Owner´s Manual

Pellet boiler PE1 Pellet 20/35

Read and follow the instructions and safety informations!
Technical changes, typographical errors and omissions reserved!
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1 Supplementary instructions

These instructions ensure safe and efficient use of the PE1 Pellet (hereinafter referred to as the “system"). These instructions are a component part of the system and must be kept next to the system and within the immediate reach of staff at all times.

Staff must carefully read and understand these instructions before commencing all work. All the safety instructions and operating guidelines specified in this manual must be observed to ensure safety at work. In addition, the local accident prevention regulations and general safety regulations apply to the area of application of the system.

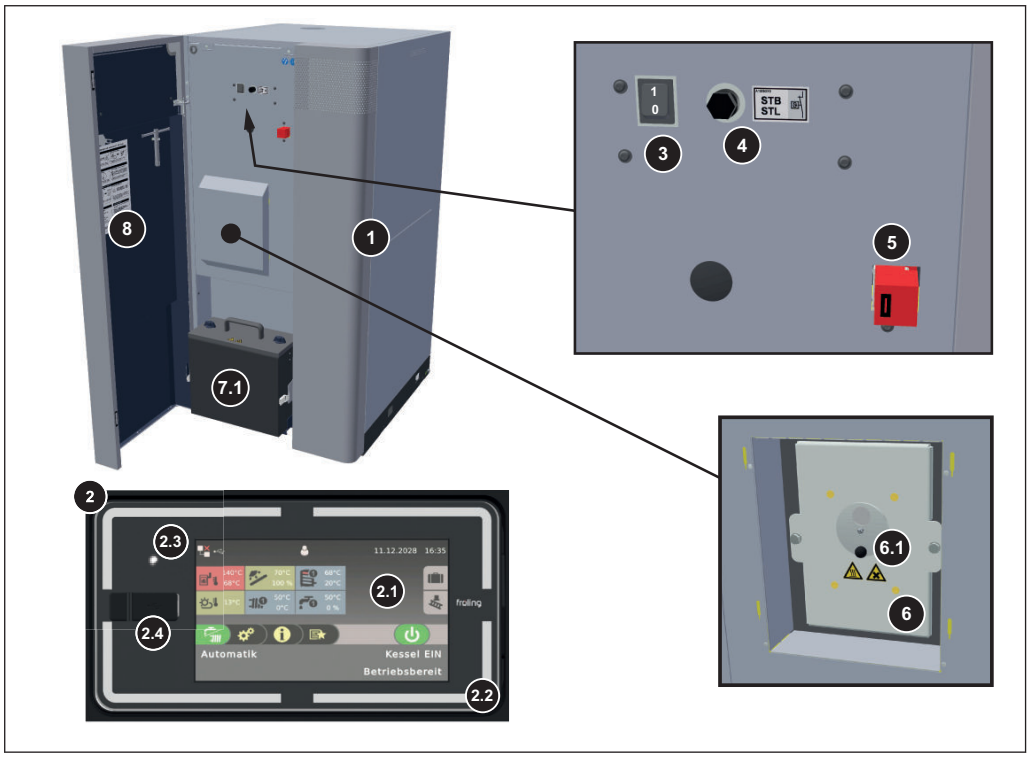
Images in these instructions are intended solely to aid understanding and may differ from the actual design.

NOTICE

SAVE THESE INSTRUCTIONS!

2 Overview

2.1 PE1 Pellet product overview



1	PE1 Pellet pellet boiler
2	Lambdatronic P 3200 boiler controller, ⇨ See "Overview of the touch display" [page 46]
2.1	Large touch screen for displaying/modifying operating statuses and parameters
2.2	Status display (operating status),⇨ See "Status display" [page 47]
2.3	Brightness sensor for automatically adjusting the brightness of the display
2.4	USB port for connecting a USB stick in order to update software
3	Main switch
4	High-limit thermostat (STL)
5	Door switch
6	Maintenance opening for combustion chamber (underneath the cover)
6.1	Inspection glass for checking combustion
7.1	Ash container for automatic ash removal
8	Quick start guide

2.2 Back view

No.	Description	Unit	PE1 Pellet	
			20	35
1	Boiler flow connection	inches	1 IT	
2	Boiler return connection		1 IT	
3	Drainage connection		½ IT	
4	Supply air connection (external diameter)	inches (mm)	80	100
5	Flue gas pipe connection		5 (129)	6 (149)
6	Pellet suction line connection		2 (50)	
7	Return-air line connection		2 (50)	

2.3 Boiler Fabrication and Testing

Your boiler was manufactured by Froling, a world leader in hot water (hydronic) heating for over 50 years. The PE1 Pellet boiler confirms to traditional high standards for quality and reliability. It offers modern wood pellets boiler technology with operating efficiencies at over 90% based on net calorific value of fuel. If treated properly and operated according to the guidelines in this manual it will provide years of safe, dependable and economic heating.

PE1 Pellet boilers are designed and built in accordance with European Standard EN 303-5. The units were safety and performance tested and listed to UL 2523-2013 and CAN/CSA B366.1-2011 (R2015) by OMNI Test Laboratories, Inc; Portland, Oregon. The installer should follow local or state installation requirements.

The PE1 Pellet boiler is a wood pellets boiler designed and constructed for highly efficient combustion of wood pellets.

Do not burn other fuels in the PE1 Pellet boiler. The PE1 Pellet boiler is not a self contained weather-tight boiler. It should be installed within the heating building. PE1 Pellet boilers should be installed with a thermal storage system to prevent short-cycling of the boiler during periods when the building is not calling for heat.

2.4 Models and Application

Two PE1 Pellet boiler models are available (20, 35) covering an output range of 68,200 Btu/hr and 119,500 Btu/hr. Specification data for each PE1 Pellet boiler is approved in the Owner´s Manual and Assembly Instrustions. The boiler can be used either as a single heat source or in parallel with another boiler.

2.5 Short description

The PE1 Pellet boiler is a boiler that produces useful heat for heating space and preparing hot water. The boiler uses wood pellets for fuel.

The pellets are transported by the suction turbine via the suction hoses into the large hopper. The pellets are transported to the downpipe with the stoker screw and fall in a metered quantity onto the combustion grate of the sturdy steel combustion chamber. Hot air is added by the automatic ignition rod to ignite the pellets.

The heat generated during combustion is used in the heat exchanger to heat the water. The flue gases produced during the combustion process are channeled outside through the chimney.

The movement of the integrated spiral springs automatically cleans the heat exchanger, maintaining the high operating efficiency. The ash from the steel combustion chamber falls through an automatic sliding grate into ash chamber, where it is transported via the ash screw into large ash containers.

3 Safety

3.1 Explanation of symbols

Safety information

Safety information in these instructions is indicated by symbols. The safety information is preceded by signal words which reflect the extent of the risk.

⚠ DANGER **This symbol and signal word combination indicates a hazardous situation which will lead to death or serious injury if it is not avoided.**

⚠ WARNING **This symbol and signal word combination indicates a hazardous situation which could lead to death or serious injury if it is not avoided.**

⚠ CAUTION **This symbol and signal word combination indicates a hazardous situation which could lead to slight or minor injuries if it is not avoided.**

NOTICE **This signal word indicates important, but not safety-related information e.g. damage to property or pollution**

Safety information in operating instructions

Safety information can refer to certain, individual operating instructions. To avoid disrupting the flow of the text when you are performing the action, this safety information is not incorporated in the operating instruction. The signal words set out above are used.

Example:

- ❒ Undo screw
- ❒ **CAUTION! Pinching hazard at cover**
  Take care when closing the cover.
- ❒ Tighten the screw

Special safety information

The following symbols are used to draw your attention to particular hazards

Tips and recommendations

Italics indicate useful tips and recommendations as well as information for efficient and smooth running.

Other markers

The following markers are used in these instructions to highlight operating guidelines, results, lists, references, and other elements:

Marker	Explanation
❒	Step-by-step operating instructions
➥	Results of actions
⇛	Links to sections of these instructions and other relevant documents
▪	Lists without a specified order
[Button]	Operating elements (e.g. button, switch), display elements (e.g. signal lights)
“Display“	Screen elements (e.g. buttons, assignment of function keys)

Units used

All units of measure are specified in these operating instructions in both SAE units and SI units. The SAE unit appears first, followed by the SI unit in brackets.

Example using information about heat output: 17 (5) BTU/h (kW) equals
17 BTU/h (SAE system) or 5 kW (SI system).

3.2 Permitted uses

The Froling PE1 Pellet boiler is intended exclusively for heating up heating water. Only use those fuels specified in the “Permitted fuels” section.

Permitted use includes compliance with all the specifications in this instruction manual.

Any use other than or above and beyond the permitted use is considered misuse.

3.3 Requirements at the place of installation

3.3.1 Approval for the heating system

The appropriate supervisory authority (inspection agency) must always be informed when installing or modifying a heating system, and authorization must be obtained from the building authorities. Also observe ANSI/NFPA 211 and CAN/CSA B365 for the installation.

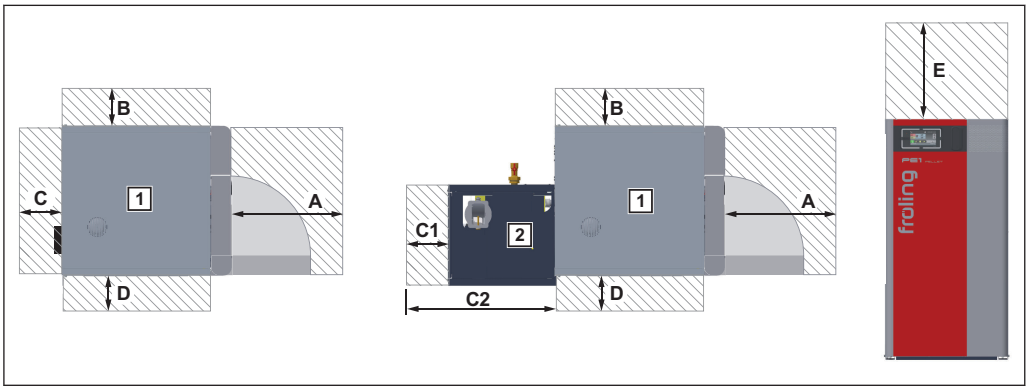
3.3.2 Space required

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

FOR SAFE INSTALLATION AND OPERATION CLEARANCES TO COMBUSTIBLES MUST BE MAINTAINED.

The diagram below shows the required space for the system in the boiler room.

The boiler may only be installed on non-combustible floor with these clearances!



	PE1 Pellet 20	PE1 Pellet 35
A	24 inches (600 mm)	
B	12 inches (300 mm)	
C	12 inches (300 mm)	
C1	9.8 inches (250 mm)	
C2	39.5 inches (750 mm)	31.1 inches (790 mm)
D	3.9 inches (100 mm)	
E	19.7 inches (500 mm)[1)]	

1. Maintenance area to expand the WOS springs upwards

3.3.3 Requirements for central heating water

Water quality

Water of the following quality is required for the first fill:

- The water must be clean, pure or purified as well as odorless and must not contain suspended matter.
- The water hardness must not exceed 190 grain/fl.oz. or 100 ppm $CaCO_3$ (100 mg/L), i.e. soft water is required.
- The chlorine concentration in the water must not exceed 58 grain/fl.oz. (30 mg/L).
- The pH value in the heating system must be between 8.0 and 8.6.

- If the water quality is too poor, use additives to prepare the water. If you are topping up with small amounts, always use clean water.

NOTICE

The hot water must not be used directly in swimming pools or thermae. Use a heat consumer of the right size to consume the heat. Do not use the heating water as drinking water.

To ensure good water quality during operation, avoid leaks and use a closed heating system. If necessary, use a return temperature control.

First fill

To prevent air from getting into the heating system during the first fill, fill the filling hose with water.

Frost protection

You can add anti-freeze to the heating water, however, this can reduce the heating efficiency. Always follow the manufacturer's dosing instructions when using anti-freeze, as using the incorrect amount can cause corrosion. Check the concentration of the anti-freeze at regular intervals.

3.3.4 Ventilation requirements for boiler room

Introduction

The external combustion air must meet certain requirements to ensure that adequate combustion air is supplied to the boiler and no by-products from the combustion get into the boiler room.

Ventilation air for the boiler room must be taken from and expelled directly outside, and the openings and air ducts must be designed to prevent weather conditions (e.g. from foliage or snowdrifts), plants or animals from obstructing the air flow. Permanent ventilation is required to ensure that the boiler runs smoothly.

In North America there are several regulations which govern the minimum requirements of combustion air for chimneys.

The boiler must be installed in such a way that it receives adequate ventilation and combustion air and that the fuel in the boiler burns. The exhaust air must be expelled safely outside via the chimney and maintained within a safe temperature range.

Boiler rooms are usually so small that normal ventilation does not provide enough air and air must be brought in from outside. External air openings and air channels must be of an appropriate size to supply adequate combustion air. The design must comply with NFPA 211.

Consult your local chimney inspector for the installation and install the boiler in accordance with the applicable local regulations.

Recommended size of air openings according to NFPA 54 and NFPA 211:

The boiler requires a fresh air supply of between 1 sq.in. per 2,500 BTU/h and 1 sq.in. per 4,000 BTU/h (550 mm²/kW and 880 mm²/kW), depending on local conditions and the climate zone. Local conditions may necessitate an additional air supply.

3.3.5 Requirements for the heating system

- The whole heating system must be designed in accordance with relevant national and local regulations.
- The boiler's nominal load must be adjusted to the calculated heating requirements of all the consumer loads connected in the heating circuit in summer and winter.
- The heating system must be big enough to transport the heat generated by the boiler and an additional heat source (if present). The pressure throughout the whole system including all heating zones must be even.
- Special equipment must be available for filling and ventilating the heating circuit.
- All fitted pipes must be water-tight and air-tight and insulated for safety reasons.
- If there is a risk of parts of the heating system freezing, add anti-freeze to the water in these heat zones.

3.3.6 Requirements for the installation room (boiler room)

- There must not be a potentially explosive atmosphere in the boiler room as the boiler is not suitable for use in potentially explosive environments!
- The boiler room must be frost-free!
- The boiler does not provide any light, so the customer must ensure sufficient lighting in the boiler room in accordance with national workplace design regulations!
- When using the boiler at an altitude higher than 2,000 meters above sea level the manufacturer must be contacted!
- Fire hazard due to combustible materials!
  Never store flammable substances near the boiler. Never place flammable objects (e.g. clothing, etc.) on the boiler to dry.
- Damage due to impurities in combustion air!
  Do not use any solvents or cleaning agents containing chlorine in the boiler room.
- Keep the air suction opening of the boiler free of dust!

⚠ WARNING **Do not store fuel within installation clearances!**

3.3.7 Requirements for the fuel store

- The fuel store must be protected against the direct effects of weather.
- Before refilling the fuel store, check for pellet dust and clean if necessary.
- When fans are used in the fuel storage area, they should be installed so as not to create negative pressure in the rom where the solid-fuel-burning appliance is located.

3.3.8 Hose lines

For the hose lines used with the suction device, the universal suction systems, and the silo delivery unit, please observe the following:

Fuel delivery hose must be supplied by your local Froling boiler representative and must be manufactured according to ISO 3994 (specifies requirements for helical thermoplastic reinforced hoses) and certified to UL 94 HB (flammability of plastic materials).

3.3.9 Combination with a storage tank

A storage tank does not need to be used for the heating system to run smoothly. However, we recommend that you use the system with a storage tank to ensure a continuous supply of fuel in the boiler's ideal output range.

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

3.3.10 Requirements for the chimney connection

The chimney connection must be big enough to channel flue gases from the building. The whole flue gas system must be designed to prevent possible seepage, insufficient feed pressure and condensation.

The manufacturer recommends fitting a draft regulator to limit the pressure to 0.10 mm WC (25 Pa). The draft regulator should be fitted directly below the chimney connection where the pressure is very low.

The boiler must be connected to a brick chimney or a shop-made chimney in accordance with UL 103 HT (ULC S629 in Canada). The chimney must be clean and in good condition at the time of installation.

The pipe unions within the chimney must be made of stainless special steel (with 304, 316 or 321 alloys). The individual pipe sections must be joined together with at least three self-tapping screws and the joins sealed using high-temperature silicone. The flue gas pipe must not contain more than two 90° bends.

All connections must conform to NFPA 211. Consult your local chimney sweep for the installation and install the boiler in accordance with the applicable local regulations.

The chimney connection, ventilation ducts and fresh air openings must not be closed over or blocked.

The flue gas pipe must not be displaced by an attic, loft, fuel store or similar areas.

Basic data for designing the chimney connection

Description		PE1 Pellet	
		20	35
Flue gas temperature at nominal load	°C	150	160
	°F	300	320
Flue gas temperature at partial load	°C	100	100
	°F	210	210
Flue gas mass flow at nominal load	kg/h	52	90
	lb/h	115	198
Flue gas mass flow at partial load	kg/h	20	40
	kg/s	44	88
Required feed pressure at nominal load	Pa	5	
	in WC	0.03	
Required feed pressure at partial load	Pa	2	
	in WC	0,012	
Maximum permissible feed pressure	Pa	30	
	in WC	0.10	
Flue pipe diameter	inches	5	6
	mm	129	149
Supply air connection for room air-independent operation	Inches	3	4
	mm	80	100
Combustion air volume at nominal load	m³/h	39	68
	ft³/h	1377	2401

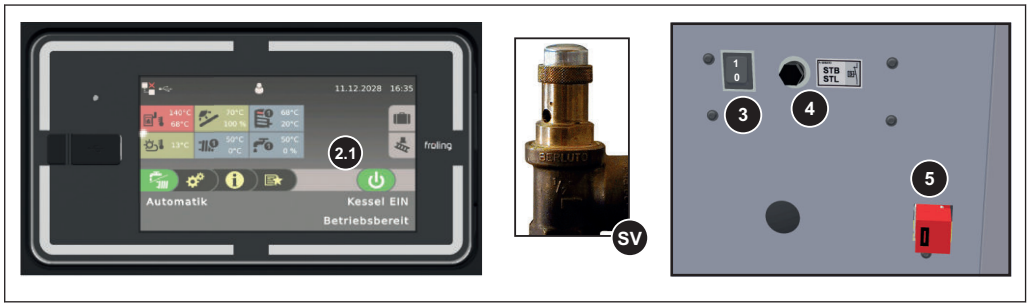
⚠ CAUTION

ADJUSTMENT OF THE FLUE DRAFT HIGHER THAN 0.10 INCHES WATER CLOUMN (25 Pa) COULD CAUSE FIRE TO BURN OUT OF CONTROL AND CAUSE AN UNSAFE CONDITION!

❒ Maximum permitted setting: 0.10 inches WC (25 Pa)
Ideal setting: 0.04 inches WC (10 Pa)

3.4 Safety devices

3.4.1 Position of safety devices



2.1 **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

3 **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

4 **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.

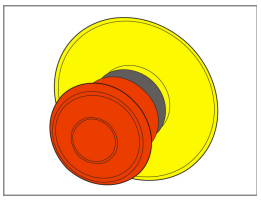
5 **DOOR SWITCH** *(protection against access to moving components)*

If the insulated door opens while the boiler is operating, all units stop in order to prevent injuries that may be caused by moving components. If the insulated door remains open for more than 10 seconds, the boiler is switched off automatically.

SV **SAFETY VALVE** *(protection against overheating/excess pressure)*

When the boiler pressure reaches a maximum of 2 bar, the safety valve opens and the heated water is blown off in the form of steam.

3.4.2 Description of safety devices



Emergency stop button (optional)

Pressing the emergency stop button stops the entire boiler (fuel infeed, combustion process in the boiler and the blower fan). Only the pump in the heating circuit continues to run to be able to dissipate the residual heat. The emergency stop button is on the same safety chain as the high-limit thermostat.

After an emergency stop button has been pressed, it must be released again by turning it and the fault acknowledged at the SPS so that you can turn the heating system back on again.

The system is controlled via the Lambdatronic P 3200. The "*Boiler OFF*" command allows you to switch off the boiler in the event of overheating. After the boiler has been switched off via the control system, automatic mode is switched off and the control shuts the boiler down according to the shutdown procedure. The pumps continue to run.

Safety valve (provided by the customer)

Depending on the boiler type which is use, different kinds of pressure values of the safety valves are necessary! When the boiler reaches a pressure of 30 psi (2 bar), 43.5 psi (3 bar) or 45 psi (3 bar) the safety valve opens and the heated water is blown off in the form of steam.

Technical specifications

3.5 Safety markers

3.5.1 Mandatory signs

Refer to the operating instructions

Only use the indicated system once you have read the operating instructions.

Wear hearing protection

This sign indicates that hearing protection must be worn in the area concerned.

Wear protective gloves

This sign indicates that protective gloves must be worn in the area concerned.

Wear safety shoes

This sign indicates that safety shoes must be worn in the area concerned.

Wear a dust mask

This sign indicates that a dust mask must be worn in the area concerned.

Keep the doors closed

Keep the doors closed during operation.

Turning off the main switch

Switch off the main switch and take precautions to prevent accidental switching on before carrying out work to the system

Switch off the main switch for the fuel infeed and take precautions to prevent accidental switching on before entering the fuel storage room.

Securing the main switch

Switch off the main switch and secure with a padlock when carrying out maintenance work to the boiler.

3.5.2 Prohibitions

Unauthorized access prohibited

Only persons authorized by the operator may enter the danger zone and fuel storage room. Keep children away! Keep the fuel storage room locked and keep the access key in a safe place. Protect the fuel from moisture.

No fire, open flames or smoking

Areas marked with this are at risk of fire or explosion. Keep ignition sources away from these areas.

3.5.3 Warning signs

Risk of falling

There is a risk of falling when working at heights in the fuel storage room or on components of the fuel infeed. Use a suitable ladder or hoist for all work.

Automatic start-up

This sign indicates that there is a risk of the system starting up automatically. Work may only be carried out in areas with this marking if the system has been secured.

Electric current

Only licensed electricians may work in workspace with this marking.

Unauthorized persons are not permitted to enter work areas with this marking or open the cabinet with this marking.

Risk of collapse

There is a risk of collapse and being buried alive as a result of cavity formation in the fuel storage room. Never step on piles of fuel.

Harmful or irritant materials

These materials can be irreparably harmful to health, trigger allergic reactions or irritate the mucous membranes.

Observe the information on the packaging and containers.

Danger from carbon monoxide

There is a risk of poisoning from a possible concentration of carbon monoxide in the fuel storage room and boiler room. Ventilate the fuel storage room for at least 15 minutes before entering. Two people must always be present when working in the fuel storage room. The access door must be kept open at all times. Also wear a dust mask because of the high dust levels.

Hand injuries

Keep hands away from areas bearing this warning.

There is a risk that your hands could get trapped, pulled in or otherwise injured.

Hot surfaces

Hot surfaces, such as hot system parts, may not always be obvious. Do not touch these parts without protective gloves.

Crushing hazard

Keep hands away from areas bearing this warning.

There is a risk that your hands could get trapped, pulled into or otherwise injured in automatic screws.

Risk of falling

There is a risk of falling in the fuel store because of slippery surfaces or fuel lying about. Take extreme care and wear personal protective equipment.

Risk of injury at fans

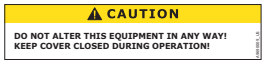
Keep hands away from areas bearing this warning.

There is a risk that your hands could get trapped, pulled into or otherwise injured in automatic fans.

Risk of being buried alive

There is a risk of being buried alive in the fuel storage room. Keep out of the fuel storage room, especially during filling.

3.5.4 Additional safety signage



Warning sign for covers

Do not modify the system peripherals. The covers must be kept shut during operation.

3.5.5 Signage on the boiler

Notice of risks during installation

PE1 PELLET - WOOD PELLET FIRED BOILER

INSTALLATION HAZARDS

Install, modify and use only in accordance with manufacturer's manuals. Refer to authorities having jurisdiction for proper installation. Contact local building and fire officials about restrictions and installation inspection in your area. If there are no applicable local codes, follow ANSI/NFPA 211 and CAN/CSA B365. Special precautions are required for passing the chimney through a combustible wall or ceiling.
Inspect and clean exhaust system, heat exchanger, burner, pellet hopper and ash boxes frequently in accordance with owner's manual.

Basic boiler data for layout of chimney system		PE1 PELLET	
Quantity	**Unit**	**20**	**35**
Flue gas temperature Rated / partial load	°F °C	300 / 210 150 / 100	320 / 210 160 / 100
Minimum draft at boilers flue gas connection		0.03 inches water column (5 Pa)	
Maximum draft at boilers flue gas connection		0.10 inches water column (25 Pa)	
Flue gas connector Diameter		5 inches (129 mm)	6 inches (149 mm)
Maximum water temperature	°F °C	194 90	
Maximum allowable working pressure		30 psi (2 bar)	

For detailed design information please refer to Installation Manual! For unit specifications, see Listing Label! For supply connections use No. 14 AWG (2.1mm²) or larger wires acceptable for at least 194°F (90°C). Use copper. Use regular overcurrent protection device 15 AMP, two phases (L1 & L2).

DANGER!

- Working on electrical components may cause severe injuries from electric shocks!

WARNING!

- The electrical system of the boiler shall be supplied from a double 115 V 60 Hz (nominal 230 V AC) 15 amp branch circuit including neutral and earth connection. For wiring instructions please refer to Installation Manual!
- Chimney must be 5" (129mm – PE1 Pellet 20) or 6'' (149 mm – PE1 Pellet 35) diameter listed UL-103 HT or ULC-S629 residential all-fuel type or tile-lined masonry. Flue connector pipe must be 5" (129mm – PE1 Pellet 20) or 6'' (149 mm – PE1 Pellet 35) diameter made of a minimum 24 MSG black steel.
- Inadequate design, installation and maintenance of the flue gas system will lead to insufficient chimney draft and could result in Danger of Life or Severe Injury caused by serious faults in combustion, e.g. explosively combustion of carbonization gases and flash fires!
- This boiler requires fresh air for safe operation and must be installed so there are provision for adequate combustion and ventilation air!

CAUTION!

- DO NOT CONNECT THIS UNIT TO A CHIMNEY FLUE SERVING ANOTHER APPLIANCE!
- LOAD FUEL CAREFULLY OR DAMAGE MAY RESULT.
- REFER TO OWNER´S MANUAL. DO NOT ALTER THIS EQUIPMENT IN ANY WAY.
- UNSAFE TO ADJUST FLUE DRAFT HIGHER THAN 0.10 INCHES WATER COLUMN (25 Pa)
- MAY BE CONNECTED TO AN EXISTING BOILER SYSTEM.
- Flooring must be a minimum 3/8'' (10 mm) non-combustible material covering the installation clearance area! The floor must be level and reinforced if required. For construction of the floor beneath the boiler mind the weight of boiler, water content and wood fuel according to the Installation Manual!
- This boiler is for use with an automatic stoker only!
- Use original spare parts only. Installation of non-licensed replacement parts will void the warranty!

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Notice of risks during operation

PE1 PELLET - WOOD PELLET FIRED BOILER

OPERATION HAZARDS

NOTICE! Burn Wood Pellets only as specified in Owner's Manual!

Pellet Fuel Institute (PFI) "Super Premium" or "Premium" recommended.

DANGER! Risk of Fire or Explosion!

- Do not burn garbage, gasoline, drain oil, or other flammable liquids.
- DO NOT BURN GARBAGE, GASOLINE, NAPHTA, ENGINE OIL, OR OTHER INAPPROPRIATE MATERIALS!
- DO NOT USE CHEMICALS OR FLUIDS TO START UP THE FIRE.
- Use of inappropriate fuels can result in Danger of Life or Severe Injury caused by explosive combustion and flash fires!
- Burning fuels other those designated in the manual will void the warranty!

DANGER! Explosive Gases!

- Never open Boiler doors, Covers or Heat Exchanger Cask Cover during operation!
- Faulty operation of boiler system will cause Danger of Life or Severe Injury and Material Damage!
- TO AVOID INJURY FROM MOVING PARTS; SHUT OFF BOILER CONTROL SYSTEM BEFORE OPENING BOILER DOORS, AND COVERS!

WARNING! Risk of Fire!

- Do not burn garbage, gasoline, drain oil, or other flammable liquids or materials.
- KEEP ALL BOILER DOORS, FUEL STORAGE DOOR AND ALL COVERS TIGHTLY CLOSED DURING OPERATION!
- AFTER OPENING BOILER DOORS AND COVERS; CLOSE ALL DOORS AND COVERS TIGHTLY!
- DO NOT OPERATE WITH FLUE DRAFT EXCEEDING 0.10 INCHES WATER COLUMN (25 Pa)!
- Do not operate with flue draft exceeding 0.10 inches in water column (25 Pa).
- UNSAFE TO ADJUST FLUE DRAFT HIGHER THAN 0.10 INCHES WATER COLUMN (25 Pa)!
- THE HEAT EXCHANGER, DRAFT INDUCER, FLUE PIPE, AND CHIMNEY MUST BE CLEANED REGULARLY TO REMOVE ACCUMULATED CREOSOTE AND ASH. ENSURE THAT THE HEAT EXCHANGER, FLUE PIPE, AND CHIMNEY ARE CLEANED AT THE END OF HEATING SEASON TO MINIMIZE CORROSION DURING THE SUMMER MONTHS. THE APPLIANCE, FLUE PIPE, AND CHIMNEY MUST BE IN GOOD CONDITION. THESE INSTRUCTIONS ALSO APPLY TO A DRAFT INDUCER IF USED.
- Do not store fuel or other combustible material within marked installation clearances!
- Faulty operating conditions not complying with Owner's Manual, such as insufficient combustion air, incorrect or insufficient cleaning and maintenance or non-permitted fuel could result in Danger of Life or Severe Injury caused by serious faults in combustion (e.g. spontaneous combustion of carbonization gases or flash fires)!
- Inspect and clean flues and chimney regularly!
- First firing during start-up of boiler system shall be carried out in attendance of an authorized installer or manufacturer's representative only! Disregarding of warning may cause damage or explosion of combustion chamber and severe injuries unfavorably!

CAUTION! Hot surfaces!

- Hot parts and the flue pipe can cause serious burns!
- Do not touch during operation.
- Maximum draft marked on nameplate.
- Unauthorized access to the boiler room and pellets store could result in personal injury and damage to property!
- FOR SAFETY KEEP FIRING AND ASHPIT DOORS TIGHTLY CLOSED.
- Keep children away.
- Always use protective gloves during maintenance.
- Always use control handles when open boiler doors.
- Insulate flue pipe and do not touch during operation.
- Do not carry out maintenance when the boiler is hot.
- Do not touch hot surfaces behind Boiler doors and Covers.

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Notice regarding procedures in an emergency

PE1 Pellet – WOOD PELLET FIRED BOILER

EMERGENCY PROCEDURES

⚠ DANGER! In case of strong smell of flue gas!

Flue gases can cause fatal poisoning!
- Do not open any boiler doors or covers, or fuel transportation system door or covers!
- Turn off the boiler by pressing “Boiler OFF” (⏻)
- Air the room where boiler is installed!
- Close the door of the boiler room and doors to living areas!

⚠ DANGER! In the event of loss of electrical power!

- Do not open any boiler doors or covers, or fuel transportation system doors or covers!
- Boiler Control automatically restarts after power fail restart.
- Half an hour after power has returned, check system for normal operation and compare the pressure gauge reading to initial settings. If system pressure is low, replenish water to the heating system according plumber’s instructions.

⚠ DANGER! In the event of runaway fire!

- Call the fire department!
- Turn off Emergency Switch, if installed.
- Do not open any boiler doors or covers, or fuel transportation system doors or covers!
- Do not switch off Main switch at Boiler!
- Evacuate your house.
- If possible, wet your entire roof with a garden hose.
- When there is no more risk of runaway fire, turn on Emergency Switch and resume to normal operation of the system.

To cool overheated boiler (over 220°F / 105°C)!

- Turn off Emergency Switch, if installed.
- Do not open any boiler doors or covers, or fuel transportation system doors or covers!
- Turn off boiler by pressing “Boiler OFF” (⏻)
- Open all mixer taps, switch on all pumps.
- Leave the boiler room and close the door.
- Open all hot water faucets.
- Turn all thermostats in your house to their highest temperature settings and open all windows if room heat is too hot
- When boiler temperature has dropped below 180°F (82°C), reverse the above steps.
- In case Safety Temperature Limit Switch automatically has been activated please refer to Owner’s Manual.

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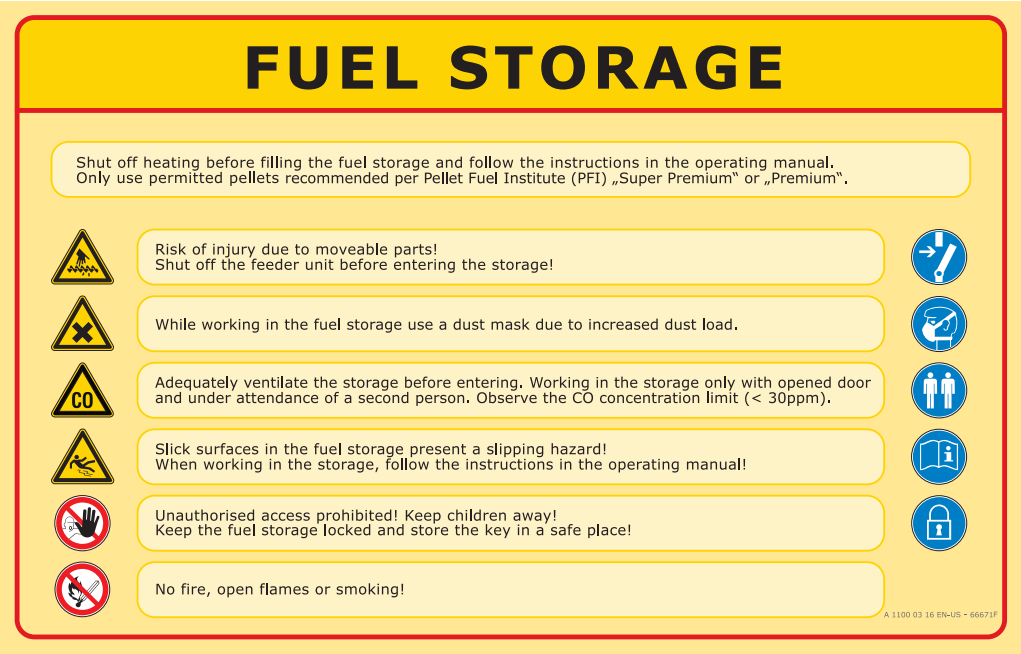
3.5.6 Sign on fuel store

The following signage must be posted in the access area of the fuel store. It explains the correct fuel store procedures.



3.6 Residual risks

The system has been designed to the state of the art and in accordance with current safety requirements. There are, however, still some residual risks which require care and attention. The residual risks and consequential procedures and measures are listed below.

3.6.1 Basic risks

Incorrect operation

⚠ WARNING

Risk of injury from operating the system incorrectly!

❒ Modifications to the control system must only be undertaken in consultation with the manufacturer.

➥ Modifying parameters on the control system can cause malfunctions.

Noise

⚠ WARNING

Hearing loss from noise!

❒ Always wear hearing protection when working around the discharge system

➥ Depending on the discharge system and fuel, the noise level inside the discharge system can reach over 80 dB(A) during transportation of the fuel.

Risk of falling

⚠ WARNING

Risk of falling when working close to the boiler!

- ❒ When working on ladders, always ensure that the ladder is securely positioned on a firm and even surface.
- ❒ Always observe the relevant safety regulations when working with a hoist.
- ❒ Never step on the boiler.

➥ Careless work on ladders or hoists during installation, maintenance and repair work can cause injury.

Working in the fuel store

⚠ WARNING

Risk of injury when carrying out work in the fuel store

- ❒ Switch the boiler off at the control system before entering the fuel store.
- ❒ Turn off the boiler's main switch.
- ❒ Never climb onto piles of fuel.
- ❒ For safety reasons never work in the fuel store alone. Take another person with you.
- ❒ Always wear personal protective equipment for work (protective clothing, safety shoes, protective gloves, dust mask, protective goggles).
- ❒ Also observe the information on the notice on the access door to the fuel store.

➥ Piles of fuel are at risk of caving in if you stand on them when working in the fuel store. There is also a risk of poisoning due to an increased concentration of carbon monoxide in the air.

Dirt and objects lying around

⚠ CAUTION

Risk of injury from stumbling on dirt or objects lying around!

- ❒ Always keep the boiler room clean and tidy.
- ❒ Take any items no longer required out of the boiler room and, in particular, remove from ground level.

➥ Dirt and objects lying around the boiler room constitute a risk of slipping and tripping. Falling can result in injury.

3.6.2 Risks from electricity

Electric current

DANGER

Risk of death from electrocution!

- ❒ Only allow licensed electricians to carry out electrical work to the electrical system.
- ❒ If the isolation gets damaged, switch off the power supply immediately and have it repaired.
- ❒ Prior to commencing work to active parts, shut off electrical systems and equipment so that they are no longer live and secure so that they remain off for the duration of the work. Follow the five safety rules:
  - Disconnect.
  - Secure against switching back on.
  - Check the system is no longer live.
  - Earth and short circuit.
  - Cover or shield any adjacent live parts.
- ❒ Never bypass or disable fuses. When replacing fuses, use the correct amperage.
- ❒ Always lay lines and cables far away from hot surfaces.
- ❒ Use shielded cables when using frequency converters.
- ❒ Ensure that the system is properly earthed with a protective earth system. Have all component assemblies checked at regular intervals to ensure the correct earthing.
- ❒ Keep moisture away from live parts. This can cause short circuits.
  - ➥ Touching live parts can cause immediate death by electrocution. Damage to the isolation or individual components can be perilous.

Static electricity from charge

CAUTION

Risk of injury from residual electrostatic potential!

- ❒ Always proceed with caution when working in the fuel storage room and wear personal protective equipment (protective clothing, safety shoes, protective gloves).
  - ➥ Electrostatic potential can build up when pellets are being blown in. Touching pellets in the fuel storage room can, therefore, result in injury.

3.6.3 Danger from movement of the system

Automatic start-up

WARNING

Risk of injury from automatic start-up!

- ❒ Before doing any work, switch the boiler off at the control system.
- ❒ Switch off the main switch and take precautions to prevent accidental switching on.
  - ➥ There is a risk of serious injury from the system starting up automatically if it is switched on during inspection and cleaning.

Screw movement

WARNING

Risk of injury from getting crushed, trapped and caught in moving screws!

- ❒ Never step onto the screws (if present) in the fuel store.
- ❒ Never reach into the transport screw of the fuel infeed or the ash discharge screws (if present) when they are running.
- ❒ Never bypass limit switches and fuses.
- ❒ Switch off the boiler at the control system and allow it to cool before carrying out work on the screws.
- ❒ Always wear personal protective equipment for work (protective clothing, safety shoes, protective gloves).
  - ➥ Moving screws can catch on parts of clothing or long hair and clamp or sever body parts, resulting in serious injury or death.

3.6.4 Danger from fire and explosion

Risk of fire and explosion

WARNING

Risk of fire and explosion around the boiler!

- ❒ DO NOT BURN GARBAGE, GASOLINE, NAPHTA, ENGINE OIL OR OTHER INAPPROPRIATE MATERIALS.
- ❒ DO NOT USE CHEMICALS OR FLUIDS TO START THE FIRE.
- ❒ DO NOT OPERATE WITH FLUE DRAFT EXCEEDING 0.10 INCHES WATER COLUMN (25 Pa).
- ❒ UNSAFE TO ADJUST FLUE DRAFT HIGHER THAN 0.10 INCHES WATER COLUMN (25 Pa).
- ❒ THE HEAT EXCHANGER, DRAFT INDUCER, FLUE PIPE, AND CHIMNEY MUST BE CLEANED REGULARLY TO REMOVE ACCUMULATED CREOSOTE AND ASH. ENSURE THAT THE HEAT EXCHANGER, FLUE PIPE, AND CHIMNEY ARE CLEANED AT THE END OF HEATING SEASON TO MINIMIZE CORROSION DURING THE SUMMER MONTHS. THE APPLIANCE, FLUE PIPE, AND CHIMNEY MUST BE IN GOOD CONDITION. THESE INSTRUCTIONS ALSO APPLY TO A DRAFT INDUCER IF USED.
- ❒ DO NOT INSTALL IN A MOBILE HOME.
- ❒ Keep covers on the boiler and the access doors to the fuel store closed during operation.
- ❒ Smoking, fire and open flames are not permitted in the fuel store and boiler room.
- ❒ Do not store flammable materials in the boiler room.
- ❒ Do not set flammable objects on the boiler to dry (e.g. clothing).
- ❒ Always ensure that the boiler room is adequately ventilated.
- ❒ Maintain and inspect the heating system at the prescribed intervals. Ensure that the chimney vent is cleaned regularly.
- ❒ Do not use any hydrogen halides or cleaning agents containing chlorine in the boiler room.
- ❒ Observe the safety signs around the system.
  - ➥ Using the boiler incorrectly can cause fire or explosions.

Fire protection

WARNING

Risk of injury from limited or incorrect firefighting!

- ❒ Ensure that all fire extinguishers provided are suitable for the fire class.
- ❒ Test that the fire extinguishers are fit for use every two years or in accordance with the regulations set out by the fire authorities.
- ❒ Refill the fire extinguisher after each use.
- ❒ Only use approved extinguishing agents and spare parts that match the prototype on the fire extinguisher.
- ❒ When using the fire extinguisher, follow the safety and operating instructions on it.
- ❒ Note the operating temperature range when using the extinguisher.
  - ➥ If, in the event of a fire, the fire extinguisher is not fit for use or unsuitable for the specific fire class, this can result in serious injuries or even death and significant damage to property.

Flue gas system

WARNING

Risk of injury and damage to property from obstructing the flue gas system!

- ❒ The chimney is only to be used as an outlet for one heating system.
- ❒ Optimum performance can only be guaranteed if the flue gas system is functioning correctly. It is, therefore, important to have the flue gas system cleaned regularly to ensure that the flue gas can escape properly.
- ❒ Arrange for the chimney sweep to check the chimney connection and chimney for tar oil deposits twice a month during the heating period.
  - ➥ Problems with the flue system, such as poor cleaning of the flue pipe or insufficient chimney escape can cause serious faults in combustion (such as spontaneous combustion of carbonization gases/explosion).

3.6.5 Danger from high temperatures

Hot surfaces

WARNING

Risk of injury from hot surfaces!

- ❒ FOR SAFETY REASONS, KEEP COVERS AND ASH PIT DOORS TIGHTLY CLOSED.
- ❒ Before carrying out any work on the boiler, switch it off at the control system (“Boiler OFF” status) and allow it to cool down.
- ❒ Protective gloves must usually be worn for work on the boiler. Only touch the boiler using the handles provided.
- ❒ Insulate the flue gas pipes and do not touch them during operation.
- ❒ Do not touch system parts and heating pipes during operation.
- ❒ Keep children and unauthorized persons away from the boiler and fuel store.
- ❒ Allow the boiler to cool before carrying out any maintenance work.
  - ➥ Touching hot surfaces on the boiler, on the flue gas pipe and on heating pipes can cause serious burns.

Hot media

WARNING

Risk of scalding from hot media!

- ❒ Temperature modifications in the control system must only be undertaken in consultation with the manufacturer.
- ❒ Do not touch heating pipes and consumer loads in the heating circuit (radiator etc.) during operation.
- ❒ Allow the system to cool before carrying out any maintenance work. Always wear protective gloves when working on the system.
- ❒ Keep children and unauthorized persons away from the heating system.
  - ➥ Heating pipes and consumer loads in the heating circuit can heat up considerably from the hot water. An incorrect setting in the control system means that the water obtained can be extremely hot. Contact with hot water or hot surfaces can cause scalding to skin.

Hot ashes

WARNING

Risk of injury from hot ashes!

- ❒ Always wear protective clothing and protective gloves when working on the system.
- ❒ Before handling ash, check whether or not it is still hot. Allow to cool if necessary.
  - ➥ Ash is extremely hot after the combustion process. Contact can cause serious burns.

3.6.6 Risks from flue gases, incorrect fuel and other equipment

Lubricants

WARNING

Risk of damage to health from lubricants!

- ❒ Always wear protective gloves when handling lubricants.
- ❒ Do not swallow, do not inhale fumes.
- ❒ If you accidentally get lubricant in your eyes, rinse thoroughly with plenty of water and seek medical advice if necessary.
- ❒ Following skin contact wash off thoroughly with plenty of soap and water.
- ❒ Observe the lubricant manufacturer’s safety data sheets.
  - ➥ Contact with lubricants can cause allergies and skin irritations.

Proposition 65

WARNING

CALIFORNIA Proposition 65

This product may contain chemicals known to the State of California to cause cancer and birth defects or other reproductive harm.

Leaking flue gas

WARNING

Risk of poisoning from flue gases in the boiler room!

- ❒ If you smell flue gas keep all the doors on the boiler closed.
- ❒ Switch off the boiler under controlled conditions using the controller.
- ❒ Ventilate the boiler room.
- ❒ Close the fire door and doors to living areas.
  - ➥ Contact with flue gases can cause perilous situations.

Carbon monoxide

⚠ WARNING

Risk of poisoning from carbon monoxide in the fuel storage room!

- ❒ Ensure that there is adequate ventilation before entering the fuel storage room.
- ❒ For safety reasons never work in the fuel storage room alone. Take another person with you.
  - ➥ Carbon monoxide is an odorless gas and, therefore, goes unnoticed. Carbon monoxide can develop from storing pellets in the fuel storage room, and an increased carbon monoxide concentration in the air can pose a risk of poisoning.

Explosive dusts

⚠ WARNING

Risk of death from fire and explosion due to dispersed dust deposits!

- ❒ Do not smoke within or close to the danger zone. Do not work with any kind of naked flame, fire or ignition sources.
- ❒ Keep the danger zone free from dust. Dust deposits over 5 mm thick are not permitted and must be removed.
- ❒ Do not enter the fuel storage room whilst pellets are being blown in.
- ❒ Always wear protective clothing, protective goggles and breathing protection when working in the fuel storage room. Follow the manufacturer's instructions with regard to the requirements of the breathing protection.
- ❒ Stop work immediately in the event of a fire. Leave the danger zone until you get the all-clear and notify the fire brigade.
  - ➥ Dust deposits could catch fire or form an explosive compound if dispersed with the ambient air when blown into the fuel storage room. This can result in serious and even fatal injuries.

Incorrect fuel

⚠ WARNING

Risk of injury and damage to the boiler if the incorrect fuel is added.

- ❒ Only use fuel permitted by the boiler manufacturer.
- ❒ Only store permitted fuel in the fuel store.
- ❒ Never burn corn, cereal, coal, coke, garbage, painted or treated wood, bark, petrol, oil or other flammable liquids in the boiler.
- ❒ Never store fuel or other flammable materials in the boiler room.
- ❒ Never use chemicals, kerosene, charcoal, spirits or other flammable liquids to start or reignite the combustion process in the boiler.
  - ➥ Using the incorrect fuel can cause dangerous malfunctions or damage to the system or the discharge system.

3.7 What to do in the case of danger

What to do if the system overheats (at temperatures above 220°F (105°C))

⚠ WARNING

Risk of injury from switching the system off prematurely at the main switch!

- ❒ To switch the boiler off, switch off automatic mode using “Boiler OFF" at the control system. The boiler follows the controlled shutdown procedure via the control. The system must only be switched off at the main switch once the boiler has cooled down sufficiently.
  - ➥ Switching off the main switch in automatic mode can cause major combustion faults leading to serious accidents.

If the boiler overheats, proceed as follows:

- ❒ Switch the boiler off at the control system.
- ❒ Keep all doors on the boiler and all covers closed.
- ❒ Open all mixing valves; switch on all pumps. The Froling heating circuit control takes on this function in automatic operation.
- ❒ Leave the boiler room and close the access door.
- ❒ Ensure that heat is being consumed. To do this, activate all consumer loads.
- ❒ Open any available radiator thermostat valves.
- ❒ Once the boiler temperature has fallen to 185°F (85°C), return the heating circuit to normal status.

If the temperature does not drop:

- ❒ Inform the installer or Froling customer service.

What to do in the event of a power failure

In the event of a power failure proceed as follows:

- ❒ Keep all the doors and covers on the boiler and on the fuel infeed closed
- ❒ The boiler controller will start again automatically after the restart.
  - ➥ Half an hour after the boiler restart, compare the values in the controller and the values on the pressure gauges with the original values. If the pressure level is too low, add water to the heating system in accordance with the instructions of the heating installer.

In the event of excessive temperature the high-limit thermostat may have triggered. You may have to release this to allow the boiler to restart.

What to do if there is a smell of flue gas

If you smell flue gas, proceed as follows:

- ❒ Keep all doors on the boiler and all covers closed.
- ❒ Switch the boiler off at the control system.
- ❒ Ventilate the boiler room where the boiler is located.
- ❒ Close the fire door and doors to living areas.

What to do in the event of fire

In the event of a fire proceed as follows:

- ❒ Press the emergency stop button (if present).
- ❒ Keep all the doors and covers on the boiler and on the fuel infeed closed
- ❒ Leave the main switch on the control cabinet switched on.
- ❒ Close the fire door.
- ❒ Leave the boiler room and the building.
- ❒ Notify the fire brigade.

3.8 Staff requirements

Risk of injury from inadequate qualification of staff!

⚠ WARNING

Risk of injury from inadequate qualification of staff!

If unqualified staff work on the system, or are within the danger zone of the system, this creates hazards which could cause serious injuries and considerable damage to property.

- ❒ All such activities should be carried out only by suitably qualified staff.
- ❒ Keep unqualified staff away from danger zones.

Definition of staff qualifications

The staff qualifications listed here for the United States are based on the descriptions of professional qualifications in the Occupational Outlook Handbook 2011-12 edition of the United States Department of Labor, Bureau of Labor Statistics.

In this manual, staff qualifications for the various activity areas are named as follows:

Operator

The operator is the person who operates the heating system for commercial or economic purposes by himself or cedes use/application to a third party and bears the legal responsibility concerning the product for the protection of the user or third parties during the operation.

He has been trained by the manufacturers and the suppliers in dealing with the system and its components and can independently detect potential hazards and avoid the associated risks.

Froling customer service or an authorized partner

The Froling customer service or its authorized partner is able to perform the tasks assigned to it and recognize and avoid possible dangers thanks to its professional, product-related training, knowledge and experience as well as its knowledge of the relevant local regulations.

Heating system installer

The heating system installer has demonstrably received specific instructions by the manufacturer regarding the tasks entrusted to him and potential dangers associated with improper conduct. The heating system installer must have read and understood these instructions. The heating system installer must have undertaken training and have professional experience of at least one year in his field of application.

The skills of the heating system installer include:

- ❒ Understanding technical contexts

- ❒ Reading and understanding technical drawings and diagrams
- ❒ Installing system components
- ❒ Installing and connecting of heating lines
- ❒ Performing maintenance work
- ❒ Dismantling and repairing or replacing system components, if a problem occurs

Licensed electrician

Thanks to his training, knowledge, experiences and knowledge of relevant standards and provisions the licensed electrician is capable of performing the following tasks on electrical systems professionally and according to safety requirements:

- ❒ Planning and connecting electrical systems based on circuit and current flow diagrams
- ❒ Assembling pipes and connecting electric components
- ❒ Analyzing, measuring and testing electrical systems and functions
- ❒ Performing safety checks on electrical systems, components and devices
- ❒ Troubleshooting electrical systems

The licensed electrician is able to independently recognize and avoid hazards associated with these works.

Chimney sweep

The chimney sweep is able to perform the tasks assigned to him and recognize and avoid possible dangers thanks to his professional training, knowledge and experience as well as his knowledge of the relevant standards and regulations.

The skills of the chimney sweep include:

- ❒ Understanding technical contexts
- ❒ Reading and understanding technical drawings and diagrams
- ❒ Checking heating, flue gas and ventilation systems as well as fuel stores for proper operation and fire safety
- ❒ Cleaning heating plants, smoke ducts and ventilation systems
- ❒ Knowledge of provisions under building law and environmental protection law, as well as knowledge in the field of energy efficiency, fire protection and climate protection
- ❒ Performing seal checks

Basic requirements

Only persons expected to carry out their work reliably are admitted as staff member. Persons whose ability to react is influenced, e.g. by drugs, alcohol or medication, are not permitted.

When choosing staff, observe the applicable age and profession-specific regulations on site.

Unauthorized

⚠ WARNING

Risk of death for unauthorized persons due to hazards in the danger zone and work area!

- ❒ Keep unauthorized persons away from the danger zone and work area.
- ❒ In case of doubt, address the persons and direct them to leave the danger zone and work area.
- ❒ Suspend the work as long as there are unauthorized persons in the danger zone and work area.
  - ➥ Unauthorized persons that do not meet the requirements described here, do not know the dangers in the work area. Therefore, unauthorized persons are exposed to risk of serious injury and even death.

Instruction

The operator must regularly instruct the staff. For the purposes of traceability, you must create a training log containing the following at minimum:

- ❒ Date of training
- ❒ Name of the trainees
- ❒ Contents of the training
- ❒ Name of the instructor
- ❒ Signatures of the trainees and the instructor

3.9 Personal protective equipment

Personal protective equipment is used to protect persons from compromised health and safety at work.

During the various types of work to and with the system the staff must wear personal protective equipment which is set out separately in the individual sections of this manual.

Description of the personal protective equipment

The personal protective equipment is as follows:

Protective workwear:

Protective workwear is tight-fitting work clothing with low tear resistance, narrow sleeves and without any protruding parts.

Protective goggles

Protective goggles are used to protect the eyes from flying parts when cleaning the system.

Protective gloves

Protective gloves are used to protect the hands against friction, abrasion, puncture, or deeper injuries and contact with hot surfaces.

Safety shoes

Safety shoes protect feet from crushing and falling parts as well as from sliding on slippery surfaces.

Dust mask

The dust mask is used for protection against dust when cleaning the system and when working in the fuel store.

3.10 Replacement parts

Incorrect replacement parts

⚠ WARNING

Danger of injury when using incorrect replacement parts!

- ❒ Use only original Froling replacement parts or spare parts approved by Froling.
- ❒ In case of doubt, always contact our customer service.
  - ➥ Hazards for the staff can arise through the use of incorrect or faulty spare parts and cause damage, malfunction or total failure.

Spare parts can be obtained from the manufacturer or importer.

3.11 Environmental protection

NOTICE

Danger to the environment resulting from incorrect handling of environmentally hazardous substances!

- ❒ Always follow the instructions below when handling hazardous substances and their disposal.
- ❒ If hazardous substances are accidentally released into the environment, take appropriate measures immediately. In case of doubt, inform the competent authority about the damage and request that proper measures be taken.
  - ➥ Incorrect handling of environmentally hazardous substances, in particular incorrect disposal, can cause significant damage to the environment.

The following hazardous substances are used:

Ash

Ashes should be placed in a steel container with a tight-fitting lid. The closed container of ashes should be placed on a non-combustible floor on the ground, well away from all combustible materials, pending final disposal. If the ashes are disposed of by burial in soil or otherwise locally dispersed, they should be retained in the closed container until all cinders have thoroughly cooled. For the disposal of ash from the heat exchanger, consult the local chimney sweep or waste disposal service of the municipality or province. Other waste should not be placed in this container.

Lubricants

Lubricants such as greases and oils contain poisonous substances. They must not be released into the environment. Disposal must be carried out by a specialist disposal company. Observe the manufacturer’s safety data sheet.

3.12 The operator's responsibilities

Operator

The operator is the person who operates the system for commercial or economic purposes by himself or cedes use to a third party and bears the legal responsibility concerning the product for the protection of the user, staff or third parties during the operation.

Operator duties

The system is used in the commercial sector. The system operator is therefore subject to the legal obligations for safety at work.

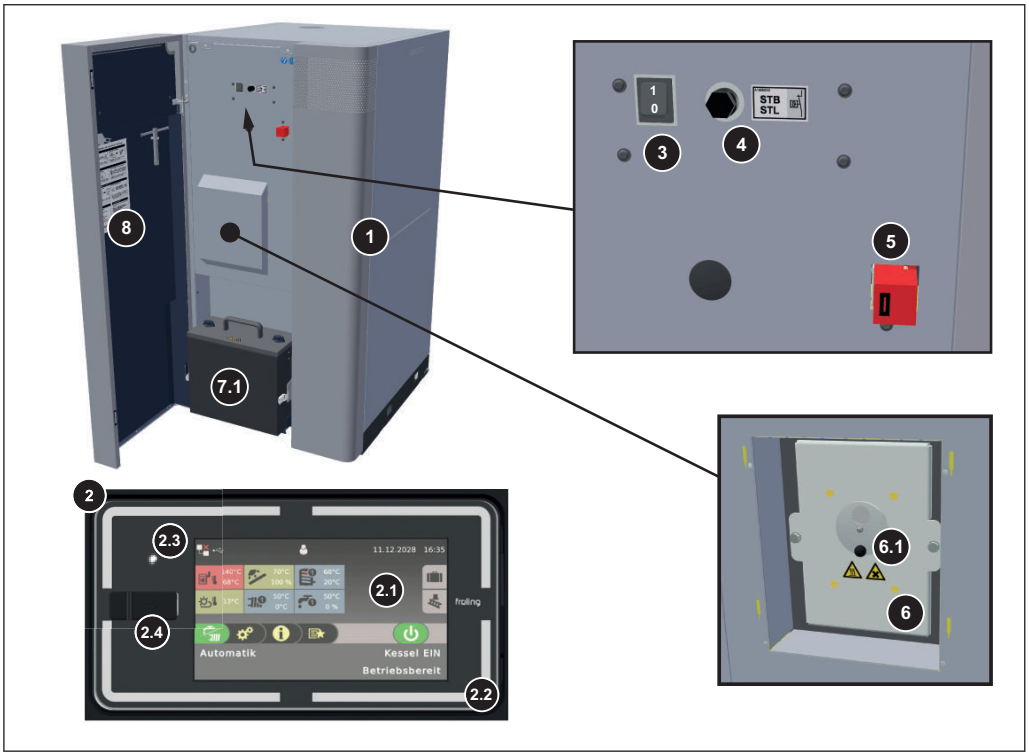
In addition to the safety instructions in this manual, the applicable regulations on safety, safety at work and environmental protection must be observed.

Therefore, in particular, the following applies:

- The "Occupational Safety and Health Act" of 1970 lays down that a safe workplace must be provided at all times during the execution of work.
- The operator must be aware of the applicable occupational safety regulations. Additionally, he must perform a risk assessment to determine hazards arising from special working conditions at the site where the system is used. He must implement these in the form of operating instructions for system operation.
- The operator must check throughout the entire period of use of the system whether the operating instructions created by him correspond to the current version of the regulations, and, if necessary, adjust them.
- The operator must clearly manage and determine the responsibilities for operation, troubleshooting, maintenance and cleaning.
- The operator must ensure that all persons who deal with the system have read and understood this manual. In addition, he must train the staff at regular intervals and inform them about possible dangers. Moreover, the operator must ensure that unauthorized persons do not get close to the system.
- The operator must provide the required protective equipment to staff and instruct them that it is obligatory to wear the necessary protective equipment.
- The operator must ensure that only fuels approved by the manufacturer are used.
- The operator must ensure that the prescribed safety tests are performed.
- The operator must ensure that the regulatory approval requirements are respected.
- The operator must ensure compliance with the requirements of the installation site and the safety measures when working in the fuel storage room.
- Furthermore, the operator is responsible for ensuring that the system is always in full working order. Therefore the following applies:
- The operator must ensure that the maintenance intervals described in these instructions are respected.
- The operator must ensure that the safety devices are regularly checked for proper functioning and completeness.

4 Description of the boiler

4.1 PE1 Pellet product overview



1	PE1 Pellet pellet boiler
2	Lambdatronic P 3200 boiler controller, ⇨ See "Overview of the touch display" [page 46]
2.1	Large touch screen for displaying/modifying operating statuses and parameters
2.2	Status display (operating status),⇨ See "Status display" [page 47]
2.3	Brightness sensor for automatically adjusting the brightness of the display
2.4	USB port for connecting a USB stick in order to update software
3	Main switch
4	High-limit thermostat (STL)
5	Door switch
6	Maintenance opening for combustion chamber (underneath the cover)
6.1	Inspection glass for checking combustion
7.1	Ash container for automatic ash removal
8	Quick start guide

4.2 Back view

No.	Description	Unit	PE1 Pellet	
			20	35
1	Boiler flow connection	inches	1 IT	
2	Boiler return connection		1 IT	
3	Drainage connection		½ IT	
4	Supply air connection (external diameter)	inches (mm)	80	100
5	Flue gas pipe connection		5 (129)	6 (149)
6	Pellet suction line connection		2 (50)	
7	Return-air line connection		2 (50)	

4.3 Functional description

4.3.1 General operation

The PE1 Pellet boiler is a boiler that produces useful heat for heating space and preparing hot water. The boiler uses wood pellets for fuel. This appliance meets the 2020 US Environmental Protection Agency´s wood pellets emissions limits for wood pellets heaters sold after May 15, 2020.

This wood pellet heater needs periodic inspection and repair for proper operation. It is against federal regulations to operate this wood pellet heater in a manner inconsistent with operating instructions in this manual. This wood pellet heater has a manufacturer set minimum low burn rate that must not be altered. It is against federal regulations to alter this setting or otherwise operate this wood pellet heater in a manner inconsistent with operating instructions in this manual.

The pellets are transported by the suction turbine via the suction hoses from the fuel store into the large hopper. Either suction probes or pellet screws are used as a discharge system.

The pellets are transported to the downpipe with the stoker screw and fall in a metered quantity through the burn back flap onto the combustion grate of the sturdy steel combustion chamber. Hot air is added by the automatic ignition to ignite the pellets.

Together with the speed-controlled induced draft fan and the stoker screw, the broadband Lambda probe ensures optimum combustion.

Heat generated during combustion moves through the steel combustion chamber to the heat exchanger, where it is used for heating the hot water. Ash contained in the flue gas is deposited in the heat exchanger. An efficiency optimization system in the heat exchanger ensures automatic cleaning by means of turbulators (spiral springs) and the ash falls downwards. The ash falls into the ash chamber, where it is transported via the ash screw into large ash containers.

4.3.2 Operating modes

Continuous load In the “Continuous load” mode, the boiler runs 24 hours a day and tries to maintain the boiler setpoint temperature set on the control system. The system is shut down for cleaning purposes only.

Automatic If the boiler is combined with a storage tank, the “Automatic" mode must be set. The storage tank is monitored by temperature sensors which are connected to the control system. The boiler only continues to run in automatic mode with the storage tank until the water in the storage tank is heated to a preset temperature.

If the “Automatic" mode is set even though there is no storage tank connected with the boiler, this operating mode is the same as “Continuous load"; in addition, however, a time period can be specified in which the boiler tries to maintain the set boiler setpoint temperature.

Domestic hot water The heating circuit controller is deactivated in the “Domestic hot water" mode; a cold storage tank, if present, is not part of the starting criteria for the boiler. A boiler start requires only a demand for hot water. When the set hot water temperature is achieved, the boiler shuts off again.

4.3.3 Approved fuels

Pellets

Use only wood pellets made of natural wood in accordance with the specifications of the PFI premium quality class like those of the Pellet Fuel Institute (PFI) Standard Specification for residential/commercial densified fuel.

Note on standards

US/CAN: Fuel acc. "Pellet Fuel Institute (PFI) Standard Specification for Residential / Commercial Densified Fuel": Fuel grade: “Super Premium” or “Premium”

EU: Fuel as per EN 17225 - Part 2: Wood pellets class A1 / D06

Fuel storage room

Before refilling the fuel storage room, check for pellet dust and clean if necessary

5 Transport, Installation and Initial start-up

5.1 Safety

Transport as well as installation and commissioning are carried out exclusively by the manufacturer's employees or staff authorized by the manufacturer.

⚠ WARNING

Risk of death from incorrect transport and faulty installation and commissioning!

- ❒ Transport, installation and commissioning must be carried out exclusively by the manufacturer's employees or staff authorized by the manufacturer.
- ❒ Consult the manufacturer even in case of a subsequent change of location.
- ❒ Refrain from unauthorized transport, unauthorized installation and commissioning, as well as changes of location.
  - ➥ An error during transport and installation/commissioning can lead to perilous situations or cause substantial damage to property.

5.2 Conditions for commissioning

Staff:	❒ Operator
	❒ Froling customer service or an authorized partner
	❒ Chimney sweep
	❒ Licensed electrician
	❒ Heating system installer

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

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

- It is essential that the electrician who 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. This training is provided only once and the respective parties (e.g. operators) must be present for correct customer acceptance of the product.

NOTICE

Escaping condensation during the initial heat-up phase does not indicate a fault.

- ❒ Tip: If this occurs, clean it up with a cleaning rag.

6 Loading fuel

Working in the fuel storage room

⚠ WARNING

Risk of injury when carrying out work in the fuel storage room!

- ❒ Switch the boiler off at the boiler control system before entering the fuel storage room.
- ❒ Never climb onto piles of fuel.
- ❒ Ensure that there is adequate ventilation when entering the fuel storage room.
- ❒ For safety reasons never work in the fuel storage room alone. Take another person with you.
- ❒ Always wear personal protective equipment for work (protective clothing, safety shoes, protective gloves, dust mask, protective goggles).
- ❒ Also observe the information on the notice on the access door to the fuel storage room.
  - ➥ Piles of fuel (wood chips or pellets) are at risk of caving if you stand on them when working in the fuel storage room. There is also a risk of poisoning due to an increased concentration of carbon monoxide in the air.

⚠ CAUTION

Filling the fuel 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.

6.1 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 (< 30 ppm)!

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!

Fire, open flames, or smoking are prohibited inside the fuel store!

⚠ CAUTION

Filling the fuel 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 fine particles and clean if necessary
- ❒ Close all openings to the store to seal out dust
- ❒ Fill the store with pellets
  - ➥ Only use permitted pellets!

7 Heating the boiler

7.1 Safety instructions for heating

Incorrect operation

⚠ WARNING

Risk of injury due to incorrect operation!

Incorrect operation can cause serious injuries and considerable property damage.

- ❒ Perform all operating steps according to the information and instructions in this manual.
- ❒ Only trained staff may carry out work to the system.
- ❒ Check the system externally for any visible damage or defects at least once a day.
- ❒ Before starting work, make sure that all covers and safety devices are installed and work properly.
- ❒ Never disable or bypass safety equipment during operation.
- ❒ Do not alter the boiler controller.

7.2 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 PE1 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 authorized 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 the Lambdatronic pellet boiler

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

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

- It is essential that the electrician who 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. This training is provided only once and the respective parties (e.g. operators) must be present for correct customer acceptance of the product.

NOTICE

Escaping condensation during the initial heat-up phase does not indicate a fault.

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

7.3 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

7.4 Operate the boiler using the touch display

7.4.1 Overview of the touch display

A	Display of arbitrarily selectable information ⇨ See "Select information displays" [page 53]
B	Display and switching the current user level ⇨ See "Lock display/switch user level" [page 63]
C	Display and changing the current date/time ⇨ See "Change date and time" [page 57]
D	Holiday program ⇨ See "Configure the holiday program" [page 64]
E	Chimney sweeper function
F	Display of current operating status, switching the boiler ON/OFF ⇨ See "Switch boiler ON/OFF" [page 55]
G	Invoking the available functions in the quick menu ⇨ See "Quick menu" [page 52]
H	Invoking all system information. Parameters must not be changed in the information menu.
I	System menu for invoking the system settings. All parameters can be displayed and/or edited depending on the user level. ⇨ See "Navigation within the system menu" [page 49]
J	Display and change the current boiler mode ⇨ See "Change boiler mode" [page 56]

K	Display icons for using froeling-connect ⇨ See "Display icons for froeling-connect/remote control" [page 48]
L	Brightness sensor for automatically adjusting the brightness of the display
M	LED frame to display the current system status ⇨ See "Status display" [page 47]
N	USB interface for software update (⇛ see operating instructions for the boiler controller) **NOTICE! USB interface is for service purposes only and must not be used to load devices or PC connections!**

Status display

The status display indicates the system's operating status:

- Constant in the set color: **SWITCHED ON**
  Boiler in an error-free operating state (standby, heating, etc.)
  Set color 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.

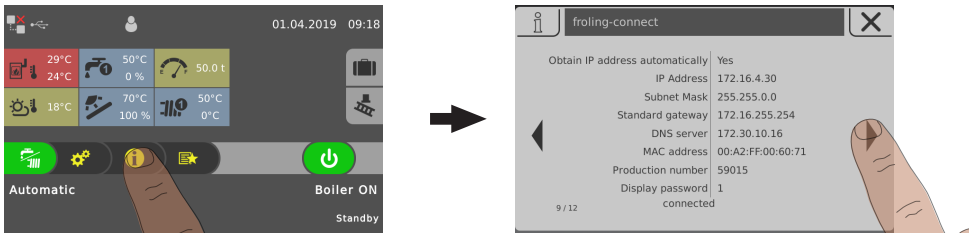
Display icons for froeling-connect/remote control

The icons for connection status and remote control are displayed at the top left-hand corner 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, ⇨ See "Connection status to "froeling-connect"" [page 48]		

Connection status to "froeling-connect"

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



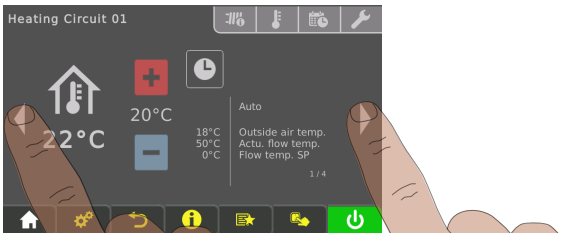
❒ Tap the information menu in the basic display and navigate to the “froeling-connect” menu

➥ The connection status is displayed in the lower range (connected, deactivated, etc.)

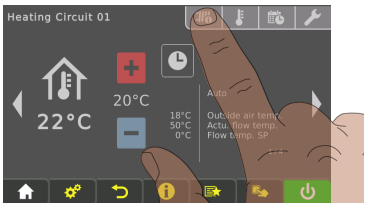
NOTICE! Consult the “froeling-connect” operating instructions for a detailed description of the connection status as well as troubleshooting

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. For example, if several heating circuits are installed, you can use the right and left arrows to navigate to the desired heating circuit.



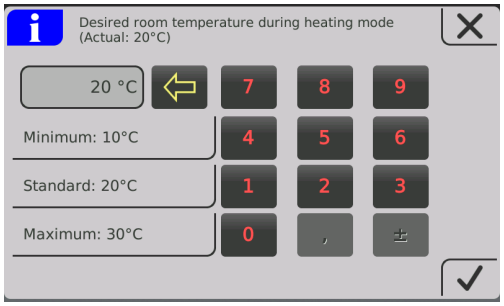
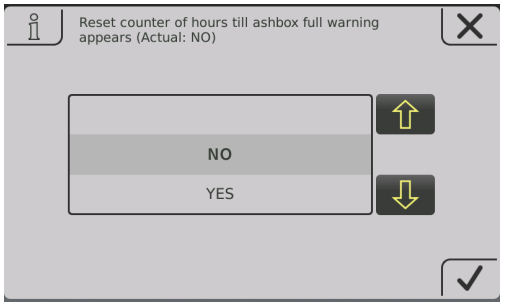
Tap the respective tab to carry out settings in the menus.

Icon	Tab	
	State	
	Temperatures	
	Times	
	Service	
	General settings	
	Solar heat meter	

Changing parameters

Staff ❒ Operator

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

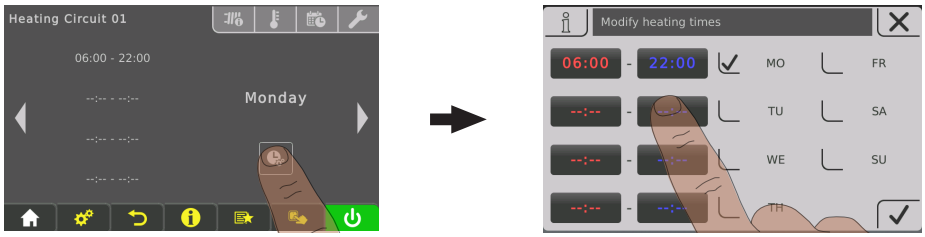
Numeric keypad	Dropdown list
	

Changing the time window

Staff ❒ Operator

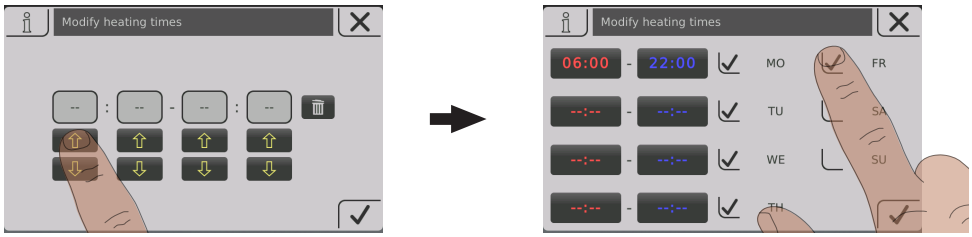
The desired time window can be set in the “Times” tab in the menus of the heating components (heating, water, etc.). Up to four time windows are possible per day.

- ❒ Use the left or right arrow to navigate to the desired day of the week
- ❒ Tap the time window or icon underneath the day of the week
- ❒ Tap on the time window to be changed

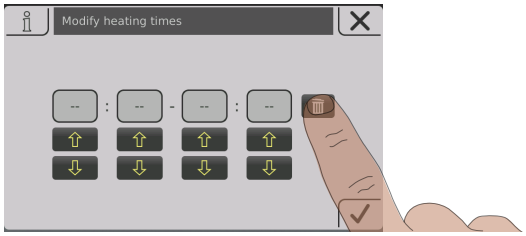


- ❒ Use the up and down arrows to set the start and end time and save by tapping the “Confirm” icon

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



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



Quick menu

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

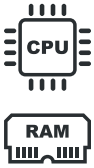
Icon	Description
	**Language selection** Sets the desired system language: Deutsch – English – Francais – Italiano – Slovenski – Cesky – Polski – Svenska – Espanol – Magyar – Suomi – Dansk – Nederlands – Русский – Srpski – Hrvatski
	**Clean the touch display** The touch display is locked for 10 seconds,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

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

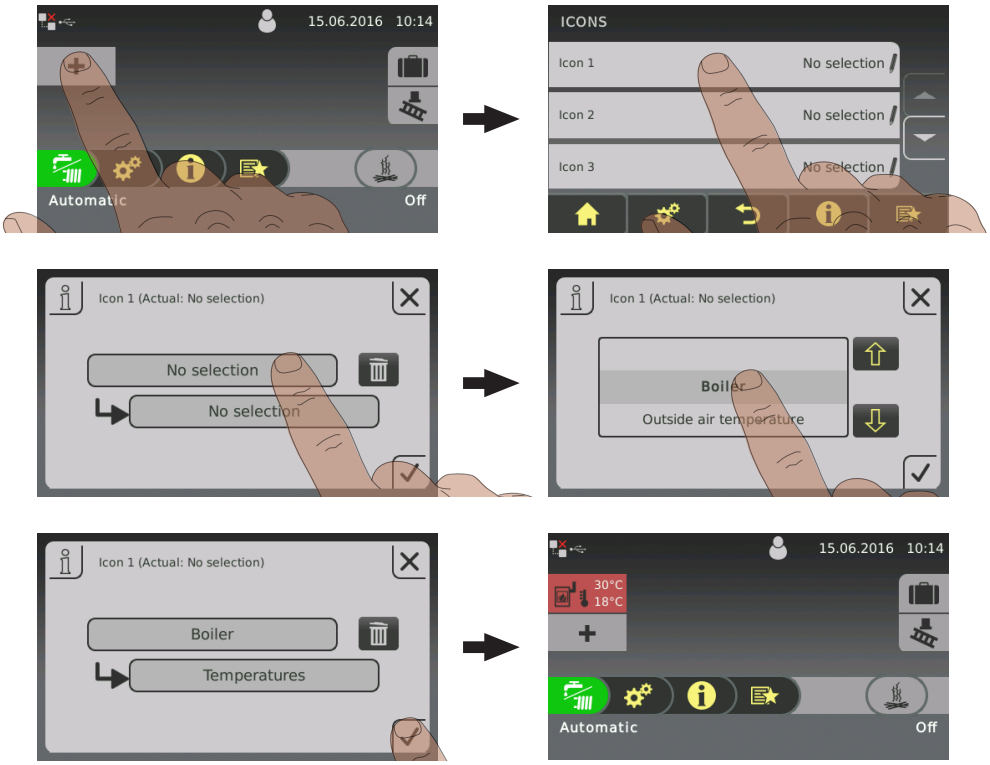
7.4.2 Select information displays

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

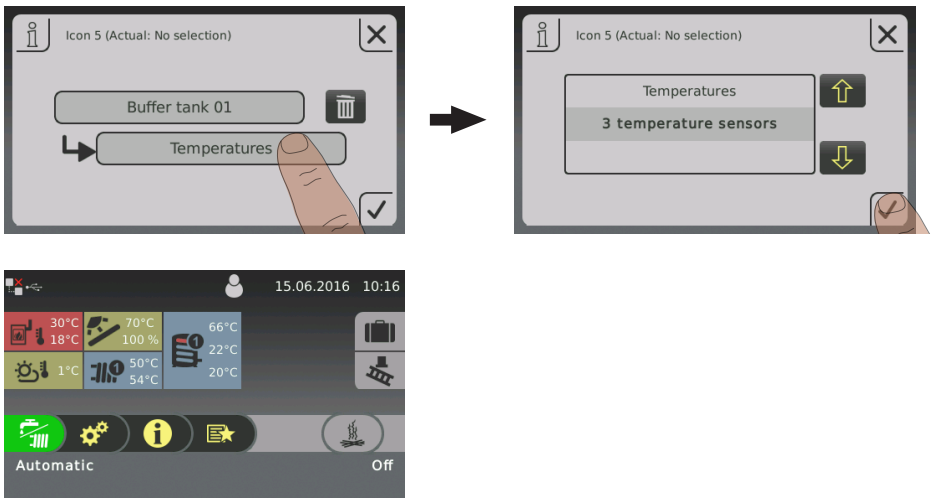
Menu	Selection	Icon	Description
Boiler	Empty ash box in		Display of the remaining heating hours until the message “Ash box full, please empty” appears.
	Temperatures		Display of boiler und flue gas temperature
	Calorific value heat exchanger[1)]		Display of boiler and flue gas temperature before or after the calorific value heat exchanger.
	Operation hours		Display of the operating hours and the operating hours since last maintenance.
Outside air temperature	Temperatures		Display of the current outside air temperature.
Boiler 2	Temperatures		Display of the temperature of the secondary boiler and the status of the burner relay
Solar	Temperatures		Display of the collector temperature and control of the collector pump.
Pellets	Remaining pellet amount in storeroom		Display of the remaining amount of pellets in storeroom.
Heating circuit 01 – 18	Temperatures		Display of the actual flow temperature and flow temperature setpoint of the respective heating circuit.
DHW tank 01 – 08	Temperatures		Display of the current DHW tank temperature and control of DHW tank pump of the respective DHW tank.
Storage tank 01 – 04	Temperatures		Display of storage tank temperature, top and bottom
	3 temperature sensors[1)]		Display of storage tank temperature, top, middle and bottom.
	4 temperature sensors[1)]		Display of storage tank temperature top, store sensor 2, store sensor 3 and bottom.
Circulation pump	Temperatures		Display of the status at the flow sensor (if present) and the current circulation return temperature.

Menu	Selection	Icon	Description
Difference controller	Temperatures		Display of the current temperature from source and recess of the differential regulator
System	CPU/RAM capacity		Display of the CPU and RAM capacity in percent

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



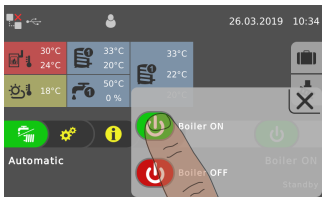
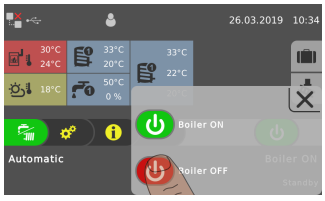
When using more than two store sensors, it is possible to have an information display with storage tank temperatures in accordance with the number of sensors. An information display that spans two areas is used.



7.4.3 Switch boiler ON/OFF

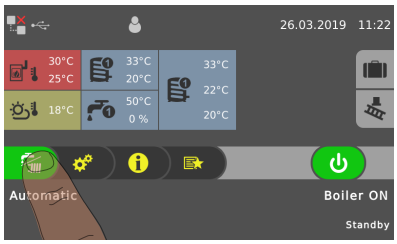
Staff	❒ Operator

The hydraulic system is controlled in accordance with the mode that is set, regardless of boiler status, Change boiler mode

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

7.4.4 Change boiler mode

Staff ❒ Operator



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

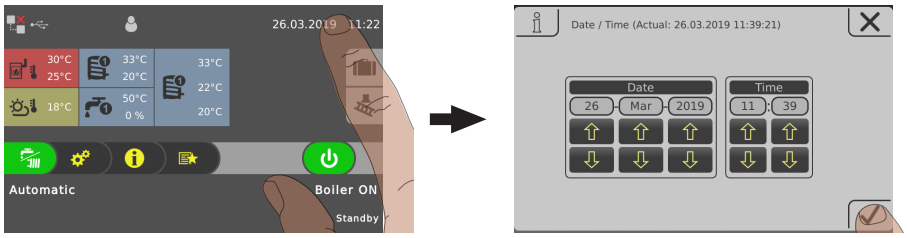
Mode	Icon	Description
Automatic		Supply heating circuits and domestic hot water tanks with heat according to the selected heating times.
Domestic hot water		The domestic hot water tank is supplied with heat within the selected loading times. Heating circuits are switched off, frost protection remains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

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

7.4.5 Change date and time

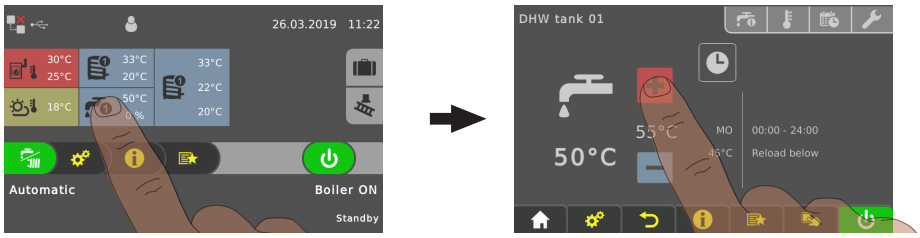
Staff	❒ Operator

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



7.4.6 Change desired DHW tank temperature

Staff	❒ Operator

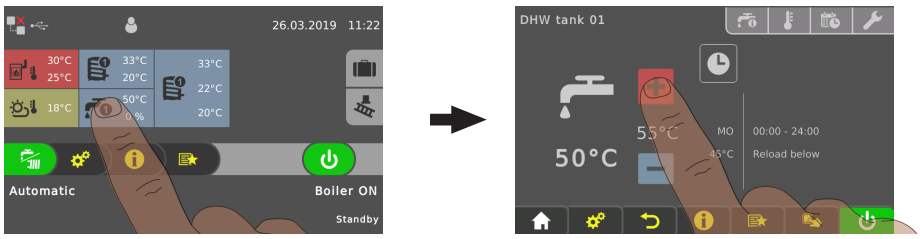


❒ Tap the information display for the desired DHW tank
❒ Adjust the temperature setpoint by tapping “+” or “-”

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

7.4.7 One-time extra loading of an individual DHW tank

Staff	❒ Operator



❒ 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.

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

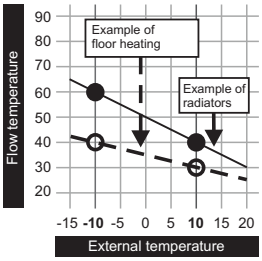
Staff	❒ Operator

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.

⇨ See "Quick menu" [page 52]

7.4.9 Set the heating curve of a heating circuit

Staff ❒ Operator



A flow temperature is calculated using the heating curve of the heating circuit depending on the outside air temperature and the two adjustable parameters "flow temperature at -10°C (14°F) outside air temperature" and "flow temperature at 10°C (50°F) outside air temperature".

Example:
The heating curve is defined with 60°C (140°F) (at -10°C (14°F) outside temperature) and 40°C (104°F) (at +10°C (50°F) outside temperature). If the current outside air temperature is -2°C (28.4°F), the flow temperature is calculated as 52°C (125.6°F).

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)

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

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

High temperature circuit
▪ Desired flow temperature at -10°C (14°F) outside air temperature: **60°C (140°F)**
▪ Desired flow temperature at 10°C (50°F) outside air temperature: **40°C (104°F)**

Low temperature circuit
▪ Desired flow temperature at -10°C (14°F) outside air temperature: **40°C (104°F)**
▪ Desired flow temperature at 10°C (50°F) outside air temperature: **30°C (86°F)**

Lowering the flow temperature

Outside of the set heating times (Change time window), 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 (64.4°F))	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 setback mode on (default: 7°C (44.6°F))	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)

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

Staff ❒ Operator

Situation	Effect
Room temperature generally too low	Move heating curve up in parallel. Increase both points on the heating curve by the same temperature level. (see figure 1)
Room temperature on warm days too low, OK on cold days	Change the slope of the heating curve. Increase the temperature curve at -10°C (14°F) (see Figure 2)
Room temperature on warm days too high, OK on cold days	Change the slope of the heating curve. Temperature level of heating curve lowered by 10°C (50°F) (see Figure 3)

Figure 1

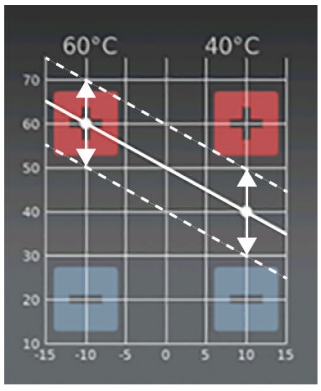


Figure 2

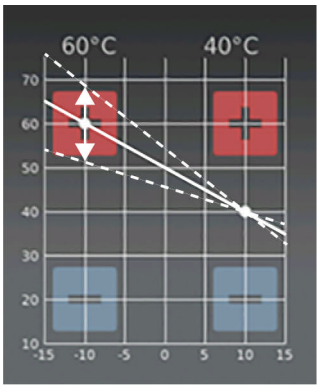
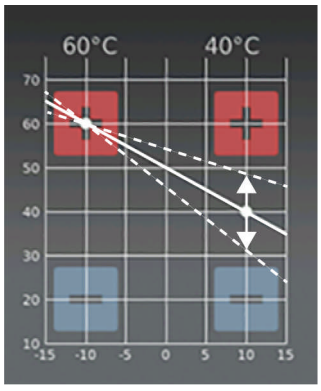


Figure 3

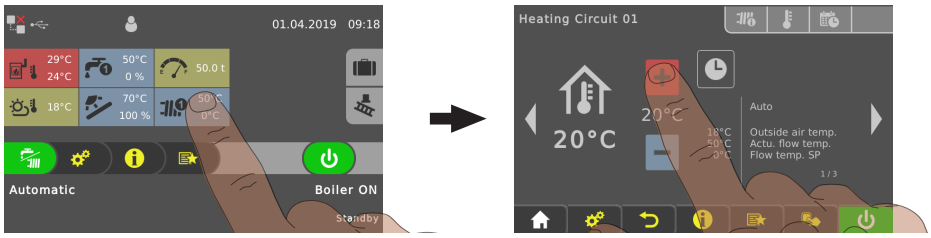


Depending on the situation, the heating curve an be adapted by tapping “+” or “-” at +/-10°C (+/-18°F) outside air temperature.

If the heating curve must be changed, never change the desired point for a high temperature circuit more than 5°C (41°F), and never more than 3°C (6°F) for a low temperature circuit. Once the changes have been made, wait a few days and assess comfort levels before carrying out additional changes.

7.4.11 Change room temperature (heating circuit mit room temperature sensor)

Staff	❒ Operator



❒ Tap information display of the desired heating circuit
❒ Tap “+” or “-” to adjust the desired room temperature

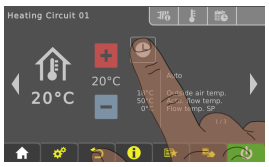
NOTICE! If this selection is not configured in the information display in the basic display, open the components in the system menu.

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

7.4.12 Switch heating circuit mode

Staff	❒ Operator

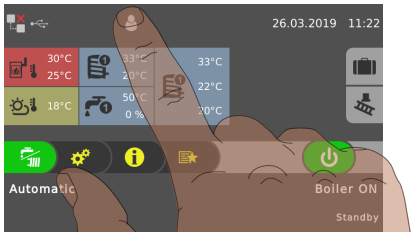
Tap the mode icon in the menu of the respective heating circuit in order to change the mode.

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.

7.4.13 Lock display/switch user level

Staff	❒ Operator

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



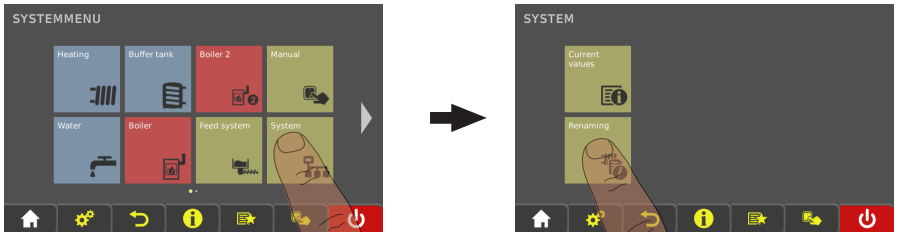
❒ Tap on the icon for the user level in the upper area of the basic display and enter the code.

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

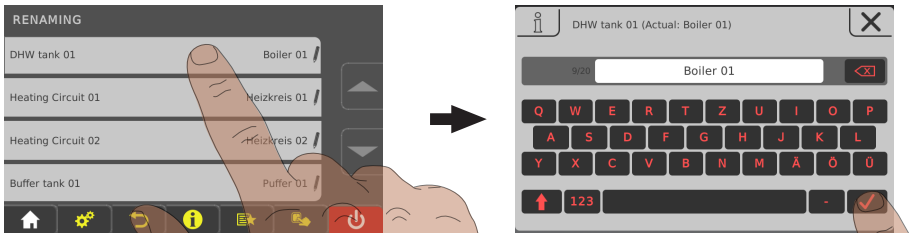
7.4.14 Rename components

Staff	❒ Operator

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



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

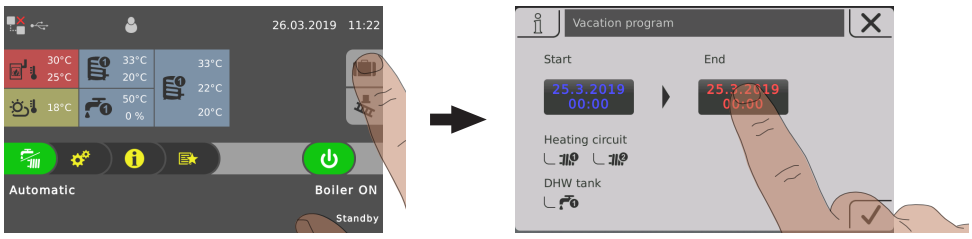


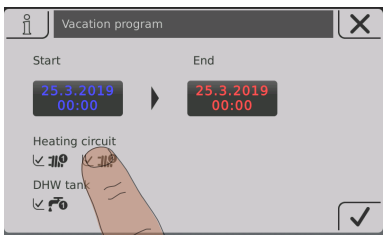
❒ Tap the desired component and use the keyboard to rename it

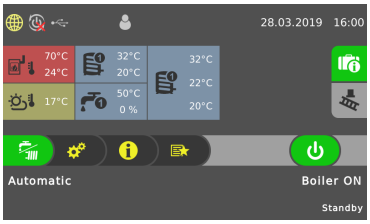
7.4.15 Configure the holiday program

Staff	❒ Operator

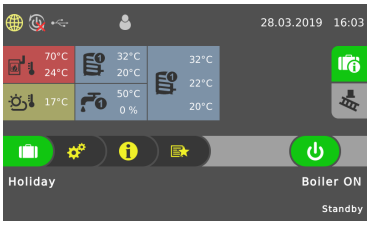
Setting a start and end date in the holiday program determines a time period in which an active heating circuit is regulated for the set setback temperature and in which an activated boiler is not loaded. If Legionella heating is set, it remains active.





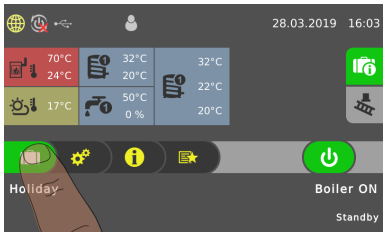


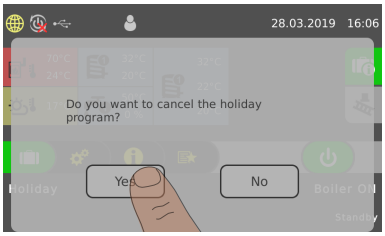
If the start date is set in the future, the “suitcase” icon will be highlighted in green.

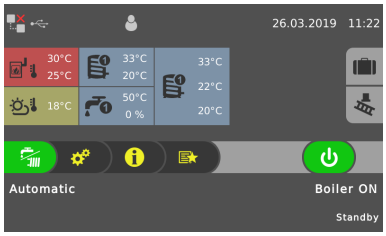


Once the set start time of the holiday program has been reached, the boiler switches to “holiday” mode

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).







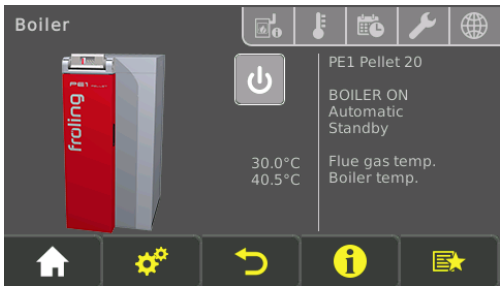
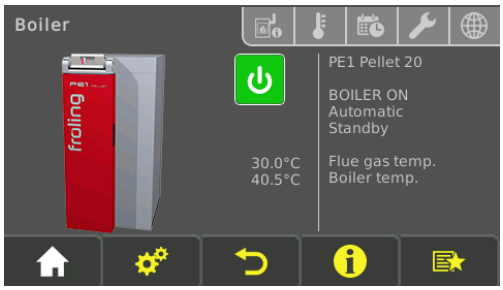
7.5 Switch the boiler ON/OFF on the room console

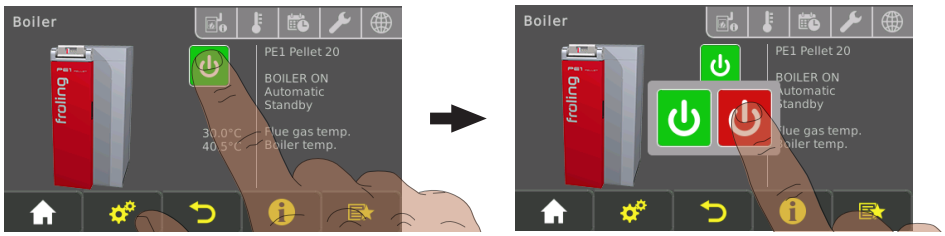
Staff	❒ Operator

Prerequisite:

- Boiler access rights configured for the room console

If the boiler remote control is also activated (⇨ See "Display icons for froeling-connect/ remote control" [page 48]), the boiler can be switched on and off on the room console.

	
Boiler remote control deactivated	Boiler remote control activated



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

7.6 Adjust pellet consumption counter after fuel delivery

7.6.1 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 (< 30 ppm)!

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!

Fire, open flames, or smoking are prohibited inside the fuel store!

⚠ CAUTION

Filling the fuel 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:

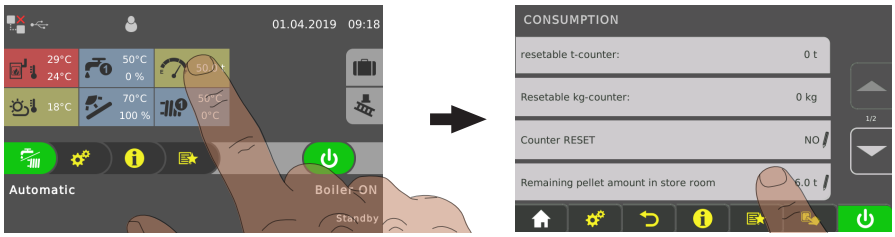
- ❒ Before filling, check the store for fine particles and clean if necessary
- ❒ Close all openings to the store to seal out dust
- ❒ Fill the store with pellets
  - ➥ Only use permitted pellets!
    ⇨ See "Approved fuels" [page 40]

7.6.2 Correct the remaining pellet amount in store room

Staff	❒ Operator

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

7.6.3 Adjust the pellet consumption counter to the fuel

Staff	❒ Operator

NOTICE! The boiler must be in the “Boiler off/standby” operating status!

To accurately calculate pellet consumption, it is recommended to regularly weigh the amount of pellets fed in at 100% feed rate.

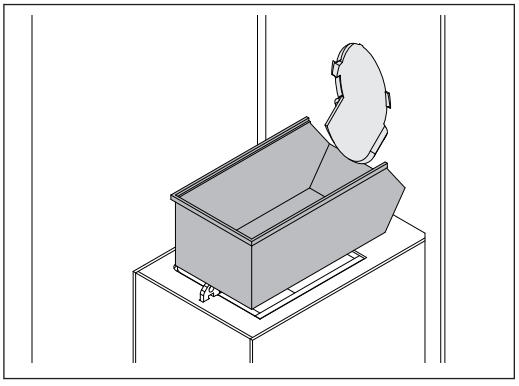
❒ Remove the cover and the combustion chamber cover

❒ Remove the burn-out tray

➥ The burner insert remains in the burner

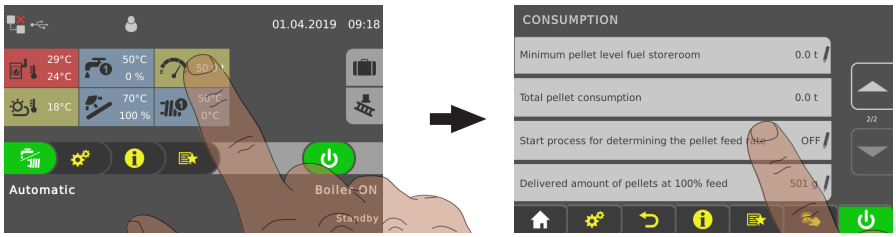
❒ Remove fly ash and clean combustion chamber and burner

⇨ See "Cleaning the burn-out tray, burner insert and combustion chamber" [page 79]



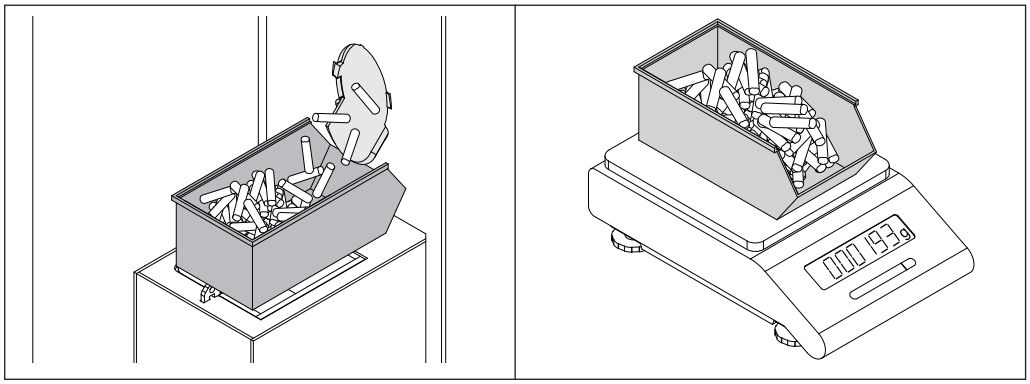
❒ Insert receiving tank with suitable dimensions into the burner

Start the process:



❒ In the "Consumption" menu, set the "Start the process for determining the pellet feed rate" parameter to "YES"

➥ Stoker screw feeds pellets to the receiving tank with a fuel feed-in of 100% for several minutes



Once the process is finished:

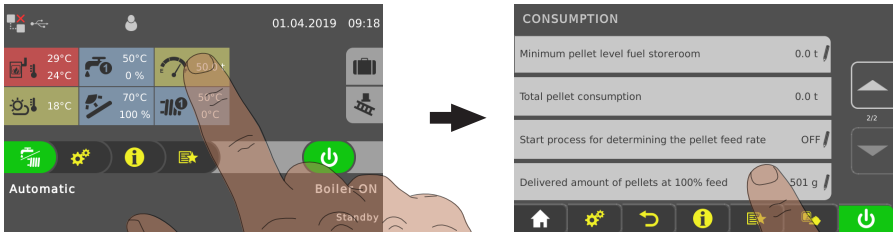
❒ Manually move the pellets away from the feed-in opening into the receiving tank so that none of the pellets fall into the ash chamber below

❒ Weigh the receiving tank including pellets on the kitchen scale

❒ Subtract the weight of the receiving tank and note the value

❒ Empty the pellets into the pellet fuel store

❒ Carry out the entire procedure again and note the displayed value once again

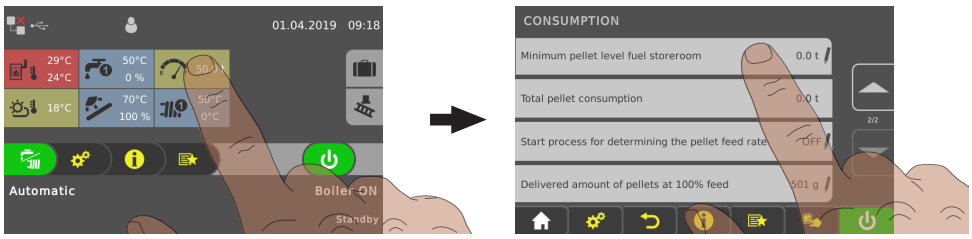


❒ Tap the information display of the pellet consumption

❒ Enter the larger of value of the two measurements in the "Consumption" menu in the "Delivered amount of pellets at 100% feed" parameter

7.6.4 Setting the automatic notification for minimum level

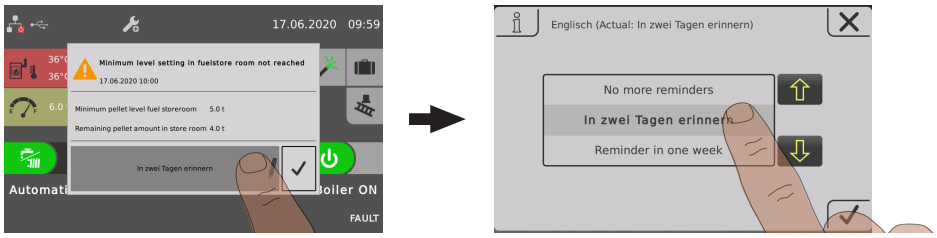
Staff	❒ Operator



❒ 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

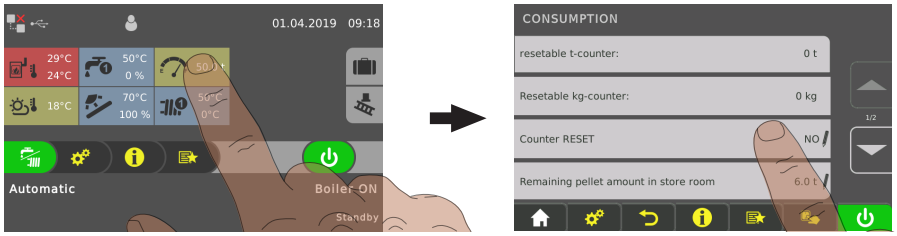
7.6.5 Resetting the pellet consumption counter

Staff	❒ Operator

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”

7.7 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. The grate, burn-out tray and combustion chamber should also be checked at these intervals.

⚠ WARNING

When removing the ash container cover during operation:

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

Before checking the ash level / emptying the ash container:

❒ Switch off the boiler by tapping “Boiler off”

➥ The boiler follows the shutdown procedure and switches to “Boiler off” status.

Hot ashes

⚠ WARNING

Risk of injury from hot ashes!

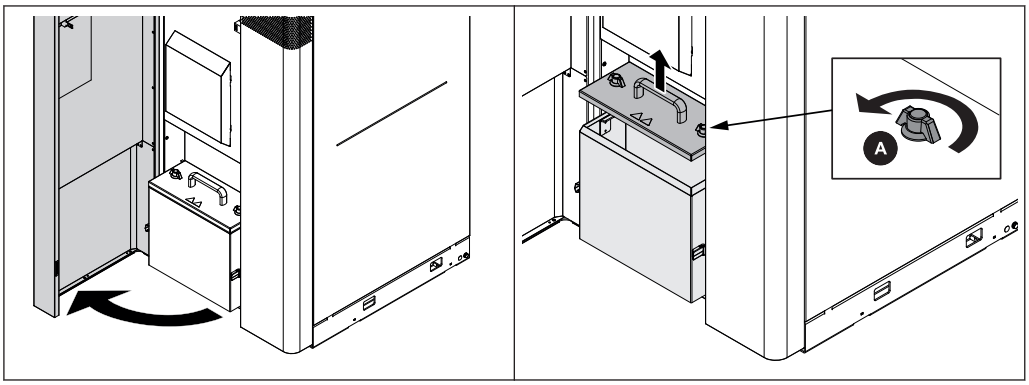
❒ Always wear protective clothing and protective gloves when working on the system.

❒ Before handling ash, check whether or not it is still hot. Allow to cool if necessary.

➥ Ash is extremely hot after the combustion process. Contact can cause serious burns.

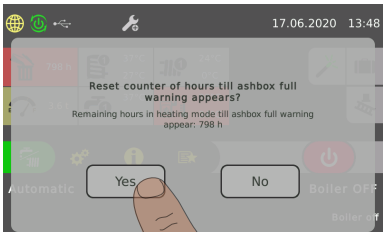
7.7.1 Check the fill level of the ash container

Staff	❒ Operator



- ❒ Open the insulated door
- ❒ Open the locks (A) on the cover by turning anti-clockwise
- ❒ Remove the cover and check the fill level
- ❒ Replace the cover and secure with locks (A)

The message "`Reset counter of hours till ashbox full warning`" appears on the boiler display:



If the ash container is emptied:

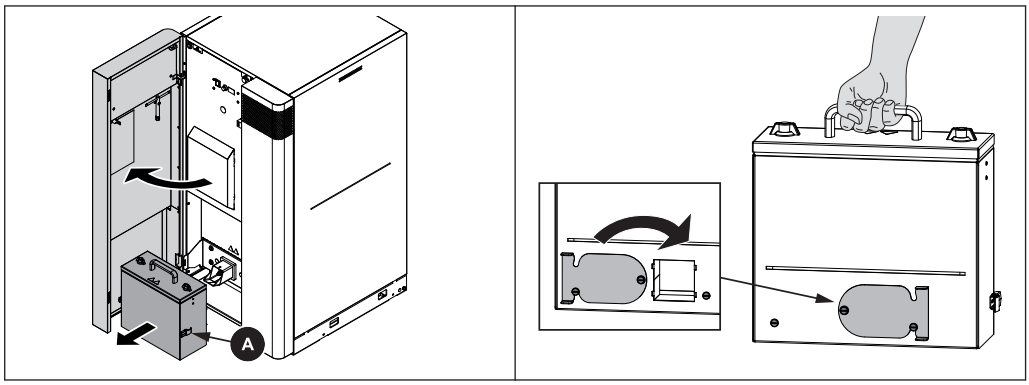
- ❒ Confirm the message by tapping on "`YES`"
  - ➥ The counter of the remaining heating hours is reset to the preset value

If the ash container is not emptied:

- ❒ Close the message by tapping on "`NO`"
  - ➥ The counter of the remaining heating hours remains unchanged

7.7.2 Empty ash container

Staff	❒ Operator



❒ Open the insulated door of the boiler
❒ Open the side fasteners (A) on the ash container and remove the ash container
❒ Close the opening at the rear with the sliding valve and take the ash container to the emptying point
➥ Disposal of the ash

7.8 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 off the boiler by tapping “Boiler off”
➥ The boiler shuts down in a controlled manner and switches to the operating state "Operating state OFF" 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!

8 Maintaining the boiler

8.1 Safety instructions for maintenance

Automatic start-up

⚠ WARNING

Risk of injury from automatic start-up!

- ❒ Before doing any work, switch the boiler off at the control system.
- ❒ Switch off the main switch and take precautions to prevent accidental switching on.
  - ➥ There is a risk of serious injury from the system starting up automatically if it is switched on during inspection and cleaning.

Risk of injury due to improperly performed maintenance work!

⚠ WARNING

Risk of injury due to improperly performed maintenance work!

- ❒ Before starting any work, switch the boiler off using the control system. Allow the boiler to cool sufficiently. Once the boiler has cooled down, switch off the main switch and take precautions to prevent accidental switching on.
- ❒ Only operate the boiler using the handles provided.
- ❒ Perform all inspection and cleaning work to the boiler in the proper way.
- ❒ Pay attention to order and cleanliness in the boiler room.
- ❒ Any maintenance work not permitted for the operator must be carried out exclusively by Froling customer service or an authorized partner.
- ❒ Always wear personal protective equipment for work (protective clothing, safety shoes, protective gloves, dust mask, protective goggles).
- ❒ Before starting up again, make sure that there is no-one in the danger zone and that all covers and safety devices are installed and work properly.
- ❒ THE HEAT EXCHANGER, DRAFT INDUCER, FLUE PIPE, AND CHIMNEY MUST BE CLEANED REGULARLY TO REMOVE ACCUMULATED CREOSOTE AND ASH. ENSURE THAT THE HEAT EXCHANGER, FLUE PIPE, AND CHIMNEY ARE CLEANED AT THE END OF HEATING SEASON TO MINIMIZE CORROSION DURING THE SUMMER MONTHS. THE APPLIANCE, FLUE PIPE, AND CHIMNEY MUST BE IN GOOD CONDITION. THESE INSTRUCTIONS ALSO APPLY TO A DRAFT INDUCER IF USED.
  - ➥ Incorrect or insufficient inspection and cleaning of the boiler can cause serious faults in combustion (e.g. spontaneous combustion of carbonization gases or explosion) and this can lead to serious accidents and damage.

8.2 Maintenance schedule

Interval	Maintenance work	Staff
Every 100 operating hours	Visually inspect the system	Operator
	Check that safety equipment is functioning properly	Operator
twice a month during the heating period	Remove soot, tar oil and ash deposits from the chimney connection and chimney	Chimney sweep
After every operating period of 2000 hours or once a year	Clean the heat exchanger	Froling customer service or an authorized partner
	Cleaning the combustion grate	Froling customer service or an authorized partner
	Cleaning the measurement line of the underpressure controller	Froling customer service or an authorized partner
	Cleaning the flue gas pipe	Froling customer service or an authorized partner
	Checking the draft controller flap	Froling customer service or an authorized partner

8.3 Maintenance work

8.3.1 Carrying out a visual inspection

Staff:	❒ Operator
Protective equipment:	❒ Protective workwear ❒ Protective gloves ❒ Safety shoes

The operator must check the system at regular intervals. If you detect a damage, contact Froling customer service or an authorized partner immediately.

- ❒ Check the quantity of fuel in the fuel store.
- ❒ Check the fuel supply to the boiler.
- ❒ Visually inspect the seal on the boiler's geared motors.

There should be no significant leakage of lubricant. The presence of a few drops of lubricant may be normal. If a significant quantity of lubricant is leaking, immediately inform the heating system installer, Froling customer service or an authorized partner.

8.3.2 Checking the safety equipment

Staff:	❒ Operator
Protective equipment:	❒ Protective workwear ❒ Protective gloves ❒ Safety shoes

Emergency stop button

- ❒ Check the emergency-stop button for proper function (if present).

STL (high-limit thermostat)

❒ Check the high-limit thermostat.

Safety valve

❒ Check the safety valve in the heating circuit.

System pressure

❒ Check the system pressure on the pressure gauge.

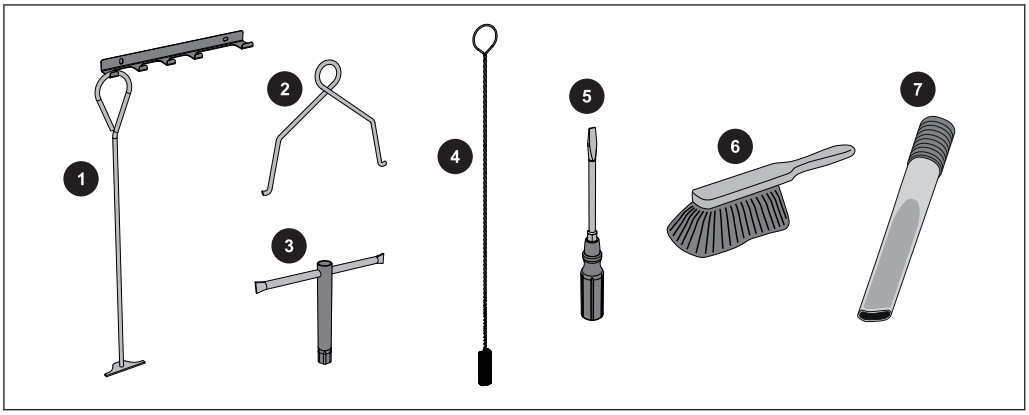
Check that the position of the pressure gauge and rated pressure of the expansion tank match your heating system installer's specifications.

❒ If the system pressure is low, the heating system installer must refill water and check the heating system for leaks.

❒ In case of large pressure fluctuations, ask the heating system installer to inspect the expansion tank.

8.3.3 Required tools

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



Included in delivery:	
1	Furnace tool with bracket
2	Mounting bracket for burner insert (only for PE1 Pellet 35)
3	Socket wrench AF 13
4	Cleaning brush (Ø 41 x 1000) for cleaning the heat exchanger

Not included:	
5	Screwdriver set (Philips, flat head, Torx T20, T25, T30)
6	Small brush or cleaning brush
7	Ash vacuum

8.3.4 Maintenance work by the operator

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

❒ Recommendation: Use an ash vacuum for cleaning.

Inspection

Staff	❒ Operator

Checking the system pressure

❒ Check the system pressure on the pressure gauge.

➥ The value must be 20% greater than the preload 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:

❒ Add water.
NOTICE! If this happens frequently, the seal of the heating system is faulty! Inform your installer.

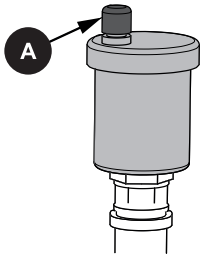
If large pressure fluctuations are observed:

❒ 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! 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

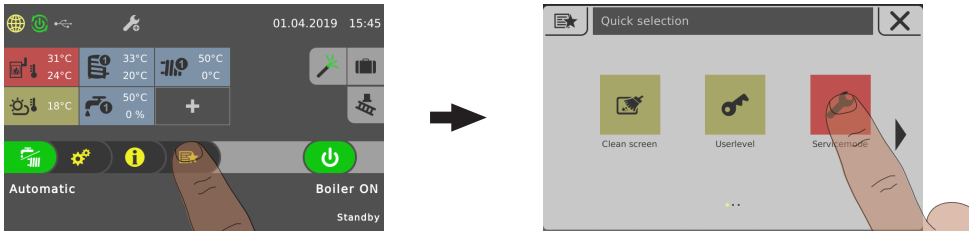
NOTICE! The vent cap (A) must be loose (screw on approx. two revolutions) to ensure correct functioning.

Cleaning

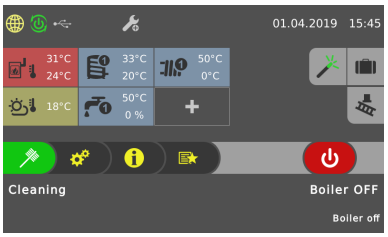
Staff	❒ Operator

❒ Allow the boiler to cool for at least one hour
❒ Activate service as described in the following

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



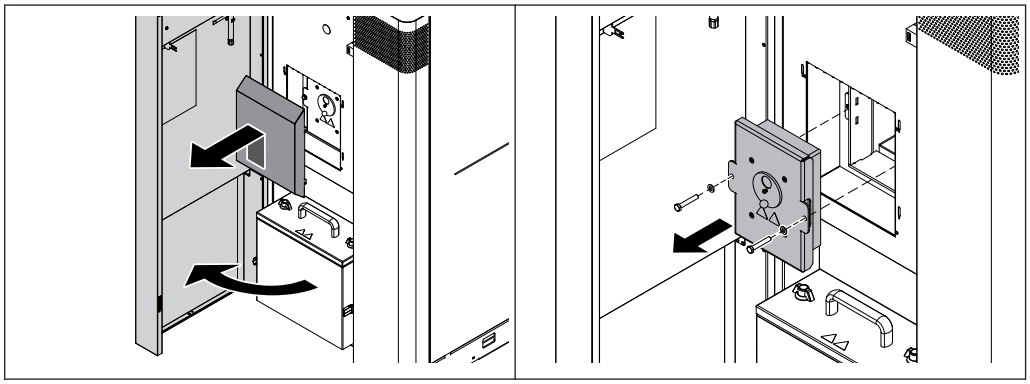
❒ The “Cleaning” mode is activated in accordance with boiler-specific processes
➥ As soon as this state is displayed, the cleaning process may begin.

Cleaning the burn-out tray, burner insert and combustion chamber

Staff	❒ Operator

❒ Allow the boiler to cool for at least one hour

❒ Activate service mode

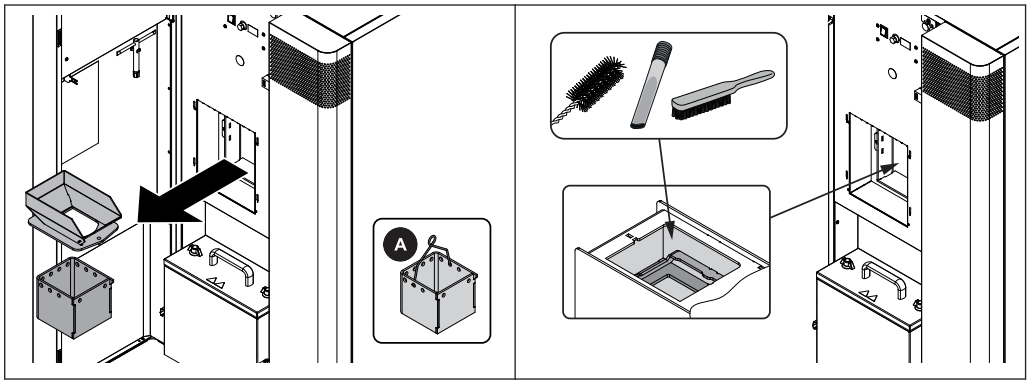


❒ Open the insulated door

❒ Lift up to unhook the cover of the combustion chamber

❒ Dismantle the combustion chamber cover using a box wrench combustion chamber

➥ The box wrench is attached in tool clamp (A) on the inside of the insulated door



❒ Remove burn-out tray and burner insert
For PE1 Pellet 35:
- Rotate components 90° to facilitate dismantling.
- Use mounting bracket (A)

❒ Clean burn-out tray and burner insert

❒ Clean the top side and interior surfaces of the burner

❒ Remove deposits from the opening of the igniter tube

Periodic inspection and cleaning

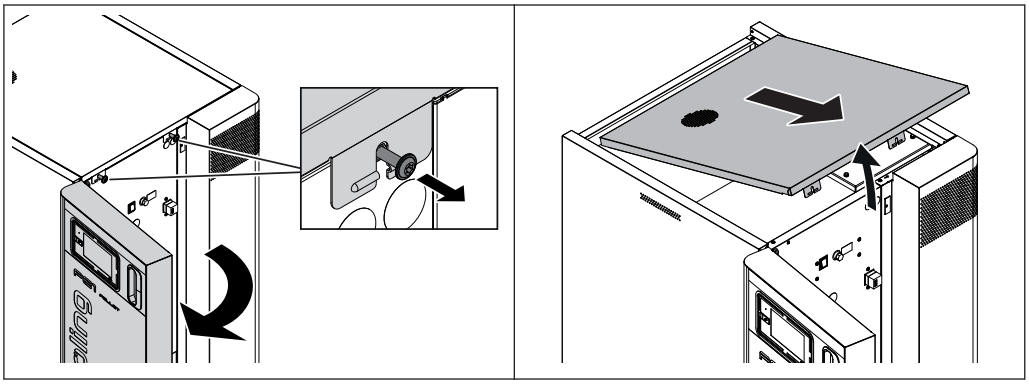
The boiler must be inspected and cleaned at appropriate intervals depending on the operating hours and fuel quality.

Inspection and cleaning must be repeated after not more than 2,500 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.

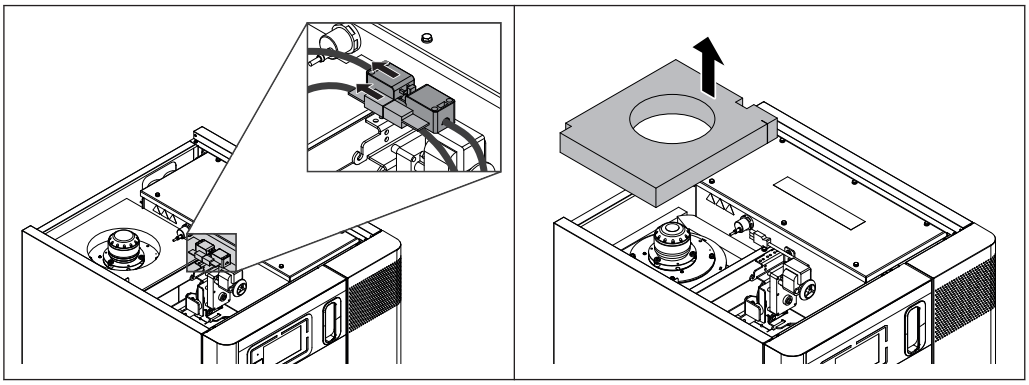
Clean the induced draft fan

Staff	❒ Operator

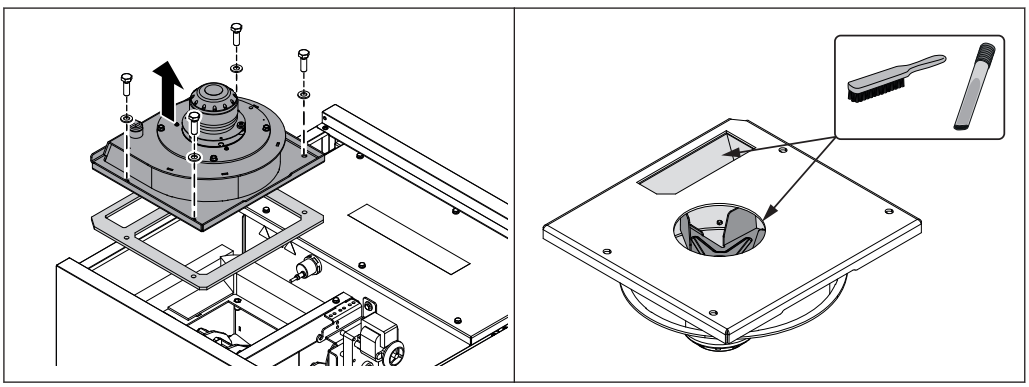
❒ Start the shutdown procedure by tapping “Boiler OFF”
❒ Switch of the boiler at the main switch and let cool down for at least one hour



❒ Open the insulated door and undo the safety screws located behind it
❒ Lift the cover slightly and remove it from the front



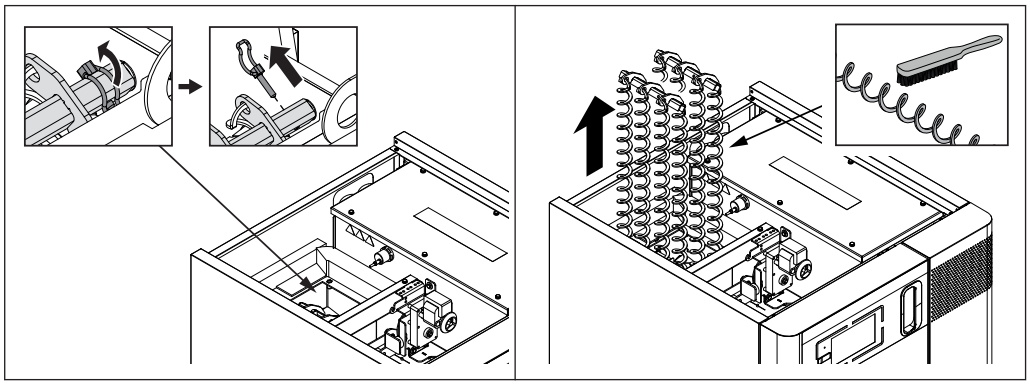
❒ Remove the plug connection from the induced draught fan
❒ Remove the thermal insulation on the induced draught fan



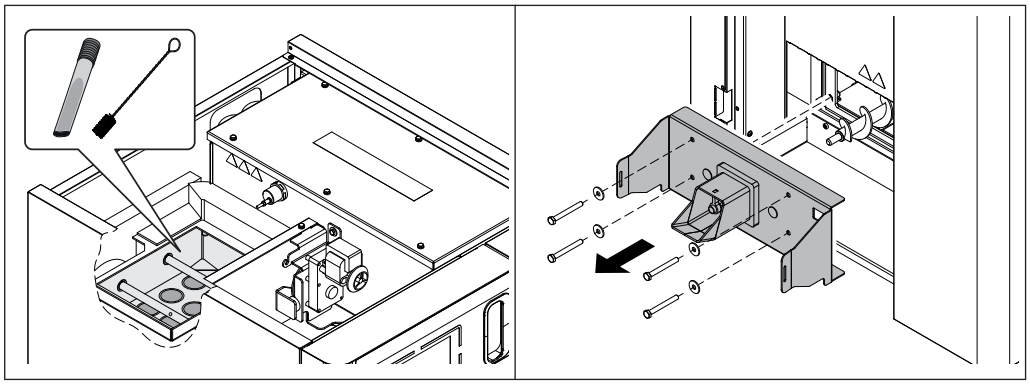
❒ Dismantle the induced draught unit housing including ID fan
❒ Carefully clean the induced draught unit housing and impeller on the ID fan

Clean the heat exchanger and WOS springs

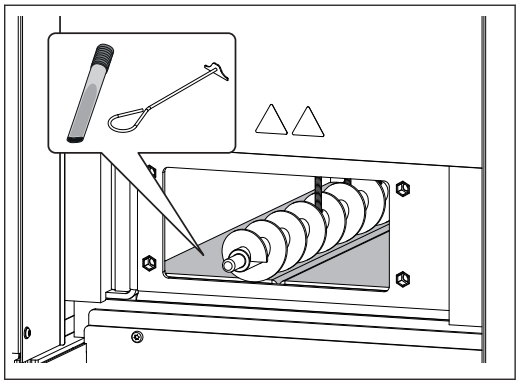
Staff	❒ Operator



❒ Remove the pipe locking pin from the linking plate
❒ Lift out the linking plates including WOS springs
❒ Clean the WOS springs



❒ Use a brush to clean the flue gas collection chamber, opening to the flue gas pipe and heat exchanger pipes
❒ Remove any soot which has fallen in
➥ **TIP:** Use an ash vacuum
❒ Dismantle the ash removal console at the front



❒ Remove any accumulated soot using a flat scraper

Cleaning the flue gas pipe

Staff	❒ Operator

❒ Remove the inspection cover on the connecting pipe
❒ Clean the connecting pipe between the boiler and chimney with a chimney sweeping brush
➥ Depending on the layout of the flue gas pipes and the chimney draught, cleaning once a year may not be enough!

Checking the draft controller flap

Staff	❒ Operator

❒ Check that the draught controller flap moves freely

8.3.5 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 authorized 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 optimized 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 maintenance contract, which optimizes operating safety. Please see the details in the accompanying guarantee certificate.

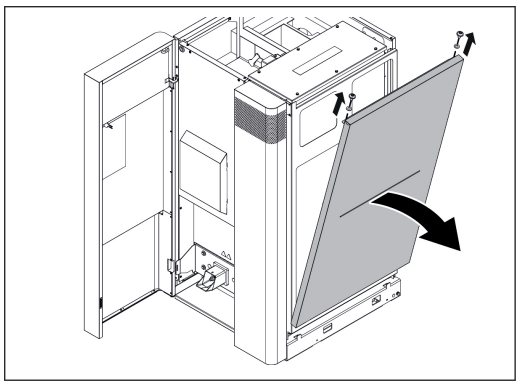
Your Froling customer service office will also be happy to advise you.

NOTICE

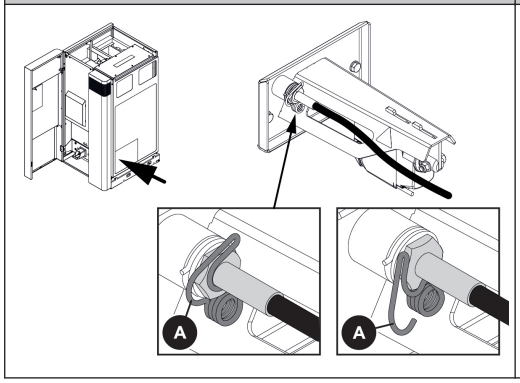
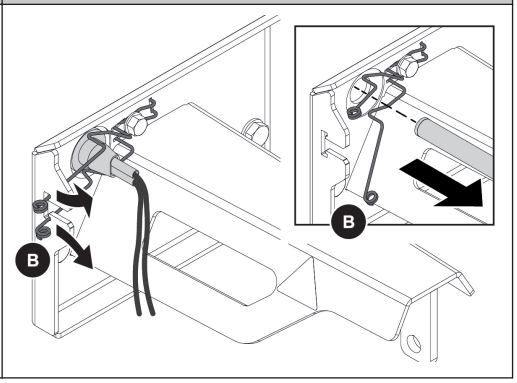
All national and regional regulations relating to regular testing of the system must be observed. Please be advised that, in Austria, commercial systems with a rated heat output of 50 kW or more must be regularly tested at yearly intervals in accordance with the Heating Plant Regulations (FAV in the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

Cleaning the combustion grate

Staff	❒ Skilled worker



❒ Undo the screws on the top and remove the side panel

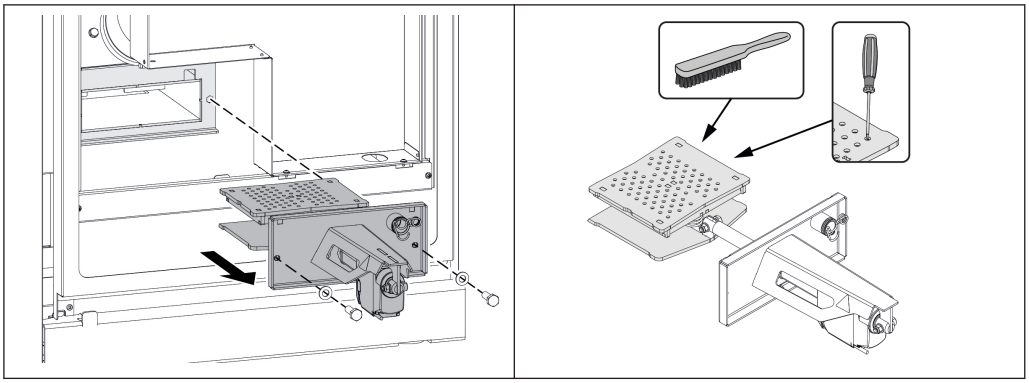
Ignition cartridge	Glow igniters
	

With ignition cartridge:

❒ Pull the hooks (A) on the spring cotter to the side and pull out the ignition cartridge

With glow igniters:

❒ Loosen spring clip (B) and pull out glow igniters



❒ Dismantle the entire grate unit

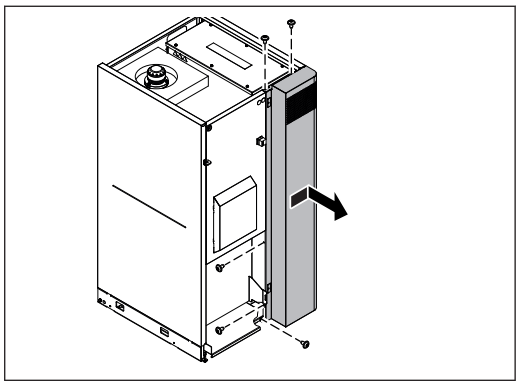
➥ Pay attention to the cable for the grate unit

❒ Thoroughly clean the combustion grate, remove any dirt from the air openings using a screwdriver

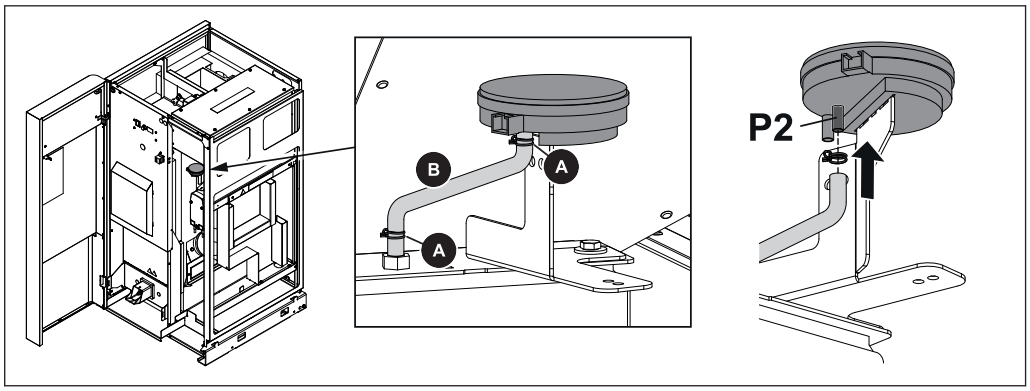
NOTICE! Small cracks and slight deformations on the grate are not indicative of a fault. After a thorough cleaning, the grate can be installed again.

Cleaning the measurement line of the underpressure controller

Staff	❒ Skilled worker



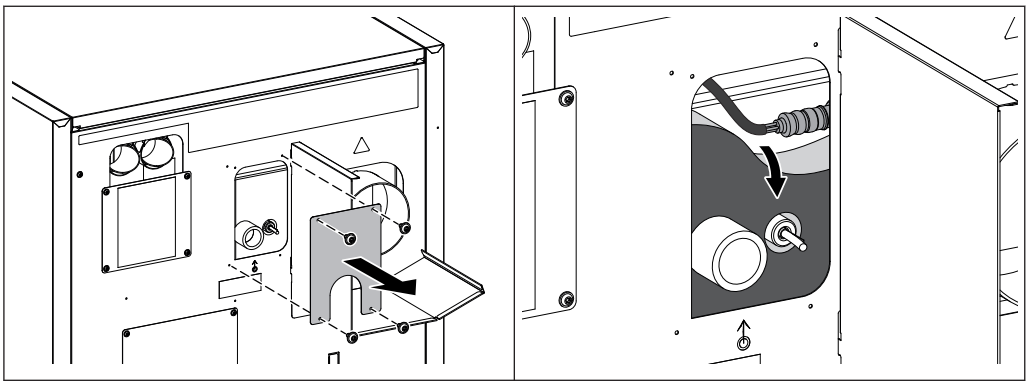
❒ Undo the screws on the front cover plate
❒ Unlock cover plate to the right and lift off to the front



❒ Loosen the twin wire clamps (A) with pliers and remove the measurement line (B)
❒ Clean the measurement line with gentle compressed air
➥ WARNING! Do not blow compressed air into the differential pressure transmitter!
It may damage the measuring device
❒ After cleaning, insert the measurement line into the measuring nipple and the “P2” connection of the differential pressure transmitter and attach using twin wire clamps

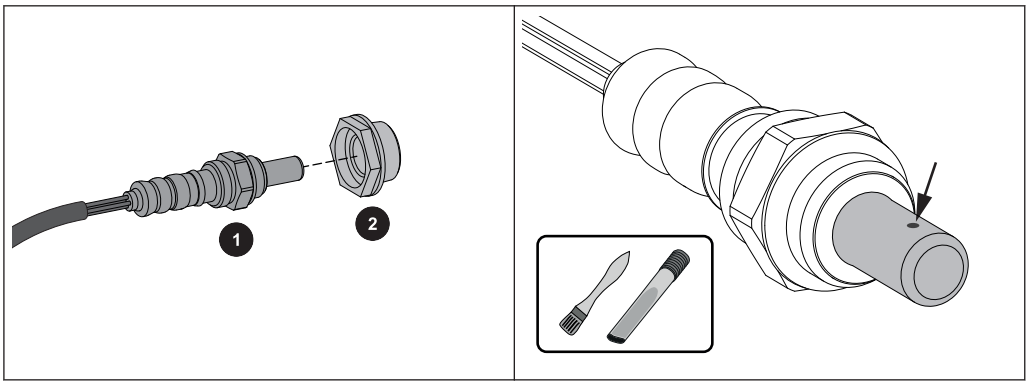
Cleaning the Lambda probe

Staff	❒ Skilled worker



❒ Remove the cover plate on the boiler flow

❒ Press the thermal insulation behind it slightly downwards



❒ Carefully remove the Lambda probe (1) and plastic bushing (2)

➥ Pay attention to the cables of the Lambda probe!

❒ Carefully remove impurities from the measuring ports with a fine brush and ash vacuum

➥ Hold the Lambda probe with the tip downwards so that deposits can fall out of the measuring ports

❒ Check the plastic bushing (2) for dirt and cracks, replace if necessary

➥ IMPORTANT: The seal surface of the plastic bushing must lie flat after assembly

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

8.4 After maintenance

After completion of maintenance work and before switching on the system perform the following steps:

- ❒ Check that all previously loosened screw connections are tightened.
- ❒ Check whether all previously removed safety devices and open doors and covers are closed again properly.
- ❒ Make sure that all tools, materials and other equipment used have been removed from the work area.
- ❒ Clean the work area and remove any substances that may have leaked such as liquids, processing materials or similar.
- ❒ Make sure that all safety devices on the system are functioning properly.

9 Boiler faults

9.1 Safety instructions for troubleshooting

Improperly performed troubleshooting operations

⚠ WARNING

Risk of injury due to incorrect troubleshooting!

- ❒ Before starting work, ensure that there is sufficient space for assembly.
- ❒ Pay attention to order and cleanliness at the assembly site. Loosely overlapping or scattered components and tools are sources of accident.
- ❒ If components have been removed, pay attention to correct assembly, refit all fasteners and observe tightening torques for screws.
- ❒ Do not release the blockage until you have ensured that the release will not lead to a dangerous movement of system components.
- ❒ Do not acknowledge the fault until it is eliminated or its cause is resolved.
- ❒ In case of doubt contact Froling customer service.
- ❒ Before starting up again, please note the following:
  - ➥ Make sure that all troubleshooting operations have been performed and completed according to the instructions in this manual.
  - ➥ Make sure that there is no-one in the danger zone.
  - ➥ Make sure that all covers and safety devices are installed and work properly.
  - ➥ Improperly performed troubleshooting operations can cause serious injuries and considerable property damage.

9.2 Fault messages

Faults that occur are displayed on the basic display of the control system. The fault messages are divided into categories and marked in different colors. The faults are marked with a number and the date and time when they occurred.

If there is a fault that has not yet been eliminated, a warning symbol blinks in the basic display on the quick menu icon.

Calling up fault messages

- ❒ In the basic display, select the *"Quick menu icon"* to open the available quick functions.
- ❒ Select the *"Error display"* menu in the quick menu.
  - ➥ The current fault list is displayed.

Acknowledging a fault message

Tap on the fault message to display additional information in the "Error display" menu.

- ❒ Open the current fault list.
- ❒ Tap on the fault message to acknowledge it.

Once all faults have been eliminated and acknowledged, the warning symbol will disappear from the basic display.

Fault message categories

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

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

9.3 Table for troubleshooting

Fault description	Cause	Remedy	Staff
Nothing is shown on the display	General power failure	Check power supply and, if necessary, restart boiler.	Operator
No power to the control system	▪ Main switch is turned off	▪ Turn on the main switch	Operator
	▪ FI-protective circuit breaker, power line protection tripped	▪ Switch the protective circuit breaker on the control cabinet back on.	Operator
High-limit thermostat has activated.	Over-temperature	▪ Allow system to cool. ▪ Check status of the system (note the fault messages). ▪ Reset the high-limit thermostat.	Operator
System does not start.	Insufficient combustion air	Check the air inlet to the boiler room and clean, if necessary.	Operator
	Covers on the boiler not closed	Check the covers and close, if necessary.	Operator
Boiler combustion fault	Insufficient chimney escape due to deposits in the chimney	Have a chimney sweep clean soot, ash and tar oil deposits from the chimney connection and chimney.	Chimney sweep

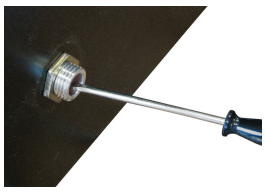
9.4 Operations for troubleshooting

9.4.1 Reset the high-limit thermostat.

Staff:	❒ Operator
Protective equipment:	❒ Protective workwear ❒ Protective gloves ❒ Safety shoes
Special tools:	❒ Screwdriver

The high-limit thermostat switches off the boiler at a temperature of 203-212°F (95-100°C). The pumps continue to run.

Once the temperature falls below approx. 185°F (approx. 85°C), the high-limit thermostat can be reset mechanically.



❒ Unscrew the cap of the high-limit thermostat.
❒ Unlock the high-limit thermostat by pressing with a screwdriver.
❒ Refit the cap of the high-limit thermostat.

9.5 After troubleshooting

Once the fault is eliminated, perform the following steps to start the boiler up again:

❒ Reset the emergency stop devices.
❒ Acknowledge the fault message via the control system.
❒ Make sure that there is no one in the danger zone.
❒ Start according to the instructions in the "Operation” chapter.

10 Dismantling and disposal

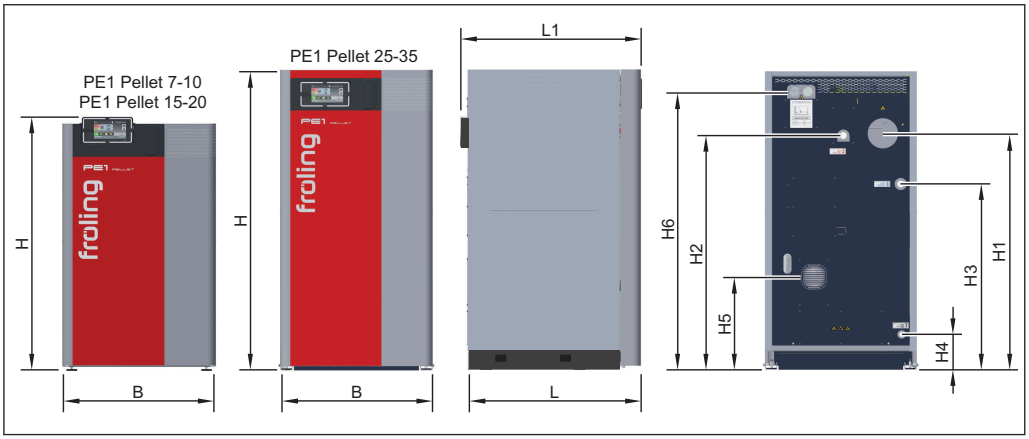
⚠ WARNING

Risk of death from improper dismantling!

- ❒ Dismantling must be carried out exclusively by employees of the manufacturer or staff authorized by the manufacturer.
- ❒ Consult the manufacturer even in case of a subsequent relocation.
- ❒ Refrain from unauthorized dismantling and relocation.
  - ➥ An error during dismantling can lead to life-threatening situations or cause substantial damage to property.

11 Technical information

11.1 PE1 Pellet 20/35 dimensions



Dimension	Description	Unit	PE1 Pellet	
			20	35
L	Length of boiler	inches (mm)	27 (690)	33.5 (850)
L1	Total length incl. flue gas pipe connection		29 (740)	35 (890)
B	Width, boiler		29.5 (750)	29.5 (750)
H	Height, boiler		49 (1246)	58.3 (1480)
H1	Height, flue pipe connection		36.5 (940)	46 (1170)
H2	Height, flow connection		37 (930)	46 (1160)
H3	Height, return connection		29.5 (750)	36 (920)
H4	Height, drainage connection		4 (95)	7 (175)
H5	Height of supply air connection (for room air-independent operation)		15 (390)	18 (460)
H6	Height of suction system connection		44 (1110)	54 (1380)

11.2 Components and connections

No.	Description	Unit	PE1 Pellet	
			20	35
1	Boiler flow connection	inches	1 IT	
2	Boiler return connection		1 IT	
3	Drainage connection		½ IT	
4	Supply air connection (external diameter)	inches (mm)	80	100
5	Flue gas pipe connection		5 (129)	6 (149)
6	Pellet suction line connection		2 (50)	
7	Return-air line connection		2 (50)	

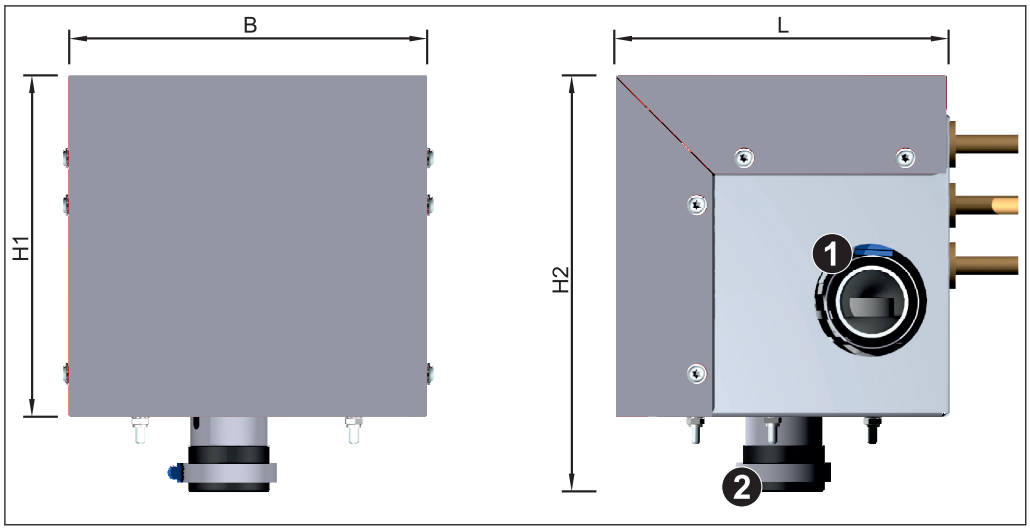
11.3 Technical data

Description		PE1 Pellet	
		20	35
Nominal output	Btu/h (kW)	68.200 (20)	119.500 (35)
Output range		15.300 – 68.200 (4.5 – 20)	24.600 – 119.500 (7.2 – 35)
Electrical connection	230V / 50Hz / fused C16A		
Power consumption	Btu (W)	170 (50)	229 (67)
Boiler weight	lbs (kg)	550 (250)	840 (380)
Total boiler capacity (water)	gal (l)	10 (38)	16 (60)
Pellet container capacity		11 (41)	20 (76)
Ash box capacity		5 (18)	7.4 (28)
Water pressure drop (ΔT = 20K)	inch WC (mbar)	2 (5.0)	5.6 (14.0)
Minimum boiler return temperature	Not applicable due to internal return temperature control		
Maximum boiler temperature setting	°F (°C)	194 (90)	
Minimum boiler temperature setting		104 (40)	122 (50)
Airborne sound level	dB(A)	< 70	
Boiler class as per EN 303-5:2012	5		
Permitted fuel	Fuel as per EN ISO 17225 – Part 2: wood pellets Class A1 / D06		

11.3.1 Emission data

Description	Unit	PE1 Pellet	
		20	35
8-HOUR OUTPUT RATING [$Q_{out-8hr}$]	Btu/hr	n/a	n/a
8-HOUR AVERAGE EFFICIENCY [$03B7_{avg-8hr}$]		n/a	n/a
8-HOUR AVERAGE EFFIENCY [$\eta_{avg-8hr}$] (Using lower heating value)		n/a	n/a
MAXIMUM OUTPUT REATING [Q_{max}]	Btu/hr	68.200	119.500
ANNUAL EFFICIENCY RATING [η_{avg}] (Using higher heating value)		78.4	80.1
ANNUAL EFFICIENCY RATING [η_{avg}] (Using lower heating value)		84.4	86.2
PARTICLE EMISSIONS [E_{avg}]	Grams/hr (Average)	0,425	0,678
	Lbs/mmBtu/ hr Output	0,049	0,053
CO EMISSIONS	Grams/mi- nute	0,073	0,074
N.A = Not applicable because the hydronic heater is an automatic pellet fuelled applicance.			

11.4 External suction module



Dimen-sion	Description	Unit	Dimensions
B	Width of suction module	inches (mm)	11.5 (290)
L	Length of suction module		10.4 (265)
H1	Height of suction module		9 235
H2	Total height incl. hose connection		11.2 (285)
1	Return-air line connection (line to suction point)	inches (mm)	2 (50)
2	Return-air line connection (line to boiler)		2 (50)

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12 Notes

13 Appendix

13.1 Adresses

13.1.1 Address of manufacturer

FROLING
Heizkessel- und Behälterbau GesmbH

Industriestraße 12
A-4710 Grieskirchen
AUSTRIA

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

13.1.2 Address of importer

STAMP

13.1.3 Address of Local Dealer

STAMP