. The maximum excess pressure of the boiler's pressure relief valve depends on the size of the boiler (→ tab. 18, page 41).

Example:

Pressure relief valve excess pressure: $P_{SV} = 5 \text{ bar}$

Setting value, maximum pressure limiter:

$5 \text{ bar} - 0.2 \text{ bar} = 4.8 \text{ bar}$



To set the pressure limiter, refer to documentation of the pressure limiter.

8.4.2 Setting the minimum pressure limiter

The minimum pressure limiter must be set in such a way that no steam bubbles form in the boiler, and that the boiler still operates safely.

This setting depends on the system conditions and the sitting situation of the boiler system.

A minimum value of 1 bar must always be set for rooftop infrastructure centres. We recommend using a low water indicator with rooftop infrastructure centres.

For the setting value, the boiling pressure associated with the setting value of the high limit safety cut-out is relevant as is the consumer at the highest geodetic level above the boiler.

The available geodetic level calculated lies between the highest point of the consumer and the installation location of the pressure maintaining system.

Boiling pressure:

An allowance is not required up to the high limit safety cut-out 100 °C.

High limit safety cut-out 110 °C corresponds to an allowance of 0.5 bar.

Example:

Boiler system with high limit safety cut-out setting = 110 °C

Highest consumer above the boiler = 12 m (10 m equates to approx. 1 bar) = 1.2 bar

Safety margin = 0.2 bar (fixed value)

Excess pressure $P_{\min} = 0.5 \text{ bar} + 1.2 \text{ bar} + 0.2 \text{ bar} = 1.9 \text{ bar}$



To set the pressure limiter, refer to documentation of the pressure limiter.

8.5 Making the heating system operational



According to standards, a leakage rate on the flue gas side of 2 % of the flue gas mass flow rate is permissible.

Observe the following points during commissioning:

- ▶ Before commissioning, vent the heating system via the ventilation facilities provided for this purpose.
- ▶ Check that the cleaning cover on the flue gas collector is closed.
- ▶ Check that the burner door is securely closed.
- ▶ Check that the safety equipment (e.g. safety valve, minimum and maximum pressure limiters, high limit safety cut-out) is functioning.
- ▶ Check that the required operating pressure has been built.
- ▶ Check the flange connections and other connections for tightness.
- ▶ Tighten screw connections at the flue gas collector and reversing chamber and check tightness.
- ▶ Check the control unit connections and temperature sensor positions.
- ▶ Fill the condensate siphon.

8.6 Starting up the control unit and the burner.

When commissioning the control unit, specific commissioning parameters are set for the burner. Following commissioning, the burner can then be started from this control unit. For further information, refer to the instructions of the relevant control unit or burner.



The flame in the boiler can be observed through the sight glass in the burner door. The combustion chamber pressure can be measured during commissioning at the measurement nipple next to the sight glass. A permanent connection for testing the combustion chamber pressure is not permitted as this can lead to condensate formation.

- ▶ When installing the burner and gas and/or oil supply pipe, observe the operation manual of the burner manufacturer. Carry out the installation in accordance with local regulations.
- ▶ Following the installation, make sure all pipes are tight. Perform tightness test if necessary (e.g. using gas leak detection spray for gas lines)
- ▶ Use the control unit to commission the boiler.
- ▶ Observe operating instructions for the control unit and burner.
- ▶ Program control unit (→ control unit series CFB 800/CFB 900: chapter 7.2.4, page 27; control unit series CC 8000: chapter 7.3.4, page 31).
- ▶ Complete the commissioning report in the technical documentation of the boiler, the control and burner.

9 Shutdown

NOTICE

Risk of damage to the system from frost!

When there is a frost, the heating system can freeze up if it is not operational, (e.g. switched off, mains failure or fault shutdown)!

- ▶ Check the "Control unit settings" function to ensure the heating system remains operational.
- ▶ When there is a risk of frost, protect your heating system against freezing up.
- ▶ If your heating system has been shut down for several days, e.g. due to a fault shutdown, and there is a risk of frost: Drain the heating water at the DFV. Also leave the air vent at the highest point in the heating system open.

9.1 Shutting down the heating system.

The heating system is shut down via the control unit. The burner is also automatically shut down.

- ▶ Switch off the burner at the control unit.

9.2 Shutting down the heating system in emergencies



Only in emergencies, switch off the heating system via the heating system circuit breaker or heating system emergency stop switch.

- ▶ Never put your life at risk. Your own safety is paramount.
- ▶ In dangerous situations, immediately close the main fuel shut-off valve and the power supply of the heating system via the boiler room main MCB/fuse or the heating system emergency stop switch.
- ▶ Isolate the fuel supply.

10 Inspection and maintenance

10.1 Safety instructions for inspection and maintenance



DANGER

Risk to life through explosion of flammable gasses!

- ▶ Work on gas components may only be carried out by qualified and authorized personnel.



DANGER

Danger to life due to electric shock when the heating system is open!

- ▶ Prior to opening the heating system: Isolate the heating system from the mains power supply via the heating system emergency stop switch or the corresponding domestic MCB/fuse.
- ▶ Secure the heating system against unintentional reconnection.

NOTICE

System damage due to inadequate cleaning and maintenance!

- ▶ Carry out cleaning and maintenance at least once a year. In the course of this work, check the entire heating system including the neutralising system for correct function.
- ▶ Immediately correct all faults to prevent system damage.



Annual inspection and service are part of the warranty terms.



Spare parts can be ordered from the manufacturer's spare parts catalogue.

- ▶ Use only genuine spare parts from the manufacturer.

- ▶ Offer your customer an annual inspection and requirement-based maintenance and inspection contract.

An overview of the tasks that must be included in such contracts:

- ▶ Observe inspection and maintenance protocols (→ chapter 15.5, page 43).

10.2 Preparing the boiler for inspection and maintenance



If gas lines have to be detached from the gas burner, the burner door may only be opened by a competent contractor.

- ▶ Shut down the heating system (→ chapter 9.1, page 34).

Prior to opening the burner door:

- ▶ Check the general condition of the heating system.
- ▶ Visual inspection and function check of the heating system.
- ▶ Check fuel and water routing system parts for tightness and signs of corrosion.

10.3 Cleaning the boiler

10.3.1 Preparing the boiler for cleaning with brushes



CAUTION

Risk of injury through falling parts!

- ▶ Prior to opening the doors, ensure that the hinge pin is correctly fitted in the burner door and secured with a spring washer.

- ▶ Remove the front cover (→ chapter 6.12, page 23).
- ▶ Remove the burner.
- ▶ Open the burner door (→ chapter 6.9.1, page 20).
- ▶ Clean the combustion chamber and the heating surfaces.
- ▶ Open the flue gas collector cover (→ chapter 10.3.5, page 36).
- ▶ Open cover of the condensation heating surface (→ chapter 10.3.5, page 36).
- ▶ Check the flue gas collector and condensate pipe, and clean via the inspection aperture if required.

10.3.2 Cleaning the boiler with cleaning brushes



WARNING

Risk of damage to system by using incorrect cleaning equipment!

- ▶ If cleaning with a brush, use only genuine cleaning brushes from the manufacturer.
- ▶ When cleaning only use brushes made of nylon or of stainless steel with a stainless steel linkage.
- ▶ [2] Clean the heating surfaces of the combustion chamber (→ Figure 37, [1], page 35) with the cleaning brush.
- ▶ Remove any cleaning residues using a vacuum cleaner.
- ▶ Check gasket on the burner door, the reversing chamber and flue gas collector and replace if required.
- ▶ Close and secure the burner door.

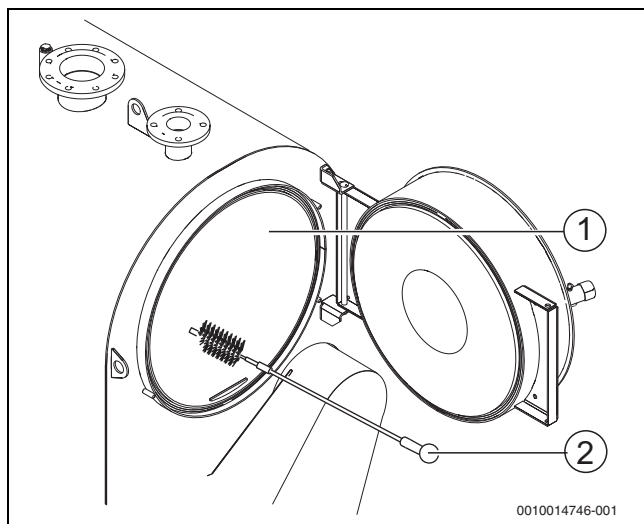


Fig. 37 Clean the heating surface

- [1] Combustion chamber (heating surface of the combustion chamber)
- [2] Cleaning brush

10.3.3 Clean the reversing chamber

To be able to remove combustion residues from the reversing chamber, the covers of the reversing chamber and the flue gas collector must be removed. The relevant parts of the casing must be removed beforehand.

The cover of the reversing chamber can be found on the back of the boiler. The cover of the flue gas collector can be found under the bottom front cover.

- Unscrewing the insulation of the reversing chamber cover.
- Unscrew the nuts and washers of the cover of the reversing chamber.
- Remove the cover the reversing chamber.

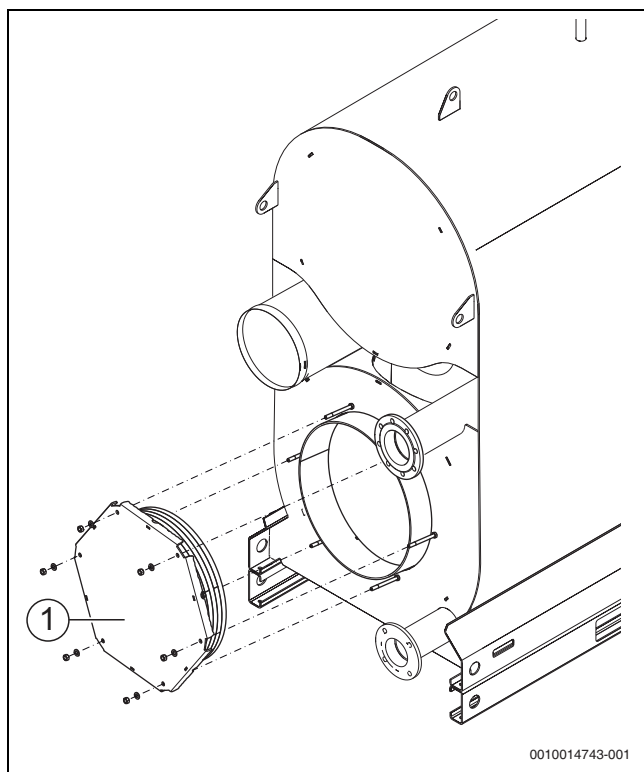


Fig. 38 Removing the cover of the reversing chamber.

- [1] Reversing chamber cover
- Unscrew the nuts and washers of the cover of the flue gas collector.
- Remove the cover.



If you do not push the whole bristle part of the cleaning brush right through the secondary heating pipe, you will find it very difficult to pull the brush back out of the pipe.

- Push the bristle part of the cleaning brush right through the secondary heating pipe until the bristles emerge at the other end of the secondary heating pipe.
- Clean the secondary heating pipes with a brush (→ Figure 39, page 35).
- Remove all loose combustion residues from the combustion chamber (→ Figure 37, [1], page 35), the hot gas flues and the reversing chamber (→ Figure 38, [1], page 35).

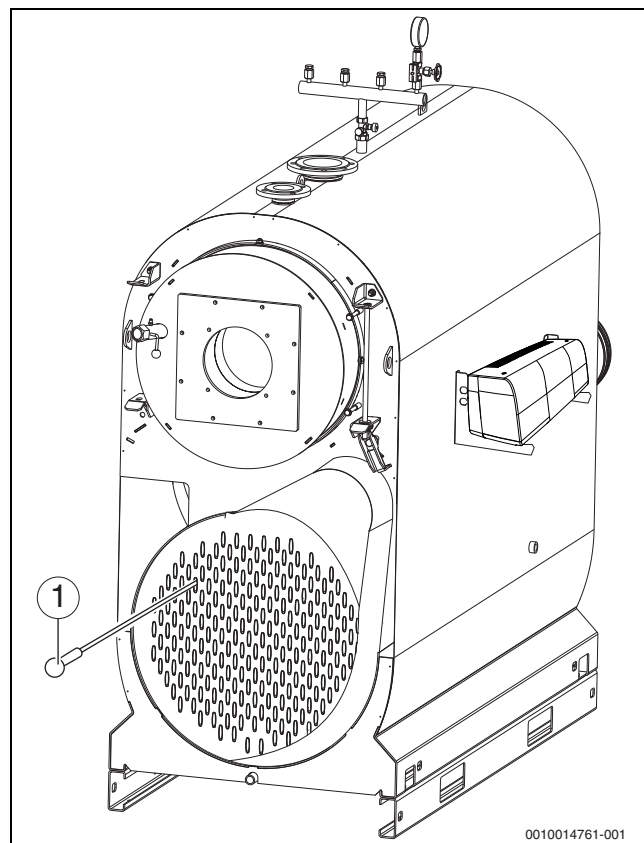


Fig. 39 Cleaning the flue gas collector

- [1] Cleaning brush

10.3.4 Replacing the flue gas collector gasket



Replace the gasket in the flue gas collector cover during the annual service.

- Remove the old gasket and adhesive residues.
- Trim the new gasket.
- Affix the new gasket directly to the edge of the flue gas collector.
- Allow abutting edges to overlap.
- Cut off abutting edges at an angle of 45°.
- Press diagonally abutting edges together leaving no gap.

10.3.5 Fitting the covers to the flue gas collector and reversing chamber

DANGER

Risk of poisoning through escaping gases.

Flue gas can escape during operation if the flue gas collector and condensate drain pipe are not correctly sealed.

- ▶ Carefully seal the flue gas collector with its inspection cover and the condensate drain pipe with the siphon and hydraulic seal.
- ▶ Check the cover gasket for damage and replace if required.
- ▶ Position the flue gas collector cover.
- ▶ Tighten the nuts with a torque of 15 Nm.
- ▶ Fit the reversing chamber cover and secure tightly with a torque of 25 Nm.
- ▶ Secure lagging mat.
- ▶ Mount the burner.
- ▶ Mount the front cover.
- ▶ Restart the heating system.

10.3.6 Wet-cleaning the boiler

NOTICE

System damage through moisture in the control unit.

If moisture enters the control unit, it will be damaged. Never allow any spray to enter the control unit.

- ▶ Ensure that you only spray cleaning agent onto the heating surfaces of the hot gas flues and the combustion chamber.

NOTICE

System damage through cleaning agents in connected components!

If liquids displaced by the cleaning agents are channeled through connected components (e.g. siphon, neutralisation system, etc.), these components may become inoperable or be damaged.

- ▶ Protect or remove connected components.



For wet cleaning (chemical cleaning):

- ▶ Follow the instructions and safety precautions of the cleaning device and agent.
- ▶ Ensure that the cleaning agent is chloride-free.
- ▶ Observe the cleaning agent safety instructions.

- ▶ When wet-cleaning, use a cleaning agent appropriate for the level of contamination.
- ▶ For wet cleaning, proceed according to the manufacturer's instructions.

Liquid cleaning residues can be drained off through the condensate drain pipe on the flue gas collector.

- ▶ Disconnect the heating system from the power supply.
- ▶ Close off the fuel supply.
- ▶ Disconnect the neutralisation system and siphon prior to wet cleaning.
- ▶ Cover the control panel with foil to prevent spray from entering it.
- ▶ Clean the boiler according to the instructions of the cleaning agent manufacturer.

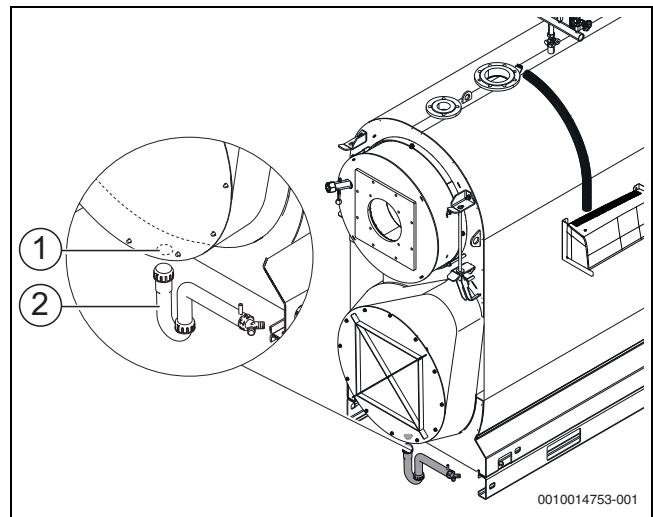


Fig. 40 Opening/closing the cleaning drain

- [1] Cap of cleaning drain
- [2] Cleaning drain

After cleaning:

- ▶ Mount siphon on condensate pipe.
- ▶ Connect the drain hose to the condensate drain.
- ▶ Check gasket on burner door and replace if required (→ chapter 10.3.4, page 35).



If you open the cleaning cover of the flue gas collector, the gasket on the cleaning cover must be replaced (→ chapter 10.3.4, page 35)

- ▶ Close and secure the burner door (→ chapter 6.9.1, page 20).
- ▶ Close and tightly seal the cleaning cover on the flue gas collector (→ chapter 10.3.5, page 36).
- ▶ Continue to ensure adequate ventilation of the installation location.
- ▶ Remove the foil from the control unit.
- ▶ Start up the heating system (→ chapter 8, page 32).

10.4 Check and correct the operating pressure

Operation without a sufficient volume of water is not permitted.

- ▶ Only operate the system when it contains a sufficient volume of water (operating pressure).

If the operating pressure in the heating system is too low.

- ▶ Fill the heating system with top-up water.

For the water quality:

- ▶ Note the information specified in the operator's log.
- ▶ Check the operating pressure once a month.

10.4.1 When should you check the operating pressure in the heating system?



The fill and top-up water quality must comply with the specifications in the operator's log supplied.



Air pockets may form in the heating system through the fill or top-up water releasing gases.

- ▶ Vent the heating system (e.g. at the radiators).
- ▶ If required, top up with water.

Recently added fill or top-up water loses much of its volume in the first few days because it releases gases.

With newly filled systems:

- ▶ Initially check the operating pressure of the heating water daily and then in ever increasing intervals.

Once the heating system is hardly losing any volume:

- ▶ Check the operating pressure of the heating water once a month

A distinction is made between open and closed systems. In practice, open vented systems are rarely installed nowadays. We will therefore be using a closed heating system to demonstrate how you can check the operating pressure. All settings will have already been made by the contractor when the system was first commissioned.

10.4.2 Sealed unvented systems

NOTICE

System damage due to frequent topping up!

Depending on the water quality, the heating system can be damaged by corrosion or scaling.

- ▶ Ensure that the heating system is vented.
- ▶ Check the heating system for tightness and the expansion vessel for its function.
- ▶ Observe the requirements regarding water quality (→ operator's log).
- ▶ In case of frequent water loss, determine the cause and remedy immediately.

NOTICE

System damage due to thermal stress.

- ▶ Only fill the heating system when it is cold (the flow temperature should be no more than 40 °C).
- ▶ During operation, only fill the heating system via the filling facility in the heating system pipework (return).

In closed systems, the pressure gauge needle (→ Figure 41, [3], page 37) must be within the green marking [2]. The red needle [1] of the pressure gauge must be set to the minimum pressure required for the heating system.

- ▶ Check the heating system pressure.

If the pressure gauge needle [3] drops below the green marking [2]:

- ▶ Top up with make-up water.
- ▶ Top up with water via a filling facility in the heating system pipework.
- ▶ Vent the heating system.
- ▶ Check the operating pressure again.

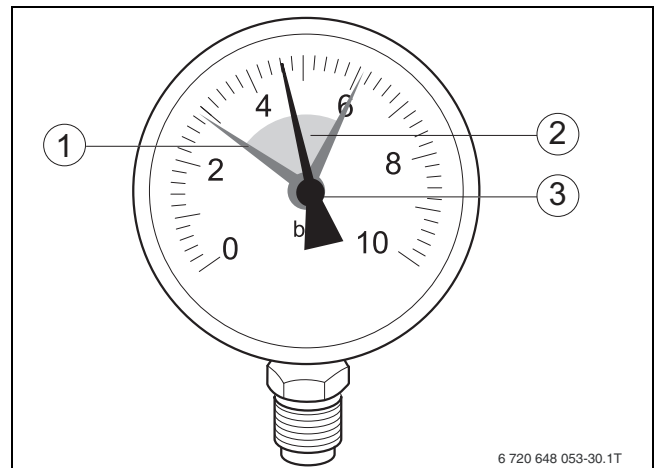


Fig. 41 Pressure gauge for closed heating systems

- [1] Red needle
- [2] Green marking
- [3] Pressure gauge needle

10.4.3 Installations with automatic pressurisation units

For installations in which an automatic pressure maintaining system is integrated:

- ▶ Follow the manufacturers' instructions.
- ▶ Observe water quality requirements (→ operator's log).

10.5 Take water samples



WARNING

Risk of scalding from hot boiler water!

If the water samples are taken without suitable water coolers, there is an acute risk of scalding.

- ▶ Use a water sample cooler to take the boiler water sample.

Document the quality of the boiler water and the fill and top-up water in the operator's log.

The table 21 on page 44 contains the minimum scope of the values and parameters to be documented.

When taking a boiler water sample, a water sample cooler must be used. Analysis errors may result from incorrect water samples, or water samples taken using unsuitable water sample coolers.

Only take water samples under normal system operating conditions, i.e. not while cold or during start-up. For the analysis, a representative sample is required which allows cooling of the test water to 25 °C via suitable cooling means.

11 Faults

11.1 Correcting a burner fault

NOTICE

System damage due to frost.

When there is a frost, the heating system can freeze up if it is not operational, e.g. switched off, mains failure or fault shutdown!

- ▶ Check the "Control unit settings" function to ensure the heating system remains operational.
- ▶ When there is a risk of frost, protect your heating system against freezing up.
- ▶ If your heating system has been shut down for several days, e.g. due to a fault shutdown, and there is a risk of frost:
Drain the heating water at the DFV. Also leave the air vent at the highest point in the heating system open.

NOTICE

System damage from pressing the reset button too frequently.

This can damage the burner ignition transformer.

- ▶ Press the reset button no more than three times in sequence.

The display shows a fault in the heating system. Further information on the fault displays can be found in the service instructions of the relevant control unit. In addition, burner faults are signalled by an indicator on the burner.

- ▶ Press burner reset button (see operating instructions of burner and control).

If the burner still fails to start after three attempts, contact a contractor.

11.2 Other faults

For other possible faults, see the installation and operating instructions of the control unit.

12 Environmental protection and disposal

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

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

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

Packaging

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

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

Used appliances

Used appliances contain valuable materials that can be recycled.

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

Old electrical and electronic appliances



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

The symbol is valid in countries where waste electrical and electronic equipment regulations apply, e.g.

"European Directive 2012/19/EC on old electronic and electrical appliances". These regulations define the framework for the return and recycling of old electronic appliances that apply in each country.

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

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

You can find more information here:

www.weee.bosch-thermotechnology.com/

13 Data Protection Notice



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14 Safety equipment

Safety accessories are listed in the catalogue or website of the manufacturer. Contact your supplier.

14.1 Arrangement of minimum safety equipment in accordance with BS EN 12828:2012

Boiler > 300 kW; operating temperature ≤ 105 °C; shutdown temperature (high limit safety cut-out) ≤ 110 °C – direct heating

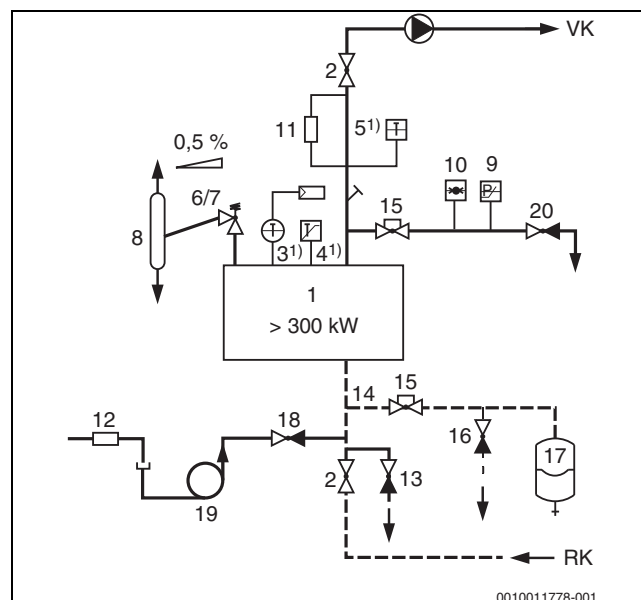


Fig. 42 Safety equipment in accordance with BS EN 12828:2012 for boilers > 300 kW with high limit safety cut-out (STB) ≤ 110 °C

- RK Boiler return
- VK Flow
- [1] heat source
- [2] Shut-off valve, flow/return
- [3] Temperature controller¹⁾
- [4] High limit safety cut-out¹⁾
- [5] Temperature capturing facility¹⁾
- [6] Diaphragm safety valve MSV 2.5 bar/3.0 bar or
- [7] Pressure relief valve HFS ≥ 2.5 bar
- [8] Flash trap; not required in systems > 300 kW if a high limit safety cut-out (with a limit of ≤ 110 °C) and a maximum pressure limiter are additionally provided for each boiler.
- [9] Maximum pressure limiter
- [10] Pressure meter
- [11] Low water indicator; not in systems ≤ 300 kW, where instead a minimum pressure limiter or a replacement measure approved by the manufacturer is provided for each boiler.
- [12] Non-return component
- [13] Drain & fill valve (DFV)
- [14] Safety pipe
- [15] Shut-off valve – protected against unintentional closure, e.g. by sealed cap valve
- [16] Drain upstream of the expansion vessel
- [17] Expansion vessel (EN 13831)
- [18] Filling facility
- [19] Suitable device for separate heating from potable water system
- [20] Boiler safety assembly drain valve (manostat bar)

- 1) The maximum achievable flow temperature in combination with control units in the CFB 800/CFB 900 series is around 18 K below the cut-off temperature of the high limit safety cut-out.
The maximum achievable flow temperature in combination with control units of the CC 8000 series is around 12 K below the cut-off temperature of the high limit safety cut-out.



The figures provide a schematic representation of the safety equipment in accordance with EN 12828:2012 for the system version listed here - no claim is made as to their completeness. Practical implementation is subject to currently applicable technical rules.

- Observe country-specific limits.

Low water indicator to protect against overheating

In accordance with BS EN 12828:2012, a low water indicator is required to protect the boiler against overheating. BS EN 12828:2012 permits an approved minimum pressure limiter as an alternative to the low water indicator.

14.2 Safety equipment in accordance with the EU type examination



The following items of equipment are included in the EU type examination. We therefore recommend that you purchase safety equipment with the boiler.

The following safety equipment is included in the type examination of the boiler:

Safety component	Make	Verification of suitability
Minimum pressure limiter as low water indicator	Sauter DSL 143 F001	TÜV ID ...6022
maximum pressure limiter	Sauter DSH 143 F001	TÜV ID ... 6023
High limit safety cut-out	Sauter: TUC 407 F001	TÜV ID: 0000046121

Table 17 Approval designations of additional safety equipment in accordance with EN 12828:2012

14.3 Requirements for alternative items of safety equipment and other pieces of equipment

14.3.1 Safety valve requirements

- The safety valve must be suitable for discharging domestic hot water (e.g. via type-tested appliances in accordance with BS 6644).
- The pipework between the boiler and the safety valve must be unrestricted. The pressure drop in the pipework between the boiler and the safety valve must be kept to a minimum.
- The safety valve must be able to safely discharge the rated output during a full load with the anticipated overpressure.
- The pressure drop of the discharge pipe must not exceed the nominal pressure of the safety valve by more than 10 %.
- The safety valve must be installed accessibly on the heat appliance or within close range in the flow pipe, without any barriers between the heat appliance and the safety valve.



If using different safety equipment to the type shown in tab. 17, page 40, the following information must be observed without fail as otherwise the type examination qualification of the boiler will be invalidated.

14.3.2 High limit safety cut-out requirements

- Devices which are suitable for responding must be used (e.g. type-tested devices with the identification TÜV.STB ID... or devices according to EN 60730-2-9 (device type 2) or EN 14597).
- To adjust the higher limit safety cut-out, observe the instructions in chapter 7.1, page 25.
- Limiters with a time delay are not to be installed.
- The limiter is generally installed with the sensor set in the designated socket branch with a sensor pocket. The installation situation for other appliances is yet to be established. The sensor pocket is screwed in ex works.

14.3.3 Maximum pressure limiter requirements

- Devices which are suitable for responding under increasing pressure must be installed (e.g. type-tested devices with the TÜV.SDB...S... ID).
- Observe information in chapter 8.4.1, page 33.
- Limiters with a time delay are not to be installed.
- The limiter sits on the boiler safety assembly, possible connection with G ½".

14.3.4 Water level limiter as low water indicator requirements

- Devices which are suitable for responding with a lack of water must be installed (e.g. type-tested devices with the TÜV.HWB... or TÜV.WB... ID).
- The low water indicator is installed on the boiler; possible connection G 2".

14.3.5 Burner requirements

- Oil burner certified in accordance with EN 267.
- Gas burner certified in accordance with EN 676.
- Please observe EMC and Low Voltage Directives, and other relevant European guidelines.
- Observe information in chapter 4.2, page 13.

14.3.6 Boiler control



The boiler control of Buderus is included in the EU type examination in accordance with the Gas Appliances Directive. If the boiler control is provided on site, a full certification may need to be carried out on site for the boiler and control.

- Comply with EMC and Low Voltage Directive.
- Observe notice in chapter 7.1, page 25.

14.4 Connection of the boiler

Information and examples of the boiler connection can be found in the technical guide.

14.5 Dirt traps

Deposits in the heating system can lead to local overheating, noise and corrosion. Any resulting boiler damage falls outside the warranty obligations.

To remove dirt and sludge deposits, flush the heating system thoroughly before connecting a boiler to an existing system. In addition, we recommend the installation of dirt traps or a sediment separator.

Dirt traps retain contaminants and thereby prevent faults in control devices, pipework and boilers. Dirt traps must be installed near the lowest point of the heating system in an easily accessible position. Clean the dirt traps every time the heating system is serviced.

15 Appendix

15.1 Technical data

		Unit	Boiler type		
			800	1000	1200
Safety limit / manual reset high limit (STB) ¹⁾		°C	110	110	110
maximum operating temperature		°C	depending on the control unit ²⁾		
Permissible operating pressure		bar	6	6	6
Weight (empty)	Net	kg	1540	1792	1822
Operating weight ³⁾	Gross	kg	2470	2992	3012
Water content		l	930	1200	1190
Volume of products of combustion		l	1020	1310	1320
Nominal heat input [Burner output Q _n (Hi)]	Full load, max.	kW	742	928	1114
	Partial load 30%	kW	223	278	334
Available flue resistance		Pa	Subject to burner (50) ⁴⁾	Subject to burner (50) ³⁾	Subject to burner (50) ³⁾
Resistance of products of combustion		mbar	6.4	6.5	7.5

- 1) The specification corresponds to T_{max} on the type plate and shows the maximum permissible safety temperature of the heat generator; the actual safety temperature depends on the control unit, smaller safety temperatures are possible
- 2) Maximum possible flow temperature with control units of the series CFB 800/CFB 900= safety limit (STB) - 18 K.
Example: safety limit (STB) = 100 °C, maximum possible flow temperature = 100 - 18 = 82 °C.
Maximum possible flow temperature with control units of the series CC 8000= safety limit (STB) - 12 K.
Example: safety limit (STB) = 99 °C, maximum possible flow temperature = 99 - 12 = 87 °C.
- 3) Specification without burner.
- 4) Value in brackets is the recommended draught.

Table 18 Technical data

15.2 Values for the flue gas calculation

		Unit	Boiler type		
			800	1000	1200
Values at system temperature 50/30 °C					
Rated heat output, gas ¹⁾	Full Load	kW	800	1000	1200
	Partial load 30 %	kW	243	303	364
Rated output, oil	Full Load	kW	770	962	1155
	Partial load 30 %	kW	233	292	351
CO ₂ content ²⁾	Gas/Oil	%	10 / 13	10 / 13	10 / 13
Flue gas temperature ³⁾	Full Load	°C	40	40	40
	Partial load 30 %	°C	30	30	30
Exit flue gas mass flow	Full Load	kg/s	0.300	0.375	0.451
	Partial load 30 %	kg/s	0.089	0.112	0.134
Values at system temperature 80/60 °C					
Rated heat output, gas ¹⁾	Full Load	kW	725	906	1090
CO ₂ content ²⁾	Gas/Oil	%	10 / 13	10 / 13	10 / 13
Flue gas temperature ³⁾	Full Load	°C	66	66	66
	Partial load 30 %	°C	36	36	36
Exit flue gas mass flow	Full Load	kg/s	0.316	0.395	0.475
	Partial load 30 %	kg/s	0.095	0.118	0.142

- 1) When operating with fuels with a hydrogen content of up to 20 %, the performance may deviate from the data specified. Details should be requested from the gas supplier and the service organisation if required.
- 2) When operating with gaseous fuels with a hydrogen content of up to 20 %, the CO₂ values deviate from the data specified. Details should be requested from the gas supplier and the service organisation if required.
- 3) Calculated flue gas temperature for cross-sectional calculation according to EN 13384 (average value across the product line). The actual flue gas temperature may differ from this, subject to burner setting and actual operating temperature.

Table 19 System temperatures 50/30 °C and 80/60 °C

15.3 Floor standing boiler parameters

Pressure drop on the water side

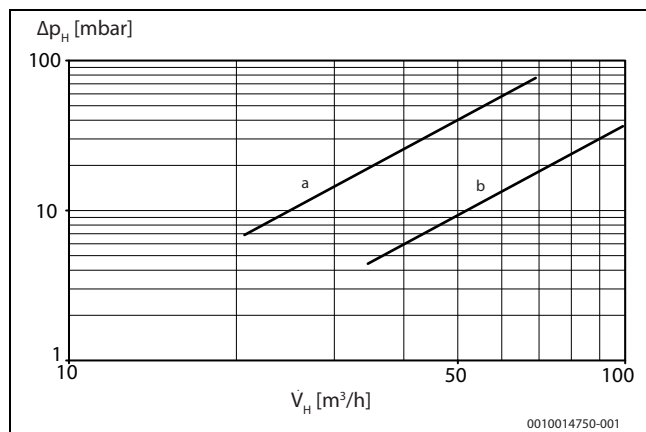


Fig. 43 Pressure drop on the water side

Δp_H Pressure drop on the heating water side [mbar]

V_H Flow rate [m^3/h]

a Uni Condens 8000 F 800...1200, boiler size 800

b Uni Condens 8000 F 800...1200, boiler size 1000/1200

15.4 Commissioning report

The boiler can be operated with an oil or gas burner.

- Carefully complete the commissioning report for the relevant oil or gas burner.
- Sign all completed commissioning work and enter the date.

	Commissioning work	Page (individual steps)	Comments (signature)
1.	Purge the heating system.	Chapter 8.1, page 32	
2.	Fill the heating system with water.	Chapter 8.3, page 32	
3.	Vent heating system.		
4.	Carry out tightness test.	Chapter 8.2, page 32	
5.	Switch on the control unit. ► Boiler-specific parameters set and recorded.	Chapter 7, page 25	
6.	Ensure the function of all safety equipment.		
7.	Check combustion air vents.	Chapter 4.1, page 13	
8.	Check the fuel line for tightness.		
9.	Starting the burner.	See technical burner documentation.	
10.	Complete the burner test report regarding the individual output stages.		
11.	Perform tightness test on hot gas side. After a short time in operation, tighten the screws in the burner door to prevent leakage around the door as a result of the packing cord settling.		
12.	Check the flange connections and fittings after the boiler has been heated up and retighten.		
13.	Check flue path for tightness.		
14.	Check the flue gas temperature.		
15.	Carry out a function test on all safety equipment and record this.		
16.	Instruct the system user and hand over technical documentation.		

Standby loss

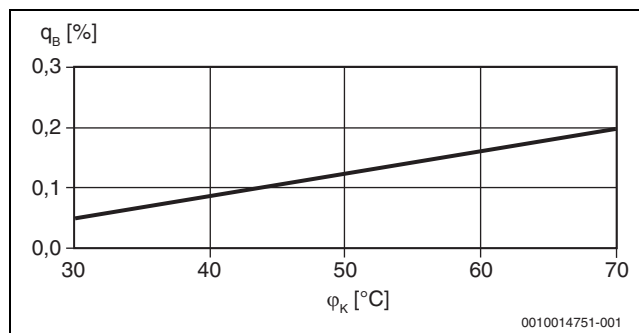


Fig. 44 Standby loss subject to the average boiler temperature

q_B Standby loss [%]

ϕ_K Average boiler temperature [$^{\circ}C$]

	Commissioning work	Page (individual steps)	Comments (signature)
17.	Enter the fuel used in the table (→ operating instructions).		
18.	Confirm professional commissioning.		
	Company stamp/signature/date		

Table 20 Commissioning report

15.5 Inspection and maintenance reports

The inspection and maintenance protocols provide an overview of the required inspections and service steps that must be carried out annually. The records also serve as a master copy.



Warranty:

Annual inspection and maintenance are part of the warranty conditions.

- ▶ Complete reports when carrying out inspections and maintenance.
- ▶ Sign and date the completed work.

	Inspection work	Page (individual steps)	Remarks
1.	Check the general condition of the heating system (visual inspection).		
2.	Check the heating system function.		
3.	Check the components in contact with fuel and water throughout the system for the following: • Tightness • visible signs of corrosion • Signs of ageing		
4.	Check the combustion chamber and heat emitter for contamination and clean. Shut down the heating system for this step.	chapter 9.1, page 34	
5.	Check and, if required, replace gaskets and packing cords at: • Burner door • Inspection aperture of reversing chamber • Inspection aperture of flue gas collector Tighten screw connections at the reversing chamber and flue gas collector to the specified torque and check tightness.	chapter 10.3.4, page 35 chapter 10.3.5, page 36	
6.	Check and clean the burner. ▶ Visual inspection and remove any contamination. ▶ Check all safety equipment (safety shutdown). ▶ Function check ▶ Flue gas analysis with test report for each output stage.	See technical documentation for burner.	
7.	Check that the flue is functioning safely.	See technical documentation for burner.	
8.	Check the hydraulic seal of the condensate siphon and supplement if required.		
9.	Check the operating pressure and pre-charge pressure of the expansion vessel.	chapter 10.4, page 36	
10.	Check the control unit settings are suitable and adjust if required.	See technical documentation for burner.	
11.	Test all safety equipment (safety shutdown) and record findings. For example: ▶ High limit safety cut-out ▶ Pressure limiter min./pressure switch min. ▶ Pressure limiter max. (if installed) ▶ Low water indicator (if installed) ▶ Other safety equipment.		

	Inspection work	Page (individual steps)	Remarks
12.	Conduct a water analysis and record the results in the operator's log: ▶ pH value ▶ Residual hardness ▶ Oxygen binder ▶ Phosphate ▶ Electrical conductivity ▶ Appearance ▶ Check water records (e.g. amount of top-up water) in the operator's log.		
13.	Check the neutralising system.		
14.	Final check of the inspection work, take measurements and record values and test results.		
15.	Confirm professional commissioning.		
	Company stamp/signature/date		

Table 21 Inspection record

	Demand-based maintenance	Page (individual steps)	Remarks
1.	Shutting down the heating system.	Chapter 9.1, page 34	
2.	Clean the combustion chamber.	Chapter 10.3, page 34	
3.	Clean the hot gas flues (heating surfaces)	Chapter 10.3, page 34	
4.	Check and, if required, replace gaskets and packing cords at: • Burner door • Inspection aperture of reversing chamber • Inspection aperture of flue gas collector Tighten screw connections at the reversing chamber and flue gas collector to the specified torque and check tightness.	chapter 10.3.4, page 35 chapter 10.3.5, page 36	
5.	Check that the condensate pipe is clean and filled with a water seal.		
6.	Check the neutralising system.	See technical documents of the condensate neutraliser	
7.	Bring the heating system into operation.	Chapter 8.5, page 33	
8.	Final check of the maintenance work, take measurements and record values and test results.	See technical documentation for burner.	
9.	Check the function and operational safety (safety equipment).		
10.	Confirm professional commissioning.		
	Company stamp/signature/date		

Table 22 Heating system maintenance protocol







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