Installation Instructions

Lambdamat LM 750/1500

Translation of the original German installation instructions for technicians

Read and follow the instructions and safety information!

Technical changes, typographical errors and omissions reserved!

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CE

Fröling Ges.m.b.H | A-4710 Grieskirchen, Industriestraße 12 | www.froeling.com

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1 General

Thank you for choosing a quality product from Froling. The product features a state-of-the-art design and conforms to all currently applicable standards and testing guidelines.

Please read and observe the documentation provided and always keep it close to the system for reference. Observing the requirements and safety information in the documentation makes a significant contribution to safe, appropriate, environmentally friendly and economical operation of the system.

The constant further development of our products means that there may be minor differences from the pictures and content. If you discover any errors, please let us know: doku@froeling.com.

Subject to technical change.

Issuing a delivery certificate

The EC Declaration of Conformity is only valid in conjunction with a delivery certificate, which has been filled in correctly and signed as part of the commissioning process. The original document remains at the installation site. Commissioning installers or heating engineers are requested to return a copy of the delivery certificate together with the guarantee card to Froling. On commissioning by FROLING Customer Service the validity of the delivery certificate will be noted on the customer service record.

2 Safety

2.1 Hazard levels of warnings

This documentation uses warnings with the following hazard levels to indicate direct hazards and important safety instructions:

⚠ DANGER

The dangerous situation is imminent and if measures are not observed it will lead to serious injury or death. You must follow the instructions!

⚠ WARNING

The dangerous situation may occur and if measures are not observed it will lead to serious injury or death. Work with extreme care.

⚠ CAUTION

The dangerous situation may occur and if measures are not observed it will lead to minor injuries.

NOTICE

The dangerous situation may occur and if measures are not observed it will lead to damage to property or pollution.

2.2 Qualification of assembly staff

⚠ CAUTION

Assembly and installation by unqualified persons:

Risk of personal injury and damage to property

During assembly and installation:

❒ Observe the instructions and information in the manuals

❒ Only allow appropriately qualified personnel to work on the system

Assembly, installation, initial startup and servicing must always be carried out by qualified personnel:

- Heating technician / building technician
- Electrical installation technician
- Froling customer services

The assembly staff must have read and understood the instructions in the documentation.

2.3 Personal protective equipment for assembly staff

You must ensure that staff have the protective equipment specified by accident prevention regulations.

▪ For transportation, setup and assembly:
- suitable work wear
- protective gloves
- sturdy shoes (min. protection class S1P)

3 Design Information

3.1 Notes on standards

The system must be installed and commissioned in accordance with the local fire and building regulations. Unless contrary to other national regulations, the latest versions of the following standards and guidelines apply:

3.1.1 General standards for heating systems

EN 303-5	Boilers for solid fuels, manually and automatically fed combustion systems, nominal heat output up to 500 kW
EN 12828	Heating systems in buildings - design of water-based heating systems
EN 13384-1	Chimneys - Thermal and fluid dynamic calculation methods Part 1: Chimneys serving one appliance
ÖNORM H 5151	Planning of central hot water heating systems with or without hot water preparation
ÖNORM M 7510-1	Guidelines for checking central heating systems Part 1: General requirements and one-off inspections
ÖNORM M 7510-4	Guidelines for checking central heating systems Part 4: Simple check for heating plants for solid fuels

3.1.2 Standards for structural and safety devices

ÖNORM H 5170	Heating installation - Requirements for construction and safety engineering, as well as fire prevention and environmental protection
TRVB H 118	Technical directives for fire protection/prevention (Austria)

3.1.3 Standards for heating water

ÖNORM H 5195-1	Prevention of damage by corrosion and scale formation in closed warm water heating systems at operating temperatures up to 100°C (Austria).
VDI 2035	Prevention of damage hot water heating systems (Germany)
SWKI BT 102-01	Water quality for heating, steam, cooling and air conditioning systems (Switzerland)
UNI 8065	Technical standard regulating hot water preparation. DM 26.06.2015 (Ministerial Decree specifying the minimum requirements) Follow the instructions of this standard and any related updates. (Italy)

3.1.4 Regulations and standards for permitted fuels

1. BImSchV	First Order of the German Federal Government for the implementation of the Federal Law on Emission Protection (Ordinance on Small and Medium Combustion Plants) in the version published on 26 January 2010, BGBl. JG 2010 Part I No. 4.
EN ISO 17225-2	Solid bio-fuel - Fuel specifications and classes Part 2: Wood pellets for use in industrial and domestic systems
EN ISO 17225-4	Solid bio-fuel - Fuel specifications and classes Part 4: Wood chips for non-industrial use

3.2 Installation and approval of the heating system

The boiler should be operated in a closed heating system. The following standards govern the installation:

Note on standards

EN 12828 - Heating Systems in Buildings

NOTICE! Each heating system must be officially approved.

The appropriate supervisory authority (inspection agency) must always be informed when installing or modifying a heating system, and authorisation must be obtained from the building authorities:

Austria: report to the construction authorities of the community or magistrate

Germany: report new installations to an approved chimney sweep / the building authorities.

3.3 General information for installation room (boiler room)

Boiler room characteristics

- The floor must be even, clean and dry and have an adequate load-bearing capacity.
- There must not be a potentially explosive atmosphere in the boiler room as the boiler is not suitable for use in potentially explosive environments.
- The boiler room must be frost-free.
- The boiler does not provide any light, so the customer must ensure sufficient lighting in the boiler room in accordance with national workplace design regulations.
- When using the boiler above 2000 metres above sea level you should consult the manufacturer.
- Danger of fire due to flammable materials.
  The floor of the boiler room must not be flammable. No flammable materials should be stored near the boiler. Flammable objects (e.g. clothing) must not be put on the boiler to dry.
- Damage due to impurities in combustion air.
  Do not use any solvents or cleaning agents containing chlorine and hydrogen halides in the room where the boiler is installed (e.g. chlorination units for swimming pools).
- Keep the air suction opening of the boiler free of dust.
- The system must be protected against the chewing or nesting of animals (e.g. rodents etc.).

Ventilation of the boiler room

Ventilation air for the boiler room should be taken from and expelled directly outside, and the openings and air ducts should be designed to prevent weather conditions (foliage, snowdrifts, etc.) from obstructing the air flow.

Unless otherwise specified in the applicable building regulations for the boiler room, the following standards apply to the design and dimensions of the air ducts:

Note on standards

ÖNORM H 5170 - Construction and fire protection requirements
TRVB H118 - Technical directives on fire protection/prevention

3.4 Requirements for central heating water

Unless contrary to other national regulations, the latest versions of the following standards and guidelines apply:

Austria:	ÖNORM H 5195	Switzerland:	SWKI BT 102-01
Germany:	VDI 2035	Italy:	UNI 8065

Observe the standards and also follow the recommendations below:

- ❒ Aim for a pH value of between 8.2 and 10.0. If the central heating water comes into contact with aluminium, the pH value must be between 8.0 and 8.5
- ❒ Use prepared water which complies with the standards cited above for filling and make-up water
- ❒ Avoid leaks and use a closed heating system to maintain water quality during operation
- ❒ When filling with make-up water, always bleed the filling hose before connecting, in order to prevent air from entering the system

Advantages of prepared water:

- Complies with the applicable standards
- Less of a drop in output due to reduced limescale build-up
- Less corrosion due to fewer aggressive substances
- Long-term cost savings thanks to improved energy efficiency

Permitted water hardness for the fill and make-up water in accordance with VDI 2035:

Overall heat output	Total hardness at <20 l/kW minimum individual heat output [1]		Total hardness at >20 ≤50 l/kW minimum individual heat output [1]		Total hardness at >50 l/kW minimum individual heat output [1]	
kW	°dH	mol/m³	°dH	mol/m³	°dH	mol/m³
≤50	no demand or		11.2	2	0.11	0.02
	<16.8 [2]	<3 [2]				
>50 ≤200	11.2	2	8.4	1.5		
>200 ≤600	8.4	1.5	0.11	0.02		
>600	0.11	0.02				

1. From specific system volume (litres nominal capacity/heat output; for multi-boiler systems use the smallest individual heat output)
2. In the case of systems with central heating boilers and for systems with electric heating elements

Additional requirements for Switzerland

The filling and make-up water must be demineralised (fully purified)

- The water must not contain any ingredients that could settle and accumulate in the system
- This makes the water non-electroconductive, which prevents corrosion
- It also removes all the neutral salts such as chloride, sulphate and nitrate which can weaken corrosive materials in certain conditions

If some of the system water is lost, e.g. during repairs, the make-up water must also be demineralised. It is not enough to soften the water. The heating system must be professionally cleaned and rinsed before filling the units.

Inspection:

- After eight weeks, the pH value of the water must be between 8.2 and 10.0. If the central heating water comes into contact with aluminium, the pH value must be between 8.0 and 8.5
- Yearly. Values must be recorded by the owner

3.5 Notes for using pressure maintenance systems

Pressure maintenance systems in hot-water heating systems keep the required pressure within predefined limits and balance out volume variations caused by changes in the hot-water temperature. Two main systems are used:

Compressor-controlled pressure maintenance

In compressor-controlled pressure maintenance units, a variable air cushion in the expansion tank is responsible for volume compensation and pressure maintenance. If the pressure is too low, the compressor pumps air into the tank. If the pressure is too high, air is released by means of a solenoid valve. The systems are built solely with closed-diaphragm expansion tanks to prevent the damaging introduction of oxygen into the heating water.

Pump-controlled pressure maintenance

A pump-controlled pressure maintenance unit essentially consists of a pressure-maintenance pump, relief valve and an unpressurised receiving tank. The valve releases hot water into the receiving tank if the pressure is too high. If the pressure drops below a preset value, the pump draws water from the receiving tank and feeds it back into the heating system. Pump-controlled pressure maintenance systems with **open expansion tanks** (e.g. without a diaphragm) introduce ambient oxygen via the surface of the water, exposing the connected system components to the risk of corrosion. These systems offer no oxygen removal for the purposes of corrosion control as required by VDI 2035 and **in the interests of corrosion protection should not be used**.

3.6 Return lift

If the hot water return is below the minimum return temperature, some of the hot water outfeed will be mixed in.

⚠ CAUTION

Risk of dropping below dew point/condensation formation if operated without return temperature control.

Condensation water forms an aggressive condensate when combined with combustion residue, leading to damage to the boiler.

Take the following precautions:

❒ Regulations stipulate the use of a return temperature control.

➥ The minimum return temperature is 60 °C. We recommend fitting some sort of control device (e.g. thermometer).

3.7 Use with storage tank

NOTICE

In principle it is not necessary to use a storage tank for the system to run smoothly. However, we recommend that you use the system with a storage tank, as this ensures a continuous supply of fuel in the ideal output range of the boiler.

For the correct dimensions of the storage tank and the line insulation (in accordance with ÖNORM M 7510 or guideline UZ37) please consult your installer or Froling.

⇨ See "Addresses" [page 64]

3.8 Chimney connection/chimney system

EN 303-5 specifies that the entire flue gas system must be designed to prevent, wherever possible, damage caused by seepage, insufficient feed pressure and condensation. Please note in this respect that flue gas temperatures lower than 160K above room temperature can occur in the permitted operating range of the boiler.

The flue gas temperatures (for clean systems) and additional flue gas values can be found in the table below.

The connection between the boiler and the chimney system should be as short as possible. The upward angle of the connection should not exceed 30 - 45°. Insulate the connection. The entire flue gas system - chimney and connection - should be calculated in accordance with EN 13384-1.

Local regulations and other statutory regulations also apply.

NOTICE! The chimney must be authorised by a smoke trap sweeper or chimney sweep.

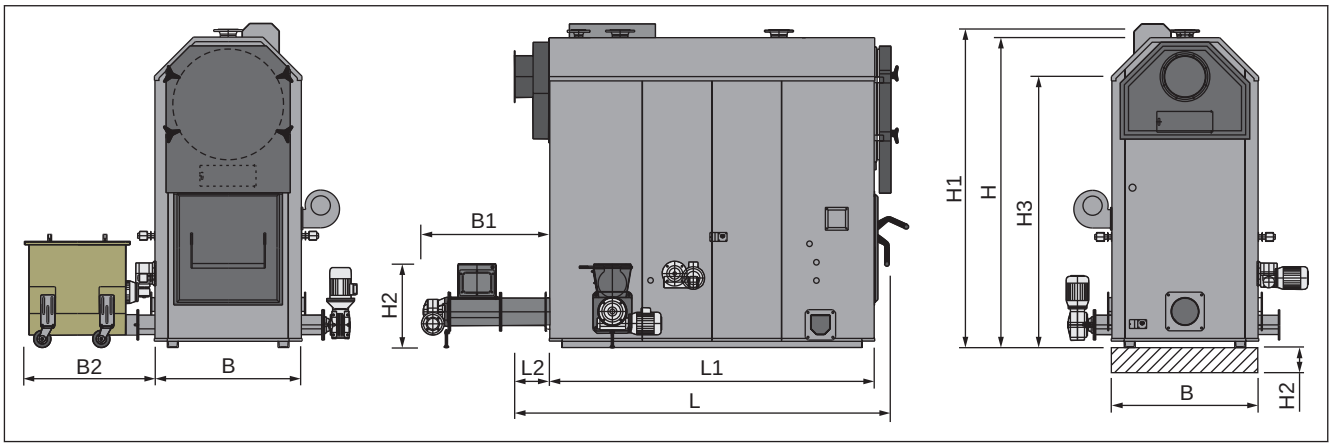
3.8.1 Draught limiter

We generally recommend the installation of a draught limiter. A draught limiter must be installed if the maximum permissible feed pressure as given in the boiler data for planning the flue gas system is exceeded.

NOTICE! Install the draught limiter directly under the mouth of the flue line, as the pressure is constantly low at this point.

4 Technical information

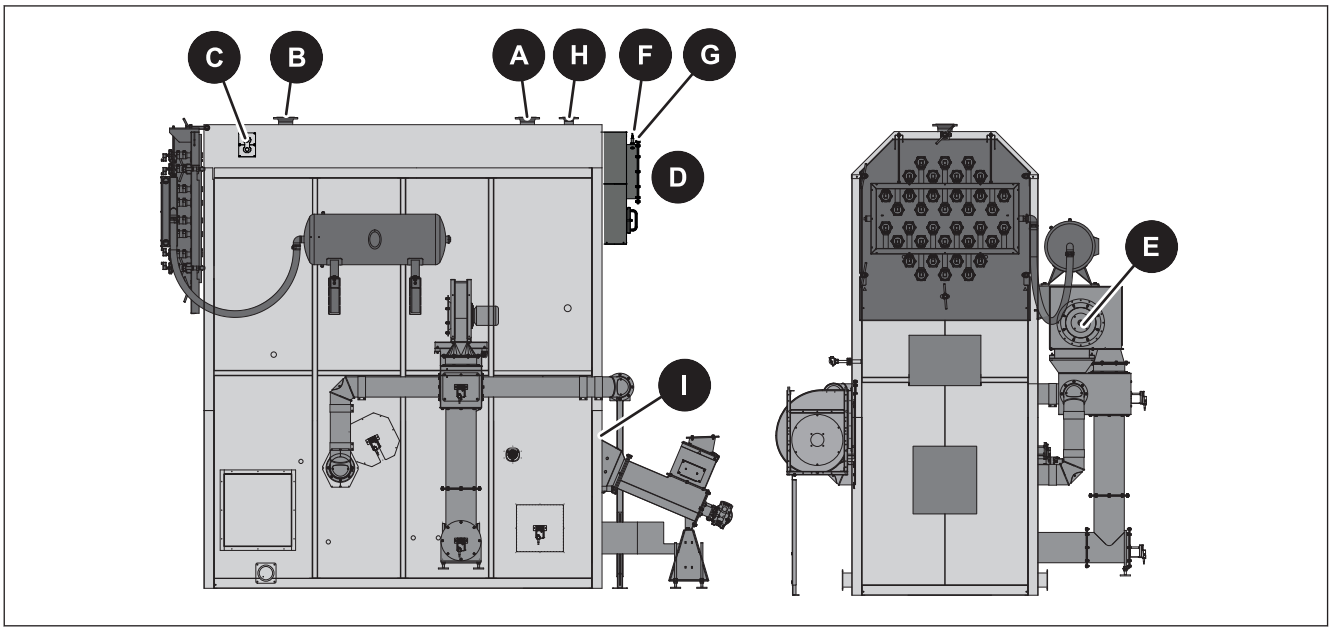
4.1 Dimensions



Item	Description	Unit	Lambdamat	
			750	1500
H	Height, boiler	mm	3600	4585
H1	Height, flow/return connection		3660	4660
H2	Height, stoker including burn back protection system (wood chips BBF 300)		1220	1500
H3	Height, flue gas pipe connection		3250	4200
H4	Minimum height, base [1)]		260	-
W	Width, boiler		1630	1850
W1	Width, stoker incl. gears		1290	1290
W2	Width, ash container (optional)		1295	1295
L	Length, boiler incl. reversing chamber door and flue gas pipe connection		3075	4360
L1	Length, boiler		2710	3935
L2	Length, flue gas collection box		255	600

1. Base required for ash removal to ash container via screw

4.2 Components and connections



Item	Description	Unit	LM 750	LM 1500
A	Boiler flow connection	inches	DN100 / PN 6	DN150 / PN 6
B	Boiler return connection	inches	DN100 / PN 6	DN150 / PN 6
C	Safety battery connection	inches	1” ET	1” ET
D	Flue gas pipe connection	mm	400	500
E	FGR (flue gas recirculation) connection	mm	300	300
F	Broadband probe connection		-	-
G	Flue gas temperature sensor connection		-	-
H	Safety valve connection (provided by the customer)	inches	DN65 / PN 6	DN80 / PN 6
I	Drainage connection	inches	2“ IT	2“ IT

4.3 Technical specifications

Description		LM 750	LM 1500
Nominal output	kW	750	1500
Output range	kW	225 - 750	450 - 1500
Nominal fuel heating efficiency with wood chips	kW	833	1667
Efficiency at nominal load / partial load	%	90.0 / 90.3	> 90.0
Quantity of wood chips required at nominal load	kg/h	242	490
Electrical connection		400 V / 50 Hz	
Electric fuses[1)]	A	as per circuit diagram	
Electrical power consumption	W	as per circuit diagram	
Dimensions required for combustion chamber installation (LxWxH)	mm	3600 x 1600 x 1850	4780 x 1830 x 2700
Dimensions required for heat exchanger installation (LxWxH)	mm	3050 x 1600 x 1650	3980 x 1850 x 1950
Weight – combustion chamber	kg	3620	7600
Weight – heat exchanger	kg	3500	8200
Weight – fireclay	kg	4320	7500
Total weight excl. fittings	kg	11440	23300
Heat exchanger water capacity	l	1840	4240
Water pressure drop (ΔT = 20 K)	mbar	15	63
Flow rate (ΔT = 20 K)	m³/h	32.4	66
Minimum ventilation opening as per ÖNORM H 5170	cm²	1666	3338
Minimum boiler return temperature	°C	65	
Maximum permitted operating temperature	°C	95	
Maximum permitted working over-pressure	bar	6	
Permitted fuel as per EN ISO 17225 [3)]		Part 4: Wood chips class A2 / P16S-P45S	
Airborne sound level	dB(A)	< 70	

1. Electric fuses and power consumption vary depending on design and features
2. Use the maximum attainable oxygen content for chimney design
3. Detailed information on the fuel can be found in the operating instructions in the section entitled “Permitted fuels”

Boiler data for planning the flue gas system

Description		LM 750	LM 1500
Flue gas temperature at nominal load / partial load	°C	220 / 160	
Draught requirement at ID fan outlet at nominal load / partial load	Pa	5 / 2	
	mbar	0.05 / 0.02	
CO_2- volume concentration at nominal load / partial load	%	10.3 / 10.3	
Flue gas mass flow with wood chip W30, 12% O_2 [2)]	m^3/h (kg/h)	4419 (3120)	8838 (6240)
Flue gas mass flow with wood chips W30, 9% O_2	m^3/h (kg/h)	3143 (2214)	6285 (4428)
Recommended maximum chimney draught	Pa	60	
	mbar	0.6	

5 Installation

⚠ WARNING

Risk of falling when working at a height

Therefore:

❒ Implement appropriate measures in accordance with the applicable national industrial safety guidelines to protect against the risk of falling (e.g. ladders, platforms, etc.)

5.1 Transport

NOTICE

Possibility of damage to components if handled incorrectly

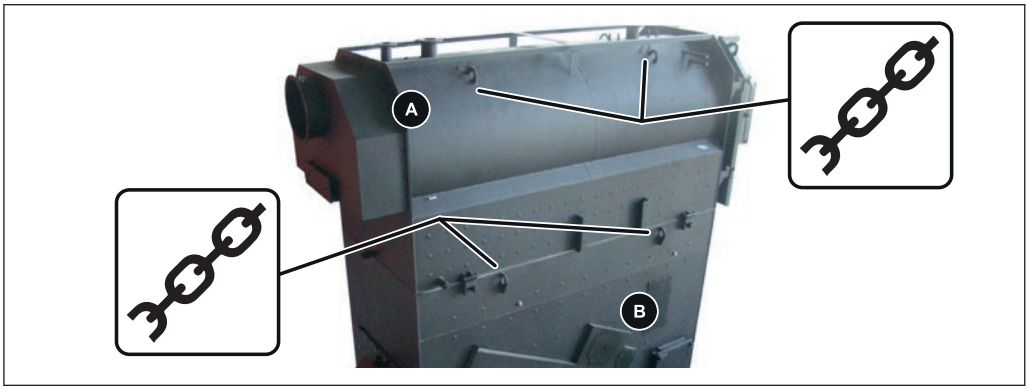
❒ Follow the transport instructions on the packaging
❒ Transport components with care to avoid damage
❒ Protect components against damp
❒ Unloading, positioning and installation should only be performed by trained professionals! Staff must be trained in techniques for moving heavy loads (correct tools and lifting equipment, hooking and slinging points, etc.)

5.2 Temporary storage

If the system is to be assembled at a later stage:

❒ Store components at a protected location, which is dry and free from dust
  ➥ Damp conditions and frost can damage components, particularly electric ones!

5.3 Positioning



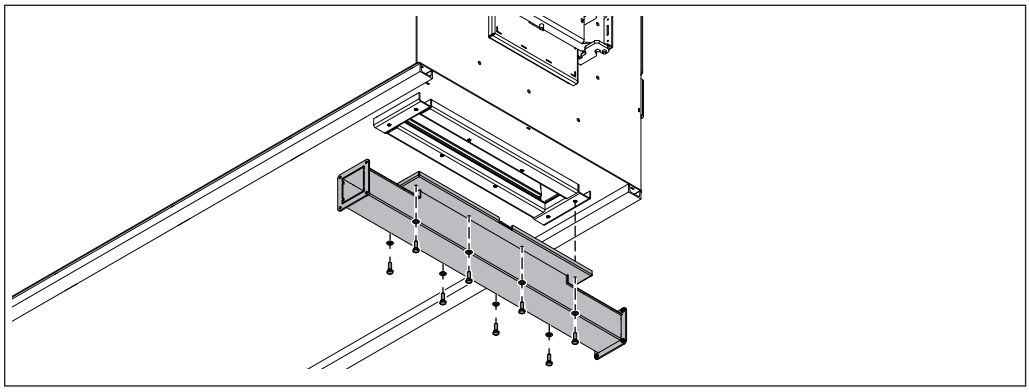
❒ Secure cable winch or similar lifting device to the attachment points on the heat exchanger (A) and the combustion chamber (B) and position the components.

5.3.1 Fit the ash duct for ash removal of the combustion chamber (only with Lambdamat 750).

NOTICE! If ash is to be removed from the boiler via an ash screw, a base must be provided by the customer beneath the boiler.

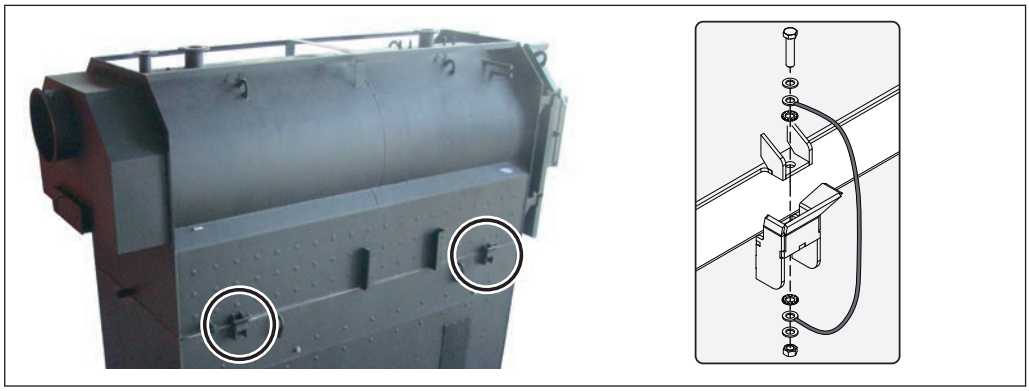
⇨ See "Dimensions" [page 14]

If an ash screw (optional) is provided for removing ash from the combustion chamber, the ash duct should be fitted as follows when the combustion chamber is being positioned.



❒ Fit the ash duct to the underside of the combustion chamber.

5.3.2 Bolting together the combustion chamber and heat exchanger



❒ Position the heat exchanger on the centre of the combustion chamber and secure to the combustion chamber with 4x screws and nuts.

➥ Also screw on the earthing wire (supplied) with the toothed washer as potential equalisation.

5.4 Setting up in the boiler room

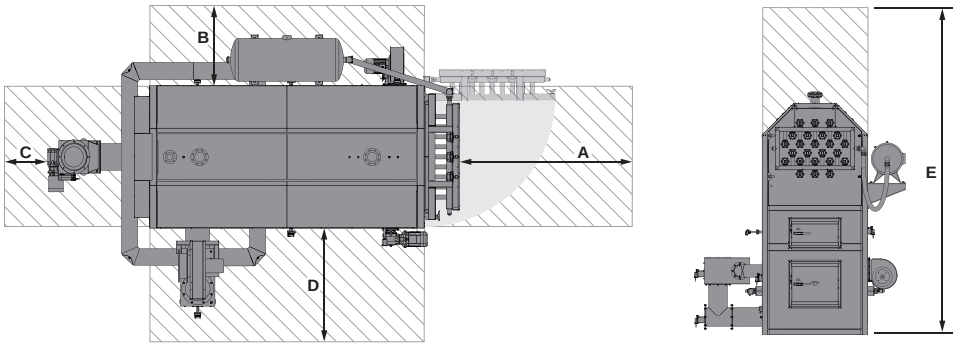
5.4.1 Moving the boiler in the boiler room

❒ Position a lifting device with a suitable load-bearing capacity at the base frame.
❒ Lift and transport to the intended position in the installation room.
➥ Observe the minimum distances in the boiler room.

5.4.2 Operating and maintenance areas of the equipment

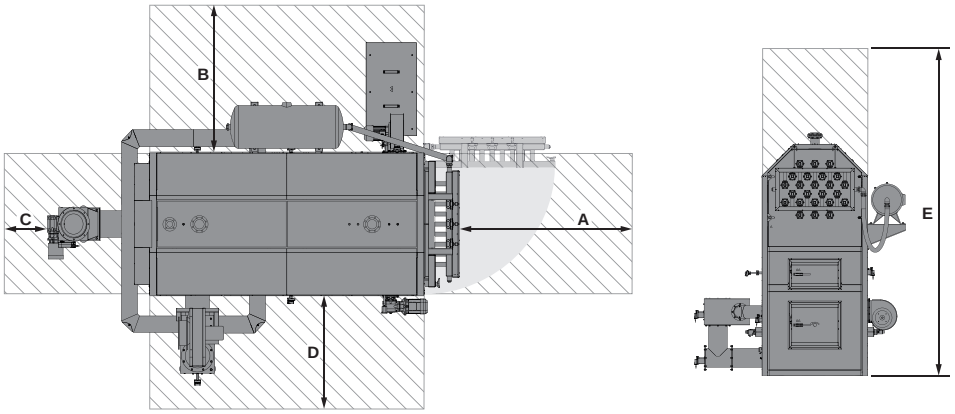
- The system should generally be set up so that it is accessible from all sides allowing quick and easy maintenance.
- Regional regulations regarding necessary maintenance areas for inspecting the chimney should be observed in addition to the specified distances!
- Observe the applicable standards and regulations when setting up the system.
- Observe additional standards for noise protection!
(ÖNORM H 5190 - Noise protection measures)

Lambdamat without ash box/ash screw



Item	LM 750	LM 1500
A	2800 mm	3700 mm
B	900 mm	
C	500 mm	
D	1500 mm	
E	3800 mm	4900 mm

Lambdamat with ash box/ash screw



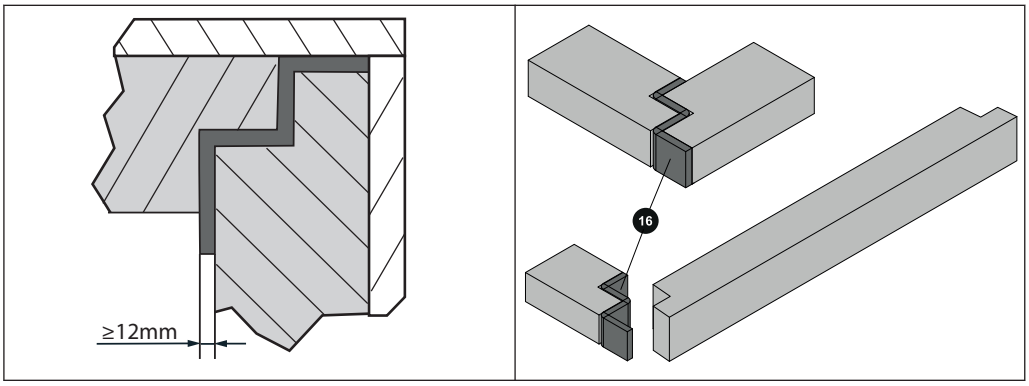
Item	LM 750	LM 1500
A	2800 mm	3700 mm
B	1500 mm (2100 mm)[1)]	
C	500 mm	
D	2100 mm (1500 mm)[1)]	
E	3800 mm	4900 mm

1. The side of the boiler on which the ash screw is pulled out for maintenance (B or D) should be positioned at least 2100 mm from the wall so that the ash screw can be pulled the whole way out.

5.5 Laying firebricks in the combustion chamber

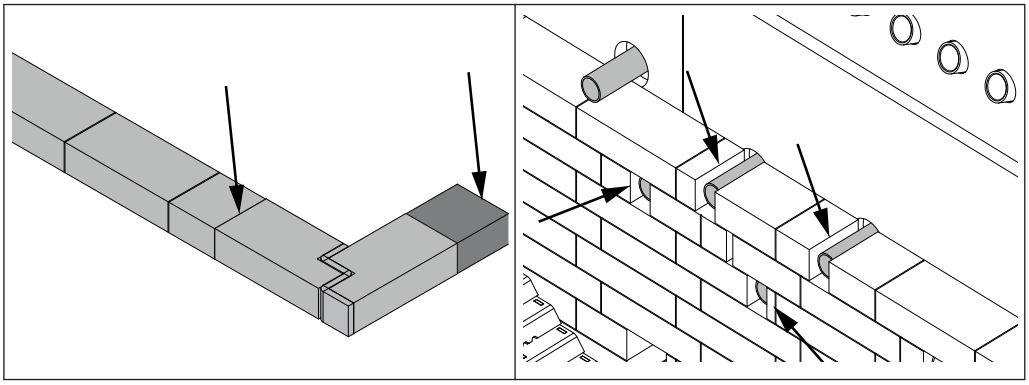
5.5.1 General

Use Carathin K65-2 mortar where normal bricks and expansion joint bricks of AK60 quality are being laid.



NOTICE! Caution: Expansion joints must be at least 12mm wide.

NOTICE! Ceramic fibre mats (16) must always be placed between expansion joint bricks and crossbars / between two expansion joint bricks.

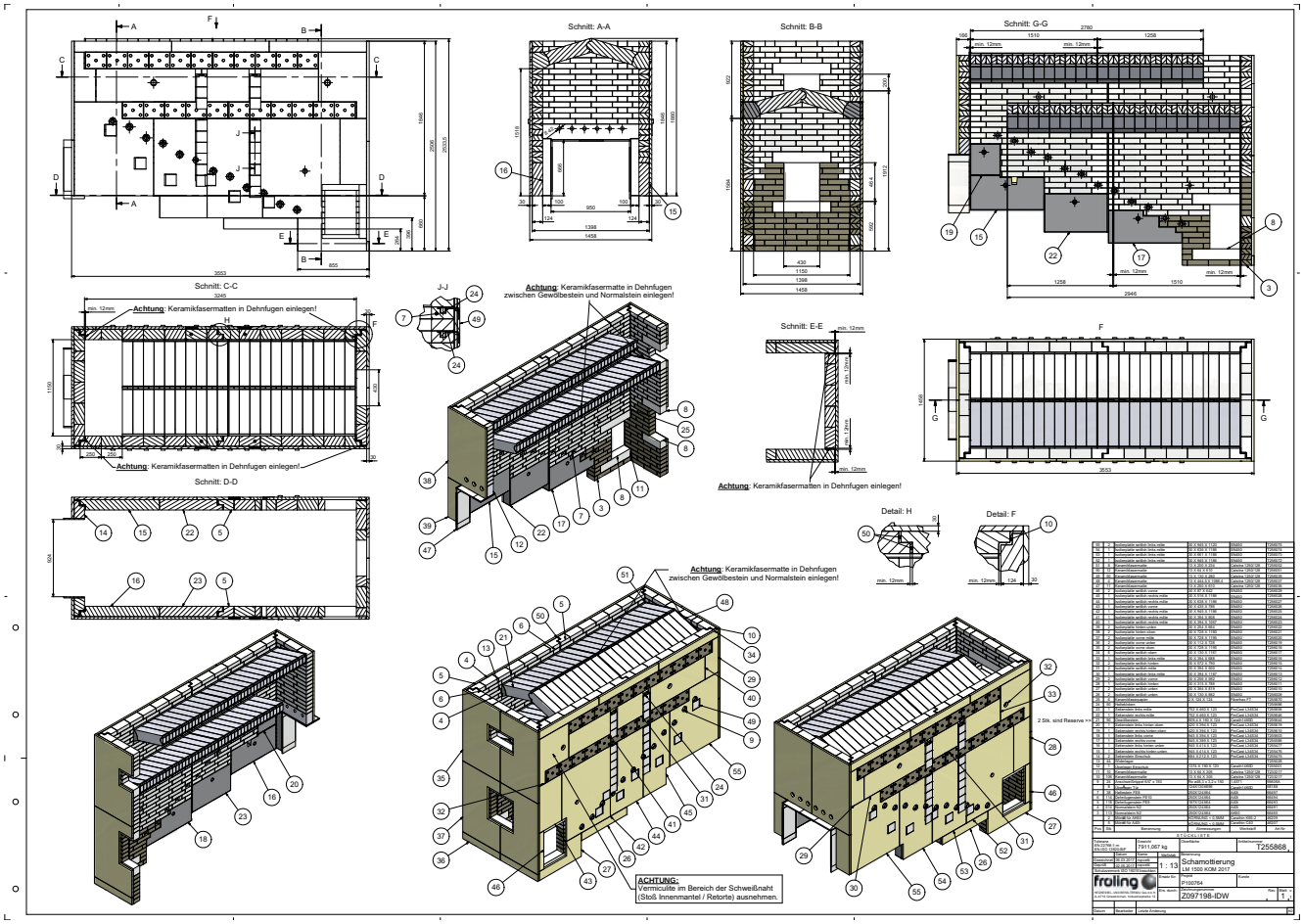


❒ Shorten the length of normal bricks as required.

❒ Recess and, if necessary, shorten the length and/or height of normal bricks in places where air nozzles, the combustion chamber temperature sensor, combustion chamber low pressure warning device and the automatic ignition are positioned.

5.5.2 Laying firebricks

The included fireclay diagram shows the exact layout of all firebricks, ceramic fibre mats and insulating panels. For the sake of simplicity, all normal bricks and expansion joint bricks of AK60 quality appear slightly darker in the fireclay diagram.



5.6 Installing the boiler

5.6.1 General information

NOTICE

Reduction in performance due to air leakage

The use of flanges without sealing cords can result in a reduction in performance due to air leakage

Therefore:

❒ Sealing cords or the surface sealant provided must be used on all the flanged connections on the following components: loading; ash removal; pressure ducting; air ducts; combustion air fan; flue gas and flue gas return piping.

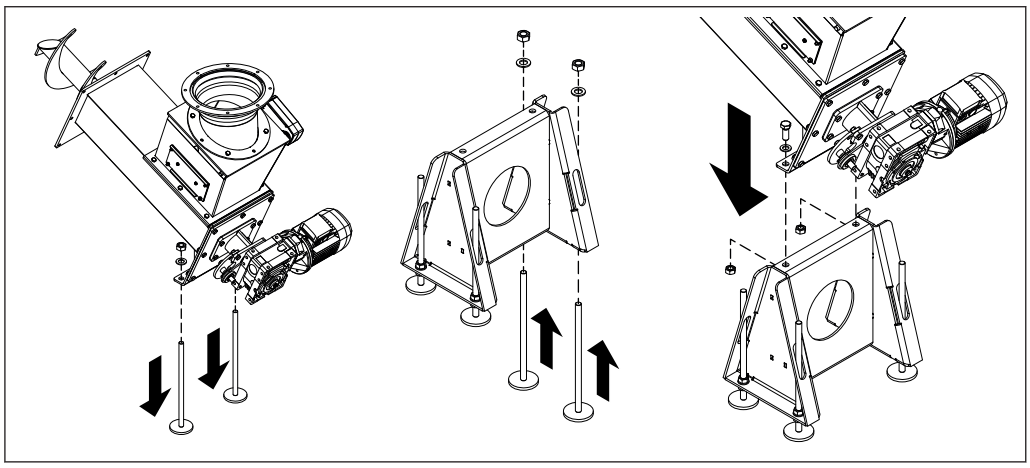
Front and back of boiler

The front of the boiler is its operating side. All the elements required to operate the system such as the combustion chamber door, burning chamber door and reversing chamber door are on the front.

The back of the boiler is opposite the front. The stoker unit and the flue gas system are on the back of the boiler.

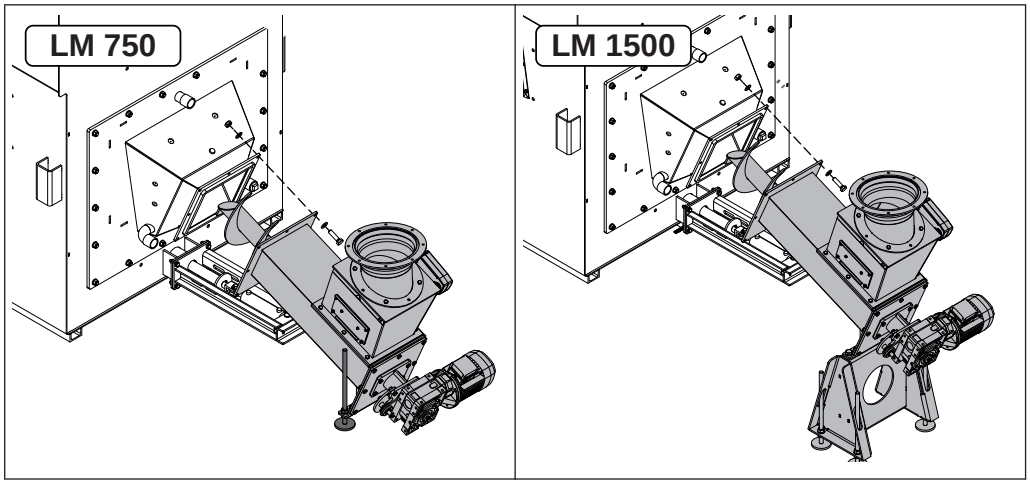
5.6.2 Installing the stoker unit

For LM 1500 only:



❒ Undo the adjustable feet on the stoker unit and fit to the support provided instead.

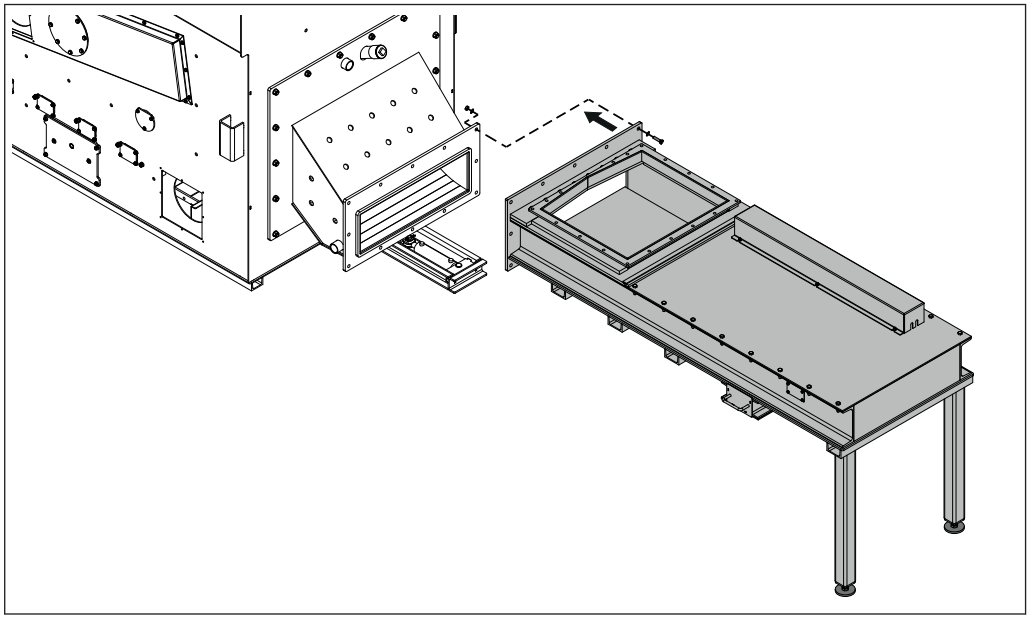
❒ Screw the stoker unit and support together.



❒ Fit the stoker unit to slide-on duct.
❒ Align the whole stoker unit using the adjustable feet.

❒ Fit the discharge system (feed screw, etc.) according to the installation instructions enclosed.

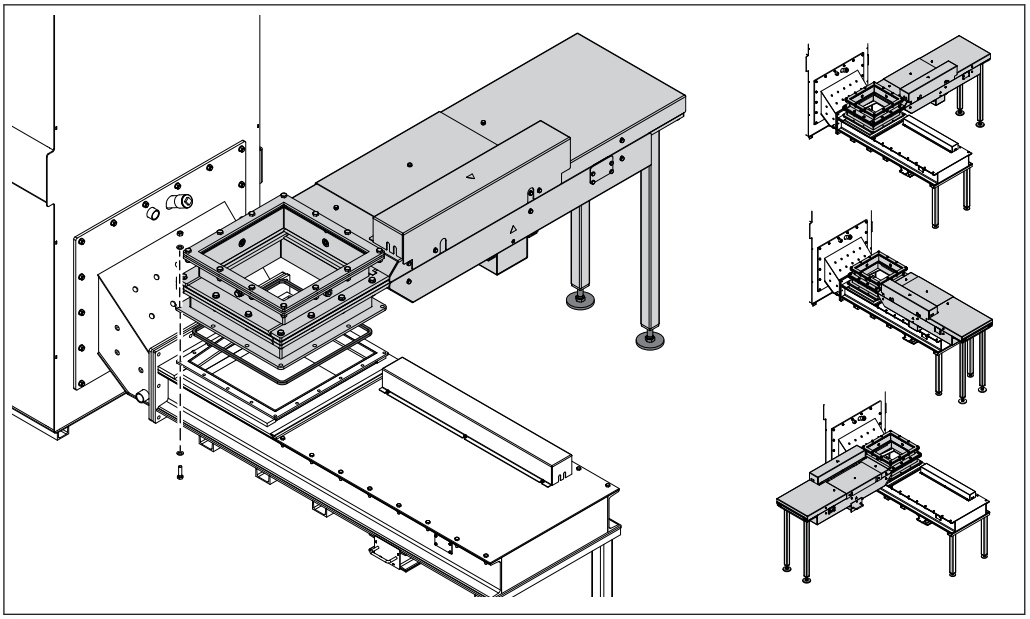
5.6.3 Installing the hydraulic stoker unit



❒ Fit hydraulic stoker unit to slide-on duct.
❒ Align the entire stoker unit with the adjustable feet.

5.6.4 Fitting the burn back slide valve

The burn back slide valve can be positioned as shown below depending on the space available in the installation room – follow the installation diagram!

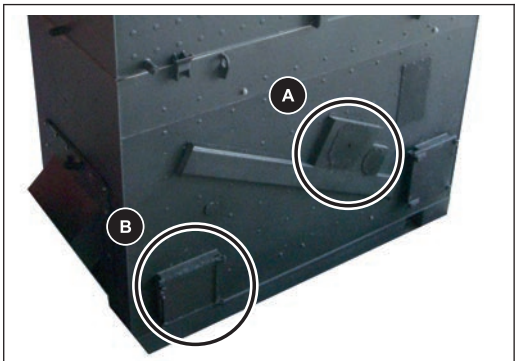


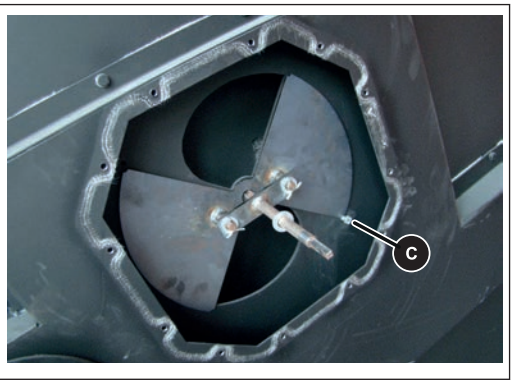
❒ Fit the burn back slide valve with seal to the hydraulic stoker.

❒ Align the burn back slide valve using the adjustable feet.

❒ Fit the discharge (feed screw, etc.) according to the installation instructions enclosed.

5.6.5 Installing the air controllers





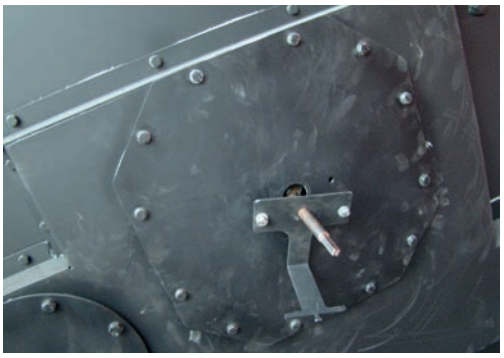
❒ Remove the blanking plate from the two secondary air boxes (A) and the primary air box (B).

❒ Insert the air damper in the air box.

➥ Short air damper shaft: secondary air box (A)

➥ Long air damper shaft: primary air box (B)

❒ Screw the stop screw (C) into the air boxes so that the air damper touches the thread.

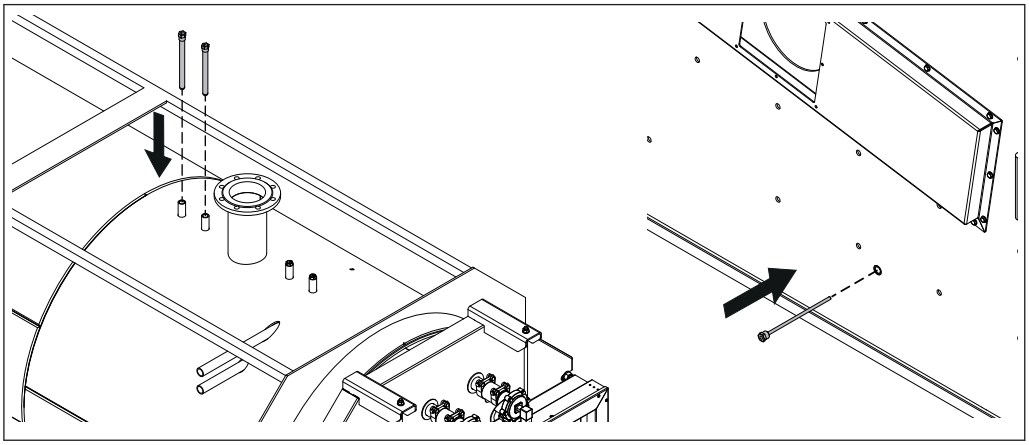


❒ Re-fit the blanking plate to the air boxes.

❒ Fit the torque supports to the air damper shafts.

❒ Remove the blanking plate and replace it with the pipe with seal (A).

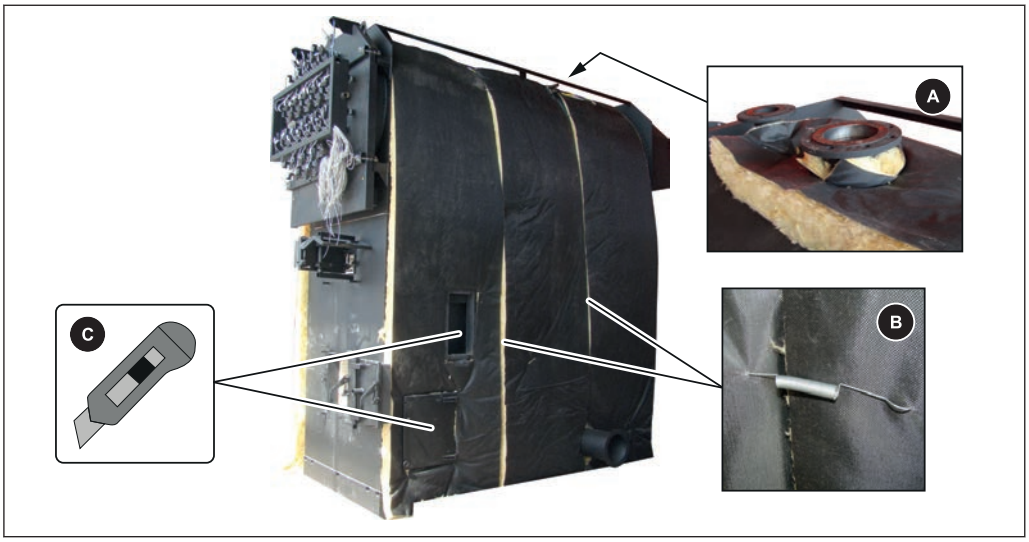
5.6.6 Fitting the immersion sleeves for the thermal discharge valve and undergrate sensor



❒ Seal the immersion sleeves for the thermal discharge valve in top of heat exchanger.

❒ Seal the immersion sleeve for the undergrate sensor on the same side of the boiler as the combustion air fan.

5.6.7 Fitting thermal insulation to the boiler

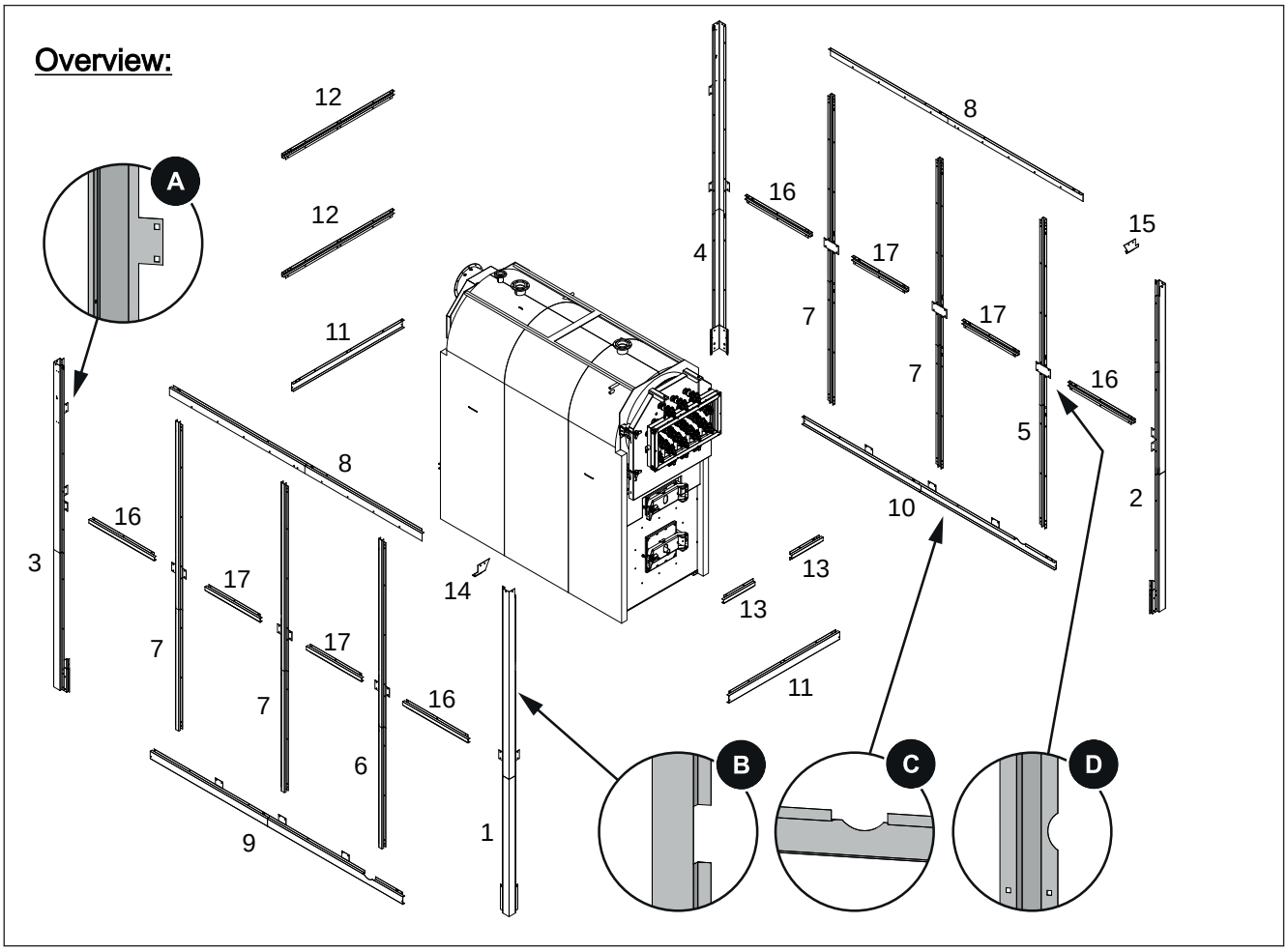


❒ Fit the thermal insulation to the left and right of the boiler, cutting it out at the connections (A).

➥ Secure the thermal insulation with tension springs (B).

❒ Cut out the thermal insulation at all the necessary places (C) (doors, torque supports, openings, etc.).

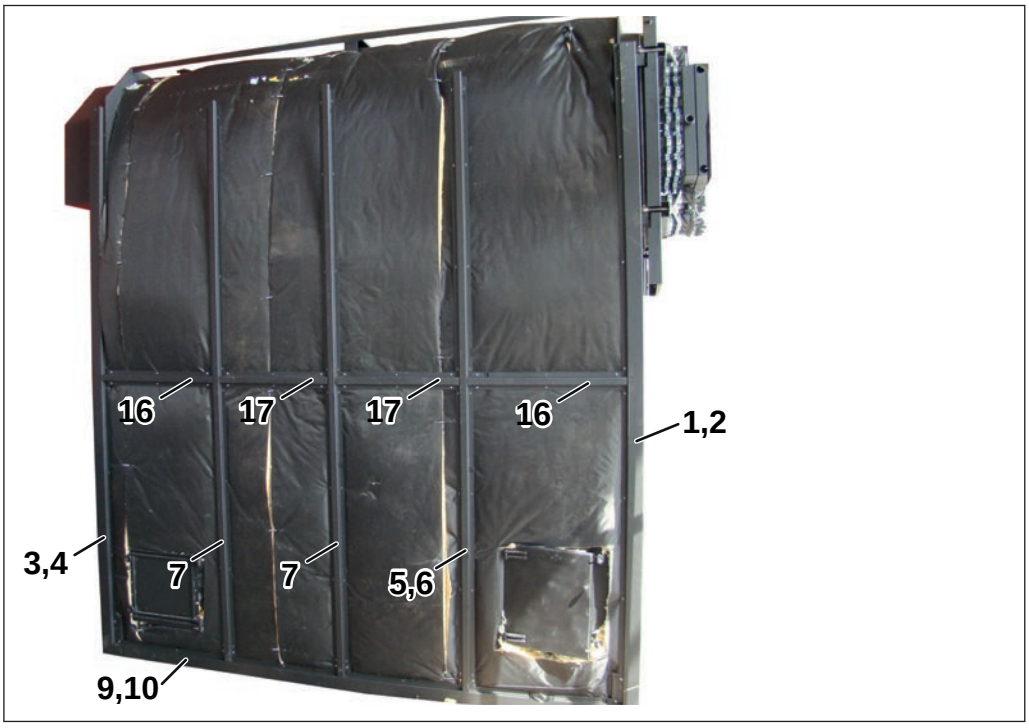
5.6.8 Fitting the insulation base frame



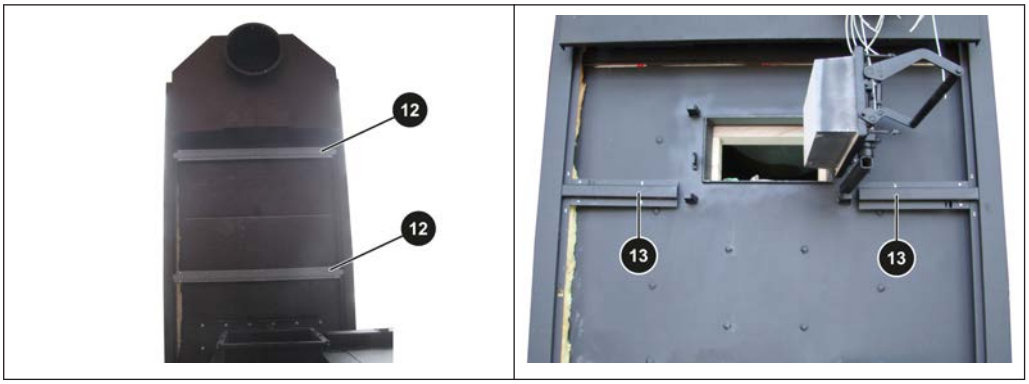
1	Front left corner rod	L = 4158 mm	**10**	Bottom right lengthways strut	L = 3733 mm
2	Front right corner rod	L = 4158 mm	**11**	Bottom cross-piece	L = 1638 mm
3	Back left corner rod	L = 4158 mm	**12**	Top cross-piece	L = 1638 mm
4	Back right corner rod	L = 4158 mm	**13**	Carrier pieces, short	L = 463 mm
5	Front central rods	L = 3954 mm	**14**	Left attachment panel	
6	Front left central rods	L = 3954 mm	**15**	Right attachment panel	
7	Back central rods	L = 3954 mm	**16**	Long lengthways strut	L = 968 mm
8	Top lengthways strut	L = 3733 mm	**17**	Short lengthways strut	L = 817 mm
9	Bottom lengthways strut	L = 3733 mm			

All frame elements feature the position number from the overview so that all parts can be clearly identified.

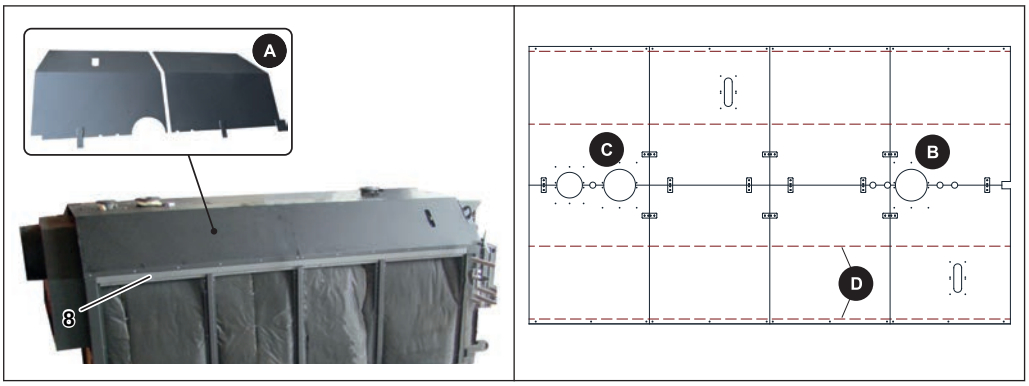
❒ Position the four corner rods (1-4) on the boiler.
  ➥ **Distinctive feature:** the front ones have a cut-out for ring bolts (B), the back ones have extra lugs (A) – see overview.
❒ Join the corner rods (1-4) to the bottom cross-piece (11) at the front and back of the boiler.



❒ Join the front corner rods (1-2) and back corner rods (3-4) to the bottom lengthways strut (9, 10).
  ➥ Note the semi-circular cut-out (C) for the ash removal screw – see overview.
❒ Fit the front central rod (5, 6) and the two back central rods (7) to the bottom lengthways strut (9, 10).
  ➥ Note the semi-circular cut-out (D) on the front central rod (5, 6) – see overview.
❒ Join the corner rods (1-4) and central rods (5, 6, 7) to the side lengthways struts (16, 17).
  ➥ Long lengthways strut (16): front and back
  ➥ Short lengthways strut (17): middle



❒ Fit the top two cross-pieces (12) to the back of the boiler.
❒ Fit the short cross-pieces (13) to the corner rods (1, 2).



❒ Fit the lengthways strut (8) to the corner rods and the central rods.
❒ Place eight top cover plates (A) on the boiler as shown in the diagram and secure to the lengthways strut (8).

Note the layout:

- Flow (B) and return (C) opening
- Dotted lines (D) indicate 45° angled parts

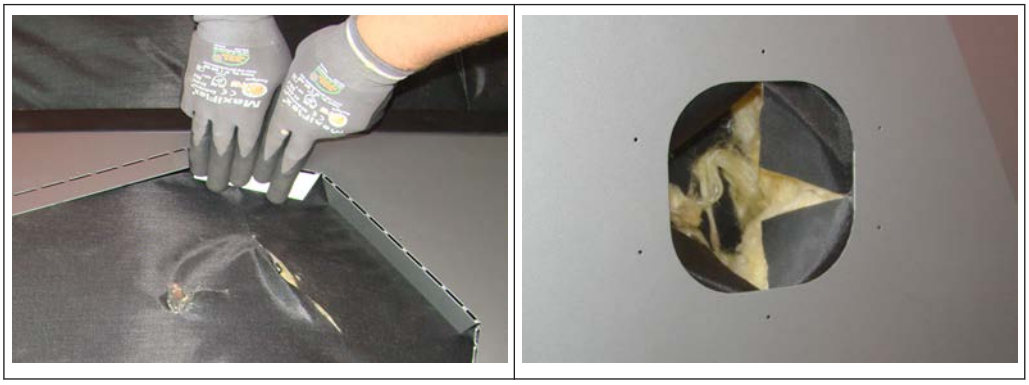
5.6.9 Fitting the side panels

Use the supplied countersunk head screws with slit and cup washers to fit the side panels.

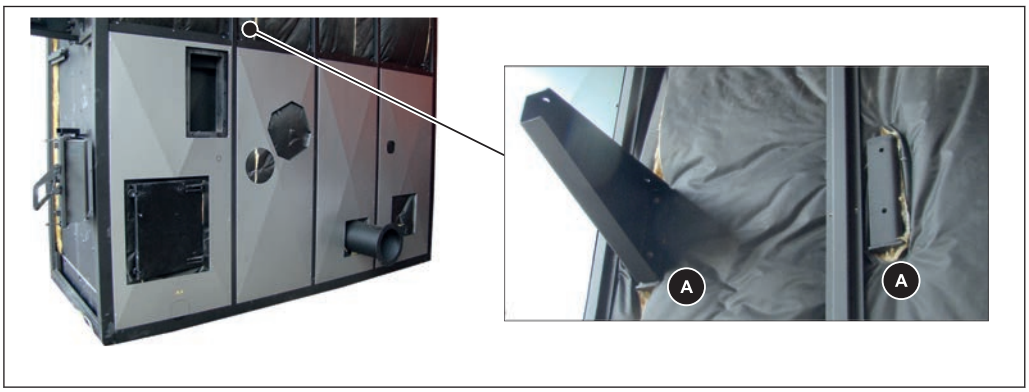
NOTICE! Only hand-tighten screws to avoid damage and deformation to the side panels!

❒ Cut out all the pre-cut perforations required for the boiler on the side panels.

❒ Fit the side panels as shown to the left and right-hand side of the boiler.



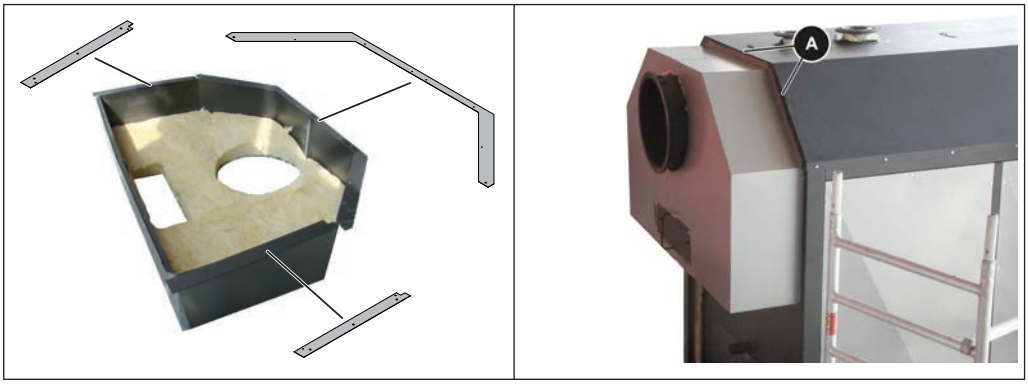
❒ Bend the pre-cut flaps 90° inwards by hand.
❒ Cut out the thermal insulation at the perforations for the automatic ignition.



❒ Fit the brackets of the compressed air tank to the heat exchanger (A).
↪ These are fitted to the stop side of the reversing chamber door.

❒ Take out the perforations for the brackets and remove the burrs using a half-round file.

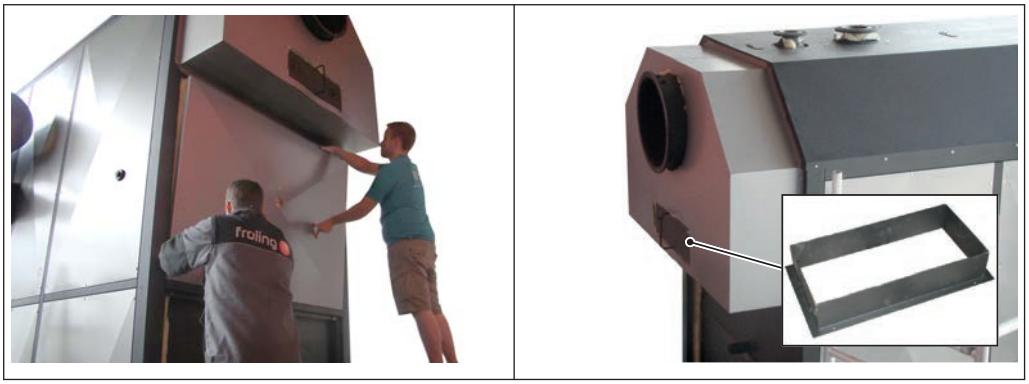
❒ Fit the side panels as shown to the left and right-hand side of the boiler.



❒ Fit the frame sections to the flue gas chamber insulation as shown.

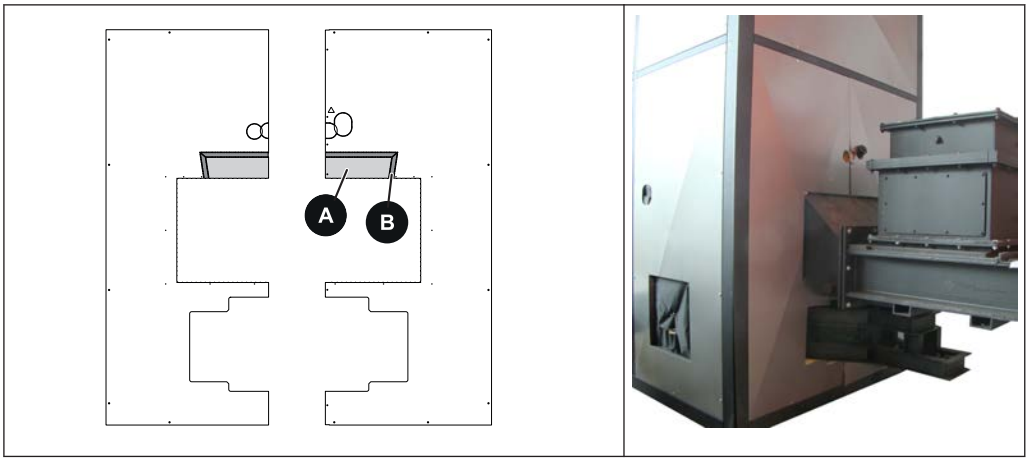
❒ Fit the flue gas chamber insulation to the side of the corner rods and beneath the cross-piece.

❒ Weld the insulation to the top cover plates (A).



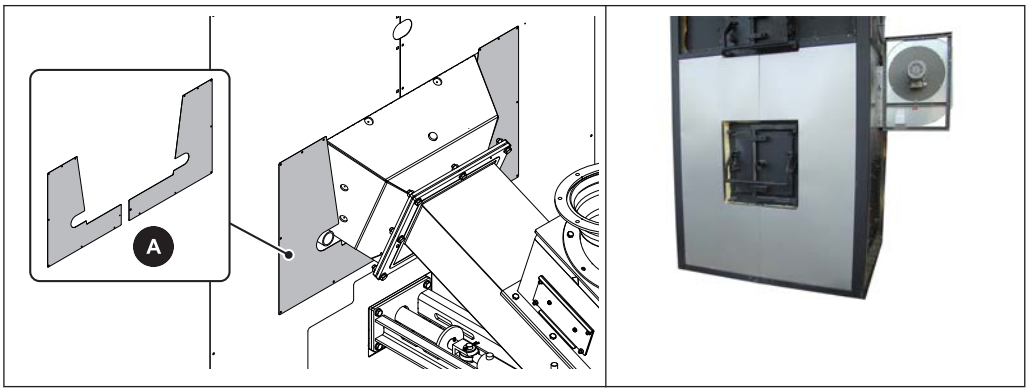
❒ Fit the back panel below the flue gas chamber.

❒ Fit the door frame to the cleaning door.



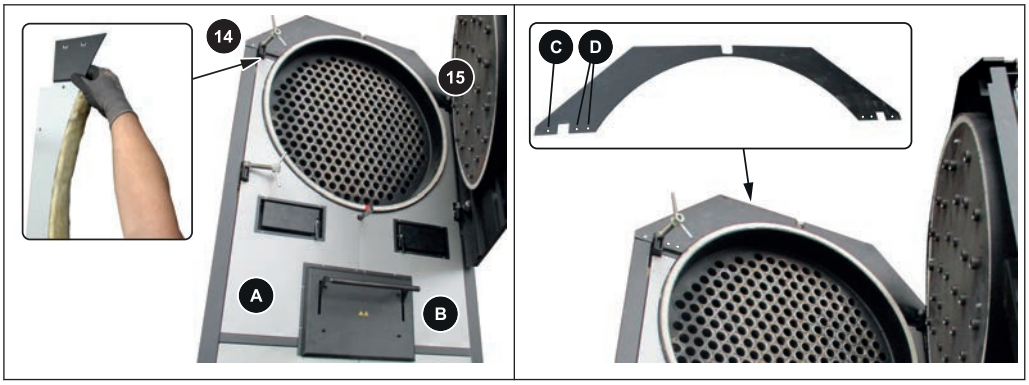
❒ **For stoker unit with screw:** Cut out the perforation (A) on the back panels and tilt the parts angled by hand (B) back 90°.

❒ Insert and fit the two back panels on the stoker.



❒ **For stoker unit with screw:** fit the cover plates (A) to the left and right of the stoker duct.

❒ Fit the two front panels to the frame.



❒ Secure the attachment panel (14, 15) to the left (A) and right (B) front part and fit the front parts to the frame as shown.

➥ Lift the door handles of the cleaning doors for easier assembly.

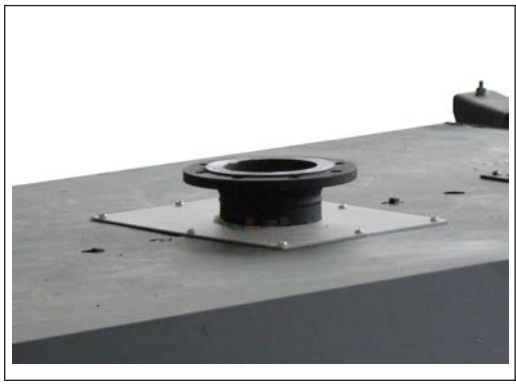
❒ Secure the cover plate to the top left and right of the heat exchanger.

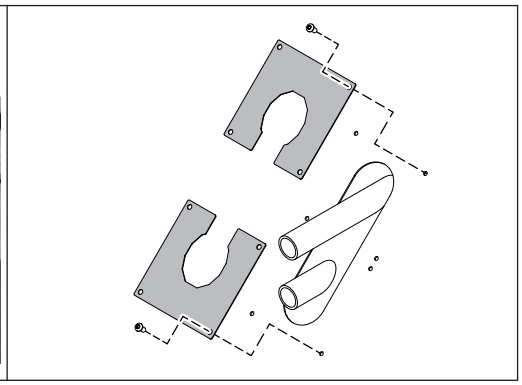
➥ C: 1x to frame

➥ D: 2x to attachment panel

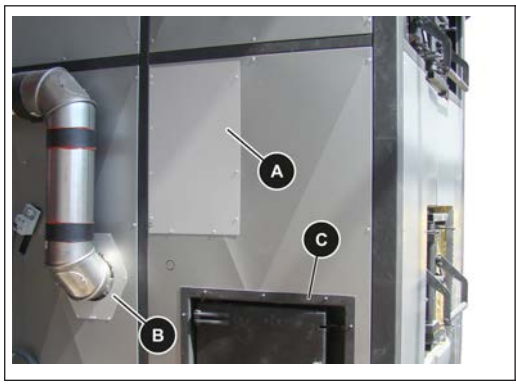
❒ Weld the cover plate to the top cover plates.

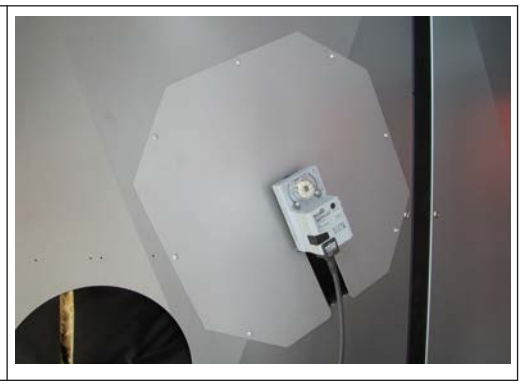
5.6.10 Fitting various covers





❒ Fit the covers to the flow and return connection and to the safety valve connection.
❒ Fit the covers to the two safety batteries.





Fit all the covers:

❒ Supply air box (A)
❒ Entire FGR piping (B)
❒ Door frame (C)
❒ Primary air and two secondary air dampers

5.6.11 Fitting the door contact switch

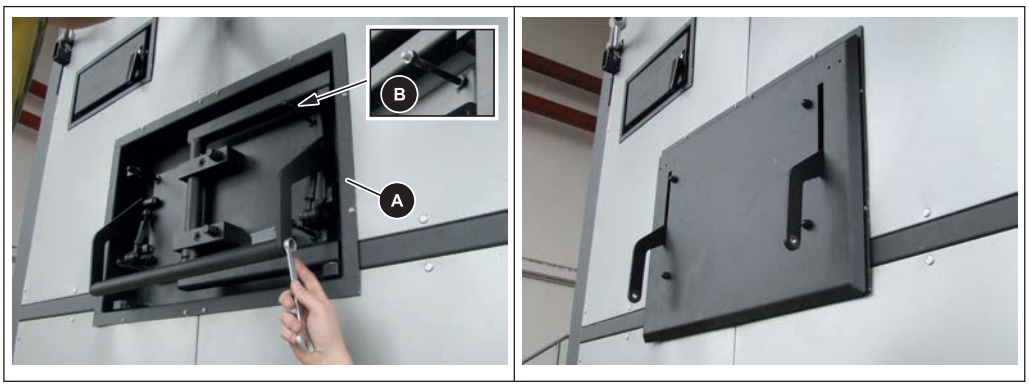
Before fitting the insulation panels, check that the tunnel door and the combustion chamber door are tight as explained below.

- ❒ Open the door.
- ❒ Insert a sheet of paper at both the top and the bottom between the door and the boiler.
- ❒ Close the door.
- ❒ Try to pull out the sheet of paper.
  - ➥ If the paper cannot be removed: door is tightly sealed.
  - ➥ If the paper can be removed: door is not sealed – adjust the closing mechanism.

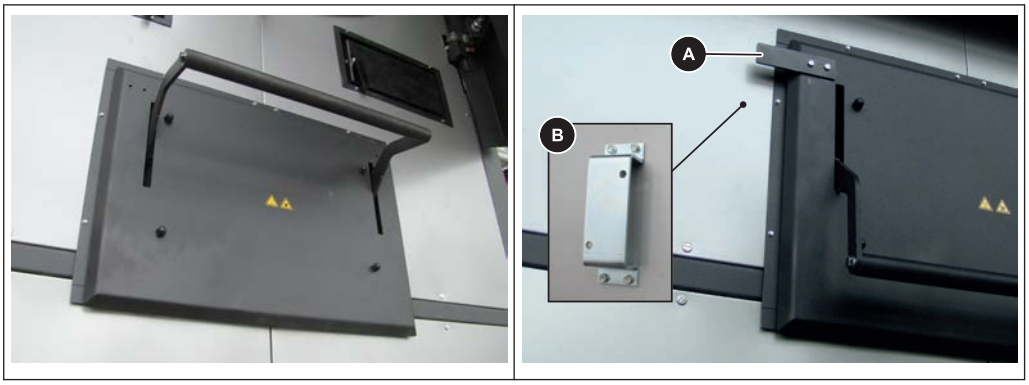
Adjusting the seal:

- ❒ Undo the lock nut (A).
- ❒ Adjust the closing force by turning the top nut (B).

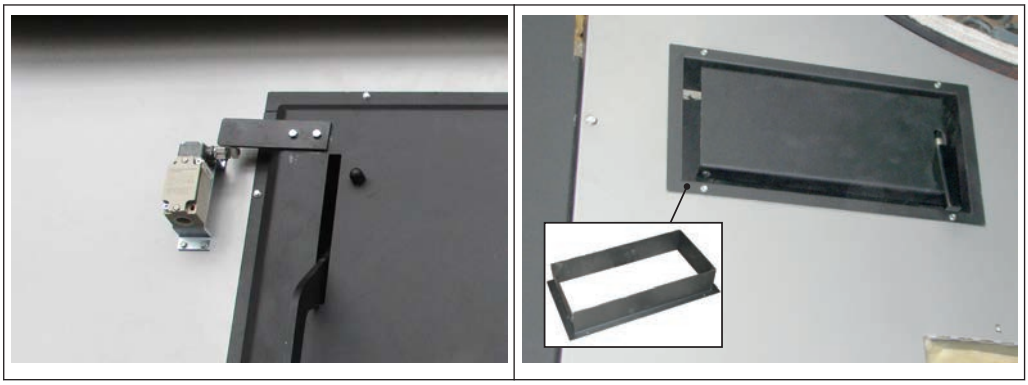
The following steps explain how to fit the door switch to the top tunnel door; fit the fittings to the bottom combustion chamber door in the same way.



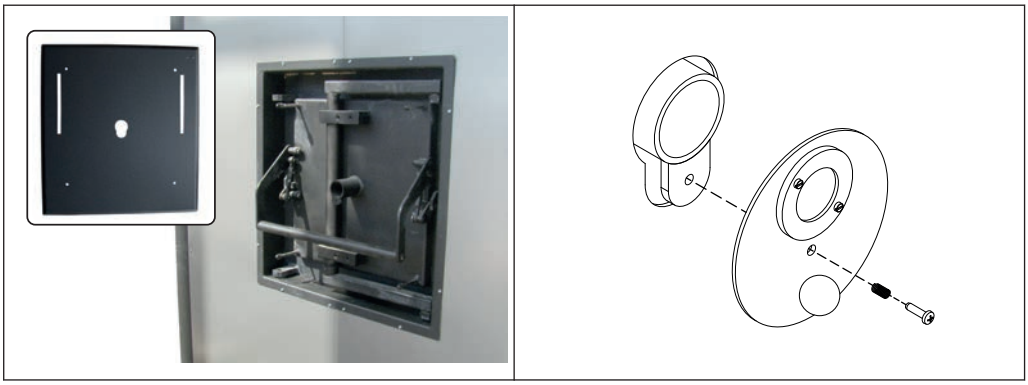
- ❒ Fit the door frame (A).
- ❒ Undo the two screws on the door handle and remove the handle.
- ❒ Undo the cap nuts (B) on the four assembly screws.
- ❒ Insert the insulation sheet at the handles and fit with lock nuts.
- ❒ Secure the insulation sheet with cap nuts.
- ❒ Replace the door handle.



❒ Stick the stickers provided (irritant, hot surface) to the centre of the insulation sheet.
❒ Fit the trigger plate (A) to the insulation sheet using two screws.
❒ Secure the mounting bracket (B) to the front part.
➥ Position the mounting bracket (B) and limit switch in such a way that the trigger plate (A) activates the limit switch.



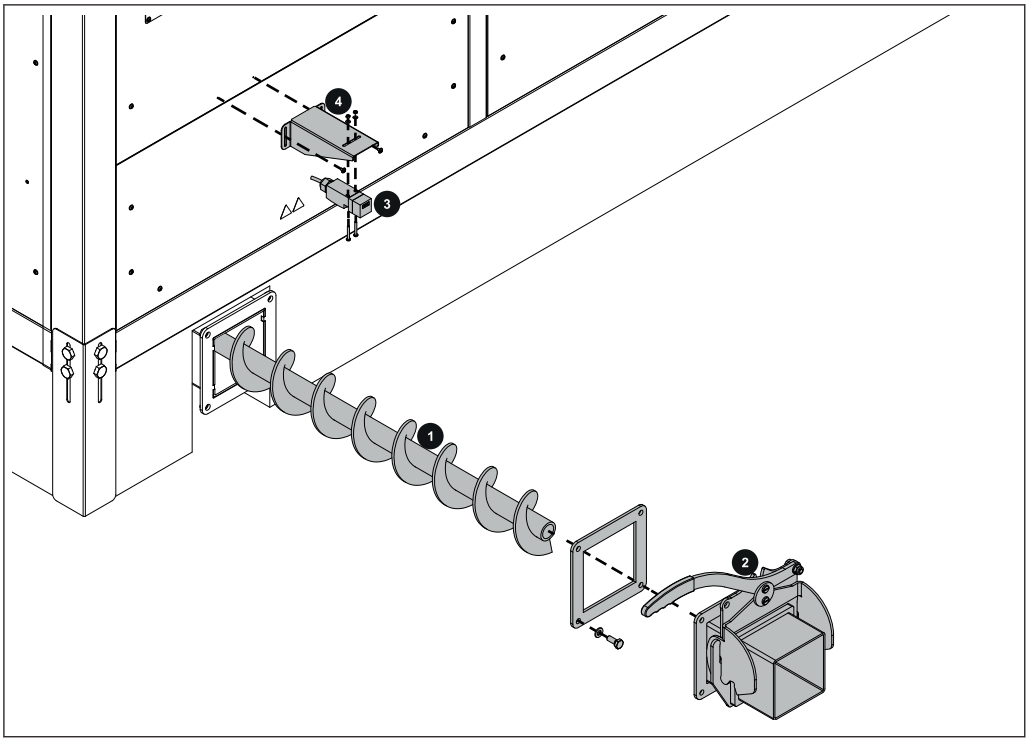
❒ Secure the limit switch to the mounting plate.
❒ Fit the door frame to the two cleaning doors.



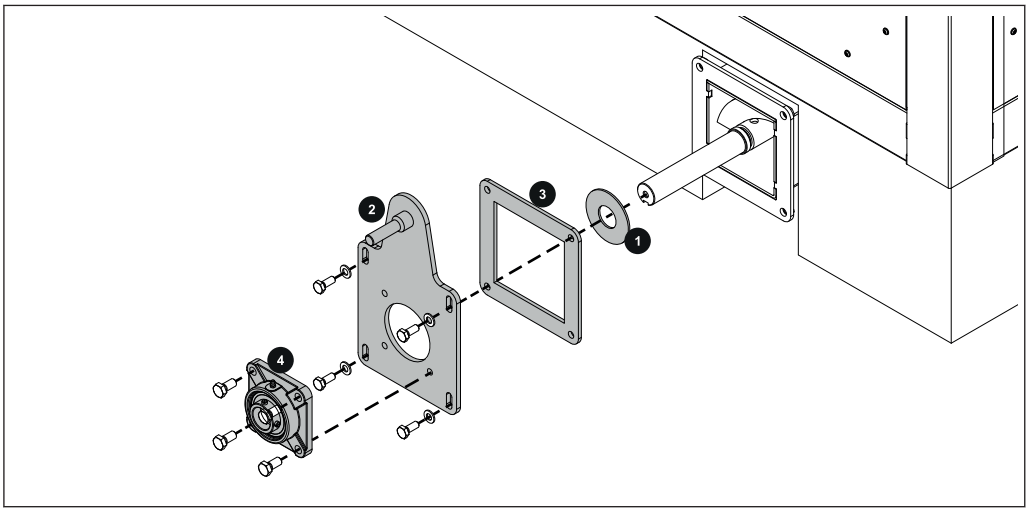
❒ Fit the insulation sheet shown above to the combustion chamber door.
❒ Fit the inspection glass and screw with spring to the combustion chamber door.

5.6.12 Fitting the combustion chamber ash removal unit (optional)

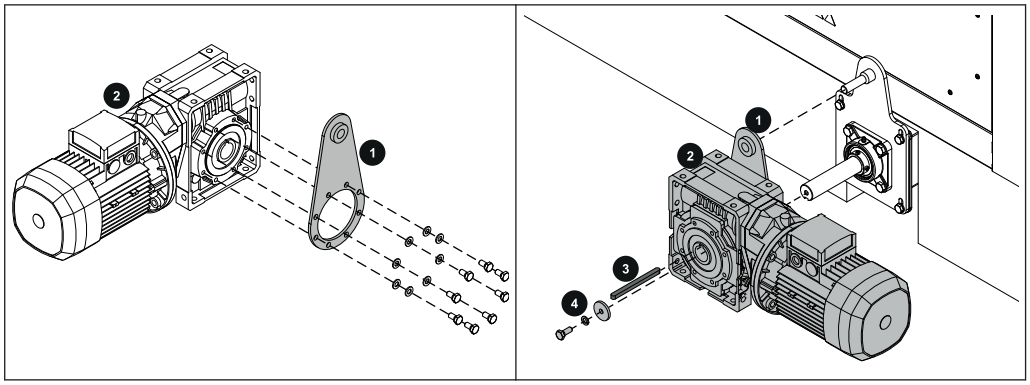
The ash container for removing ash from the combustion chamber by ash screw can be fitted to the right or left-hand side of the boiler. The following steps show how to fit it to the right-hand side of the boiler. If the ash container is to be fitted to the left, the steps are the same but on the opposite side.



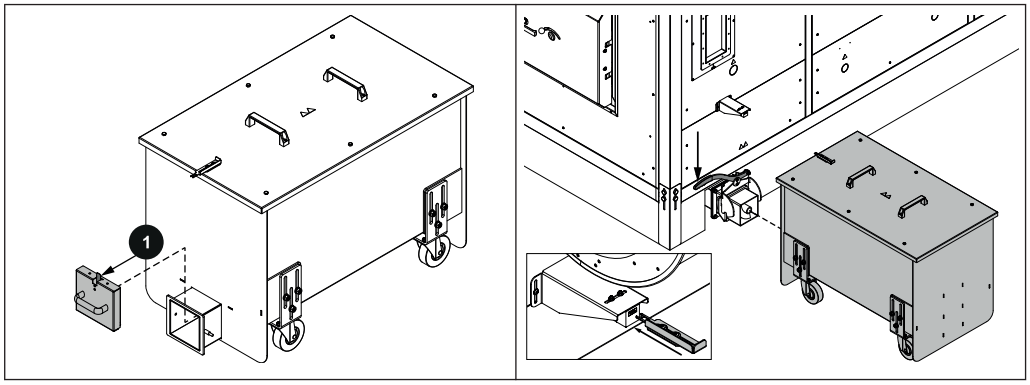
- ❒ Push the ash screw (1) into the right of the combustion chamber.
- ❒ Fit the ash removal unit flange (2) with seal to the right of the combustion chamber.
- ❒ Fit the safety switch (3) to the bracket (4).
- ❒ Fit the bracket (4) to the insulating side panel.



- ❒ On the opposite side of the combustion chamber, put the washer (1) onto the shaft stub.
- ❒ Fit the flange plate (2) with the seal (3) and the flange bearing (4).



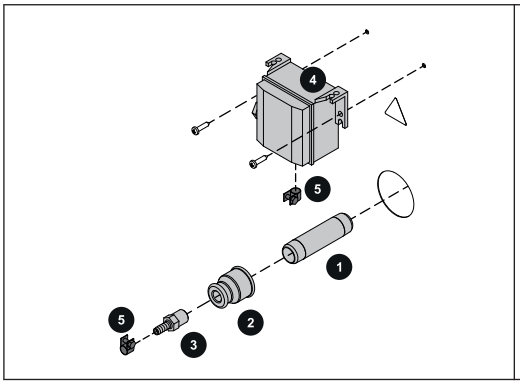
❒ Fit the torque support (1) to the geared motor (2).
❒ Fit the geared motor (2) onto the shaft stub.
➥ Ensure that the key groove in the shaft stub is aligned with the key groove in the geared motor.
❒ Slide the key (3) into the groove and fit the shaft retainer (4)



❒ Press the clamp (1) forwards and remove the cover plate of the ash cans.
➥ Store the cover plate in a suitable location where you can find it later. It will be needed when disposing of the ash.
❒ Position the ash container at the ash removal unit flange.
❒ Push the lever on the side of the ash removal unit flange downwards to lock the ash container in place.
❒ Push the key plate into the safety switch.
❒ Set the safety switch so that the key plate engages correctly.
❒ Tighten the screws on the safety switch.

5.6.13 Installing the underpressure controller

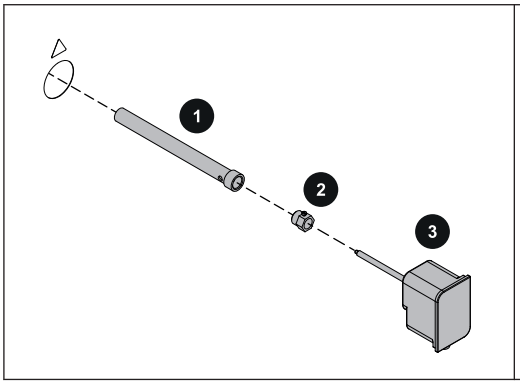
The underpressure controller should be fitted to the same side of the boiler as the FGR blower fan.

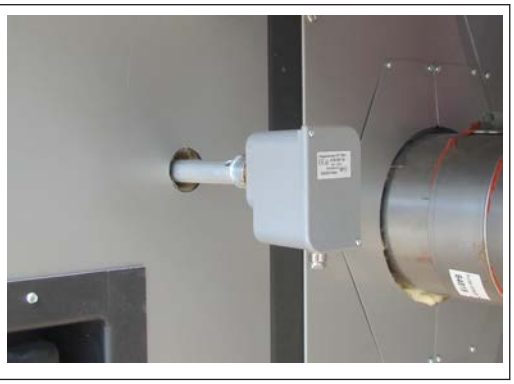


- ❒ Assemble the double thread nipple (1), reduction union (2) and hose nipple (3).
- ❒ Screw the assembled unit onto the side of the combustion chamber from which the blanking plug was previously removed.
- ❒ Fix the underpressure sensor cartridge (4) with two self-tapping screws to the side panel.
- ❒ Thread the hose clamp (5) onto the silicon hose, place on hose nipple (3) and then tighten.
- ❒ Fix the other end of the silicon hose to the "-" nipple of the underpressure sensor cartridge (4) with the hose clamp (5) and tighten.
  - ➥ Do not remove the red reduction plug!

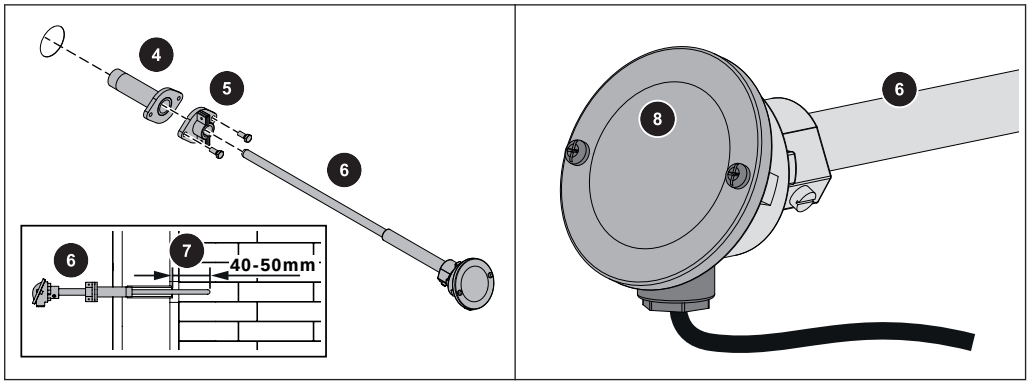
5.6.14 Installing the combustion chamber overpressure and temperature sensors

The combustion chamber overpressure monitor and combustion chamber temperature sensor should be fitted to the left-hand side of the boiler so that it is easily accessible for maintenance purposes. Two combustion chamber temperature sensors are required for the Lambdamat 1500.





- ❒ Screw in the spacer tube (1).
- ❒ Screw the brass bush (2) into the spacer tube (1).
- ❒ Push in the combustion chamber overpressure sensor (3) and slightly tighten the retaining screw.

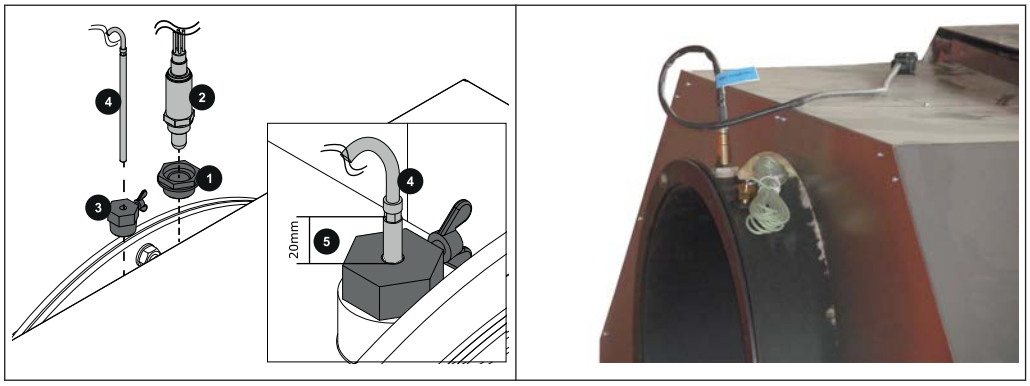


❒ Screw in the flanged pipe (4).
❒ Fit the counter flange (5).
❒ Insert the combustion chamber temperature sensor (6) so that it projects by approx. 40 - 50 mm into the combustion chamber (7).
❒ Fix in position on the counter flange with the clamping screws by hand.

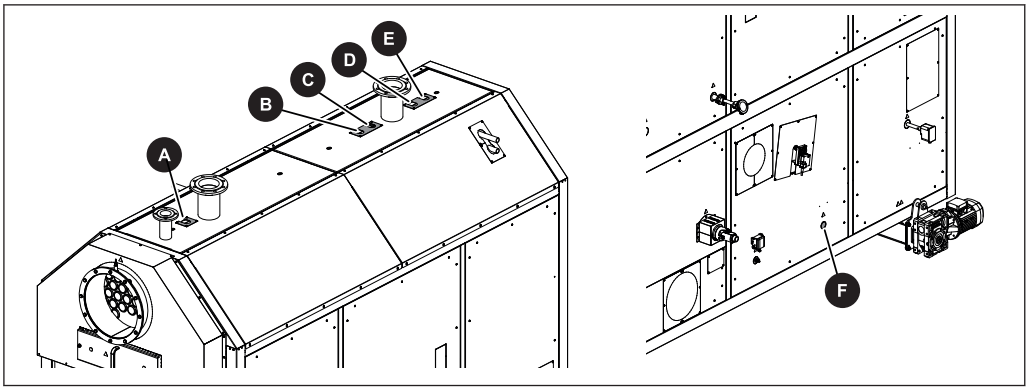
Connecting the combustion chamber temperature sensor:

❒ Unscrew the connector box cover (7). Connect up the compensating line as follows:
- green wire to the terminal with the green dot
- white wire to the unmarked terminal
- shield is not connected.

5.6.15 Fitting the Lambda probe and various sensors



❒ Screw in bushing (1) on flue gas chamber and gently tighten.
❒ Screw the Lambda probe (2) into the bushing (1) and tighten slightly using an Allen key (22 mm).
❒ Screw in the brass bush (3) for the flue gas sensor (4).
❒ Push the flue gas sensor (4) in so that approx. 20 mm is still projecting from the housing (5). Secure it in this position with the wing screw.
❒ Fit the sensor box of the Lambda probe to a suitable place on the boiler and wire according to enclosed instructions.



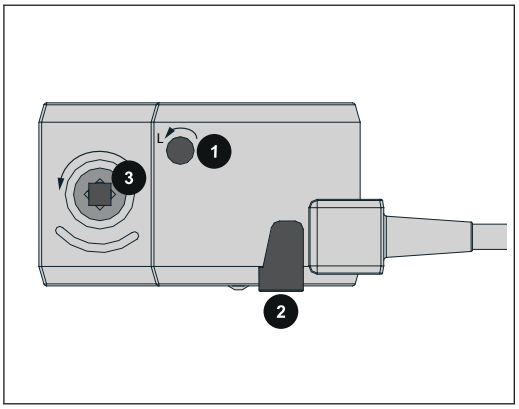
Insert the following sensors into the respective immersion sleeves:

- ❒ A: Return sensor
- ❒ B: Capillary of high-limit thermostat (STL)
- ❒ C: Sensor of thermal discharge safety device
- ❒ D: Sensor of thermal discharge safety device
- ❒ E: Boiler sensor
- ❒ F: Undergrate temperature sensor
  (on same side of boiler as combustion air fan)

- ❒ Fit STL housing to side panel using screws provided
  NOTICE! Do not link cable of STL capillary!

5.6.16 Installing the servo-motors

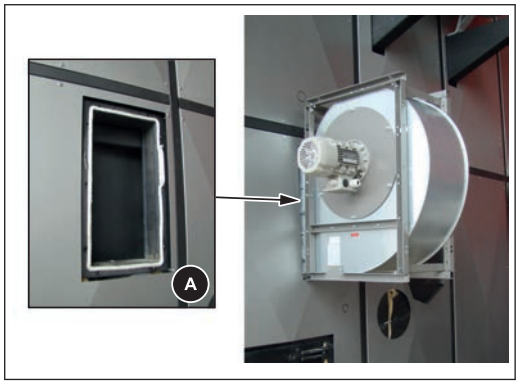
- ❒ Check that the air flaps are at the left stop.
  - ➥ All air flaps should be closed.
  - ➥ Where necessary, turn the air flaps to the left stop using pliers.



- ❒ Set the direction of rotation of the servo-motor (1) to left (L).
- ❒ Press the unlock key (2) and turn the drive for the shaft to the air duct (3) in an anti-clockwise direction as far as the stop.

❒ Plug the servo-motors for primary air and secondary air into the pneumatic rods on the side where the respective air controllers were previously fitted.
➥ Picture shows servo-motor for secondary air on right-hand side of boiler.

5.6.17 Fitting the combustion air fan

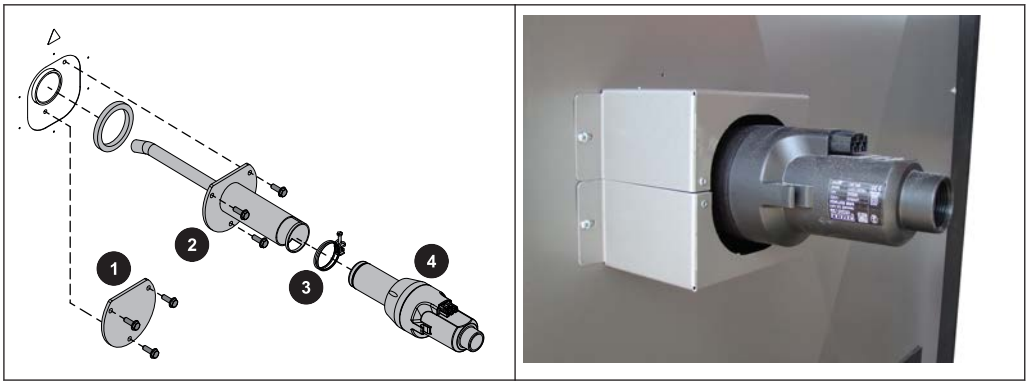


❒ Stick seal cord (A) to connection flange.
➥ The seal cord must overlap by at least 100 mm.
❒ Fit the combustion air fan to the connection flange.
❒ Fit the support provided to the combustion air fan and anchor to ground.

TIP: Fit the combustion air fan to the opposite side of the compressed air tank to make space for the switching units of the compressed air supply.

5.6.18 Fitting the automatic ignition (optional)

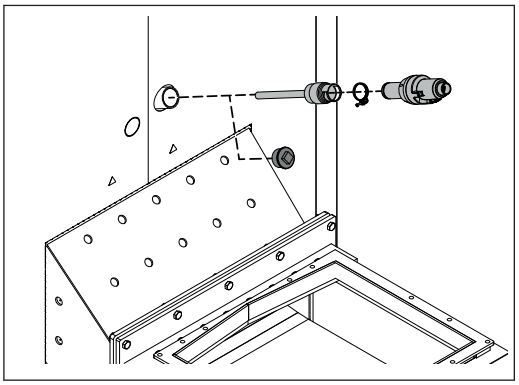
The automatic ignition is fitted to the left or right-hand side of the boiler, therefore, perform the following steps on both sides.



- ❒ Remove the blanking plate (1).
- ❒ Screw in the igniter tube (2) and seal.
- ❒ Place the double wire hose clip (3) on the igniter tube (2).
- ❒ Insert the ignition fan (4) into the igniter tube (2) and secure using the double wire hose clip (3).
- ❒ Fit the covers above and below the ignition fan.

5.6.19 Fitting an additional ignition for hydraulic stoker unit (optional)

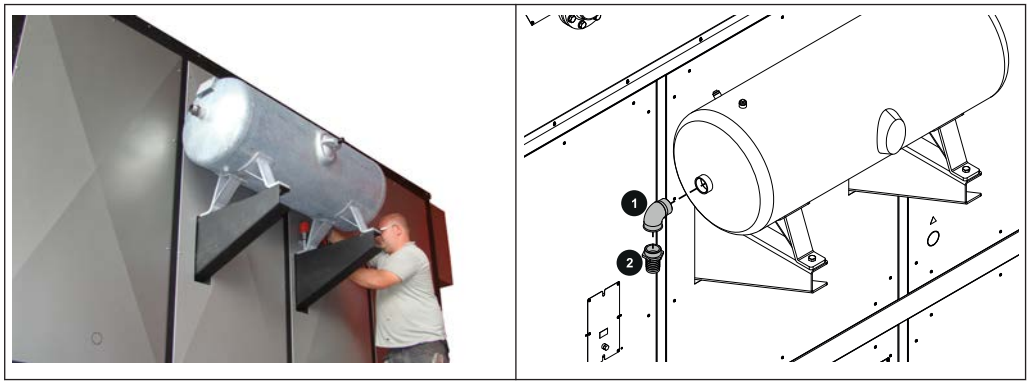
An additional ignition can be fitted to the back of the boiler if a hydraulic stoker unit is being used.



- ❒ Remove the blanking plug.
- ❒ Insert the igniter tube.
- ❒ Place the double screw clip onto the igniter tube.
- ❒ Insert the ignition fan into the igniter tube and fix in place using the double screw clip.

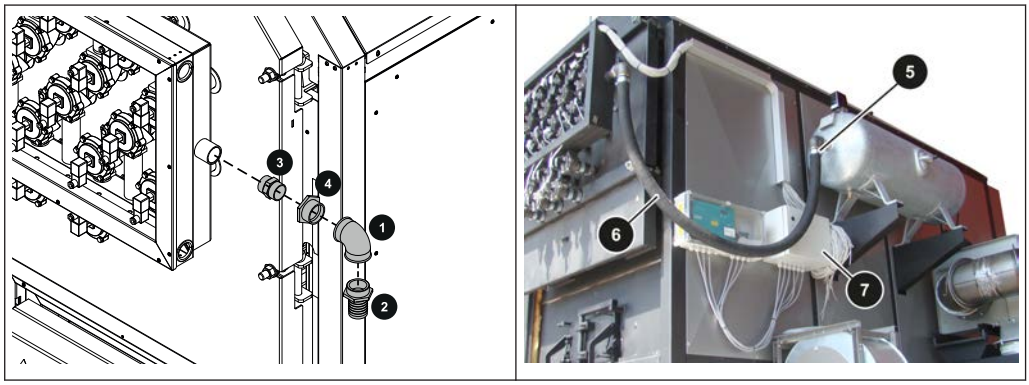
5.6.20 Fitting the compressed air cleaner (optional)

The compressed air cleaner is fitted to the stop side of the reversing chamber door. The following steps show how to fit it to the right-hand side of the boiler. The procedure for fitting it to the left-hand side is the same, just on the opposite side. The brackets have already been fitted in front of the side panels.



❒ Fit the compressed air tank to the brackets.

❒ Fit the elbow (1) and hose connection (2) to the compressed air tank.



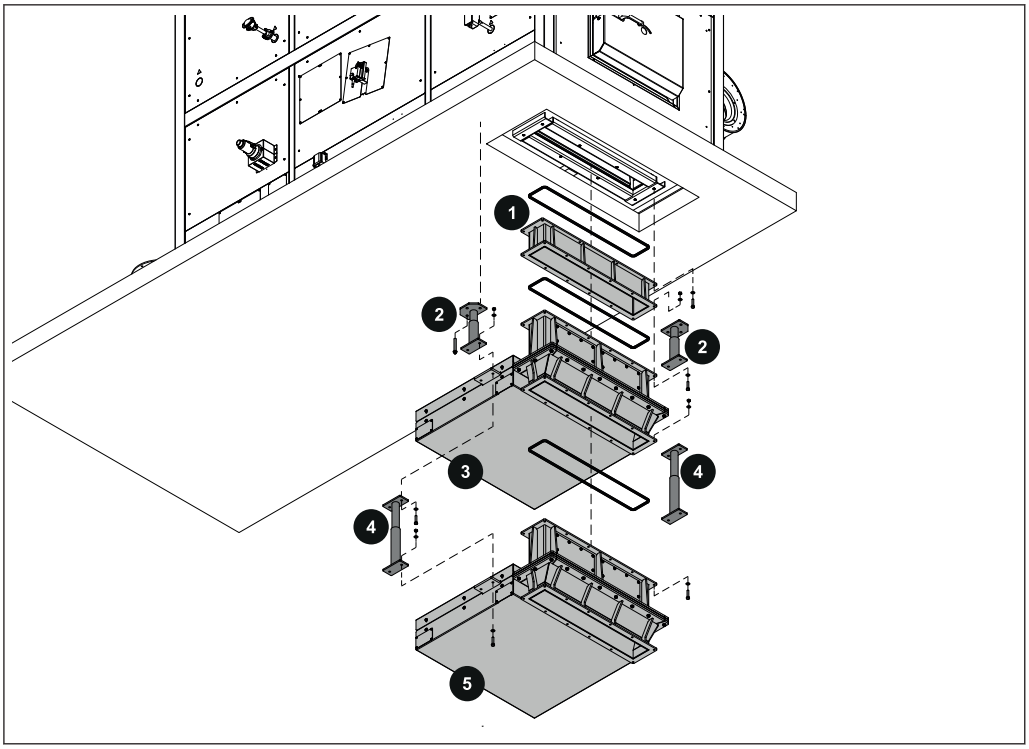
❒ Fit the double nipple (3), taper (4), elbow (1) and hose connection (2) to the right-hand side of the reversing chamber door on the air distribution frame.

❒ Fit the hose (6) between the compressed air tank and air distribution frame to the hose connection using hose clamps (5).

❒ Fit the control boxes (7) at a suitable place on the boiler.

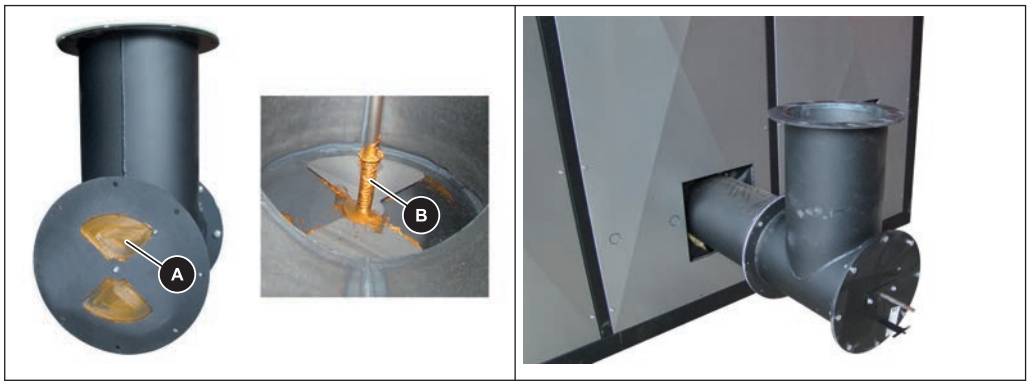
5.6.21 Fitting the ash sliding system (optional)

An ash sliding system is required if the boiler is operated with underfloor ash removal and the room in which the ash is removed is not airtight.

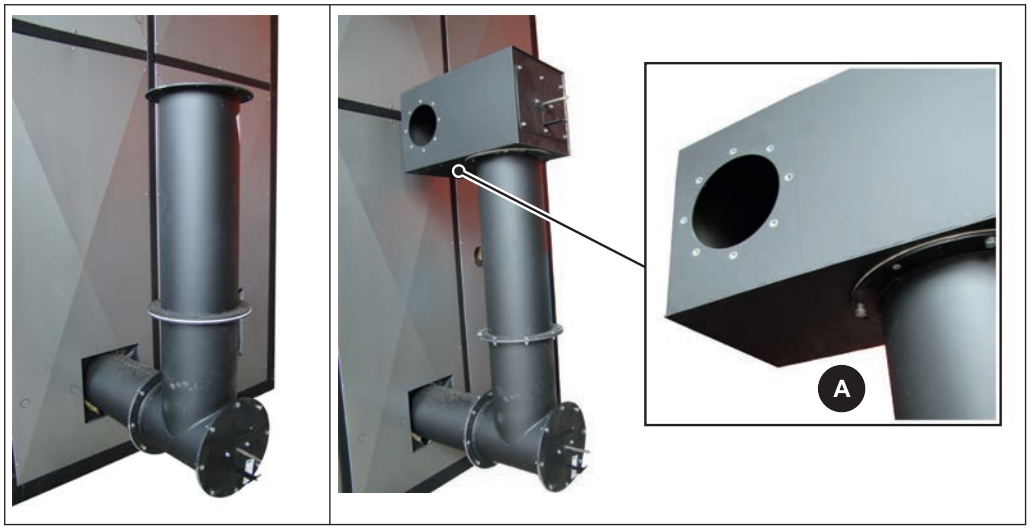


- ❒ Fit the gravity shaft (1) with seal to the underside of the combustion chamber.
- ❒ Fit the top brackets (2) to the ceiling.
- ❒ Fit the top ash sliding system (3) with seal to the gravity shaft (1) and to the top brackets (2).
- ❒ Fit the brackets (4) to the ash sliding system (3).
- ❒ Fit the bottom ash sliding system (E) with seal to the top ash sliding system and to the brackets (D).

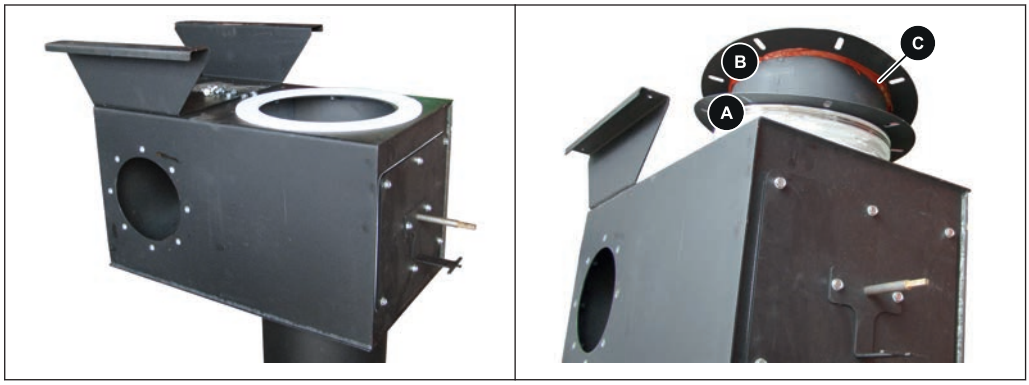
5.6.22 Installing flue gas recirculation FGR (optional)



- ❒ Grease the air damper (A) and pressure spring (B) of the T-piece with copper paste.
- ❒ Fit the T-piece with seal to the pipe.
- ❒ Use the adjustable feet to support the T-piece on the floor (not pictured).

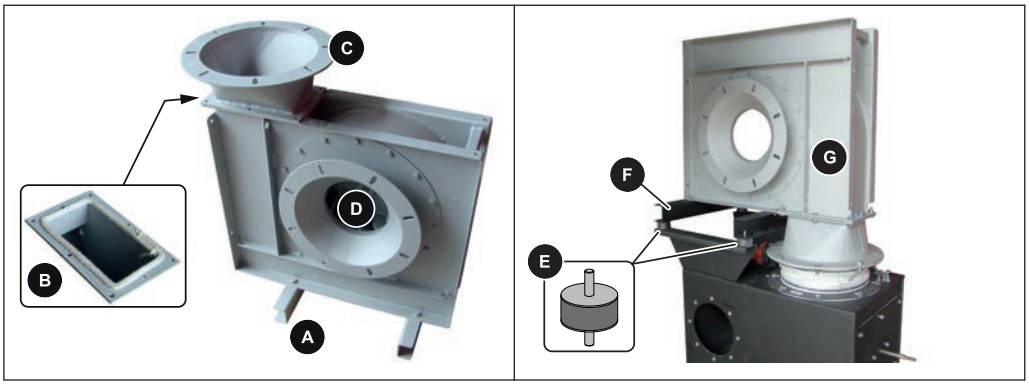


- ❒ Fit the pipe with seal to the T-piece.
- ❒ Grease the air damper and pressure spring in the secondary air box with copper paste.
- ❒ Fit the secondary air box with seal (A) to the pipe.



- ❒ Secure the mounting plate to the secondary air box.
- ❒ Remove the transport guard from the flue pipe clip (A) and take out the guard (B).
- ❒ Secure the flue pipe clip (A) with the seal to the secondary air box.

❒ Seal the guard (B) as shown with high temperature silicon (C) and insert in the flue pipe clip (A).



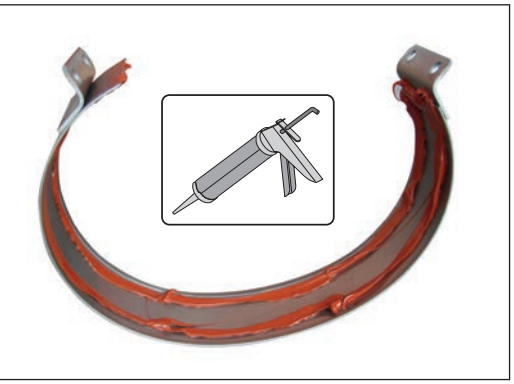
❒ Remove the U-sheets (A) from the FGR blower fan.
↳ These are no longer required.
❒ Stick on the seal cord (B) and fit the transition piece (C).
❒ Remove the drive assembly (D) from the FGR blower fan.
❒ Secure the U-sheets provided (F) with rubber buffer (E) to the mounting plate.
❒ Secure the FGR blower fan to the U-sheets and the flue pipe adapter.

❒ Replace the drive assembly on the FGR blower fan as shown.

❒ Cut out the thermal insulation on both sides of the boiler.
❒ Remove the blanking plate and seal.


❒ Position the pipes at the side of the boiler and at the secondary air box and calculate the required length.
❒ Remove the pipes and shorten accordingly.

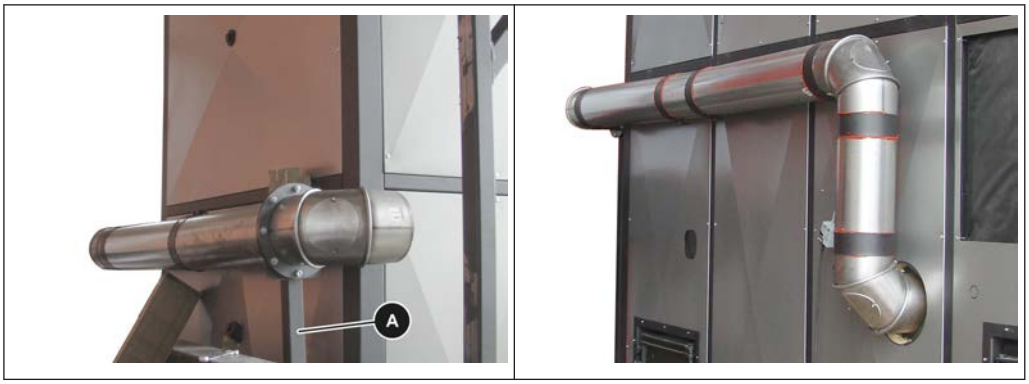
NOTICE! Twist the pipe bends provided to 90° and seal the connections with high temperature silicon as shown.

❒ Fit the pipe bends to the shortened pipes using flue pipe clips.
❒ Measure the distance between the pipe bends and adjust the pipe provided.

NOTICE! Seal the flue pipe clips with high temperature silicon.


❒ Fit the shortened pipe with flue pipe clips.
❒ Fit the pipe bend with flange on the opposite side of the boiler.
❒ Fit the piping in such a way that the flue pipes are at the same height on each side.

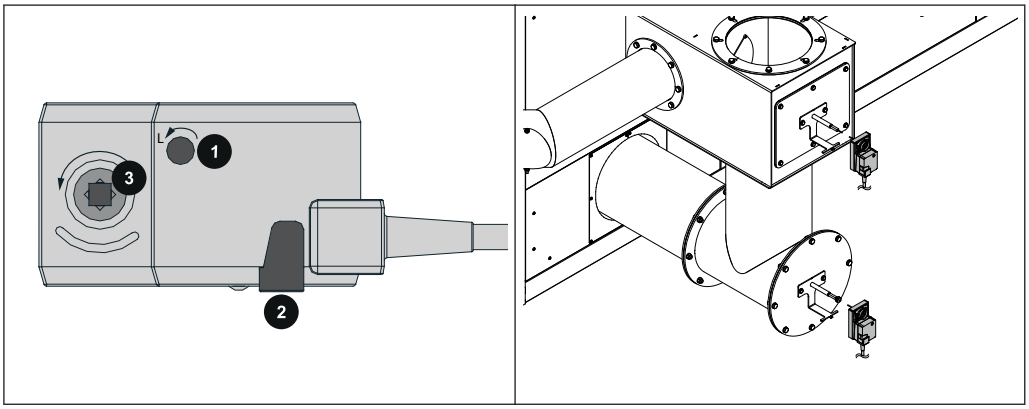


❒ Connect the secondary air box piping behind the boiler.
❒ Fit the support (A) to the pipe bend with the flange, adjust the height and anchor to ground.
❒ Finish the piping.

NOTE: All of the piping and FGR blower fan must be insulated by the customer. Make sure the drive assembly of the blower fan can be removed.

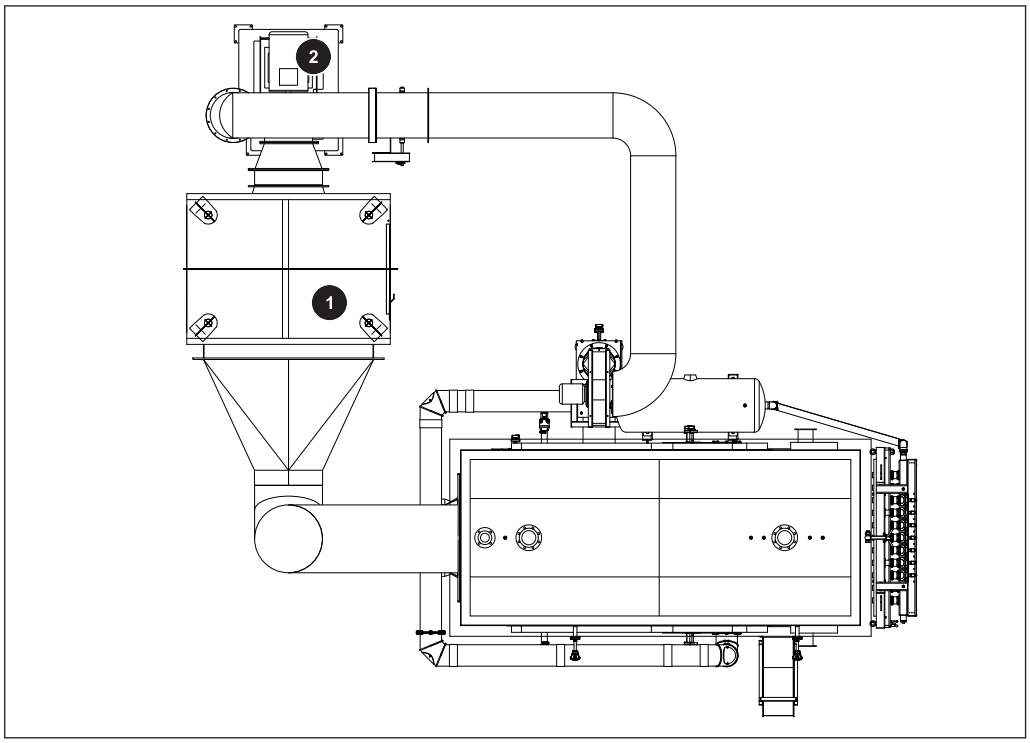
Installing the servo-motors

❒ Check that the air flaps are at the left stop.
➥ All air flaps should be closed.
➥ Where necessary, turn the air flaps to the left stop using pliers.



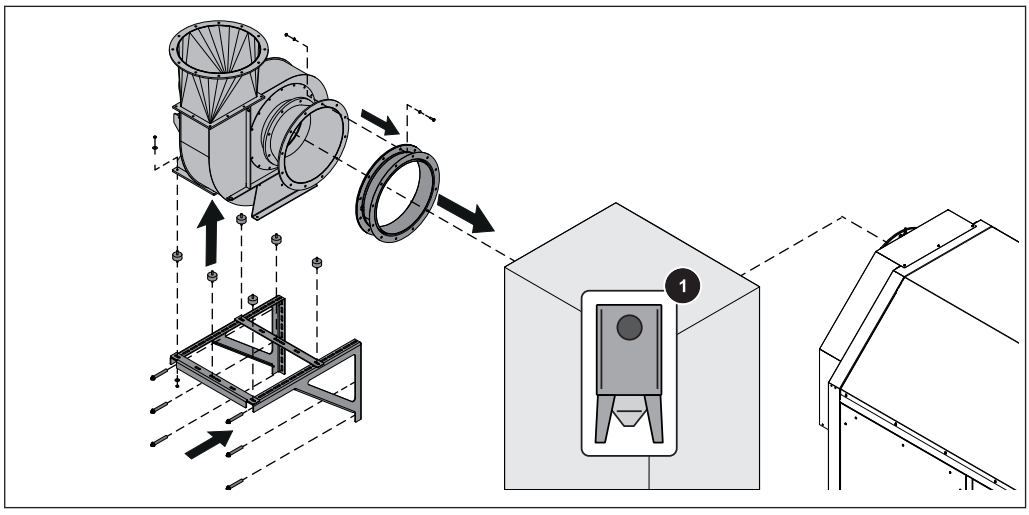
❒ Set the direction of rotation of the servo-motor (1) to left (L).
❒ Press the unlock key (2) and turn the drive for the shaft to the air duct (3) in an anti-clockwise direction as far as the stop.
❒ Place the servo-motor on the pneumatic rods of the primary and secondary air boxes.

5.7 Flue gas piping



❒ Fit the multicyclone (1) and ID fan (2) according to the installation diagram provided and connect the pipes to the boiler.

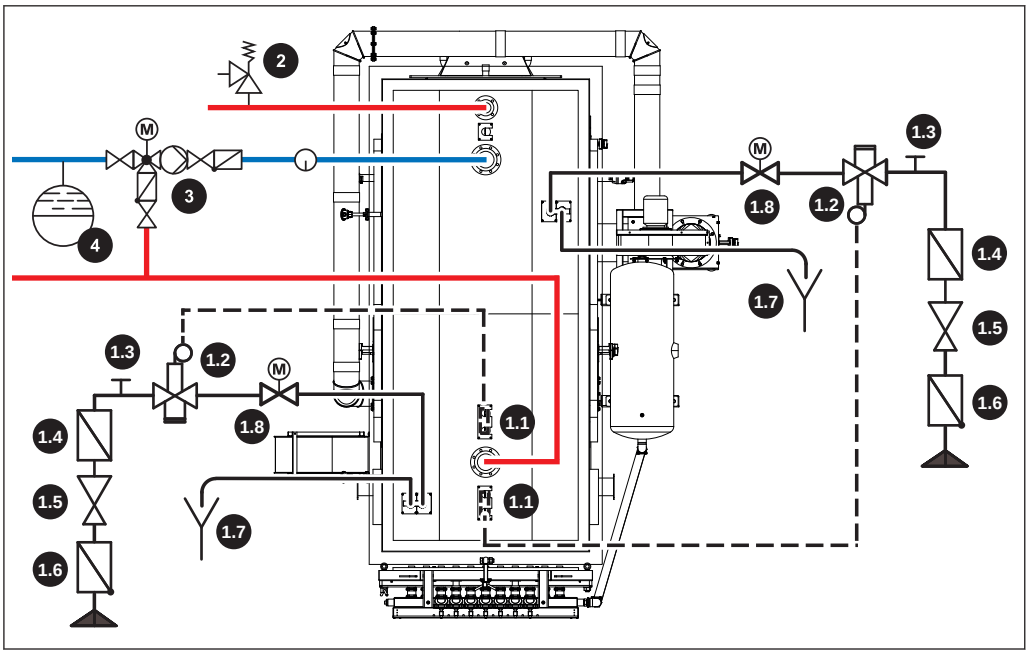
The ID fans can be fitted to different brackets. The following steps explain how to fit the induced draught fan to a wall bracket. Proceed in the same way to fit to other brackets.



❒ Fit the rubber buffers to the induced draught fan.
❒ Fit the induced draught fan with the rubber buffers to the bracket.
❒ Fit the flue pipe adapter and induced draught fan to the multicyclone (1).
❒ Fit the bracket.

NOTICE! The customer is responsible for insulating all piping as well as the induced draught fan and the FGR fan! Make sure the drive assemblies of the blower fans can be removed.

5.8 Hydraulic connection



1 Thermal discharge valve

- The thermal discharge safety device must be connected in accordance with ÖNORM/DIN EN 303-5 and as shown in the diagram above
- The discharge safety sensor must be connected to a pressurised cold water mains supply (temperature ≤ 15°C) in such a way that it cannot be shut off
- A pressure reducing valve (1.5) is required for a cold water pressure of ≥ 6 bar Minimum cold water pressure = 2 bar

1.1 Sensor of thermal discharge safety device
1.2 Thermal discharge valve
1.3 Cleaning valve (T-piece)
1.4 Dirt trap
1.5 Pressure reducing valve
1.6 Backflow preventer to prevent stagnation water from entering the drinking water network
1.7 Free outlet without counter pressure with observable flow path (e.g. discharge funnel)
1.8 Thermal discharge valve with zone valve (opens at approx. 95°C)

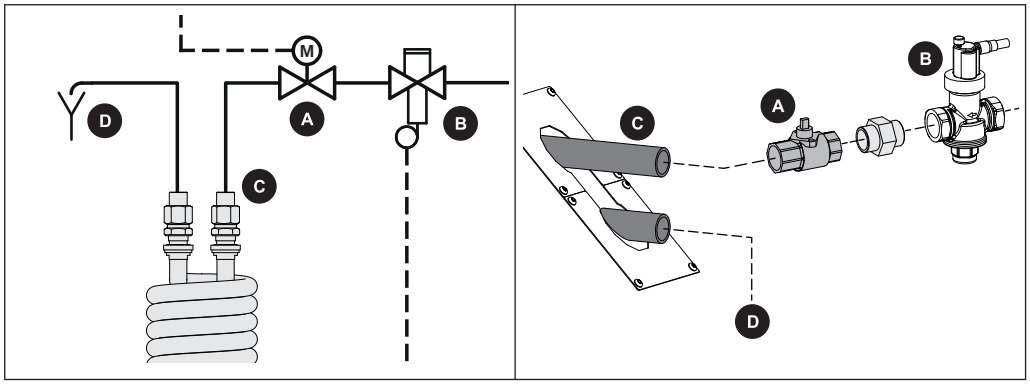
2 Safety valve

- Safety valve according to EN 12828 with a minimum diameter of DN15 (< 50 kW) or DN20 (50 – 100 kW)
- The setting pressure must not exceed 3 bar
- The safety valve must be installed in an accessible place on the heat generator or in direct proximity in the flow pipe in such a way that it cannot be shut off
- An unhindered and safe drainage of escaping steam or water must be ensured

3 Return temperature control

4	**Diaphragm expansion tank** ▪ The diaphragm pressurised expansion tank must conform to EN 13831 and hold at least the maximum expansion volume of the system's heated water including a water seal ▪ Its size must comply with the design information in EN 12828 - Appendix D ▪ Ideally it should be installed in the return line. Follow the manufacturer's installation instructions
5	**We recommend fitting some sort of control device (e.g. thermometer)**

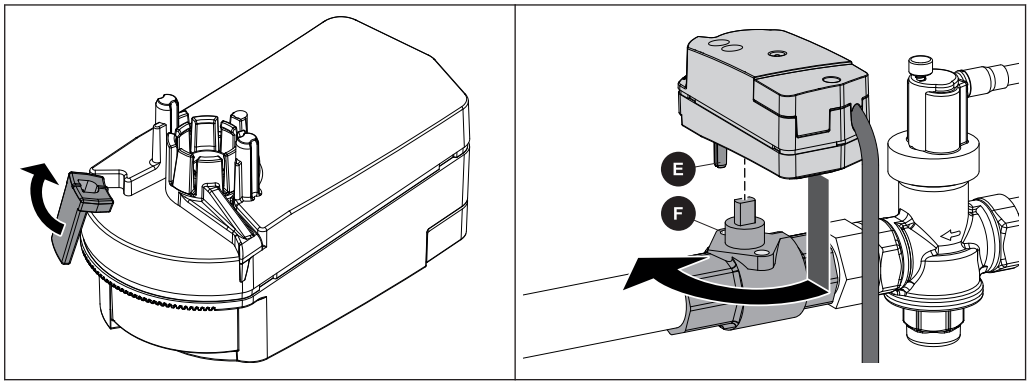
5.8.1 Thermal discharge safety device with zone valve



❒ Install the 2-way zone valve (A) in the fresh water pipe between the thermal discharge safety device (B) and the boiler safety battery (C)

➥ Fit the 2-way zone valve with the supplied double nipple directly to the discharge safety device. The remaining pipework is to be provided by the customer.

IMPORTANT: Pay attention to the flow direction of the discharge safety device (B)!

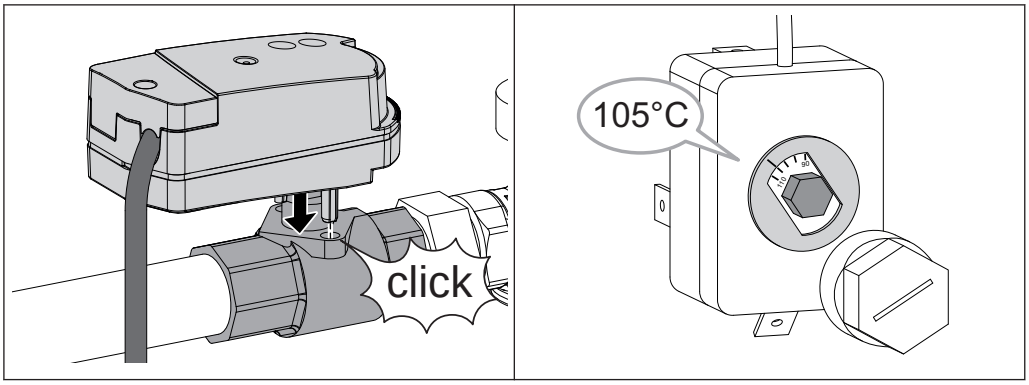


❒ Remove the stop from the rotary drive

➥ The stop is no longer required

❒ Place the rotary drive on the zone valve in such a way that the flat area of the pin fits into the drive housing

❒ Turn the rotary drive clockwise by approx. 90° until both torque supports (E) of the drive match the bores (F) on the zone valve



❒ Secure rotary drive to zone valve
➥ The rotary drive must audibly engage!
❒ Connect the cable of the rotary drive to the “Valve thermal discharge safety device” contact in the control cabinet, observing the circuit diagram of the boiler!
❒ Set the high-limit thermostat (STL) to 105 °C and install it according to the installation manual for the boiler

5.9 Power connection and wiring

DANGER

When working on electrical components:

Risk of electrocution!

When work is carried out on electrical components:
❒ Always have work carried out by a qualified electrician
❒ Observe the applicable standards and regulations
➥ Work must not be carried out on electrical components by unauthorised persons

❒ Lay the cables from the components through the cable ducts to the control cabinet.
❒ Wire the connections according to the wiring diagram.
❒ Ensure that there is strain relief for all cables in the control cabinet.

Information about laying the cables

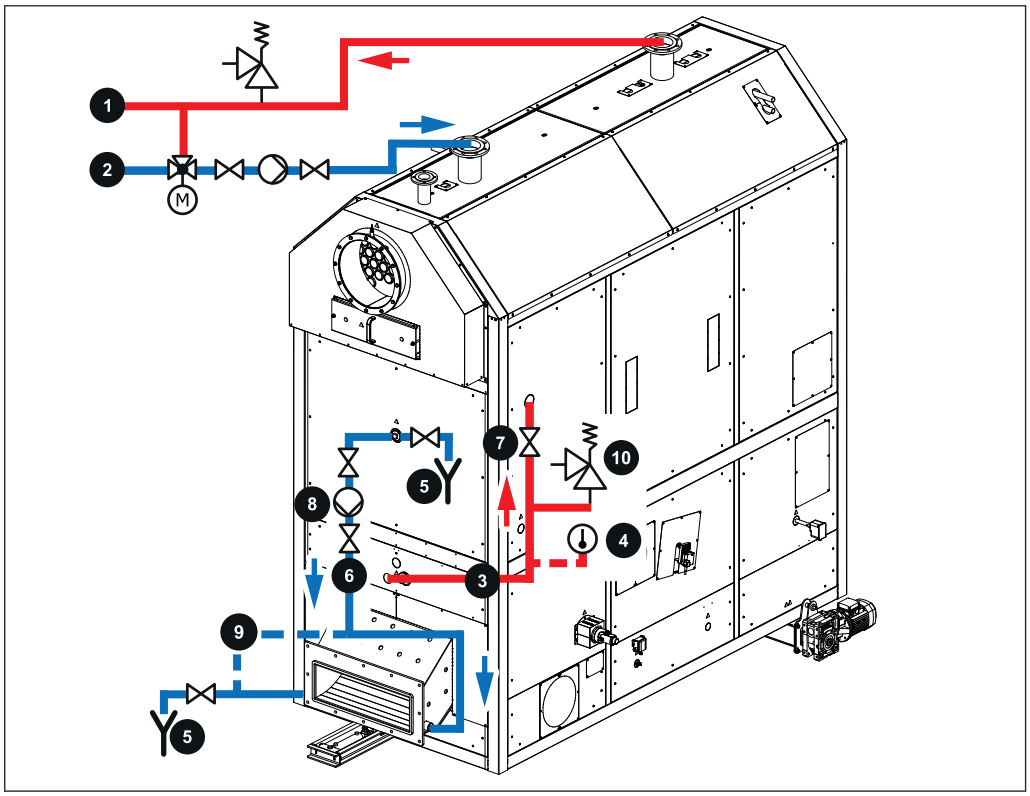
- Tie any loose hanging cables to the drive motors using cable ties. The cables must not come into contact with the stoker duct.

5.9.1 Potential equalisation

❒ The potential equalisation must comply with current directives, regulations and standards
❒ Establish potential equalisation to the induced draught fan and FGR fan

5.10 Connecting up the slide-on duct cooling

The following is a schematic diagram



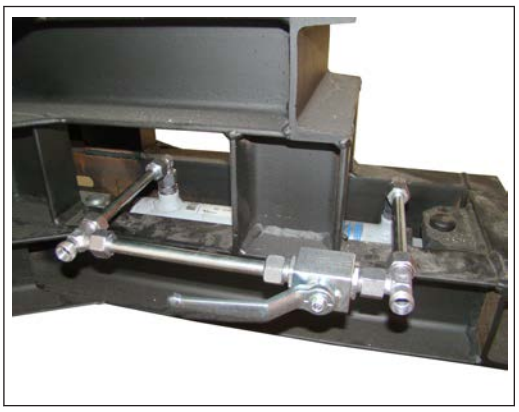
1	Boiler flow
2	Boiler return
3	Slide-on duct flow
4	Thermometer (recommended)
5	Heat exchanger drainage
6	Slide-on duct return
7	Gate valve or ball valve **CAUTION:** Gate valve or ball valve on **FLOW LINE** of the slide-on duct must be **OPEN** (may only be closed during repair of the slide-on duct). Remove the lever in the open position and keep in a safe place!
9	Slide-on duct loading pump: ▪ no gravitational brake. ▪ Up to 500 kW output: – e.g. Wilo Yonos Para 25/1-4, Yonos Pico 25/1-4, Grundfos alpha2 25-40 or the like – Flow rate approx. 2m³/h ▪ Up to 1500 kW output: – e.g. Wilo Yonos Para 25/1-7, Yonos Pico 25/1-7, Grundfos alpha2 25-60 or the like – Flow rate approx. 2.5m³/h

8	Connection cable – only required for boilers with hydraulic feed	10	Safety valve (If a gate valve or ball valve is used in the flow line of the slide-on duct, a safety valve with a DN 15 must be installed!)

General specification for pipe connections:

- Must be shut-off type.
- No press-fit connection.
- Must be possible to disassemble without removing the pipe.

5.11 Connecting the hydraulic cylinder



❒ Connect the piping to the hydraulic unit.

TIP: Fit a bypass line that can be shut off immediately in front of the hydraulic cylinder.

6 Commissioning

6.1 Before commissioning / configuring the boiler

The boiler must be configured to the heating system during initial start-up!

NOTICE

Optimum efficiency and efficient, low-emission operation can only be guaranteed if the system is set up by trained professionals and the standard factory settings are observed.

Take the following precautions:

❒ Initial startup should be carried out with an authorised installer or with Froling customer services

NOTICE

Foreign bodies in the heating system impair its operational safety and can result in damage to property.

As a result:

❒ The whole system should be rinsed out before initial start-up in accordance with EN 14336.

❒ Recommendation: Make sure the hose diameter of the flush nozzles in the flow and return complies with ÖNORM H 5195 and is the same as the hose diameter in the heating system, however not more than DN 50.

❒ Turn on the main switch

❒ Set the boiler controller to the system type.

❒ Load the boiler default values.

NOTICE! For the keypad layout and instructions for modifying the parameters, see the instruction manual for the boiler controller.

❒ Check the system pressure of the heating system.

❒ Check that the heating system is fully ventilated

❒ Check all quick vent valves of the entire heating system for leaks

❒ Check that all water connections are tightly sealed

↪ Pay particular attention to those connections from which plugs were removed during assembly.

❒ Check that all necessary safety devices are in place

❒ Check that there is sufficient ventilation in the boiler room.

❒ Check the seal of the boiler.

↪ All doors and inspection openings must be tightly sealed.

❒ Check all blanking plugs (e.g. drainage) for tightness

❒ Check that the drives and servo motors are working and turning in the right direction

NOTICE! Check the digital and analogue inputs and outputs - See the instruction manual for the boiler controller.

6.1.1 Compressed air cleaner (optional)

If there is a compressed air cleaner installed for the heat exchanger, check the following settings:

- ❒ Maximum pressure: 4 bar
  - ➥ Set mechanically on pressure reducer
- ❒ Compressed air monitor setting: 2 bar

Set the following parameters on the mecair controller of the compressed air cleaner:

- ❒ Pulse time: 0.5 secs.
- ❒ Pause time: 999 secs.

NOTICE! If a minimum compressor pressure of 2 bar cannot be established, an error message will appear on the boiler touchscreen!

6.2 Initial startup

6.2.1 Permitted fuels

Wood chips

Criterion	ÖNORM M 7133	EN ISO 17225	Description acc. to ÖNORM M 7133
Water content	**W20**	**M20**	air-dried
	W30	**M30**	suitable for storage
	W35	**-**	limited suitability for storage
	W40 [1)]	**M40** [1)]	high-moisture wood chips
	W50 [1)]	**-**	freshly-harvested wood chips
Size	**G30**	**P16S**	Fine wood chip
	G50	**P31S** from 400 kW: **P45S**	Medium-sized wood chip
	G100 [2)]	**P63** [2)]	Coarse wood chips

1. partial load conditions only to a limited extent
2. for hydraulic feeders only

Note on standards

EU:	Fuel acc. to EN ISO 17225 - Part 4: Wood chips class A1 / P16S-P45S
Additional for Germany:	Fuel class 4 (§3 of the First Federal Emissions Protection Ordinance (BimSchV) in the last amended version)

Wood shavings

Wood shavings generally cause problems with combustion. Therefore their use is permitted only with authorisation from Froling. The following additional points also apply:

- Sawdust and carpentry waste should only be used with systems with a rotary valve.
- The store should be fitted with a pressure release device in accordance with regional regulations.
- The same limits apply for the permitted water content of sawdust as for wood chips.

NOTICE

For fuels with a water content < W30 the boiler's rated heat output can only be guaranteed if it is used with a flue gas recirculation system (FGR).

Miscanthus

Switchgrass or elephant grass (Latin name: miscanthus) is a C4 plant. Standards and regulations for burning these plants have not been standardised, so the following applies:

NOTICE! The regional regulations for burning miscanthus should be observed. Operation may only be possible by special permit.

Changing the fuel

⚠ CAUTION

Incorrect fuel parameter settings:

Incorrect parameter settings have a significant adverse effect on the functioning of the boiler, and as a result this will invalidate the guarantee.

Therefore:

❒ If the fuel is changed (e.g. from wood chips to pellets), the system must be reset by Froling customer services.

6.2.2 Non-permitted fuels

The use of fuels not defined in the "Permitted fuels" section, and particularly the burning of refuse, is not permitted.

⚠ CAUTION

In case of use of non-permitted fuels:

Burning non-permitted fuels increases the cleaning requirements and leads to a build-up of aggressive sedimentation and condensation, which can damage the boiler and also invalidates the guarantee. Using non-standard fuels can also lead to serious problems with combustion.

For this reason, when operating the boiler:

❒ Only use permitted fuels

6.3 Heating up for the first time

NOTICE

Optimum efficiency and efficient, low-emission operation can only be guaranteed if the system is set up by trained professionals and the standard factory settings are observed.

Take the following precautions:

❒ Initial startup should be carried out with an authorised installer or with Froling customer services

The customer is responsible for ensuring the following prior to initial start-up of the system by Froling customer services:

- Electrical installation
- Installation of water pipes
- Connect flue gas including all insulation work
- Work must comply with local fire protection regulations

The operator must ensure the following conditions are met for initial start-up:

❒ The network can take at least 50% of the boiler's nominal output.
❒ The discharge system must be empty – "dry run" of system.
  ➥ Fuel must be available, however, so that the discharge system can be filled once the system is released.
❒ It is essential that the electrician who has carried out the installation work is available when starting up the system for the first time to make any changes to the wiring which may become necessary.
❒ Ensure that those responsible for operating the system are present.
  ➥ During initial start-up, operating staff are shown how to use the boiler. It is imperative for proper handover of the product that those involved are present as this is a one-off opportunity.

If the fireclay in the combustion chamber needs to be screed dried:

❒ Provide the following quantities of dry firewood:
  ➥ Systems up to 250 kW: ¼ m³
  ➥ Systems up to 500 kW: ½ m³
  ➥ Systems up to 1500 kW: 1 m³

The individual steps for initial start-up are explained in the operating instructions for the controller.

NOTICE! See operating instructions for the SPS 4000

NOTICE! Fissures in the fireclay are normal and do not indicate a fault.

NOTICE

If condensation escapes during the initial heat-up phase, this does not indicate a fault.

❒ Tip: If this occurs, clean up using a cleaning rag.

6.3.1 Screed drying

The combustion chamber must be slowly screed dried as described below when heating up for the first time to dry out the fireclay.

⚠ CAUTION

If the boiler heats up too quickly on initial start-up:

If the output during the heating-up process is too great, the combustion chamber may be damaged as a result of drying out too rapidly!

For this reason the following applies the first time you heat up the boiler:

❒ Screed dry the boiler in accordance with the following points:

❒ Set the boiler to user level “Service technician” and activate “Baking mode” in the quick selection menu.
❒ Fill combustion chamber with approx. 1/3 of the firewood provided.
❒ Ignite firewood and allow to burn away with the combustion chamber door half open.

Once the first load has burned out, add another approx. 1/3 of the firewood provided.

NOTICE! The combustion chamber temperature should continuously rise but must not exceed 500°C. REMEDY: Only keep the combustion chamber door open a fraction!

After adding the last batch of firewood:

❒ Allow the fire on the grate to burn out.
❒ Close the combustion chamber door.
❒ Leave the boiler in this state for a few hours (ideally overnight).

The boiler can then be used in accordance with the operating instructions ("Operating the system" section).

7 Decommissioning

7.1 Out of service for long periods

The following measures should be taken if the boiler is to remain out of service for several weeks (e.g. during the summer):

- ❒ Clean the boiler thoroughly and close the doors fully.
- ❒ Place approx. 5 kg of loose lime in the combustion chamber.
  - ➥ This absorbs moisture and thereby prevents corrosion when the boiler is out of service.

If the boiler is to remain out of service during the winter:

- ❒ Have the system completely drained by a qualified technician.
  - ➥ Protection against frost

7.2 Disassembly

To disassemble the system, follow the steps for assembly in reverse order.

7.3 Disposal

- ❒ Ensure that the system is disposed of in an environmentally friendly way in accordance with waste management regulations.
- ❒ You can separate and clean recyclable materials and send them to a recycling centre.
- ❒ The combustion chamber must be disposed of as builders' waste.

8 Appendix

8.1 Addresses

8.1.1 Address of manufacturer

FRÖLING
Heizkessel- und Behälterbau GesmbH

Industriestraße 12
A-4710 Grieskirchen
AUSTRIA

TEL 0043 (0)7248 606 0
FAX 0043 (0)7248 606 600
EMAIL info@froeling.com
INTERNET www.froeling.com

Customer service

Austria	0043 (0)7248 606 7000
Germany	0049 (0)89 927 926 400
Worldwide	0043 (0)7248 606 0

8.1.2 Address of the installer

Stamp