Compact-Size Automatic Sub-Pressure Wood Pellet Boiler

B and H versions

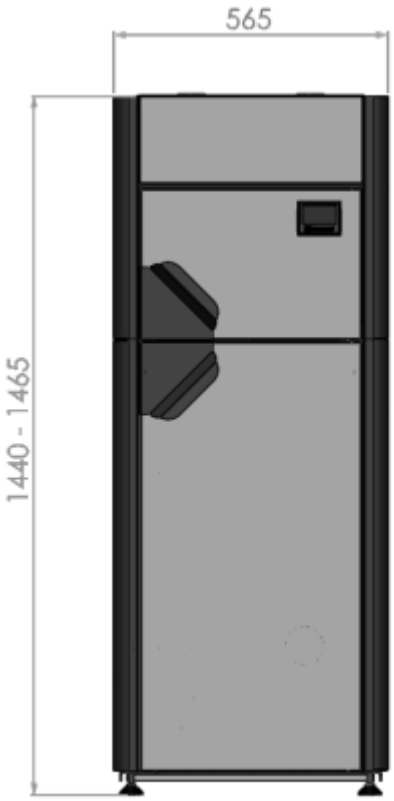
Directions

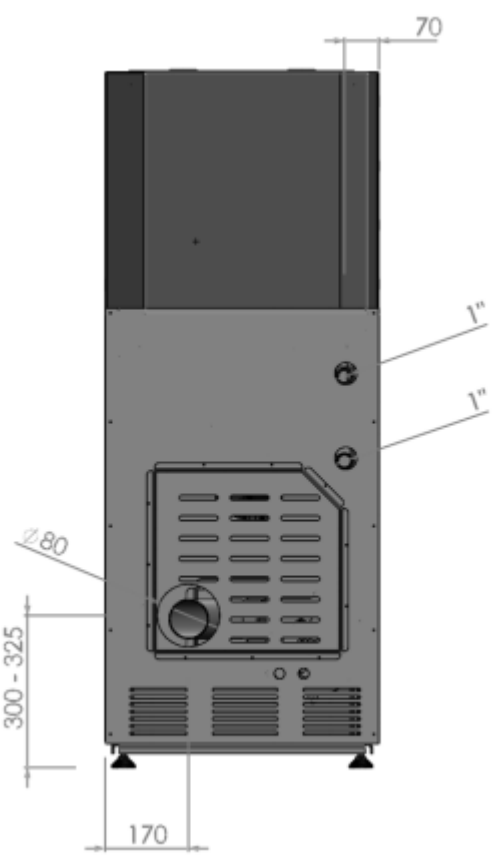
for usage and maintenance

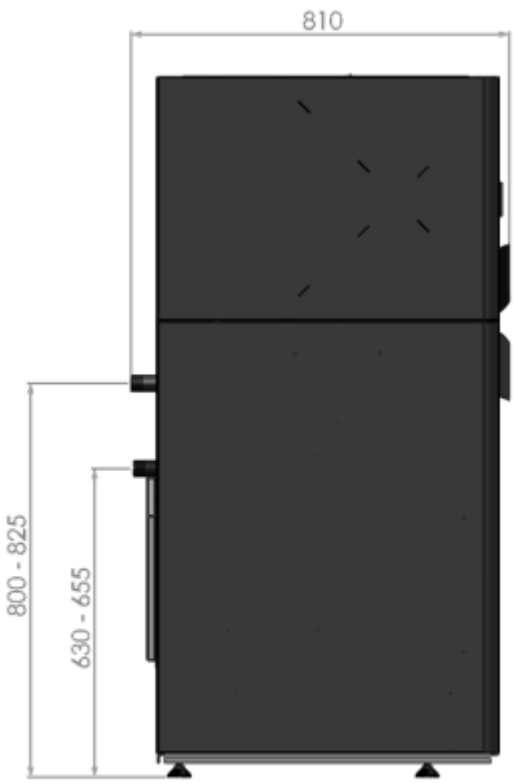
Contents

1 Boiler data

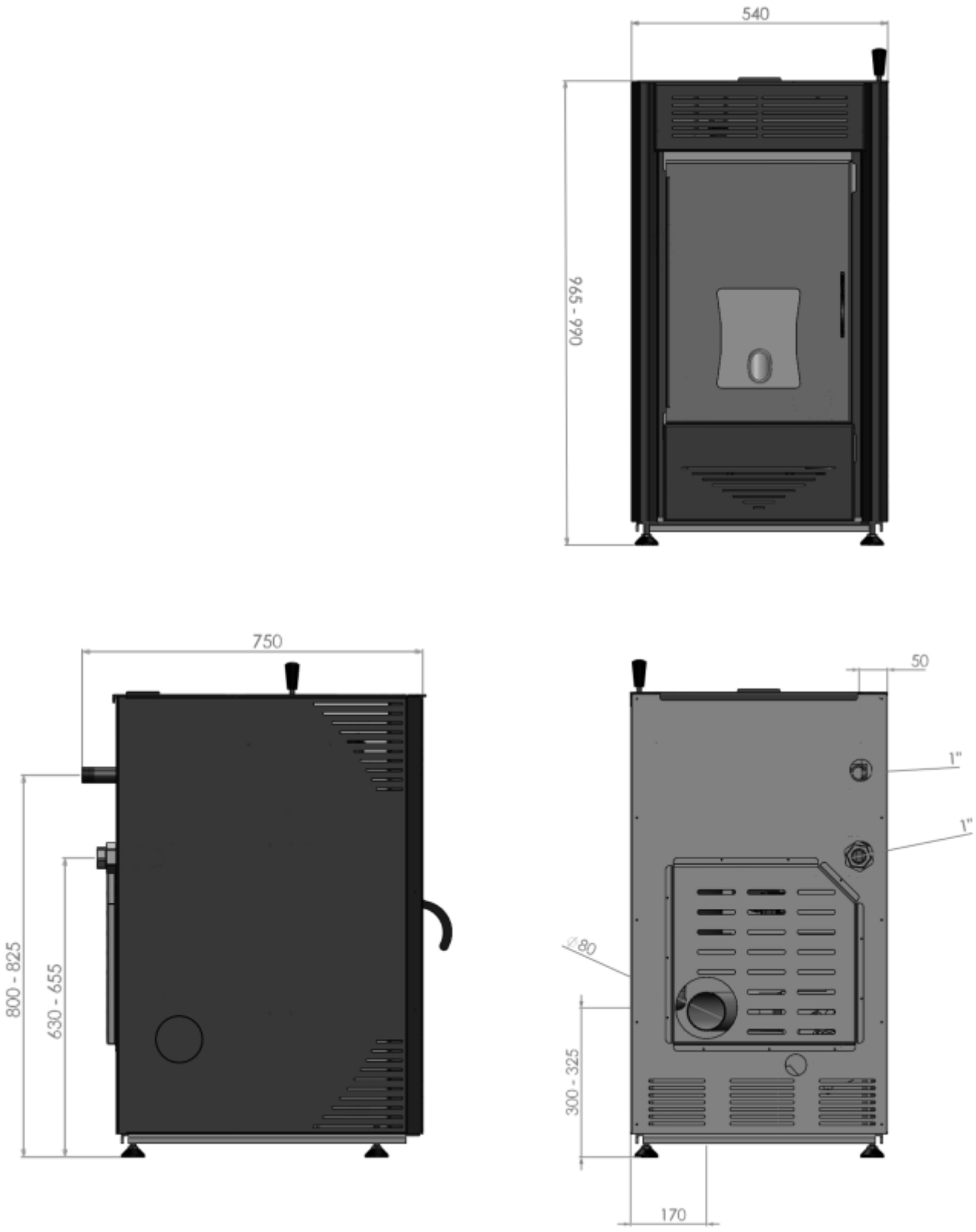
TOBY 18 is made in two different versions:







TOBY 18 B. It is a standard boiler version for placing in boiler rooms.

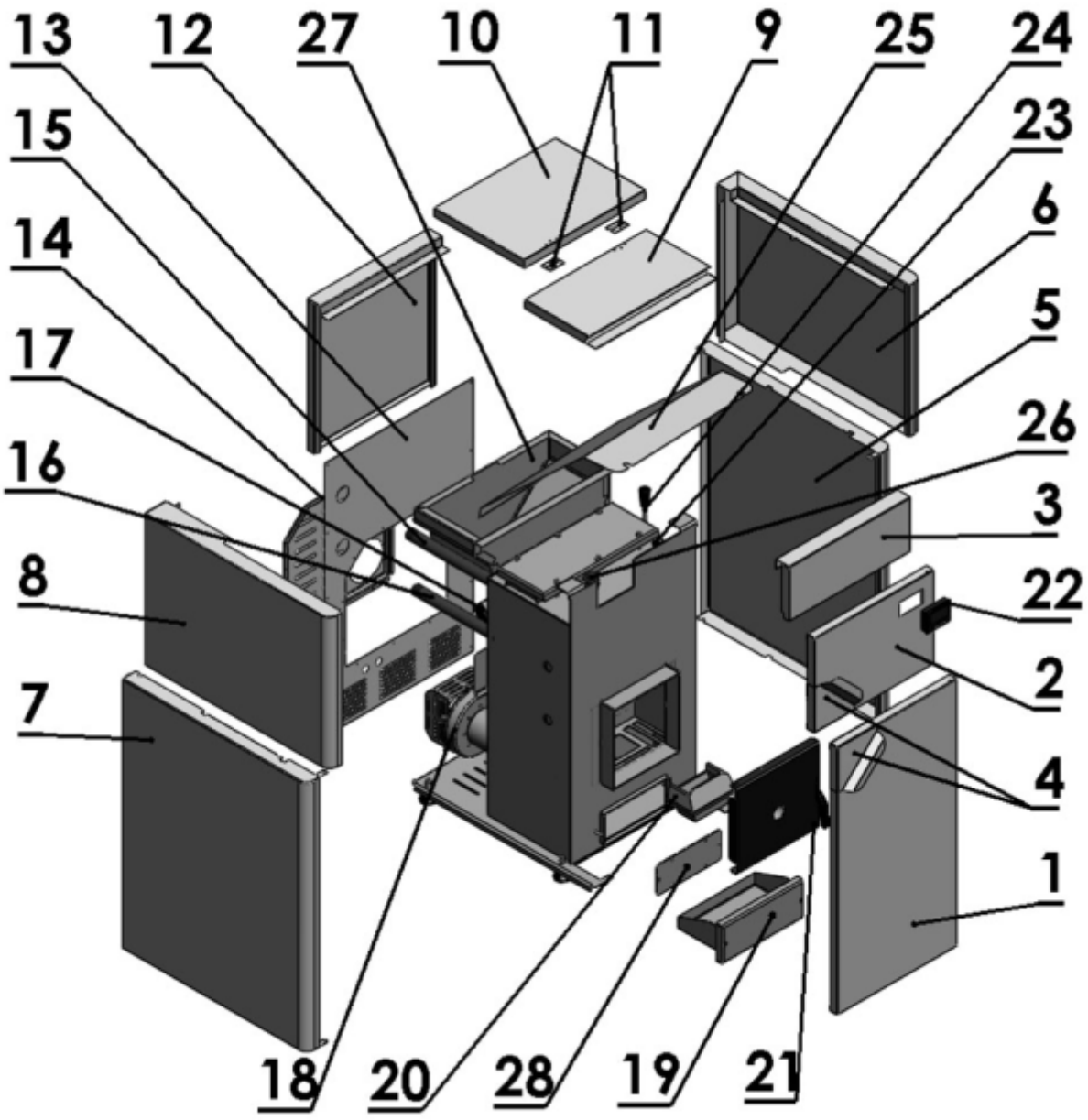


TOBY 18 H. It is a version to put into apartment or balcony.

1.1 Boiler dimensions

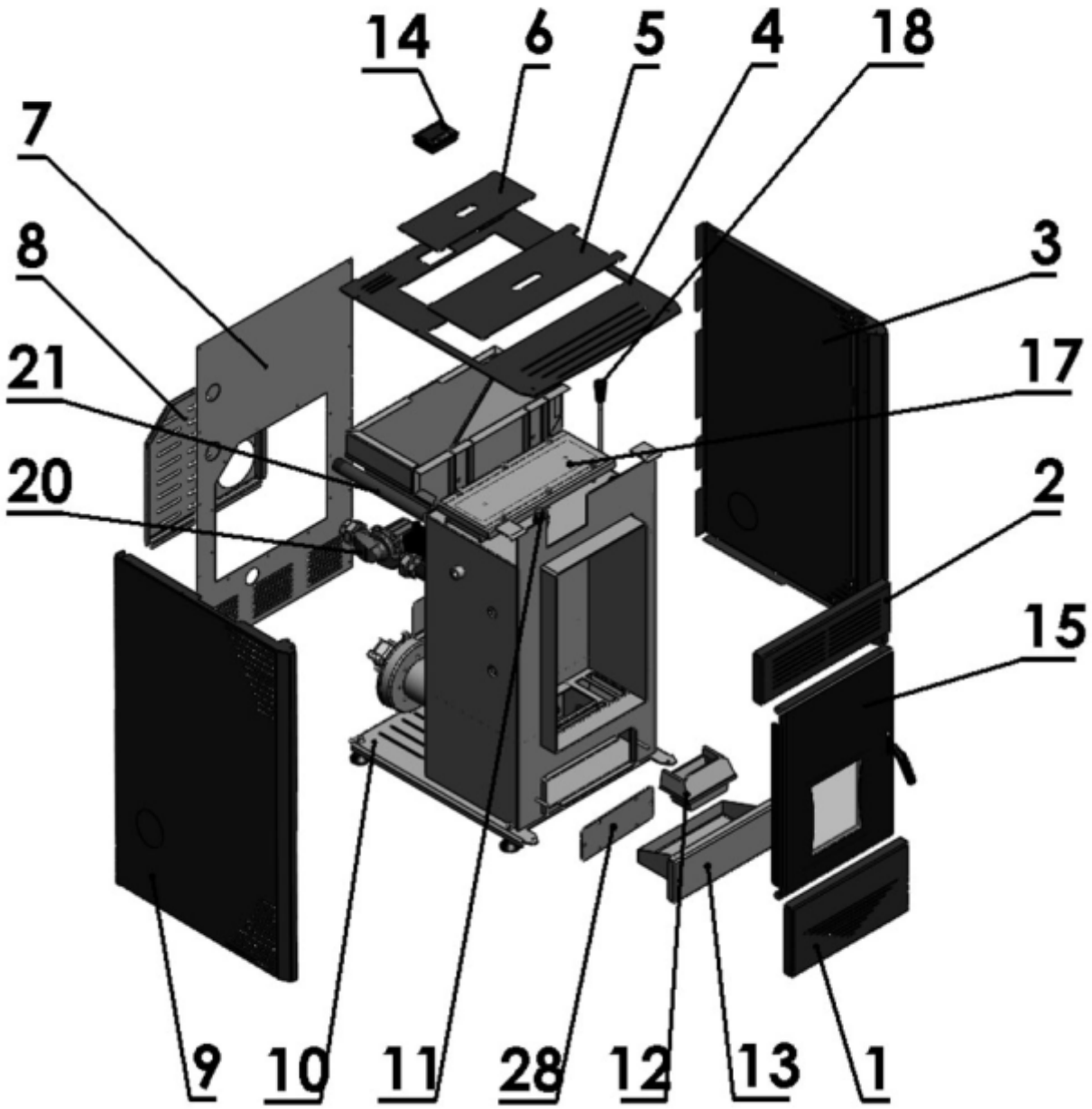
Tip kotla	Weight	Width	Height	Depth	Flue exit height
TOBY 18 B	180 kg	565 mm	1440-1465 mm	810 mm	300-325 mm
TOBY 18 H	165 kg	540 mm	965-990 mm	750 mm	300-325 mm

1.2 Boiler components TOBY 18 B

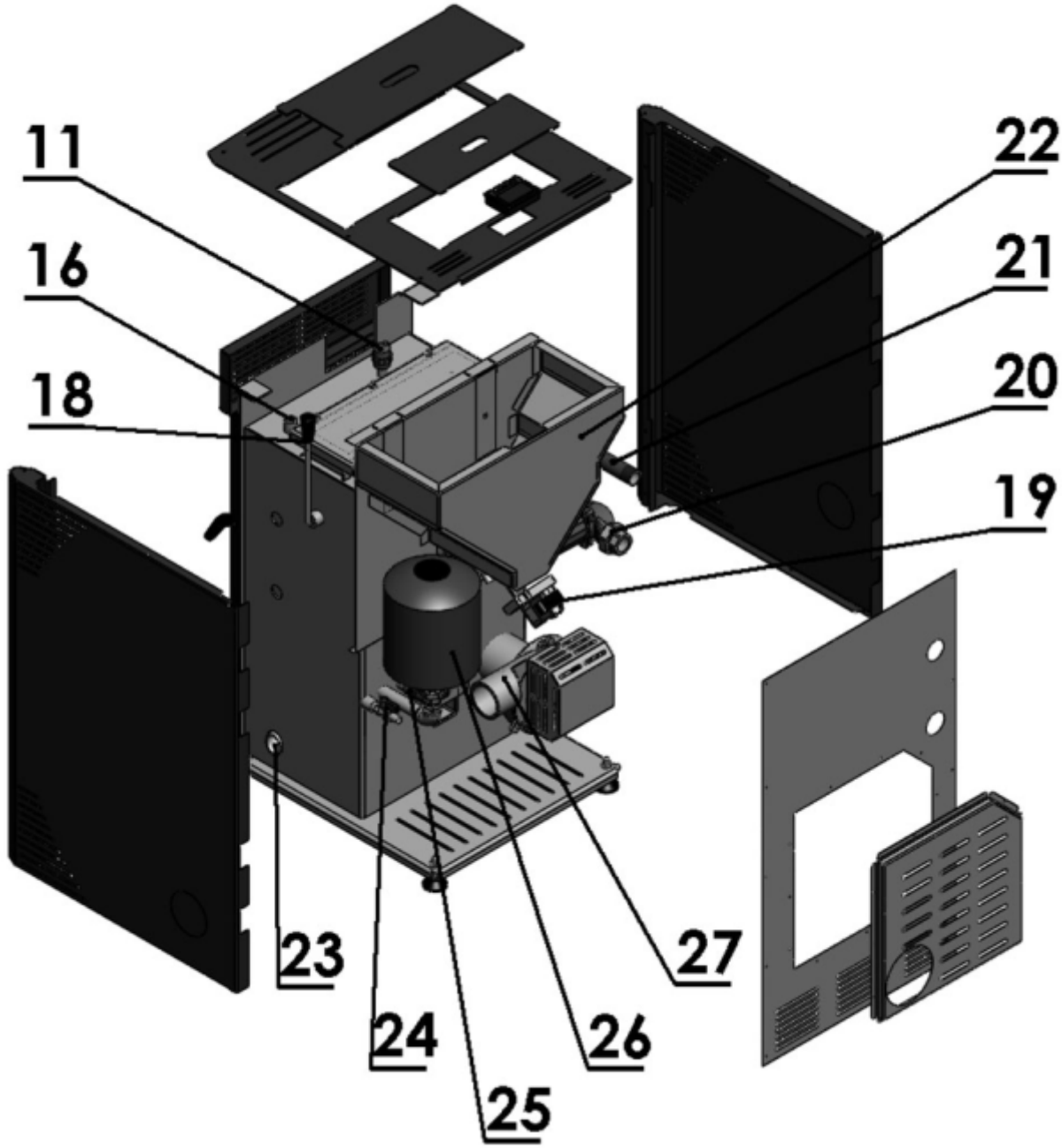


1. Lower front housing plate 2. Middle front housing plate 3. Upper front housing plate 4. Boiler handle 5. Lower right-hand-side housing plate 6. Upper right-hand-side housing plate 7. Lower left-hand-side housing plate 8. Upper leftt-hand-side housing plate 9. Upper cover (to feed pellets) 10. Upper cover (fixed part) 11. Hinges 12. Upper back housing plate 13. Lower back housing plate 14. Back housing plate - cover for the opening 15. Flow line 16. Return line 17. Screw-feeder electro-motor 18. Boiler fan 19. Cover for the lower opening 20. Burner pot (cast-iron) 21. Doors 22. Display 23. Water temperature probe 24. Tubulators handle (move to clean the tubulators) 25. Pellet storage inclination 26. Automatic air vent 27. Pellet storage

1.3 Delovi kotla TOBY 18 H



1. Lower front housing plate 2. Upper front housing plate 3. Right - hand-side housing plate 4. Upper housing plate 5. Bigger cover 6. Lower cover 7. Back-side cover 8. Back housing plate - cover for the opening 9. Left - hand-side housing plate 10. Boiler base 11. Automatic air vent 12. Burner pot 13.Cover with an ash-tray 14. Display 15. Doors 16. Water temperature probe 17. Upper opening for cleaning 18. Tubulators handle (move to clean the tubulators)



19. Screw-feeder electro-motor 20. Circulation pump 21. Flow and return line 22. Pellet storage 23. Secondary air inlet 24. Tap valve (to fill and drain) 25. Safety valve 26. Expansion vessel 27. Boiler fan

1.4 Technical data chart according to EN 303-5

Model	TOBY 18 B	TOBY 18 H
Nominal power TOBY	12 KW	18 KW
Power range	5 KW - 18 KW	5 - 18 KW
Weight	180 kg	165 kg
Flow (inch)	1”	1”
Return (inch)	1/2"	1/2"
Flue opening ⌀	80 mm	80 mm
Flue gas temperature (at nominal power)	150 C	150 C
Pellet storage size	80 kg	15 kg
Pellet consumption at min power	min 0.8 kg/h	min 0.8 kg/h
Pellet consumption at max power	max 3.6 kg/h	max 3.6 kg/h
Water content	40 lit	40 lit
Electrical network	220 V 50 Hz	220 V 50 Hz
Efficiency	92 %	92 %
Boiler class	5	5

1.5 On Product

TOBY 18 represents one of the most sophisticated solutions for automatic combustion of wood pellets to be found on the market.

It is completely adapted to burn wood pellet as a primary fuel, achieving maximum efficiency level up to 94% and a very low exit temperature for flue gases (below 160°C).

Ignition, start-up and turning-off are fully automatized. Combustion control is optimized using algorithms such as ‘modulation’ which automatically decreases pellet dose as the difference between desired and reached temperature is decreasing.

Working principle of this boiler is based on the “sub-pressure” of the heating chamber. The chamber is completely air-proof so that air flow in the boiler is fully controlled by the exhausting fan mounted on the back. Boiler regulation completely controls the quantity of the air inside the heating chamber: optimum combustion comes as a result.

Boiler chamber is made by welding 5mm thick steel plates (all surfaces in touch with fire). Other parts are made of 4mm steel.

The efficiency of this boiler is much higher than that of the conventional boilers with natural air flow.

Pellets are fed to boiler via internal transporter screw inside the storage tank. From there pellets are fed over to heating chamber where they fall free to the designated melting area (the ’actual’ embedded burner of the boiler). Storage and melting area are physically divided. There is a safety thermostat to prevent back-fire. There is also a pressure sensor inside the heating chamber - when the boiler door is open, this sensor will react and stop the feeding process. There is also an anti-explosion safety door on the side of the heating chamber.

Maintenance and cleaning are reduced to a minimum compared to all solid fuel boilers – only once a week, if not less than that, with a premium quality pellet and proper use (please advise chapter on Maintenance and cleaning and follow those rules)

2 Directions for storage and transport

2.1 Delivery form

Boiler is shipped with plastic protection sleeve on a pallet.

 Boiler must be in its upright position all the time.

 The rotation of the boiler during the shipment or installation represents a serious risk and can lead to damaging the boiler.

 It is forbidden to place one boiler onto another.

 The boiler can be stored only in closed rooms with no atmospheric influence. The humidity in the storing room also must not exceed the critical value of 80%, so as not to create any condensate. The temperature of the storing room must be in the range from 0 ˚C to 40 ˚C.

 When unpacking the boiler, you must check whether the paint on the boiler coating has been scratched somewhere and whether all parts of the boiler stand in their proper position.

2.2 Delivery range

 Together with the boiler, also the following parts are supplied:

Cleaning kit with an ash tray

Warranty paper and this boiler manual

Boiler regulation (built-in already)

Boiler cables to connect to power supply and circulation pump

18H version ONLY: Tap valve, air vent, expansion vessel, circulation pump

 Along the boiler following parts are OBLIGATORY but NOT INCLUDED in boiler delivery:

Thermo-manometer and the safety group

Mixing valve

Boiler valves etc.

3 Introductory remarks

 The end user must follow the guidelines from this manual all the time. In contrary case the warranty won't be acknowledged.

 Boiler chamber is tested on test pressure of 6 bar in our own facility.

 Pay strict attention that boiler valves are always open while boiler in use.

 Don't forget to do a mechanical reset of the circulation pump at start of every heating season.

 Clean the boiler on a regular base .

 An expert should be entrusted with the mounting of the heating and the initial operation. This must be a person who will take over the responsibility and guarantee the correct operation of the boiler and of the complete central heating system. In the case of an incorrectly planned system with manifesting deficiencies caused by the respective person's incorrect installation of the system, which can again lead to an incorrect operation of the boiler, the complete liability for the material damage and potential new costs arising in relation to it is borne exclusively by the person who was entrusted with the mounting of the central heating system, and not by the boiler manufacturer, sales representative or seller.

4 Safety remarks

 While in use, some parts of the boiler may be hot. Don't touch the boiler without appropriate hand protection against heat.

 If some parts of the boiler occur to be damaged it is strictly forbidden to continue using the boiler.

 Do not touch electrical wires with wet hands

 Electric connections must be made according to 73/23 CEE i 93/98 CEE and properly dimensioned.

 Use of the temperature relief valve is OBLIGATORY with this boiler to ensure safety in heating systems using solid fuels.

5 Boiler placement

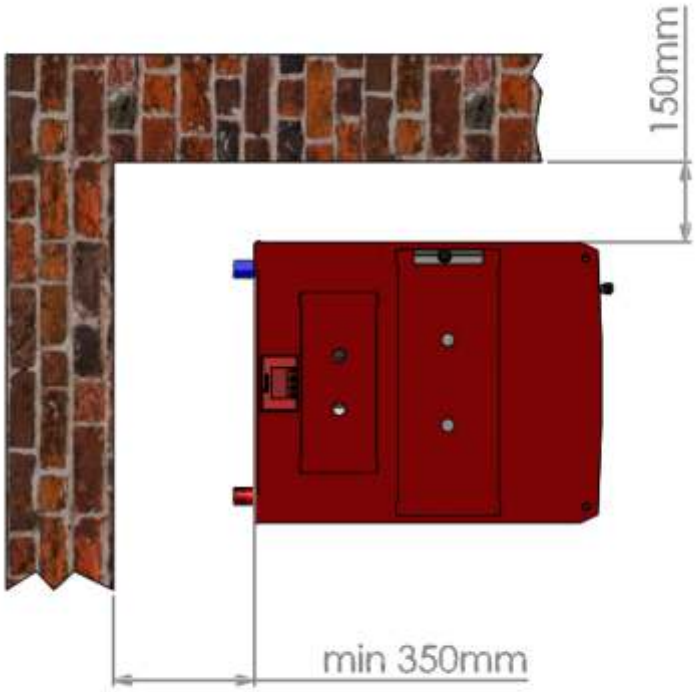
5.1 Boiler room

 Boiler room must posess ventilation windows. The area for necessary ventilation surface is defined like this:

$$A(cm^2) = 6.02P(KW)$$

where P is nominal boiler power KW.

 TOBY was designed to occupy minimum space. Connections for flue and water lines are on lateral sides of the boiler allowing the boiler to be leaned on wall almost completely.



Front side and lateral side(s) should have free access. In case that flue gas exit can be put directly through the wall on the right-hand side, you can lean the boiler completely to the back and/or to the right. Otherwise, follow the measures depicted in the drawing, since additional space is required to place the tube for flue gases behind the boiler.

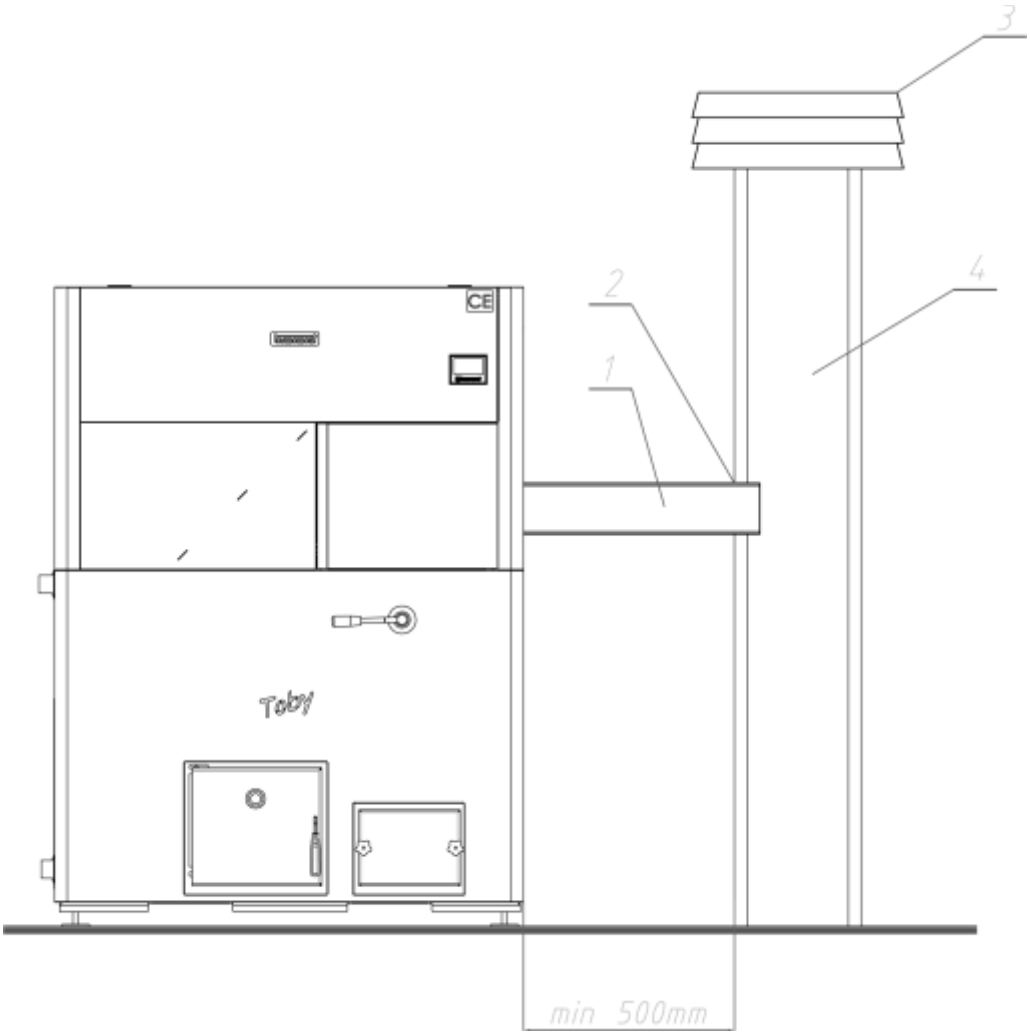
Boiler base must be stable and made of fireproof material.

5.2 Chimney

Sub-pressure pellet boilers require pressure difference of at least 10 Pa in order to ensure safe and stable combustion process.

This boiler requires a vertical connection for the flue gases in accordance with European norms.

It is essential to regularly clean the chimney, at least few times a year.



Legend: 1) Chimney 2) Gasket 3) Fireproof protection cap 4) Chimney diameter not greater than 200x200mm and not higher than 5-6m

5.3 Filling the system with water

Filling the system with water is to be done using the tap valve connection of the boiler.

When filling the system with water take care that no air remains in the boiler.

The filling process is done when no air is coming out through automatic air vent and pressure gauge is showing the value between 1,5 and 2,5 bar (closed systems). Air vent is to be set at the highest point of the (closed) central heating system. If the pressure is below 1,5 bar the filling process must be repeated.

For open systems, working pressure depends on the overall height of the system and the open expansion vessel (1 bar for each 10 m is an estimate).

After the filling process is done, it is obligatory to close the drain tap valve, close the water supply to the water-filling pipe and detach the water-filling pipe.

5.4 Connecting the boiler with a closed central heating system

The use of a safety valve is obligatory (with a 2-3 bar threshold, depending on the power of the

boiler) and it must be mounted near the boiler.

 It is essential to have a thermometer and a manometer installed to the system.

 It is recommended to install an anticondensation valve on the return line. (3-way mixing valve).

 It is also recommended to mount a filth catcher on the return line.

Depending on the position of the boiler in relation to the pipe-work and the radiators – the installation can be carried out using one of two methods.

5.4.1 Installation method 1

If the boiler is positioned on the same level or higher than the pipe-work and radiators.

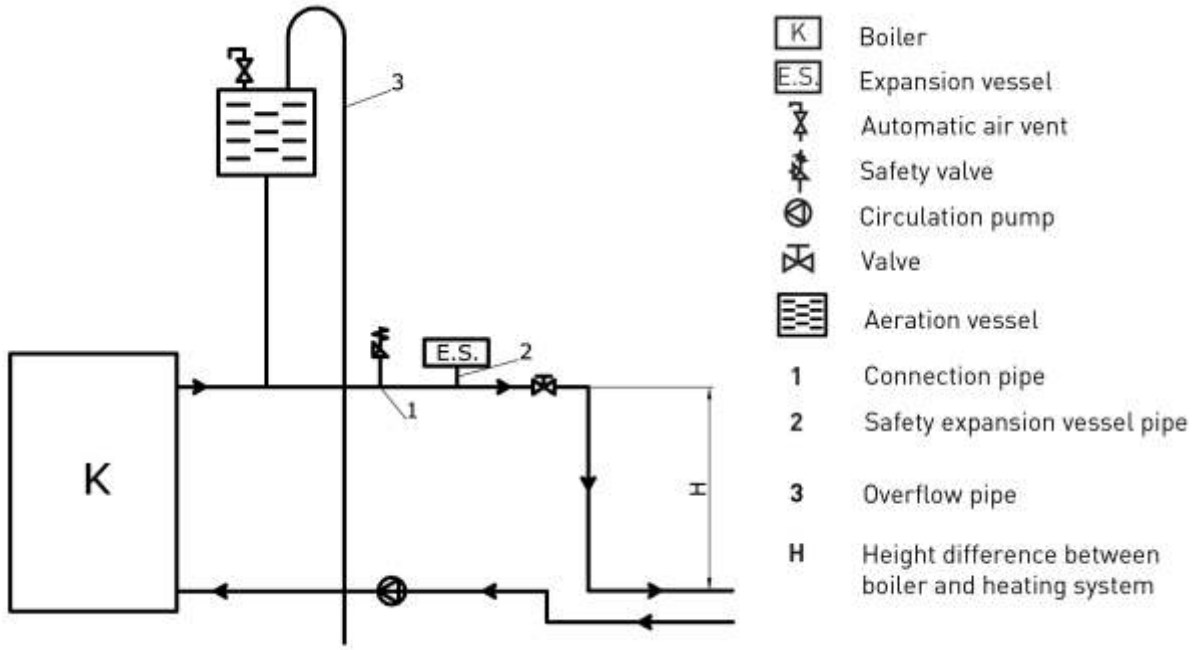
Each of the following items of equipment shall be fitted along the flow line:

1. Automatic air vent.
2. Safety valve (spring valve is recommended).
3. Expansion vessel.
4. Boiler valve.

 The safety pressure valve must always be positioned and mounted close to the boiler. It must be easily identifiable and allow for easy access. The safety pressure valve must be set to a nominal pressure of 2.5 bar. The valve must open and operate smoothly at 2.5 bar. Diameter for the aperture at the seat of the valve must be at least 15mm. Connecting pipework to the boiler must be as short as possible. Welds, joints or any possible blockage to this pipe-work must be prevented. Bends in the pipe-work should be avoided if possible. Unavoidable bends should be of a diameter r>3D (D = radius of curvature) and less than 90 ˚C .

 The closed expansion vessel shall be fitted close to the boiler. Connecting pipework should be as short as possible. Fit the expansion vessel in horizontal alignment to the pipe to ensure equal distribution of pressure. The volume of the expansion vessel is determined by the output/capacity of the boiler. A ratio of 1 kW:1 litre should be used. The safety pressure valve and the expansion vessel should be fitted in close proximity to each other, in the following order: expansion vessel closest to the boiler, followed by the safety pressure valve.

 In the event of power failure and the boiler fails to operate correctly – any sudden increase of pressure will be controlled first by the expansion vessel, on any further increase in pressure the safety pressure valve will open.



5.4.2 Installation method 2

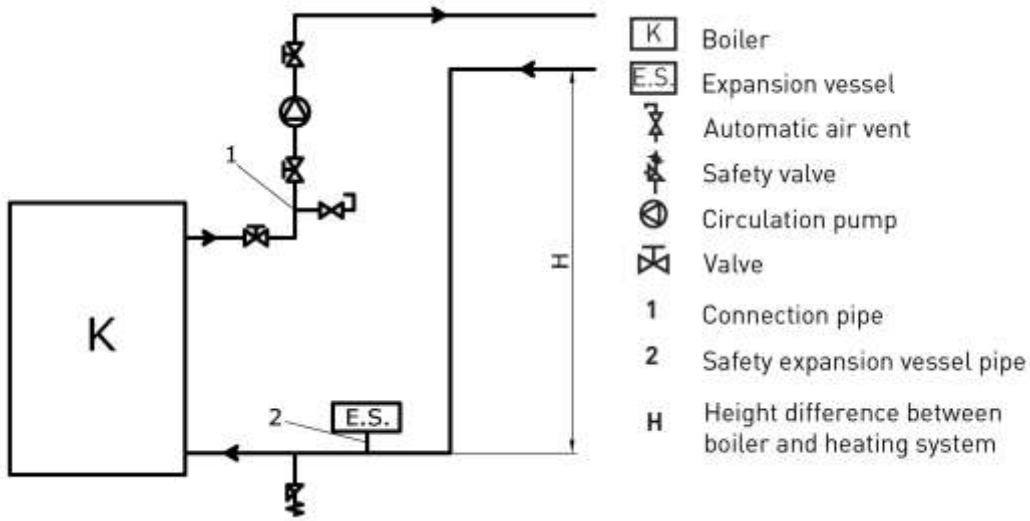
To be used in the case of the boiler being positioned and installed at a lower level than the installed pipework and radiators.

As shown on Figure, following elements are connected along the FLOW:

1. Automatic air vent
2. Safety valve
3. Circulation pump (separated with ball valves on each side so that it can be easily replaced if necessary).

Expansion vessel is on the RETURN line in this case.

Expansion vessel and safety valve are connected following the rules described in the previous chapters. For safe operation info on additional equipment such as expansion vessel and safety valve please refer to manuals delivered with those products.



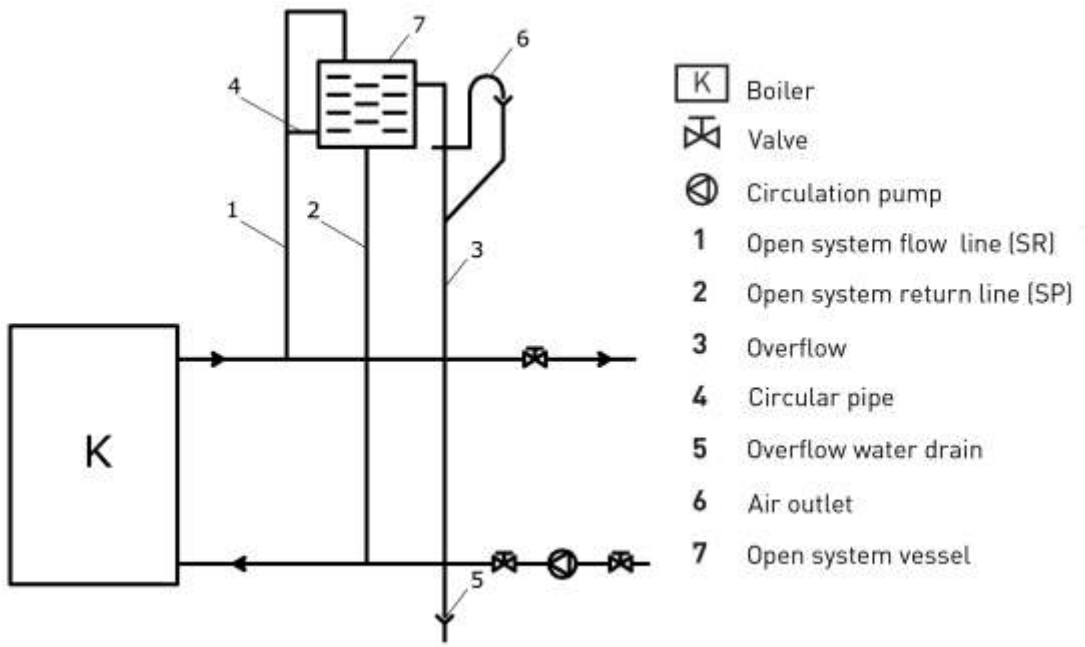
5.5 Use of temperature relief valve with obligatory filling

The temperature relief valve (shown below) must be present in the system. The valve must be installed by a qualified technician in accordance with the instructions given in the manual from the producer of the valve.

We recommend the CALEFFI 544501 valve depicted below.

5.6 Fitting the boiler to an open central heating system.

The connecting scheme of an open central heating system is depicted on the figure.



When using open system on the FLOW line following elements are to be installed: safety pipework for the open expansion vessel, boiler valve. On the RETURN line come safety return line of the open expansion vessel, boiler valve and circulation pump valves.

Open expansion vessel is connected to the hot-water distribution pipes (FLOW and RETURN) as shown on Figure – with an additional OVERFLOW pipe output plus CIRCULATION pipe (to prevent freeze during winter months).

Please note that no additional items shall be connected to the open expansion vessel – especially not valves.

The size of expansion vessel is deducted from the following equation:

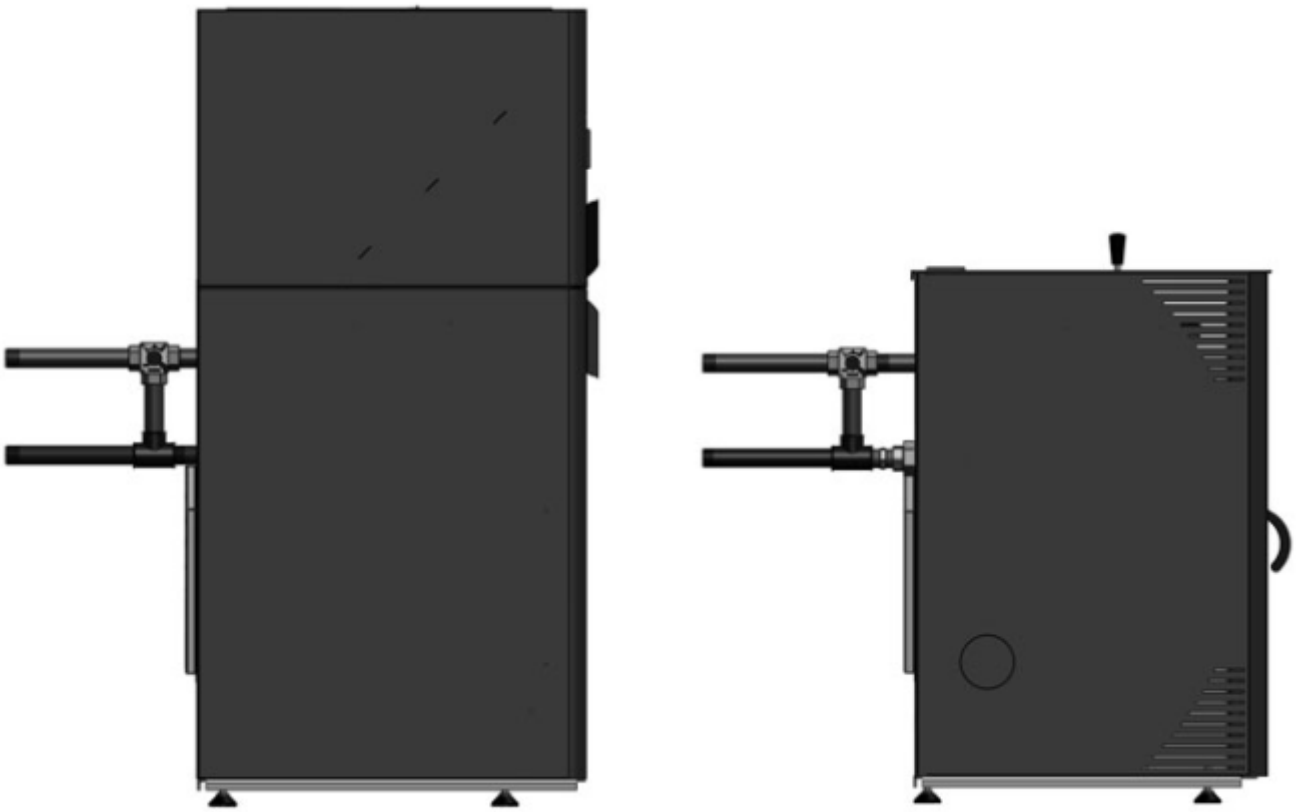
$$V = 0{,}07V_{water}\ (l)$$

V_{water} (l)is the water volume in the entire installation. Diameter for the pipework of the expansion vessle line should be round 25 mm.

Open expansion vessel is to be positioned vertically above the highest heating element.

6 Mixing valve

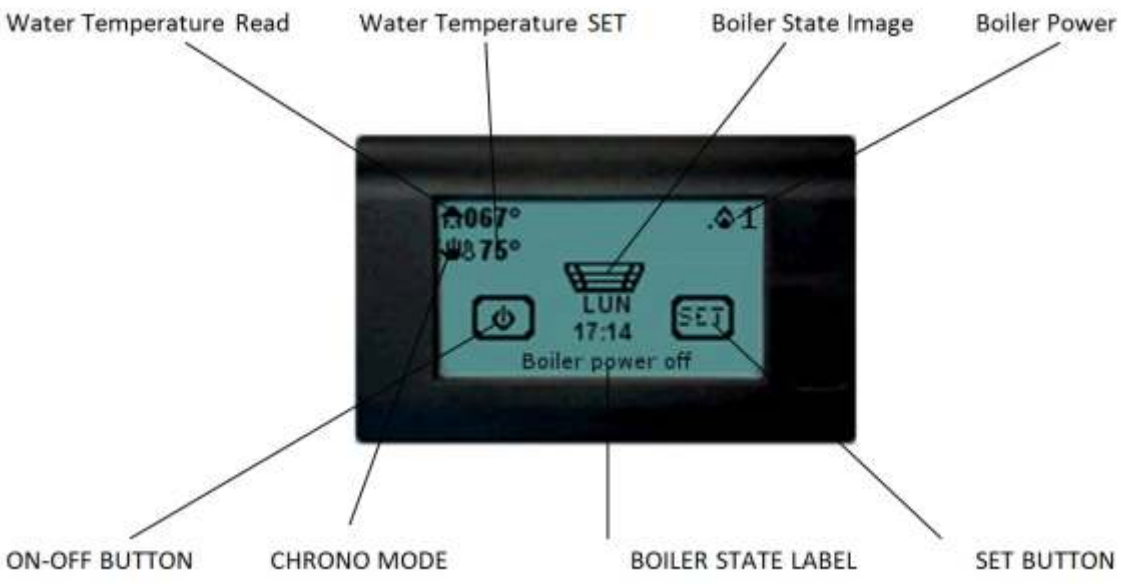
The use o a mixing valve is OBLIGATORY with this appliance:



7 Control panel

There is a user-friendly touch screen controller on the front side of the boiler.

7.1 Main menu



From main screen is possible reached all menu and pages. It is also possible turn on and turn off boiler.

7.1.1 Button description

Press and hold for two seconds on ON-OFF BUTTON boiler turn On or turn OFF.

Press and hold for two seconds on SET BUTTON enter on USER MENU.

Press and released on SET BUTTON enter on SET MENU

7.1.2 Icons

Water Temperature Read: show real water temperature inside boiler

Water Temperature SET: show set temperature by user

Boiler State Image: show boiler state using images

Boiler Power: show boiler power

Chrono Mode: Hand Symbol means boiler is in manual mode. Fixed Clock Symbol means Chrono Mode enabled. Flashing Clock Symbol means Chrono Mode enabled and time slot started.

7.1.3 Boiler state - Normal environment

Poruke se ispisuju na srpskom jeziku ukoliko je srpski jezik odabran.

Boiler power off: Boiler in off state.

Cleaning: Boiler is in cleaning fase.

Test Flame Detection: Boiler is testing flame presence.

Ignition Resistance: Boiler turn on resistence.

Loading Pellets: Boiler start feeding.

Flame Stabilization: Boiler is waiting flame stabilized.

Boiler power on: Boiler is On. Regulated by power mode.

Boiler powering off: Boiler is turning off

Waiting: Boiler is in wait state. It wait that water temperature go under SET temperature or Thermostat request (if enabled)

Test Hardware: StoveCheckProgram access

Max performance boiler power on: Boiler reached maximum combustion temperature

Boiler power in modulation: Water reached SET temperature

SERVICE: Request Service

Manual loading combustible: Boiler is feeding

Boiler Fan Calibration: Boiler is in calibration mode for combustion fan (Hall effect enabled).

No-Freeze Cycle: Kotao se gasi jer temperature vode je ispod antifriz temperature.

7.1.4 Alarms

Alarm BlackOut: Power Line Off during Boiler not in OFF State

Lighting failed: Boiler doesn't turn on in time.

Alarm Smoke sensor broken: smoke temperature probe open or short circuit

Alarm Low pressure: (if enabled) pressure sensor give alarm

Alarm Pellet Thermostat: (if enabled) pellet thermostat sensor give alarm

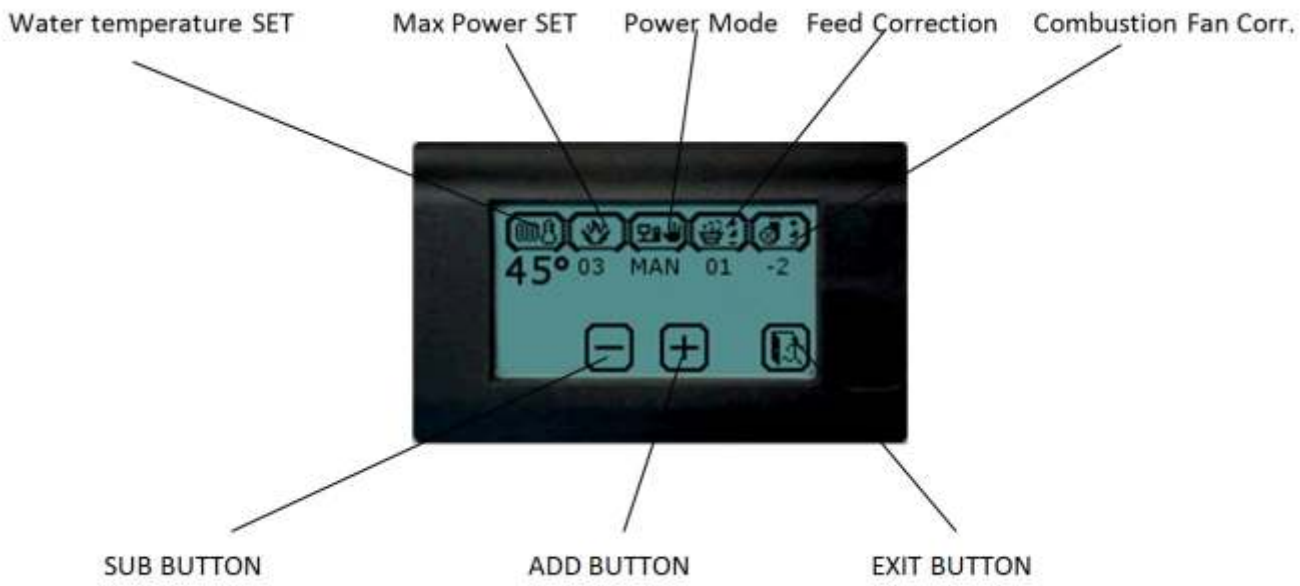
Alarm No Fuel: Smoke Temperature go under OFF Temperature. System think no feed

Alarm Water sensor broken: water temperature probe open or short circuit

Alarm High water temperature: water temperature go over maximum temperature

7.2 Set menu

In this screen user can SET water temperature, power, power mode, feed correction (if enabled), combustion fan correction (if enabled).



7.2.1 Button description

Press and Hold for 10 seconds on Water temperature SET to start Manual Loading pellet (only if boiler is in OFF state)

Press and Released on Water temperature SET to select it. It enlarged the value

Press and Released on Max Power SET to select it. It enlarged the value

Press and Released on Power Mode to select it. It enlarged the value

Press and Released on Feed Correction to select it. It enlarged the value

Press and Released on Combustion Fan Corr. to select it. It enlarged the value

Press and Released on SUB BUTTON to decrease selected value

Press and Released on ADD BUTTON to increase selected value

Press and Released on EXIT BUTTON to return MAIN SCREEN

Water temperature SET is water temperature that boiler has to reached and maintain.

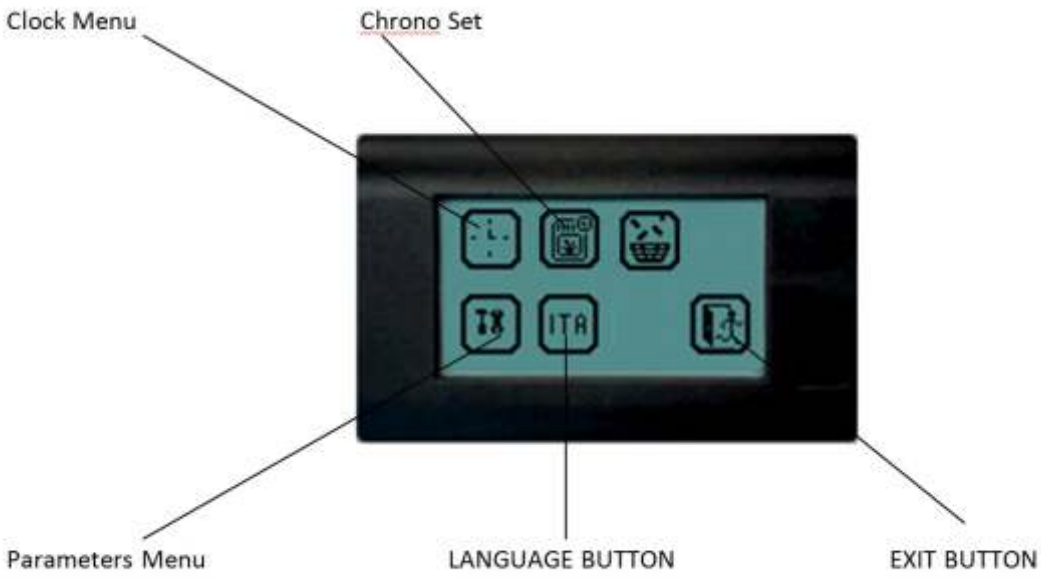
Max Power SET is power SET by user:
On Manual Power Mode boiler uses Power 1 and Power Selected here;
On Auto Power Mode boiler change automatically power depending of differences between water temperature and SET and Power Selected here is the maximum Power that boiler can use.

Power Mode select Auto Power Mode (PC icon-AUTO) or Manual Power Mode (Hand icon-MAN).

Feed Correction (if enabled) Select one of 9 positions to correct feed (every position is chosen by manufacturer). 0 Position don't apply any correction

Combustion Fan Correction : (if enabled) Select one of 9 positions to correct combustion fan speed (every position is chosen by manufacturer). 0 Position don't apply any correction

7.3 End User Menu



In this menu user can SET Clock Time, Chrono Slot Time and change Language. Technician can read and write boiler parameters protected by password.
Button description:

Press and Hold for 4 seconds on Parameters Menu to enter in Parameters Screen

Press and Released on Clock Menu to enter in Clock Setting Screen

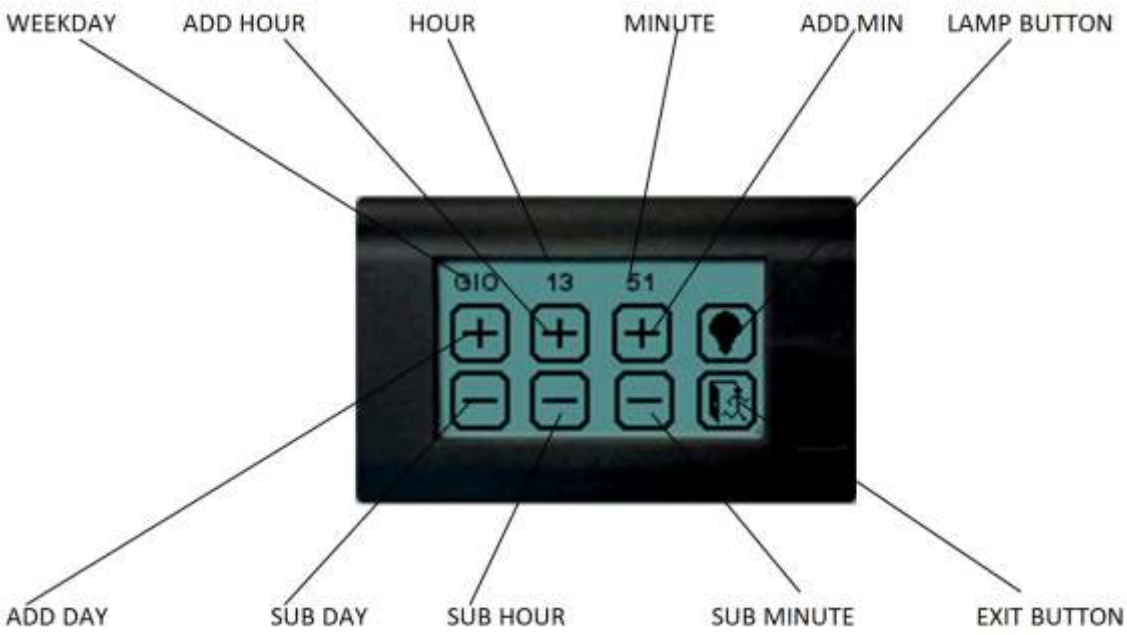
Press and Released on Chrono Set to enter in Chrono Slot Time Set

Press and Released on LANGUAGE BUTTON to change language.

Press and Released on EXIT BUTTON to return to main screen.

7.4 Clock setting

In this screen user can Set Clock Time , Weekday and Touch Screen Lamp.



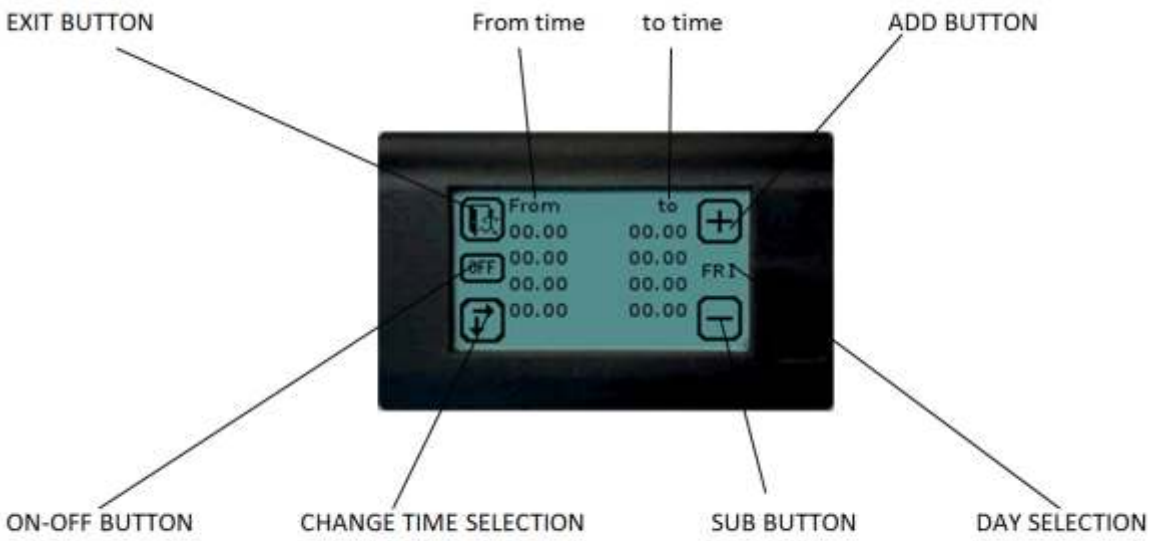
Button description:

Press and Released on ADD BUTTON to increase values

Press and Released on SUB BUTTON to decrease values.

Press and Released on LAMP BUTTON to enable lamp always on (LAMP ON) or safety energy lamp (LAMP OFF) to turn on Lamp only when user touch on screen and automatically turn off after some time.

7.5 Timer (Chrono Mode) Setting



In this menu user can set 4 slot time for start and stop boiler for every weekday.
Opis tastera:

Press and Released on ADD BUTTON to increase values

Press and Released on SUB BUTTON to decrease values.

Press and Released on EXIT BUTTON to return to USER MENU.

Press and Released on ON OFF BUTTON to enable or disable Chrono Mode. On Off option is unique for all weekday.

Press and Released on DAY SELECTION to change week day.

Press and Released on CHANGE TIME SELECTION to scroll through times.

Boiler start when , in the correct day, Clock Hour is greater than “From” and Boiler stop when clock hour is greater than “To”.

7.6 Boiler cleaning and maintenance

Pellet combustion means total combustion in this case. Little ash remains in the boiler. It is necessary to clean the boiler only once, maybe twice a week. Detailed cleaning once in a month and when the heating period is over. Regular maintenance of the boiler means:

With every cleaning, pull the handle up and down on the front side of the boiler. This is to force the ash to fall dawn from the vertical tube heat exchanger into lower part of the boiler.

1. Emptying the ash from the bottom of the boiler (using the ash tray delivered with boiler)
2. Removing ash layers in the heating chamber if such
3. Cleaning the retort burner (round plate where pellets are falling in)
4. Cleaning the plate which is carrying the retort burner

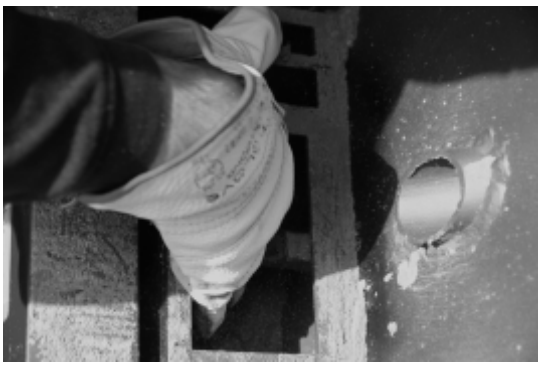
 Pre nego što se pristupi čišćenju, kotao mora biti ugašen i svi delovi ložišta potpuno ohlađeni. Obavezno koristiti rukavice.

Open the boiler doors.

Take out the burner pot.

Remove the ash from the bottom (manually or using the vacuum cleaner).

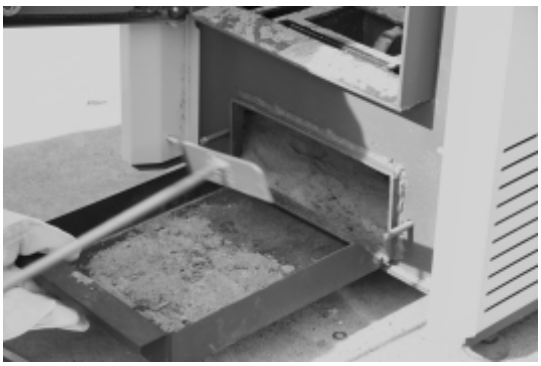
Clean the top of the tube where the ignition heater is situated.



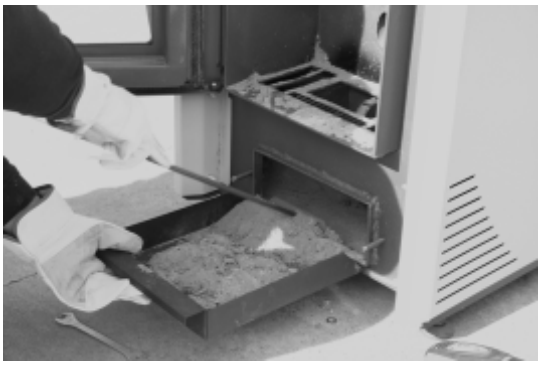
Remove the ash below the ignition heater area and the burner pot.

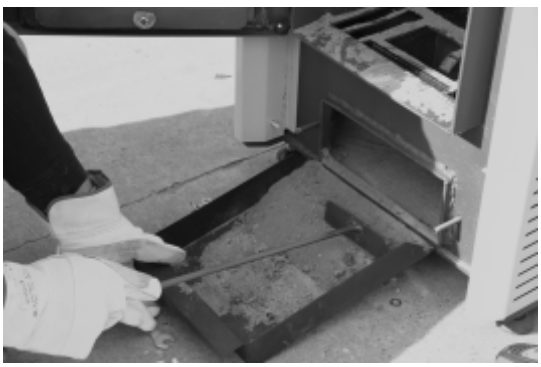
Remove the lower housing plate

It is necessary to unscrew these screws.



Take out the ash-tray.

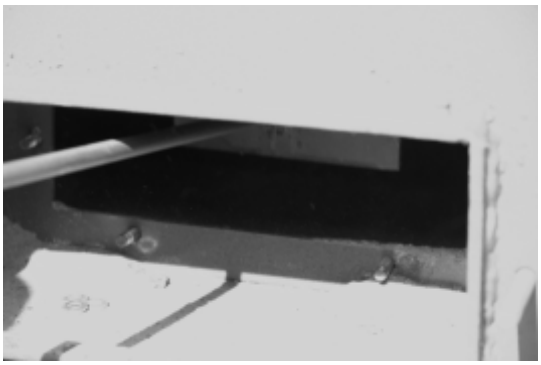




Move the handle a few times in order to clean the turbulators.

Unscrew the screws which hold the separation board between the lower part of the heating chamber andthe heat-exchanger(this and next steps are to be performed only 2-3 times during the heating season)

Remove the separation board.



Clean the area below the heat-exchangers.

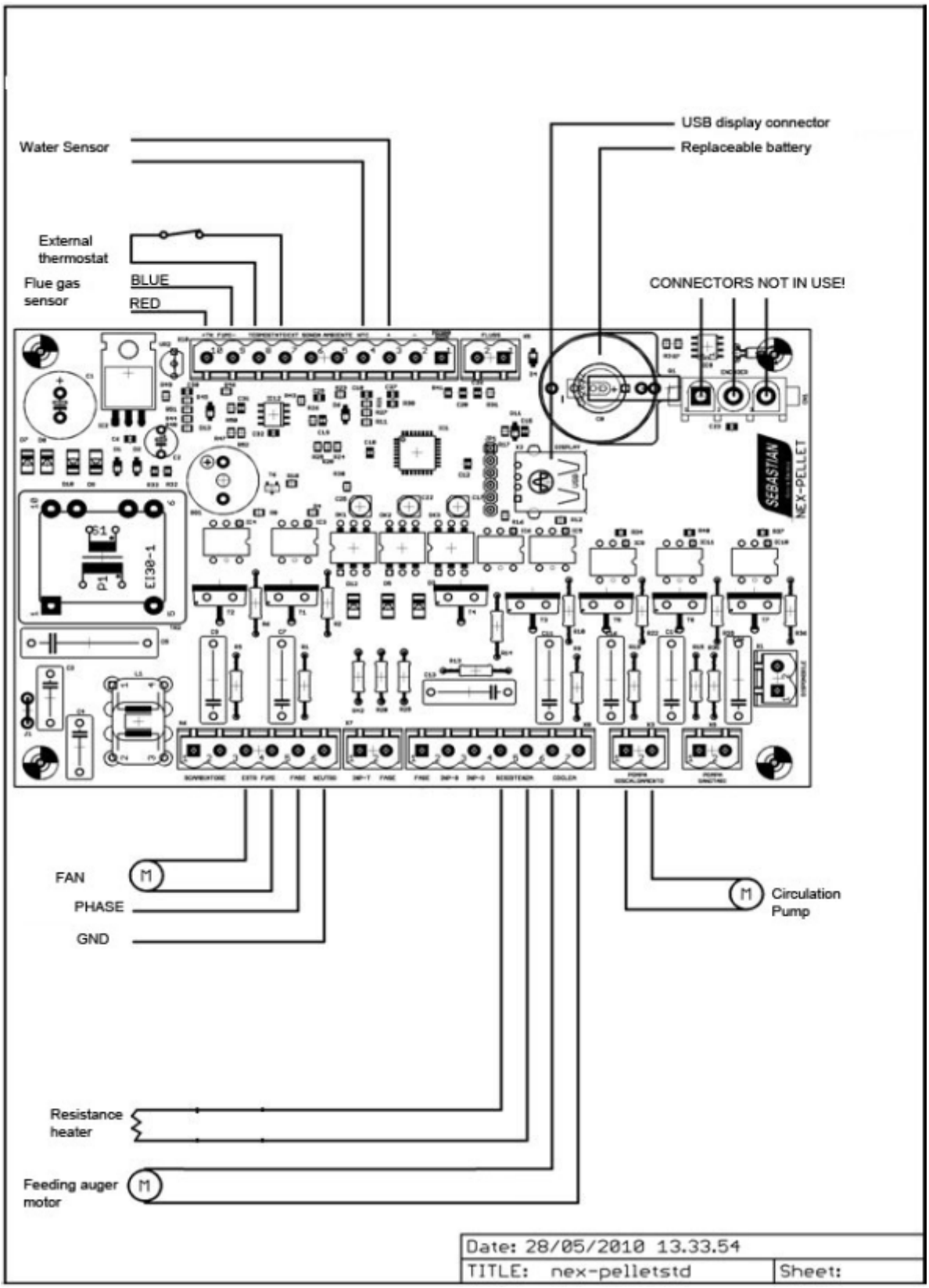
Regular maintenance will make your boiler last longer.

If bad quality pellet is used, with additions such as earth, dust, sand, silicate layer will show up in the boiler preventing the normal function of the boiler.

If dirty parts are not removed, boiler will start to decay very fast.

This boiler is aimed only for 100% wood pellets.

A Electric connection scheme



A Emissions Test Report

Following test report confirms low emissions values of TOBY boiler (within prescribed range of a class 5 boiler according to EN 303/5:2012)

Certificate

kiwa
Partner for progress

Con la presente Kiwa Italia S.p.A. attesta che l'apparecchio per il riscaldamento a combustibile solido:

Kiwa Italia S.p.A. hereby declares that the solid fuel heating appliance of kinds:

Caldaia a pellet, con alimentazione automatica / *Heating boiler for pellet, automatically stocked*

Marchio commerciale / *Trade mark:* **TERMOMONT**

Modello / *Model:* **TOBY 30**

Costruito da / *Manufactured by:* **TERMOMONT d.o.o.**
Prhovačka bb
22310, Šimanovci - Republic of Serbia

Ha superato le prove di prestazione ed emissione indicate nel rapporto di prova, secondo la sequente norma:
Comply with performance and emission tests indicated in the report, according to:

EN 303-5:2012

Rapporto di prova n. / *Test report n.:* **130200634**

Segue una sintesi dei risultati / *A summary of results is as follows:*

Modello / Model		Rendimento / Efficiency %	P term. utile / heat output kW	CO, mg/Nm³ at		OGC, mg/Nm³ at		Polveri / Dust mg/Nm³ at		Classe / Class
				10% O2	13% O2	10% O2	13% O2	10% O2	13% O2	
Toby 30	nom	90,01	31,70	416,35	302,80	7,32	5,33	24,3	17,7	5
	min	89,17	9,47	423,88	308,28	1,37	0,99	37,1	26,9	

San Vendemiano, 11 July 2013

Ing. E. Ferrari
Director Product Certification

Kiwa Italia S.p.a.
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20129 Milano (MI) - Italy
Sede Amministrativa
Via Treviso, 32/34
31020 San Vendemiano (TV) - Italy
GASTEC

Δ. ΑΝΑΣΤΑΣΙΑΔΗΣ Α.Ε.

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