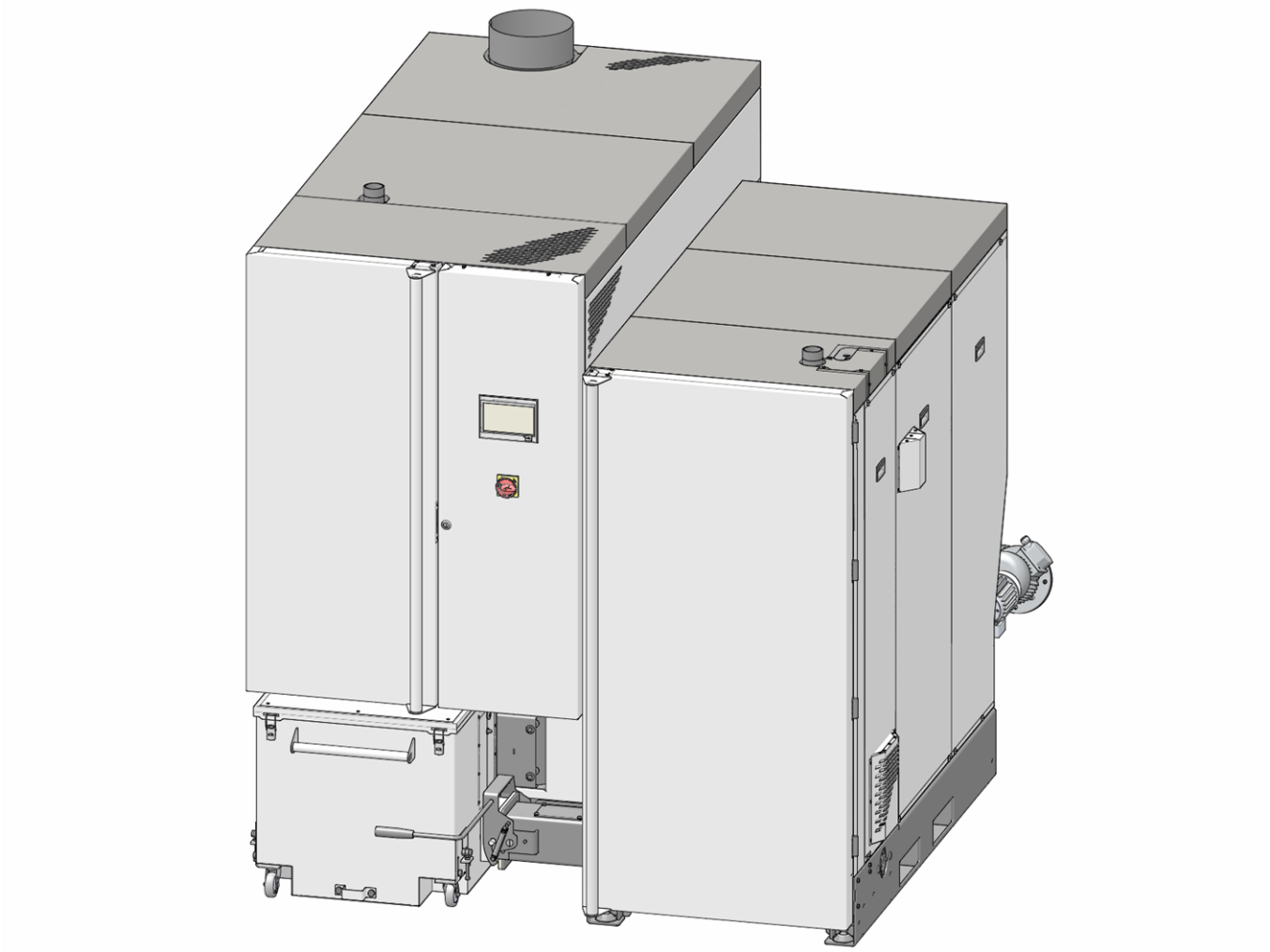

Commercial boiler **maxi**mus L

Installation manual for qualified personnel

Read carefully before operating.

DR-0160-EN / v25-202206

Content

1 About this manual

Dear Heating Engineer,

To ensure reliable and efficient operation of the heating system, the following points are extremely important:

- Correct installation
- Training of customers in initial commissioning
- Comply with the specifications and instructions in this manual
- Regular maintenance by the system operator
- Regular maintenance by qualified personnel

Language

The language of the original manual is German. All other language versions of this manual are translations of the original.

Storage

Keep the manual for the entire service life of the product and ready to hand. The manual must be passed on to the new owner when the product is dismantled/reused. If the manual is lost or destroyed, request a new copy from the manufacturer.

Hints and warnings

The instructions used in this manual are highlighted with symbols and signal words. The signal word indicates the level and nature of the danger.

Indicates information for correct handling of the product.

CAUTION - Material damage is possible if these instructions are not complied with.

DANGER - Failure to comply with this instruction poses a danger to people.

Explanation of symbols

- ☑ Precondition for an action
- ► Instruction
- ↳ Result of an action
- > Reference to page, figure, Chapter,...

1.1 Limitation of liability

SOLARFOCUS GmbH accepts no liability for injury or material damage resulting from:

- Failure to observe the instructions in this manual.
- Use of the product for any purpose other than for its intended use.
- Employment of unqualified personnel.
- Use of non-approved spare parts.
- Technical modification of the product by the system operator.

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2 Safety information

Qualification of personnel

- The work procedures described in this manual must be carried out by qualified specialist personnel.
- Work on electrical components must only be performed by trained electricians and in accordance with the relevant rules and directives.

Installation and commissioning

- System may only be installed and brought into operation by certified qualified personnel (SOLARFOCUS service technician or SOLARFOCUS service partner.

Keep unauthorized persons and children away

- Danger of burns due to hot lines and hot components, risk of injury from mechanically moving parts. Keep unauthorised persons away, do not leave children unattended, and control access to the boiler room and fuel storage room.

Safety devices

- Never disengage the safety equipment > 11 of the heating system. In case of failure, arrange for immediate repair.

Maintenance and repair

- Perform maintenance activities at the specified intervals. No or incorrect maintenance leads to inefficient operation, higher failure risk of the boiler and increased potential for hazards.

  Recommendation: Conclude maintenance contract
- Have repairs carried out by qualified personnel only. Improper repairs can lead to risks for the user and impaired operation.
- Store hot ashes only in metal containers. Never put hot or warm ash in the dustbin. There is a high risk of fire.
- For repairs use only original spare parts or parts approved by the manufacturer (e.g. standard parts).

Damage to the system

- If the electrical insulation (cables, connectors/plugs, switches) is damaged, isolate the power supply and have the insulation repaired.
- If there is visible damage (e.g. thermal deformation, mechanical damage) operation of the system must not be continued. The system may only be operated if it is in perfect technical condition.

3 Technical requirements

3.1 Warranty, guarantee, liability

- Guarantee claims can be made in accordance with a boiler maintenance agreement.
- Warranty claims can be made by the customer and the dealer has a legal responsibility to honour them.

3.1.1 Technical requirements for warranty and guarantee claims

The following technical requirements must be observed as a precondition for a warranty and guarantee claim.

Regular maintenance and cleaning

- The boiler and the heating system components must be maintained and checked regularly.
- This is the prerequisite for the following:
  - Long-term reliability of the boiler function
  - Energy-saving and environmentally friendly operation of the boiler
  - Long service life of the boiler
- Option/recommendation: Conclude maintenance contract.
- *Documentation* is crucial: When maintenance is performed by qualified personnel, the activities carried out/measures taken are documented in the maintenance log. It is advisable to keep a system book, especially when foregoing maintenance by qualified personnel (for documenting/as proof of one's own activities).

Fuel

- The fuel used > 10 must meet the specifications.
- Non-approved fuel may lead to inefficient combustion and cause damage to the boiler.
- Operation with coal, coke, waste is not permitted.

Specifications for the heating system's fill-up/-make-up water

- **Check pH value: this must be in the range of 8.2 to 9.5**
- Avoiding scale buildup (=limescale on heat exchanger surfaces> 8):
  - Take the water hardness into account
  - Soften the fill-up water, or better: desalinate it.
- Avoiding water-based corrosion > 8(triggered by oxygen in the water):
  - Correct system planning, correct dimensioning, take material combinations into account.
  - Repair leaks immediately.
  - Expansion tank > 9(prevents air from being drawn in when the system cools down): Correctly set the pressure, check it regularly.
  - Existing underfloor heating: Take care with old, diffusion-open plastic pipes > 9

Return temperature in the boiler

- A temperature below the dew point (leads to corrosion in the boiler) must be prevented by a sufficiently high return temperature in the boiler.
- The use of a return booster module is a prerequisite for guaranty claims.

Supply air to the heating boiler

- The supply air in the boiler must not contain any aggressive substances. These substances can cause corrosion in the boiler and chimney.
- Aggressive substances are, for example, chlorine or fluorine compounds (used in cleaning agents, solvents, adhesives, etc.).

3.1.2 Conditions for claims

For warranty and guarantee claims observe the following points:

- The warranty begins at the time at the time of handover (delivery note, commissioning log).
- The warranty period is calculated from the date of initial commissioning (according to the control's operating hour counter).
- The warranty periods are based on the relevant regulations.
- We must be notified promptly and accurately of any damage incurred, so that the cause can be clarified.
- If the system has defects despite correct installation (in compliance with the technical documentation), we grant a warranty provided that the system has been examined by the plant customer service (commissioning log).
- The guarantee applies to technical, construction-related faults and faults in the manufacture of the system that prevent correct and problem-free usage.
- We are not liable for parts that were not produced by SOLARFOCUS. However, we are prepared to transfer our existing claims against the producer (relating to this defect) to the buyer.

- In fulfilling the warranty/guarantee services, we shall cover only the assembly time and the materials used, but not any travel or accommodation costs necessary for the fitters/engineers or any return transport costs.
- SOLARFOCUS GmbH assumes no liability for any consequential costs of damages.
- The repair and/or warranty replacement shall be carried out on site or in the SOLARFOCUS factory at our discretion.
- The company SOLARFOCUSwill determine whether such work requires a repair or whether the parts are to be replaced free of charge.

3.1.3 Claims rendered void

The warranty and guarantee claims are rendered void if one of the following points applies:

- Non-compliance with the technical requirements > 4
- Damage during transport.
- Wilful damage.
- Damage due to force majeure (water, fire, etc.).
- Non-observance of information in the planning, installation and operation manual.
- Insufficient energy or water, fault in the hydraulics.
- Incorrect operation, failure to perform maintenance and cleaning as prescribed.
- Commissioning and maintenance carried out by non-certified companies.
- Undocumented commissioning (no commissioning log) and/or maintenance (maintenance log).
- It is almost impossible to produce flawless painted parts; for this reason, slight defects that do not adversely affect proper use shall not be deemed as grounds for complaint.
- No claims can be accepted under the warranty if unauthorised intervention (or action that has not been explicitly approved by us the manufacturer) has been carried out. In addition, the goods must be paid for within the specified payment timeframe.

3.1.4 Limitation of liability

SOLARFOCUS GmbH accepts no liability for injury or material damage resulting from:

- Failure to observe the instructions in this manual.
- Use of the product for any purpose other than for its intended use.
- Employment of unqualified personnel.
- Use of non-approved spare parts.
- Technical modification of the product by the system operator.

3.2 Standards, guidelines, regulations

The following bodies of regulations must be considered and adhered to during planning, installation and operation of the heating system:

Standards for heating systems

- ***EN 303-5*** - Part 5: Heating boilers for solid fuels, manually and automatically stoked, nominal heat output of up to 500 kW
- ***EN 12828*** - Heating systems in buildings - Design for water-based heating systems
- ***EN 13384-1*** - Chimneys - Thermal and fluid dynamic calculation methods - Part 1: Chimneys serving one combustion appliance
- ***ÖNORM H 5151*** - Planning of central hot water heating systems with or without hot water preparation - Part 1: Building with a specific transmission conductance value above 0.5 W/(K.m²)
- ***ÖNORM 7510-1*** - Checking of heating systems - Part 1: General requirements and inspection - national supplement to ÖNORM EN 15378
- ***ÖNORM 7510-4*** - Checking of heating systems, Part 4: Simple testing of combustion systems for solid fuels

Standards for structural setup and safety devices

- ***TRVB 118 H*** - Technical guidelines for preventative fire protection (Austria)
- ***ÖNORM H 5170*** - Heating systems - requirements for construction and safety technology as well as for fire prevention and environmental protection
- ***ÖNORM M 7137*** - Compressed wood in natural state - Wood pellets - Requirements for storage of pellets at the ultimate consumer

Standards for fuel

- **EN ISO 17225-2** - Solid biofuels - Fuel specifications and classes; Part 2: Graded wood pellets
- **1. BImSchV**- Federal Immission Control Ordinance - ordinance on small and medium solid-fuel combustion systems (Germany)

Standards for heating water

- ***ÖNORM H 5195-1*** - Heat transfer media for building services systems, Part 1: Preventing damage from corrosion and scale formation in closed hot water heating systems (Austria)
- ***VDI 2035*** - Prevention of damage in hot water heating systems (Germany)
- ***SWKI BT 102-01*** - Water quality for building systems (Switzerland)
- ***UNI 8065*** (Italy)

3.3 Installation room

Structural specifications

- The boiler may only be installed in a dry, frost-free room; the permissible room temperature is 5 to 30°C.
- The boiler may only be used on a non-combustible surface with sufficient load-bearing capacity.
- Observe spacing to combustible materials (regional regulations).
- Note the installation dimensions to ensure sufficient space is provided (e.g. for service and maintenance work).
- For normative requirements, see ÖNORM H 5170 and directive TRVB 118 H.

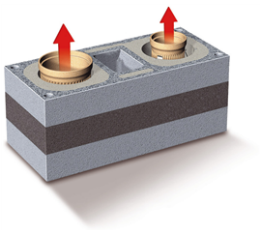
Fire extinguishers

- Austria: A 6 kg ABC powder extinguisher is specified as the minimum requirement. Install it outside the boiler room in an easily visible and quickly accessible place.
- Germany, Switzerland: In private homes, no fire extinguisher is required for heating systems. However, having a fire extinguisher is recommended.

Keep escape routes clear

- The installation of fireplaces under staircases, on emergency exit routes and in attics that have not been extended is not permitted.

3.4 Chimney, flue gas pipe



Chimney cross-section and chimney height

The necessary cross-section depends on the nominal output of the heating system and the effective chimney height (at least 6.5 m). Recommendation: Have the chimney dimensions calculated by qualified personnel.

Chimney

- The chimney must be resistant to moisture. Use fire brick or stainless steel.
- The chimney must conduct away the flue gases reliably at all times.

Connect the chimney condensate drain to the sewage system

- Connect the condensate drain line of the chimney to the domestic sewage system (to drain condensate, rainwater).
- Use DN 25 diameter pipe, install siphon.

Provide each boiler with its own chimney

- The boiler and the chimney must be compatible with each other. This is the only way to ensure the proper functioning of the heating system and the correct discharge of the flue gases.
- If there is only one chimney available for two boilers there is a risk of them not being compatible (considering the different operating states of the boilers - full load/partial load). This can lead to problems (e.g. the flue gas has too little energy during the ascent, and does not lift off sufficiently from the chimney mouth, ...odour pollution by flue gases).
- Chimneys with just one device are more reliable and safer than chimneys with multiple devices.

Do not connect a gas boiler and blower boiler to the same chimney

Do not connect a wood-burning stove and blower boiler to the same chimney

- A wood-burning stove typically requires a larger chimney diameter than the blower boiler.
- Acoustic disturbance from the blower boiler may be possible in the living room (by the wood-burning stove).
- Unnecessary risk due to gas leakage, e.g. if the blower boiler is defective.

Execution of the flue gas pipe

- **Run the flue gas pipe towards the chimney in a short and rising direction, with as few changes of direction as possible.**
- Change direction in the form of aerodynamically favourable arcs, do not build kinks.
- The diameter of the flue gas pipe to the chimney may be enlarged if required, but may not be reduced.
- Place the inlet of the flue gas pipe in the chimney just below the ceiling.
- The flue gas pipe must be tight. Seal seal-less flue gas pipes on site with heat-resistant silicone.

Insulate flue gas pipe

- Insulate the flue gas pipe continuously from the boiler to the chimney.
- Recommended insulation thickness: 50 mm rockwool.
- Serves to prevent temperature loss and prevents the consequential formation of condensation.

Cleaning opening in the flue gas pipe

- To clean the flue gas pipe (e.g. removal of accumulated flue ash) there must be an easily accessible cleaning opening.
- Recommendation: Coordinate the number and placement of the cleaning openings with the chimney sweep.

Opening for emissions measurement in the flue gas pipe

Make an opening (hole) in the flue gas pipe to perform the prescribed emission measurement > 30

Minimum draught requirement for boiler: 5 Pa

A draught stabiliser must be fitted if the specified draught of 15 Pa is exceeded.

Recommended chimney diameter

For all **maxi** mus L Boilers (150 to 300 kW output), a chimney diameter of 25 cm is recommended.

Install explosion flap

Abb. 2-1: Explosion flap integrated into draught stabiliser

Before longer horizontal pipe sections (L>20xD) and at the high point before dropping down the flue gas pipe, an explosion flap must be installed, independent of the boiler output.

From 100 kW boiler output, an explosion flap is required in the flue gas pipe. This avoids damage to the boiler or the flue gas system even when deflagrations occur.

3.5 Supply air in the installation room

The following applies for Austria (in accordance with H 5170):

- For the supply air, 2 cm² per kW thermal output of the fuel, but allow at least 200 cm² free cross-section. (Fuel heat capacity = boiler capacity / efficiency)
- For the exhaust air, allow at least 180 cm² free cross-section up to 100 kW nominal heat and an additional 1 cm² free cross-section for every further kW.

Calculate at least a further 20 % for wire mesh in the aeration cross-section.

The following applies for Germany (according to specimen firing ordinance):

- For heating appliances with a nominal output of up to 35 kW, a combustion air opening of at least 150 cm² or 2 x 75 cm² routed directly into the open air must be provided.
- Alternatively, a door/window leading outside and a room content of at least 4 m³/kW nominal heat output are suitable. If the Heizraum does not abut onto an outside wall, combustion air supply via connecting rooms is possible. Here, the combustion air is supplied via a sufficiently dimensioned adjacent room which abuts onto an outside wall.
- From 35 to 50 kW, provide a free aeration cross-section of at least 150 cm². From 50 kW upwards, for aeration and ventilation, provide a minimum free cross-section of 150 cm² for each, plus 2 cm² per KW in excess of 50 kW.

Calculate at least a further 20 % for wire mesh in the aeration cross-section.

Boiler power [In kW]	Minimum space [in cm²] including 20% surcharge for grids			
	Austria		**Germany**	**Switzerland**
	Supply air	Exhaust air	Supply air/Exhaust air	Supply air
20 kW	>240	>216	>180	>206
25 kW			>180	>258
35 kW			>180	>361
50 kW			>228	>515
70 kW			>228	>721
90 kW			>276	>927
130 kW	>347	>252	>372	>1339
200 kW	>533	>336	>540	>2060
400 kW	>1067	>576	>1020	>4120

3.6 Heating system fill-up water

In regard to the fill-up water quality, two key points must be observed (in accordance with Guideline VDI 2035):

- Avoiding scale buildup (limescale)
- Avoiding water-based corrosion (caused by oxygen in the heating water)

The lowest possible corrosion acceleration rate of the installed metallic materials is achieved by keeping the circulation water in the correct pH range (8.2 to 9.5) and, at the same time, having the lowest level of electrical conductivity possible (50 to 100 µS/cm).

3.6.1 Avoiding scale buildup

What is scale buildup?

Scale buildup is the formation of firmly adhering deposits on water-contacting walls of hot water heating systems (e.g. the boiler heat exchanger surfaces). This can subsequently lead to damage (stress cracks in metal, leaks).

Causes of scale buildup

The cause of scaling is the presence of calcium carbonate in the water.

The following calculation/table determines the total permitted hardness of the fill-up water. If the value is exceeded, the fill-up water must be treated, e.g. softened.

Calculation of the total permitted hardness of the fill-up water

To use the table, the *specific system volume* for the system must be determined:

System volume divided by *total heat output* results in the *specific system volume*

1166 litres / 25 kW = **46.64 l/kW specific system volume**

Table: Total permitted hardness of the fill-up water

Total heat output	Specific system volume (VDI 2035)		
	<20 l/kW	≥ 20 <50 l/kW	≥ 50 l/kW
< 50 kW	≤ 16.8°dH	≤ *11.2°dH*	< 0.11°dH
50 - 200 kW	≤ 11.2°dH	≤ 8.4°dH	< 0.11°dH
20 - 600 kW	≤ 8.4°dH	< 0.11°dH	< 0.11°dH
> 600 kW	< 0.11°dH	< 0.11°dH	< 0.11°dH

In our example: if the total hardness of the fill-up water is more than 11.2 dH, then the fill-up water must be treated.

3.6.2 Avoiding water-side corrosion

Corrosion is usually triggered by the available oxygen in the water. This value can be brought into a safe range with proper planning, design, installation and maintenance of the heating system. A constant input of oxygen should be avoided.

Important in this regard:

- Expansion tank > 9: Air must be prevented from being drawn in when the heating system is cooling down. Ensure:
  - Correct planning and implementation of the expansion tank.
  - Regular check of the system pressure, expansion tank pre-pressure.
- Immediate repair of leaks in the heating system.
- In the case of older underfloor heating, ensure pipes are diffusion resistant > 9

Check the pH of the fill-up water

- **The pH value must be between 8.2 and 9.5.**
- If this pH value does not self adjust after a week of operation, it must be raised by adding 10 g/m³ trisodium phosphate (Na3PO4) or 5 g/m³ sodium hydroxide (NaOH). Allow 2 to 4 weeks of operation before further corrections.
- Exception: If aluminium materials are used in the heating system, a pH from 8.2 to 8.5 must be met (pH> 8.5 increased corrosion tendency).

Electrical conductivity

The probability of corrosion usually decreases with decreasing electrical conductivity of the heating water.

Low salt operation - filling with demineralised water, see VDI 2035 sheet 2.

	Low salt
Electrical conductivity at 25°C	< 100 µS/cm

In the case of low-salt operation, feeding with non-demineralised water can have a significant effect on the pH value and push it into a critical range.

► Check the pH value regularly.

3.7 Intermediate storage

If installation of the heating system is not started immediately after taking delivery of the components, make sure that the components are stored safely in a dry area with protection against dust, contamination and mechanical damage.

3.8 Information about the hydraulic connection

Return flow boosting (RFB)

- Functioning: If cold heating water (temperature < 55°C) flows from the heating circuit or the buffer tank into the hot boiler, the steam contained in the flue gas condenses on the "cool" boiler heat exchanger surfaces. In the long term this leads to corrosion and damage in the boiler. To avoid this, hot water from the boiler flow is added to the boiler return.
- Return booster modules with a motor-controlled mixer perform this task more accurately and reliably than thermally controlled modules.
- In addition, they allow the use of residual heat: If the boiler temperature rises again after the burner has stopped, then the charging pump starts, the mixer opens, and the residual heat from the boiler is transferred to the buffer tank.

Provide shut-off options in the lines

- Position shut-off valves for each section (in buffer tank, etc.) in order to minimise the quantity of water that needs to be replaced in the event of repairs or system extensions (see: preventing the ingress of oxygen, heating system's fill-up/make-up water > 8).

Pressure equalisation through expansion tank

- The expansion tank prevents air from being drawn in when the system cools down (issue: oxygen input, heating system's fill-up water > 8)
- Dimension the expansion tank with a capacity of 12% of the total hydraulic system volume.
- Secure the expansion tank against shut-off. To do this, either use the shut-off options on the way to the expansion tank as cap valves, or unscrew the hand lever (handwheel) and attach it to the expansion tank with the wire in a clearly visible position.
- Installation of an expansion tank or a pressure maintenance system is essential. Use of open expansion tanks is not permitted.
- The pressure in the heating system (can be viewed on pressure gauge) and the set pre-pressure in the expansion tank must be checked regularly.

Caution with (older) diffusion-open plastic pipes, e.g. existing underfloor heating

- In the case of older underfloor heating, the diffusion-open plastic pipes can result in increased oxygen input in the heating system. This has a corrosion-inducing effect on the heating system components (see: Avoiding water-side corrosion > 8).
- In this case, the system must be separated (through installation of a heat exchanger).
- Newer plastic pipes (since around the mid 1980s) are diffusion resistant in line with DIN 4726.

Buffer tank: Use, dimensioning

Advantages of using a buffer tank:

- The boiler can always be operated in the optimum load range. This results in a longer boiler service life and reduces emissions.
- Avoids unnecessary boiler start phases, the higher fuel consumption during the start phases is significantly reduced.
- Continuously heated water is available in the buffer tank for the heating circuit. The heating circuits can therefore always be quickly supplied with heat at all times.

If the heating system is operated without a buffer tank, a hydraulic switch > 10 must be installed.

Dimensioning the buffer tank:

- For pellet boilers, a buffer tank volume of at 30 litres per kW heating output is recommended.
- For wood chip boilers, a buffer tank volume of at 35 litres per kW heating output is recommended.

Hydraulic switch

- A hydraulic switch separates the flows in the boiler and heating circuits.
- If the heating system is operated without a buffer tank, a hydraulic switch must be installed between flow and return.

Installing the dirt and sludge separator

- The separator removes circulating, magnetic and non-magnetic free dirt and sludge particles (as of 5 µm) in fully-automatic continuous operation from the heating system.
- Ensures the long-term, correct functioning of heat generators, thermostatic valves, heat exchangers and lowers the risk of defects and malfunctions over the long-term.
- Helps ensure quality heating water, even in the case of existing systems, for example.

4 Product information

4.1 Product description

- **maxi** mus L is a boiler for firing wood pellets and wood chips.
- The boiler has an automatic fuel ignition system, automatic fuel supply and automatic heat exchanger cleaning.
- The ash produced is collected in an ash container, which must be emptied at regular intervals.

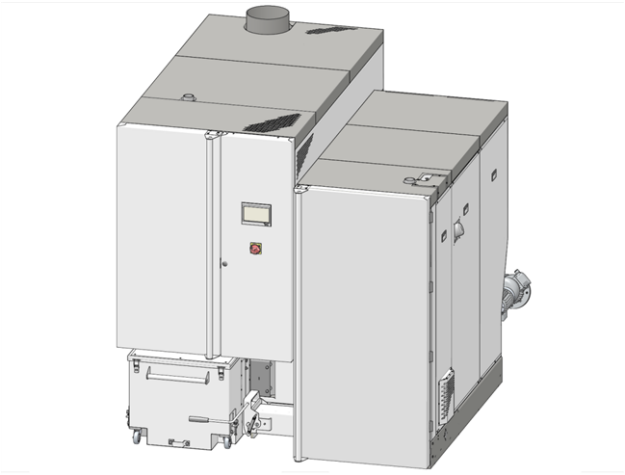


Abb. 2-2

4.2 Fuel

Pellets

Use wood pellets only in accordance with these specifications:

- Pellets according to the ISO 17225-2 standard, class A1.
- Pellets that meet the additional ENplus certification.
- Pellets that meet the additional DINplus certification.

Wood chips

Use wood chips only in accordance with these specifications:

- Wood chips according to the EN ISO 17225-4:2014 standard
- Permissible classes A1, A2, B1
  Not permissible: Class B2
- Sizes P16S and P31S
- Moisture content maximum 35%(M35)

Detailed information on the classification of wood chips > 21

4.3 Safety devices

Heat dissipation

- This function of the boiler control is a safety device that prevents overheating of the boiler.
- Functioning: If the boiler temperature exceeds the *Heat dissipation maximum boiler temperature*[1] parameter, all pumps relating to the connected devices (e.g. heating circuit, DHW tank, buffer tank) will be switched on and the heating circuit mixing valve opened. In this way, energy is drained from the boiler and it may be possible to prevent other safety devices tripping.
- If the boiler temperature falls below the set *Heat dissipation maximum boiler temperature* minus 1°C again, the pumps and mixing valves will be operated in standard mode again.

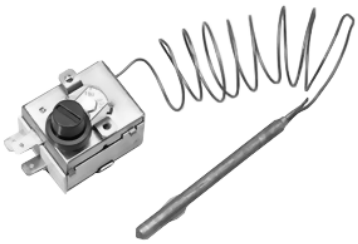
[1] You can find the parameter in *Service menu* | *System parameters* button | *General settings* button. The *Service menu* can only be accessed by qualified personnel (code input required).

Thermal overload protection

- The thermal overload protection prevents an uncontrolled increase in temperature and pressure of the boiler.
- Functioning: At a boiler water temperature > 95°C, the valve opens and directs cold water through the two series-connected safety heat exchangers. This lowers the temperature of the boiler and avoids the need for further safety precautions or equipment damage.

► Install thermal overload protection > 29

Overtemperature reset (OTR)



- The overtemperature reset is a safety device that prevents overheating of the boiler.
- Functioning: The overtemperature reset stops the heating process at a boiler temperature ~95°C (exclusively electrical function; fuel and air supply are interrupted).
- After tripping, the overtemperature reset must be manually released again by unscrewing the black sealing cap *1* and pressing the button as soon as the boiler temperature falls below 60°C.
- If the overtemperature reset trips, this is indicated on the boiler control display.

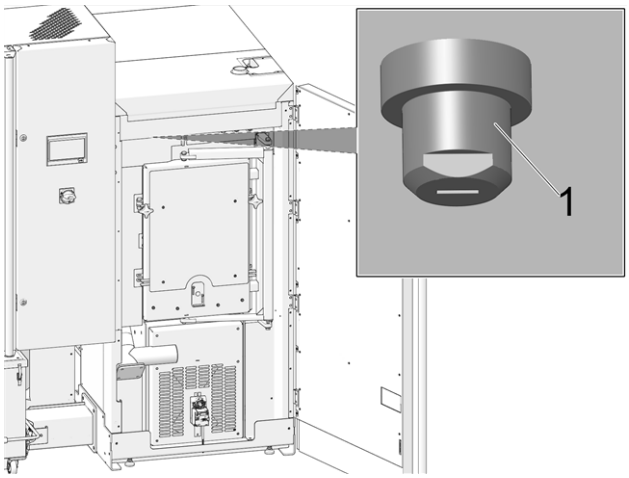


Abb. 2-3: Position of the overtemperature reset

► Install overtemperature reset > 35

Safety valve (to protect against excess pressure in the system)

- The safety valve *1* is a safety device for protecting against overpressure in the water circuit of the heating system.
- Functioning: The valve opens when the system pressure exceeds 3 bar. Water/steam are discharged into an open drain via a blow-off line, which avoids subsequent damage to the heating system. The safety valve is closed during normal operation.
- For normative specification see EN 12828.

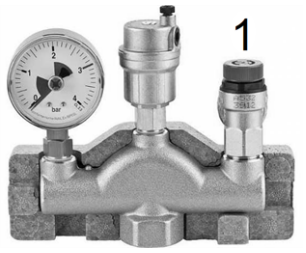


Abb. 2-4: Safety valve integrated into boiler safety group

► Install safety valve > 28

Water shortage safety

The pressure sensor > 32 in the heat exchanger fulfils the water shortage safety function (in accordance with EN 12828 standard).

At a water pressure <0.5 bar the boiler must not start. A message is displayed in the boiler control (*system pressure too low*).

Emergency OFF switch

- The emergency OFF switch is a manually operated safety device. The burner and the fuel supply to the boiler are stopped. Circulation pumps remain in operation to dissipate heat and cool the boiler.
- The switch must be installed outside the boiler room in a safe place that is easy to access.

► Install EMERGENCY OFF switch > 37

Temperature monitor in the fuel storage room (TM)

- Required according to guideline TRVB 118 H for wood chips, depending on system design, heating capacity and fuel storage quantity.
- Functioning: On the channel of the fuel delivery auger, a temperature sensor of a protected design must be installed in the area of the wall penetration (inside the storage room). When a temperature of about 70°C is exceeded, the warning device is (optically or acoustically)triggered.
- Art. No.: 6565 and 6567

► Install temperature monitor > 29

Automatically triggered extinguishing device (ATED)

- This extinguishing device serves to automatically suppress burn-back within the feeder. Due to the proper nature and location of the fire detection element, burn-back must be reliably detected and the extinguishing device must be triggered automatically (this must be ensured even in the event of a power failure).
- Functioning: If at the temperature sensor *1* the temperature exceeds 50°C (direct extraction) or 95°C (downpipe extraction), the valve opens and floods the feeder channel with water through the connecting pipe *2*.

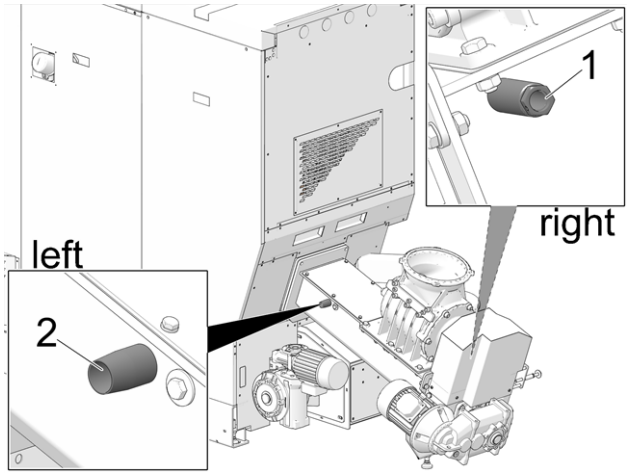


Abb. 2-5

1 Immersion sleeve for temperature sensor (IG)
2 Connection for water discharge (AG)

If this device is not used, both connections must be sealed shut. False air will otherwise be drawn into the burner, which will impair burner performance.

- The extinguishing device must be connected either directly to a pressurised water supply or to a water reservoir (Note: Domestic waterworks may also be affected in case of power failure).
- The water supply amount must be equal to three times the volume of the feeder equipment, but at least 20 litres.
- The container must be equipped with a fill level monitor, including connection to the warning device (temperature monitor > 12).
- The inlet opening in the feeder is to be configured in such a way that blockage through delivery operation is not possible and this can easily be checked at any time.
- The routing of the extinguishing system must be made as a non-combustible version.
- Art. No.: 63260 and 6553
- Specification regarding requirement yes/no see TRVB 118 H

Manually triggered extinguishing device (MTED)

- This extinguishing device is used to combat a fire source in the fuel storage room, or fuel storage in the area of the extraction/delivery line. The triggering must be done manually.
- This device consists of an empty pipe with a minimum nominal size of DN 20 and is to be installed in the fuel storage as specified by the manufacturer of the firing system directly above the delivery line in front of the wall or ceiling passage in such a way that the greatest possible success can be achieved in extinguishing. The empty piping must be connected directly to a pressurised water supply and provided with a shut-off valve arranged in the boiler room. Mark this valve with a sign "Extinguisher - Fuel Storage Room".
- The execution of the extinguishing system must be done so that damage during fuel feed or from the extraction device is not possible. In addition, make sure that the fuel supply to the delivery line is not affected.
- Specification regarding requirement yes/no see TRVB 118 H.

Rotary valve

The rotary valve fulfils all normative requirements for the approved fuels regarding fire protection, burn-back safety, backflow of gases:

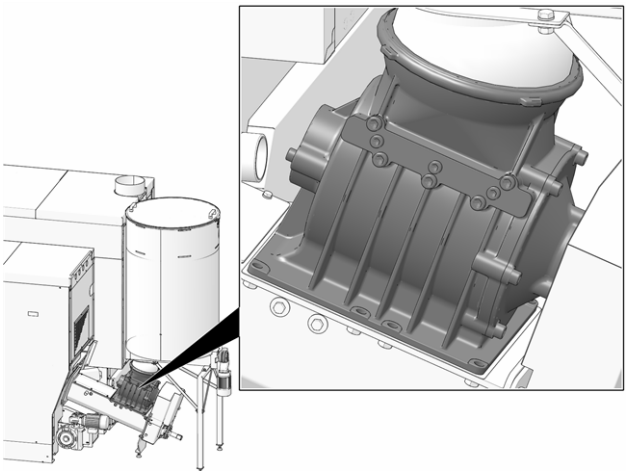
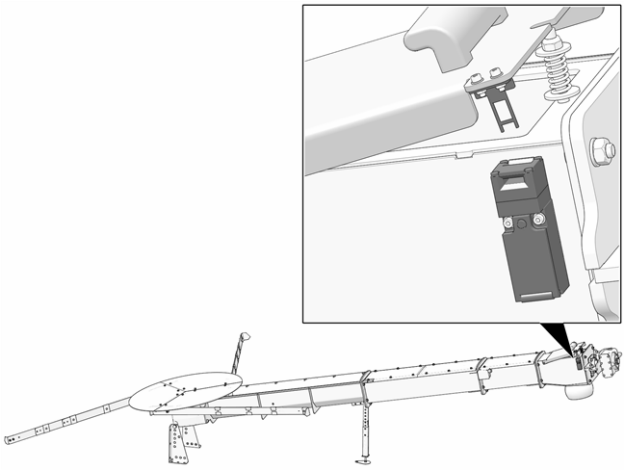


Abb. 2-6: Rotary valve

- Complies with requirements regarding burn-back protection devices (BPD) according to TRVB 118 H.
- Prevents backflow of flammable products of combustion into the fuel supply (according to EN 303-5).
- Prevents fire spreading into the fuel supply (according to EN 303-5).

Safety switch on the trough cover



Opening the channel cover interrupts the power supply to the auger motor.

► Connect the safety switch > 39

Heating system encompassing several fire compartments

If the boiler room and fuel storage room are located in different fire compartments, optional equipment must be installed in addition to the factory safety equipment, e.g.

- a temperature monitor (TM) > 12
- a manually triggered extinguishing device (MED) > 13

4.4 Accessories

External ash extraction system

- Optional accessories
- Ash extraction system with 240 litre standard bin, item 63791
- Ash extraction system with 600 litre tipping container, item 63793
- Further information is provided in the documentation of the ash extraction system, DR-9969

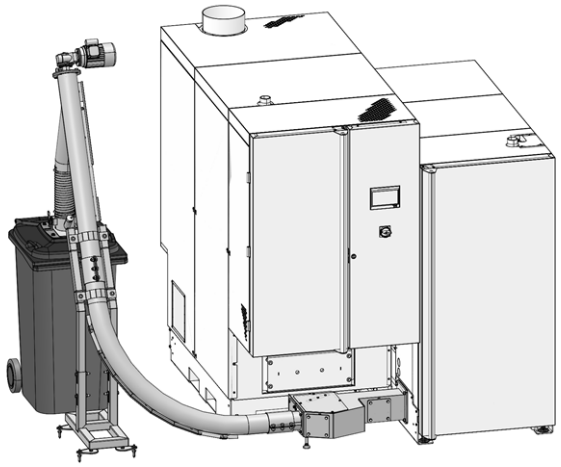


Abb. 2-7: 240 litre standard bin

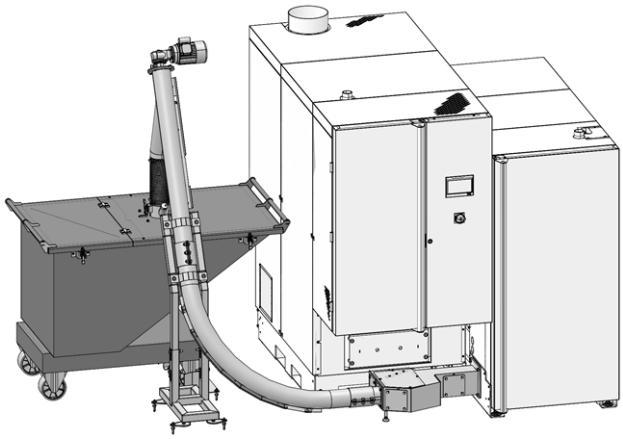


Abb. 2-8: 600 litre tipping container

4.5 Dimensioning the boiler

The boiler must be dimensioned in terms of output in the right proportion to the underlying heat distribution system.

For a correct design, see the calculations according to standard EN 12828.

4.6 Dimensions

The following figures show the **maxi** mus L with mounted intermediate pellet store.

Top view

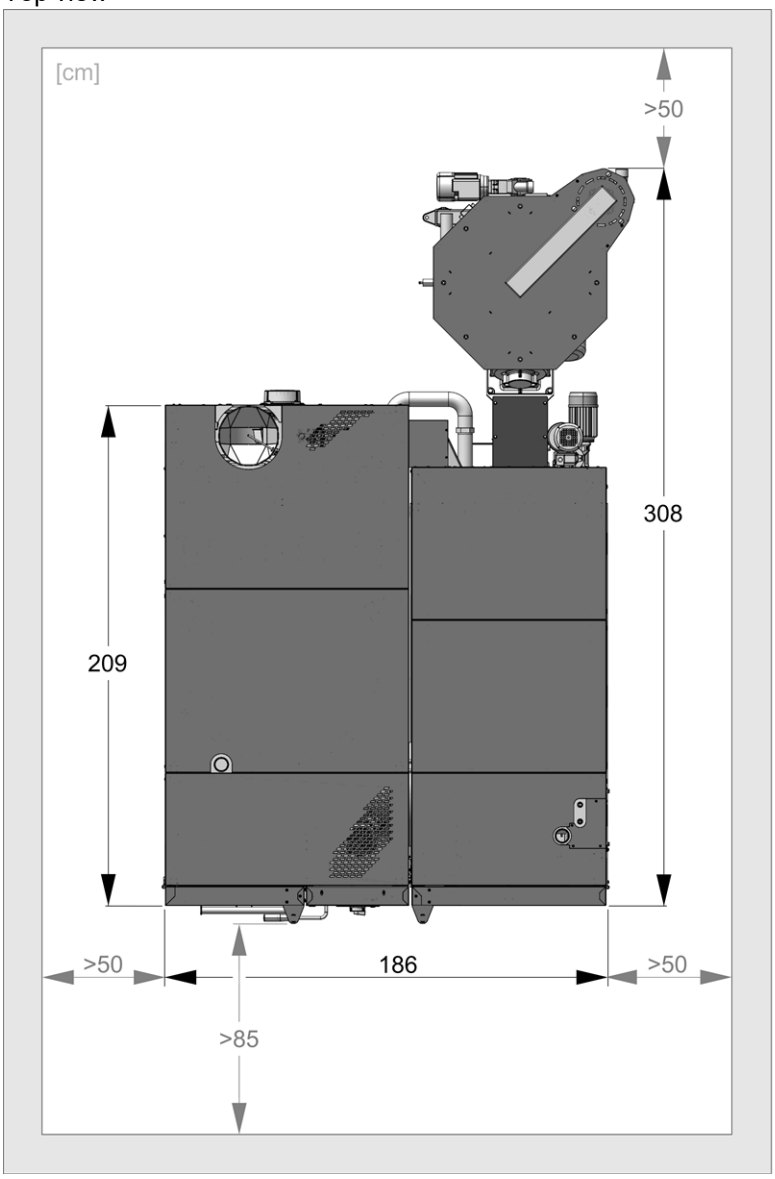


Abb. 2-9

Front

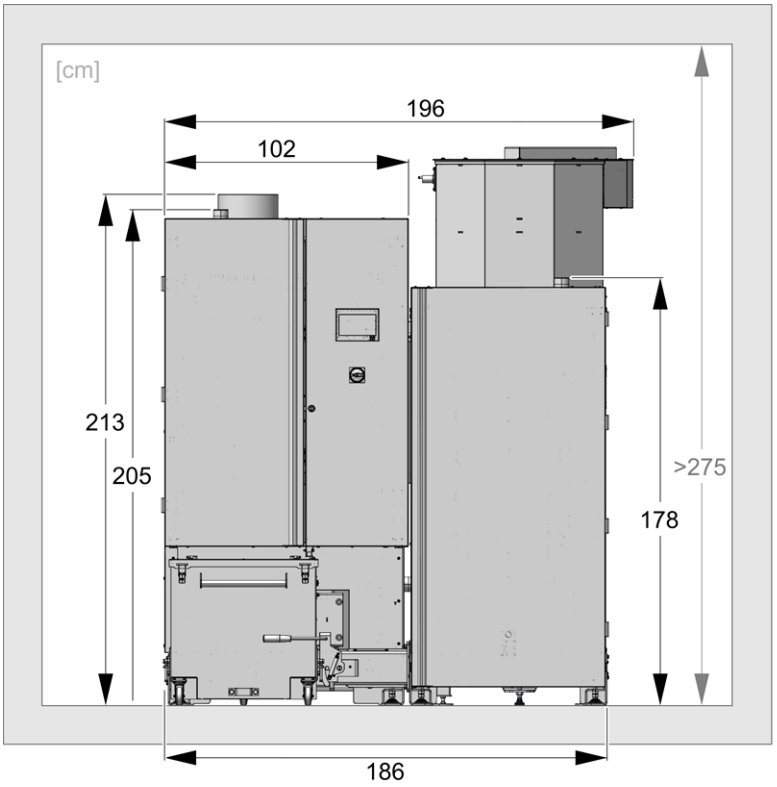


Abb. 2-10

Side view

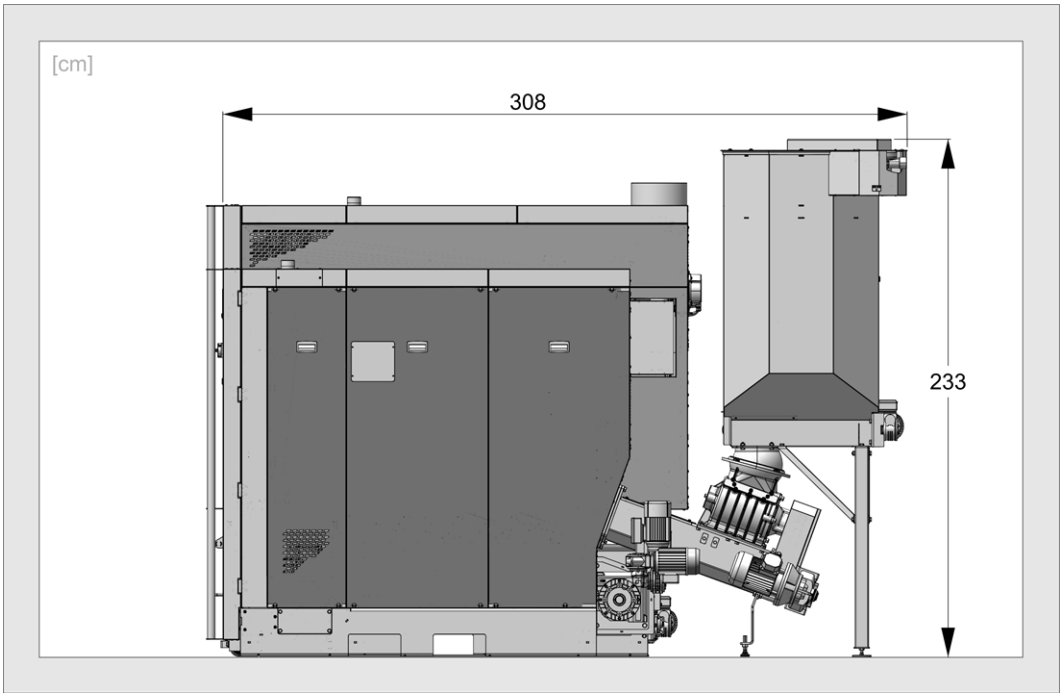


Abb. 2-11

4.7 Functional components, combustion principle

Burner

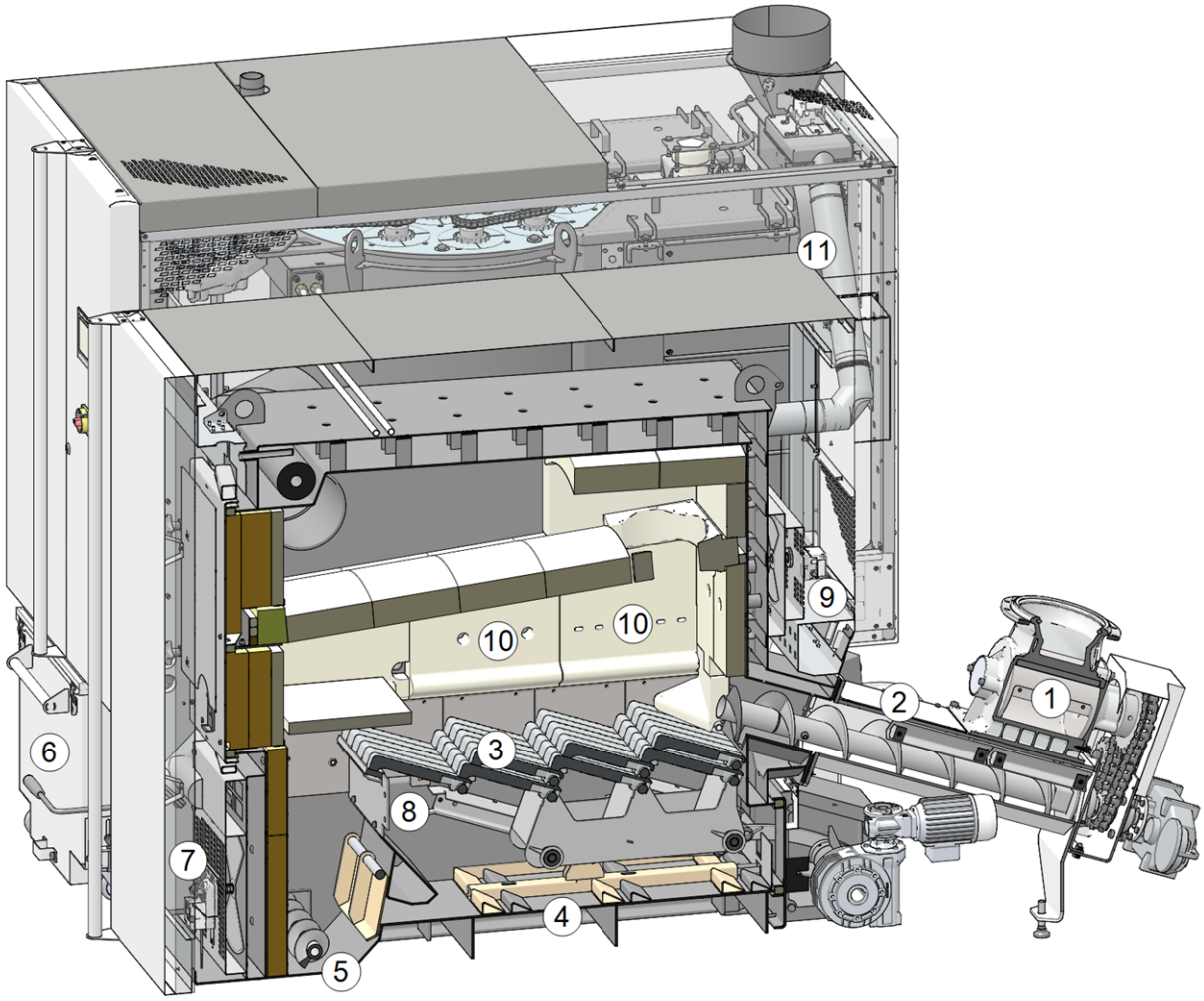


Abb. 2-12: Section through the burner

Functional components

1 Rotary valve
2 Feeder unit
3 Push grate
4 Ash scraper
5 Ash auger burner
6 Ash container
7 Rotary drive for primary air
8 Primary air outlet
9 Rotary drive for secondary air
10 Secondary air outlet
11 Flue gas recirculation line

Fuel path

- The fuel falls through the rotary valve *1* into the channel of the feeder unit *2*. The auger delivers the fuel to the feed grate *3*.
- During combustion, the fuel is transported on the feed grate and the resulting ash falls down through the grate.
- The ash pusher *4* push the ashes to the ash auger *5*, and the auger transports the ash into the ash container *6*.

Airflow

- Primary air is drawn in at the opening *7*, forwarded in a space on the left and right side of the boiler. At the holes *8* the primary air escapes from under the stainless steel combustion grate and makes it way through the feed grate into the combustion chamber.
- Secondary air is drawn in at the opening *9* and passes through openings *10* in the fire brick (left, right, rear) above the stainless steel combustion grate into the combustion chamber.
- Flue gas recirculation: Flue gas is introduced via the path of the flue gas recirculation line *11* here and added to the primary air. This leads to the cooling of the feed grate and the combustion chamber and thus to lower stress on the components.

Heat exchanger

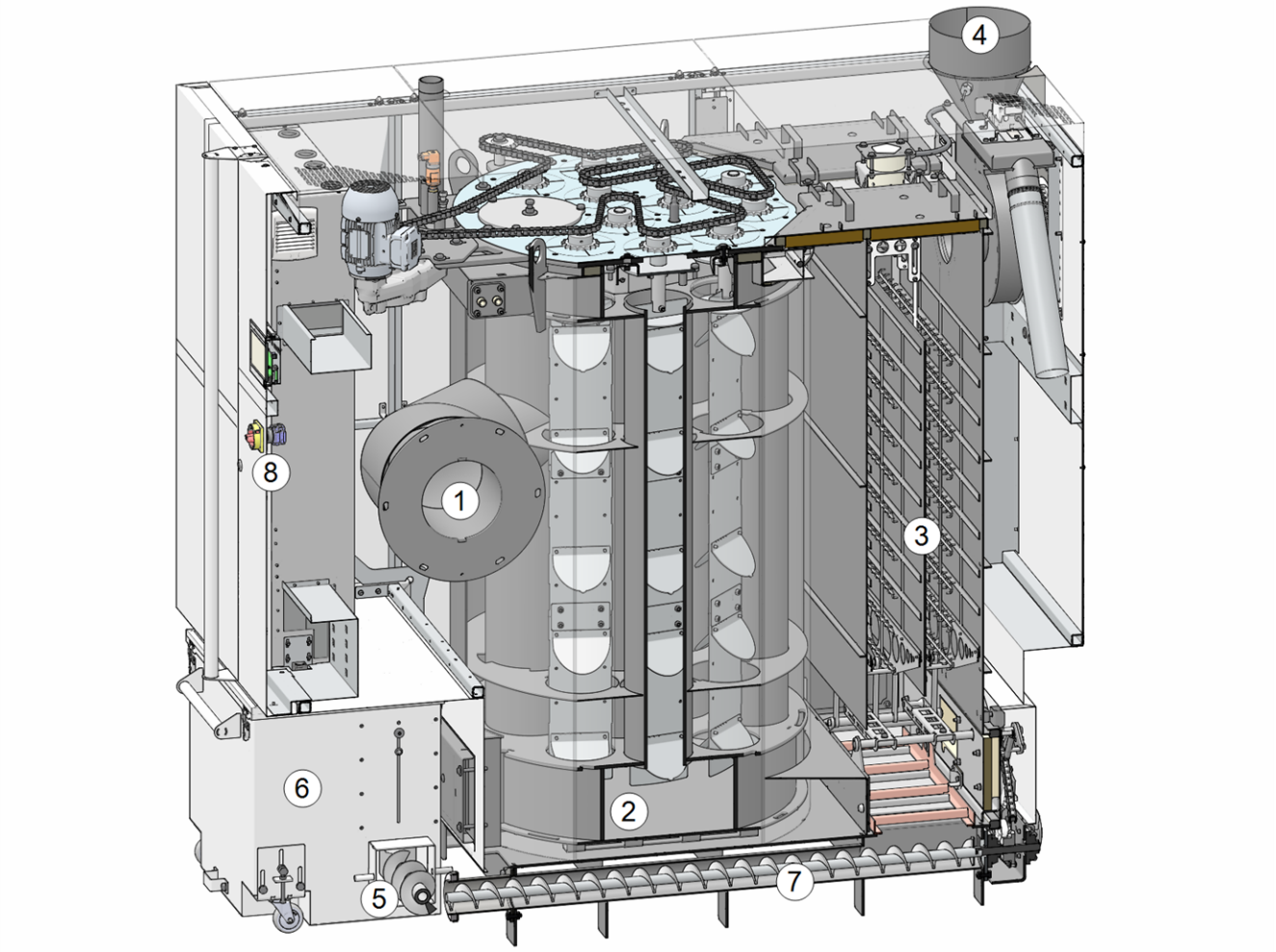


Abb. 2-13: Cross section through heat exchanger

Functional components

1	Flue gas pipe connecting flange	4	Flue gas pipe	7	Ash auger heat exchanger
2	Heat exchanger	5	Ash auger burner	8	Main switch
3	Electrostatic dust collector	6	Ash container		

Flue gas guide

- The flue gas *1* from the combustion chamber flows through the heat exchanger *2*, past the electrostatic dust separator *3* into the flue gas pipe *4* and into the chimney.

De-ashing

- The ash that accumulates on the feed grate (in the burner) is transported from the transverse ash auger burner *5* into the ash container *6*.
- The ash that accumulates on the electrostatic dust collector *3* is transported forwards by the ash auger heat exchanger *7* into the collective ash container.

4.8 Technical specifications

maxi mus L		**150**	**200**	**250**	**300**
Wood chips output	[kW]	149	201	240	-
Pellets output	[kW]	149	201	250	299
Boiler class (acc. to EN 305:5 2012)		5	5	5	5
Dimensions					
Width	[cm]	195	195	195	195
Height inc. adjustable feet [1]	[cm]	214	214	214	214
Depth with ID fan	[cm]	222	222	222	222
Burner transport dimension - width	[cm]	90	90	90	90
Heat exchanger transport dimension - width [2]	[cm]	100	100	100	100
Heat exchanger transport dimension - height	[cm]	210	210	210	210
Minimum room height [3]	[cm]	275	275	275	275
Weight					
Burner weight	[kg]	1321	1321	1321	1321
Heat exchanger weight	[kg]	1456	1456	1456	1456
Feeder unit weight (inc. single axis rotary valve)	[kg]	215	215	215	215
Total weight (inc. ash container and feeder unit; ready for operation, without fill-up water)	[kg]	3290	3290	3290	3290
Water side					
Water content (burner and heat exchanger)	[l]	565	565	565	565
Operating temperature	[°C]	70 - 90	70 - 90	70 - 90	70 - 90
Maximum permissible temperature	[°C]	90	90	90	90
Max. permissible operating pressure	[bar]	3	3	3	3
Min. return temperature	[°C]	60	60	60	60
Boiler flow/boiler return connection	[“]	G 2“ ET	G 2“ ET	G 2“ ET	G 2“ ET
Drain connection	[“]	G 1“ ET	G 1“ ET	G 1“ ET	G 1“ ET
Connection for thermal overload protection	[“]	G 1/2“ ET	G 1/2“ ET	G 1/2“ ET	G 1/2“ ET
Electrical connection					
Connection, fuse		400 V AC, 50 Hz, 16 A, 3P+N+PE			
Fuel					
Fuel - wood chips		Wood chips in accordance with EN ISO 17225-4, classes A1, A2, B1; sizes P16S and P31S; water content max. 35% (M35) > 10			
Fuel - wood pellets		Wood pellets according to EN ISO 17225-2 > 10			
Flue gas side					
Flue gas pipe diameter	[cm]	25	25	25	25
Height up to upper edge of flue gas pipe [1]	[cm]	214	214	214	214
Minimum draught requirement [4]	[Pa]	5	5	5	5
Maximum flue gas temperature [5] full load	[°C]	140	140	140	140

maxi mus L	**150**	**200**	**250**	**300**

Emissions according to test report: *Wood chips*

Flue gas values (in relation to 13% O_2) from test report:testing institute/test report No.		18-IN-AT-UW-OÖ-EX-205/3 TÜV Austria	Interpolation according to EN 303-5	18-IN-AT-UW-OÖ-EX-205/4 TÜV Austria	-
CO full load	[mg/m³]	19	30	38	-
CO partial load	[mg/m³]	20	20	20	-
NO_X full load	[mg/m³]	120	120	115	-
NO_X partial load	[mg/m³]	93	93	93	-
Org. C full load	[mg/m³]	2	2	2	-
Org. C partial load	[mg/m³]	2	2	2	-
Dust content full load	[mg/m³]	9.5	11.6	6	-
Dust content partial load	[mg/m³]	6	6.5	6	-
Flue gas mass flow full load	[g/s]	97.9	130.5	156.7	-
Flue gas mass flow partial load	[g/s]	29.4	39.2	47.0	-

Emissions according to test report: *Pellets*

Flue gas values (in relation to 13% O_2) from test report:testing institute/test report No.		18-IN-AT-UW-OÖ-EX-205/1 TÜV Austria	Interpolation according to EN 303-5	Interpolation according to EN 303-5	18-IN-AT-UW-OÖ-EX-205/2 TÜV Austria
CO full load	[mg/m³]	<3	3	3.6	3.6
CO partial load	[mg/m³]	29	29	29	29
NO_X full load	[mg/m³]	112	112	113	113
NO_X partial load	[mg/m³]	83	83	83	83
Org. C full load	[mg/m³]	2	2	2	2
Org. C partial load	[mg/m³]	2	2	2	5
Dust content full load	[mg/m³]	1	8	2	10.2
Dust content partial load	[mg/m³]	5	5	5	5
Flue gas mass flow full load	[g/s]	94.5	126.0	157.6	189.1
Flue gas mass flow partial load	[g/s]	28.4	37.8	47.3	56.7

[1] Adjustable feet at maximum depth of thread
[2] The boiler cladding parts are removed. The dimension including fitted cladding is 106 cm.
[3] The minimum room height is required for maintenance work
[4] A draught stabiliser must be fitted if the specified draught of 15 Pa is exceeded
[5] Flue gas temperature can be adjusted electronically

4.9 Wood chipclassification

according to EN ISO 17225-4 standard

		Property class > 21		
	Unit	**A1**	**A2**	**B1**
Origin, source		Complete trees without roots; Trunk wood; Woodland offcuts; Chemically untreated waste timber		Woodland timber and plantation wood as well as other natural timber; Chemically untreated waste timber
Particle size P > 21	mm	P16S / P31S		P16S / P31S
Water content M	m-%	M10 ≤ 10 M25 ≤ 25	M35 ≤ 35	M35 ≤ 35
Ash content A	m-% waterless	A1.0 ≤ 1.0	A1.5 ≤ 1.5	
Bulk density BD > 22	kg/m³	BD150 ≥ 150 BD200 ≥ 200 BD250 ≥ 250	BD150 ≥ 150 BD200 ≥ 200 BD250 ≥ 250 BD300 ≥ 300	BD150 ≥ 150
Nitrogen N	m-% waterless	Not applicable		N1.0 ≤ 1.0
Sulphur S	m-% waterless	Not applicable		S0.1 ≤ 0.1
Chlorine Cl	m-% waterless	Not applicable		Cl0.05 ≤ 0.05
Arsenic As	mg/kg waterless	Not applicable		≤ 1
Cadmium Cd	mg/kg waterless	Not applicable		≤ 2.0
Chromium Cr	mg/kg waterless	Not applicable		≤ 10
Copper Cu	mg/kg waterless	Not applicable		≤ 10
Lead Pb	mg/kg waterless	Not applicable		≤ 10
Mercury Hg	mg/kg waterless	Not applicable		≤ 0.1
Nickel Ni	mg/kg waterless	Not applicable		≤ 10
Zinc Zn	mg/kg waterless	Not applicable		≤ 100

Property class

The property classes A1 and A2 represent natural wood and chemically untreated waste timber.

A1 denotes fuels with low ash content, which have little or no bark, and fuels with low water content. Class A2 indicates a slightly higher ash content and/or water content.

B1 extends the origin and source of class A and includes other materials, such as e.g. short rotation coppice, wood from gardens and plantations etc., as well as chemically untreated waste wood from industry.

B2 (not approved for **maxi** ^{mus} L) includes waste wood from industry (also chemically treated wood) and chemically untreated used wood.

Particle size

	Main portion [1] (at least 60 m-%)	**Fine material portion** m-% (≤ 3.15 mm)	**Coarse material portion** m-% (length of particle)	**Maximum length** of particles [2]	**Coarse material portion** (Maximum cross-section area[3] of particle)
P16S	3.15 to 16 mm	≤ 15 %	≤ 6 % (> 31,5 mm)	≤ 45 mm	≤ 2 cm²
P31S	3.15 to 31.5 mm	≤ 10 %	≤ 6 % (> 45 mm)	≤ 150 mm	≤ 4 cm²
P45S	3.15 to 45 mm	≤ 10 %	≤ 10 % (> 63 mm)	≤ 200 mm	≤ 6 cm²

[1] The numerical values (P class) of the dimensions relate to the particle sizes that match the specified sieve opening size of a round hole sieve (ISO 17827-1). The lowest possible property class should be specified. Only one class shall be given for wood shavings.

[2] The length and cross-section area shall only be determined for particles in the coarse material portion. In a sample of about 10 l, no more than 2 pieces may exceed the maximum length if the cross-section area < 0.5 cm².

[3] For measurement of the cross-section area, it is recommended to use a transparent protractor, arrange the particles orthogonally (at right angles) behind the protractor and estimate the maximum cross-section area of these particles with the aid of the cm² pattern.

Bulk density (kg/m³)

Water content (with moist mass being reference base)	m-%	**8 to 18**	**18 to 25**	**25 to 35**
Conifer tree species	Bulk volume [kg/m³]	160 to 180	180 to 200	200 to 225
	Property class	**BD150**	**BD150**	**BD200**
Deciduous tree species	Bulk volume [kg/m³]	225 to 250	250 to 280	280 to 320
	Property class	**BD200**	**BD250**	**BD250**

5 Installation

5.1 Transport

Option 1: Transport with an industrial/fork-lift truck

Taking load from side

The heat exchanger and burner can be lifted on both sides.

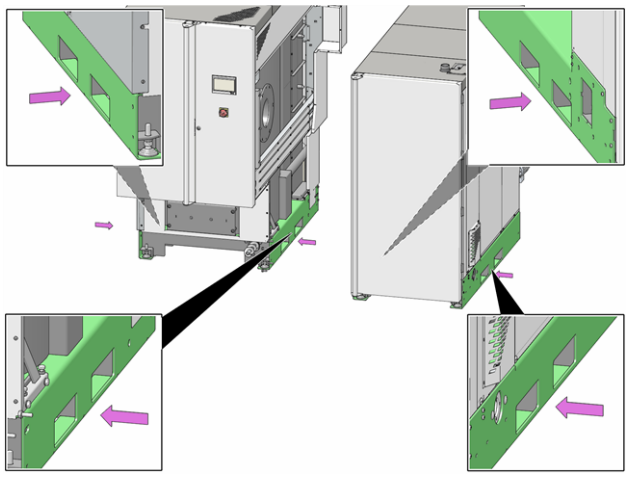


Abb. 2-14: Support points when taking load from side

Taking load from front/rear

On the heat exchanger and on the burner, the projections (metal plates) on the underside are used as a support for the forks.

► Take the load of the heat exchanger from the front. Take the load of the burner from the rear.

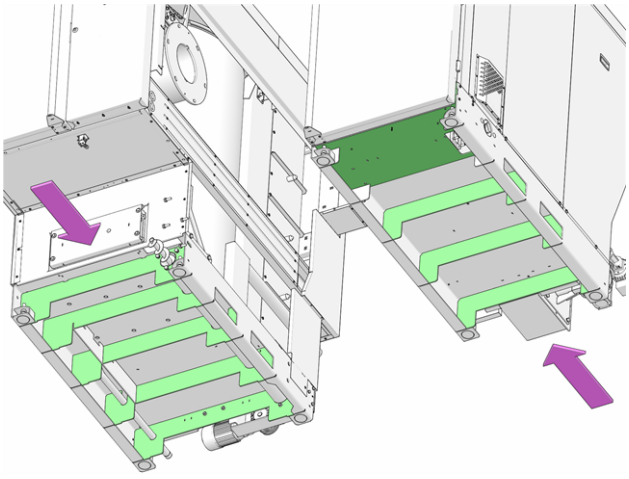


Abb. 2-15: Support when taking load from front, rear

ⓘ When the load of the burner is taken from the front, the front door must first be removed. When the load of the heat exchanger is taken from the rear, some of the mechanical components must first be removed (electric motor, gearbox, drive chain,…).

Option 2: Lifting with a crane

! **WARNING** - When using a hoist (e.g. chain), make sure that the angle does not fall below 45 degrees. If it falls below this, excessively high forces act on the components and damage is possible.

► Secure the heat exchanger at four metal eyelets *1*.

► Secure the burner at both metal eyelets *2*.

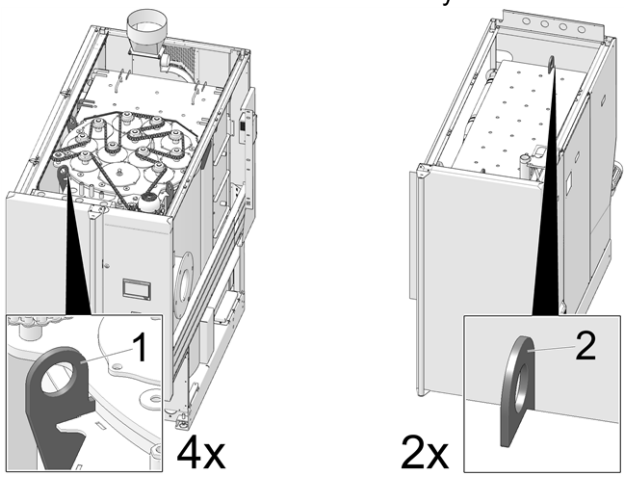


Abb. 2-16: Metal eyelets for crane transport

5.2 Checking fire brick

► After transport, check the fire brick in the burner to make sure it is positioned correctly.

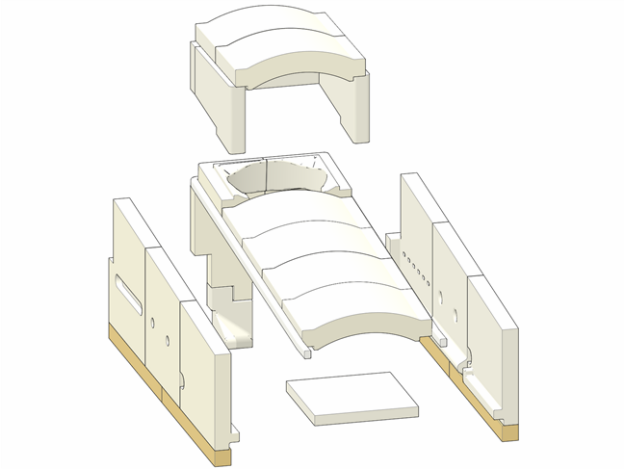
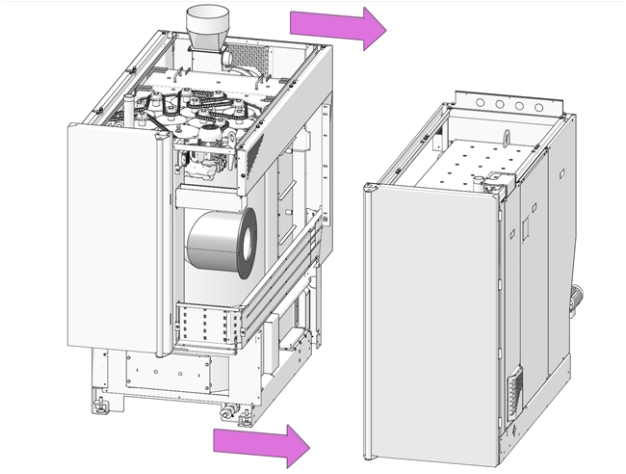


Abb. 2-17: View of front of burner

5.3 Connecting heat exchanger and burner



This chapter describes how to make the necessary connections between the heat exchanger and the burner.

! **WARNING** - Before connecting the burner and heat exchanger, check that the sealing cord *1* in the flue gas pipe flange is in the correct position.

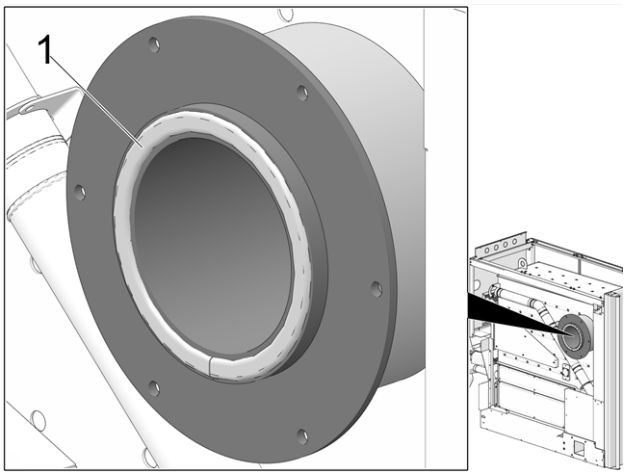


Abb. 2-18: Sealing cord in the flue gas pipe of the burner

5.3.1 Adjust spacing screws

► The two lower holes *1* serve to receive the spacing adjustment screws.

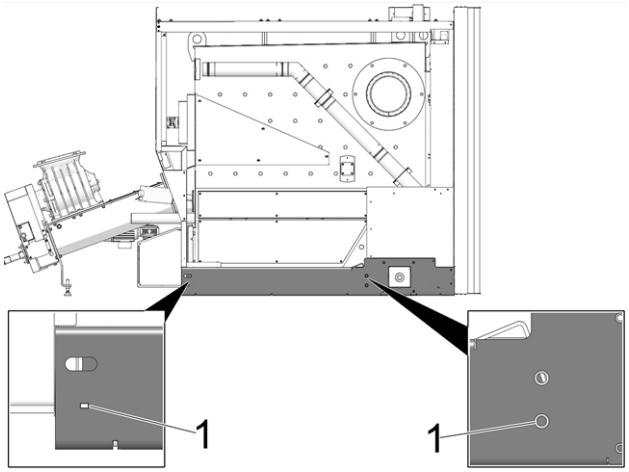


Abb. 2-19: Hole for screws

► Set the two hexagonal screws so that a spacing of **25 mm** is maintained between the bottom plates of the burner and the heat exchanger.
► Push the heat exchanger to the burner (spacing screws) until the stop.

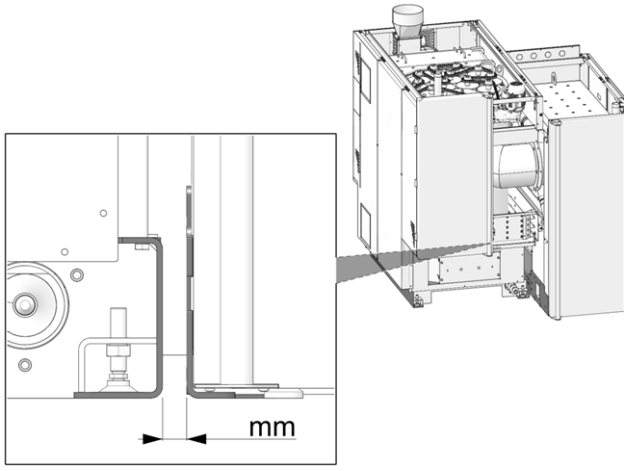


Abb. 2-20: Distance between the bottom plates

5.3.2 Screw on flue gas pipe flange

► Connect the flange of the flue gas pipe with 6× hexagon screws and nuts.

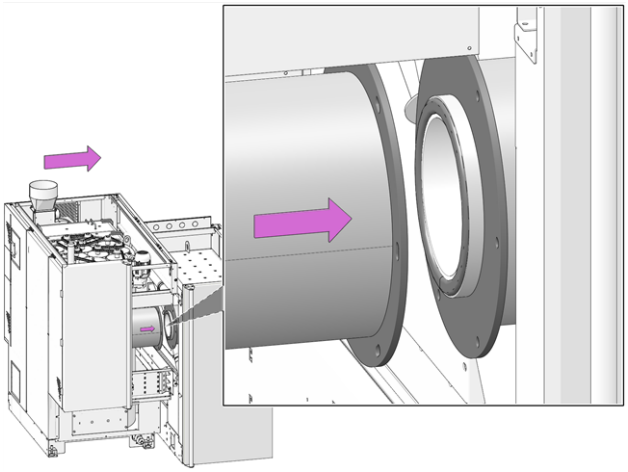


Abb. 2-21: Screw on flange

Two additional spacers (8 mm thickness each) are supplied to facilitate adjustment of the required spacing and can be used as an option.

Ensure that connection is correctly sealed. Reliable measures must be taken to prevent the intake of false air. Failure to observe this can impair the performance of the burner.

5.3.3 Install automatic ash extraction

Hint on assembling the components: Mount the parts by hand first and then tighten once they are joined correctly.

► Check the correct position of the ash auger heat exchangers: The auger must be locked in the rear drive in the bayonet mount.

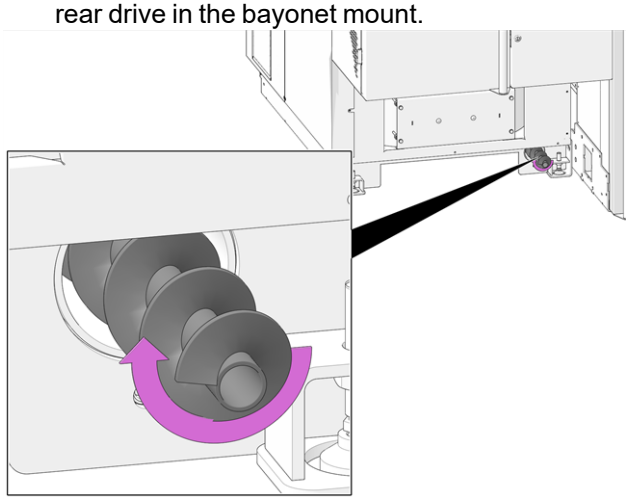


Abb. 2-22: Check auger drive

► Mount auger trough *1* on heat exchanger.

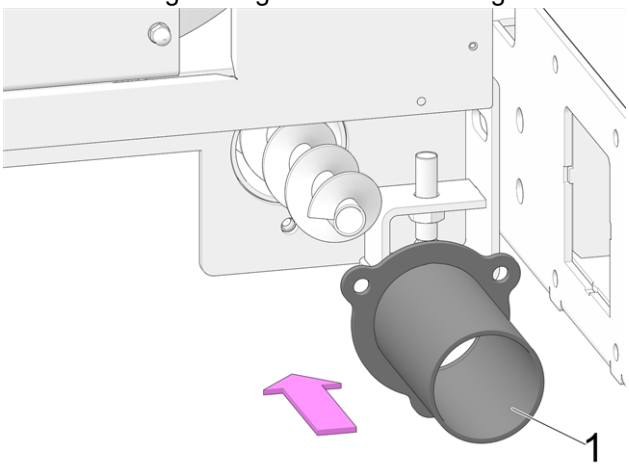


Abb. 2-23: Mount the auger channel

► Push metal ring *1* and gasket *2* onto auger trough.

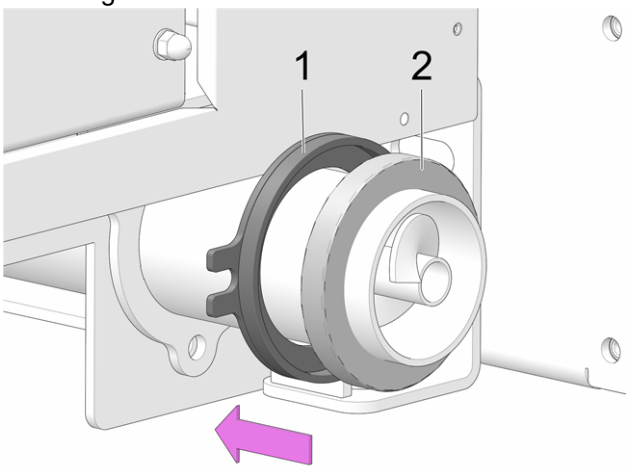


Abb. 2-24: Slide on sealing elements

► Screw flange plate onto auger trough.

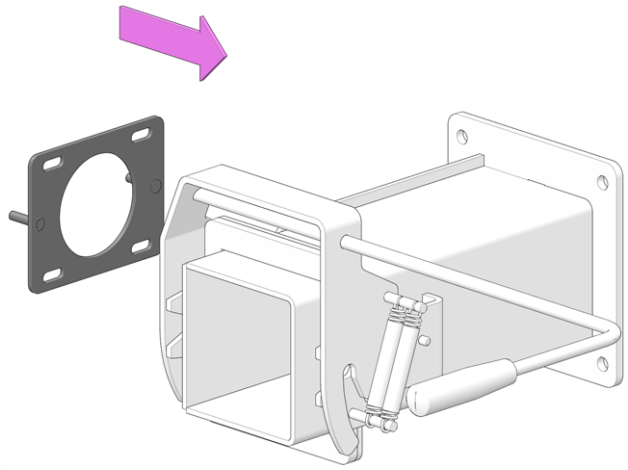


Abb. 2-25: Mount flange plate

► Mount auger trough *1* on burner with 4× hexagon screws and washers. Enclose seal *2*.

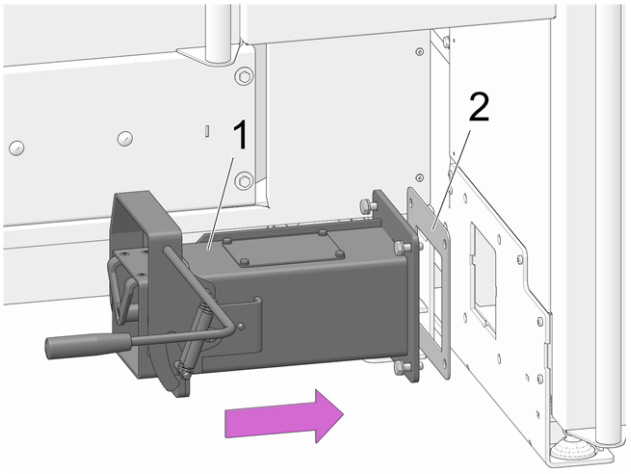


Abb. 2-26: Mount the auger channel

► Tighten metal ring *1* on studs using 2× hex nuts and washers. Sealing ring *2* is pressed axially thereby creating a radial seal.

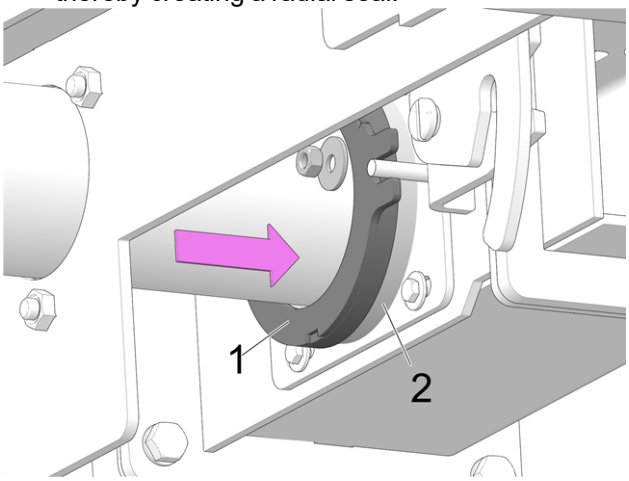


Abb. 2-27: Tighten sealing elements

► Insert ash auger burner *1* into auger trough.

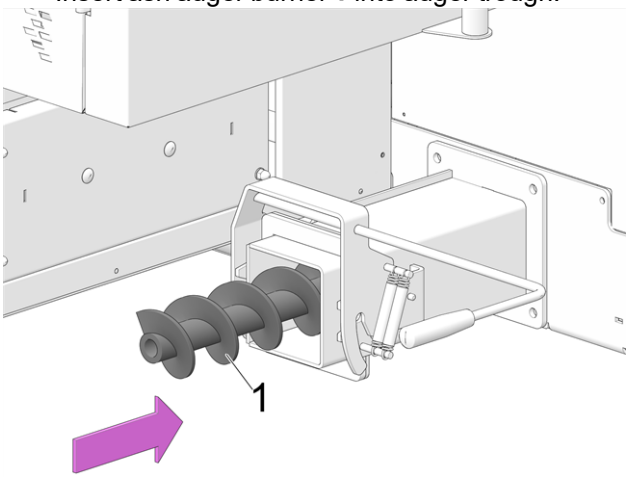


Abb. 2-28: Insert the auger

► Mount geared motor on auger shaft *1*.
► Use key *2* and two securing rings *3*

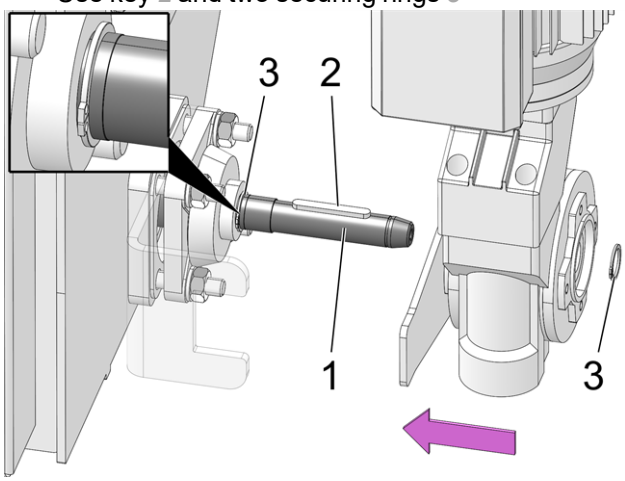


Abb. 2-29: Drive on right side of burner

5.3.4 Connect flue gas recirculation line

► Join flue gas recirculation line with elbow joint *1* and 0.5 m pipe *2* (adapt length of pipe as necessary).

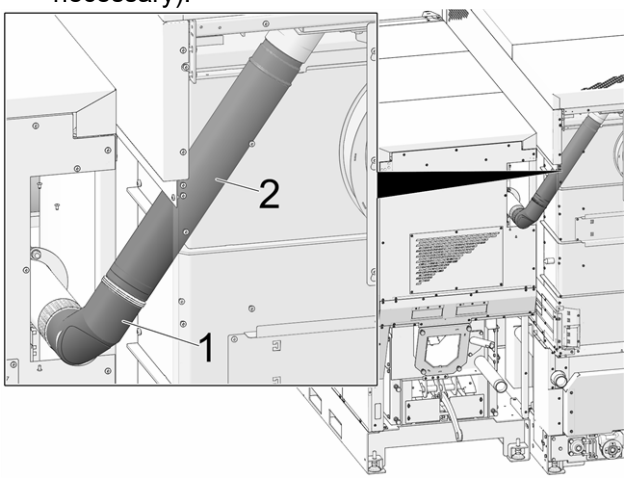


Abb. 2-30

5.3.5 Connect burner and heat exchanger hydraulically

- Join and insulate both connections (pipe and insulation not included in scope of delivery)

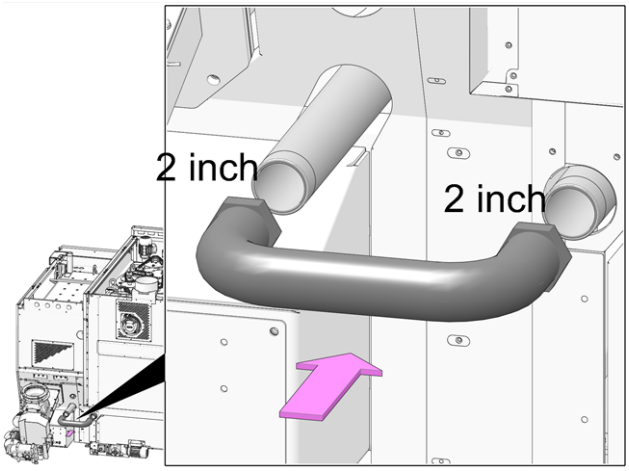


Abb. 2-31: Connect the water circuit

5.4 Mount feeder grate drive

- Mount drive unit *1* (plate, housing, motor/-gearbox) to the burner with 4× hexagon screws.
- Mount connecting rod *2* with washer and circlip on the bolt *3*.
- If necessary (to turn the crank), remove motor/-gearbox *4*.
- Connect motor. Cable **X4.7-X4.9** is pre-routed in ducts 3 and 2 > 38.

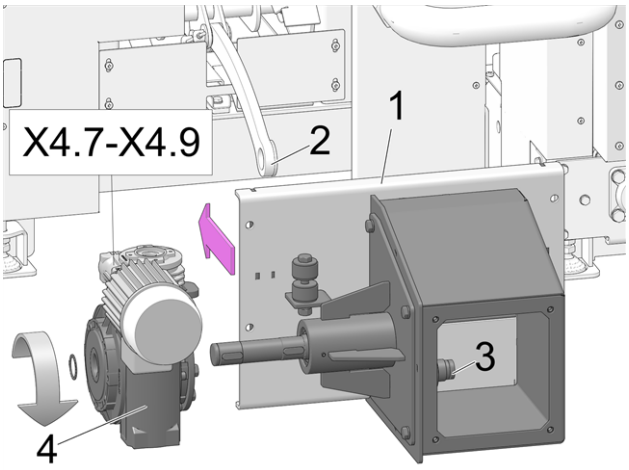


Abb. 2-32: Mount feeder grate drive

Connect the feed grate motor

- Connect the pre-routed cable as shown in the terminal area of the motor.

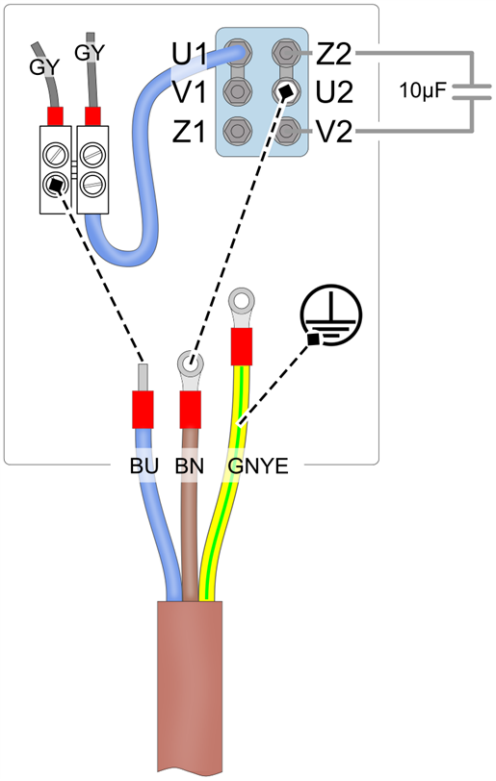


Abb. 2-33: Connect the cable in the motor terminal area

5.5 Install the feeder unit

- Mount the feeder unit *1* including installed rotary valve on the burner with 4× hexagon screws.
- Set adjustable foot *2*.
- Connect the feeder motor *3* to the cable **FU1** pre-routed in ducts 3 and 2 > 38**: U,V,W**.

Check - swap two phases if the direction of rotation is wrong.

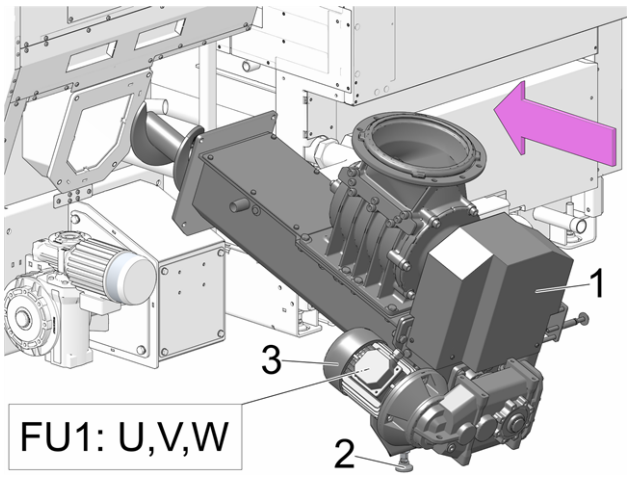


Abb. 2-34: Install the feeder unit

Install the feeder sensor

- ► Fix the feeder sensor *1* in the retaining tube
- ► Connect to **A1:X33**, cable is pre-routed in ducts 3 and 2 > 38.

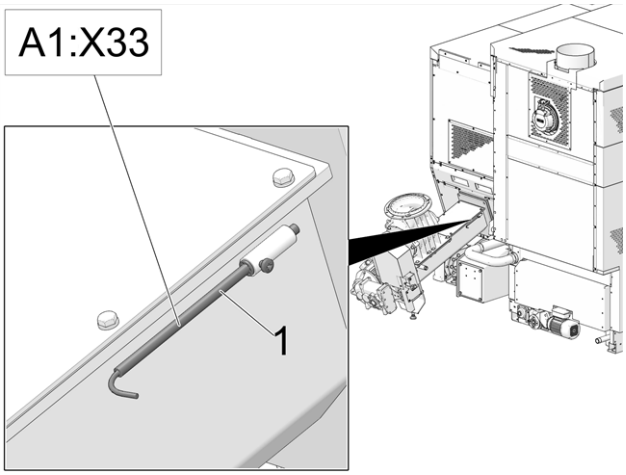


Abb. 2-35: Install the feeder sensor

Connect the feeder motor

- ► Connect the pre-routed cable as shown in the terminal area of the motor.

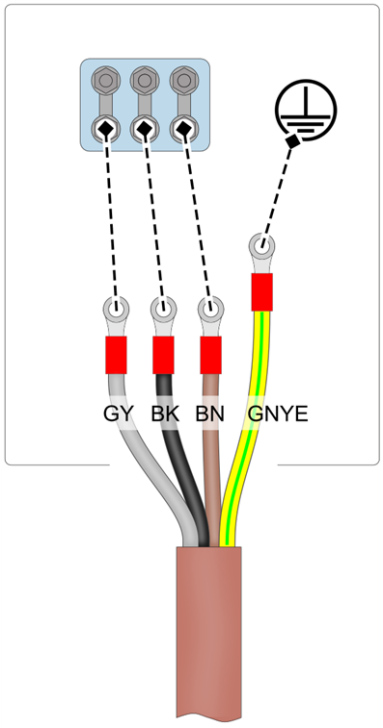


Abb. 2-36: Connect the cable in the motor terminal area

FU1	Feed motor	Cable
U	U1	black
V	V1	brown
W	W1	grey
PE	PE	yellow/green

For frequency converter *FU1* see inside of boiler cabinet door > Abb. 2-52, > 34

5.6 Install the hot air fan

- ► Mount cover *1* and *2*.
- ► Install hot air fan *3* in ignition pipe and secure with t-bolt hose clamp.
- ► Connecting to terminals:
  Fan **A1:X7**
  Heating element **A1:X4**
- ► The cable is pre-routed in ducts 3 and 2 > 38.

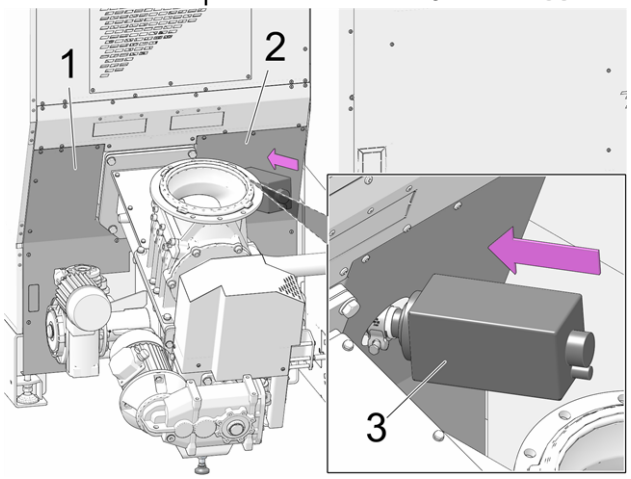
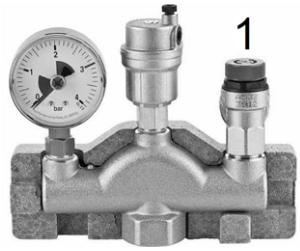


Abb. 2-37: Install the hot air fan

5.7 Install safety valve



- ► Install the safety valve *1* (or boiler safety group) in the boiler supply line, at the highest point of the line, as close as possible to the boiler. Observe installation position.

! **ATTENTION** - Do not install any barriers in the pipework that could render the safety valve ineffective.

5.8 Installing return flow boost

Information on return flow booster > 9

5.9 Installing thermal overload protection

The boiler **maxi** mus L has two safety heat exchangers installed (one in the burner, one in the heat exchanger). The two safety heat exchangers are connected in series.

ATTENTION

- Only standard-tested thermal overload protection may be installed (according to the EN 14597 standard).
- The cold water pipe must not be able to be shut off and must permanently have a minimum pressure of 2 bar; the water temperature must not exceed 15°C. A flow of 2 m³/h must be guaranteed.
- The drain line must be routed freely into an open drain funnel.

▶ Connect the thermal overload protection as shown, i.e. inflow line *1*, backflow line *2*.

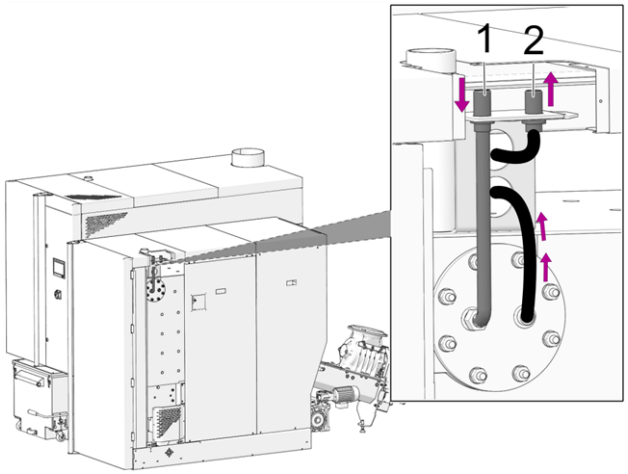


Abb. 2-38: Connect thermal overload protection

Safety heat exchanger in the heat exchanger

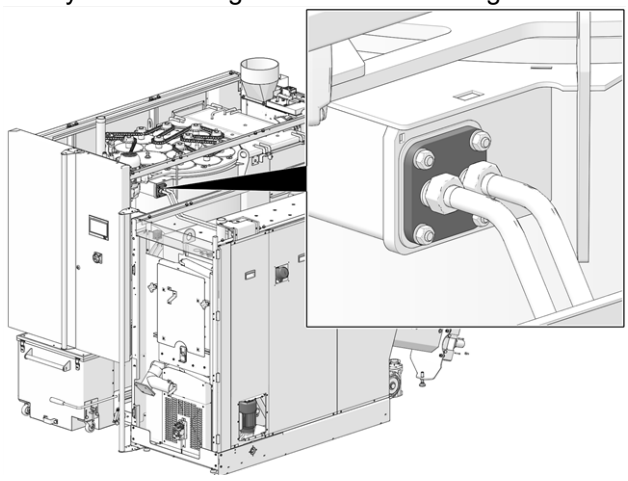


Abb. 2-39

▶ **Fit the thermal overload protection valve before (as seen from the direction of flow) the safety heat exchanger** (i.e. no water pressure building up in the heat exchanger).

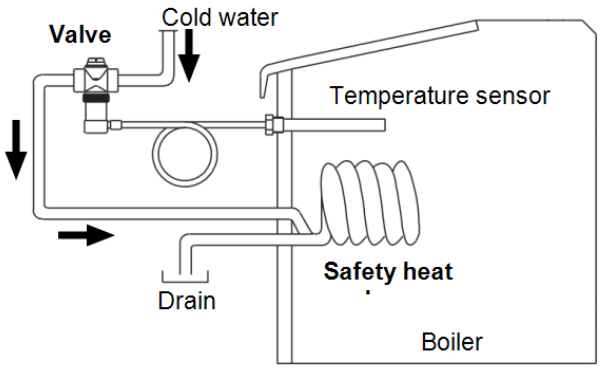
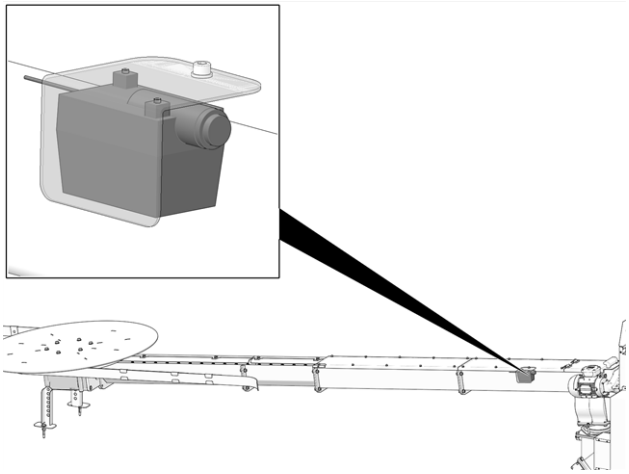


Abb. 2-40: Function of the thermal overload protection (schematic representation)

5.10 Install temperature monitor (TM)



▶ Mount the temperature monitor on the channel of the fuel auger in the area of the wall penetration (inside the storage room).

▶ Connection to terminal **A1:X21**

5.11 Bleeding the heating system

Boilers of the series **maxi** mus L have no vent valves installed in the boiler. The venting takes place via the piping system (e.g. vent valve in the boiler safety group). Set venting option at the highest point of the entire system in the flow.

5.12 Connecting the chimney

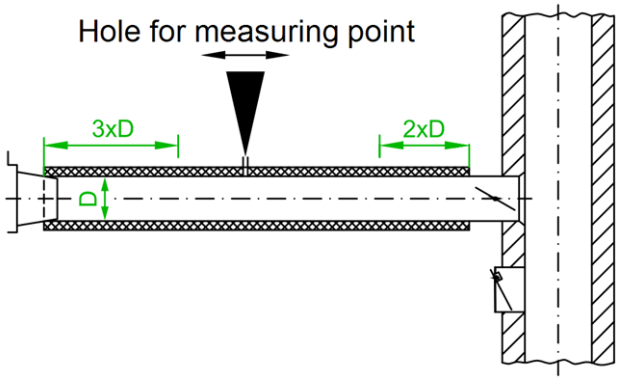
See instructions for execution > 6

5.12.1 Flue gas pipe: Hole for emission measurement

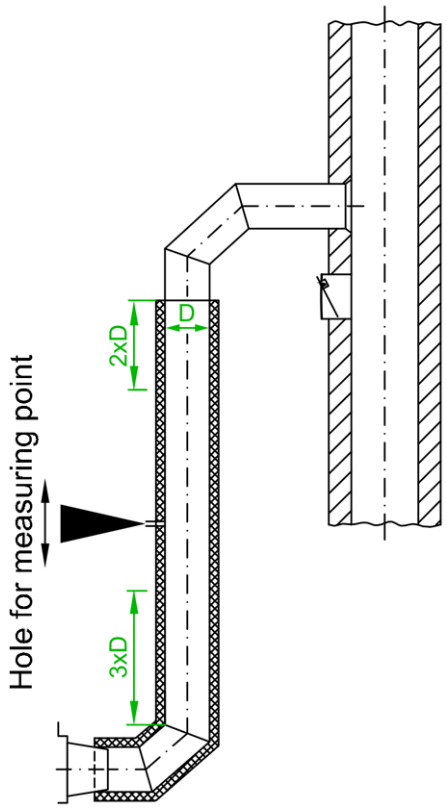
- ► Make the hole for the emission measurement according to the following images (recommendation according to standard).
- ► If these specifications cannot be implemented, then make the measuring point after a calming section, i.e. after the longest straight section of the pipe. The orientation of the pipe (horizontal, vertical, angled) is of no significance here.
- ► In any case, place the measuring point before any existing draught stabilisers.

You can find the function for carrying out the emission measurement in the boiler operation manual, keyword: *Chimney sweep function*.

Flue gas pipe horizontal



Flue gas pipe vertical



5.13 Mounting ash container

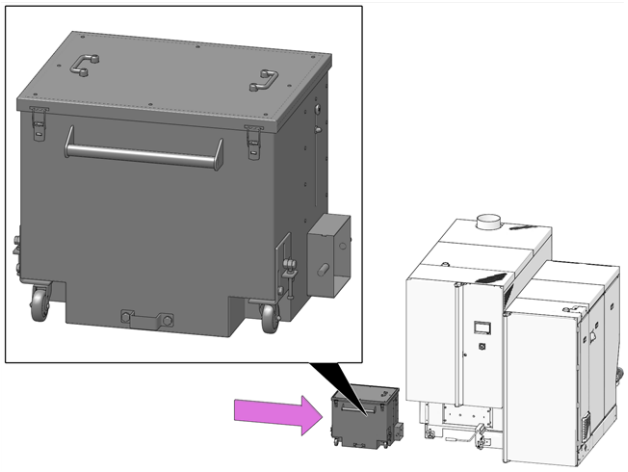


Abb. 2-41

Check seal

- ► Check that seal *1* is positioned correctly.

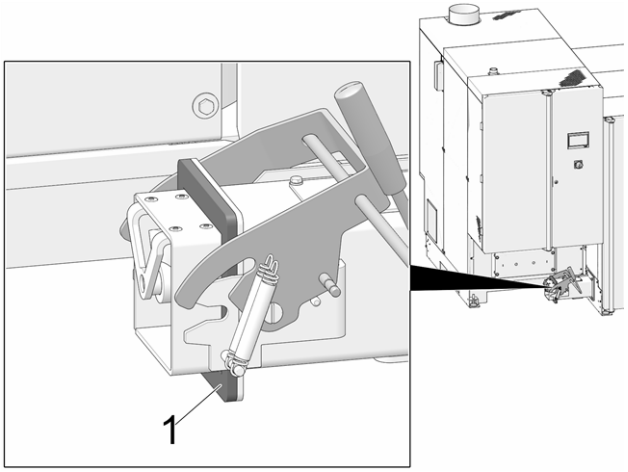


Abb. 2-42

Ensure that connection is correctly sealed. Reliable measures must be taken to prevent the intake of false air. Failure to observe this can impair the performance of the burner.

Adjust height of ash container

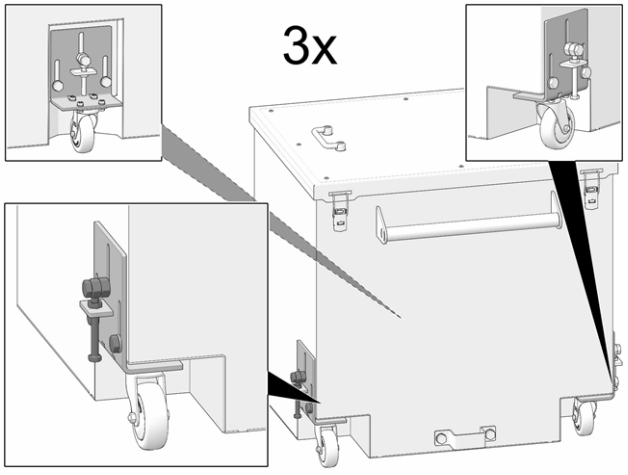


Abb. 2-43: Latch in ash container

Latch in ash container

► Press lever *1* down to the stop. The ash container is thereby pressed against the auger channel.

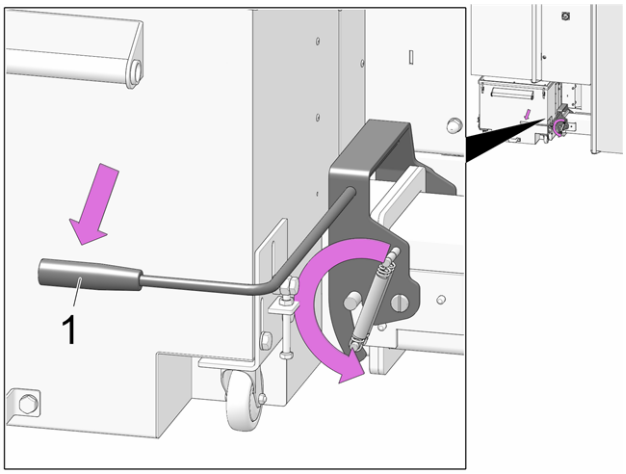
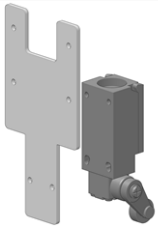


Abb. 2-44: Latch in ash container

Adjust safety switch of ash container

The switch must be adjusted to the height (distance) of the ash container.



► Loosen 4× screws *1* and adjust height of switch retaining plate *2*.

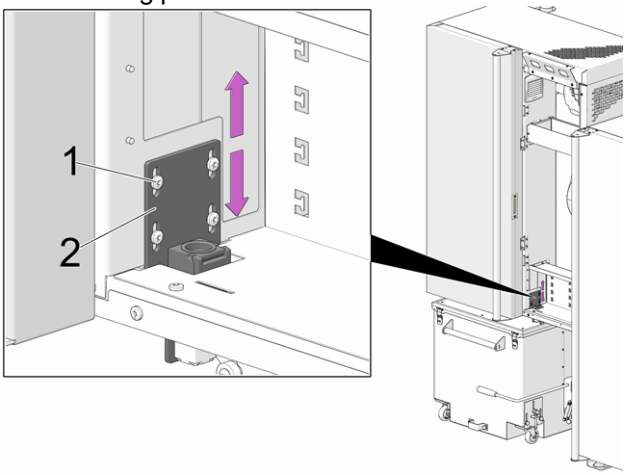


Abb. 2-45: Adjust safety switch

5.14 Mounting cladding on the boiler

► Mount two covers on the back.

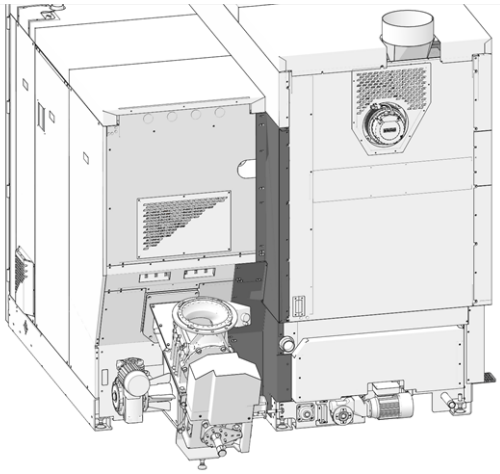


Illustration of further boiler covers > 44

6 Hydraulic connection

6.1 Boiler connections

Boiler flow, boiler return

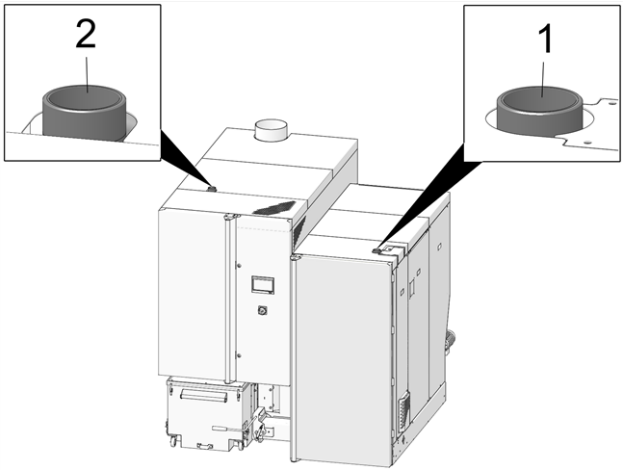


Abb. 2-46

1 Boiler flow, G 2” OT
2 Boiler return, G 2” OT

Feeler, immersion sleeves

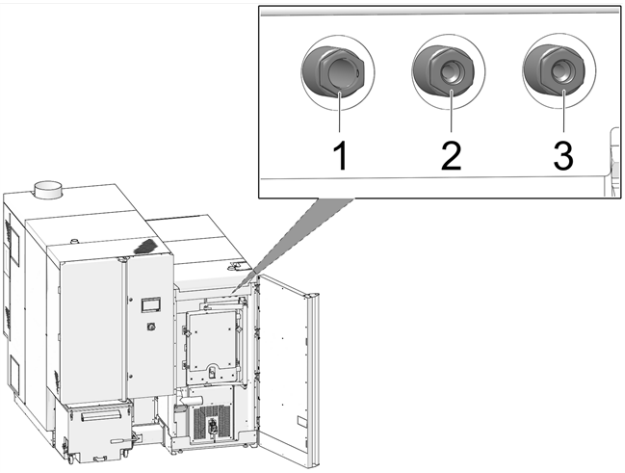


Abb. 2-47: Immersion sleeves on the burner

1 Sensor for thermal overload protection (TOP)
2 Boiler temperature sensor
3 Sensor for overtemperature reset button (STB)

Install thermal overload protection > 29

Return sensor, pressure sensor

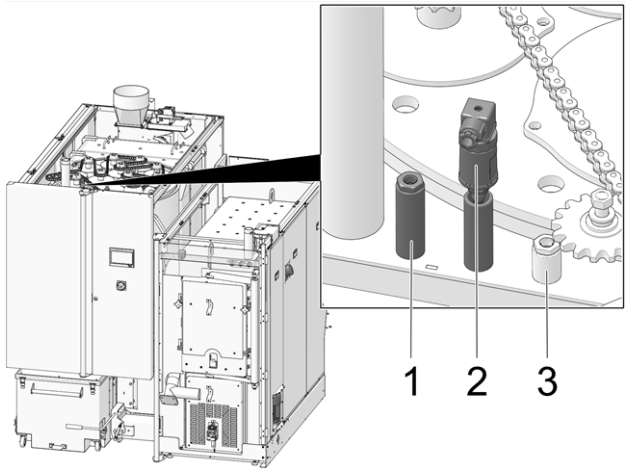


Abb. 2-48

1 Return sensor
2 Pressure sensor
3 blank

Boiler draining

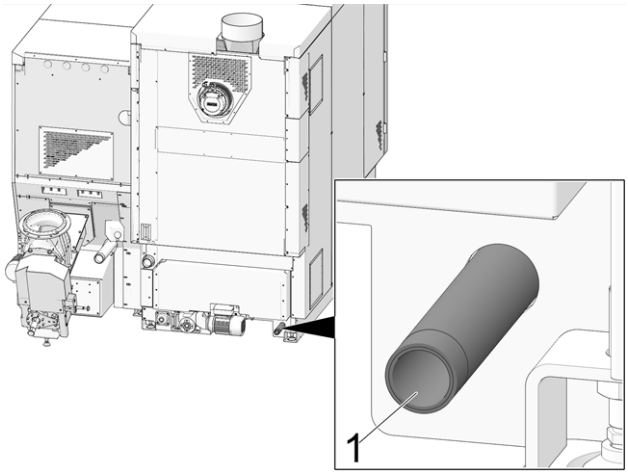


Abb. 2-49: Draining on the back of the heat exchanger

1 Boiler draining, G 1” OT

7 Electrical connection

DANGER - There is a risk of fatal electric shocks when working on electrical components of the system

- Work may be performed only by a qualified electrician.
- Applicable standards and regulations must be observed.

To be installed on site

Most of the electrical components are installed and electrically connected.

Components to be connected on site to the control cabinet (pre-wiring is available) on the front of the burner are listed here > 35

Components to be connected on the back of the burner (pre-wiring is available) are:

- Hot air fan > 28
- Feeder grate drive > 27
- Feeder unit (including feeder sensor) > 27
- Depending on the fuel delivery system, additional components:
  - see intermediate pellet store > 41
  - see delivery systems > 48

7.1 Power supply for the heating system

- Provide a separate power circuit in the Heizraum for the heating system.
- Connection: 400 V AC, 50 Hz, 16 A, 3P+N+PE
- Connect the boiler with the plug CEE 5 x 16 A.
- Use a heat-resistant PVC or silicone cable with 5-pin min. 2.5 mm² as the supply cable.
- The rotating field must turn anti-clockwise.
- Connection in boiler control cabinet, terminal block X0, > Abb. 2-52, > 34

Establish potential equalisation

- Connect the two parts (burner and heat exchanger) to the potential equalisation conductor *1*.
- From this connection, connect the boiler to the potential equalisation rail of the house installation, conductor cross-section min. 10 mm².

ATTENTION Failure to observe this may cause damage to the components.

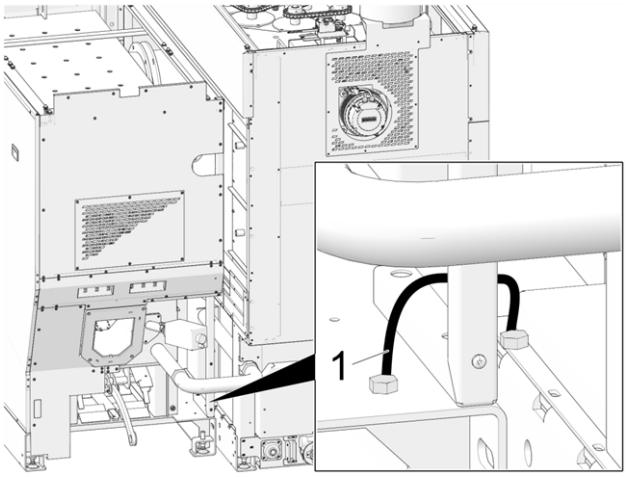


Abb. 2-50: Connect potential equalisation

7.2 Boiler control cabinet

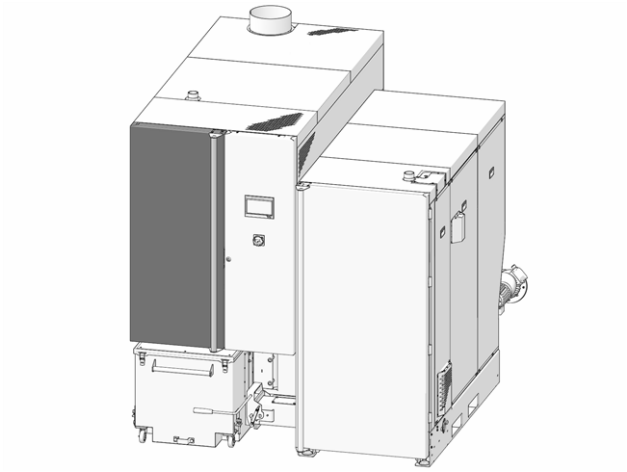


Abb. 2-51: Position of the control cabinet

Components (power elements,…) in the control cabinet

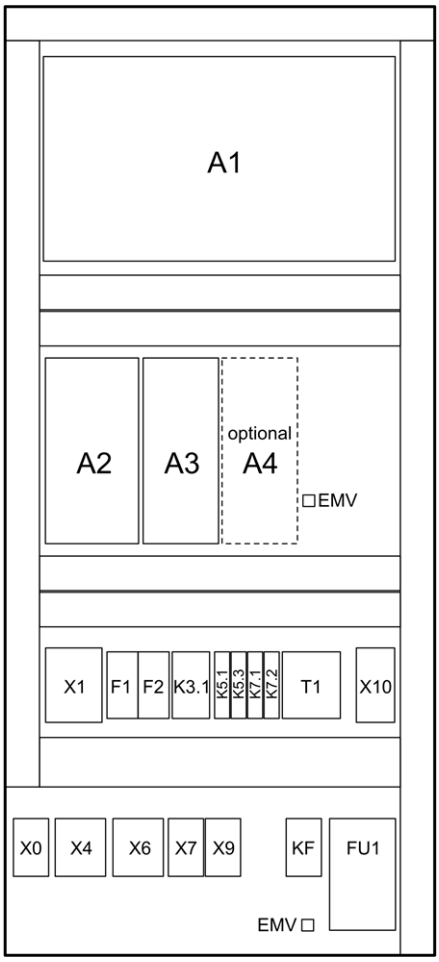


Abb. 2-52

Detailed illustrations of the power element A1 and the circuit boards A2 and A3 (A4) > 45

Position high voltage module_A5 > 46

7.3 Terminal assignment

Designation	Connection
Flue gas temperature sensor > 47	A1:X34
Ash extraction burner: Motor > 36	A1:X16
Ash extraction heat exchanger (and separator cleaning): Motor > 47	A1:X23
Ash extraction heat exchanger (and separator cleaning): Position switch > 47	A1:X48
Outside temperature sensor	A1:X42
CAN bus connection for electronic modules > 45	A3:X6, A4:X6
Display (boiler control **eco**manager-*touch*)	A1:X53
Rotary drive for primary air > 17	
Rotary drive for recirculation > 46	
Rotary drive for secondary air > 17	
Feeder sensor > 27	A1:X33
Feeder motor > 27	FU1: U,V,W
Electrostatic dust collector: 230 V supply for the high voltage module_A5 > 46	A2:X4
Electrostatic dust collector: Analogue output 0-10V *nominal voltage* for high voltage module_A5 > 46 (0-30kV)	A2:X7
Electrostatic dust collector: Analogue output 0-10V *nominal current* for high voltage module_A5 > 46 (0-4mA)	A2:X8
Electrostatic dust collector: Analogue input 0-10V *actual voltage* for high voltage module_A5 > 46 (0-30kV)	A2:X9
Electrostatic dust collector: Analogue input 0-10V *actual current* for high voltage module_A5 > 46 (0-4mA)	A2:X10
External request of the boiler > 37	A1:X51
External boiler request (**maxi** mus L requests additional boiler) > 37	A1:X28
Hot air fan: Fan > 28	A1:X7
Hot air fan: Heating element > 28	A1:X4
Boiler temperature sensor (in the water jacket of the boiler) > 35	A1:X31
Lambda sensor > 46	A1:X45
Intermediate pellet store: Container auger > 42	A3:X2
Intermediate pellet store: Filling level sensor > 42	A1:X49
Intermediate pellet store: Suction turbine > 42	X4.13-X4.15
Intermediate pellet store: Container flap sensor > 42	A2:X12
Buffer tank sensor Top	A1:X44
Buffer tank sensor Bottom	A1:X36

Designation	Connection
Direct extraction 1*(RA1)*: Thermal contact + safety switch > 39	X9.1-X9.2
Direct extraction 2*(RA2)*: Thermal contact + safety switch > 39	X9.3-X9.4
Direction extraction for suction systems (only for pellets, e.g. suction auger, mole) > 37	A1:X14
Direct extraction motor 1 (*RA1*) > 48 1-phase with motor container auger (intermediate pellet store) 3-phase with direct extraction	A3:X2
Direct extraction motor 1 (*RA2*) > 48 3-phase: ‚Motor for bunker filling auger; or motor for intermediate auger)	A4:X2
Spare	A1:X6
Return booster pump	X4.4-X4.6
Return sensor > 32	A1:X32
Return mixer	A1:X13
Induced draft fan > 47	X4.1-X4.3
Control cabinet fan	A1:X19
Control cabinet temperature	A1:X30
safety chain (several safety devices are connected here), e.g. EMERGENCY OFF switch > 37 Ash box safety switch (connection A1.X50 can also be used as an option)	X6.1-X6.8
Overtemperature reset (OTR) > 35	X6.1-X6.8
Boiler power supply 400V > 33	X0
Fault > 37	A1:X29
Temperature monitor in fuel storage room (TM) > 29	A1:X21
Temperature monitor in fuel storage room (TM) > 29 : Warning device (visual or acoustic)	X7.3-X7.4
Feed grate motor > 27	X4.7-X4.9
Heat exchanger cleaning - motor > 46	X4.10-X4.12

7.4 Connections, functions

For the following components, the pre-wiring on the burner is present (the cables are pre-routed in cable duct 1 > 38). The connection of the plug in the control cabinet must be made on-site.

- Overtemperature reset
- Boiler temperature sensor
- Ash extraction burner

7.4.1 Connect overtemperature reset

► Connect overtemperature reset (OTR) *1* to **X6.1:X6.8**

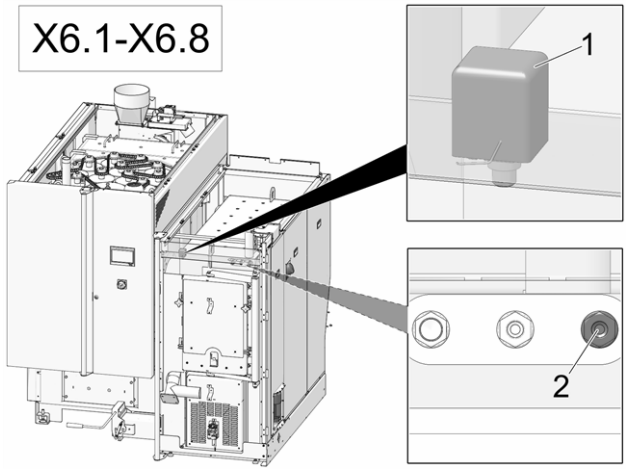


Abb. 2-53

1 Overtemperature reset (OTR)
2 Sensor for overtemperature reset

7.4.2 Connect the boiler temperature sensor

► Connect boiler temperature sensor *1* to **A1:X31**

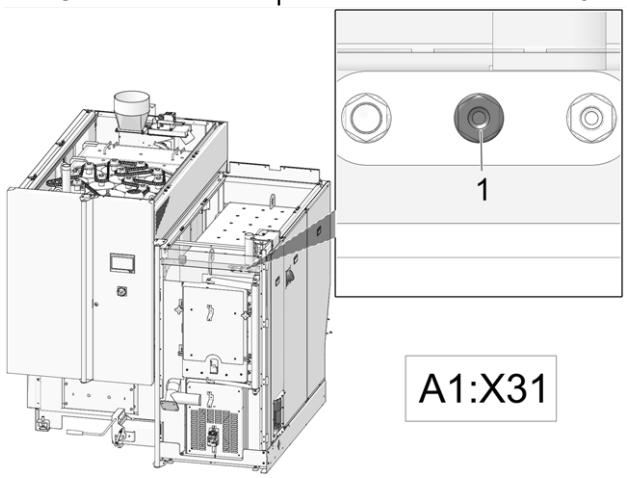


Abb. 2-54

7.4.3 Connect ash extraction burner

▶ Connect automatic ash extraction motor *1* to **A1:X16**

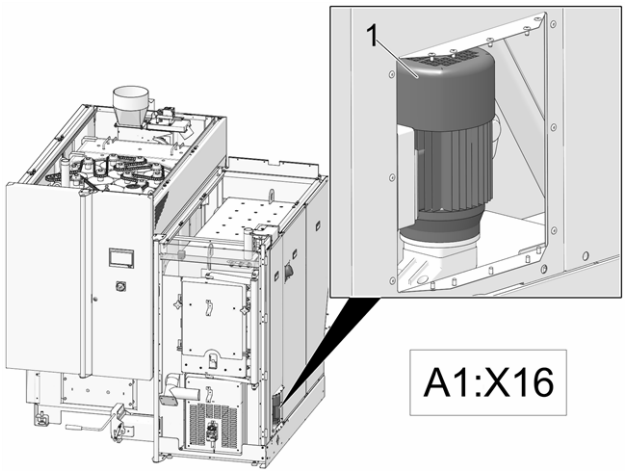


Abb. 2-55

7.4.4 Connect rotary actuators

The bus cables coming from the control cabinet (clamping area X10) of the heat exchanger include the following components when fully installed:

- **Rotary drive for primary air** > 46 (connect on site)
- **Rotary drive for secondary air** > 46 (connect on site)
- Rotary drive for flue gas recirculation > 46
- Induced draft fan > 47

▶ Join MATE-N-LOK connector *1* for primary air, **X200**

▶ Join MATE-N-LOK connector *2* for secondary air, **X201**

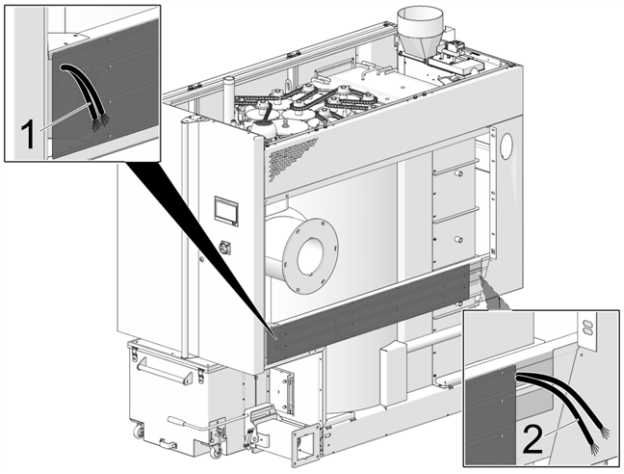
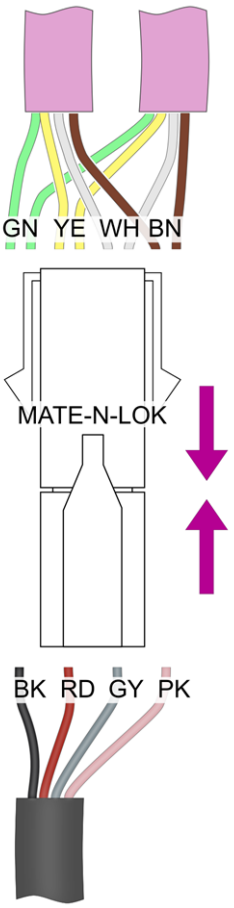
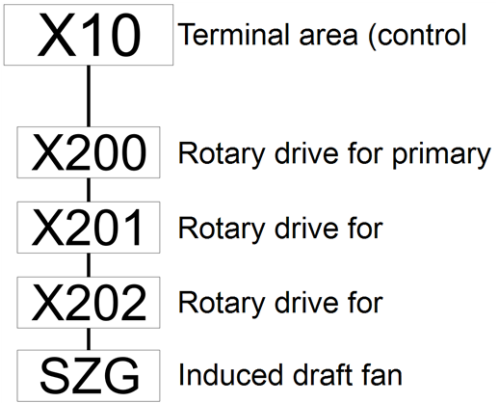


Abb. 2-56: Connect bus cable

Connection **X20**x (rotary drive for primary air and secondary air)



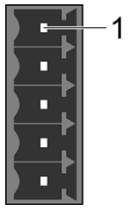
Order of bus slaves



7.4.5 Connection for electronic modules

CAN-OUT interface X6

See power element_A3 (optional A4) > 45



Pin	Signal	Function
1	+24 V	+24 V supply
2	CAN A	CAN signal low
3	CAN B	CAN signal high
4	GND	Ground
5	SH	Shield (ground)

7.4.6 Installing the emergency OFF switch

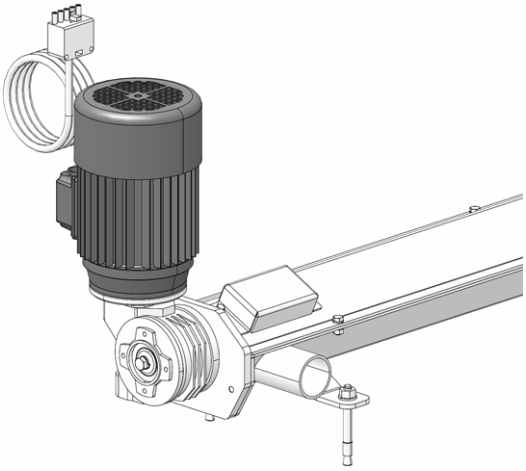
Austria: Firing systems for which a boiler room is required must be equipped with an emergency OFF switch, which must not have an effect on the room lighting. It must be situated immediately outside the access door and labelled clearly and visibly. This switch may also be located inside the boiler rooms, immediately next to the access doors, but only if the boiler rooms can be accessed from outdoors.

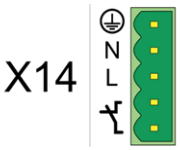
- ► Integrate the emergency OFF switch into the safety chain of the boiler, connection **X6.1-X6.8**
- ► Connect other components integrated in the safety chain in series ("loop through")

7.4.7 Pellet delivery system (A1:X14)

Suction system auger extraction

- ► Connect the auger motor to the power element X14, use cable 5x1.5 mm^2.



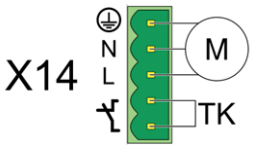


5-pin connector, direct extraction motor	Connection *X14* on the power element
PE	PE (1)
N	N (2)
L3	L (3)
L2	TC(4)
L1	TC (5)

Third-party manufacturer system

Use e.g. for pellet box transfer unit auger and for the *pellet mole* (these systems have integrated motor–thermal protection).

- ► Bridge the two thermal contact terminals (TC) on the power element.
- ► Use 3x1.5 mm^2 cable



7.4.8 External boiler request (A1:X28)

Potential-free Relay output for switching an external boiler, e.g. an external boiler receives a release from the SOLARFOCUS boiler control.

ATTENTION – The connection is potential-free and has a maximum load of 5A.

7.4.9 Malfunction (A1:X29)

Potential-free relay output, for example, to switch a warning device (optical/acoustic). Triggered in the event of an operating fault on the boiler.

ATTENTION – The connection is potential-free and has a maximum load of 5A.

7.4.10 External request (A1:X51)

Input, i.e. the SOLARFOCUS boiler can be started by an external controller.

CAUTION - The connection must be potential-free.

7.5 Cable ducts on the boiler

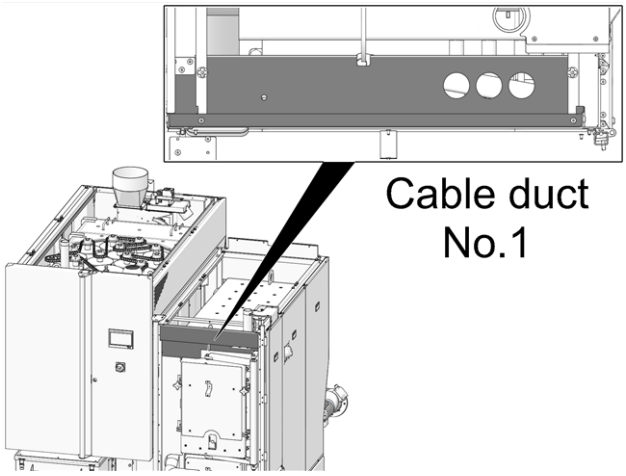


Abb. 2-57: Burner front top

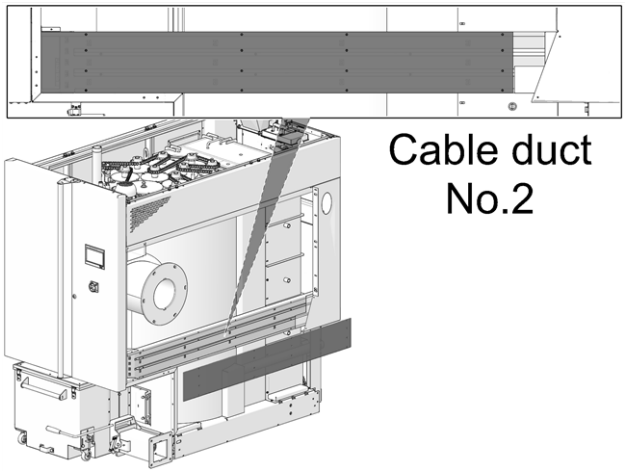


Abb. 2-58: Heat exchanger longitudinal side

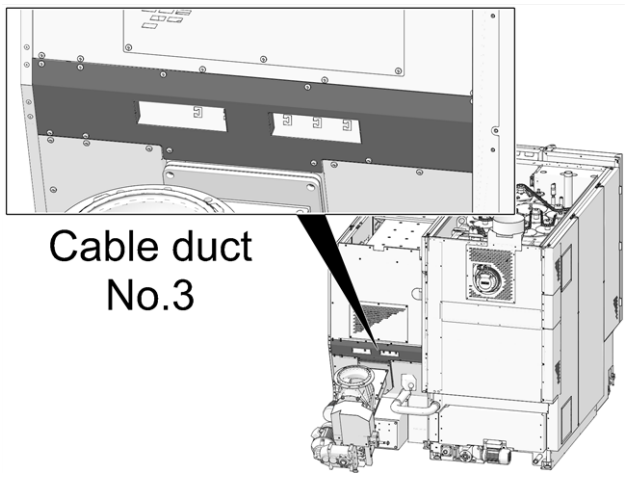


Abb. 2-59: Burner rear

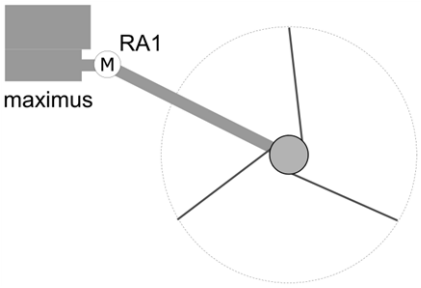
7.6 Direct extraction system for wood chips: Connecting auger

The motor of the direct extraction auger, the motor of the optional intermediate auger(s) and also the safety switch of the auger trough cover must be connected.

The following sections (*connecting*…) apply to the direct extraction auger and the intermediate auger(s).

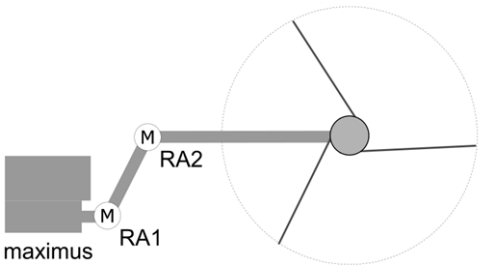
Motor of feeder unit > 27

Direct extraction auger



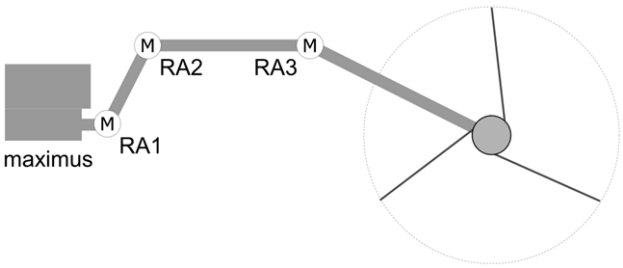
RA1 = Motor of direct extraction auger

Direct extraction auger, intermediate auger



RA1 = Motor of intermediate auger
RA2 = Motor of direct extraction auger

Direct extraction auger, intermediate auger 1, intermediate auger 2



RA1 = Motor of intermediate auger 1
RA2 = Motor of intermediate auger 2
RA3 = Motor of direct extraction auger (see separate manual DR-0214)

7.6.1 Connecting auger motor

► Connect the cable as shown in the terminal area of the motor.

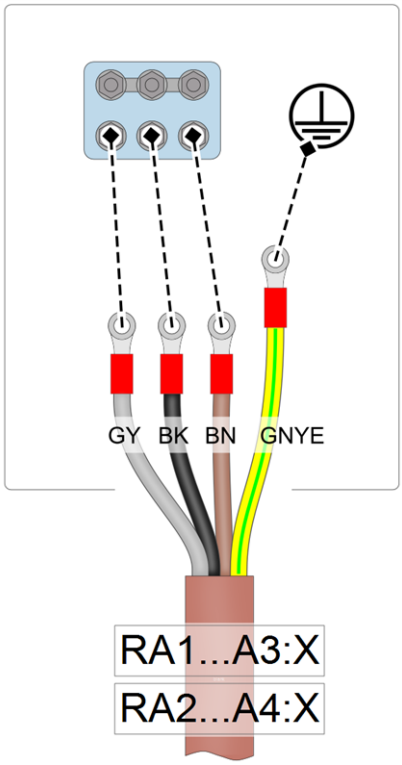


Abb. 2-60: Connect the cable in the motor terminal area

A3:X2, and A4:X2	Auger motor	Cable
L1	V1	black
L2	U1	brown
L3	W1	grey
PE	PE	yellow/green

For power elements A3 and A4 see inside of boiler cabinet door > Abb. 2-52, > 34

7.6.2 Connecting the safety switch

► Connect the safety switch *1* according to the diagram in the terminal area of the auger motor *2*.

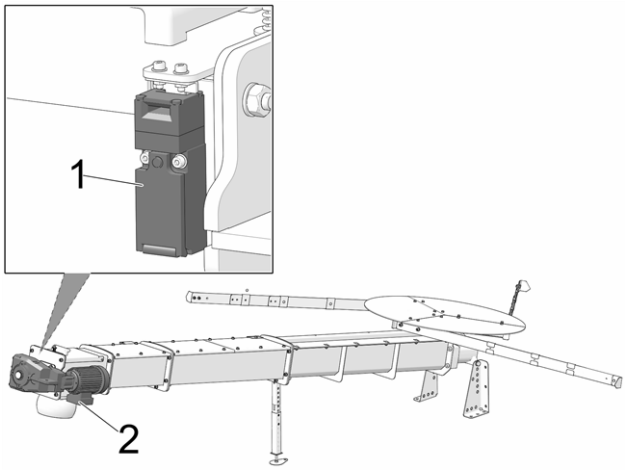


Abb. 2-61: Direct extraction auger

Connection in motor terminal area

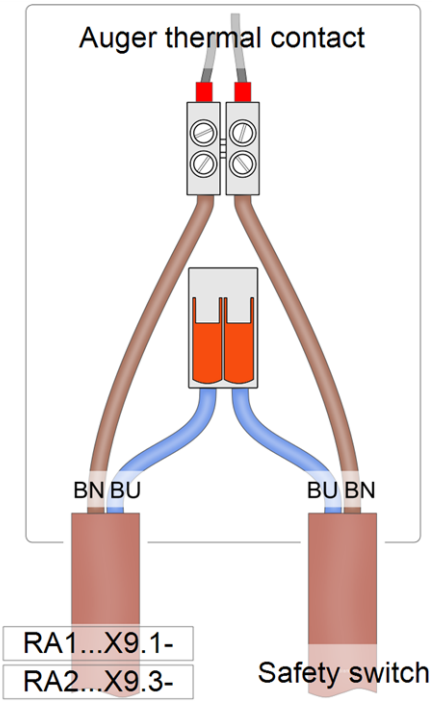


Abb. 2-62: Connect the safety switch in the motor terminal area

7.7 Sensor resistance table

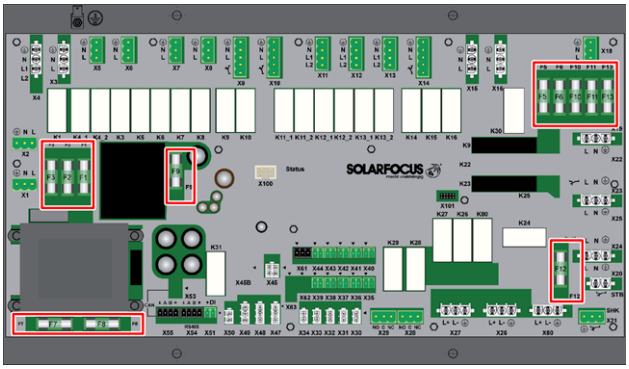
Type	KTY 81-110	PT100	PT1000	KTY 81-210
Tolerance	± 3 %	± 0.7 %	± 1 %	± 3 %
°C	Ohm	Ohm	Ohm	Ohm
-20	684	92.16	922	1367
-10	747	96.09	961	1485
0	815	100	1000	1630
10	886	103.9	1039	1772
20	961	107.79	1078	1922
25	1000	109.74	1097	2000
30	1040	111.69	1117	2080
40	1122	115.54	1155	2245
50	1209	119.4	1194	2417
60	1299	123.24	1232	2597
70	1392	127.07	1271	2785
80	1490	130.8	1309	2980
100	1696	138.5	1385	3392
120	1915	146.06	1461	3617
140	2124	153.58	1536	4186
150	2211	157.31	1573	4280
160	-	161.04	-	-
170	-	164.76	-	-
180	-	168.46	-	-
190	-	172.16	-	-

7.8 Electrical fusing

DANGER - There is a risk of fatal electric shocks when working on electrical components of the system

- Work may be performed only by a qualified electrician.
- Applicable standards and regulations must be observed.

Position of the fuses on the power element



Fuses on the power element (A1)

	Value	Size	Use
F1	T 3.15A	5x20 mm	Fuse 230 V AC: Main transformer pre fuse
F2	T 125mA	5x20 mm	Fuse 230 V AC: Standby transformer pre fuse
F3	T 10A	5x20 mm	Fuse 230 V AC: Relay outputs
F5	F 8A	5x20 mm	Fuse for X18 (power supply to external modules 230V AC)
F6	F 8A	5x20 mm	Fuse 230 V AC: Triac outputs
F7	T 2.5A	5x20 mm	Fuse 12V AC: Heating lambda sensor
F8	T 2.5A	5x20 mm	Fuse 18V AC: Internal electronics for main transformer
F9	T 800mA	5x20 mm	Fuse 18V AC: Internal electronics, standby transformer; display supply
F10	T 10A	5x20 mm	Spare fuse
F11	F 8A	5x20 mm	Spare fuse
F12	F 0.5A	5x20 mm	230 VAC fuse: Relay outputs X26, X27 and X80
F13	F 0.5A	5x20 mm	Spare fuse for F12

7.9 Connecting boiler control to the internet

To enable the Internet connection of the **eco**manager-*touch* boiler control, connect the Ethernet port **X2** *1* (type RJ45) on the bottom of the display by cable to a network router.

The connection is required in order to use the following functions:

- mySOLARFOCUS app
- Weatherman function
- IP-VNC (remote access to boiler control)
- Sending e-mails

Additional information on these functions can be found in the operation manual.

Display - Connections

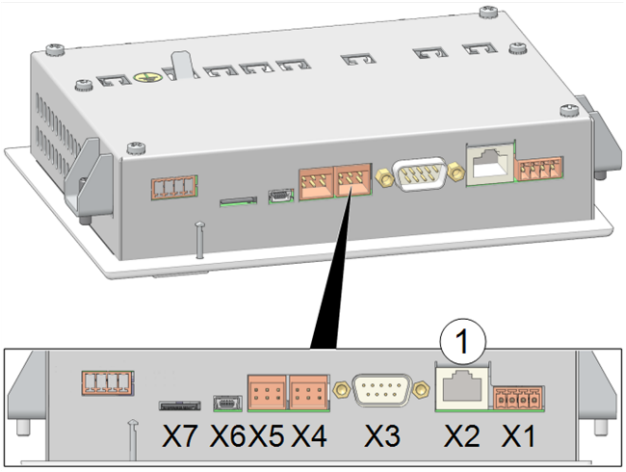


Abb. 2-63: Connections on the underside of the display

Access to the rear of the display

► Lift cover upwards.

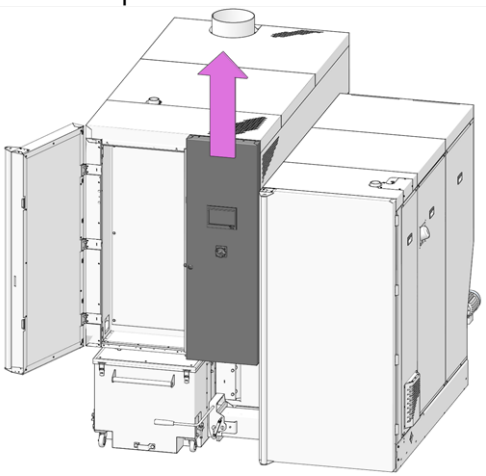


Abb. 2-64

8 Installing the intermediate pellet store

Overview showing set-up situation of attached intermediate pellet store > 15

Two persons are required for installation of the intermediate pellet store.

Preinstall parts

- Mount 2× longitudinal struts *1* and 2× transverse struts *2* on support frame *3*.

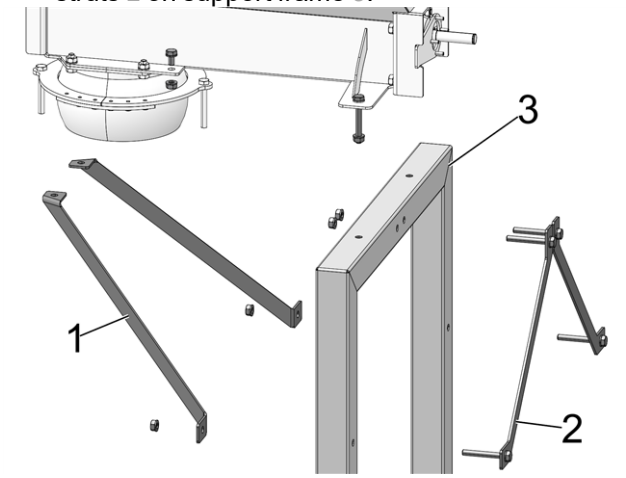
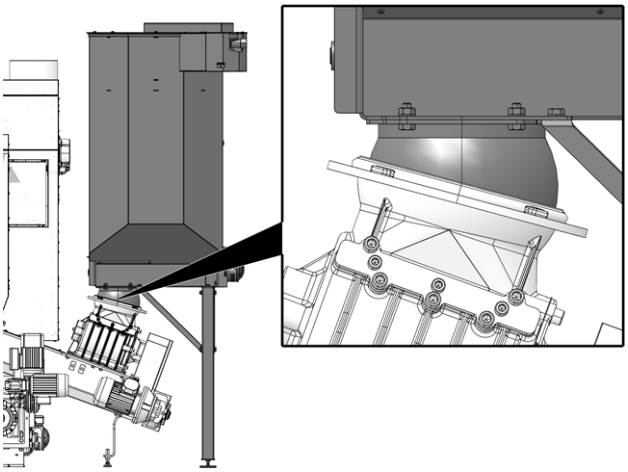


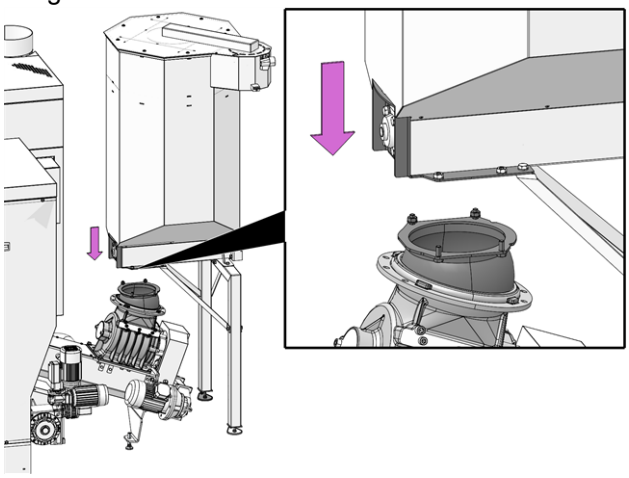
Abb. 2-65

Set up container, join angular compensator



Tip: Mount angular compensator BEFORE assembly

As an alternative to joining the angular compensator when setting up the container, it is possible to assemble the entire angular compensator in advance and screw the intermediate store to the angular compensator (placed on top of it) using the straight flange.



If necessary: Install intermediate store rotated

If necessary due to the set-up situation, the intermediate store can be mounted rotated on the left or right of the feeder unit.

However, straight alignment is recommended in the extension of the feeder unit.

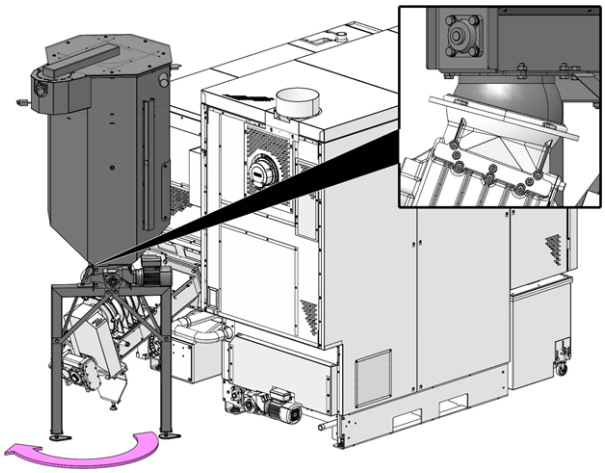


Abb. 2-66

Fix retaining plates to the floor

- ► Set-up the container horizontally using the adjustable feet.
- ► Attach 2× retaining plates to the floor with screws.

⚠ **DANGER** - The retaining plates of the adjustable feet must be securely screwed down as otherwise there is a risk of the container tipping over and presenting a risk of injury.

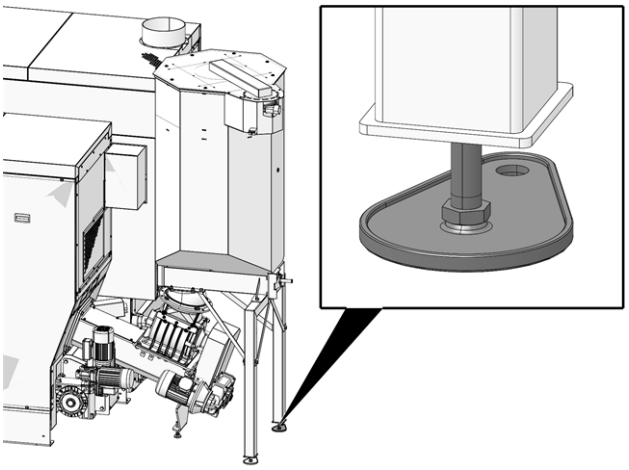


Abb. 2-67

Mount the drive unit

- ► Mount the drive unit *1* on the shaft *2* and attach using the securing ring *3*.

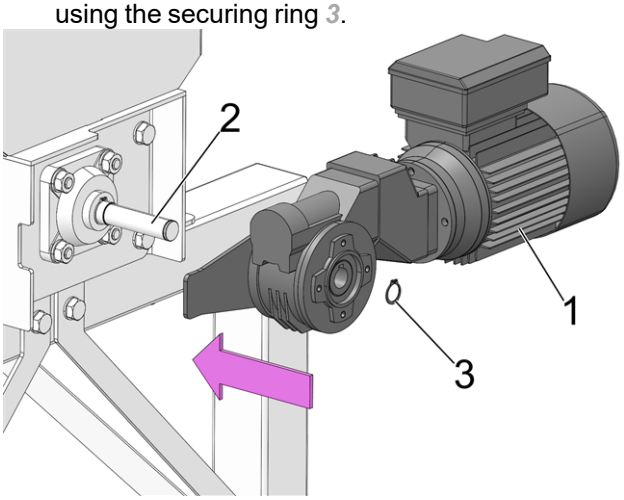


Abb. 2-68

Connect pellet hose

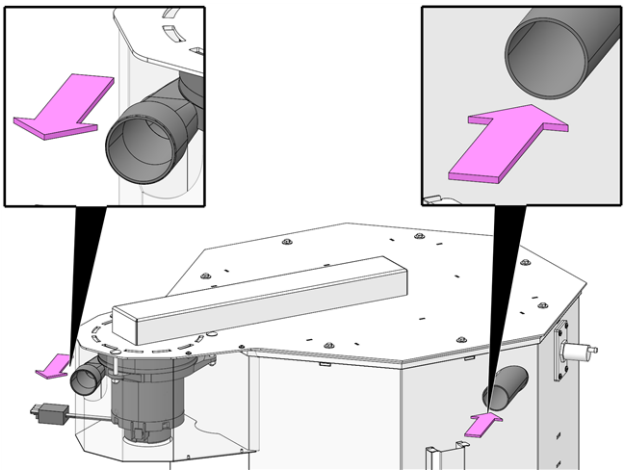


Abb. 2-69

Notes on installing the pellet hose > 47

Connect electrical components

- ► Connect components; cables are in pre-routed in ducts 3 and 2 > 38 of boiler.
- ► Use the cable duct that runs vertically along the intermediate pellet store.

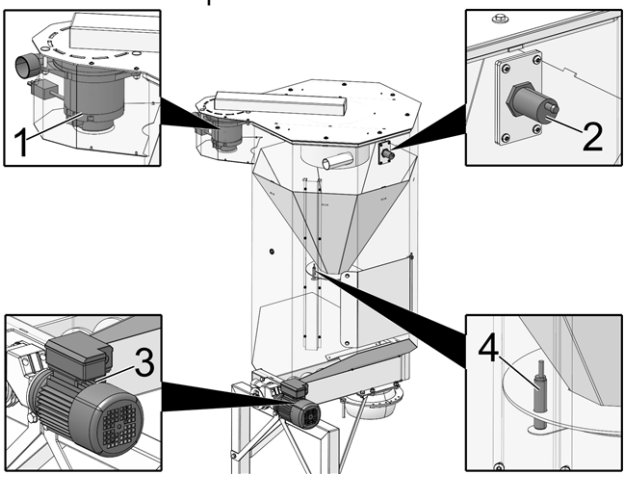


Abb. 2-70: Intermediate pellet store

1	Pellet suction turbine	X4.13-X4.15
2	Filling level sensor	A1:X49
3	Container auger motor (*Direct extraction motor 1*)	A3:X2
4	Container flap sensor	A2:X12

Connect the motor of the container auger

► Connect the pre-routed cable as shown in the terminal area of the motor.

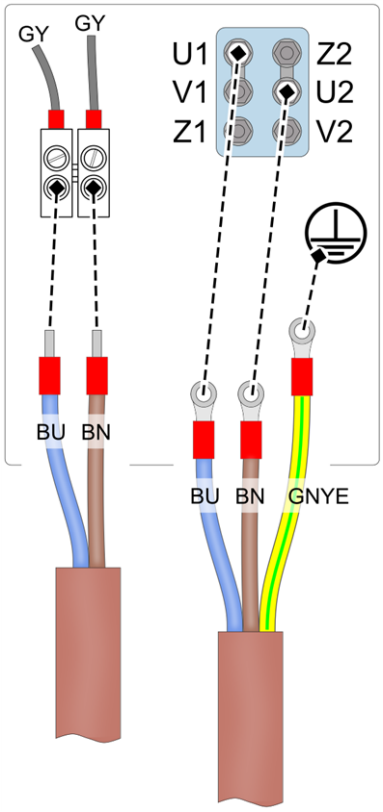


Abb. 2-71: Connect the cable in the motor terminal area

9 Initial start-up

Initial commissioning of the boiler may only be performed by qualified personnel (SOLARFOCUS service technician or SOLARFOCUS specialist service partner) (= condition for guarantee, warranty).

Requirements

☑ The boiler is hydraulically connected.
☑ The heating system is filled with water and has been vented.
☑ The boiler is electrically connected.

Commissioning

► Connect the boiler to the mains power supply.
► Carry out the *commissioning routine* in the boiler control.

Complete the commissioning log, send it

Once commissioning is complete, the completed commissioning log should be sent to SOLARFOCUS. If this does not happen, then for guarantee and warranty claims of any kind the date of shipment from the manufacturer to the dealer (according to the delivery note and invoice) will be used.

10 Shut-down

Disassembly

– Switch off the boiler and secure it against being switched back on again.
– Disconnect the boiler from the power supply.
– Carry out disassembly in the reverse order to the installation.

Disposal

– Observe regional regulations in regard to proper/environmentally-friendly disposal.
– Recycle the recyclable materials.

11 Annex

11.1 Mounting boiler covers - overview

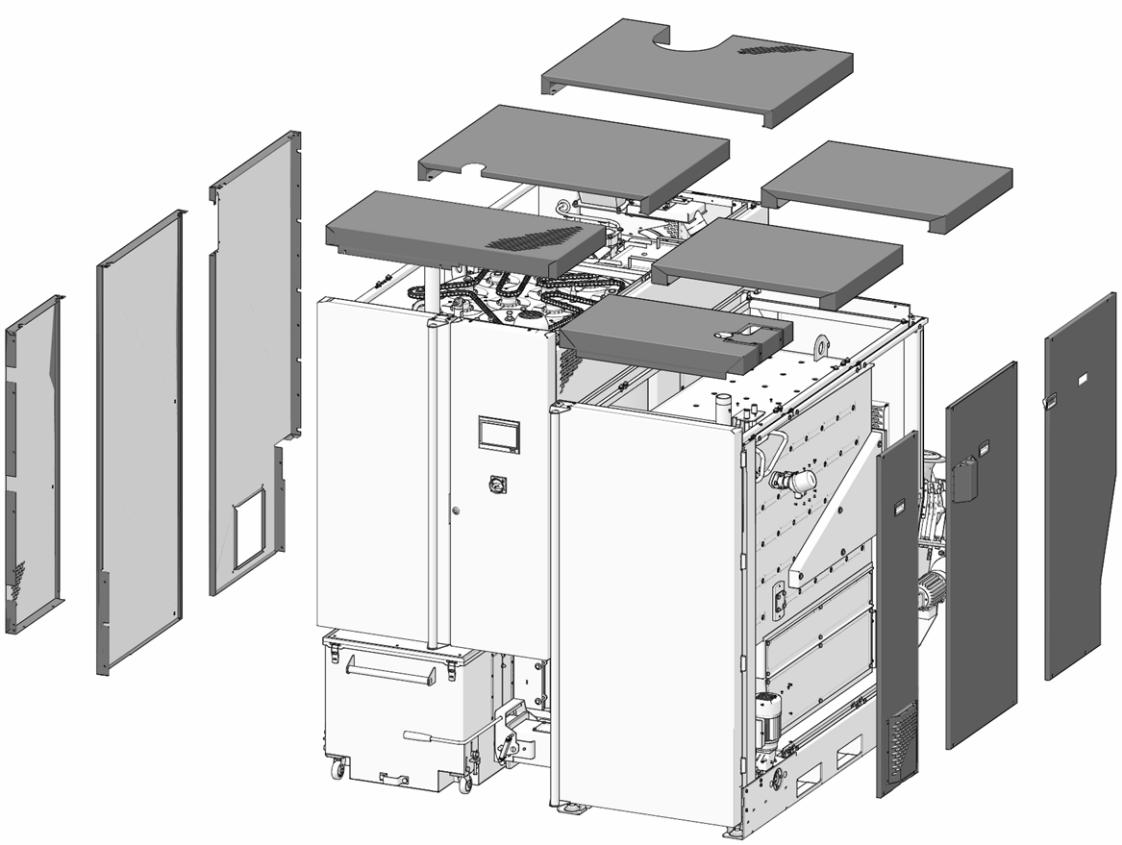


Abb. 2-72

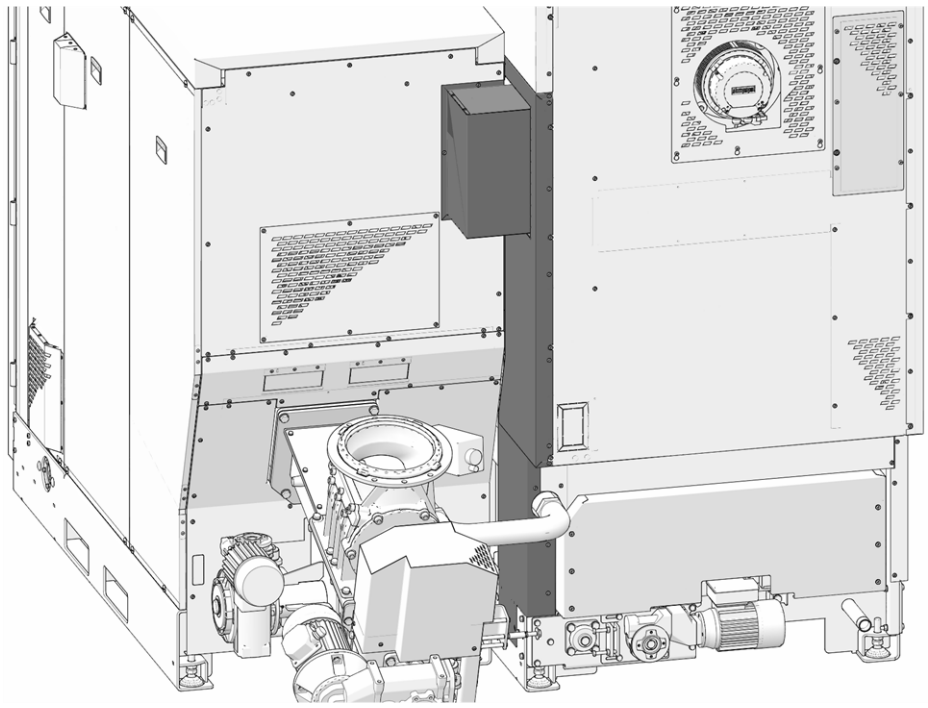


Abb. 2-73

11.2 Boiler power element, circuit boards

Boiler power element (A1)

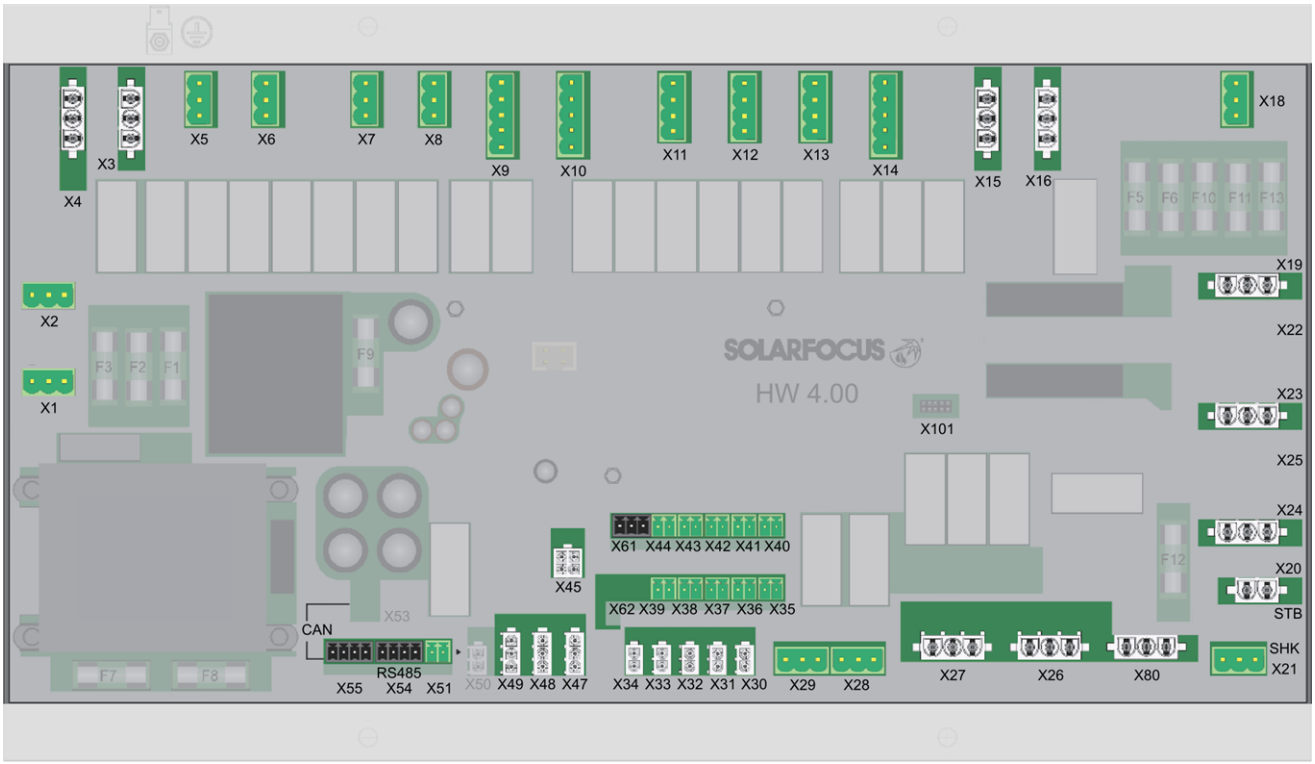


Abb. 2-74

Power element_A2

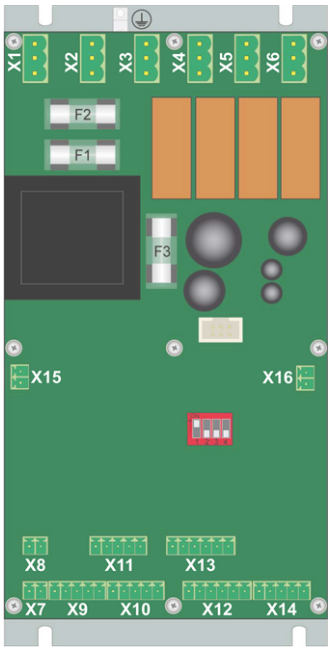


Abb. 2-75

Power element_A3 (or optional power element_A4)

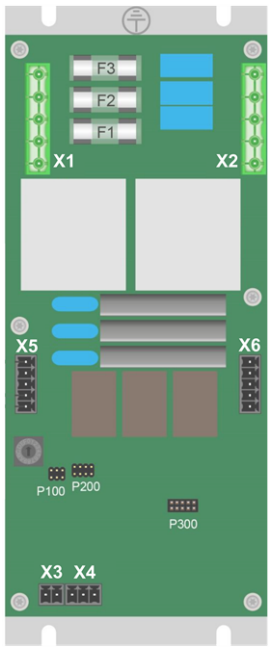


Abb. 2-76

Power element_A3 = *direct extraction 1* (RA1)
Power element_A4 = *direct extraction 2* (RA2)

- Access to the power element > 33
- Electrical fuses on the power element > 40
- Connections (X..) on the boiler power unit and power elements > 34

11.3 Electrical components: Overview

The components listed below are factory-installed and -connected, i.e. no assembly/installation work is required on site.

The information given here is intended to contribute to a better understanding or facilitate the locating of components in the event that they need to be replaced.

Burner: Front

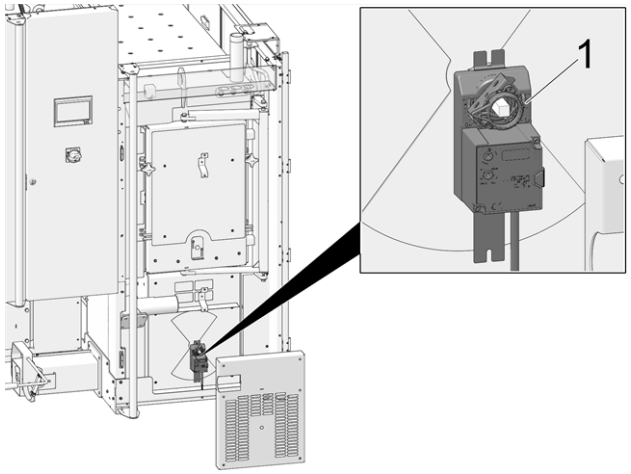


Abb. 2-77

1 Rotary drive for primary air

Burner: Back

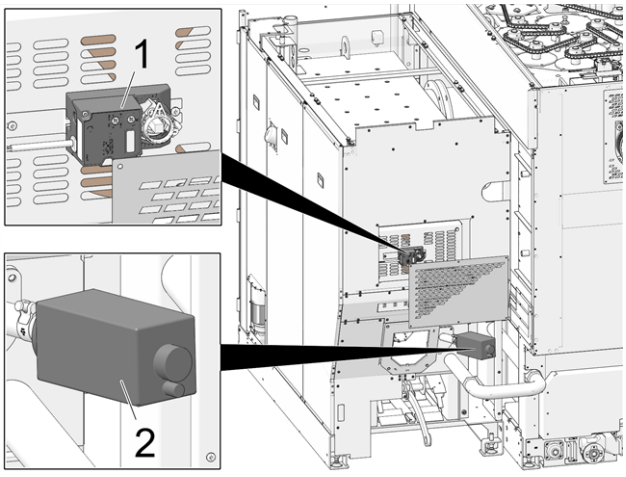


Abb. 2-78

1 Rotary drive for secondary air
2 Hot air fan

Heat exchanger: Top side

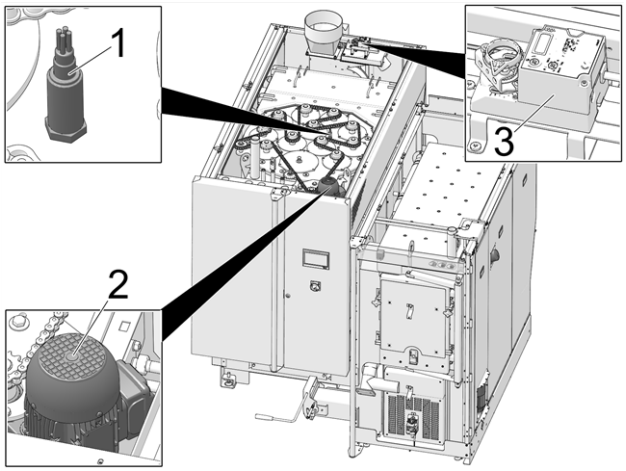


Abb. 2-79

1 Lambda sensor
2 Motor for heat exchanger cleaning
3 Rotary drive for flue gas recirculation

Heat exchanger: Side

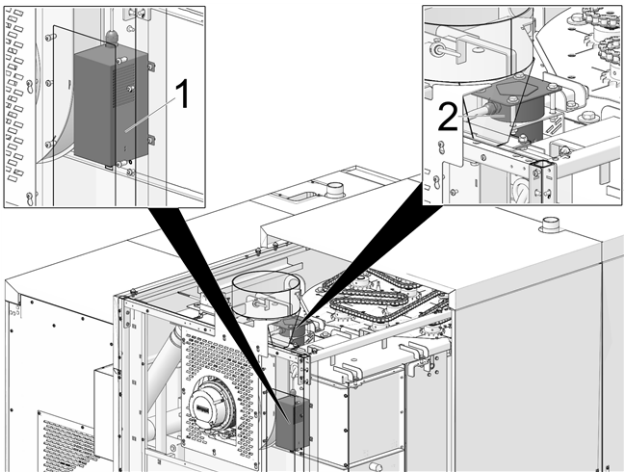


Abb. 2-80

1 High-voltage module_A5 (for electrostatic dust collector)
2 High voltage electrode with insulator

Heat exchanger: Back

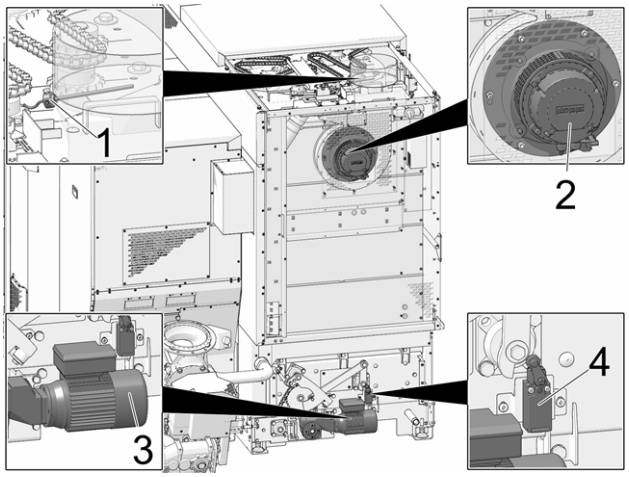


Abb. 2-81

1 Flue gas temperature sensor
2 Induced draft fan
3 Motor for separator cleaning and ash extraction heat exchanger
4 Position switch (for ash extraction heat exchanger)

11.4 Connect pellet hose

When installing the hose, observe the maximum permissible values.

Maximum hose length and delivery height

Routing	Max. Hose length	Max. Delivery height
Suction head to diverter for suction heads	10 m	1 m
Suction head diverter to boiler	20 m	2.5 m
Total delivery path	30 m	3.5 m

Observe the following when installing hoses

- The hose must be attached to the floor at several points (e.g. with perforated tape) to prevent it from 'floating' upwards (in the case of floor-mounting, e.g. suction head).
- Route hose as straight as possible. To avoid sagging, use SOLARFOCUS product *support shell made of zinc plated sheet steel*.
- Do not kink the hose (observe bending radius of > 30 cm).
- The hose is not UV-resistant (routing outdoors is not permissible).
- Temperature resistance of the hose < 60°C.
- Always push the end of the hose fully onto the pipe connection as far as the stop. The hose will slide on to the connection pipe better if you apply a little water to the pipe.
- Tighten hose clamps firmly. Detachment of the hose and the intake of false air must be reliably prevented.

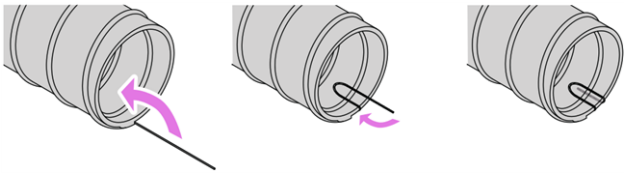
Electrically earthing the pellet hose

A metal braid is integrated into the inside of the plastic hose coil.

This metal braid must be electrically connected to the connecting pipe at each hose end (for suction hose and return air hose).

Expose the braid and bend it into the hose

- ► Expose approx. 10 cm of the metal braid at the hose end (remove any plastic sheathing on the braid with stripping pliers).
- ► Curve the metal braid and bend it onto the inside of the hose.
- ► Slide the hose onto the metal connecting pipe.



CAUTION - The metal braid must have permanent electrically conductive contact to the connecting pipe.

Remove any adhesive tape on the connection pipes and/or scrape off the existing coating.

Earthing of the pellet hoses is also required for the manually actuated variant of the diverter for suction heads (Art. 68190).

11.5 Delivery systems (pellets, wood chips)

Pellets

Suction heads and diverter for suction heads manual or automatic

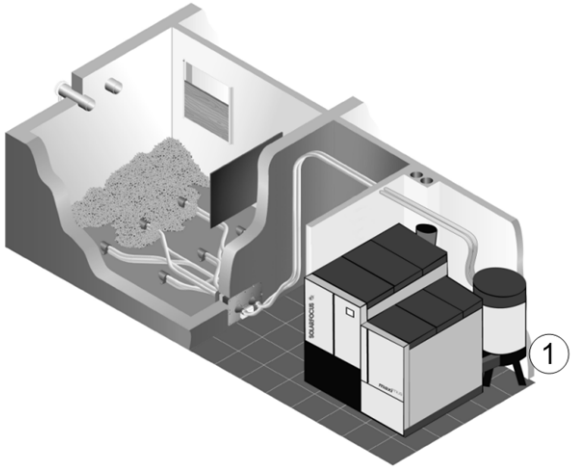


Abb. 2-82

1 Container auger motor > 42 (=*direct extraction motor 1*), connection **A3:X2**

Suction system with suction auger

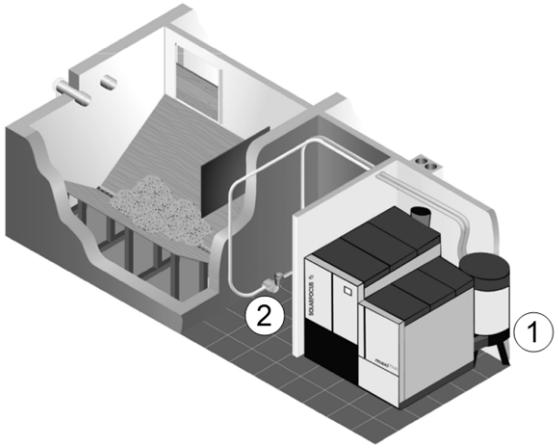


Abb. 2-83

1 Container auger motor > 42 (=*direct extraction motor 1*), connection **A3:X2**
2 Pellet delivery auger =direct extraction motor 2, connection **A1:X14**

Mole suction system

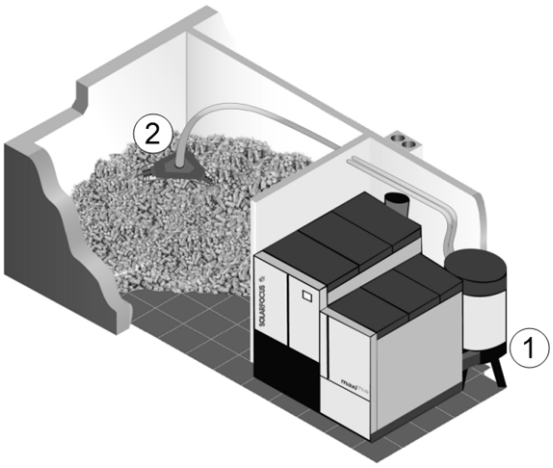


Abb. 2-84

1 Container auger motor > 42 (=*direct extraction motor 1*), connection **A3:X2**
2 Connect *mole* to **A1:X14**, the parameter in the manufacturer's manual is called *Boiler request* (mole is unlike *direct extraction motor* 2)

Wood chips

Direct extraction with leaf spring agitator

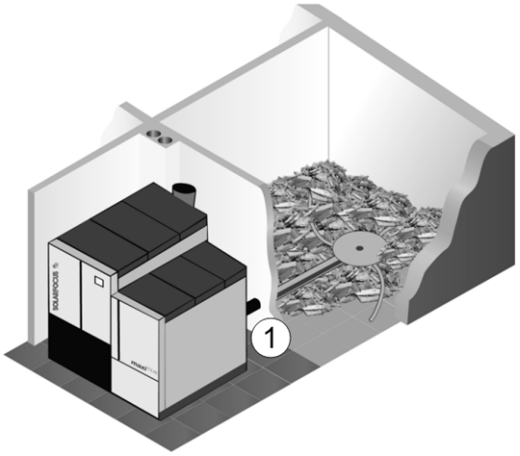


Abb. 2-85

1 Direct extraction auger motor (=*direct extraction motor 1*), connection **A3:X2**

Direct extraction with articulated arm agitator

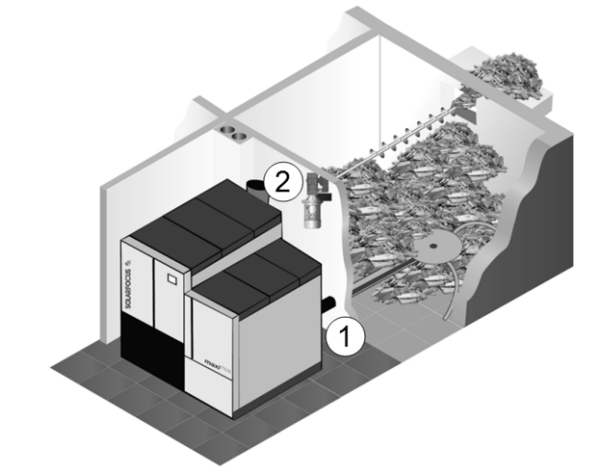


Abb. 2-86

1 Direct extraction auger motor (=*direct extraction motor 1*), connection **A3:X2**
2 Bunker filling auger motor (=*direct extraction motor 2*), connection **A4:X2**

Direct extraction by downpipe

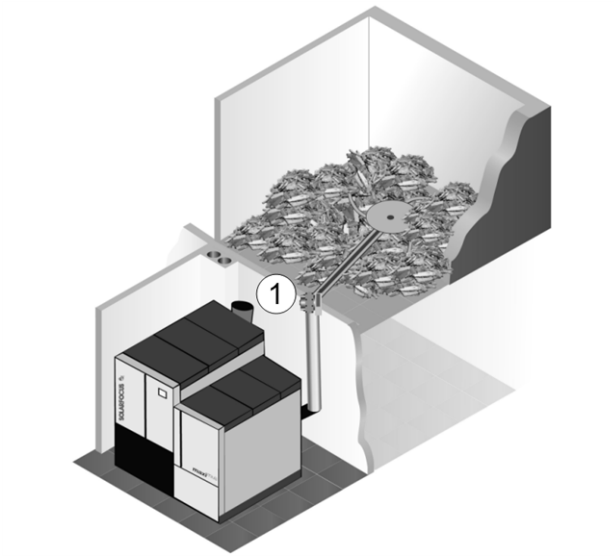


Abb. 2-87

1 Direct extraction auger motor (=*direct extraction motor 1*), connection **A3:X2**

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Pellets


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