Installation Instructions

TI 350

Translation of the original German installation instructions for technicians

Read and follow the instructions and safety information!

Technical changes, typographical errors and omissions reserved!

M1830521_en | Edition 18/02/2021

CE

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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 such an environment.
- The boiler room must be frost-free.
- The boiler does not provide any light, so adequate lighting must be ensured 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. Never place flammable objects (e.g. clothing, etc.) 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.

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.

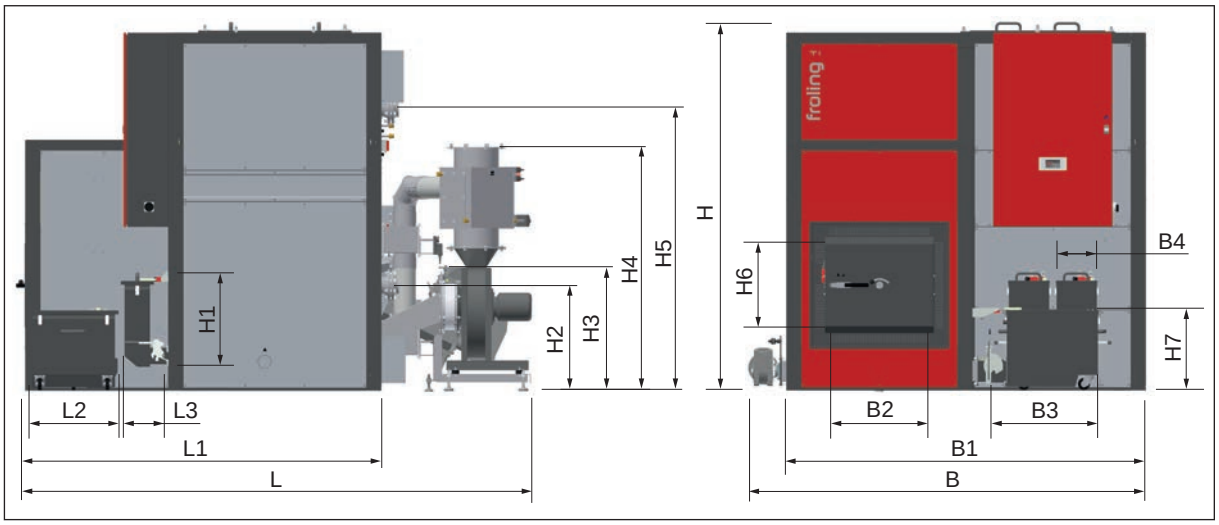
3.8.1 Draught limiter

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.

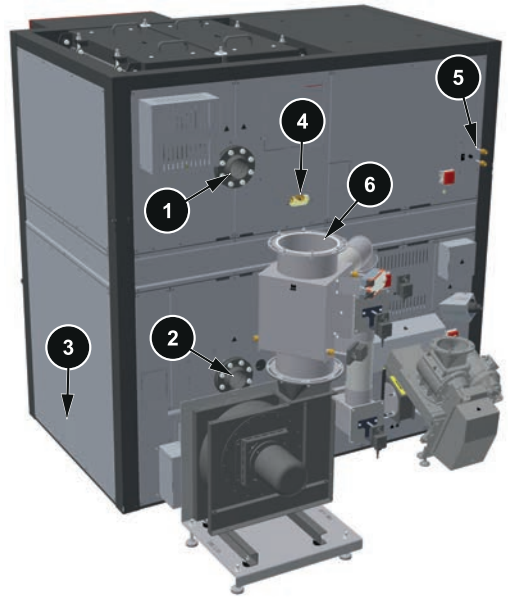
4 Technology

4.1 Dimensions



Item	Description	Unit	Value
L	Total length including fittings	mm	3460
L1	Total length without fittings		2455
L2	Length, combustion chamber ash container		605
L3	Length, heat exchanger ash container		320
H	Boiler height including insulation		2475
H1	Height, heat exchanger ash container		635
H2	Height of return connection		705
H3	Height of stoker including burn back protection system		825
H4	Height, flue gas pipe connection with FGR		1630
H5	Height of flow connection		1890
H6	Height, combustion chamber door opening		530
H7	Height, combustion chamber ash container		540
B	Total width including fittings		2670
B1	Total width without fittings		2415
W2	Width, combustion chamber door opening		510
B3	Width, combustion chamber ash container		780
B4	Width, heat exchanger ash container		280

4.2 Components and connections



Item	Description	Unit	Value
1	Boiler flow connection	inches	DN100 / PN16
2	Boiler return connection	inches	DN100 / PN16
3	Drainage connection	inches	1“
4	Thermal discharge valve connection (heat exchanger)	inches	$^{3}/_{4}$” AG
5	Thermal discharge valve connection (burn through elbow) without optional pipe assembly	inches	$^{1}/_{2}$” AG
	Thermal discharge valve connection (burn through elbow) with optional pipe assembly	inches	$^{3}/_{4}$” AG
6	Flue gas pipe connection with FGR (flue gas recirculation)	mm	300

4.3 Technical data

Description		Value
Nominal output	kW	350
Output range		105-350
Required fuel consumption at nominal load	kg/h	110
Electrical connection		400V / 50 Hz / C35A or as per circuit diagram
Power consumption wood chips (NL / PL)	W	<0.8 / 0.4 % of nominal output
Power consumption pellets (NL / PL)	W	<0.6 / 0.3 % of nominal output
Minimum room height	mm	2900
Dimensions required for combustion chamber installation (LxWxH)		2550 x 1100 x 1500
Dimensions required for heat exchanger installation (LxWxH)		1250 x 1400 x 2400
Total weight incl. fittings	kg	5630
Weight - combustion chamber		1270
Weight - heat exchanger		1600
Weight - fireclay		1060
Heat exchanger water capacity	l	590
Water pressure drop (ΔT = 20 / 10 K)	mbar	3 / 15
Flow rate (ΔT = 20 / 10 K)	m³/h	15 / 30
Minimum boiler return temperature	°C	65
Maximum permitted operating temperature	°C	90
Permitted operating pressure	bar	6
Boiler class as per EN 303-5:2012		5
Flue gas temperature (NL / PL)	°C	140 / 110
Flue gas volume/mass flow with wood chips W30, 12% O_2 [2)]	m³/h (kg/h)	1574 (1327)
Flue gas volume/mass flow with wood chip W30, 9% O_2		1152 (969)
Flue gas volume/mass flow with wood pellets 12% O_2		1307 (1114)
Flue gas volume/mass flow with wood pellets 9% O_2		955 (815)
Required feed pressure at outlet of induced draught housing at nominal load	Pa	5
	mbar	0.05
Required feed pressure at outlet of induced draught housing at partial load	Pa	2
	mbar	0.02
Maximum permissible feed pressure	Pa	30
	mbar	0.3

Description		Value
Permitted fuel as per EN ISO 17225 [1)]		Part 2: Wood pellets class A1 / D06 Part 4: Wood chips class A1 / P16S-P31S
Airborne sound level	dB(A)	<70
Minimum ventilation opening as per ÖNORM H 5170	cm²	755
Test book number		PB 099 00 17

1. Detailed information on the fuel can be found in the operating instructions in the section entitled “Permitted fuels”
2. Use higher oxygen content for chimney design

Regulation (EU) 2015/1189 - ηs in [%]	
Heating space annual rate of use ηs with wood chips as fuel	78
Heating space annual rate of use ηs with pellets as fuel	82

Regulation (EU) 2015/1189 - Emissions in [mg/m³][1)]	
seasonal space heating emissions of particulate (PM)	≤ 40
seasonal space heating emissions of organic gaseous compounds (OGC)	≤ 20
seasonal space heating emissions of carbon monoxide (CO)	≤ 500
seasonal space heating emissions of nitrogen oxides (NO_x)	≤ 200

1. Emissions of particulate matter, organic gaseous compounds, carbon monoxide and nitrogen oxides shall be expressed standardised to a dry flue gas basis at 10 % oxygen and standard conditions at 0°C and 1013 millibar

4.3.1 Boiler data for planning the flue gas system

Description		TI 350
Flue gas temperature at nominal load	°C	140
Flue gas temperature at partial load		110
Flue gas volume/mass flow with wood chip W30, 12% O_2	m^3/h (kg/h)	1574 (1327)
Flue gas volume/mass flow with wood chip W30, 9% O_2		1152 (969)
Flue gas volume/mass flow with wood pellets 12% O_2		1307 (1114)
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Required feed pressure at outlet of induced draught housing at nominal load	Pa	5
	mbar	0.05
Required feed pressure at outlet of induced draught housing at partial load	Pa	2
	mbar	0.02
Maximum permissible feed pressure	Pa	30
	mbar	0.3
Flue pipe diameter	mm	300

5 Assembly

⚠ 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.)

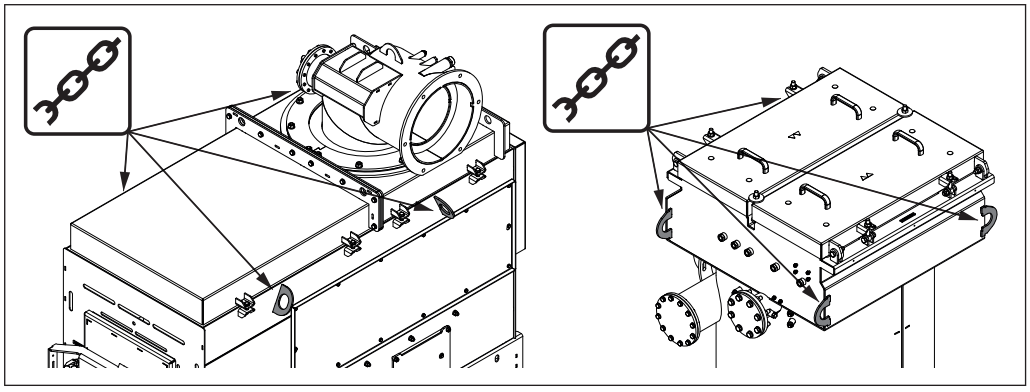
5.2 Temporary storage

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

❒ Store components at a protected location, which is dry and free from dust

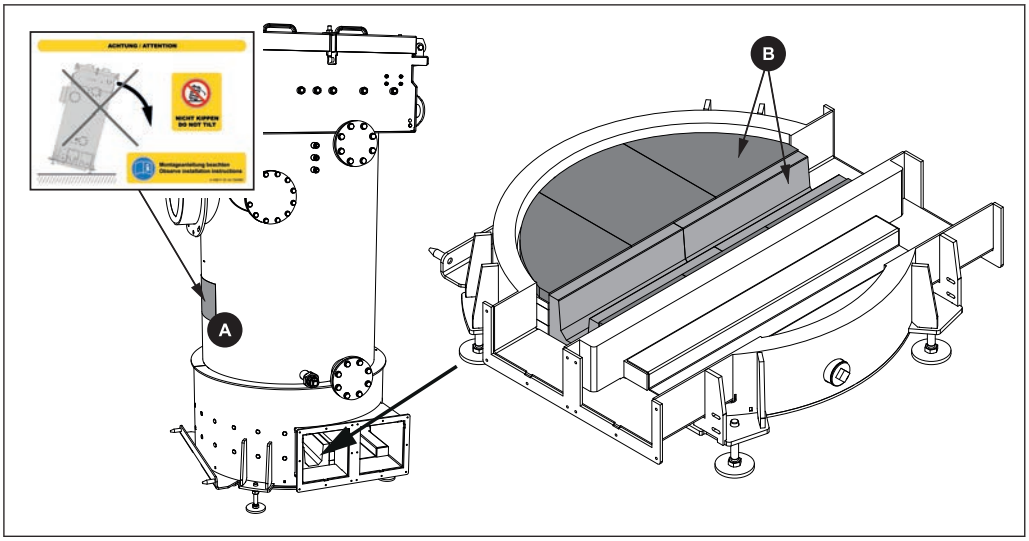
➥ Damp conditions and frost can damage components, particularly electric ones!

5.3 Positioning



❒ Secure cable winch or similar lifting device to the attachment points and position the components

➥ **CAUTION:** It is forbidden to stand under suspended loads!



CAUTION: Do not tilt the heat exchanger during installation or assembly! – see sticker (A).

After positioning the heat exchanger, check the correct position of the firebricks (B).

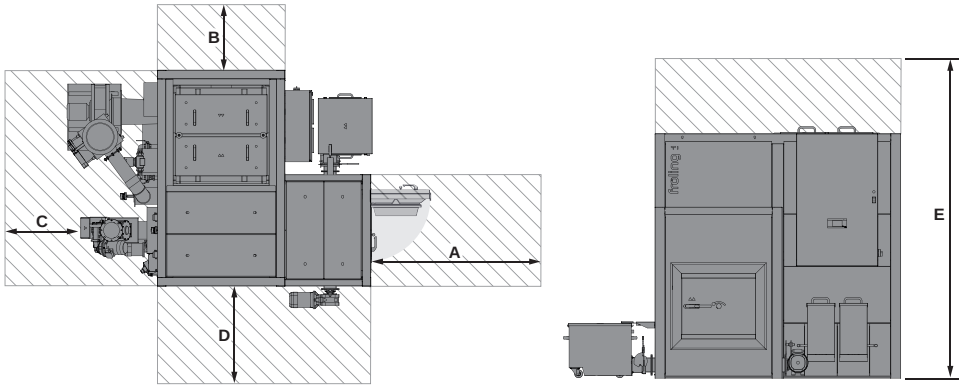
5.4 Setting up in the boiler room

5.4.1 Moving the boiler in the boiler room

- ❒ Position a forklift or similar lifting device with a suitable load-bearing capacity at the base frame
- ❒ Lift and transport to the intended position in the installation room.
  - ➥ Pay attention to the operating and maintenance areas of the equipment in the process!

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)



A	1500 mm
B	400 mm
C	400 mm
D	675 mm
E	2900 mm (3500 mm)[1]

1. Required room height to pull out the turbulators

5.5 Installing the boiler

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; flue gas and flue gas return piping.

NOTICE

The assistance of a second person is required due to the size and weight of various components included in delivery.

5.5.1 General information

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, control cabinet and ash container are on the front.

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

Heat exchanger on the left or right

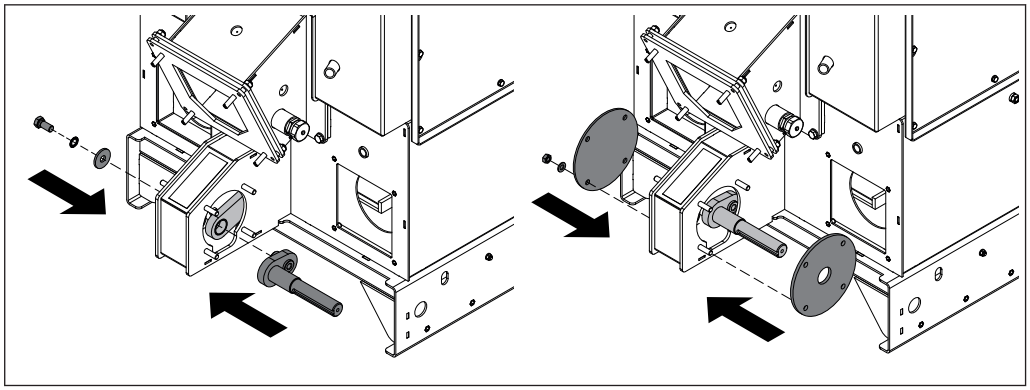
A general distinction is made between whether the heat exchanger is located to the left or right of the combustion chamber (as seen from the front = operating side). Before you start installation, check if the heat exchanger is to be installed on the left or the right. In some cases this is already indicated on the layout drawing.

NOTICE! The figures below show the assembly steps for installing a heat exchanger to the right, unless stated otherwise. If the heat exchanger is to be installed to the left, the steps should be carried out in the same way but on the other side.

For clarity reasons, the side of the combustion chamber which is furthest from the heat exchanger is referred to as the **“outside”**. In the case of the heat exchanger, the side which is furthest from the combustion chamber is referred to as the **“outside”**.

5.5.2 Installing the grate drive

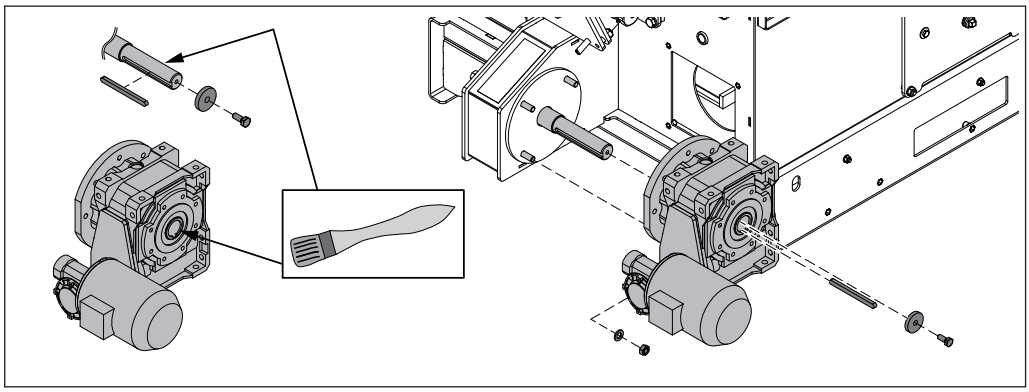
NOTICE! The geared motor of the grate drive can only be installed on the side shown below!



❒ Assemble the crank shaft
  ➥ Push/pull the moving grate forwards with the help of a suitable tool
  ➥ Shaft end with keyway points outwards!
❒ Install the blind flange opposite the shaft end
❒ Insert blind flange with hole onto crank shaft

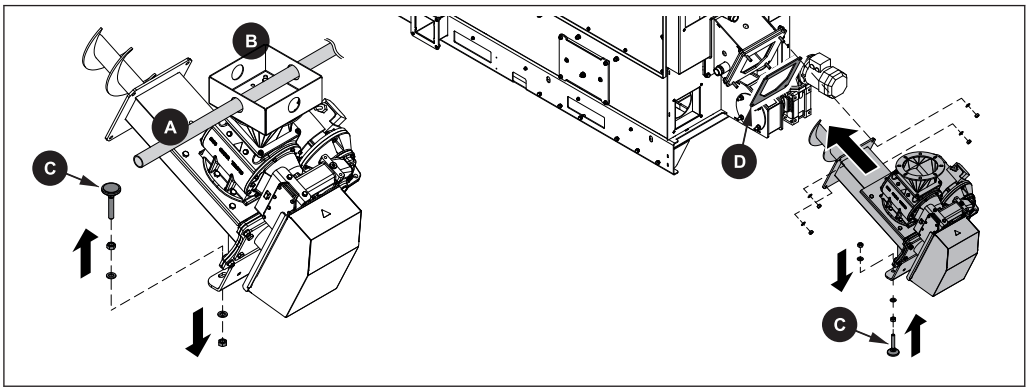
Prepare the geared motor:

❒ Remove the shipping clamp from the geared motor
❒ Fit the vent screw (supplied) to the highest point



❒ Remove the locking screw with the spacer washer and fitting key from the shaft stub
❒ Lubricate the inside of the shaft stub and gears with copper paste
❒ Install the gears as shown
  ➥ With the help of a suitable tool, position the crank shaft so that the groove is aligned with the groove of the gears
❒ Slide key into groove and fit shaft retainer

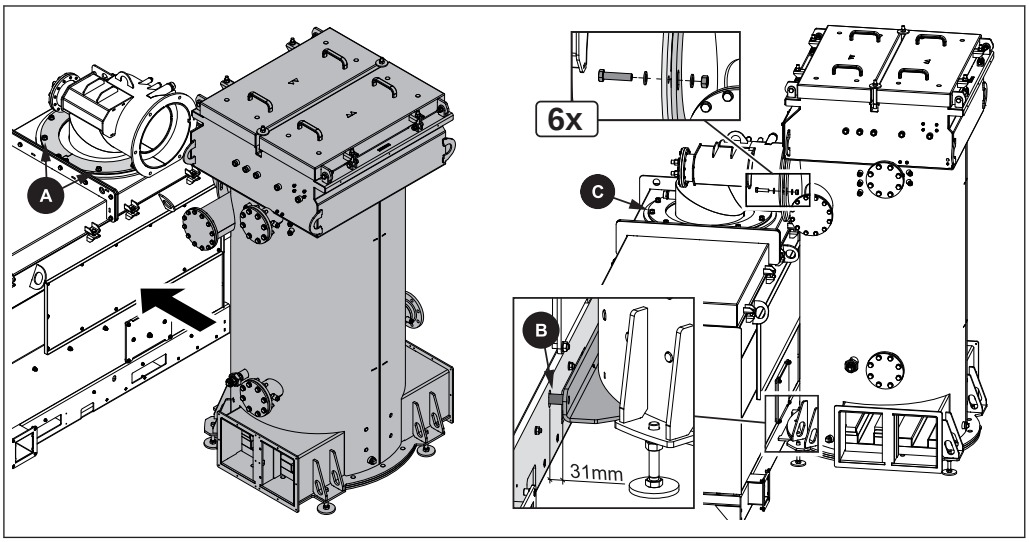
5.5.3 Installing the stoker unit



- ❒ Transport the stoker unit to the slide-on duct using a suitable pipe (A – e.g. 1” pipe) through bracket (B)
- ❒ Remove the pre-assembled adjustable foot (C) and bracket (B)
- ❒ Change the adjustable foot to the other side and then refit it
  - ➥ Do not fully tighten the screws yet
- ❒ Fit the stoker unit complete with seal (D) to the slide-on duct
- ❒ Adjust the complete stoker unit with the adjustable foot (C) and then tighten the screw on the adjustable foot

- ❒ Fit the discharge system (feed screw, etc.) according to the installation instructions enclosed
- ❒ Position the combustion chamber in line with the discharge system or according to the diagram and connect to the discharge system

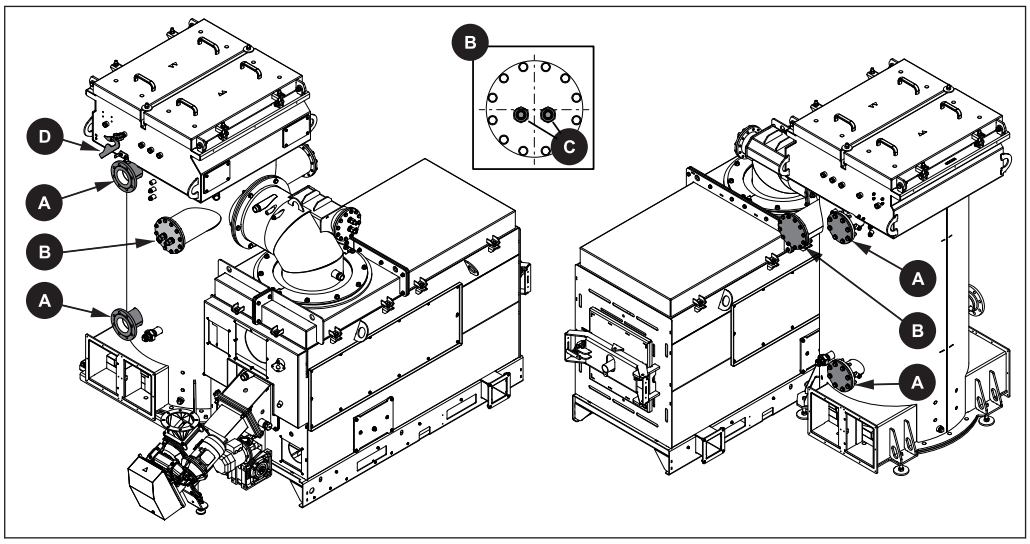
5.5.4 Bolting together the combustion chamber and heat exchanger



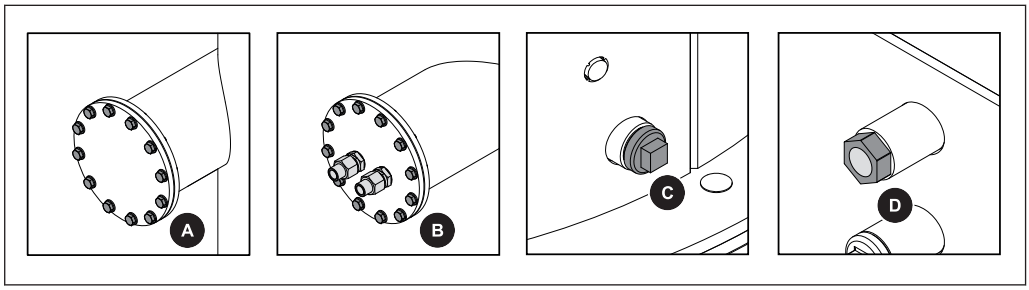
- ❒ Loosen screw connection (A) on the adjustable flanges
- ❒ Transport the heat exchanger to the combustion chamber using suitable materials handling equipment (e.g. forklift truck)
- ❒ Adjust the height of the adjustable feet so that the burn through elbow with connection to the heat exchanger is aligned
- ❒ Check the distance between the heat exchanger and the combustion chamber
  - ➥ B: Distance 31 mm ± 2 mm

❒ Fix the burn through elbow to the heat exchanger with six screws including nuts and washers
❒ Fix the screw connection of the adjustable flange (B)

Check the following components for correct assembly:



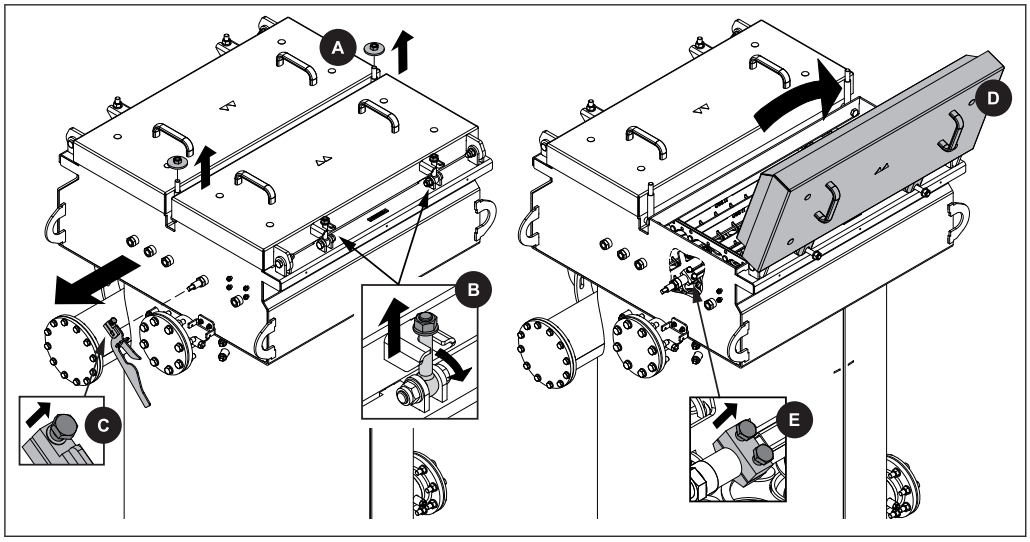
❒ Flow and return (A) must be open on the back of the boiler and closed on the front of the boiler with blanking plates, otherwise reposition blanking plates
❒ The safety battery (B) must be located on the back and connections must be arranged horizontally or be offset eccentrically downwards (C), otherwise reposition the safety battery
❒ WOS lever (D) must be mounted on the back, otherwise ⇨ See "Repositioning the WOS lever (if required)" [page 26]



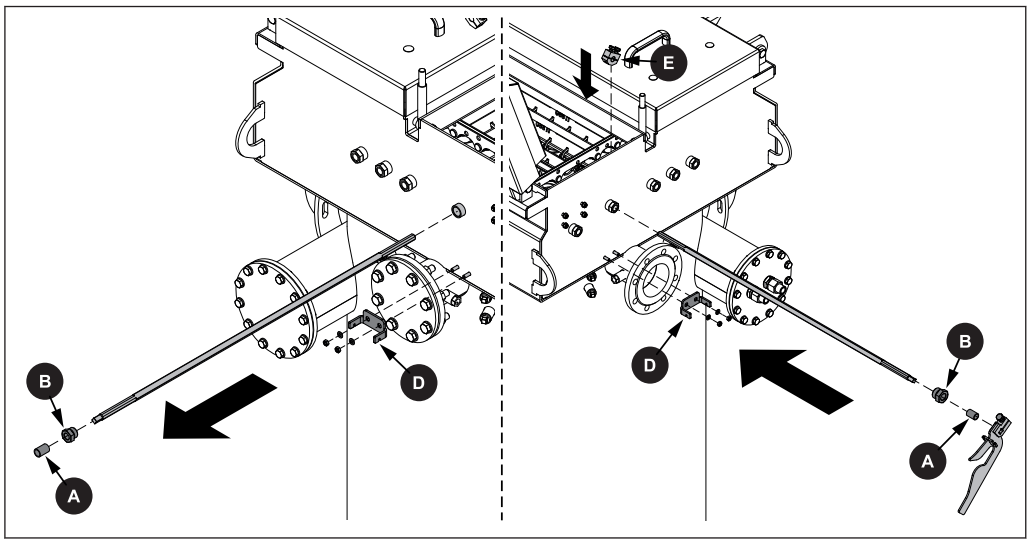
IMPORTANT: Check the tightness of the blanking plates (A), the two safety batteries (B) as well as all blanking plugs (C) and immersion sleeves (D) are and tighten them if necessary!

5.5.5 Repositioning the WOS lever (if required)

The WOS drive is always fitted to the back of the boiler. If the WOS lever is located on the front, the WOS rods must be repositioned as follows.



- ❒ Remove nuts and washers (A)
- ❒ Loosen nuts and washers (B) and unlatch
- ❒ Open the heat exchanger cover (D)
- ❒ Loosen screw (C) on the front of the lever and remove the lever
- ❒ Loosen both screws of the clamping jaw (E) and remove the clamping jaw

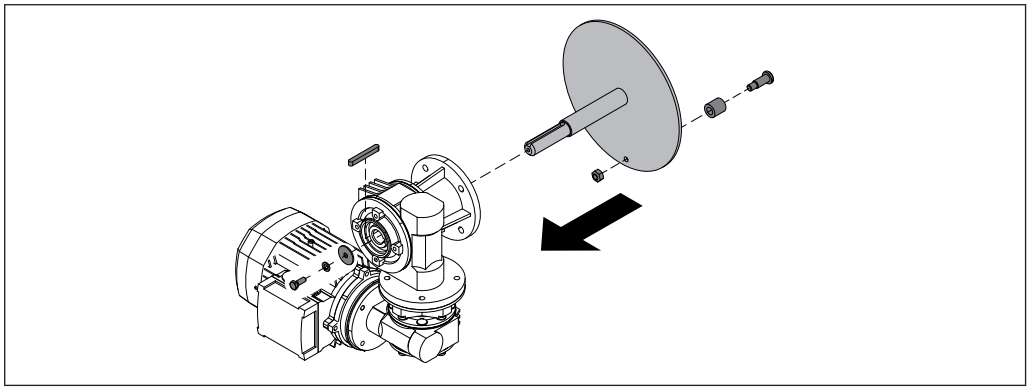


- ❒ Remove the spacer sleeve (A) from the shaft
- ❒ Remove the bearing bush (B) and pull out the shaft
- ❒ Remove the linking plate (D) and refasten the screws including nuts

- ❒ Remove the blanking plug (C) on the back and insert the shaft into the WOS pipe
- ❒ Reinstall the blanking plug (C) on the opposite side
- ❒ Fit the bearing bush (B) and spacer sleeve (A) onto the shaft
- ❒ Slide the WOS lever onto the shaft and secure it again with a screw
  ↪ Lever must point away from the combustion chamber!
- ❒ Loosen nuts incl. washers and fit linking plate (D)

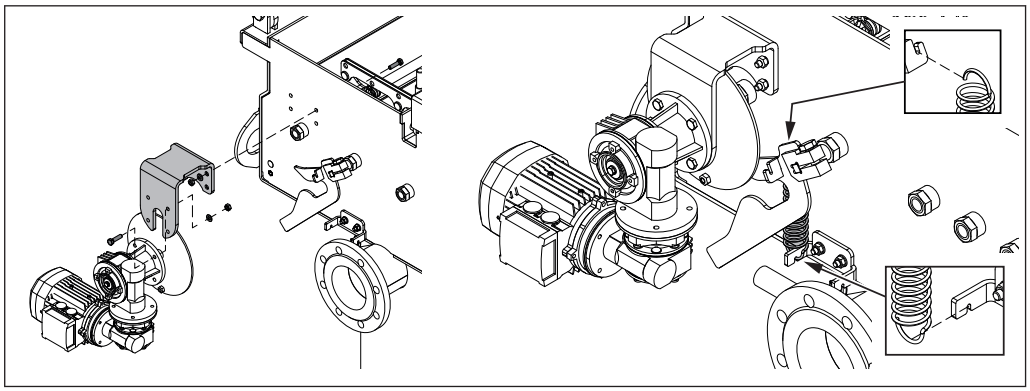
❒ Place clamping jaw (E) onto the shaft and secure with two screws

5.5.6 Fitting the WOS drive

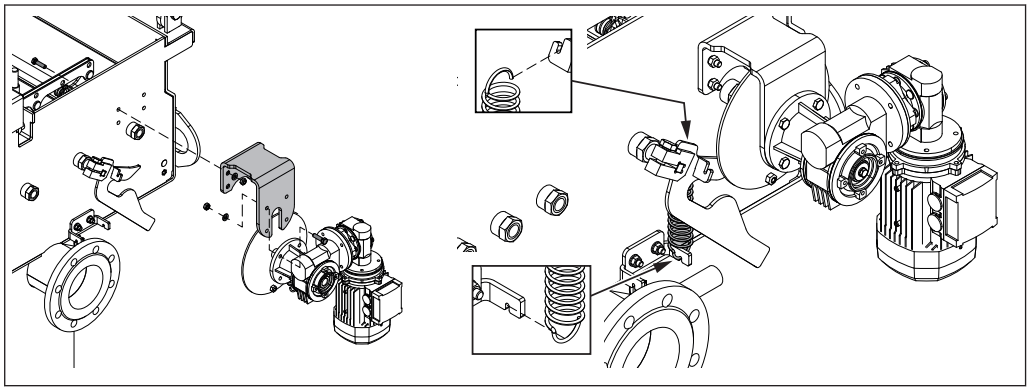


❒ Fit the flat head screw, bushing and nut onto WOS disc
❒ Insert the WOS disc into the geared motor
➥ Ensure groove in shaft is aligned with groove in geared motor
❒ Slide key into groove and fit shaft retainer

Version with heat exchanger on the right:

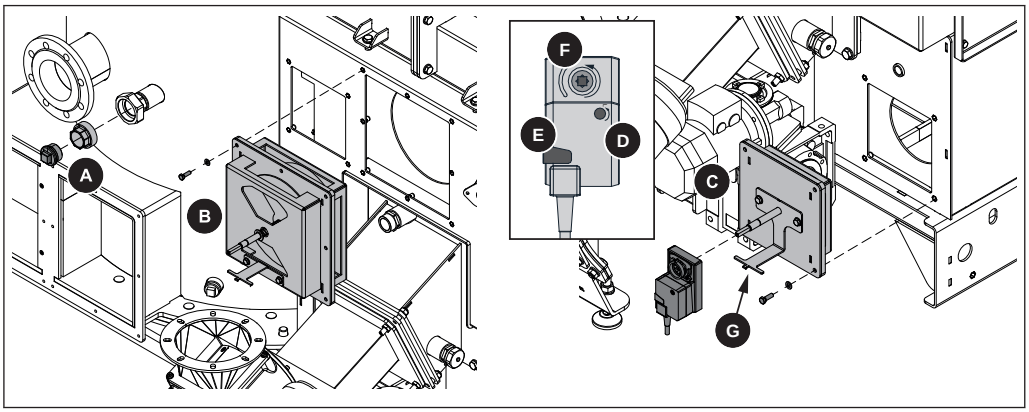


Version with heat exchanger on the left



❒ Fix the motor mount to the gearbox flange using the four screws as shown
❒ Fit WOS drive to heat exchanger
❒ Attach tension spring to linking plate and WOS lever

5.5.7 Installing the air controllers

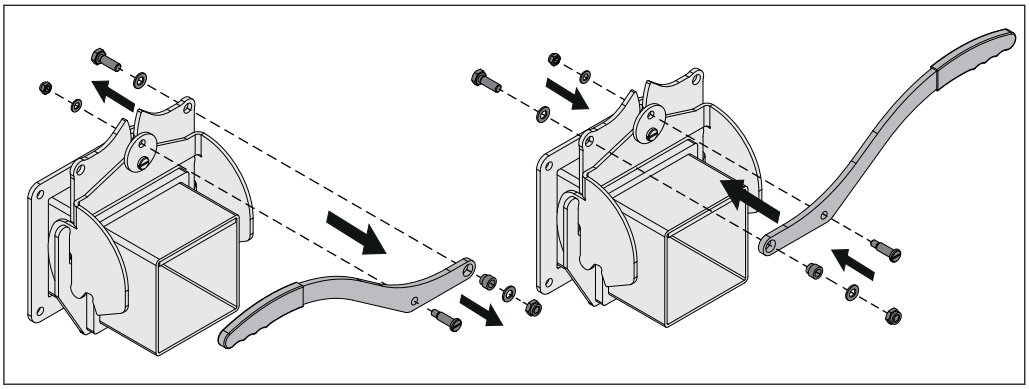


- ❒ Remove the stop and sleeve (A) next to the return flow connection
- ❒ Fit the dual air controller (B) above the stoker
- ❒ Fit air controller (C) next to stoker
- ❒ Position the air damper of the air controller (C) to the left stop
- ❒ Set the direction of rotation of the servo-motor to left (D)
- ❒ Press unlock key (E) and turn drive (F) to the left until it stops
- ❒ Install servo-motor onto shaft
- ❒ Push the torque support (G) slightly down and secure the servo-motor

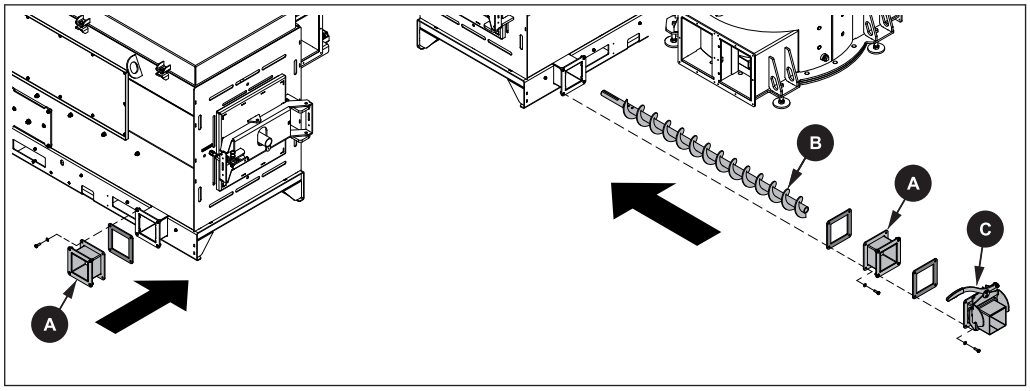
5.5.8 Installing the ash removal chamber

If the heat exchanger is mounted to the left, modify the container connection before you start assembly as follows:

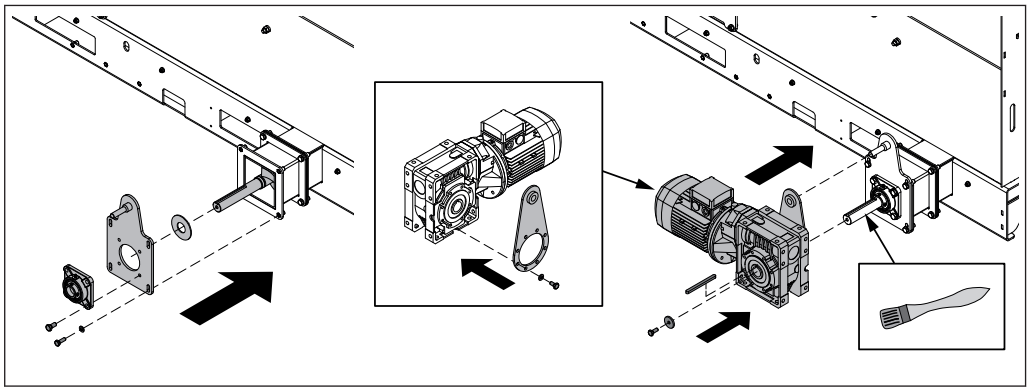
Version with heat exchanger on the left



- ❒ Dismantle the container connection, turn it and then refit it

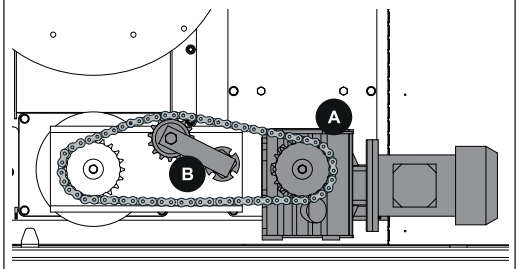
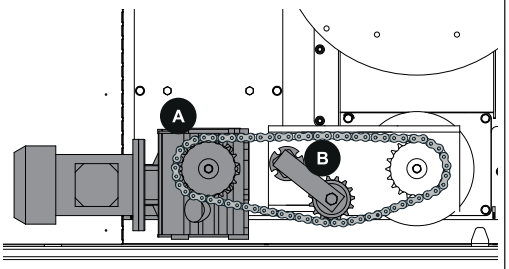


❒ Install adapter flange (A) with seals on both sides of the ash removal channel
❒ Push the ash screw (B) into the combustion chamber
  ➥ The shaft stub must be on the opposite side of the combustion chamber
❒ Fit the container connection (C) with seal onto the adapter flange on the heat exchanger side
  ➥ Make sure that the lever of the container connection is pointing forwards

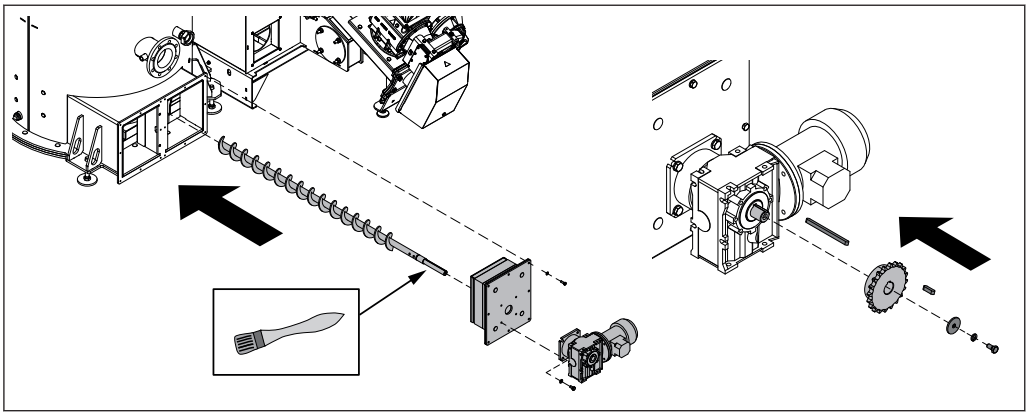


❒ Fix the washer to the shaft stub
❒ Install the flange plate and flange bearing on the ash removal channel
❒ Fit torque support to gears
❒ Lubricate shaft stub with copper paste
❒ Fit the geared motor onto the shaft stub
  ➥ Ensure groove in shaft stub is aligned with groove in geared motor
❒ Slide key into groove and fit shaft retainer

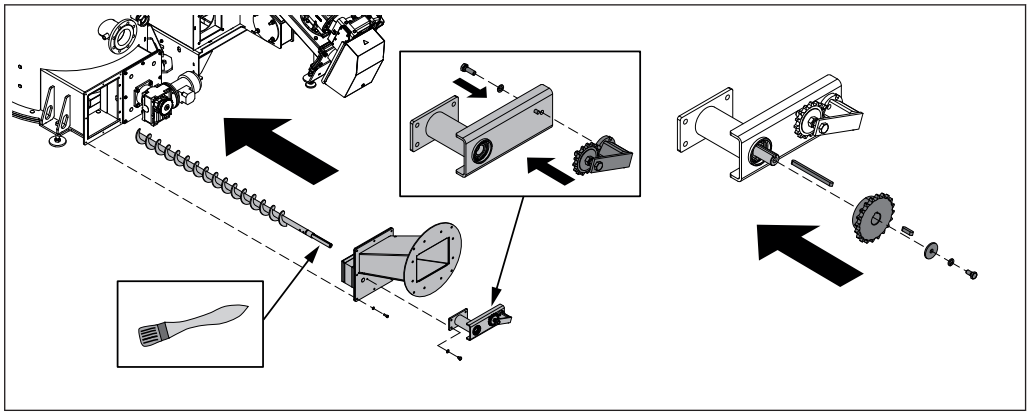
5.5.9 Installing the heat exchanger ash removal unit

Heat exchanger right	Heat exchanger left
	

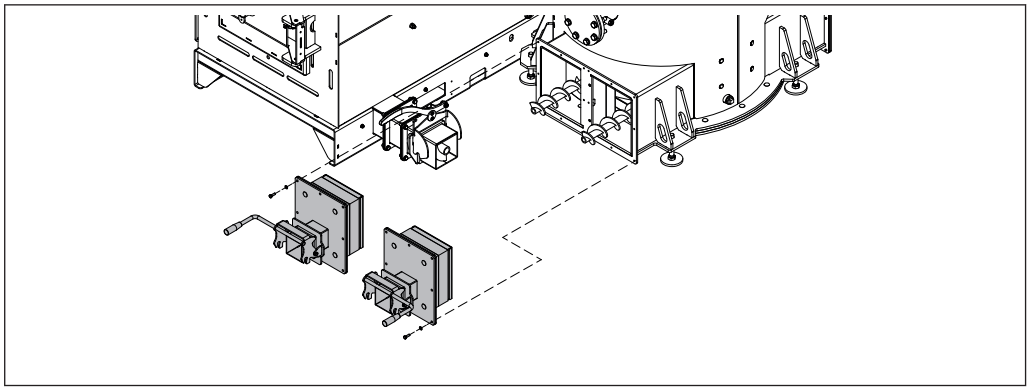
The following instructions are for fitting the automatic heat exchanger ash removal screw unit to a boiler with the heat exchanger mounted on the right. The instructions also apply to boilers with the heat exchanger mounted on the left. It is important to note that the geared motor (A) must always be mounted on the combustion chamber side. This is to ensure that in the event of a roller chain fault ash removal will take place at the first pull. With the heat exchanger on the right, the chain tensioner (B) points upwards. With the heat exchanger on the left, the chain tensioner points downwards.



- ❒ Lubricate shaft stub of ash screw with copper paste
- ❒ Fit geared motor onto flange plate
- ❒ Insert the ash screw through the flange plate and geared motor
  - ➥ Ensure groove in shaft stub is aligned with groove in geared motor
- ❒ Slide the long key for the geared motor into the groove
- ❒ Attach the sprocket
- ❒ Slide the short key for the sprocket into the groove and fit the shaft retainer
- ❒ Insert the flange plate with the ash screw into the heat exchanger on the back of the boiler and fix in place with screws

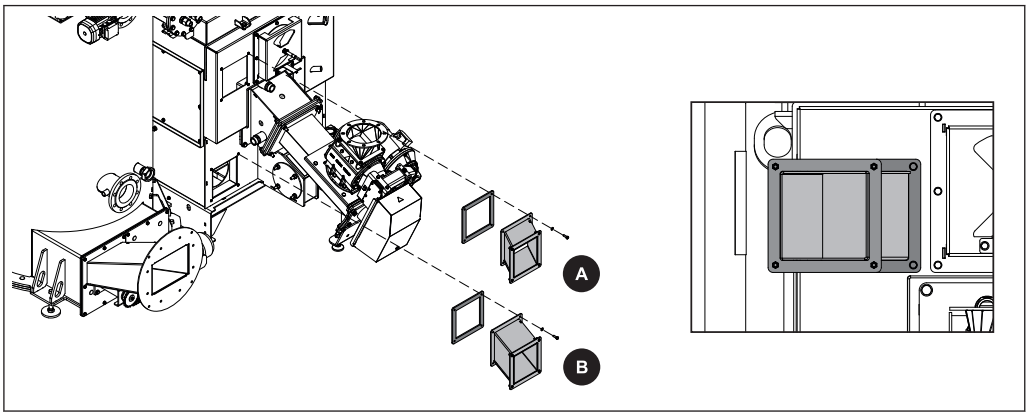


❒ Fit the chain tensioner to the bearing block
  ➥ Engage the chain tensioner with the bolts on the bearing block so that the chain can be tensioned correctly
❒ Fit the bearing block to the induced draught fan flange
❒ Lubricate shaft stub of ash screw with copper paste
❒ Insert ash screw through gear flange and bearing block
  ➥ The groove in the shaft stub must be aligned with the groove in the bearing block
❒ Push long key into the groove
❒ Attach the sprocket
❒ Slide the short key for the sprocket into the groove and fit the shaft retainer
❒ Insert the flange plate with the ash screw into the heat exchanger on the back of the boiler and fix in place with screws



❒ Fit the container connection to the front of the boiler
  ➥ The levers on the locking mechanism must face outwards

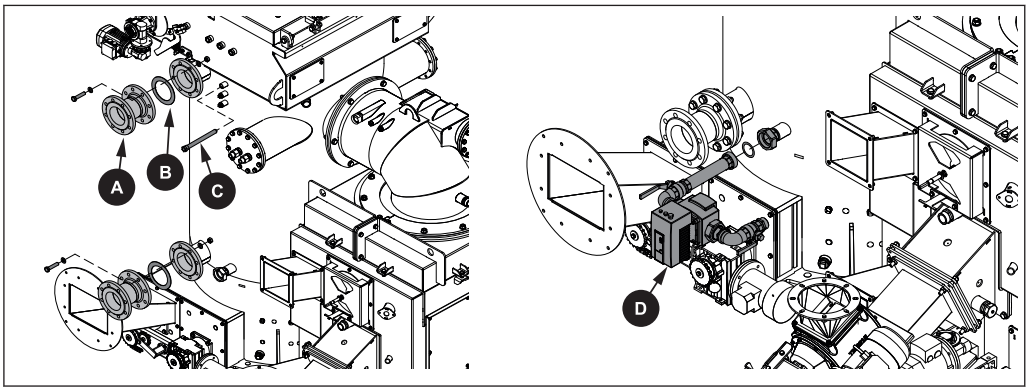
5.5.10 Installing the air ducts



❒ Fit the secondary air duct (A – short) and primary air duct (B – long) with seals to the rear of the boiler as shown

➥ The air ducts must run in the direction of the heat exchanger

5.5.11 Installing the adapter flange und pump assembly (optional)



❒ Fit the adapter flange (A) with seal (B) to the flow and return connections

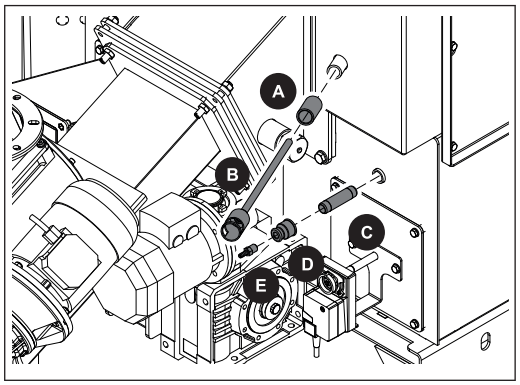
❒ Seal the brass immersion tube (C) next to the flow connection in the upper sleeve

❒ Fir the pump assembly (D – optional) with seal next to return connection

➥ The shorter outflow must point in the direction of the combustion chamber

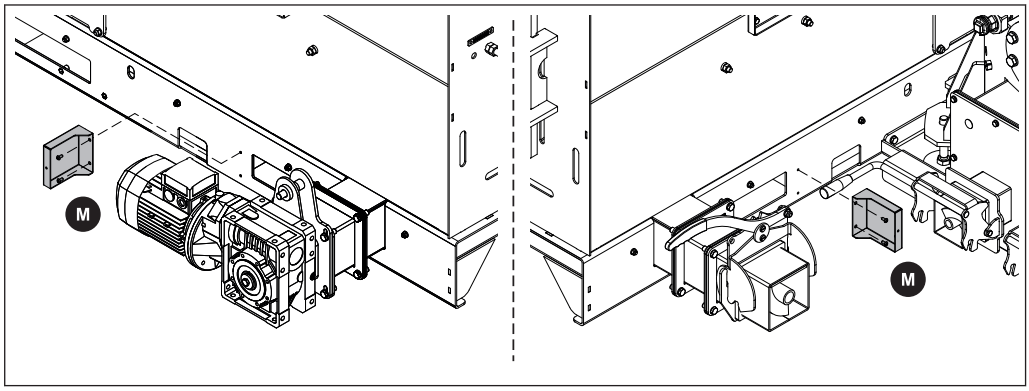
If the optional pump assembly is not used, then the piping must be carried out by an installer, ⇨ See "Cooling connection" [page 64]

5.5.12 Installing the igniter tube and undergrate temperature sensor



❒ Screw on sleeve (A) next to the stoker and secure the igniter tube (B)
❒ Screw in double-nippled pipe (C), secure reduction union (D) and hose nipple (E)

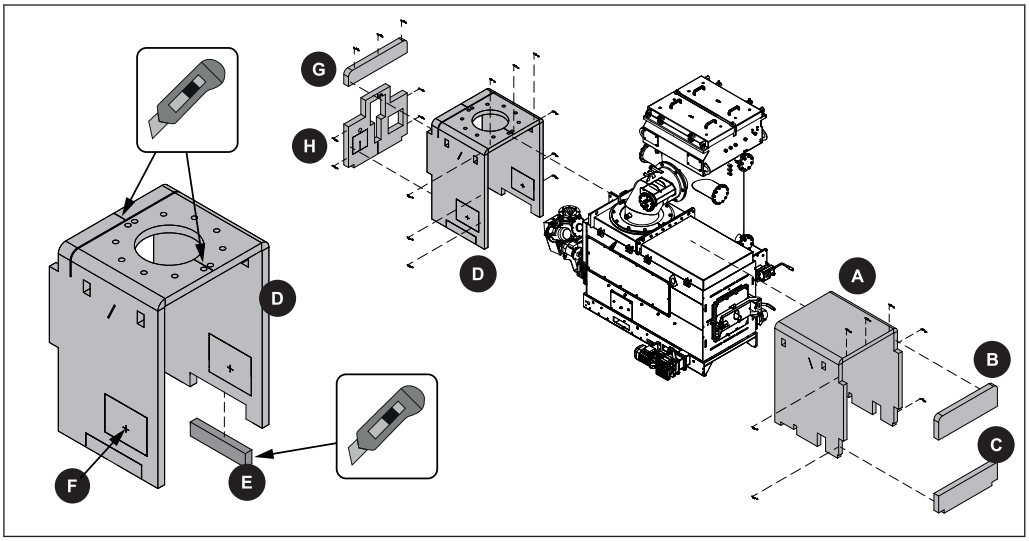
5.5.13 Installing the spacer plate on the combustion chamber



❒ Fit the spacer plate (M) as shown on both sides of the base plate of the combustion chamber, ⇨ See "Installing the frames" [page 36]

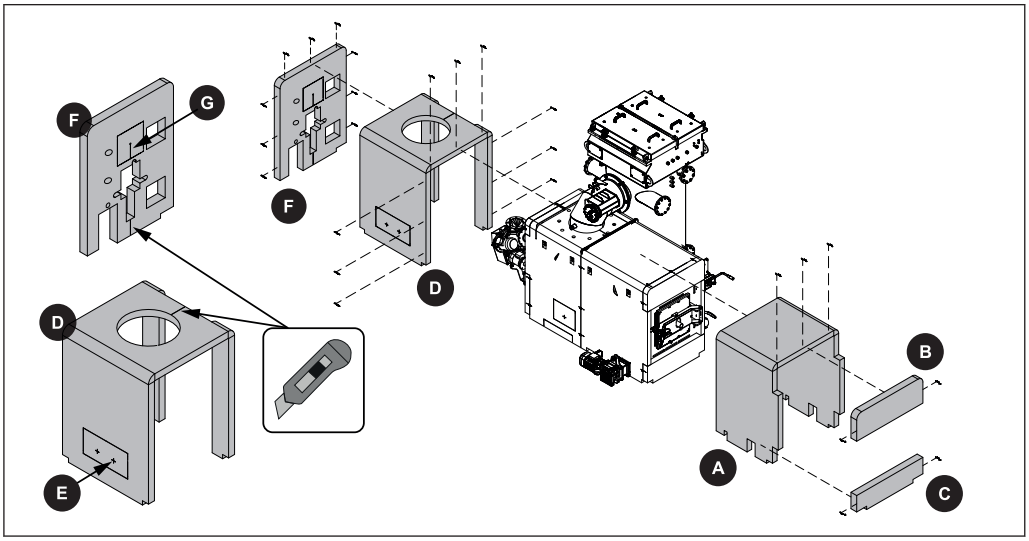
5.5.14 Positioning two-layer thermal insulation on the combustion chamber

1st layer positioning



- ❒ Lay the thermal insulation (A) over the combustion chamber from the front
- ❒ Fix the thermal insulation at the front (B, C) in place using tension springs
  - ➥ Air openings above and below the combustion chamber door must not be covered!
- ❒ Cut the thermal insulation (D) at the top of the perforation and take out the insulating material (E) on the side of the heat exchanger
- ❒ Lay the thermal insulation (D) on the burn through elbow over the combustion chamber and fix in place using tension springs
- ❒ Run the cable of the undergrate temperature sensor through the side cut-out (F)
- ❒ Fix the rear thermal insulation (G, H) in place with tension springs

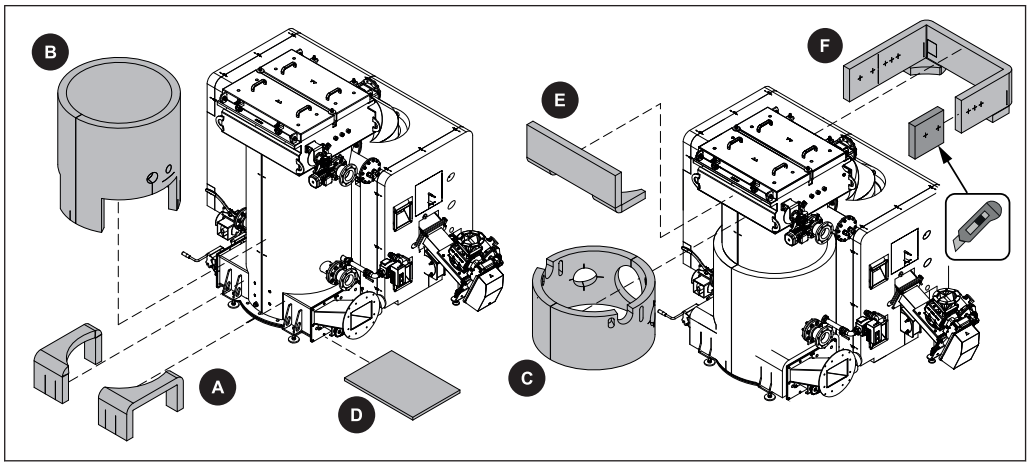
2nd layer positioning



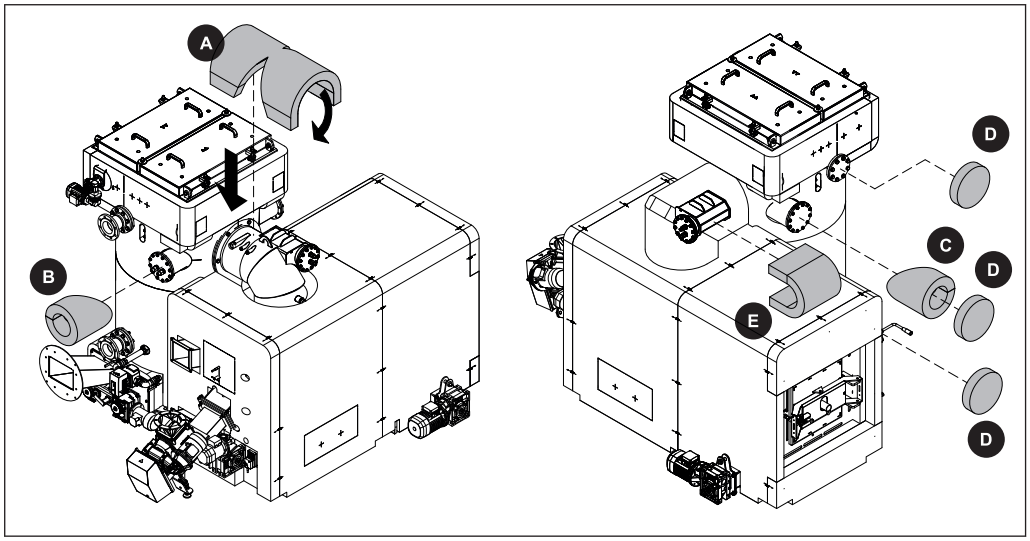
- ❒ Lay the thermal insulation (A) over the combustion chamber from the front
- ❒ Fix the thermal insulation at the front (B, C) in place using tension springs
  - ➥ Air openings above and below the combustion chamber door must not be covered!
- ❒ Cut the thermal insulation (D) at the top of the perforation and lay it on the burn through elbow over the combustion chamber
- ❒ Run the cable of the undergrate temperature sensor through the side cut-out (E)

❒ Cut the thermal insulation (F) at the perforation and fix in place with tension springs at the back of the combustion chamber
➥ Push the thermal insulation on the cut-out (G) over the torque support

5.5.15 Positioning thermal insulation on the heat exchanger



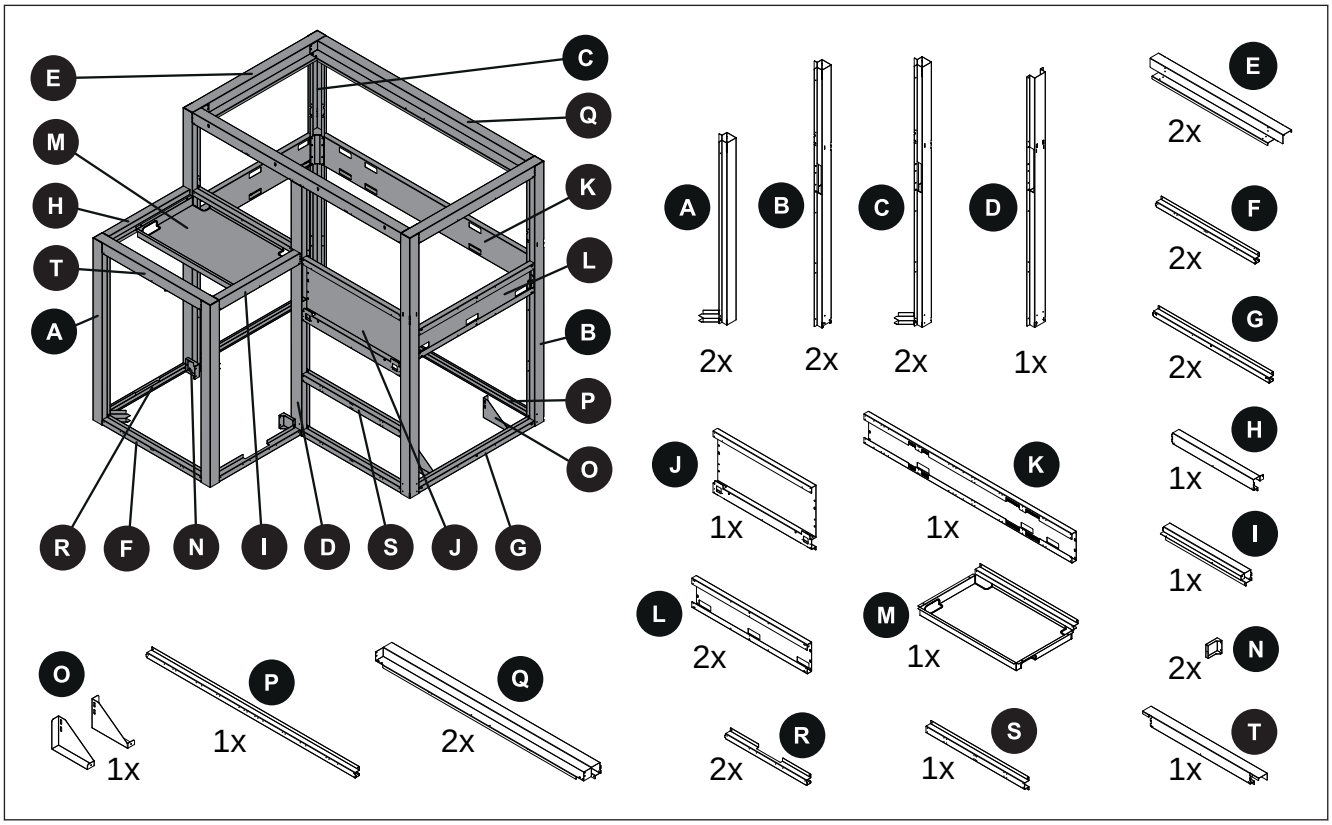
❒ Place thermal insulation (A) onto heat exchanger ash removal
❒ Wrap bottom thermal insulation (B) and upper thermal insulation (C) around heat exchanger and fix in place with tension springs
❒ Push floor insulation (D) underneath the heat exchanger
❒ Position side thermal insulation (E) onto heat exchanger
❒ Shorten thermal insulation (F) on the WOS drive and wrap around heat exchanger

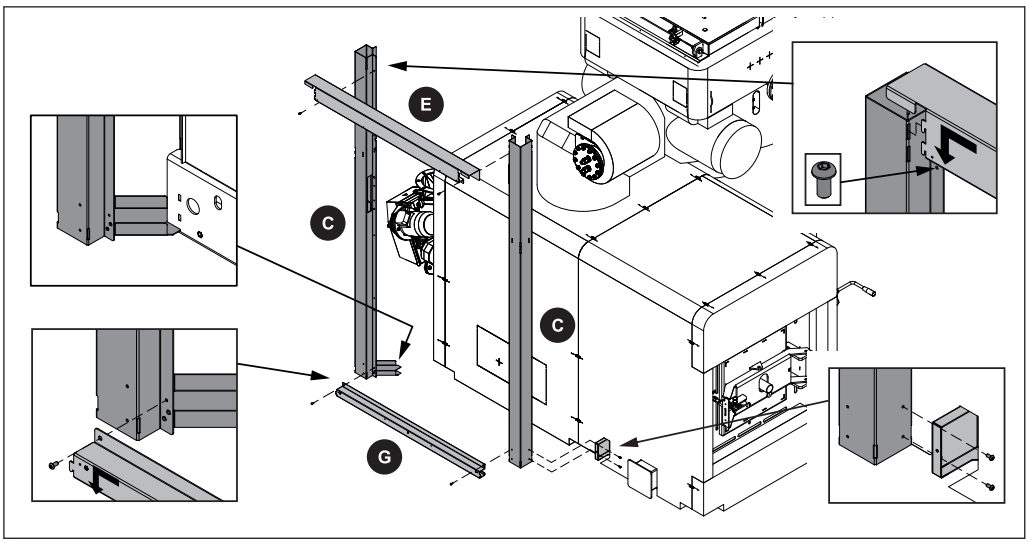


❒ Place thermal insulation (A) on burn through elbow
➥ Keep the safety battery free
❒ Position thermal insulation (B, C) on the flow connection at the front and back
❒ Position round thermal insulation (D) at the front of the flow, return and blanking plate of the safety battery

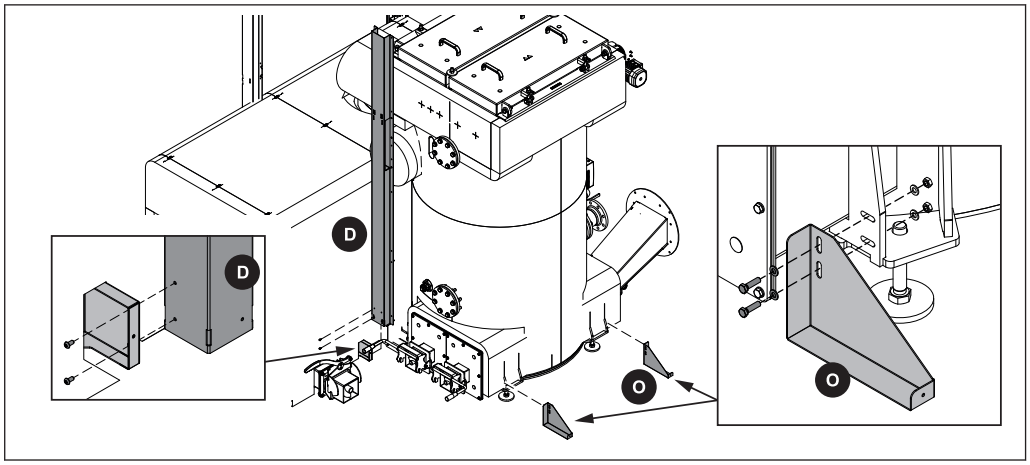
5.5.16 Installing the frames

Frames overview

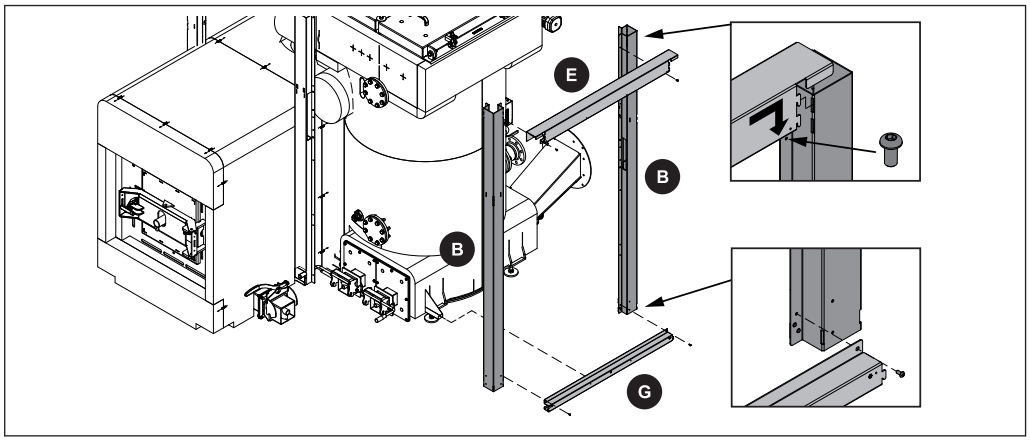




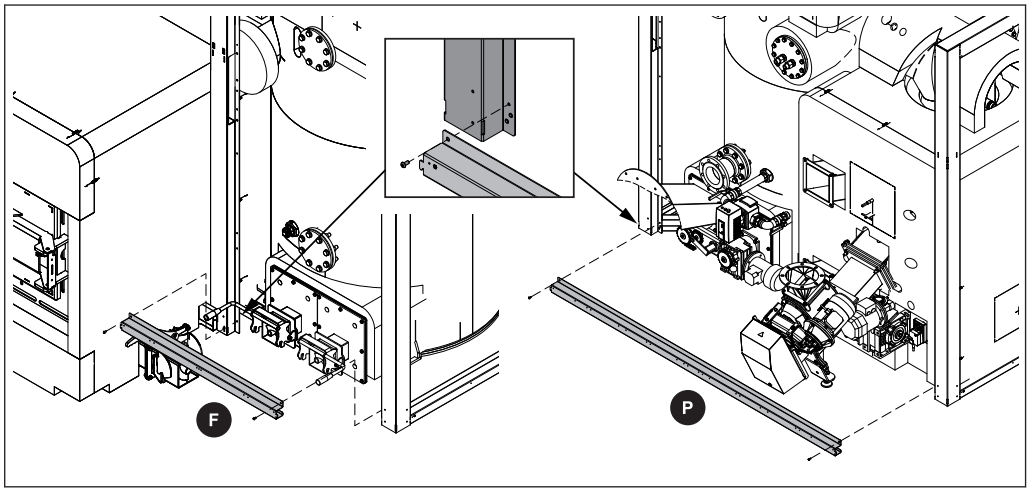
- ❒ Fix the support element (C) to the spacer plate with two screws
- ❒ Position the support element (C) at the rear of the combustion chamber so that the recess of the bottom spacer plate touches the base plate of the combustion chamber
- ❒ Hang the lengthways struts (E, G) onto the support elements and fix them in place



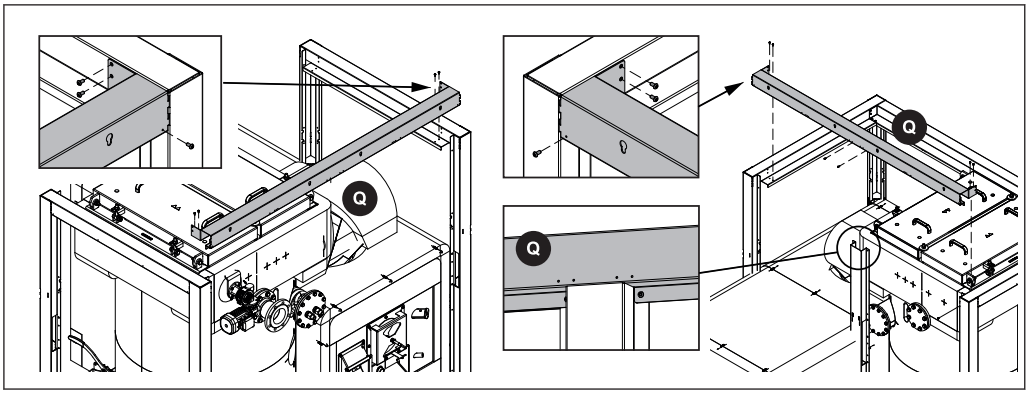
❒ Fix the support element (D) to the spacer plate with two screws
❒ Fit both fixing brackets (O) to the lugs of the adjustable feet of the heat exchanger



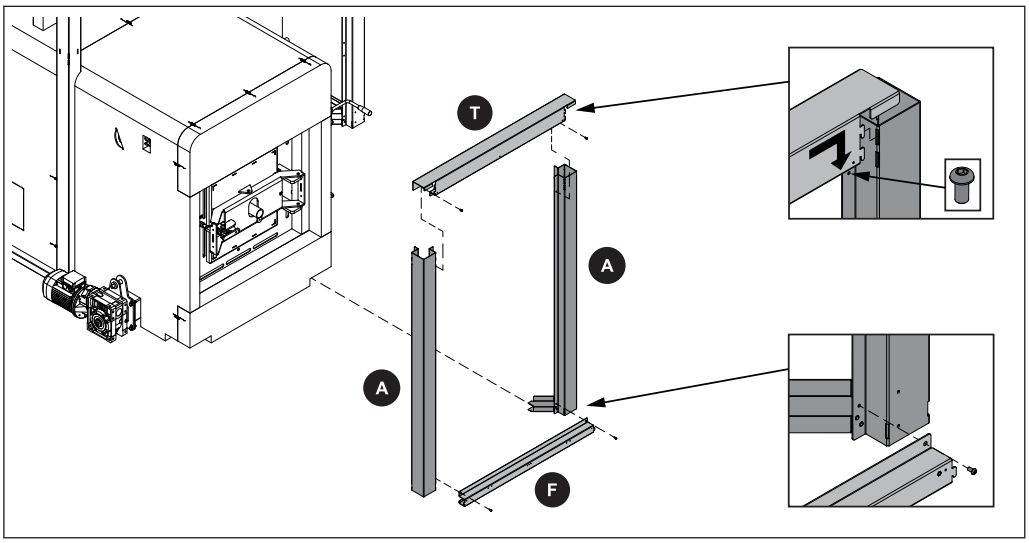
❒ Hang the lengthways struts (E, G) onto the support elements (B) and fix them in place
❒ Fit lengthways strut (G) to the fixing brackets (O)



❒ Hang cross-piece (F) below container connections and fix in place
❒ Insert cross-piece (P) under the stoker, hang it on to the frame and fix it in place

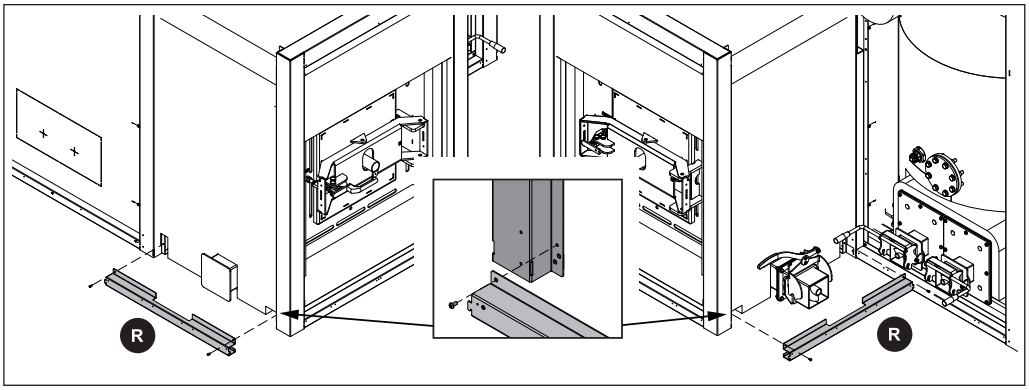


❒ Hang cross-piece (Q) onto the support elements and fix it in place

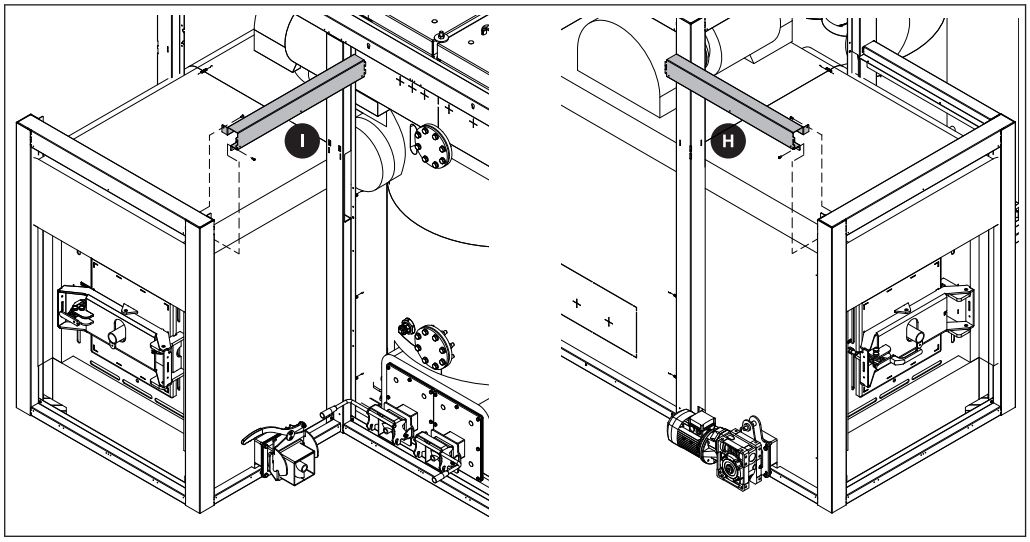


❒ Position the front support elements (A) on the combustion chamber so that the recesses of the bottom spacer plates make contact with the bottom plate of the combustion chamber

❒ Hang cross-pieces (F, T) onto the support elements and fix them in place

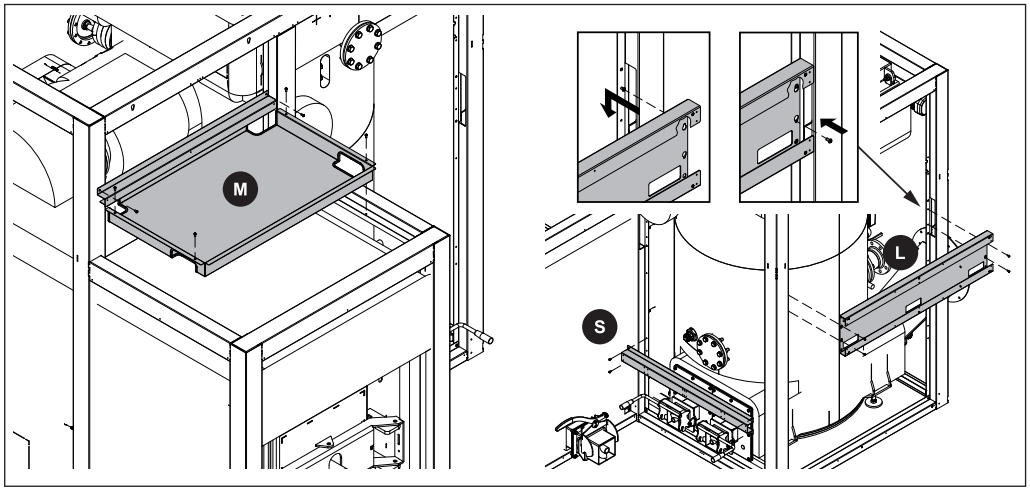


❒ Insert lengthways struts (R) underneath the drive and container connection and fix in place



❒ Hang lengthways struts (H, I) to the front frame and to the support elements and fix in place

➥ Latch with bore hole must be fixed to the front frame

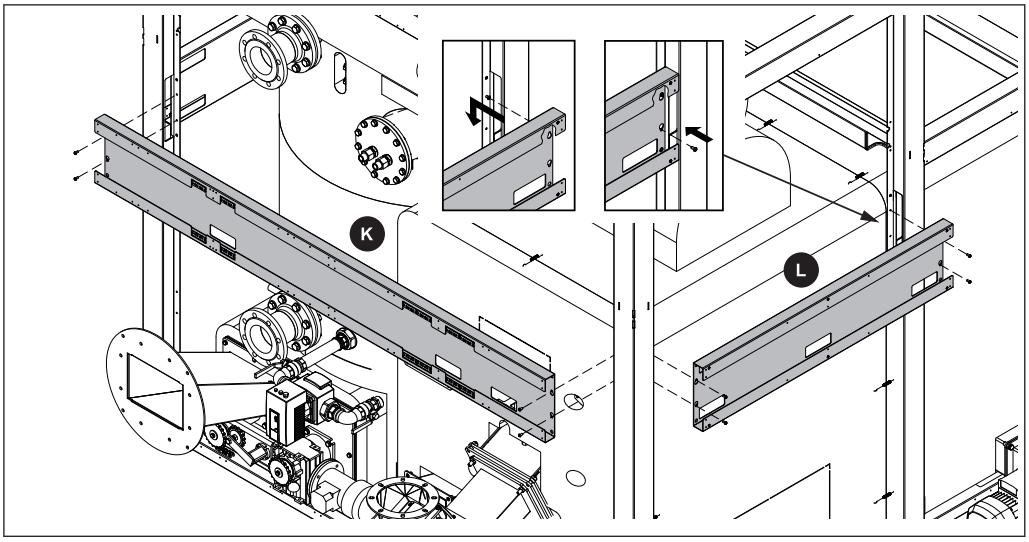


❒ Position the cable tray (M) above the combustion chamber and fix it in place

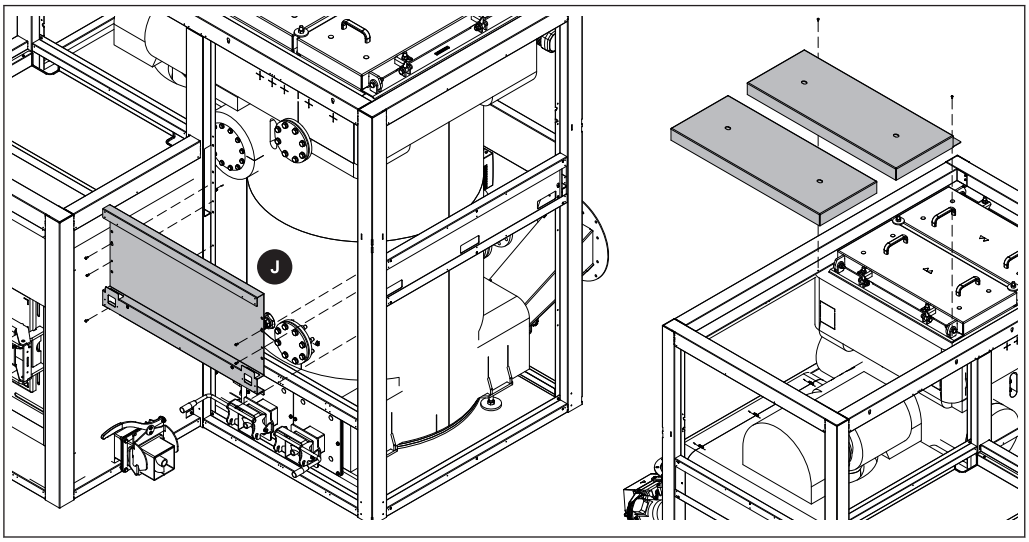
❒ Hang the cross-piece (S) above the container connection and fix it in place

❒ Fit the cable duct (L) to the support elements

➥ **TIP:** Screw one screw into each of the upper holes of the support elements and hang the cable duct (L) Screw one screw into each of the lower holes and tighten all screws



❒ Fit cable ducts (K, L) to the support elements



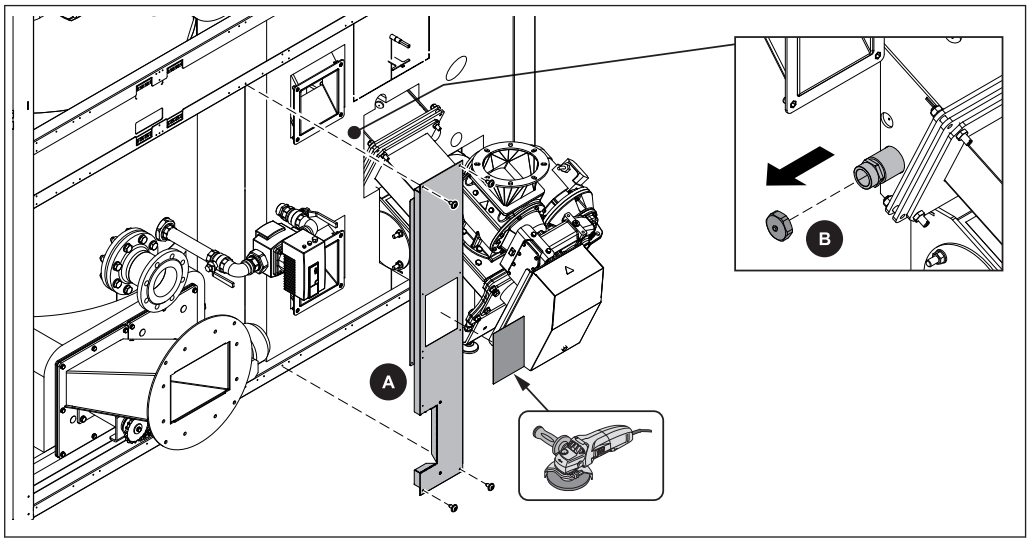
❒ Screw one screw into each of the upper holes of the support elements and hang the cable duct (J)

❒ Screw two screws into each of the lower holes and tighten all screws

❒ Insert the cover with latch above the combustion chamber and fix it to the cross-pieces

❒ Insert the cover next to it

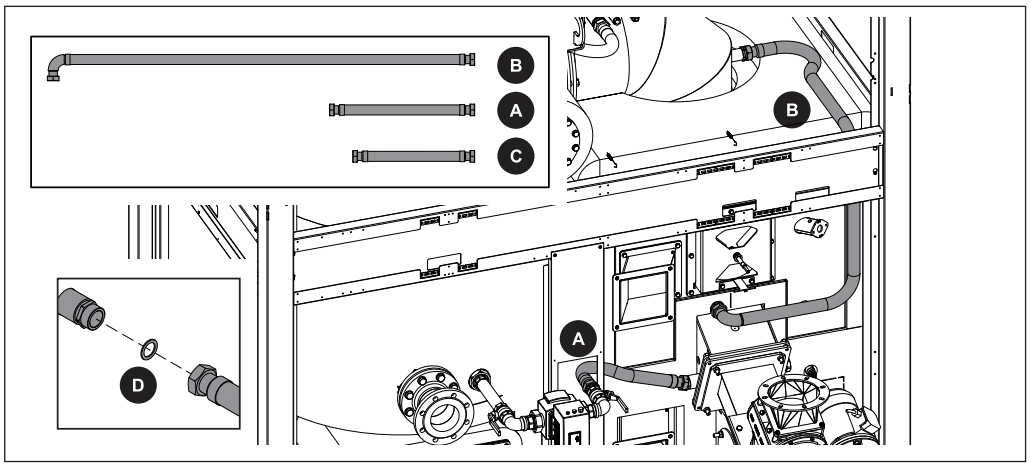
5.5.17 Preparing the cooling piping (optional)



❒ Cut out the pre-punched blanking at the rear cover plate (A)
➥ Blanking for the cooling piping
❒ Fit the cover plate onto the frame so that the pump assembly connection is flush with the blanking
❒ Remove cover (B) on the stoker on the side of the heat exchanger

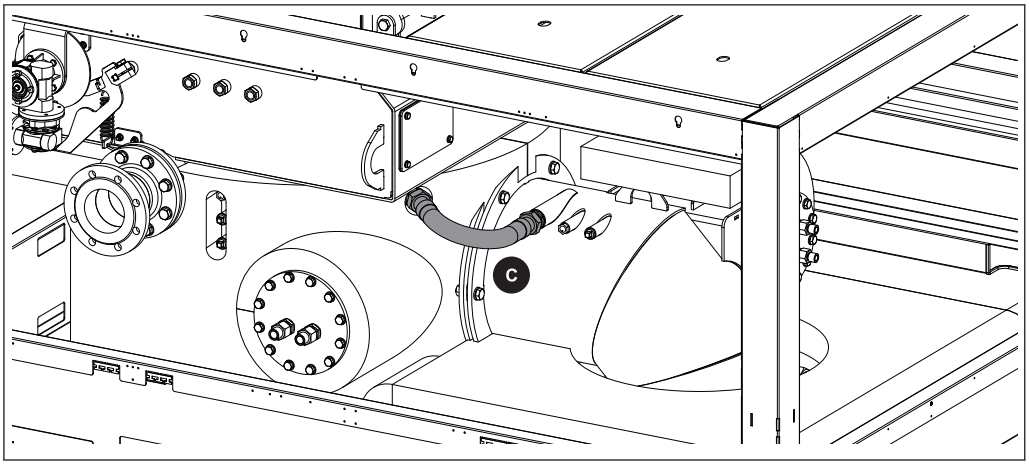
5.5.18 Installing the cooling piping (optional)

The following steps apply when using the optionally available cooling piping. If this is not the case, then the piping must be carried out by an installer, ⇨ See "Cooling connection" [page 64]



Establish connections with stainless steel corrugated hoses including flat seal (D) as follows:

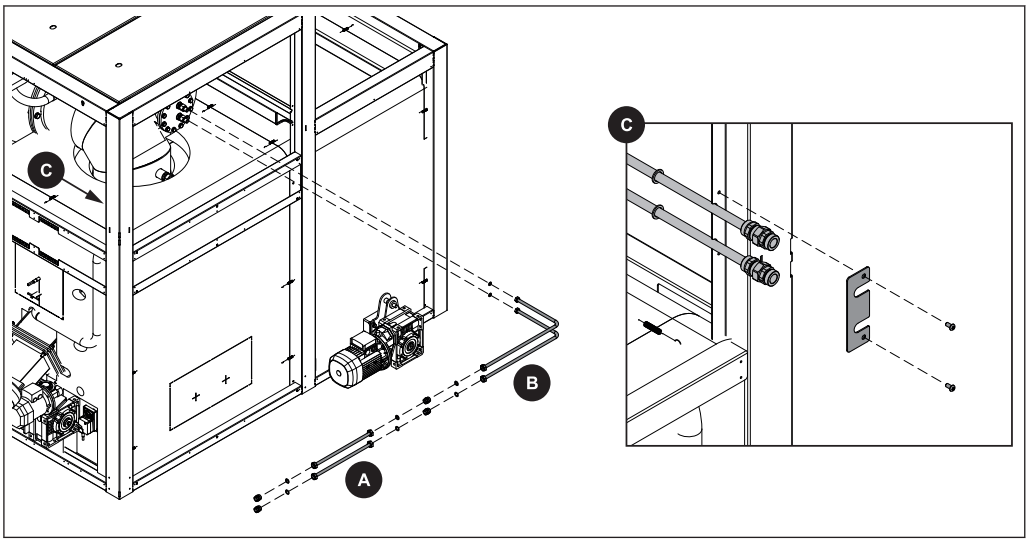
❒ A: Pump assembly and side connection to the slide-on duct
❒ B: Upper connection to the slide-on duct with lateral connection to the burn through elbow



❒ C: Rear connection to burn through elbow with connection to the heat exchanger

5.5.19 Installing the piping of the safety battery

The following step describes the procedure when the heat exchanger is located on the right-hand side For heat exchangers located on the left-hand side, pipe connections A are not required, the pipe connections B are inserted at the rear support element.



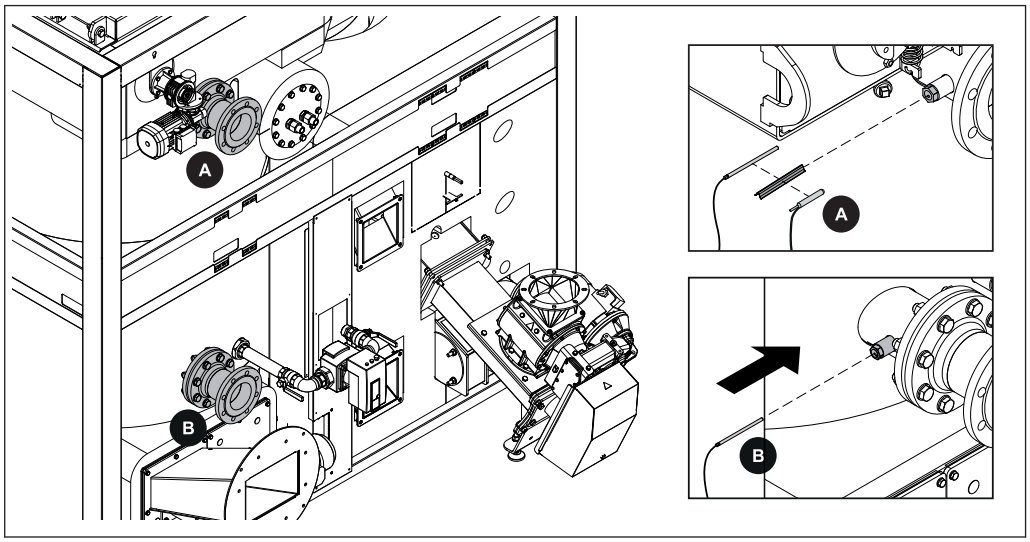
❒ Screw in the double nipple with SIL seal on both sides of the pipe connections (A)

❒ Screw bent pipe connections (B) to the pipe connections (A)

❒ Secure the entire piping to the safety battery on the burn through elbow with SIL seals

❒ Insert the piping into the recess on the rear support element and fix it with a securing plate (C)

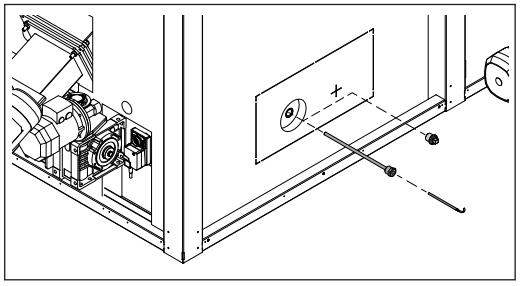
5.5.20 Fit sensor and wire components



❒ **Boiler flow A:**
Push the boiler sensor and STL capillary into the pre-installed immersion sleeve with the pressure spring

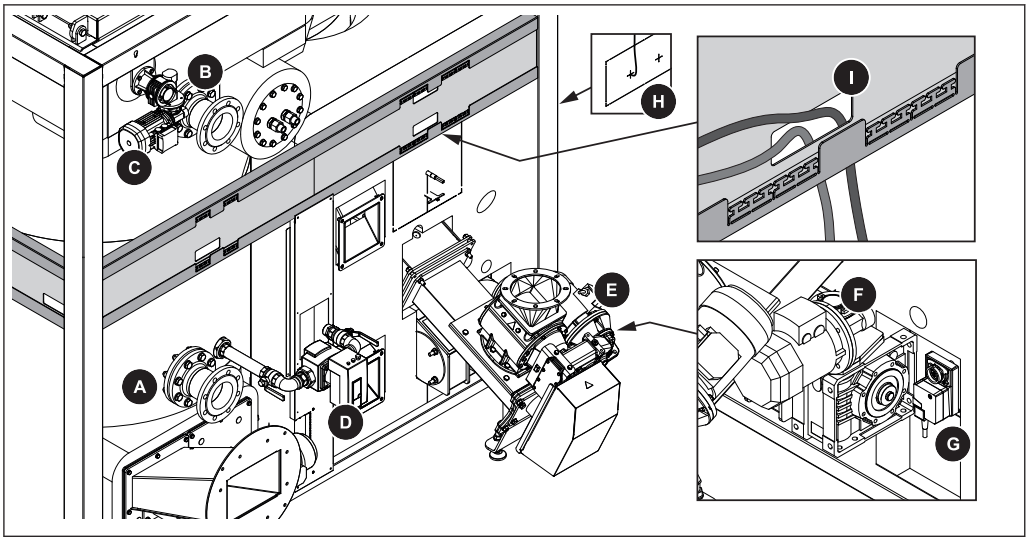
❒ **Boiler flow B:**
Push the boiler sensor into the pre-installed immersion sleeve

The high-limit thermostat is fitted later, ⇨ See "Installing the cladding" [page 45]



❒ Remove the blanking plug from the side of the combustion chamber and screw in immersion sleeve tightly

❒ Insert and secure the undergrate temperature sensor

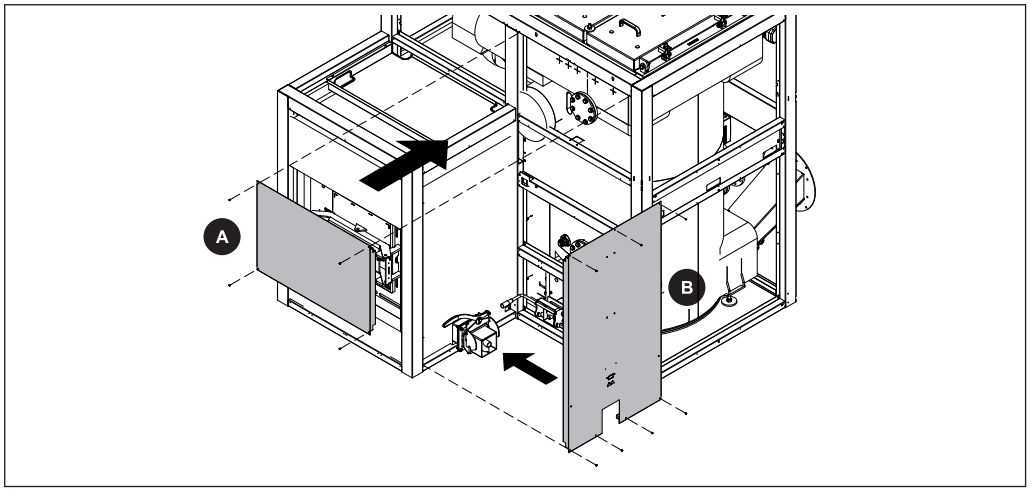


❒ Lay the following cables to the cable duct:
- Boiler sensor from boiler return (A)
- Boiler sensor and STL capillary from boiler flow (B)
- WOS-drive (C)
- Pump assembly optional (D)
- Drive for rotary valve and stoker (E)
- Drive for moving grate (F)
- Servo-motor next to stoker (G)
- Undergrate temperature sensor (H)

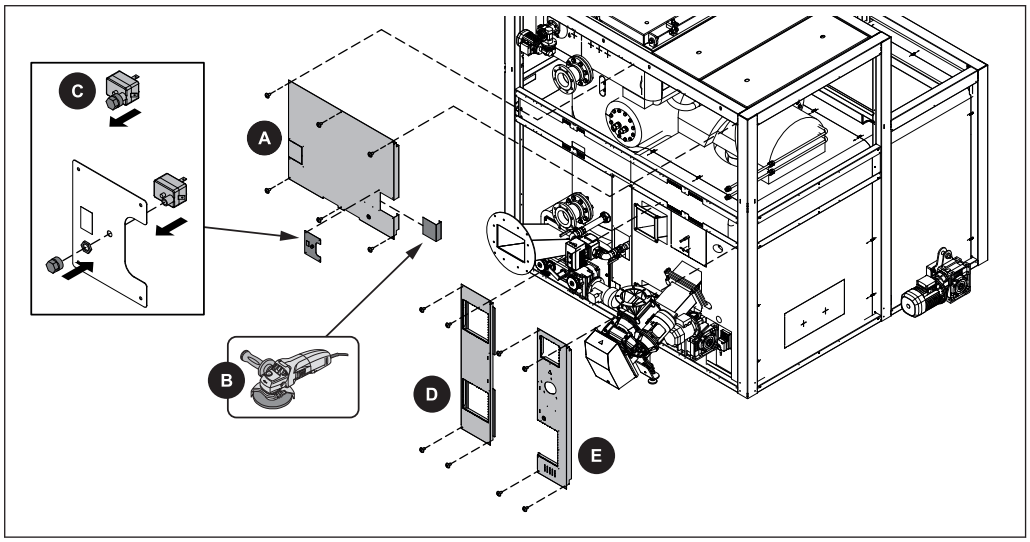
➥ Feed the cables through the cut-out (I) from the back into the cable duct

5.5.21 Installing the cladding

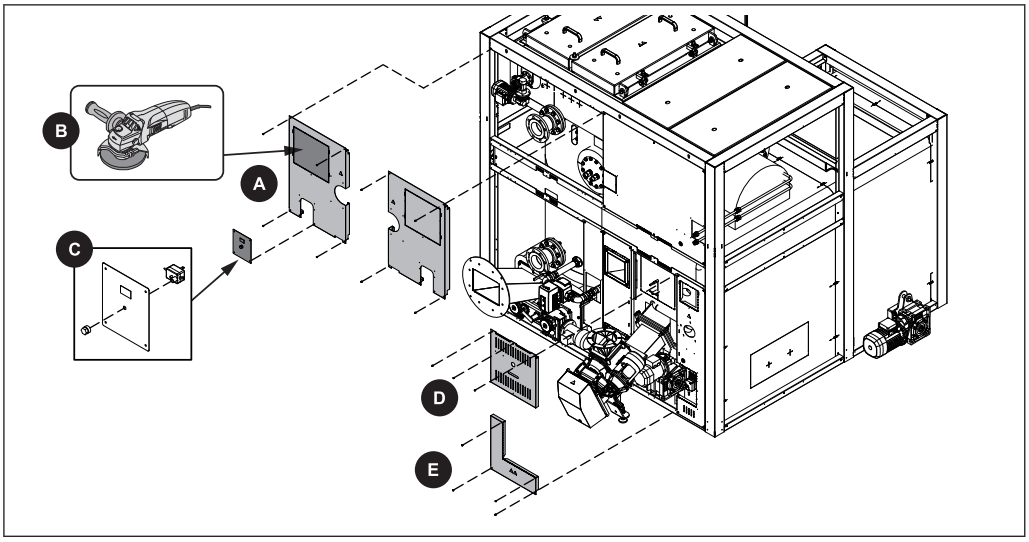
NOTICE! Some parts of the cladding are covered with a protective film, which must be carefully removed immediately before installation.



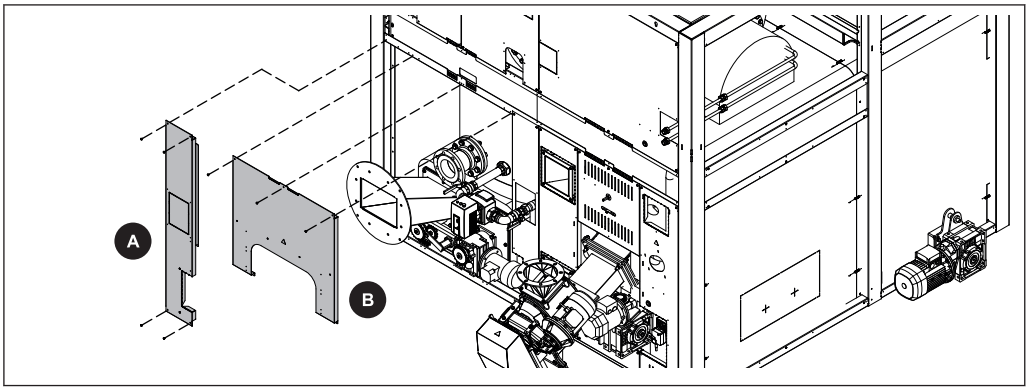
❒ Fix side panel (A) to the frame of the heat exchanger
❒ Fix side panel (B) behind container connection to the frame of the combustion chamber



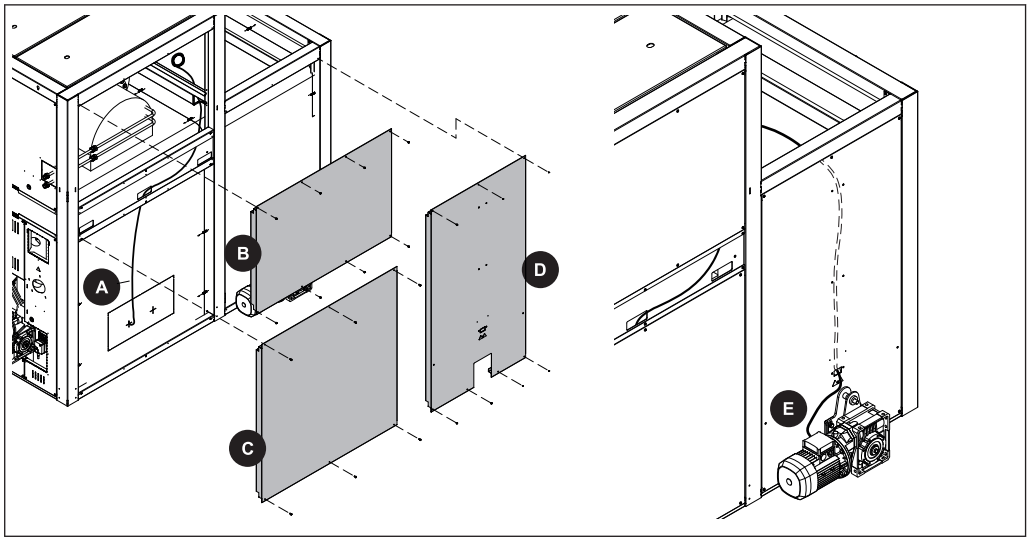
❒ Cut out the pre-punched blanking on the cover plate (A) at the position of the piping (B)
❒ Remove the cap and fixing bolt of the high-limit thermostat (STL) (C)
❒ Insert the STL (C) from the back through the cover plate
❒ Refit the lock nut to the front of the STL. Screw on the cap
❒ Fix the cover plate to the cover plate (A) and fit the cover plate onto the frame
❒ Feed the STL cable through the cut-out from the back into the cable duct
❒ Fix cover plates (D, E) next to stoker



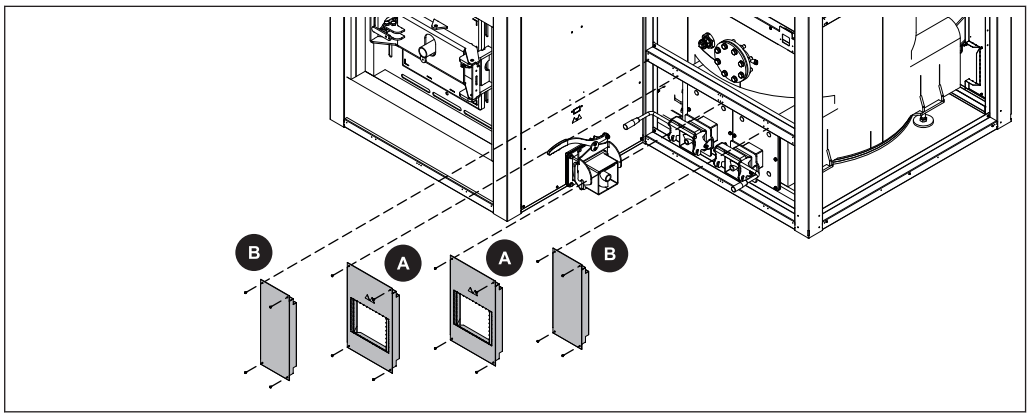
- ❒ Cut out pre-punched blanking for WOS drive at the corresponding cover plate (A) with angle grinder (B)
- ❒ Fit the STL to the cover plate (C) in the same way as before and fix it to the cover plate (A)
- ❒ Feed the STL cable through the cut-out from the back into the cable duct
- ❒ Fix both cover plates to the rear of the heat exchanger
- ❒ Fix cover plate (D) above and cover plate (E) below stoker



- ❒ Fix cover plate (A) to the frame behind the heat exchanger
- ❒ Fix cover plate (B) over heat exchanger ash removal

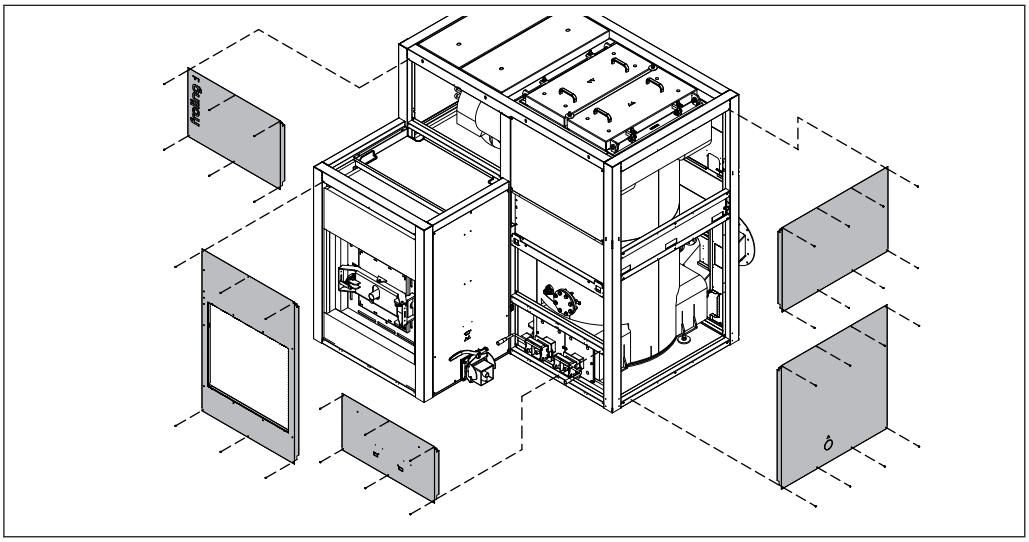


- ❒ Feed the cable of the undergrate temperature sensor (A) through the cut-out from the rear into the cable duct and lay it forward to the cable tray
- ❒ Fix the cover plate (B) above and cover plate (C) below the cable duct
- ❒ Fix the cover plate (D) behind the ash removal drive to the frame of the combustion chamber
- ❒ Bend the pre-punching area inwards above the ash removal and lay the drive cables via the cable duct to the cable tray

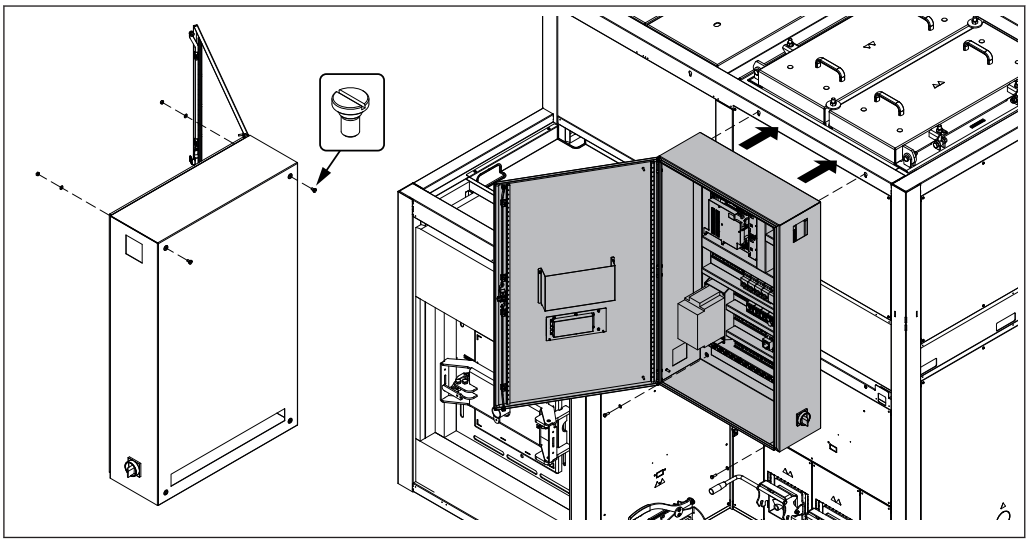


- ❒ Attach cover plates (A) onto the levers and fix them to the frame
- ❒ Fix cover plates (B) onto the outside of the frame

Fix the cover plates to the frame as shown:



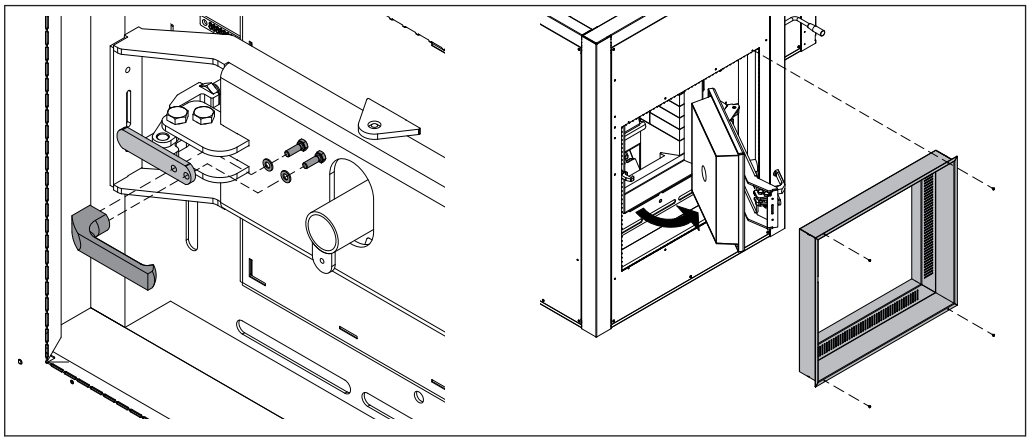
5.5.22 Fitting the control cabinet



❒ Fix flat-headed screw with nut and washer at the rear of the control cabinet

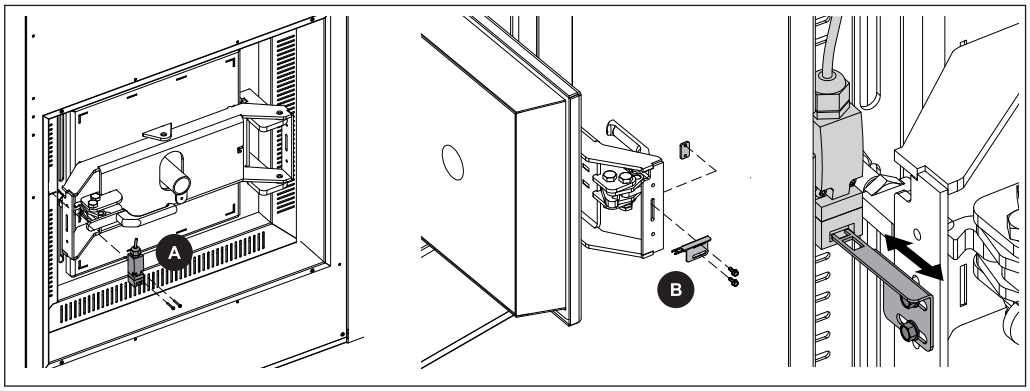
❒ Hang the control cabinet from the recesses on the cross frame and fix it with screws at the bottom

5.5.23 Installing the combustion chamber door components



❒ Fit the door handle on the combustion chamber door

❒ Open door, insert door frame and fix it to cover plate



❒ Fix door contact switch (A) to the door frame

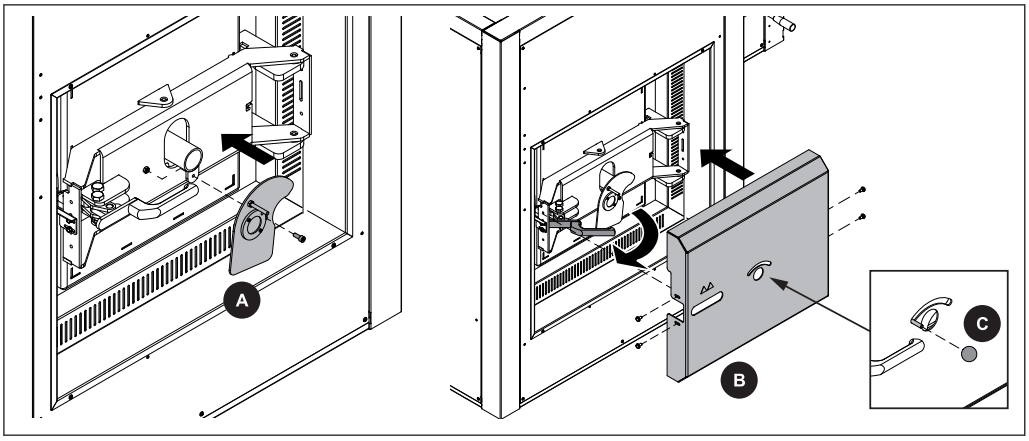
❒ Lay cable over cable tray to control cabinet

❒ Fit the key plate (B) to the combustion chamber door

➥ Do not fully tighten the screws yet

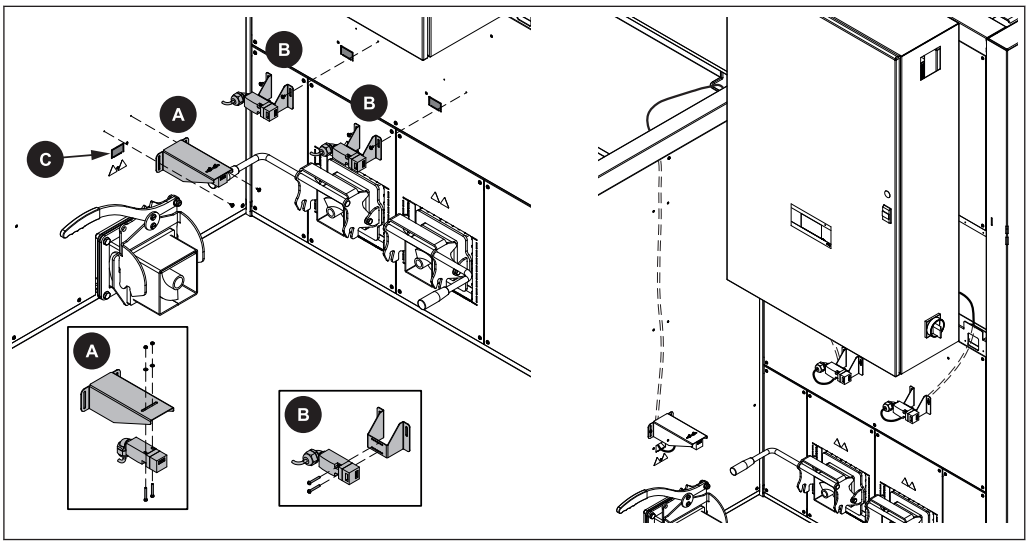
❒ Close the door and as you are doing so, slide the key plate so that it engages smoothly with the door contact switch

❒ Fix the key plate in position. Open and close the door several times and check that the door contact switch has properly engaged.



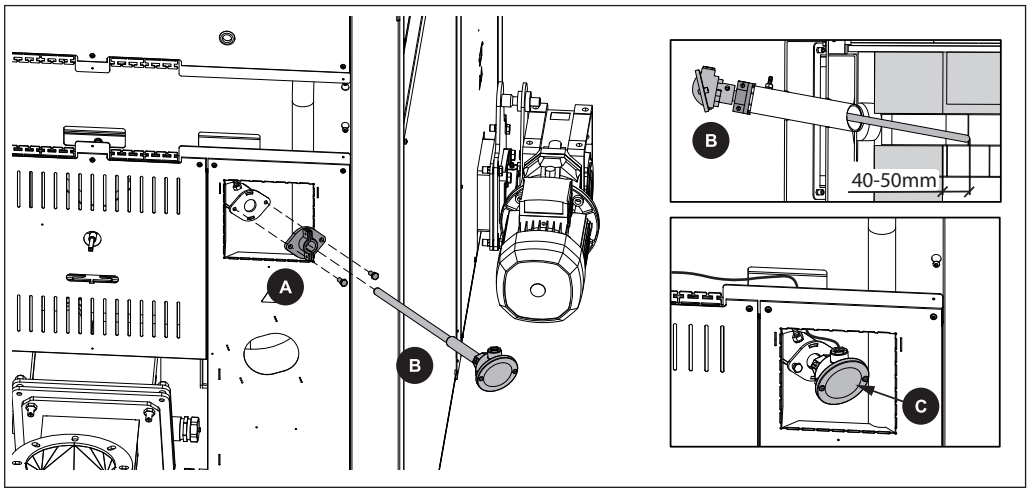
- ❒ Fit the rotary disc (A) to the combustion chamber door
- ❒ Open the door slightly and insert the cover (B)
- ❒ Fix the cover to the door
- ❒ Attach the spherical handle (C) to the rotary disc

5.5.24 Installing the ash container limit switch

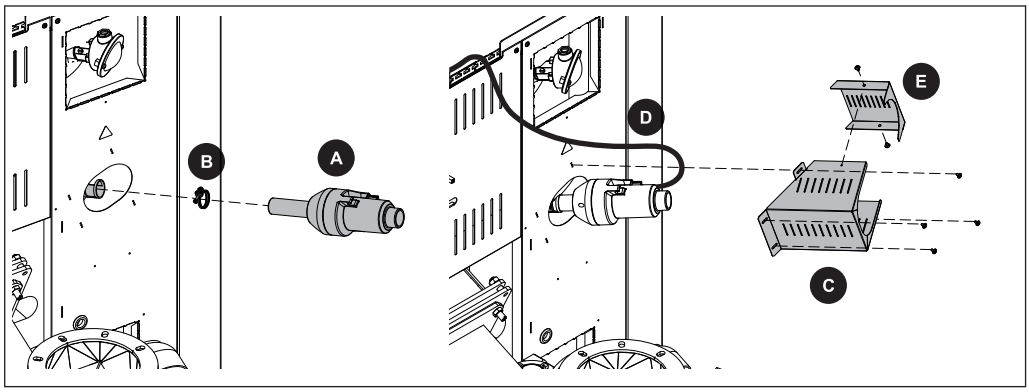


- ❒ Fit the limit switch to bracket (A) and fix it to the cover plate above the container connection of the combustion chamber
- ❒ Fit the limit switch to bracket (B) and fix it to the cover plate above the container connection of the heat exchanger
- ❒ Press the perforations (C) inwards and lay the cable to the control cabinet

5.5.25 Installing the combustion chamber temperature sensor and ignition

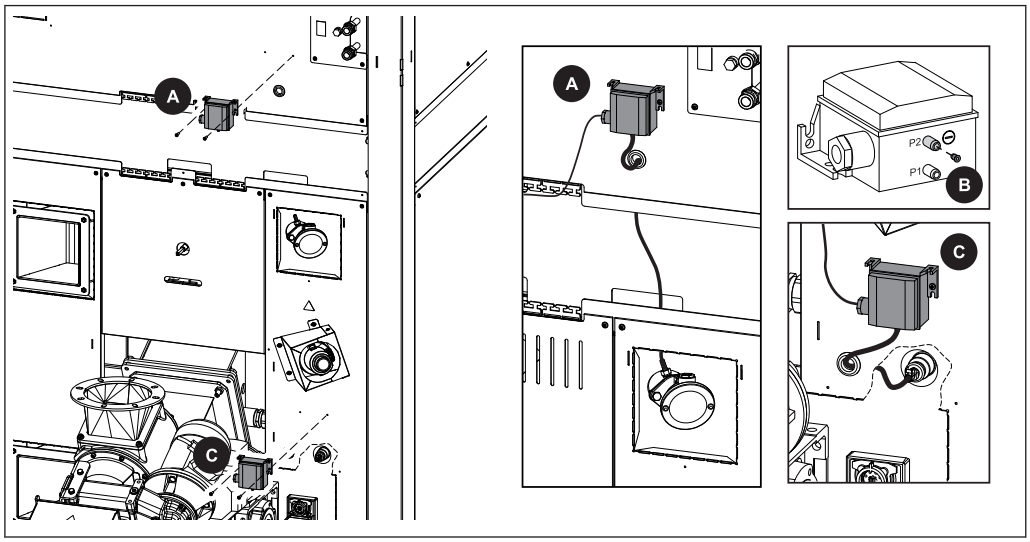


- ❒ Fit counter flange (A) to flanged pipe
- ❒ Insert the combustion chamber temperature sensor (B) so that it projects by approx. 40 - 50 mm into the combustion chamber
- ❒ Fix in position on the counter flange with the clamping screws by hand
- ❒ Unscrew the connector box cover (C). Connect up the compensating line as follows:
  - green wire to the terminal with the green dot
  - white wire to the unmarked terminal
  - shield not connected up.
- ❒ Feed the compensating line through the cut-out from the rear into the cable duct



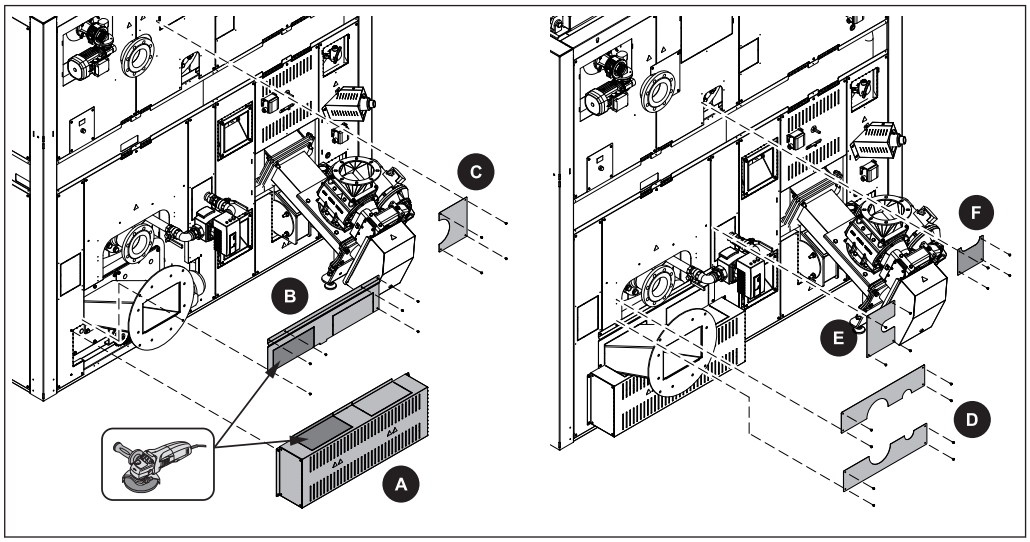
- ❒ Slide the double screw clip (B) onto the already mounted igniter tube
- ❒ Insert the ignition fan (A) into the igniter tube and fix in place using the double screw clip (B)
- ❒ Fit the cover (C)
- ❒ Connect cable (D) to the ignition fan and lay it to the control cabinet
- ❒ Fit the cover (E)

5.5.26 Installing the underpressure controller

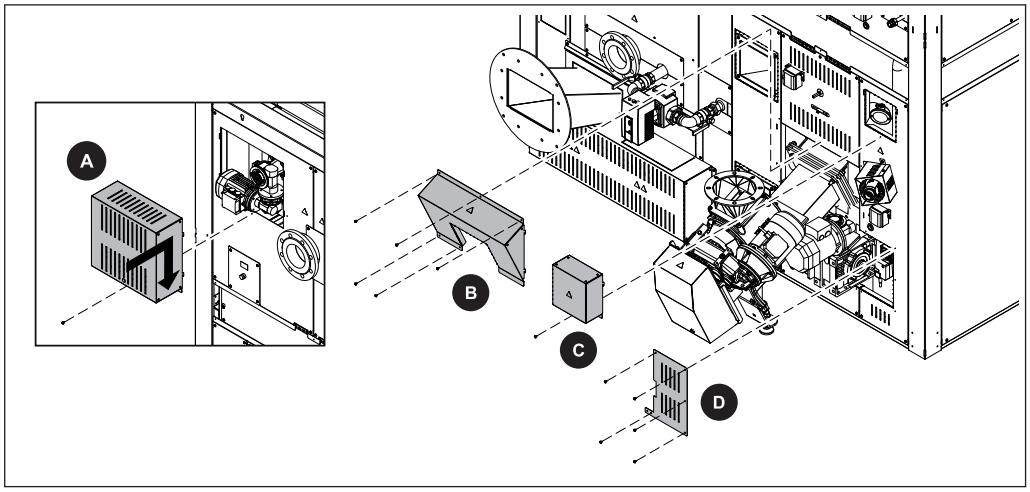


- ❒ Install differential pressure transmitter (A) next to safety battery
- ❒ Insert the reducing plug (B) at connection "-" on the transmitter
- ❒ Attach air hose with "-" hose nipple to the transmitter and lay it to the hose nipple on the combustion chamber temperature sensor
  - ➥ Secure both sides with hose clamps
- ❒ Install differential pressure transmitter (C) next to stoker
- ❒ Insert the reducing plug (B) at connection "-" on the transmitter
- ❒ Attach air hose with "-" hose nipple to the transmitter and lay it to the hose nipple behind the cover
  - ➥ Secure both sides with hose clamps

5.5.27 Installing remaining covers

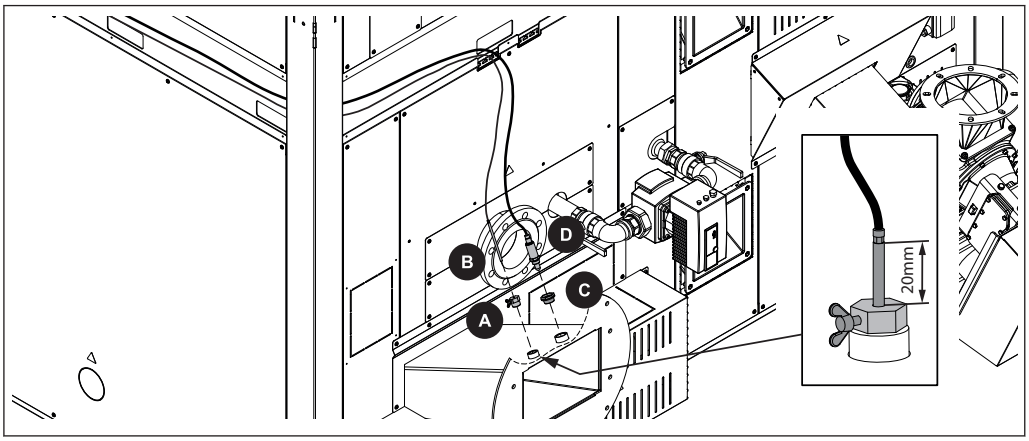


- ❒ Remove the pre-punched blanking for induced draught fan flange from cover (A) and fix the cover with captive screws under heat exchanger ash removal
- ❒ Remove the pre-punched blanking for induced draught fan flange from cover (B) and fix the cover above the heat exchanger ash removal
- ❒ Fix cover (C) to flow connection
- ❒ Fix cover plates (D) to the return connection
- ❒ Fix cover plate (E) behind pump assembly
- ❒ Fix cover plate (F) to the safety battery of the heat exchanger



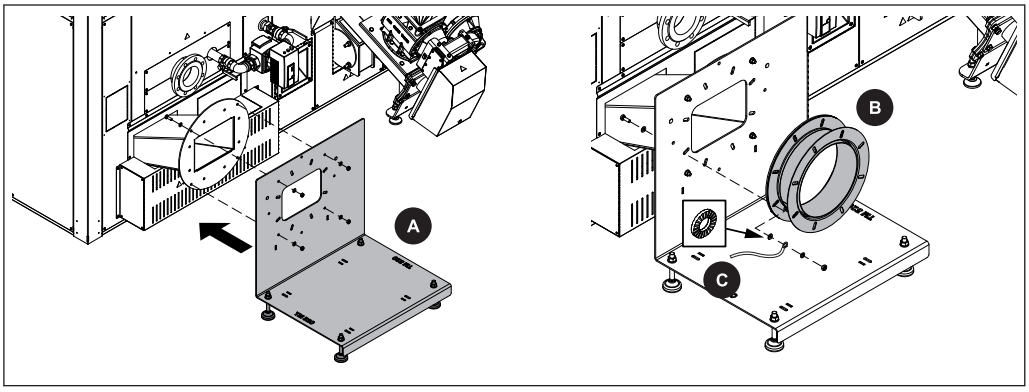
- ❒ Hang cover (A) onto the drive unit of the WOS and fix it in place
- ❒ Hang cover (B) over the stoker unit and fix it in place
- ❒ Hang cover (C) over the combustion chamber temperature sensor and fix it in place
- ❒ Fit the cover (D) next to the drive of the moving grate

5.5.28 Installing the broadband probe and flue gas temperature sensor

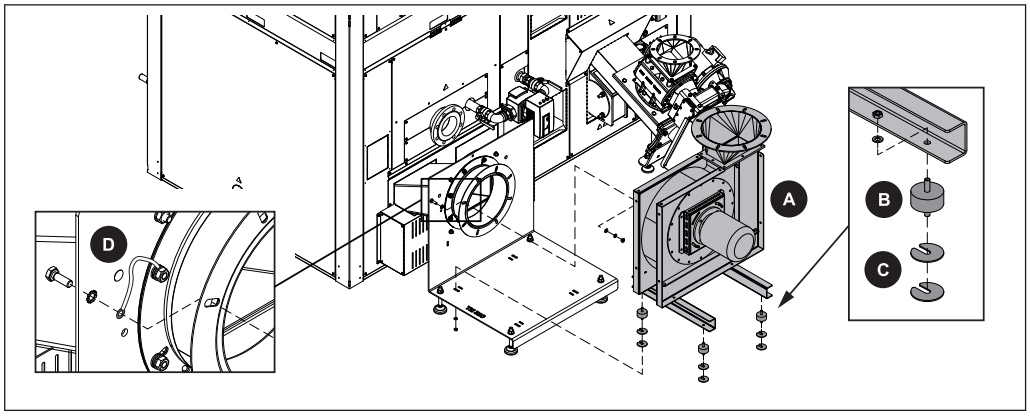


- ❒ Screw the brass bushing (A) for the flue gas temperature sensor into the induced draught fan flange
- ❒ Push the flue gas temperature sensor (B) in so that it protrudes approx. 20 mm from the housing and secure the position with the wing screw
- ❒ Screw in bushing (C) for the broadband probe and gently tighten
- ❒ Screw the broadband probe (D) into the bushing (C) and gently tighten using an Allen key (SW 22 mm)
- ❒ Wire the flue gas temperature sensor cable and the broadband probe cable to the control cabinet

5.5.29 Installing the induced draught fan



- ❒ Fit the induced draught fan bracket (A) to the induced draught fan flange
  - ➥ Align correctly using the adjustable feet and fix in place using the spacer washers and hexagonal nuts
- ❒ Fit the flue pipe compensator (B) and screws complete with spring washers and spacer washers to the induced draught fan bracket
  - ➥ Also screw on the earthing wire (supplied) with the toothed washer (C) as potential equalisation



❒ Fit rubber buffer (B) to induced draught fan (A)

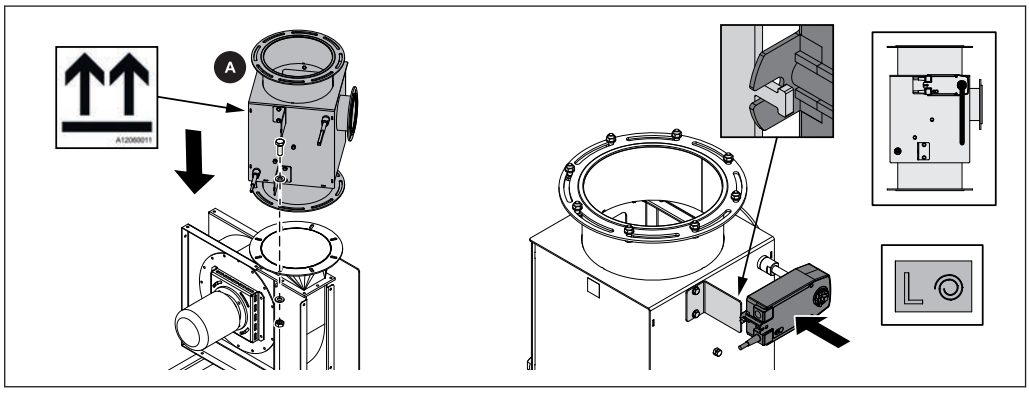
❒ Fit the induced draught fan (A) to the induced draught fan bracket and level

➥ **TIP:** Use the spacers (C) provided to align the induced draught fan!

❒ Fit the induced draught fan to the flue pipe compensator using bolts and spacer washers

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

5.5.30 Installing the flue gas recirculation (FGR)



❒ Place the flue gas collecting box (A) onto the induced draught fan and secure it lightly

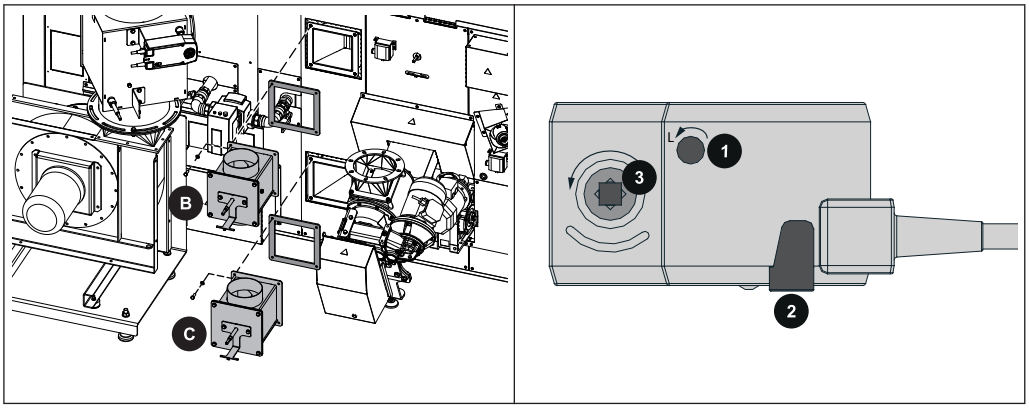
➥ The arrows of the sticker on the flue gas collecting box must point upwards

❒ Push the servo-motor onto the flue gas flap shaft as shown

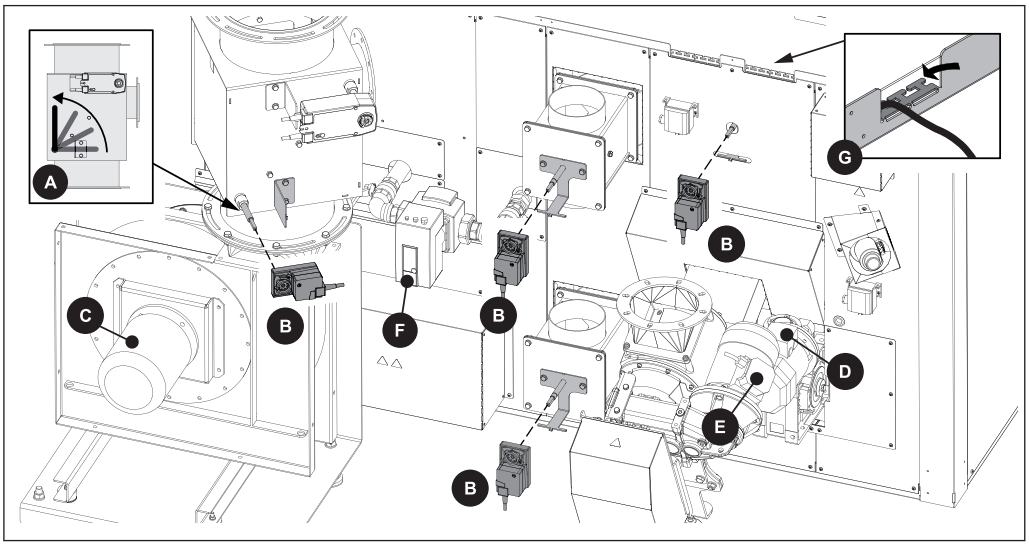
➥ Fit the servo-motor with the “L” motor side at the front (orange side)

➥ Flue gas flap must be open in a currentless state

❒ Wire the servo-motor via the cable duct to the control cabinet



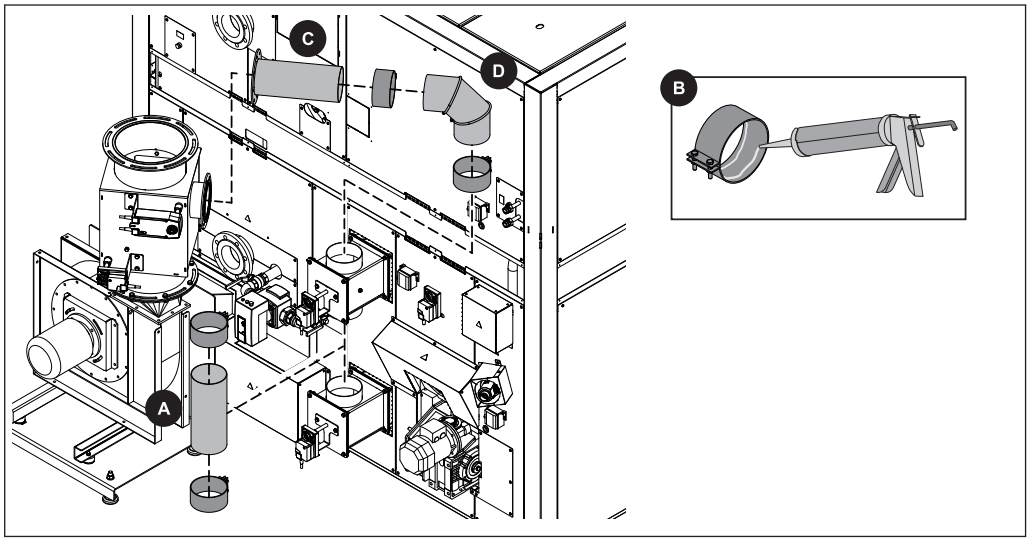
❒ Fit the secondary air box (B) to the upper connection with seal
  ➥ Flue pipe connection top and bottom
❒ Fit the primary air box (C) to the lower connection with seal
  ➥ Flue pipe connection top only
❒ Set the direction of rotation of the servo-motors (1) to left (L)
❒ Press the unlock key (2) and turn the drive for the shaft to the air duct (3) in an anti-clockwise direction as far as the stop



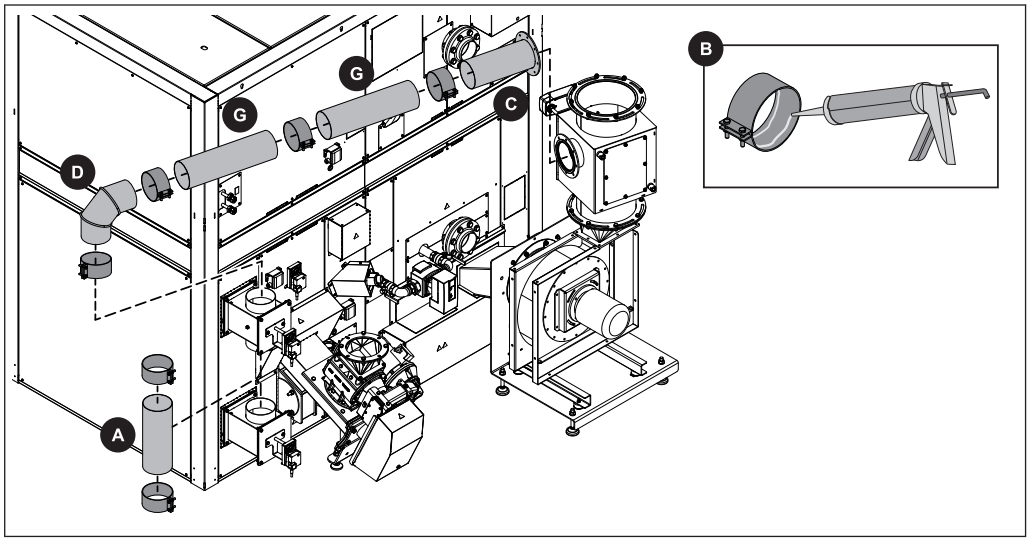
❒ Check that the air flaps are at the left stop
  ➥ All air flaps should be closed
  ➥ Flap in flue gas collecting box (A) is open
  ➥ Where necessary, turn the air flaps to the left stop using pliers
❒ Fit servo-motors (B) at the following positions:
  ➥ Flue gas collecting box
  ➥ FGR secondary air box
  ➥ FGR primary air box
  ➥ Dual air controller
❒ Wire the following units via the cable duct to the control cabinet:
  ➥ Servo-motors (B)
  ➥ Induced draught fan (C)
  ➥ Drive for moving grate (D)
  ➥ Driver for stoker (E)
  ➥ Optional pump assembly (F)

❒ Bend the tabs on the cable duct (G) inwards and secure the cables with cable ties

Heat exchanger right



Heat exchanger left



❒ Fit flue pipe (A) with two flue pipe brackets between the primary and secondary air box

➥ Seal all flue pipe clamps using high-temperature silicone sealant (B)

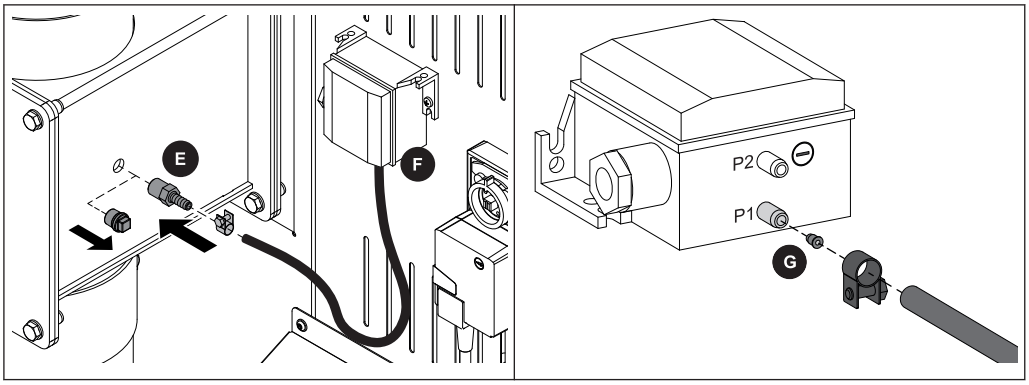
❒ Secure the pipe section with flange (C) to the settling chamber

❒ **Version with heat exchanger on the right:** Connect pipe section (C) and primary air box to the flue pipe elbow (D) and two flue pipe brackets

❒ **Version with heat exchanger on the left:** Connect pipe section (C) and primary air box to the flue pipe elbow (D) and two flue pipes (G)

➥ Adjust the lengths of the flue pipes

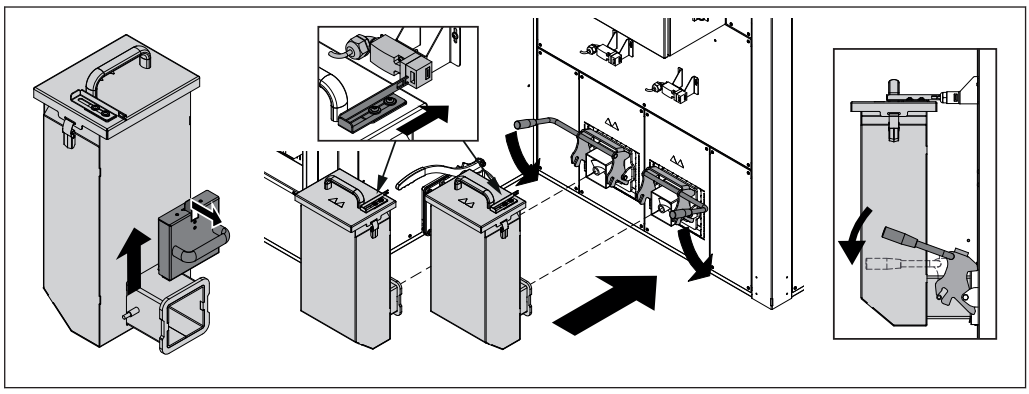
❒ Secure screw connection between induced draught fan and flue gas collecting box



- ❒ Install differential pressure transmitter (F) right next to secondary air box
- ❒ Remove blanking plug on the side of the secondary air box and fit hose nipple (E)
- ❒ Fit air hose to hose nipple (E) using hose clamp
- ❒ Insert the reducing plug (G) at connection “P1” of the differential pressure transmitter and fit the hose with the hose clamp

5.5.31 Positioning the ash container

Heat exchanger ash container:



❒ Pull the clamp forwards and remove the ash container coupling caps

➥ Store the coupling cap in a suitable location where you can find it later. It will be needed when disposing of the ash.

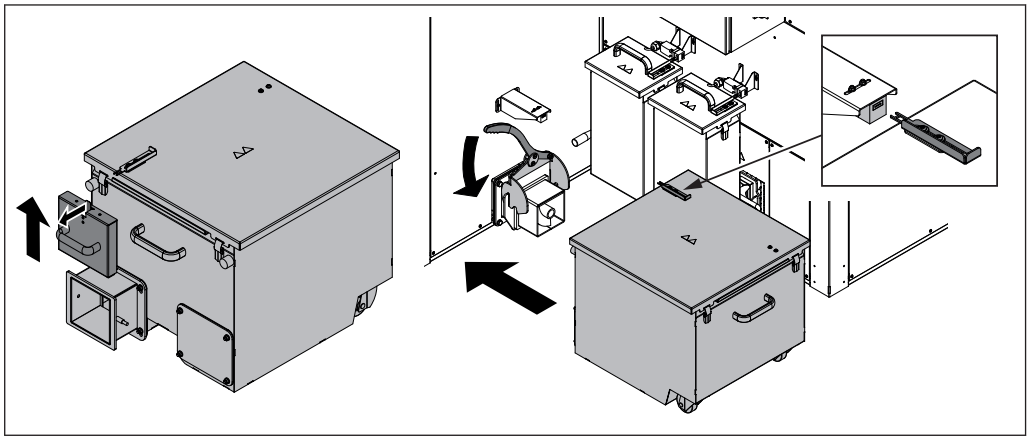
❒ Push both ash containers onto the container connections and press the side lever downwards to fix them in place

❒ Push the key plate into the safety switch

❒ Set the safety switch so that the key plate engages correctly

❒ Tighten the safety switch screws

Combustion chamber ash container:



❒ Pull the clamp forwards and remove the ash container coupling caps

➥ Store the coupling cap in a suitable location where you can find it later. It will be needed when disposing of the ash.

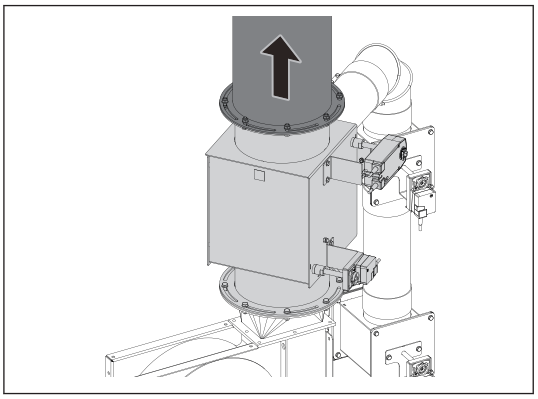
❒ Push the ash container onto the container connection and press the side lever downwards to fix it in place

❒ 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

5.5.32 Flue gas piping



❒ Connect the on-site flue gas system to the flue gas collecting box

IMPORTANT: Insulate all piping, collecting boxes, induced draught fan and FGR blower fan on site! Make sure the drive assemblies of the blower fans can still be removed.

5.6 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

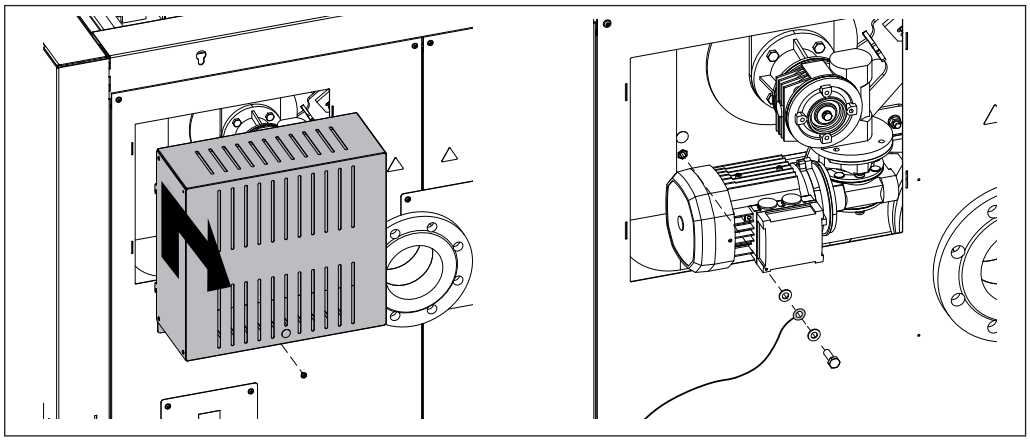
❒ Wire the connections according to the wiring diagram

❒ Ensure that there is strain relief for all cables in the control cabinet.

Notes 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.

5.6.1 Potential equalisation



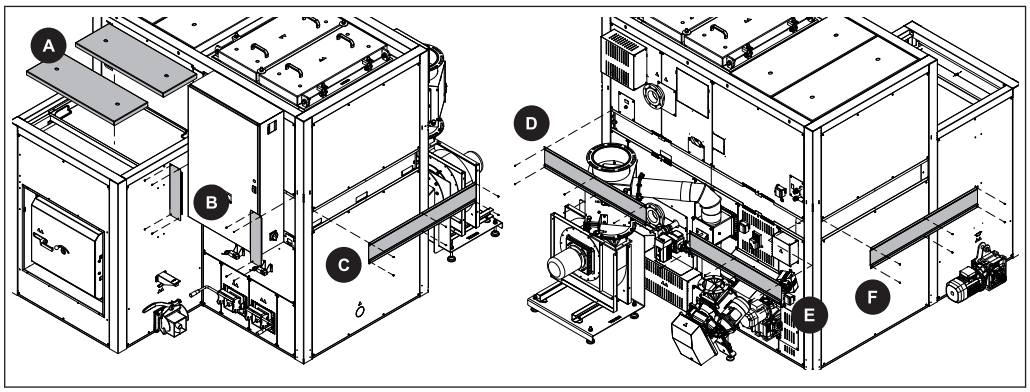
❒ Remove the cover on the WOS drive unit and connect the potential equalisation to the heat exchanger

❒ Establish potential equalisation to all boiler components

➥ Chamber discharge system, ash removal, induced draught fan, flue gas pipe, pipes, control cabinet etc.

IMPORTANT: The potential equalisation must comply with current directives, regulations and standards.

5.6.2 Installing the cable duct covers

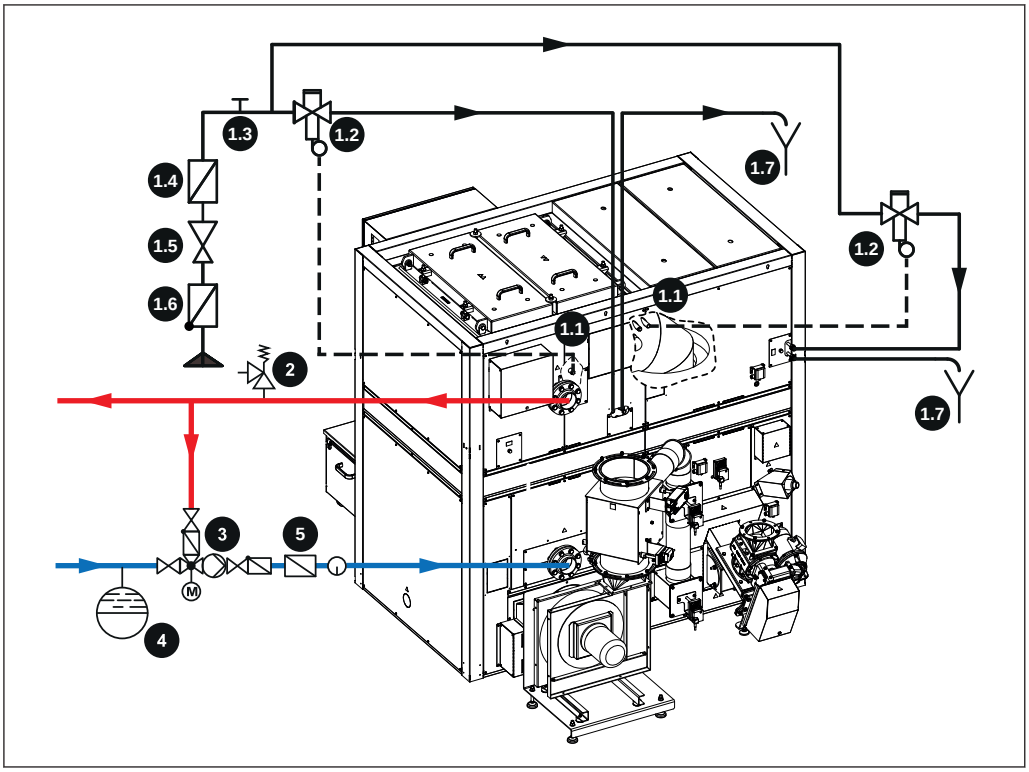


❒ Place cover (A) onto the combustion chamber

❒ Fit covers (B) on both sides of the control cabinet

❒ Fit side covers (C, F) and covers (D, E) at the back over cable ducts

5.7 Connecting the hydraulic safety devices



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 (opens at approx. 95°C)
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)

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**

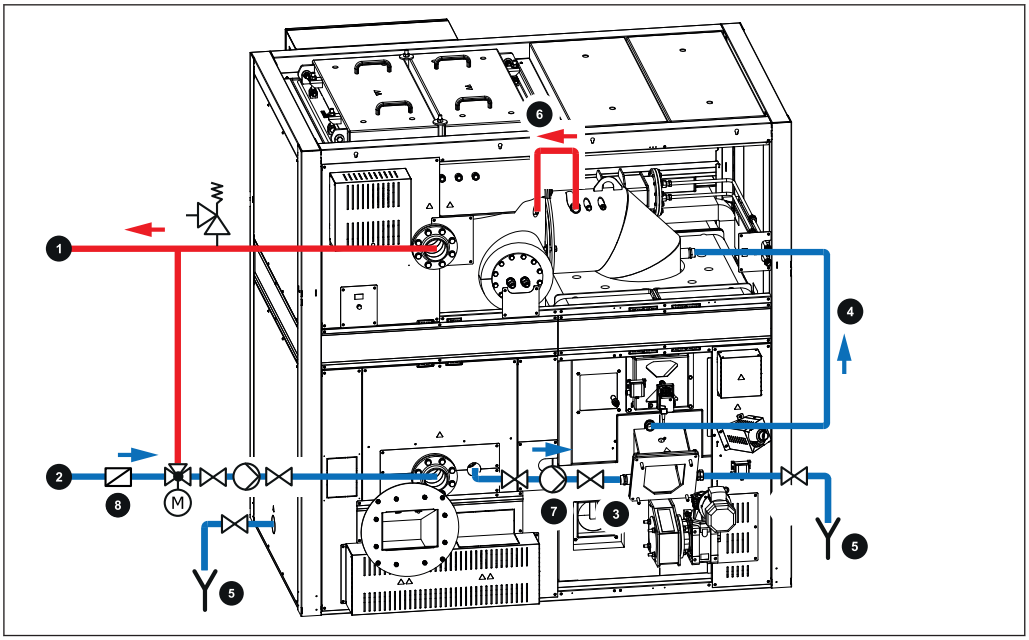
- The diaphragm pressurised expansion tank must conform to EN 13831 and hold at least the maximum expansion volume of the system's heated water including a water seal
- Its size must comply with the design information in EN 12828 - Appendix D
- Ideally it should be installed in the return line. Follow the manufacturer's installation instructions

5 **Dirt trap**

- Installation in boiler return to prevent dirt deposits in the heat exchanger
- Position the screw-in part downward so that the sieve can be cleaned easily
- TIP: Provide an option for shut-off immediately upstream and downstream of the dirt trap

5.8 Cooling connection

The following is a schematic diagram



1	Boiler flow	7	Slide-on duct loading pump: ▪ no gravitational brake. ▪ Up to 350 kW output: – e.g. Wilo Stratos 30/1-8, Grundfos Magna 3 32-80[2)] or similar – Flow rate approx. 6m³/h
2	Boiler return		
3[1)]	Slide-on duct return		
4[1)]	Slide-on duct flow		
5	Heat exchanger drainage		
6[1)]	Burn through elbow flow	8	Dirt trap

General specification for pipe connections:
- must be shut-off type.
- no press-fit connection.

must be possible to disassemble without removing the pipe.

1. Optionally available as prefabricated components
2. Additional release of the pump required, see operating instructions for boiler controller

5.9 Final installation steps

5.9.1 Setting and checking the seal on the door

NOTICE! The seals must be replaced if they have turned black!

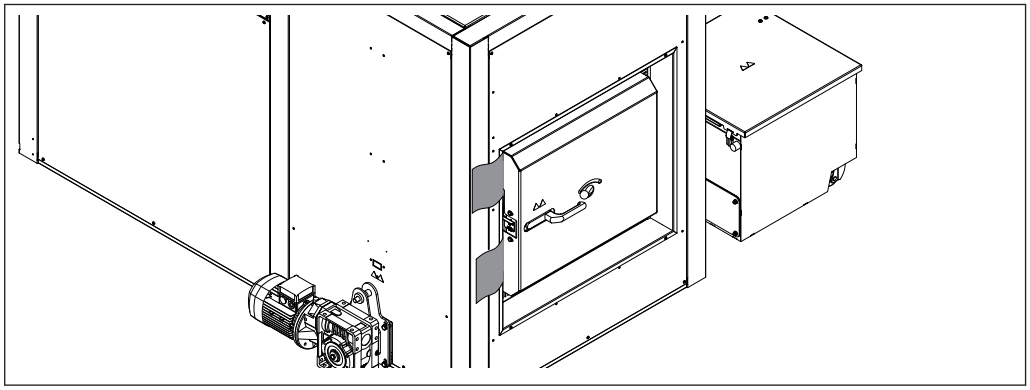
Checking the setting

❒ Close the door

➥ The door can be closed with a normal amount of effort:
does not require adjustment.

➥ The door cannot be closed or can only be closed with great effort:
loosen the locking hook.
⇨ See "Adjusting the door" [page 66]

Checking the seal



❒ Open the door

❒ Insert a sheet of paper at both the top and the bottom between the door and the boiler

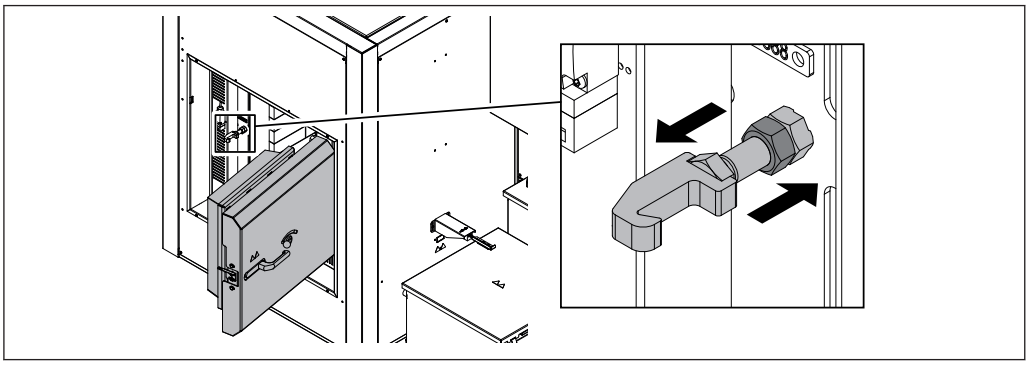
❒ Close the door

❒ 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 properly - tighten the locking hook!
⇨ See "Adjusting the door" [page 66]

5.9.2 Adjusting the door



❒ Open the combustion chamber door
❒ Loosen the lock nut on the locking hook
❒ Tighten or loosen the locking hook as required
❒ Fix in place using lock-nuts

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.

6.2 Initial startup

6.2.1 Permitted fuels

Wood chips

Criterion	Designation as per		Description acc. to ÖNORM M 7133
	ÖNORM M 7133	EN ISO 17225	
Water content	**W20**	**M20**	air-dried
	W30	**M30**	suitable for storage
Size	**G30**	**P16S**	Fine wood chip
	G50	**P31S**	Medium-sized wood chip

Note on standards

EU:	Fuel acc. to EN ISO 17225 - Part 4: Wood chips class A1 / P16S-P31S
Additional for Germany:	Fuel class 4 (§3 of the First Federal Emissions Protection Ordinance (BimSchV) in the last amended version)

Wood pellets

Wood pellets made from natural wood with a diameter of 6 mm

Note on standards

EU:	Fuel acc. to EN ISO 17225 - Part 2: Wood pellets class A1 / D06
and/or:	EN*plus* / DIN*plus* certification scheme

General note:

Before refilling the store, check for pellet dust and clean if necessary.

TIP: Fit the PST pellet deduster for separating the dust particles contained in the return air

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.

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.

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

NOTICE! See operating instructions for the Lambdatronic H 3200

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

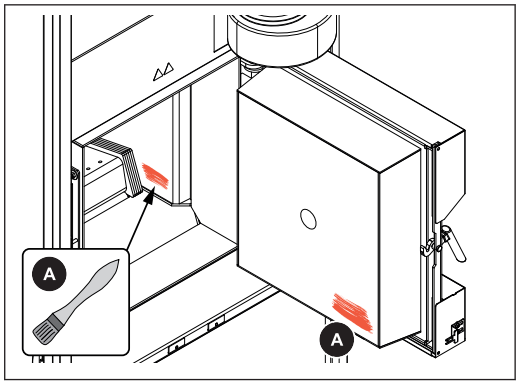
NOTICE

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

All of the components in the combustion chamber that consist of fireclay are thoroughly tempered in the factory. This is indicated by a coloured marking (A):



- Red marking
  - Fireclay tempered, no need for screed drying
- Yellow marking
  - Fireclay NOT tempered
  - Follow these steps for 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 Notes

9 Appendix

9.1 Addresses

9.1.1 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

9.1.2 Address of the installer

Stamp