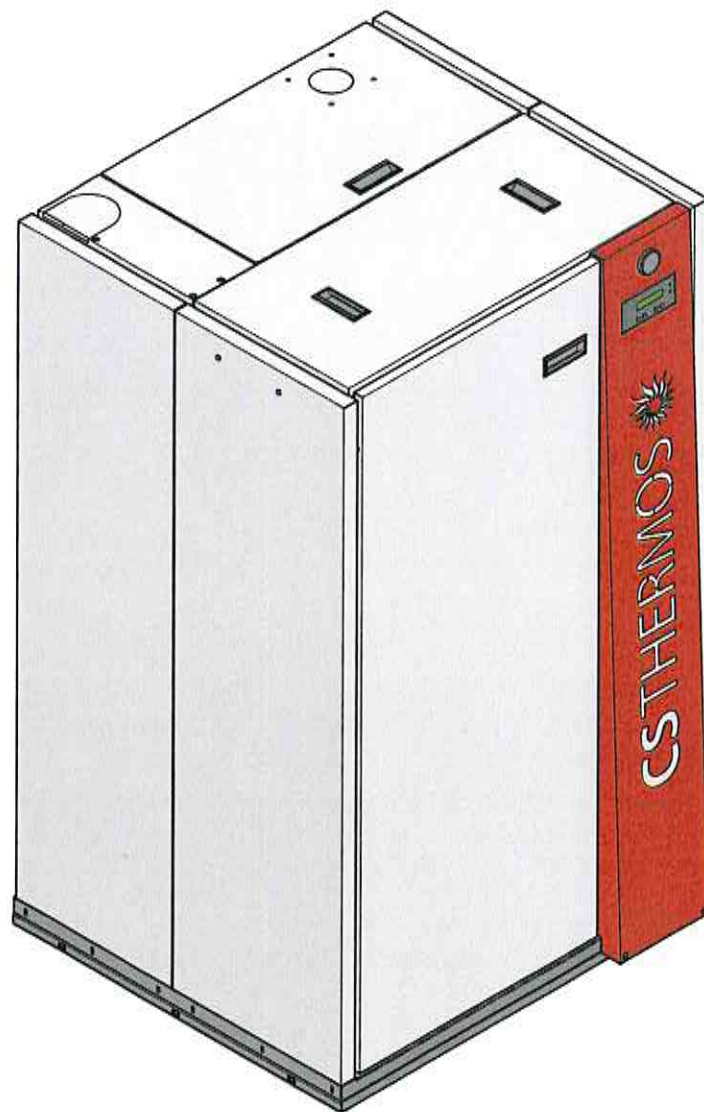




***Lyra boiler 16 - 19***  
***Lyra Eco boiler 23 - 27***



Dear Customer,

We wish to thank you for choosing a **CSTHERMOS** boiler and welcome you into our pellet/biomass heating world.

We remind you that our products are manufactured wholly in Italy with superb quality materials and are accurately tested in compliance with the provisions of the safety regulations in force.

Great innovation and sophisticated design are added to this guarantee of quality and comfort.

This boiler has been designed for domestic use.

This boiler model is fitted with an innovative and patented biomass burner (European Patent No. 09425188-1266 EP 2144001) capable of burning not only wooden pellets of all kinds (for instance consisting of bark and branches) but also the biomass deriving from agricultural waste such as almond-hazelnut shells, olive pits, agripellets.

An automatic cleaning system is managed by an electronic board and keeps the burner always clean, obtaining great efficiency and reliability of use. The modulating operation varies according to the set boiler temperature and therefore allows optimal room heating. During the initial ignition phase (about 10 minutes), the burner automatically fills with fuel, while resistors, heating up, trigger the flame. Once the flame has been detected by the combustion fume detector, normal operation begins that, thanks to the microprocessor, allows changing the supply of fuel, obtaining therefore flame modulation. The electronic board checks the temperature sensors, electrical motors and safety devices continuously and, in case of an anomaly, stops their operation and shows this on the display (see alarm code paragraph). The heating of the room is guaranteed by a circulator, fitted internally and an anti-condensation valve that ensures a constant return temperature to the boiler, to prevent the condensation phenomenon.

The production of hot water is guaranteed by a motorized diverter valve, fitted inside the boiler too, and controlled by the hot water heater probe that will switch its position, giving always priority to the hot water heater.



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# 1 - SAFETY REGULATIONS

## *Safety regulations for the user*



This manual is an integral part of the product: it is important to read it in all its parts before installing or using the equipment. Ensure it is always available, also in case of a move/sale/transfer to another owner, so that it can be consulted by the new user, installer or by any authorized staff.

Any use, cleaning or maintenance other than as stated in this booklet must be considered incorrect and may cause damage, injury or death, making the guarantee null and void and releasing the Manufacturer from any liability.

Extraordinary maintenance must be carried out **only by qualified personnel authorized by the Dealer or Manufacturer.**



This pictogram refers to a situation of immediate danger or a dangerous situation that might cause injury or death.



This pictogram shows that it is necessary to behave in such a way as not to endanger the safety of staff or cause damage to the equipment.



This pictogram hints at important technical information that must be taken into account by the installer or user of the equipment.



Danger of burns



Danger of electric shock



Danger of crushing your hands



Danger of asphyxia



Fire hazard



Danger of crushing your feet



Obligation to use protection gloves



Safety or equipment automatic adjustment devices must be modified only by the manufacturer or by an authorized service centre or supplier, during the whole life of the system.

If the equipment is not to be used for a long time, switch off the main power switch.



If the equipment does not work or you notice functional or structural changes, disconnect it from the power mains and contact **a service centre authorized by the Manufacturer or Dealer without attempting any DIY**. As to repairs, always ask for original spare parts to be used, in order to avoid problems and invalidating the warranty.



Any kind of tampering or replacement carried out by non-qualified personnel can be dangerous for the user and releases the Manufacturer from all civil and criminal liability.

Ensure the room where the unit is going to be installed is suitable and provided with air vents with minimum openings in compliance with the legislation of the country of destination and anyway sufficient to obtain perfect combustion.

When the unit is delivered, check it is intact because vibrations or impacts during transport might have loosened some components. Check the housing or the parts making up the equipment have not been damaged. If this is the case, inform the installer and/or our customer service.

Do not leave any flammable containers or substances next to the boiler, comply with the safety distances mentioned in the manual.

Before connecting the equipment to the mains, always check the system data match those on the equipment plate.

Use only the fuel recommended by the Manufacturer. The product must not be used as an incinerator. It is absolutely forbidden to use liquid fuels.

Do not load the pellets into the burner manually.



The unit cannot be used by children or people with limited physical, sensory or mental capabilities or without the necessary knowledge and experience. Children must not play with the apparatus.

Non-compliance with these instructions can cause damages, injuries and even death and invalidates the warranty.

Since potentially dangerous, any packaging material must be kept out of the reach of children or animals and disposed of in compliance with local regulations.

Connect the earth cables of the equipment to the earth system of the building where it is installed.

The data plate supplies important technical information that is vital in case of a request for maintenance or repair of the equipment: please do not remove, damage or modify it.

Do not open the burner while it is running.

Do not operate the unit with the glass broken.

Do not disconnect it by unplugging it when there is a flame on in the burner.

Do not use the unit to cook food or heat drinks.

Do not use the product as a supporting structure or as a ladder.

To prevent fires, do not hang wet clothes on the unit to dry them, drying racks can be positioned at a safe distance.

Do not wash the product with water jets. Water may penetrate into the unit and cause electric shocks.

If the ignition system fails, it is absolutely forbidden to use flammable materials to light the flame.

Disconnect the electrical supply before any maintenance or cleaning.

To ensure the equipment is in perfect use and safety conditions, we recommend that it is maintained and checked by a Service Centre authorized by the Manufacturer or Dealer at least once a year.

**The product warranty starts on the date when the equipment is switched on for the first time by an authorized engineer (dealer or Technical Service Centre).**

### *Further risks*



The boiler has been conceived, designed and built taking all the applicable Safety Regulations currently in force in the country of manufacture into account. Even if all possible precautions to comply with the Regulations currently in force have been taken, the following risks can still apply:



**Risk of BURNS** in accessing the inspection and cleaning doors with the flame still on or not completely cooled down.



**Risk of ELECTRICAL SHOCK.** For a correct and safe electrical connection as well as safe protection, the thermo-stove must be connected to a thermal differential with a trigger threshold not exceeding 30 mA, in compliance with the regulations in force.



**Risk of HAND INJURY** during the opening and cleaning operations and/or maintenance of the supply auger, burner and ash drawer. We recommend suitable Personal Protection Equipment (PPE), such as gloves, is used. When disassembling some parts of the equipment and then reassembling them, pay attention to the risk of crushing your hands.



**Risk of ASPHYXIA** if there is no correct fume expulsion. We advise you to periodically inspect and keep the flue and fire outlets clean.



**Risk of FIRE** if flammable objects are placed on the surface of the unit or if solid or liquid flammable materials are positioned near it.



Draught conditions unsuitable to the flue, excessive fuel humidity or high ash residue in the combustion chamber, can cause ignition failures that must not be considered a fault in the product.

**The company accepts no liability for any damages that may derive, either directly or indirectly, to people, animals or property due to the non-compliance with all the provisions listed in this manual and, in particular, concerning the warnings with regard to the installation, use and maintenance of the apparatus.**

## 2 - RECEIVING THE EQUIPMENT

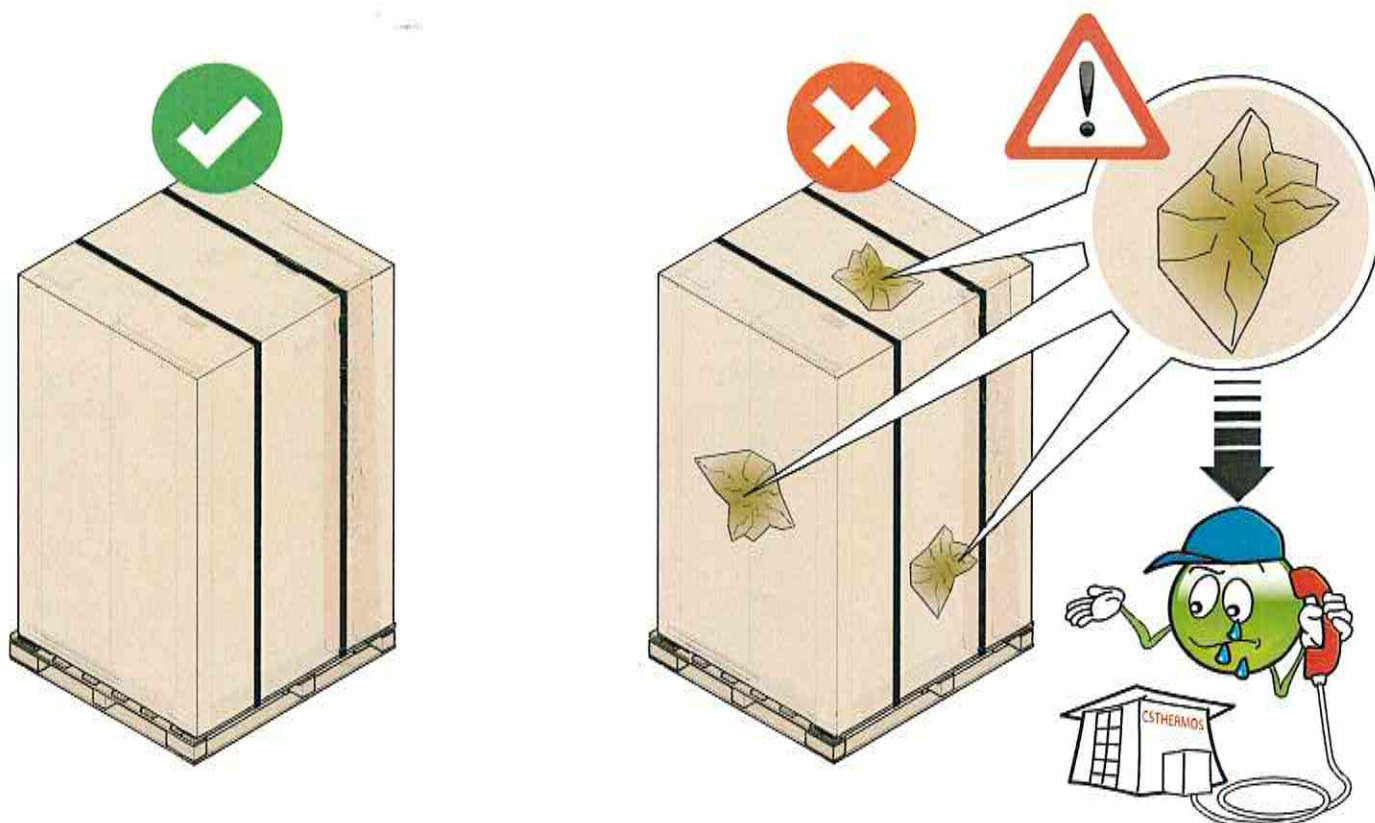


When you receive the equipment, check its packaging is intact. In case of visible damage or if some pieces are missing, do not install it, but contact the Manufacturer straight away.

If no anomaly is found, the product can be installed.

Handle the equipment following the Manufacturer's instructions shown on the packaging and in this manual. Use personal protection equipment all the time.

The means and method of transport must be chosen by the person responsible for handling, according to the equipment weight and size. Handling must guarantee the safety of the people directly involved in the installation.



## 3 - TRANSPORT AND HANDLING



The apparatus must be lifted with a winch fitted with a hook (A) and handled with a transpallet or forklift truck of suitable capacity.

The area of movement must be free from objects or people not involved in the transport operation.

If the equipment is handled using a winch, it is necessary to use some spreader bars (C) between the lifting ropes, to prevent the unit from being damaged and ensure no excessive pressure is applied to the packaging or machine itself.

### Lifting with a winch fitted with a hook



Use hooks of capacity and material suitable to the weight to be lifted. Ensure the safety lock (D) is in the correct position while lifting.

Do NOT move the equipment if the field of vision is poor or if there are other obstacles along the way (i.e. electrical cables, lintels, etc.). The range of action of the lifting equipment must be kept free from people when the loads are lifted.

Shifting must always be vertical. Use steel hooks, chains or cables in perfect condition, of a suitable material and capacity and without any joints or extensions (E). Carry out periodic checks to guarantee efficiency.

To anchor the unit, pass the ropes or chains through the pallet holes (B), paying attention it is kept perfectly level.

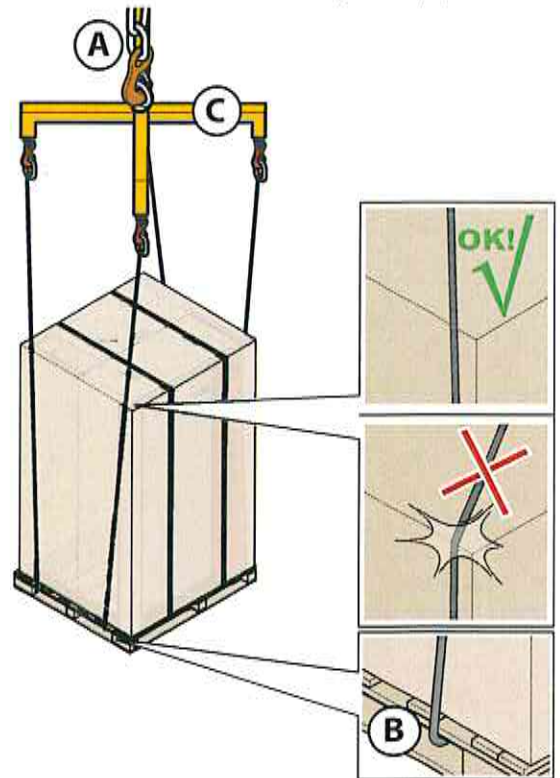
Check the flatness of the ground where the lifting equipment is standing, making sure it is stable and not prone to subsidence.

Do not move the lifting equipment during the operation.

Before starting lifting, check correct anchoring to the mentioned points and the centre of gravity, then slowly lift the packaged equipment to the minimum height required and move it carefully to avoid dangerous vibrations.

Take care of the control panel that must undergo no impacts or be exposed to the weather (rain, humidity): any damage may affect its operation.

Avoid sudden stops of the lifting or descending movement, in order to avoid dangerous oscillations.



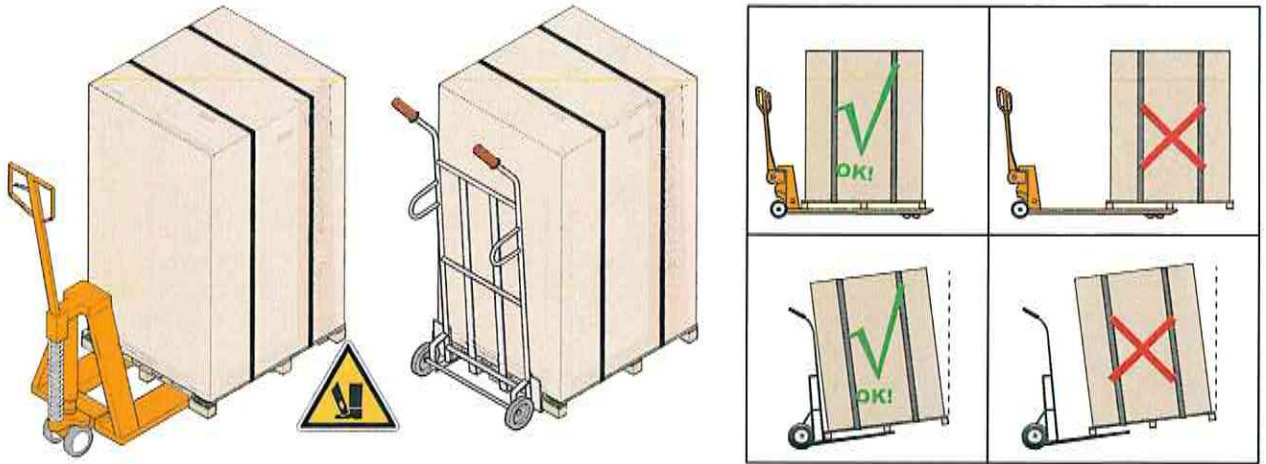


### **Lifting with a transpallet or forklift truck**



If the transport is done using a transpallet, ensure it is adequate to the weight and size of the packaged equipment. Insert the forks into the points provided for handling (usually in the central position), to keep the centre of gravity of the load balanced. Move the equipment carefully, avoiding sudden movements.

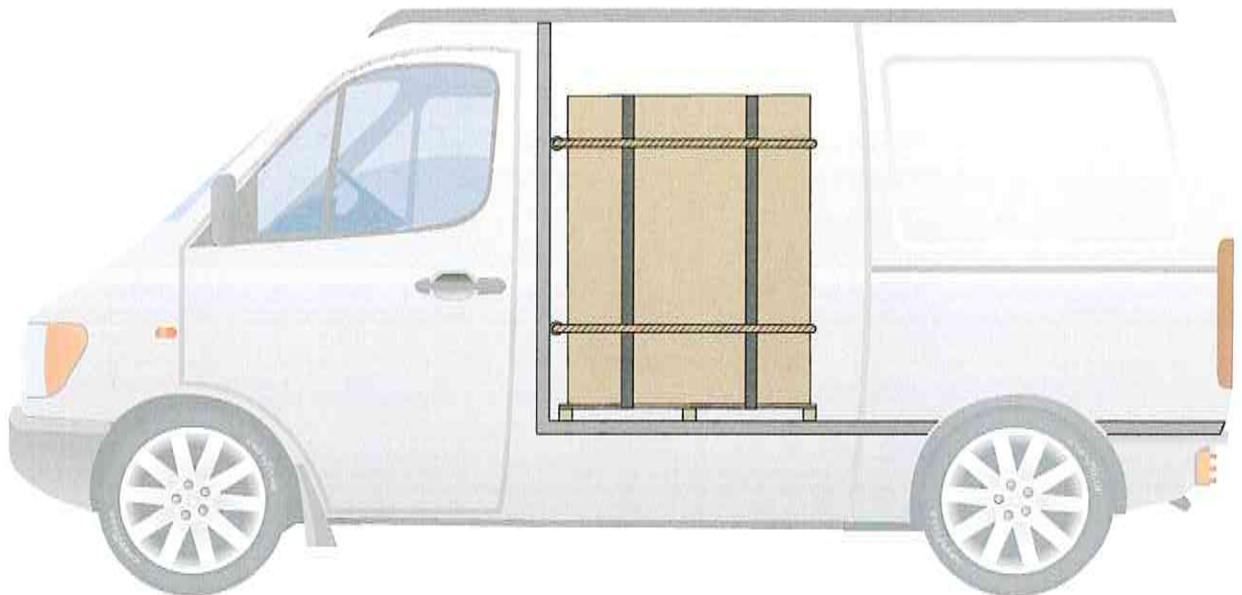
If the transport is done with a forklift truck, ensure this is strong enough to withstand the weight of the equipment and that this can be moved safely, without any risk of it falling.



### **Transport with a van**

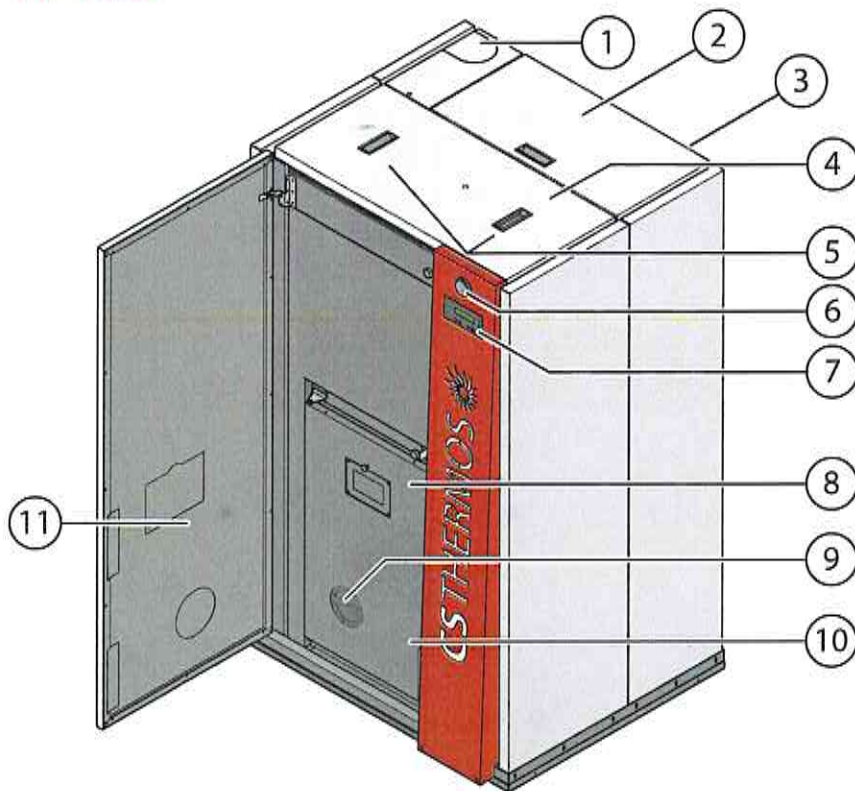


If transport is done using a van, the apparatus must be fixed properly inside it, using ropes, so that it cannot move while handling.



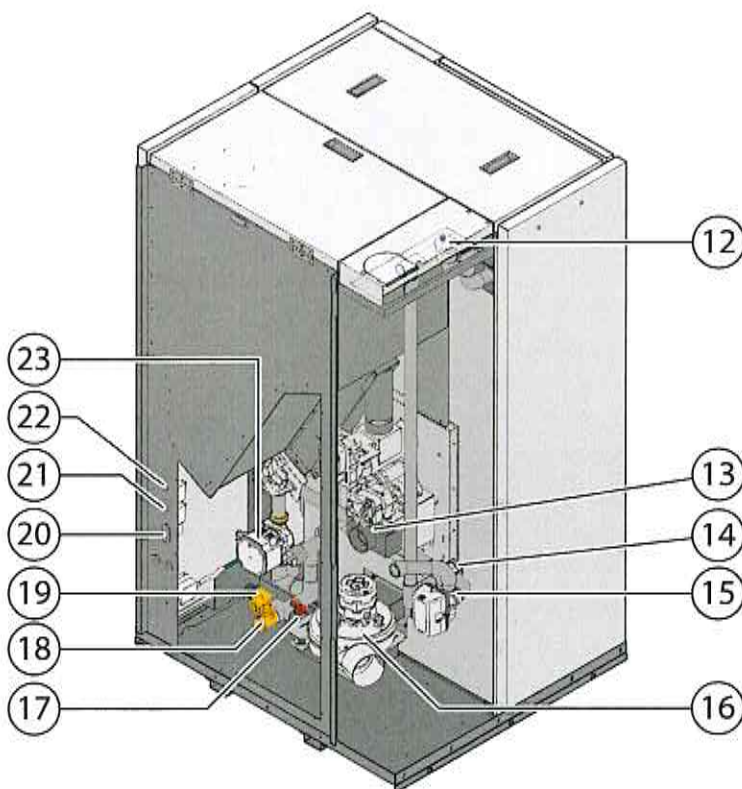
## 4 - DESCRIPTION OF THE PARTS

### 4.1 Boiler

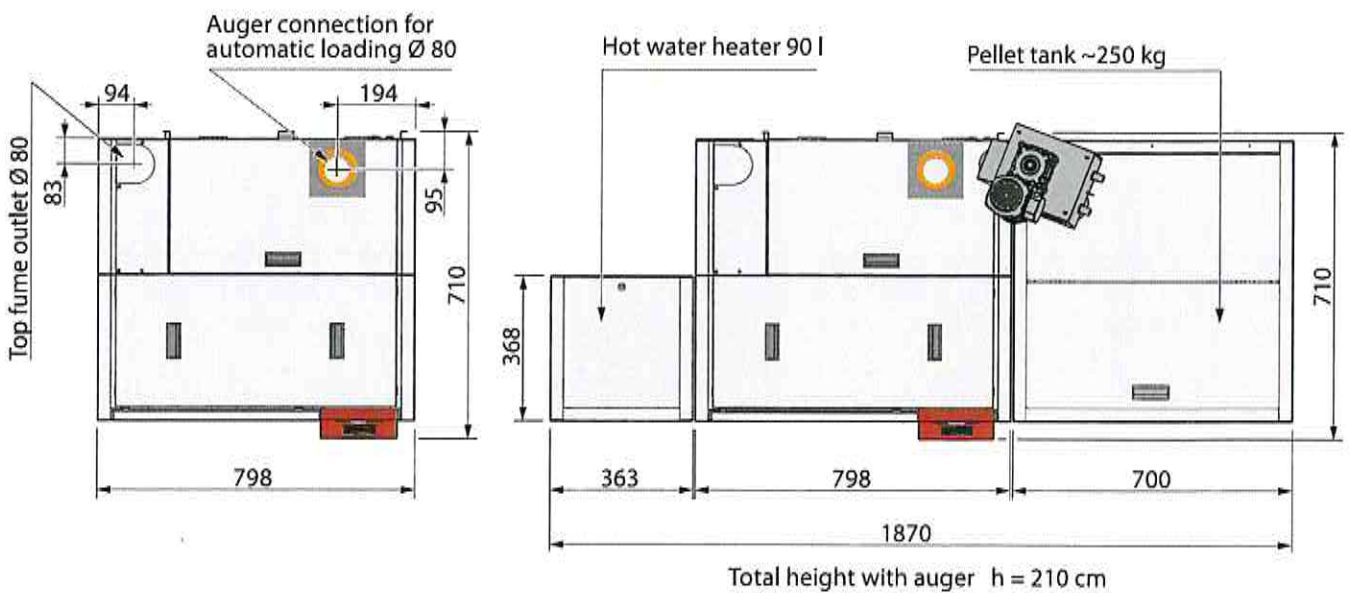
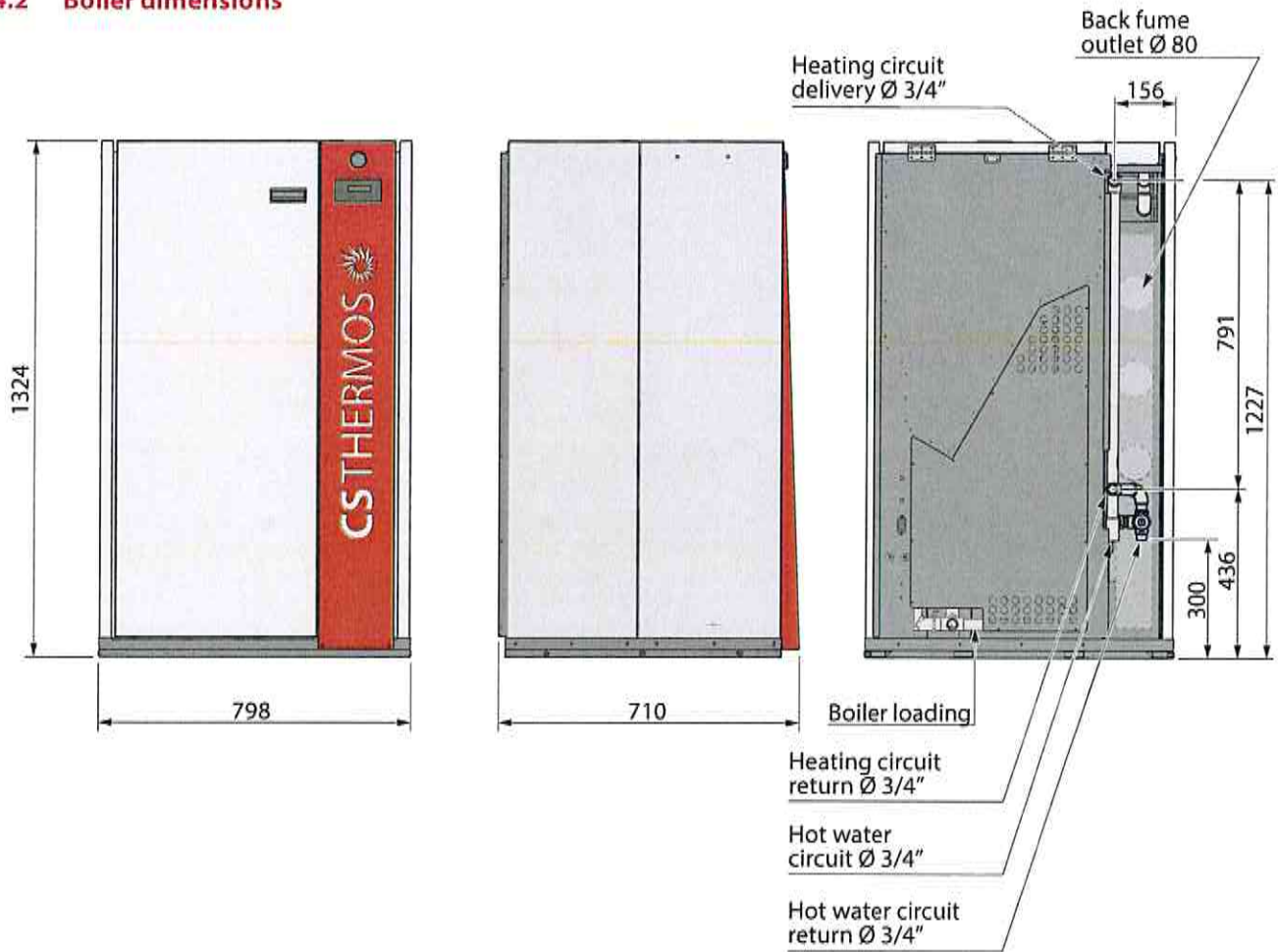


#### Description

- 1) Smoke exhaust arrangement
- 2) Fuel tank lid
- 3) Technical data label
- 4) Top cover panel
- 5) Scrapers
- 6) Pressure gauge
- 7) Display
- 8) Hearth door
- 9) Anti-explosion valve
- 10) Ash drawer
- 11) Front door
- 12) Automatic air vent
- 13) Air intake
- 14) Anti-condensation thermostatic valve
- 15) Diverter valve (3 ways)
- 16) Fume motor
- 17) Boiler loading (3/4")
- 18) Boiler discharge tap
- 19) Safety valve 3bar
- 20) Electrical outlet
- 21) Auger safety thermostat
- 21) Boiler safety thermostat
- 23) Circulator



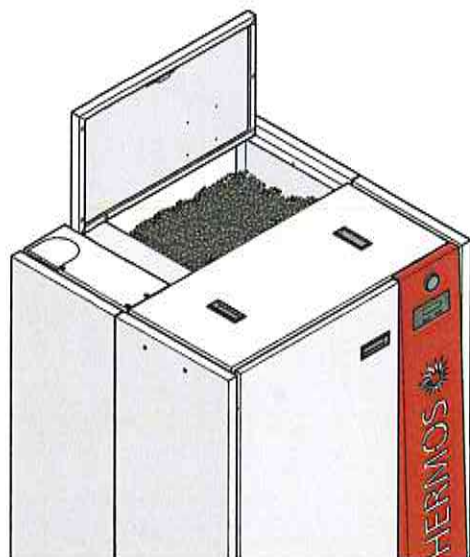
## 4.2 Boiler dimensions



### 4.3 Pellet tank

The boiler is equipped with a 70kg internal tank to load the pellets.

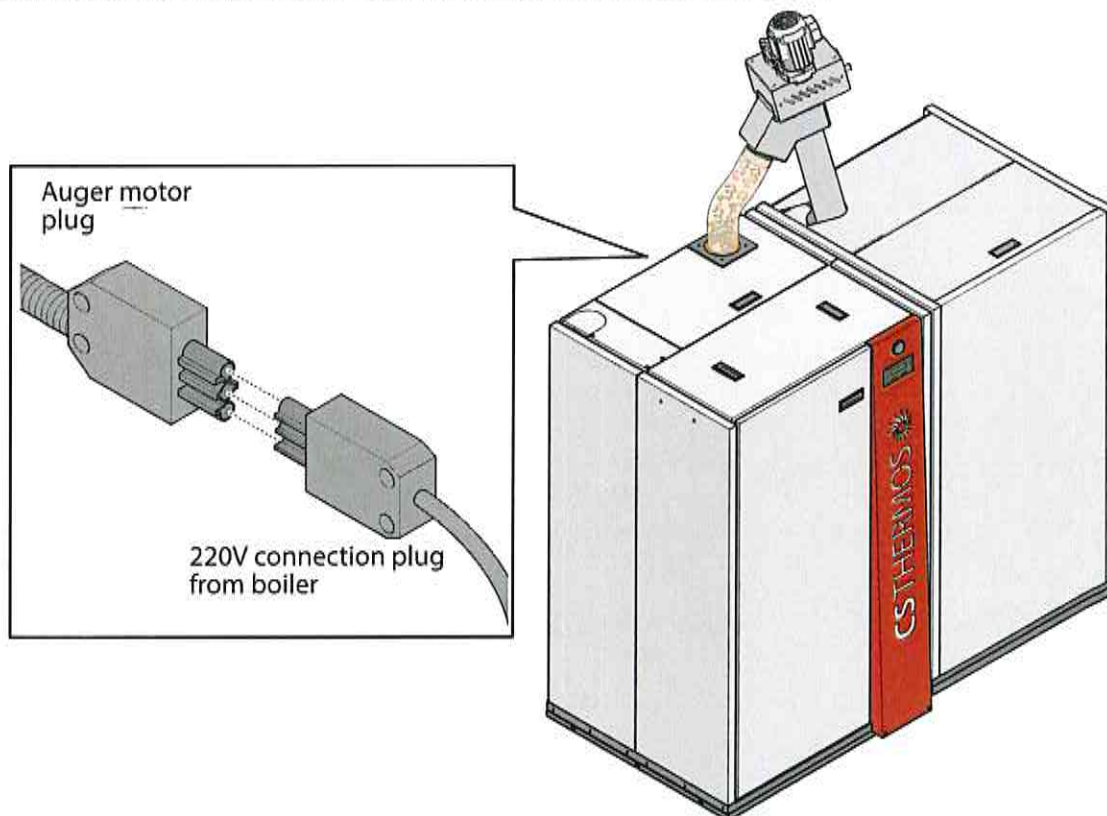
#### INTERNAL TANK



#### EXTERNAL TANK WITH WHEELS (OPTION)

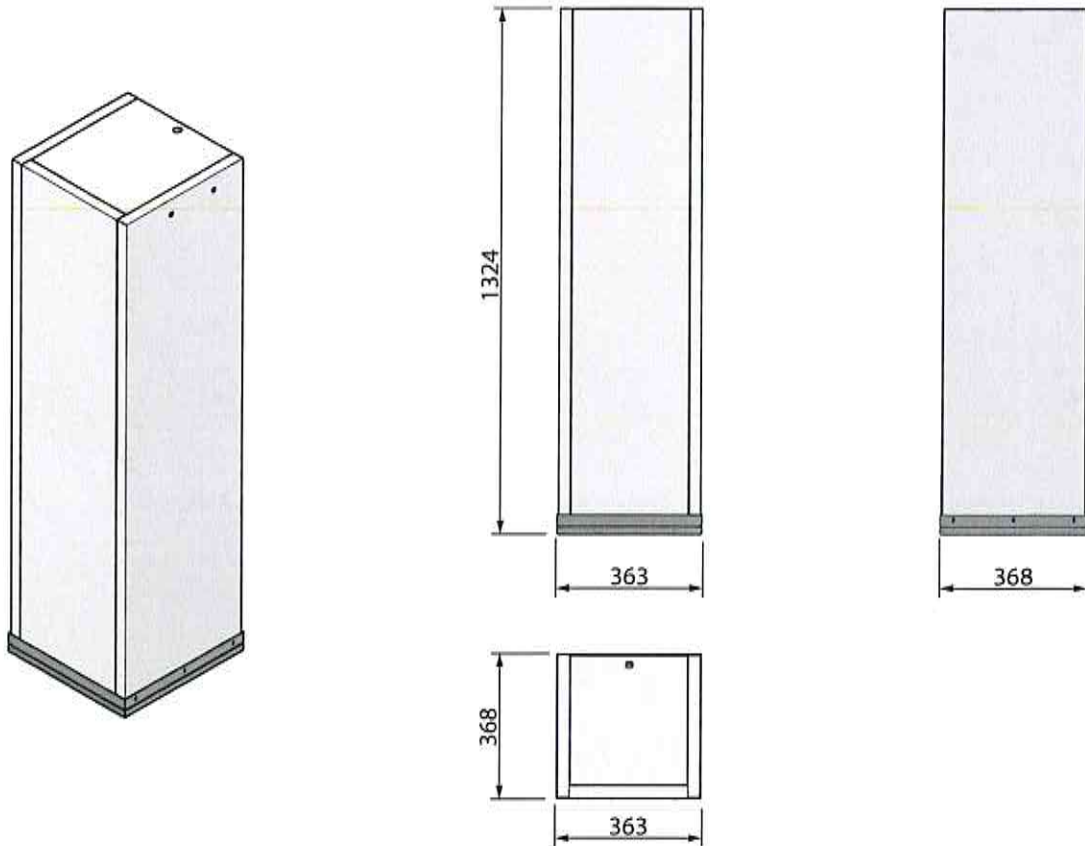
By breaking the pre-cut piece on the lid, it is however possible to use an external tank (capacity about 250kg) fitted with an auger to transport the pellets and wheels for ease of handling. After inserting the auger into the tank, fill it with fuel and connect the electrical plug.

**N.B.:** place the tank on the right of the boiler, at a maximum distance of 5 cm.

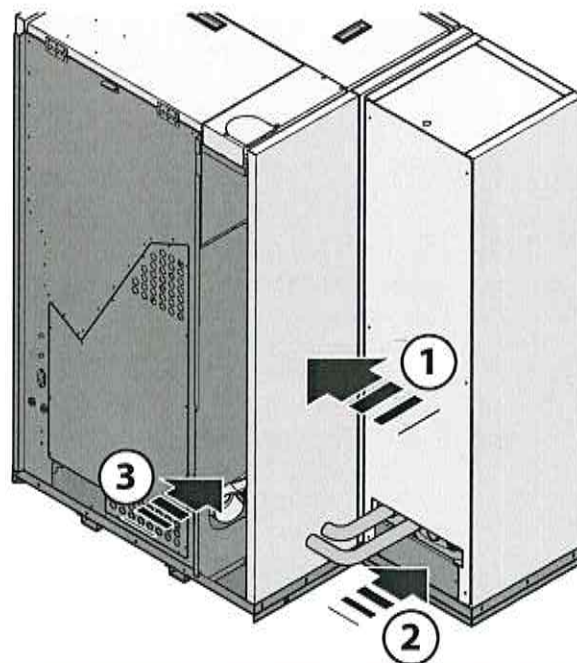


#### 4.4 Hot water heater (option)

To produce hot water, the specially designed 90 l water heater is recommended, to use alongside the boiler for a good operation.



After positioning the water heater next to the boiler, connect the hydraulic tube supplied as well as the relative probe to the boiler electronic board.



#### 4.5 Boiler data plate

The plate with the data regarding the boiler is located on its back. It supplies important technical information that is vital in case of a request for maintenance or repair of the equipment: please do not remove, damage or modify it.

 <b>CSTHERMOS</b> STUFE A BIOMASSA		 EN 303-5: 2012	
MODELLO	LYRA 16	NUMERO DI SERIE	XX-XX-XX
POTENZA TERM. INTRODOTTA	18,1 kW	TENSIONE NOMINALE	230V - 50 Hz
POTENZA TERM. NOMINALE	17,0 kW	POT. ELETTRICA NOMINALE	580W
POTENZA TERM. RIDOTTA	5,4 kW	PRESSIONE MAX ESERCIZIO	3 bar
POTENZA NOM. RIDOTTA	4,8 kW	CO 10% O <sup>2</sup>	163 mg/Nm <sup>3</sup>
RENDIMENTO POT. NOMINALE	93,7 %	OGC 10% O <sup>2</sup>	11,4 mg/Nm <sup>3</sup>
RENDIMENTO POT. RIDOTTA	89,3 %	PP 10% O <sup>2</sup>	21,5 mg/Nm <sup>3</sup>
TEMPERATURA MEDIA FUMI	80° C	CLASSE (EN 303-5)	5


APPARECCHIO PER RISCALDAMENTO DOMESTICO ALIMENTATO A PELLETTI DI LEGNO  
 DISTANZA MINIMA DA MATERIALI INFIAMMABILI 100 mm SU TUTTI I LATI  
 USARE SOLO I COMBUSTIBILI RACCOMANDATI - LEGGERE E SEGUIRE LE ISTRUZIONI D'USO

 <b>CSTHERMOS</b> STUFE A BIOMASSA		 EN 303-5: 2012	
MODELLO	LYRA 19	NUMERO DI SERIE	XX-XX-XX
POTENZA TERM. INTRODOTTA	21,0 kW	TENSIONE NOMINALE	230V - 50 Hz
POTENZA TERM. NOMINALE	19,8 kW	POT. ELETTRICA NOMINALE	580W
POTENZA TERM. RIDOTTA	5,4 kW	PRESSIONE MAX ESERCIZIO	3 bar
POTENZA NOM. RIDOTTA	4,8 kW	CO 10% O <sup>2</sup>	208 mg/Nm <sup>3</sup>
RENDIMENTO POT. NOMINALE	93,4 %	OGC 10% O <sup>2</sup>	11,1 mg/Nm <sup>3</sup>
RENDIMENTO POT. RIDOTTA	89,3 %	PP 10% O <sup>2</sup>	21,9 mg/Nm <sup>3</sup>
TEMPERATURA MEDIA FUMI	80° C	CLASSE (EN 303-5)	5

APPARECCHIO PER RISCALDAMENTO DOMESTICO ALIMENTATO A PELLETTI DI LEGNO  
 DISTANZA MINIMA DA MATERIALI INFIAMMABILI 100 mm SU TUTTI I LATI  
 USARE SOLO I COMBUSTIBILI RACCOMANDATI - LEGGERE E SEGUIRE LE ISTRUZIONI D'USO

 <b>CSTHERMOS</b> STUFE A BIOMASSA		 EN 303-5: 2012	
MODELLO	LYRA ECO 23	NUMERO DI SERIE	XX-XX-XX
POTENZA TERM. INTRODOTTA	22,18 kW	TENSIONE NOMINALE	230V - 50 Hz
POTENZA TERM. NOMINALE	20,81 kW	POT. ELETTRICA NOMINALE	580W
POTENZA TERM. RIDOTTA	6,40 kW	PRESSIONE MAX ESERCIZIO	3 bar
POTENZA NOM. RIDOTTA	5,77 kW	CO 10% O <sup>2</sup>	86 mg/Nm <sup>3</sup>
RENDIMENTO POT. NOMINALE	93,80 %	OGC 10% O <sup>2</sup>	1,9 mg/Nm <sup>3</sup>
RENDIMENTO POT. RIDOTTA	90,15 %	PP 10% O <sup>2</sup>	7,7 mg/Nm <sup>3</sup>
TEMPERATURA MEDIA FUMI	110° C	CLASSE (EN 303-5)	5

APPARECCHIO PER RISCALDAMENTO DOMESTICO ALIMENTATO A PELLETTI DI LEGNO  
 DISTANZA MINIMA DA MATERIALI INFIAMMABILI 100 mm SU TUTTI I LATI  
 USARE SOLO I COMBUSTIBILI RACCOMANDATI - LEGGERE E SEGUIRE LE ISTRUZIONI D'USO

 <b>CSTHERMOS</b> STUFE A BIOMASSA		 EN 303-5: 2012	
MODELLO	LYRA ECO 27	NUMERO DI SERIE	XX-XX-XX
POTENZA TERM. INTRODOTTA	26,9 kW	TENSIONE NOMINALE	230V - 50 Hz
POTENZA TERM. NOMINALE	25,30 kW	POT. ELETTRICA NOMINALE	580W
POTENZA TERM. RIDOTTA	6,40 kW	PRESSIONE MAX ESERCIZIO	3 bar
POTENZA NOM. RIDOTTA	5,77 kW	CO 10% O <sup>2</sup>	90 mg/Nm <sup>3</sup>
RENDIMENTO POT. NOMINALE	93,78 %	OGC 10% O <sup>2</sup>	2,2 mg/Nm <sup>3</sup>
RENDIMENTO POT. RIDOTTA	90,15 %	PP 10% O <sup>2</sup>	7,5 mg/Nm <sup>3</sup>
TEMPERATURA MEDIA FUMI	118° C	CLASSE (EN 303-5)	5

APPARECCHIO PER RISCALDAMENTO DOMESTICO ALIMENTATO A PELLETTI DI LEGNO  
 DISTANZA MINIMA DA MATERIALI INFIAMMABILI 100 mm SU TUTTI I LATI  
 USARE SOLO I COMBUSTIBILI RACCOMANDATI - LEGGERE E SEGUIRE LE ISTRUZIONI D'USO

## 5 - BOILER TECHNICAL DATA

TECHNICAL DATA	UNITS OF MEASUREMENT	LYRA 16	LYRA 19	LYRA ECO 23	LYRA ECO 27
Thermal power input (pellets)	kW	18,1*	21,0*	22,1*	26,9*
Nominal thermal power (pellets)	kW	17,0*	19,6*	20,8*	25,3*
Reduced thermal power (pellets)	kW	5,4*	5,4*	6,3*	6,3*
Reduced nominal power (pellets)	kW	4,8*	4,8*	5,7*	5,7*
Efficiency nominal power (pellets)	%	93,7*	93,4*	93,8*	93,7*
Efficiency reduced power (pellets)	%	89,3*	89,3*	90,1*	90,1*
CO 10% O <sup>2</sup>	mg/Nm <sup>3</sup>	163	208	86	90
OGC 10% O <sup>2</sup>	mg/Nm <sup>3</sup>	11,4	11,1	1,9	2,2
Nox 10% O <sup>2</sup>	mg/Nm <sup>3</sup>	186,9	189,5	159	156
PP 10% O <sup>2</sup>	mg/Nm <sup>3</sup>	21,5	21,9	7,7	7,5
Fuel		Wooden pellets (EN ISO 17225-2)	Wooden pellets (EN ISO 17225-2)	Wooden pellets (EN ISO 17225-2)	Wooden pellets (EN ISO 17225-2)
Consumption at maximum power (pellets)	kg/h	3,7 max**	4,3 max**	4,6 max**	5,6 max**
Consumption at minimum power (pellets)	kg/h	1,1 max	1,1 max	1,3 max	1,3 max
Pellet tank capacity	kg	70	70	70	70
Heatable volume	m <sup>3</sup>	180/420***	180/500***	300/580***	300/680***
Smoke outlet diameter	mm	80	80	80	80
Combustible gas bulk	Kg/s	0,015	0,016	0,018	0,020
Min/Max fume temperature	°C	65 / 90	65 / 90	65 / 110	65 / 110
Power supply	V	V230~ / 50Hz	V230~ / 50Hz	V230~ / 50Hz	V230~ / 50Hz
Maximum absorption	A	3	3	3	3
Average electrical power during operation	W	120	120	130	130
Maximum electrical power	W	700	700	700	700
Electric power on stand-by	W	2	2	2	2
Boiler min/max temperature	°C	50 / 80	50 / 80	50 / 80	50 / 80
Maximum temperature of the hot water	°C	65	65	65	65
Maximum operating pressure	bar	3	3	3	3
Boiler pressure loss	hPa	55	55	55	55
Boiler water content	lt	60	60	60	60
Boiler net weight	kg	280	280	300	300
Maximum draught required	Pa	10	10	10	10
Class EN 303-5		5	5	5	5
Environmental quality class (D.M. 186)		3	3	4	4

\* The fire and rated power as well as the efficiency are measured in a lab test in optimal installation conditions.

\*\* The data was recorded in a lab test in optimal conditions. Hourly consumption can vary according to the type of pellets used and the installation.

\*\*\* The heatable volume is subject to variation according to installation conditions, type of house insulation and external climatic conditions connected with the geographic location.

## 6 - FUELS

There are numerous types and qualities of wooden pellets on the market, so it is important to choose one that contains no glue, resins or chemicals and may cause early clogging of the smoke discharge, the formation of corrosive gases, loss of efficiency and the emission of polluting substances into the atmosphere. The pertinent regulations state that the products working with this fuel must use good quality, compact and not very floury pellets. Please ask your retailer for a suitable type of pellets, **complying with ISO 17225-2 standard**.

The characteristics of the wooden pellets to use are as follows: 6÷8 mm in diameter, about 5÷20 mm in length, 8% humidity and 18200 kJ/kg calorific value.



**The Manufacturer accepts no responsibility for the use of FUELS OTHER THAN AS STATED or the possible malfunction of the unit.**



**Stack the fuel bags at at least 1 metre from the equipment.**



**Chopped fuels (e.g.: olive stones, shells) can be used "unmixed" with the wooden pellets, but they must have a minimum diameter of 4mm and humidity not exceeding 12%.**

**Self-produced fuels or fuels bought from the market but not complying with these minimum requirements must be mixed with the wood pellets. The mixture must have a percentage of wood pellets varying from 50% up to 90% according to the characteristics of the biomass (size and humidity) to ensure good operation. To get a correct mixture, weigh each fuel with a set of scales having a 100g precision factor and mix them together in a container outside and not inside the boiler tank, since it is not possible to obtain the necessary homogeneity inside.**

Before switching the unit on, select the type of fuel to use from the display menu, following the procedure described below:

- Select "fuel 1" to use class A1 and A2 (ISO EN 17225-2) certified wood pellet.
- Select "fuel 2" to use class B (ISO EB 17225-2) certified wood pellets.
- Select "fuel 3" to use agripellets with a humidity not exceeding 12%.
- Select "fuel 4" to use almond-hazelnut shells with a 4mm minimum diameter and humidity not exceeding 12%.
- "Fuel 5" is at the technician's/dealer's discretion for settings to be used with unsuitable fuels or fuels that have not been mentioned previously.

**For the boiler to work correctly and performance to be high, it will therefore be necessary to change the list of**



**fuels, selecting the most suitable.**



# 7 - INSTALLATION

## 7.1 PRE-INSTALLATION

**Before installing the boiler, check that everything has been prepared.**

Find below a quick checklist, for the complete information always refer to the pre-installation card.

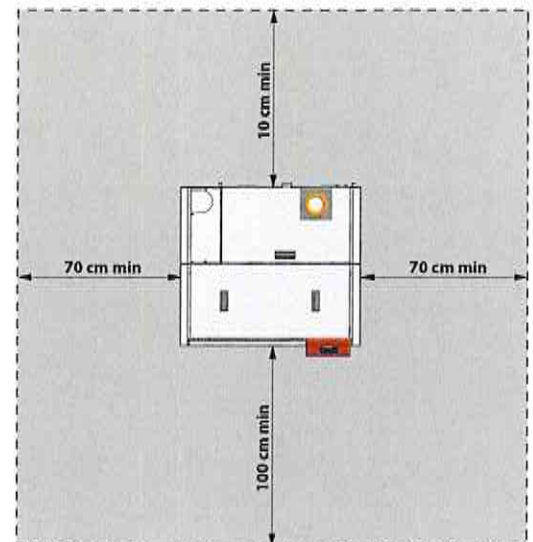
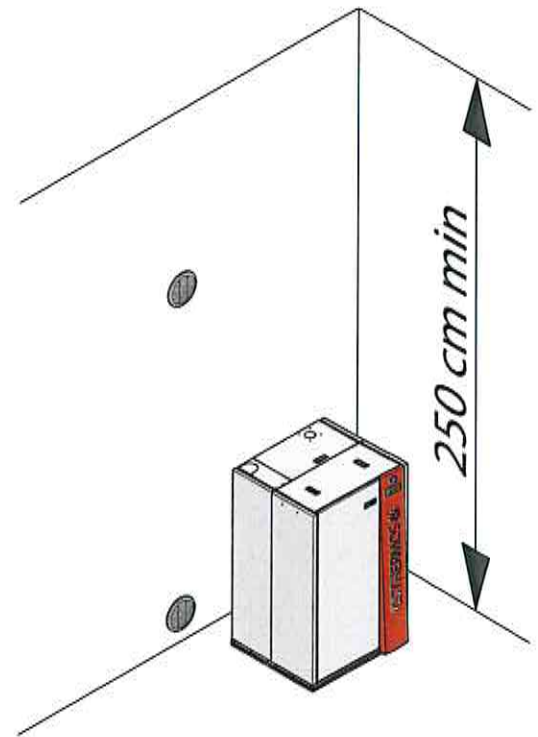
Check that:

- the surface supporting the generator is level and cannot be affected by the heat;
- if the floor does not withstand the weight of the boiler, a 4mm-thick metal sheet platform in the right size must be placed in between, with insulating material, to be applied on the floor, of mineral origin (rock wool) and with a rated density exceeding 80 kg/m<sup>3</sup>.
- if the boiler is installed on a wooden floor, we recommend a precautionary insulation of the support base with a 2mm-thick metal sheet bigger than 50mm, all inside the unit.
- The fume outlet tube must exceed 80 mm in diameter.
- minimum dimensions have been complied with;
- In case of installation near flammable or combustible walls, keep a safety distance of at least 30cm on both sides and on the back. Avoid leaving any type of combustible or flammable material within 1 meter from the front of the unit.
- there is sufficient ventilation (0.5 m<sup>2</sup> minimum);
- an appropriate flue pipe for the discharge of the fumes has been provided outside the installation area;
- a thermal circuit breaker has been installed upstream that supplies the boiler and is triggered as required;
- there is no flammable material around the installation area;

The unit has been designed to be installed within the area it will serve.

As to positioning, the installer must comply with the minimum distances from the walls and surrounding material.

The surrounding spaces will also be used as easy access in case of maintenance (see figure).



## 7.2 FLUE PIPE

For the boiler to work well, the flue must be made by a qualified engineer that must comply with the regulations in force (UNI EN 10683). If that is not the case, the company cannot be held responsible for any malfunctions.

To clarify things: chimney or flue is the vertical part of a duct that is characterized by its own draft (natural convection). On the other hand, the smoke duct is the horizontal ducting necessary to connect the unit to the flue.

This unit must discharge combustion products via a vertical flue having a minimum depression of 6-8 Pa, in order to guarantee fume expulsion even if there is no electrical power or the environmental conditions are adverse.

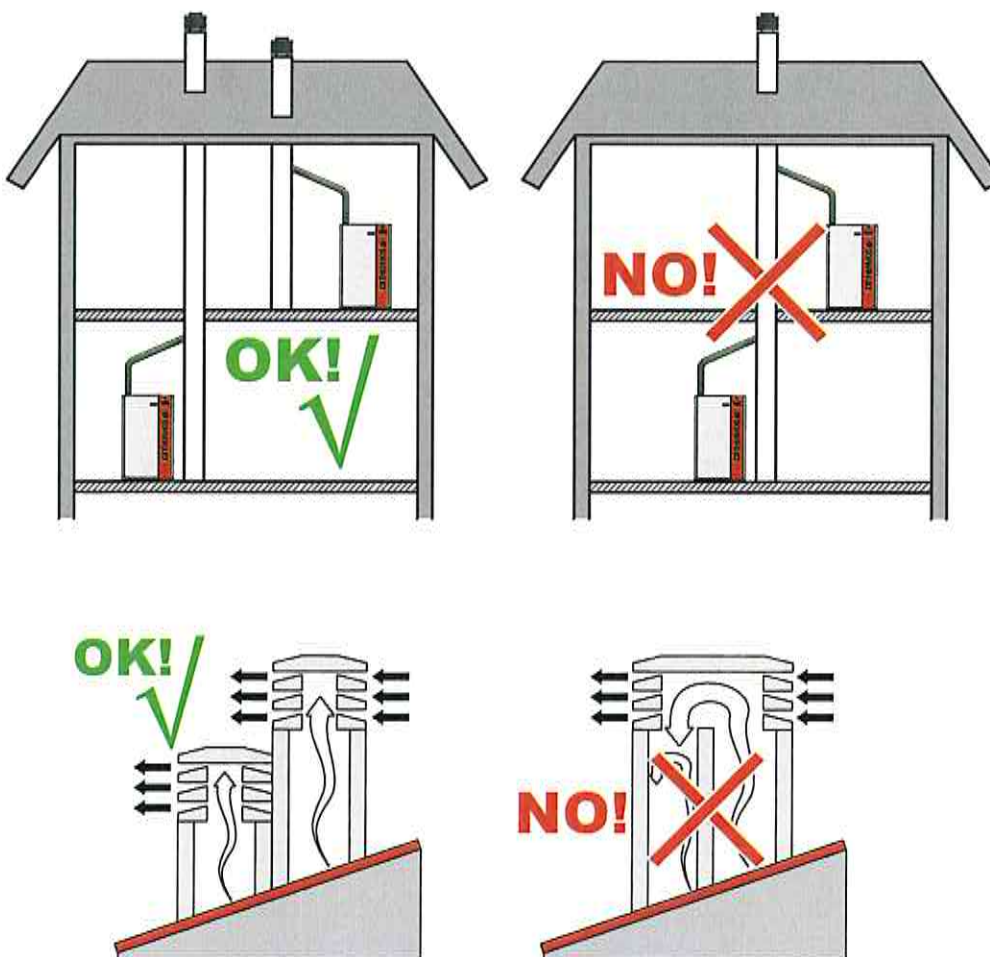
The section of flue that gets out of the roof or remains in contact with the outside must be covered in flat tiles, or anyway, be very well isolated.

Any buildings, plants and other obstacles exceeding the height of the roof must be at a minimum distance of 3m from the chimney.

We recommend the smoke duct is provided with a chamber collecting solid materials and condensate, located under the mouth of the fume channel, so that it can be opened easily and inspected via an airtight door.

**For the flue, smooth pipes and fittings must be used and assembled with suitable gaskets, to guarantee the tightness of the seal and prevent combustion gases from escaping in case of a malfunction. No corrugated hoses must be used.**

**IT IS ABSOLUTELY FORBIDDEN TO INSTALL THE UNIT IN A COLLECTIVE FLUE!**



In particular, as to flues/smoke ducts, we wish to remind you of the following:

**MATERIALS:**

- They must withstand mechanical stress.
- They must withstand any acid condensation that may form from the combustion products.  
(the use of STAINLESS STEEL 316 is recommended).
- They must be waterproof.
- They must obviously withstand the heat.
- The pipes that can be used are rigid in painted steel (minimum thickness 1.5mm) or stainless steel (minimum thickness 0.5mm). The male/female coupling collars must overlap by at least 40mm.
- The tube diameter depends on the type of system. The boiler has been designed for pipes with an 80mm diameter maximum, as shown in the table; in some cases a 100mm diameter is recommended. If pipes with a 100mm diameter must be used, connect them to the boiler with a "T" coupling with an 80mm diameter and a fitting  $\varnothing$  80 -  $\varnothing$  100.

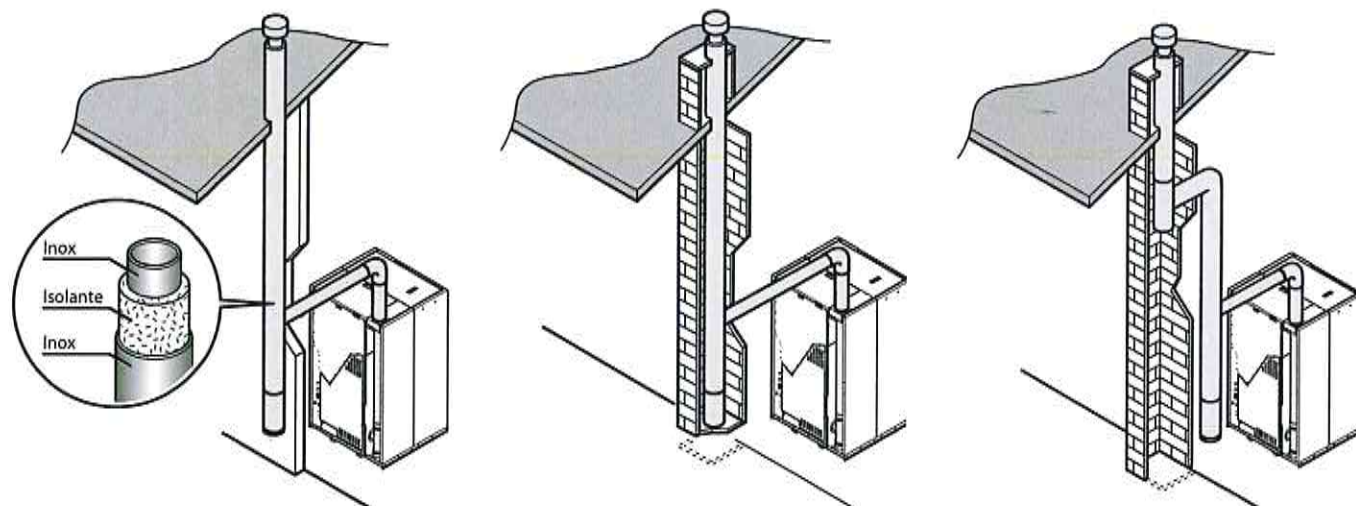
FLUE	DIAMETER	ASSESSMENT
Pipe shorter than 5m	80mm	Correct
Pipe longer than 5m	100mm (minimum)	Mandatory
Installations located over 1200 m above sea level	100mm (minimum)	Recommended

**PATTERN AND SECTIONS:**

- They must be as vertical as possible, with a constant section and a smooth internal surface to prevent the accumulation of head losses that would affect the draft required to discharge the smoke.
- The lower part of the flue must be provided with a collection "T" with lid (steel flue) or with an inspection door (masonry flue), so that any condensation or soot can be collected.
- Smoke ducts connecting the unit to the flue must be as short as possible (2 - 3 metres maximum) and with two 90° turns maximum. It is important for them to have a 3-5° positive slope towards the flue to ensure the smoke goes out.
- Calculate a loss of head of 1 metre for each 90° turn.
- Calculate a loss of head of 0.5 metre for each 45° turn.
- To connect the flue and smoke duct, "T" junctions with inspection plugs must be used, to make cleaning easier.
- It is forbidden to install gates or valves that can prevent the fumes from going out.

**CHIMNEY:**

- In order to prevent any boiler malfunction, the chimney must comply with these installation rules:
- It must be the same section and internal shape as the flue and an outlet section no less than twice the section of the flue.
- It must be a windproof chimney, to guarantee the expulsion of the smoke with winds coming from any direction and angle.
- It must prevent rain, snow and foreign bodies from getting in.
- It must not be close to other buildings, but have a free outlet that ensures combustion gases are dispersed into the atmosphere and above all, if the outlet is on a roof, its height must exceed the reflux area.



#### INSULATION:

- Stainless steel flue: if the flue is located outside, it must be adequately insulated to guarantee good draught and prevent condensation. If the chimney is built along the outside wall, heat-insulated double-wall tubes or single-wall tubes with an adequate layer of rock-wool or ceramic fibre insulation are normally used. All chimneys must be provided with a condensation collecting plug located in the bottom part of the structure. Inside the building, simple wall tubes can be used, but have the flue sections passing through the roof space or unheated areas well insulated.
- Flue in uninsulated pre-existing masonry: in order to prevent condensation that may be visible outside the flue as humidity patches, we recommend it is ducted in a stainless steel tube.

#### ASSEMBLY:

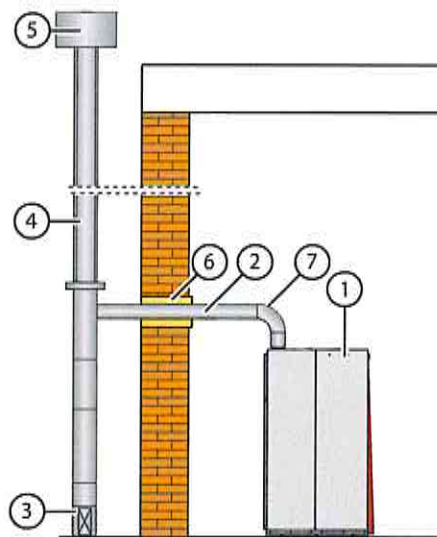
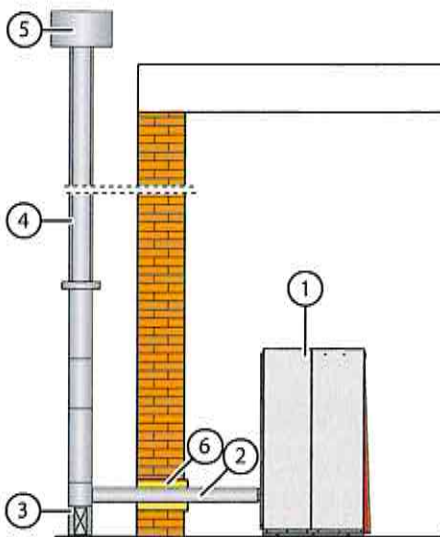
- It must be possible to access all parts of the flue, so that it can be cleaned at regular intervals.
- All sections must be sealed.
- The whole structure must be able to absorb thermal expansion.
- In case of excessive draught, regulators can be fitted, on condition they do not affect the unit normal operation and guarantee minimum draught. Integration must anyway be carried out by specialized personnel.
- **WARNING: Since the regulations on the installation of pellet boilers are changed continuously, ask your installer for any upgrades.**

#### OTHER USEFUL SUGGESTIONS:

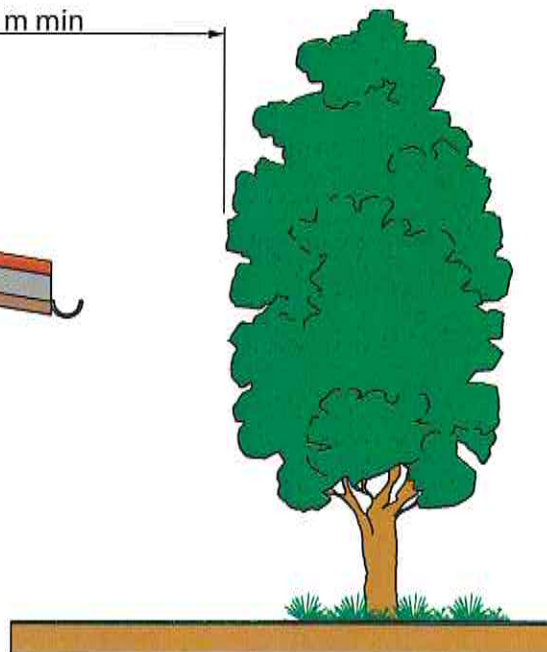
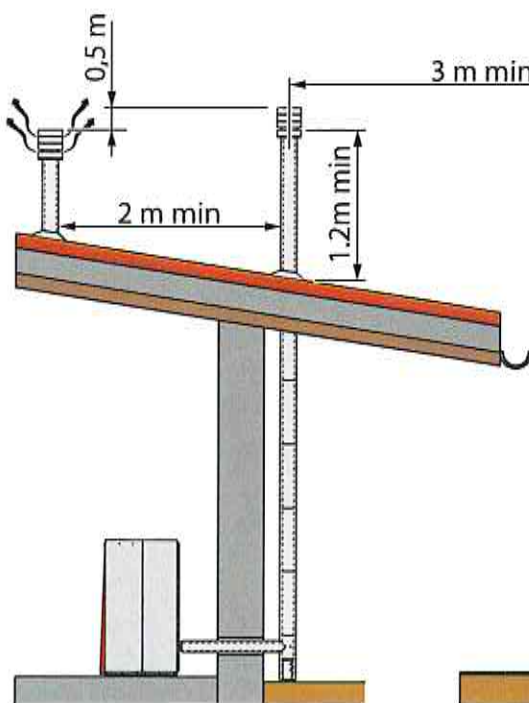
- No other heating equipment must be connected to the chimney.
- The flue must be kept at a safe distance from flammable objects.
- The flue must have the same section as the smoke discharge pipe of the boiler, or bigger.
- No other pipe must be located in the flue.

In pellet boilers, smoke extraction is guaranteed by a fan keeping the combustion chamber pressurized, combined with a state-of-the-art chimney that must allow smoke evacuation using the natural draught. For this reason we recommend you contact a specialized engineer to build the flue. The costs for any modification in programming carried out by the service centres, due to the incorrect installation of the flue, will be debited to the user. If malfunctions persist and are due to the flue, the manufacturer will carry out no interventions under warranty.

Find below some examples of flues:



- 1) Boiler
- 2) Smoke channel
- 3) Flue ash collection element
- 4) Double-walled steel flue
- 5) Chimney
- 6) Sealed passage
- 7) Elbow



### 7.3 ELECTRICAL ARRANGEMENT

All the units are fitted with an electrical supply cable: if this has to be replaced (e.g. if damaged), contact an authorized Technical Service Centre.

Before connecting the unit, make sure that:

- the electrical system is fitted with a 6A thermo-magnetic circuit breaker
- the system characteristics meet the details on the data plate applied to the unit (electrical power, rated voltage, etc.)
- the system is fitted with an efficient ground connection, in compliance with the legal regulations in force (grounding is compulsory by law)
- at no point should the supply cable reach an overtemperature of 50°C in comparison with the ambient temperature. If direct connection to the network is required, an omnipolar switch must be used, with a 3mm minimum opening between contacts, sized for the load stated on the plate and compliant with the regulations in force; the yellow/green earth wire must not be interrupted by the switch. The omnipolar switch must be easily reachable once the unit is installed.

If the unit is not used for a long time, disconnect the supply.

The Manufacturer accepts no responsibility if the above, as well as the usual safety regulations, are not complied with.

### 7.4 HYDRAULIC ARRANGEMENT

To work correctly, the boiler must be appropriately connected to a heating system. Please remember the installation must be done professionally by a qualified person or company in compliance with the provisions of Ministerial Decree 37/08. The Manufacturer accepts no responsibility for incorrect installations or if they are not carried out by a competent technician.

For the installation, refer to the UNI7129 and UNI10412 standards (and their respective amendments).

For a correct installation, check that there is no leak in the hydraulic system that may affect the operation of the boiler and its integrity. To this end, the installing company must adopt the solutions it deems necessary to prevent the boiler heat exchange surfaces from getting limescale deposits, slurry, iron residues from the system and anything else that might be alien to the heating water. This will allow optimizing the thermal efficiency and safe operation of both boiler and system. We recommend that you install a softener on the cold water inlet and a fine filter on the boiler piping, to filter the largest impurities.



- **vent the heating system and the boiler every time you fill it.**
- **connect and take outside the boiler the discharge of the safety valve.**
- **on the return circuit, a chemical-physical water treatment system must be installed, for instance a magnetic dislimmer: it is necessary to protect the boiler internal components, such as the electronic circulator, from impurities and ferrous particles present in the system. Alternatively, use a heat exchanger to separate the water of the boiler from the system water.**
- **It is always mandatory to perform a system flushing or restoration in case of new installation and replacement of the heat generator as required by the UNI8065 standard.**

If hot water must be produced, a water heater must be installed, holding at least 80 litres, so that the boiler can work efficiently.

The boiler is fitted with an 8-litre expansion tank: if this is insufficient for the system, one of suitable size must be installed. Find below the calculation to determine the capacity required for the expansion tank:

$$V_e = \frac{C_e \cdot (V_i + V_c)}{\left(1 - \frac{P_i}{P_f}\right)}$$

$V_e$  = expansion volume

$C_e$  = expansion coefficient

$V_i$  = litres contained in the water system

$V_c$  = litres contained in the boiler

$P_i$  = tank precharge pressure

$P_f$  = valve set pressure



- If the expansion tank in the system is insufficient, a supplementary tank must be added.

MAX TEMPERATURE	EXPANSION COEFFICIENT
40	0.0076
50	0.0118
60	0.0168
70	0.0224
80	0.0287
90	0.0357
99	0.0432

## 7.5 UNPACKING

We recommend you unpack the equipment only after transporting it to the place where it must be installed and only at the time of installation. This operation must be done using all the possible personal protection equipment used to protect people (gloves, safety shoes, etc.).



Do not leave the packaging unattended: it is potentially harmful to children and animals (choking hazard).



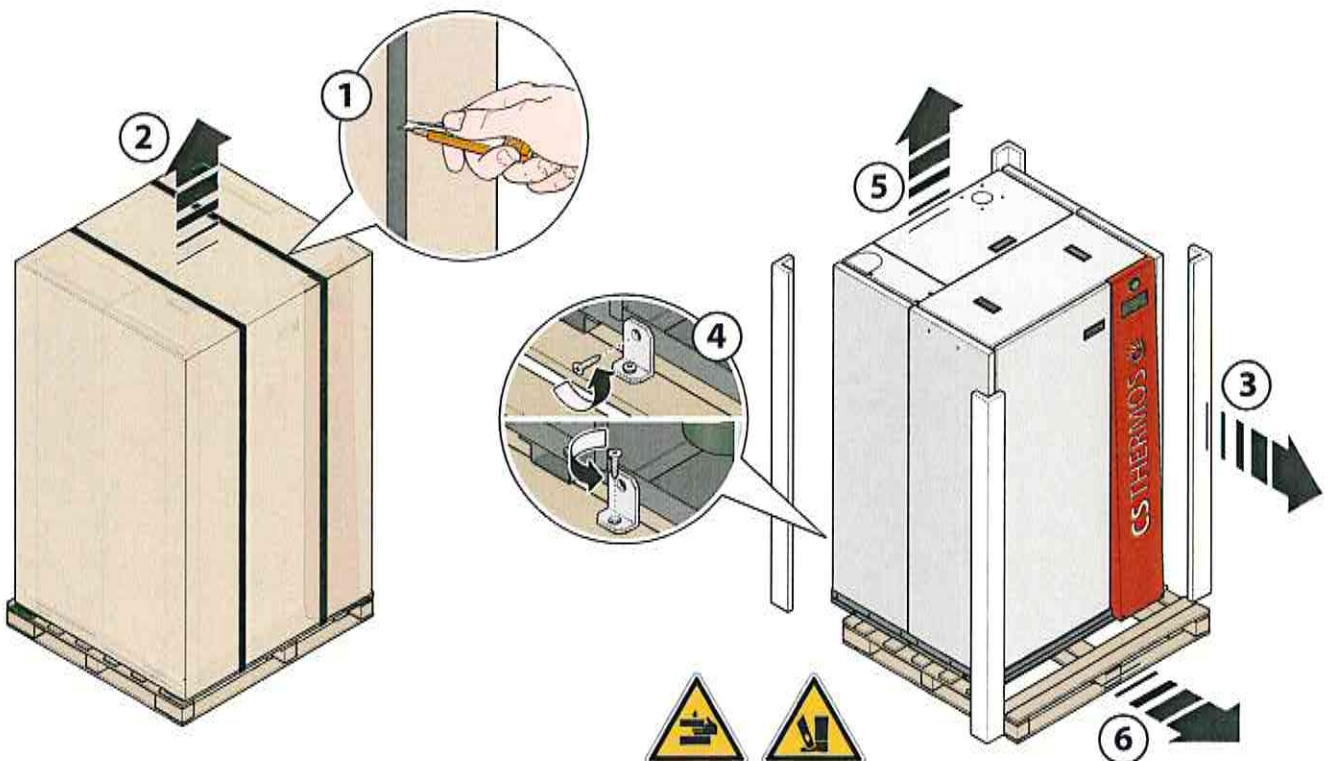
Some packaging material can be kept for future use (wooden crates, pallets, etc.), while the material that cannot be reused (polystyrene, straps, etc.) must be disposed of in compliance with the regulations in force in the country of installation: this will protect the environment!

After unpacking, check what you have received: all deliveries are accompanied by transport documents containing the list and description of the items delivered. Check all the components are present and undamaged, contact the Manufacturer in case of any problems.

While waiting for installation, components and documents must be kept in an area with the following characteristics:

- it must be dedicated only to the storage of components;
- be covered and protected from the elements (prepare a closed area, if possible), with a temperature no lower than 0°C;
- be accessible only to the operators assembling the equipment;
- have a stable floor, capable of supporting the equipment (check the load coefficient);
- be free from any other components, above all if potentially explosive/flammable/toxic.

If you cannot proceed with the installation straight away, check periodically that the above storage conditions are guaranteed.





## 7.6 FITTING THE BOILER

After unpacking the boiler, position it in the room where it will be used.

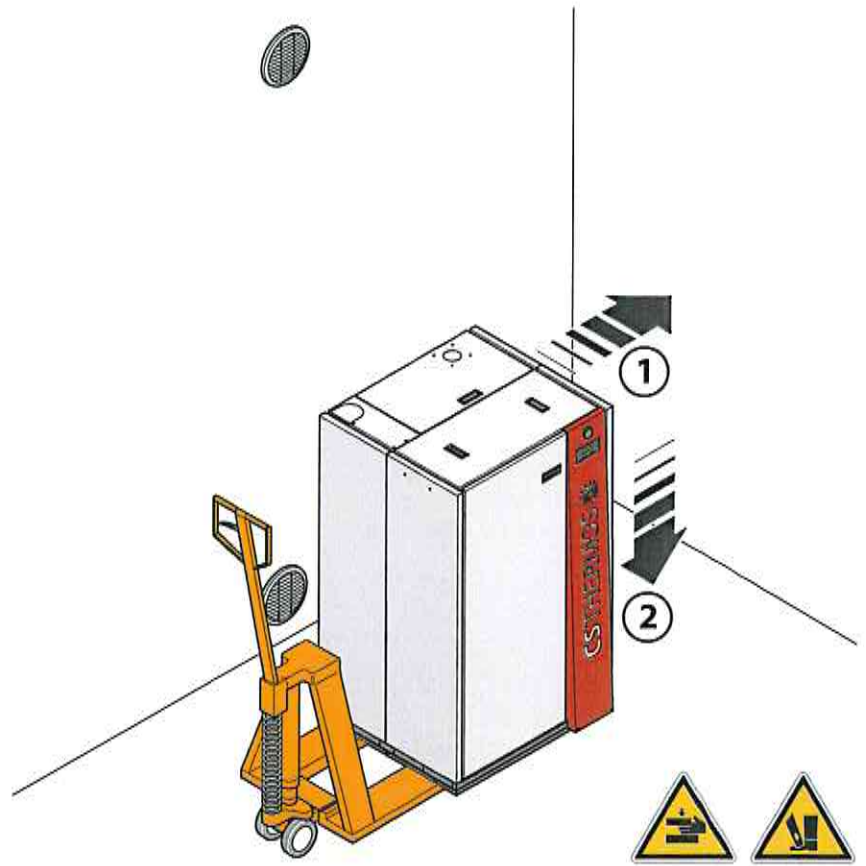
You can use a forklift truck or transpallet.

In moving the boiler, pay attention not to damage its external parts.

Please pay attention to the distances mentioned above.

In positioning the boiler, make sure there are no objects underneath it that might affect its correct positioning.

Pay attention that your hands or feet are not trapped when you place the boiler on the floor. Use protective gloves.



## 7.7 CONNECTING THE FLUE PIPE

The boiler can be connected to the previously installed flue pipe in two ways.

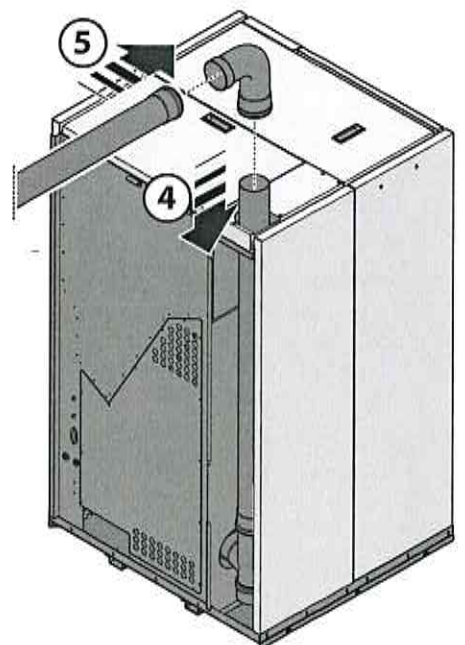
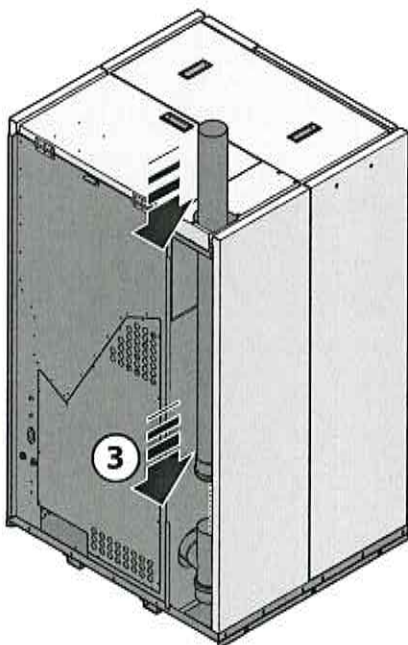
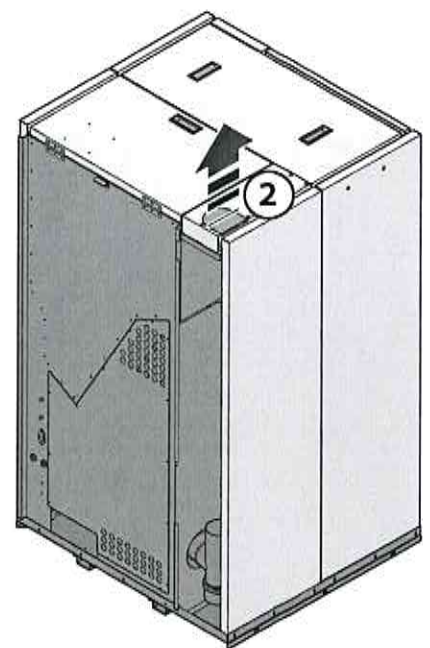
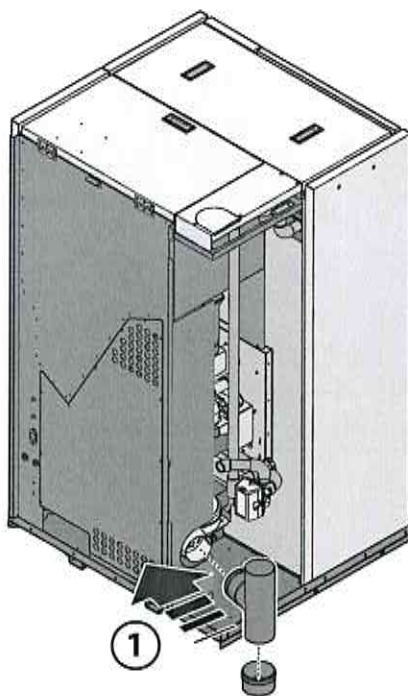
The first one is vertically, that is having the pipe come out of the top part of the boiler; the second one is horizontally, coming out from the back of it.

Please use pipes suitable to discharge pressurized fumes and fitted with seals (UNI EN 1856-1 and 1856-2).

### VERTICAL CONNECTION

Carry out the following operations as shown in the pictures on the side:

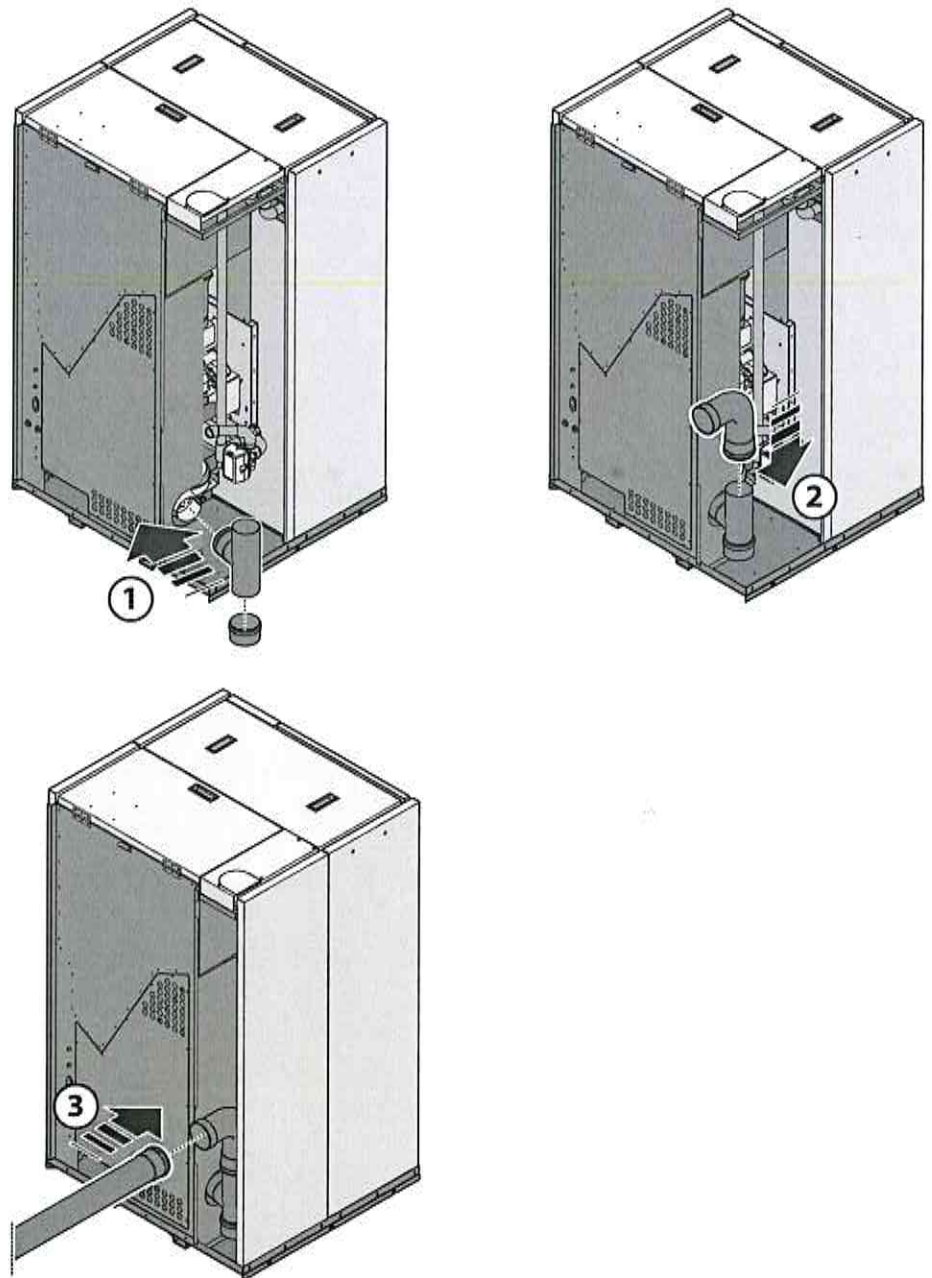
- Connect an ash collection "T" to the fume motor (1).
- Break the pre-cut on the top metal sheet (2).
- Insert a straight pipe (3).
- Install a 90° bend (4) to get the fume discharge on the back.
- Connect a straight pipe to the bend and to the flue (5).



## HORIZONTAL CONNECTION

Carry out the following operations as shown in the pictures on the side:

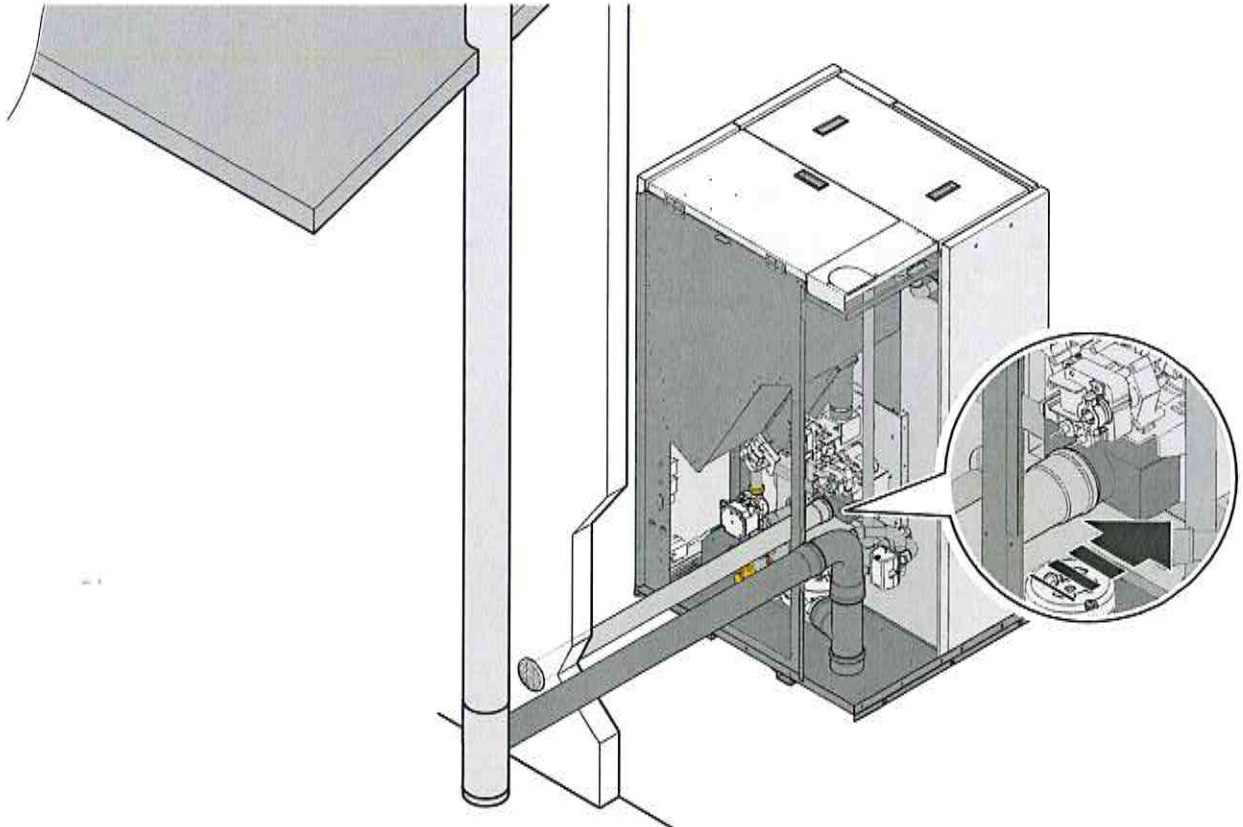
- Connect an ash collection "T" to the fume motor (1).
- Install a 90° bend (2) to get the fume discharge on the back.
- Connect a straight pipe to the bend and to the flue (3).



## 7.8 COMBUSTION AIR INLET

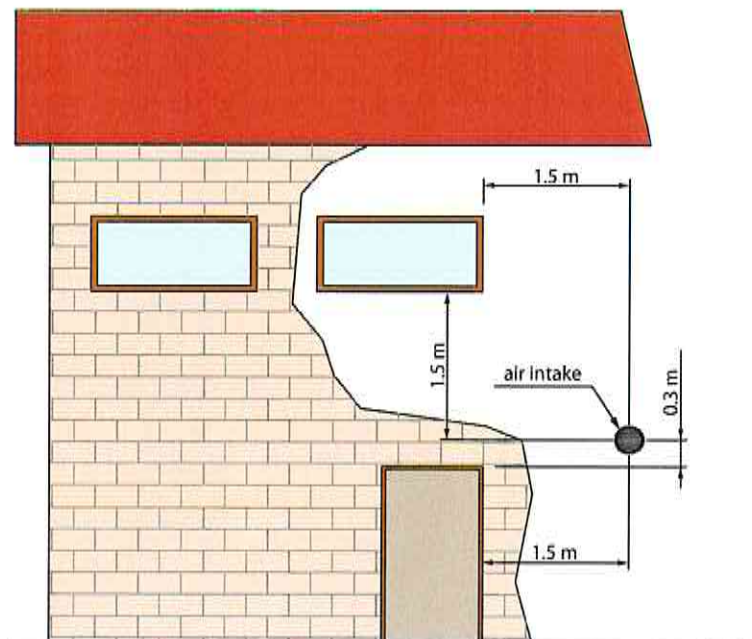
Combustion air can be taken from the room, if sufficiently ventilated, or from the outside, if not: this way optimal combustion is guaranteed, avoiding opening an air intake in the room. In both cases, refer to the regulations about installations in force (UNI 10683 and UNI7129), to avoid health risks for those who spend time in the room where the equipment is installed.

Do not use hoses and install a grille at the start of the air intake (on the outside), to prevent foreign bodies from entering and affecting the correct operation of the unit.



To position the air intake correctly and safely, see the drawing on the side, where the minimum distances from any other opening are shown.

It is important to take into account any wall discharges from other units or cooking extractor hoods.

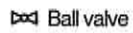


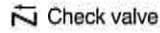


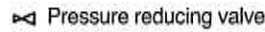

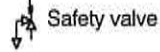




## 7.9 HYDRAULIC CONNECTIONS

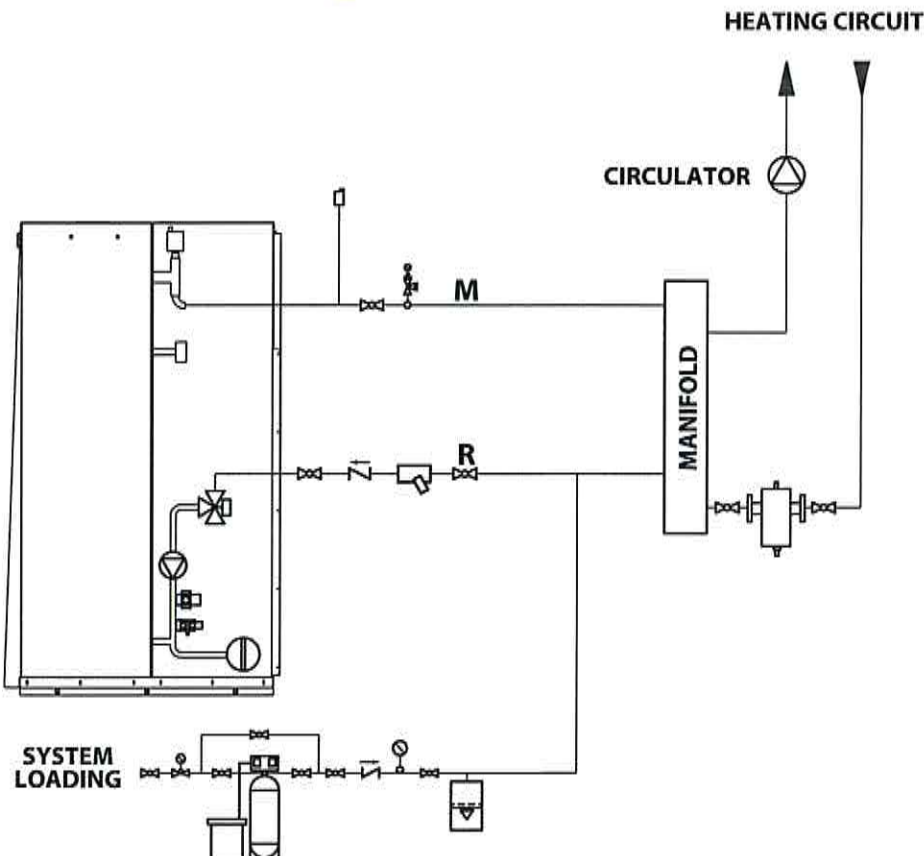


- Vent the heating system and the boiler every time you fill it.
- Connect and take outside the boiler the discharge of the safety valve.
- On the return circuit, a chemical-physical water treatment system must be installed, for instance a dirt separator fitted with a magnet: it is necessary to protect the boiler internal components, such as the electronic circulator, from impurities and ferrous particles present in the system. Alternatively, use a heat exchanger to separate the water of the boiler from the system water.
- Install a thermostatic mixer on the hot water outlet.
- Install a safety valve set at 6 bar on the cold water inlet to prevent any deformation of the sanitary accumulation.
- If hot water must be produced, a water heater must be installed, holding at least 80 litres, so that the boiler can work efficiently.

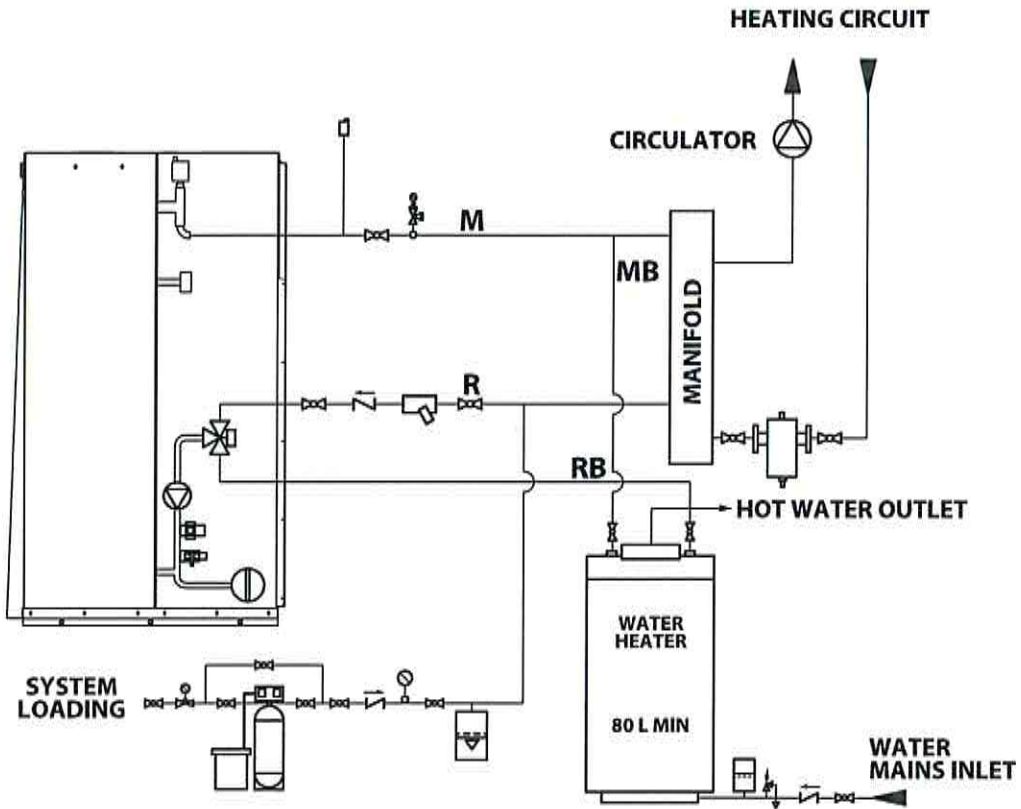
### KEY:

	Ball valve		Thermometer		Pressure gauge	<b>M</b>	Boiler delivery
	Check valve		Membrane expansion tank		Air vent	<b>R</b>	Boiler return
	Pressure reducing valve		Y filter			<b>MB</b>	Water heater delivery
	Safety valve		Dirt separator with magnet			<b>RB</b>	Water heater return
							Softener

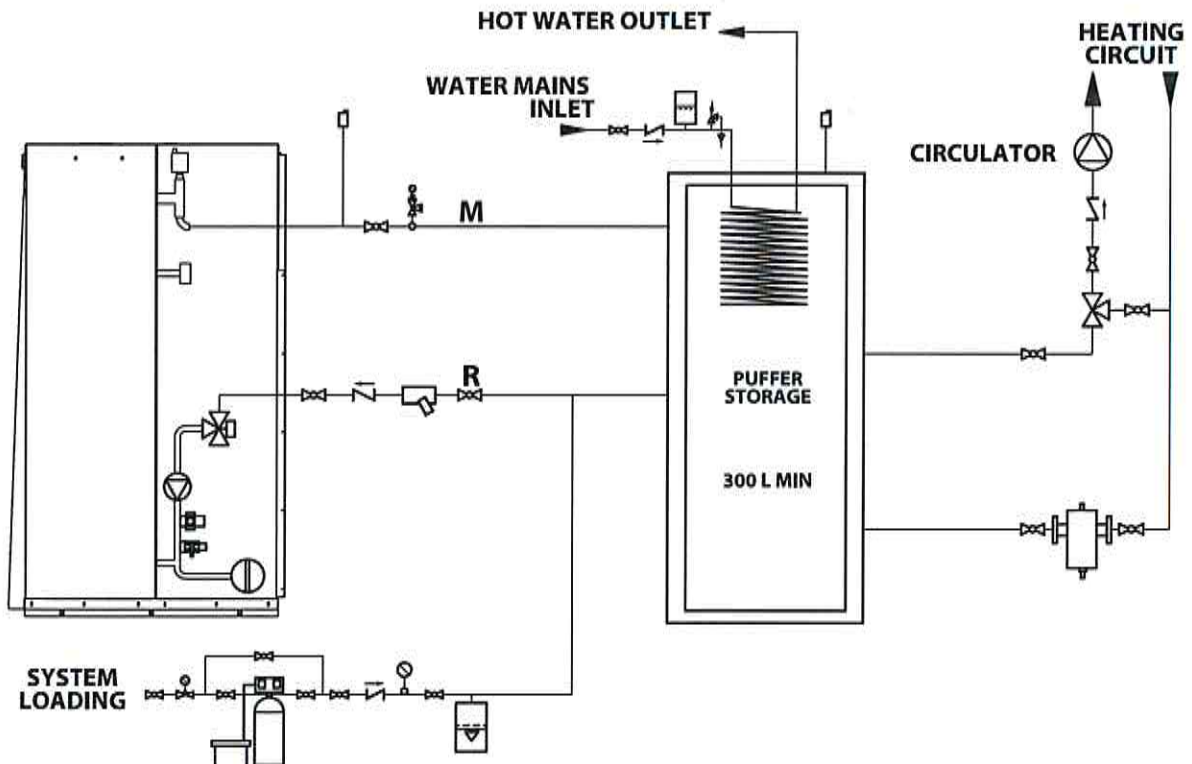
### CONNECTION DIAGRAM TO A HEATING SYSTEM



**CONNECTION DIAGRAM TO A HEATING AND HOT WATER PRODUCTION SYSTEM**



**CONNECTION DIAGRAM TO A HEATING AND HOT WATER PRODUCTION SYSTEM**

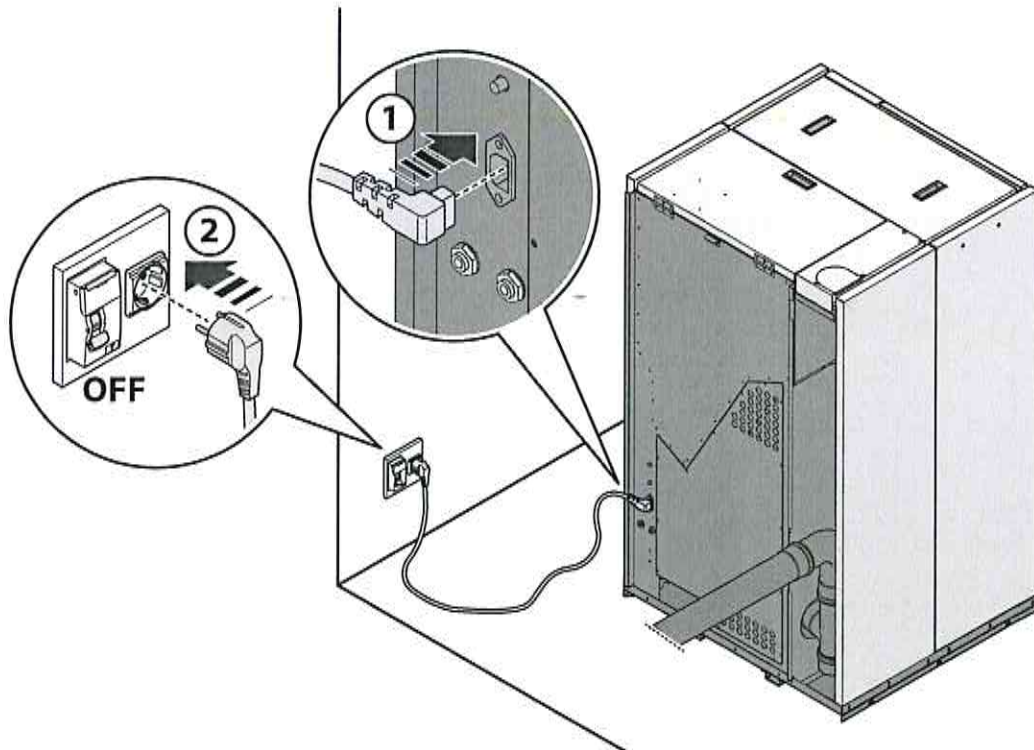


## 7.10 ELECTRICAL CONNECTIONS

On the back of the boiler there is a socket for the electrical connection. To get power, just connect the cable supplied to the unit as well as to a wall schuko socket.



Before connecting it, make sure the thermal circuit breaker is OFF.

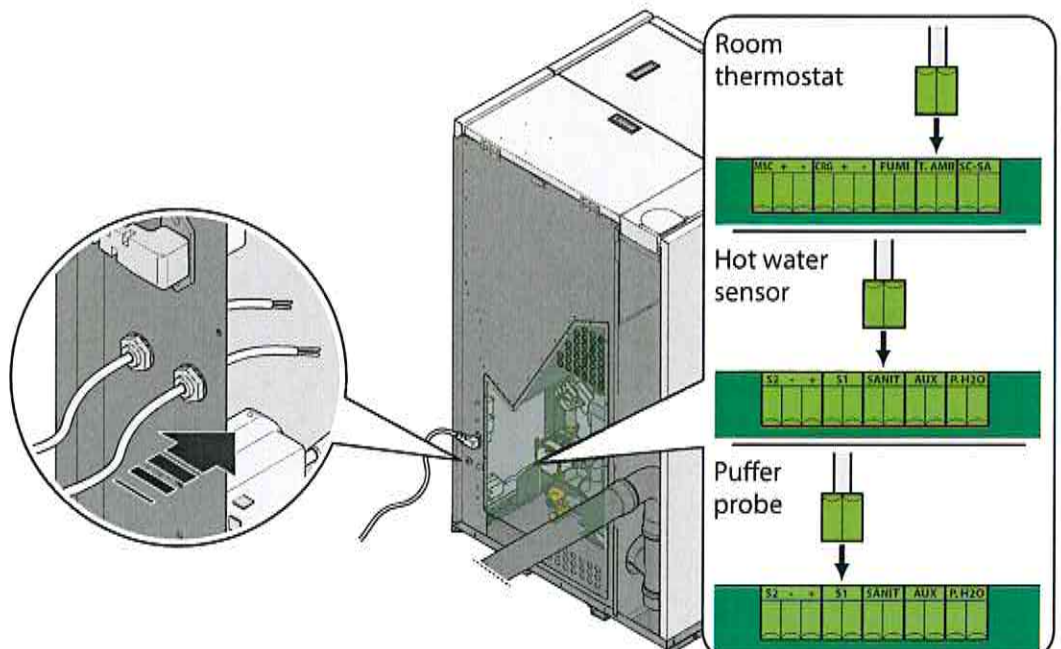


### CONNECTION OF ROOM THERMOSTAT, HOT WATER SENSOR, PUFFER PROBE (OPTIONS)

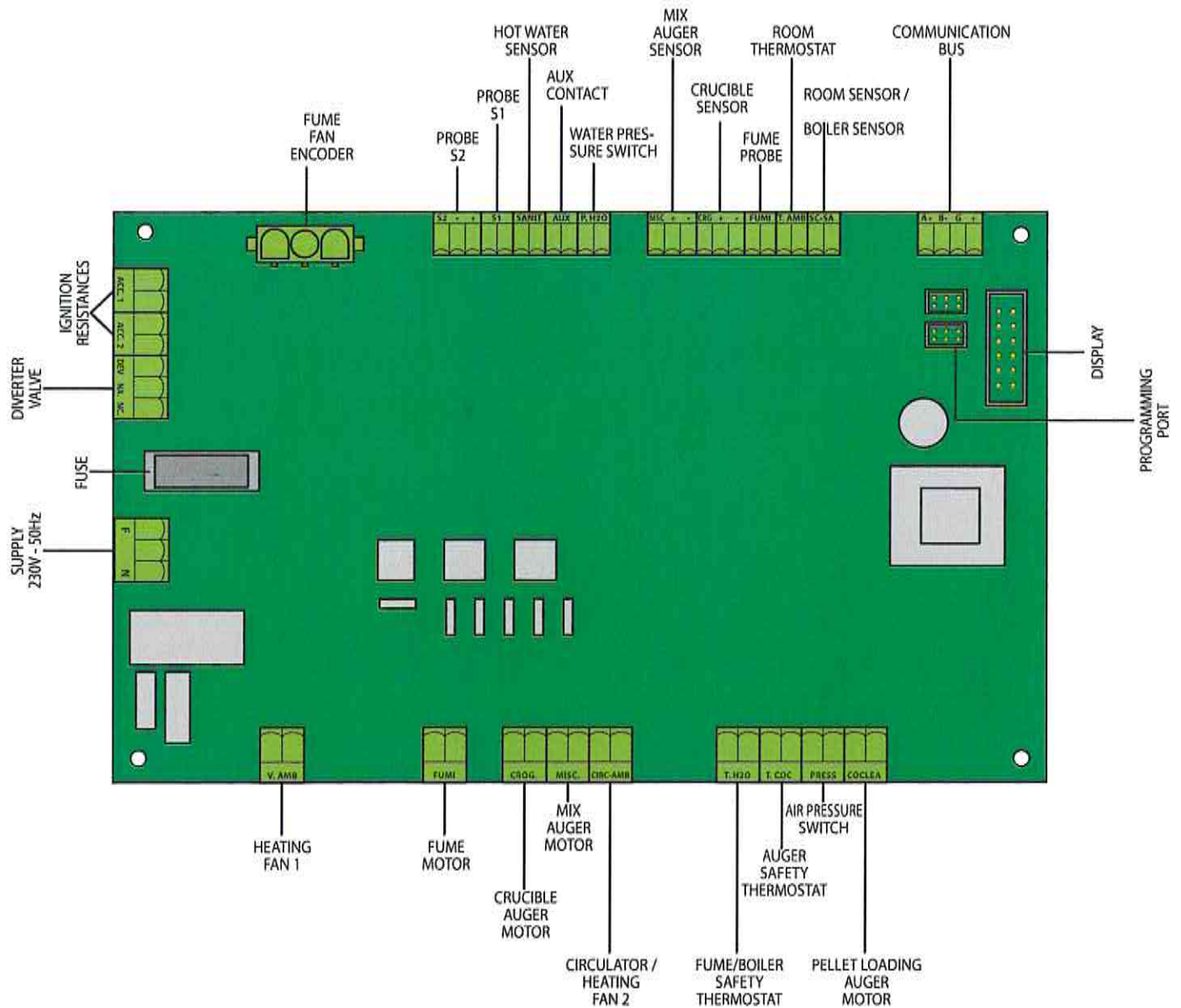
It is possible to connect a room thermostat (option) that detects the temperature in the area where it is installed and that enables and disables the operation of the boiler.

**The room thermostat must have a minimum activation  $\Delta T$  of 1°C.**

To install the thermostat or one or more sensors, use the two cable glands on the back of the boiler and connect them to the electrical board.



## 7.11 ELECTRONIC BOARD



If you are using a water heater, connect the probe supplied.

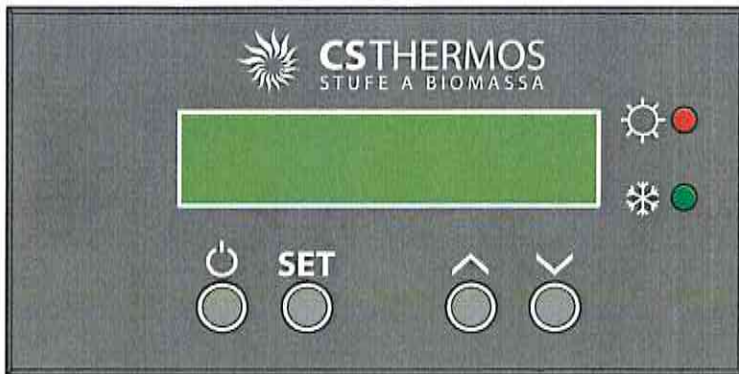





Take care with the connection of the room thermostat that will need to be with a "clean contact", to avoid damaging the electronic board.





## 8 - USE

### 8.1 DISPLAY



- Button**  - switches the boiler ON/OFF in manual mode (keep pressed for two seconds), cancels alarms and exits programming
- Button** **SET** - changes screen and confirms the set data
- Button**  - used to increase the values to be set
- Button**  - used to decrease the values to be set

#### MEANING OF THE LED LIGHTS

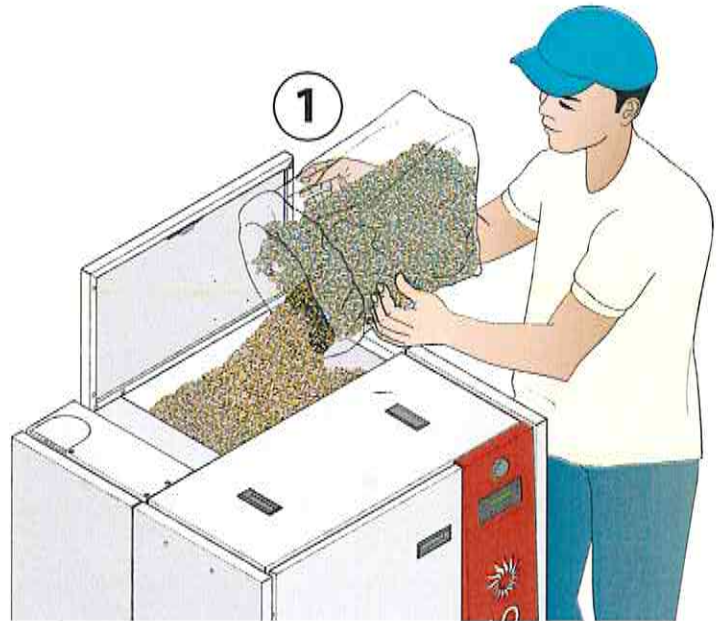
- SUMMER**  - The LED lit solid shows the temperature of the hot water has reached the desired temperature.  
- The LED flashing shows the boiler is warming the hot water
- WINTER**  - The LED lit solid shows the heating system water has reached the desired temperature.  
- The LED flashing shows the boiler is warming the water of the heating system.

## 8.2 COMMISSIONING

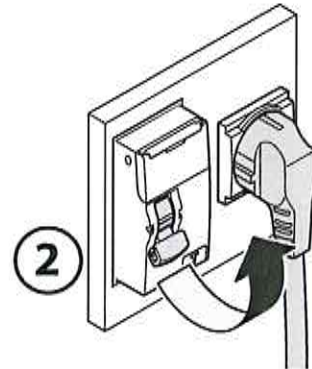


Once the installation has been completed and all the above has been checked, the system can be started for the first time. Only a CSTHERMOS authorized engineer can do this, also informing the customer on the operations to carry out to make the boiler work correctly.

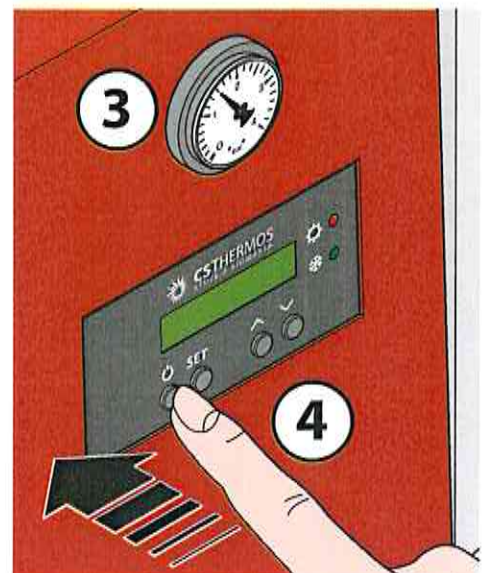
- 1 Fill the boiler tank with pellets.



- 2 Turn the thermal circuit breaker ON.



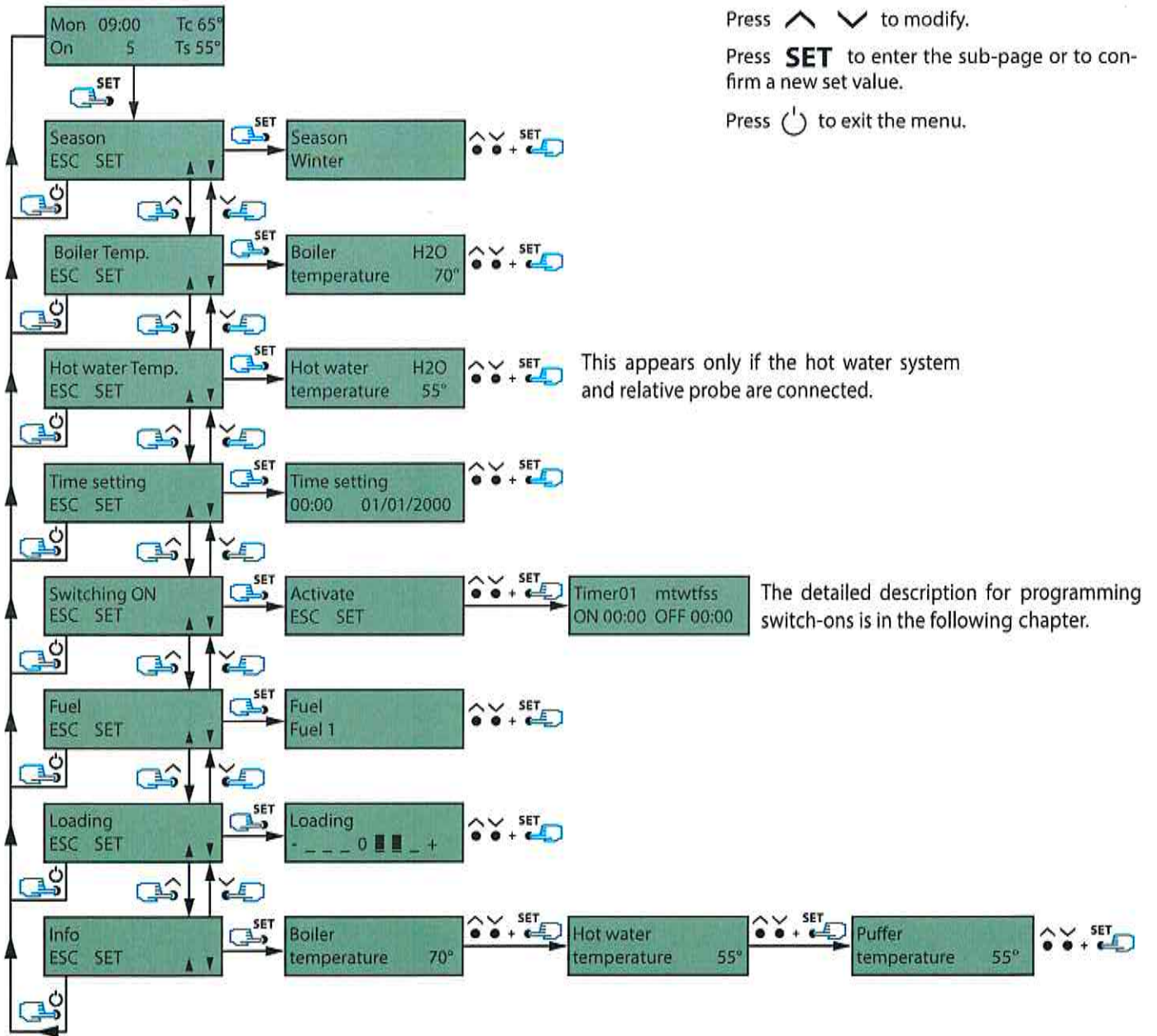
- 3 Check the gauge hand is between 1 and 2 bar.
- 4 Switch the boiler ON using the button on the control panel.



## 8.3 PROGRAMMING

### MAIN SETTINGS

Press the **SET** key repeatedly to access the desired setting.



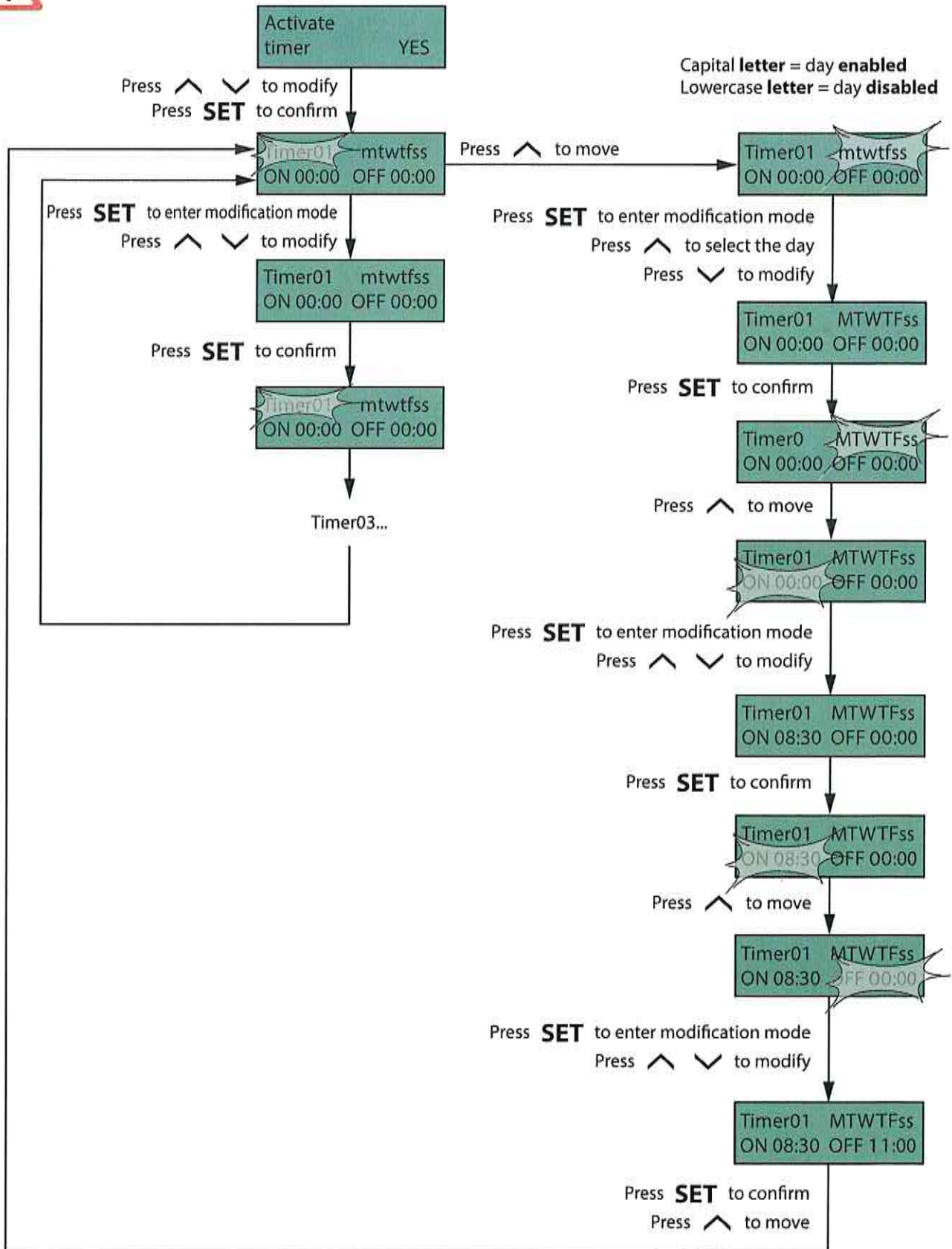
The "Loading" menu allows changing the quantity of fuel falling and is divided into 3 increasing levels (+) and 3 decreasing levels (-), each equal to 0.2 seconds for a total of +/- 0.6 seconds. This variation remains in the memory all the time and is associated to all six operating powers at the same time.

Before selecting on the display the type of fuel to use, ensure you have put the same type of fuel in the tank, in case refer to paragraph 6 on fuels.

## AUTOMATIC IGNITION PROGRAMMING



Switching-off of every time-slot **must not end** after **23:59** on the programmed day.



#### 8.4 OPERATION PHASES

DISPLAY MESSAGE	MEANING
<b>Cleaning</b>	Pre-ventilation phase and check of safety devices with crucible cleaning before fuel loading.
<b>Loading</b>	Switching-on phase with fuel loading into the burner and simultaneous power ON to resistors.
<b>Pause</b>	Flame wait pause
<b>Flame wait</b>	Waiting phase within which time ignition must take place
<b>Flame stabil.</b>	Stabilisation phase after flame ignition with fuel intermediate loading.
<b>ON</b>	Burner normal operation phase with power variation from 1 to 6.
<b>Switching-off</b>	Timed switching-off phase associated to fuel interruption with crucible cleaning and waiting for the flame to go off totally.
<b>OFF</b>	OFF state until heat is requested again.
<b>Stand by</b>	Switching-off due to the heating and water having reached the desired temperature.



**In case of an alarm, it is necessary to wait for the end of the switching-off phase.**

## 8.5 ALARM CODE LIST



For your safety, do not tamper with or modify any component of the equipment: the manufacturer does not guarantee its correct operation, which can be very dangerous. In case of malfunction, problems or if a safety device is triggered, please call authorized personnel. Anyway, all operations must be carried out with the burner off and cooled down and with the power disconnected.

No.	DISPLAY	MEANING
10	fume motor	Fume motor not working: call for an authorized engineer
11	mixing auger	The mixing auger of the burner is not turning: check for any obstructions in the fuel pipe or call for an authorized engineer
12	crucible	The burner crucible does not rotate: clean the burner and restart or call for an authorized engineer
20	1 res. start. KO	One of the ignition resistances is not working: call for an authorized engineer
21	2 res. start. KO	Both ignition resistances are not working: call for an authorized engineer
22	res. fault	The ignition resistances are always powered: call for an authorized engineer
30	fume probe	Fume temperature probe interrupted or not connected: call for an authorized engineer
32	boiler probe	Boiler temperature probe interrupted or not connected: call for an authorized engineer
33	hot water probe	Hot water temperature probe interrupted or not connected: call for an authorized engineer
40	auger sensor	Fuel auger safety thermostat triggered: clean the boiler interior, reset the thermostat and restart the boiler.
41	H2O thermostat	Boiler safety thermostat triggered: clean the boiler interior, reset the thermostat and restart the boiler.
50	pressure switch	Air pressure switch not working: call for an authorized engineer
51	H2O pressure	Boiler water pressure lower than 0.5 bar: load water onto the system or call for an authorized engineer
60	black out	No power: clean the burner and restart it
61	Network frequency	Electric voltage frequency incorrect: call for an authorized engineer
62	Communication Err.	Internal error of the electronic board: call for an authorized engineer
63	Short circuit err.	Internal error of the electronic board: call for an authorized engineer
70	failed ign.	Failed ignition: clean the burner and restart it
71	flame OFF	The flame went OFF during operation: clean the burner and restart
72	fume overheating	Combustion fume overheating: clean every part of the boiler and restart
73	continuous loading	Pellet loading motor operation fault: call for an authorized engineer
100	system cycle	Internal error of the electronic board: switch off and restart the boiler
101	service	Boiler maintenance warning: call for an authorized engineer
80	filling	Fuel tank filling did not take place in the preset time: check the loading auger and that there is fuel. Call for an engineer
82	puffer probe	Temperature probe interrupted or not connected: call for an authorized engineer



To reset the boiler, keep button  pressed for 3 seconds.

## 9 - CLEANING



During maintenance, use personal protection equipment all the time (i.e. gloves).

For the stove to work perfectly, we recommend it undergoes thorough cleaning at least once a week when using wood pellets.

If biomass is used (olive pits, shells, agripellets), cleaning must be carried out between 1 and 3 days according to the quantity of residue left in the burner.



The Manufacturer accepts no responsibility for the use of FUELS OTHER THAN AS STATED or the possible malfunction of the unit.

### 9.1 CLEANING THE OUTSIDE

To clean the outside, use:

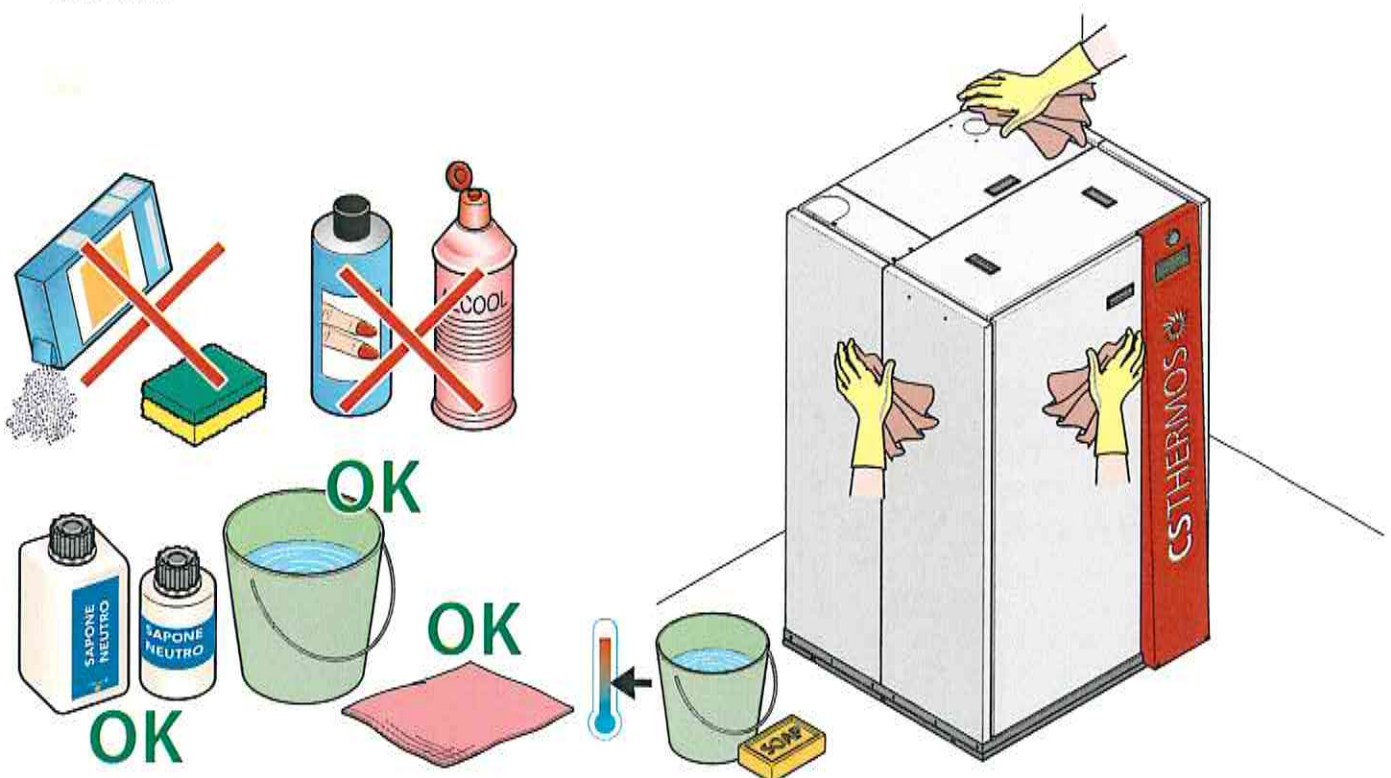
- soft cloths
- neutral products, suitable for painted or plastic surfaces.

Follow the instructions for use stated on the product label.

Always finish by drying it perfectly, possibly with a soft dry cloth.

**Do not use:**

- powder or abrasive detergents;
- aggressive or corrosive detergents (i.e. hydrochloric/muriatic/sulphuric acid). Warning! Do not use these substances even to clean the floor around the equipment;
- sharp or abrasive tools (i.e. abrasive sponges, scrapers, steel brushes, etc.)
- water jets.



## 9.2 CLEANING THE BURNER



Before starting any operation on the burner, wait for it cool down (about 3 hours).



Clean the burner every 1 to 7 days according to the type of fuel used.



Before starting work on the burner, disconnect the boiler from the mains and turn the circuit breaker on the main panel to OFF.



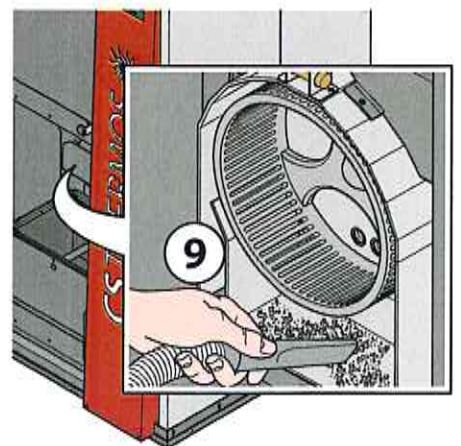
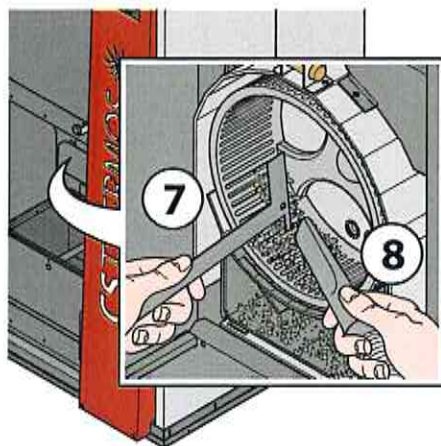
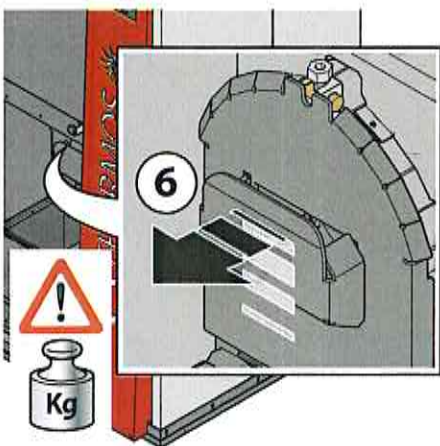
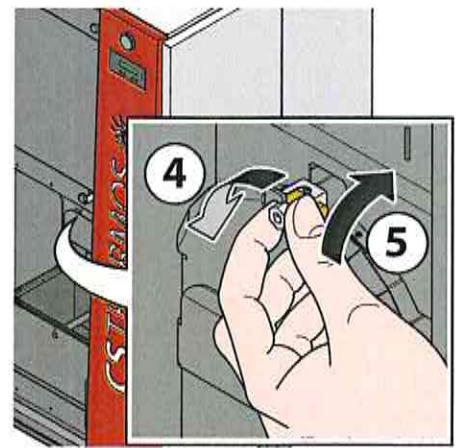
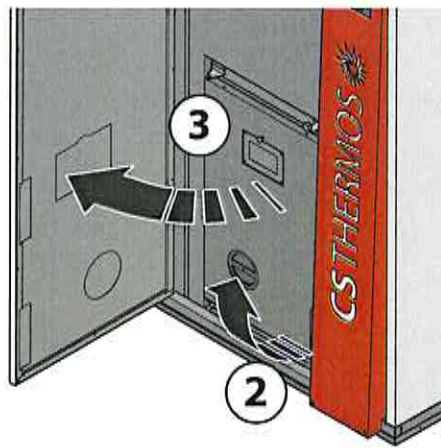
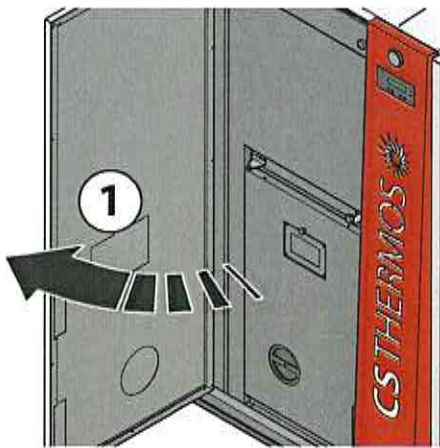
If the burner block or ash collection drawer are opened before they cool down, there might be a risk of burns.

To clean the burner, use:

- steel brush
- ash aspirator
- scraper (to remove the more obstinate residue)

**Do not use:**

- aggressive or corrosive detergents (i.e. hydrochloric/muriatic/sulphuric acid).
- water jets.





Unburnt residues inside the crucible (7), can be aspirated but can also be made to fall on the bottom with a scraper (8), where they will then go into the ash collection drawer. Once cleaning is complete, the burner lid can be refitted and closed, carrying out the same operations in reverse order.

After every cleaning, check the wear of the hearth door seal.

**Ensure that the holes of the burner basket are always totally clear from any combustion residue.**

### 9.3 EMPTYING AND CLEANING THE ASH COLLECTOR

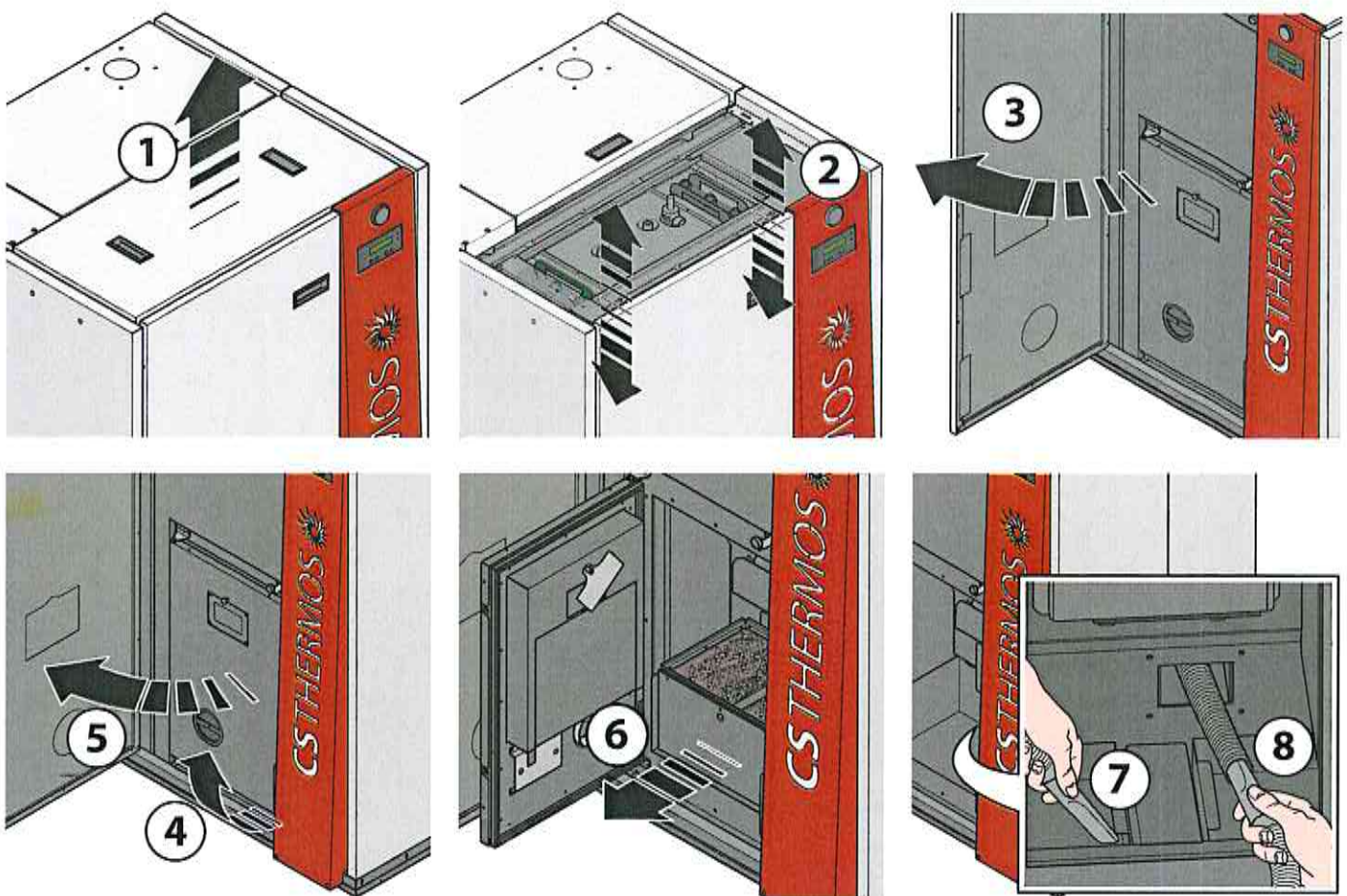


Checking the ash collector must be carried out at least once a week.



Take care because there may be some incandescent pieces among the residues. If they come into contact with flammable material, they may cause a fire.

To open and empty the ash collection drawer, follow the procedure below.



The ash must be disposed of in compliance with the regulations in force in the country, inside a dedicated bin with a lid made out of fire-resistant material.

Once the ash container has been emptied, clean it with soft cloths and neutral products suitable for painted or plastic surfaces.

## 9.4 CLEANING AND MAINTENANCE OF OTHER PARTS

### By the user

Clean any dust deposited on the bottom of the fuel loading container every two months.

Check the whole boiler is in good condition.

Check the burner combustion chamber is undamaged.

Check all seals are in good condition and are not showing any wear.

Check that the glass on the hearth door is not damaged (i.e. chipped).

If necessary, clean the "T" at the base of the fume duct and the pipe horizontal section, if any, at least once a month

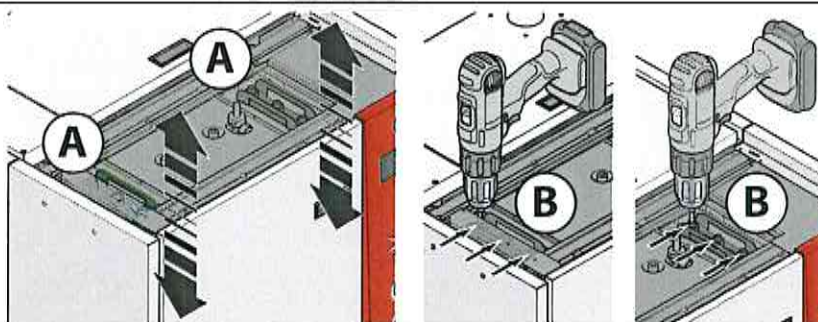
Inspect the combustion air inlet on the back of the boiler at least once a month. Remove any dirt as required

### Maintenance company CS THERMOS (annual cleaning)

Check all mechanical elements are working correctly.

Check and clean the flue.

Clean the boiler flue gas pass as shown in the figure. After moving the turbulators vertically using the appropriate handles (A), turn every individual pin (B) using a screwdriver and a hexagonal insert.



Check and clean the pellet unloading duct.

Check sleeves, gaskets and electrical cables are undamaged.

Check and clean the fume fan and its relative seat.

Check and lubricate the bushings of the fuel loading auger and of the burner.

Check the magnesium anode of the water heater



**For any other operation not mentioned in this list, please refer only to the CS THERMOS service centre.**

**If, while cleaning, the user notices any anomalies, contact CS THERMOS service centre straight away and do not use the equipment for any reason.**

## 10 - DISPOSAL

### ADVICE TO DISPOSE OF THE PRODUCT CORRECTLY

**Waste of electrical and electronic equipment (WEEE) pursuant to Decree-Law 49/2014 implementing Directive 2012/19/EU.**



At the end of its useful life, the product must not be disposed of together with urban waste but must be delivered to the appropriate collection centres or to the dealers that offer this service.

Disposing of the equipment separately allows avoiding possible negative consequences for health and the environment deriving from its inadequate disposal and promotes the recycling of the materials it is made of.

To stress the need for disposing of the equipment separately, the product bears the mark of the mobile waste container crossed out.


Maximum care has been paid to guarantee the accuracy of this manual.

The Manufacturer reserves the right to modify the equipment or the documentation at any time, without notice.

Therefore there might be small differences between this manual and the product you have received; we apologize in advance for any inconvenience.

The total or partial reproduction of this manual without the Manufacturer's consent is prohibited. Measurements are purely indicative and not binding.

The original language of this manual is Italian: the Manufacturer is not responsible for any mistakes in translation/interpretation.

Made by: 



**[www.csthermos.it](http://www.csthermos.it)**

100% tested & certified

100% made in Italy

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