fröling

Operating instructions

Pellet boiler PT4e (ESP)

Translation of original German version of operating instructions for operators!

Read and follow all instructions and safety instructions!
Errors and omissions excepted!

CE

B1600125_en | Edition 07/07/2025

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.

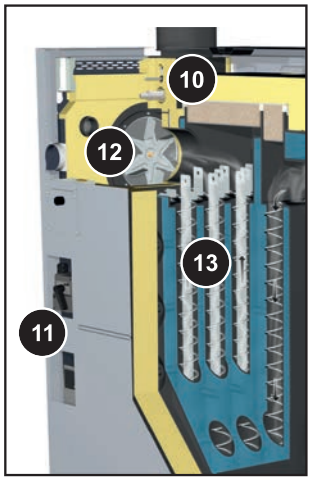
Warranty and Guarantee Conditions

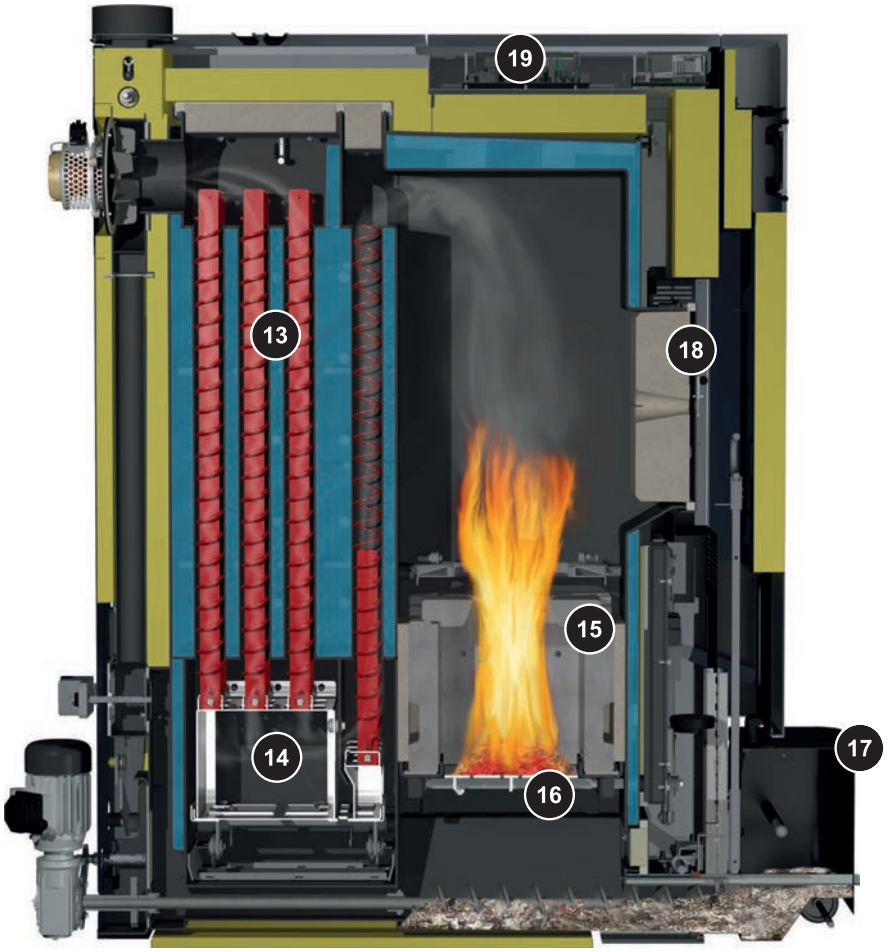
Our sale and delivery conditions will be applicable. These conditions have been made available to customers, and customers have been made aware of them at the time of order completion.

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

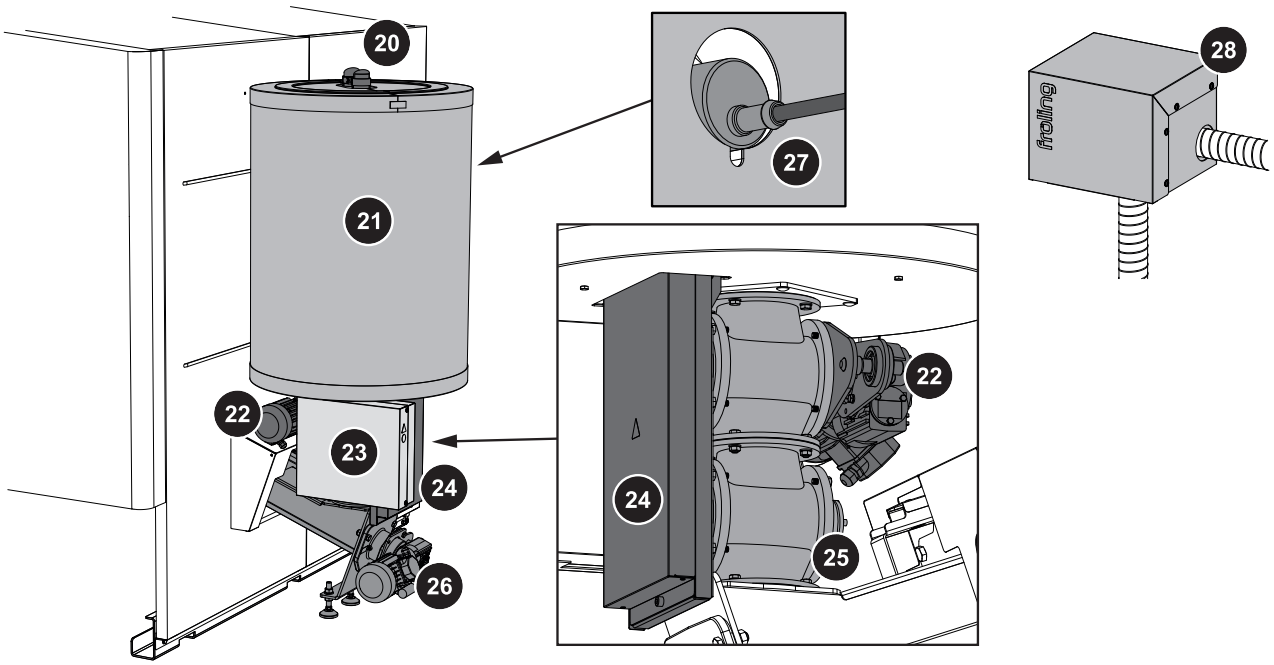
1.1 Product overview PT4e

1	Pellet boiler – Froling PT4e
2	Main switch: switches the power supply on and off for the entire system
3	High-limit thermostat STL
4	Mains connection
5	Control panel of the Lambdatronic H 3200 controller
6	Insulating cover
7	Heat exchanger cover
8	Service interface
9	Suction unit with pellet container





10	Lambda probe for fuel adjustment
11	Integrated return temperature control with pump, mixing valve and ball valve
12	Speed-controlled induced draught fan
13	WOS system with turbulators and automatic drive for heat exchanger cleaning of the second and third passes
14	Integrated electrostatic particle separator (optional)
15	Silicon carbide combustion chamber with automatic tipping grate
16	Tipping grate with drive (rotation angle 110°)
17	Ash box for combined automatic ash removal from combustion chamber and heat exchanger
18	Combustion chamber door with inspection glass
19	Lambdatronic H 3200 boiler controller



20	Connections for pellet suction hoses
21	Cyclone container including insulation
22	Drive for rotary valve unit
23	Control cabinet
24	Drive ratio for rotary valves
25	Multi-chamber rotary valves
26	Drive for stoker screw
27	Fill level sensor
28	External suction module

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.

IMPORTANT

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
	Wear protective gloves		Turn off the main switch
	Keep the doors closed		Wear a dust mask
	Work under the supervision of a second person		Lock

	Unauthorised access prohibited		No fire, open flames or smoking
	Access for persons with pacemakers or implanted defibrillators is prohibited		

	Warning - hot surface		Warning - hazardous electrical voltage
	Warning - hazardous or irritant materials		Warning - automatic boiler startup
	Warning of injury to fingers or hands, automatic fan		Warning of injury to fingers or hands, automatic screw
	Warning of injury to fingers or hands, gear/chain drive		Warning of injury to fingers or hands, cutting edge
	Hand injury warning		Warning of injury from being pulled into rotating shafts
	Increased CO concentration warning		Slipping hazard warning

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 Pellet boiler PT4e is designed solely for heating domestic water. Only the fuels specified in the "Permitted fuels" section may be used.

➲ "Permitted fuels" [▸ 12]

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 The Clean Air Act 1993 and Smoke Control Areas

Under the Clean Air Act local authorities may declare the whole or part of the district of the authority to be a smoke control area. It is an offence to emit smoke from a chimney of a building, from a furnance or from any fixed boiler if located in a designated smoke control area. It is also an offence to acquire an „unauthorised fuel“ for use within a smoke control area unless it is used in an „exempt“ appliance („exempted“ from the controls which generally apply in the smoke control area). The Secretary of State for Environment, Food and Rural Affairs has powers under the Act to authorise smokeless fuels or exempt appliances for use in smoke control areas in England. In Scotland and Wales this power rests with Ministers in the devolved administrations for those countries. Separate legislation, the Clean Air (Northern Ireland) Order 1981, applies in Northern Ireland. Therefore it is a requirement that fuels burnt or obtained for use in smoke control areas have been „authorised“ in Regulations and that appliances used to burn solid fuel in those areas (other than „authorised“ fuels) have been exempted by an Order made and signed by the Secretary of State or Minister in the devolved administrations.

Further information on the requirements of the Clean Air Act can be found here: http://smokecontrol.defra.gov.uk

Your local authority is responsible for implementing the Clean Air Act 1993 including designation and supervision of smoke control areas and you can contact them for details of Clean Air Act requirements.

The Froling PT4e 80, PT4e 90, PT4e 100, PT4e 110, PT4e 120, PT4e 140, PT4e 150, PT4e 160, PT4e 170, PT4e 180, PT4e 200, PT4e 230, PT4e 250, PT4e 300 and PT4e 350 have been recommended for use in smoke control areas when burning wood pellets only.

2.4.2 Permitted fuels

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.

2.4.3 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

IMPORTANT

In the event that non-permitted fuels are used:

Burning non-permitted fuels increases the amount of cleaning required and leads to a build-up of aggressive deposits and condensation which can damage the boiler. Consequently this invalidates the warranty! Using non-standard fuels can also lead to serious faults in combustion!

For this reason, when operating the boiler:

❒ Use only the permitted fuels

2.5 Qualification of operating staff

⚠ CAUTION

If unauthorised persons enter the Installation room / boiler room:

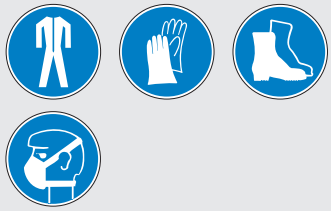
Risk of personal injury and damage to property

❒ 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.

2.6 Protective equipment for operating staff

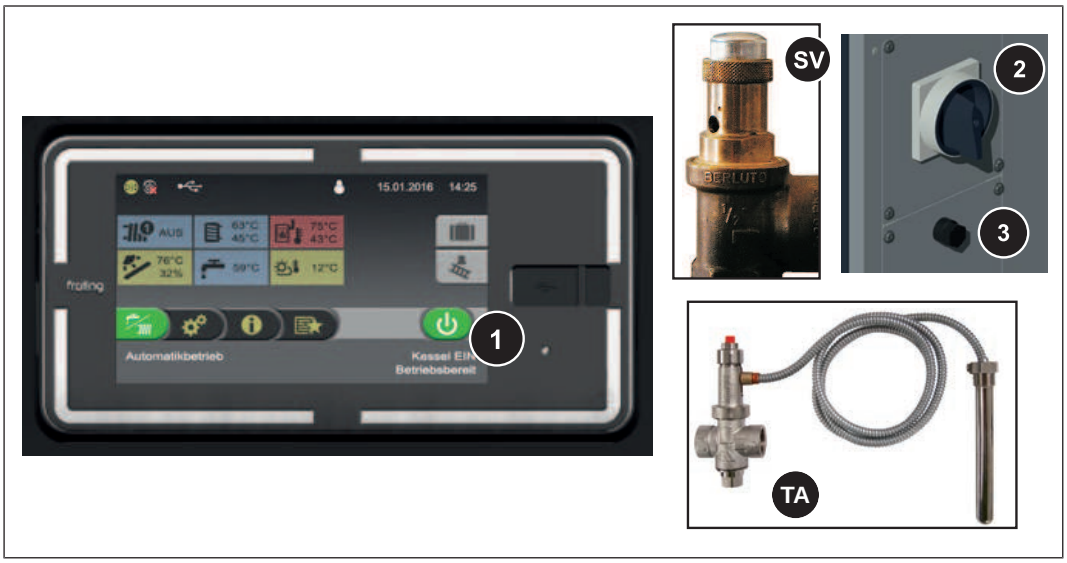
You must ensure that staff have the protective equipment specified by accident prevention regulations!



- For operation, inspection and cleaning:
  - suitable work wear
  - protective gloves
  - sturdy shoes
  - dust mask

  When working with dust from the electrostatic particle separator, use dust masks in filter class FFP2 or higher

2.7 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 ↳ Pumps continue to run
2	**MAIN SWITCH** *(switches off the power supply)* Before carrying out work on/in 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 TEMPERATURE LIMITER (STL)** *(protection against overheating)* The STL (high-limit thermostat) switches off the combustion system when the boiler reaches 100°C. The pumps continue to run. Once the temperature falls below approx. 75°C, the STL can be reset mechanically.

On site:

SV	**SAFETY VALVE** *(protection against overheating/excess pressure)* When the boiler pressure reaches a maximum of 3 bar, the safety valve opens and the heated water is blown off in the form of steam.

For PT4e 140-250:

TA	**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

2.8 Residual risks

⚠ DANGER

If maintenance work is performed when the system is in operation:

Risk to life from high voltage electrodes!

Prior to working on the electrostatic particle separator, ensure the following:

- ❒ Switch off the power supply and take precautions to prevent accidental switching on
- ❒ Earth and short circuit HV electrodes
- ❒ 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

Persons using pacemakers whilst in the immediate vicinity of the electrostatic particle separator:

Interference of the pacemaker by electromagnetic fields of the particle separator is possible!

Therefore:

- ❒ Maintain a safety distance of at least one metre from the electrostatic particle separator
- ❒ Perform work only when the electrostatic particle separator is switched off

⚠ 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 (“Boiler 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

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

When inspecting and cleaning the boiler with the main switch on:

Serious injuries possible due to automatic boiler startup!

Before inspection and cleaning work in/on the boiler:

❒ Switch the boiler off by tapping “Boiler off”
The boiler follows the shutdown procedure and switches to "Boiler off“ mode

❒ Allow the boiler to cool for at least 1 hour

❒ Switch off the main switch and take precautions to prevent accidental switching on

2.9 Emergency procedure

2.9.1 Overheating of the system

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

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

- ❒ Keep all the doors on the boiler closed
- ❒ Switch boiler off by tapping “Boiler OFF”
- ❒ 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
- ❒ 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

2.9.2 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.

2.9.3 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 room in which the boiler is installed and close the doors
- ❒ Press the on-site EMERGENCY STOP button
- ❒ 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:

- Protecting the system against frost
- 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
- Observe national and regional regulations regarding the installation of smoke detectors and carbon monoxide detectors

3.3 Combustion air

3.3.1 General requirement

For safe operation, the boiler requires around 1.5 - 3.0 m³ of combustion air per kW nominal heat output and operating hour. The air supply can be provided by free ventilation (e.g. windows, air shaft), mechanical ventilation from outside or, if necessary, from the group of rooms.

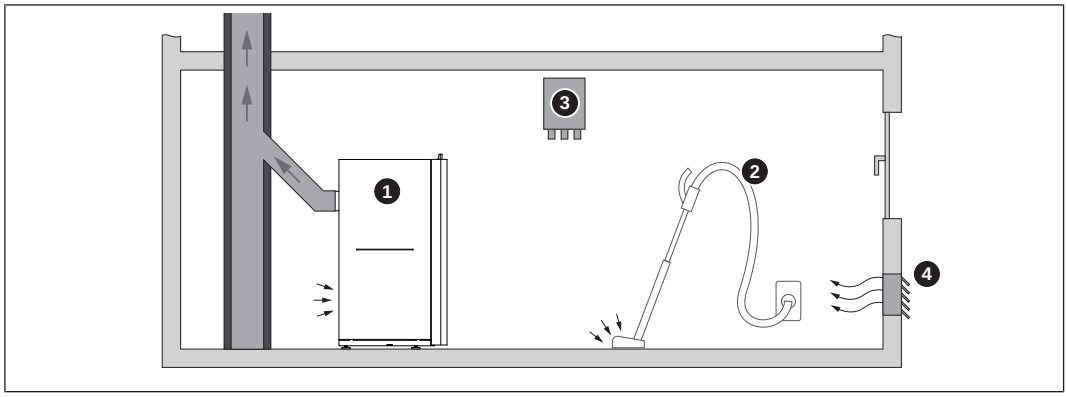
The boiler is operated depending on the room air, whereby the combustion air is taken from the installation site.

A suitable air supply must ensure that no impermissible under-pressure greater than 4 Pa is created at the installation site. The use of safety devices (under-pressure monitoring system) may be necessary, particularly if the boiler is operated concurrently with air-suction systems (such as an extractor fan).

Local **IMPORTANT! Safety equipment and conditions for the operation of the boiler (room air-dependent / room air-independent) must be clarified with the local authority (authority, chimney sweep, ...).**

3.3.2 Room air-independent operation

The combustion air is taken from the installation site. The unpressurised flow of the required air quantity must be ensured accordingly.



1	Boiler in room air-dependent operation
2	Air extraction system (such as centralised dust extraction system, room ventilation)
3	Under-pressure monitoring system
4	Combustion air supply from outside

The minimum cross-sectional area of the supply air opening from outside depends on the nominal heat output of the boiler.

Austria	400 cm² net minimum cross-sectional area plus 4 cm² for every kW of nominal heat output above 100 kW
Germany	150 cm² net minimum cross-sectional area plus an additional 2 cm² for every further kW of nominal heat output above 50 kW

Examples

Minimum free cross-section [cm²]										
Nominal heat output [kW]	**10**	**15**	**20**	**30**	**50**	**100**	**150**	**250**	**350**	**500**
Austria	400	400	400	400	400	400	600	1000	1400	2000
Germany	150	150	150	150	150	250	350	550	750	1050

Combustion air can also be supplied from other rooms if it can be proven that sufficient combustion air can flow in whilst all mechanical and natural ventilation systems are in operation. The installation site must have a minimum volume in accordance with the applicable regional standards.

Note on standards

Austria:	OIB Guideline 3 - Hygiene, health and environmental protection
Germany:	Model Firing Ordinance (MFeuV)

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:

- ❒ 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 top-up water, always vent the filling hose before connecting it, in order to prevent air being drawn into the system
- ❒ Check that the heating water is clear and free of substances that can be deposited as sediments
- ❒ Check that the pH value is 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, as specified in VDI 2035
- ❒ The use of fully demineralised filling and top-up water with an electrical conductivity not exceeding 100 µS/cm is recommended by EN 14868
- ❒ After the first 6-8 weeks, check the heating water to ensure that the specified values are being adhered to
- ❒ Unless specified otherwise by regional standards and regulations, perform an annual check on the heating water

Filling and make-up water as well as heating water to VDI 2035 Sheet 1:2021-03:

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
- Annually: values must be recorded by the owner

Advantages of heating water treated in accordance with the 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

Frost protection

When operating the system with frost-protected heat transfer media, the following instructions and ÖNORM H 5195-2 must be observed:

- Antifreeze dosage according to the manufacturer's data sheet
  IMPORTANT: If the medium contains too much or too little antifreeze it becomes highly corrosive
- Adding antifreeze reduces the specific heat capacity of the medium; therefore design components (pumps, pipework, etc.) accordingly
- Add frost protection only to heat transfer medium in those areas that may be affected by frost (TIP: system separation)
- Check the antifreeze dosage regularly according to the manufacturer's instructions
- Dispose of frost-protected heat transfer medium at the end of its shelf life and refill the system

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 temperature control

As long as the hot water return is below the minimum return temperature, part of the hot water flow is added. This function is assumed by the function which increases the temperature inside the boiler.

3.7 Storage tank

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.

Certain subsidy guidelines prescribe compulsory requirements for the installation of storage tanks. Up-to-date information about individual subsidy guidelines can be found at www.froeling.com.

Requirements for Switzerland in accordance with LRV Appendix 3, section 523

Automatic boilers for wood pellets with a rated thermal output of more than 70 kW must be equipped with a heat accumulator of a volume of at least 25 litres per kW rated thermal output. These dimensioning specifications apply up to 500 kW nominal heat output.

Hot water tank in accordance with Commission Regulation (EU) 2015/ 1189 (Ecodesign Requirements)

It is recommended to operate the boiler with a hot water tank. The recommended storage volume = 20 x Pr, where Pr is the rated heat output and is indicated in kW.

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.

IMPORTANT! 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.

IMPORTANT! See assembly instructions for thePT4e

IMPORTANT

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

IMPORTANT! 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

- 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.

IMPORTANT

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 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 Notes on filling the fuel stores

When working in the fuel store:

Risk of injury due to moveable parts!

Shut off the feeder unit before entering the fuel store!

When cleaning the fuel store, an increased amount of dust may be generated. Wear a dust mask when working in the fuel store.

Adequately ventilate the fuel store before entering. Keep the door open and always have a second person present. Observe the CO concentration limit (< 30ppm).

Slick surfaces in the fuel store present a slipping hazard!

Unauthorized access prohibited! Keep children away!

Keep the fuel store locked and store the key in a safe place!

No fire, open flames or smoking in the fuel store!

⚠ CAUTION

Filling the store when the boiler is switched on

could result in damage and consequential injury!

When filling the fuel store:

❒ Switch off the boiler by tapping “Boiler OFF”

↳ The boiler follows the shutdown procedure and switches to "Boiler off" status

❒ Allow the boiler to cool for at least half an hour

When the boiler has cooled down:

❒ Before filling check the store for fines and clean if necessary

❒ Close all openings to the store to seal out dust

❒ Fill the store with pellets

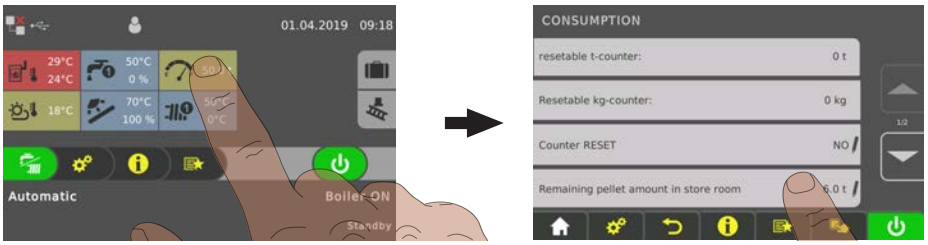
↳ Only use permitted pellets!
➲ "Permitted uses" [▸ 11]

4.4 Adjust pellet consumption counter after fuel delivery

4.4.1 Correct the remaining pellet amount in store room

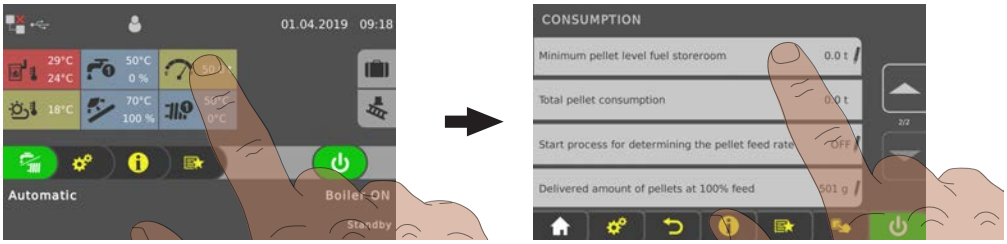
Add the following values for the available fuel quantity in the fuel store:

- Remaining pellet amount in fuel store before refilling
- Refilled quantity by the pellet supplier



❒ In the "Consumption" menu, select the "Remaining pellet amount in store room" parameter and enter the calculated value

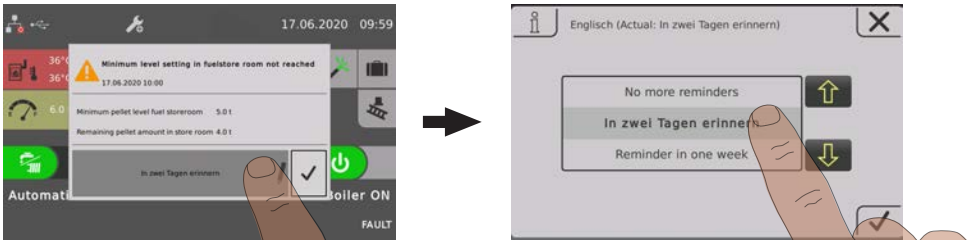
4.4.2 Setting the automatic notification for minimum level



❒ In the "Consumption" menu, select the "Minimum pellet level fuel storeroom" parameter and enter the desired value

TIP: Select approximately 10% of the fuel store capacity as the value for the minimum level.

When the set minimum level in the pellet store is reached, a message is shown on the boiler display:



❒ Select and confirm by tapping the "pen" icon

↳ No more reminders

↳ Reminder in two days

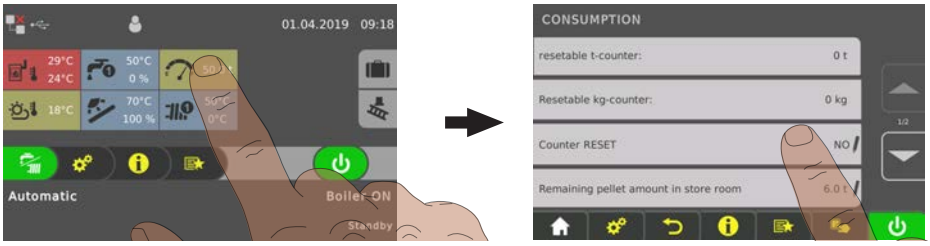
↳ Reminder in one week

4.4.3 Resetting the pellet consumption counter

The pellet consumption counter indicates the consumption of pellets in the parameters “Resettable t-counter” and “Resettable kg-counter” in steps of tons or kilograms. Both values are set to “0” by resetting.

Examples of use for the counter:

- Monthly accounting to illustrate seasonal changes in pellet consumption
- Seasonal accounting (e.g. during the winter months) to illustrate annual changes in pellet consumption



❒ In the “Consumption” menu, set the “RESET counter” to “YES”

↳ Values of the parameters “Resettable t-counter” and “Resettable kg-counter” are reset to “0”

↳ Parameter “RESET counter” is reset to “NO”

4.5 Operate the boiler using the touch display

4.5.1 Overview of the touch display

A	Display of freely selectable information ➲ "Select information displays" [▶ 35]
B	Display and change the current user level ➲ "Lock display/switch user level" [▶ 42]
C	Display and change the current date/time ➲ "Change date and time" [▶ 38]
D	Holiday program ➲ "Configure the holiday program" [▶ 43]
E	Chimney sweeper function ➲ "Emissions measurement by chimney sweep or regulatory body" [▶ 71]
F	Display of current operating status, boiler ON/OFF ➲ "Switch boiler ON/OFF" [▶ 37]
G	View available functions in the quick menu ➲ "Quick menu" [▶ 34]
H	Access all system information. No parameters may be changed in the info menu.
I	System menu for opening the system settings. All parameters can be displayed and/or edited depending on the user level. ➲ "Navigation within the system menu" [▶ 32]
J	Display and change the current boiler mode ➲ "Change boiler mode" [▶ 37]
K	Display icons for using froeling-connect ➲ "Display icons for froeling-connect/remote control" [▶ 31]
L	Brightness sensor for automatically adjusting the brightness of the display
M	LED frame to display the current system status

	➲ "Status display" [▶ 30]
N	USB interface for software update (⇨ see operating instructions for the boiler controller) **IMPORTANT! USB interface is for service purposes only and must not be used to load devices or for PC connections!**

Status display

The status display indicates the system's operating status:

- Constant in the set colour: **SWITCHED ON**
  Boiler in an error-free operating state (standby, heating, …)
  Set colour can be changed using the setting wizard "Switching on for the first time"
- ORANGE flashing: **WARNING**
- RED flashing: **FAULT**

Control icons

	Confirms values entered; activates parameters
	Discards any values entered without saving; and closes messages
	Back to basic display
	Accesses all system information
	Opens quick menu. Selection of functions depending on user level, configuration and current status.
	Tap to change parameters (dropdown menu or numeric keypad)
	Opens system menu. Menu display depends on user level and configuration
	Back to higher menu level.

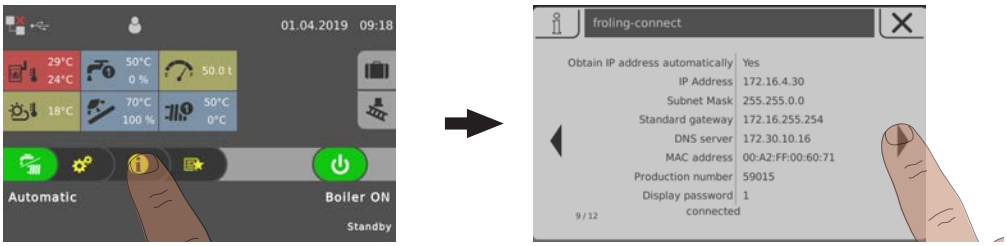
Display icons for froeling-connect/remote control

The icons for connection status and remote control are displayed at the top left of the touch display. Tap on these icons to open the “Connection Centre”. In the menu, the connection to froeling-connect as well as the remote control (switching on and off by external users) is activated/deactivated

Status to froeling-connect		Remote control of the boiler	
	froeling-connect is deactivated or not in use		Remote control of the boiler is permitted
	Establishes connection to froeling-connect		Remote control of the boiler is not permitted
	Connection to the froeling-connect server		
	No network connection to froeling-connect		
	No connection to froeling-connect server, ➲ "Connection status to "froeling-connect"" [▶ 31]		

Connection status to "froeling-connect"

The connection status to “froeling-connect” is displayed in the info menu.



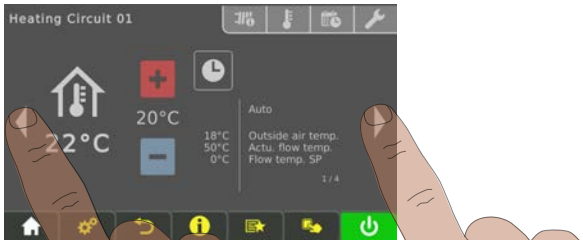
❒ Tap the info menu in the basic display and navigate to the “froeling-connect” menu

↳ The connection status is displayed in the lower range (connected, deactivated, …)

IMPORTANT! Consult the “froeling-connect” operating instructions for a detailed description of the connection status as well as troubleshooting

Navigation within the system menu

The system menu shows the menus available depending on the user level and the system configuration. Use the right and left arrows to navigate to the individual menus. Tap the corresponding icon to open the menu. Within the individual menus, the status display is shown with current values. If, for example, several heating circuits are installed, you can use the right and left arrows to navigate to the desired heating circuit.

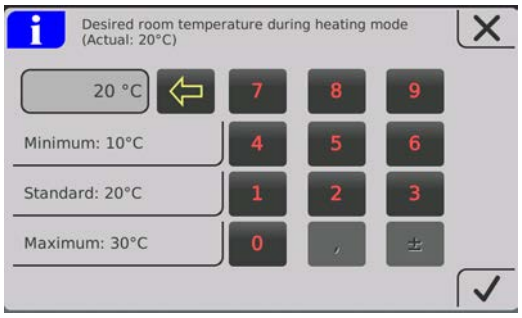
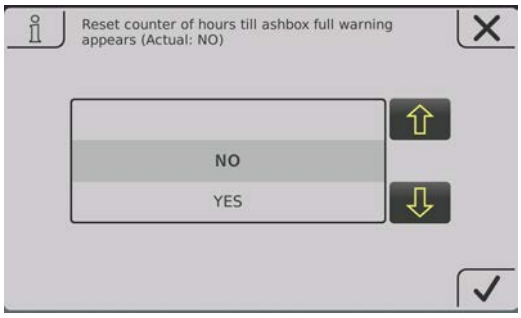


Tap the respective tab to carry out settings in the menus.

Icon	Tab	
	Status	
	Temperatures	
	Times	
	Service	
	General settings	
	Solar heat meter	

Changing parameters

If there is a “pencil” symbol next to a parameter text, the parameter can be edited. Depending on the type of parameter, it can be edited using the numeric keypad or by selecting from a list and then tapping on the “Confirm” symbol.

Numeric keypad	Dropdown list
	

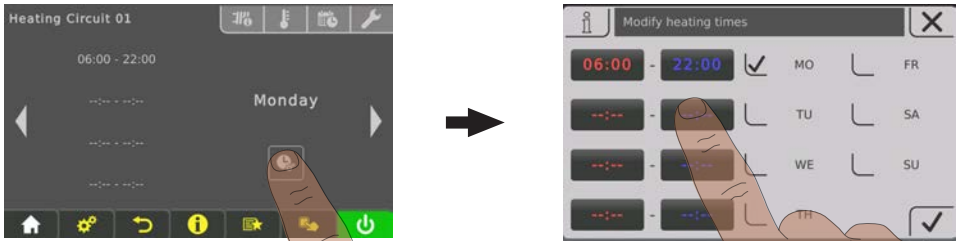
Change time window

The desired time window can be set in the “Times” tab in the menus of the heating components (heating, water, etc.). Up to four time windows are possible per day.

❒ Use the left or right arrow to navigate to the desired day of the week

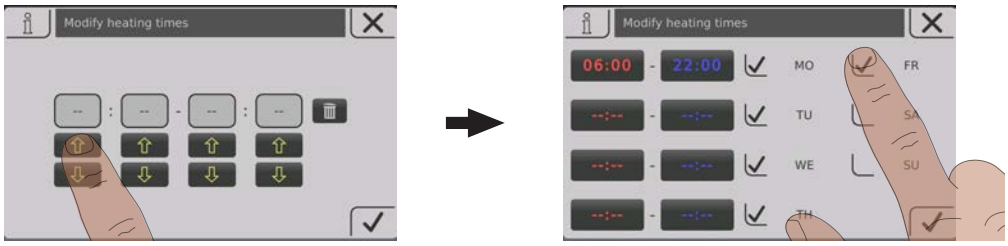
❒ Tap the time window or icon underneath the day of the week

❒ Tap on the time window to be changed

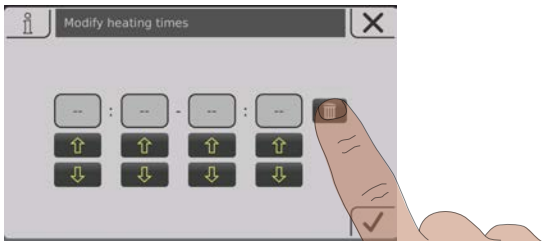


❒ Use the up and down arrows to set the start and end time and save by tapping the “Confirm” icon

The time window set is saved for all selected days of the week.



To delete a saved time window, tap on the “Recycle bin” icon next to it.



Quick menu

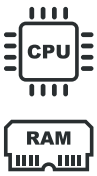
The quick menu provides different functions depending on the system configuration and system status.

Icon	Description
	**Language selection** Sets the desired system language: Deutsch – English – Francais – Italiano – Slovenski – Cesky – Polski – Svenska – Espanol – Magyar – Suomi – Dansk – Nederlands – Русский – Srpski – Hrvatski
	**Clean the touch display** The touch display is locked for 10 seconds, during which time it is possible to clean it without inadvertently changing the settings.
	**User level** Changes the current user level **Code “0”** … Child lock/Control lock **Code “1”** … Customer
	**Extra heating** Boiler starts, heating and domestic hot water tank are activated for 6 hours. The mode setting is ignored. CAUTION: The external temperature heating limit set in the "Heating" menu is active and can prevent release of the heating circuits.
	**Extra loading** One-time extra loading of all available DHW tanks. Subsequently, the mode that was previously set becomes active again.
	**Error display** List of all pending boiler faults and how to eliminate them.

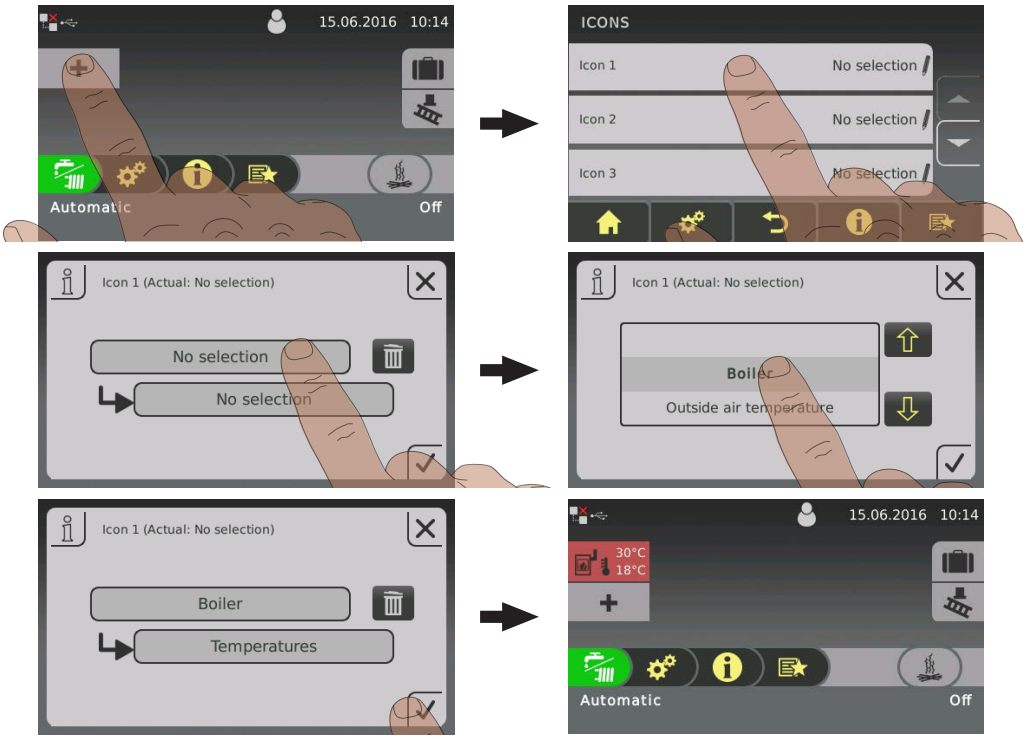
	**Setting wizard** **Switching on for the first time:** Setting the language, manufacturer’s number, date and time **Connect:** Setting parameters required for the boiler to use the “froeling-connect.com” (IP address, display password, …)

4.5.2 Select information displays

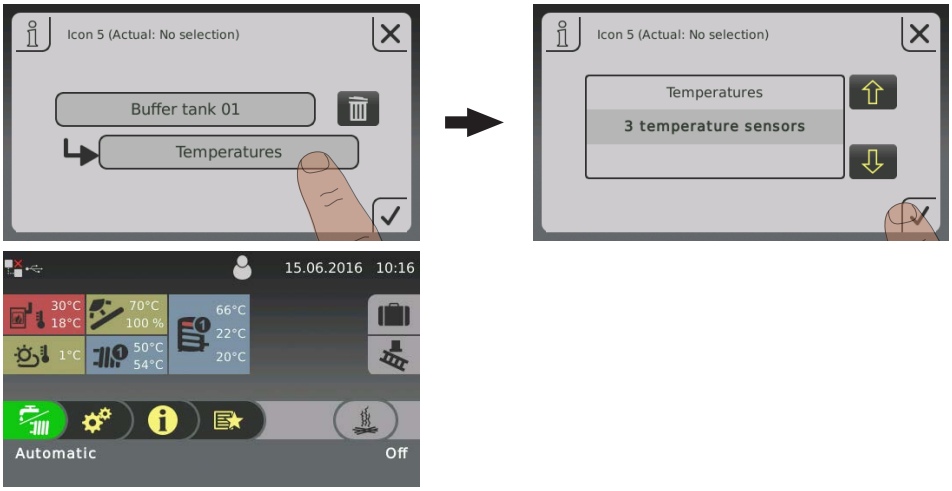
Tapping on the randomly selectable information displays in the basic display opens the respective menu. The following options are available depending on the system configuration:

Menu	Selection	Icon	Description
Boiler	Empty ash box in		Display of the remaining heating hours until the message “Ash box full, please empty” appears.
	Temperatures		Display of boiler und flue gas temperature
	Operating hours		Display of the operating hours and the operating hours since last maintenance.
Outside air temperature	Temperatures		Display of the current outside air temperature.
Boiler 2	Temperatures		Display of the temperature of the secondary boiler and the status of the burner relay
Solar	Temperatures		Display of the collector temperature and control of the collector pump.
Heating circuit 01 – 18	Temperatures		Display of the actual flow temperature and flow temperature setpoint of the respective heating circuit.
DHW tank 01 – 08	Temperatures		Display of the current DHW tank temperature and control of DHW tank pump of the respective DHW tank.
Storage tank 01 – 04	Temperatures		Display of storage tank temperature, top and bottom
	3 temperature sensors[1)]		Display of storage tank temperature, top, middle and bottom.
	4 temperature sensors[1)]		Display of storage tank temperature top, store sensor 2, store sensor 3 and bottom.
Circulation pump	Temperatures		Display of the status at the flow sensor (if present) and the current circulation return temperature.
Differential controller	Temperatures		Display of the current temperature from source and recess of the differential regulator
System	CPU/RAM capacity		Display of the CPU and RAM capacity in percent

1. This selection merges two tiles together, reducing the maximum number of information displays!



When using more than two store sensors, it is possible to have an information display with storage tank temperatures in accordance with the number of sensors. An information display that spans two areas is used.



4.5.3 Switch boiler ON/OFF

The hydraulic system is controlled in accordance with the mode that is set, regardless of boiler status, ➲ "Change boiler mode" [▸ 37]

	**Boiler ON** The boiler is activated and starts following a command from the hydraulic system. (Storage tank, heating circuit, domestic hot water…). Heating circuits and domestic hot water tanks are controlled according to the programs and times set.
	**Boiler OFF** The control follows the boiler shutdown procedure and starts the cleaning cycle. The boiler switches to “Boiler OFF” status. All boiler units are deactivated, heating circuits and domestic hot water tanks are controlled according to the programs and times set, the chamber discharge system remains active.

4.5.4 Change boiler mode

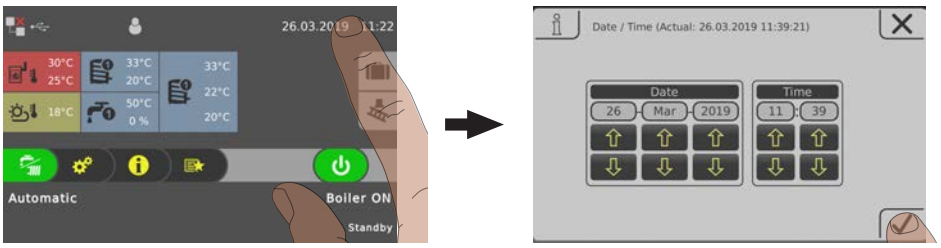
	Depending on the type of boiler, there are several modes available which can be changed directly in the basic display of the touch display.

Mode	Icon	Description
Automatic		Supply heating circuits and domestic hot water tanks with heat according to the selected heating times.
Domestic hot water		The domestic hot water tank is supplied with heat within the selected loading times. Heating circuits are switched off, frost protection remains active.
Continuous load		The boiler continuously maintains the selected boiler temperature setpoint and only shuts down for cleaning purposes. Supply heating circuits and domestic hot water tanks with heat according to the selected heating times.

IMPORTANT! Consult the enclosed operating instructions for the boiler controller for a detailed description of the boiler modes.

4.5.5 Change date and time

Tap on the displayed date and time to change the date and time in the basic display. Use the up and down arrows to adjust the settings and tap on the “Confirm” icon to save.



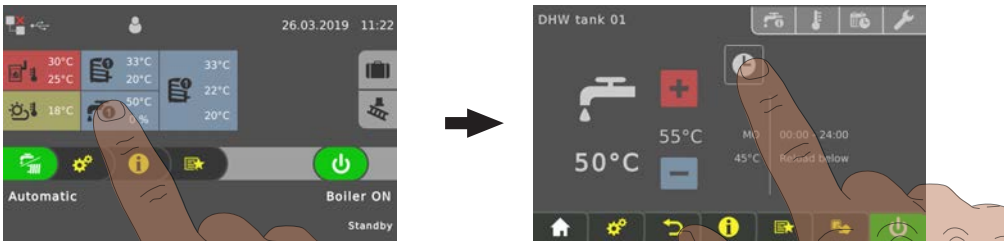
4.5.6 Change desired DHW tank temperature

❒ Tap the information display for the desired DHW tank

❒ Adjust the temperature setpoint by tapping on “+” or “-”

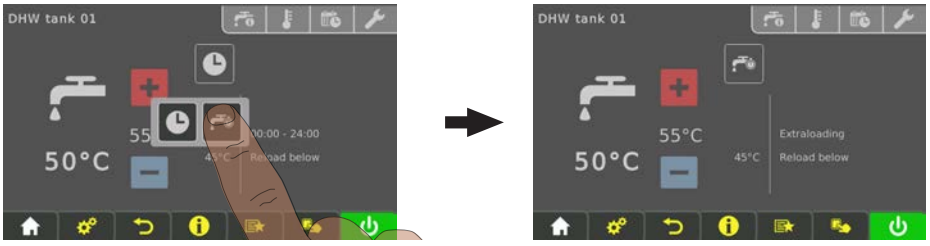
IMPORTANT! If this selection is not configured in the information display in the basic display, open the components in the system menu.

4.5.7 One-time extra loading of an individual DHW tank



❒ Tap the information display for the desired DHW tank

❒ Tap the mode icon for the DHW tank



❒ Tap the “extra loading” icon

↳ One-time loading of DHW tank starts. Once the selected DHW tank temperature setpoint has been reached, loading stops and the icon switches to “automatic”.

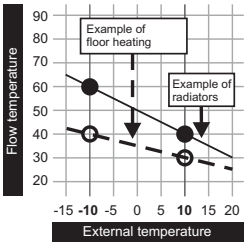
IMPORTANT! If this selection is not configured in the information display in the basic display, open the components in the system menu.

4.5.8 One-time extra loading of all existing DHW tanks.

In the case of several DHW tanks, the “extra loading” function in the quick menu is used to start a one-time extra loading of all existing DHW tanks.

➲ "Quick menu" [▶ 34]

4.5.9 Setting the heating curve for a heating circuit



A flow temperature is calculated using the heating curve of the heating circuit depending on the outside air temperature and the two adjustable parameters “flow temperature at -10°C outside air temperature” and “flow temperature at +10 °C outside air temperature“.

Example:

The heating curve is defined with 60°C (at -10°C outside air temperature) and 40°C (at +10°C outside air temperature). If the current outside air temperature is -2°C, the flow temperature is calculated as 52 °C.

Heating circuits without measuring the room temperature are operated using the calculated values. The heating curve must be adapted to influence the room temperature,
➲ "Change room temperature (heating circuit without room temperature sensor)" [▶ 40]

When using a room temperature sensor (analogue remote control FRA, room console RBG 3200, room console RBG 3200 Touch, room temperature sensor) it is not necessary to interfere with the heating curve. Any deviation of the actual room temperature to the room temperature setpoint is automatically compensated by increasing/reducing the flow temperature.

When starting up the system it is defined whether the heating circuit is operating as a “high temperature circuit” or a “low temperature circuit”. The following values are set:

High temperature circuit
▪ Desired flow temperature at -10°C outside air temperature: **60 °C**
▪ Desired flow temperature at +10 °C outside air temperature: **40 °C**

Low temperature circuit
▪ Desired flow temperature at -10°C outside air temperature: **40 °C**
▪ Desired flow temperature at +10 °C outside air temperature: **30 °C**

Reduction of flow temperature

Outside of the set heating times (➲ "Change time window" [▶ 33]), the setback mode is active and the calculated flow temperature is reduced by the adjustable value “Lowering the flow temperature in setback mode”.

Heating limits

The outside air temperature heat limits are set in the “Temperatures” tab and they activate/deactivate the heating circuit depending on the outside air temperature or time period.

Parameter	Effect
Outside air temperature, at which heating circuit pump switches off in heating mode (default: 18°C)	If the outside air temperature difference rises above the set value, the heating circuit is deactivated. (Pump off, mixing valve closes)
Outside air temperature, at which heating circuit pump switches off in setback mode (default: 7°C)	If the outside air temperature in setback mode (default: 22:00 – 06:00) falls below the set value, the heating circuit is activated (pump on, mixing valve regulated as per heating curve)

4.5.10 Change room temperature (heating circuit without room temperature sensor)

Situation	Effect
Room temperature generally too low	Move the heating curve up in parallel. Increase both points on the heating curve by the same temperature level. (see figure 1)
Room temperature on cold days too low, OK on warm days	Changing the slope of the heating curve. Increase the temperature level of the heating curve at -10°C outside temperature (see figure 2)
Room temperature on warm days too high, OK on cold days	Changing the slope of the heating curve. Reduce the temperature level of the heating curve at +10 °C outside temperature (see figure 3)

Figure 1

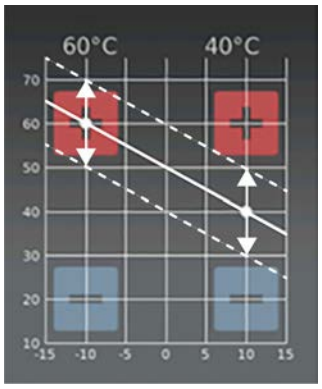


Figure 2

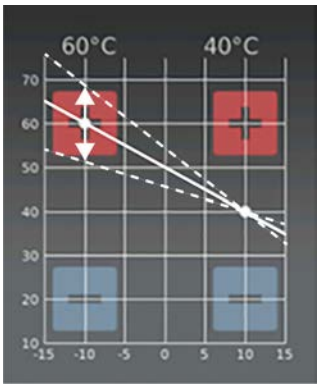
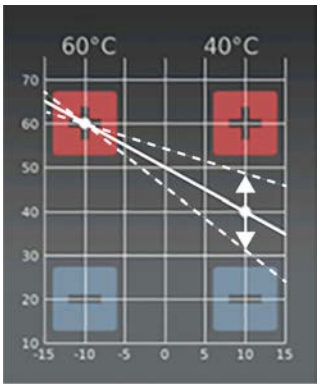


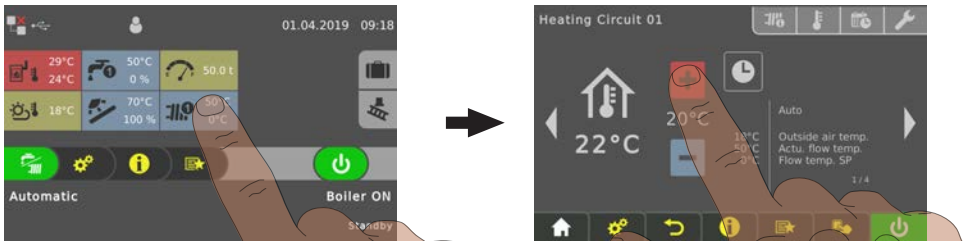
Figure 3



Depending on the situation, the heating curve an be adapted by tapping “+” or “-” at +/-10°C outside air temperature.

If the heating curve is to be changed, never change the desired point for a high temperature circuit more than 5°C, and never more than 3°C for a low temperature circuit. Once the changes have been made, wait a few days and assess comfort levels before carrying out additional changes.

4.5.11 Change room temperature (heating circuit with room temperature sensor)



❒ Tap information display of the desired heating circuit

❒ Tap “+” or “-” to adjust the desired room temperature

IMPORTANT! If this selection is not configured in the information display in the basic display, open the components in the system menu.

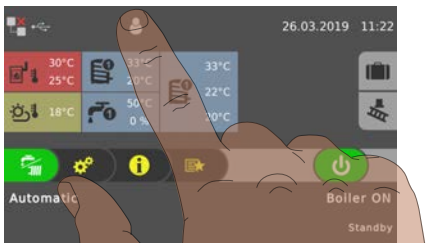
4.5.12 Switch heating circuit mode

Tap the mode icon in the menu of the respective heating circuit in order to change the mode.

Procedure	Icon	Description	
		OFF	The heating circuit is switched off. Frost protection remains active!
		Auto	The heating circuit is controlled according to the set time program.
		Party	The heating circuit is regulated before the start of the next heating time. To cancel this function prematurely, activate another mode/function.
		Setback mode	The heating circuit is regulated to the set setback temperature until the start of the next heating time. To cancel this function prematurely, activate another mode/function.
		Extra heating	The heating circuit is regulated to the set room temperature with no time limitation. To cancel this function prematurely, activate another mode/function.
		Continuous setback mode	The heating circuit is regulated to the set setback temperature until activation of another mode/function.

4.5.13 Lock display/switch user level

For safety reasons, individual parameters are only visible at specific operating levels. To change to another level it is necessary to enter the relevant user code.

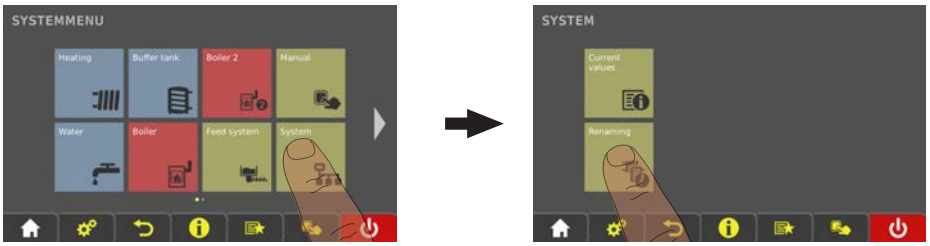


❒ Tap on the icon for the user level in the upper area of the basic display and enter the code.

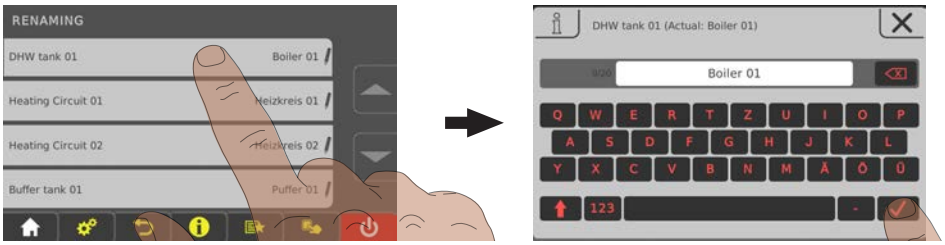
User level	Icon	Description
Operating lock (Code “0”)		At “Lock” level, only the basic display appears. It is not possible to change parameters.
Customer (Code “1”)		Standard user level for normal operation of the controller. All customer-specific parameters are displayed and can be changed.
Installer		Releases parameters to adjust the controller to the system components (if configured). All parameters are available.
Service		

4.5.14 Change the name of the components

The names of the DHW tank, storage tank and heating circuits can be freely selected. A maximum of 20 characters are available for the name.



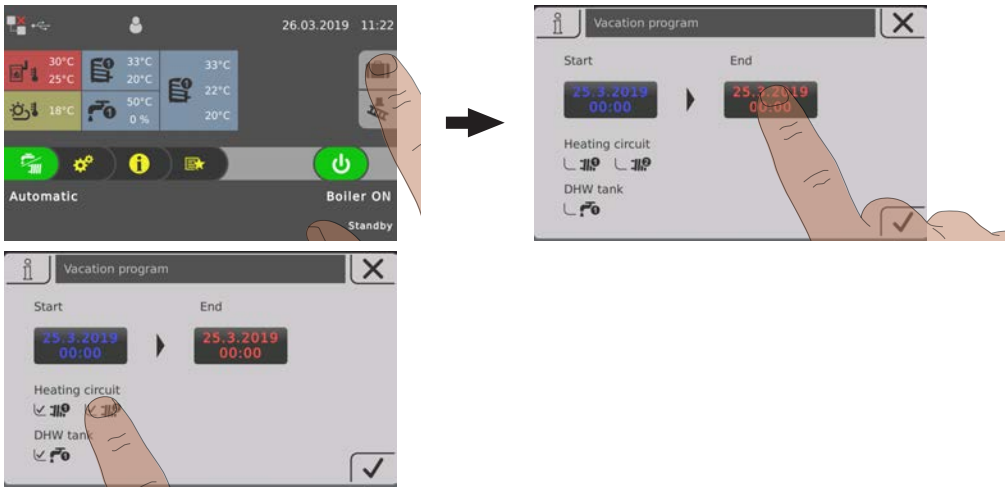
❒ Navigate to the “System” menu and open the “Renaming” sub-menu

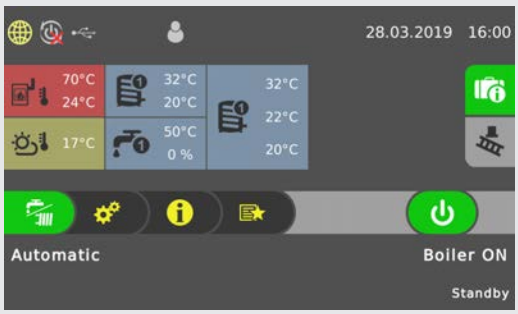


❒ Tap the desired component and use the keyboard to rename it

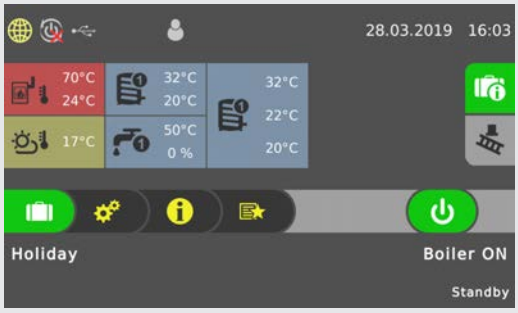
4.5.15 Configure the holiday program

Setting a start and end date in the holiday program determines a time period in which an active heating circuit is regulated for the set setback temperature and in which an activated boiler is not loaded. If Legionella heating is set, it remains active.



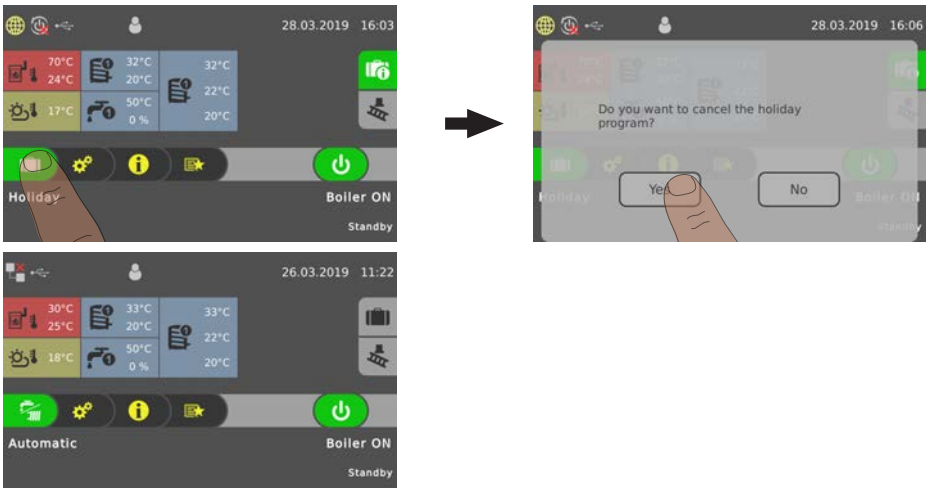


If the start date is set in the future, the “suitcase” icon will be highlighted in green.



Once the set start time of the holiday program has been reached, the boiler switches to “holiday” mode

Tap the “suitcase” icon to prematurely end the holiday program. The boiler then switches to the previously activated mode (“water tap” symbol = domestic hot water, “water tap/ radiator” symbol = automatic).

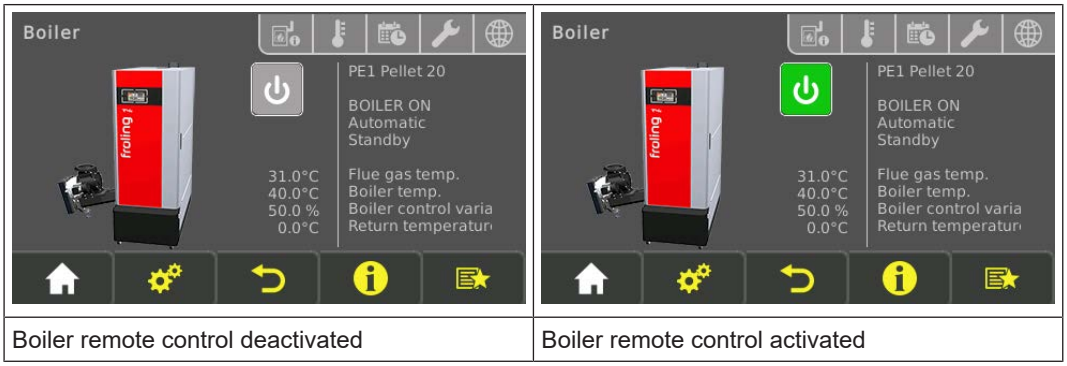


4.6 Switch the boiler ON/OFF on the room console

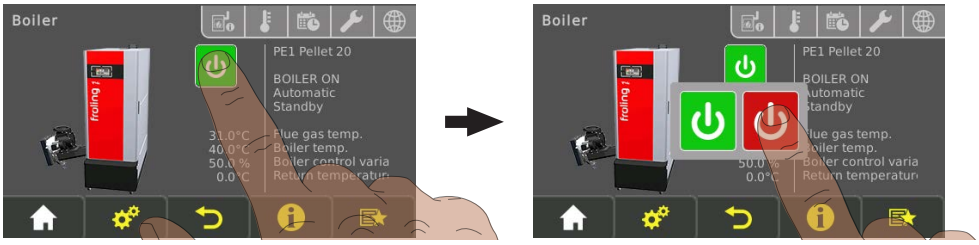
Prerequisite:

- Boiler access rights configured for the room console

If the boiler remote control is also activated (➲ "Display icons for froeling-connect/remote control" [▶ 31]), the boiler can be switched on and off on the room console.



Boiler remote control deactivated	Boiler remote control activated



❒ Switch the boiler ON/OFF by tapping on the current operating status

4.7 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 "Boiler 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.

IMPORTANT! Frost protection function is no longer active!

4.8 Checking the fill level of the ash container and emptying if required

⚠ WARNING

When removing the ash container cover during operation:

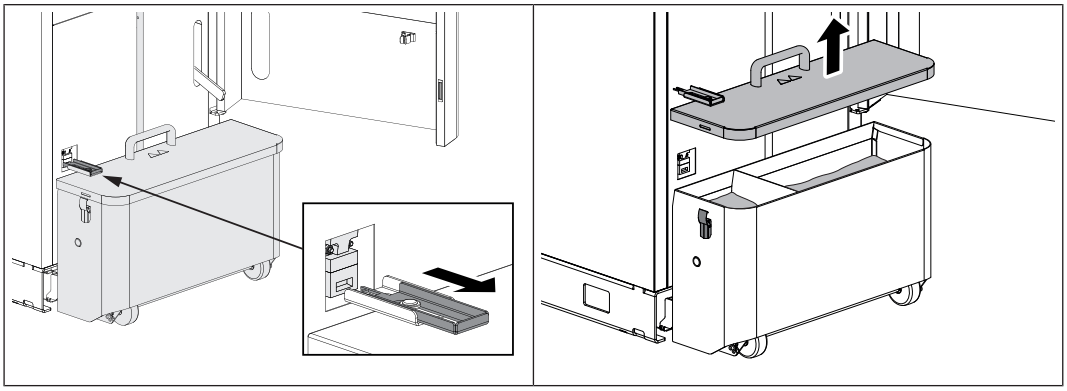
False air infiltration via the ash screw duct can lead to uncontrolled combustion and the risk of accidents.

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 "Boiler off" status.

Up to boiler type 180:



In “Boiler off” status:

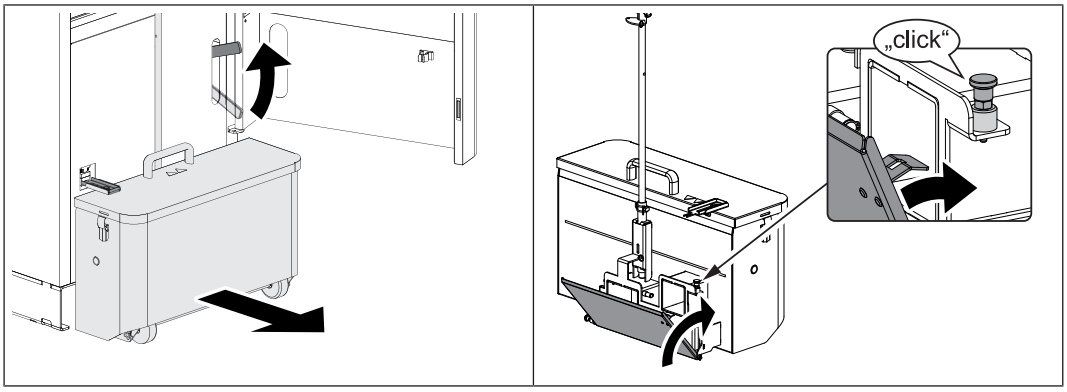
❒ Open the insulated door and pull the key plate from the safety limit switch

❒ Open the side clamps and remove the ash container cover

❒ Check the ash level in both chambers

↳ If either of the two chambers is more than two thirds full, empty the ash container

❒ Put the cover on the ash container and use the side clamps to close it again

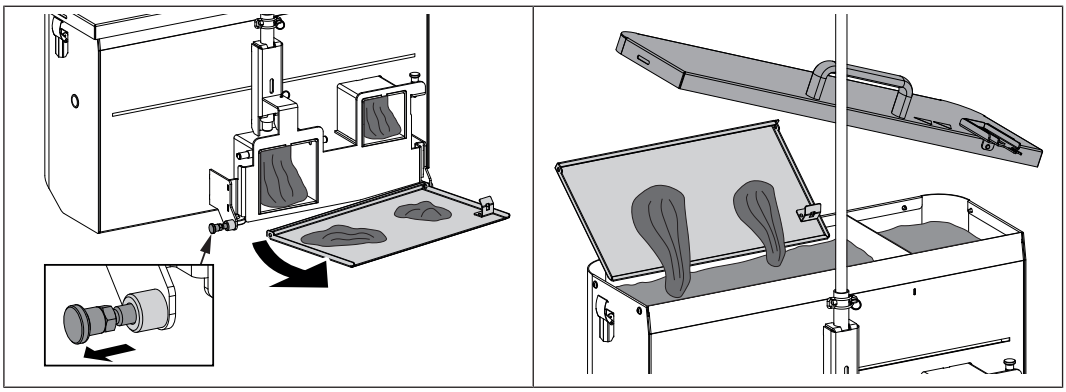


❒ Disconnect the ash container from the locking lever and pull it away from the boiler

❒ Close the hinged lid on the ash container

↳ Make sure that the hinged lid snaps into place!

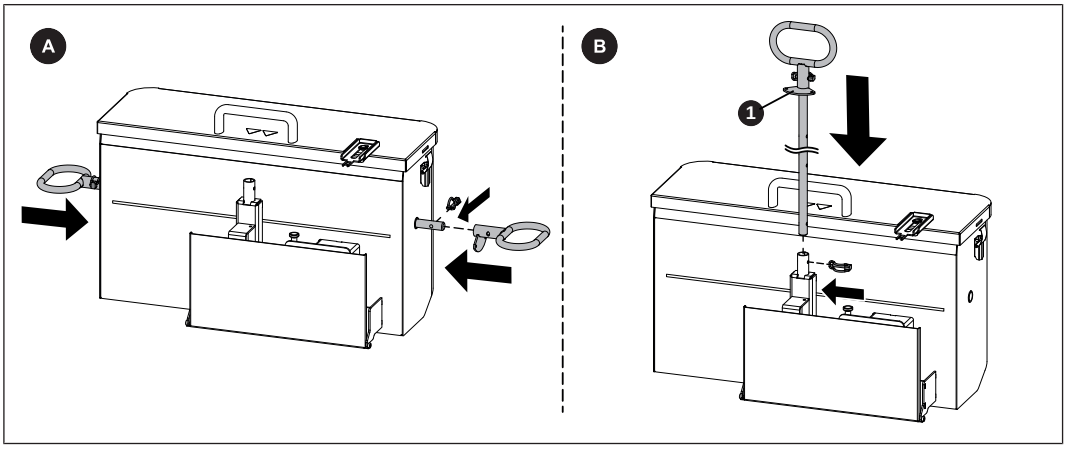
If any ash falls out of the ash container as you are removing it:



❒ Pull out the locking bolt and take out the hinged lid

❒ Remove the top ash container cover and empty the ash in the container

❒ Secure the carrying bar with handles as desired and transport the ash container to the emptying point



Option A:

❒ Insert the carrying bar with handles on the side of the ash container

❒ Secure the second handle to the opposite side of the carrying bar using a pipe locking pin

↳ The ash container can now be carried to the emptying point

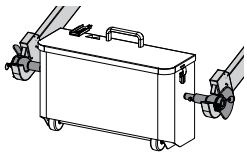
Option B:

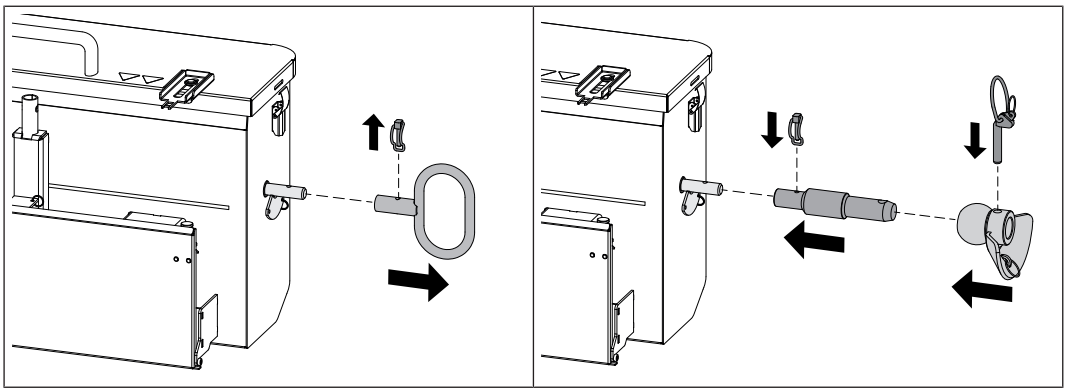
❒ Insert the carrying bar with handles on the back of the ash container and secure it with a pipe locking pin

↳ The crescent (1) of the carrying bar must face away from the ash container

↳ The ash container can now be moved to the emptying point

Transport with the lower link of the tractor:





❒ Remove the pipe locking pins and pull off both handles from the ash container

❒ Use the pipe locking pins to secure the lower link pin to the carrying bar

❒ Use the pipe locking pins to secure the catch ball to the lower link pin

After emptying the ash container:

❒ Put the cover on the ash container and use the side clamps to close it again

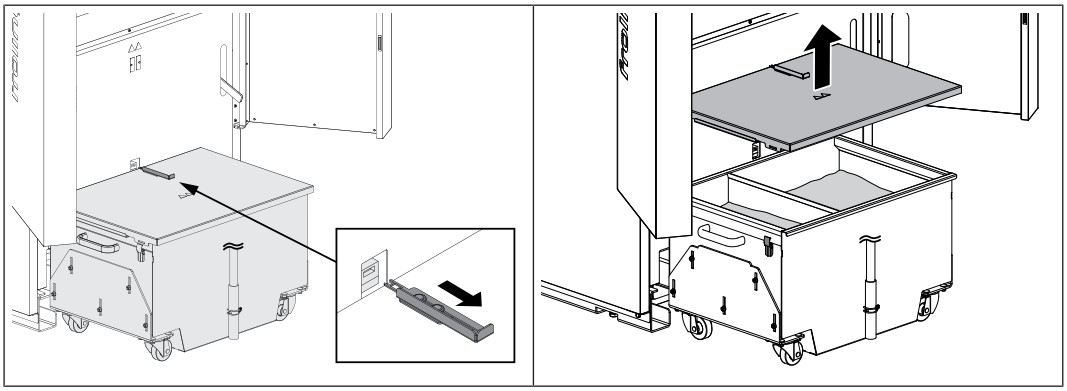
❒ Remove the locking bolt and open the hinged lid

❒ Replace the ash container in the boiler and clamp with the locking lever

❒ Push the key plate into the safety switch

❒ Close the insulated door

Starting at boiler type 200:



In “Boiler off” status:

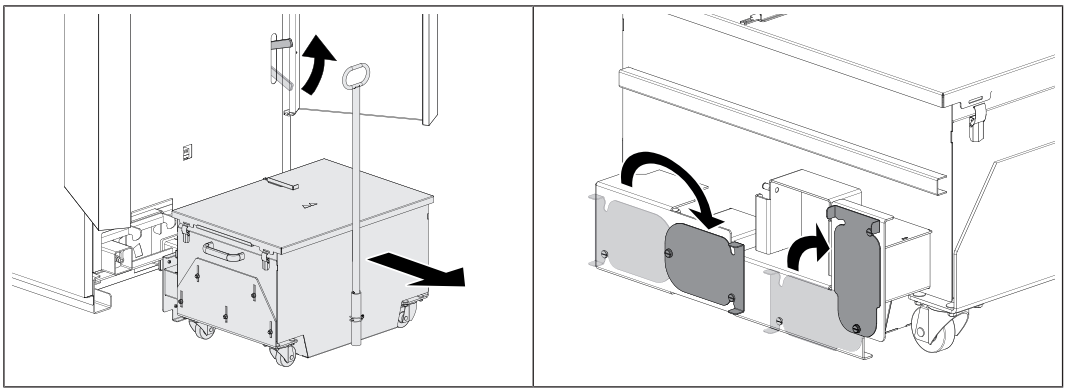
❒ Open the insulated door and pull the key plate from the safety limit switch

❒ Open the side clamps and remove the ash container cover

❒ Check the ash level in both chambers

↳ If either of the two chambers is more than two thirds full, empty the ash container

❒ Put the cover on the ash container and use the side clamps to close it again



❒ Disconnect the ash container from the locking lever and pull it away from the boiler

❒ Close the two openings at the back of the ash container with the slide plates

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

⚠ WARNING

When inspecting and cleaning the boiler with the main switch on:

Serious injuries possible due to automatic boiler startup!

Before inspection and cleaning work in/on the boiler:

- ❒ Switch the boiler off by tapping “Boiler off”
  The boiler follows the shutdown procedure and switches to "Boiler off“ mode
- ❒ Allow the boiler to cool for at least 1 hour
- ❒ Switch off the main switch and take precautions to prevent accidental switching on

⚠ WARNING

During inspection and cleaning work on the hot boiler:

Hot parts and the flue gas pipe can cause serious burns!

Take the following precautions:

- ❒ It should be standard practice to wear protective gloves when working on the boiler.
- ❒ Only operate the boiler using the handles provided
- ❒ Before starting work, switch off the boiler and allow it to cool down for at least 1 hour

⚠ 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:

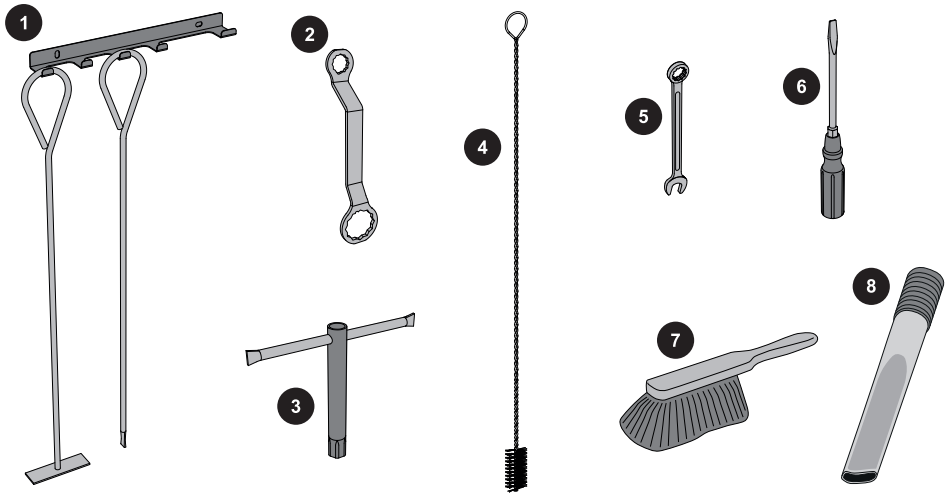
- ❒ Clean the boiler following the instructions in the instruction manual. Follow the boiler operating instructions.

IMPORTANT

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

5.2 Required tools

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



Included in delivery:	
1	Furnace tool with bracket
2	Key for door mountings and heat exchanger upper cover
3	Socket wrench AF 13
4	53x53x110 cleaning brush to clean the WOS springs

Not included:	
5	Open-jaw or ring wrench AF 13
6	Screwdriver set (Philips, slot head, Torx T20, T25, T30)
7	Small broom or cleaning brush
8	Ash vacuum

5.3 Maintenance work by the operator

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

❒ Recommendation: Use an ash vacuum for cleaning.

Reassemble the boiler components dismantled during maintenance in the reverse order after the work has been completed..

5.3.1 Weekly inspection

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
IMPORTANT! 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
IMPORTANT! 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

Check the thermal discharge valve (from PT4e 140)

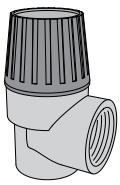
❒ Check the seal of the discharge valve

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

If water is dripping from the discharge pipe:

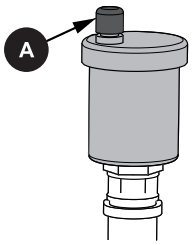
❒ Clean the discharge safety device in accordance with the manufacturer's instructions or have it checked/replaced by the installer if necessary

Checking the safety valve



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

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

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

Checking the geared motors

❒ Perform a visual inspection of the seals on all the geared motors in the system

↳ There should be no significant leakage of lubricant!
IMPORTANT! 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.

❒ Remove dust deposits

5.3.2 Recurrent check and cleaning

The boiler must be inspected and cleaned at appropriate intervals depending on the operating hours and fuel quality.

Depending on the activity, inspection and cleaning must be repeated after 1000 operting hours or at least every six months or no later than 2500 operating hours or at least once a year. For less efficient fuels (e.g. high ash content) this work needs to be carried out more frequently.

⚠ WARNING

Inspection and cleaning work with the boiler switched on

Serious injuries from automatic startup of the boiler and severe burns from hot parts and the flue gas pipe are possible.

Therefore:

❒ Only carry out work on the boiler when the main switch is turned off

❒ Always wear protective gloves when working on the boiler

❒ Only operate the boiler using the handles provided

❒ Follow the procedure below when starting and finishing inspection and cleaning work

The boiler must be inspected and cleaned at appropriate intervals depending on the operating hours and fuel quality.

Inspection and cleaning must be repeated after not more than 2500 operating hours or at least once a year. For less efficient fuels (e.g. high ash content) this work needs to be carried out more frequently.

Before starting inspection and cleaning work

❒ Switch off the boiler by tapping “Boiler off”

↳ Boiler shuts down and switches to "Boiler off” status

❒ Allow the boiler to cool for at least 1 hour

❒ On the control, go to the “Manual operation” menu
IMPORTANT! See operating instructions for boiler controller

❒ Use the DOWN arrow to navigate to the “Tip drive” parameter

❒ Set parameter to “ON”

↳ Combustion grate tips

❒ Turn off the main switch

After inspection and cleaning work

❒ Turn on the main switch

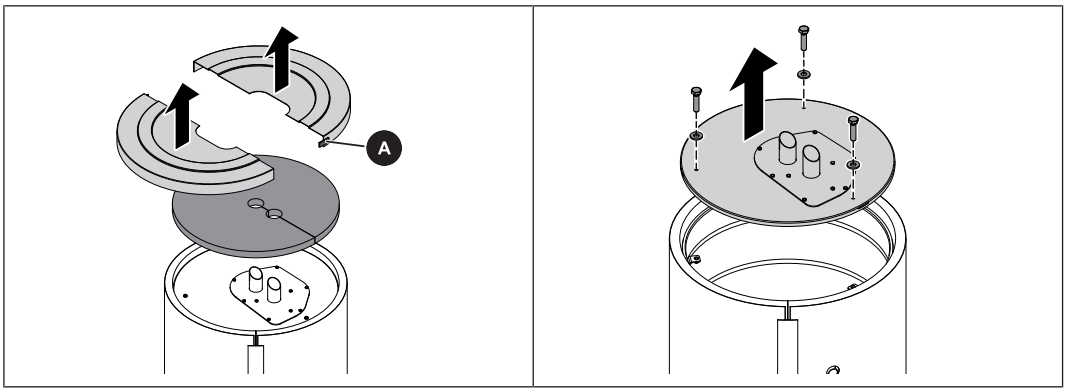
↳ Combustion grate previously opened manually now closes automatically and the boiler switches to “Boiler off” status

❒ Activate “service mode” in the quick menu

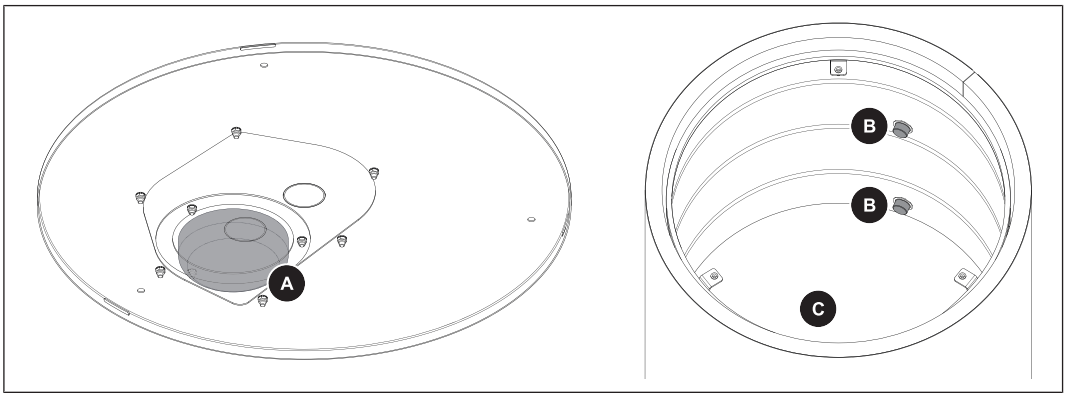
↳ The boiler starts the cleaning module and removes any remaining ash in the combustion chamber

↳ Once self-cleaning is finished the boiler switches to "Boiler off" status.

Check the cyclone container [prior to each fill of the fuel store]

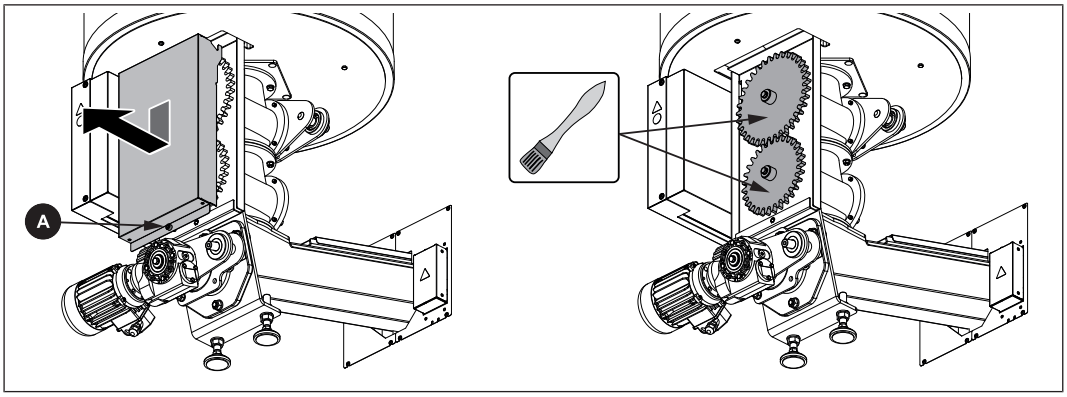


❒ Open the buckles (A) on the cover and pull the ratchet strap out of the tilt lock
❒ Remove both halves of the cover and the thermal insulation underneath
❒ Undo the screws and remove the cover
↳ Remove the hose lines if necessary



Check the following components and clean if necessary
❒ Protective grating (A) below the cover
❒ Check both fill level sensors (B) for dirt and deposits
❒ Check the bottom of container (C) for accumulation of pellet dust

Lubricate the gear ratio of the rotary valves [~500 hours / quarterly]

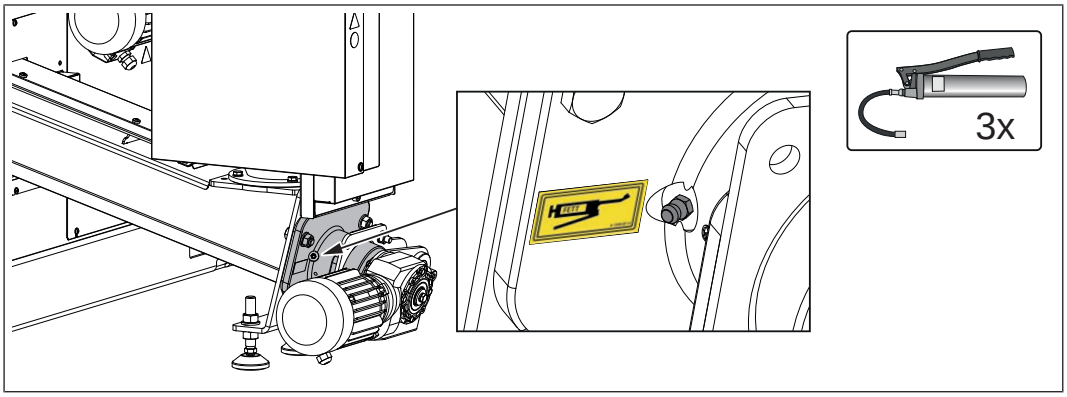


❒ Undo screw (A) at the bottom of the cover and remove the cover by pulling it downwards

❒ Check the gear wheels for wear, and replace if necessary

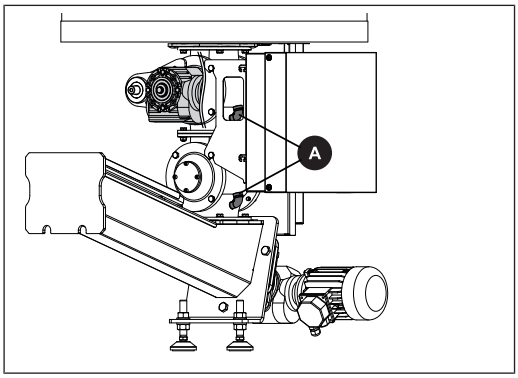
❒ Lubricate the gear wheels with copper paste

Lubricate the stoker bearings [~1000 B/every six months]



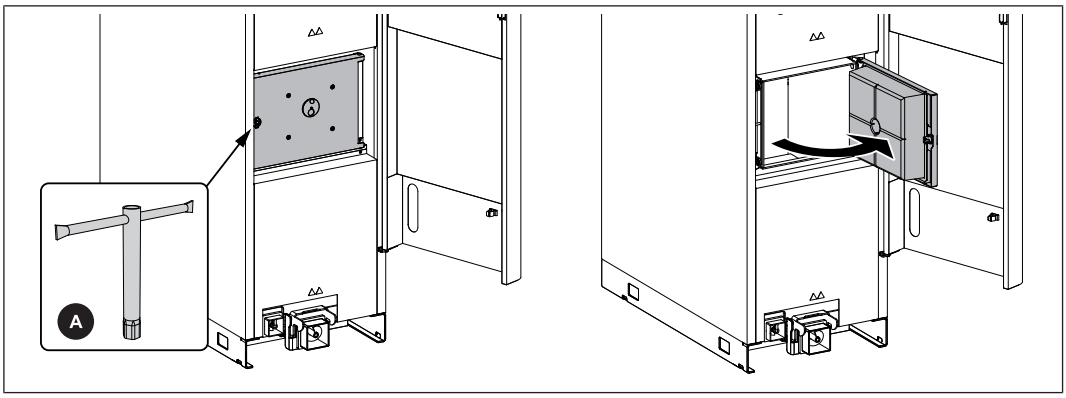
❒ Lubricate stoker bearings with three grease gun strokes per grease nipple

Check pressure relief [~1000 hours / half-yearly]



❒ Check stainless steel elbow (A) on both rotary valves for unobstructed air flow and clean carefully with compressed air, if necessary

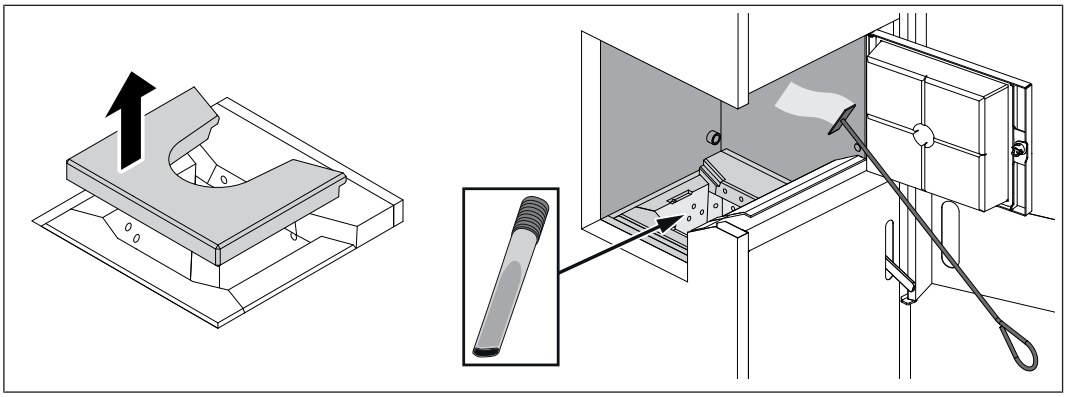
Clean the combustion chamber [~2500 Bh /yearly]



❒ Open the insulated door and remove the ash container

❒ Open the combustion chamber door by turning the Allen wrench (90°)

↳ Use the Allen wrench included (A – AF 13 mm)



❒ Remove the burn-out ring

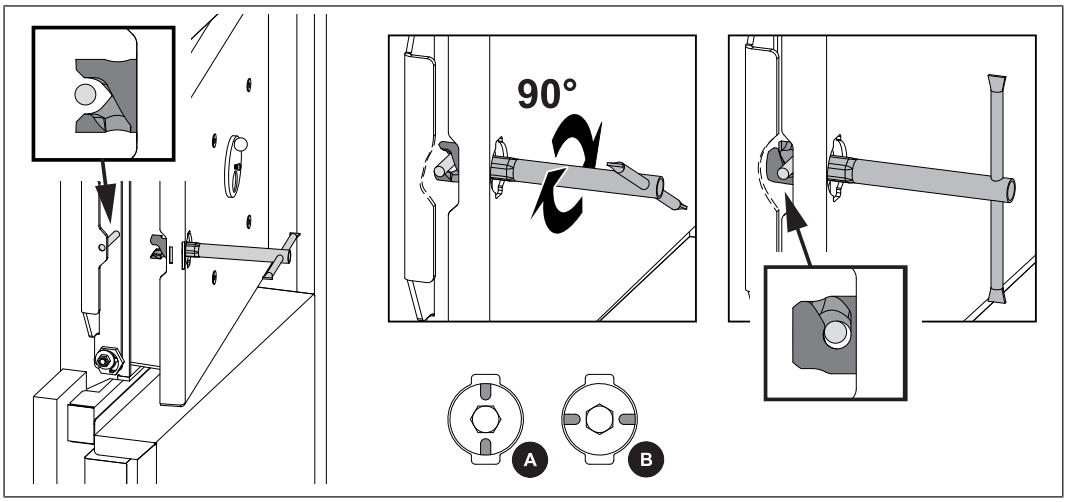
❒ Remove the ash deposits from the walls of the entire combustion chamber (top, side, back) using an ash scraper or broom

❒ Use a small shovel or similar to remove any ash from the combustion chamber

↳ Ash vacuum recommended

↳ Do not throw the ash onto the grate

❒ Check the firebricks and combustion grate for dirt and deposits and clean if necessary

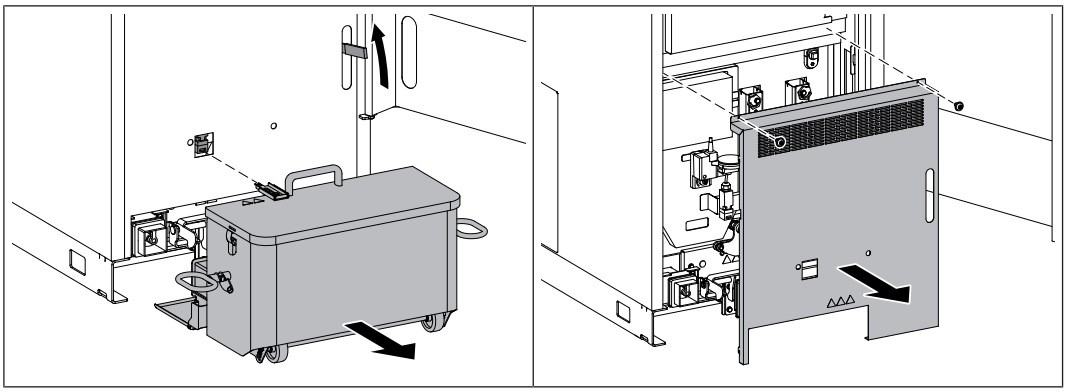


❒ Close the combustion chamber door by turning the Allen wrench (90°)

↳ A – Notch in screw cap vertical: Door open

↳ B – Notch in screw cap horizontal: Door closed

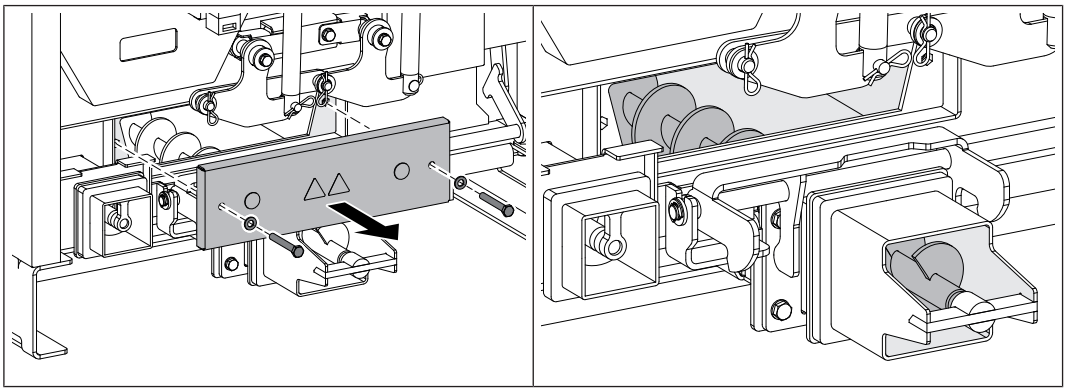
Check the area under the combustion chamber [~2500 OpHrs / year]



❒ Remove the key plate from the safety limit switch

❒ Unlock the ash container using the fixing lever, and remove the ash container

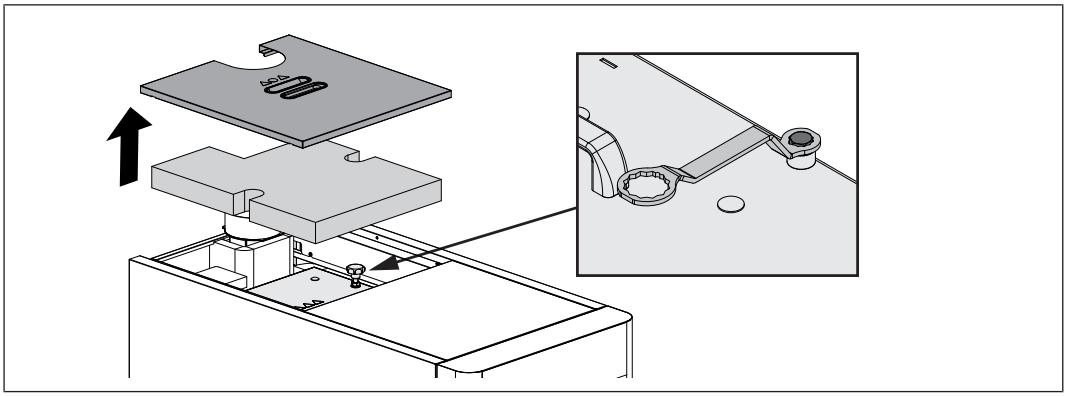
❒ Loosen the screws on the front cover plate and remove the cover plate



❒ Remove maintenance cover

❒ Clean the area under the combustion chamber and remove any foreign objects

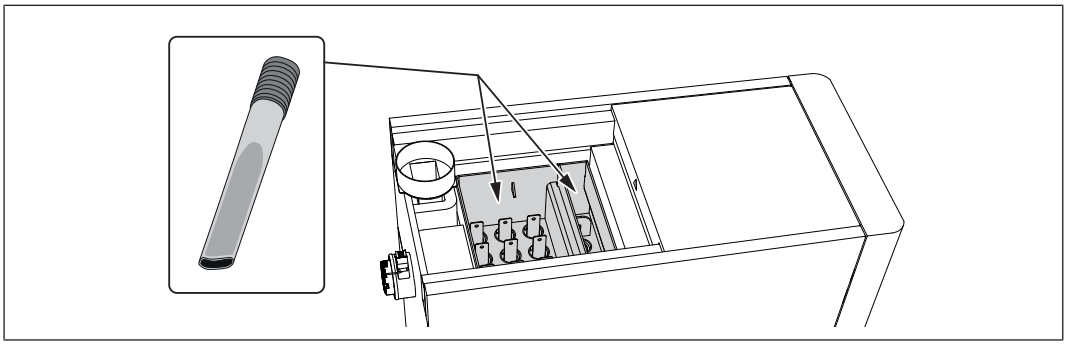
Clean heat exchanger and flue gas collection chamber [~2500 Bh/yearly]



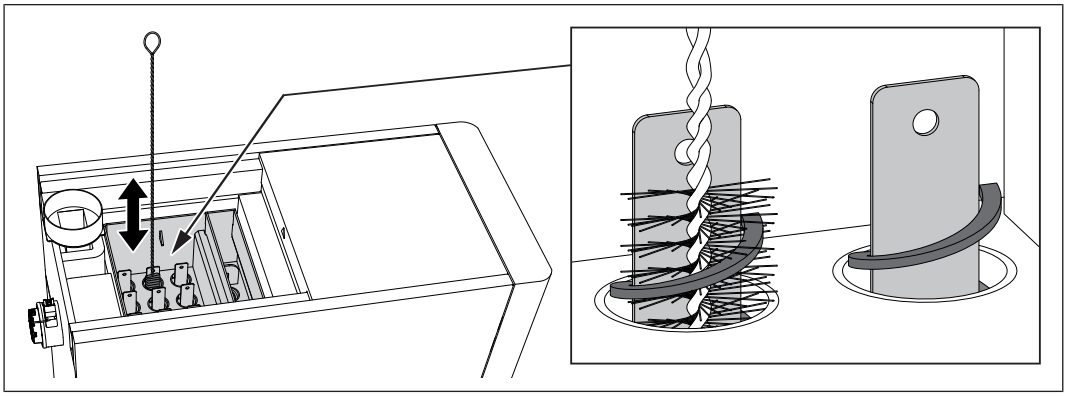
❒ Remove the insulating cover and thermal insulation

❒ Remove the spring bolt and lift the cover

↳ Use the spanner provided



❒ Clean the entire flue gas collection chamber using an ash vacuum

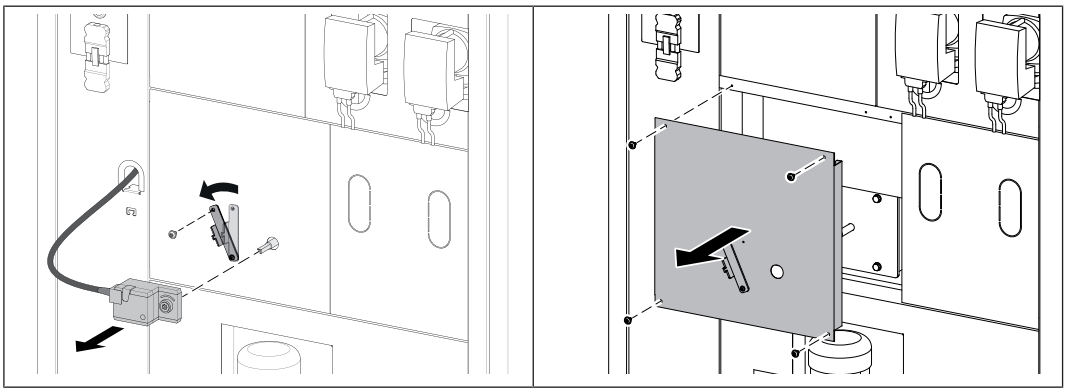


❒ Clean the WOS springs using a cleaning brush on both sides of the inner panel

IMPORTANT! WOS springs do not have to be removed for cleaning.

Cleaning the FGR duct [~2500 Bh /annually]

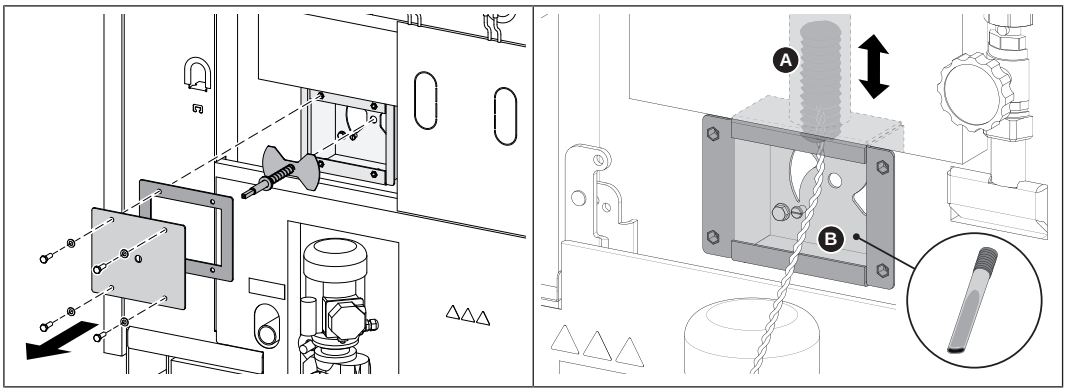
The following steps for cleaning the FGR duct on a PT4e 200-250 are illustrated. Proceed similarly for all other output ratings.



❒ Loosen the upper raised-head screw on the torque support

❒ Swing the torque support aside and pull the servo-motor off the air damper

❒ Remove the back panel

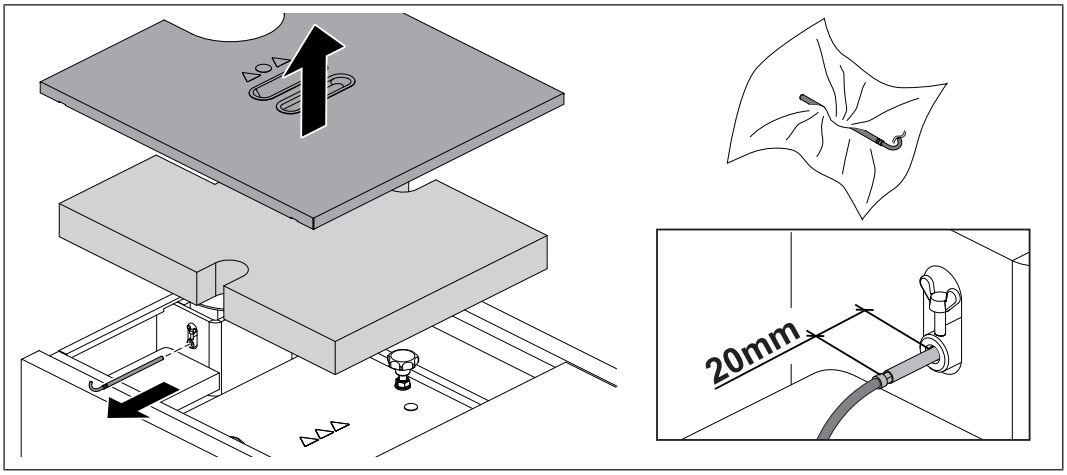


❒ Remove the cover including the gasket and pull the air damper out

❒ Using a cleaning brush, carefully clean the FGR duct (A) and remove deposits from the air duct (B)

IMPORTANT! During subsequent assembly, make sure that the air damper and servo-motor are set to the anti-clockwise stop.

Clean the flue gas temperature sensor [~2500 Bh/yearly]



- ❒ Remove the insulating cover and thermal insulation
- ❒ Release the retaining screw and remove the flue gas temperature sensor from the flue gas pipe
- ❒ Wipe the flue gas temperature sensor with a clean cloth
- ❒ Push in the flue gas temperature sensor until about 20 mm of the sensor remains protruding from the bushing and secure it with the fixing screw

Clean the flue gas pipe [~2500 Bh /yearly]

- ❒ Unplug the connection cable of the induced draught fan
  - ↳ This prevents damage to the fan from the cleaning brush
- ❒ Remove the inspection cover on the connecting pipe
- ❒ Clean the connecting pipe between the boiler and chimney with a chimney sweeping brush
  - ↳ Depending on the layout of the flue gas pipes and the chimney draught, cleaning once a year may not be enough!
- ❒ Plug in the connection cable of the induced draught fan

Check the draught regulation damper [~2500 Bh/yearly]

- ❒ Check that the draught controller flap moves freely

5.4 Maintenance work by technicians

⚠ CAUTION

If maintenance work is carried out by untrained personnel:

Risk of personal injury and damage to property!

The following applies for maintenance:

❒ Observe the instructions and information in the manuals

❒ Only allow appropriately qualified personnel to work on the system

Only qualified staff are permitted to carry out maintenance work in this chapter:

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

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

IMPORTANT! 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.

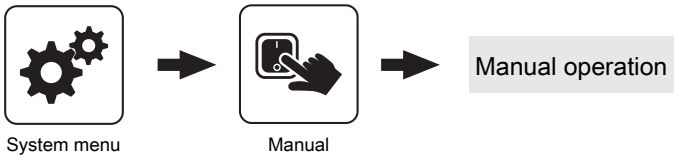
Your Froling customer service office will also be happy to advise you.

IMPORTANT

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).

5.4.1 Checking and cleaning the combustion grate

Tilt grate:

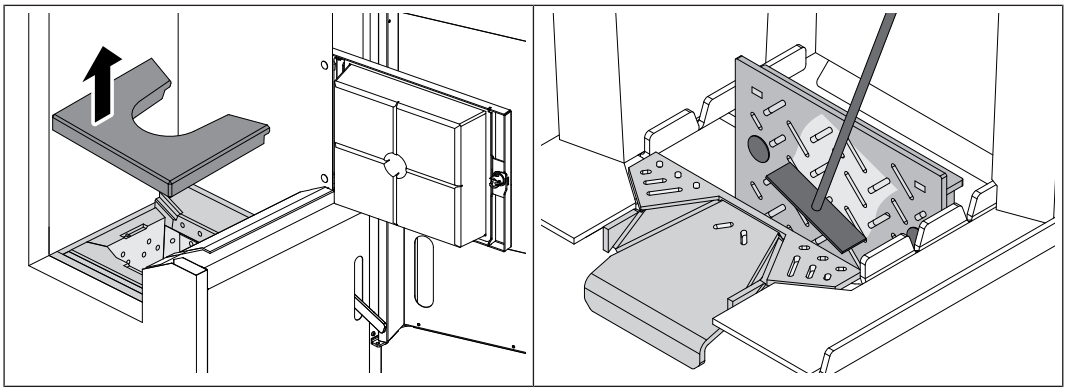


❒ Go to the "Manual operation" menu and set the "Grate drive" parameter to "ON"

↳ The tipper drive opens and the grates can be cleaned

❒ Switch off the boiler and allow it to cool down

❒ Switch off the power supply to the boiler



❒ Open the insulating door and combustion chamber door

❒ Removing the burn-out stones

↳ T4e 80-250: two burn-out stones

↳ T4e 300-350: three burn-out stones

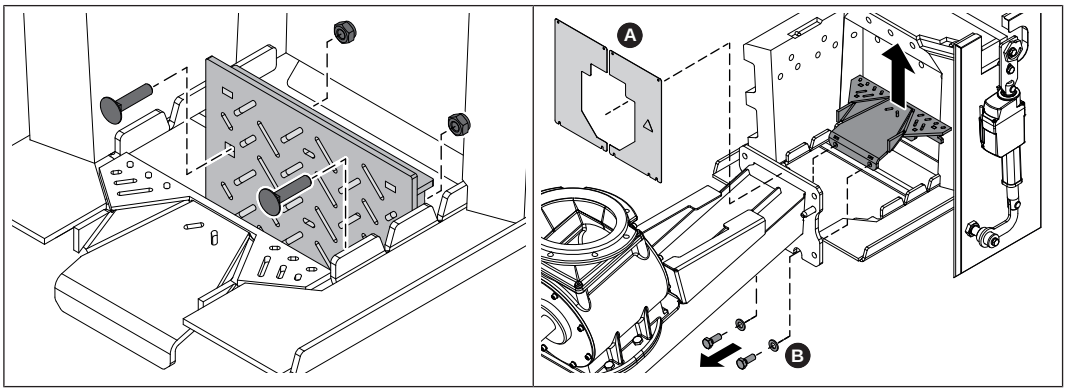
❒ Remove any dirt from the tilted grate using the furnace tool

❒ Check the grate for damage such as cracks

IMPORTANT! Small cracks and minor deformations of the grate will not affect performance. If however large cracks are found, or parts have broken off the grate, the grate must be exchanged.

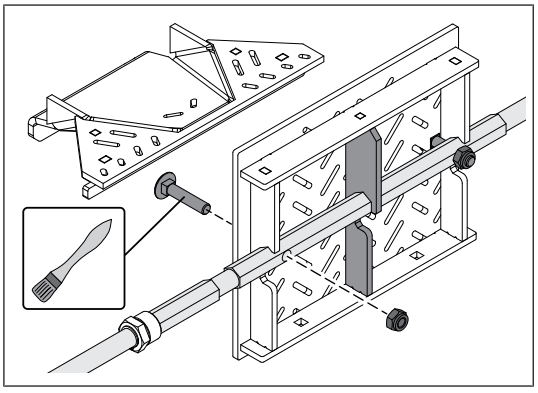
Replacing the combustion grate

IMPORTANT! Optionally a grate set for special fuels can be installed. On T4e 80-180 systems, the grate set is supplied with modification instructions.



- ❒ Loosen the screws on the grate and lift it out
- ❒ If necessary, remove the tread plate from the stoker duct
- ❒ Removing the cover plate (A) from the stoker duct
- ❒ Loosen both screws (B) under the stoker duct and lift out the fuel feed-in grate upwards
  - ↳ The grate elements are no longer required

Installing the new grate elements:



- ❒ Position fuel feed-in grate and secure with screws from the outside
- ❒ Hang the grate on the grate shaft so that the upper side faces towards the fuel feed-in grate
- ❒ Lubricate the supplied screws with copper paste
- ❒ Attach the grate to the grate shaft

Adjusting the grate

Closing the grate

⚠ CAUTION

Working on the grate elements with the boiler switched on

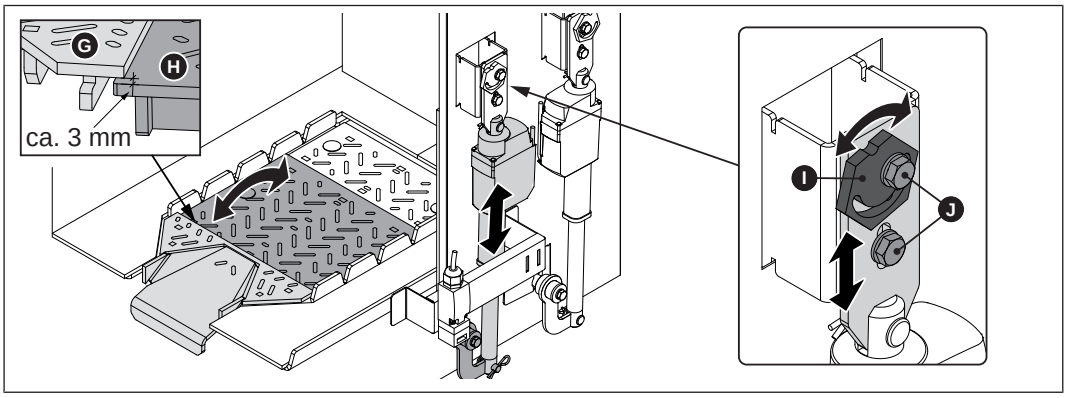
Risk of injury from automatic movement of grate

Before switching on the boiler,

- ❒ remove all items from the combustion chamber
- ❒ prevent any intervention by closing the combustion chamber door

- ❒ Connect the power supply to the boiler and switch the boiler on
- ❒ Slide the ash container onto the boiler and lock in place using locking lever
- ❒ Push the key plate into the safety limit switch
  - ↳ The grate will close automatically
- ❒ Switch off the boiler and interrupt the power supply to the boiler

Adjusting the gap

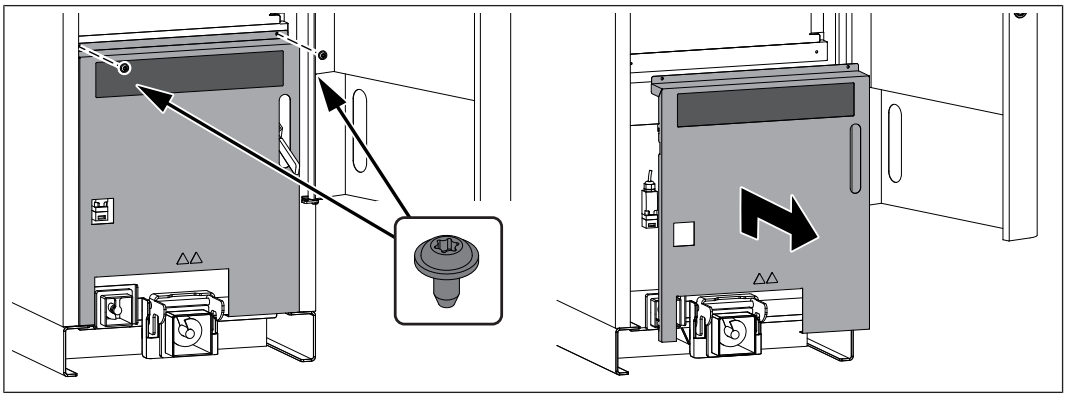


- ❒ Adjust the position of the locking cam (I) to leave a gap of approx. 3 mm between the fuel feed-in grate (G) and tipping grate (H)
- ❒ Fix the position using the screw (J)

5.4.2 Cleaning the measurement line of the underpressure controller

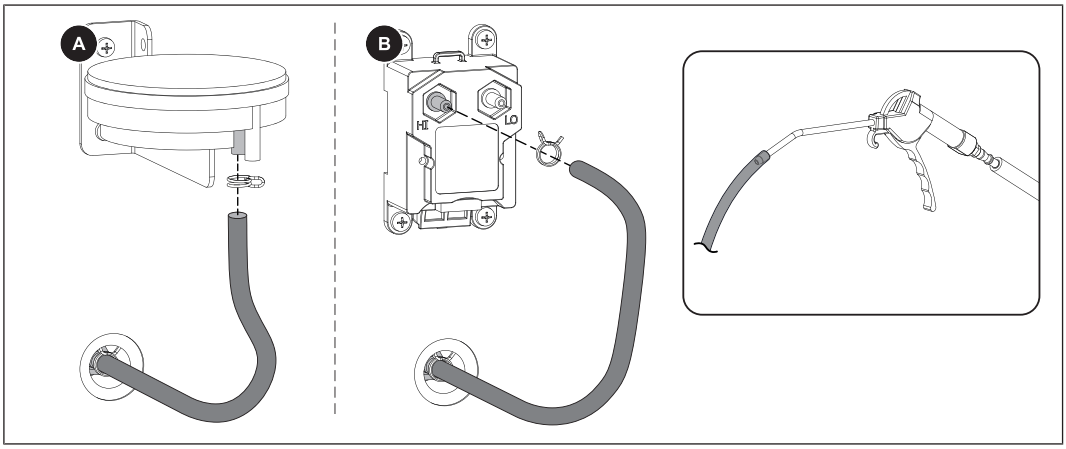
❒ Open the insulated door and remove the ash container from the boiler

↳ ➲ "Checking the fill level of the ash container and emptying if required" [▸ 46]



❒ Remove the left and right screws on the front cover plate

❒ Slide the cover plate up and remove



❒ Loosen the twin wire clamp with pliers and remove the measurement line from the under-pressure sensor cartridge

❒ Clean the measurement line with gentle compressed air

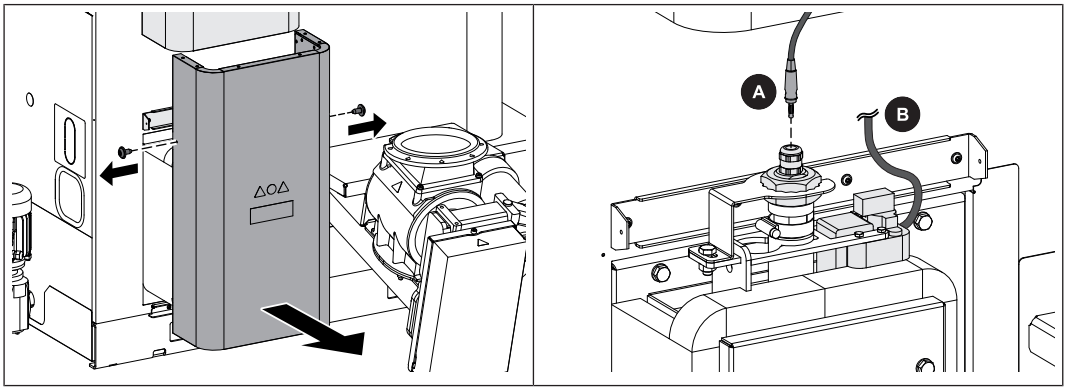
↳ WARNING! Do not direct compressed air into under-pressure sensor cartridge! This could damage it!

❒ After cleaning, refit the measurement line
Depending on the design, port “-” (A) or “HI” (B)

5.4.3 Clean the particle filter (optional) and heat exchanger pipes

Remove and clean the particle filter (optional)

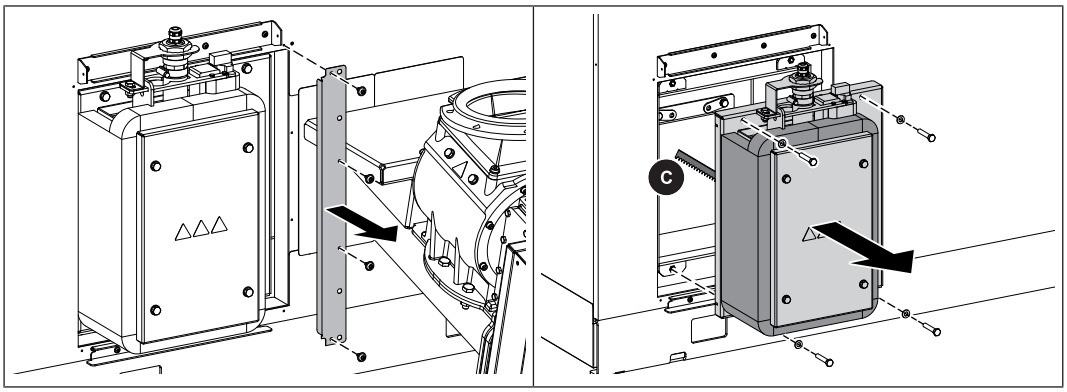
For all electrodes and housings of the particulate filter compliance with the following steps is mandatory:



❒ Undo two screws and remove the lower cover

❒ Unplug the high-voltage cable (A) from the isolator and disconnect the vibration motor plug connection (B)

Up to boiler type 60:

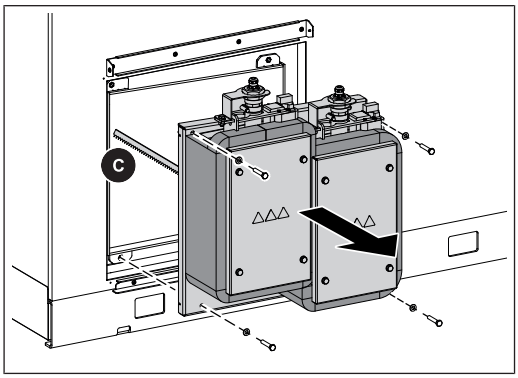


❒ Remove the cover plate between the e-filter and the stoker

❒ Undo the external screws on the cover and carefully remove the entire unit

↳ **CAUTION: In so doing, pay special attention to electrode (C).**

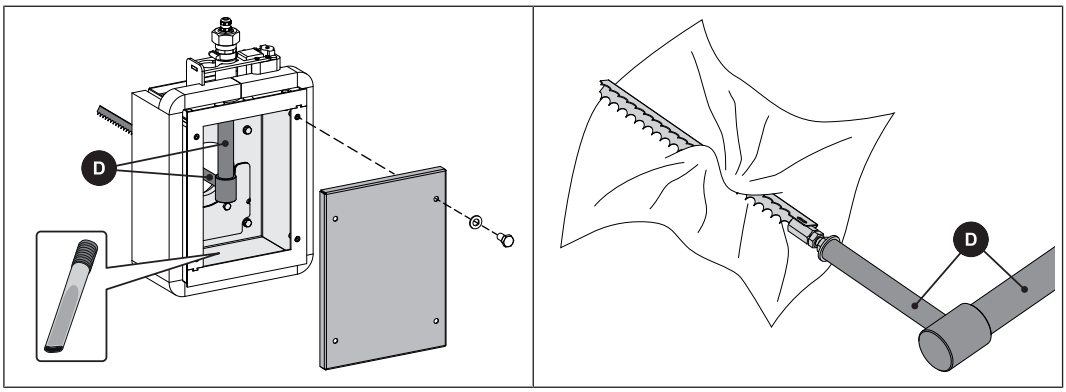
Starting at boiler type 80:



❒ Undo the external screws on the cover and carefully remove the entire unit

↳ **CAUTION: The electrodes (C) require special attention!**

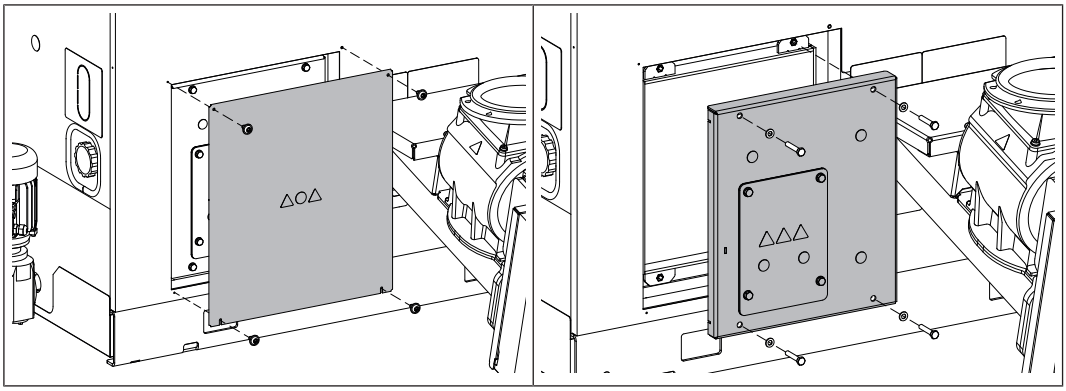
The following steps apply to all boxes and electrodes:



❒ Remove the cover and use the ash vacuum to remove deposits on the inside

❒ Carefully clean the isolator (D) and electrode with a soft cloth

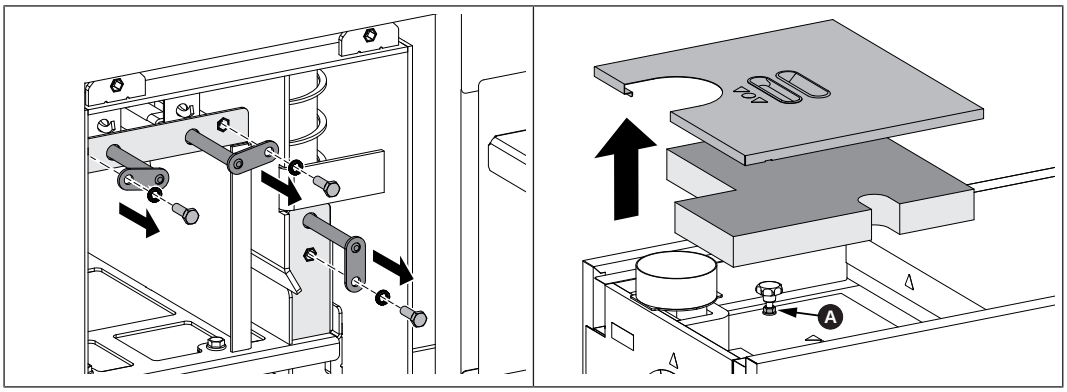
Cleaning the heat exchanger pipes



For boilers without electrostatic precipitators:

❒ Remove the lower cover plate from the reversing chamber on the stoker side

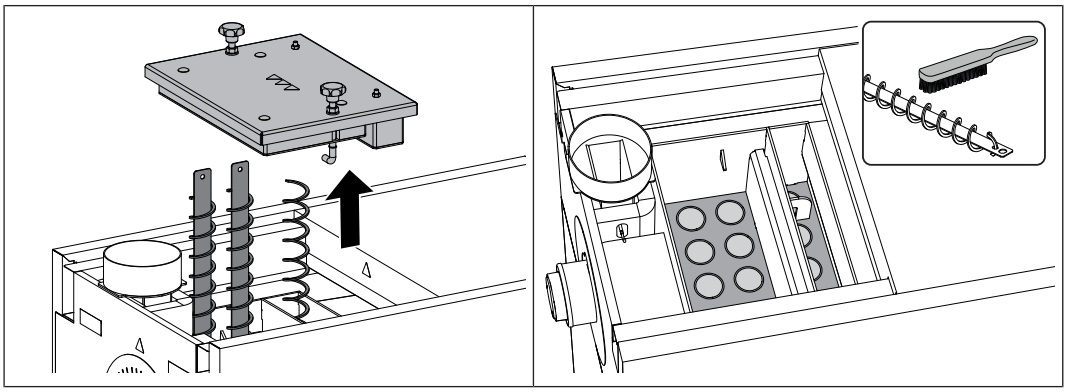
❒ Remove the cover located behind it



❒ Undo the screw connections on the WOS shaft and pull out all shafts

❒ Take off the rear cover from the flue gas nozzle and remove the thermal insulation

❒ Using the spanner supplied, loosen the locking screws (A) on the cleaning cover



❒ Remove the cleaning cover

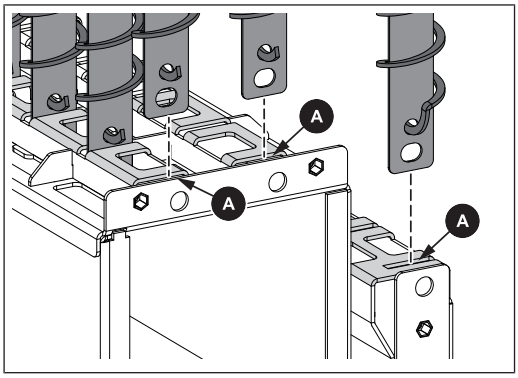
❒ **For existing e-filter:** Remove the earthing bracket from the WOS springs

❒ Pull out the WOS springs

❒ Clean the heat exchanger pipes and WOS springs

❒ Assemble all of the components in reverse order

Caution when installing WOS springs:



❒ Push the WOS springs with round cutouts down into the heat exchanger pipes

↳ In so doing, press the inside panel of the spring into the slot (A) until it stops

5.5 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)

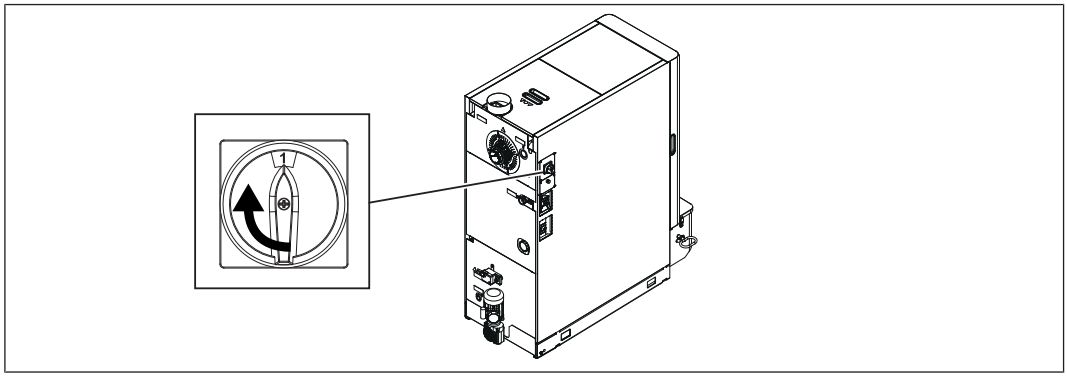
❒ There must be a suitable measuring port in the straight flue gas pipe for the measurement. The measuring port must be twice the flue gas pipe diameter away from the last upstream bend.

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

5.5.1 Switch on the system

When the cleaning is complete:

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



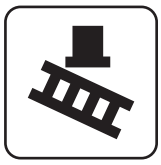
❒ Turn on the main switch

↳ 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

5.5.2 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
Enter target date	❒ Enter the time of measurement (date and time) ↳ The boiler will follow the shutdown procedure before the start of the measurement according to the time lock and will not start up again until the set time ↳ **IMPORTANT! The boiler starts 30 minutes before the start of the measurement and is already ready for measurement at the set time!**

5.6 Replacement parts

With Froling original replacement parts in your system, 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.

IMPORTANT

Installing non-original parts will invalidate the guarantee.

❒ Only replace components or parts with original replacement parts.

5.7 Disposal information

5.7.1 Disposal of the ash

Austria: ❒ dispose of ash in accordance with the Waste Management Act (AWG)

Other countries: ❒ dispose of ash in accordance with local regulations

5.7.2 Disposal of system components

❒ Ensure that they are disposed of in an environmentally friendly way in accordance with waste management regulations in the country (e.g. AWG in Austria)

❒ 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 fault with 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

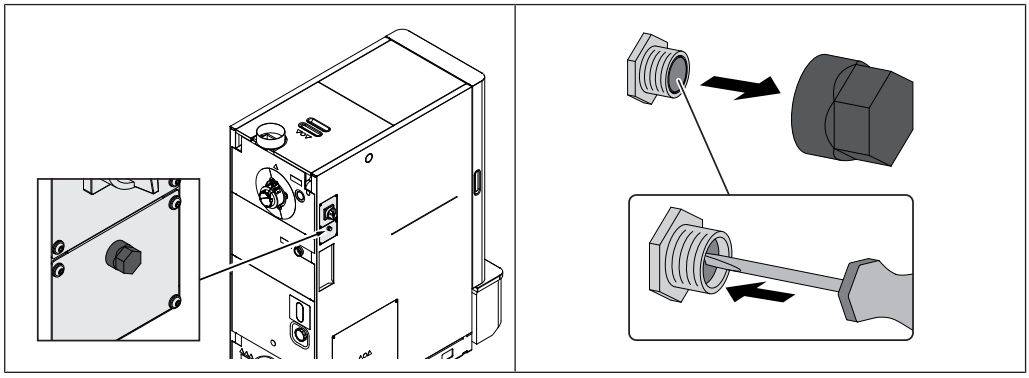
6.1.1 Behaviour of system after a power failure

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:

❒ Status LED indicates the nature of the fault
- Orange flashing: Warning
- Red flashing: Error or alarm

❒ A fault message is shown on the display

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

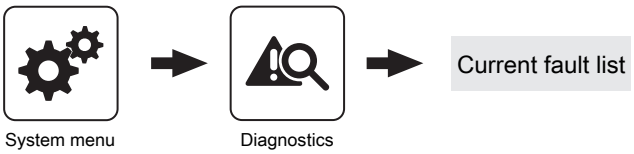
WARNING	In case of warnings the boiler initially continues controlled operation, giving the option of resolving the error quickly to prevent a shutdown.
ERROR	The boiler follows the shutdown procedure and remains in "Boiler off" status until the problem is resolved.
ALARM	An alarm triggers a system emergency stop. The boiler shuts down immediately, the heating circuit controller and pumps remain active.

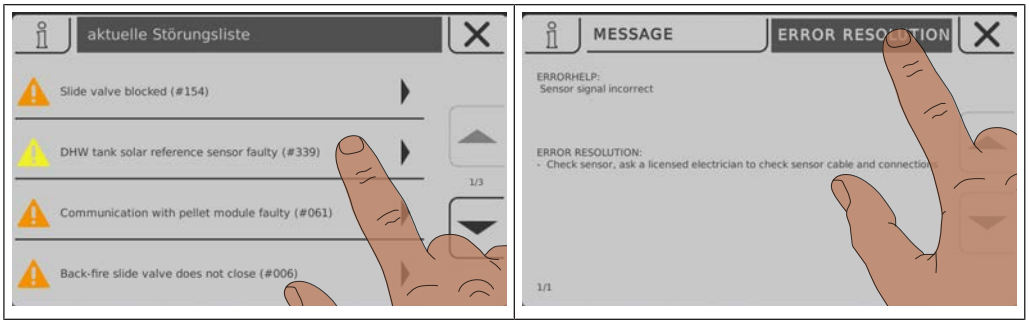
6.3.1 Procedure for fault messages

If a fault occurs on the boiler, it will be shown on the display.

If the fault is acknowledged, although it has not been rectified, the window with the associated fault can be reopened as follows:

Open error display



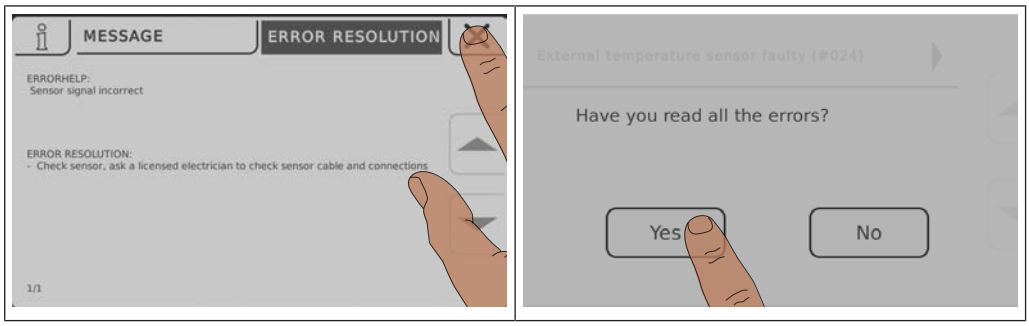


The error display lists all current faults

❒ Open by tapping the listed fault

❒ The “Message” tab displays the current fault.

❒ Press the “Error resolution” tab to view possible causes and troubleshooting procedures



❒ Tap the Cancel icon to close the current fault and display the fault list

❒ Tap the Cancel icon again and confirm that you have read all of the errors to return to the basic display

↳ The boiler is in the previously set mode

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Stamp

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