



## Pellet boiler pellet<sup>top</sup> touch

Installation manual for qualified personnel

Read carefully before operating.

DR-6015-EN / v18-202002

Service Hotline:

- Austria, International: 0043 7252 50002 4920
- Germany: 0049 6251 13665-14
- Switzerland: 0041 41 9840889

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## 1 About this manual

The language of the original manual is German. Versions of this manual in all other languages are translations of the original.

### Function of the manual


The manual is a constituent part of the product and enables safe and efficient handling of the product. Compliance with all the safety instructions specified is a basic prerequisite for safe working.


### Storing the manual


Keep the manual for the entire service life of the product and ready to hand at all times. 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 copy from the manufacturer.

### Classification of warnings


The warnings used in this manual are shown with symbols and signal words. The signal word indicates the level and nature of the danger and how to avert it.

 **DAN-** **Dangerous situation for humans!** Indicates a hazard with a high degree of risk, which – if not avoided – will cause death or a serious injury.

 **CAUTION** **Dangerous situation for humans!** Indicates a hazard with a low degree of risk, which – if not avoided – could cause minor or moderate injury.

 **WARNING** **Dangerous situation for humans!** Indicates a hazard with a medium degree of risk, which – if not avoided – could cause death or a serious injury.

**Attention!** Risk of property damage. Indicates operations or circumstances which may result in damage to the product.

 **Note:** Indicates information for correct handling of the product.

### Symbols and labelling

- Bullet point
- Precondition for an action
- ▶ Instruction
- ↪ Result of an action

### Numbering of figures

The numbering can be found below the figures, for example: Fig. 6-3

6-3 stands for the unique identification of the figure and is used in the text if the figure is referenced. The number 6 stands for the main section of the manual where the figure can be found, the number 3 for the serial number of the figure within the main section of the manual.

### Limitation of liability

SOLARFOCUS GmbH is not liable for personal injury and property damage due to:

Failure to observe the instructions in this manual.

Use of the product for any purpose other than for its intended use.

Deployment of non-qualified personnel.

Use of non-approved spare parts.

Technical modifications to the product by the user.

### Copyright


This manual is protected by copyright. Reprinting, translation and reproduction of this manual – in its entirety or in part – is only permissible with the prior written approval of the manufacturer.

### Warranty

See terms and conditions of business and delivery of SOLARFOCUS GmbH.

 Contact your heating engineer or the SOLARFOCUS service department for further information.

## 2 For your safety

 Make sure that you read this manual before commissioning the product. Compliance with the instructions in this manual, particularly the safety instructions, is vital for safe operation.

### Safety information

- Do not use or store combustible materials in the vicinity of the boiler.
- When opening the boiler door, ensure that no flue gas or flying sparks escape. Never leave the boiler door open and unattended.
- The boiler must be switched off before filling the storage room!
- Never open the combustion chamber door during operation.
- Only touch the designated operating elements (handles) while the boiler is in operation. Other components (combustion chamber door, flue gas pipe, ...) can become very hot – danger of burns!
- In the event of damage to the insulation, switch off the power supply immediately and have the insulation repaired.
- Protect live parts against moisture.
- Do not allow unauthorised persons, children or animals to enter the boiler room. Persons who are unfamiliar with the boiler or have received no instruction in its use must not be allowed to operate it.
- Use only fuel which meets the prescribed quality standards.
- Do not use auxiliary materials to ignite the prescribed fuel.
- Have maintenance work performed regularly (contact the SOLARFOCUS GmbH Service Department or an

authorised customer service partner).

- If visible damage is ascertained (e.g. leakage of water, thermal deformation, traces of smoke or scorching, mechanical damage etc.), operation must not be continued or the boiler started up again. The system may only be operated if it is in perfect technical condition.
- If the system is out of operation for lengthy periods, it must be ensured that all parts bearing water are fully protected against frost.
- The system operator is responsible for setting the parameters in the customer menu of the boiler control. As-delivered condition is always the factory setting, which must be adjusted by the system operator to meet the individual requirements. The manufacturer cannot be held liable for damage resulting from incorrect adjustment.
- The boiler must be operated exclusively in accordance with the planning and installation specifications and with the relevant regulations, laws and product-specific instructions. The manufacturer accepts no liability for damage and the consequences of damage resulting from incorrect installation, operation or use of the boiler or from failure to perform maintenance and cleaning correctly and punctually.
- The operator/owner of the system is under obligation to observe the applicable regional guidelines, directives and laws pertaining to the operation of wood- and pellet-fired combustion systems.
- The modification or disabling of safety equipment is strictly prohibited.
- The fire, building and electrical engineering requirements and the safety regulations must be complied with in addition to the instructions in the operation manual and the legal requirements applicable in the country of use!
- Incorrect cleaning and maintenance or failure to perform cleaning and maintenance can lead to serious malfunctions during combustion and thus cause accidents! Before maintenance work on the boiler: Switch the boiler off and allow it to cool down!
- All checks (service operations), cleaning processes and other events must be entered in an inspection log in accordance with TRVB H 118.



The minimum effective area of the supply air openings is 200 cm<sup>2</sup> up to 30 kW, 300 cm<sup>2</sup> up to 40 kW and 400 cm<sup>2</sup> up to 60 kW.

### **Accident prevention regulations**

In addition to the instructions contained in this manual, the local accident prevention regulations and the national industrial safety regulations also apply.

In the event of damage to the insulation, switch off the power supply immediately and have the insulation repaired.

Protect live parts against moisture and damp.

### **Qualification of personnel**

The work procedures described must be carried out by qualified specialist personnel.

Work on electrical components must be performed by trained electricians and in accordance with the relevant laws and directives.

## 3 Product description

### 3.1 Technical specifications

<b>pellet<sup>top</sup> touch</b>		35	45	49	70
Rated power	[kW]	35	44.9	49	70
Lowest output	[kW]	10.5	13.4	14.7	21
Energy efficiency class		A+			

#### Dimensions

Width (W)	[cm]	55.5		79	
Total width including ash container (B1)	[cm]	94		120	
Total depth	[cm]	144		155	
Depth without fan (D)	[cm]	134		145	
Height incl. adjustable feet <sup>[1]</sup> (H)	[cm]	156		172	
Minimum room height <sup>[2]</sup>	[cm]	175		195	

#### Weight

Weight	[kg]	554	560	882
--------	------	-----	-----	-----

#### Water side

Water content	[l]	58		130	
Maximum operating pressure	[bar]	3			
Boiler flow/boiler return connection	["]	External thread 5/4		External thread 6/4	
Drain	["]	External thread 1/2			
Thermal overload protection	["]	External thread 1/2			
Flow rate / differential pressure at $\Delta T$ 10°K	[kg/h] [hPA]	3000 45	3860 95	4200 50.6	6000 59
Flow rate / differential pressure at $\Delta T$ 20°K	[kg/h] [hPA]	1500 11	1930 17.5	2100 13	3000 16

#### Fuel

Fuel		Wood pellets acc. to EN17225-2, ENplus-A1			
Capacity of intermediate pellet store	[l]	95	95	250	250

#### Flue gas side

Flue gas pipe diameter	[cm]	15	15	20	20
Height flue gas pipe centre <sup>[1]</sup> (D)	[cm]	46	46	59	59
Flue gas mass flow full load	[g/s]	30	37	40	55
Flue gas mass flow partial load	[g/s]	10	13.5	14	20
Max. flue gas temperature (full load/partial load) <sup>[4]</sup>	[°C]	140 / 100			
Minimum draught requirement <sup>[5]</sup>	[Pa]	5			

#### Emissions according to test report

Flue gas values <sup>[6]</sup> from test report: Test institute / test report no.		TÜV Austria11-UW-Wels-EX-212-2	TÜV Austria11-UWWels-EX-619	TÜV Austria11-UWWels-EX-212	TÜV Austria11-UW-Wels-EX-212-1
CO full load	[mg/m <sup>3</sup> ]	10	9.1	8.8	7
CO partial load	[mg/m <sup>3</sup> ]	48	42.6	40.4	29
NOx full load	[mg/m <sup>3</sup> ]	101	103	104	108
NOx partial load	[mg/m <sup>3</sup> ]	102	106.9	109	119
Org. C full load	[mg/m <sup>3</sup> ]	<2			
Org. C partial load	[mg/m <sup>3</sup> ]	<2			
Dust content full load	[mg/m <sup>3</sup> ]	20	20	20	20
Dust content partial load	[mg/m <sup>3</sup> ]	17	17.6	17.8	19

[1] Adjustable feet at maximum depth of thread

[2] The minimum room height is required for maintenance work

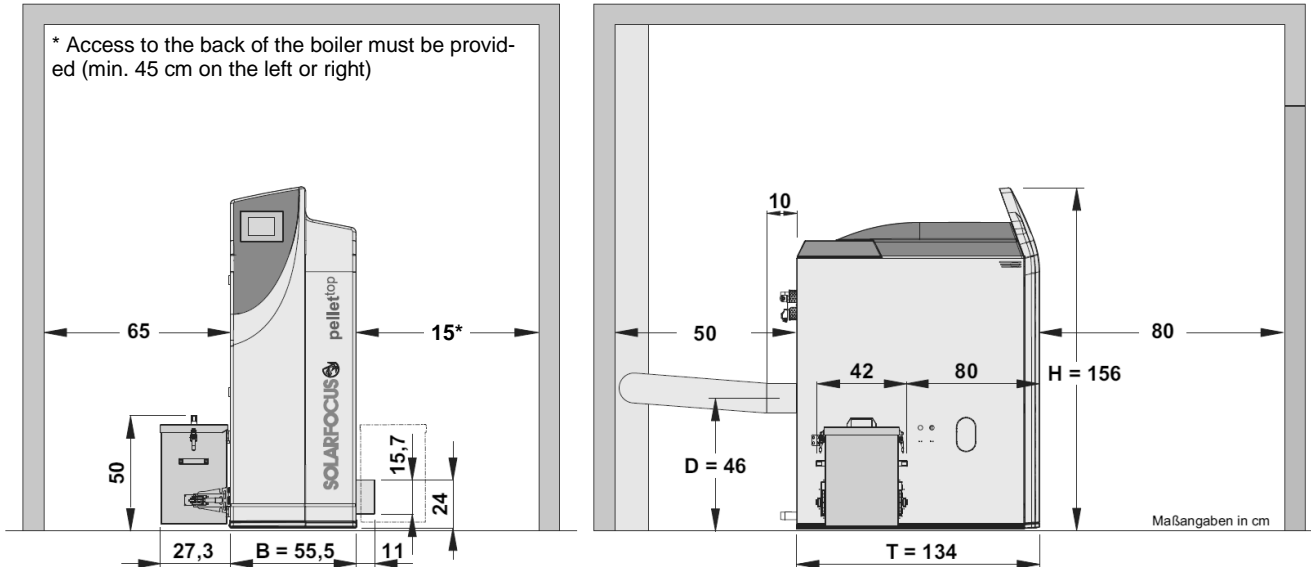
[4] The maximum flue gas temperature can be adjusted electronically

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

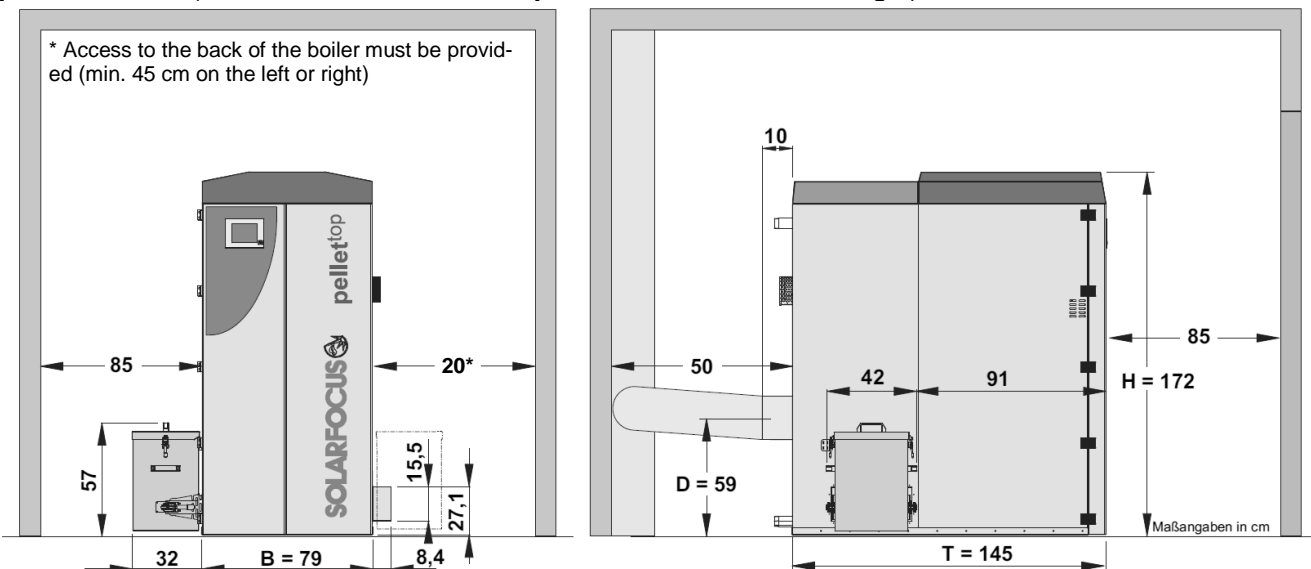
[6] Flue gas values in mg/m<sup>3</sup> are based on 13% O<sub>2</sub> of the volume flow

### 3.2 Dimensions and installation dimensions

**pellet<sup>top</sup> 35 / 45** (automatic ash extraction may be mounted on the left or right)



**pellet<sup>top</sup> 49 / 70** (automatic ash extraction may be mounted on the left or right)



**ATTENTION:** Additional clearance may need to be planned for the fuel delivery system used.

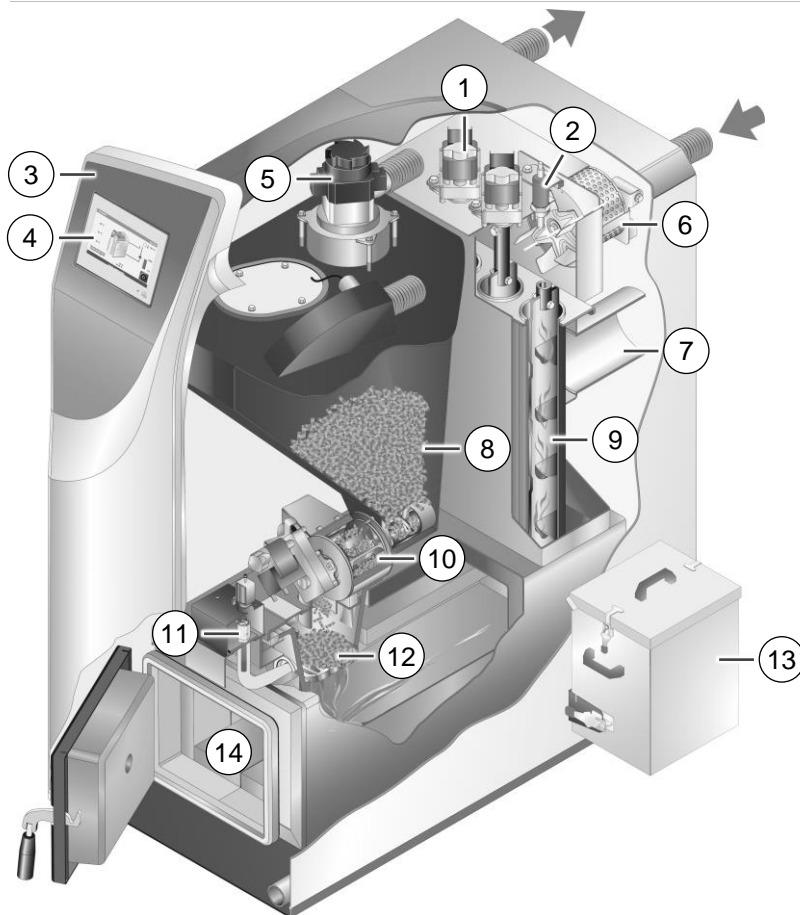
### 3.3 Scope of delivery

Pos.	Quantity	Name
1	1	Ash container, ash extraction screws, 2 motors, small parts
2	1	Ash scraper
3	1	Ash pan
4	1	Operation manual pellet <sup>top</sup>
5	1	Transparent bag with 2 x ash pan handles, 4 x hinge bolt hose clamps, 1 x stainless steel combustion grate, 4 x adjustable feet

Pos.	Quantity	Name
6	1	Transparent bag with external sensor, boiler flow contact sensor, immersion sleeves.
7	1	Gloves
8	1	Boiler
9	1	Installation manual pellet <sup>top</sup>

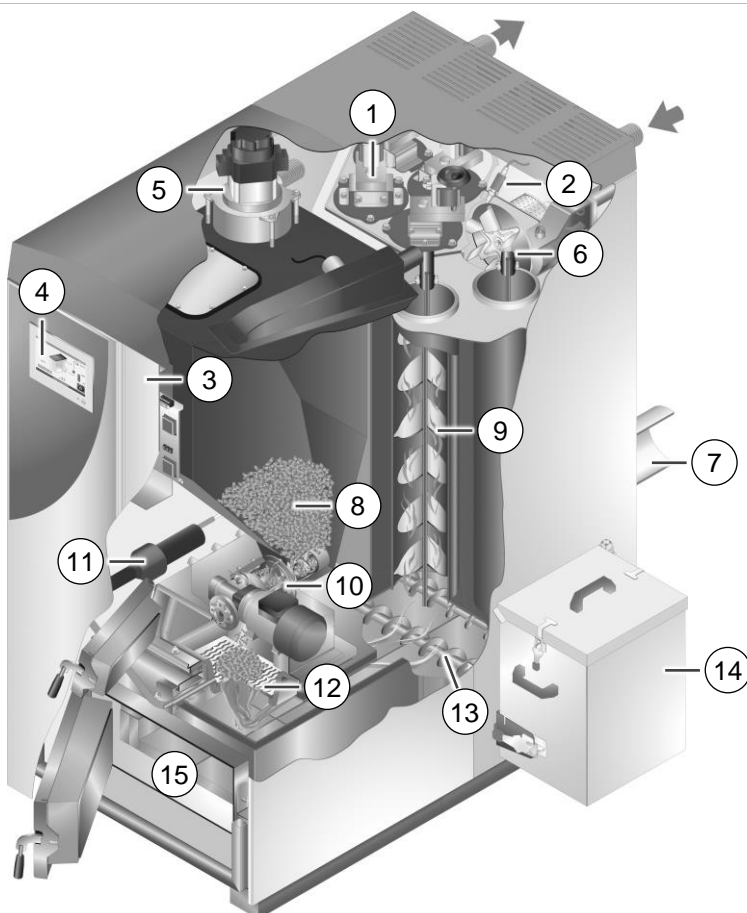
Not included in the scope of delivery:  
Pellets hose ♦ flue gas pipe parts and connection material

### 3.4 Sectional drawing



**pellet<sup>TOP</sup> 35/45**

- 1 Motors for heat exchanger cleaning
- 2 Lambda sensor
- 3 Cladding door
- 4 Operating unit
- 5 Suction turbine
- 6 ID fan
- 7 Flue gas pipe
- 8 Intermediate pellet store
- 9 Heat exchanger cleaning
- 10 Rotary valve and feed auger
- 11 Ignition device (glow pencil)
- 12 Stainless steel combustion grate
- 13 Ash container
- 14 Combustion chamber



**pellet<sup>TOP</sup> 49/70**

- 1 Motors for heat exchanger cleaning
- 2 Lambda sensor
- 3 Cladding door
- 4 Operating unit
- 5 Suction turbine
- 6 ID fan
- 7 Flue gas pipe
- 8 Intermediate pellet store
- 9 Heat exchanger cleaning
- 10 Rotary valve and feed auger
- 11 Ignition device (hot air fan)
- 12 Stainless steel combustion grate
- 13 Autom. ash extraction (auger)
- 14 Ash container
- 15 Combustion chamber

## 4 Transporting of the boiler

**i** Information about boiler weight, → 5

### 4.1 Transport aids

pellet<sup>top</sup> 35/45/49/70: Recesses **1** on one boiler front and back, 1" pipe inserted, to the back of the boiler.

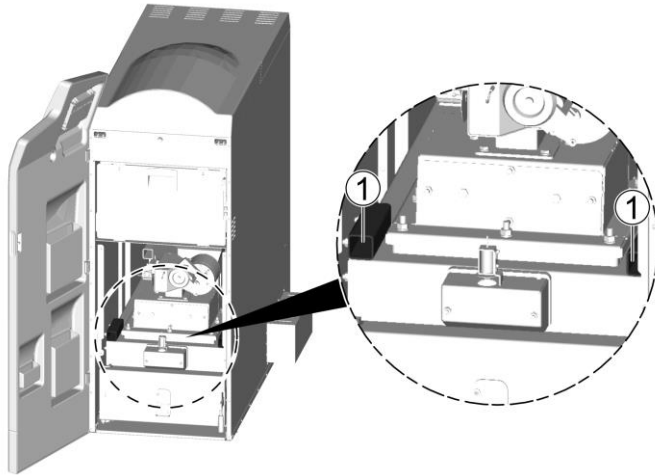


Fig. 4-1

pellet<sup>top</sup> 49/70, in addition, from the boiler top 2 x ring screws M20 **1** mountable (not included in the scope of delivery)

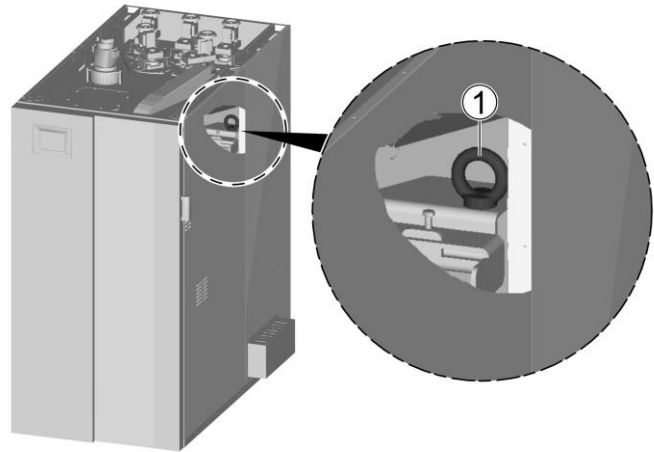


Fig. 4-2

### 4.2 Removing the shipping timber

pellet<sup>top</sup> 35/45

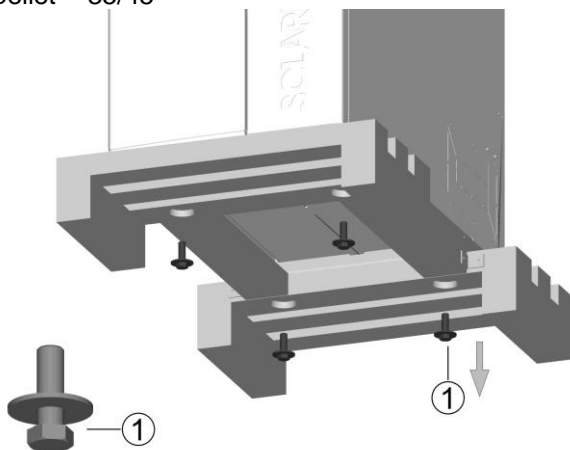


Fig. 4-3

- ▶ Release hex bolts M16x50 (SW24) and washers **1**.
- ▶ Remove pallets.
- ▶ Screw in 4 x adjustable feet (SW16).

pellet<sup>top</sup> 49/70

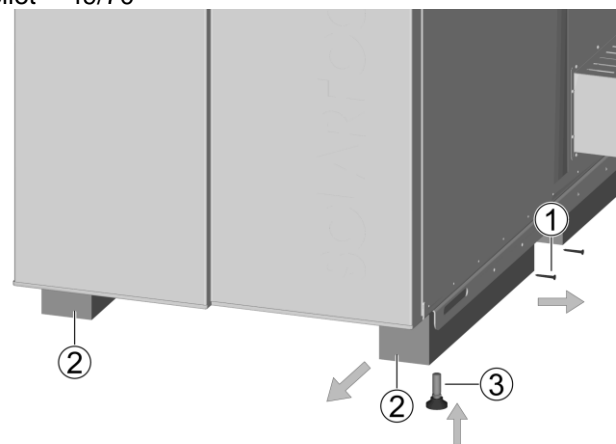


Fig. 4-4

- ▶ Remove Torx screws **1** and square timber **2**.
- ▶ Screw in 4 x adjustable feet (SW16).



## 5 Installation

### 5.1 Prior to installation

- Installation dimensions → 6
- Information about chimney connection, → 20

### 5.2 Installation sequence

#### 5.2.1 Removing the covers

pellet<sup>top</sup> 35/45

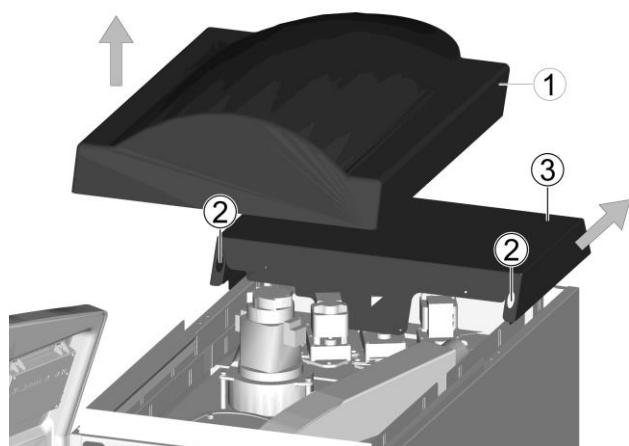


Fig. 5-1

- ▶ Lift cover 1 upwards.
- ▶ Release 2 x screws 2 pull cover 3 backwards.

pellet<sup>top</sup> 49/70

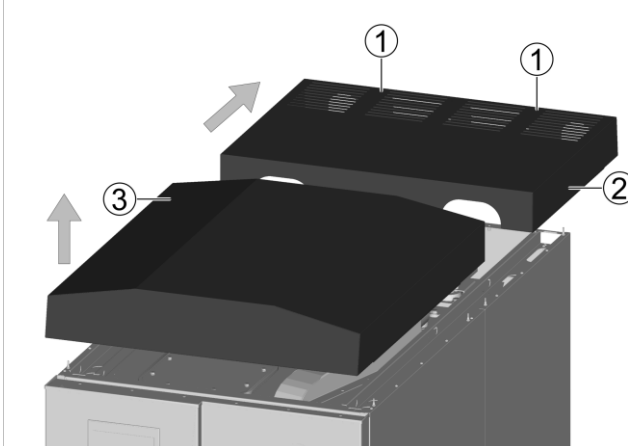


Fig. 5-2

- ▶ Release 2 x screws 1 pull cover 2 backwards.
- ▶ Lift cover 3 upwards.

#### 5.2.2 Install automatic ash extraction

**i** Arrangement of the ash container: When starting installation, determine which side of the boiler the ash container will be mounted on. The cables for the ash extraction auger motors and the cover switch for the ash container are laid on both sides of the boiler. The following procedure describes the installation of the ash container on the left side of the boiler.

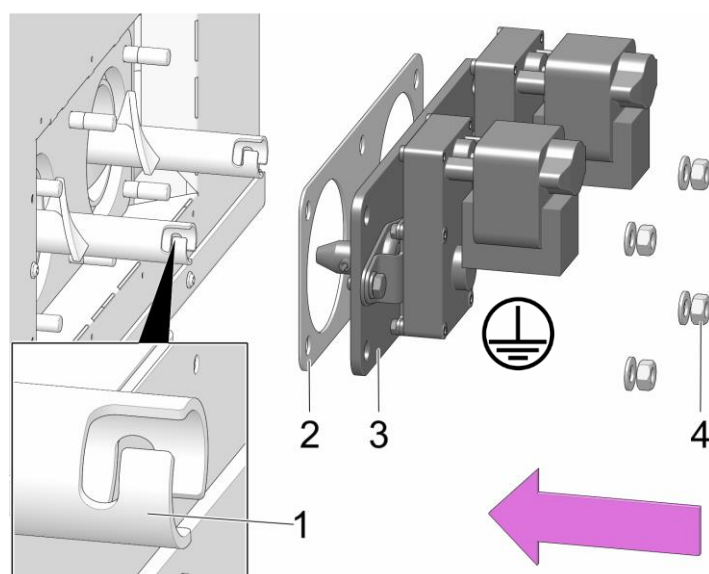


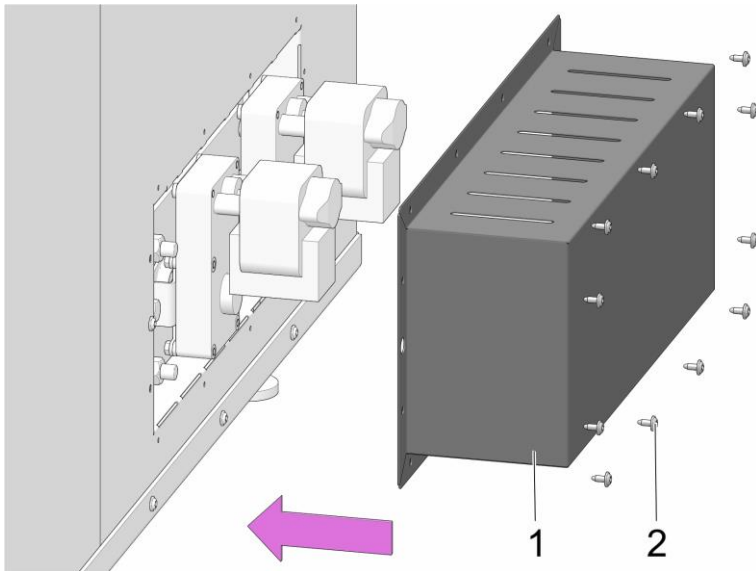
Fig. 5-3\_Installing the flange plate and motors

#### Install the flange plate with motors

**i** The *flange plate with the motors* is installed on the opposite side of the boiler to the *ash container*.

Check: The bayonet lock socket 1 of the worm shaft must point toward flange plate/motors.

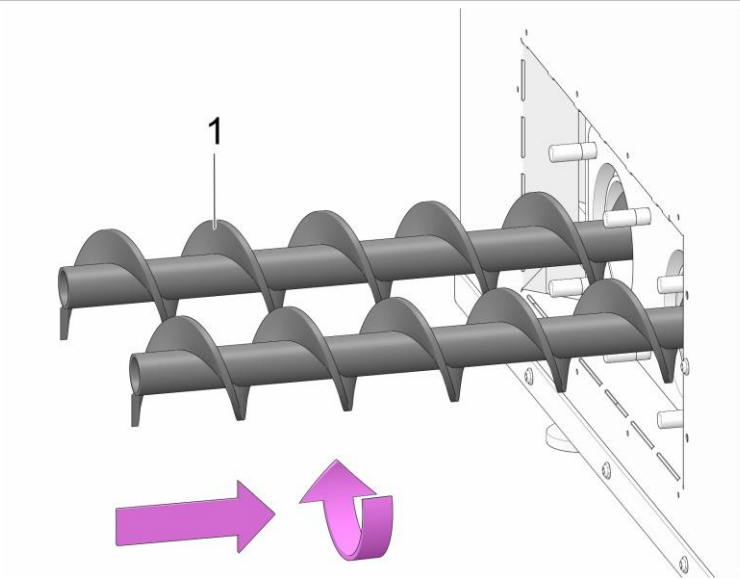
- ▶ Mount seal 2 and flange plate 3 with 6 x hex nuts M10 (SW17) and washers 4 to the boiler.
- ▶ Connect motors electrically (cable is ready to connect), attach protective earthing cable on flange plate.



**Mount the cover**

- ▶ Mount cover 1 with 12 x self-tapping screws 2.

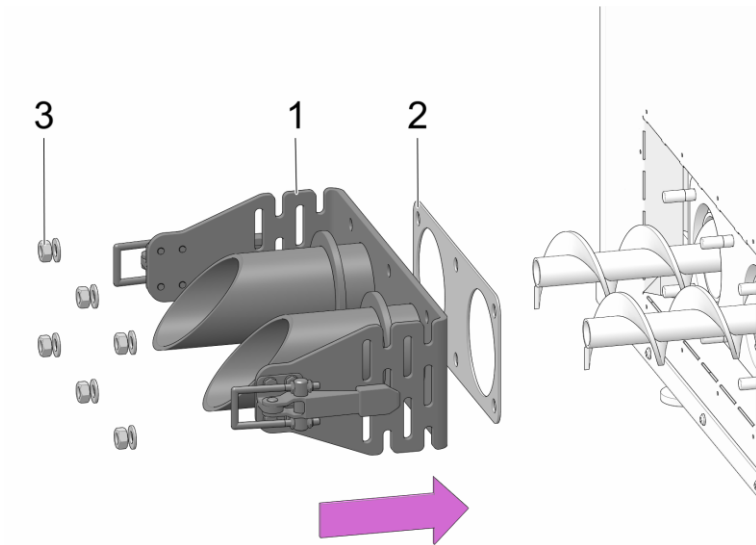
Fig. 5-4\_Fitting the cover



**Install the ash extraction augers**

- ▶ Insert the augers 1.
- ▶ Turn the augers to ensure that the bayonet lock socket at the end of the auger latches into the catch on the motor.

Fig. 5-5\_Fitting the augers



**Mount console**

- ▶ Mount console 1 and seal 2 with 6 x hex nuts M10 (SW17) and washers 3 to the boiler.

Fig. 5-6\_Fitting the console and seal

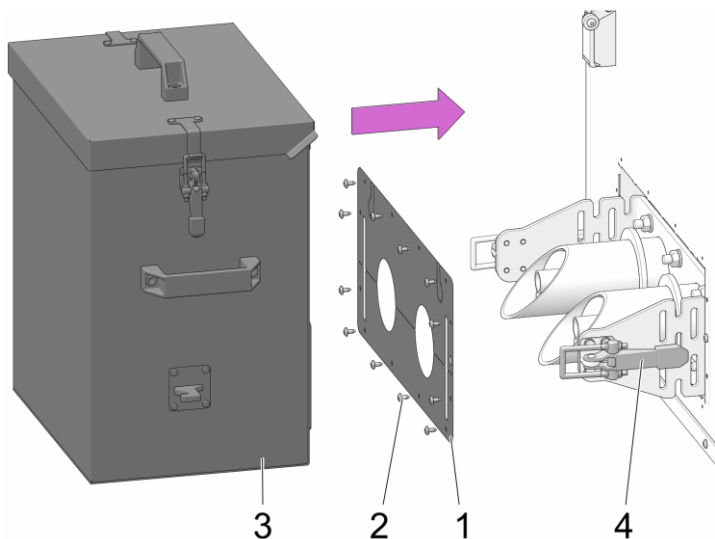


Fig. 5-7\_Fitting the cover and ash container

### Mount cover and ash container

- ▶ Mount two-section cover **1** with 12 x self-tapping screws **2**.
- ▶ Attach ash container **3** and secure it with the two turnbuckles **4**.

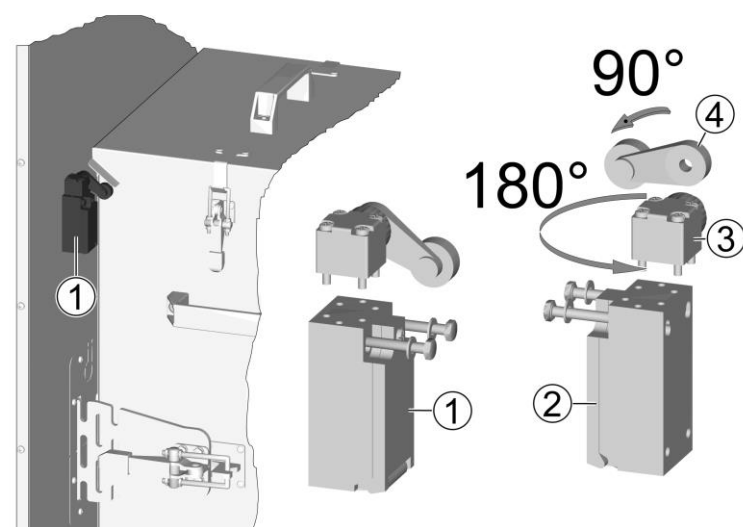


Fig. 5-8

### If necessary: convert ash container safety switch

Item **1** shows the switch assembly when mounted on the left side of the boiler.

If the switch is mounted on the right side of the boiler, proceed as follows:

- ▶ Unscrew the switch from the boiler.
- ▶ Release screws at switch head **3** and turn head 180 degrees.
- ▶ Release screws at roller lever **4** and turn head 90 degrees.
- ▶ Replace the switch on the boiler, position the parts according to **2**.
- ▶ Connect switch: Use **C** and **NO** (13, 14).

**i** The connection for the ash box safety switch (X48) and the ash transfer screw motor (X16) is pre-wired on both sides of the boiler. Connect the correct plug (note left/right marking on the cable harness label) to the boiler power element.

### 5.2.3 Connect pellet hose

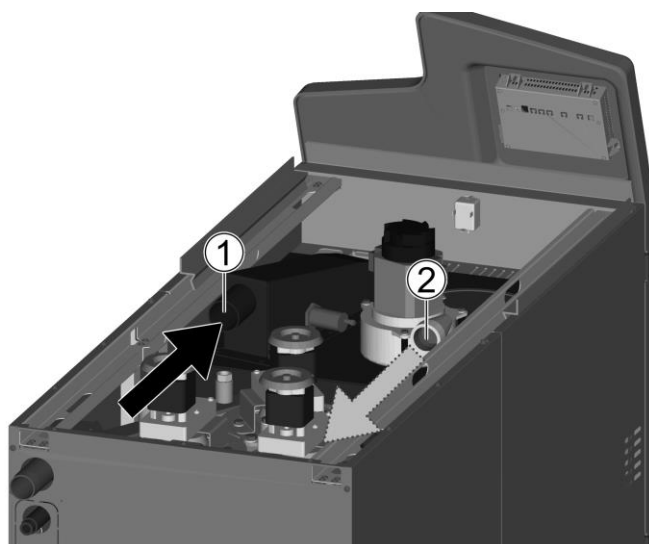


Fig. 5-9

Applicable to all pellet<sup>top</sup> boilers.

- 1** = suction (pellets)
- 2** = return air hose

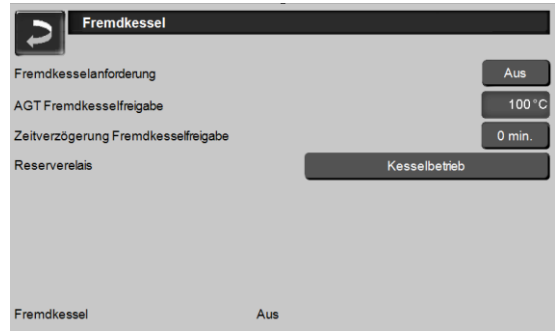
Observe notes on installing hoses,  
 ➔ 20

### 5.2.4 Boiler-controlled room air damper (optional)

Function: When the burner is running, the output is energised and the room air damper opens.

- ▶ Connect the room air damper to the boiler power element at X6 (230 V AC).
- ▶ For the parameter *Reserve relay*, select the value *Boiler operation*.

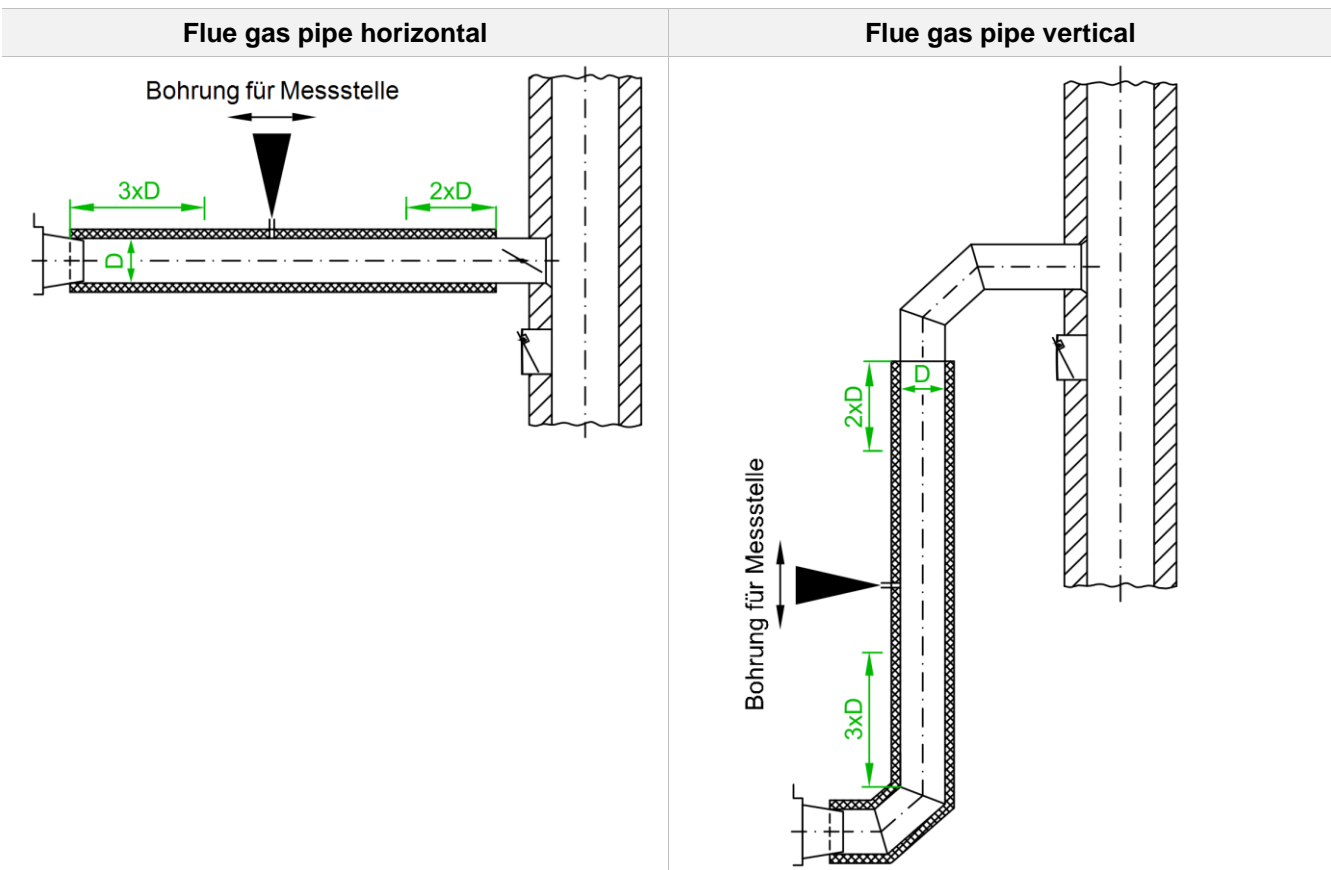
The parameter *Reserve relay* is located in the *Service menu* > *External boiler*.



### 5.2.5 Flue gas pipe: Make a 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 stabiliser.

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



## 6 Hydraulic connection

### 6.1 Fill-up water requirements

#### General recommendations for installation

- Fit an upstream filter (<25 µm) to prevent particles getting into the heating water.
- Position shut-off valves for each section (in buffer tank, etc.) in order to minimise heating water loss in the event of repairs or system extensions.

#### 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.

Important: **Pressure maintenance at regular intervals** (system pressure, pressure in the expansion tank)

#### Formation of scaling

Scaling refers to heating water deposits on the heat exchanger of the boiler. The cause of scaling is the presence of limestone in the water. If the value (total hardness °dH) is too high, the fill-up water must be treated.

Parameters that play a role in the formation of scaling:

- *System volume* (the bigger it is, the less total hardness is permissible, e.g. buffer tank fitted, boiler cascade, etc.).
- *Boiler output* (the bigger it is, the less total hardness is permissible).

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

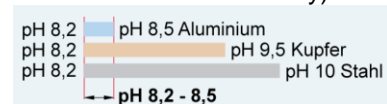
System volume (litres)	=	Spec. water content of the system (l/kW)
Boiler output (kW)		
<i>Example:</i> $\frac{1166}{25 \text{ kW}} = 46.64 \text{ l/kW}$		

Overall output of heat supply	German hardness
Specific water content of the system <20 l / kW	
≤ 50 kW	≤ 16.8 °dH
> 50 kW to ≤ 200 kW	≤ 11.2 °dH
> 200 kW to ≤ 600 kW	≤ 5.6 °dH
> 600 kW	≤ 2.8 °dH
Specific water content of the system ≥ 20 l/kW, but < 50 l/kW	
≤ 50 kW	≤ 11.2 °dH
> 50 kW to ≤ 200 kW	≤ 5.6 °dH
> 200 kW to ≤ 600 kW	≤ 2.8 °dH
> 600 kW	≤ 0.6 °dH
Specific water content of the system ≥ 50 l/kW	
≤ 50 kW	≤ 5.6 °dH
> 50 kW to ≤ 200 kW	≤ 2.8 °dH
> 200 kW	≤ 0.6 °dH

In the event of exceeding the above values, the fill-up water is to be treated. Recommended action: Softening (e.g., ion-exchange resin, the same procedure as for drinking water softening).

#### Check the pH of the fill-up water

- In the normal case (mixed installation) no measures are required to influence the pH (control: value should be in the range of 8.2 to 10). 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).



- If the value is significantly less than <8.2 after filling, then check again after 8-12 weeks
- If there is no increase in value, then add 10 g/m<sup>3</sup> trisodium phosphate (Na<sub>3</sub>PO<sub>4</sub>) or 5 g/m<sup>3</sup> sodium hydroxide (NaOH).
- Allow 2-4 weeks of operation before further corrections.

#### Electrical conductivity

Recommendation: Low salt driving (filling with demineralised water), see VDI 2035 sheet 2.

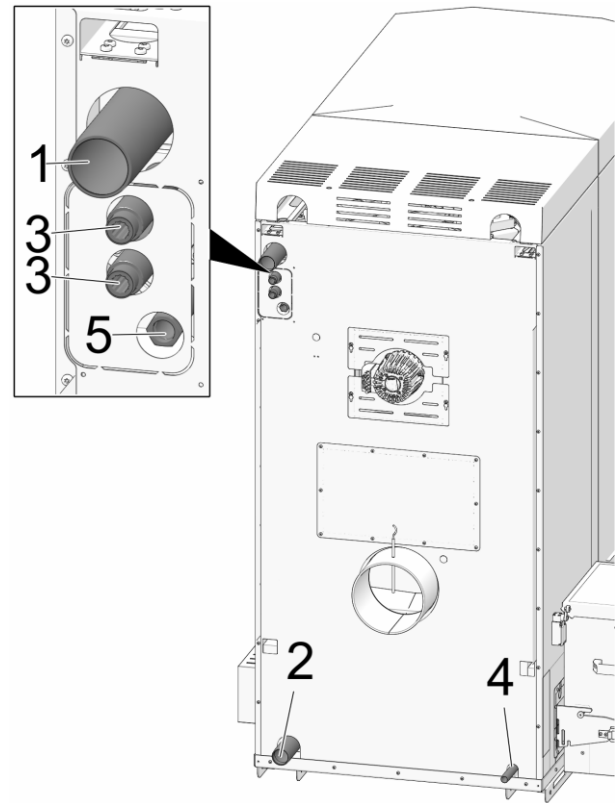
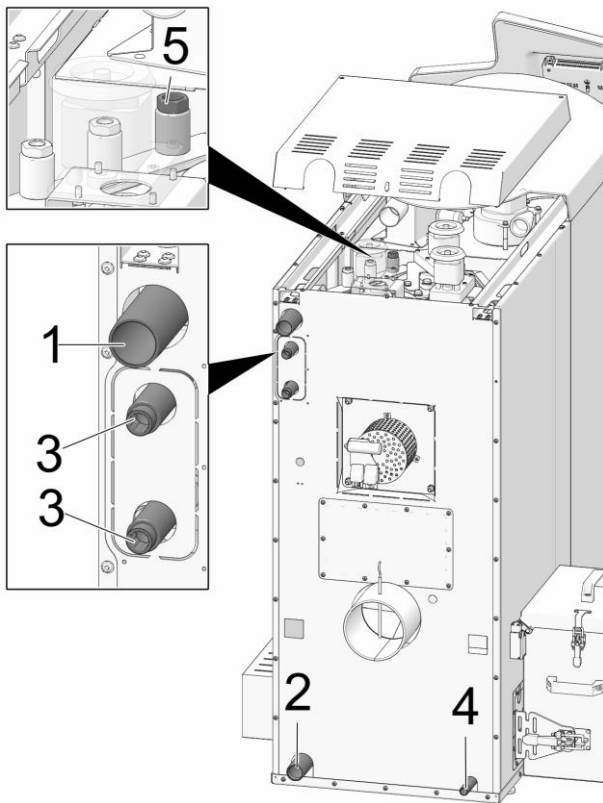
	Low salt	Salty
Electrical conductivity at 25°C	< 100 µS/cm	100 – 1500 µS/cm

**i** Compliance with the above mentioned standards / regulations must be ensured by the heating engineer.

## 6.2 Connections – overview

pellet<sup>top</sup> touch 35/45

pellet<sup>top</sup> touch 49/70

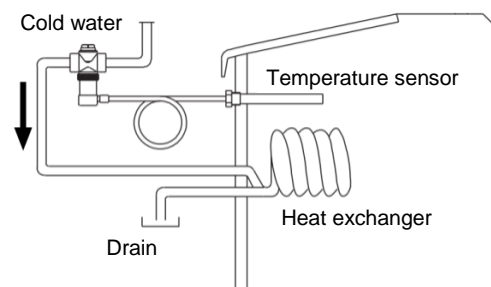


1	Boiler flow
2	Boiler return
3	Thermal overload protection
4	Drain
5	Sensor for thermal overload protection

Dimension of connections: ➔ Technical specifications, 5

## 6.3 Thermal overload protection

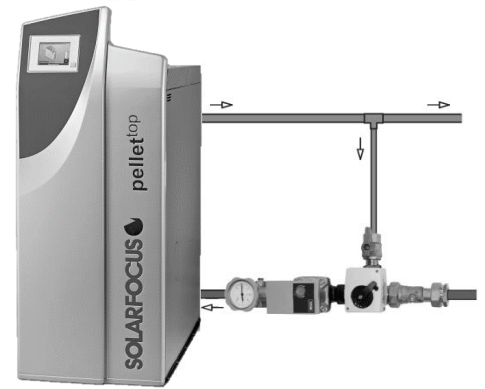
Fit the thermal overload protection valve before (as seen from the direction of flow) the heat exchanger (i.e. no water pressure building up in the heat exchanger).



## 6.4 Return flow boosting (RFB)

The return temperature must not be lower than 55°C to prevent flue gases condensing in the boiler heat exchanger, thereby causing corrosion.

A mixer regulated return booster is preferable to a thermally regulated system. This ensures that the return temperature is maintained reliably and continuously and monitored by the control, independently of the heating water flow rate. With mixing valves, it is also possible to exploit residual heat at the end of a firing phase: When the temperature in the buffer tank has fallen to lower than that in the boiler, the pumps start up again, the return mixer opens, and the residual heat from the boiler is transferred to the buffer.



**i** The installation of a return booster is a guarantee condition of SOLARFOCUS.

**i** During installation, make sure that there is a clearance >20cm between the boiler and the return booster module (to allow for subsequent replacement of pump components, if necessary).

### Connecting mixer regulated return flow boosting

Connection to the power element		Function / connection
X13	Relay output, 2 x 230 V AC	<b>Return booster module mixing valve</b>
		⊕ Protective earthing
		N Neutral conductor
		L1 Mixing valve OPEN: Circuit <i>boiler - buffer</i> is open
L2 Mixing valve CLOSED: Circuit <i>boiler flow – boiler return</i> is open		
X15(4)	Relay output, 1 x 230 V AC	<b>Return booster pump</b> (connector on back of boiler)
X32	Sensor input KTY 81-110 (can be switched to PT1000)	<b>Return temperature sensor</b> (sensor cable ready for connection, can be found on the back of the boiler)

### 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.

## 7 Electrical connection

**⚠ DANGER** There is a risk of electric shocks when performing work on electrical components of the product/system! ► Before carrying out any work on electrical systems, disconnect the product/system from the power supply and secure it against being switched back on.

### 7.1 Connections to the boiler power element

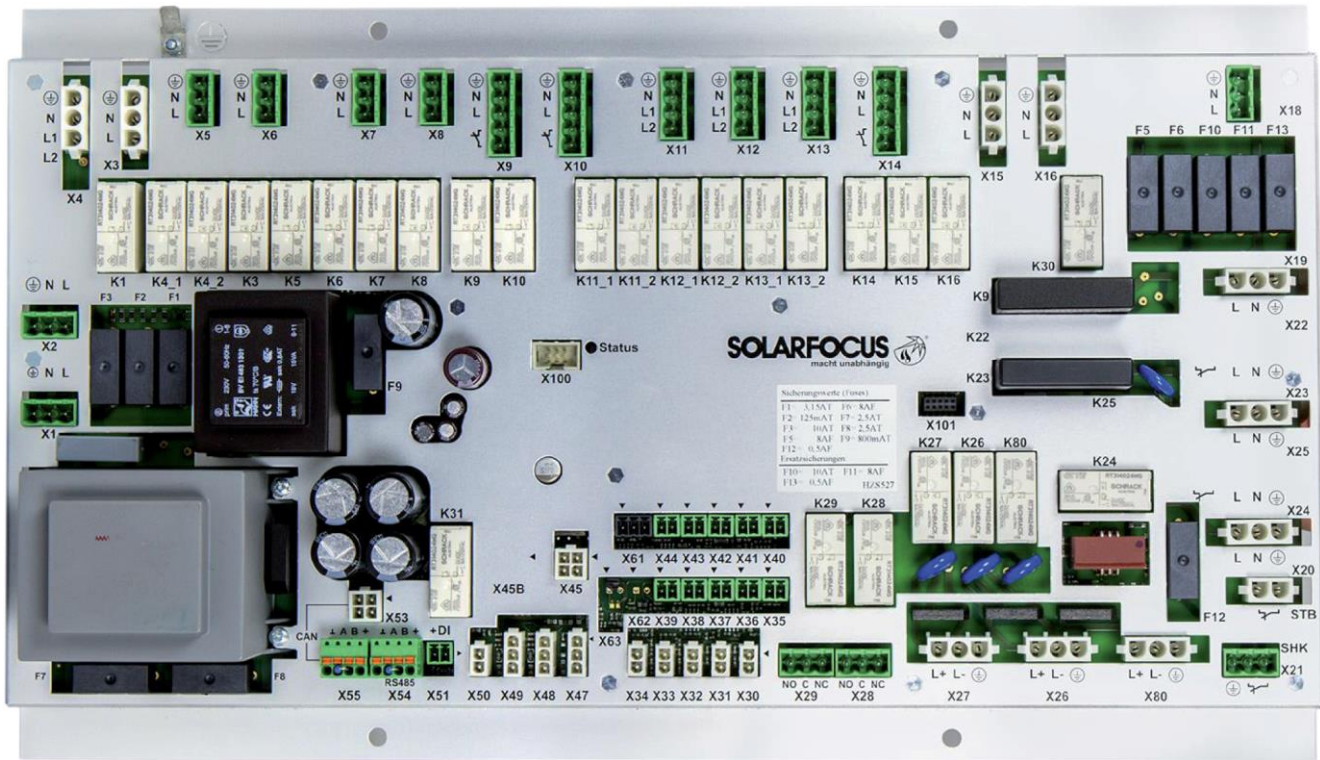


Fig. 7-1

Fuel feed	X41	Room sensor - HC1 (optional)	X13	Return mixer	
X3	Suction turbine	X42	Outside temperature sensor	X15	Return booster pump
X14	Suction system: Motor of the direct extraction auger	Boiler	X36	Buffer sensor bottom	
X14	Direct extraction: Motor of the direct extraction auger	X4	Automatic ignition	X44	Buffer sensor top
Bus	X16	Automatic ash extraction	X19	ID fan	
X53	CAN bus; connection to the display	X20	Overtemperature reset (OTR)	X21	Safety chain 230 V AC (optional); e.g. for emergency off switch
X54	Connection for RS-485 electronic modules	X23	Feed motor	X28	External boiler release (optional)
X55	CAN bus; connection for CAN bus electronic modules	X24	Heat exchanger cleaning	X29	Fault (optional)
Heating circuit	X26	Primary air solenoid	X51	External request (optional)	
X9	Heating circuit pump – HC1 → 18	X27	Ignition supply air holding magnet	DHW tank	
X10	Heating circuit pump – HC2 → 18	X30	Upper boiler temperature	X8	DHW tank pump
X11	Heating circuit mixing valve - HC1	X31	Boiler temperature sensor	X39	DHW tank sensor
X12	Heating circuit mixing valve - HC2	X32	Return temperature sensor	Recirculation control	
X37	Flow temperature sensor - HC2	X33	Feeder temperature sensor	X5	Recirculation pump
X38	Flow temperature sensor - HC1	X34	Flue gas temperature sensor	X43	Circulation sensor (optional)
X40	Room sensor - HC2 (optional)	X45	Lambda sensor		
	X47	Speed measurement ID fan	X48	Front door contact switch, ash box safety switch	
	X49	Pellet box filling level sensor	X49	Pellet box filling level sensor	
	X7	additional buffer cylinder charging pump (optional)			



## 7.2 Power supply for the heating system

A separate power circuit is to be provided in the boiler room / boiler installation room for the heating system.

Mains 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 mm<sup>2</sup>

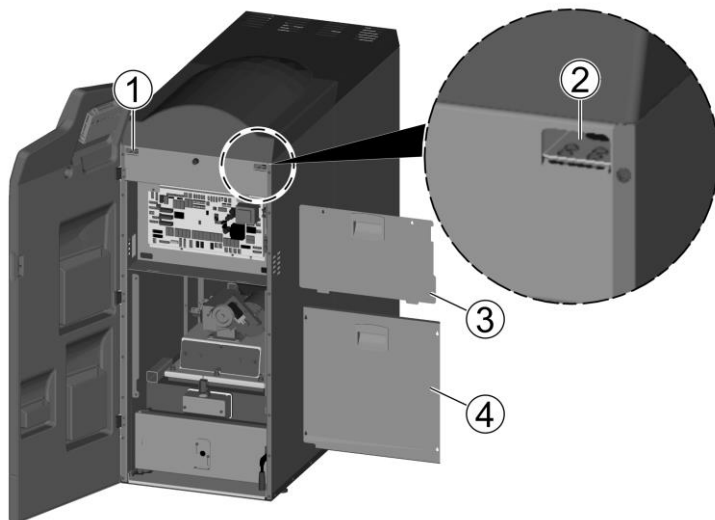


## 7.3 EMERGENCY OFF switch

An "Emergency OFF" switch must be fitted outside the boiler room – near the boiler room / boiler installation room ►; observe regional building regulations.



## 7.4 Cable management, covers

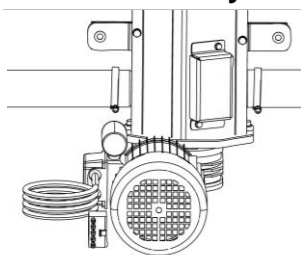


- Cable duct **1** for sensor lines on the left side of the boiler.
- Cable duct **2** for power lines on the right side of the boiler.
- Power element cover **3**
- Lower cover **4**

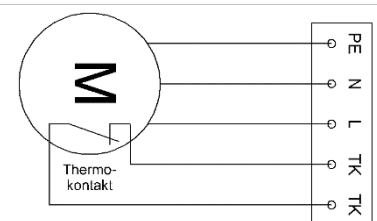
Fig. 7-2

## 7.5 System type: Suction system with suction auger

### SOLARFOCUS system



5-pin connector, direct extraction motor	Connection X14 on the power element
PE	PE
N	N
L3	L
L2	TC
L1	TC

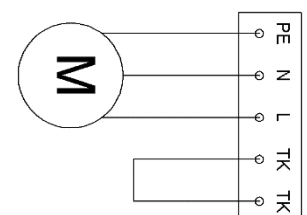


- Route cable (5x1.5 mm<sup>2</sup>, to be provided on site) from connection cable of the direct extraction motor to the power element.

### Third-party manufacturer system (motor thermal protection integrated)

- Route a cable (3x1.5 mm<sup>2</sup>) from the direct extraction motor to the boiler power element.
- Bridge the two TC terminals on the power element.

Applies e.g. to: Pellet box transfer unit screw; Pellet mole



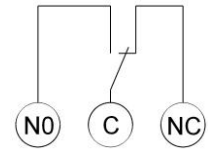
## 7.6 Other connections

### External boiler request (X28)

Potential-free relay output for switching an external boiler, for example, an external boiler receives a release from the SOLARFOCUS boiler control;

- ▶ connect to X28 on SOLARFOCUS power element.

**Attention!** The connection is potential-free and has a maximum load of 5A.

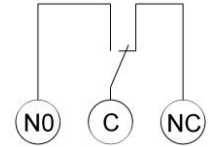


### Fault (X29)

Potential-free relay output, for example, to switch a warning device (optical/acoustic) upon occurrence of an operating fault on the boiler;

- ▶ connect to X29 on the power element.

**Attention!** The connection is potential-free and has a maximum load of 5A.



### External request (X51)

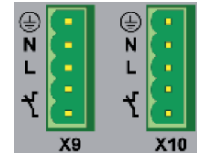
Input, i.e. the SOLARFOCUS boiler can be started by an external control;

- ▶ connect to X51 on the power element.

**Attention!** This connection must be potential-free.

### Connect the heating circuit pump (X9, X10)

- ▶ Connect heating circuit pump 1 to power element connector X9 and heating circuit pump 2 to X10.
- ▶ If required (e.g. in the case of underfloor heating), connect a limiting thermostat.
- ▶ If a limiting thermostat is not used, the contact must be bridged.



## 7.7 Internet connection

To connect the boiler control with the Internet, connect the Ethernet port **X2** (type RJ45) on the back of the display with a network router via cable. The connection is required in order to use the following functions:

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

## 7.8 Types of sensors - overview

Measuring sleeve	Colour	Cable Material / finish	Length	Sensor type	Art.No.	Use
15 cm	silver	Stainless steel braid	3 m	PT100	69688	Flue gas temperature sensor (pellet <sup>plus</sup> , octo <sup>plus</sup> , thermi <sup>nator</sup> I)
			1.6 m	PT100	69681	Flue gas temperature sensor (thermi <sup>nator</sup> II 22-30)
			2.1 m	PT100	69682	Flue gas temperature sensor (thermi <sup>nator</sup> II 36-60, pellet <sup>top</sup> , pellet <sup>plus</sup> )
			1 m	PT100	69680	Feed sensor rotary valve (pellet <sup>top</sup> , octo <sup>plus</sup> )
13 cm	grey	PVC cable	2 m	PT1000	1622	Flow sensor for fresh water module <i>fast</i>
	red	Silicone cable	2.1 m	PT100	69687	Feed sensor pellets / wood chips feed
5 cm	red	Silicone cable	3 m	KTY81-110	69686	Return sensor, boiler temperature sensor, external boiler sensor
	black	PVC cable	3 m	KTY81-110	69095	Tank sensor
		PVC cable	5 m	PT1000	69095-1000	Tank sensor
	black	PVC cable	5 m	PT1000	69098-1000	Flow sensor
		Silicone cable	5 m	KTY81-110	69689	Return sensor pellet <sup>top</sup> 70
2 cm	grey	PVC twin cable	2 m	PT1000	1621-PT	Tank sensor
	white	PVC twin cable	2 m	KTY81-210/B	1621	Tank sensor
	red	Silicone cable	2 m	KTY81-210/B	1620	Collector sensor
	black	Silicone cable	2 m	PT1000	1620-PT	Collector sensor
2 cm x 1.5 Ø Contact sensor	black	PVC cable	2 m	KTY81-110	69098	Flow sensor
-	-	to be provided on-site	-	KTY81-110	69096	External sensor; (plastic housing 66x60x39 mm)
-	-	to be provided on-site	-	PT1000	69096-1000	External sensor; (plastic housing 66x60x39 mm)

## 7.9 Sensor resistance table

Sensor type	PT 100	PT 1000	KTY 81-110
Tolerance	± 0.7%	± 1%	± 3%
Temperature [°C]	Resistance [Ohms]	Resistance [Ohms]	Resistance [Ohms]
-20	92.16	922	684
-10	96.09	961	747
0	100	1000	815
10	103.9	1039	886
20	107.79	1078	961
25	109.74	1097	1000
30	111.69	1117	1040
40	115.54	1155	1122
50	119.4	1194	1209
60	123.24	1232	1299
70	127.07	1271	1392
80	130.8	1309	1490
100	138.5	1385	1696
120	146.06	1461	1915
140	153.58	1536	2124
150	157.31	1573	2211
160	161.04	-	-
170	164.76	-	-
180	168.46	-	-
190	172.16	-	-

## 7.10 Electrical fusing

### On the power element

Fuse	Rating	Size	Function
F1	T 3.15 A	5x20 mm	Fuse 230V AC: Pre-fuse main transformer
F2	T 125mA	5x20 mm	Fuse 230V AC: Pre-fuse standby transformer
F3	T 10 A	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 10 A	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

## 8 Initial commissioning

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

- ▶ System status, according to *commissioning checklist* for biomass systems, ➔ 23
- ▶ connect the boiler to the mains power supply.
- ▶ For comfortable, automatic detection of the installed system components (such as heating circuit expansion module, fresh water module, solar module, automatic diverter for suction heads, etc.), run the *Network scan* function, ➔ boiler operation manual, section *Network scan*
- ▶ Carry out *output test heating circuits function*.

(for further information on the functions listed: refer to ➔ operation manual)

- ▶ Instruction of system operator
  - Explanation for system operator responsible for operation, cleaning, maintenance of the boiler and ancillary equipment.
  - In particular, the function of the safety equipment and measures that are necessary to maintain safe operation.

## 9 Annex

### 9.1 Connecting the pellet hose

#### Attention!

- 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.
- Route hose as straight as possible. To avoid sagging, use the SOLARFOCUS item *support shell made of zinc-plated sheet steel*.
- The hose must be attached to the floor at several points to prevent it from 'floating' upwards (in the case of floor-mounting, e.g. suction head).
- Observe maximum hose length and delivery height.

	Max. hose length	Max. conveying height
Suction head to diverter for suction heads	10 m	1.0 m
Diverter for suction heads to boiler	20 m	2.5 m
Total delivery path	30 m	3.5 m



#### **i** Notes on installing hose

- ▶ Always push the end of the hose 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).

#### Note on electr. earthing



- ▶ Cut the required length of hard PVC spiral from the hose (with a cutter).
- ▶ Adjust cable stripper to thickness of metal strand **1** and remove insulation (as for electric cables).
  - ↳ Strand is loose inside the hard PVC spiral so that it can easily be removed.
- ▶ Bend the strand onto the inside of the hose, connect hose.

**Attention!** The strand and the hose connection pipe/connection nozzles must always be in conductive electrical contact (▶ scrape off any existing coating).



**i** Note: Only the suction hose has to be earthed at both ends (no earthing required for return-air hose).

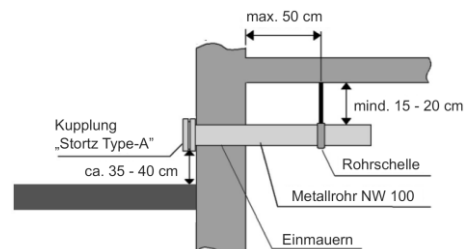
## 9.2 Pellet storage area

### Filling and suction pipe

Couplings of "Storz Type-A", with 100 mm internal diameter are most commonly used as connection couplings for the tanker vehicle. The coupling nozzles fit exactly into the recesses around a sewer pipe of 110 mm external diameter. The gap is sealed with mineral wool, silicone or foam. Easy accessibility to the connections must be ensured. The couplings must then be earthed against electrostatic charging with a cable (at least 4 mm<sup>2</sup>). The filling and suction pipe connections must be clearly labelled as such.

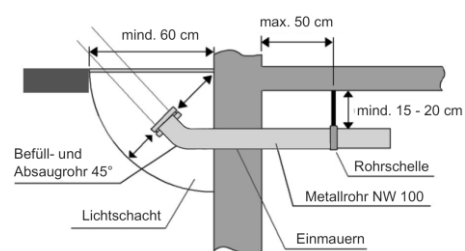
### Installation position of the filling and suction pipe

The pipes must be positioned as high as possible in the storage area, so that the storage area can be completely filled. They must be at least 20 cm from the ceiling (measured from the upper edge of the pipe to the ceiling), to ensure that the pellets do not strike the ceiling during injection (dispersal effect).



### Lines with light well

If the filling pipes are installed in a light well, they must be routed in a straight line out of the light well for connection. A working space of at least 35 cm to 40 cm must be provided at the fill couplings.

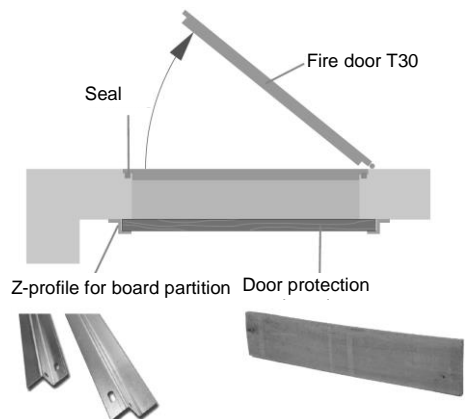


### Access openings in the storage area

In Austria, the fire door must be fire retardant to class T30.

In Germany, no fire prevention requirements apply for storage quantities of up to 6,500 kg.

All doors and access hatches must be of dust-tight design and open outwards. Wooden boards must be installed inside the door to prevent the pellets pressing against the door. This allows the door to be opened when the storage area is full. We recommend that you provide a means of checking the filling level of the store by eye (e.g. by cutting small windows in the wooden boards).



### Position of the pellet storage area and the boiler room

Wood pellets are delivered in silo lorries and blown into the pellet storage area. The silo vehicle should be able to drive up as close as possible to the filling connections / suction pipe. If the pellets are blown into the storage area over a long distance, there is mechanical strain on the pellets during filling, resulting in a certain amount of abrasion.

When filling the storage area, the length of the hose and the firmly installed filling line should not exceed a total length of 30 metres. If longer distances need to be bridged, contact your pellet supplier to clarify what technical solutions he can provide. Every metre of hose length and every bend produce more fine pellet dust during the filling procedure. It may be possible to route the line differently inside the building and considerably reduce the length of the hose required to fill the storage area.



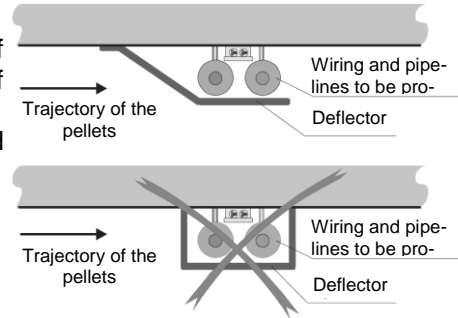
### Impact protection mat

It is essential to fit an abrasion- and tear-proof impact protection mat. This mat must be attached to the ceiling, in front of the filling pipe and at right angles to the plane of pellet injection. The impact protection mat should be 20 to 50 cm away from the opposite wall. When the storage area is filled for the first time, check that the injected pellets hit the impact protection mat. The mat is installed to protect the wall against damage. If there are several filling pipes, further impact protection mats must be installed correspondingly.

The impact protection mat must be large enough that the entire stream of pellets strikes it. Normally, it must be attached so that it swings freely. (Exception: very small storage areas). The impact protection mat must be long enough that the pellets are not blown underneath it and do not push it away. Pieces of carpet or softer plastic/rubber are unsuitable for this purpose and can lead to major damage.

**Piping and electrical installations in the storage area**

Open electrical wiring, fuse boxes and light sources are prohibited in the pellet storage area. Any installations which cannot be avoided must be of explosion-protected (air- and moisture-tight) design. Due to the danger of condensation and burst pipes, there should if possible be no water pipes in the storage area. If there are already cold water pipes in the room, and if it would be too expensive to remove them, they must be insulated to prevent the formation of condensation. Any pipelines in the trajectory of the pellets must be protected appropriately against the flow of pellets (e.g. with deflector plates, wooden panelling).



**Protection against humidity and moisture**

Pellet are highly hygroscopic. This means that they swell strongly and become unusable if they come into contact with water or damp walls. For this reason, the pellet storage area must remain dry throughout the year. If there is a danger of damp walls, use pellet boxes or install appropriate protection against moisture (e.g. back-ventilated wooden panelling on the walls).



**Structural requirements and the required fire resistance classes**

Walls and supporting parts must meet the structural requirements with regard to the weight load imposed by the pellets (bulk weight 650 kg/m<sup>3</sup>). The perimeter walls and the storey ceiling must meet the requirements of the respective fire resistance classes.

In Austria, fire resistance class EI90/REI90/F90 applies. Different rules apply in Germany, depending on the province.

All transitions to the existing brickwork as well as the corners and passages are dust-tight.

The following wall thicknesses and materials have proved effective in practice:

Material	Thickness / finish	Fire resistance class
Building bricks	a least 12 cm, plastered on both sides	EI90/REI90/F90
Hollow block	a least 17 cm, plastered on both sides	EI90/REI90/F90
Concrete	min. 10 cm	EI90/REI90/F90
Wooden structure	12 cm beams with 62 cm spacing, with 3-layer panel facing on both sides	

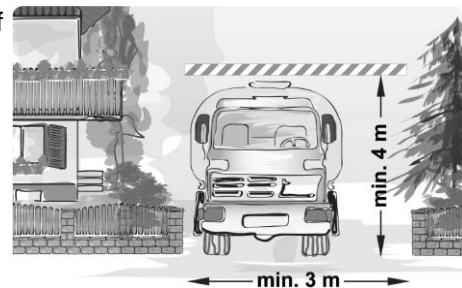
**Warning on storage room door**

- ▶ Attach warning stickers.

**Access to the storage area**

The access route must be suitable for silo vehicles. As a rule, a width of at least 3 m and a clearance height of >4 m is required.

If possible, the storage area should be directly behind an outer wall, as the injection and suction pipes preferably should be routed into the open air. It is also advisable to provide a 230V power socket in the outer wall in the direct vicinity of the fill couplings, for connection of the pellet supplier's suction fan.



**9.3 Chimney connection**

The correct dimensioning of the chimney and the selection of the right chimney system are important preconditions for correct functioning of the heating system. The chimney must route off the gases reliably at all times. The chimney should be moisture-resistant, e.g. made from stainless steel. Adequate insulation of the chimney must be provided.

### 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 chimney calculations performed by qualified personnel. However, as a general rule of thumb:

Rated boiler	Chimney diameter
up to 25 kW	13 cm
up to and incl. 30 kW	13 to 15 cm
up to and incl. 40 kW	15 to 18 cm
up to and incl. 60 kW	20 cm

**Draught requirement for boiler: 5 Pa**

### Important points regarding the chimney connector

- The chimney must be resistant to moisture (fire bricks or stainless steel)
- Ensure that the chimney is adequately insulated.
- The cross-section should correspond to the boiler flue gas pipe diameter. Consult your chimney sweep for the corresponding calculation.
- The effective height should be minimum 6.5 m.
- The flue gas pipe must rise and be insulated; avoid unnecessary bends; keep the flue gas pipe as short as possible.
- Draught regulator required! We recommend the use of an explosion flap.
- Maximum deviation between the diameter of the flue gas pipe and the diameter of the existing flue is one size larger or smaller (always consult the manufacturer)

### Supply and exhaust air

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

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

The following applies for Germany (specimen firing ordinance):

- For heating appliances with a nominal output of up to 35 kW, a combustion air opening of at least 150 cm<sup>2</sup> or 2 x 75 cm<sup>2</sup> routed directly into the open air must be provided.
- Alternatively, a door/window leading outside and a room content of at least 4 m<sup>3</sup>/kW nominal heat output are suitable. If the installation room 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 cm<sup>2</sup>. From 50 kW upwards, for aeration and ventilation, provide a minimum free cross-section of 150 cm<sup>2</sup> for each, plus 2 cm<sup>2</sup> per kW in excess of 50 kW.

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

## 9.4 Recommendations of the EU energy efficiency directive

### Use of a buffer tank

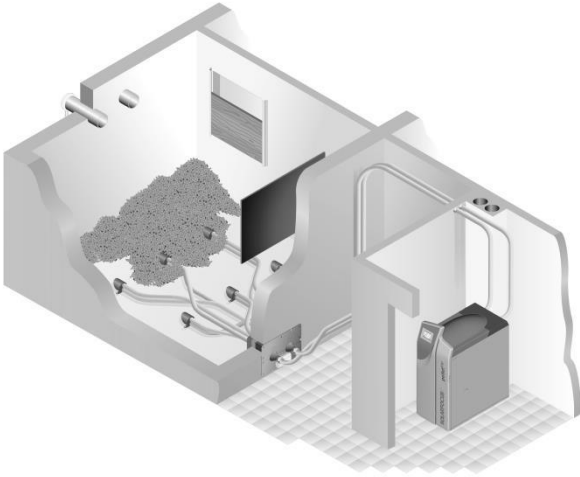
- As the most complete combustion of wood pellets is possible only when the boiler is in normal operation and as greater losses and higher emissions occur during the warm-up and burn-out phases, the use of a buffer tank is recommended.
- This tank stores the water heated by the boiler, allowing the connected devices (e.g. heating circuit, DHW tank, fresh water module, etc.) to access it as required.
- This ensures sufficiently long, uninterrupted combustion periods for the boiler.

### Use of high-efficiency heating pumps

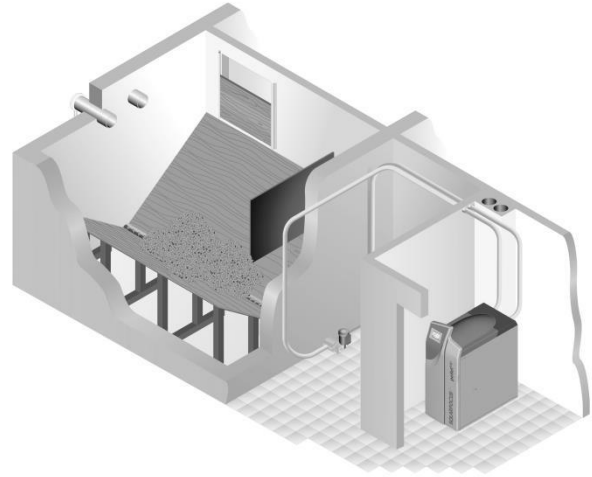
- When using external heating pumps (e.g. return flow boosting, heating circuit pumps, etc.), high-efficiency pumps with energy efficiency class A should be used.
- Savings potential up to 80% in drive energy (compared to conventional heating pumps) with identical feed results.

**i** Manufacturer's requirements for high-efficiency heat pumps: > The heater water must meet the specifications of standard VDI 2035.

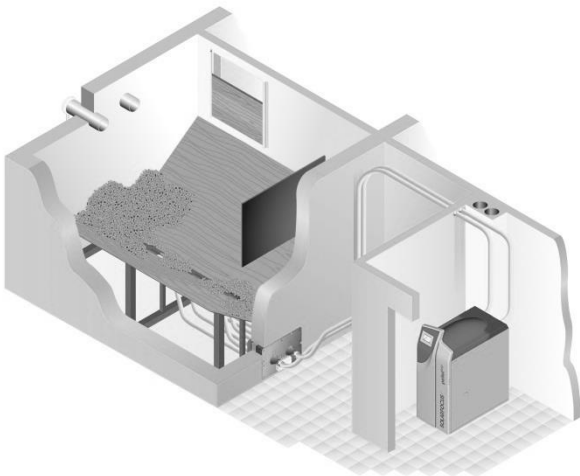
## 9.5 Storeroom and conveying system - Overview



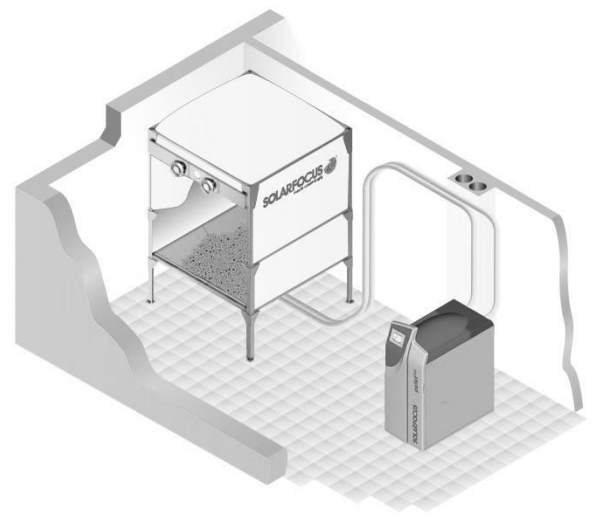
Suction system with suction heads



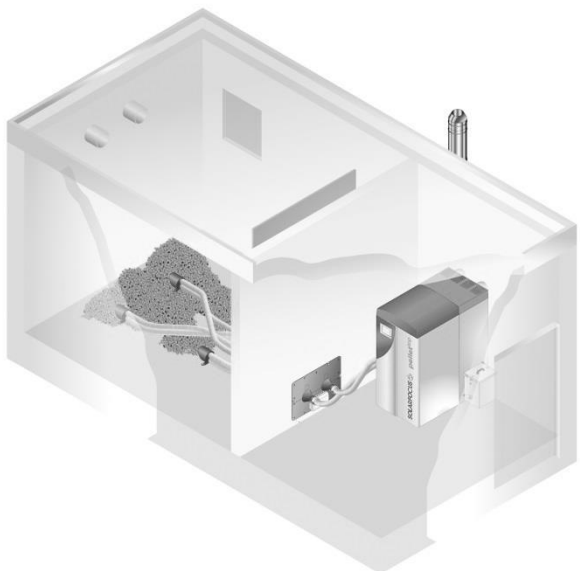
Suction system with suction auger



Suction system with suction heads and sloping floor

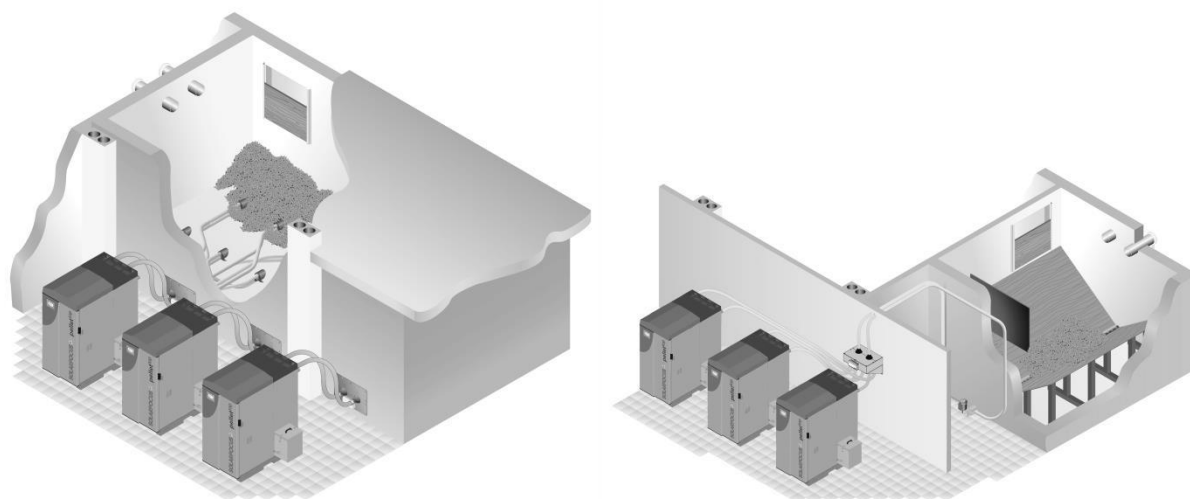


Pellet box with suction system



Pellet heating container





Boiler cascade solution with different storage / conveying system

## 9.6 Commissioning log

**SOLARFOCUS GmbH, Werkstraße 1, A-4451 St.Ulrich/Steyr**

e-mail: [office@solarfocus.at](mailto:office@solarfocus.at)  
web: [www.solarfocus.com](http://www.solarfocus.com)

Tel.: +43 (0) 7252 / 50 002 - 0  
Fax: +43 (0) 7252 / 50 002 - 10



### Commissioning log for biomass heating systems

DR-0074-EN / v15-202102

> Return by fax +43 7252 / 50002-953 or by e-mail [service@solarfocus.at](mailto:service@solarfocus.at)



#### System operator

First name / surname .....  
Street .....  
Postcode / city .....  
Phone .....  
Email .....

#### Service representative

Company .....  
Street .....  
Postcode / city .....  
Phone .....  
Email .....

#### 1. Heating system data

##### a) Boiler

Serial number: .....

- ecotop<sup>zero</sup>**       15    20    24  
**ecotop<sup>light</sup>**       15    20    24  
**octo<sup>plus</sup>**           10    15    15.5    22  
**pellet<sup>elegance</sup>**       10    15    20    24  
**pellet<sup>top</sup>**             35    45    49    70  
**thermi<sup>nator</sup> II touch**    18    22    27    30    36  
                                40    45    49    60  
**maxi<sup>imus</sup>**             150    200    250    300

##### b) Pellet storage

- Storage room             Pellet box (fabric silo)  
 Intermediate store 110    Intermediate store 250  
 Underground tank

##### c) Pellet transport

- Auger extraction           Downpipe  
 Vacuum output with ...  
 Individual suction head    Suction auger  
 Automatic diverter for suction heads, with  
      max. 6 heads    max. 12 heads  
 Manual diverter for suction heads  
 Pellets-Distribution Box    Mole

##### d) Wood chip transport

- Direct extraction           Downpipe  
 Intermediate auger

##### e) Hydraulic installation acc. to...

Schematic No. ....

Schematic acc. to supplementary sheet

##### f) Control

- Heating circuit             DHW tank  
 Buffer tank                 Circulation control  
 Solar system

##### g) Other

- Flue gas pipe connection:  Upwards    Rearwards  
 Condensing module  
 Electrostatic dust collector  
 Room-sealed operation  
 Central control

**2. Commissioning: Activities, controls**

- 1. Checked for transport damage
- 2. Boiler assembly: Tightness, operating pressure, return flow boosting mounted
- 3. Assembly of the delivery system: Storage room, impact protection mat, ...
- 4. Mounting of the pellet hoses: correct direction, earthing, fire protection collars
- 5. Thermal overload protection installed
- 6. Flue gas pipe installation: Tightness, insulation, chimney draught stabiliser installed
- 7. Electrical supply line: Power connection is made directly  or by means of a Schuko plug
- 8. System connected to potential equalisation: Heating pipework system, electronic module, filling/intake pipe, extraction
- 9. Diverter for suction heads connected to potential equalisation
- 10. Direction of rotation: ID fan, mixer and drive motors, pumps
- 11. Sensor positioning: Flow, return, DHW tank, buffer tank
- 12. DHW tank 750 and 1000 l: Parasitic current anode connected and functional
- 13. Test operation: Log wood, automatic log wood function, automatic pellet or wood chip function
- 14. Chimney draught: cold = ..... hPa, hot = ..... hPa
- 15. Pellet or wood chip quality OK: Dust content, humidity, ...
- 16. Heating water - measured pH value: .....
- 17. Boiler and cleaning equipment as well as all necessary sensors supplied
- 18. Set parameters according to prog. Version ..... documented
- 19. Menus, choice of fuel and fire lighting explained (in accordance with the operation manual)
- 20. Cleaning intervals and activities declared (according to operation manual)
- 21. Walkthrough for pellet storage area according to VDI 3464 has taken place
- 22. Notes on safety controls (at the factory - warranty condition)
- 23. Error messages and troubleshooting measures explained
- 24. Note on extended warranty / maintenance contract is completed
- 25. Photo of finished installation, customer allows use as reference
- 26. Work report and invoice via e-mail requested

Here any additions to individual items lead

No .....  
 No .....  
 No .....  
 No .....  
 No .....  
 No .....  
 No .....  
 No .....

**3. Status, conclusion**

- The system was shut down due to safety faults. The system may be put into operation only after the faults have been fully rectified. The listed deficiencies are resolved...  
 by (date) .....
- by the heating engineer  by customer service  
 by the system operator
- The system operator / heating engineer hereby confirms the professional installation and functionality of the system; local installation regulations have been complied with by the system installer.
- The system operator has been instructed in terms of the operation, mode of operation, as well as maintenance and cleaning of the biomass system, and the operation manual / commissioning form was handed over to him.
- Commissioning carried out on .....
- Signature of qualified personnel  
 .....
- Signature of system operator  
 .....

The goods remain the property of SOLARFOCUS GmbH until full payment. Only our terms and conditions apply – available on the internet. The place of jurisdiction for disputes is 4400 Steyr. The domestic jurisdiction in Austria is agreed.

## 9.7 Customer service order form



DR-0075-EN / v15-201707

### Customer service order form for biomass heating

Return by Fax +43 7252 / 50002-953 or by e-mail [service@solarfocus.at](mailto:service@solarfocus.at)

#### System operator

First name / surname .....

Street .....

Postcode / city .....

Telephone .....

Email .....

Is the system operator present on the date  yes  no

#### Service representative

Company.....

Street .....

Postcode / city .....

Telephone .....

Email .....

#### The form sender is the

System operator  Heating engineer  Wholesaler

#### Desired date

1) ..... 2) .....

#### SOLARFOCUS representative responsible

.....

#### Requirement type

Commissioning  Customer service  Recall  Other

#### Invoice to

System operator  Heating engineer  Wholesaler

#### Wholesaler responsible / location

.....

#### Heating system data

##### Boiler

Serial number.....

Revision number.....

octo<sup>plus</sup>

10  15  15.5  22

pellet<sup>elegance</sup>

10  15  20  24

pellet<sup>top</sup>

15  25  35  45  49

70

thermi<sup>nator II</sup>

18  22  27  30  36

40  49  60

##### Pellet transport

Pellet supply via auger

Downpipe system

Suction system with...

Individual suction head

Extraction auger for vacuum system

Automatic diverter for suction heads,  max. 6 heads,  max. 12 heads

Diverter for suction heads - manual

Pellet distribution box

Mole

##### Pellet storage

Storage area

Pellet box (fabric tank)

Intermediate store  110  250

Underground tank

##### Wood chips transport

Direct extraction

Downpipe system

Intermediate auger

##### Hydraulic installation acc. to

Schematic acc. to supplementary sheet

Schematic No. ....

##### Controller

Heating circuit

Domestic hot water tank

Buffer tank

Recirculation control

Solar system

##### Other

Room sealed appliance (RSA)

Central control

Description (request, service order, ...)

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Date, Signature (Form Sender)

With my signature, I confirm that the information provided is correct and that installation of the system (hydraulic & electrical) will be completed by the date set for commissioning, incl. an adequate supply of fuel. Waiting times and/or additional assignments will be charged separately.

To be completed by SOLARFOCUS

Date confirmed for (date/time): ..... COMM ordered acc. to customer service order form ..... Paid  Yes  No ..... Processed by SOLARFOCUS ..... Service engineer .....

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### Austria

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web: [www.solarfocus.at](http://www.solarfocus.at)

Fax: +43 (0) 7252 / 50 002 - 10

### Germany

**SOLARFOCUS GmbH, Marie-Curie-Str. 14-16, D-64653 Lorsch**

e-mail: [office@solarfocus.de](mailto:office@solarfocus.de)

Tel.: +49 (0) 6251 / 13 665 - 00

web: [www.solarfocus.de](http://www.solarfocus.de)

Fax: +49 (0) 6251 / 13 665 - 50