

# froling

Operating instructions  
**PE1e Pellet**



Pellet boiler PE1e Pellet



Pellet condensing boiler PE1e Pellet

Translation of original German version of operating instructions for operators.

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



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<b>1 General</b>	<b>4</b>
1.1 Product overview PE1e Pellet 45-60	5
<b>2 Safety</b>	<b>6</b>
2.1 Hazard levels of warnings	6
2.2 Pictograms used	7
2.3 General safety information	8
2.4 Permitted uses	9
2.4.1 The Clean Air Act 1993 and Smoke Control Areas	9
2.4.2 Permitted fuels	9
2.4.3 Non-permitted fuels	11
2.5 Qualification of operating staff	11
2.6 Protective equipment for operating staff	11
2.7 Safety Devices	12
2.8 Residual risks	13
2.9 Emergency procedure	15
2.9.1 Overheating of the system	15
2.9.2 Smell of flue gas	15
2.9.3 Fire in the system	15
<b>3 Notes for operating a heating system</b>	<b>16</b>
3.1 Installation and approval	16
3.1.1 Obligation to report as a condensing boiler system	16
3.2 Installation site	16
3.3 Combustion air	17
3.3.1 General requirement	17
3.3.2 Room air-independent operation	17
3.3.3 Room air-independent operation (RIO)	18
3.4 Domestic hot water	20
3.5 Pressure maintenance systems	22
3.6 Return temperature control	22
3.7 Storage tank	22
3.8 Chimney connection/chimney system	23
3.9 Condensate drainage	23
<b>4 Operating the system</b>	<b>24</b>
4.1 Assembly and initial startup	24
4.2 Switching on the power supply	25
4.3 Operate the boiler using the touch display	25
4.3.1 Overview of the touch display	25
4.3.2 Select information displays	31
4.3.3 Switch boiler ON/OFF	33
4.3.4 Change boiler mode	33
4.3.5 Change date and time	34
4.3.6 Change desired DHW tank temperature	34
4.3.7 One-time extra loading of an individual DHW tank	34
4.3.8 One-time extra loading of all existing DHW tanks	35
4.3.9 Setting the heating curve for a heating circuit	35
4.3.10 Change room temperature (heating circuit without room temperature sensor)	36
4.3.11 Change room temperature (heating circuit with room temperature sensor)	37
4.3.12 Switch heating circuit mode	37
4.3.13 Lock display/switch user level	38
4.3.14 Change the name of the components	38
4.3.15 Configure the holiday program	39

---

4.4	Switch the boiler ON/OFF on the room console.....	40
4.5	Adjust pellet consumption counter after fuel delivery.....	41
4.5.1	Notes on filling the fuel stores.....	41
4.5.2	Correct the remaining pellet amount in store room.....	42
4.5.3	Setting the automatic notification for minimum level.....	42
4.5.4	Resetting the pellet consumption counter.....	43
4.6	Check the fill level of the ash container and empty if required.....	44
4.6.1	Check the ash container fill level.....	44
4.6.2	Empty ash container.....	45
4.7	Switching off the power supply.....	46
<b>5</b>	<b>Servicing the system .....</b>	<b>47</b>
5.1	General information on servicing.....	47
5.2	Required tools.....	48
5.3	Maintenance work by the operator.....	49
5.3.1	Weekly inspection.....	49
5.3.2	Periodic inspection and cleaning.....	50
5.4	Maintenance work by technicians.....	62
5.4.1	Cleaning the measurement line of the underpressure controller.....	63
5.4.2	Cleaning the Lambda probe.....	64
5.4.3	Clean the heat exchanger and WOS springs.....	65
5.5	Emissions measurement by chimney sweep or regulatory body.....	67
5.5.1	Switch on the system.....	67
5.5.2	Start emissions measurement.....	68
5.6	Replacement parts.....	68
5.7	Disposal information.....	68
5.7.1	Disposal of the ash.....	68
5.7.2	Disposal of system components.....	68
<b>6</b>	<b>Troubleshooting .....</b>	<b>69</b>
6.1	General fault with power supply.....	69
6.1.1	Behaviour of system after a power failure.....	69
6.2	Excessive temperature.....	69
6.3	Faults with fault message.....	70
6.3.1	Procedure for fault messages.....	70

# 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](mailto:doku@froeling.com).

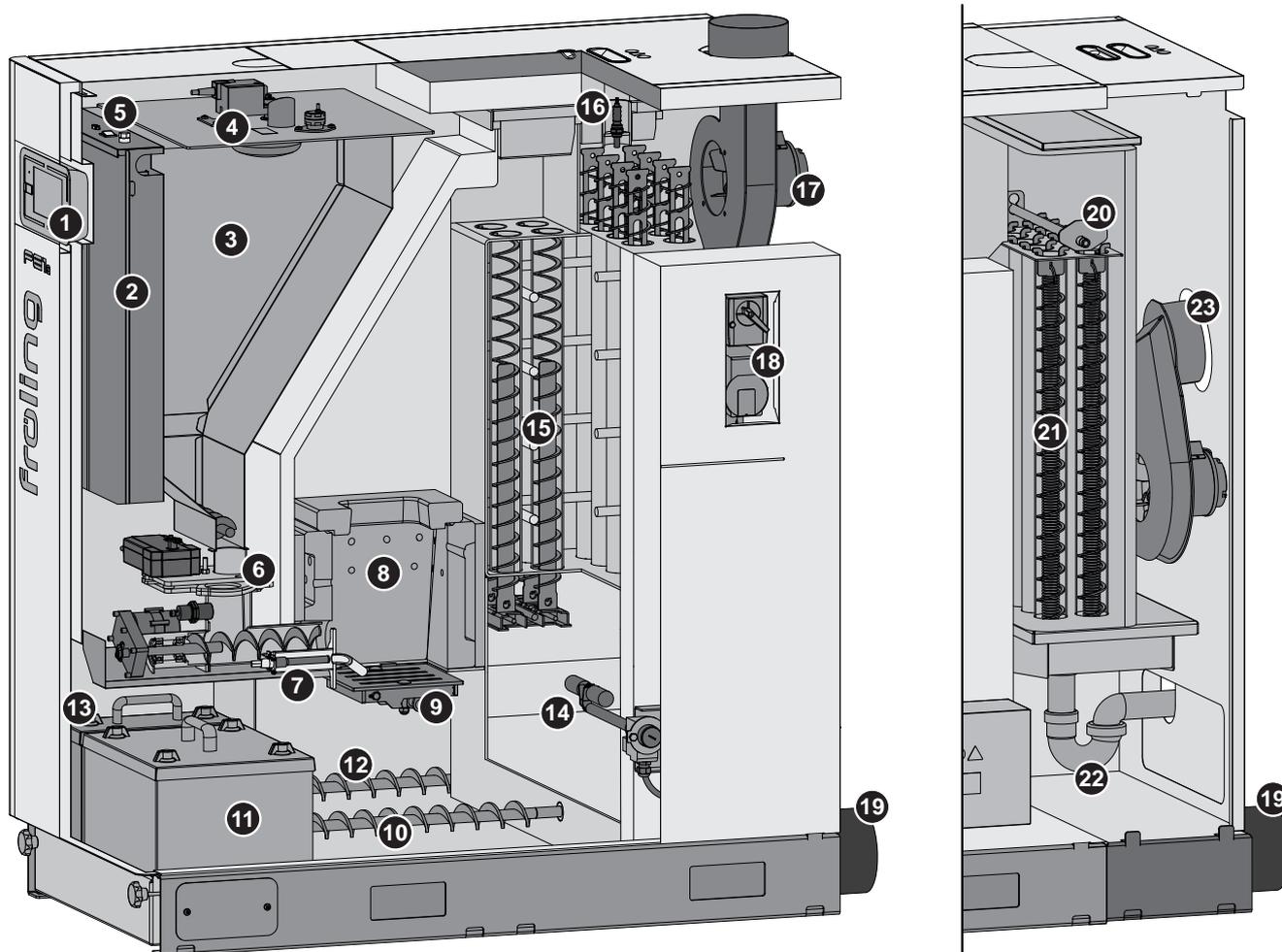
Subject to technical change.

## 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 PE1e Pellet 45-60



1	Lambdatronic P 3200 control, ➔ " <a href="#">Overview of the touch display</a> " [▶ 25]	13	Heat exchanger ash container
2	Lambdatronic P 3200 boiler controller	14	Electrostatic particle separator (optional)
3	Pellet container 175 L	15	WOS Efficiency Optimisation System
4	Cyclone cover with sealing slider	16	Lambda probe
5	Service interface, main switch and safety temperature limiter STL	17	Induced draught unit fan
6	Burn back sliding valve	18	Return temperature control
7	Ceramic igniter	19	Connection for operation independent of room air (optional)
8	Silicon carbide combustion chamber	20	Condenser washing device
9	Tipping grate	21	Efficiency Optimisation System EOS with turbulator
10	Combustion chamber ash screw	22	Siphon für condensation drain
11	Combustion chamber ash container	23	Condenser flue gas pipe connection
12	Heat exchanger ash screw		

## 2 Safety

### 2.1 Hazard levels of warnings

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

#### **DANGER**

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

---

#### **WARNING**

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

---

#### **CAUTION**

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

---

#### **NOTICE**

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

---

## 2.2 Pictograms used

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

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

	Refer to the operating instructions		Wear safety shoes
	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
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	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 Fröling 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 PE1e Pellet is designed solely for heating domestic water. Only the fuels specified in the "Permitted fuels" section may be used.

➤ "Permitted fuels" [▶ 9]

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

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

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

### 2.4.1 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 furnace 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 PE1e Pellet 45, 50, 55, 60 and PE1e Pellet 45 ESP, 50 ESP, 55 ESP, 60 ESP have been recommended as suitable for use in smoke control areas when burning wood pellets.

The Condensing Boiler PE1e Pellet 45, 50, 55, 60 and Condensing Boiler PE1e Pellet 45 ESP, 50 ESP, 55 ESP, 60 ESP have been recommended as suitable for use in smoke control areas when burning wood pellets.

### 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: ENplus / DINplus certification scheme

**General note:**

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

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

### 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

#### NOTICE

In case of use of non-permitted fuels:

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

For this reason, when operating the boiler:

- Use only the permitted fuels

### 2.5 Qualification of operating staff

#### ⚠ CAUTION



If unauthorised persons enter the Installation 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

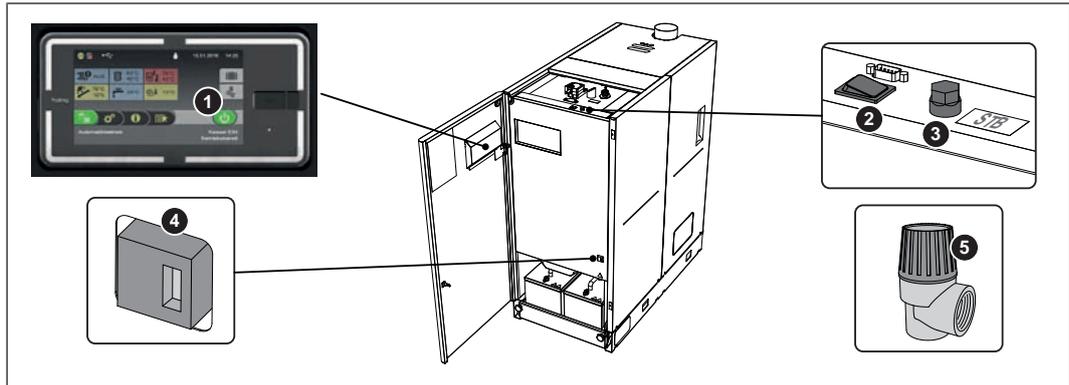
You must ensure that staff have the protective equipment specified by accident prevention regulations!



- 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.

### 4 **DOOR SWITCH** (protection against access to moving components)

If the insulated door opens while the boiler is operating, all of the units stop to prevent injuries at moving components. If the insulated door remains open for more than a specified time, the boiler automatically follows the shutdown procedure.

### 5 **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.

## 2.8 Residual risks

### DANGER



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

#### ***Risk to life from high voltage electrodes!***

Before carrying out work on/in the electrostatic precipitator:

- 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:

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

- Keep all the doors on the boiler closed
- Open all mixing valve taps, switch on all pumps.
  - ↳ The Froling heating circuit control takes on this function in automatic operation.
- Leave the boiler room and close the door
- 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.

#### 3.1.1 Obligation to report as a condensing boiler system

A condensing boiler system with condensate discharge must be reported to the responsible regional authorities (for instance the water and sewage board in Austria).

### 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 m<sup>3</sup> 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.

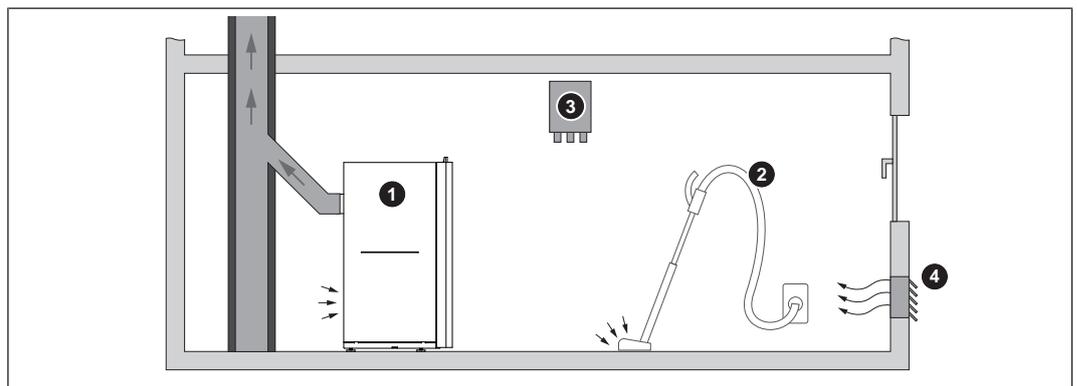
The boiler is operated either dependent on room air (combustion air is taken from the installation site) or independent of room air (direct combustion air supply via a separate pipe from outside).

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 **NOTICE! 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 cm <sup>2</sup> net minimum cross-sectional area plus 4 cm <sup>2</sup> for every kW of nominal heat output above 100 kW
Germany	150 cm <sup>2</sup> net minimum cross-sectional area plus an additional 2 cm <sup>2</sup> for every further kW of nominal heat output above 50 kW

Examples

	Minimum free cross-section [cm <sup>2</sup> ]									
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

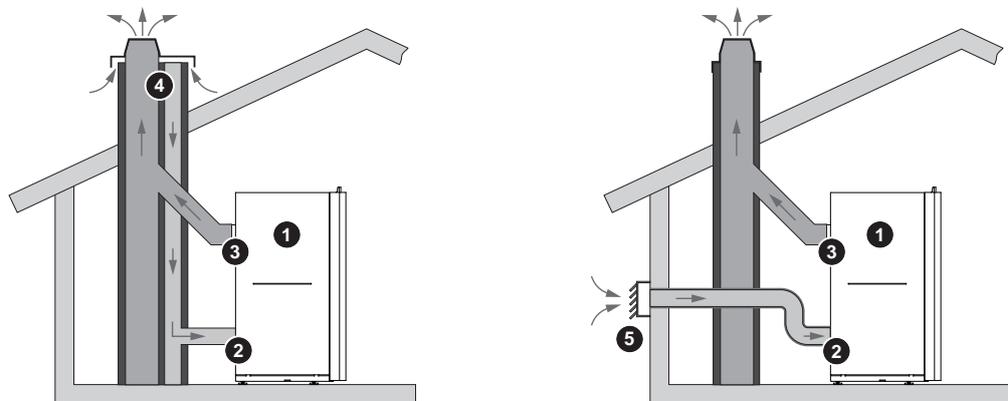
Austria:	OIB Guideline 3 - Hygiene, health and environmental protection
Germany:	Model Firing Ordinance (MFeuV)

### 3.3.3 Room air-independent operation (RIO)

#### General requirement

The combustion air is supplied to the boiler via a separate duct from the outside of the building. The supply must be dimensioned so that the total pressure drop at nominal load does not exceed 20 Pa.

Ventilation of the installation site must be ensured by free or mechanical ventilation under the condition that no impermissible under-pressure greater than 4 Pa is created at the installation site.



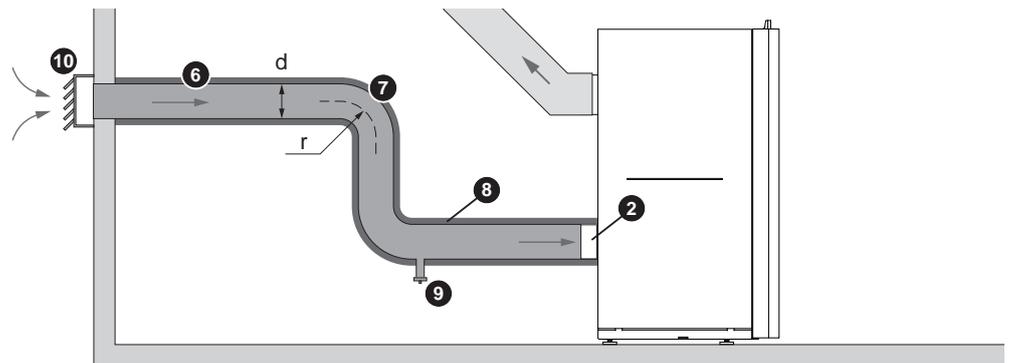
1	Boiler in room air-dependent operation
2	Combustion air connection at the boiler
3	Flue gas line connection at the boiler

4 Supply air duct via system exhaust system (LAS)

5 Supply air duct from the outside

The boiler has a central combustion air connection (2) to which the supply air duct is connected with a leak-tight joint. The combustion air can be supplied from the draught of a system flue gas system (4) or directly from the outside of the building via a separate supply air duct (5).

## Supply air line



### Observe the following instructions when installing the combustion air supply (duct):

- If necessary, have the pressure drop in the combustion air supply (6) calculated by a specialist (resistance in the supply air duct max. 20 Pa)
- For dimensions of the combustion air connection (2) on the boiler, see chapter "Technical data"  
IMPORTANT: Do not reduce the dimensions of the connection
- In the duct, use bends (7) with the largest possible ratio ( $\geq 1$ ) of radius of curvature ( $r$ ) to duct diameter ( $d$ )
- Use as few bends as possible (7) in the duct  
Recommendation:
  - up to 5 m duct length: max. 5 pipe bends
  - up to 10 m duct length: max. 3 pipe bends
- The supply air duct should be as straight as possible and take the shortest path
- Insulate the supply air duct with suitable thermal insulation (8) to prevent formation of condensation
- Lay the supply air duct with a gradient to the outside so that condensate can drain off. If required, install a condensate trap (9) at the lowest point
- Provide suitable protective devices (e.g. protective grille - 10) to prevent the ingress of water, foreign bodies or small animals. The cross-section must not be narrowed as a result.
- Do not close or obstruct the inlet opening
- Ensure the duct is stable at a range of temperatures (up to 120 °C)

### 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/m <sup>3</sup> (total hardness in °dH)		
	Specific system volume in l/kW heat output <sup>1)</sup>		
	≤ 20	20 to ≤40	> 40
≤ 50 specific water content heat generator ≥ 0.3 l/kW <sup>2)</sup>	none	≤ 3.0 (16.8)	< 0.05 (0.3)
≤ 50 specific water content heat generator < 0.3 l/kW <sup>2)</sup> (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](http://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 =  $20 \times Pr$ , 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.

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

### 3.9 Condensate drainage

The condensate must be continuously drained into the waste water system in accordance with local regulations for heating systems with condensing boiler technology.

In respect of the condensate drainage, ensure:

- Line of raw material resistant to condensate
- Diameter at least 50 mm
- Lengths of line as short as possible
- Fall gradient at least 3°
- Frost-free
- Easily accessible for disassembly and cleaning
- Inspection at regular intervals

**NOTICE! The condensate connection may not be changed or closed.**

**NOTICE! If the pipework to the drain cannot be installed in a correct fashion, the use of waste water pumping system is recommended. Suitable systems are available on request from Fröling GesmbH.**

## 4 Operating the system

### 4.1 Assembly and initial startup

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

**NOTICE! See assembly instructions for the PE1e Pellet**

#### NOTICE

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

Take the following precautions:

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

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

**NOTICE! See operating instructions for boiler controller!**

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

- Electrical installation
- Installation of water pipes
- Connect flue gas including all insulation work
- Work must comply with local fire protection regulations
  
- It is essential that the electrician who has carried out the installation work is available when starting up the system for the first time to make any changes to the wiring which may become necessary.
- During initial start-up, operating staff are shown how to use the boiler. It is imperative for proper handover of the product that those involved are present as this is a one-off opportunity.

#### NOTICE

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

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

## 4.2 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 Operate the boiler using the touch display

### 4.3.1 Overview of the touch display



- |          |   |
|----------|---|
| <b>A</b> | Display of freely selectable information<br><a href="#">↪ "Select information displays" [▶ 31]</a>  |
| <b>B</b> | Display and change the current user level<br><a href="#">↪ "Lock display/switch user level" [▶ 38]</a>  |
| <b>C</b> | Display and change the current date/time<br><a href="#">↪ "Change date and time" [▶ 34]</a>   |
| <b>D</b> | Holiday program<br><a href="#">↪ "Configure the holiday program" [▶ 39]</a>   |
| <b>E</b> | Chimney sweeper function<br><a href="#">↪ "Emissions measurement by chimney sweep or regulatory body" [▶ 67]</a>  |
| <b>F</b> | Display of current operating status, boiler ON/OFF<br><a href="#">↪ "Switch boiler ON/OFF" [▶ 33]</a>   |
| <b>G</b> | View available functions in the quick menu<br><a href="#">↪ "Quick menu" [▶ 30]</a>   |
| <b>H</b> | Access all system information. No parameters may be changed in the info menu.   |
| <b>I</b> | System menu for opening the system settings. All parameters can be displayed and/or edited depending on the user level.<br><a href="#">↪ "Navigation within the system menu" [▶ 28]</a> |

<b>J</b>	Display and change the current boiler mode  "Change boiler mode" [ <a href="#">▶ 33</a> ]
<b>K</b>	Display icons for using froeling-connect  "Display icons for froeling-connect/remote control" [ <a href="#">▶ 27</a> ]
<b>L</b>	Brightness sensor for automatically adjusting the brightness of the display
<b>M</b>	LED frame to display the current system status  "Status display" [ <a href="#">▶ 26</a> ]
<b>N</b>	USB interface for software update (⇒ see operating instructions for the boiler controller) <b>NOTICE! USB interface is for service purposes only and must not be used to load devices or for PC connections!</b>

## 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.

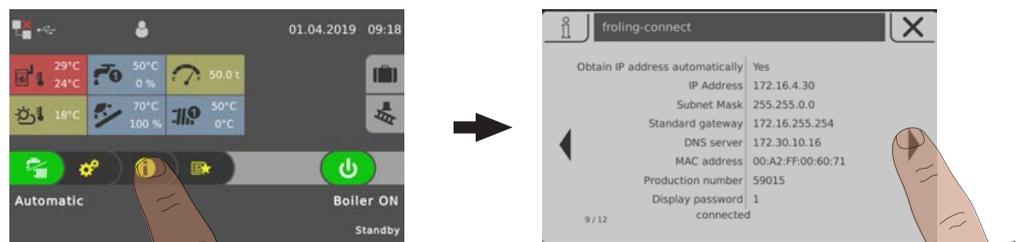
### Display icons for froeling-connect/remote control

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"" [ <a href="#">▶ 27</a> ]		

### 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, ...)

**NOTICE! 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.

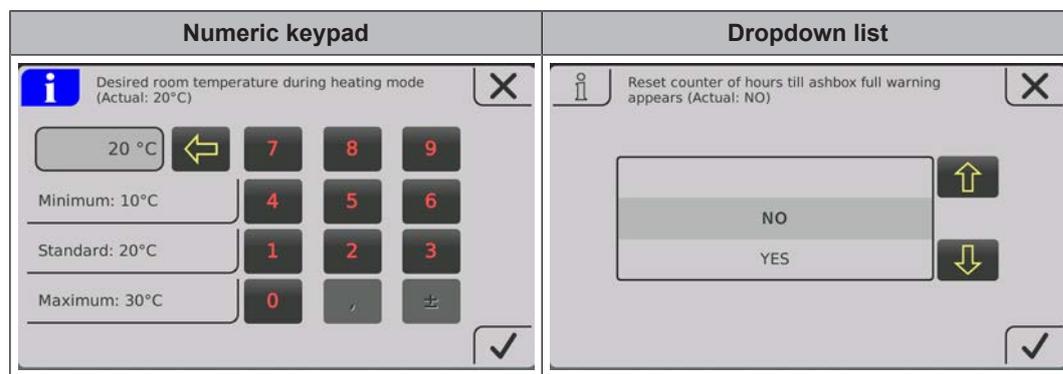
Icon			Tab
			Status
			Temperatures
			Times
			Service
			General settings
			Solar heat meter



## Changing parameters



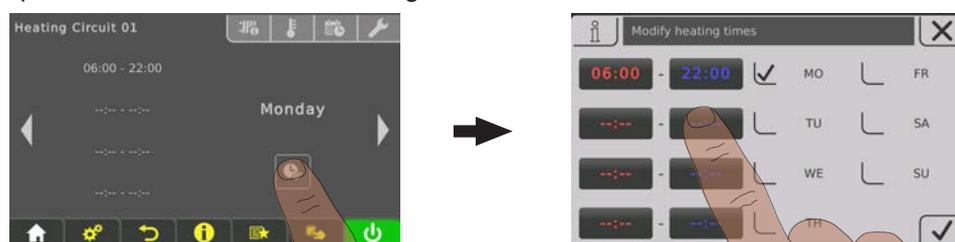
If there is a “pencil” symbol next to a parameter text, the parameter can be edited. Depending on the type of parameter, it can be edited using the numeric keypad or by selecting from a list and then tapping on the “Confirm” symbol.



## Change time window

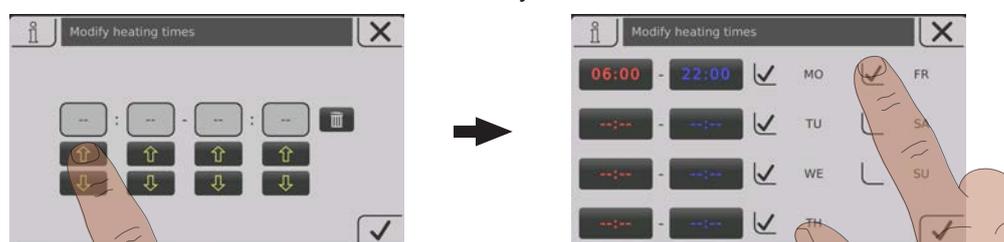
The desired time window can be set in the “Times” tab in the menus of the heating components (heating, water, etc.). Up to four time windows are possible per day.

- 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

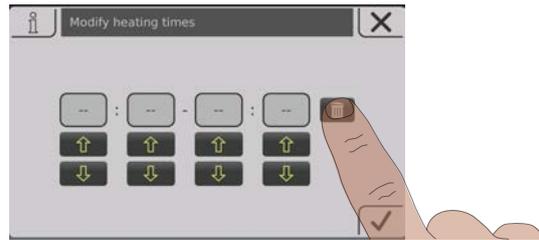


- Use the up and down arrows to set the start and end time and save by tapping the “Confirm” icon

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.

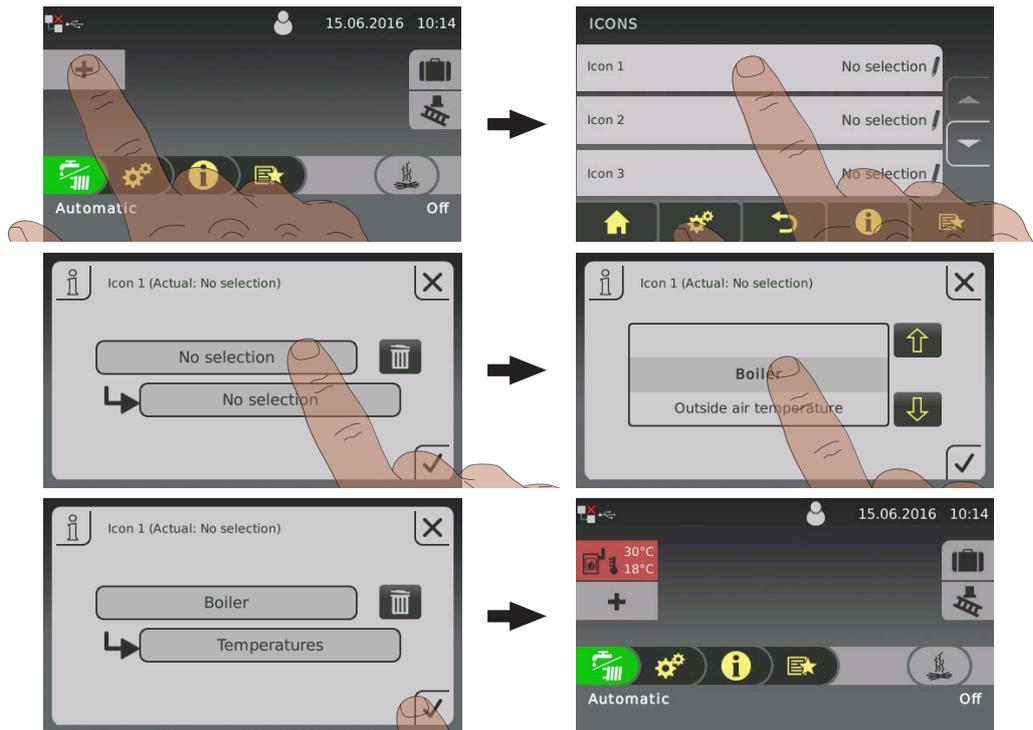
Icon	Description
	<b>Language selection</b> Sets the desired system language: Deutsch – English – Francais – Italiano – Slovenski – Cesky – Polski – Svenska – Espanol – Magyar – Suomi – Dansk – Nederlands – Русский – Srpski – Hrvatski
	<b>Clean the touch display</b> The touch display is locked for 10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

### 4.3.2 Select information displays

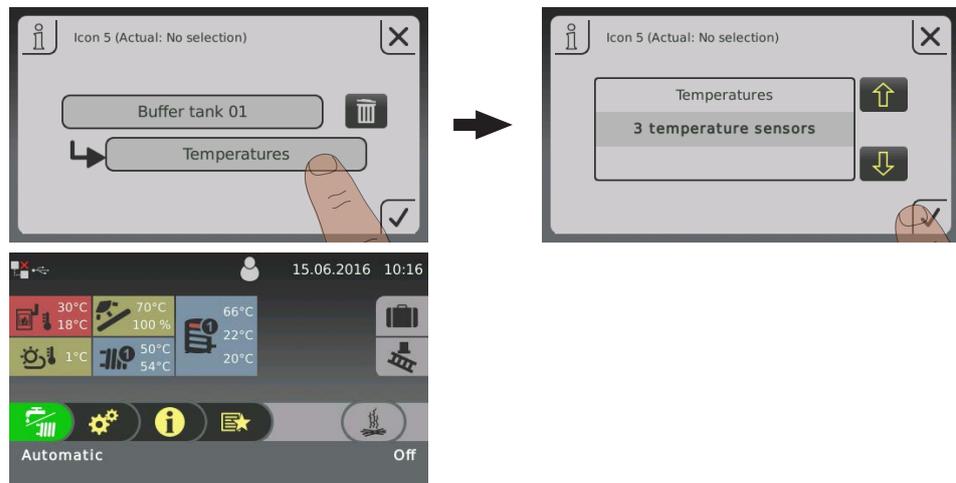
Tapping on the randomly selectable information displays in the basic display opens the respective menu. The following options are available depending on the system configuration:

Menu	Selection	Icon	Description
<b>Boiler</b>	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.
<b>Outside air temperature</b>	Temperatures		Display of the current outside air temperature.
<b>Boiler 2</b>	Temperatures		Display of the temperature of the secondary boiler and the status of the burner relay
<b>Solar</b>	Temperatures		Display of the collector temperature and control of the collector pump.
<b>Pellets</b>	Remaining pellet amount in storeroom		Display of the remaining amount of pellets in storeroom.
<b>Heating circuit 01 – 18</b>	Temperatures		Display of the actual flow temperature and flow temperature setpoint of the respective heating circuit.
<b>DHW tank 01 – 08</b>	Temperatures		Display of the current DHW tank temperature and control of DHW tank pump of the respective DHW tank.
<b>Storage tank 01 – 04</b>	Temperatures		Display of storage tank temperature, top and bottom
	3 temperature sensors <sup>1)</sup>		Display of storage tank temperature, top, middle and bottom.
	4 temperature sensors <sup>1)</sup>		Display of storage tank temperature top, store sensor 2, store sensor 3 and bottom.
<b>Circulation pump</b>	Temperatures		Display of the status at the flow sensor (if present) and the current circulation return temperature.
<b>Differential controller</b>	Temperatures		Display of the current temperature from source and recess of the differential regulator
<b>System</b>	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.



### 4.3.3 Switch boiler ON/OFF

The hydraulic system is controlled in accordance with the mode that is set, regardless of boiler status, ["Change boiler mode" \[▶ 33\]](#)

	<p><b>Boiler ON</b></p> <p>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.</p>
	<p><b>Boiler OFF</b></p> <p>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.</p>

### 4.3.4 Change boiler mode

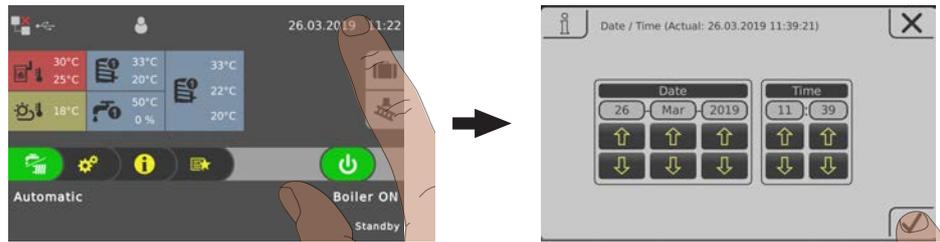
	<p>Depending on the type of boiler, there are several modes available which can be changed directly in the basic display of the touch display.</p>
--	--

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.

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

### 4.3.5 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.



### 4.3.6 Change desired DHW tank temperature



- Tap the information display for the desired DHW tank
- Adjust the temperature setpoint by tapping on “+” or “-”



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

### 4.3.7 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”.



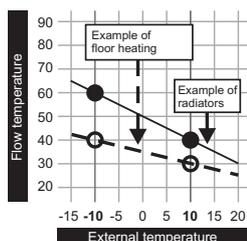
**NOTICE!** If this selection is not configured in the information display in the basic display, open the components in the system menu.

### 4.3.8 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" [▶ 30]

### 4.3.9 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  $-10^{\circ}\text{C}$  outside air temperature” and “flow temperature at  $+10^{\circ}\text{C}$  outside air temperature”.

#### Example:

The heating curve is defined with  $60^{\circ}\text{C}$  (at  $-10^{\circ}\text{C}$  outside air temperature) and  $40^{\circ}\text{C}$  (at  $+10^{\circ}\text{C}$  outside air temperature). If the current outside air temperature is  $-2^{\circ}\text{C}$ , the flow temperature is calculated as  $52^{\circ}\text{C}$ .

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)" [▶ 36]

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  $-10^{\circ}\text{C}$  outside air temperature:  **$60^{\circ}\text{C}$**
- Desired flow temperature at  $+10^{\circ}\text{C}$  outside air temperature:  **$40^{\circ}\text{C}$**

#### Low temperature circuit

- Desired flow temperature at  $-10^{\circ}\text{C}$  outside air temperature:  **$40^{\circ}\text{C}$**
- Desired flow temperature at  $+10^{\circ}\text{C}$  outside air temperature:  **$30^{\circ}\text{C}$**

### Reduction of flow temperature

Outside of the set heating times (➔ "Change time window" [▶ 29]), the setback mode is active and the calculated flow temperature is reduced by the adjustable value “Lowering the flow temperature in setback mode”.

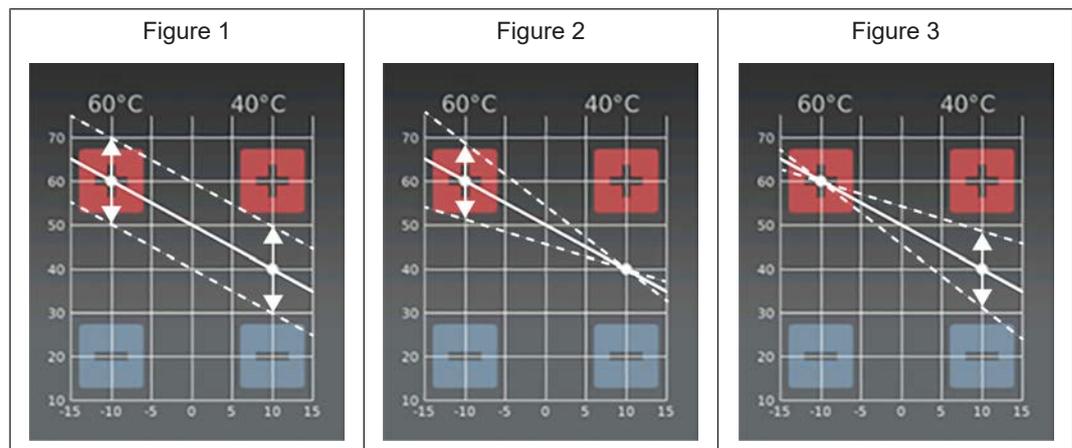
### Heating limits

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)

#### 4.3.10 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)



Depending on the situation, the heating curve can 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.**

### 4.3.11 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



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

Otherwise, the room temperature can be adjusted directly on the remote control/room console.

### 4.3.12 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.

### 4.3.13 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.

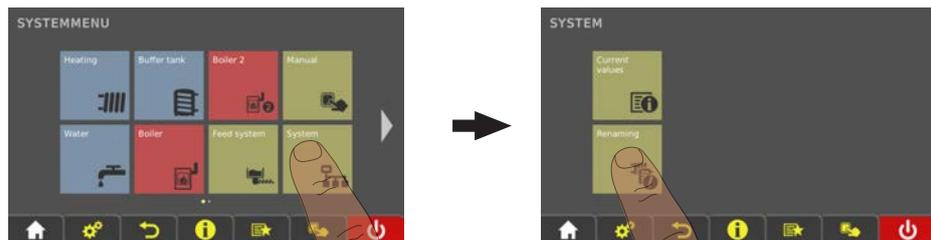


- Tap on the icon for the user level in the upper area of the basic display and enter the code.

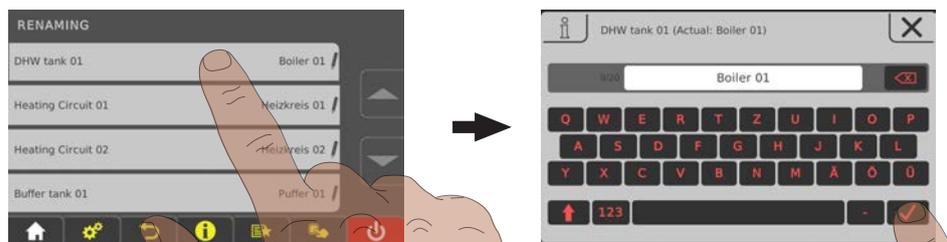
User level	Icon	Description
<b>Operating lock</b> (Code "0")		At "Lock" level, only the basic display appears. It is not possible to change parameters.
<b>Customer</b> (Code "1")		Standard user level for normal operation of the controller. All customer-specific parameters are displayed and can be changed.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

### 4.3.14 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.



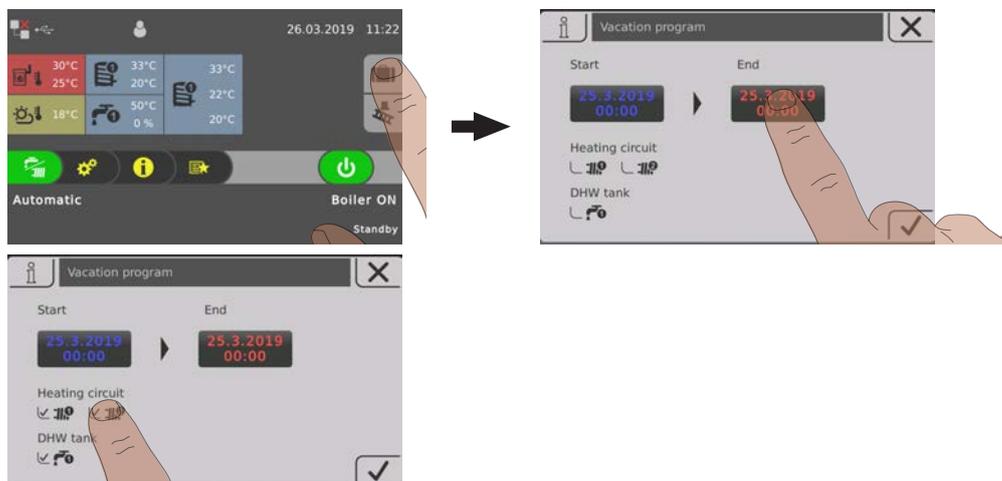
- Navigate to the "System" menu and open the "Renaming" sub-menu



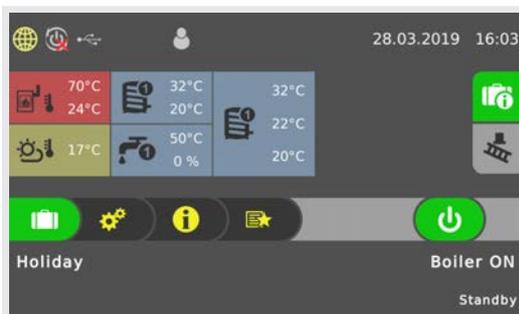
- Tap the desired component and use the keyboard to rename it

### 4.3.15 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).



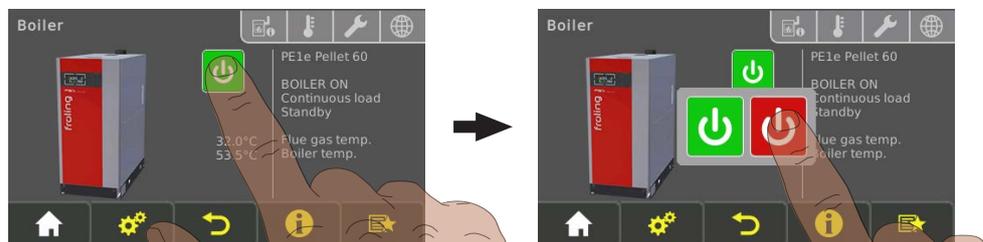
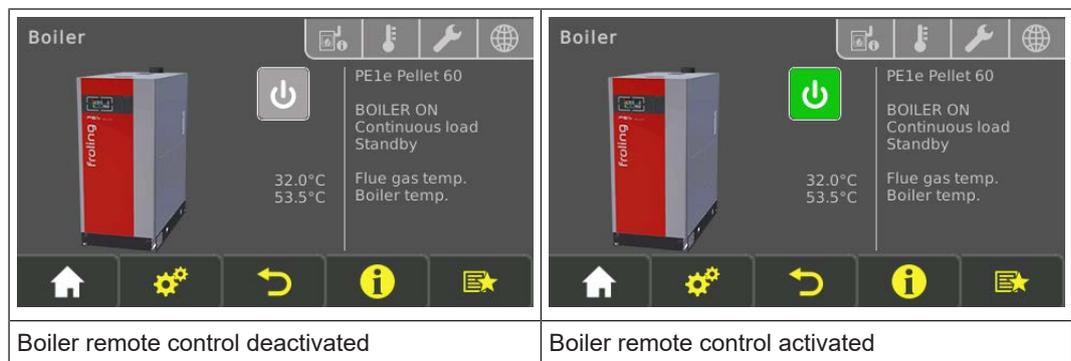


## 4.4 Switch the boiler ON/OFF on the room console

### Prerequisite:

- Boiler access rights configured for the room console

If the boiler remote control is also activated (➔ "Display icons for froeling-connect/remote control" [▶ 27]), the boiler can be switched on and off on the room console.



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

## 4.5 Adjust pellet consumption counter after fuel delivery

### 4.5.1 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" [▶ 9]

### 4.5.2 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

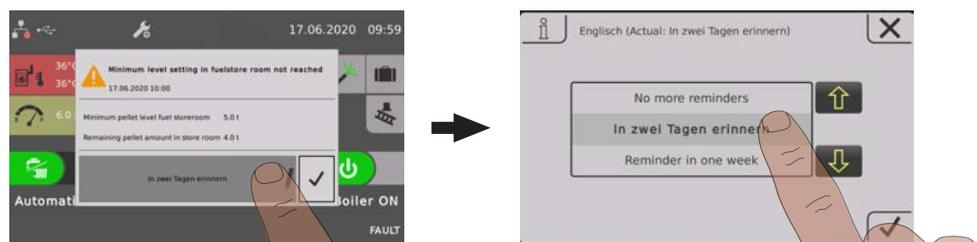
### 4.5.3 Setting the automatic notification for minimum level



- ☐ 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

#### 4.5.4 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



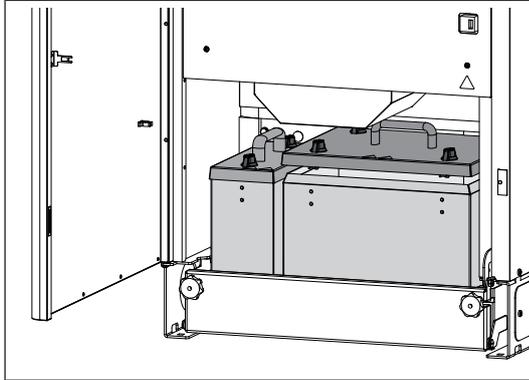
□ In the “Consumption” menu, set the “RESET counter” to “YES”

- ↳ Values of the parameters “Resettable t-counter” and “Resettable kg-counter” are reset to “0”
- ↳ Parameter “RESET counter” is reset to “NO”

## 4.6 Check the fill level of the ash container and empty if required

The ash container must be emptied at appropriate intervals depending on energy requirements and fuel quality. At these intervals, also check the burn-out stones, combustion chamber and grate.

### 4.6.1 Check the ash container fill level



- Open the insulated door
- Open the locks on the cover of both ash containers by turning them anticlockwise.
- Remove the cover and check the fill level
- Put the lid back on and fix it with the fasteners

*Reset counter* The message “Reset counter of hours till ashbox full warning” appears on the boiler display:



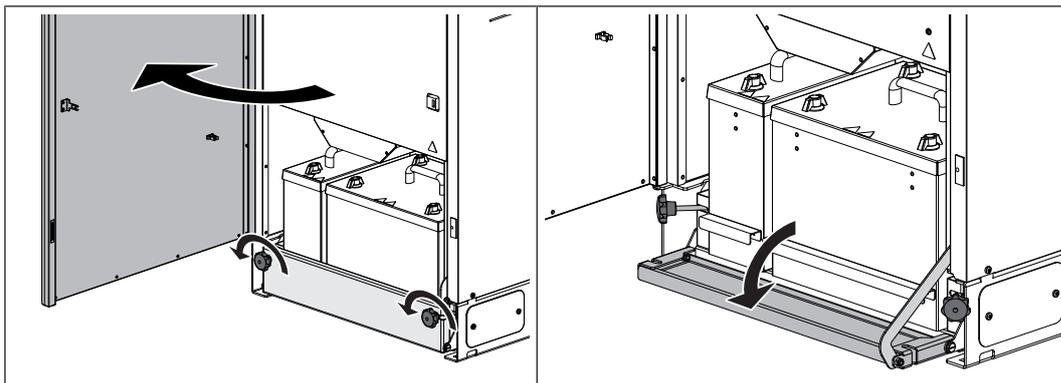
If the ash container is emptied:

- Confirm the message by tapping on “YES”
  - ↳ The counter of the remaining heating hours is reset to the preset value

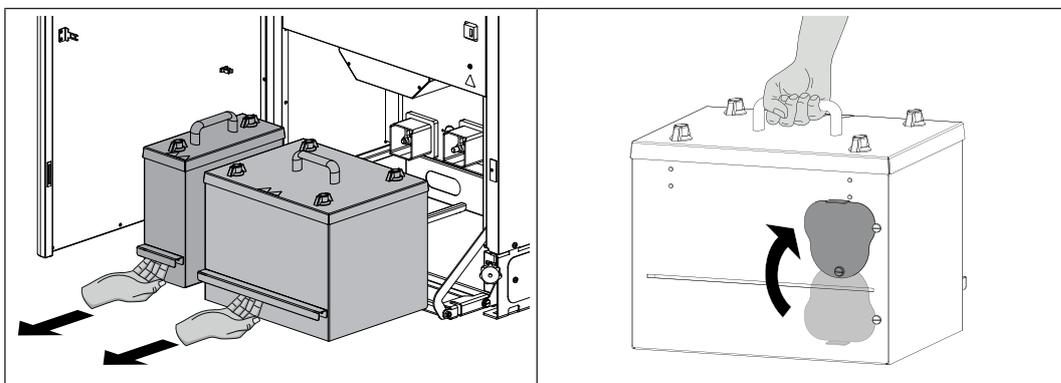
If the ash container is not emptied:

- Close the message by tapping on “NO”
  - ↳ The counter of the remaining heating hours remains unchanged

## 4.6.2 Empty ash container



- Open the front insulating door
- Loosen the star-shaped knobs and swivel to one side
- Fold the cover plate forward



- Pull out both ash containers
- Close the opening at the rear with the sliding valve
- Transport the ash container to the emptying point

## 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
    - ↳ There is no power supply to any of the boiler components

**NOTICE! Frost protection function is no longer active!**

## 5 Servicing the system

### 5.1 General information on servicing

#### **DANGER**

When working on electrical components:



**Risk of electrocution!**

When work is carried out on electrical components:

- Always have work carried out by a qualified electrician
- Observe the applicable standards and regulations
- ↪ Work must not be carried out on electrical components by unauthorised persons

#### **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

#### **NOTICE**

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

#### **WARNING**

Incorrect inspection and cleaning:



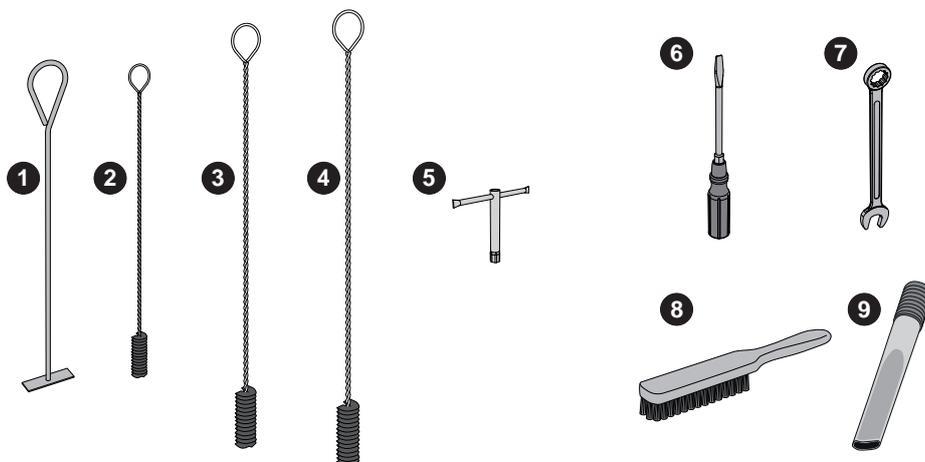
**Incorrect or insufficient inspection and cleaning of the boiler can cause serious faults in combustion (e.g. spontaneous combustion of carbonisation gases / flash fires) and this can lead to serious accidents and damage!**

Take the following precautions:

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

## 5.2 Required tools

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



Included in delivery:	
1	Flat scraper
2	Plastic cleaning brush (25 x 50 x 750) for cleaning the FGR duct
3	Cleaning brush (24 x 50 x 1200) for cleaning the WOS springs
4	Stainless steel cleaning brush (Ø 56 x 1350) in condensing boiler
5	SW 13 mm socket wrench

Not included:	
6	Screwdriver set (Philips, flat head, Torx T20, T25, T30)
7	Spanner or box wrench set
8	Small brush or cleaning brush
9	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
- NOTICE! Check that the position of the pressure gauge and rated pressure of the expansion tank match your installer's specifications!**

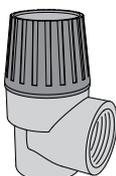
If the system pressure decreases:

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

If large pressure fluctuations are observed:

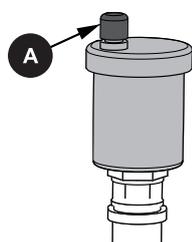
- Ask an expert to inspect the expansion tank

#### Checking the safety valve



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

#### Checking the quick vent valve



- Regularly check all the quick vent valves on the entire heating system for leaks
  - ↪ If any liquid is leaking, replace the quick vent valves

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

### 5.3.2 Periodic inspection and cleaning

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.

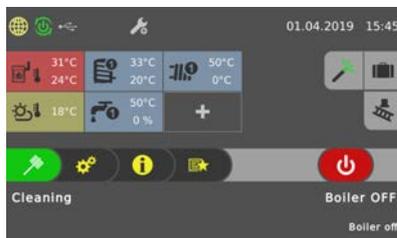
#### Clean the burn-out ring and burners

- Switch off the boiler by tapping “Boiler OFF”
- Allow the boiler to cool for at least one hour
- Activate service as described in the following

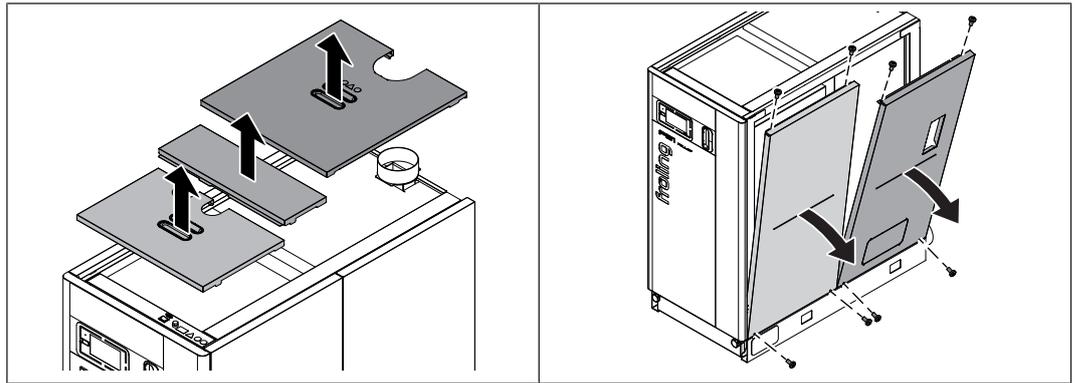
*Activate service mode:* In service mode the induced draught rotates at low speed. The cleaning process is thus supported by the suctioning up of the stirred up ash.



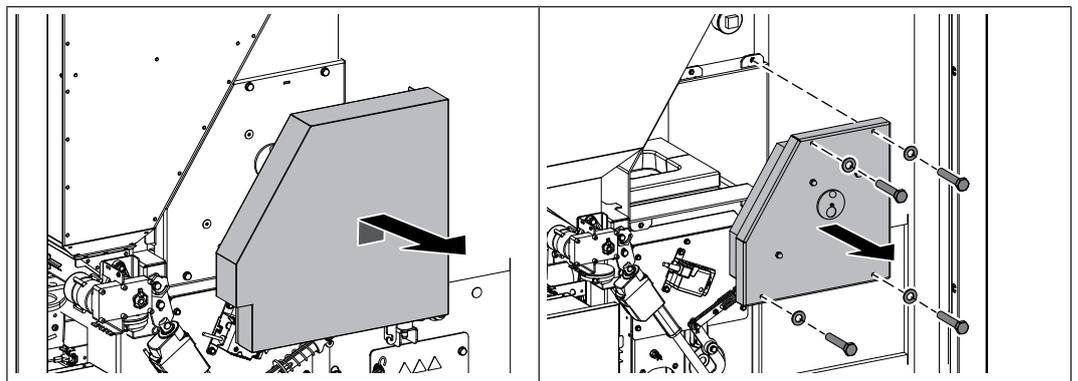
- Tap on “Service mode” in the quick menu



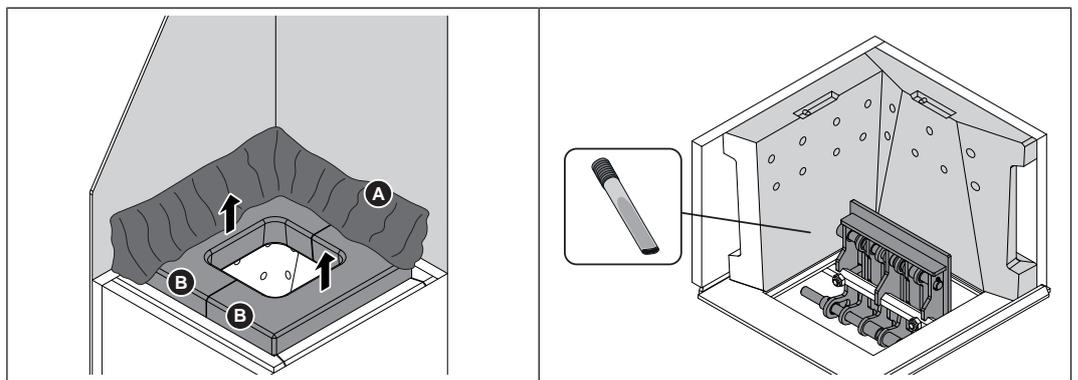
- The “Cleaning” mode is activated in accordance with boiler-specific processes
  - ↳ As soon as this state is displayed, the cleaning process may begin.



- Remove the cover on the upper side of the boiler
- Removing the side panels



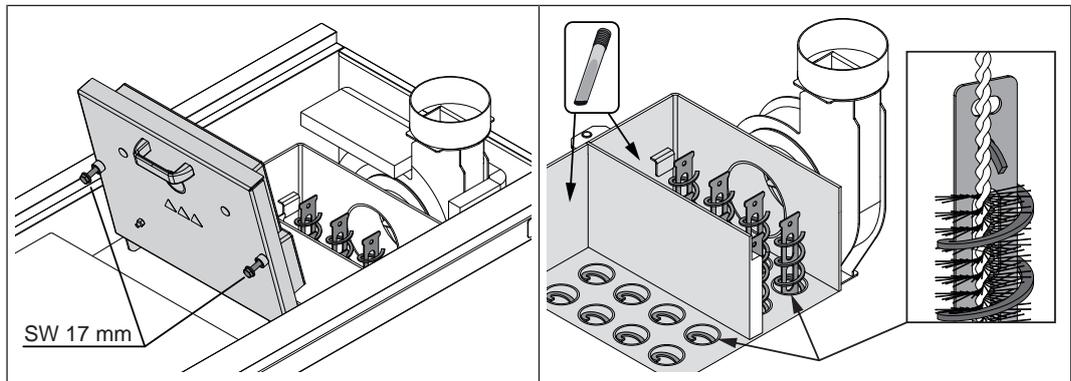
- Lift and unhook the cover
- Use the box wrench to unscrew and remove the combustion chamber cover
  - ↪ The box wrench is attached to the tool clamp on the inside of the insulating door



- Remove ash cone (A) with brush
- Remove both burn-out stones (B) and clean them carefully
- Remove ash deposits on the walls of the entire combustion chamber and the combustion chamber stones with a brush
  - ↪ Ash vacuum recommended
- Check the combustion grate for dirt and clean if necessary

### Clean the heat exchanger and WOS springs

- Start the shutdown procedure by tapping “Boiler OFF”
- Switch of the boiler at the main switch and let cool down for at least one hour

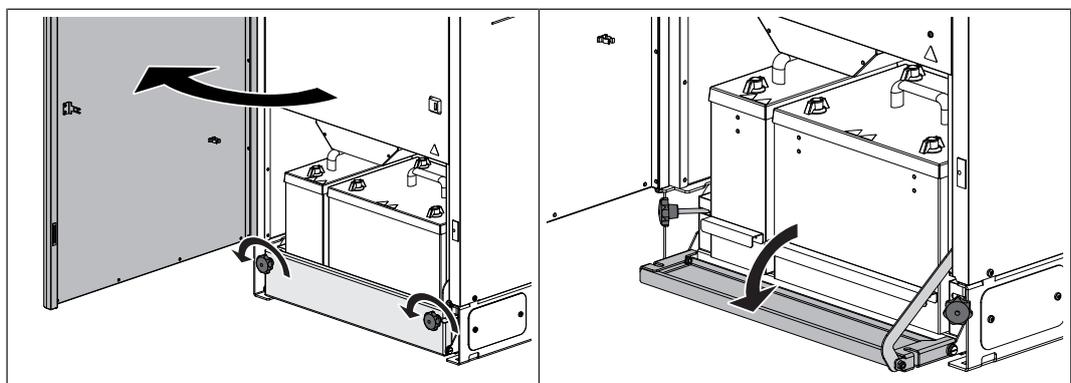


- Undo screw connection (AF 17 mm) and open heat exchanger cover
- Clean the entire flue gas collection chamber using an ash vacuum
- Clean the WOS springs using a cleaning brush on both sides of the inner panel

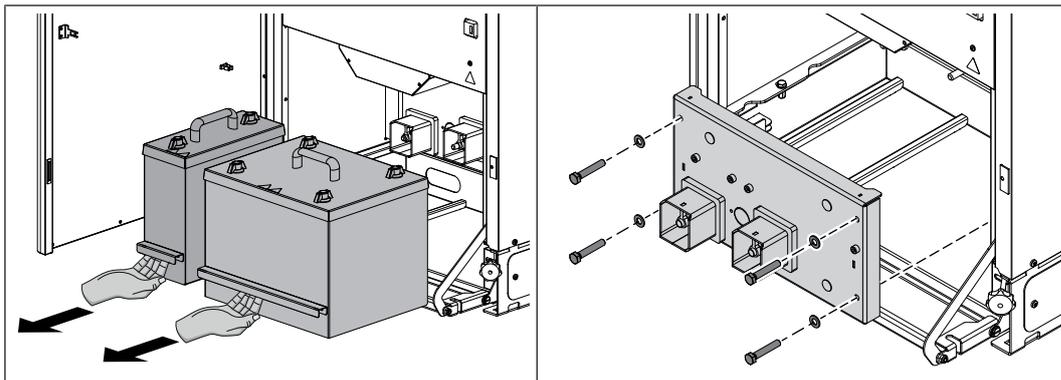
**NOTICE! WOS springs do not have to be removed for cleaning!**

### Clean area under combustion chamber

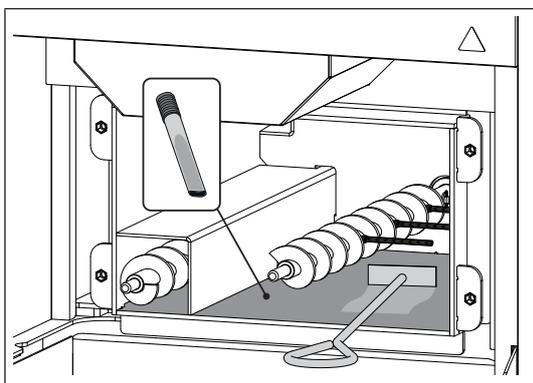
- Start the shutdown procedure by tapping “Boiler OFF”
- Switch of the boiler at the main switch and let cool down for at least one hour



- Open the front insulating door
- Loosen the star-shaped knobs and swivel to one side
- Fold the cover plate forward



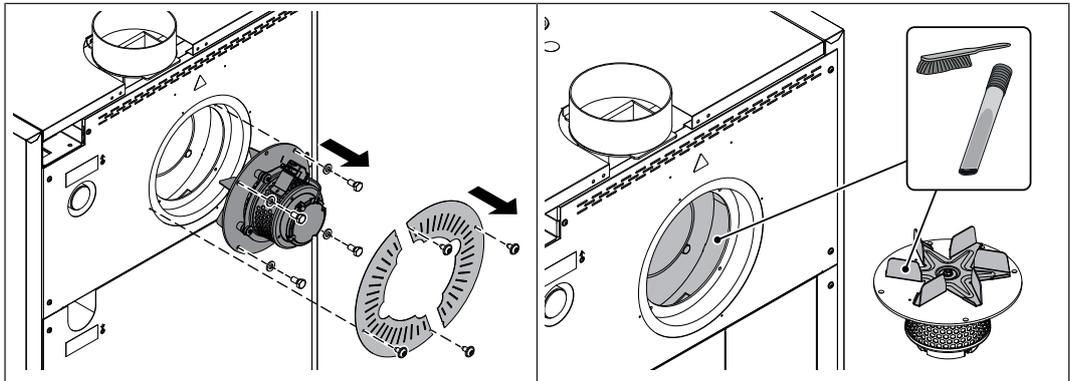
- Pull out both ash containers
- Remove the ash container bracket behind that



- Remove the ashes under the combustion chamber
  - ↪ Use the ash vacuum and supplied flat scraper

### Clean the induced draft fan

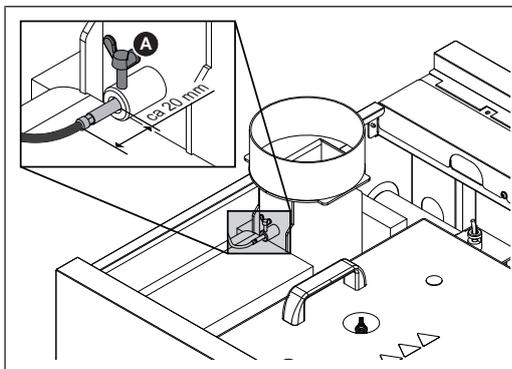
- Start the shutdown procedure by tapping "Boiler OFF"
- Switch of the boiler at the main switch and let cool down for at least one hour



- Unplug the connection cable of the induced draught unit fan
- Remove the induced draught cover plate and induced draught unit fan
  - ↳ Take care not to damage the seal on the induced draught unit housing
- Clean the fan wheel from the inside out using a soft brush or paint brush
- Remove contaminants and deposits from the induced draught unit housing

### Clean the flue gas temperature sensor

- Start the shutdown procedure by tapping "Boiler OFF"
- Switch of the boiler at the main switch and let cool down for at least one hour

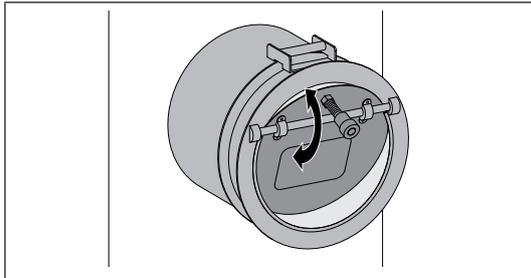


- Undo the wing screw (A) and take out the flue gas temperature sensor
- Wipe the flue gas temperature sensor with a clean cloth
- Push in the flue gas temperature sensor so that approx. 20 mm protrudes from the bushing

### **Cleaning the flue gas pipe**

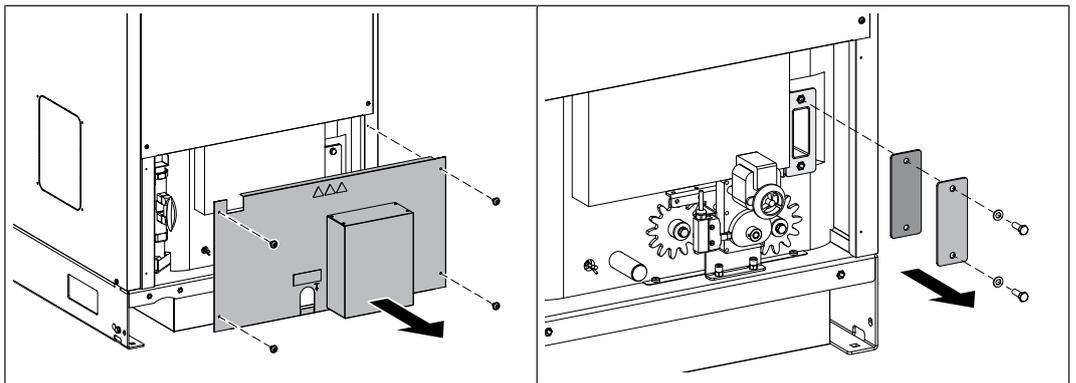
- Remove the inspection cover on the connecting pipe
- Clean the connecting pipe between the boiler and chimney with a chimney sweep's brush
  - ↪ Depending on the layout of the flue gas pipes and the chimney draught cleaning, yearly may not be enough!

### **Checking the draught controller flap**

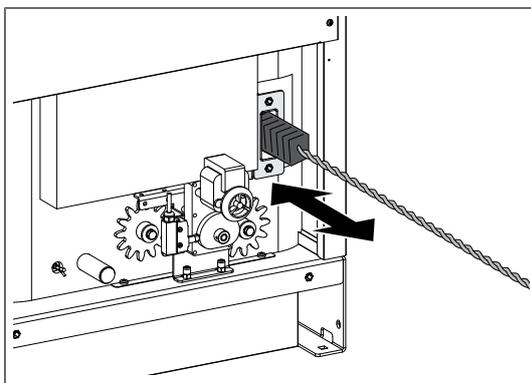


- Check that the draught controller flap moves freely

### **Clean FGR duct**



- Remove lower back panel
- Remove cover from the FGR duct



- Clean FGR duct with cleaning brush

### Check condensation drain (with condensing boiler heat exchanger)

- Start the shutdown procedure by tapping "Boiler OFF"
- Switch of the boiler at the main switch and let cool down for at least one hour

#### CAUTION

When cleaning on the siphon and the outflow tub:

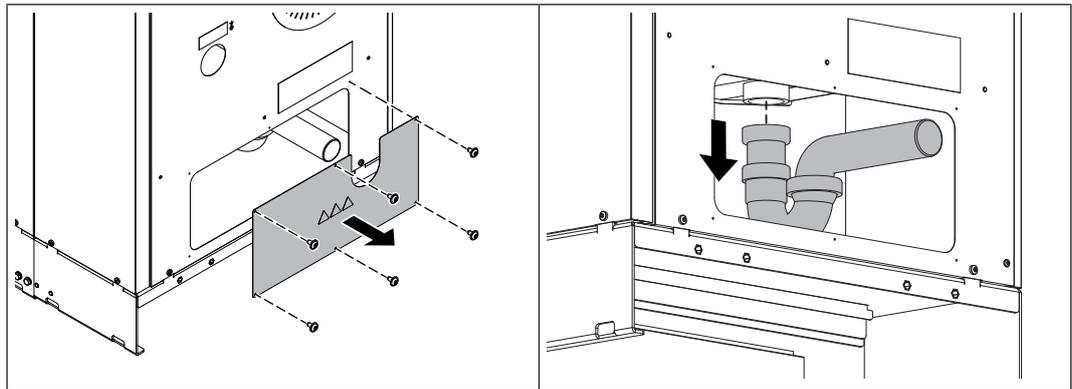
***Danger of viral or bacterial infection due to contaminated condensate or cleaning water.***

Therefore:

- use waterproof protective gloves when handling condensate



**NOTICE!** If the condensation drain is blocked, the outflow tub will fill with condensation, preventing the flue gas from escaping through the chimney, which could in turn lead to problems with combustion. For this reason it is important to check the condensation drain regularly.



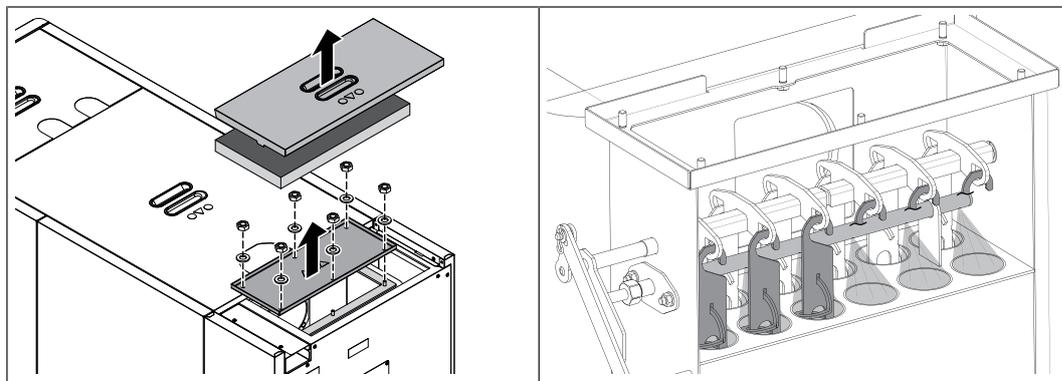
On the rear of the boiler:

- Remove cover from the condensation drain
- Unscrew siphon and check for dirt and deposits
- Check the condensation drain up to where it enters the waste water system and clean if necessary
  -  Ensure that the condensation is continually drained into the waste water system!

### Check rinse water cleaning (with condensing boiler heat exchanger)

- Tap on “Boiler OFF” in order to turn off the boiler
- Allow the boiler to cool for at least one hour

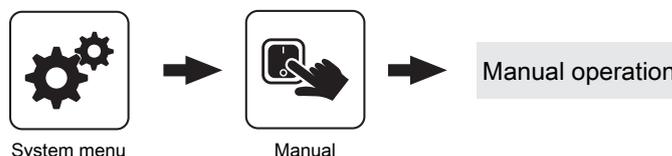
**DO NOT switch off the main switch of the boiler!**



- Remove the cover and thermal insulation on the condensing boiler heat exchanger
- Open the inspection cover

In the event of light soiling of the heat exchanger pipes, the flushing device can be checked to ensure proper cleaning. In the event of heavy soiling the heat exchanger must first be cleaned, ➔ ["Clean the heat exchanger and WOS springs" | 52](#)

- Manually activate the flushing device on the controller:



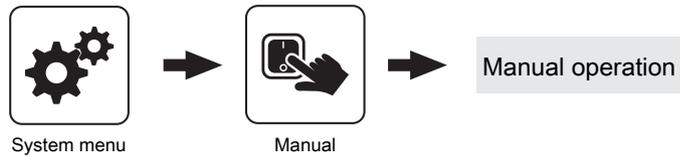
- In the "Manual operation" menu set the “calorific value heat exchanger manual flushing - only in boiler off/standby” parameter to “YES” for approx. 10 seconds
  - ↳ When exiting the menu, the flushing process finishes
- Check the cleaning status of the heat exchanger pipes
  - ↳ In the case of uneven cleaning, check the nozzles on the flushing device for blockages (lime scale, dirt, etc.)

### Clean the screen on the flushing device (with condensing boiler heat exchanger)

- Start the shutdown procedure by tapping "Boiler OFF"
- Allow the boiler to cool for at least one hour

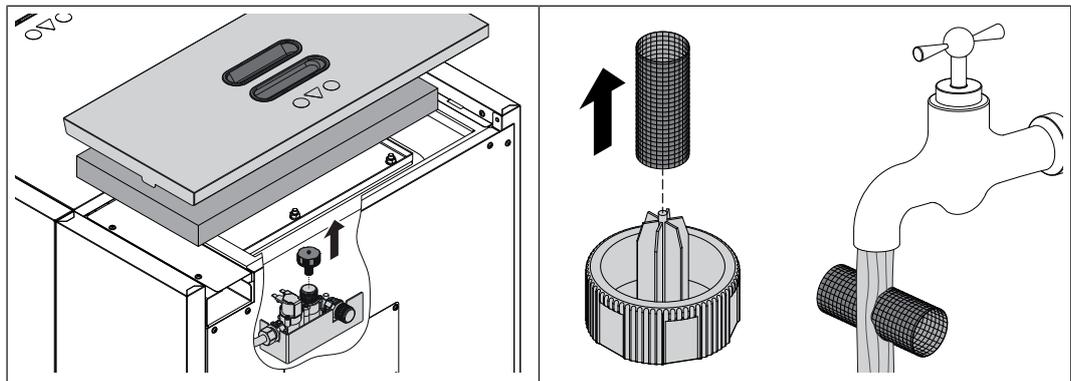
**DO NOT switch off the main switch of the boiler.**

- Close the shut-off valve on the water intake
- Manually activate the flushing device on the controller in order to empty the flushing line



- In the "Manual operation" menu set the "calorific value heat exchanger manual flushing - only in boiler off/standby" parameter to "YES" for a few seconds

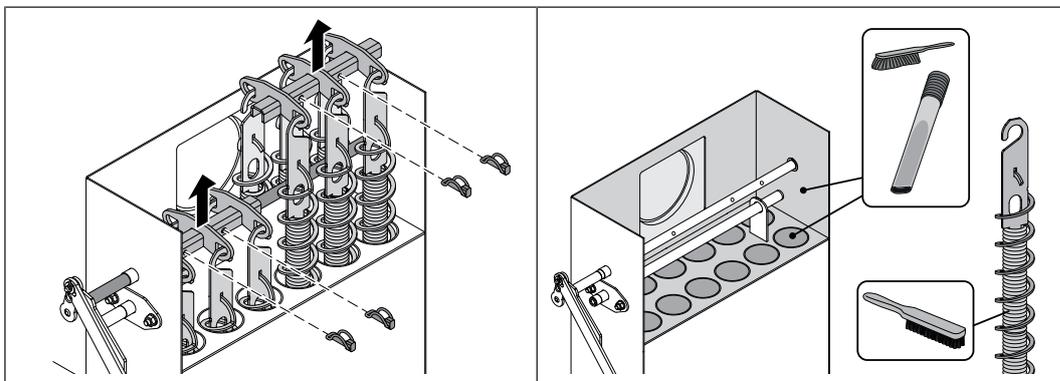
↳ The flushing finishes when you exit the menu



- Remove cover and thermal insulation above the condensing boiler heat exchanger
- Unscrew the filter cover
- Remove the screen and thoroughly clean it under running water

### Clean the heat exchanger and WOS springs (with condensing boiler heat exchanger)

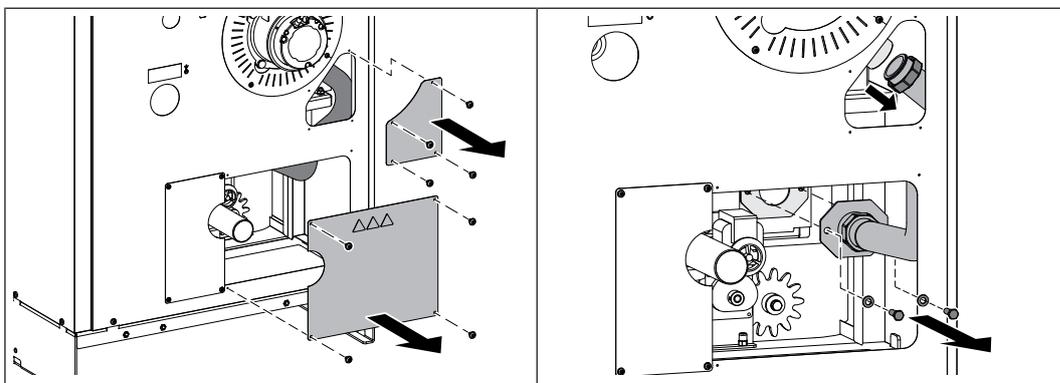
- Tap on "Boiler OFF" in order to turn off the boiler
- Switch off the boiler at the main switch and let the boiler cool down for at least one hour



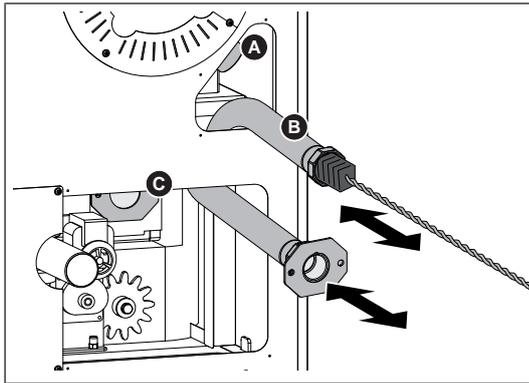
- Remove the pipe locking pin from the mounting plate and remove the WOS mount along with the springs
- Clean WOS springs and heat exchanger pipes with the supplied stainless steel brush
- Clean the entire flue gas collection chamber using an ash vacuum

**NOTICE! ONLY use the supplied stainless steel brush to clean all stainless steel components!**

### Clean FGR duct (with condensing boiler heat exchanger)



- Remove left cover from the siphon and next to the induced draught unit fan
- Remove flexible FGR hose on the induced draught unit housing and boiler body



- Clean components with a cleaning brush
  - ↳ Sleeve on induced draught unit housing (A)
  - ↳ Flexible FGR hose (B)
  - ↳ FGR duct (C)

### Clean electrode (with electrostatic particle separator)

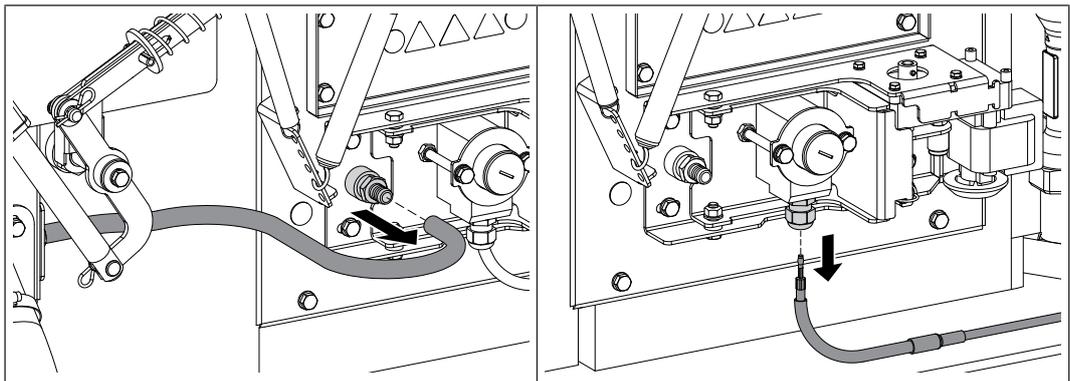
#### **⚠ CAUTION**



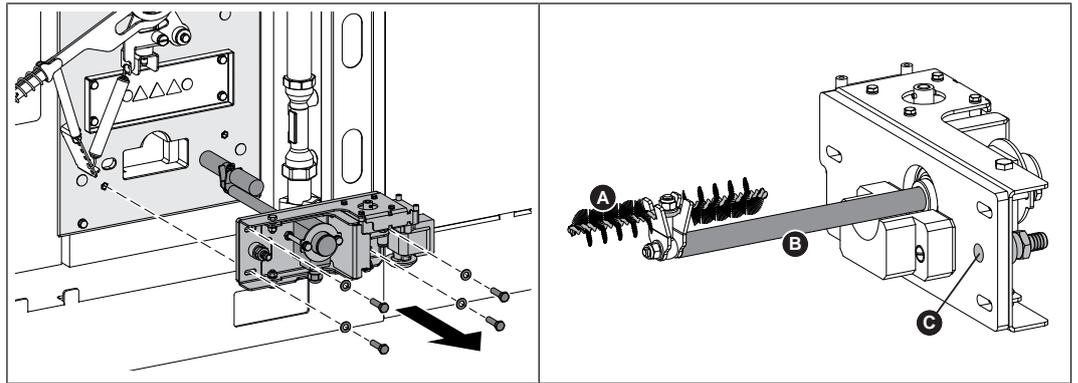
Increased dust buildup during maintenance work on the electrostatic particle separator!

Therefore:

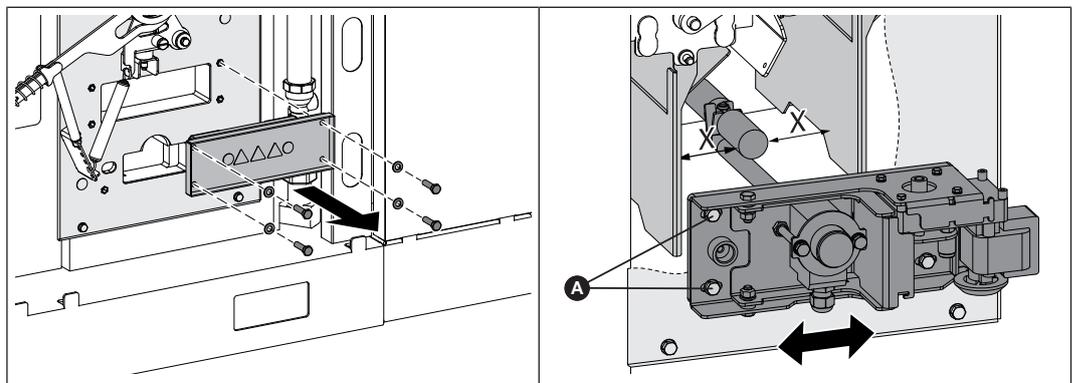
- Wear a dust mask of filter class FFP-2 or higher
- Tap on "Boiler OFF" in order to turn off the boiler
- Switch off the boiler at the main switch and let the boiler cool down for at least one hour



- When using room air-independent operation:** Pull off the silicone hose at the hose nozzle
- Disconnect the plug from the electrode



- Remove the electrode unit, paying attention to the brush
- Remove soot and ash deposits from brush (A) and isolator (B)  
**TIP: Use scouring fluid and a scouring pad to clean the isolator (B)!**
- Clean air opening (C) using a screwdriver



- Remove the top cleaning cover
- Insert the electrode unit
- Position the electrode in the center between the linking plates
- Tighten the screws (A) of the electrode unit evenly

## 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.

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

Regular maintenance and servicing by a heating specialist will ensure a long, trouble-free service life for your heating system. It will ensure that your system stays environmentally-friendly and operates efficiently and cost-effectively.

In the course of this maintenance the entire system is inspected and optimised, particularly regulation and control of the boiler. The emission measurement carried out can also be used to draw conclusions about the combustion performance of the boiler. For this reason, FROLING offers a service agreement, which optimises operating safety. Please see the details in the accompanying guarantee certificate.

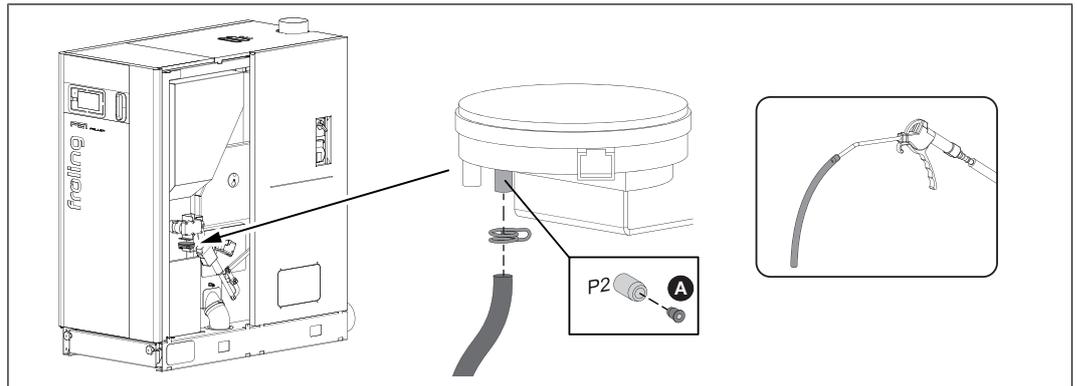
Your Froling customer service office will also be happy to advise you.

### NOTICE

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

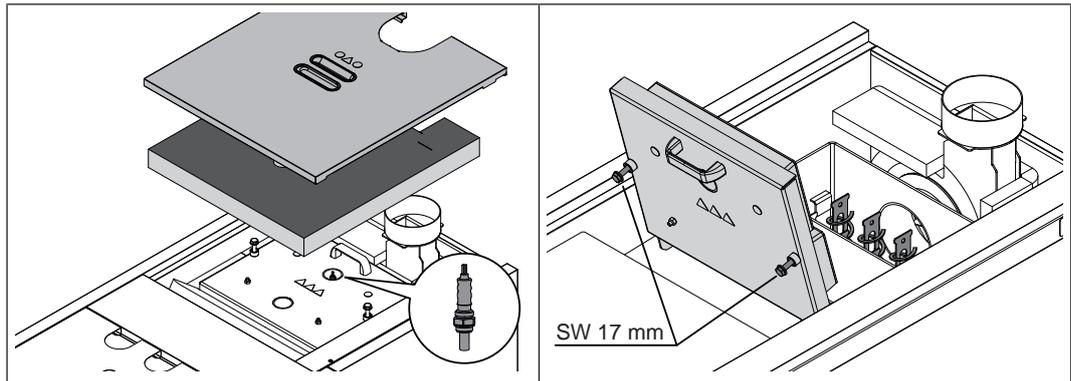
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### 5.4.1 Cleaning the measurement line of the underpressure controller

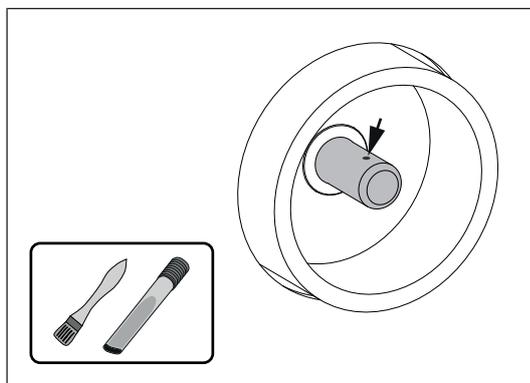


- ❑ Loosen the twin wire clamp with pliers and remove the measurement line from the under-pressure sensor cartridge
- ❑ Clean the measurement line with gentle compressed air
  - ↪ **WARNING!** Do not direct compressed air into under-pressure sensor cartridge. This could damage it.
- ❑ After cleaning, install measurement line to connection "P2"
  - ↪ Make sure that reducing plug (A) is completely pushed into connection "P2"

### 5.4.2 Cleaning the Lambda probe



- Remove the back cover and thermal insulation upwards
- Undo screw connection (AF 17 mm) and open heat exchanger cover

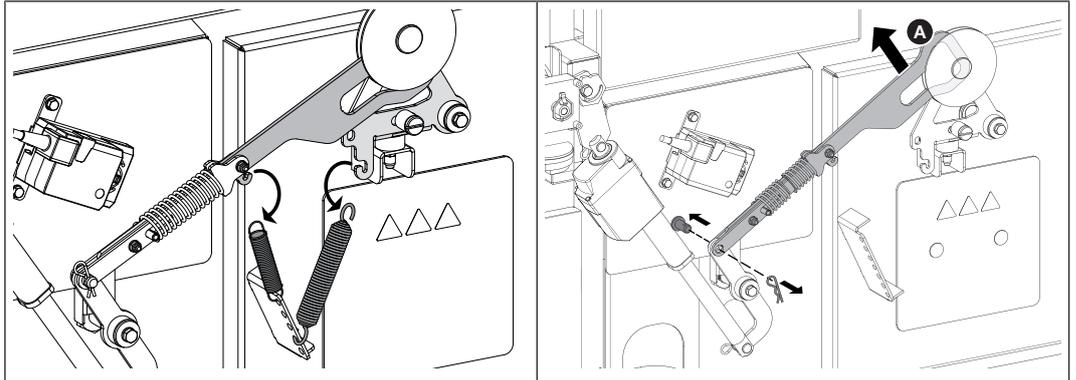


- Carefully remove impurities from the measuring ports with a fine brush and ash vacuum
- Carefully close the heat exchanger cover several times so that deposits can fall out of the measuring openings

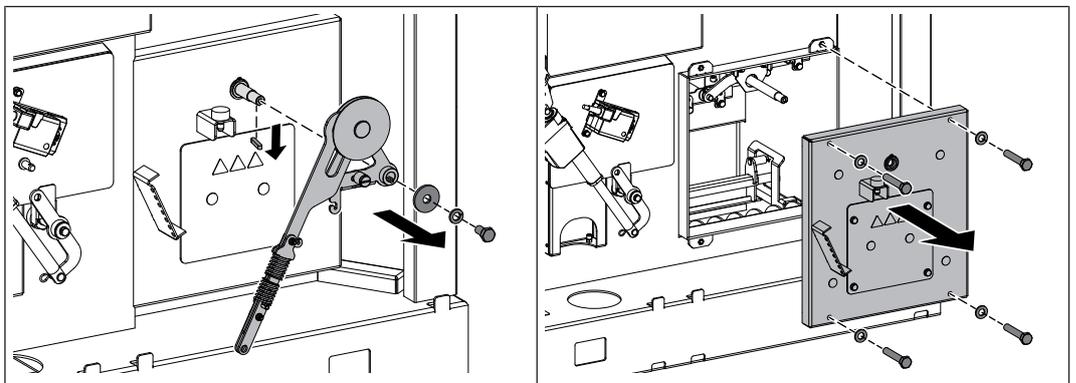
**CAUTION:**

- Do not clean the Lambda probe with compressed air
- Do not use chemical cleaning agents (brake cleaner, etc.)
- Careful handling of the Lambda probe, no “tapping” or cleaning with a wire brush

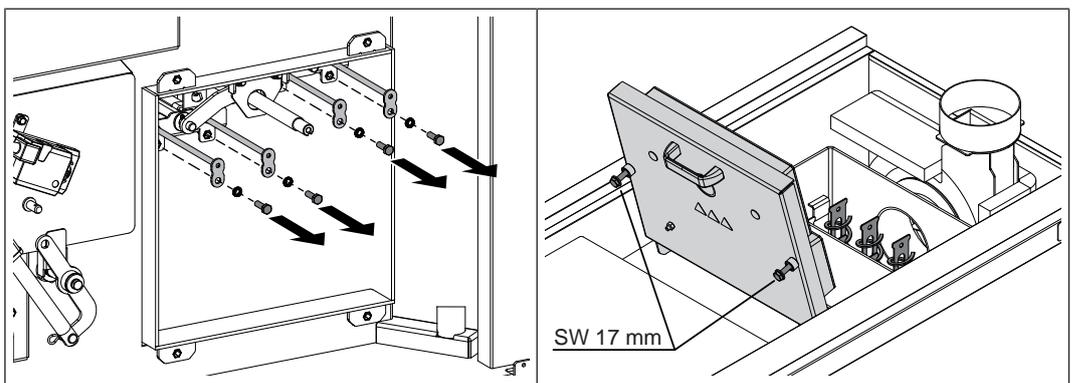
### 5.4.3 Clean the heat exchanger and WOS springs



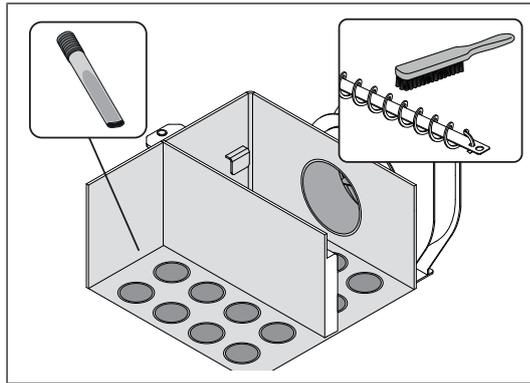
- Unhook tension springs on the connecting rod of the WOS
- Lift the driver lever in the upper area (A) and remove the pin at the other end



- Remove the driver lever and take the key out of the WOS shaft
- Then remove the maintenance cover

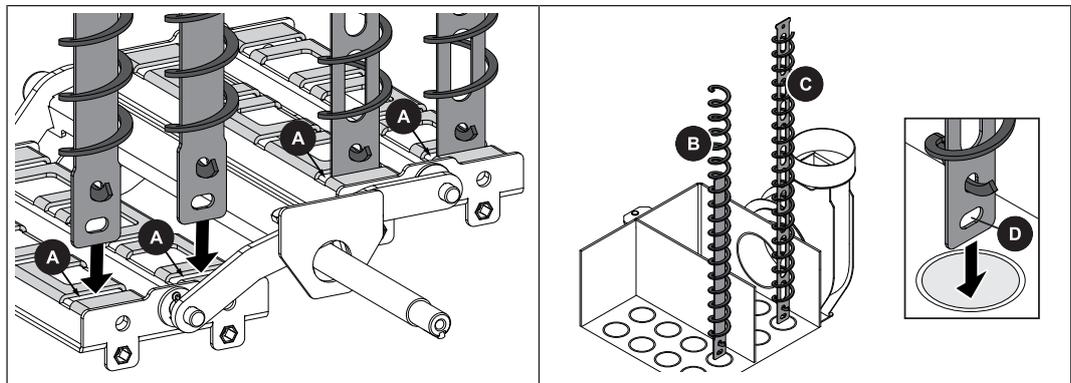


- Remove WOS shafts
- Undo screw connection (AF 17 mm) and open heat exchanger cover



- Pull WOS springs out of the heat exchanger
- Clean WOS springs and heat exchanger pipes
- Clean the entire flue gas collection chamber using an ash vacuum

*Caution when installing WOS springs:*



- Push WOS springs with slot (D) downwards into heat exchanger pipes
  - ↳ Push inner plate of the springs as far as the stop in slots (A)
  - ↳ **B:** WOS springs for downwards stroke (front)
  - ↳ **C:** WOS springs for downwards stroke (rear)

## 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.

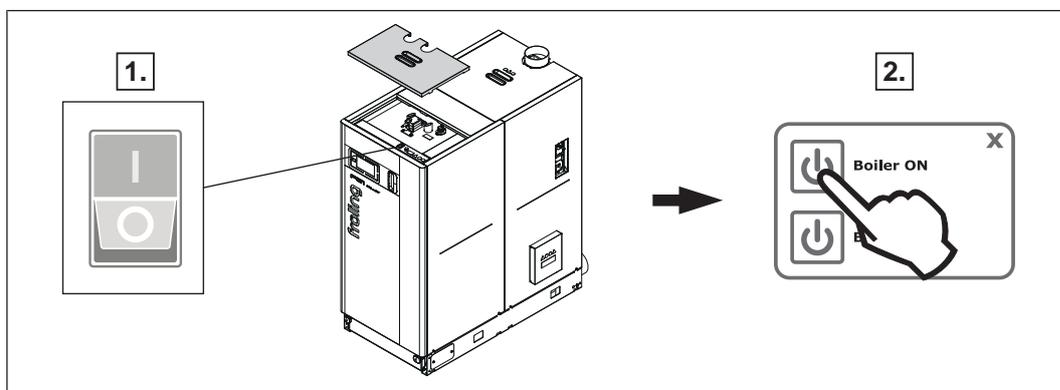
The following minimum requirements must be met by the operator of the system for a successful measurement:

- Thoroughly clean the boiler immediately before the 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

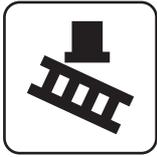
When the cleaning is complete:

- 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	<ul style="list-style-type: none"> <li><input type="checkbox"/> Specify the type of measurement (nominal load / partial load)                             <ul style="list-style-type: none"> <li>↳ The flue gas temperature and residual oxygen content should have stabilised approximately 20 minutes after activation</li> <li>↳ The display will indicate that the boiler is ready for measurement as soon as all the conditions for the measurement are fulfilled</li> </ul> </li> </ul>
Enter target date	<ul style="list-style-type: none"> <li><input type="checkbox"/> Enter the time of measurement (date and time)                             <ul style="list-style-type: none"> <li>↳ 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</li> <li>↳ <b>NOTICE! The boiler starts 30 minutes before the start of the measurement and is already ready for measurement at the set time!</b></li> </ul> </li> </ul>

### 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.

#### NOTICE

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.
- 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.

## 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 FI-protective circuit breaker, power line protection or SPS power line protection tripped	Turn on the main switch 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.

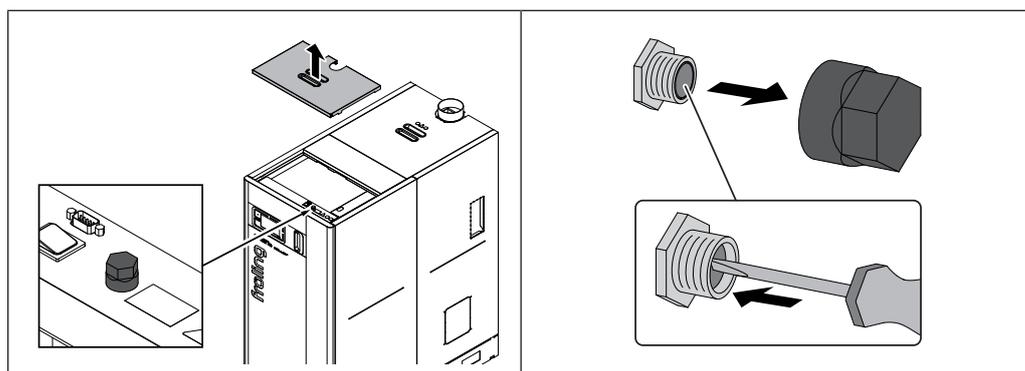
- After a power failure, check whether the STL (high-limit thermostat) has tripped.
- Keep the doors of the boiler closed during and after the power failure, at least until the induced draught fan automatically starts up again.

**EXCEPTION:**

If the boiler operating status was "Heating up", "Pre-heating" or "Ignition" before the power failure, the boiler follows the shutdown procedure and cleaning commences. Only then does the boiler switch to "Preparation" operating status and the system 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:

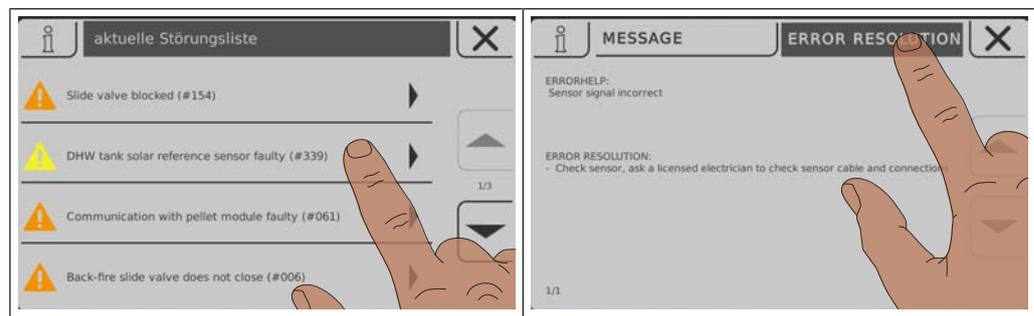
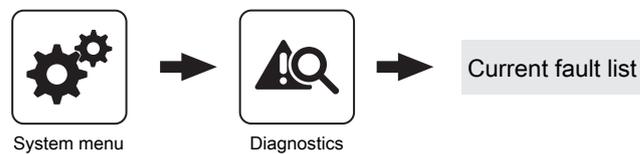
<b>WARNING</b>	In case of warnings the boiler initially continues controlled operation, giving the option of resolving the error quickly to prevent a shutdown.
<b>ERROR</b>	The boiler follows the shutdown procedure and remains in "Boiler off" status until the problem is resolved.
<b>ALARM</b>	An alarm 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.

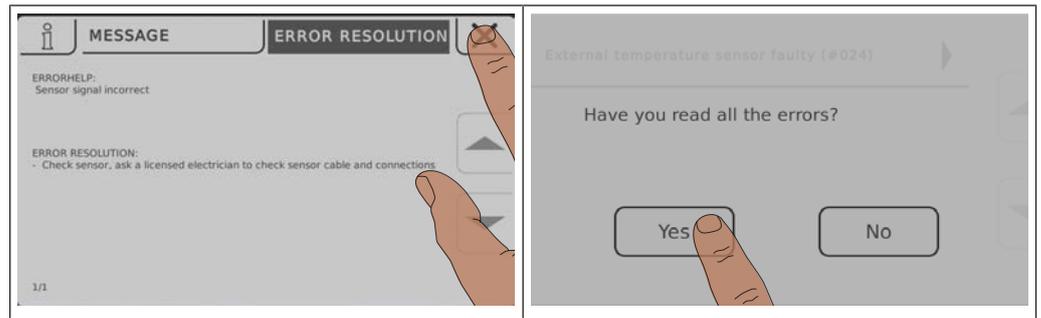
If the fault is acknowledged, although it has not been rectified, the window with the associated fault can be reopened as follows:

#### 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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