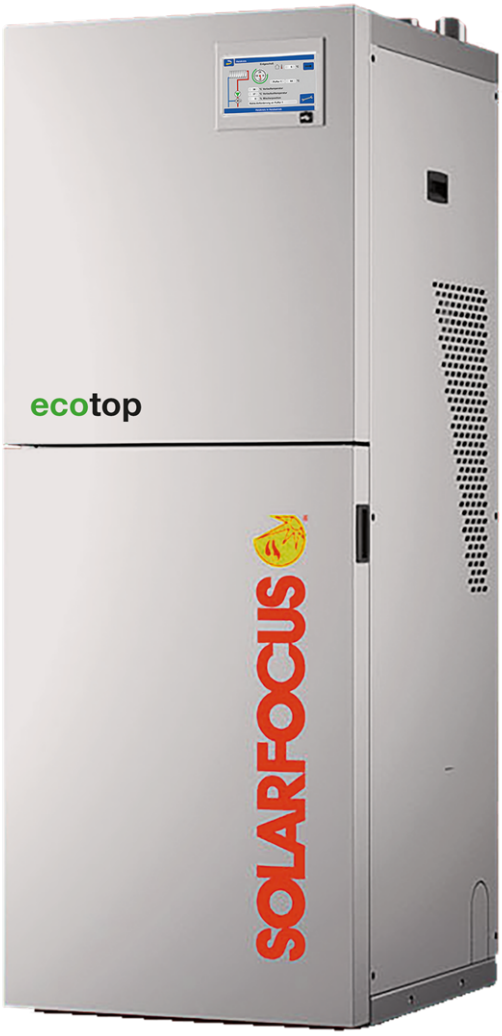
SOLARFOCUS



Pellet boiler
ecotop^zero, ecotop^light

Installation manual for qualified personnel

Read carefully before operating.

DR-0179-EN / v7-202109

Content

1 About this manual

Dear heating installer

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

- Correct installation
- Training of customers in 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. Versions of this manual in all other languages 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.

Instructions 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 - Failure to comply with this instruction could result in damage to property.

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

Manufacturer

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2 Safety information

Qualification of personnel

- The work procedures described in this manual must only 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 put into operation by 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 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 done 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 great danger 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, plugs, switches) becomes damaged, switch off the power supply and have the insulation repaired.
- In the case of visible damage (e.g. thermal deformation, mechanical damage) the operation of the system must not be continued. The system may only be operated if it is in perfect technical condition.

3 Technical specifications

3.1 Warranty, guarantee, liability

Warrantyclaims apply within the framework of a boiler maintenance contract.

3.1.1 Technical specifications for warranty and guarantee claims

A prerequisite for the assertion of warranty and guarantee claims is compliance with the following technical specifications.

Regular maintenance and cleaning

- The boiler and the components of the heating system must be maintained and checked regularly.
- This is the prerequisite
  - for permanently reliable functioning of the boiler,
  - for energy-saving and environmentally friendly operation of the boiler,
  - for a long service life of the boiler.
- Option/Recommendation: Conclude maintenance contract.
- Keyword *documentation*: In the course of maintenance by qualified personnel, the completed activities/measures are documented in the maintenance log. It is recommended to keep a plant logbook (for documentation/evidence purposes of own activities), especially if specialist maintenance is not carried out.

Fuel

- The fuel used > 10must comply with the specifications.
- Unapproved fuel can lead to inefficient combustion and can damage the boiler.

Specifications for the filling/supplementary water of the heating system

- **Control the pH value: must be between 8.2 and 9.5**
- Avoid of stone formation > 8(=lime deposits on heat exchanger surfaces):
  - Pay attention to the water hardness
  - Soften filling water, or better: desalinate.
- Avoid the corrosion on the water side > 8Corrosion is usually triggered by the available oxygen in the water):
  - Correct system planning, correct dimensioning, pay attention to material combinations.
  - Repair leaks immediately.
  - Expansion vessel > 9(prevents air suction when the system cools down): Set pressure correctly, check regularly.
  - Existing underfloor heating: Attention with old, diffusion-open plastic pipes > 9

Return temperature to the boiler

- A sufficiently high return temperature into the boiler must prevent the temperature from falling below the dew point (resulting in corrosion in the boiler).
- This is ensured at **ecotop** zero/light by the integrated return lift as standard.

Supply air to the boiler

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

3.1.2 Conditions for entitlement to benefits

For warranty and warranty claims observe the following points:

- The warranty begins at the time at the time of handover (delivery note, commissioning form).
- The warranty period is calculated from the date of initial commissioning (according to the meter of the operating hours of the control).
- 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 form).
- 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 assign our claims against the producer (concerning 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 Cessation of entitlements

The maintenance, warranty and guarantee services expire if one of the following points applies:

- Non-compliance with the technical requirements > 3
- 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 and failure to perform maintenance and cleaning as prescribed.
- Commissioning and maintenance carried out by non-certified companies.
- Undocumented commissioning (missing commissioning protocol) and/or maintenance (maintenance protocol).
- 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) 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 assumes 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.
- Deployment 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: Boilers for solid fuels, manually and automatically fed firing systems, nominal heat output up to 500 kW
- *DIN EN 12828* Heating systems in buildings - planning for water-based heating systems
- ***EN 13384- 13384*** - Flue gas systems - thermal and flow-based calculation methods- 1: Exhaust systems with one fireplace
- ***ÖNORM H 5151*** - Planning of central hot water heating systems with or without hot water preparation - Part 1:
-
- Simple inspection of combustion plants for solid fuels

Standards for structural and safety installations

- ***TRVB 118 H*** - Technical Guidelines for Preventive Fire Protection (Austria)
- ***ÖNORM H 5170*** - Heating systems - requirements for construction and safety technology as well as for fire and environmental protection
- ***ÖNORM M 7137*** - Pressed natural wood pellets - Wood pellets - Requirements for pellet storage at the end-user

Standards for fuel

- **EN ISO 17225-2** - Biogenic solid fuels - Fuel specifications and classes; Part 2: Classification of wood pellets
- **1. BImSchV** - Federal Immission Control Ordinance - Ordinance on Small and Medium Solid-fuel Boilers()

Standards for the 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 services installations (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 sufficiently stable and non-combustible surface.
- Observe spacing to flammable materials (regional regulations).
- Note the installation dimensions to ensure sufficient space is provided (e.g. for service and maintenance work).
- For normative specifications see ÖNORM H 5170 and guideline TRVB 118 H.

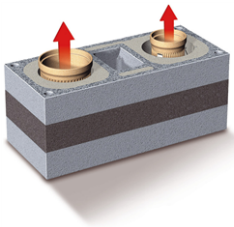
Fire extinguishers

- 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

- Under staircases, on escape routes and in unfinished attics, the installation of fireplaces is inadmissible.

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). We recommend that you have the calculations performed by an expert.

Chimney execution

- 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 fireplace must be coordinated. 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 (considering the different operating states of the boilers - full load/partial load). This can lead to problems (e.g. the flue gas has too low energy during the ascent, and does not lift off sufficiently from the chimney mouth, ...odour pollution by flue gases).
- Singly equipped chimneys are more reliable and safer than multi-fuelled fireplaces.

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 rock wool.
- 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 fly 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 > 19

Minimum draught requirement for boiler: 5 Pa

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

Install explosion damper

Abb. 2-1: Explosion damper integrated into draught limiter

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

For boiler outputs <50 kW, no explosion damper is required (with short and rising flue gas pipe to the chimney).

3.5 Supply air into the installation room

For Austria (according to standard 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.

For Germany In accordance with the Model 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 Aufstellraum 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 Room sealed appliance (RSA)

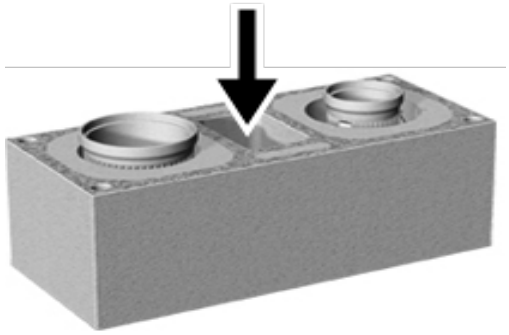
A room sealed operation of the **ecotop** zero/-light is optionally possible. The connection for the supply air line is integrated in the boiler as standard > 19

Basic information

In conventional boiler rooms, the necessary supply air openings from outdoors lead to uncontrolled heat loss. This is prevented by using boilers that operate independent of the room air, as the combustion air is drawn directly into the boiler in from outside in sealed supply air lines.

RAI line integrated in chimney

The recommended variant: The intake air is taken in from outside of the chimney pipe down to the boiler.



RSA line outside of the chimney

- Fire-rated insulation with rockwool required if the RAI line passes through other rooms.
- Cold insulation of the RAI line within building elements (wall, floor, ...) required to avoid damage to the building from condensate.
- Further information: standard EN 15287-2

► Establish the RSA connection > 19

3.7 Filling water of the heating system

Two essential points must be observed with regard to the quality of the filling water (according to guideline VDI 2035):

- Avoidance of stone formation (limescale)
- Avoidance of corrosion on the water side (caused by oxygen in the heating water)

The lowest possible rate of corrosion of the installed metallic materials can be achieved primarily if the circulating water is located in the correct pH range (8.2 to 9.5) , and if at the same time there is a low electrical conductivity (50 to 100 µS/cm).

3.7.1 Avoid the formation of scaling

What is scaling

Scaling is the formation of firmly adhering deposits on water-contacting walls of hot water heating systems. This can subsequently lead to damage (stress cracks in the metal, leakage).

Cause of scaling

The cause of scaling is the presence of limestone in the water.

The following calculation/table determines the permissible total hardness of the filling water. If the values are exceeded, the filling water must be treated, e.g. softened.

Calculation of the permissible total hardness of the filling water

To determine the total allowable hardness for the system, the *specific water content* must be determined:

System volume divided by *total heating capacity* equals *Specific system volume*

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

Table: Permissible total hardness of the filling 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

For example: if the total hardness of the filling water is more than 11.2°dH, the filling water must be treated.

3.7.2 Avoid the corrosion on the water side

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 vessel > 9: Air suction during cooling of the heating system must be prevented. Pay attention to:
  - Correct planning and execution of the expansion vessel.
  - Regularly check the system pressure, pre-pressure of the expansion vessel.
- Immediately repair leaks in the heating system.
- In the case of underfloor heating systems of older construction years, ensure diffusion-tight pipes > 9

Check the pH of the filling water

- **The pH value must be between 8.2 and 9.5.**
- If this pH value does not adjust itself after one week in 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 driving - filling with demineralised water, see VDI 2035 sheet 2.

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

In the low-salt mode, the replenishment of water that is not fully desalinated can significantly influence the pH value and shift it into a critical range.

► Check the pH value regularly.

3.8 Notes on the hydraulic connection

Return flow boosting (RFB)

- Functioning: If cold heating water (temperature < 55°C) flows from the heating circuit/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: When the temperature in the buffer cylinder has fallen to lower than that in the burner, the pumps start up again, the return mixer opens, and the residual heat from the boiler is transferred to the buffer.

The **ecotop** zero/light has an integrated return booster module; therefore no further measures are required in this regard.

Provide shut-off facilities in the pipes

- 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(: Avoiding the introduction of oxygen, filling/supplementary water of the heating system > 8).

Pressure compensation through expansion vessel (ADG)

- The expansion vessel prevents air from being sucked in when the system cools down (problem: oxygen input, filling water of the heating system > 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.
- The installation of an expansion vessel or a pressure maintenance system is mandatory. The use of open expansion vessels is not permitted.
- The pressure in the heating system (readable on the pressure gauge) and the pre-pressure set in the expansion vessel must be checked regularly.

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

- With older underfloor heating systems, the plastic pipes, which are more open to diffusion, can lead to increased oxygen ingress into the heating system. This has a corrosive effect on components of the heating system (keyword: Avoidance of corrosion on the water side > 8).
- In this case, a system separation (by installing a heat exchanger) must be carried out.
- Newer plastic pipes (approximately since the mid-1980s) are diffusion-tight according to DIN 4726.

Buffer tank: Use, dimensioning

Advantages of installing a buffer tank:

- The boiler can always be operated in the optimum load range. This leads to a longer boiler service life and reduces emissions.
- Avoidance of unnecessary boiler start phases, the higher fuel consumption during the start phases is significantly reduced.
- Heated water is continuously available in the buffer tank for the heating circuits. This enables a rapid heat supply to the heating circuits at any time.

If the heating system is operated without a buffer tank, the installation of a hydraulic separator > 9 is required.

Dimensioning of the buffer tank:

For pellet boilers, a buffer volume of 30 litres per kW heating output is recommended.

Hydraulic switch

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

Install the dirt and sludge separator

- The separator removes circulating, magnetic and non-magnetic free dirt and sludge particles (from 5 µm) from the heating system in fully automatic continuous operation.
- Ensures the proper functioning of heat generators, thermostatic valves, heat exchangers in the long term and reduces the risk of defects and failures in the long term.
- Contributes to high-quality heating water, e.g. also for existing systems.

4 Product information

4.1 Product description

- **ecotop** zeroThe **ecotop** light is a boiler for the combustion of wood pellets
- The boiler has an automatic fuel ignition system, automatic fuel supply and automatic cleaning of the heat exchanger.
- The ash produced is collected in an ash box, which must be emptied at regular intervals.
- The **ecotop** zero has an integrated electrostatic dust collector.
- At **ecotop** light , this electrostatic dust collector can be retrofitted on request.

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.

4.3 Scope of delivery

Qty.	Designation
1	Boiler, preassembled
1	Return booster, integrated
2	Combustion grate
1	Needle nose pliers for combustion grate
1	Ash scraper
1	Ash pan
1	Bag (transparent) with outdoor temperature sensor
1	Flue gas pipe expansion from Ø100 mm to Ø130 mm(Item 66556NIRO)
1	Operating manual
1	Installation manual

Not included in the standard scope of delivery:

- Boiler safety group (KSG)
- Pellet hose
- Chimney connection material

4.4 Accessories

Lifting aid

– Optional accessories for carrying/moving the boiler
– Item 6144

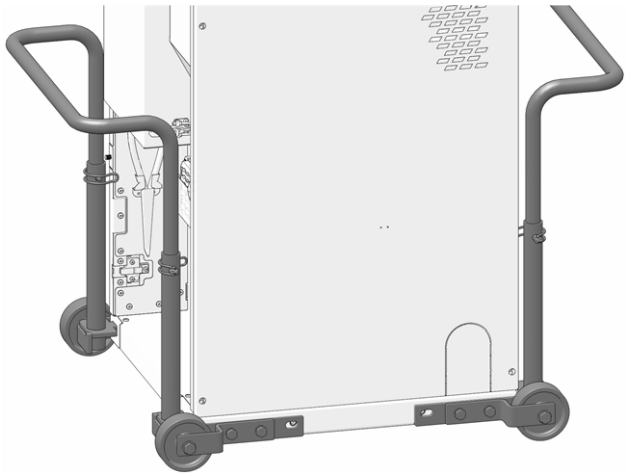
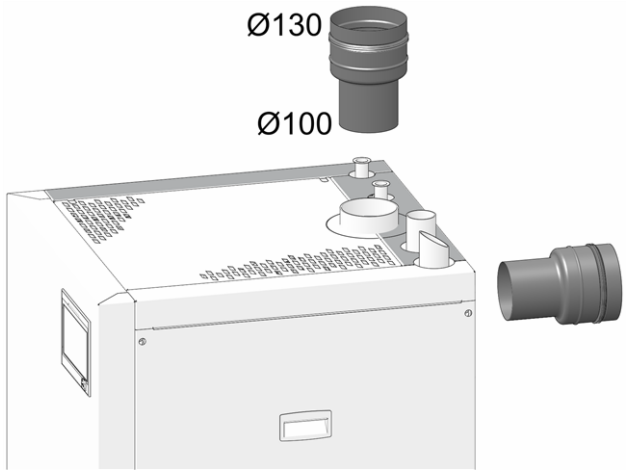


Abb. 2-2: Lifting aid mounted

Extension for exhaust pipe connection

– Accessory (included in delivery) for optional extension of the connection, from Ø100 mm to Ø130 mm.
– Can be used for flue pipe orientation upwards or backwards.
– Art. 66556NIRO



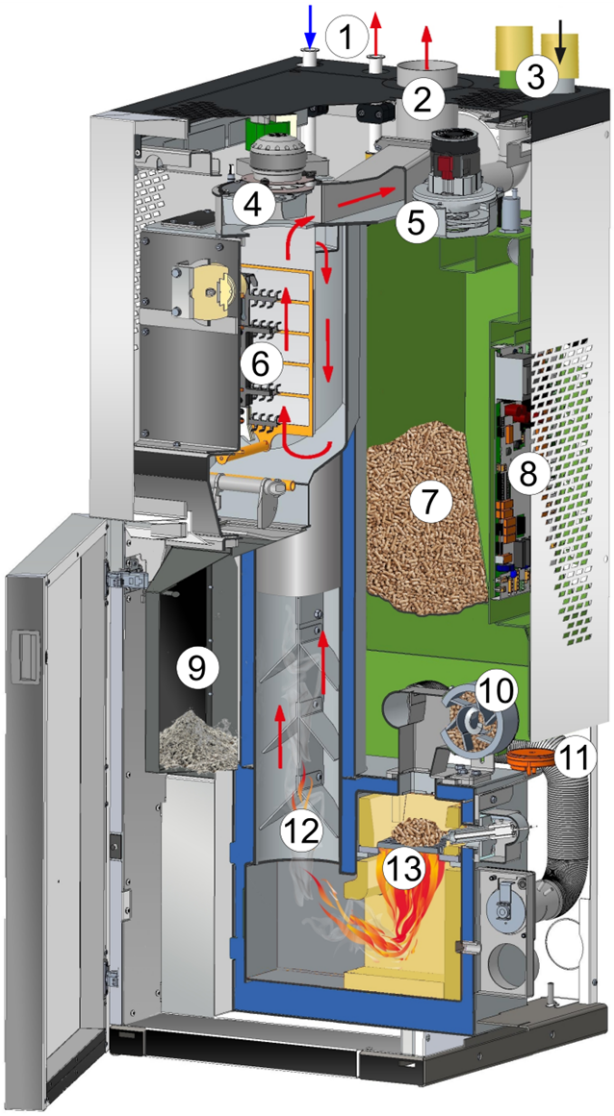
► Establish the chimney connection > 19
► Specifications for chimney design > 6

4.5 Dimensioning of the boiler

The boiler must be correctly dimensioned in relation to the heat distribution system behind it.

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

4.6 Functional components



1 Heating water, heating circuit (return/flow)
2 Flue gas pipe
3 Connections for pellets > 20
4 Induced draft fan
5 Suction turbine for pellets suction
6 Electrostatic dust filter (optional at **ecotop** light)
7 Intermediate pellet store
8 Boiler electrical power element > 23
9 Ash container
10 Rotary valve > 13
11 Differential pressure gauge
12 Heat exchanger with interior turbulators
13 Combustion grate

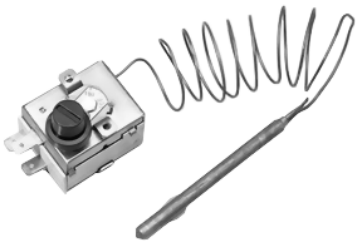
4.7 Safety devices

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 set *Heat dissipation maximum boiler temperature*, all pumps relating to the energy consumer units (e.g. heating circuit, DHW tank, buffer tank, etc.) will be switched on and the heating circuit mixer 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 mixers will be operated in standard mode again.

[1] The parameter can be found in the *Service menu* | *System parameters* button | *General settings* button.

Overtemperature reset (OTR)



- The safety temperature limiter (STL) is a safety device that prevents overheating of the boiler.
- Functioning: The STL stops the heating process at a boiler temperature ~95°C (exclusively electrical function; fuel and air supply are interrupted).
- After tripping, the STL 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 safety overtemperature reset trips, this is indicated in the boiler control display.

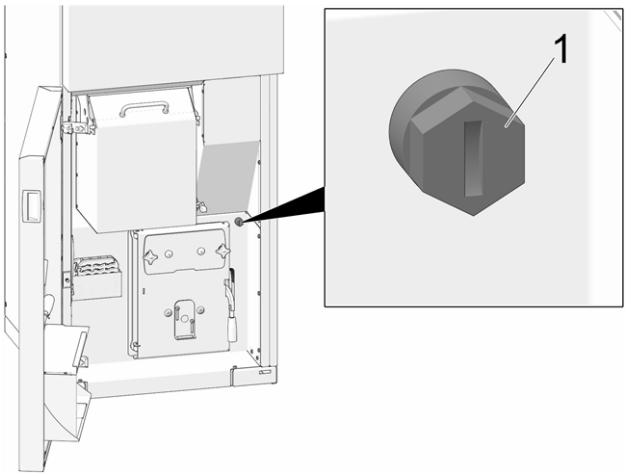


Abb. 2-3: Position of the overtemperature reset

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 discharge line, which avoids consequential damage to the heating system. The valve is closed during normal operation.
- For normative specification see EN 12828.

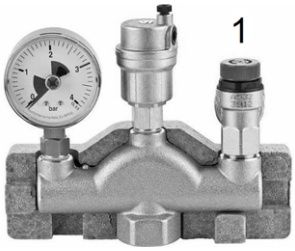


Abb. 2-4: Safety valve integrated into boiler safety group

► Install safety valve > 22

The safety valve (or a boiler safety group) is not included in the boiler. On-site installation required.

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 > 25

Rotary valve

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

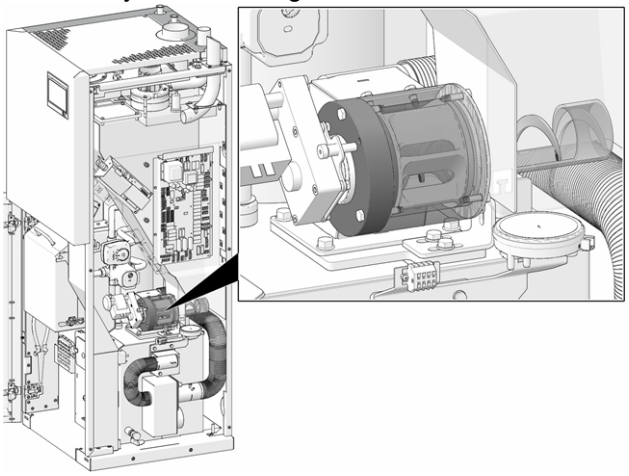
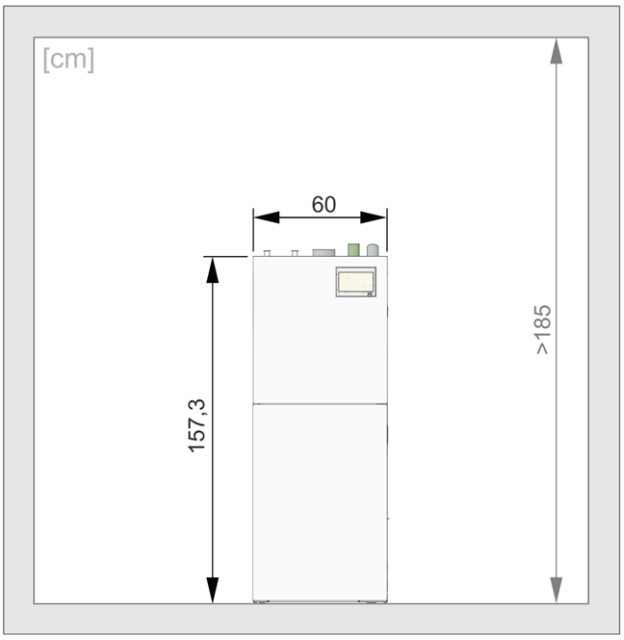


Abb. 2-5: Rotary feeder for pellet transport

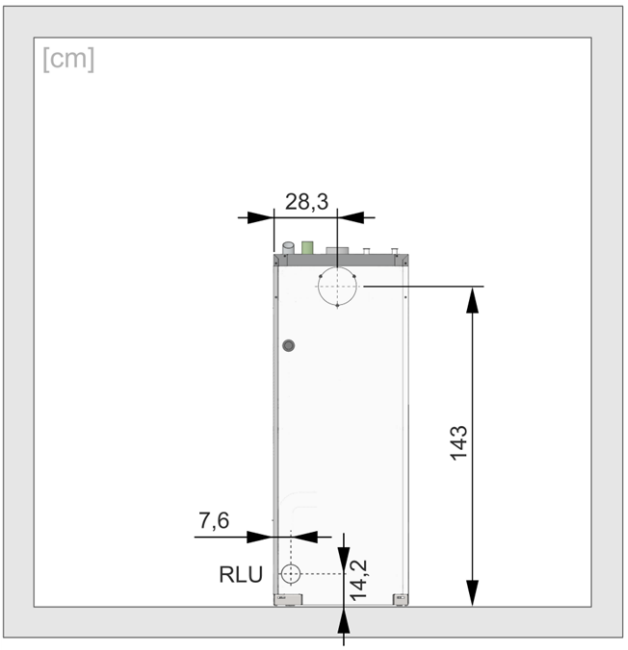
- Complies with requirements regarding burn-back protection devices (BPD) according to TRVB 118 H.
- Prevents backflow of flammable products of combustion into the fuel supply (according to EN 303-5).
- Prevents spreading of fire into the fuel supply (according to EN 303-5).

4.8 Dimensions and connections

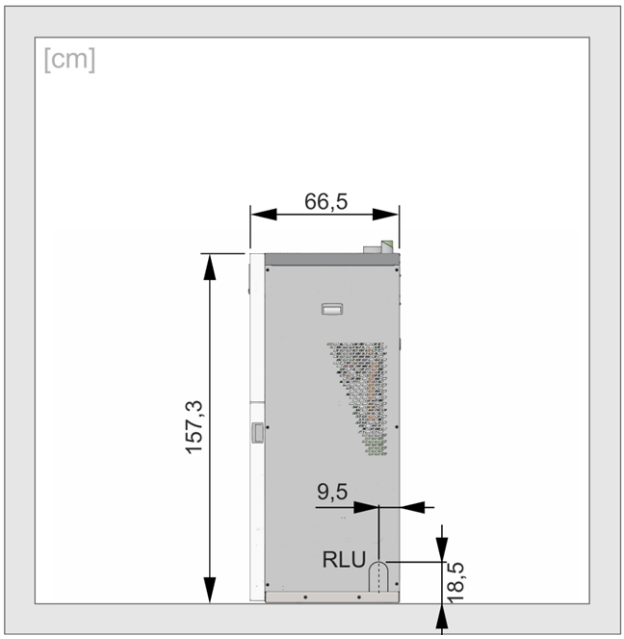
Front



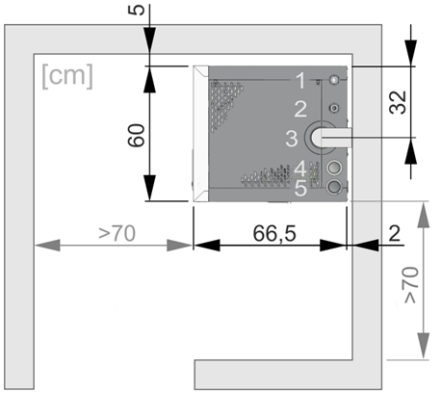
Back



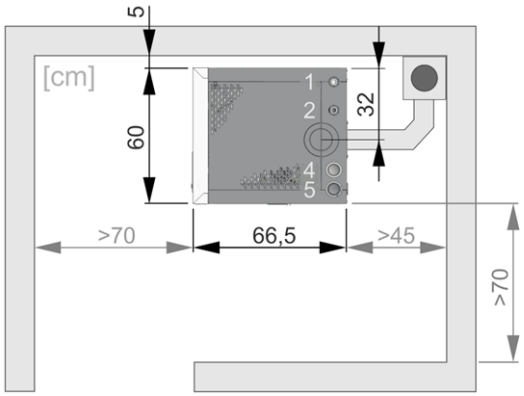
Side view



Top view - flue gas pipe connection aligned upwards



Top view - flue gas pipe connection aligned backwards



1 Boiler return
2 Boiler flow
3 Flue gas pipe
4 Pellet return air
5 Pellet suction

4.9 Technical specifications

ecotop zero, **ecotop** light		**15**	**20**	**24**
Nominal heat output (NHO)	[kW]	15.4	19.7	24.0
Heat output range	[kW]	4.6 - 15.4	5.9 - 19.7	7.2 - 24.0
Energy efficiency class		A+	A+	A+
Boiler class (according to EN 303-5:2012)		5	5	5
Boiler efficiency - zero - full load	[%]	95.7	95.3	94.9
Boiler efficiency - zero - part load	[%]	95.9	96	96.1
Boiler efficiency - light - full load	[%]	93.8	93.5	93.2
Boiler efficiency - light - part load	[%]	92.1	93.2	94.3
Dimensions				
Width	[cm]	60	60	60
Depth	[cm]	66.5	66.5	66.5
Height (H)- incl.adjustable feet, adjustable feet screwed at maximum depth of thread- without hydraulic connections on the top of the boiler	[cm]	157.3	157.3	157.3
Minimum room height	[cm]	185	185	185
Weight				
Weight	[kg]	280	280	280
Weight with wooden pallet	[kg]	288	288	288
Water side				
Water content	[l]	55	55	55
Max. permissible operating pressure	[bar]	3	3	3
Boiler flow/boiler return connection	[”]	1” UN	1” UN	1” UN
Drain connection	[”]	AG 1/2 ”	AG 1/2 ”	AG 1/2 ”
Differential pressure at ΔT 10°K	[hPa]	145	245	345
Differential pressure at ΔT 20°K	[hPa]	35	60	85
Thermal overload protection	[”]	not required	not required	not required
Electrical connection				
Connection, fuse protection		230 V AC, 50 Hz C13 A	230 V AC, 50 Hz C13 A	230 V AC, 50 Hz C13 A
Fuel				
Fuel		Wood pellets acc. to EN17225-2, ENplus-A1	Wood pellets acc. to EN17225-2, ENplus-A1	Wood pellets acc. to EN17225-2, ENplus-A1
Capacity of intermediate pellet store	[l]	55	55	55
Capacity of ash box	[l]	20.3	20.3	20.3
Flue gas side				
Flue gas pipe diameter	[mm]	100/130	100/130	100/130
Height to centre of flue pipe	[cm]	143	143	143
Flue gas mass flow full load	[g/s]	9 / 10	12 / 12.5	15 / 15
Flue gas mass flow partial load	[g/s]	3 / 4	4 / 4.5	5 / 5
Maximum flue gas temperature [1] full load	[°C]	140	140	140
Maximum flue gas temperature [1] partial load	[°C]	100	100	100
Minimum draught requirement [2]	[Pa]	5	5	5
Condensation		No	No	No

ecotop zero, **ecotop** light		**15**	**20**	**24**
Emissions according to test report - ecotop zero				
Emission values [3] from the test report:Testing Institute / Test Report No.		TÜV SÜD 2219038-1	TÜV SÜD 2219038-2	TÜV SÜD 2219038-3
CO full load	[mg/m³]	4	7	9
CO Partial load	[mg/m³]	83	50	17
NOx full load	[mg/m³]	111	114	116
NOx partial load	[mg/m³]	107	109	111
Org. C full load	[mg/m³]	0.3	0.6	0.9
Org. C partial load	[mg/m³]	1.5	1.1	0.6
Dust content full load	[mg/m³]	0.6	1	1.3
Dust content partial load	[mg/m³]	0.5	0.9	1.3
Emissions according to test report - ecotop light				
Emission values (related to 13% O2) from test report:Test institute / test report no.		TÜV SÜD 2220046-1	TÜV SÜD 2220046-2	TÜV SÜD 2220046-3
CO full load	[mg/m³]	8	6	5
CO Partial load	[mg/m³]	70	49	29
NOx full load	[mg/m³]	112	113	114
NOx partial load	[mg/m³]	106	108	110
Org. C full load	[mg/m³]	1.7	2	1.9
Org. C partial load	[mg/m³]	1.8	3	3.2
Dust content full load	[mg/m³]	7.9	7	5.7
Dust content partial load	[mg/m³]	6.3	8	9.1
Regulation (EU) 2015/1187 - ecotop zero				
Nominal heating output	[kW]	15	20	24
Energy efficiency class of the boiler		A+	A+	A+
Energy efficiency class EEI Composite boiler and controller		A++	A++	A++
Energy efficiency index EEI of the boiler		121	121	122
Energy Efficiency Index EEI Composite Boiler and Controller		125	125	126
Space heating annual efficiency etaS	[%]	81	82	82
Annual emission values				
CO - carbon monoxide	[%]	98	58	22
NO_X- Nitric oxide	[%]	149	151	154
C - Total (carbon)	[%]	1	1	1
Dust	[%]	1	1	1
Regulation (EU) 2015/1187 - ecotop light				
Nominal heating output	[kW]	15	20	24
Energy efficiency class of the boiler		A+	A+	A+
Energy efficiency class EEI Composite boiler and controller		A+	A+	A++
Energy efficiency index EEI of the boiler		118	119	121
Energy Efficiency Index EEI Composite Boiler and Controller		122	123	125
Space heating annual efficiency etaS	[%]	80	81	82
Annual emission values				
CO - carbon monoxide	[mg/m³]	83	58	35
NO_X- Nitric oxide	[mg/m³]	146	150	153
C - Total (carbon)	[mg/m³]	2	2	3
Dust	[mg/m³]	8	11	12

[1] Flue gas temperature can be adjusted electronically.

[2] A draught stabiliser must be fitted if the specified draught of 15 Pa is exceeded (Caution: In a boiler with room-sealed operation, use a room-sealed independent draught limiter)

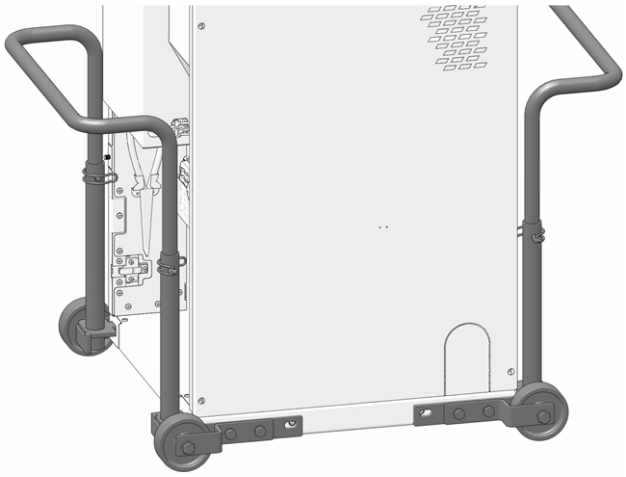
5 Installation

5.1 Transport

Option 1: Transport on pallet, with lift truck
The boiler is delivered factory-assembled on a single-use wooden pallet.

Option 2: Transport with lifting kit

Lifting Kit



- ► Dismantle the 4 x mounting angles of the boiler/pallet.
- ► Dismantle the boiler door > 18
- ► Mount the lifting kit (optional accessory) > 11 on the boiler.
- ► Lift/move the boiler from the pallet.

5.2 Dismantling the boiler door

- ► Pull the tab *1* below the fitting.
  - ↳ The hinge is released from the fixture.

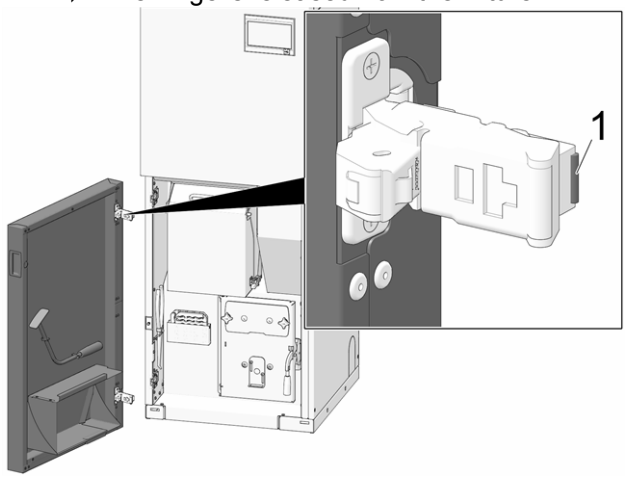


Abb. 2-6

5.3 Remove the pallets

- ► Dismantle the 4 x mounting angles of the boiler/pallet.
- ► Lift/move the boiler from the pallet.

If necessary, use *carrying aid* (optional accessory) > 11

5.4 Placing the boiler

Observe the placement of the boiler, the required minimum > 13

5.5 Set adjustable feet

- ► If necessary, adjust the adjustable feet **on the underside of the boiler** .

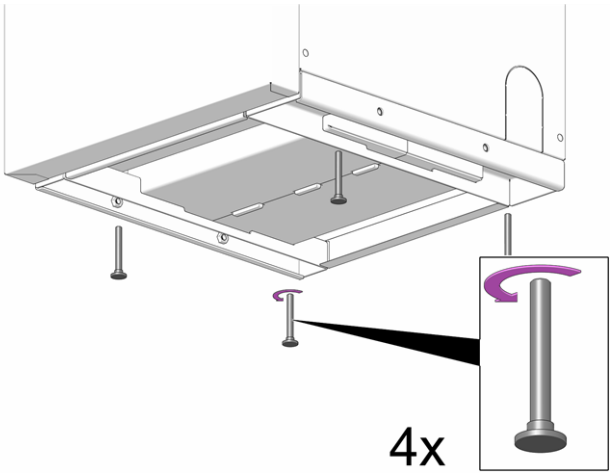
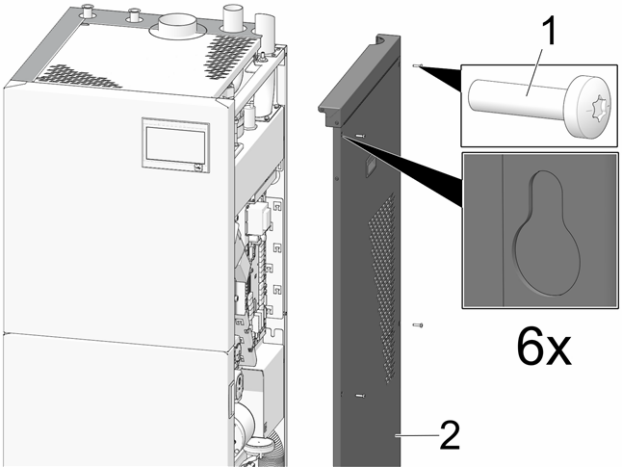


Abb. 2-7

5.6 Removing the right-hand side panel

- ► Loosen 6 screws *1*.
- ► Slightly lift the right-hand side part *2* and remove it from the side.



5.7 Dismantle upper cover

► Loosen the 4 screws
► Lift the cover on the right-hand side and remove it.

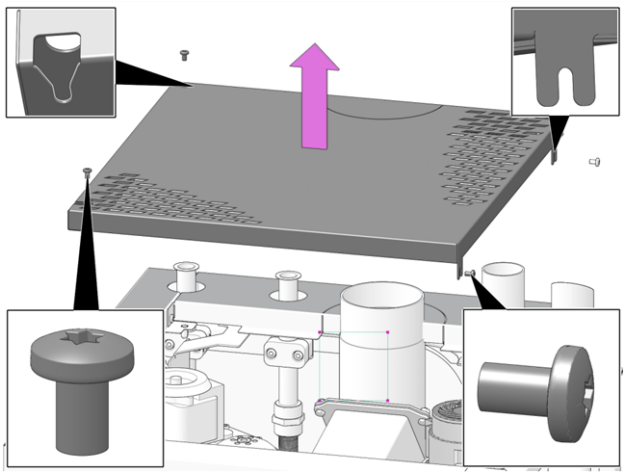


Abb. 2-8

5.8 Establish RLU connection (optional)

► Feed the aluminium hose into the boiler at opening *2* or *3* and fit it at connection *1*.

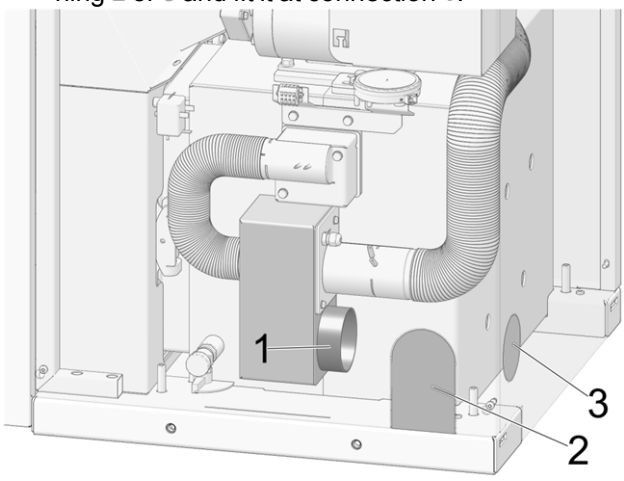


Abb. 2-9

Boiler-controlled room air damper in the RAI line (optional)

Function: When the burner is switched off, the damper closes to prevent any exchange of air inside the RAI line.

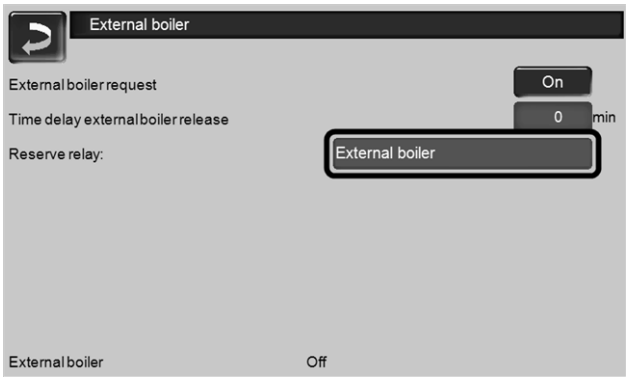


Abb. 2-10: Control of a room air damper

► Connect the room air damper on the boiler power element to X6 (230 V AC).
► For the parameter *Reserve relay*, select the value *External boiler*.

The parameter *Reserve relay* is located in the *Service menu* > *External boiler*.

5.9 Establish the chimney connection

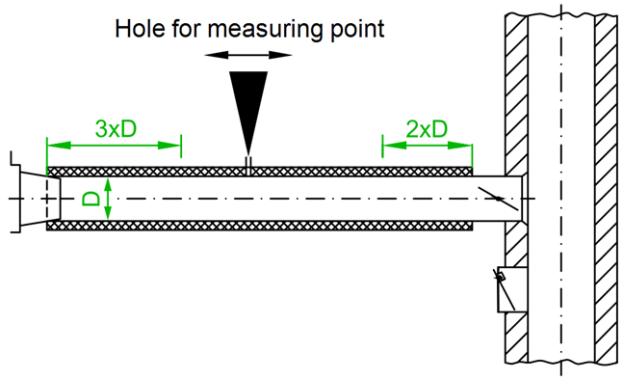
See instructions for execution > 6

5.9.1 Flue gas pipe: Hole for emission measurement

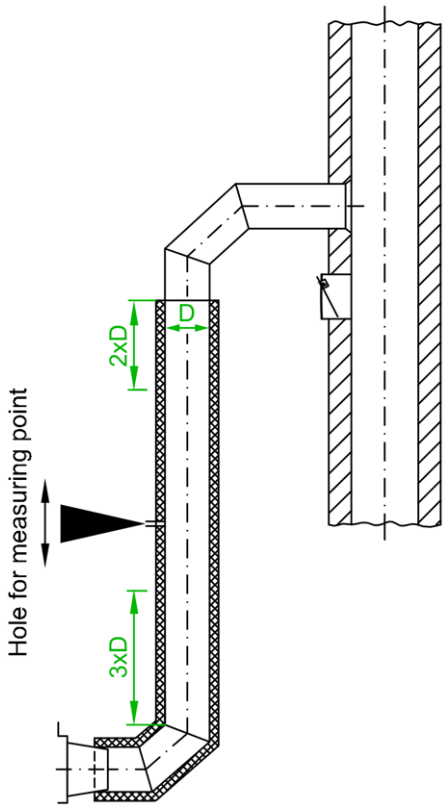
► Make the hole for the emission measurement according to the following images (recommendation according to standard).
► If these specifications cannot be implemented, then make the measuring point after a calming section, i.e. after the longest straight section of the pipe. The tube orientation (horizontal, vertical, oblique) plays no role in this case.
► In any case, place the measuring point before any existing draught limiters.

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

Exhaust pipe horizontal



Exhaust pipe vertical



5.10 Connecting the pellet hose

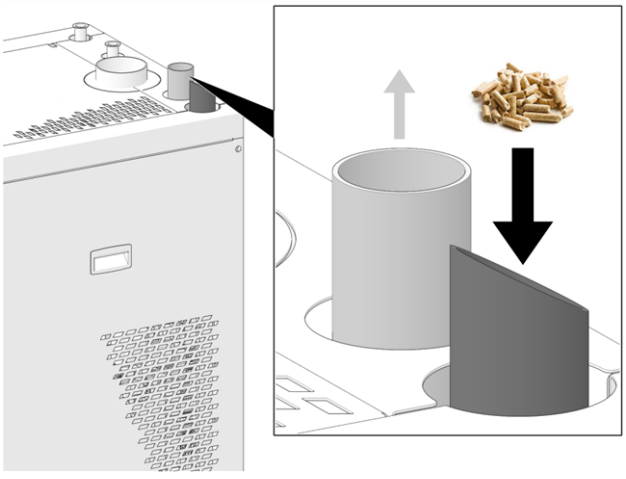


Abb. 2-11

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
Diverter for suction heads 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, suction head).
- Route hose as straight as possible. To avoid sagging, use SOLARFOCUS article *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.

5.10.1 Electrically earthing the pellet hose

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

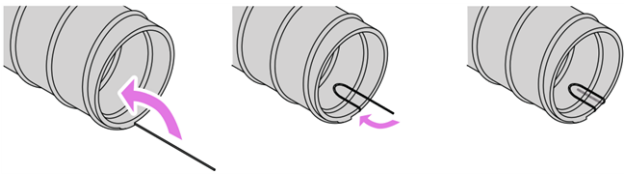
This metal braid must be electrically connected to the connecting pipe at each hose end (for suction hose and return air hose).

Expose the strand and bend it into the hose

► Expose approx. 10 cm of the metal strand at the end of the hose (remove any plastic sheathing from the strand with wire strippers).

► Curve the metal braid and bend it onto the inside of the hose.

► Push the hose over the metal connection 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).

6 Hydraulic connection

6.1 Piping in the boiler

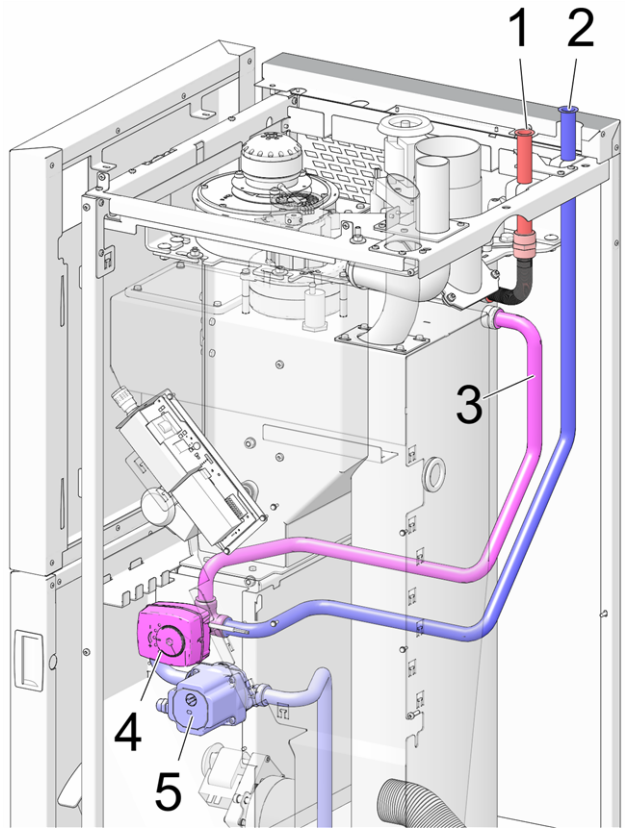
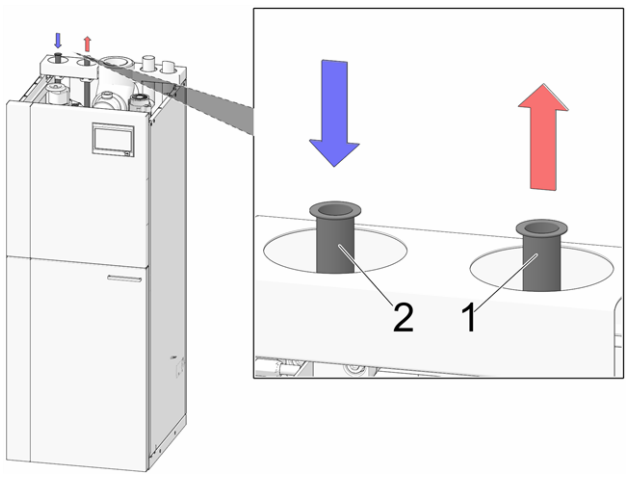


Abb. 2-12

1 Boiler flow
2 Boiler return
3 Bypass line
4 Motor mixer for return flow boost
5 Circulation pump

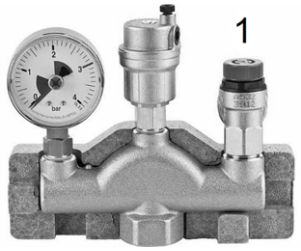
6.2 Boiler connections

Boiler flow, Boiler return



1 Boiler flow
2 Boiler return

6.3 Install safety valve



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

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

6.4 Position mixer shaft, mixer motor

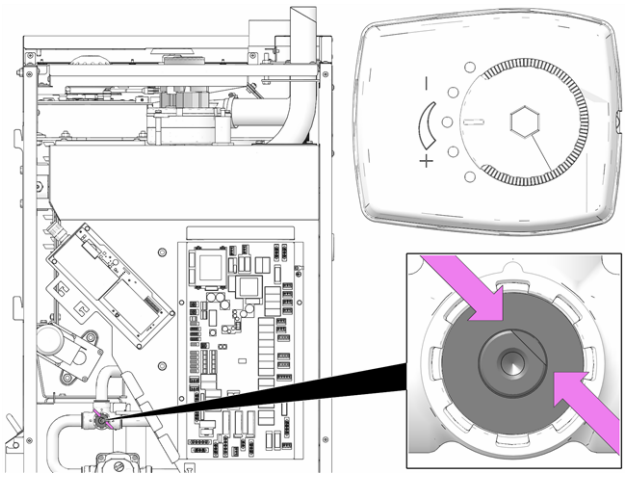


Abb. 2-13: Pay attention to the flattening of the shaft

6.5 Fill the heating system

ⓘ Follow the regulations for the heating system filling water> 8

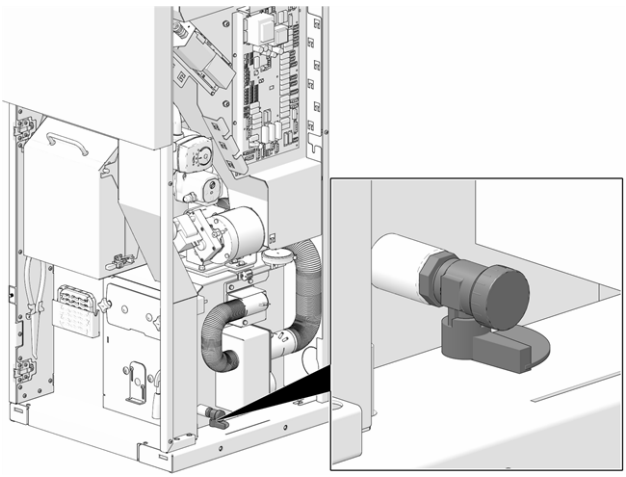


Abb. 2-140: FE valve for filling and draining the boiler

6.6 Bleed the heating system

► Vent the boiler at valve *1* .

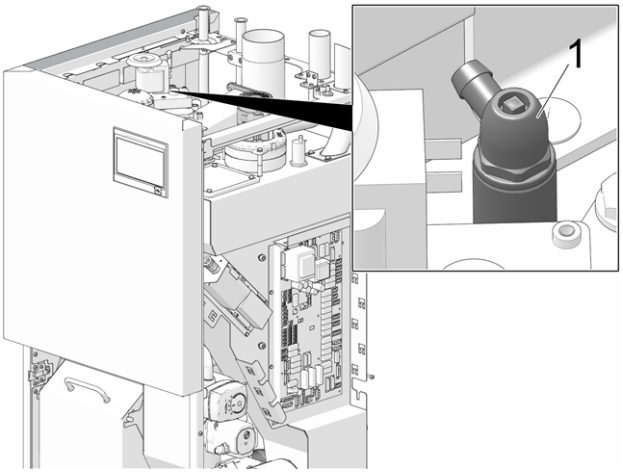


Abb. 2-15

► Check pipework inside and outside the boiler for leaks.

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.

7.1 Voltage supply for the heating system

- A separate power circuit must be provided in the Aufstellraum for the heating system.
- Connection 230 V AC / 50 Hz C13 A
- Specification for the mains connection cable (e.g. in case of replacement): cable SIHF-J 3x1.5 mm²

7.2 Connections to the boiler power element

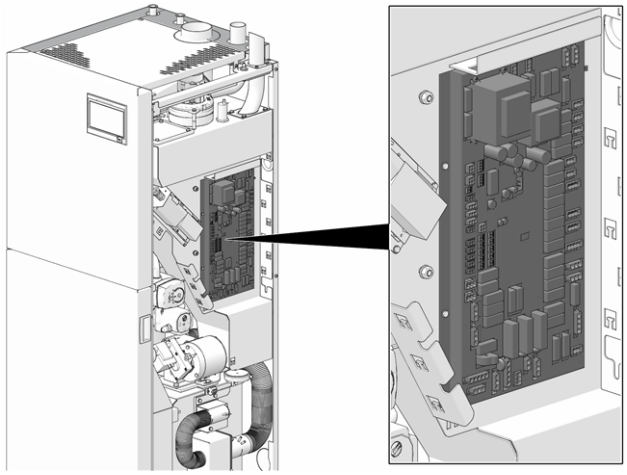
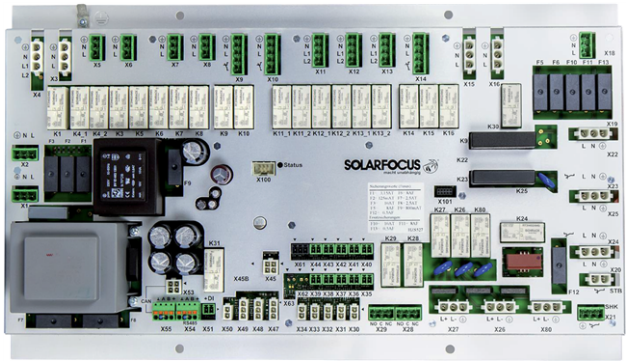


Abb. 2-16: Boiler power element

To access boiler power element ***1***:

► Remove the right-hand side panel> 18

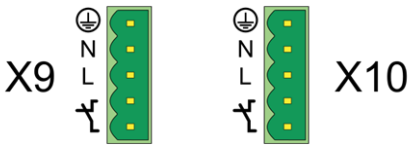


Detailed illustration of the power element > 28

	Heating circuit 1
X9	Heating circuit pump 1 > 24
X11	Heating circuit mixer 1
X38	Flow temperature sensor 1
X41	optional: Room temperature sensor 1
X42	Outside temperature sensor
	Heating circuit 2
X10	Heating circuit pump 2 > 24
X12	Heating circuit mixer 2
X37	Flow temperature sensor 2
X40	optional: Room temperature sensor 2
	Buffer tank
X7	Special version: Buffer loading pump
X13	Return mixer
X15	Standard version: Return booster pump
X36	Bottom buffer sensor
X44	Top buffer sensor
	DHW tank
X8	DHW tank pump
X39	DHW tank sensor
	Recirculation control
X5	Recirculation pump
X43	Circulation sensor (optional)
	Display
X53	Bus line to control unit (Display)
	Mains connection
X1	Mains connection for power element, 230 V AC
X2	230 VAC output
X18	230 V AC output (F8 A fuse)
	Pellet conveyor
X14	Motor of the pellet auger (for *auger conveyor intake system*) > 24
X14	Motor of the transfer auger (for *pellet box*)
	Boiler
X3	Suction turbine > 30
X4	Glow pencil (ignition device) > 29
X16	Ash extraction motor > 30
X19	Induced draft fan > 29
X20	Overtemperature reset (OTR)
X23	Feeder motor > 29
X24	Motor heat exchanger cleaning
X26	Primary air damper holding magnet > 29
X27	Ignition supply air holding magnet > 29
X31	Boiler temperature sensor
X32	Return temperature sensor > 29
X34	Flue gas temperature sensor > 29
X45	Lambda sensor > 29
X47	Speed measurement induced draft fan
X48	Door contact switch
X49	Level sensor in pellet storage tank > 30

X61	Differential pressure gauge > 29
	optional
X6	Spare
X21	Safety chain 230 V AC (EMERGENCY OFF switch, if necessary connect through pressure sensor,...in series) > 25
X28	External boiler request > 24
X29	Fault > 25
X51	External request (optional) > 25
X54	External bus line; connection for RS-485 electronic modules
X55	External bus line; connection for CAN bus electronic modules

7.2.1 Connect heating circuit pump(X9, X10)

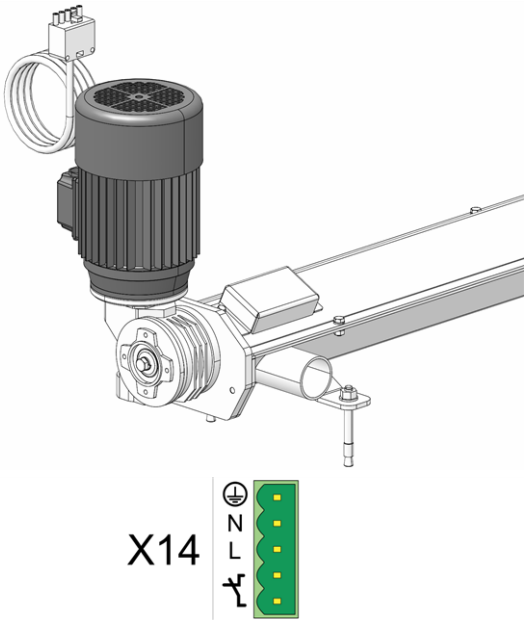


- ► Connect heating circuit pump 1 to power section connector *X9* , connect heating circuit pump 2 to *X10* .
- ► If required (e.g. for underfloor heating), connect a limiting thermostat (art. 61612).
- ► If no limiting thermostat is used, the contact must be bridged.

7.2.2 Pellet conveyor system (X14)

Extraction system direct extraction auger

- ► Connect the motor of the screw conveyor to power unit X14, use cable 5x1.5 mm^2.

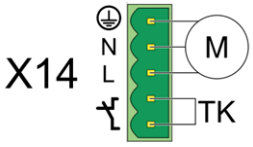


5-pin connector, direct extraction motor	Terminal *X14* on the power element
PE	PE (1)
N	N (2)
L3	L (3)
L2	TK(4)
L1	TK (5)

OEM system

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

- ► Bridge the two TK terminals on the boiler power element.
- ► Use 3 x1.5 mm² cable



7.2.3 External boiler request (X28)

Potential-free Relay output for switching an external boiler, for example, an external boiler is controlled by the SOLARFOCUS boiler control.

! **CAUTION** – The connection is floating and has a maximum load of 5 A.

7.2.4 Malfunction (X29)

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

CAUTION – The connection is floating and has a maximum load of 5 A.

7.2.5 External request (X51)

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

CAUTION–The connection must be potential-free.

7.3 Cable ducts on the boiler

► Feed the cable through opening *1* into the boiler.
► Fix on the cable ducts *2* and *3*.

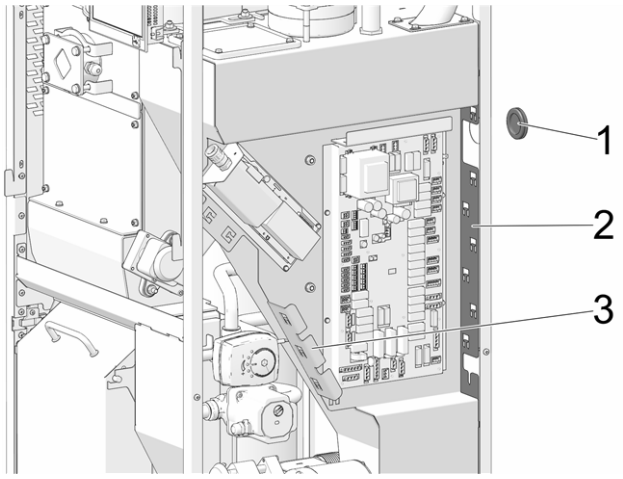


Abb. 2-17

7.4 Install 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.

► Connect other components integrated in the safety chain in series ("loop through")

7.5 Sensor resistance table

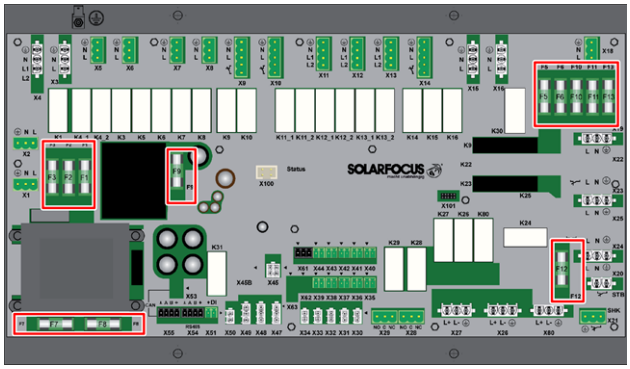
Type	KTY 81-110	PT100	PT1000	KTY 81-210
Tolerance	± 3 %	± 0.7 %	± 1 %	± 3 %
°C	Ohm	Ohm	Ohm	Ohm
-20	684	92.16	922	1367
-10	747	96.09	961	1485
0	815	100	1000	1630
10	886	103.9	1039	1772
20	961	107.79	1078	1922
25	1000	109.74	1097	2000
30	1040	111.69	1117	2080
40	1122	115.54	1155	2245
50	1209	119.4	1194	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	-	-

7.6 Electrical fuses

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 boiler power unit



Fuses present on boiler power element

	Value	Size	Use
F1	T 3.15A	5x20 mm	Fuse 230V AC: Pre-fusing main transformer
F2	T 125mA	5x20 mm	Fuse 230V AC: Pre-fusing standby transformer
F3	T 10A	5x20 mm	Fuse 230V AC: relay outputs
F5	F 8A	5x20 mm	Fuse for X18 (power supply to external modules 230V AC)
F6	F 8A	5x20 mm	Fuse 230V 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 protection fuse: relay outputs X26, X27 and X80
F13	F 0.5A	5x20 mm	Replacement fuse for F12

7.7 Connecting the control to the internet

To enable the Internet connection of the **eco**manager-*touch* boiler control, connect the Ethernet port **X2** (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
- Screen IP-VNC - Remote access to the control
- Sending e-mails

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

Display - Connections

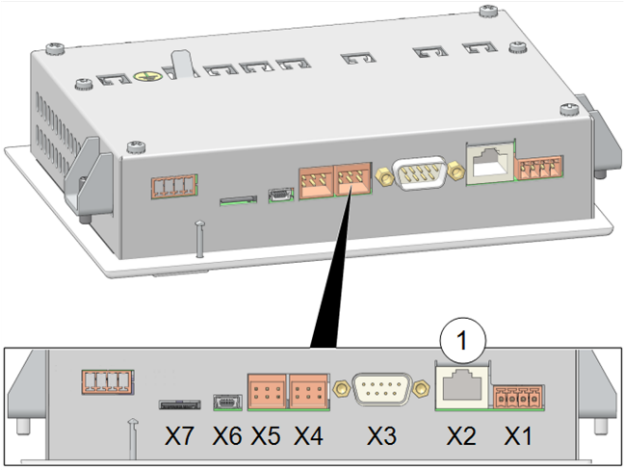


Abb. 2-18: Connections on the underside of the display

Access to the read of the display

► Removing the right-hand side panel > 18
► Dismantle upper cover > 19

► Loosen 2 screws (TX25) *1* and lift the cover upwards.

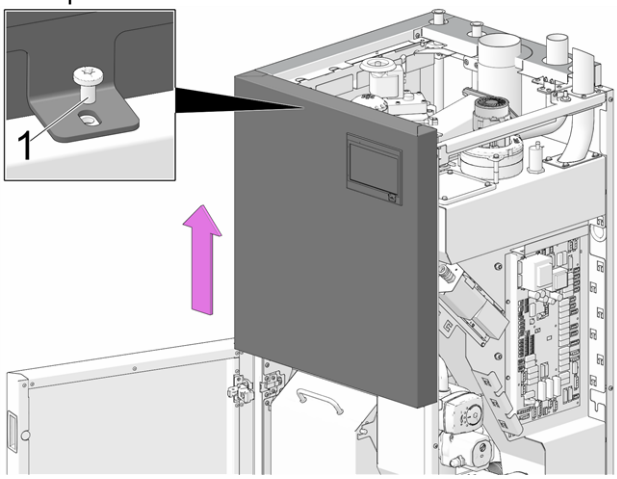


Abb. 2-19

8 Initial start-up

Initial commissioning of the bioler 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.

Fill out commissioning report, send

After having completed initial commissioning, the completed commissioning form should be returned 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.

Commissioning protocol for biomass heating (see at the end of these instructions)

DR-0074

Power setting

- ► During commissioning, set the correct boiler type *1*, the correct nominal boiler output *2* and the system type *3* .
  - ↳ The power control (control of the induced draught fan) is based on factory-set parameters. No further adjustment work is required for this.

Basic settings screen

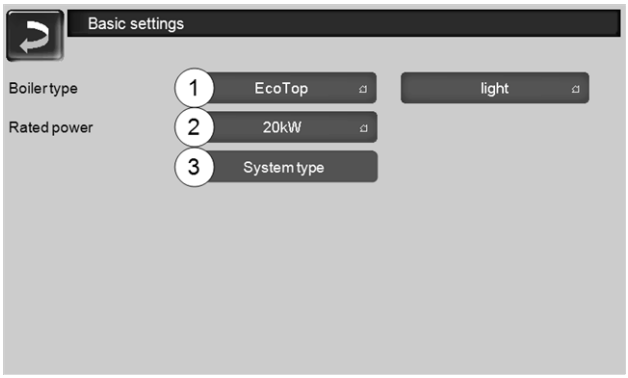


Abb. 2-20

9 Shut-down

Disassembly

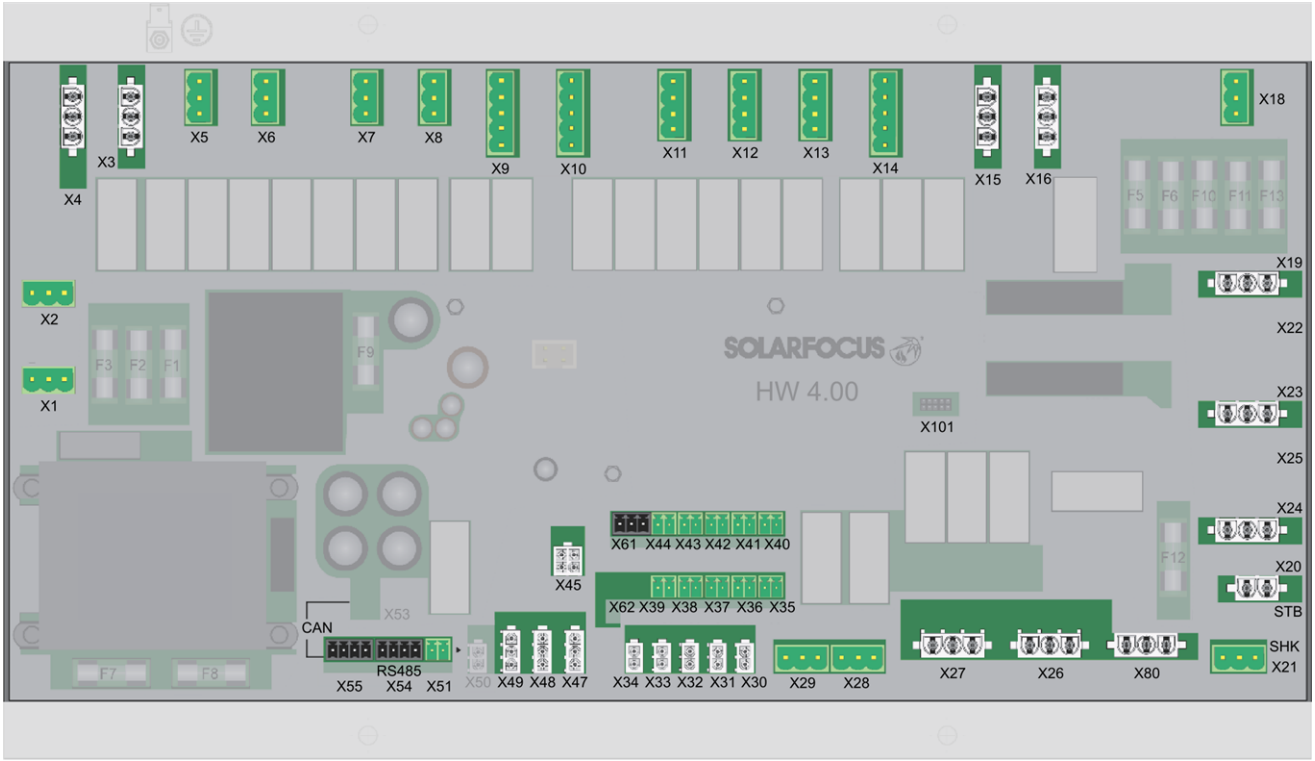
- – Switch off the boiler and secure it against being switched on again.
- – Disconnect the boiler from the power supply.
- – Carry out disassembly in the reverse order of assembly.

Disposal

- – Observe the regional regulations regarding professional/environmentally sound disposal.
- – Recycle recyclable materials.

10 Annex

10.1 Boiler power element (image)



- Access to the boiler power unit > 23
- Electrical fuses on the boiler power unit > 25
- Connections (X..) to the boiler power unit > 23

10.2 Overview of the electrical components

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.

Right side of the boiler

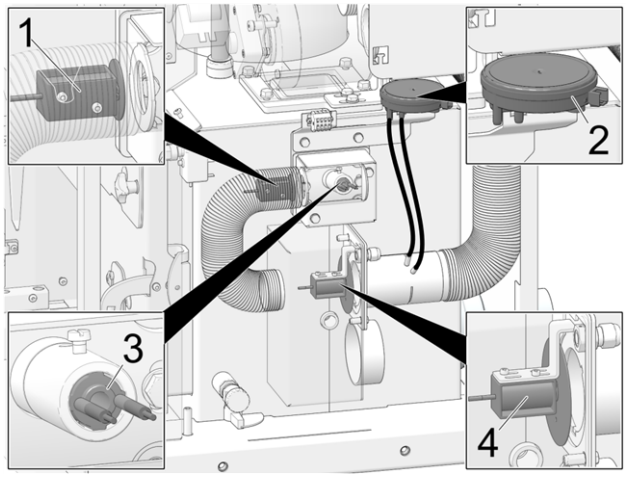


Abb. 2-21

1 Ignition air: Holding magnet, and flap
2 Differential pressure gauge > 29
3 Glow pencil (ignition device)
4 Primary air: Holding magnet, and flap

Differential pressure gauge: Air hose connection

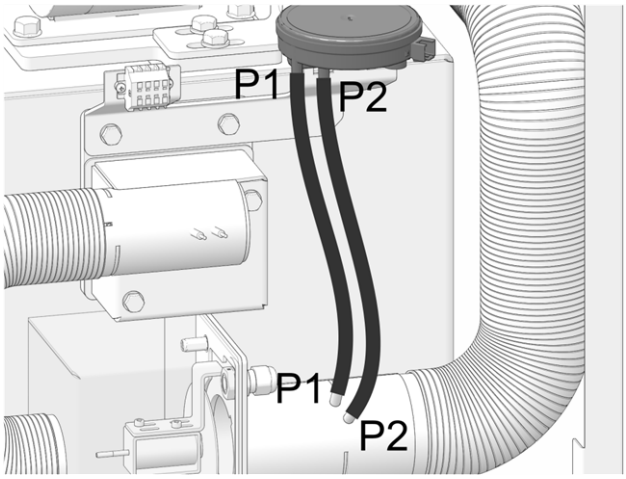


Abb. 2-22

Boiler top

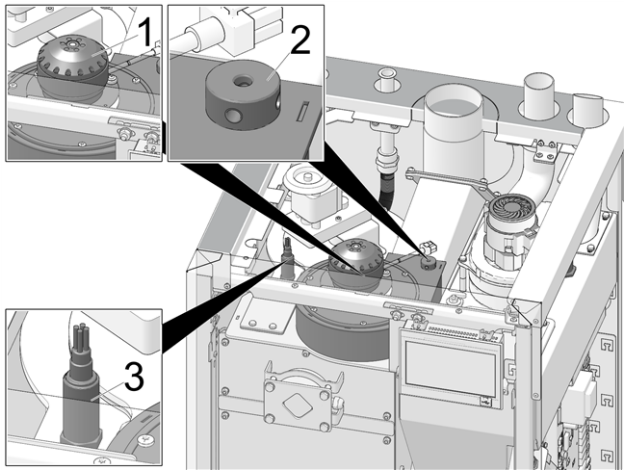


Abb. 2-23

1 ID fan
2 Holder for flue gas temperature sensor
3 Lambda sensor

Rotary valve

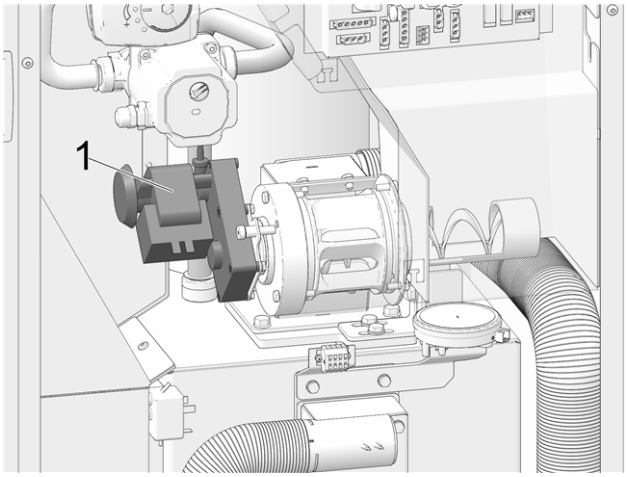


Abb. 2-24

1 Feeder motor, on rotary valve

Return temperature sensor

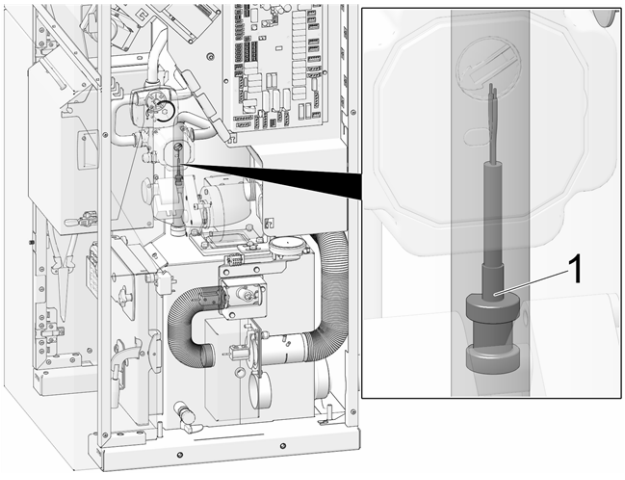


Abb. 2-25

1 Return temperature sensor (contact sensor)

Boiler top: Pellet suction

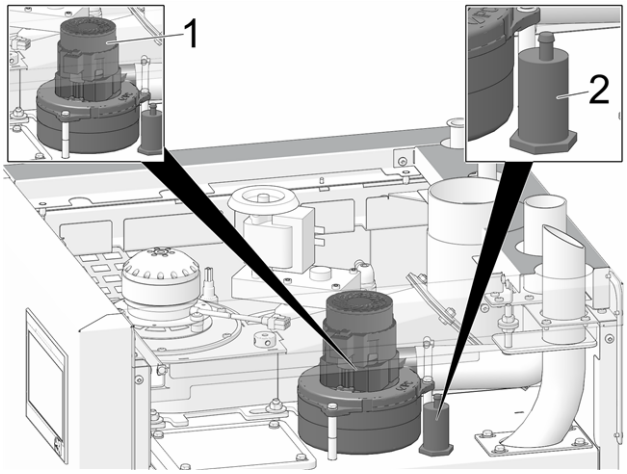


Abb. 2-26

1 Suction turbine for pellets
2 Level sensor in pellet storage tank

Boiler top: Temperature sensor

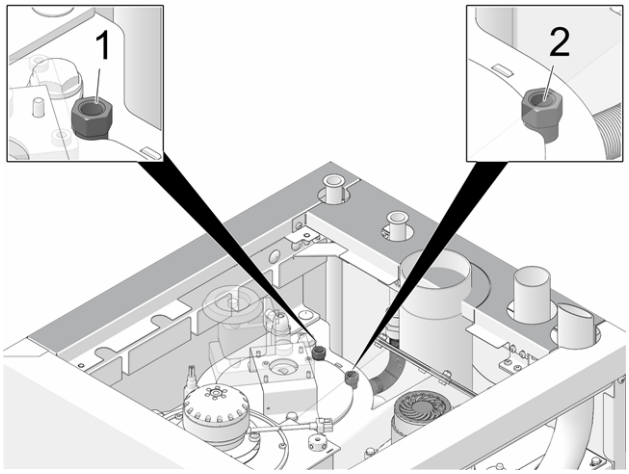


Abb. 2-27

1 Boiler flow sensor (immersion sleeve G1/4" L=70 mm)
2 Sensor for safety temperature limiter-STB (immersion sleeve G1/4" L=70 mm)

Exhaust gas cleaning, electrostatic dust collector, ash transport

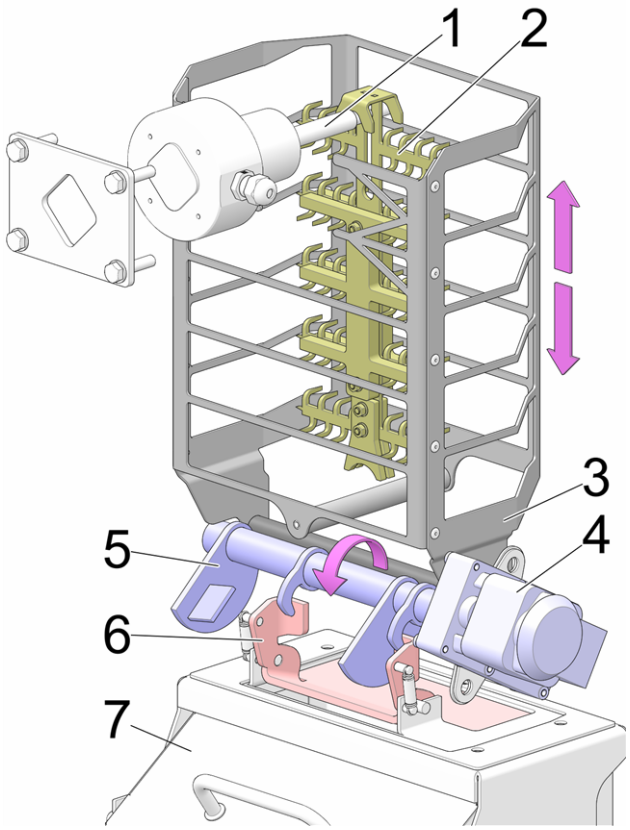


Abb. 2-28

1 Suspension discharge electrode
2 Discharge electrode
3 Cleaning rake
4 Ash extraction motor
5 Lifting mechanism
6 Ash flap
7 Ash container

High-voltage module

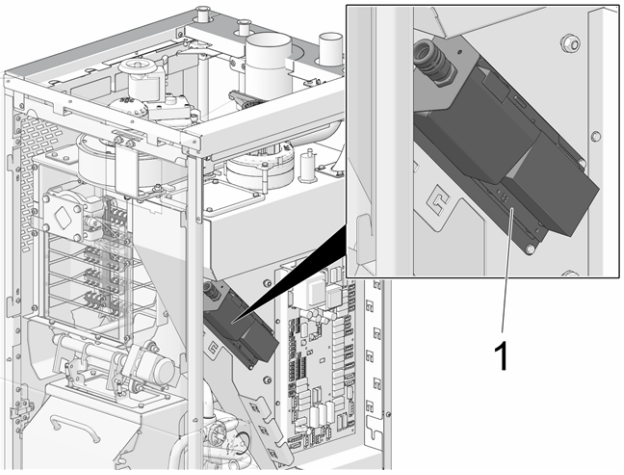


Abb. 2-29

1 High voltage module (for electrostatic dust collector)

SOLARFOCUS
makes you independent

Innovative products that are easy on the environment and your wallet.

Everything from a single source

- ☑ Biomass heating
- ☑ Solar energy systems
- ☑ Heat pumps
- ☑ Fresh water technology


Pellets


Log wood + pellets


Log wood


Wood chips


Solar energy


Fresh water


Heat pump

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