

Assembly Instructions
Pellet boiler PE1 Pellet 20/35



Read and follow the instructions and safety informations!
Technical changes, typographical errors and omissions reserved!
M2030120_en-us | Edition 11/11/2020



Inhaltsverzeichnis

1	Supplementary instructions	4
2	Safety	5
2.1	Explanation of symbols	5
2.2	Permitted uses	6
2.3	Requirements at the place of installation	6
2.3.1	Approval for the heating system	6
2.3.2	Space required	7
2.3.3	Requirements for central heating water	7
2.3.4	Ventilation requirements for boiler room	8
2.3.5	Requirements for the heating system	9
2.3.6	Requirements for the installation room (boiler room)	9
2.3.7	Requirements for the fuel store	9
2.3.8	Hose lines	9
2.3.9	Combination with a storage tank	10
2.3.10	Requirements for the chimney connection	10
	<i>Basic data for designing the chimney connection</i>	11
2.4	Safety devices	12
2.4.1	Position of safety devices	12
2.4.2	Description of safety devices	12
2.5	Safety markers	13
2.5.1	Mandatory signs	13
2.5.2	Prohibitions	14
2.5.3	Warning signs	14
2.5.4	Additional safety signage	15
2.5.5	Signage on the boiler	16
	<i>Notice of risks during installation</i>	16
	<i>Notice of risks during operation</i>	17
	<i>Notice regarding procedures in an emergency</i>	18
2.5.6	Sign on fuel store	19
2.6	Residual risks	19
2.6.1	Basic risks	19
2.6.2	Risks from electricity	21
2.6.3	Danger from movement of the system	21
2.6.4	Danger from fire and explosion	22
2.6.5	Danger from high temperatures	23
2.6.6	Risks from flue gases, incorrect fuel and other equipment	24
2.7	What to do in the case of danger	26
2.8	Staff requirements	27
2.9	Personal protective equipment	30
2.10	Replacement parts	30
2.11	Environmental protection	31
2.12	The operator's responsibilities	31
3	Technical information	33
3.1	PE1 Pellet 20/35 dimensions	33
3.2	Components and connections	34

3.3	Technical data	35
3.3.1	Emission data	36
3.4	External suction module	37
4	Assembly	38
4.1	Tools required	38
4.2	Transport	38
4.3	Positioning	38
4.4	Temporary storage	39
4.5	Install PE1 Pellet	40
4.5.1	Remove boiler from pallet	40
4.5.2	PE1 Pellet 35 – Prepare the boiler for transport and setup	41
4.5.3	Align the boiler with the floor	43
4.5.4	Prepare for room air-independent operation	43
4.5.5	Installing the discharge system	44
	<i>Installing the external suction module</i>	44
	<i>Fit the suction hoses to the boiler</i>	46
	<i>Assembly information for hose lines</i>	47
4.5.6	Install the protective plate for the flue pipe	49
4.5.7	Electrical connection	50
	<i>Potential equalisation</i>	51
	<i>Information on circulating pumps</i>	52
4.6	Final installation steps	53
5	Start-up	54
5.1	Before commissioning / configuring the boiler	54
6	Decommissioning	55
6.1	Mothballing	55
6.2	Disassembly	55
6.3	Disposal	55
7	Notes	56

1 Supplementary instructions

These instructions ensure safe and efficient use of the (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!*****Copyright***

This instruction manual is protected by copyright.

This instruction manual must not be transferred to third parties, reproduced in any form – even excerpts thereof – or the contents used and/or disclosed without the written consent of Froling Ges.m.b.H. (hereinafter "manufacturer"), unless for internal purposes. Failures to comply with this shall incur damages. The manufacturer reserves the right to assert further claims.

The manufacturer holds the copyright.

© Froling Ges.m.b.H.

2 Safety

2.1 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.



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



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



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



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).

2.2 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.

2.3 Requirements at the place of installation

2.3.1 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.

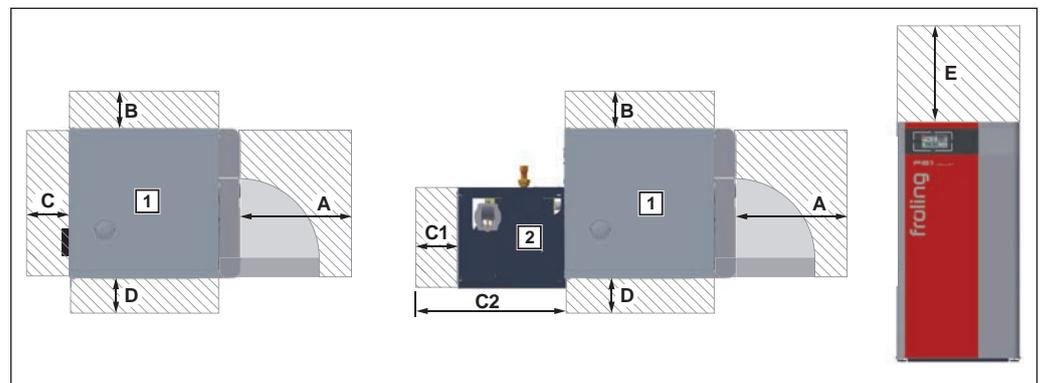
2.3.2 Space required

- 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

2.3.3 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 CaCO₃ (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.

2.3.4 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.

2.3.5 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.

2.3.6 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!

2.3.7 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 room where the solid-fuel-burning appliance is located.

2.3.8 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).

2.3.9 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.

2.3.10 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 joints 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



ADJUSTMENT OF THE FLUE DRAFT HIGHER THAN 0.10 INCHES WATER COLUMN (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)

2.4 Safety devices

2.4.1 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.

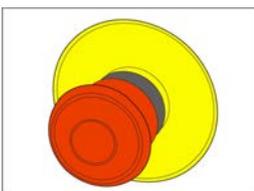
5 DOOR SWITCH (protection against access to moving components)

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.

2.4.2 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

2.5 Safety markers

2.5.1 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.

2.5.2 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.

2.5.3 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.

2.5.4 Additional safety signage

**Warning sign for covers**

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

2.5.5 Signage on the boiler

Notice of risks during installation

PE1 PELLETT - WOOD PELLETT 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 PELLETT	
Quantity	Unit	20	35
Flue gas temperature	°F	300 / 210	320 / 210
Rated / partial load	°C	150 / 100	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!

A 2150 00 17

Notice of risks during operation**PE1 PELLETT - WOOD PELLETT 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.

A 2151 00 17

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.

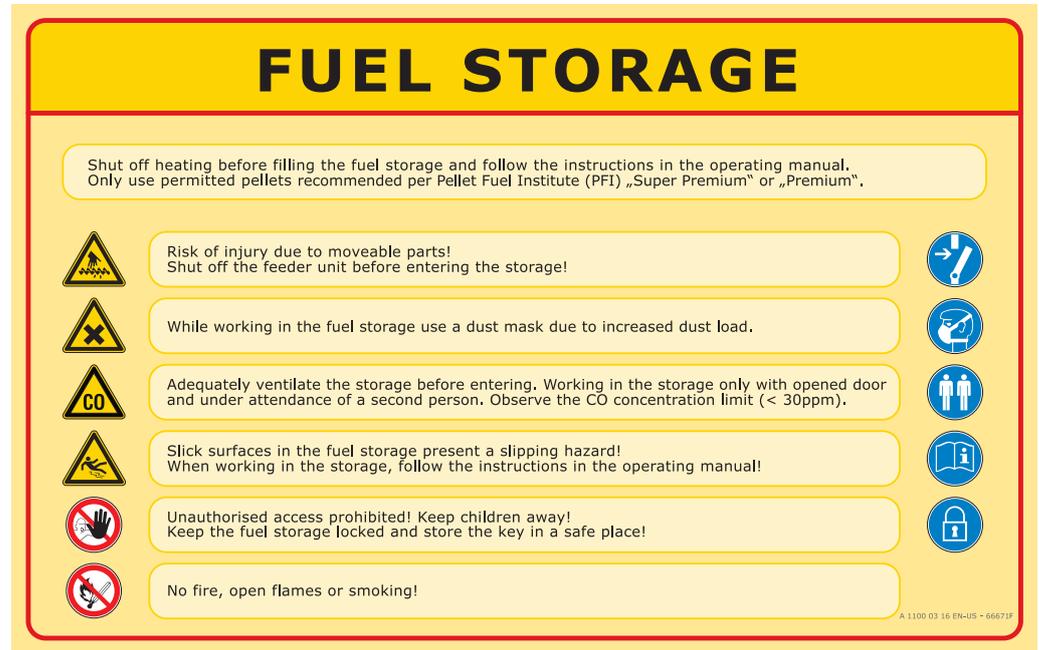
To cool overheated boiler (over 220°F / 105°C)!

- 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.

A 2152 00 17

2.5.6 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.



2.6 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.

2.6.1 Basic risks

Incorrect operation



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



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.

2.6.2 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.

2.6.3 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.

2.6.4 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).

2.6.5 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.

2.6.6 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.

2.7 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.

2.8 Staff requirements

Risk of injury from inadequate qualification of staff!**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

2.9 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.

2.10 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.

2.11 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.

2.12 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.

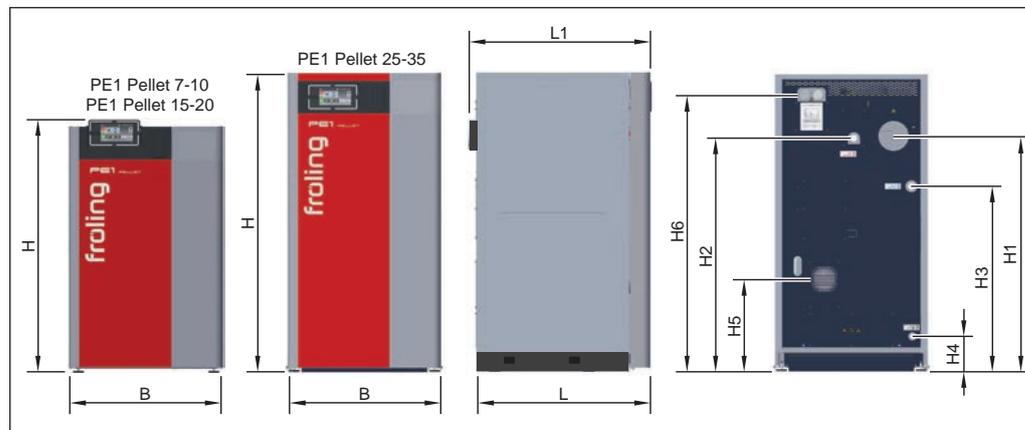
In addition to the safety instructions in this manual, the applicable regulations on safety, safety at work and environmental protection must be observed.

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.

3 Technical information

3.1 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)

3.2 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)	

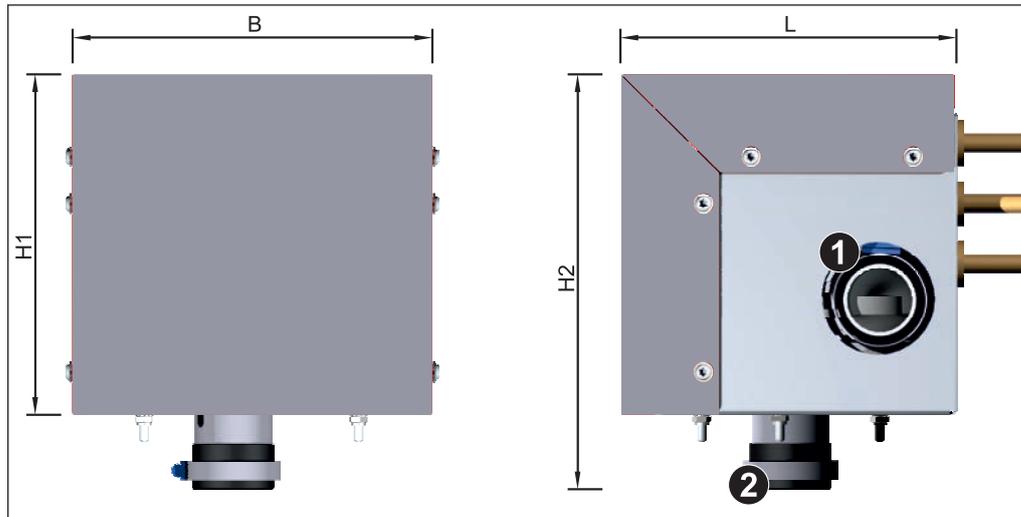
3.3 Technical data

Description		PE1 Pellet	
		20	35
Nominal output	Btu/h	68.200 (20)	119.500 (35)
Output range	(kW)	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	10 (38)	16 (60)
Pellet container capacity	(l)	11 (41)	20 (76)
Ash box capacity		5 (18)	7.4 (28)
Water pressure drop ($\Delta T = 20K$)	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	194 (90)	
Minimum boiler temperature setting	(°C)	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	

3.3.1 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 EFFICIENCY [$\eta_{avg-8hr}$] (Using lower heating value)		n/a	n/a
MAXIMUM OUTPUT RATING [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 appliance.			

3.4 External suction module



Dimension	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)

4 Assembly

NOTICE

Several parts of the boiler are covered with a protective film. This film **MUST** be removed before assembly!

4.1 Tools required



The following tools are required for assembling the boiler and suction module:

- Spanner or box wrench set
- Set of Allen keys
- Flat head and cross-head screwdrivers
- Pipe wrench or water pump pliers (1")
- Cordless screwdriver and set of Torx bits (T20, T25, T30)
- Power drill with masonry drill bit Ø12 mm (0.47 inch)

4.2 Transport

The product is delivered on pallet(s) in cardboard packaging.

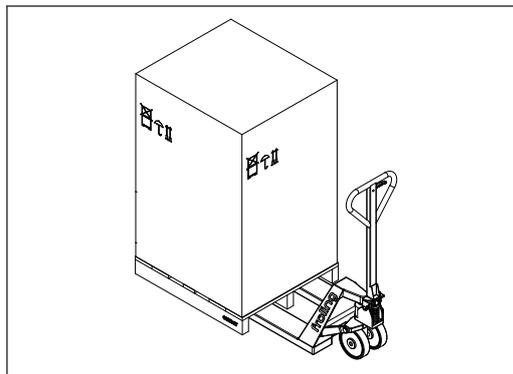
NOTICE

Possibility of damage to components if handled incorrectly

- Follow the transport instructions on the packaging
- Transport components with care to avoid damage
- Protect components against damp
- Pay attention to the pallet's centre of gravity when lifting

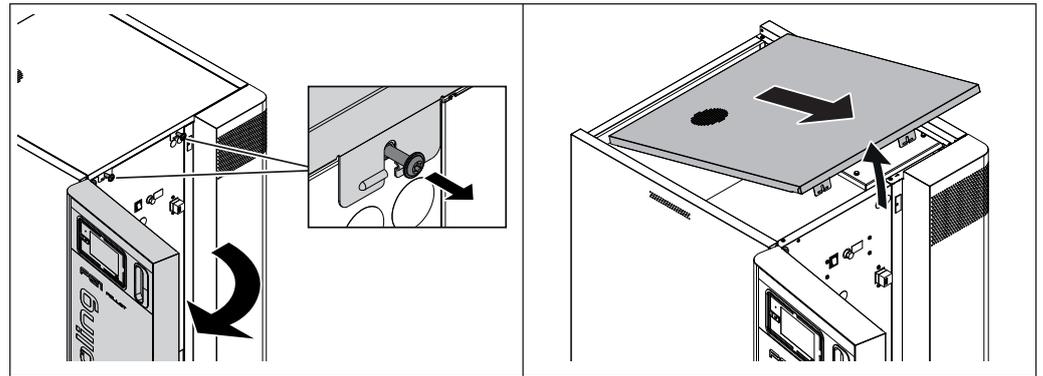
4.3 Positioning

Transport with fork-lift or similar lifting device

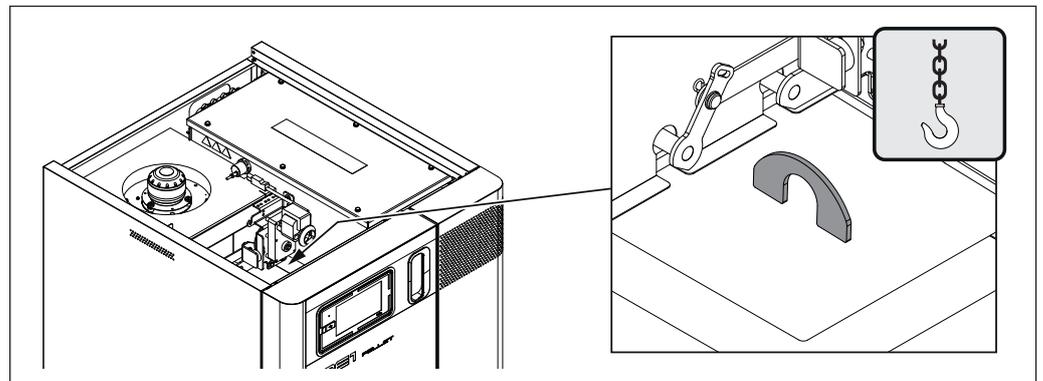


- Position a fork-lift or similar lifting device at the pallet and bring in the components

Positioning using a crane:



- Open the insulated door
- Unlock the cover by undoing the retaining screws
- Lift the cover on the front edge slightly and remove it towards the front



- Transport the boiler using a crane hook

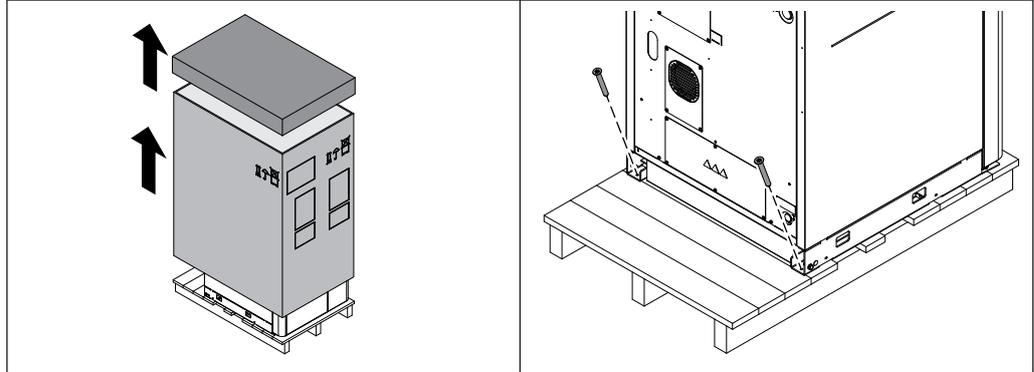
4.4 Temporary storage

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

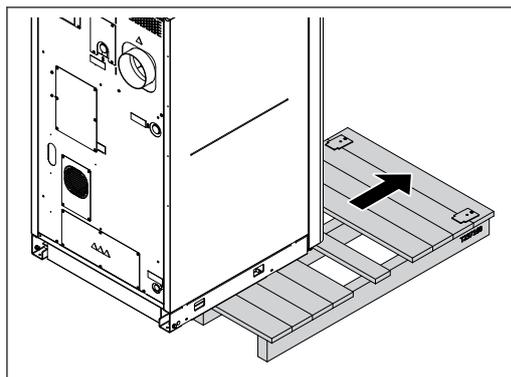
- Store components at a protected location, which is dry and free from dust
 - ➔ Damp climate conditions and frost can damage components, particularly electric ones!

4.5 Install PE1 Pellet

4.5.1 Remove boiler from pallet



- Cut through the strapping and lift off the cardboard
- Remove components behind boiler (suction module, furnace tool, etc.) from pallet
- Loosen the transport lock on the back of the boiler



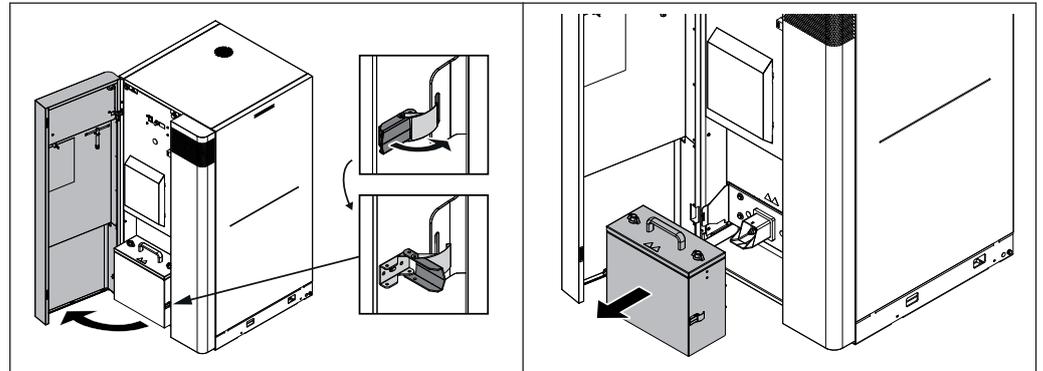
- Lift the boiler and pull the pallet forward

TIP: We recommend using Froling's KHV 1400 boiler lifting system to make pallet removal easier

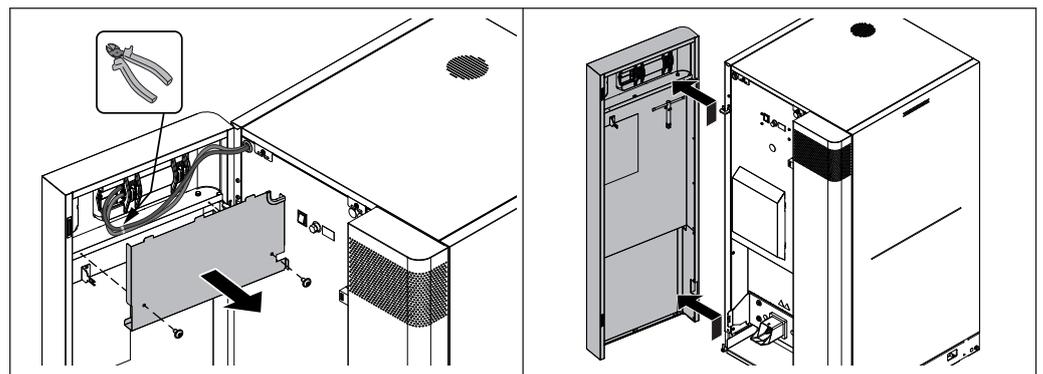


4.5.2 PE1 Pellet 35 – Prepare the boiler for transport and setup

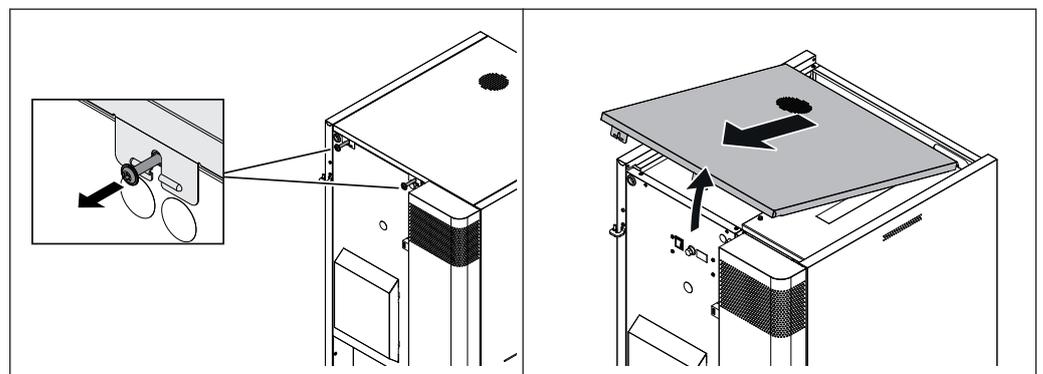
The following preparations are necessary in order to remove the PE1 Pellet 35 from the pallet using the Fröling KHV 1400 boiler lifting system or similar hoisting equipment and transporting it.



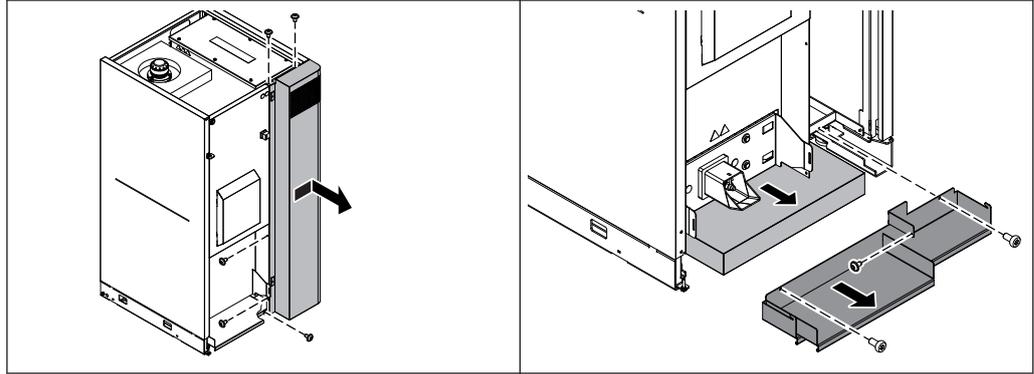
- Open the insulated door
- Release the clamps and remove from the ash container from the boiler



- Remove the cover plate on the inside of the insulated door
- Remove cable ties and unplug both display cables
TIP: Uniquely identify the cables (top bushing: BUS, bottom bushing: ETHERNET)
- Remove insulated door



- Unlock the cover by undoing the retaining screws
- Lift the cover on the front edge slightly and remove it towards the front



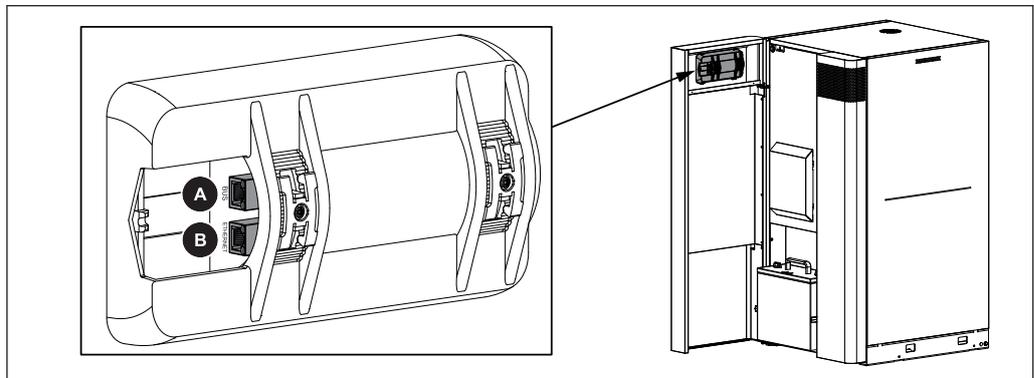
- Undo the screws on the front cover plate
- Unlock cover plate to the right and lift off to the front
- Remove the protective plate from the bottom of the boiler
- Pull out floor insulation

The Fröling KHV 1400 boiler lifting system can now be used to lift the boiler off the pallet and the boiler can be transported using a forklift or similar lifting device.

Assemble all components in reverse order.

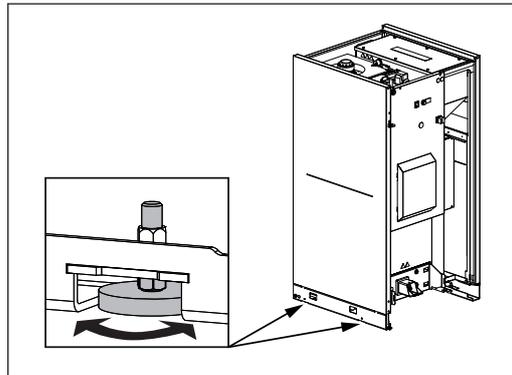
IMPORTANT: Plug the display cable into the right bushing:

- Bushing A: BUS
- Bushing B: ETHERNET



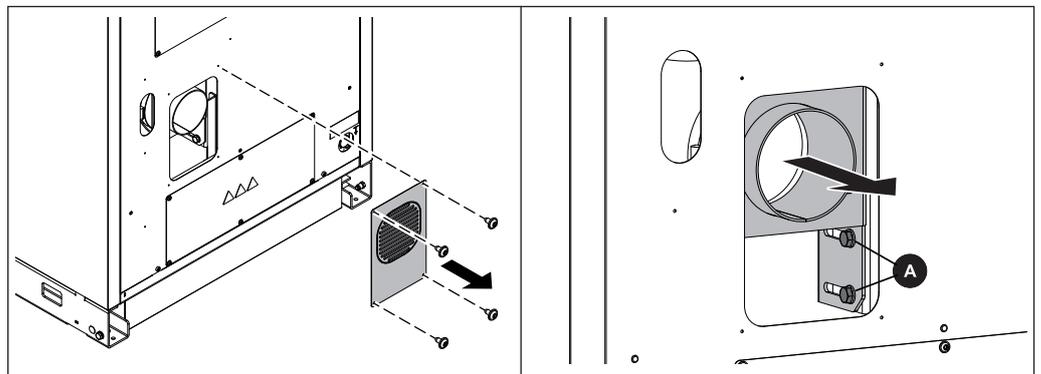
4.5.3 Align the boiler with the floor

For PE1 Pellet 20 the leveling feet are adjusted from the outside. The leveling feet of PE1 Pellet 35 are only accessible by removing the front protective plate, → See "PE1 Pellet 35 – Prepare the boiler for transport and setup" [page 41].

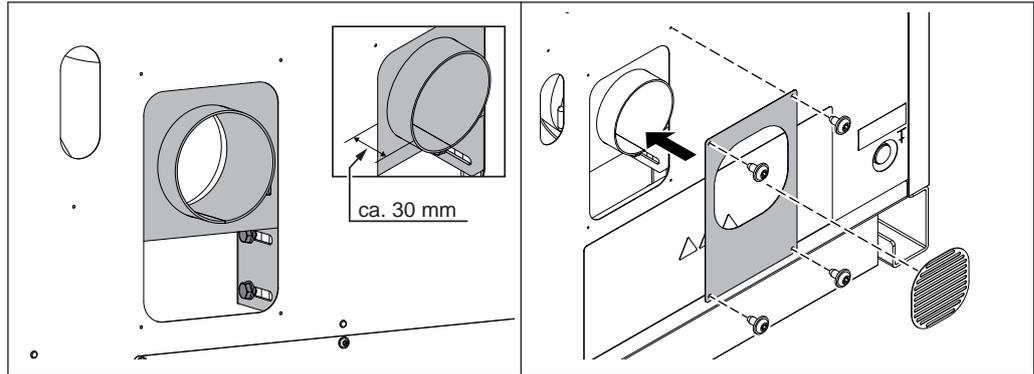


- ☐ Lift the boiler off the floor and use the adjustable feet to level it the boiler
 - ➔ To avoid structure-borne sound transmission, the bottom of the boiler must not rest on the floor

4.5.4 Prepare for room air-independent operation



- ☐ Remove the cover grille on the back of the boiler
- ☐ Loosen both screws (A) on the air connection



- Pull the console of the supply air connection to the rear until approx. 30 mm (1.18 inches) of the pipe protrudes
- Fasten both screws
- Remove the grille from the cover plate
- Remove the burrs using a half-round file
- Mount cover plate on the supply air connection

4.5.5 Installing the discharge system

Once the discharge system has been assembled in accordance with the assembly instructions enclosed, the suction and return air line needs to be connected to the boiler and the external suction module connected as well.

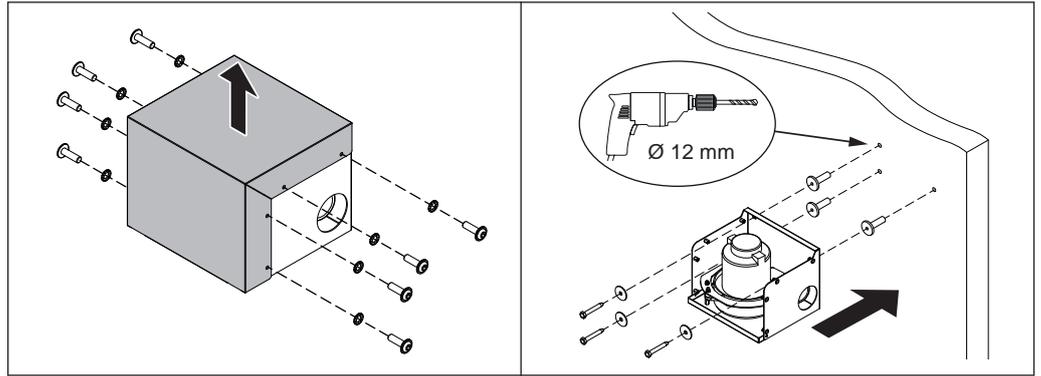
Installing the external suction module

The pellets are loaded using an external suction module. The suction module is installed in the return-air line between the boiler and the suction point.

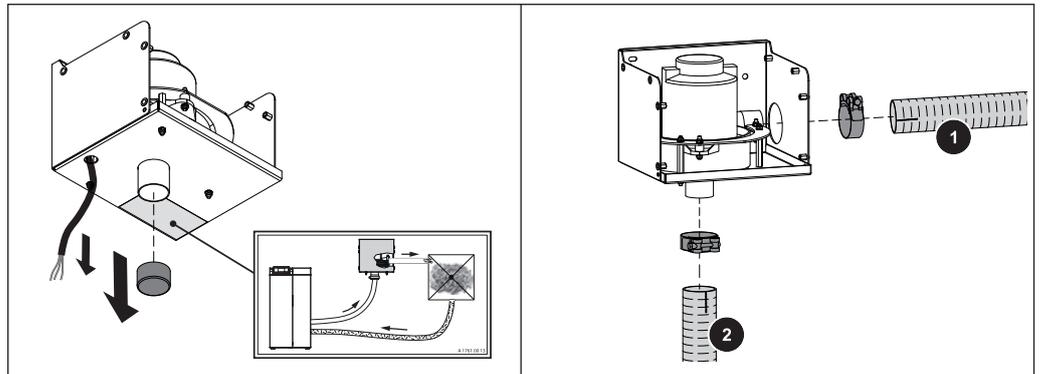
The following points should be noted for assembly:

- The position in the return air line can be chosen freely.
When using an optional PST pellet dust extractor, it is recommended that the suction module be installed in the return air line between the pellet dust extractor and the store to protect the turbine from pellet dust
- Before assembly, check whether the supplied assembly material is suitable and, if required, needs to be replaced by suitable material for the base.
- No specific installation position is required for the suction turbine to operate smoothly. Preferably, the suction module should be mounted so that existing openings in the housing are not on the upper side and the suction turbine is protected against external influences.
- To prevent interference with moving parts, the electrical connection and the setup of the external suction module should be carried out only after connecting the hose lines.

Depending on the boiler type, two different sized suction modules are used. The installation itself is the same for both sizes.

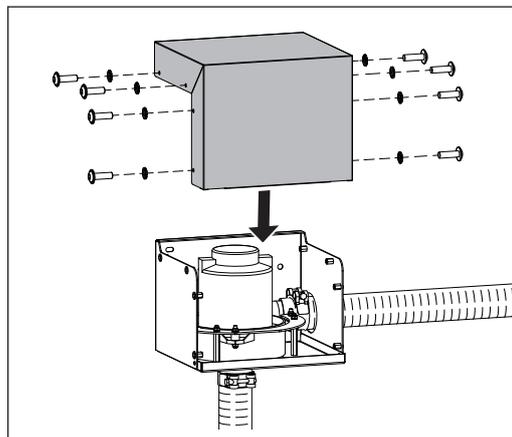


- Unscrew the screws on the side of the suction module and remove the cover hood
- Install the bottom panel including the supplied dowels and screws at any desired position in the return air line
 - ➔ If the suction module is positioned at a maximum distance of 2 m (6.7 ft) to the boiler, the power supply line can be plugged in as is. When distances are greater the power supply line must be lengthened accordingly on-site

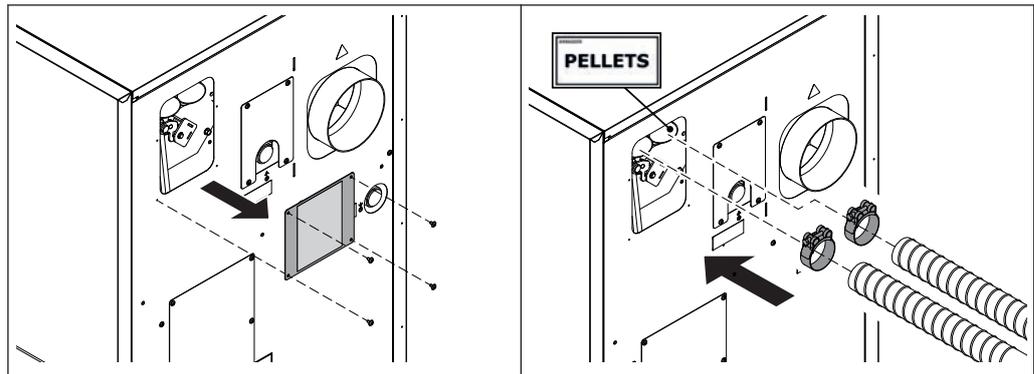


- Unwind the cable of the suction turbine and feed it through the opening of the housing underside
- Remove the protective cap on the underside of the suction module
- Lay the return air line from the suction point to the suction module and fix it to the pressure side (position 1) with a hose clamp
- Fix the second part of the return-air line to the under-pressure side (position 2) with a hose clamp and lay the line to the boiler

NOTICE! When connecting the lines, pay attention to equipotential bonding, ⇒ See "Assembly information for hose lines" [page 47]

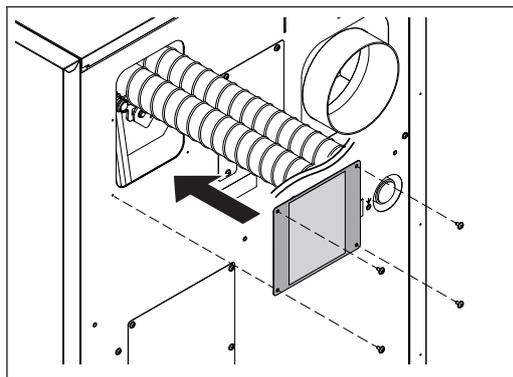


- Secure the cover hood with the previously removed screws

Fit the suction hoses to the boiler


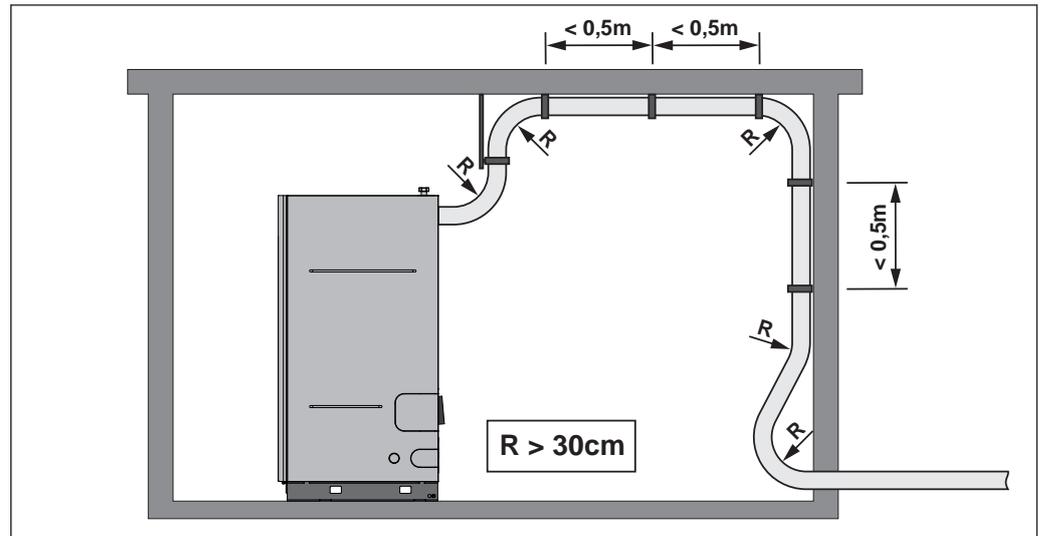
- Remove the cover plate at the connections
- Fix the suction hoses to the connections using hose clamps
 - Left-hand connection: Return-air line
 - Right-hand connection: Suction hose (PELLETS sticker)

NOTICE! When connecting the lines, pay attention to equipotential bonding, ⇨
 See "Assembly information for hose lines" [page 47]



- Install cover plate underneath the suction hoses

Assembly information for hose lines

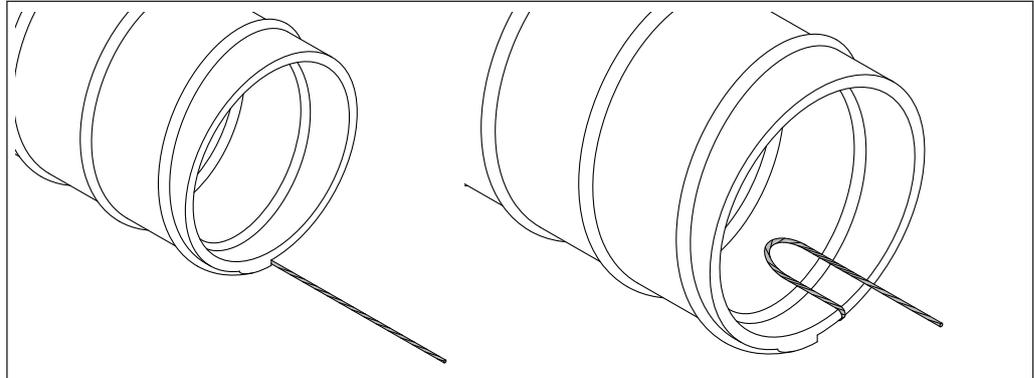


Please note the following with regard to the hose lines used in Froling vacuum discharge systems:

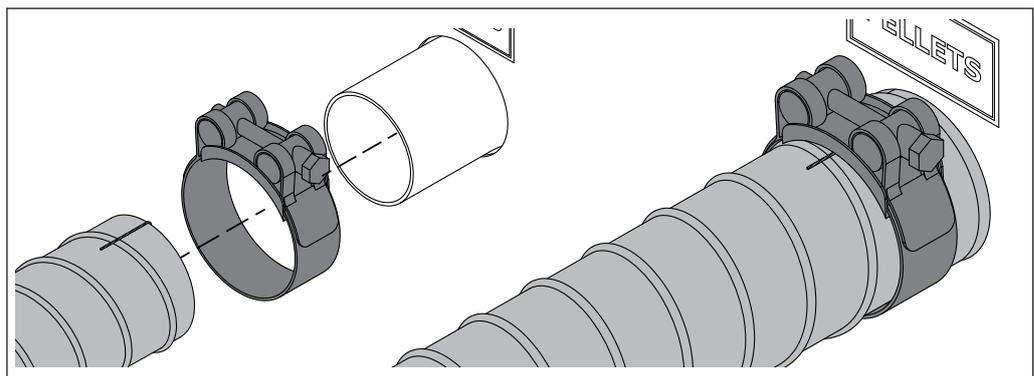
- Do not kink the hose lines! Minimum bending radius = 30cm (11.81 inches)
- Lay the hose lines as straight as possible! Sagging lines can lead to so-called “pockets”, which may cause problems with the pellet feed.
- Lay the hose lines in short sections away from walking areas.
- Hose lines are not UV-proof. Therefore: Do not install the hose lines outdoors.
- Hose lines are suitable for temperatures up to 60°C (140°F). Therefore: Hose lines must not come into contact with flue gas pipes or uninsulated heating pipes.
- Hose lines must be earthed on both sides to ensure that no static charge builds up as a result of transporting the pellets.
- The suction hose to the boiler must be in a single section.
- The return-air line can be made up of several sections, but consistent potential equalisation must be established throughout the line.
- For systems over 48 kW, only suction hoses with PU inlet are recommended due to the increased load.

Potential equalisation

When connecting the hose lines to the individual connections, ensure there is consistent potential equalisation throughout the line.

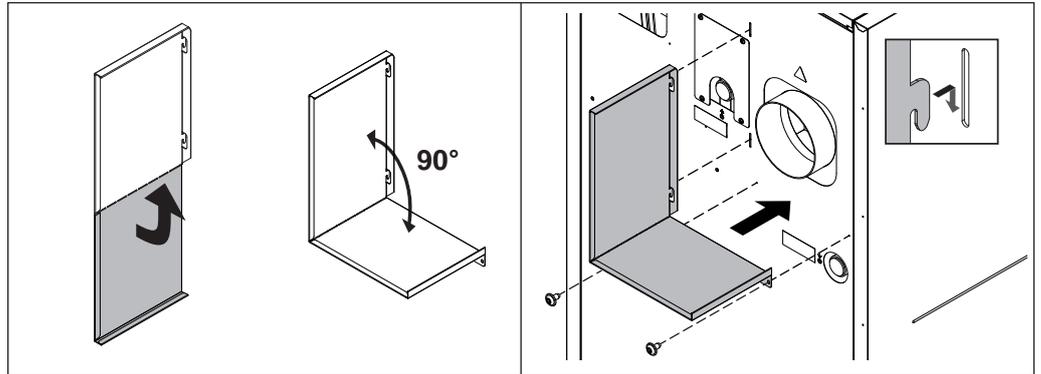


- Expose approximately 8 cm (3.15 inches) of the earth wire at the end of the hose line
 - ➔ **TIP:** Slit the insulation open along the wire with a knife
- Bend the earth wire inwards in a loop
 - ➔ This prevents the earth wire from being damaged by the pellet movement



- Slide the hose clamp onto the hose line
- Attach the hose line to the connector
 - ➔ Ensure that contact is established between the earth wire and the connector. Remove paint from the affected area if necessary
 - ➔ **TIP:** If stiffness occurs when trying to attach the hoses to the connectors, pour a few drops of water onto the pipe (do not use grease).
- Secure the hose line with a hose clamp

4.5.6 Install the protective plate for the flue pipe



- Bend the protective plate at the punched edge 90°
- Hang the protective plate onto the back of the boiler and fix the plate using the screws
 - ➔ The protective plate is designed to shield boiler components from the hot flue pipe to the smoke stack.

4.5.7 Electrical connection

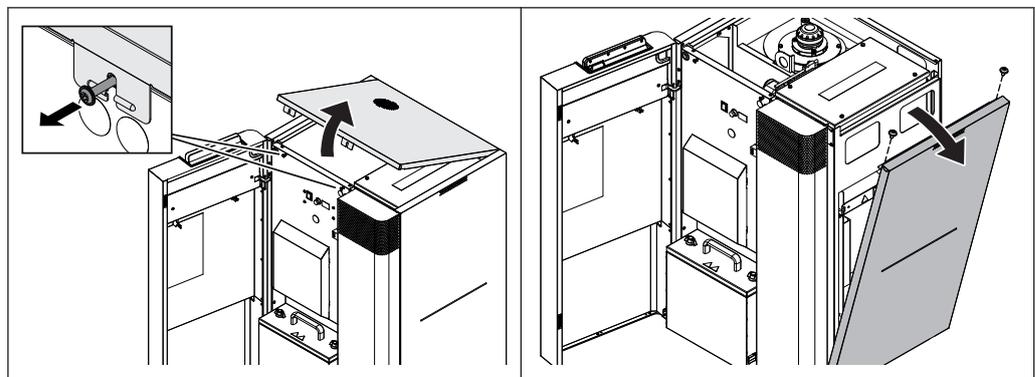
⚠ DANGER

When working on electrical components:

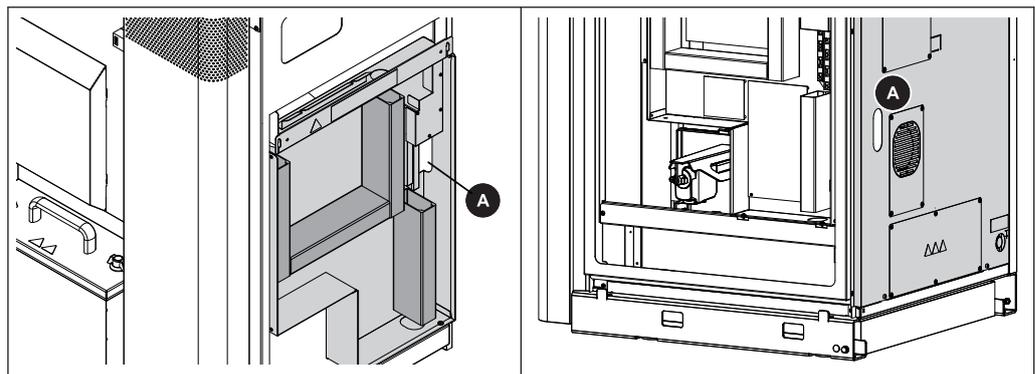
Risk of electrocution!

When work is carried out on electrical components:

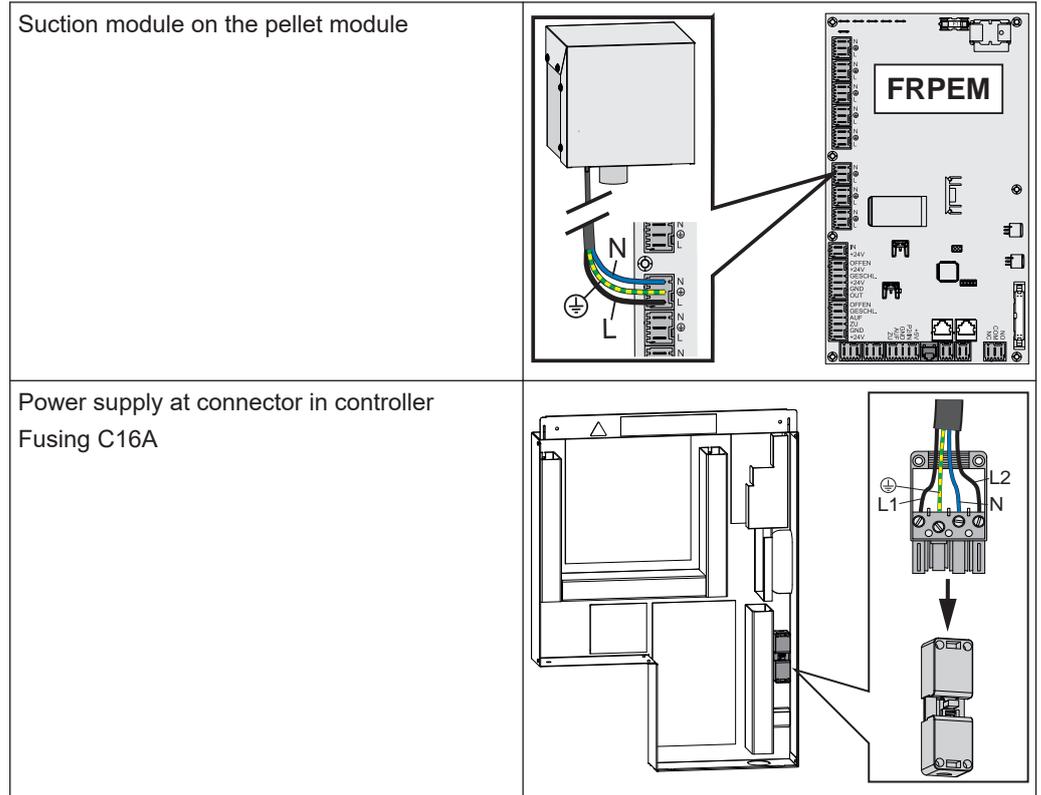
- Only have work carried out by a qualified electrician
- Observe the applicable standards and regulations
 - ➔ Work must not be carried out on electrical components by unauthorised persons
- Flexible sheathed cable must be used for the wiring; this must be of the correct size to comply with applicable regional standards and regulations



- Unlock the cover by undoing the retaining screws
- Lift the cover on the front edge slightly and remove it towards the front
- Undo the screws on the top and remove the side panel

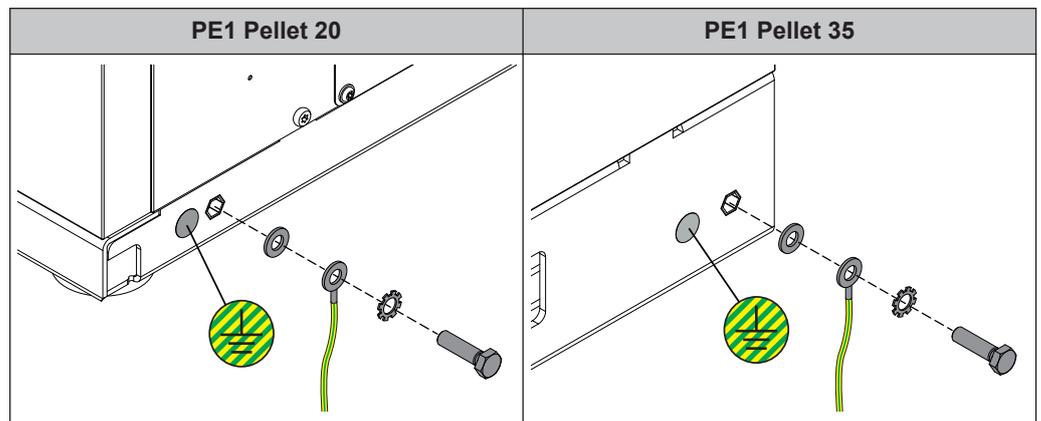


- Run the cables of all components through cut-out (A) in the back panel to the controller and plug in to the following boards



NOTICE! Compliance with additional information in the relevant boiler controller documentation is mandatory!

Potential equalisation



❑ The potential equalisation on the boiler base must comply with current directives, regulations and standards.

Information on circulating pumps

NOTICE

According to 2012/622/EU external, wet running circulating pumps must comply with the following limit values of the Energy Efficiency Index (EEI):

- Effective from 01/01/2013: Wet running circulating pumps with $EEI \leq 0.27$
- Effective from 08/01/2015: Wet running circulating pumps with $EEI \leq 0.23$

Only high efficiency pumps with a connection option for a control signal (PDM / 0-10V) should be connected to speed-controlled pump outputs (pump 1 on the core module and pump outputs on the hydraulic module). In this case, the control line is connected to the corresponding PDM outputs of the boards. Observe the connection instructions in the boiler controller documentation!

CAUTION

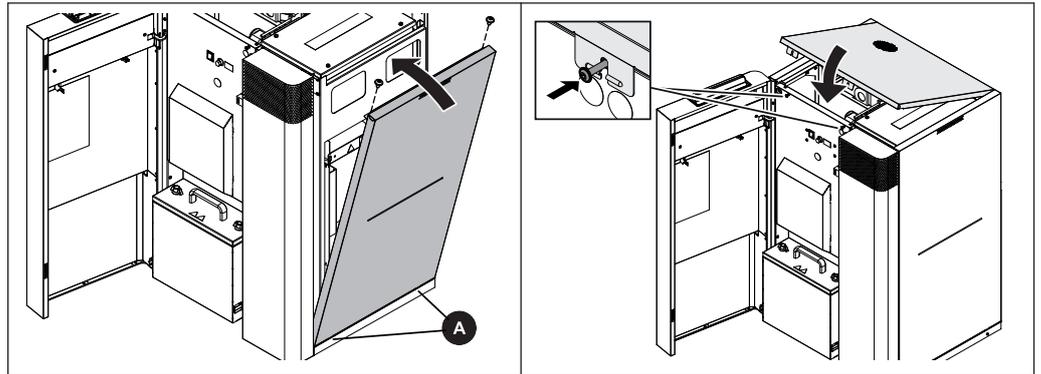
When using high efficiency pumps without an additional control line at speed-controlled pump outputs:

Malfunctions of the boiler, the pump and the hydraulic system may occur!

Therefore:

- Do not connect EC motor pumps without a control line to the speed-controlled pump outputs of the boards.
 - ➔ Only use special high efficiency pumps with a connection option for a control line (PWM/0-10V)!
 - ➔ Observe the additional instructions and information on board outputs in the operation instructions for the boiler controller.

4.6 Final installation steps



- Insert side panel into lugs (A) and attach at the top
- Insert the cover at the rear and attach it with a retaining screw

5 Start-up

5.1 Before commissioning / configuring the boiler

The boiler must be adjusted to the heating system during commissioning.

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.

- Adjust the boiler controller to the system type.
- Apply boiler standard values.

NOTICE! Detailed instructions for keypad assignment and the steps required for modifying the parameters can be found in the operating instructions for the boiler control unit.

- Check the heating system pressure.
- Ensure that the heating system is fully ventilated (free of air).
- Ensure that the safety devices are present and working correctly.
- Ensure that there is sufficient ventilation in the boiler room.
- Check the boiler seals
 - ➔ All doors and inspection openings must be tightly sealed!

- Ensure that drives and actuators are working and turning in the right direction.

NOTICE! For information about checking the analog and digital outputs, see the operating instructions for the boiler controller.

- Ensure that the door contact switch is working correctly.

NOTICE! For information about checking the digital inputs, see the operating instructions for the boiler controller.

6 Decommissioning

6.1 Mothballing

The following measures should be taken if the boiler is to remain out of service for several weeks (e.g. during the summer):

- Clean the boiler thoroughly and close the doors completely.

If the boiler is to remain out of service during the winter:

- Have the system completely drained by a qualified technician.
 - ➔ Protection against frost

6.2 Disassembly

To disassemble the system, follow the steps for assembly in reverse order.

6.3 Disposal

- Ensure that they are disposed of in an environmentally friendly way in accordance with waste management regulations in the country (e.g. AWG in Austria)
- You can separate and clean recyclable materials and send them to a recycling centre.

