fröling

Operating instructions

Lambdamat LM 650 / 750 / 1500



Translation of original German version of operating instructions for operators.

Read and follow all instructions and safety instructions.
All errors and omissions excepted.

CE

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1 General information

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.

Warranty and Guarantee Conditions

Our sale and delivery conditions will be applicable. These conditions have been made available to customers, and customers have been made aware of them at the time of order completion.

You can also find the guarantee conditions on the enclosed guarantee certificate.

1.1 Lambdamat LM 1500 product overview



1	Control cabinet with integrated controller	15	Thermal discharge valve connection
2	Main switch: switches the power supply on and off for the entire system	16	Boiler return connection
3	SPS 4000 control panel	17	Safety valve connection
4	Reversing chamber door	18	Boiler flow connection
5	Combustion chamber door	19	Flue gas recirculation (FGR) (optional)
6	Burning chamber door	20	Primary air servo-motor flue gas recirculation (FGR)
7	Combustion air fan	21	Secondary air servo-motor flue gas recirculation (FGR)
8	Ash container 300l (optional)	22	Compressed air tank of compressed air cleaner (optional)
9	Drive for ash removal (optional)	23	Air distribution frame of compressed air cleaner (optional)
10	Burning chamber overpressure monitor	24	Primary air actuator
11	Under-pressure controller	25	Secondary air servo-motor II
12	Secondary air servo-motor I	26	Tertiary air servo-motor
13	Automatic ignition	27	High-limit thermostat (STL)
14	Burning chamber temperature sensor	28	Cleaning door

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 Pictograms used

The following symbols are used in the documentation and/or on the boiler to show what is required and forbidden and to give warnings.

In accordance with the Machinery Directive, signs fitted directly within the danger area of the boiler indicate immediate hazards or safety procedures. These stickers must not be removed or covered.

	Refer to the operating instructions		Wear safety shoes
	Always wear protective gloves		Wear hearing protection
	Keep the doors closed		Turn off the main switch
	Unauthorised access prohibited		No not walk on the surface
	Warning - hot surface		Warning - hazardous electrical voltage
	Warning - hazardous or irritant materials		Warning - automatic boiler startup
	Hand injury warning		Warning of injury to fingers or hands, automatic fan
	Cutting injury warning		Warning of injury to fingers or hands, automatic screw

2.3 General safety information

⚠ DANGER



If the device is used incorrectly:

Incorrect use of the system can cause severe injury and damage.

When operating the system:

- ❒ Observe the instructions and information in the manuals
- ❒ Observe the details on procedures for operation, maintenance and cleaning, as well as troubleshooting in the respective manuals.
- ❒ Any work above and beyond this (e.g. servicing) must be carried out by a heating engineer approved by Fröling Heizkessel- und Behälterbau GesmbH or by Froling customer services

⚠ WARNING



External influences:

Negative external influences, such as insufficient combustion air or non-standard fuel, can cause serious faults in combustion (e.g. spontaneous combustion of carbonisation gases or flash fires) which can in turn cause serious accidents!

When operating the boiler, please note the following:

- ❒ Instructions and information regarding versions and minimum values, as well as standards and guidelines for heating components in the instructions must be observed.

⚠ WARNING

Severe injuries and damage can be caused by an inadequate flue gas system.

Problems with the flue gas system, such as poor cleaning of the flue pipe or insufficient chimney draught, can cause serious faults in combustion (such as spontaneous combustion of carbonisation gases or flash fires).

Take the following precautions:

- ❒ Optimum boiler performance can only be guaranteed if the flue gas system is functioning correctly.

2.4 Permitted uses

The Froling Lambdamat is designed exclusively for heating domestic water. Only use fuels specified in the "Permitted fuels" section.

➲ "Permitted fuels" [▸ 9]

The unit should only be operated when it is in full working order. It must be operated in accordance with the instructions, observing safety precautions, and you should ensure you are aware of the potential hazards. The inspection and cleaning intervals in the operating instructions must be observed. Ensure that any faults which might impair safety are rectified immediately.

The manufacturer or supplier is not liable for any damage resulting from non-permitted uses.

Only original spare parts or specific alternative spare parts authorised by the manufacturer may be used. Any kind of change or modification made to the product will invalidate the manufacturer's conformity with the applicable guideline(s). In such cases, the product will need to undergo new hazard evaluation procedures by the operator. The operator will then be fully responsible for the declaration of conformity according to the valid guideline(s) for the product and will need to issue a corresponding declaration for the device. This person will then assume all of the rights and responsibilities of a manufacturer.

2.4.1 Permitted fuels

Wood chips

Description according to EN ISO 17225-4	Description
M20	Water content max. 20%
M30	Water content max. 30%
M35	Water content max. 35%
M40[1)]	Water content max. 40%
M50[1)]	Water content max. 50%
P16S	Main proportion (at least 60% mass portion): 3.15 – 16 mm, max. length of 45 mm, previously referred to as fine wood chips G30
P31S	Main proportion (at least 60% mass portion): 3.15 – 31.5 mm, max. length of 150 mm, previously referred to as medium-sized wood chips G50
from 400 kW: **P45S**	Main proportion (at least 60% mass portion): 3.15-45 mm, max. length of 200 mm, previously referred to as medium-sized wood chips G50
from 400 kW: **P63**[2)]	Main proportion (at least 60% mass portion): 3.15–63 mm, max. length 350 mm, previously referred to as coarse wood chips G100

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

Note on standards

EU:	Fuel as per EN 17225 – Part 4: Wood chips class A1 / P16S-P45S
Additional for Germany:	Fuel class 4 (§3 of the 1st 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.

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.

2.4.2 Non-permitted fuels

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

NOTICE

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:

❒ Use only the permitted fuels

2.4.3 Qualification of operating staff

⚠ CAUTION



If unauthorised persons enter the Boiler room:

Risk of personal injury and damage to property

❒ The operator is responsible for keeping unauthorised persons, in particular children, away from the system.

Only trained operators are permitted to operate the unit. The operator must also have read and understood the instructions in the documentation.

2.4.4 Protective equipment for operating staff

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

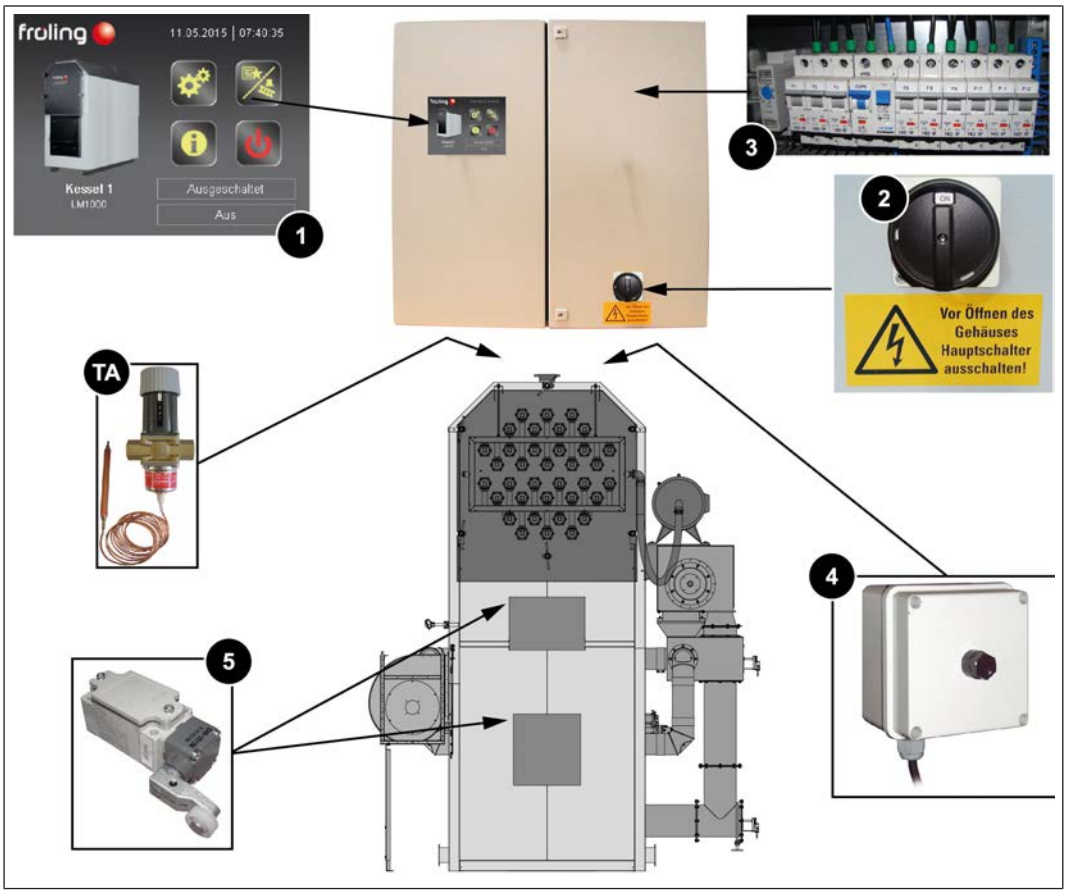


- During inspection and cleaning tasks wearing the following equipment is mandatory:
  - proper work clothing
  - protective gloves
  - sturdy shoes



- Additional equipment is mandatory during operation:
  - hearing protection (sound level > 70 dB)
  - protective goggles

2.5 Safety devices



1	**BOILER OFF** *(switches off the boiler to prevent overheating)* ❒ Tap “Boiler off” ↳ Automatic mode is switched off ↳ Control system follows the boiler shutdown procedure ↳ The pumps continue to run **NOTICE! Never use the main switch!**
2	**MAIN SWITCH** *(switches off the power supply)* Before carrying out work on the boiler: ❒ Tap “Boiler off” ↳ Automatic mode is switched off ↳ Control system follows the boiler shutdown procedure ❒ Switch off the main switch and let the boiler cool down
3	**SAFETY OVERLOAD SWITCHES, MOTOR PROTECTION SWITCHES, RESIDUAL CURRENT PROTECTIVE DEVICES (RCD)** Switch off the related component in the event of fault currents or overloads.
4	**SAFETY TEMPERATURE LIMITER (STL)** *(protection against overheating)* The STL switches off the combustion system when the boiler reaches 95 - 100°C. The pumps continue to run. Once the temperature falls to below approx. 85°C, the STL can be reset mechanically.
5	**DOOR CONTACT SWITCH** When the door is opened, the induced draught is kept at a constant speed and the combustion air and FGR blower fan stops.
TV	**THERMAL DISCHARGE VALVE** *(protection against overheating)*

	The thermal discharge valve opens at approx. 100°C and feeds cold water to the safety heat exchanger to lower the boiler temperature
	SAFETY VALVE *(not shown, supplied by the customer)* When the boiler pressure reaches a maximum of 6 bar, the safety valve opens and the heated water is blown off in the form of steam.

2.5.1 External safety devices

Hydraulic chamber safety switch



Before starting any maintenance work in the hydraulic chamber of the sliding floor:

❒ Turn the safety switch to the "0" position

↳ The boiler follows the shutdown procedure and the discharge is deactivated

❒ Turning the selector switch past the "0" position engages the locking lever

↳ The switch can be locked with a padlock to prevent it from being switched on again

On completion of the maintenance work:

❒ Remove the padlock

❒ Turn the selector switch past the "0" position to automatically release the locking switch. The selector switch can now be turned back to the "1" position.

❒ Acknowledge the fault and press the Start button to activate the boiler

Guardrail

When working at a height, appropriate measures must be taken in accordance with the applicable national industrial safety guidelines to protect against the risk of falling (e.g. ladders, platforms, etc.). It is the responsibility of the operator to select and provide these means.

Alternatively, a railing can be fitted to the top of the boiler as per EN ISO 14122.

2.6 Residual risks

⚠ WARNING



When touching hot surfaces:

Severe burns are possible on hot surfaces and the flue gas pipe!

When work is carried out on the boiler:



- ❒ Shut down the boiler according to procedure (“Switched off OFF” operating status) and allow it to cool down
- ❒ Protective gloves must usually be worn for work on the boiler, and it should only be operated using the handles provided
- ❒ Insulate the flue gas pipes and do not touch them during operation

⚠ WARNING

Opening the door to the combustion or burning chamber, or the cleaning door or lids during operation

may result in injury or damage or flue gas generation!

Therefore:

- ❒ Do not open any doors or lids while the boiler is in operation!

⚠ WARNING

If non-permitted fuel types are used:

Non-standard fuels can cause serious faults in combustion (e.g. spontaneous combustion of carbonisation gases / flash fires) which can lead to serious accidents!

Take the following precautions:

- ❒ Only use fuels specified in the "Permitted fuels" section of these operating instructions.

⚠ WARNING



Inspection and cleaning work on a system which is operational:

Risk of serious injuries from automatic startup of the system and severe burns from hot parts and the flue gas pipe!



When working on the system:

- ❒ always wear protective gloves
- ❒ only operate the boiler using the handles provided
- ❒ switch off the boiler by tapping “Boiler off” at the mode icon
  - ↳ The boiler follows the shutdown procedure and switches to “Switched off OFF“ status
- ❒ switch off the main switch and take precautions to prevent accidental switching on
- ❒ allow the boiler to cool off for at least 1 hour
- ❒ once all of the tasks have been completed, turn the main switch back on and switch the boiler on in the desired mode

2.7 Emergency procedure

2.7.1 Overheating of the system

If the system overheats and the safety devices fail to operate, proceed as follows:

NOTICE! Do not under any circumstances switch off the main switch or disconnect the power supply.

- ❒ Keep all the doors on the boiler closed
- ❒ Open all mixing valve taps, switch on all pumps.
  - ↳ The Froling heating circuit control takes on this function in automatic operation.
- ❒ Leave the boiler room and close the door
- ❒ Increase heat consumption by turning on all radiators and other appliances
- ❒ Open any thermostatic valves on the radiator and ensure sufficient heat dissipation from the rooms

If the temperature does not drop:

- ❒ Contact the installer or Froling customer services

2.7.2 Smell of flue gas

⚠ DANGER





If you smell flue gas in the boiler room:

Inhaling toxic flue gas can be fatal!

If you smell flue gas in the room where the boiler is installed:

- ❒ Keep all the doors on the boiler closed
- ❒ Shut down the boiler according to procedure
- ❒ Ventilate the room where the boiler is installed
- ❒ Close the fire door and doors to living areas

Recommendation: Do not install smoke alarms and carbon monoxide detectors near the system.

2.7.3 Fire in the system

⚠ DANGER





In case of fire in the system:

Risk of death by fire and poisonous gases

Emergency procedure in case of fire:

- ❒ Leave the boiler room
- ❒ Close the doors
- ❒ Inform the fire department

3 Notes for operating a heating system

Carrying out modifications to the system and changing or disabling safety equipment is prohibited.

Always comply with all fire, building and electrical regulations when installing or operating the system, in addition to following the operating instructions and mandatory regulations that apply in the country in which the tank is operated.

3.1 Installation and approval

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

IMPORTANT: Every 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.

3.2 Installation site

Requirements for the load bearing substrate:

- Flat, clean and dry
- Non-combustible and with sufficient load-bearing capacity

Conditions at the installation site:

- Frost-free
- Sufficiently well lit
- Free of explosive atmospheres such as flammable substances, hydrogen halides, cleaning agents and consumables
- Installation at altitude higher than 2000 metres above sea level only after consultation with the manufacturer
- The system must be protected against gnawing and nesting by animals (such as rodents)
- No flammable materials in proximity to the system

3.3 Combustion air supply at the installation room

The system is operated in open flue mode, i.e. the combustion air required to operate the boiler is drawn from the installation room.

Requirements:

- Opening to the atmosphere
  - Weather conditions must not affect the air flow in any way (e.g. snow and foliage)
  - Cross-section area free of obstructions such as cover gratings and slats
- Air supply lines
  - For air supply lines longer than 2 metres and where mechanical means are used to feed combustion air, the flow rate must be calculated (maximum flow rate = 1 m/s)

Note on standards

ÖNORM H 5170 - Construction and fire protection requirements

TRVB H118 - Technical directives on fire protection/prevention

3.4 Domestic hot 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 8.2 and 9.0
- ❒ 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
- ❒ The heating water must be clear and free from substances that lead to sediments.
- ❒ With regard to corrosion protection, the use of fully demineralised filling and make-up water with an electrical conductivity of up to 100 µS/cm is recommended in accordance with EN 14868

Advantages of low-salt or fully demineralised 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

Filling and make-up water as well as heating water in accordance with VDI 2035:

Total heat output in kW	Total earth alkalis in mol/m³ (total hardness in °dH)		
	Specific system volume in l/kW heat output[1)]		
	≤ 20	20 to ≤40	> 40
≤ 50 specific water content heat generator ≥ 0.3 l/kW[2)]	none	≤ 3.0 (16.8)	< 0.05 (0.3)
≤ 50 specific water content heat generator < 0.3 l/kW[2)] (e.g. circulation water heater) and systems with electric heating elements	≤ 3.0 (16.8)	≤ 1.5 (8.4)	
> 50 to ≤ 200	≤ 2.0 (11.2)	≤ 1.0 (5.6)	
> 200 to ≤ 600	≤ 1.5 (8.4)	< 0.05 (0.3)	
> 600	< 0.05 (0.3)		

1. For calculating the specific system volume, the smallest individual heating capacity is to be used for systems with several heat generators.
2. In systems with several heat generators with different specific water contents, the smallest specific water content is decisive in each case.

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

NOTICE

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 kind of control device (e.g. thermometer).

3.7 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 Fröling.

Additional requirements for Switzerland in accordance with LRV Appendix 3, section 523

Automatic boilers with a rated thermal output ≤ 500 kW must be equipped with a heat accumulator of a volume of at least 25 litres per kW rated thermal output.

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.

NOTICE! Please see the technical data contained in the assembly instructions for further information about standards and regulations as well as the flue gas temperatures when clean and the other flue gas values!

4 Operating the system

4.1 Assembly and initial startup

Assembly, installation and initial startup of the boiler must only be carried out by qualified staff, and these procedures are described in the accompanying assembly instructions.

NOTICE! See assembly instructions for the Lambdamat

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

NOTICE! See operating instructions for boiler controller!

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 that at least 50% of the boiler's rated heat output can be extracted from the network on commissioning.
- The necessary "dry run" of the system means that the discharge system must be empty at the start of initial startup. Fuel must be available, however, so that the discharge system can be filled once the system is released.
- When heating up the boiler for the first time to dry out the fireclay concrete, the customer must provide approx. 1 m³ of dry firewood.
- 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.
- 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.

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.

4.2 Filling/refilling the store with fuel

Note the following when loading the machine with fuel:

❒ only use permitted fuels!
➲ "Permitted fuels" [▸ 9]

❒ remove foreign bodies in the store space before filling

NOTICE! Systems in which the fuel is delivered by tanker and is blown into the store space must be fitted with a rotary valve.

⚠ CAUTION

Entering the store space when the system is switched on

Risk of injury due to automatic startup of system, particularly the discharge system!

Therefore, before entering the fuel store space:

❒ switch off the boiler by tapping “Boiler off” at the mode icon

↳ The boiler follows the shutdown procedure and switches to “Switched off OFF” status

❒ turn off the boiler’s main switch

❒ turn off the main switch on the expansion switch cabinet (if installed)

For blowing in fuel the following precautions also apply:

⚠ CAUTION

Blowing in fuel when the boiler is switched on:

The negative pressure resulting from blowing in fuel can lead to smoke being sucked back into the store if the boiler is operational. Possible excess pressure could cause smoke to escape into the installation room, possibly resulting in injury and damage!

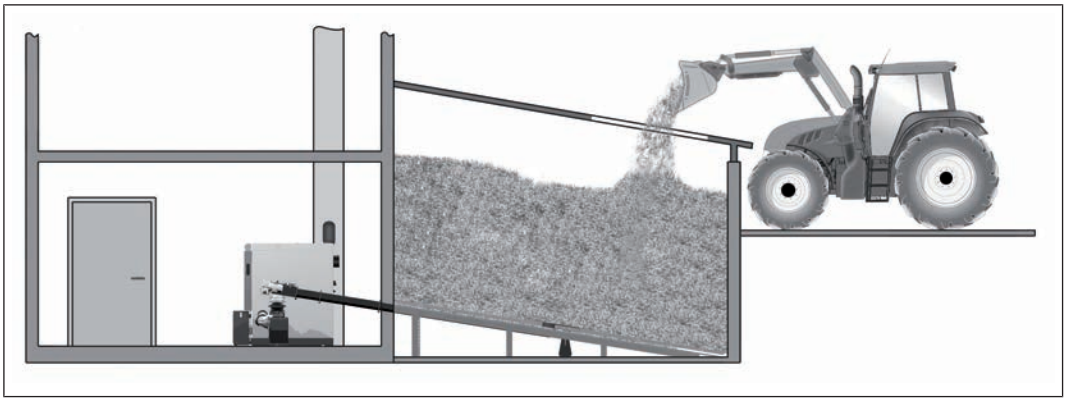
Therefore, before blowing in the fuel:

❒ Switch off the boiler by tapping “Boiler off” at the mode icon

↳ The boiler follows the shutdown procedure and switches to “Switched off OFF” status

❒ Leave to cool for **at least two hours** in “Switched off Off” mode.

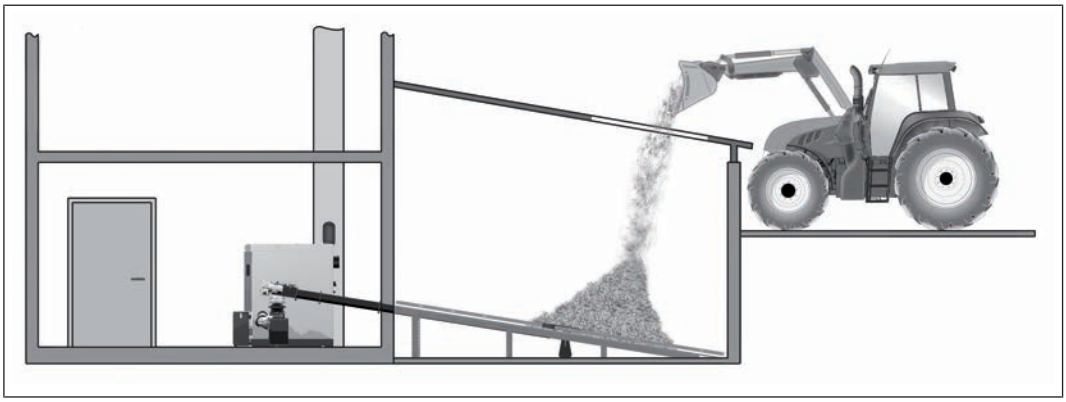
4.2.1 Loading of fuel for a partially emptied store with rotary agitator



If there is still sufficient fuel in the fuel store (the rotary agitator head is completely covered with fuel and the rotary agitator arms / spring blades are not extended), the store can be filled.

❒ Load the fuel at the filling opening

4.2.2 Loading fuel into an empty fuel store with a rotary agitator



If the rotary agitator head is already free from material and the rotary agitator arms / spring blades are extended, the feeder unit must be active until the rotary agitator arms / spring blades have fully retracted.

For combined drive:

❒ Activate “Extra heating” mode in the quick selection menu

For separate drive:

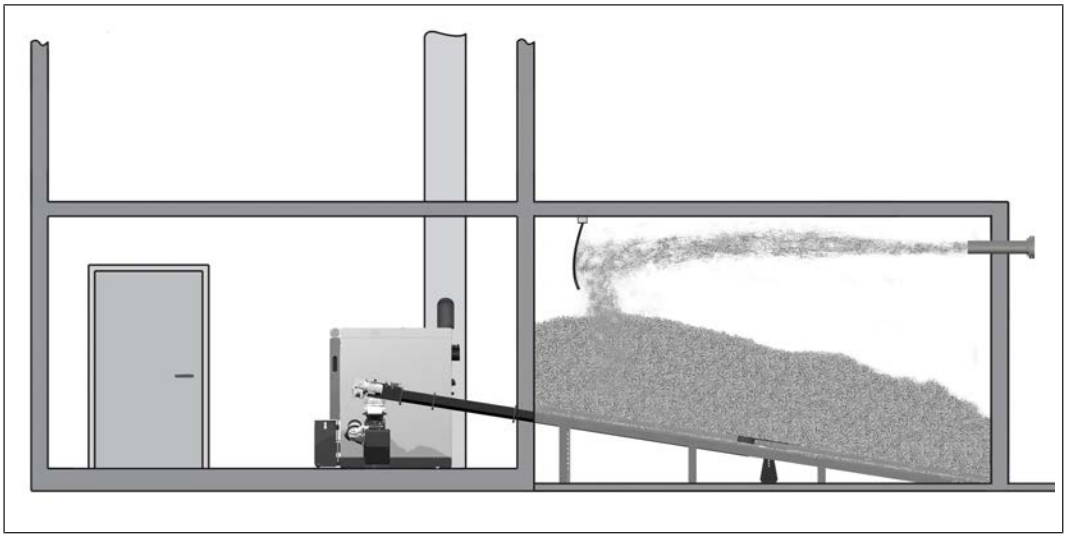
❒ Tap “On” in “Bunker filling rotary agitator” during manual operation

↳ The rotary agitator head runs for approx. 3 minutes

❒ Load a small quantity of wood chips and wait until the arms / spring blades are touching the head of the rotary agitator (approx. 2 revolutions)

❒ Only then should you load the remaining material

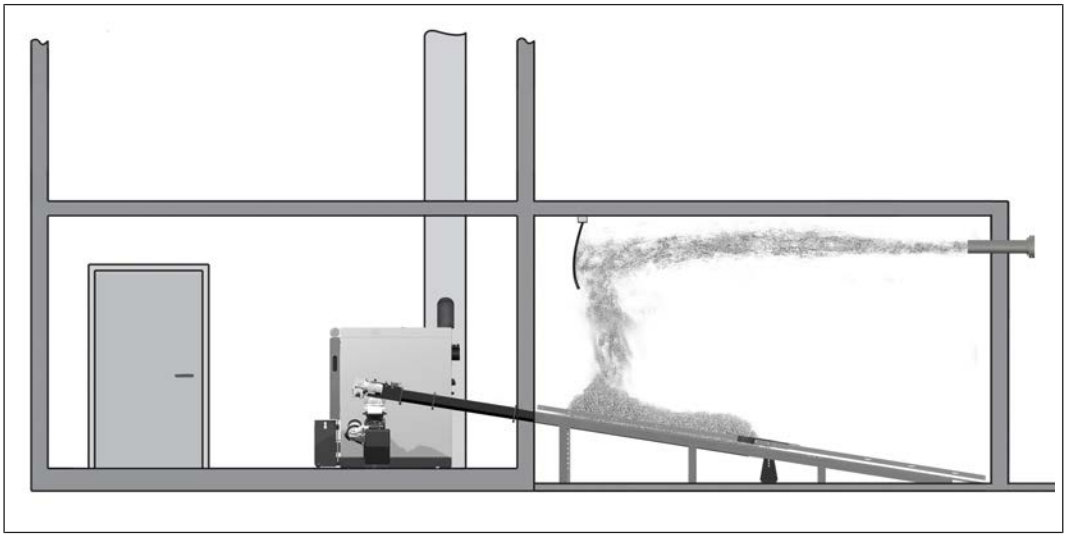
4.2.3 Blowing in fuel for a partially emptied store with rotary agitator



If there is still sufficient fuel in the fuel store (the rotary agitator head is completely covered with fuel and the rotary agitator arms / spring blades are not extended), the fuel store can be filled as follows:

- ❒ Switch off the boiler by tapping “Boiler off” at the mode icon and allow to cool for at least two hours
- ❒ Close all openings to the store to seal out dust
- ❒ Blow the fuel into the fuel store

4.2.4 Blowing in fuel for an empty store with rotary agitator



If the rotary agitator head is already free from material and the rotary agitator arms / spring blades are extended, they should be covered with the remaining fuel in the fuel store and retracted. This should be done well before the agreed loading time.

Before working in the fuel store

- ❒ Switch off the boiler by tapping “Boiler off” at the mode icon and switch off main switch
- ❒ Turn off the main switch on the expansion switch cabinet (if installed)
- ❒ Distribute any fuel remaining in the store (in corners, against walls) over the head of the rotary agitator with your hands
  - ↳ Follow the instructions on working in the fuel store!

NOTICE! Refer to the notice at the entrance to the fuel store

After working in the fuel store

- ❒ Turn on the main switch on the boiler and on the expansion switch cabinet (if installed)

For combined drive:

- ❒ Activate “Extra heating” mode in the quick selection menu

For separate drive:

- ❒ Tap “On” in “Bunker filling rotary agitator” during manual operation
  - ↳ The rotary agitator head runs for approx. 3 minutes

- ❒ Wait until the rotary agitator arms / spring blades are touching the head of the rotary agitator (approx. 2 revolutions)
- ❒ Switch off the boiler by tapping “Boiler off” at the mode icon and allow to cool for at least two hours
- ❒ Close all openings to the store to seal out dust
- ❒ Blow the fuel into the fuel store

If the fuel store is completely empty and there is no residual fuel to redistribute:

- ❒ Contact Froling and seek advice before filling the fuel store

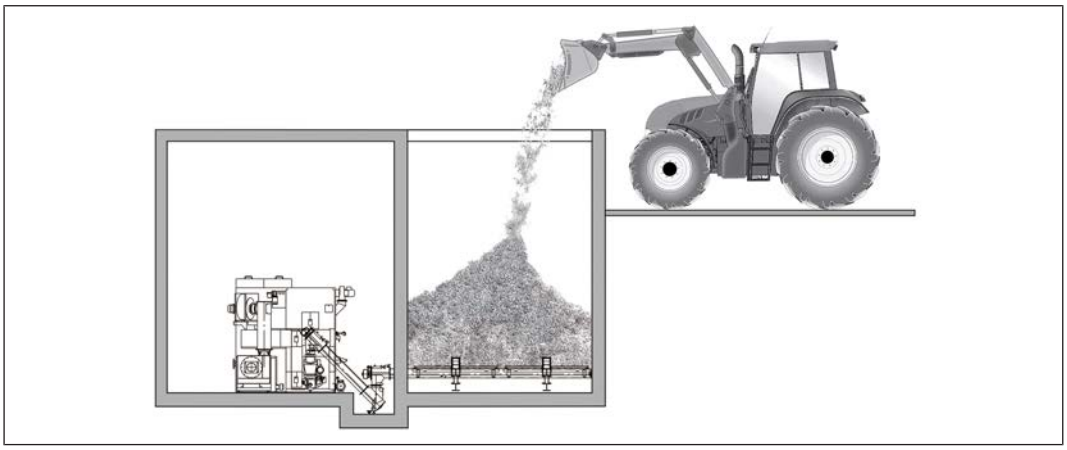
4.2.5 Blowing in pellets for a store with pellet screw

- ❒ Switch off the boiler by tapping “Boiler off” at the mode icon and allow to cool for at least two hours
- ❒ Close all openings to the store to seal out dust
- ❒ Blow the fuel into the store

4.2.6 Loading fuel in a store space with a sliding floor discharge unit

NOTICE! Compliance with the maximum dumping height of the fuel according to the assembly instructions of the sliding floor discharge system is mandatory

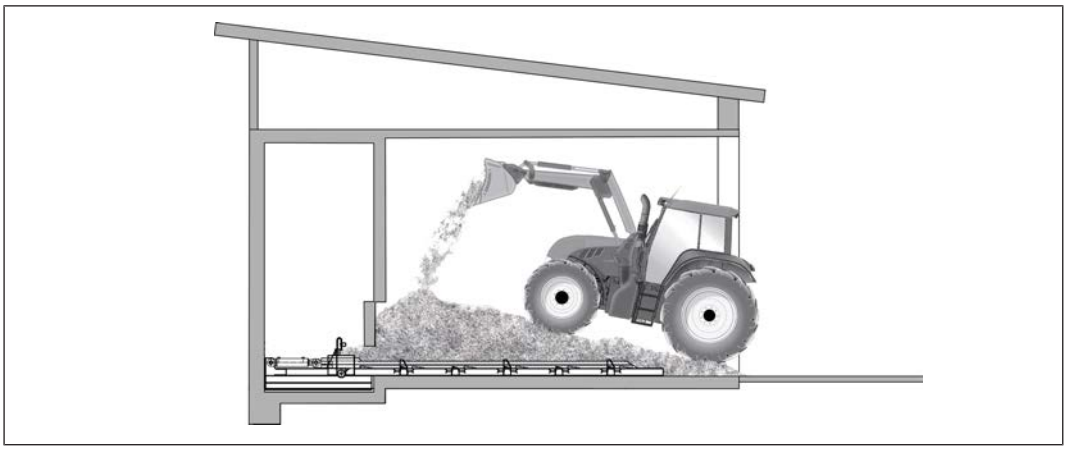
Filling the storeroom without moving the slide rods



❒ Use the filling opening to add the fuel

↳ The system does not have to be shut down during the filling process

Filling the storeroom by moving the slide rods



Only move the slide rods in compliance with the following instructions:

❒ Fuel quantity of at least 30 cm on the slide rods

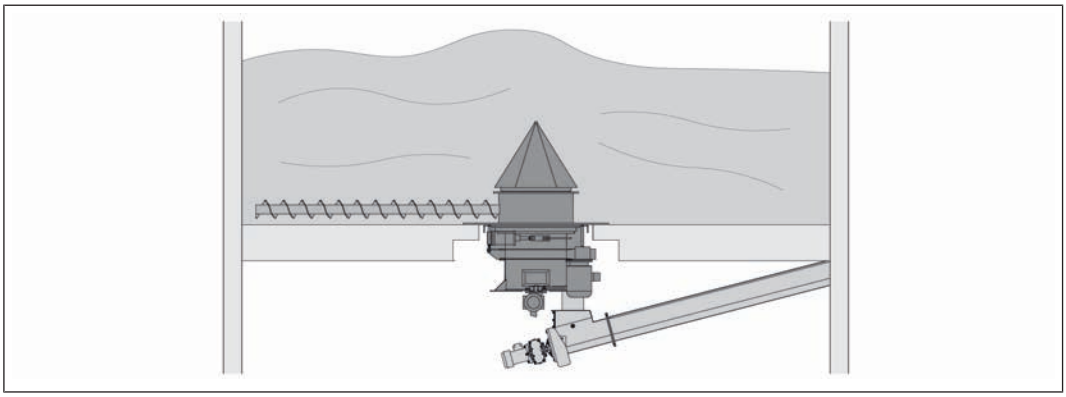
❒ Do not drive on the wedges and longitudinal members of the sliding floor discharge. TIP: A guiding device for driving inside the storeroom must be provided, e.g. gates must be positioned appropriately

❒ Hydraulic unit switched off and secured to prevent accidental restart

❒ When driving across the slide rods, the steering movements of the vehicle must be kept to a minimum

NOTICE! Driving onto the slide rods may compact the fuel and thus causing the sliding floor discharge unit to move sluggish

4.2.7 Loading fuel in a store space with a horizontal screw discharge unit



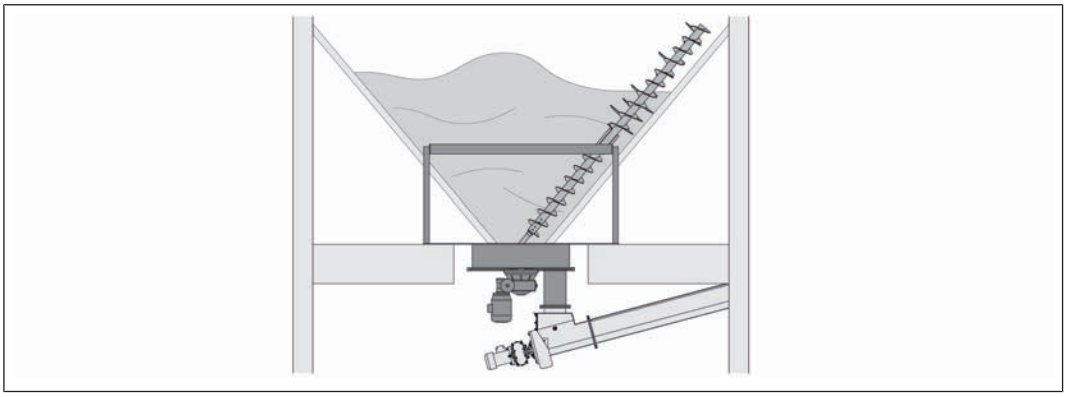
❒ Switch off the boiler by tapping “Boiler off” at the mode icon and allow to cool for at least two hours

❒ If injecting fuel:
Close all openings to the store to seal out dust

❒ Adding fuel to the storage room

NOTICE! In systems with a second rotary valve, the filling process can also take place when the boiler is switched on.

4.2.8 Loading fuel in a store space with an inclined screw discharge unit



When the oblique screw is still covered with fuel and is in the vertical position, the storage room can be filled.

❒ Use the filling opening to add the fuel

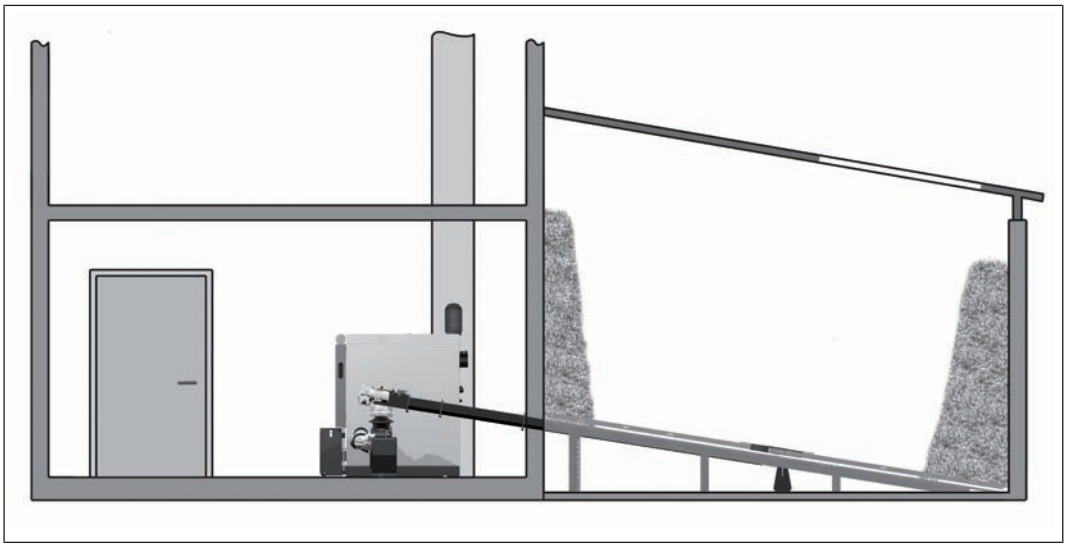
If the oblique screw is already in contact with the gear rim:

❒ Switch on the system on and fill slowly until the oblique screw is in the vertical position

❒ Use the filling opening to add the fuel

4.2.9 Drainage of fuel store

When the fuel store is emptied, a certain amount of fuel remains and is not removed by the rotary agitator. This is not a malfunction but occurs due to the nature of the system. This effect is amplified when the wood chips are compressed.



Tips for better emptying:

- Use suitable wood chips in terms of moisture content, size etc.
- Reduce the dumping height onto the rotary agitator
- Avoid compressing the wood chips, e.g. by carefully adding to the fuel store
- Design the walls in the bunker so they are as smooth as possible

4.3 Heating up the boiler

NOTICE

Do not modify the factory settings!

Changing the system's factory settings can be detrimental to efficiency and emissions of the system.

NOTICE

It is not permitted to manually feed fuel into the boiler!!

4.3.1 Switching on the power supply



❒ Turn on the main switch

↳ There is voltage at all of the boiler's components

↳ When the control has completed the system start, the boiler is ready for operation

4.3.2 Switching on the boiler



❒ Switch the boiler on by tapping “Boiler ON”

↳ Automatic mode is active

↳ The heating system is controlled via the controller according to the selected mode in automatic mode

❒ For other modes press the relevant function key

↳ Information on function keys in the relevant operating instructions of the boiler controller

4.3.3 Regulating the boiler

Please see the relevant operating instructions for the boiler controller for the necessary control steps, as well as displaying and modifying parameters

4.3.4 Switching off the boiler



❒ Switch off the boiler by tapping “Boiler off”

↳ The boiler follows the shutdown program and switches to "Switched off Off" status

↳ The combustion unit is switched off, the chamber discharge unit and the entire hydraulic system remain active

4.3.5 Switching off the power supply

⚠ WARNING

When turning off the main switch in automatic mode:

Serious combustion faults leading to serious accidents are possible.

Before turning off the main switch:

❒ Switch boiler off by tapping “Boiler OFF”

↳ The boiler follows the shutdown procedure and switches to "Switched off OFF“ status after the cleaning cycle



❒ Turn off the main switch

↳ Boiler controller is switched off

↳ The components powered via the control cabinet are powered down

↳ CAUTION: the expansion switch cabinet, which has its own power supply, is still live.

NOTICE! Frost protection function is no longer active!

5 Servicing the system

5.1 General information on servicing

⚠ 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

⚠ DANGER



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.)

⚠ WARNING



Inspection and cleaning work on a system which is operational:

Risk of serious injuries from automatic startup of the system and severe burns from hot parts and the flue gas pipe!



When working on the system:

- ❒ always wear protective gloves
- ❒ only operate the boiler using the handles provided
- ❒ switch off the boiler by tapping “Boiler off” at the mode icon
  - ↳ The boiler follows the shutdown procedure and switches to “Switched off OFF“ status
- ❒ switch off the main switch and take precautions to prevent accidental switching on
- ❒ allow the boiler to cool off for at least 1 hour
- ❒ once all of the tasks have been completed, turn the main switch back on and switch the boiler on in the desired mode

⚠ WARNING



Incorrect inspection and cleaning:

Incorrect or insufficient inspection and cleaning of the boiler can cause serious faults in combustion (e.g. spontaneous combustion of carbonisation gases / flash fires) and this can lead to serious accidents and damage!

Take the following precautions:

- ❒ Clean the boiler following the instructions in the instruction manual. Follow the boiler operating instructions.

NOTICE

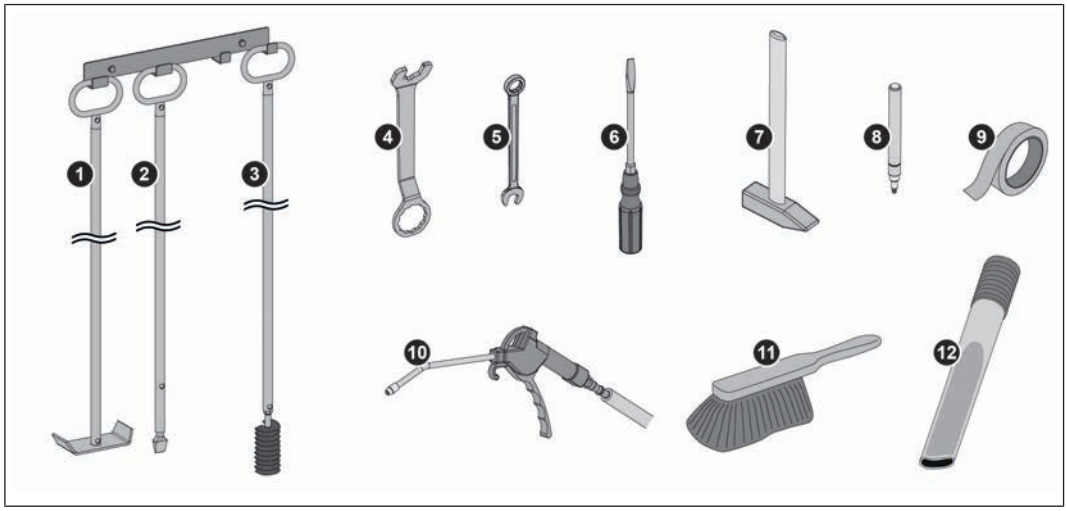
We recommend that you keep a maintenance book in accordance with ÖNORM M7510 of the Technical Directive for Fire Prevention (TRVB)

NOTICE

As well as the cleaning and maintenance tasks explained in these instructions, also refer to the specifications according to TRVB H 118 given in the enclosed inspection book.

5.2 Required tools

The following tools are required in order to proceed with cleaning and maintenance tasks:



Included in delivery:	
1	Flat scraper
2	Stoking rod
3	Cleaning brush Ø 54
4	Key for Lambda probe / door mountings

The following items are not included in the delivery:	
5	Spanner or box wrench AF 13
6	Screwdriver set (Philips, flat head, Torx T20, T25, T30)
7	Hammer
8	Marker for metal
9	Sticky tape
10	Air gun and compressed air supply
11	Small brush or cleaning brush
12	Ash vacuum

5.3 Inspection

5.3.1 Checking the system pressure



❒ Check the system pressure on the pressure gauge

↳ The value must be 20% above the pre-stressed pressure of the expansion tank
NOTICE! Check that the position of the pressure gauge and rated pressure of the expansion tank match your installer's specifications!

If the system pressure decreases:

❒ Top up with water
NOTICE! If this happens frequently, the seal of the heating system is faulty! Inform your installer

If large pressure fluctuations are observed:

❒ Ask an expert to inspect the expansion tank

5.3.2 Checking the thermal discharge safety device

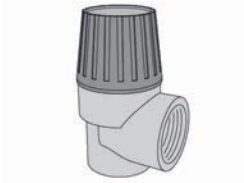
❒ Check the seal of the discharge valve

↳ The discharge pipe must not drip
NOTICE! Exception: Boiler temperature > 100 °C

If water is dripping from the discharge pipe:

❒ Clean the discharge safety device in accordance with the manufacturer's instructions or have it checked/replaced by the installer if necessary

5.3.3 Checking the safety valve



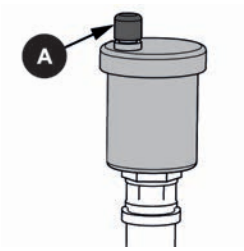
❒ Check the seal of the safety valve regularly and ensure that the valve is not dirty
NOTICE! The inspection work must be carried out in accordance with the manufacturer's instructions.

5.3.4 Checking the geared motors

❒ Carry out a visual inspection of the seal on the geared motors in the system

↳ There should be no significant leakage of lubricant
NOTICE! The presence of a few drops of lubricant may be normal. If there is significant loss of lubricant, inform your installer or Froling customer services

5.3.5 Checking the quick vent valve

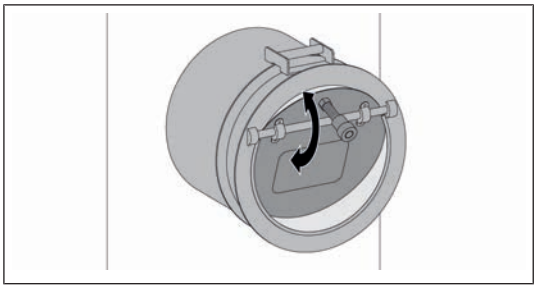


❒ Regularly check all the quick vent valves on the entire heating system for leaks

↳ If any liquid is leaking, replace the quick vent valves

NOTICE! The vent cap (A) must be loose (screw on approx. two revolutions) to ensure correct functioning.

5.3.6 Checking the draught controller flap



❒ Check that the draught controller flap moves freely

5.3.7 General weekly inspection

❒ Check all components of the boiler for cleanliness and clean if necessary

❒ Carry out acoustic testing and functional checks of all components

❒ Immediately change or have someone exchange defective components

5.4 Cleaning

The frequency at which the following cleaning work is carried out depends on energy requirements, fuel quality and the number of operating hours.

⚠ WARNING

When removing the ash container cover during operation:

False air infiltration via the ash screw duct can lead to uncontrolled combustion and the risk of accidents.

Before checking the ash level / emptying the ash container:

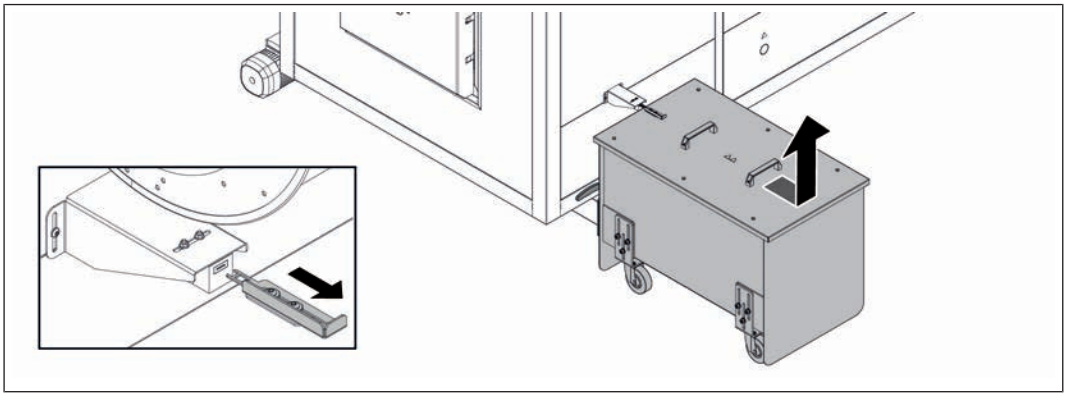
❒ Switch off the boiler by tapping “Boiler off”

↳ The boiler follows the shutdown procedure and switches to "Switched off OFF" status.

5.4.1 Ash container for combustion chamber (optional)

NOTICE! The current fill level of the ash container can also be checked while the boiler is in operation. Requirement:

- The ash container cover must be closed again within 15 seconds
- Caution: if the cover remains open for more than 15 seconds, the boiler is switched off automatically!



❒ Remove the key plate from the safety switch

❒ Slide back the cover of the ash container

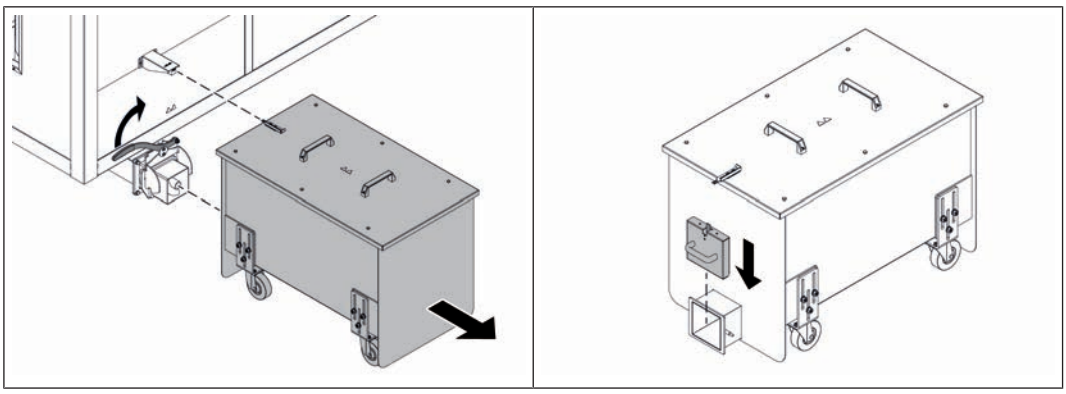
❒ Remove the cover and check the fill level

❒ Put the cover back on and slide it forwards until it clicks in place

↳ If the container does not need emptying, slide the key plate back into the safety switch

If the container needs emptying, proceed as follows:

❒ switch off the boiler by tapping “Boiler off” at the mode icon



❒ Push the side lever up to release the ash container

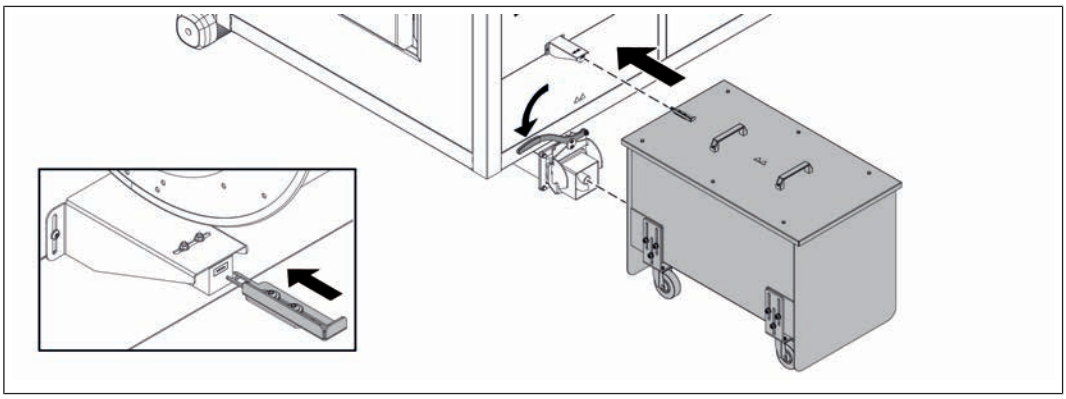
❒ Pull out the ash container

❒ Push the coupling cap onto the ash container

❒ Take the ash container to the emptying point and empty it

↳ Pay attention to the weight of the ash container

Replace the ash container:



❒ Unlock and remove the cover

❒ 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

5.4.2 Cleaning the combustion and burning chamber

⚠ WARNING



Inspection and cleaning work on a system which is operational:

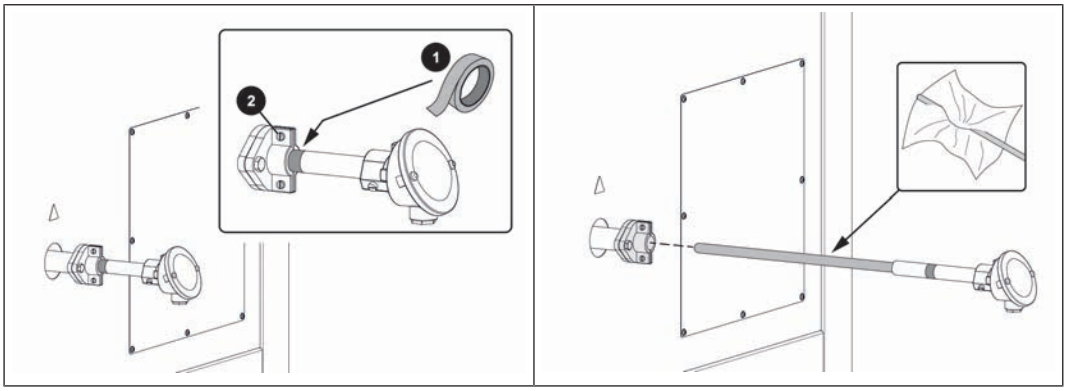
Risk of serious injuries from automatic startup of the system and severe burns from hot parts and the flue gas pipe!



When working on the system:

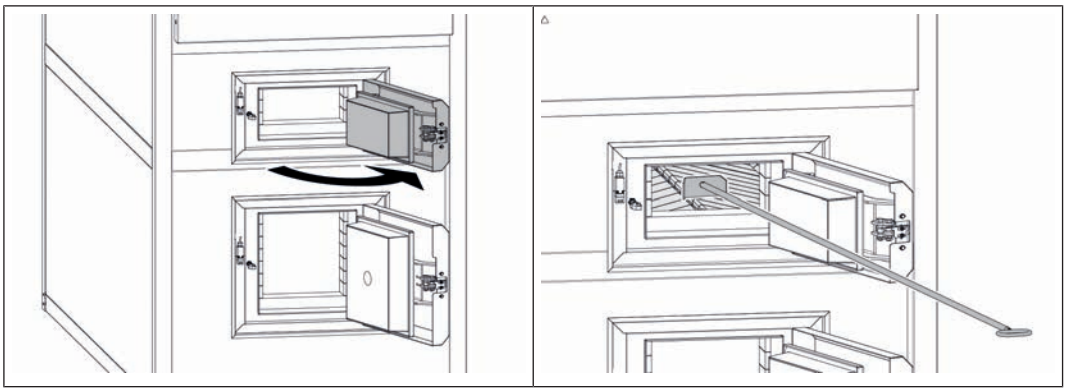
- ❒ always wear protective gloves
- ❒ only operate the boiler using the handles provided
- ❒ switch off the boiler by tapping “Boiler off” at the mode icon
  - ↳ The boiler follows the shutdown procedure and switches to “Switched off OFF“ status
- ❒ switch off the main switch and take precautions to prevent accidental switching on
- ❒ allow the boiler to cool off for at least 1 hour
- ❒ once all of the tasks have been completed, turn the main switch back on and switch the boiler on in the desired mode

NOTICE! In order to avoid damage to the burning chamber temperature sensor, it should be removed before starting work in the burning chamber



- ❒ Note the position of the burning chamber temperature sensor
  - ↳ Use sticky tape (1) for example
- ❒ Loosen the screws on the bracket (2)
- ❒ Carefully remove the burning chamber temperature sensor
  - ↳ if necessary, clean carefully
- ❒ When all tasks in the burning chamber have been completed, replace the burning chamber temperature sensor
  - ↳ Note the marking (e.g. sticky tape)

Cleaning the burning chamber

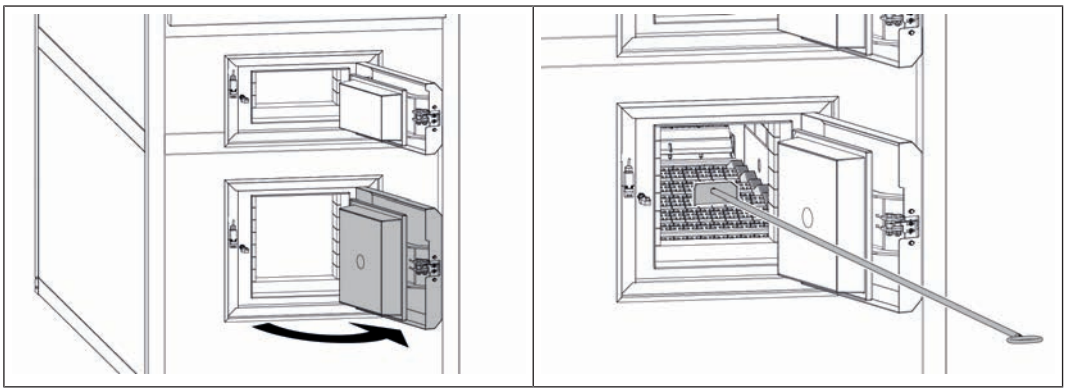


❒ Open the combustion chamber door

❒ Using a flat scraper, push the ash deposits on the upper side of the vault towards the rear

↳ The ash will fall down into the burning chamber

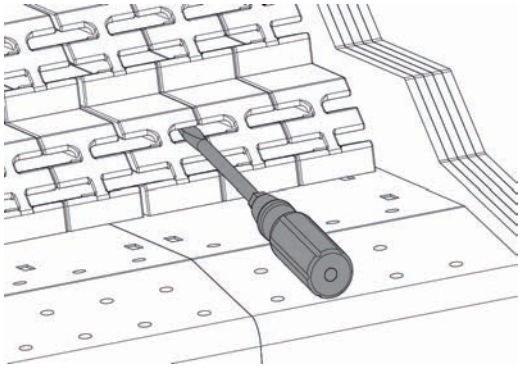
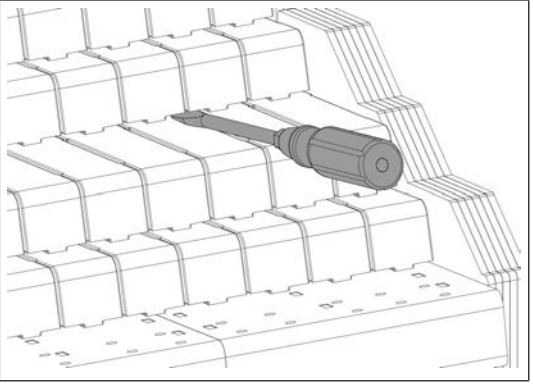
Cleaning the combustion chamber



❒ Open the burning chamber door

❒ Remove unburned material and foreign bodies from the burning chamber

❒ Using a flat scraper, move the ash on the combustion chamber grate towards the ash shaft

Wood chips moving grate	Pellets moving grate
	

❒ Remove any dirt (nails, stones, slag, etc.) from the moving grate

❒ Clean the primary air slot with a suitable tool (e.g. screwdriver)

↳ The primary air slots must be free from obstructions!

❒ Turn on the main switch

❒ Activating the moving grate and ash removal screws in manual mode

↳ Ash that gathers is moved into the ash container

❒ Empty the ash container whenever necessary

5.4.3 Emptying the multicyclone ash container



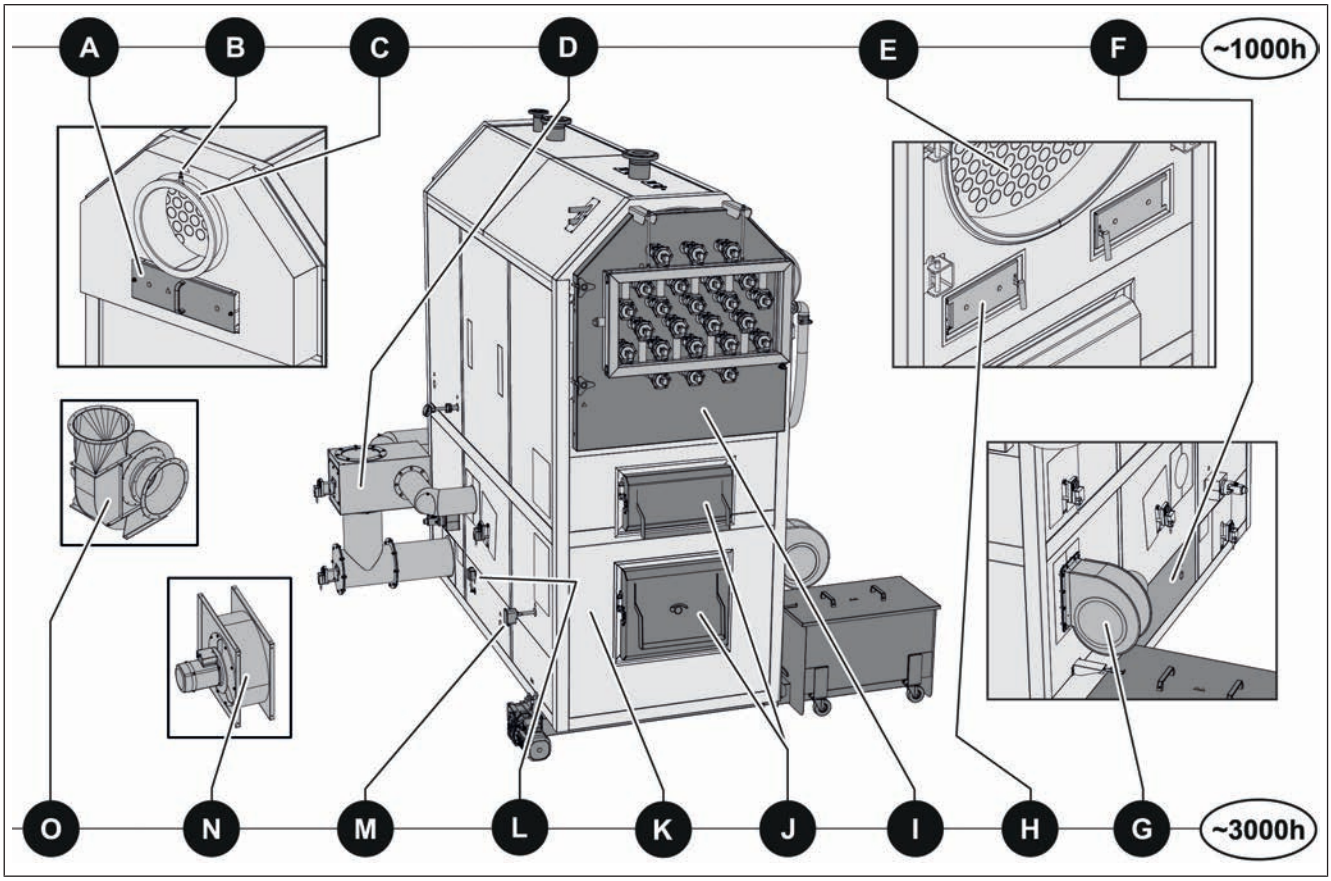
❒ Check the ash level and empty the container if necessary

5.5 Maintenance tasks

❒ Regular cleaning of the boiler extends its life and is a basic requirement for smooth running.

❒ Recommendation: use an ash vacuum for cleaning.

5.5.1 Periodic inspection and cleaning



approx. 1,000 h	
A ➲ "Cleaning the ash transfer chamber" [▸ 42]	D ➲ "Cleaning the flue gas recirculation (FGR) duct" [▸ 44]
B ➲ "Cleaning the Lambda probe" [▸ 43]	E ➲ "Checking the heat exchanger" [▸ 44]
C ➲ "Cleaning the flue gas temperature sensor" [▸ 43]	F ➲ "Cleaning the area under the moving grate" [▸ 45]
approx. 3,000 h	
G ➲ "Cleaning the combustion air fan" [▸ 46]	L ➲ "Checking the underpressure controller" [▸ 50]
H ➲ "Checking the seal of the cleaning port doors" [▸ 47]	M ➲ "Checking the combustion chamber overpressure sensor" [▸ 51]
I ➲ "Checking the seal of the reversing chamber door" [▸ 47]	N ➲ "Cleaning the FGR blower fan" [▸ 51]
J ➲ "Checking/adjusting the burning chamber and combustion chamber door" [▸ 48]	O ➲ "Cleaning the induced draft fan" [▸ 52]
K ➲ "Cleaning the fireclay elements" [▸ 49]	

5.5.2 Periodic inspection and cleaning (approx. 1,000 hrs)

For fuels with a low ash content, cleaning and inspection after approx. 1,000 service hours is usually sufficient (under normal use conditions, approximately every quarter). For less efficient fuels and fuels with a high ash content (indicated by short emptying intervals for the ash container), the work should be carried out more frequently accordingly.

⚠ WARNING



Inspection and cleaning work on a system which is operational:

Risk of serious injuries from automatic startup of the system and severe burns from hot parts and the flue gas pipe!

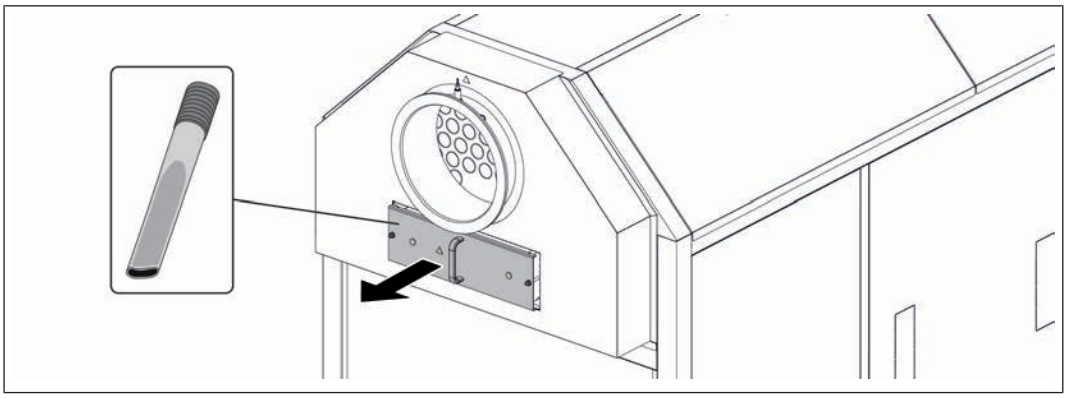


When working on the system:

- ❒ always wear protective gloves
- ❒ only operate the boiler using the handles provided
- ❒ switch off the boiler by tapping “Boiler off” at the mode icon
  - ↳ The boiler follows the shutdown procedure and switches to “Switched off OFF“ status
- ❒ switch off the main switch and take precautions to prevent accidental switching on
- ❒ allow the boiler to cool off for at least 1 hour
- ❒ once all of the tasks have been completed, turn the main switch back on and switch the boiler on in the desired mode

Cleaning the ash transfer chamber

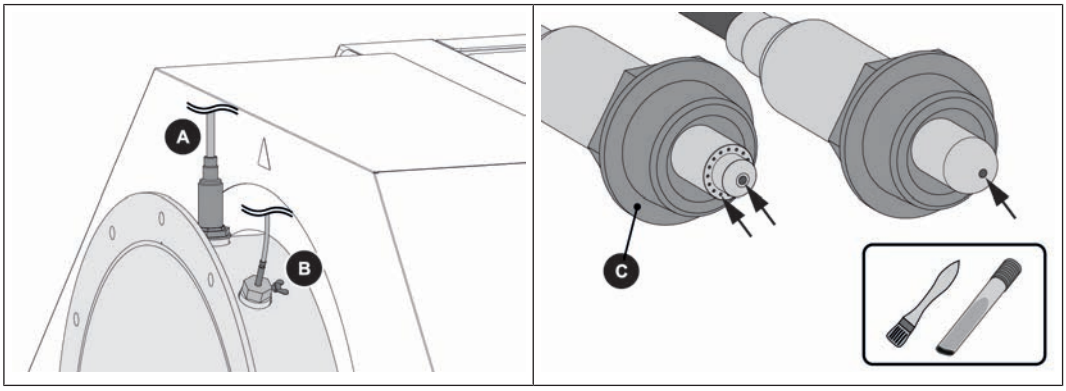
(Pos. A ➲ "Periodic inspection and cleaning" [▸ 41])



- ❒ Remove the cleaning door at the back of the boiler
- ❒ Check the ash level in the ash transfer chamber and clean using an ash vacuum, if necessary

Cleaning the Lambda probe

(Item B ➲ "Periodic inspection and cleaning" [▶ 41])



❒ Unscrew the Lambda probe (A)

↳ CAUTION: Lambda probe may be hot!

❒ Remove dirt with a soft brush

↳ Tip: to remove all the dirt, use an ash vacuum afterwards

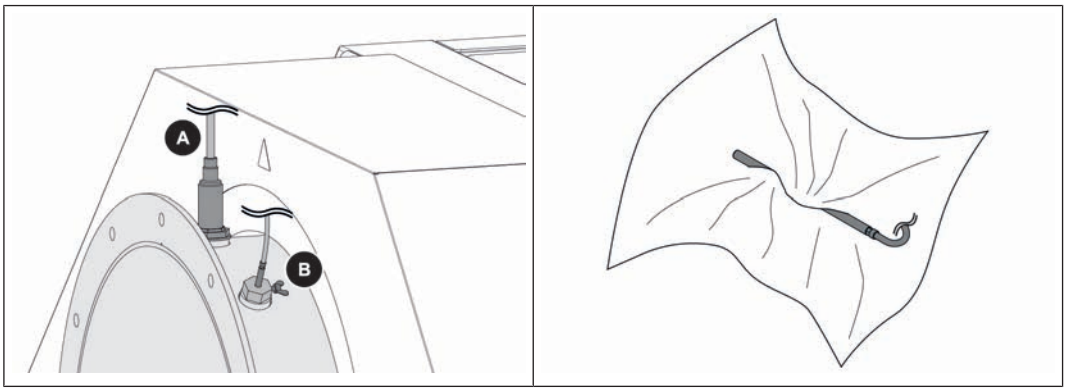
↳ CAUTION: Do not use sharp objects or compressed air to clean the Lambda probe

❒ Screw the Lambda probe back on again by hand

↳ IMPORTANT: The seal surface of the bushing (C) must lie flat on the sleeve after assembly

Cleaning the flue gas temperature sensor

(Item C ➲ "Periodic inspection and cleaning" [▶ 41])



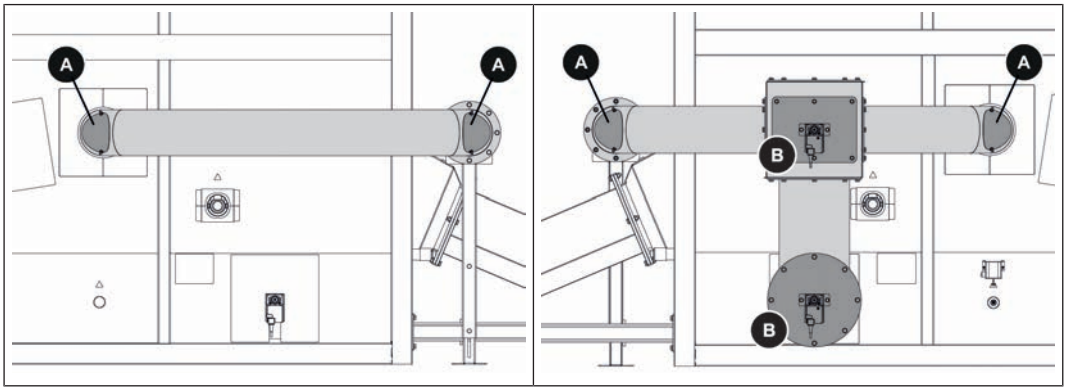
❒ Loosen the retaining screw and pull out the flue gas temperature sensor (B)

❒ Wipe the flue gas temperature sensor with a clean cloth

❒ Insert the flue gas temperature sensor back into the flue gas pipe and finger-tighten the retaining screw

Cleaning the flue gas recirculation (FGR) duct

(Pos. D ➲ "Periodic inspection and cleaning" [▸ 41])



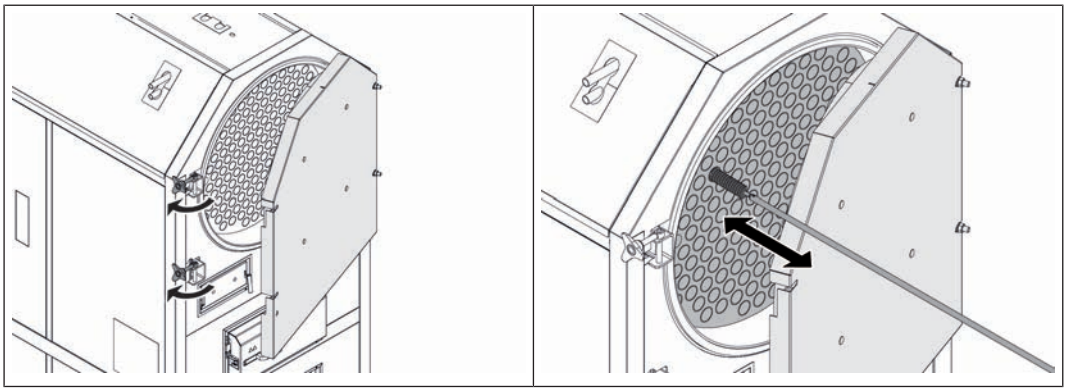
❒ Remove the thermal insulation from the FGR duct

❒ Dismantle the maintenance openings (A) on the FGR duct and on the FGR boxes (B)

❒ Check the FGR duct and clean using an ash vacuum, if necessary

Checking the heat exchanger

(Pos.E ➲ "Periodic inspection and cleaning" [▸ 41]



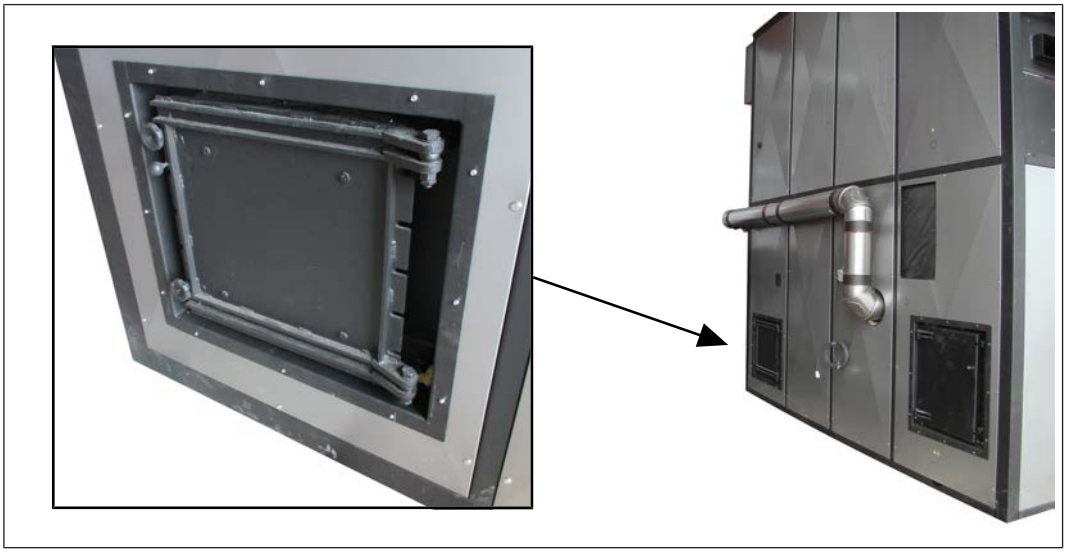
❒ Loosen the star-shaped knobs and open the reversing chamber door

❒ Check the heat exchanger pipes and clean thoroughly using a brush, if necessary

NOTICE! If the boiler features an automatic compressed air cleaner (optional), the cleaning interval increases accordingly, however the cleaning procedure set out above must be carried out at least once a year.

Cleaning the area under the moving grate

(Pos. F ➲ "Periodic inspection and cleaning" [▶ 41])



❒ Open the maintenance opening of the moving grate at the back of the boiler

❒ Check the area under the moving grate and ash rakes for deposits. Clean where necessary

❒ Check the grate, grate shafts and grate bearings for wear and deformation

↳ Exchange components wherever necessary

❒ Check the grate drive for dirt and deposits and ensure it operates smoothly

❒ Check the seal of the maintenance opening when closing it

5.5.3 Periodic inspection and cleaning (approx. 3,000 hrs)

For fuels with a low ash content, cleaning and inspection after approx. 3,000 service hours is usually sufficient (under normal use conditions, approximately every quarter). For less efficient fuels and fuels with a high ash content (indicated by short emptying intervals for the ash container), the work should be carried out more frequently accordingly.

⚠ WARNING



Inspection and cleaning work on a system which is operational:

Risk of serious injuries from automatic startup of the system and severe burns from hot parts and the flue gas pipe!

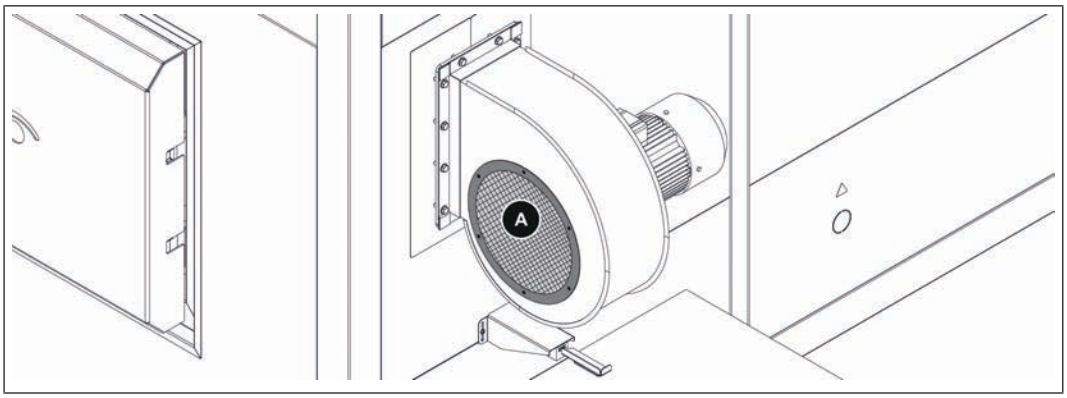


When working on the system:

- ❒ always wear protective gloves
- ❒ only operate the boiler using the handles provided
- ❒ switch off the boiler by tapping “Boiler off” at the mode icon
  - ↳ The boiler follows the shutdown procedure and switches to “Switched off OFF“ status
- ❒ switch off the main switch and take precautions to prevent accidental switching on
- ❒ allow the boiler to cool off for at least 1 hour
- ❒ once all of the tasks have been completed, turn the main switch back on and switch the boiler on in the desired mode

Cleaning the combustion air fan

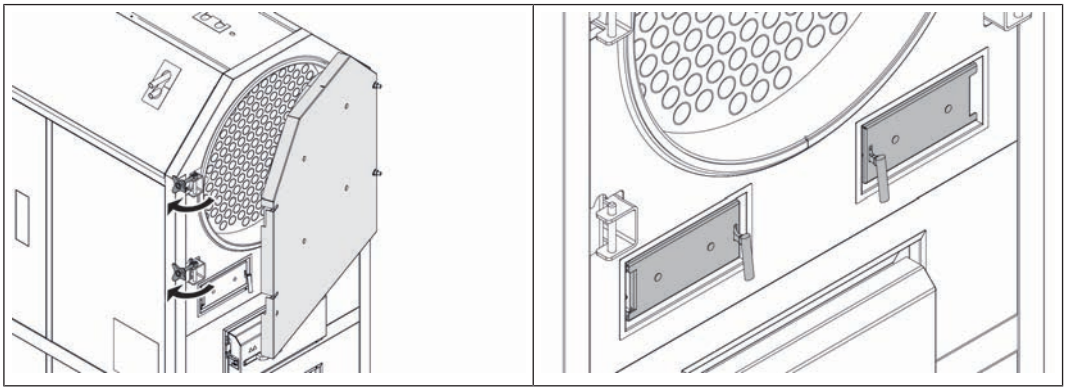
(Pos. G ➲ "Periodic inspection and cleaning" [▸ 41])



- ❒ Clean any dust and deposits from the protective grating (A)
- ❒ Remove the protective grating (A) if necessary and use a soft brush to clean the fan

Checking the seal of the cleaning port doors

(Pos. H ➲ "Periodic inspection and cleaning" [▶ 41])



❒ Loosen the star-shaped knobs and open the reversing chamber door

❒ Check that the fibre-glass seal of the cleaning port doors is perfectly aligned on the door frame

↳ Imprint on the fibre-glass seal or ceramic packing

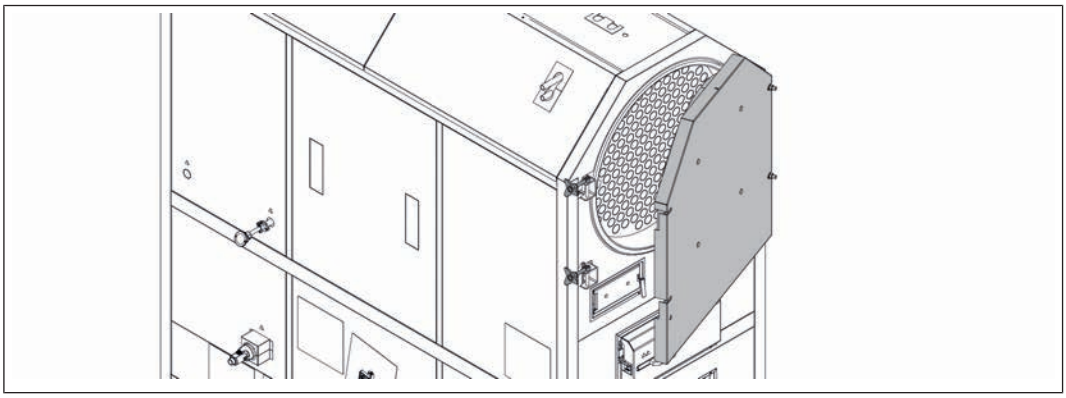
If the imprint of the seal is broken:

❒ The seal is no longer guaranteed

❒ Retighten the door fastening or replace the fibre-glas seal or ceramic packing

Checking the seal of the reversing chamber door

(Pos. I ➲ "Periodic inspection and cleaning" [▶ 41])



❒ Loosen the star-shaped knobs and open the reversing chamber door

❒ Check that the fibre-glass seal of the reversing chamber door is perfectly aligned on the door frame

↳ Imprint on the fibre-glass seal or ceramic packing

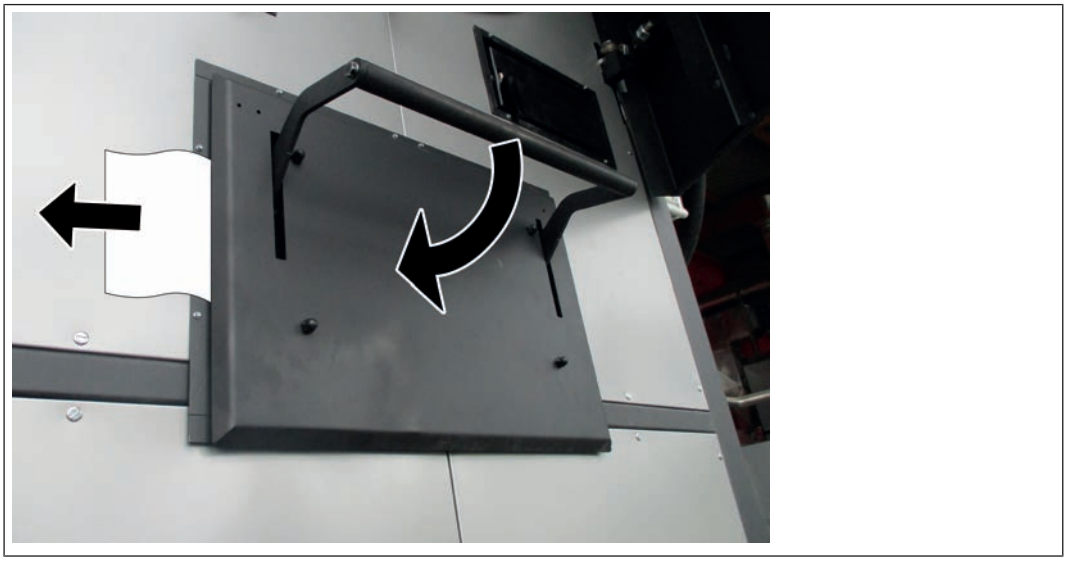
If the imprint of the seal is broken:

❒ The seal is no longer guaranteed

❒ Retighten the door fastening or replace the fibre-glas seal or ceramic packing

Checking/adjusting the burning chamber and combustion chamber door

(Pos. J ➲ "Periodic inspection and cleaning" [▶ 41])



❒ 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



❒ Remove the cover plate from the door

❒ Undo the lock nut (A)

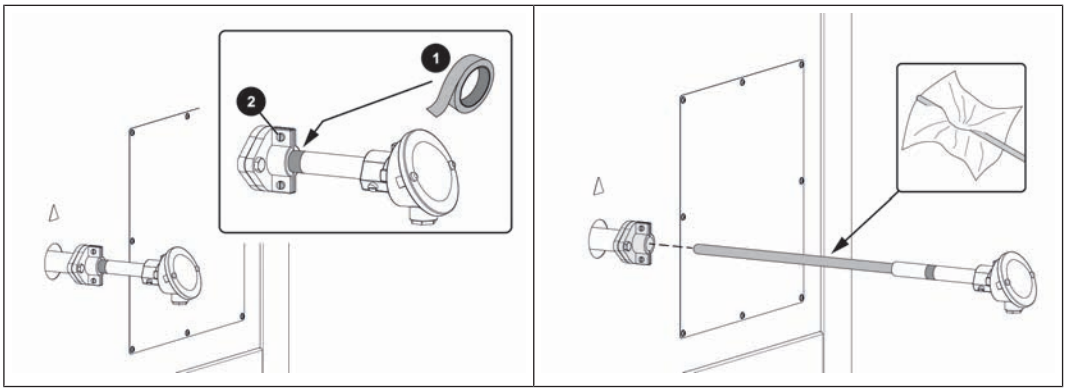
❒ Adjust the closing force by turning the top nut (B)

❒ Check again and then secure the setting using the lock nut

Cleaning the fireclay elements

(Pos. K ➲ "Periodic inspection and cleaning" [▶ 41])

NOTICE! In order to avoid damage to the burning chamber temperature sensor, it should be removed before starting work in the burning chamber



❒ Note the position of the burning chamber temperature sensor

↳ Use sticky tape (1) for example

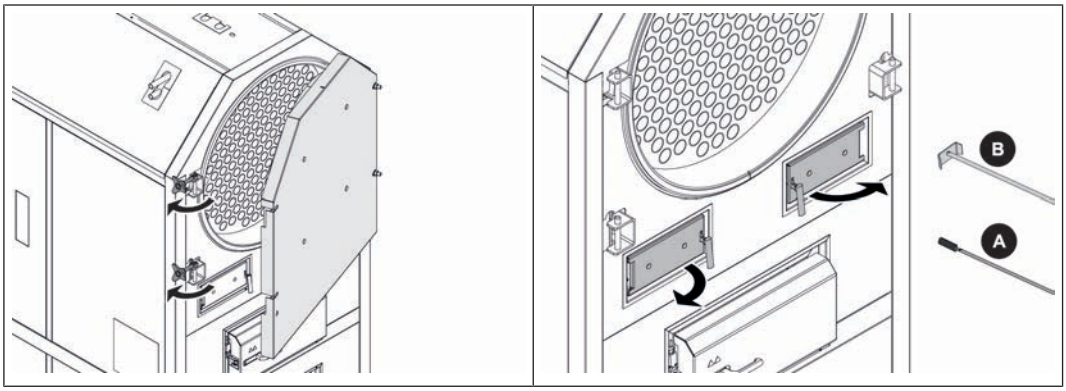
❒ Loosen the screws on the bracket (2)

❒ Carefully remove the burning chamber temperature sensor

↳ if necessary, clean carefully

❒ When all tasks in the burning chamber have been completed, replace the burning chamber temperature sensor

↳ Note the marking (e.g. sticky tape)



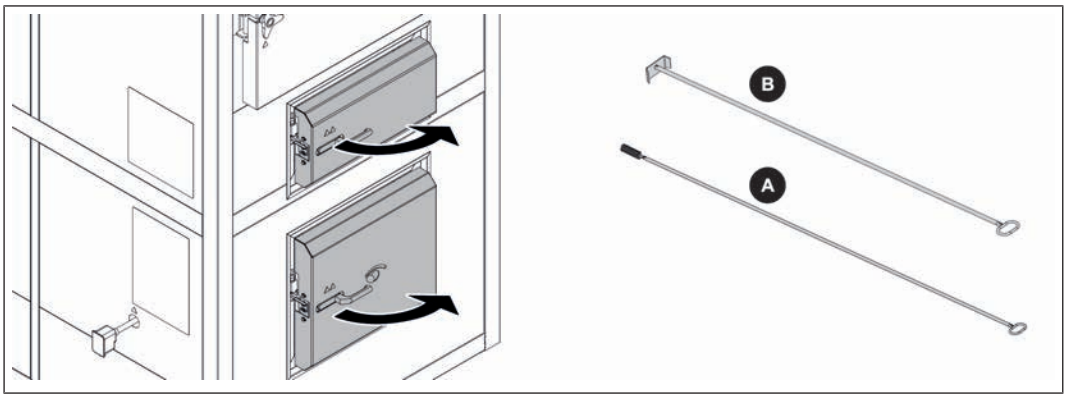
❒ Open the reversing chamber door

❒ Open the two cleaning port doors

❒ Carefully clean the bottom of the heat exchanger and the top of the upper vault using the cleaning brush (A)

❒ Carefully clean the side walls with the flat scraper (B)

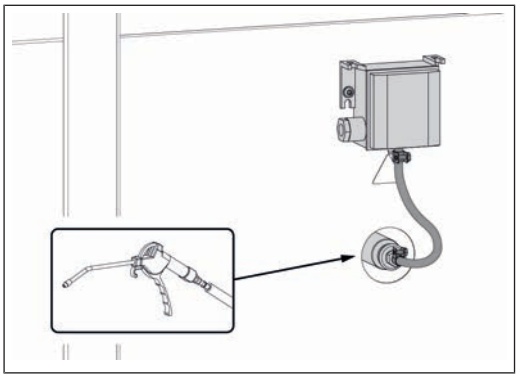
❒ Check the fireclay elements for wear



- ❒ Open the combustion chamber door
- ❒ Carefully clean the bottom of the upper vault as well as the lower vault, using the cleaning brush (A)
- ❒ Carefully clean the side walls using the flat scraper (B)
- ❒ Open the burning chamber door
- ❒ Carefully clean the bottom of the upper vault, using the cleaning brush (A)
- ❒ Carefully clean the side walls using the flat scraper (B)
- ❒ Check the fireclay elements for wear
- ❒ Remove any ash which has fallen down
- ❒ Close all doors again

Checking the underpressure controller

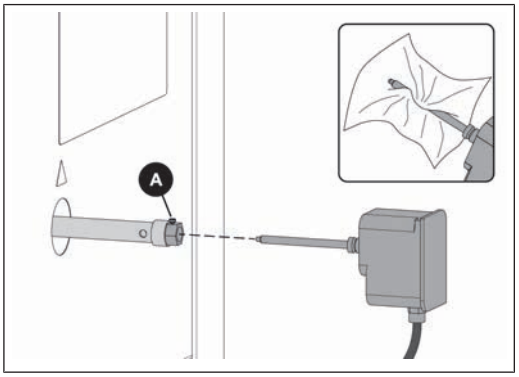
(Pos. L ➲ "Periodic inspection and cleaning" [▸ 41])



- ❒ Disconnecting the silicone hose from the differential pressure transducer
- ❒ Using compressed air, blow out the hose in the direction of the burning chamber in order to remove any deposits
- ❒ Connect the silicone hose to “Minus”

Checking the combustion chamber overpressure sensor

(Pos. M ➲ "Periodic inspection and cleaning" [▸ 41])



❒ Loosen fixing screw (A) and pull the burning chamber overpressure monitor out of the spacer tube

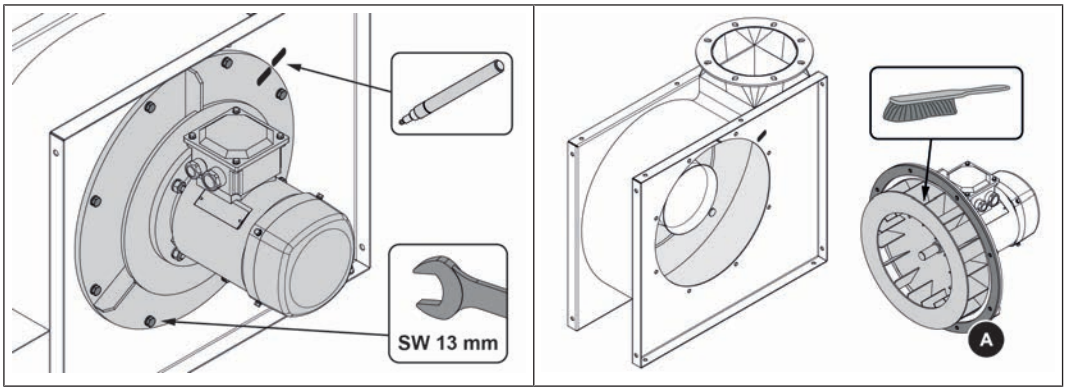
❒ Clean the sensor with a fine cloth

❒ Check that the spacer tube is clear

❒ Insert the burning chamber overpressure monitor and secure loosely with fixing screws

Cleaning the FGR blower fan

(Pos. N ➲ "Periodic inspection and cleaning" [▸ 41])



❒ Mark the position of the flange

❒ Loosen the screws on the flange

❒ Take out the blower fan and clean the blower wheel with a brush

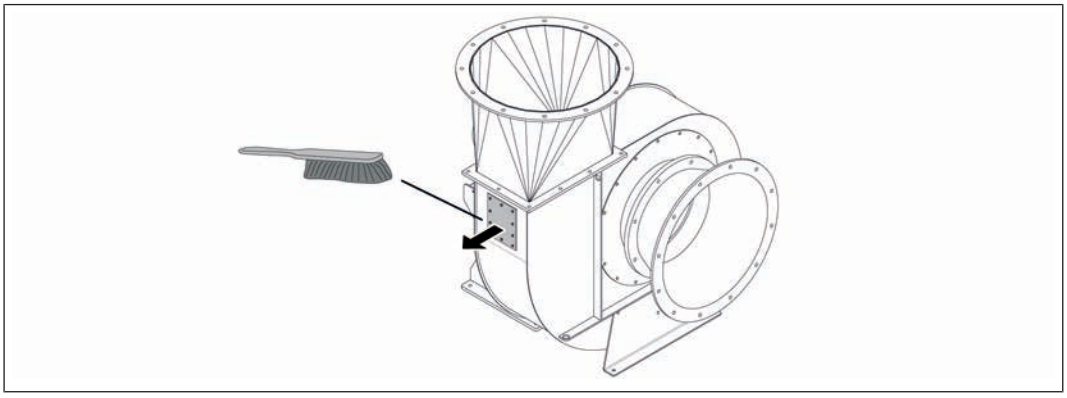
❒ Check the seal (A) and replace if necessary

❒ Replace the blower fan

↳ Note the marking on the flange!

Cleaning the induced draft fan

(Pos. O ➲ "Periodic inspection and cleaning" [▸ 41])



1. Remove the inspection cover
2. Carefully clean the running wheel and coil of the induced draught fan with a brush

Lubricating the bearings

❒ Grease the bearings of the screws and the drives at the correct points.

Checking the flue gas pipe

❒ Check the flue gas pipe and chimney

❒ Where necessary, remove any deposits using a cleaning brush

↳ Always use stainless steel brushes to clean stainless steel flue pipes, chimney pipes and connections!

5.6 Maintenance instructions for hydraulic system

⚠ WARNING



Do not use unskilled personnel for hydraulic system maintenance

Risk of injury and damage to property!

Take the following precautions:

❒ Only allow trained professionals to carry out servicing and maintenance work on the hydraulic system. Follow the manufacturer's operating instructions.

NOTICE! Do not allow the oil temperature to exceed +50°C or fall below -30°C.

The interval at which oil should be changed depends on a variety of factors including the age of the oil and the amount of dirt contained in it. As a general rule, the oil should be changed at the following intervals:

Interval [service hours]	Component / Maintenance Operation
50 – 100	ONE-TIME maintenance after first commissioning: ❒ Change the oil and the filter
50	❒ Check the oil level ↳ The oil must show no visible signs of foaming ❒ Check the tightness of screw connectors
200	❒ Check the return filter for dirt (pressure gauge on filter) ❒ Change the filter cartridge if necessary
5,000 (or yearly)	❒ Change the oil ❒ Change the return filter and the vent filter sets

Recommended procedure for oil change:

❒ Move all hydraulic cylinders to the end stop

↳ This will expel all the oil

❒ Drain off or pump off the oil from the hydraulic unit

❒ Remove the unit cover or open the inspection cover

❒ Thoroughly clean the oil tank (make sure you remove all oil sludge)

❒ Change the return filter and the vent filter sets

❒ Refit the unit cover or close the inspection cover

❒ Fill the tank with hydraulic oil to the level mark shown on the inspection glass

Use the hydraulic oil grade specified by the manufacturer

❒ At the other end of the cylinder plunger (relative to its current position), remove the hydraulic cylinder hose fitted to the fixed piping side.

❒ Using the hydraulic unit move the cylinders to the other end position

↳ The remaining old oil will be pushed out of the hose and into the container

❒ Refit the hydraulic hoses and check the seal

❒ Bleed the hydraulic system and check the oil level

NOTICE! Dispose of hydraulic oil in accordance with local regulations!

5.7 Emissions measurement by chimney sweep or regulatory body

Various legal regulations stipulate that heating systems must be inspected periodically. In Germany this is regulated by the First Federal Emissions Protection Ordinance (BimSchV) in the last amended version, and in Austria by various state laws.

The following minimum requirements must be met by the operator of the system for a successful measurement:

❒ Ensure there is adequate fuel

↳ Only use fuels of high quality which meet the requirements as stipulated in the boiler operating instructions (“Permitted fuels” chapter)

❒ Ensure that there is adequate heat consumption on the day of the measurement (e.g. storage tank must be able to take heat for the duration of the measurement)

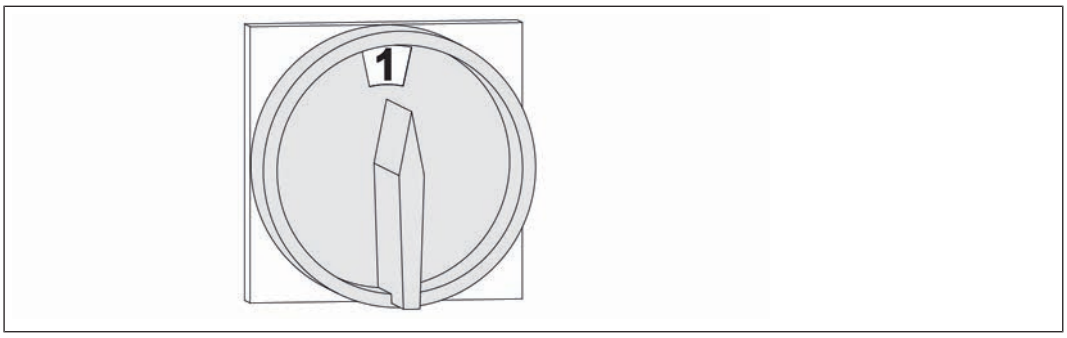
❒ There must be a suitable measuring port in the straight flue gas pipe for the measurement. The measuring port must be twice the flue gas pipe diameter away from the last upstream bend.

↳ If the measuring port is not correctly positioned, the measuring result will be distorted

5.7.1 Switch on the system

When the cleaning is complete:

❒ Reassemble all dismantled components in reverse order and check for tightness and correct installation



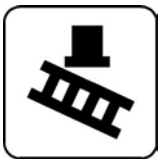
❒ Turn on the main switch

↳ When the control has completed the system start, the boiler is ready for operation

❒ Switch the boiler on by tapping “Boiler ON”

↳ Automatic mode is active. The heating system is controlled via the controller according to the selected mode in automatic mode

5.7.2 Start emissions measurement



❒ Activate the “Chimney-sweep mode” icon

❒ Select the desired time from the menu:

immediately	❒ Specify the type of measurement (`nominal load` / `partial load`) ↳ The flue gas temperature and residual oxygen content should have stabilised approximately 20 minutes after activation ↳ The display will indicate that the boiler is ready for measurement as soon as all the conditions for the measurement are fulfilled

5.8 Maintenance agreement / Customer service

NOTICE! We recommend a yearly inspection by Froling customer services or an authorised partner (third party maintenance).

Regular maintenance and servicing by a heating specialist will ensure a long, trouble-free service life for your heating system. It will ensure that your system stays environmentally-friendly and operates efficiently and cost-effectively.
In the course of this maintenance the entire system is inspected and optimised, particularly regulation and control of the boiler. The emission measurement carried out can also be used to draw conclusions about the combustion performance of the boiler. For this reason, FROLING offers a service agreement, which optimises operating safety. Please see the details in the accompanying guarantee certificate.

Your Froling customer service office will also be happy to advise you.

NOTICE

All national and regional regulations relating to regular testing of the system must be observed. Please be advised that, in Austria, commercial systems with a rated heat output of 50 kW or more must be regularly tested at yearly intervals in accordance with the Heating Plant Regulations (Feuerungsanlagen-Verordnung).

5.9 Replacement parts

With Froling original replacement parts in your boiler, you are using parts that match perfectly. As the parts fit together so well, installation times are shortened and a long service life is maintained.

NOTICE

Installing non-original parts will invalidate the guarantee.

❒ Only replace components or parts with original replacement parts

5.10 Disposal information

5.10.1 Disposal of the ash

❒ The ash should be disposed of in accordance with waste management regulations.

5.10.2 Disposal of system components

❒ 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.

6 Troubleshooting

6.1 General faults in the power supply

Error characteristics	Cause of error	Elimination of error
Nothing is shown on the display	General power failure	
No power to the controller	Main switch is turned off	Turn on the main switch
	FI-protective circuit breaker, power line protection or SPS power line protection tripped	Switch on the protective circuit breaker

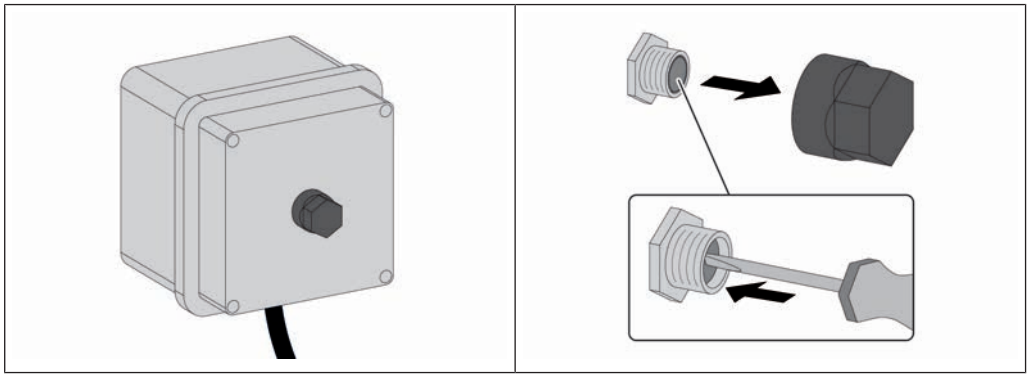
6.1.1 Behaviour of system after a power failure

When the power supply has been restored, the boiler returns to the previous mode and is controlled according to the specified program.

- ❒ **After a power failure, check whether the STL (high-limit thermostat) has tripped.**
- ❒ **Keep the doors of the boiler closed during and after the power failure, at least until the induced draught fan automatically starts up again.**

6.2 Excessive temperature

The high-limit thermostat (STL) shuts down the boiler when it reaches a temperature of max. 100°C. The pumps continue to run.



Once the temperature falls below approx. 75°C, the STL can be reset mechanically.

- ❒ Unscrew the cap on the STB (high-limit thermostat)
- ❒ Unlock the STL by pressing with a screwdriver

6.3 Faults with fault message

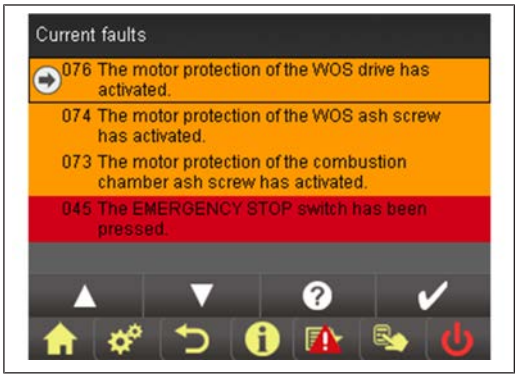
If a fault has occurred and has not yet been cleared:



- A warning symbol (1) flashes in the Quick menu
- In case of a fault/alarm, the operating status “Fault Off” (2) is displayed

❒ Navigate to the error display using the Quick menu

↳ The current fault list is displayed:



The term “fault” is a collective term for warnings, errors and alarms. The boiler reacts differently to the three types of message:

Type of fault	Character	Boiler behaviour
WARNING	▪ YELLOW warning sign ▪ Message with YELLOW background	In case of warnings the boiler initially continues controlled operation, giving the option of resolving the error quickly to prevent a shutdown.
ERROR	▪ ORANGE warning sign ▪ Message with ORANGE background	The boiler follows the shutdown procedure and remains in "Switched off OFF" status until the problem is resolved.
ALARM	▪ RED warning sign ▪ Message with RED background	An alarm triggers a system emergency stop. The boiler shuts down immediately, the heating circuit controller and pumps remain active.

6.3.1 Procedure for fault messages

Troubleshooting and fault messages
See operating instructions SPS 4000

Notes

Manufacturer’s address

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Installer’s address

Stamp

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