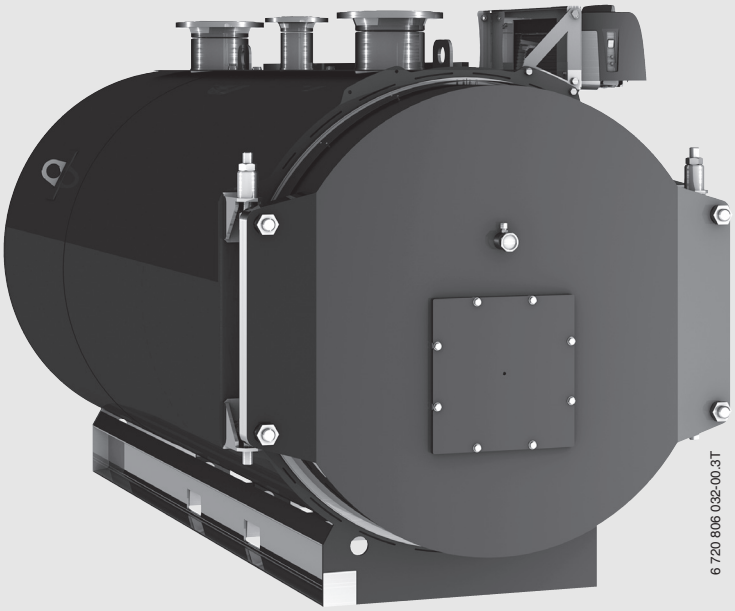


Oil/gas boiler

Uni 3000 F

Output range 120 to 1850 kW

BOSCH

Installation and maintenance instructions for the contractor

6 720 814 352 (2019/02) AU

Contents

1 Key to symbols and safety instructions

1.1 Key to symbols

Warnings

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

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

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

Important information

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

Additional symbols

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

Table 1

1.2 Safety instructions

General safety instructions

Failure to observe the safety instructions can result in serious personal and possibly life-threatening injuries as well as physical damage and damage to the environment.

- ▶ Read the safety instructions carefully prior to commissioning the system.

Risk of damage due to operator error

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 be carried out only by a qualified contractor.

Installation, conversion and operation

Insufficient ventilation can lead to dangerous flue gas leaks.

- ▶ Ensure that the boiler installation room remains free from the risk of frost.
- ▶ The heating system must be installed and operated in accordance with the applicable rules of technology as well as national, regional and local code.
- ▶ Have the appliance installed only by an licensed contractor.
- ▶ Never modify any parts for flue gas routing.
- ▶ Do not operate the device without a sufficient quantity of water.
- ▶ Always keep equipment openings (doors, maintenance cover) closed during operation.
- ▶ Only use approved fuels according to the rating plate.
- ▶ Do not cover or reduce the size of ventilation apertures in doors, windows and walls.

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 combustion air free of dust.

Danger through failure to consider your own safety in an emergency such as a fire

- ▶ Never put your life at risk. Your own safety is paramount.

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 the gas isolation valve.
- ▶ Open windows.
- ▶ Never operate electrical switches.
- ▶ Extinguish all naked flames.
- ▶ **From outside the building**: call gas supplier and authorised heating contractor.

If you smell flue gas

- ▶ Switch off the appliance.
- ▶ Open windows and doors.
- ▶ Notify an authorised contractor.

Electric shock hazard

- ▶ Before carrying out any work on the heating system, disconnect all poles of the heating system. For example, activate the emergency stop switch outside the boiler room.
- ▶ It is not enough to switch off the control unit.
- ▶ Safeguard the heating system against unintentional reconnection.

Thermal disinfection

- ▶ **Risk of scalding!**
  Monitor any operation with temperatures in excess of 60 °C.

Inspection and servicing

- ▶ **Recommendation for customers:** Arrange a maintenance and inspection contract with an authorised contractor, covering an annual inspection and demand-dependent maintenance.
- ▶ The user is responsible for the general and environmental safety of the heating system.
- ▶ Immediately correct all faults to prevent system damage!
- ▶ Use only original spare parts and accessories from the manufacturer. Damage caused by the use of spare parts and accessories not supplied by the manufacturer are excluded from our warranty.

Explosive and highly flammable material

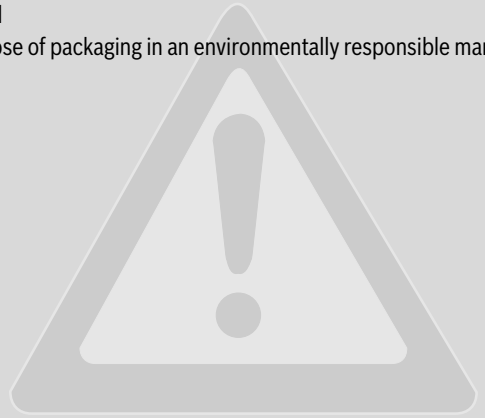
- ▶ Never use or store highly flammable materials (paper, thinners, paints etc.) near the boiler.

Instructions to the customer

- ▶ Explain to the customer how the appliance works and how to operate it.
- ▶ Advise the customer that he/she must not make any modifications to the appliance or carry out any repairs on it.

Disposal

- ▶ Dispose of packaging in an environmentally responsible manner.



2 Product details

2.1 Standards, regulations and directives

This boiler must be installed in accordance with the manufacturer's installation instructions, AS5601, AS/NZS3500.4, AS3000 wiring regulations and all Local Building, Water and Gas fitting regulations. Observe the following local regulations and standards during installation and operation:

- local building codes concerning the installation conditions,
- local building codes regarding the ventilation facilities and the chimney connection,
- regulations regarding connection to the power supply,
- the technical rules of the gas supply utility concerning the connection of the gas burner to the public gas mains,
- regulations and standards regarding the safety equipment of heating systems.

The level of safety equipment must comply with at least AS3814. Also observe country-specific regulations if these specify further requirements.

Standards requiring compliance, for instance, include:

- General requirements relating to flue systems in and on buildings - AS560
- Electrical connection to AS/NZS3000
- Protection of potable water against contamination - In AU/NZS observe AS/NZS 3500 and AS/NZS 2845.1

2.2 Intended use

The oil/gas-fired Uni 3000 F floor-standing boiler has been designed for hot water heating systems, e. g. for apartment buildings or industrial units.

The boiler is only approved for open flue operation.

Any oil or gas burner to EN 676 and EN 267 can be used if its operating range matches the boiler specification.

Only burners that have been tested and approved for electromagnetic compatibility (EMC) may be used.

Control units from the CFB 9xx controller series are used with these boilers.

For further detail on correct use, see → Chapters 2.8 and 2.9, page 5.

2.3 Safety equipment

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

- ▶ For safety temperatures (HLSC) max. 99 °C the safety equipment must, at least, meet the requirements of AS/NZS2598.
- ▶ Also observe local regulations, if these specify further requirements.
- ▶ Observe local limits if these specify an alternative temperature limit (HLSC 99 °C).

Equipment examples are included in the appendix (→ page 35).
The components comprising the safety equipment are available as accessories.

2.4 Gas supply

To be installed and servised only by an authorized person.

- ▶ Please note that, depending on the region, approvals for the flue system and condensate connection to the public sewage system may be required. Before starting installation, notify the responsible agencies as specified by local regulations.

2.5 EU Declaration of Conformity

The design and operation of this product conform to the applicable European directives and, when necessary, supplementary national requirements.
Conformity has been demonstrated.

You can request the declaration of conformity for the product. Please refer to the contact address on the back cover of these instructions.

Applicable up to 400 kW only:

This product is a boiler block with a casing pursuant to the Official Journal of the European Union, L 239, Commission Regulation (EU) No. 813/2013 implementing guideline 2009/125/EC Art. 2, §6.

According to the aforementioned Official Journal, Art. 1 § 2 (g), this product is recognized as a replacement product which replaces an identical boiler block already on the market. This shall be valid until it expires. December 2017.

Anyone offering this product to consumers shall be responsible for its correct use.

2.6 Overview of types

Type	Output
Uni 3000 F	120 kW to 360 kW
	420 kW to 1850 kW

Table 2 Overview of types

2.7 Operating conditions

Observe all standards and guidelines applicable to the installation of this system in your country!
Ensure compliance with the information on the data plate. These are definitive and must be observed.

Operating conditions and time constants		
Maximum permissible temperature, high-limit safety cut-out	**°C**	99 (AU/NZS)
Maximum operating pressure	**bar**	6
Temperature controller	**s**	40
Monitor/limiter	**s**	40

Table 3 Operating conditions and time constants

The control unit settings in Chapter 4.9 must be observed!

Prevent load peaks in excess of the stated boiler output. On average, the burner may not be started more than four times per hour (relative to the actual hours run by the burner).

Boiler operating conditions				
Minimum flow rate	**Minimum return temperature in °C**		**Minimum boiler output at the 1st stage (base-load output) %**	**When not in use**
	with oil as fuel	**with gas as fuel[1)]**		
In conjunction with a CFB 9XX control unit for modulating low-temperature operation				
No demand[2)]	50	60	-	No requirements The boiler is shut down automatically by the CFB 9xx control unit
In conjunction with a CFB 9xx control unit for constant boiler temperatures, e. g. CFB 810 with CME 930 or with additional external control				
No demand[2)]	50	60	-	No demand[2)]

Table 4 Operation conditions

1) Gas quality as per Natural Gas I2H (G20)

2) If it has been ensured, that the FV/FZ return temperature sensor is always covered by water from the boiler circuit.

2.8 Suitable fuels

The boiler must only be operated with the specified fuels. Only burners that are suitable for the specified fuels may be used. Observe the manufacturer's burner selection list and the burner manufacturer's instructions.

Gas burner

Permissible fuels:

- Natural gas from the public gas supply in accordance with national regulations with a total sulphur content < 50 mg/m^3.
- LPG in accordance with national regulations with a content of elementary sulphur < 1.5 ppm and volatile sulphur < 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 sulphur content < 50 ppm and a proportion of bio-oil (FAME) ≤10%.

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

Biogas

Proportion of sulphur and sulphur compounds in the gas up to a maximum of 1500 mg/m^3 (approx. 0.1 % by volume)

Proportion of chlorine and chlorine compounds in the gas up to a maximum of 50 mg/m^3

Proportion of fluoride and fluoride compounds in the gas up to a maximum of 25 mg/m^3

Homologated dual burners can also be used. Here are the requirements for gas side and oil side as previously described. Also all the products described in the following course apply equally to the gas side and for the oil side.

2.9 Heating water quality

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 constant operational condition 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 heat exchanger surfaces will rise and the thermal stresses (loads on the boiler body) will increase.
This is why the quality of the fill or top-up water must meet the conditions stipulated in the operator's log provided and be recorded in this log.
The conditions for boilers > 600 kW require general water treatment independent of the water hardness and the volume of fill and top-up water.

2.10 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.

2.11 Pressure maintenance

- ▶ Size the expansion vessels correctly.
- ▶ Set the pre-charge pressures correctly.

If using pump-controlled pressurisation units, 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 protection against damage:

- ▶ Ensure that every heat source is equipped with an individual expansion vessel.
- ▶ Set the pre-charge pressure of the expansion vessel correctly.

Boiler output (kW)	Diaphragm expansion vessel Capacity in litres
up to 300	50
up to 500	80
up to 1 000	140
up to 2 000	300
up to 5 000	800
up to 10 000	1600

Table 5 Minimum expansion vessel sizes

2.12 Data plate

The data plate is located at the front of the boiler.

There you will find information such as the serial number, output and approval details.

Please quote these details if you have to contact the manufacturer because of a problem with your heating appliance or accessories.

2.13 Tools,materials and assembly aids

For the installation and maintenance of the boiler, standard tools are required, as used for heating, gas, water and electrical installations.

2.14 Description of appliance

The Uni 3000 F is a stationary floor-standing boiler with dual-flue combustion to EN 303-1, EN 303-2, EN 303-3, EN 14394+A1 for use with oil and gas as fuel. It is referred to in this manual as the floor-standing boiler or the boiler. The boiler must be fitted with a burner suitable for the boiler output. The boiler is supplied with the boiler casing mounted.

For optional accessories, contact your local Bosch Commercial and Industrial Heating representative.

NOTICE: Risk of system damage from incorrect burner.
- ▶ Only use burners that meet the technical requirements of the boiler and match the boiler output (→ Chapter 2.16, page 8).

The boiler consists of the following main components:

- The boiler shell transfers the heat generated by the burner to the heating water.
- Boiler casing and thermal insulation [2].
  The boiler jacket and thermal insulation reduce heat losses.
- Control unit (accessory [1]).
  The control unit monitors and controls all electrical boiler components.

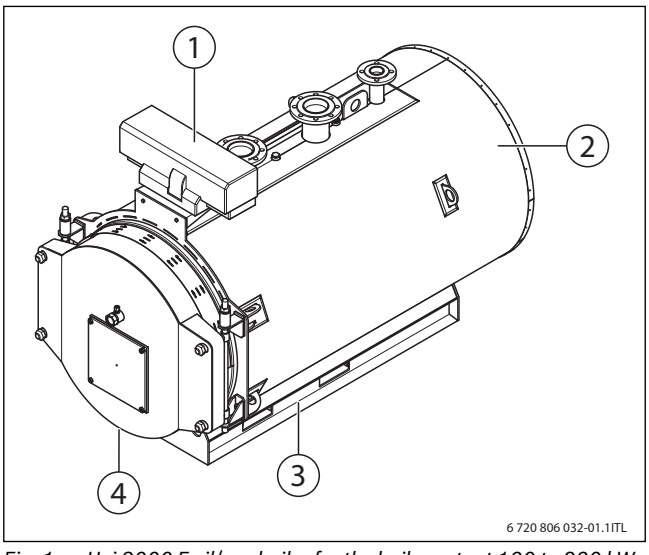


Fig. 1 Uni 3000 F oil/gas boiler for the boiler output 120 to 820 kW

[1] Control unit (accessory)
[2] Boiler jacket
[3] Base frame
[4] Burner door

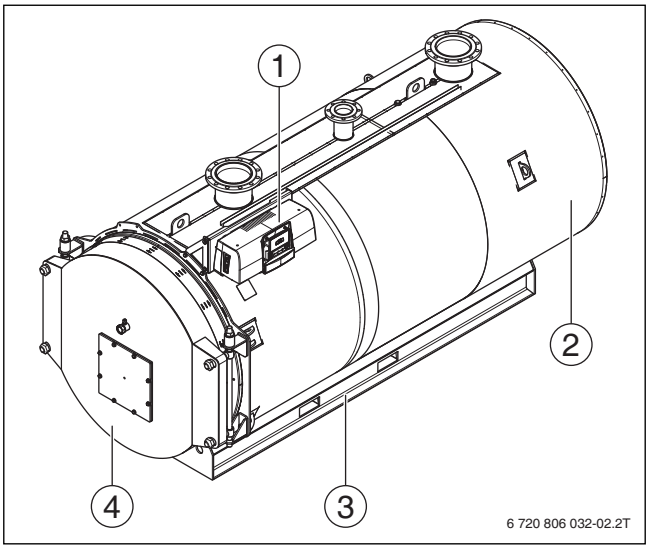


Fig. 2 Uni 3000 F oil/gas boiler for the boiler output 1040 to 1850 kW

[1] Control unit (accessory)
[2] Boiler jacket
[3] Base frame
[4] Burner door

2.15 Standard delivery

▶ On delivery, check that all packaging is in perfect condition.
▶ Check the delivery is complete.

- Boiler with turbulators and an undrilled burner plate
- Control unit retainer and cable conduit
- Insulating rings for blast tube
- Technical documents
- Cleaning brush
- Burner cable for first burner stage

2.15.1 Required accessories

The following accessories are not part of the standard delivery, but are required to operate the boiler:

- Burner suitable for the boiler output
- Control unit with burner cable for second burner stage
- Safety equipment
- Boiler safety assembly
- Burner plate suitable for the burner

2.15.2 Optional accessories

- Sound insulation strips

For additional accessories, please contact your local Bosch Commercial and Industrial Heating representative.

2.16 Specifications, dimensions and values for the flue gas calculation

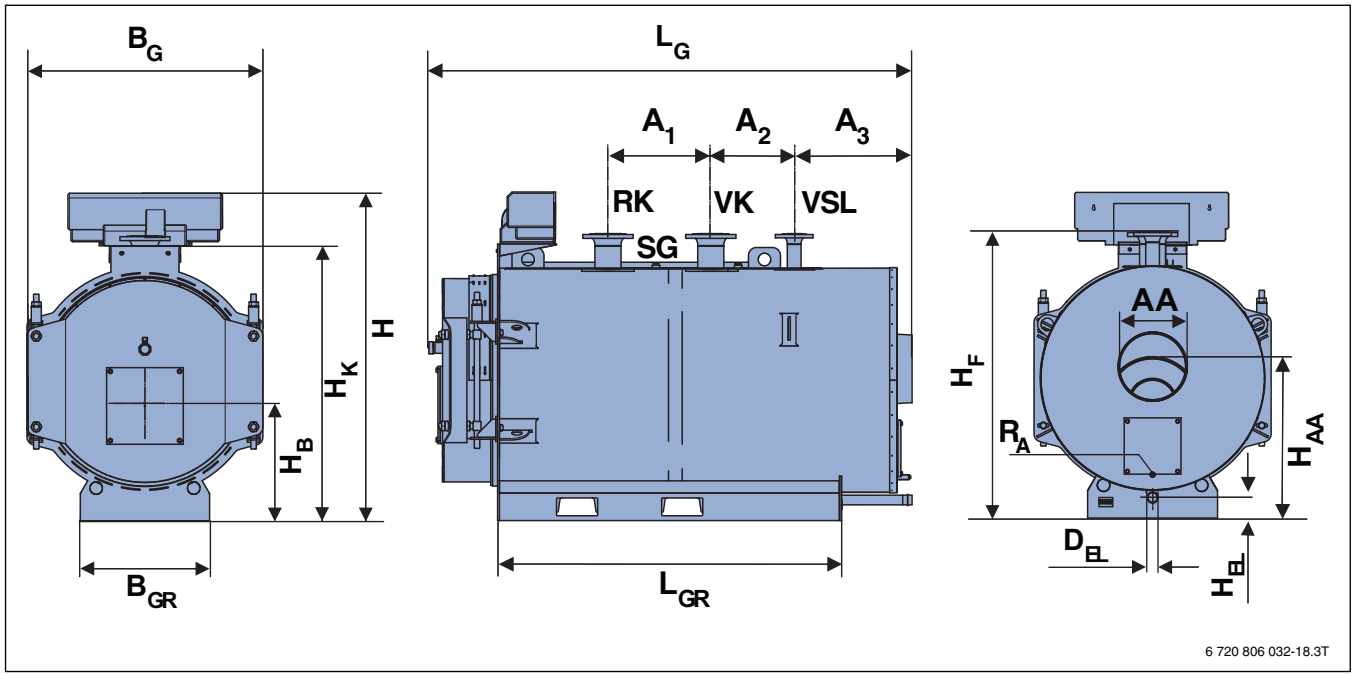


Fig. 3 Dimensions, Uni 3000 F 120 kW to 820 kW

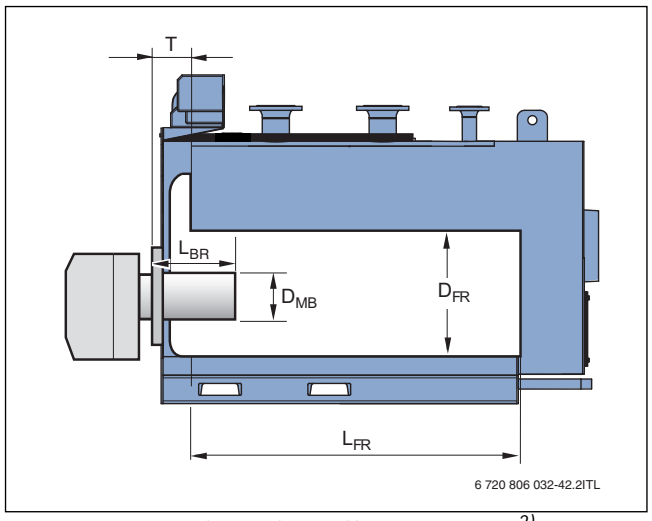


Fig. 4 Dimensions, burner door and burner Uni 3000 F[2)]

Measurements			Uni 3000 F[1]									
Boiler size			**120**	**190**	**250**	**300**	**360**	**420**	**500**	**600**	**730**	**820**
Boiler length	L_G	mm	1515	1720	1850	2010	1972	2172	2114	2364	2310	2510
Boiler width (overall)	B_G	mm	800	850	890	890	955	955	1040	1040	1150	1150
Base frame length	L_{GR}	mm	915	1110	1240	1400	1373	1573	1503	1753	1700	1900
Swivelling range of the burner door	B_T	mm	700	760	790	790	860	860	950	950	1060	1060
Base frame width	BGR	mm	420	430	450	450	480	480	570	570	650	650
Overall height (with control unit)	H	mm	1157	1220	1255	1255	1320	1320	1430	1430	1430	1430
Boiler height	HK	mm	937	1000	1035	1035	1100	1100	1210	1210	1320	1320
Flue outlet diameter	D_{AA}	mm	200	200	250	250	250	250	300	300	350	350
Flue outlet height	H_{AA}	mm	542	582	597	597	632	632	664	670	727	727
Combustion chamber length	L_{FR}	mm	865	1060	1190	1350	1260	1460	1390	1640	1585	1785
Combustion chamber diameter	D_{FR}	mm	390	420	450	450	488	488	548	548	624	624
Maximum blast tube diameter	D_{MB}	mm	130	240	240	240	290	290	290	290	350	350
Minimum blast tube length	L_{BR}	mm	[2]	[2]	[2]	[2]	[2]	[2]	[2]	[2]	[2]	[2]
Burner door depth	T	mm	260	260	260	260	260	260	260	260	260	260
Installed burner height	H_B	mm	427	442	457	457	477	477	507	507	547	547
Boiler flow connection[3]	VK	DN (mm)	65	65	65	65	80	80	100	100	125	125
Boiler return connection[3]	RK	DN (mm)	65	65	65	65	80	80	100	100	125	125
Flow connection safety cable[3]	VSL	DN (mm)	40	40	40	50	50	50	50	50	65	65
Boiler safety assembly connection	SG	inch	1	1	1	1	1	1	1	1	1	1
Flange height VK/VSL/RK	H_F	mm	1005	1065	1095	1095	1165	1165	1255	1255	1255	1365
Clearance	A_1	mm	240	345	495	470	540	540	450	450	620	620
Clearance	A_2	mm	170	205	185	200	225	225	365	365	350	350
Clearance	A_3	mm	400	400	413	573	437	637	516	766	541	541
Drain & fill valve (DFV) connection	D_{EL}	inch	1¼	1¼	1¼	1¼	1¼	1¼	1¼	1¼	1¼	1¼
Drain & fill valve (DFV) height	HEL	mm	100	100	100	100	100	100	100	100	80	90
Cleaning seq	R_A	inch	G 3/8	G 3/8	G 3/8	G 3/8	G 3/8	G 3/8	G 3/8	G 3/8	G 3/8	G 3/8

Table 6 Dimensions for the Uni 3000 F (→ Fig. 3)

1) Output levels > 400 kW are not covered by the scope of the Ecodesign Directive

2) The blast tube must protrude beyond the lining in the burner door.

3) Flange to DIN 2633 (PN16)

Specifications		Uni 3000 F									
Boiler size		**120**	**190**	**250**	**300**	**360**	**420**	**500**	**600**	**730**	**820**
Nominal heat output	kW	120	190	250	300	360	420	500	600	730	820
Nominal heat input	kW	132	209	274	329	393	459	546	655	795	893
Transport weight	kg	400	490	590	615	735	840	1005	1090	1260	1395
Boiler water content	ltr	136	203	233	262	323	367	434	502	607	675
The volume of the combustion part of the boiler	ltr	129	183	238	268	304	350	420	495	618	693
Pressure drop on the hot gas side	mbar	0.8	1.6	1.54	2.7	3.3	3.9	4.7	5.59	6.1	6.47
Draught required	Pa	0	0	0	0	0	0	0	0	0	0
Maximum temperature of high limit safety cut-out	°C	110[1)]	110[1)]	110[1)]	110[1)]	110[1)]	110 [1)]	110[1)]	110[1)]	110[1)]	110[1)]
Maximum permissible operating pressure (boiler)	bar	6	6	6	6	6	6	6	6	6	6
Useful efficiency for nomina heating output[4)]	%	**90,9**	**90,9**	**91,2**	**91,2**	**91,6**	**91,5**	**91,6**	**91,6**	**91,8**	**91,8**
Nominal heat input for partial load 30%	kW	40	63	82	99	118	138	164	197	268	268
Nominal heat output for partial load 30%	kW	36	57	75	90	108	126	150	180	246	246
Useful efficiency for nominal heating output.[3)]	%	**85,7**	**85,7**	**86**	**86**	**86,4**	**86,3**	**86,4**	**86,4**	**86,6**	**86,6**
Useful efficiency for nominal partial load 30%. [3)]	%	**87,2**	**87,2**	**87,5**	**87,5**	**87,9**	**87,8**	**87,9**	**87,9**	**88,1**	**88,1**
Control range of water temperature[2)]	°C	50-105	50-105	50-105	50-105	50-105	50-105	50-105	50-105	50-105	50-105
Heat loss to surroundings	%	0,4	0,34	0,29	0,26	0,23	0,21	0,2	0,21	0,25	0,25

Table 7 Specifications for the Uni 3000 F (certified with modulating burner output)

1) High limit safety cut-out setting if the boiler is operated to heat DHW.
2) According to table 4- Operation conditions+ tables 14 and 15
3) Based on gross calorific value
4) Based on net calorific value

Values for calculating the flue gas		Uni 3000 F									
Boiler size		**120**	**190**	**250**	**300**	**360**	**420**	**500**	**600**	**730**	**820**
Flue gas temperature, partial load 60 %[1)]	°C	150	150	150	150	150	150	150	150	150	150
Flue gas temperature, full load[1)]	°C	210	205	202	200	200	200	200	200	198	198
Flue gas mass flow rate, oil, partial load 60 %[2)]	kg/s	0.0317	0.0494	0.0646	0.0769	0.0934	0.1085	0.1277	0.1668	0.1868	0.2088
Flue gas mass flow rate, oil, full load[2)]	kg/s	0.0527	0.0824	0.1076	0.1282	0.1557	0.1809	0.1301	0.2780	0.3113	0.348
Flue gas mass flow rate, gas, partial load 60 %[3)]	kg/s	0.0314	0.0488	0.0650	0.0778	0.0929	0.1068	0.1396	0.1674	0.1869	0.2102
Flue gas mass flow rate, gas, full load[3)]	kg/s	0.0523	0.0813	0.1084	0.1297	0.1548	0.178	0.2168	0.2790	0.3116	0.3503
CO_2 content, oil	%	13	13	13	13	13	13	13	13	13	13
CO_2 content, gas	%	10	10	10	10	10	10	10	10	10	10

Table 8 Values for the flue gas calculation for the Uni 3000 F (certified with modulating burner output)

1) Relative to average boiler temperature 70 °C
2) Relative to fuel oil (up to 1000 mg/kWh (ppm) sulphur content), Hi = 11.86 kWh/kg
3) Relative to Natural Gas I2H (G20), Hi = 9.03 - 10.03 kWh/m^3

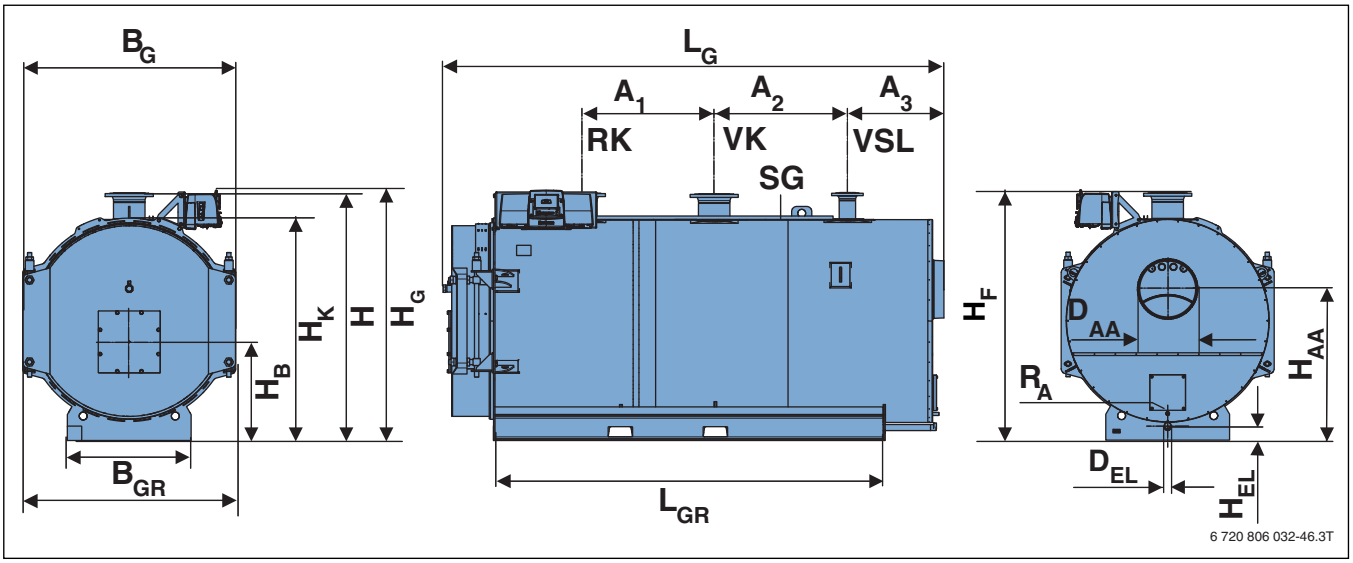


Fig. 5 Dimensions Uni 3000 F 1040 and 1200 kW

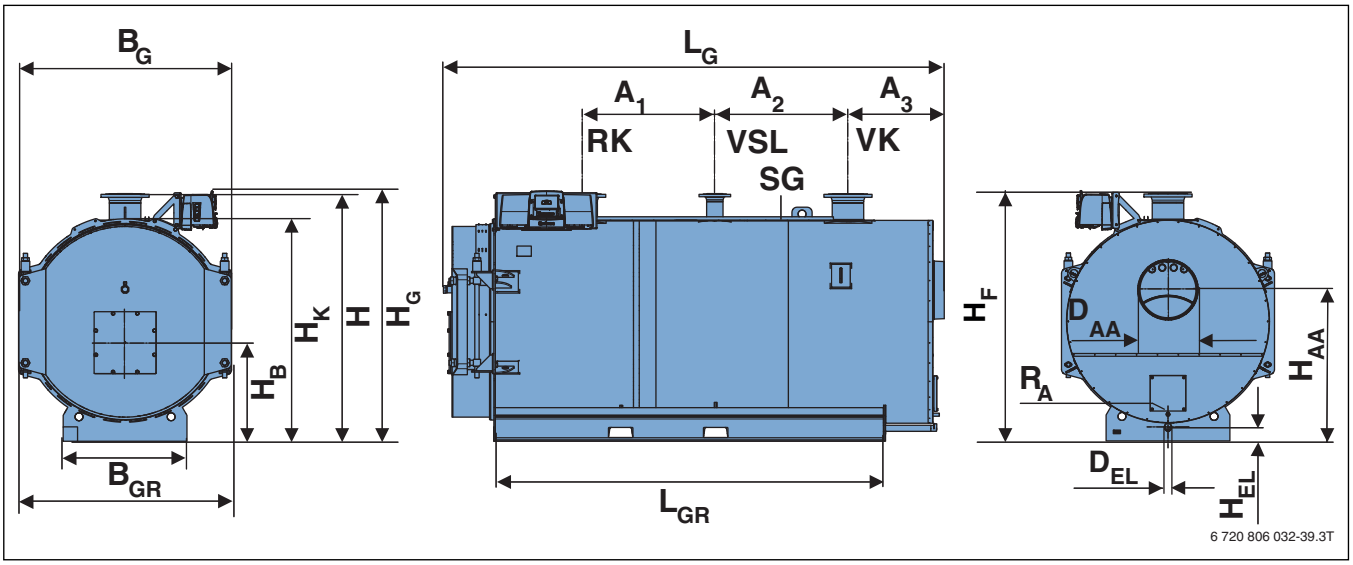


Fig. 6 Dimensions Uni 3000 F 1400 kW and 1850 kW

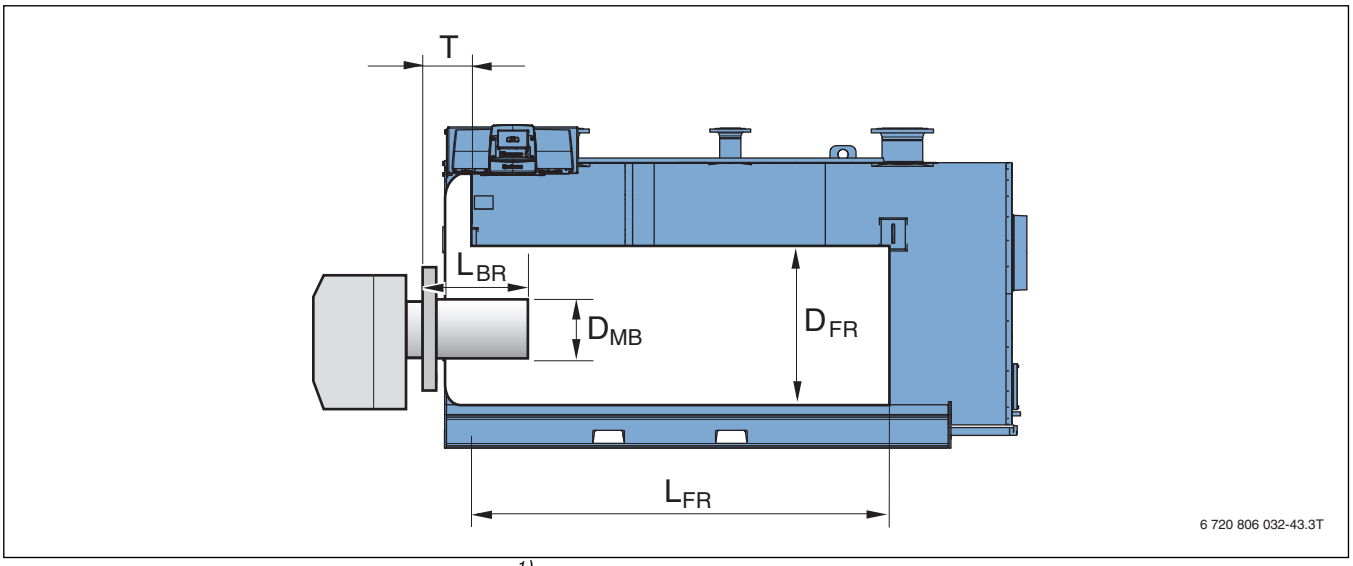


Fig. 7 Dimensions, burner door and burner Uni 3000 F[1)]

1) The blast tube must protrude beyond the lining in the burner door.

Measurements			Uni 3000 F			
Boiler size			**1040**	**1200**	**1400**	**1850**
Boiler length	L_G	mm	2635	2935	3080	3480
Boiler width (overall)	B_G	mm	1230	1230	1322	1381
Swivelling range of the burner door	B_T	mm	1170	1170	1280	1385
Base frame length	L_{GR}	mm	1960	2260	2316	2720
Base frame width	BGR	mm	820	820	880	860
Overall height	H	mm	1475	1475	1612	1730
Boiler height	HK	mm	1340	1340	1460	1545
Control unit height	H_G	mm	1534	1534	1651	1739
Flue outlet diameter	D_{AA}	mm	350	350	400	400
Flue outlet height	H_{AA}	mm	800	800	1070	1050
Combustion chamber length	L_{FR}	mm	1845	2145	2120	2520
Combustion chamber diameter	D_{FR}	mm	710	710	780	860
Maximum blast tube diameter	D_{MB}	mm	350	350	350	350
Minimum blast tube length	L_{BR}	mm	1)	1)	1)	1)
Burner door depth	T	mm	310	310	310	310
Burner height	H_B	mm	592	592	635	685
Boiler flow connection 2)	VK	DN (mm)	125	125	150	200
Boiler return connection 2)	RK	DN (mm)	125	125	150	200
Flow safety line connection 2)	VSL	DN (mm)	80	80	80	100
Boiler safety assembly connection	SG	inch	1	1	1	1
Flange height VK/VSL/RK	H_F	mm	1475	1475	1612	1732
Clearance	A_1	mm	620	620	725	925
Clearance	A_2	mm	595	595	725	925
Clearance	A_3	mm	569	870	673	670
Drain & fill valve (DFV) connection	D_{EL}	inch	1¼	1¼	1½	1½
Drain & fill valve (DFV) height	HEL	mm	100	100	80	90
Cleaning seq	R_A	inch	G ½	G ½	G ½	G ½

Table 9 Dimensions for the Uni 3000 F (→ Fig. 6, page 11)

1) The blast tube must protrude beyond the lining in the burner door.

2) Flange to DIN 2633 (PN16)

Specifications		Uni 3000 F			
Boiler size		**1040**	**1200**	**1400**	**1850**
Nominal heat output	kW	1040	1200	1400	1850
Nominal heat input	kW	1138	1313	1532	2024
Transport weight	kg	1850	2040	2480	3100
Boiler water content	ltr	822	942	1339	1655
The volume of the combustion part of the boiler	ltr	934	1071	1275	1710
Pressure drop on the hot gas side	mbar	7.25	7.74	7.13	9.17
Draught required	Pa	0	0	0	0
Maximum temperature of high limit safety cut-out	°C	110 1)	110 1)	110 1)	110 1)
Maximum permissible operating pressure (boiler)	bar	6	6	6	6
Useful efficiency for nomina heating output 4)	%	**91,4**	**91,4**	**91,4**	**91,4**
Nominal heat input for partial load 30%	kW	341	394	460	607
Nominal heat output for partial load 30%	kW	312	360	420	555
Useful efficiency for nominal heating output. 3)	%	**86,2**	**86,2**	**86,2**	**86,2**
Useful efficiency for nominal partial load 30%. 3)	%	**87,7**	**87,7**	**87,7**	**87,7**
Control range of water temperature 2)	°C	50 – 105	50 – 105	50 – 105	50 – 105
Heat loss to surroundings	%	0,25	0,25	0,26	0,26

Table 10 Specifications for the Uni 3000 F (certified with modulating burner output)

1) High limit safety cut-out setting if the boiler is operated to heat DHW.

2) According to table 4- Operation conditions+ tables 14 and 15

3) Based on gross calorific value

4) Based on net calorific value

Values for calculating the flue gas		Uni 3000 F			
Boiler size		**1040**	**1200**	**1400**	**1850**
Flue gas temperature, partial load 60 %[1)]	°C	150	150	150	150
Flue gas temperature, full load [1)]	°C	198	195	195	195
Flue gas mass flow rate, oil, partial load 60 %[2)]	kg/s	0.2651	0.3049	0.3571	0.4725
Flue gas mass flow rate, oil, full load [2)]	kg/s	0.4418	0.5082	0.5952	0.7875
Flue gas mass flow rate. Gas partial load 60 % [3)]	kg/s	0.2671	0.3089	0.36	0.4761
Flue gas mass flow rate, gas, full load [3)]	kg/s	0.4451	0.5148	0.5999	0.7935
CO_2 content, oil	%	13	13	13	13
CO_2 content, gas	%	10	10	10	10

Table 11 Values for the flue gas calculation for Uni 3000 F(certified with modulating burner output)

1) Relative to average boiler temperature 70 °C
2) Relative to fuel oil (up to 1000 mg/kWh (ppm) sulphur content), Hi = 11.86 kWh/kg
3) Relative to Natural Gas I2H (G20), Hi = 9.03 -10.03 kWh/m^3

2.17 Pressure loss on the water side

The pressure loss on the water side is the pressure differential between the boiler flow and return connections. The pressure loss on the water side depends on the VK/RK connector size and the heating water flow rate.

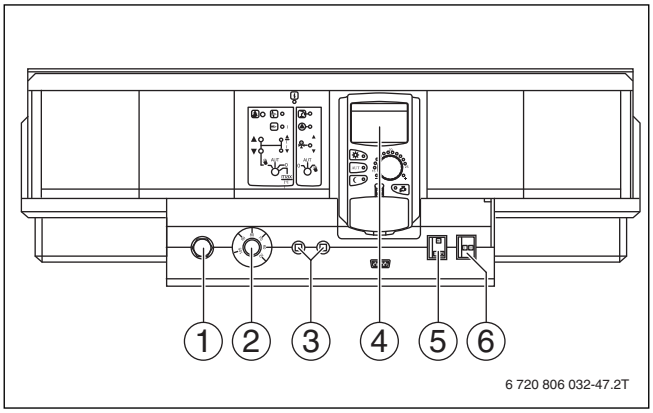


Fig. 8 Pressure loss on the water side Logano SK655/SK755

Δp_H Pressure loss
$\dot{V}_H$ Heating water flow rate

1 SK655: 120 kW
2 SK655: 190 kW, 250 kW, 300 kW
3 SK655/SK755: 360 kW, 420 kW
4 SK755: 500 kW, 600 kW

Calculation example for SK655 250 kW:

Given

- ΔT = 15 K
- c = 4,19 kJ/kg × K
- $Density_{Water}$ = approx. 1000 kg/m^3

ΔP_H calculated as follows::

$$Q = m \times c \times \Delta T$$

$$m = \frac{Q}{c \times \Delta T}$$

$$m = \frac{250\ kW}{4{,}19\ kJ/kg\ K \times 15\ K} \times 3600\ s/h$$

Result

- m = 14320 kg/h

$$V_H = \frac{14320\ kg/h}{1000\ kg/m^3} = 14{,}3\ m^3/h$$

Result

- The intersection of the straight line 2 and $\dot{V}_H$ = 14.3 m^3/h m^3/h results in Δp_H = 35 mbar

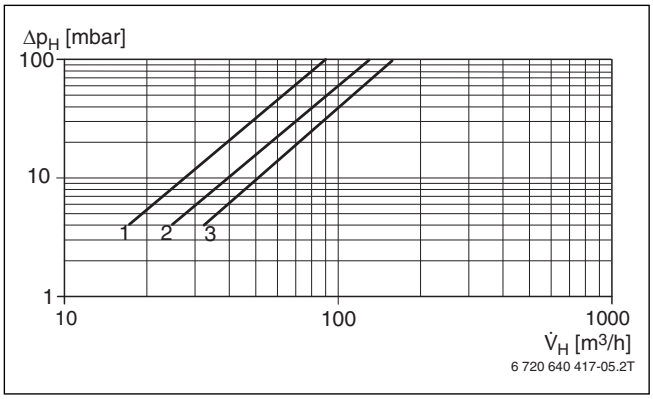


Fig. 9 Pressure drop on the water side Logano SK755

Δp_H Pressure loss
$\dot{V}_H$ Heating water flow rate

1 SK755: 730 kW, 820 kW, 1040 kW, 1200 kW
2 SK755: 1400 kW
3 SK755: 1850 kW

3 Handling

DANGER: Risk to life from inadequately secured boiler.
- ▶ Use suitable means to transport the boiler (e.g. 2 pallet trucks, or a forklift truck).
- ▶ When transporting, secure the boiler to prevent it from falling.

DANGER: Risk to life through falling load.
- ▶ Secure the boiler with safety straps prior to transportation.

Securing the load

To secure the load during transportation:
- ▶ Never pull retaining straps (fixing straps, chains) over the boiler casing.
- ▶ Secure retaining straps only to the locking lugs.

3.1 Transporting the boiler with a forklift truck

You can transport the boiler with a forklift truck. When transporting the boiler, observe the following instructions:

DANGER: Risk to life through falling load.
- ▶ Distribute the boiler weight evenly across the forklift truck's forks when lifting and transporting the boiler.
- ▶ Observe the weight of the boiler and that of the means of transport.
- ▶ When transporting, secure the boiler to prevent it falling.
- ▶ Use the openings provided for a forklift truck (→ Fig. 10, [2]).

NOTICE: Risk of boiler damage from a damaged boiler shell.
- ▶ Lift the boiler only by means of the base frame, not the boiler shell or boiler door.
- ▶ Transport the boiler with the forks of the forklift truck inserted from the side.
- ▶ Transport the boiler with the forks inserted into the openings in the base frame (→ Fig. 10, [2]).

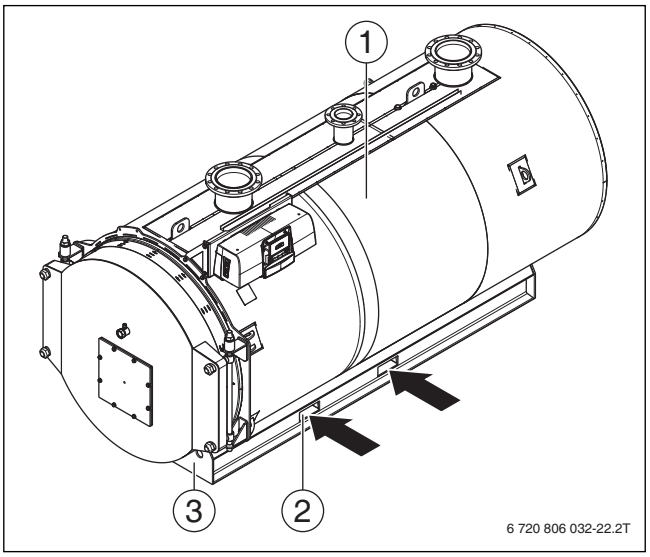


Fig. 10 Transporting the boiler with a forklift truck

[1] Boiler body
[2] Transport openings for forklift truck
[3] Base frame

3.2 Transporting the boiler on rollers

- ▶ Insert pipes (→ Fig. 11, [2]).
- ▶ Lift the boiler with a car jack.
- ▶ Place pipes underneath.

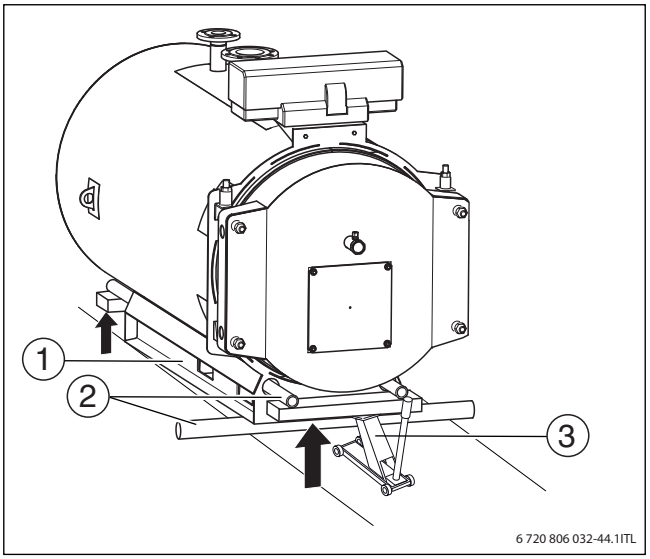


Fig. 11 Transporting the boiler on rollers

[1] Base frame
[2] Pipes
[3] Car jack (check specification for suitability)

3.3 Lifting the boiler with a crane

You can lift and transport the boiler with a crane (→ Fig. 12, [1]).

DANGER: Risk to life through falling load.
- Only use lifting ropes of the same length.
- Only use lifting ropes that are in perfect condition.
- Hook lifting tackle only into the lifting eyes provided in the gusset plates on top of the boiler.
- **Never hook lifting tackle into the locking lugs on the side of the boiler, or into the connectors.**
- Lift the boiler with a crane only if you are suitably qualified to operate the crane.
- Never lift the boiler with a crane on its side or on end.

Never use the locking lugs for lifting.

- Insert the hooks on the transport chain [2] into the holes of the four gusset plates [3] on the boiler body.
- Attach the lifting hook of the crane [1] to the lifting rope.

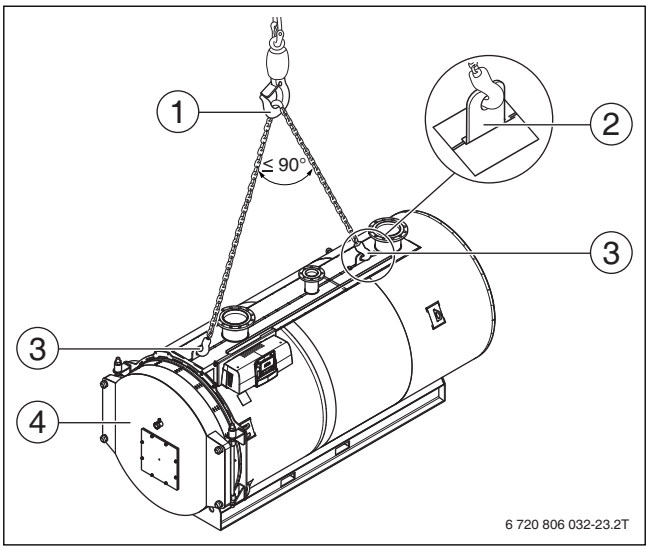


Fig. 12 Lifting the boiler with a crane

[1] Crane hooks with safety mechanisms
[2] Hook of lifting rope
[3] Gusset plates (Installation location depends on the boiler size)
[4] Boiler

4 Mounting

Regarding installation and operation of your heating system, observe all relevant national standards and guidelines. The information on the data plate is binding and must be observed.

4.1 Installing the boiler

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 system damage through frost.
- Position the boiler in a room free from the risk of frost.

Installation room requirements:
- The support surface must provide sufficient load-bearing capacity and solidity.
- The installation room must be dry and free from the risk of frost.
- The size of the installation room must be adequate to ensure correct operation.

Minimum wall clearances

Observe the specified minimum wall clearances for the foundations or installation surface (→ Fig. 13, and Tab. 12). 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 foundation.

Fig. 13 shows an installation example.

The burner door closure can be fitted to the left or right (→ Chapter 4.5 from page 19).

Boiler dimension data can be found in Chapter 2.16, page 8.

Boiler	Boiler size	Clearance A_H in mm	Clearance A_V in mm[1)]	Clearance A_S in mm[1)]
Uni 3000 F	120 – 360	1000	2000	$250+L_{BR}$[2)]
	420 -1850	1000	2500	

Table 12 Specified wall clearances

1) Observe dimension L_{BR} (burner length) and dimension B_T (swivelling range of the burner door, Tab. 6, page 8 and Tab. 9, page 12) in relation to clearances A_V and A_S (on the closure side of the burner door).

2) On the Uni 3000 F, observe the dimension of the particular control unit with regard to the minimum clearance A_S (on the installation side of the control unit $250+L_{BR}$). On the side where the burner door is not hinged, only observe 250mm clearance. If the hinge arrangement may change following installation please observe the LBR dimension.

Allow extra space if a flue silencer and/or a flue gas heat exchanger is to be installed.

Where a separation between the installation site and the boiler is required to prevent the transfer of structure-borne noise, fit these anti-vibration measures (e.g. anti-vibration supports) prior to boiler installation.

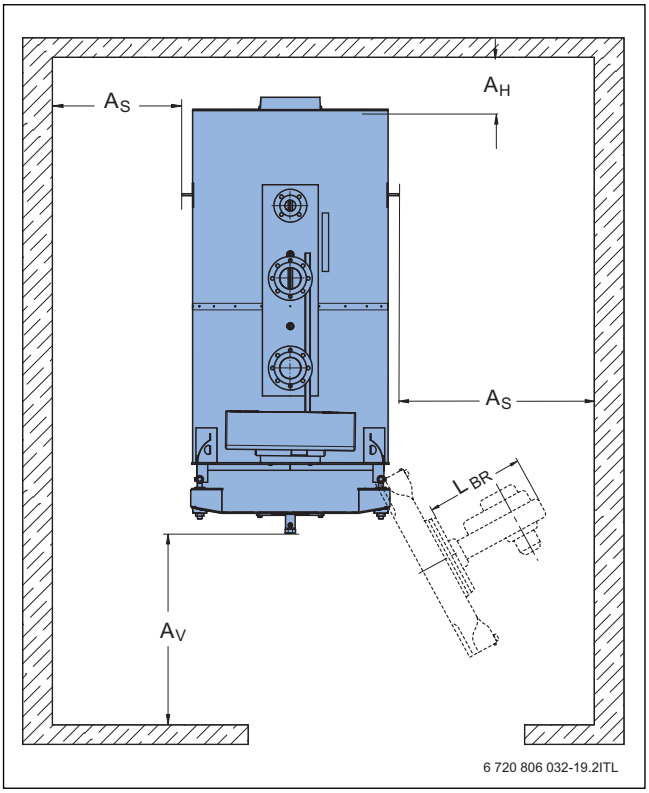


Fig. 13 Boiler room with boiler (dimensions in mm)

4.2 Levelling the boiler

The boiler must be levelled in the lengthwise and crosswise directions to prevent air pockets forming inside.

Use metal shims to level the boiler.

- Level the boiler [2] both horizontally and vertically using a spirit level [1].

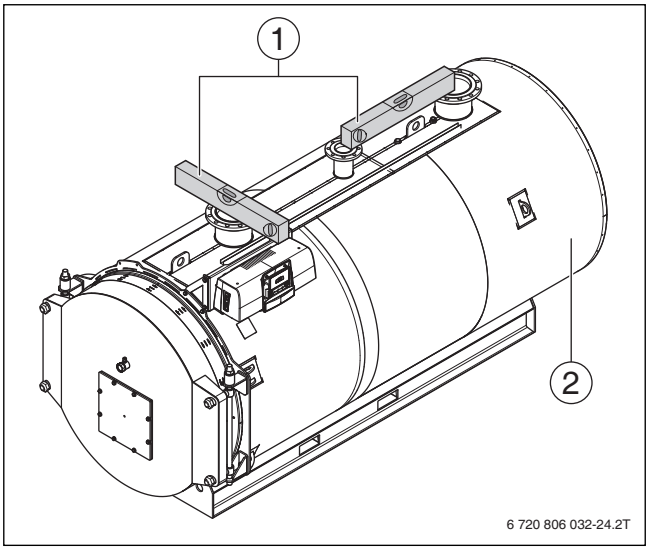


Fig. 14 Levelling the boiler

[1] Spirit level
[2] Boiler

4.3 Fitting sound insulation strips (accessory)

CAUTION: Risk of injury from carrying heavy weights!
Incorrect lifting and carrying of heavy loads can cause injuries.

- Observe the transport markings on the packaging.
- Only lift the appliance at the points provided for this purpose.
- Lift and carry the device with a sufficient number of persons.

-or-

- Use suitable means of transportation, (e. g. a pallet truck, dolly with strap).
- Secure the appliance to prevent it slipping, tilting and falling.

Consider additional sound insulation measures before installing the boiler.

To reduce noise, sound-absorbing strips (optional accessory) can be placed under the base frame, flush with the front and back of the boiler.

- Lift the boiler on to its installation site.
- Place sound insulation strips lengthways below the boiler frame at all four corners.

▶ Carefully set the boiler down.

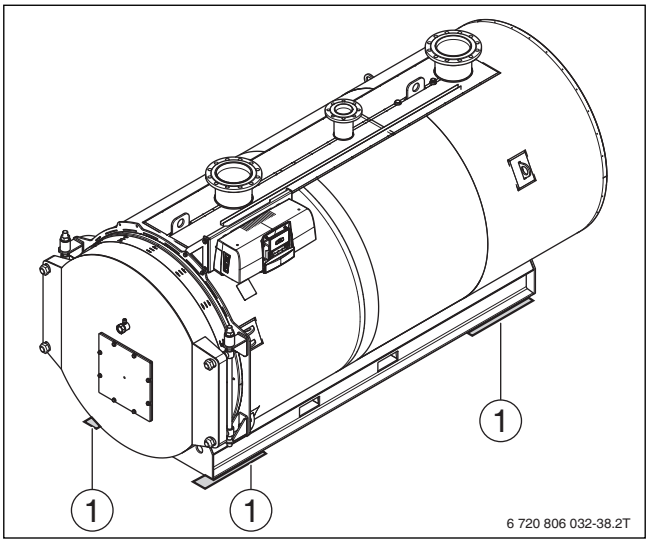


Fig. 15 Positioning the sound insulation strips

[1] Sound insulation strips

4.4 Flue gas and water connections for heating system

DANGER: Risk to life through poisoning!
Insufficient ventilation can lead to dangerous flue gas leaks!
- ▶ Never operate the boiler unless faults are rectified immediately.
- ▶ Inform the operator in writing of any faults and their associated risks.

4.4.1 General requirements of the flue system

The following recommendations pertaining to the implementation of flue systems should guarantee trouble-free operation of a combustion system. Failure to observe these rules can result in substantial operating problems during combustion and may even result in explosions. Possible problems frequently include acoustic disturbances, compromised combustion stability or excessive vibrations on assemblies or their components. Low NOx combustion systems are to be viewed as being more sensitive to operating faults on account of their combustion control. Therefore, engineer and implement the flue system with particular care.

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

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

- Size flue systems in accordance with the respective national and local regulations and applicable standards. For instance, free-standing chimneys, fluid mechanical calculation (for examples of pertinent standards, see → Chapter 2.1, page 4). The implementation of the flue system must comply with local building codes. Observe country-specific regulations.
- When selecting the material for a flue system, take the composition and temperatures of the flue gases into account to prevent damage and contamination of the flue parts that are in contact with flue gas.
- Route flue gases as directly as possible to the chimney considering the best possible flow characteristics (e.g. short and with a gradient and the fewest possible deviations). Provide a separate chimney flue for each boiler. Take the thermal expansion of the system into account.
- Implement deviations in the connection pieces as favourably as possible where flow is concerned by using bends or deflectors. Connection pieces with several deviations should be avoided, as they would have a detrimental effect on 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. The joint angle should not exceed 30°, the same as for any reducers/expansions that may be required.
- Where possible, connection pieces should be joined to the chimney to provide optimum flow characteristics and with an incline (at an angle less than 45°). Any terminal pieces at the chimney outlet must ensure the free discharge of flue gas into the open air.
- Any condensate must be able to drain freely over the entire length, be treated and drained off in accordance with local regulations.
- Inspection apertures should be provided in compliance with local regulations, possibly after discussion with the responsible flue gas inspector.
- The chimney must be separated from the boiler system (e.g. with compensators) to interrupt transfer of structure-borne noise.
- Where a flue gas damper is set into a flue system, an "OPEN" safety limit switch must be integrated into the boiler control. 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. Implement the end position CLOSED at the flue damper so that the flue damper never closes fully. This prevents damage to the fitted burner through heat build up.

4.4.2 Fitting a sealing collar (accessory)

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

4.4.3 Fitting the flue gas temperature sensor (accessory)

▶ Fit the flue gas temperature sensor as described in the installation instructions provided.

4.4.4 Connecting the boiler to the pipework

Observe the following information for connecting the boiler to the pipework. This is important to ensure trouble-free operation.

Boiler contamination on the water side is not permitted. To prevent contamination on the water side, we recommend the installation of an air/dirt trap in the return.

NOTICE: Risk of system damage from leaking connections.
- ▶ Install all lines free from stress to the boiler connections.

Connecting the heating return

NOTICE: Risk of system damage from too low a return temperature.
- ▶ Observe the operating conditions (→ Tab. 4, page 5). Back-end Protection must be designed into the hydraulic arrangement.

▶ Connect the heating system return to the boiler return connection (→ Fig. 16 and Fig. 17, page 18, [3]).

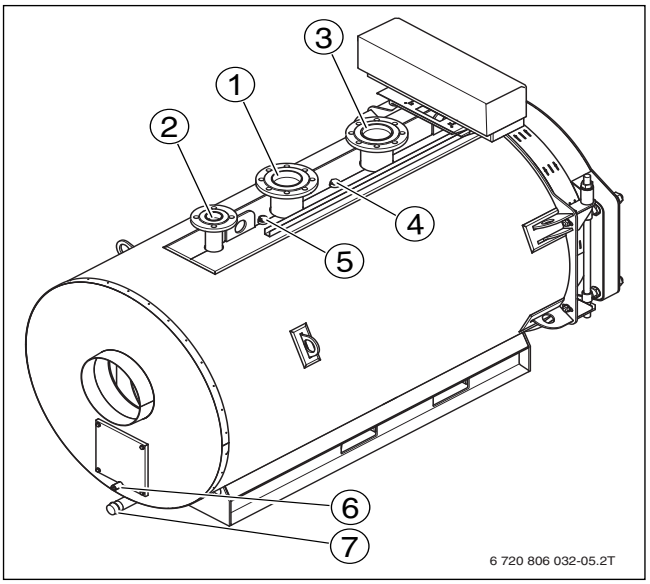


Fig. 16 Boiler Uni 3000 F 120 kW to 820 kW (left = rear of boiler)

[1] Boiler flow connection (VK)
[2] Safety flow line (VSL - connection for an on-site safety valve)
[3] Boiler return connection (RK)
[4] Test point (sensor well 3/4") for 190 kW to 820 kW
[5] Test point (sensor pocket 3/4") for 120 kW
[6] Drainage
[7] Drain & fill valve (DFV)

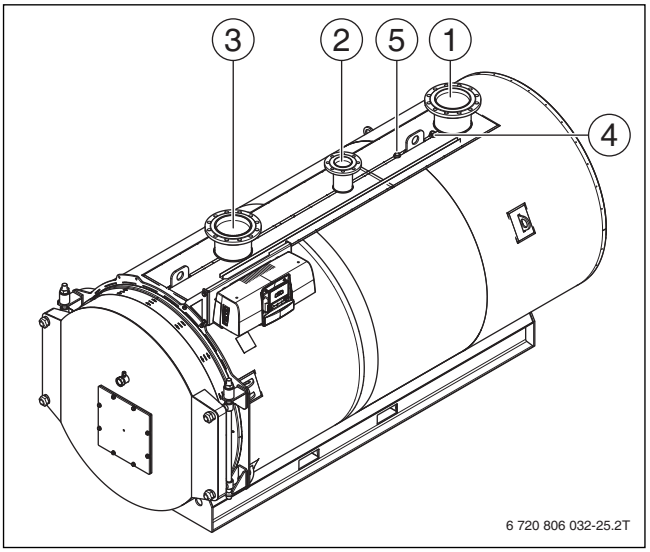


Fig. 17 Boiler Uni 3000 F 1040 kW to 1850 kW (left = front of boiler)

[1] Boiler flow connection (VK)
[2] Safety flow line (VSL - connection for an on-site safety valve)
[3] Boiler return connection (RK)
[4] Test point (sensor pocket 3/4")
[5] Boiler safety assembly connection (safety devices)

Connecting the heating flow

▶ Connect the heating system flow to the boiler flow connection (→ Fig. 16 and Fig. 17, [1]).

Connecting the boiler safety assembly (accessory)

▶ Connect the boiler safety assembly to the connection on the safety line.

Connecting the flow safety line

NOTICE: Risk of system damage from connecting the wrong assemblies to the flow safety line [2].
▶ Never connect a DHW cylinder or other heating circuit to the flow safety connection [2].

▶ Fasten the pressure relief valve to the safety line flow connection (VSL) with screws (→ Fig. 16 and Fig. 17, [2]).

4.4.5 Filling the boiler and checking connections for leaks

Check the heating system for leaks before commissioning to ensure there are no leaks when the system is in operation.

The test pressure level is subject to the system components and to the heating system.
▶ Observe local standards and regulations.

NOTICE: Personal injury and/or system damage through excess pressure when testing for leaks.
Pressure, control and safety equipment may be damaged through excessive pressure.
▶ When you carry out the leak test, ensure that no pressure, control or safety equipment that cannot be isolated from the boiler water chamber is fitted.

NOTICE: Risk of system damage from thermal stress.
▶ Only fill the system when cold (the flow temperature must be no more than 40 °C).

▶ Fill the heating system with water (→ Chapter 5.3, page 25). 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.

4.5 Opening and closing the burner door

Retighten the nuts that secure the burner door 14 days after commissioning.

4.5.1 Opening the burner door

WARNING: Risk of injury from falling parts.
The burner door can fall off when opened.
- ▶ Loosen the screws only on one side of the burner door.

The burner door can be opened either to the left or right. The following instructions assume opening to the right.

- ▶ Left side: Loosen two nuts on the burner door [1].
- ▶ Right side: Loosen two nuts on the burner door [1] 2 to 3 turns.
- ▶ Left side: Lower hinges by loosening the hinge nut [2] (2 to 3 turns). The door must no longer be in contact with the pin of the door hinge [4] (→ Fig. 19). Right side: Turn the lock nut [3] 2 to 3 turns in the direction of the burner door. This pushes the burner door away from the boiler. There must be a gap of at least 5 mm between the burner door and boiler in order not to damage the gaskets.
- ▶ Left side: The burner door is opened by turning the lock nut [3] in the direction of the burner door. The burner door must no longer be in contact with the pin [4] of the door hinge.
- ▶ Opening the burner door.

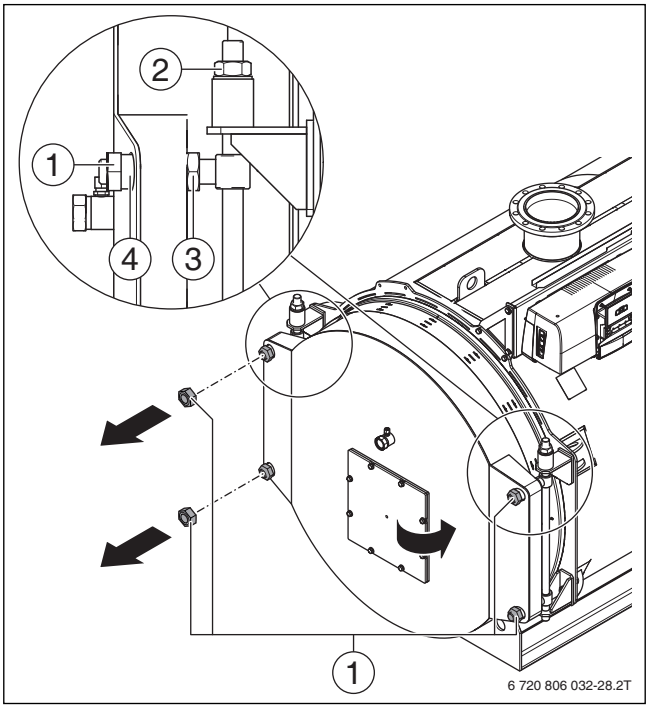


Fig. 18 Opening the burner door

[1] Nuts
[2] Hinge nut
[3] Securing nut
[4] Hinge pin

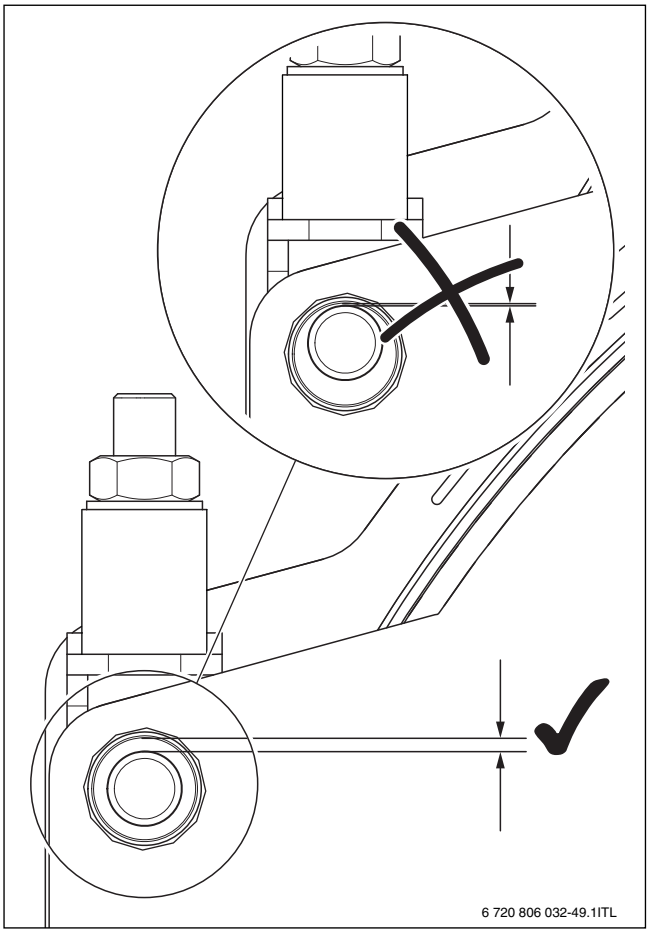


Fig. 19 Positions of burner door and hinge pin

4.5.2 Closing the burner door

- ▶ Left and right side: turn the lock nut [3] in the direction of the boiler.
- ▶ Close the burner door.
- ▶ Screw the nut (→ Fig. 18, [1]) onto the hinge pin [4] and bring the door to just before the sealing faces.
- ▶ Left and right side: Align the sealing faces of the burner door and boiler by tightening the hinge nuts [2] alternately.
  The burner door must have the same clearance (about 10 mm) from the edge of the closing face of the boiler on all sides.
- ▶ Left and right side: Tighten the lock nuts [1] until the burner door seals tightly on all sides.
- ▶ Left and right side: Secure the burner door with lock nut [3].
- ▶ Check the tightness of the burner door
  (e. g. with a gas leak detection spray).

4.6 Fitting the burner (accessory)

NOTICE: Risk of system damage from incorrect burner.
- Only use burners that meet the technical requirements of the boiler (→ Chapter 2.16, page 8).

4.6.1 Fitting the burner plate (accessory)

Pre-drilled burner plates are available from the boiler manufacturer (accessory).
The burner plate depends on the burner used.

- Secure burner plate [2] with gasket [3] to burner door [4] using hexagon bolts and washers [1].

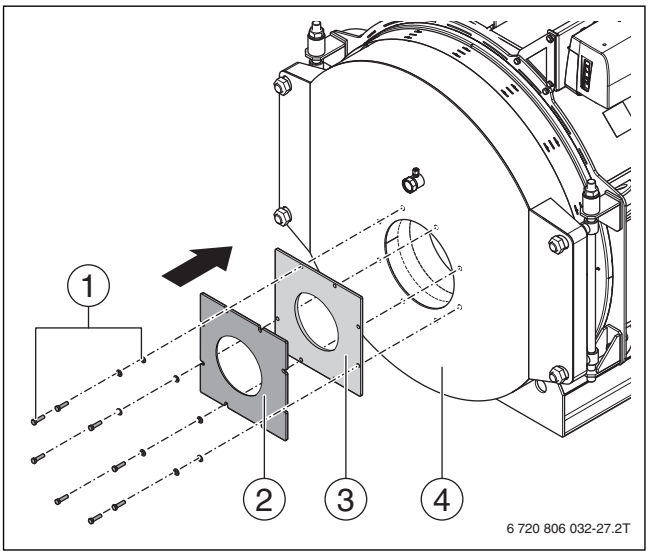


Fig. 20 Fitting the burner plate

[1] Hexagon bolt and washer
[2] Burner plate
[3] Sealing ring
[4] Burner door

4.6.2 Fitting the burner to the burner plate

Refer to the installation instructions of the particular burner for how to mount and connect it.

The thermal insulation in the burner door comes standard with a 200 mm hole for the blast tube. If the blast tube is larger than this, the diameter of the aperture can be increased to a maximum of 275 mm.

NOTICE: Risk of system damage from incorrect or missing insulating rings.
- Only use the insulating rings supplied.

The burner door must be opened to allow the burner to be fitted.

- Open the burner door (→ Chapter 4.5.1).
- Push a gasket (→ Fig. 20, [3]) onto the burner connector.
- Screw burner (→ Fig. 21, [1]) to the burner plate [2].
- Cut out insulating rings [4] in accordance with the diameter of blast tube [5].
- Fill remaining gap between burner door insulation [3] and blast tube [5] with adapted insulating rings [4].
- Connect the blower connection for the sight glass with burner [1] to ensure the sight glass remains free from deposits.
- Close burner door and tighten nuts (→ Chapter 4.5, page 19).
- Connect burner cable to burner [1].

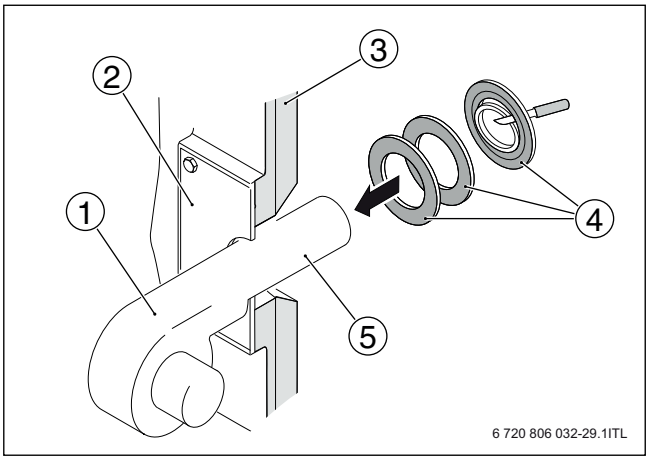


Fig. 21 Fitting the burner

[1] Burner
[2] Burner plate
[3] Burner door insulation
[4] Insulating rings
[5] Blast tube

4.7 Fitting the control unit (accessory)

This chapter explains how to fit the control units of the CFB controller series and a temperature sensor set for the boiler.

When using the CFB 940 control unit:
The CFB 940 control unit may be used only with the H programmer and special high-temperature sensors (→ control unit documentation). Consumption electric energy is listed in manuals of control units.

The control unit is fitted on the side of the boiler.

4.7.1 For boiler sizes 120 kW to 820 kW

In Fig. 22, the control unit (without rear panel) and the control unit holder [1] are shown from the rear.

- Undo both screws from cover [1]. Lift off the cover.
- Place the control unit with the locking tabs [4] into the holes in the front of the control unit holder (mounted on the front of the boiler) [5].
- Pull the control unit forwards and then tip backwards. The flexible hooks [2] must latch Into the openings [3].

▶ Screw the base of the control unit to the control unit holder with 2 sheet-metal screws.

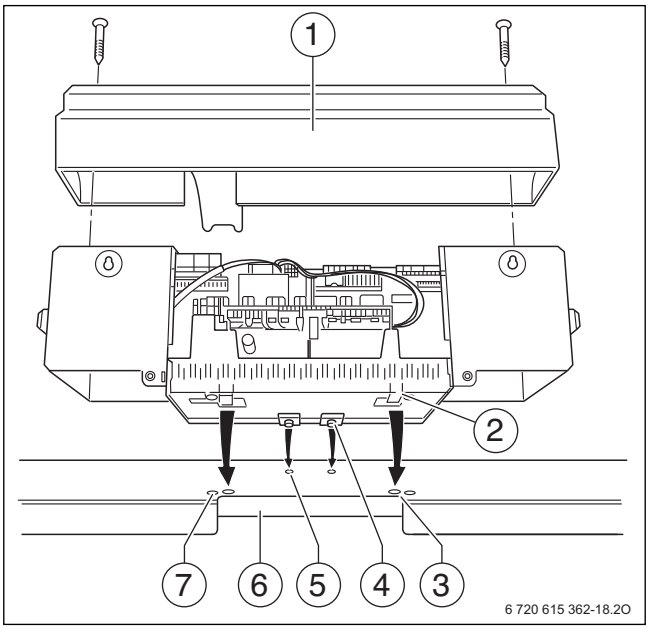


Fig. 22 Fitting the control unit for boiler sizes 120 kW to 820 kW

[1] Cover
[2] Flexible hooks
[3] Rectangular openings in the control unit holder
[4] Locking tabs
[5] Oval holes in the control unit holder
[6] Cable feed in the control unit holder
[7] Holes for self-tapping screws

4.7.2 For boiler sizes 1040 kW to 1850 kW

In Fig. 23, page 21, the control unit is shown from the rear.

▶ Undo both screws from cover [1]. Lift off cover [2] (→ Fig. 22).
▶ Remove both plugs (→ Fig. 23, [2]) from the control unit.
▶ Place the control unit (→ Fig. 23, [4]) on the studs of the control unit holder on the side of the boiler.
▶ Secure the control unit by screwing screws into the mounting holes [3] on the control unit holder.

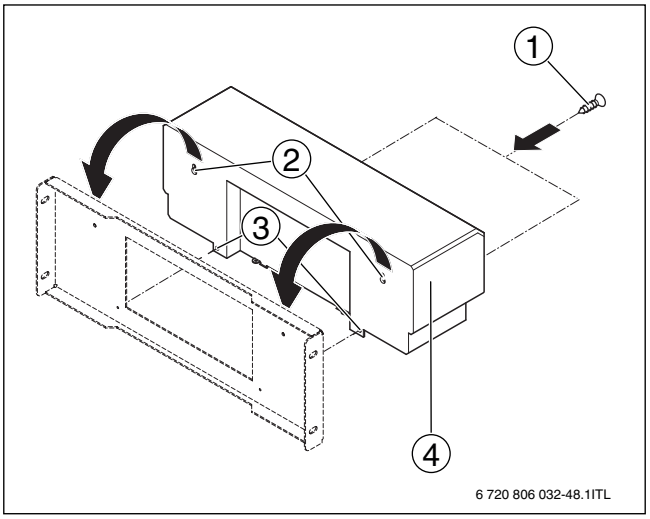


Fig. 23 Fitting the control unit for boiler sizes 1040 kW to 1850 kW

[1] Screws
[2] Plug
[3] Mounting Holes
[4] Control unit

4.7.3 Making the electrical connection

DANGER: Risk to life through electric shock.
▶ Prior to opening the appliance, isolate all poles of the heating system and secure against unintentional reconnection.
▶ Carefully route the cables/leads and capillary tubes.
▶ Only carry out electrical work if you are a qualified electrician. If you are not suitably qualified, arrange for a qualified electrician to make the electrical connections.
▶ Observe all local installation regulations.
▶ Create a permanent connection in accordance with the applicable international installation standards and local regulations.

DANGER: Risk of fatal injury and fire from hot components. Hot components can damage the cabling.
▶ Secure cable sufficiently and route in the provided cable holding systems where necessary.
▶ Route cables with a sufficient clearance from hot components.

▶ Knock out or cut out the appropriate parts from back panel [1] (→ Fig. 24) as required.
▶ Make the plug-in connection in the control unit in accordance with the labelling on the terminal strip.
▶ Route the burner cable to the control unit (→ Chapter 4.8, page 22).
▶ Connect the burner cable to the control unit in accordance with the labelling on the plug-in connector strip.
▶ Route the sensor leads to the control unit (→ Chapter 4.8, page 22).
▶ Connect the sensor leads to the control unit in accordance with the labelling on the plug-in connector strip.
▶ Route the electrical cables provided by the customer for the heating system (for example, sensors, pumps, actuators) to the control unit.
▶ Make the on-site connections on the control unit in accordance with the labelling on the plug-in connector strip.

The positions of the terminal strips on control units are not identical. The terminal strip is easy to identify after the control unit has been opened.
The labelling of the terminal strip in the various control units is identical.

▶ Make on-site electrical connections for the heating system to the appropriate plug-in connectors according to the connection diagram (→ control unit documentation).

▶ Refit back panel (→ Fig. 24) to the control unit.

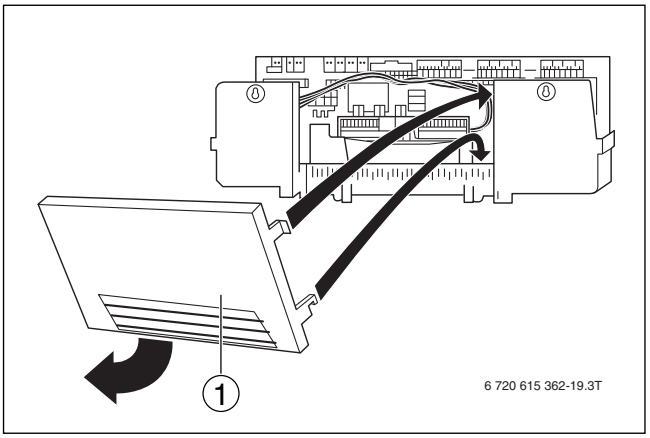


Fig. 24 Preparing the cable entry

[1] Control unit back panel

Secure all cables with cable clips (scope of delivery of the control unit). Carry out the following steps:

▶ Insert the cable clip with inserted electrical cable from the top into the slot of the clip frame (**step 1**).
▶ Push cable clip down (**step 2**).
▶ Push against the clip (**step 3**).
▶ Flip the toggle up (**step 4**).
▶ Refit the cover (→ Fig. 22 and Fig. 23, page 21) to the control unit.
▶ Tighten screws (Fig. 22, page 21 and Fig. 23, page 21) to secure the control unit cover hood.

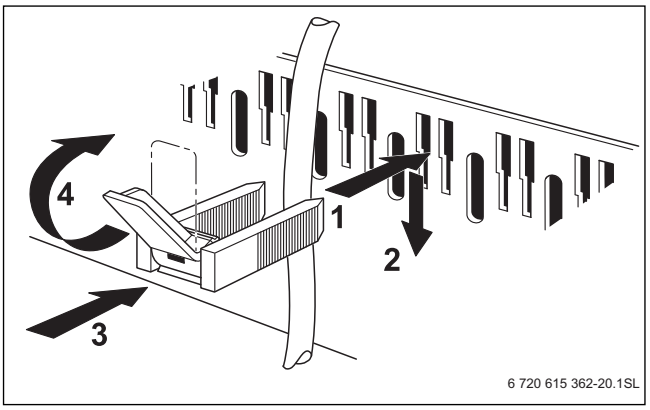


Fig. 25 Securing the electrical cable with cable clips

4.8 Installing the temperature sensor

NOTICE: Risk of system damage from 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: Risk of system damage from incorrect sensor position!
The sensors of the high limit safety cut-out (STB) and of the temperature controller (TR) **must** be fitted at the installation location on the top of the boiler (→ Fig. 26 and Fig. 27).
▶ 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 located at the top of the boiler shell (location of the test point → Fig. 16, page 18 and Fig. 17, page 18).

The temperature sensor of a temperature controller is marked “TR”.

Note that installation of the temperature sensor set is different when the CFB 810 control unit with the CME 930 auxiliary module is used.

▶ Insert sensor set (→ Fig. 26, page 22, [3]) into the measuring point [1] until it bottoms.
▶ Secure sensor set [3] with sensor retainer [4] in the test point.

Insert compensating spring [1] between the temperature sensors to ensure a good contact between sensor well [4] and sensor surfaces, and thereby a reliable temperature transfer.

▶ Roll up excess lengths of cables, capillaries (never kink) and sensor leads and position them on the thermal insulation of the boiler body.

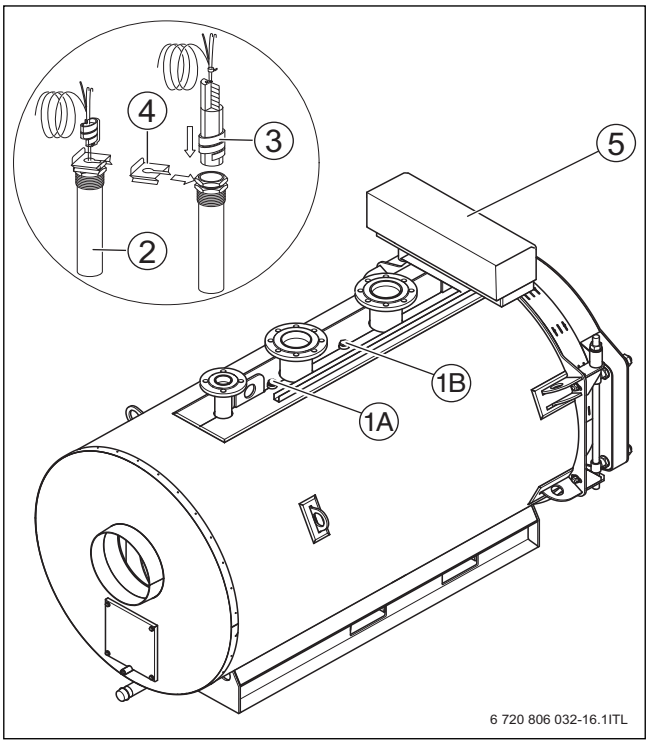


Fig. 26 Installing the temperature sensor set on the Uni 3000 F up to 820 kW

[1A] Test point (sensor pocket 3/4") for 120 kW
[1B] Test point (sensor well 3/4") for 190 kW to 820 kW
[2] Sensor well in the test point
[3] Sensor set
[4] Sensor retainer
[5] Control unit

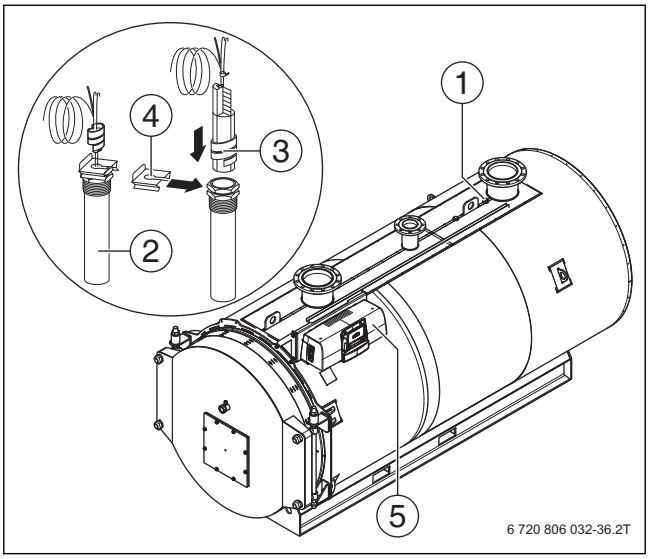


Fig. 27 Installing the temperature sensor set on the Uni 3000 F

[1] Test point (sensor pocket 3/4") for 1040 kW to 1850 kW
[2] Sensor well in the test point
[3] Sensor set
[4] Sensor retainer
[5] Control unit

When using the CFB 810 control unit with CME 930 auxiliary module:

▶ Fit the temperature sensor of the CME 930 as contact sensor on site to the boiler return using heat conducting paste and a tie.

NOTICE: Risk of system damage from incorrect sensor position.
Fitting the temperature sensor elsewhere can result in system damage.

▶ Install the temperature sensor of the CME 930 only in the boiler return.

4.9 Control unit settings

We recommend using a control unit from the CFB 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 water controller switching the burner on and off.

▶ Maintain the minimum differential between the selected shutdown temperature of the high limit safety cut-out, the temperature controller, the maximum boiler water temperature and the maximum temperature demand (→ Tab. 13 to 15, page 23).

The maximum boiler water temperature can be selected in the control unit (programmer) in the "Boiler parameters" menu, under menu item "Max. shutdown temperature".

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

If a CFB 9xx control unit is used, burner modulation in standard mode is not enabled for 3 minutes. Never modulate upwards more quickly than this.

Adjustable parameter (max. temperature)	CFB 910/CFB 930	
High limit safety cut-out (STB)[1)]	110 °C	↑ minimum 18 K ↓
	↓↑ **minimum 5 K** ↓↑	
Temperature controller (TR)[1)]	105 °C	
	↓↑ **minimum 6 K** ↓↑	
Max. boiler water temperature	99 °C	
	↓↑ **minimum 7 K**↓↑	
Max. temperature demand[2)] of heating circuit[3)] and DHW[4)]	92 °C	

Table 13 Adjustable parameter CFB 910/CFB 930

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 water temperature.
3) The temperature demand of heating circuits equipped with an actuator is composed of the set flow temperature and the "Boiler rise" parameter in the heating circuit data menu.
4) The temperature demand of DHW heating is composed of the set DHW temperature and the "Boiler rise" parameter in the DHW menu.

Caution: the CFB 940 control unit has its own applicable minimum safety clearances!

Adjustable parameter (max. temperature)	CFB 940
High limit safety cut-out (STB)[1)]	110 °C
	↓↑ **minimum 5 K** ↓↑
Temperature controller (TR)[1)2)]	105 °C
	↓↑ **minimum 6 K** ↓↑
Max. boiler water temperature	110 °C
	↓↑ **minimum 7 K**↓↑
Max. temperature demand[3)] of heating circuit[4)] and DHW[5)]	103 °C

Table 14 Adjustable parameter CFB 940

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) The TR does not function on the CFB 940 in automatic mode.
3) Both temperature demands must always be at least 7 K under the maximum boiler water temperature.
4) The temperature demand of heating circuits equipped with an actuator is composed of the set flow temperature and the "Boiler rise" parameter in the heating circuit data menu.
5) The temperature demand of DHW heating is composed of the set DHW temperature and the "Boiler rise" parameter in the DHW menu.

Adjustable parameter (max. temperature)	CFB 810 with CME 930
High limit safety cut-out (STB)[1)]	110 °C
	↓↑ **minimum 5 K** ↓↑
Temperature controller (TR)	105 °C

Table 15 Adjustable parameter CFB 810

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.

Settings for boiler water controller and maximum boiler water temperature

The boiler water controller is only designed to provide emergency operation with an adjustable boiler water temperature if the control electronics fail. In standard control mode, the function of the boiler water controller is provided by the maximum boiler water temperature. The maximum boiler water temperature can be selected in the control unit in the "Boiler parameters" menu, under menu item "Max. shutdown temperature".

Control unit settings

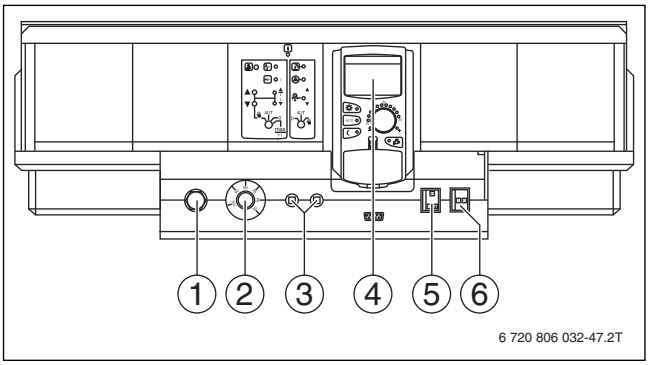


Fig. 28 Control unit settings, example for CFB 910

[1] High limit safety cut-out
[2] Temperature controller
[3] F1, F2 Fuse
[4] Programmer
[5] Burner emergency operation switch
[6] Appliance on/off switch

▶ Set temperatures (→ Tab. 13 to 15, and page 23) for high limit safety cut-out [1] in the control unit and on the temperature controller [2].
▶ Set the maximum boiler water temperature on the programmer [4].

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

Example DHW demand:

Sum of the set DHW temperature (60 °C) the "Boiler rise" parameter (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 parameter "Boiler rise" (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 water temperature.

Notes on setting third party control units

NOTICE: System damage due to incorrect sensor position!
The sensors of the high limit safety cut-out (STB) and of the temperature controller (TR) **must** be fitted at the installation location 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.

Observe the operating conditions in chapter 2.7, page 5 and observe chapter 4.8, page 22 when installing sensors.

- The third party control unit (building management system or PLC controllers) must ensure a maximum internal boiler water temperature that is sufficiently different from the high limit safety cut-out. It must also be ensured that the control electronics rather than the boiler water controller switch the burner on and off.
- The control unit must ensure that the burner is switched to low load before being shut down. If this is not observed, the safety shut-off valve (SAV) in the gas train may lock out.
- Select control equipment that allows a gentle start-up with a time delay when the system is cold.
- After the burner demand, an automatic timer (for example) should limit the burner to low load for a period of approx. 180 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 on the control unit used (or alternatively on the burner control unit).

	Unit	Value
Temperature controller	**s**	40
Monitor/limiter	**s**	40
Minimum difference between burner on and off temperatures	**K**	7

Table 16 CONDITIONS OF USE

5 Commissioning

NOTICE: Risk of boiler damage from contaminated combustion air.
- ▶ Never operate the boiler when there is a lot of dust in the boiler room, e.g. due to building work.
- ▶ Ensure adequate ventilation.
- ▶ 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 boiler room.
- ▶ A burner contaminated during building work must be cleaned before commissioning.

▶ Complete the commissioning report (→ chapter 5.7, page 27).

5.1 Commissioning

The burner door is lined inside with insulating and refractory concrete. On account of its manufacturing technique, residual moisture will be contained in the door lining. This may evaporate during the initial operation, resulting in droplets forming on the door. Any water vapour created must be able to dissipate during the overall heat-up time. This process may take up to one week.

Observe control parameters and specification.

Cracks may occur during heat-up as a result of shrinkage. Small shrinkage cracks and some flaking are unavoidable and will not impair the function nor are they considered damage.

NOTICE: Risk of system damage from water vapour.
If the boiler heats up too rapidly, the water vapour cannot escape through existing pores in the lining, which may result in flaking of the door insulation. This may result in a total destruction of the lining.
- ▶ To prevent destruction of the lining, it is essential that the stated heat-up time and maximum heat-up output be observed.

The heat input in the first ten hours run must not exceed 60 %.

This heat-up procedure must be performed.

5.2 Flushing the heating system

Flush the heating system prior to commissioning to prevent contamination that could block or damage the circulation pump.

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

- ▶ Isolate the heating flow and return at the boiler.
- ▶ Connect the heating flow to a drinking 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).
- ▶ Flush the heating system with fresh water until clear water emerges from the heating return.
- ▶ Drain the heating system down.

5.3 Filling the heating system

NOTICE: Risk of system damage from thermal stress.
- ▶ Only fill the heating system when cold (the flow temperature must not exceed 40 °C).
- ▶ Fill the heating system during operation only by means of a filling facility in the return of the pipework for the heating system.

CAUTION: Health risk from contaminated drinking water.
- ▶ It is essential to observe all country-specific regulations and standards regarding the prevention of drinking water contamination. In Europe, observe standard EN 1717.

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

The pH value of the heating water increases after the heating system has been filled. After 3 – 6 months (initial service) 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 valves on the heating water side.
- ▶ Fill the heating system with the aid of a filling facility and observe the pressure gauge whilst doing so.
- ▶ Vent the heating system via the radiator air vent valves.
- ▶ Top up with water if the water pressure drops as a result of venting the system.

5.4 Preparing the heating system for operation

Concerning tightness on the flue gas side, a leakage rate of 2 % of the flue gas flow rate is permissible.

Observe the following when commissioning:

- ▶ Before commissioning, vent the heating system via the ventilation facilities provided for this purpose.
- ▶ Ensure that the inspection aperture on the flue gas collector is closed.
- ▶ Ensure that the burner door is securely closed.
- ▶ Ensure that the safety equipment is functioning correctly.
- ▶ Check that the required operating pressure has been built.
- ▶ Check the flange connections and other connections for tightness.

5.5 Commissioning the control unit and burner

- ▶ Use the control unit to commission the boiler.
- ▶ Set the parameters of the control unit (→ Chapter 5.5.1).
- ▶ Observe the commissioning times (→ Chapter 5.1)

By commissioning the control unit you automatically commission the burner as well. The burner can then be started by the control unit. For further details, see the technical documents for the particular control unit and/or burner.

You have the opportunity of raising the flue gas temperature if the measurements taken for the commissioning report indicate that the flue gas temperature is too low (risk of condensate forming) for the chimney concerned.

- ▶ Complete the commissioning report in the technical documentation of the burner.

5.5.1 Setting control unit parameters

The controller settings listed in Tab. 17 apply to the CFB 910 and CFB 930 control units.

Make settings at the service level of the "Boiler specifications" and "Special parameters" menus.

The service documentation for the control unit should be used for parameterising the CFB 940 control unit.

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: Burner type for fuel: Gas	Burner: Burner type for fuel: Oil	Control unit setting: Burner type to be selected	Control unit setting: Fuel to be selected	Control unit setting: Parameter 49 and 50 setting[1]	Control unit setting: Return temperature raising function
Single fuel burner	Modulating		Modulating	Gas (biogas)	55[2] (63[3])	No
	2-stage		2-stage	Gas (biogas)	60[2] (68[3])	No
		Modulating	Modulating	Oil	50[4]	No
		2-stage	2-stage	Oil	55[4]	No
Dual-fuel burner	Modulating	Modulating	Modulating	Gas (biogas)	55[2)5)] (63[3])	No
	2-stage	Modulating	Not applicable			
	Modulating	2-stage	Dual-fuel burner	No setting required	55[2] (63[3])	No
	2-stage	2-stage	two-stage	Gas (biogas)	60[2] (68[3])	No

Table 17 Controller settings for CFB 910, CFB 930 and CFB 940 control units

1) On CFB 940: "Set return temperature" parameter
2) Corresponds to a return temperature of 60 °C
3) Corresponds to a return temperature of 68 °C for biogas
4) Corresponds to a return temperature of 50 °C
5) Corresponds to a return temperature of 60 °C for gas and 50 °C for oil

5.6 Raising the flue gas temperature

▶ Start the heating system using the control unit.

For a new boiler with an average boiler temperature of 80 °C, the flue gas temperature is approx. 205 °C.

You can raise the flue gas temperature again by removing the turbulators.

▶ Shutting down the boiler (→ Chapter 6, page 28).
▶ Open the burner door (→ Chapter 4.5, page 19).

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

▶ Remove two or three turbulators [2] from secondary heating pipes [1], starting with the turbulators at the bottom.
▶ Re-check the flue gas temperature.

If the flue gas temperature is still too low:

▶ Remove further turbulators [2] from secondary heating pipes [1].

If the flue gas temperature is too high:

▶ Re-insert turbulators [2] one after the other in secondary heating pipes [1], until the correct flue gas temperature has been reached (→ also Chapter 7.3.3, page 29)

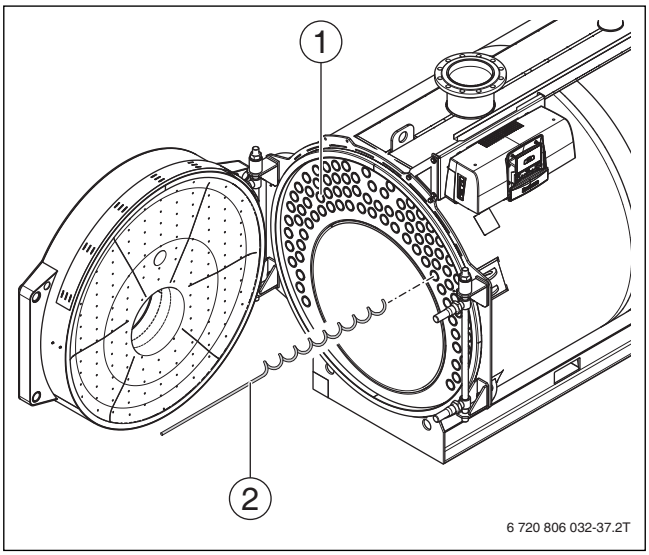


Fig. 29 Removing the turbulators

[1] Secondary heating pipes
[2] Turbulator

5.7 Commissioning report

This boiler can be used with an oil or gas burner. Fill in the commissioning report for the appropriate type of oil or gas burner carefully.

▶ Sign all completed commissioning work and enter the date.

	Commissioning work	Page (individual steps)	Remarks
1.	Flush the heating system.	Page 25	
2.	Fill the heating system with water. Note the water quality and document the values in the operator's log provided for water.	Page 25	
3.	Vent the heating system.		
4.	Carry out tightness test.	Page 18	
5.	Switch on the control unit. ▶ Boiler-specific parameters are set.	See technical documentation on the control unit, specifications and Chapter 5.5.1, page 26.	
6.	Check the fuel line for tightness.		
7.	Starting the burner.	See technical burner documentation.	
8.	Complete the burner test report regarding the individual output stages.		
9.	Conduct a tightness test on the hot gas side. After being in operation for a while, the burner door bolts will have to be retightened in order to avoid leakage around the door as a result of settling of the packing cord.		
10.	Check the flange connections and fitting after the boiler has been heated up and retighten.		
11.	Check flue path for tightness.		
12.	Carry out a function test on all safety equipment and record this.		
13.	Instruct the system user and hand over technical documentation.		
14.	Enter the fuel used in the table (→ "General" operating instructions).		
15.	Confirm professional commissioning. Company stamp/signature/date		

Table 18 Commissioning report

6 Decommissioning

NOTICE: Risk of system damage through frost.
When there is a frost, your heating system can freeze up if it is shut down, e.g. through a fault shutdown.

- ▶ 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 due to a fault shutdown and there is a risk of frost, drain the heating water at the drain & fill valve. Also leave the air vent valve at the highest point in the system open.

NOTICE: System damage due to frost.
The heating system can freeze up as a result of a power failure or if the power has been switched off.

- ▶ Check the "Control unit settings" to ensure the system remains operational (especially when there is a risk of frost).

6.1 Shutting down the heating system

Shut down your heating system via the control unit. This also switches the burner off automatically.

- ▶ Place the operating mode selector switch on the control unit in the "0" (Off) position.
- ▶ Isolate the fuel supply to the appliance.

6.2 Shutting down the heating system in an emergency

Only in emergencies, switch OFF the heating system via the boiler room MCB/fuse or the 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 to the appliance.

7 Inspection and maintenance

7.1 General notes

Offer your customer an annual contract covering inspection and responsive service. For the work covered by such a contract see chapter 7.5 "Inspection and maintenance reports", page 32.

NOTICE: System damage due to inadequate cleaning and maintenance!

- ▶ Carry out cleaning and maintenance at least once a year. Check that the complete heating system operates correctly.
- ▶ Immediately correct all faults to prevent system damage.

Annual inspection and service are part of the warranty terms.

Use only original spare parts from the manufacturer. Spare parts can be ordered via spare parts merchants.
A genuine spare parts list is available online (see last page for details).

7.2 Preparing the boiler for inspection and maintenance

- ▶ Shut down the heating system (→ Chapter 6.1, page 28).

DANGER: Risk to life from 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.

DANGER: Risk to life from the explosion of flammable gases.

- ▶ Work on gas components must only be carried out by qualified and authorised Gas Safe and ACS accredited contractors.

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

Before opening the burner door:

- ▶ Check the general condition of the heating system.
- ▶ Visual inspection and function check of the heating system.
- ▶ Check all system parts that carry fuel or water for leaks and visible corrosion.
- ▶ Open the burner door (→ Chapter 4.5, page 19).

7.3 Cleaning the boiler

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 nut.

7.3.1 Cleaning heating surfaces and turbulators with a cleaning brush

WARNING: Risk of system damage from using incorrect cleaning equipment.
- ▶ If cleaning with a brush, use only genuine cleaning brushes from the manufacturer. Brush included in scope of delivery.

- ▶ Remove turbulators [4] from secondary heating pipes [1].
- ▶ Clean turbulators [4].
- ▶ Push the bristle part of the cleaning brush [3] right through the secondary heating pipe until the bristles emerge at the other end of the pipe. The internal surface of the pipe must be cleaned thoroughly.
- ▶ Clean the heating surfaces in combustion chamber [2] and the heating surfaces in secondary heating pipes [1] with cleaning brush [3].

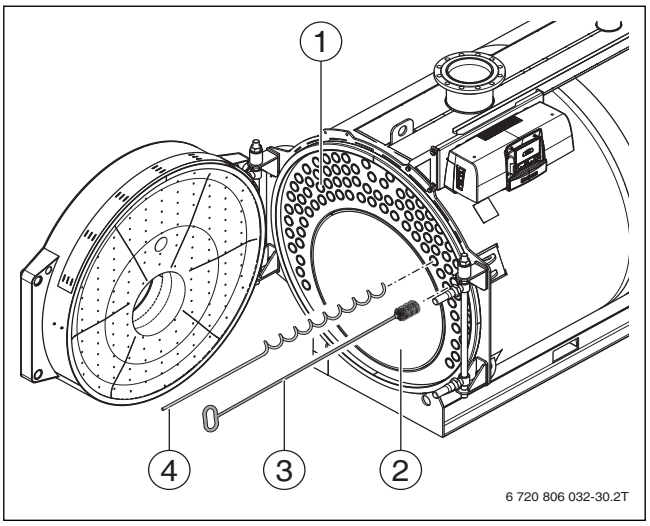


Fig. 30 Cleaning the heating surfaces

[1] Secondary heating pipes
[2] Combustion chamber (heating surfaces of combustion chamber)
[3] Cleaning brush
[4] Turbulator

7.3.2 Cleaning the flue gas collector

To be able to remove combustion residues from the flue gas collector, remove the cleaning cover. The cleaning cover is located on the rear of the boiler.

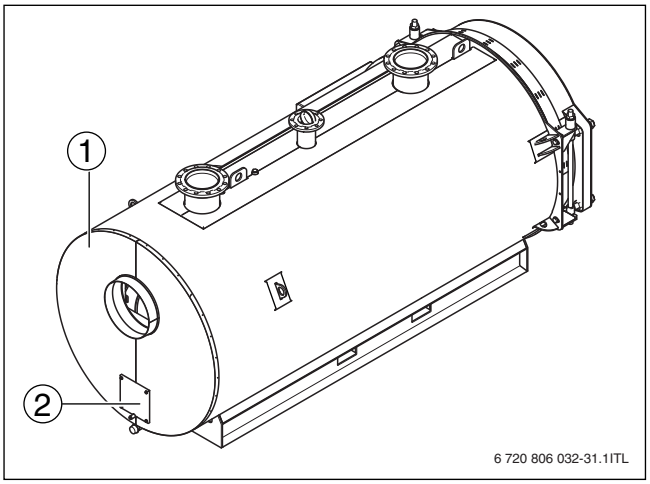


Fig. 31 Opening the cleaning cover of the flue gas collector

[1] Rear panel
[2] Cleaning cover

- ▶ Remove nuts and washers from the cleaning cover [2].
- ▶ Remove the cleaning cover of flue gas collector [2].
- ▶ Remove the loosened combustion residues from the combustion chamber (→ Fig. 30, page 29), the hot gas flue and the flue gas collector as well as the condensate hose.

7.3.3 Inserting turbulators

NOTICE: Risk of system damage from improperly inserted turbulators.
Incorrectly inserted turbulators impede the flow of flue gas and lead to overheating of the boiler front.
Insufficiently secured turbulators will drift out of the secondary heating pipes during operation and burn up.
- ▶ Align turbulators correctly.
- ▶ Check that the turbulators are secured in the secondary heating pipes. It must not be possible to pull the turbulators out of the secondary heating pipes easily.

- ▶ Insert turbulators (→ Fig. 32, [1]) into secondary heating pipes [2].

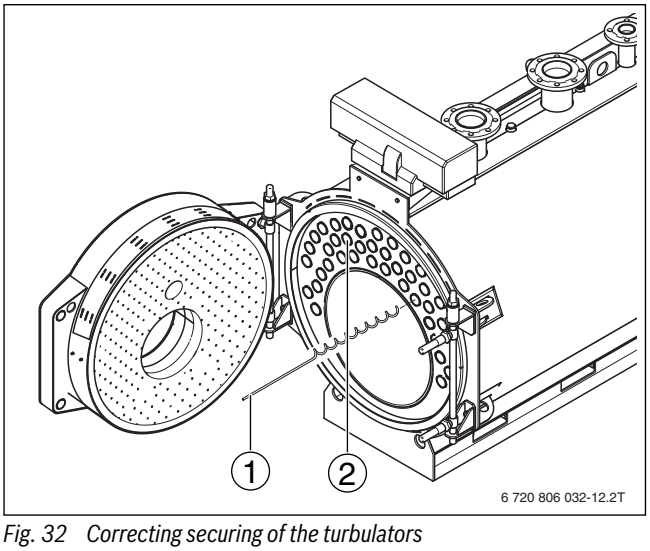


Fig. 32 Correcting securing of the turbulators

[1] Turbulator
[2] Secondary heating pipes

▶ Align turbulators in such a way that all the ends (→ Fig. 33, [2]) point towards the middle of the combustion chamber.

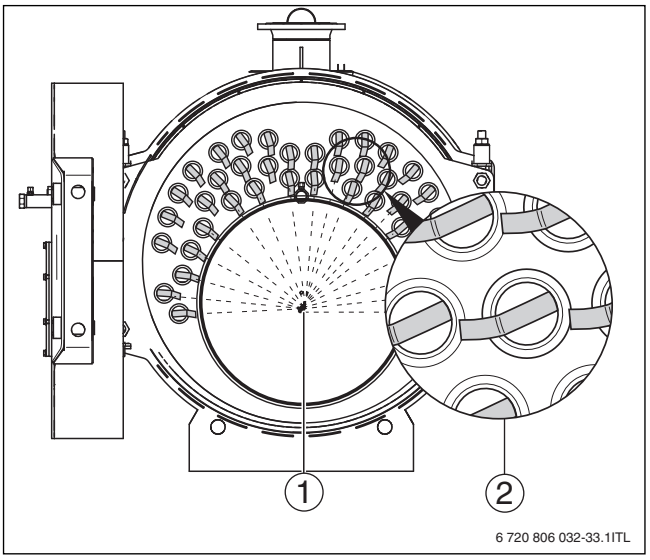


Fig. 33 Aligning the turbulators

[1] Combustion chamber
[2] Turbulator, folded end

If turbulators are no longer secured sufficiently, correct how they are secured.

▶ Pull ¾ of turbulator out of secondary heating pipe.
▶ Bend turbulator by 10° – 15°.
▶ Re-insert turbulator into secondary heating pipe.
▶ Recheck how well the turbulator is secured.
▶ Check the gaskets around the burner door and inspection aperture; replace if necessary.
▶ Check the condition of the insulating rings between the burner door thermal insulation and the blast tube (filling the annular gap → Fig. 21, page 20).

Suitable packing cord/insulating rings are available via spare parts merchants. A genuine spare parts list is available online (see last page for details).

▶ Close the burner door tightly (→ Chapter 4.5, page 19).

7.3.4 Fitting the cleaning cover

DANGER: Risk of poisoning through escaping gases.
Flue gas can escape if the flue gas collector and cleaning drain are not correctly sealed.
▶ Carefully close the flue gas collector with the cleaning cover and the cleaning drain with a cap.

▶ Position cleaning cover [3] of the flue gas collector.
▶ Install nuts and washers on the cleaning cover [2].

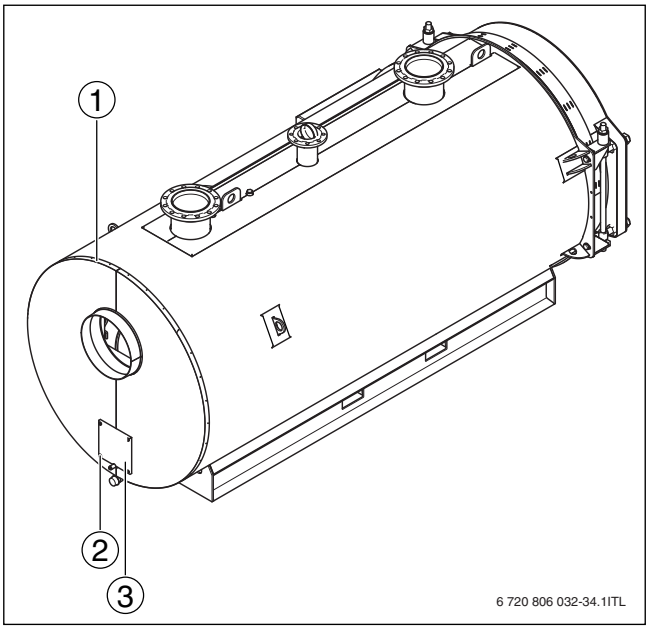


Fig. 34 Fitting the cleaning cover

[1] Flue gas collector
[2] Nuts and washers on the cleaning cover
[3] Cleaning cover of flue gas collector

7.3.5 Wet-cleaning the boiler

When wet-cleaning, use a cleaning agent appropriate for the level of contamination.

For wet cleaning, follow the same procedure as for cleaning with brushes (→ Chapter 7.3, page 29).

DANGER: Risk of poisoning through escaping gases.
Flue gas can escape if the flue gas collector and cleaning drain are not correctly sealed.
▶ Carefully close the flue gas collector with the cleaning cover and the cleaning drain with a cap.

For wet-cleaning (chemical cleaning), observe the operating instructions of the relevant cleaning equipment and cleaning agent.
It may be necessary to vary the wet-cleaning process from that described here.

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

NOTICE: Risk of system damage from moisture in the control unit.
An ingress of moisture into the control unit will damage it. 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.

▶ Select a cleaning agent that is appropriate for the type of contamination (soot or encrustation).
▶ Cover the control unit with foil to prevent ingress of the cleaning agent.
▶ Spray cleaning agent evenly into the hot gas flues.
▶ Heat the boiler to a temperature of at least 70 °C.
▶ Feed brushes through the secondary heating pipes.
▶ Remove the dummy cap on cleaning drain [1].

- ▶ Drain off any fluid that has accumulated.
- ▶ Put the cap [1] over the cleaning drain again.

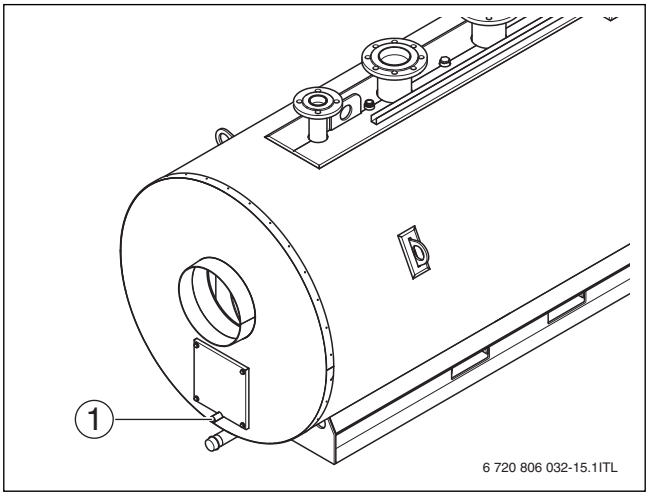


Fig. 35 Opening/closing the cleaning drain

[1] Dummy cap for cleaning drain

7.4 Checking and correcting the water pressure

Your heating system must contain sufficient water to ensure it functions correctly.

- ▶ If the water pressure in the heating system is too low, top up with water.
- ▶ Check the water pressure monthly.

7.4.1 When should you check the water pressure in the heating system?

The fill and top-up water quality must comply with the specifications in the operator's log supplied. Recently added fill or top-up water loses much of its volume in the first few days because it releases gases. With new systems you should therefore initially check the heating water pressure on a daily basis, and then at gradually longer intervals.

Air pockets may form in the heating system through the fill or top-up water releasing gases.
- ▶ Vent the heating system (e.g. bleeding the radiators).
- ▶ If required, top up with water.

Once the heating system is hardly losing any volume, check the heating water pressure monthly.

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

7.4.2 Sealed unvented systems

With closed systems, the system pressure must be adjusted on the basis of the heating system requirements.

- ▶ Check the water pressure of the heating system.

NOTICE: Risk of system damage due to frequent topping-up.
Subject to the water quality, your heating system can be damaged through corrosion or scaling.
- ▶ Ensure that the heating system is vented correctly.
- ▶ Check the heating system for leaks and the expansion vessel for functionality.
- ▶ Observe the requirements regarding water quality (see Operating Instruction).
- ▶ If water loss occurs frequently, locate the cause and rectify the problem without delay.

NOTICE: Risk of system damage from thermal stress.
- ▶ Only fill the heating system when cold (the flow temperature must not exceed 40 °C).
- ▶ Fill the heating system during operation only by WRAS approved filling facility in the return of the pipework for the heating system.

- ▶ If the pressure in the heating system drops below the required minimum operating pressure: Add top-up water.
- ▶ Add top-up water only by means of a filling facility in the return of the pipework for the heating system.
- ▶ Vent the heating system.
- ▶ Check the water pressure once more.
- ▶ Enter the operating pressures and water quality in the operating instructions.

7.4.3 Open vented systems

NOTICE: Risk of system damage from thermal stress.
- ▶ Only fill the heating system when cold (the flow temperature must not exceed 40 °C).
- ▶ Fill the heating system during operation only by means of a filling facility in the return of the pipework for the heating system.

For open vented systems, the hydrometer needle [1] should be within the red band [3].

The operating pressure depends on the static height of the system and the installation height of the expansion vessel.

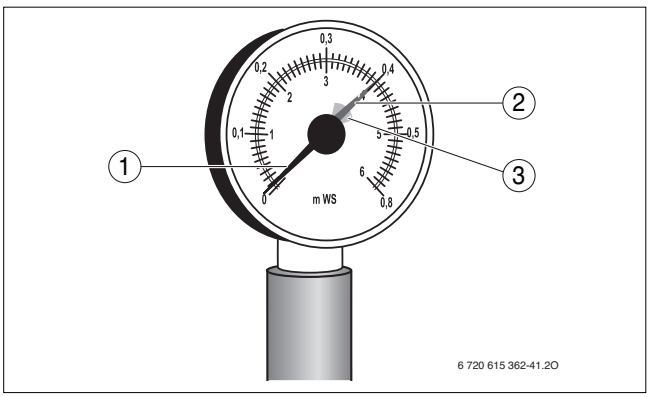


Fig. 36 Hydrometer for open vented heating systems

[1] Hydrometer needle
[2] Green needle
[3] Red band

7.5 Inspection and maintenance reports

The inspection and maintenance reports provide an overview of the required inspection and service steps that should be carried out annually.

Warranty:
Annual inspection and service are part of the warranty terms.

Complete these reports after inspections and service. The report can also be used as copying template.

▶ Sign and date the completed inspection work.

	Inspection work	Page (individual steps)	Date: ____	Date: ____	Date: ____
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 heating surface for contamination and clean them. For this, shut down the heating system.	Page 29			
5.	Check gaskets/packing cord on the burner door and replace if necessary.	Page 29			
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 water pressure and pre-charge pressure of the expansion vessel.	Page 31			
9.	If necessary, check that the DHW cylinder and the magnesium anode are functioning properly.	See technical documentation for DHW cylinder.			
10.	Check the control unit settings are suitable.	See technical documentation for the control unit.			
11.	Test all safety equipment (safety shutdown) and record findings. When doing this, the technical documents for the control unit and accessories should be observed. For example: ▶ High limit safety cut-out ▶ Pressure limiter min. ▶ Pressure limiter max. (if installed)				

Table 19 Inspection record

	Inspection work	Page (individual steps)	Date: ____	Date: ____	Date: ____
12.	Analyse the boiler water and record findings: ▶ 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.	Final check of the inspection work, take measurements and record values and test results.				
14.	Confirm correct inspection	Company stamp/ signature	Company stamp/ signature	Company stamp/ signature	Company stamp/ signature

Table 19 Inspection record

	Demand-based maintenance	Page (individual steps)	Date: ____	Date: ____	Date: ____
1.	Shutting down the heating system.	Page 28			
2.	Clean the hot gas flues (heating surfaces)	Page 29			
3.	Clean the combustion chamber.	Page 29			
4.	Check gaskets/packing cord on the burner door and replace if necessary.	Page 29			
5.	Start up the heating system	Page 25			
6.	Final check of the maintenance work, take measurements and record values and test results.	See technical documentation for burner.			
7.	Check the function and operational safety (safety equipment).				

Table 20 Maintenance report

8 Correcting burner faults

The display shows heating system faults. 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.

NOTICE: Risk of system damage through frost.
When there is a frost, your heating system can freeze up if it is shut down, e.g. through a fault shutdown.

- If your heating system has been shut down for several days due to a fault shutdown and there is a risk of frost, drain the heating water at the drain & fill valve. Also leave the air vent valve at the highest point in the system open.

- Press burner reset button (see burner operating instructions).

NOTICE: System damage due to the reset button being pressed too frequently.
This can damage the burner ignition transformer.

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

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

9 Environment/disposal

Environmental protection is a key commitment of the Bosch Group. Quality of products, efficiency and environmental protection are equally important objectives for us. All laws and regulations relating to environmental protection are strictly observed. To protect the environment, we use the best possible technology and materials, subject to 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

Old appliances contain materials that should be recycled.
The relevant assemblies are easy to separate and all plastics are identified. In this way the individual assemblies can be easily sorted and directed to recycling or disposal.

10 Appendix

10.1 Arrangement of safety equipment to AS3814; operating temperature ≤ 94 °C; shutdown temperature (high limit safety cut-out) ≤ 99 °C

Boiler ≤ 300 kW; operating temperature ≤ 94 °C; shutdown temperature (high limit safety cut-out) ≤ 99 °C

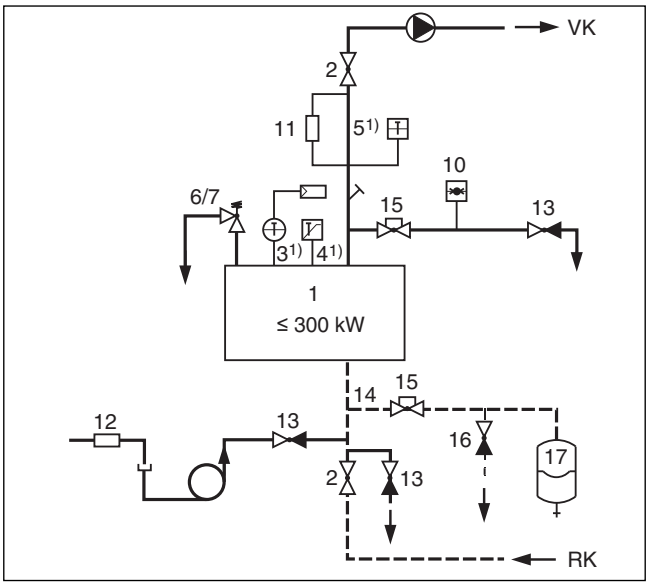


Fig. 37 Safety equipment to AS3814 for boilers = 300 kW with high limit safety cut-out ≤ 99 °C (direct heating)

Boiler > 300 kW; operating temperature ≤ 94 °C; shutdown temperature (high limit safety cut-out) ≤ 99 °C

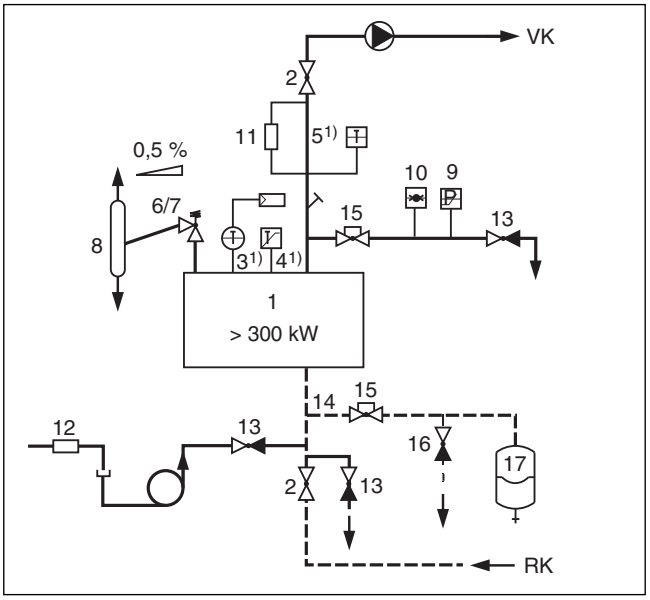


Fig. 38 Safety equipment to AS3814 for boilers > 300 kW with high limit safety cut-out ≤ 99 °C (direct heating)

1) (For Fig. 37 and 38) Standard equipment of the boiler control unit: The maximum achievable flow temperature in combination with control units from the CFB 9xx series is approx. 18 K lower than the shutdown temperature (high limit safety cut-out).

Key to fig. 37 and 38:

[RK] Heating return
[VK] Heating flow connection
[1] Heat sources
[2] Shut-off valve, flow/return
[3] Temperature control unit
[4] High limit safety cut-out
[5] Temperature capturing facility
[6] Diaphragm safety valve 2.5 bar/3 bar or
[7] Lift spring safety valve = 2.5 bar
[8] Flash trap in systems > 300 kW; not required if, instead, a high limit safety cut-out with shutdown temperature of ≤ 99 °C and a maximum pressure limiter are provided additionally for each boiler.
[9] Maximum pressure limiter
[10] Pressure gauge
[11] Low water indicator (not in systems ≤ 300 kW). Alternatively one minimum pressure limiter or a replacement measure approved by the manufacturer is provided for each boiler.
[12] Non-return valve
[13] Drain & fill valve (DFV)
[14] Expansion line
[15] Shut-off valve with lockout against unintentional closure (e.g. by sealed cap valve)
[16] Drain upstream of the expansion vessel
[17] Expansion vessel (to AS3814)

The figures show the safety equipment to AS3814 schematically for the system versions listed here - no claim is made as to their completeness.

Practical implementation is subject to currently applicable technical rules.

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Notes

Notes

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