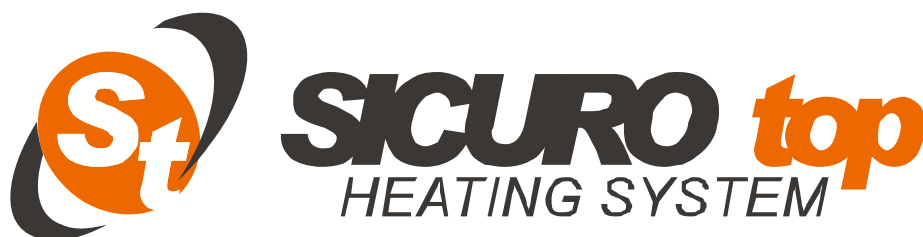


KLOVER

EN

S.R.L.

SICURO TOP SYSTEM BOILERS



MODELS: KL top - KLB top

TRADITIONAL BOILERS



MODELS: KL - KLB

**INSTALLATION
USE AND MAINTENANCE
USEFUL ADVICE**

User guide

Dear Customer,

First of all we would like to thank you for choosing a “**KLOVER**” boiler and we hope you will be satisfied with this product.

Read the warranty guarantee carefully, which is found on the last page of this *User guide*; fill the attached warranty card in fully and send it **within 10 days** from the date of purchase.

We would like to thank you again for trusting KLOVER products and we also inform you that these models are the result of forty years experience in the field of construction of solid fuel products (wood, pellets).

Every single detail that composes the boiler has been realised by qualified staff, using the most modern equipment.

The manual contains a detailed description of the boiler and its functioning, instructions for proper installation, basic maintenance and control points, which must be periodically performed; furthermore it contains practical advice which helps to obtain maximum performance from the boiler with minimum fuel consumption.

Enjoy the heat with KLOVER!

DECLARATION OF CONFORMITY

The Manufacturer

KLOVER s.r.l.

With head offices in

**Via A. Volta, 8
37047 San Bonifacio
Verona – Italy**



Declares that the product:

| | | |
|--------------|---|--------------------------------------|
| Product name | : | Boiler |
| Type | : | Wood burning boiler |
| Models | : | KL top - KLB top KL - KLB |

Has been designed and built in compliance with standards in force regarding the structure of the boiler, water tightness of the boiler body and the electric parts.

In particular:

- The overall heat output is greater than 75%;
- The direct fluid heat output is greater than 45%;
- The temperature of flue gas exiting the combustion gas outlet is no more than 400 °C beyond room temperature;
- The temperature of the rear and side external surfaces is no more than 130 °C beyond room temperature;
- The boiler complies with DM 1/12/1975 “Safety standards for appliances containing hot pressurised liquids”.

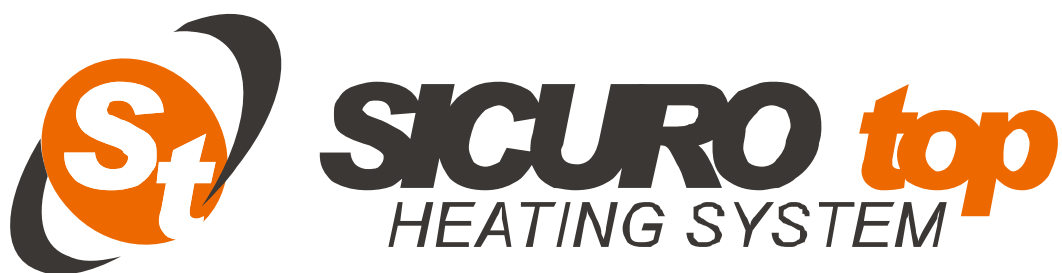
We reserve the right to modify the appliance, for technical purposes, remaining within tolerances foreseen by standards.

Therefore, the installer is excluded from all liability due to boiler faults that do not derive from incorrect assembly of the same or from the hydraulic plant that is not built in compliance with all Standards in force.

September 2004

KLOVER_{S.R.L.}
The Sole Administrator

SICURO TOP SYSTEM BOILERS



MODELS: KL top - KLB top

TRADITIONAL BOILERS



MODELS: KL - KLB

KLOVER S.R.L.

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Latest revision: February 2012

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INTRODUCTION

Important security instructions

ATTENZIONE!

Read these instructions before installing and using the product.

- **Wood-burning boiler installation and commissioning must be performed by skilled staff aware of the importance of respecting the Safety Standards in force. They will be responsible for the definitive installation of the machinery and its consequent proper functioning. KLOVER srl will not be held responsible if these precautions are not respected.**
- **During installation of the appliance all local regulations, included those referring to National and European Standards, must be followed.**
- Connect the product flue gas outlet to a flue that has the features given in the *Connections* section in this *user guide*.
- The appliance is not suitable for the installation on a shared flue system.
- If the flue should catch fire, you must be provided with appropriate systems for damping down the fire or call the fire service.
- Connect the product to sockets with earth. Avoid using sockets controlled by switches or automatic timers.
- Do not use a damaged or worn power supply cable.
- If a multiple socket is used, make sure that the total voltage of the connected devices does not exceed that supported by the socket. Furthermore make sure that the total voltage of all these devices connected to the socket does not exceed the maximum level accepted.
- Do not use flammable substances to clean the appliance and its elements.
- Do not leave containers and flammable substance in the place where the wood-burning boiler is installed.

- Do not use the appliance as incinerator or in any other way different from that for which it has been designed.
- Do not use fuels different to those which are recommended
- Do not use liquid fuels
- External surfaces of the appliance reach high temperatures when it is running; operate with caution in order to avoid burns.
- Only use original spare parts recommended by the manufacturer.
- Do not perform any unauthorised modification to the appliance.

Some Precautions

- Do not touch the *hot components* of the boiler (wood loading door, flue gas exhaust outlet) during normal functioning.
- Use the appropriate luminous button to switch the electrical panel off. Do not disconnect the power cable while the boiler is running.
- Keep children away from the boiler when it is running since they could get burned by touching its *hot components*.
- Children and inexperienced people are not allowed to use the appliance

Conventions used in the manual

ATTENZIONE! Danger due to boiler functionality



General danger for personal safety.



Danger for people and objects due to materials at high temperatures.



Danger for people and objects due to electric power.

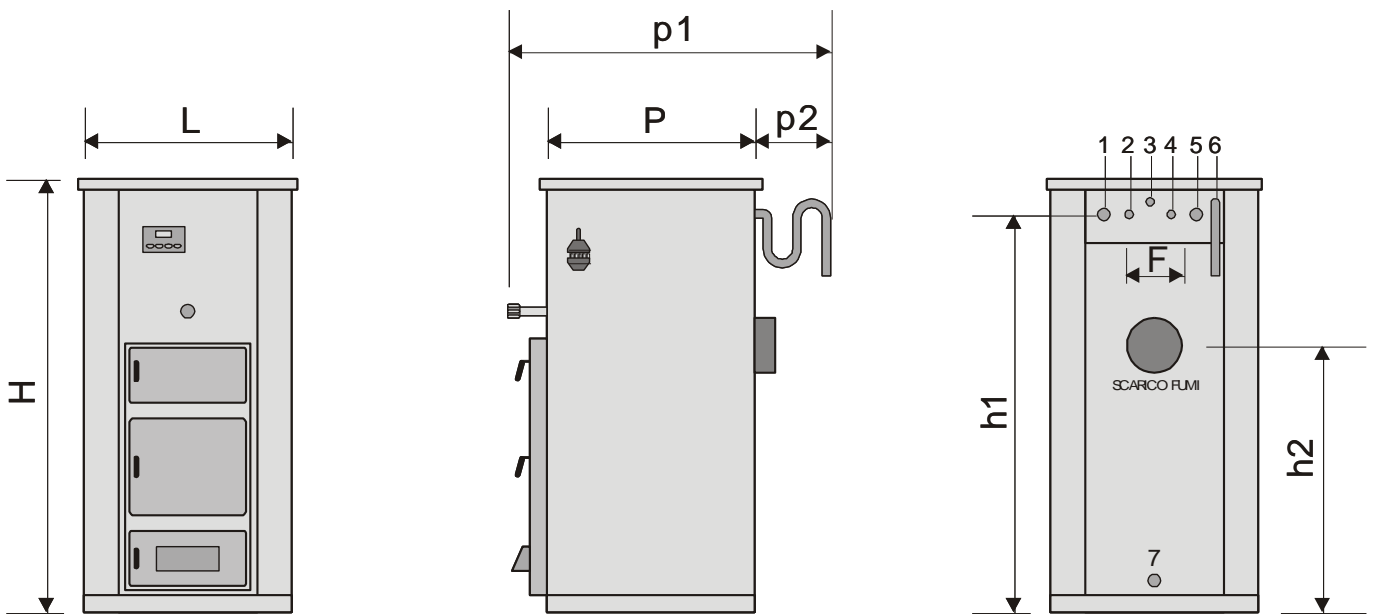


Burns hazard for people due to hot liquids.

DIMENSIONS AND TECHNICAL DATA

Here below are the three fundamental views of the boiler useful to check clearance and detailed dimensions.

SICURO top wood-burning boilers mod. KL top - KLB top



| MODEL | H | L | P | FLUE GAS EXHAUST | h1 | h2 | p1 | p2 | WEIGHT Kg |
|------------|-------|-----|-----|------------------|-------|-------|------|-----|-----------|
| KL 29 top | 1.500 | 650 | 650 | 160 | 1.300 | 1.000 | 1040 | 240 | 280 |
| KL 40 top | 1.500 | 650 | 650 | 180 | 1.300 | 1.000 | 1040 | 240 | 290 |
| KLB 29 top | 1.500 | 650 | 650 | 160 | 1.300 | 1.000 | 1040 | 240 | 290 |
| KLB 40 top | 1.500 | 650 | 650 | 180 | 1.300 | 1.000 | 1040 | 240 | 305 |

N.B.: measurements expressed in millimetres. KLOVER s.r.l. declines all liability for possible errors or omissions.

1 = SYSTEM FLOW

2 = DOMESTIC HOT WATER OUTLET (only mod. KLB top)

3 = BOILER LOADING

4 = DOMESTIC COLD WATER INLET (only mod. KLB top)

5 = SYSTEM RETURN

6 = BOILING EXHAUST

7 = BOILER EXHAUST

LOADING INLET SIZE H x L

COMBUSTION CHAMBER SIZE H x L x D

1" M GAS

3/4" M GAS

1/2" M GAS

3/4" M GAS

1" M GAS

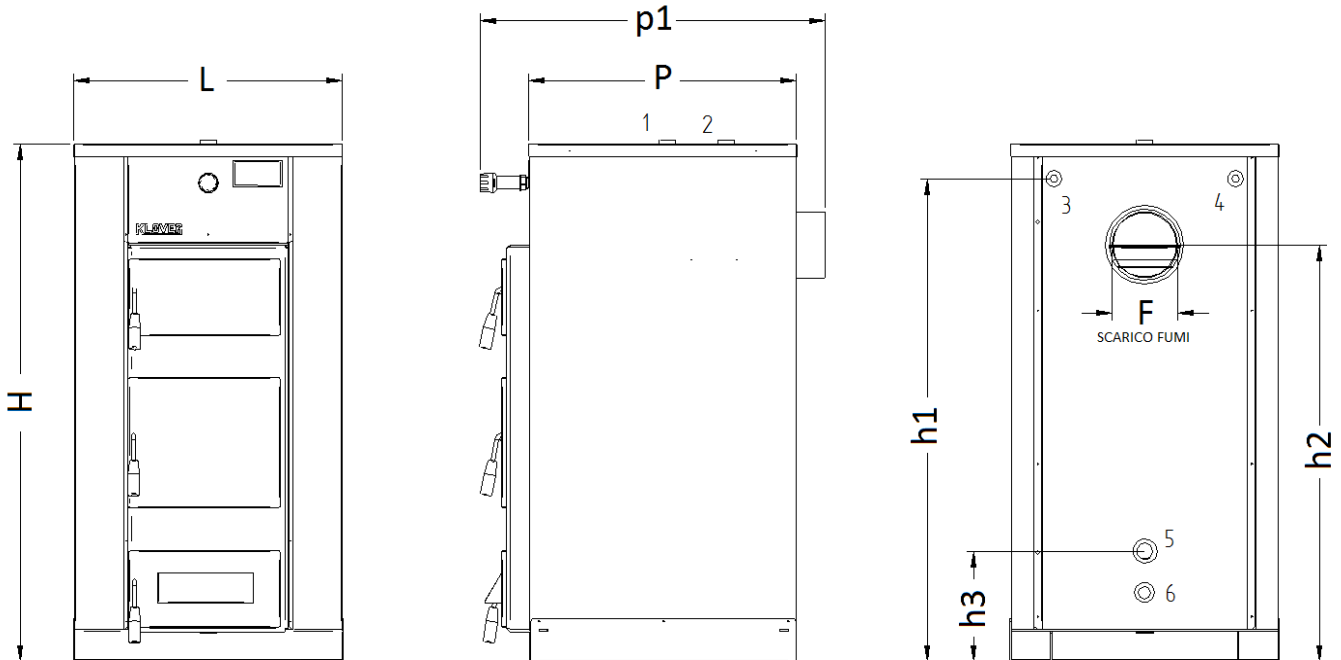
1" M GAS

3/4" F GAS

280 x 320 mm

440 x 490 x 450 mm

SERIE 2000 wood-burning boilers...Mod. KL - KLB



| MODEL | H | L | P | F | h1 | h2 | h3 | P1 | WEIGHT Kg |
|--------|-------|-----|-----|-----|------|------|-----|-----|--------------|
| KL 29 | 1.250 | 650 | 650 | 160 | 1170 | 1000 | 270 | 840 | 265 |
| KL 40 | 1.250 | 650 | 650 | 180 | 1170 | 1000 | 270 | 840 | 275 |
| KLB 29 | 1.250 | 650 | 650 | 160 | 1170 | 1000 | 270 | 840 | 275 |
| KLB 40 | 1.250 | 650 | 650 | 180 | 1170 | 1000 | 270 | 840 | 290 |

N.B.: measurements expressed in millimetres. KLOVER s.r.l. declines all liability for possible errors or omissions.

1 = OPEN VESSEL VENT VALVE

2 = SYSTEM FLOW (mod. KL 29, KL 40, KLB 29, KLB 40)

3 = DOMESTIC HOT WATER OUTLET (only models KLB SERIE 2000)

4 = DOMESTIC COLD WATER INLET (only mod. KLB SERIE 2000)

5 = SYSTEM RETURN (mod. KL 29, KL 40, KLB 29, KLB 40)

6 = BOILER EXHAUST

LOADING INLET SIZE H x L

COMBUSTION CHAMBER SIZE H x L x D

1" F GAS

1 1/4" F GAS

3/4" M GAS

3/4" M GAS

1 1/4" F GAS

1/2" F GAS

280 x 320 mm

440 x 490 x 450 mm

Technical features of wood-burning boilers *mod. KL top – KLB top – KL – KLB*

| | | SICURO top LINE | | | | SERIE 2000 LINE | | | |
|---------------------------------|-------------------------------|-----------------|-----------------|------------------|------------------|-----------------|----------|-------------|-------------|
| | | KL 29 top | KL 40 top | KLB 29 top | KLB 40 top | KL 29 | KL 40 | KLB 29 | KLB 40 |
| NOMINAL HEAT INPUT | KCal/h | 29.900 | 40.000 | 29.900 | 40.000 | 29.900 | 40.000 | 29.900 | 40.000 |
| | KW | 34,7 | 46,5 | 34,7 | 46,5 | 34,7 | 46,5 | 34,7 | 46,5 |
| NOMINAL HEAT OUTPUT | KCal/h | 24.800 | 33.200 | 24.800 | 33.200 | 24.800 | 33.200 | 24.800 | 33.200 |
| | KW | 28,8 | 38,6 | 28,8 | 38,6 | 28,8 | 38,6 | 28,8 | 38,6 |
| OVERALL EFFICIENCY | % | 83 | 83 | 83 | 83 | 83 | 83 | 83 | 83 |
| WATER CONTENT | L | 130 | 140 | 125 | 135 | 110 | 120 | 105 | 115 |
| DOMESTIC HOT WATER PRODUCTION * | $\Delta t=25^{\circ}\text{C}$ | / | / | 18 L/min | 20 L/min | / | / | 18 L/min | 20 L/min |
| RECOMMENDED AMOUNT OF WOOD ** | Kg/h | 3 ÷ 10 | 3 ÷ 13 | 3 ÷ 10 | 3 ÷ 13 | 3 ÷ 10 | 3 ÷ 13 | 3 ÷ 10 | 3 ÷ 13 |
| VOLUME HEATED *** | m ³ | 550 | 735 | 550 | 735 | 550 | 735 | 550 | 735 |
| COMBUSTION CHAMBER VOLUME | dm ³ | 97 | 97 | 97 | 97 | 97 | 97 | 97 | 97 |

* With boiler at 85°C

** BEECH WOOD fuel with NCV = 3,800 Kcal/Kg

*** With house insulated according to law 10/91. Heat requirement of 45 Kcal/m³

AIR VENT

Dimension and position

Modern houses are all equipped with hermetic fittings, which do not allow any air to pass.

ATTENZIONE!

To burn one Kg of wood, approximately 15 m³ of air are required (in closed hearth boilers).

If the combustion of the wood inside the combustion chamber is perfect, the amount of carbon dioxide (CO₂) produced will be equal to that absorbed by a living plant via the “chlorophyll photosynthesis” process.



The lack of oxygen leads to bad and incomplete combustion, which only makes partial use of the wood's energy and instead of developing carbon dioxide (CO₂) causes the formation of carbon monoxide (CO), a highly toxic substance. Consequently it heats less and pollutes more.

This is why an external air vent is **absolutely necessary**.

IMPORTANT:

Make an external air vent respecting the following minimum passages:

Boilers up to 40,000 Kcal/h:

MINIMUM PASSAGE 600 cm² (DIAMETER 28 cm)

If it is not possible to implement the air vent near the boiler, make a hole in a perimeter wall where the boiler is installed.

ATTENZIONE!

If it not possible to make the external air vent in the same room where the boiler is installed, this hole can be made in an adjoining room as long as this room communicates permanently, by means of a transit hole the same diameter as the air vent.



The UNI 10683 Standard PROHIBITS the withdrawal of combustion air from garages, combustible material warehouses, or from businesses where there is a fire hazard.

If there are other heating or suction appliances in the room, air vents must guarantee an air volume necessary for the proper functioning of all devices.



Only sealed appliances (e.g. C type gas appliances, according to the UNI 7129 Standard) or appliances that do not cause a lower pressure compared with the external environment can pre-exist or be installed in the place where the boiler must be installed.

Extractor fan can cause operation problems to the boiler when they are installed in the same room or space where the appliance is found.

CONNECTIONS

Hydraulic connection (SICURO top models)

The hydraulic connections must be made in a rational way using the connections on the boiler template. To facilitate connection of the pipes, we have prepared all hydraulic connections of the heating and domestic hot water system on the rear.

The boiler can be coupled to any other boiler already installed in the system; naturally it is indispensable to insert the due safety devices and shut-offs according to the system used.

IF IT IS INSTALLED AS THE ONLY SOURCE OF HEATING, IN ALL CASES IT IS DEEMED NECESSARY THAT THE SYSTEM IS SUPPLIED WITH: CLOSED EXPANSION VESSEL, FILLING UNIT, SYSTEM SAFETY VALVE (2.5 BAR). THE DOMESTIC HOT WATER SYSTEM MUST BE EQUIPPED WITH A SAFETY VALVE CALIBRATED AT 6 BAR.

N.B.: THE SYSTEM MUST BE DIMENSIONED WITH AVERAGE FLOW TEMPERATURE OF 55°C.

ATTENZIONE!



THE BOILER MUST BE INSTALLED EXCLUSIVELY BY QUALIFIED STAFF. SCRUPULOUSLY COMPLY WITH THAT STATED IN THIS GUIDE;



ALL LIABILITY IS DECLINED FOR DAMAGE CAUSED BY INCORRECT ASSEMBLY.

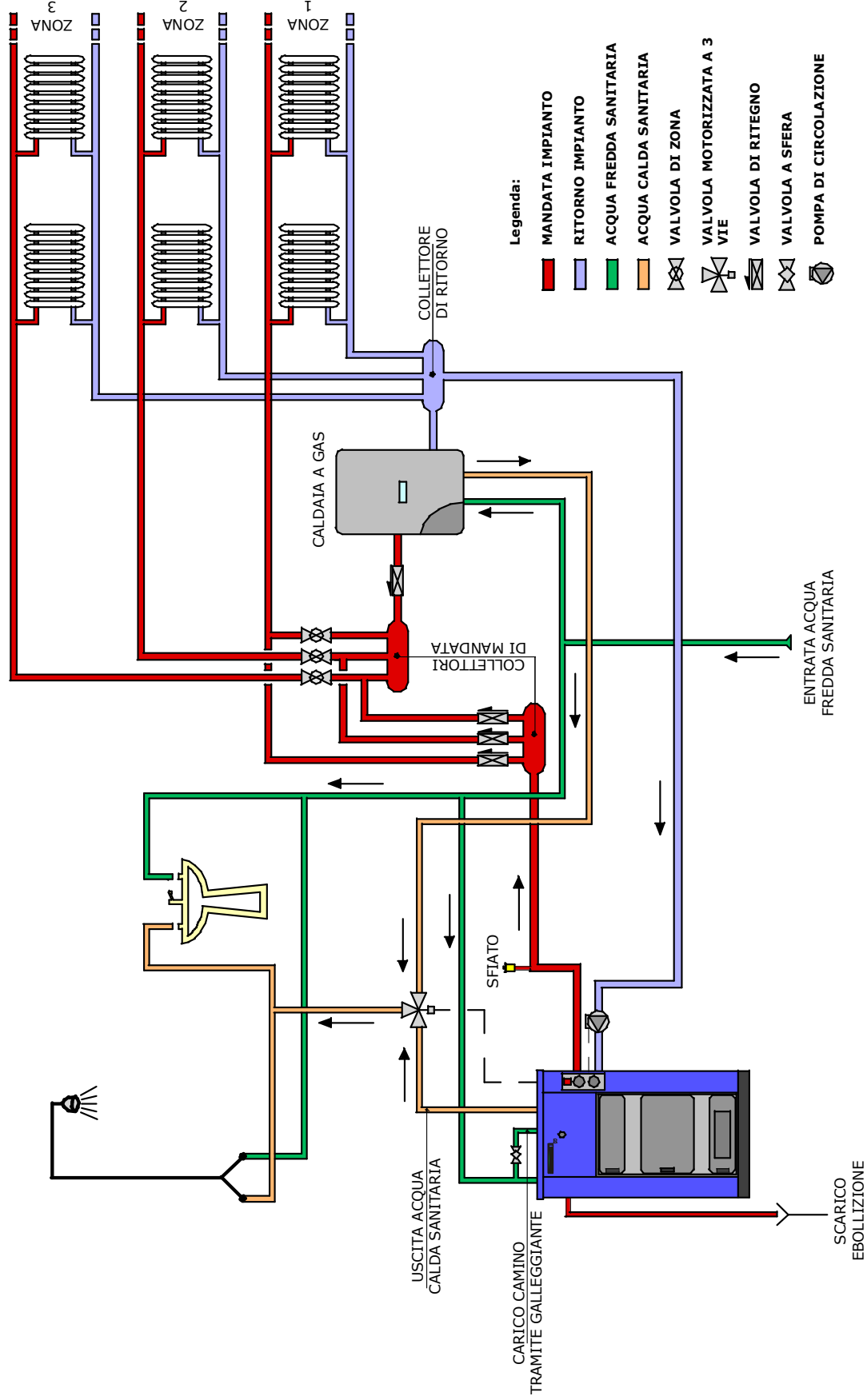


DO NOT PASS ELECTRIC CABLES IN THE IMMEDIATE VICINITY OF THE FLUE GAS PIPE, UNLESS THEY ARE INSULATED WITH SUITABLE MATERIALS.



IN THE CASE OF WATER WITH FIXED RESIDUE AT 180°C THAT EXCEEDS 300 MG/L IT IS INDISPENSABLE TO INSTALL A WATER SOFTENER UPSTREAM THE BOILER INLET.

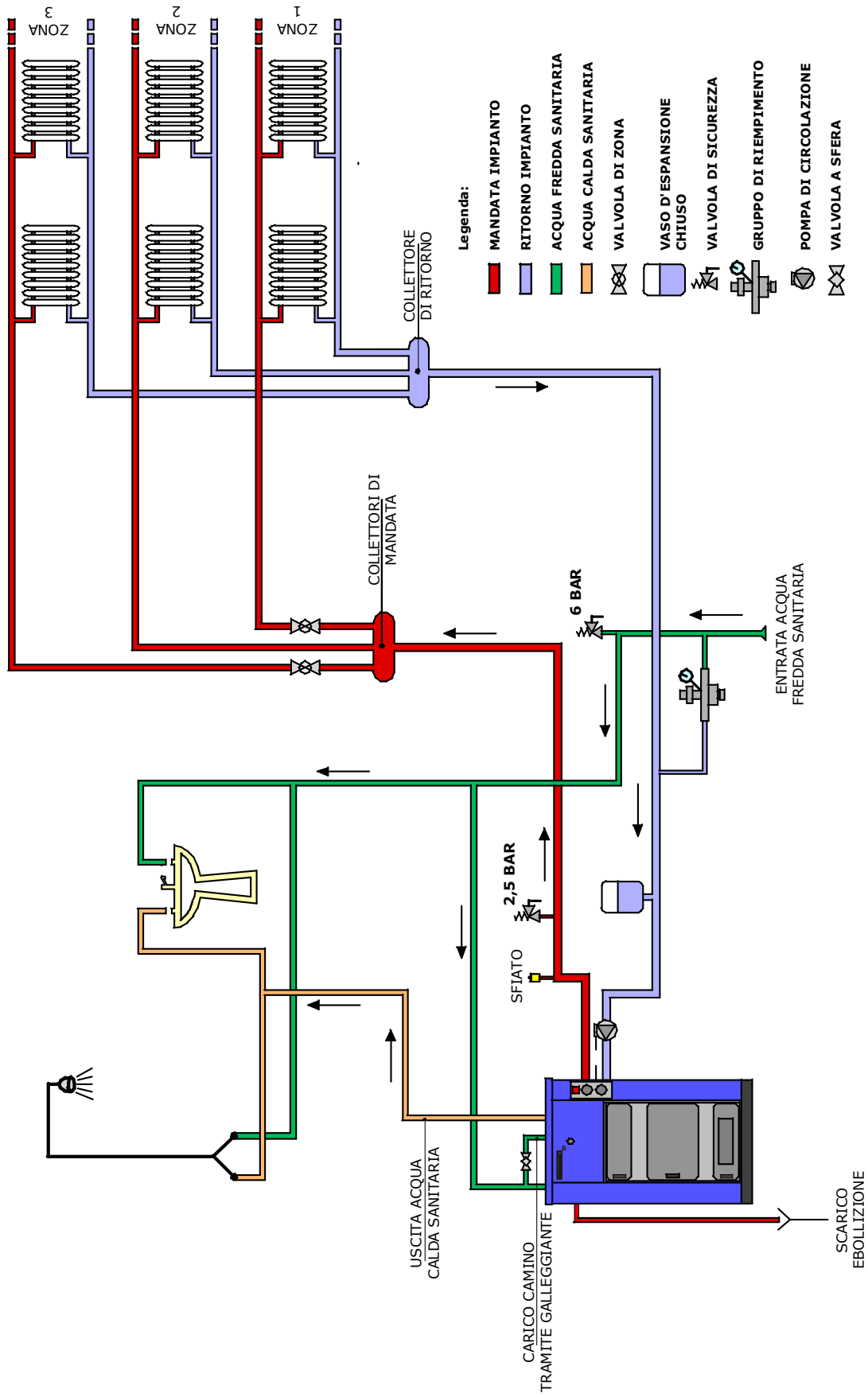
ESEMPIO DI COLLEGAMENTO CALDAIA A LEGNA SICURO TOP - CALDAIA



E' NECESSARIO INSTALLARE SULL'IMPIANTO IDRAULICO DI RISCALDAMENTO UN GRUPPO DI CARICAMENTO, UN VASO DI ESPANSIONE CHIUSO ADEGUATO ALL'IMPIANTO E LE OPPORTUNE VALVOLE DI SICUREZZA. L'IMPIANTO SANITARIO DEVE AVERE UNA VALVOLA DI SICUREZZA TARATA A 6 BAR.
 (Se ritenuto opportuno si possono sfruttare i sopracitati componenti presenti nella caldaia murale).

Questo schema è puramente indicativo e non costituisce impegno o responsabilità alcuna da parte di KLOVER s.r.l. e dei suoi collaboratori. La progettazione esecutiva e la conseguente messa in opera dovranno essere realizzate nel rigoroso rispetto delle norme vigenti.

ESEMPIO DI COLLEGAMENTO CALDAIA SICURO TOP



Questo schema è puramente indicativo e non costituisce impegno o responsabilità alcuna da parte di KLOVER s.r.l. e dei suoi collaboratori. La progettazione esecutiva e la conseguente messa in opera dovranno essere realizzate nel rigoroso rispetto delle norme vigenti.

Hydraulic connection (SERIE 2000 models)

The boiler can be coupled to any other boiler already installed in the system; naturally it is indispensable to insert the due safety devices and shut-offs according to the system used.

**SERIE 2000 MODELS MUST BE INSTALLED WITH AN OPEN EXPANSION VESSEL.
THE SYSTEM MUST BE EQUIPPED WITH A SAFETY VALVE CALIBRATED AT 6 BAR.**

ATTENZIONE!



THE BOILER MUST BE INSTALLED EXCLUSIVELY BY QUALIFIED STAFF. SCRUPULOUSLY COMPLY WITH THAT STATED IN THIS GUIDE;



**ALL LIABILITY IS DECLINED FOR DAMAGE CAUSED BY INCORRECT ASSEMBLY.
THE NETWORK WATER INLET PRESSURE MUST NEVER EXCEED 3 BAR; RECOMMENDED WORK PRESSURE: 1.2 BAR.**

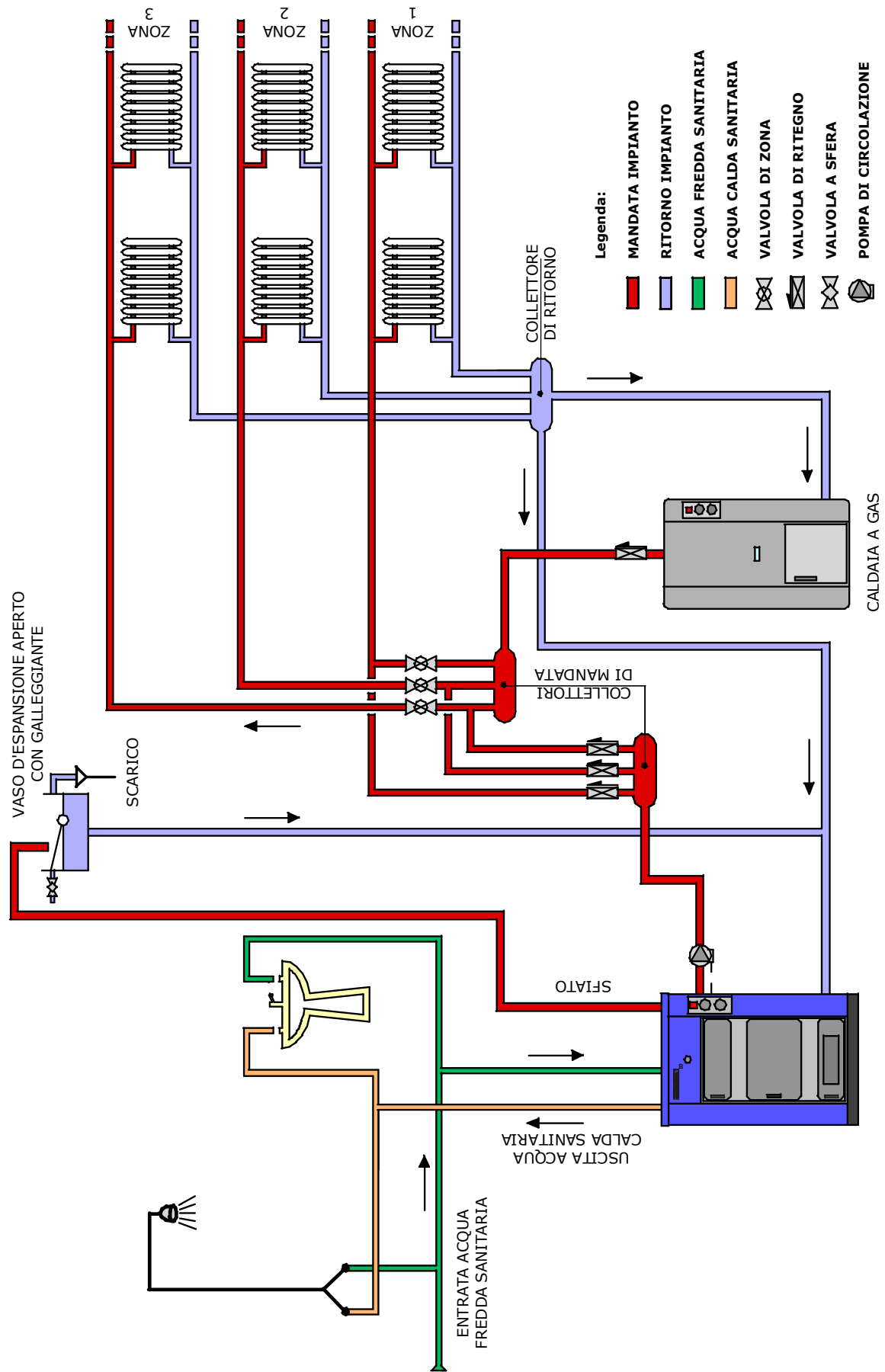


DO NOT PASS ELECTRIC CABLES IN THE IMMEDIATE VICINITY OF THE FLUE GAS PIPE, UNLESS THEY ARE INSULATED WITH SUITABLE MATERIALS.



IN THE CASE OF WATER WITH FIXED RESIDUE AT 180°C THAT EXCEEDS 300 MG/L IT IS INDISPENSABLE TO INSTALL A WATER SOFTENER UPSTREAM THE BOILER INLET.

ESEMPIO DI COLLEGAMENTO CALDAIA A LEGNA SERIE 2000



Questo schema è puramente indicativo e non costituisce impegno o responsabilità alcuna da parte di KLOVER s.r.l. e dei suoi collaboratori. La progettazione esecutiva e la conseguente messa in opera dovranno essere realizzate nel rigoroso rispetto delle norme vigenti.

Electrical connection

The electric connection must only be performed by **qualified staff**, with respect to general and local Safety Standards in force.

ATTENZIONE!

Check that the power supply voltage and frequency correspond to 220V – 50 Hz.

Appliance safety is obtained when it is correctly connected to an efficient earth plant.

In the electric connection to the mains power supply, envision a 6 A – Id 30 mA differential magnet circuit breaker switch with relevant breaking load. The electric connections, including the earth, must be made after the voltage has been removed from the electric plant. When realising the system remember that the cables must be placed in an unmovable and away from parts subject to high temperatures. During the final wiring of the circuit, only use components with a suitable electric protection rating.



KLOVER srl declines all responsibility for injury to persons, animals or damage to objects deriving from the failure to earth the wood-burning boiler and failure to comply with the IEC Standards.

ATTENZIONE!

Connection to the power supply must be performed only after having connected wires to the terminal board.

Klover srl will not be held liable for damage caused by incorrect connections or improper use of the device.

Electronic control unit

Two wires come out of the control unit, one of which without a plug. The wire with a plug must be connected to an electric socket with the previously described features, while the wire without the plug must be connected to the three-way motorised valve.

The electric control unit, already installed in the boiler, is used to control and command the start-up of the pump and any motorised 3-way valves.

It is composed of:

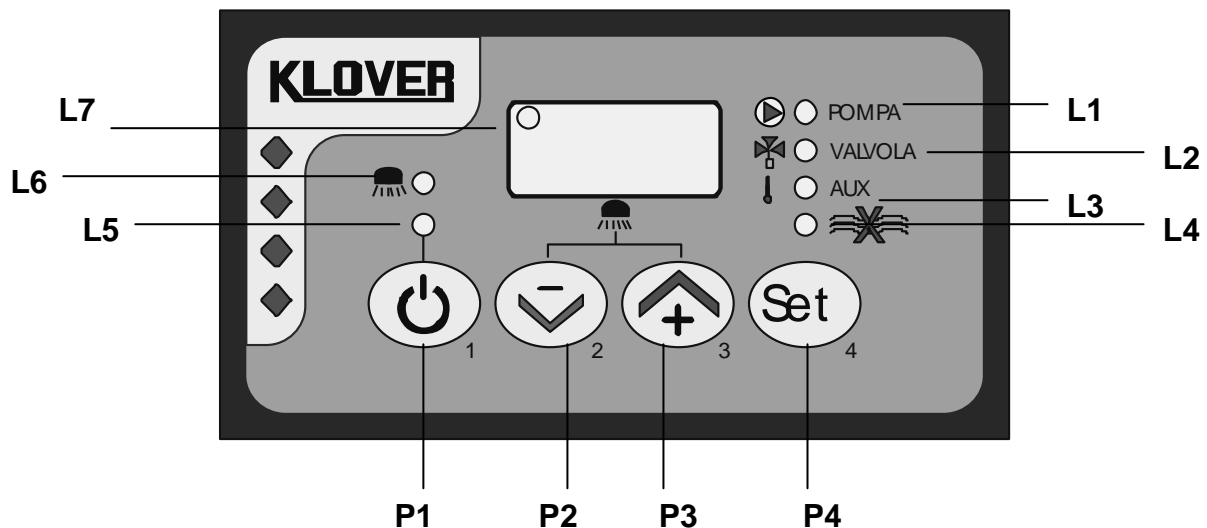


- **master switch** (used to supply power to the control unit itself);
- **pump adjustable thermostat** (used to activate or deactivate the pump on reaching, or not, the temperature we set on the thermostat itself);
- **valve adjustable thermostat** (used to exchange any motorised valve on reaching, or not, the temperature we set on the thermostat itself. It is normally used for the DHW connection with coupling to another boiler);
- **thermometer** (indicates the temperature of the water inside the boiler);
- **acoustic alarm** (it activates whenever the water of the body-boiler reaches and exceeds the temperature of 90-95°C);
- **level switch** (indicates the level of the water inside the boiler).



The wire without a plug comes out of the control unit which must be connected to the three-way motorised valve.

The control unit has an internal fuse **T 3,15A**.



DESCRIPTION OF THE KEYS

- **P1 ON/OFF** the button, pressed for two consecutive seconds, allows manual switch-on/off of the control unit depending on whether it is respectively off or on.

ATTENZIONE!

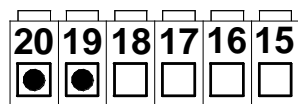
During the normal operation of the boiler, the control unit must ALWAYS be turned on.

- **P2 DECREASE TEMPERATURE** allows to decrease the value of the thermostat indicating the minimum water temperature of the boiler to turn on the pump and to switch any 3-way motorised valve.
- **P3 INCREASE TEMPERATURE** allows to increase the value of the thermostat indicating the minimum water temperature of the boiler to turn on the pump and to switch any 3-way motorised valve.
- **P4 SET/MENU** provides access to the set thermostat values reported by the associated PUMP / VALVE / AUX / SERV flashing LED.
It also allows to save changes made to the values of each thermostat.

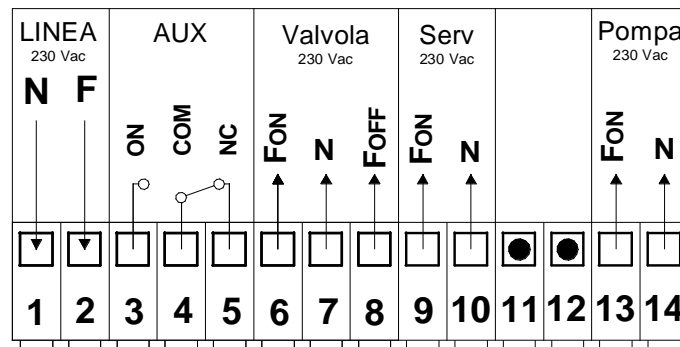
LED DESCRIPTION

- **L1 PUMP LED** The LED is on when the service thermostat has been selected.

- **L2 VALVE LED** The LED is on when the service thermostat has been selected.
- **L3 AUX LED** The LED is on when the service thermostat has been selected.
- **L4 LEVEL SWITCH LED** The LED is on when there is no water inside the tray or not enough water.
- **L5 OFF LED** The LED is on when the control unit is off.
- **L6 DHW LED** The LED is on when the DHW function is active.
- **L7 SERV LED** The LED is on when the service thermostat has been selected.



LIV. SONDA



| | | |
|---------------|-----------------------------|---|
| Inputs | PROBE | Water Probe: Temperature Range 0 – 100 °C |
| | H₂O LEVEL | ON/OFF consent: Level switch |

| | | | | |
|----------------|--------------|--------------|----------------------|---------------------------------------|
| Outputs | PUMP | System pump: | 230 Vac power supply | Clamps 13(FON) - 14(N) |
| | SERV | Service: | 230 Vac power supply | Clamps 9(FON) - 10(N) |
| | VALVE | Valve: | 230 Vac power supply | Clamps 6(FON) - 7(N) - 8(FOFF) |
| | AUX | Auxiliary: | Free contacts | Clamps 3(No) - 4(COM) - 5(NC) |

FUNCTIONS

1- ON/OFF:

The control unit is switched on/off by pressing and holding the **P1 (ON/OFF)**

The OFF status is signalled by the fact that the **L5** LED turns on.

2- SAFETY function:

If the temperature detected by the **PROBE** exceeds the value of the **Safety Thermostat**,

this forces the activation of the PUMP.

3- ALARM function:

If the temperature detected by the **PROBE** exceeds the value of the **Alarm Thermostat**.

this activates the acoustic and visual signal.

SILENCE: by pressing any button, the acoustic signal is deactivated for **5 minutes**.

4- NO ICE function:

If the temperature detected by the **PROBE** goes below the value of the **ANTI-FREEZE** Thermostat,

this activates the timed **PUMP** outlet.

The relative **L1** LED turns on and **ICE** starts flashing on the display.

5- PUMP ANTI-LOCKING programme:

In the event of inactivity of the **PUMP** outlet for more longer than the **ANTILOCKING** Timer,

this activates the outlet of the **PUMP**.

The relative **L1** LED turns on and **bLP** appears on the display.

6- SECURE TEMP function:

If the device is **OFF** and in **SAFE** conditions,

the device automatically positions itself in the **ON** status.

7- LEVEL SWITCH function:

The closure of the input closure determines the activation of the **L4** LED.

8- OUTPUTS function:

PUMP ON: for a temperature above the PUMP thermostat
for a temperature above the ALARM thermostat
for a temperature below the ANTI-FREEZE thermostat

VALVE ON: for a temperature above the VALVE Thermostat
AUX ON: for a temperature above the AUX Thermostat
SERV ON: for a temperature above the SERVE thermostat

9- DHW function:

By holding down the **P2 (-)** and **P3 (+)** buttons at the same time it is possible to activate the DHW function. At this point, while the **L6** LED flashes, just set the time (in minutes) for which you want to have all the heat burned for the production of domestic hot water. By activating this function, the pump turns off and remains off until the minutes set on this function have elapsed. When this function is active, the pump will turn on only when you reach the safety temperature of 85 ° C. It is possible to turn it off again by pressing the **P2 (-)** and **P3 (+)** buttons again.

MAIN menu

- With a simple **click** of the **P4 (SET)** button, it is possible to scroll through the values of the set Thermostats signalled by the flashing of the associated **PUMP / VALVE / AUX** led
- To change the value:
 - Go on the Thermostat to change.
 - By using the **P2 (-)** and **P3 (+)** buttons, it is possible to increase/decrease the value.
- To save the change, press **P4 (SET)**.
- To exit the menu, press **P1 (ESC)** or wait for 5 seconds.

| Parameters | Symbol | Min | Value set by the manufacturer | Max | Typical values | Reference LEDs |
|------------------|------------|-----|-------------------------------|-----|-------------------|----------------|
| PUMP thermostat | A01 | 20 | 55 | 85 | Minimum 55 | L1 |
| VALVE thermostat | A02 | 20 | 75 | 85 | | L2 |
| AUX thermostat | A03 | 20 | 75 | 85 | | L3 |
| SERVE thermostat | A04 | 20 | 75 | 85 | | L7 |

REPORTING FAULTS OR ALARMS

The control unit reports faults related to the probe via a flashing message:

- **Lo:** indicates a value below the set scale (temperature below 0°C)
Probe stop
- **Hi:** indicates a value above the set scale (temperature above 100°C)
Probe short-circuit

TECHNICAL FEATURES

| | |
|------------------------|--|
| Power supply: | 230 Vac $\pm 10\%$ ~50Hz Protective fuse T3,15A |
| Mechanical dimensions: | Built-in temperature controller: 120 x 80 x 50 mm |
| Temperature probe: | silicone/pvc cable Operating temperature: -50°C /130°C Measurement limits :0 – 99°C Precision: $\pm 1^\circ\text{C}$ |
| Outputs: | PUMP output: power supply - 230 Vac max capacity 5 A 250 Vac VALVE output: power supply - 230 Vac max capacity 5 A 250 Vac AUX output: free contact max capacity 5 A 250 Vac SERV output: power supply - 230 Vac max capacity 5 A 250 Vac |
| Standards applied: | EN 60730-1 50081-1 EN 60730-1 A1 50081-2 |

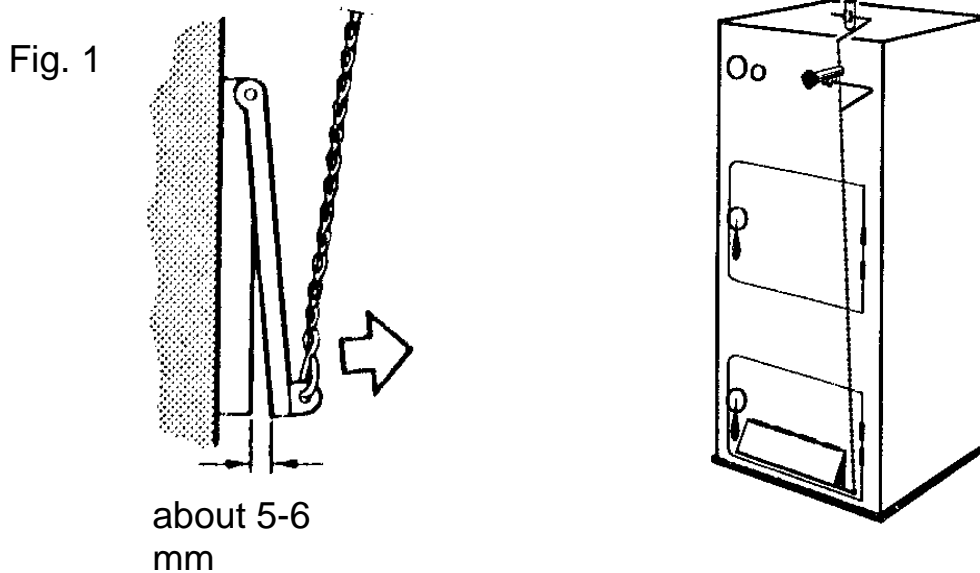
Draught regulator assembly

The draught regulator, which automatically controls combustion air, modulates the intensity of the fire according to requirements of the system thus implementing a comfortable room temperature and considerable fuel economy.

The draught regulator must be screwed all the way onto the specific 3/4" sleeve on the front of the boiler in order to be properly sealed and to be correctly directed respect to the draught door. After having screwed it on, insert the rod from the right part of the regulator so that it faces slightly downward. Then apply the chain on the rod and on the lower door of the boiler. Block the lever (with the proper screw) so that the chain is in axis

ATTENZIONE!

with the connection of the draught door. When installation is finished, position the knob at 30 °C and, with the boiler off, adjust the chain which must be taut when the door is open by approximately 5-6 mm (see fig. 1). Increasing the temperature of the regulator (but turning the knob) the door should open gradually. The chain moves approximately 12mm/10°C.



Flue and connection to the same

The **Flue** is a fundamental component for correct functioning of the boiler.

The flue gas exhaust on the boiler is:

- 160 mm on models KL/KLB 29 top and KL/KLB 29 serie 2000
- 180 mm on models KL/KLB 40 top and KL/KLB 40 serie 2000

The minimum cross section of the flue must be:

- 180 mm on models KL/KLB 29 top and KL/KLB 29 serie 2000
- 200 mm on models KL/KLB 40 top and KL/KLB 40 serie 2000

Each boiler must be equipped with its own flue, without other intakes (boilers, chimneys, stoves etc...). Flue dimensions are closely related to its height, which must be measured from the boiler flue gas outlet to the chimney base. In order to guarantee draught, the chimney flue outlet surface must be twice as big as the flue section. The combustion products exhaust pipe, generated

by the natural draught appliance, must respond to the following requisites:

ATTENZIONE!

- Combustion products sealed, waterproof and suitably isolated and insulated in the same way as the conditions of use (cf UNI 9615);
- Realised with suitable materials in order to resist to normal mechanical stress, heat, action of the combustion products and in the event of condensation;
- Upward alignment after the vertical tract throughout the remaining pathway with 20% minimum gradient. The sub-horizontal alignment part must not have a length greater than $\frac{1}{4}$ of the effective height of the flue or chimney and it must not however be longer than 2,500 mm;
- Preferably circular internal section: squared and rectangular sections must have rounded angles with radius larger than 20 mm;
- Constant, free and independent internal section;
- Rectangular sections with 1:5 maximum ratio between the sides
- **If the flue is installed externally then it must be insulated in order to avoid the flue gas cooling and the formation of condensate;**
- Elements of non-combustible material must be used for the assembly of the flue gas pipes (which go from the appliance to the flue inlet), which are suitable for resisting combustion products and their condensation;
- It is prohibited to use fibre cement pipes to connect the appliances to the flue;
- Flue pipes must not pass through places in which the installation of combustion appliances is prohibited;
- The assembly of flue pipes must guarantee the sealing against flue gas for the appliance operation conditions when in low pressure;
- **The assembly of horizontal tracts is prohibited, unless absolutely necessary;**
- It is prohibited to use tilted elements;



- The flue gas pipe must allow the recovery of soot or be cleanable and must have a constant section;
- It is prohibited to make other air intake channels and pipes for plant engineering transit inside the flue gas pipes, even if over-dimensioned.

Chimney

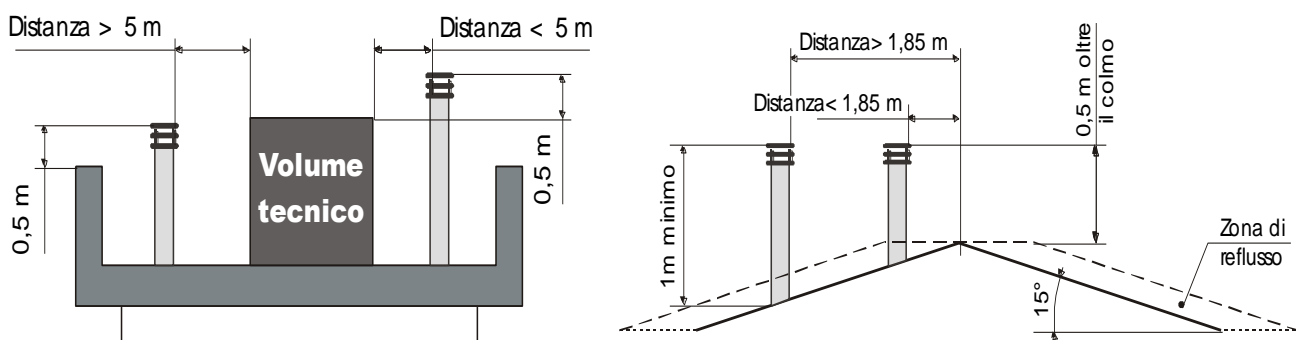
The **chimney** is a device crowning the flue, used to ease dispersion of combustion products.

It must satisfy the following requisites:

- Have a useful outlet section that is not less than the double of that of the flue on which it is inserted;
- Be conformed in a way to prevent the penetration of rain and snow into the flue;
- Be built in a way that, also in the case of winds from every direction and inclination, to ensure combustion exhaust.

The outlet height (where height means that which corresponds to the top of the flue, independently of any chimneys) must be outside of the so-called reflow area in order to prevent the formation of counter-pressures, which prevent free exhaust of the combustion products in the atmosphere.

It is therefore necessary that the minimum heights, indicated in the following figures, are respected:



COMMISSIONING

Filling the system

After having connected the boiler, fill the system as follows:

ATTENZIONE!

- Loosen the caps of any air vent valves;
- If necessary, very slowly loosen the pump/s vent valve cap, making the fluid flow for a few seconds;
- Have the system filled very slowly in order to allow air bubbles to escape from the system through the air bleeding valve;
- Bleed all radiators and any other deaeration systems in order to ensure that there are no air bubbles.

When installation has been completed, check the boiler for at least 4-5 days, in order to verify the tightness of all hydraulic joints.

Filling the boiler (SICURO top models)

When the system has been filled, then fill the boiler via the float. It is recommended to install a ball valve in the boiler loading pipe in order to isolate the float if the same should break. **Regulate this ball valve in a way that the pressure of the float cock is not particularly high (LESS THAN 1 BAR).**

Regulate the float stick in a way that the exchangers are completely inside the boiler water.

ATTENZIONE!

THE BEST LEVEL IS REACHED WHEN THE WATER EXCEEDS THE COPPER HEAT EXCHANGERS BY A FEW CENTIMETRES.

N.B.: IF THE BOILER IS INSTALLED AS THE ONLY SOURCE OF HEATING, IN ALL CASES IT IS DEEMED NECESSARY THAT THE SYSTEM IS SUPPLIED WITH A CLOSED EXPANSION VESSEL, A FILLING UNIT AND A SAFETY VALVE CALIBRATED AT 2.5 BAR. THE DOMESTIC HOT WATER SYSTEM MUST BE EQUIPPED WITH A SAFETY VALVE CALIBRATED AT 6 BAR.

Ignition

Perform the following operations:

ATTENZIONE!

- Before switching the boiler on, make sure that the control unit switch is on;
- Make sure that there is water in the system;
- Regulate the thermostat that controls the pump to a temperature of 55-60 °C; **NEVER lower the temperature below this limit as condensation could be formed in the boiler body which, over time, would ruin the boiler;**
- Open the smoke damper completely (handle in vertical position);
- Open the ash discharge door;
- Light the fire using seasoned, thin wood, if possible;
- When the wood has ignited well, close the ash door and adjust combustion air by means of the draught regulator (position it around 65 -70 °C).



ATTENZIONE!

NEVER IGNITE THE BOILER USING ALCOHOL OR OTHER HIGHLY INFLAMMABLE LIQUIDS.

Anti-freeze protection

In intensely cold periods it is good practice that the heating system remains running. In the case of prolonged absence, anti-freeze must be added to the heating water or the system must be completely emptied.

ATTENZIONE!

Anti-freeze must also be added to water in the boiler.

WATER MUST NEVER BE EMPTIED FROM THE BOILER.



In a system subject to being emptied frequently it is indispensable that filling is performed with water that has been appropriately treated to eliminate hardness that can lead to lime scale deposits.

Boiling (SICURO top models)



If for any reason (power cut, a pump fault, too much wood, etc...), the water in the boiler body reaches boiling point, carry out the following operations immediately, **IN SPITE THAT THE BOILER GUARANTEES ABSOLUTE SAFETY:**

- **Open the DHW cock and let the water run until the temperature in the boiler body drops** (only for models connected to the DHW plant);
- **Open the smoke damper completely;**
- **Close the draught regulator completely.**

ATTENZIONE!

Boiling (SERIE 2000 models)



If for any reason (power cut, a pump fault, too much wood, etc...), the water in the boiler body reaches boiling point, carry out the following operations immediately:

- **Open the DHW cock and let the water run until the temperature in the boiler body drops** (only for specific models);
- **Open the loading door;**
- **Close the draught regulator completely;**
- **Throw water on the fire to put it out manually.**

ATTENZIONE!

After having found the reason for the high temperature, wait until the temperature goes back to normal (below 60°C), bleed all the radiators and air release valves; light the boiler with a bit of wood and keep it under control to make sure it works properly.

MAINTENANCE

Cleaning the body-boiler

ATTENZIONE!

Punctual and systematic maintenance is a fundamental component for perfect functioning, excellent heat yield and duration of the appliance through time. It is therefore recommended to clean the boiler body periodically (at least twice a year).

It is possible to reach all points affected by the flue gas by acting as follows:



- Open the upper door of the boiler and vacuum any ash deposit;
- Remove the smoke pipes connecting the boiler to the flue and clean them;
- Vacuum ash deposited inside the smoke pipe of the boiler itself.



Any deposits on the walls of the combustion chamber (if particularly resinous wood is burned) can be eliminated by running the boiler at maximum conditions for 30-40 minutes (in this case bring the thermostat to 85°C) by burning dry wood.

Leave the fire to go out and then scrape the inside walls using a steel spatula.

Periodically empty the ash drawer in order to guarantee an efficient flow of combustion agent air.

Maintenance of boiler body (only mod. SICURO top)

ATTENZIONE!

The **SICURO top** boiler is equipped with a special magnesium anode which protects the boiler body and copper heat exchangers from corrosion due to stray currents in the system.

This anode protects from galvanic corrosion.

MAGNESIUM ANODE



The anode must be controlled at least once a year and replaced when its diameter measures less than 15 mm.

To inspect the boiler body, remove the upper lid fixed using the four knobs.

ATTENZIONE!

To replace the anode, just loosen it and screw-in the new one paying attention that the latter does not come into contact with the stainless steel heat exchangers.

NEVER EMPTY THE WATER INSIDE THE BOILER SO AS NOT TO COMPROMISE THE DURATION OF THE SAME.

THE WOOD TO BURN

Wood features

Wood is one of the most precious materials offered by nature. For heating purposes, it must be verified that the features of the wood satisfy some important requisites that must not be ignored, the

most important of which is without a doubt the correct seasoning or drying, in other words the wood must have the correct amount of humidity, around 10-15%, therefore also the period of the year in which it is felled becomes important. This should coincide with

the winter period. The correct seasoning (at least 2 years) allows to have a fuel with excellent yield and not very pollutant.

It must be kept in covered, well-aired places, already cut appropriately into pieces suitable for the hearth of the boiler.

The wood is divided into softwood and hardwood on the basis of the weight

kg of a cubed metre of material. A softwood that weighs about 300-350 kg/m³ is fir, pine, poplar, European alder, chestnut, willow, while hardwood that weighs about 350-400 kg/m³ is beech, ash, carpine, acacia and oak.

Softwood ignites easily, is consumed quickly and develops a long flame and is used in ovens that require a long flame pass. Hardwood is more compact, the combustion is slower with short flame, and it lasts longer and is more suitable for domestic central heating.

The wood to be burned for heating purposes has different features according to the plant variety from which it is obtained. Not all woods are the same and the features regarding the drying time and the calorific value vary from plant to plant.. The calorific value depends on the level of humidity and its density. Woods of excellent quality are beech, ash, carpine, acacia and oak.

Avoid resinous woods as they could compromise the duration of the boiler.

In fact, resinous woods have a rather sooty combustion and therefore, the flue and boiler must be cleaned more often.

The calorific value of the different types of wood depends greatly on their humidity and consequently the heat output of the boiler is directly affected by the type of wood used, on average a well-seasoned wood has a calorific value of 3200 kcal/kg.

Calorific value of wood depending on its humidity:

| % of humidity | Calorific value kcal/kg |
|----------------------|--------------------------------|
| 15% | 3490 |
| 20% | 3250 |
| 25% | 3010 |
| 30% | 2780 |
| 35% | 2450 |
| 40% | 2300 |

CALORIFIC VALUE of the wood means the amount of heat yielded during combustion, referring to the unit quantity of the material burned.

The calorific value of a wood species depends on the presence of **lignin** (6000 Kcal/Kg) or **cellulose** (4000 Kcal/Kg) as well as the abundance of **resin** (8500 Kcal/Kg).

The calorific value relative to the unit of weight (= absolute) is highest in Conifers

- Conifers absolute calorific value: 4700 Kcal/Kg
- Broad-leaved species absolute calorific value: 4350 Kcal/Kg.

In opposition the **SPECIFIC WEIGHT** of the “broad-leaved species” is greater; therefore equal volumes introduced into the boiler, both the weight and amount of heat available for combustion are greater; in practice the relative calorific value is higher (referring to a unit of volume).

Example: the calorific value of the white fir is practically the same as that of the oak, but the oak has a specific weight that is double that of the fir. Therefore half the volume of oak must be introduced into the boiler in order to have the same "heat" obtained with the fir.

| | *Calorific value (Kcal/Kg) | **Specific weight (Kg/m3) |
|---------------------|-------------------------------|------------------------------|
| WHITE FIR | 4650 | 440 |
| RED FIR | 4857 | 450 |
| MAPLE | 4607 | 740 |
| BIRCH | 4968 | 650 |
| CARPINO NERO | 4640 | 820 |
| CHESTNUT | 4599 | 580 |
| OAK | 4648 | 900 |
| CYPRESS | 5920 | 620 |
| BEECH | 4617 | 750 |
| ASH | 5350 | 720 |
| HOLM OAK | / | 960 |
| LARCH | 4050 | 660 |
| EUROPEAN ALDER | 4700 | 530 |
| MANNA ASH | / | 760 |
| PLATAN | / | 690 |
| CYPRESS POPLAR | 4130 | 500 |
| ROBINIA | 4500 | 790 |
| DOWNY OAK | 4631 | 880 |

* theoretical absolute superior

** wood seasoned in the air; residual humidity 12-15 %

TROUBLESHOOTING

INSUFFICIENT DRAUGHT.
DIFFICULT FLUE GAS EVACUATION.
DISTRIBUTION OF THE FLUE GAS IN THE INDOOR ENVIRONMENT.

| ELEMENTS TO CHECK | ORIGIN |
|--|--|
| External air vent | <ul style="list-style-type: none"> • Inexistent; • Gate valve closed; • Accidental obstruction; • Insufficient section. |
| Air vent (pipe) | <ul style="list-style-type: none"> • Insufficient section. |
| Flow regulator | <ul style="list-style-type: none"> • Closed or badly regulated |
| Hood gate valve | <ul style="list-style-type: none"> • Closed or badly regulated. |
| Wood | <ul style="list-style-type: none"> • Excessive humidity. |
| Flue Hood fitting/flue gas channel | <ul style="list-style-type: none"> • Insufficient section; • Insufficient height; • Accidental obstructions; • Periodical cleaning not performed; • Heat insulation or insulation insufficient or inexistent; • Use of unsuitable materials; • Heat insulation or insulation absent or insufficient; • Inadequate section (square or rectangular) in incorrect dimensioning; • Narrowing or presence of obstacles to the flow of flue gas; • Accidental obstructions; • Infiltrations of parasite air due to the use of materials non-impermeable to gas and liquids; • Insufficient height. |
| Chimney | <ul style="list-style-type: none"> • The outlet height in reflow zone; • Vicinity or approach to other chimneys; • Vicinity of obstacles, both natural and artificial; • Obstruction (Example: birds' nests); • Inadequate chimney pot shape; • Insufficient emission section. |

CONDENSATE ESCAPING THROUGH THE MASONRY.

| ELEMENTS TO CHECK | ORIGIN |
|---|--|
| Flue gas channel Flue Condensate tray | <ul style="list-style-type: none">• Use of inadequate material;• Absence or installation not performed state-of-the-art of the relevant condensate collector with drain and connected to the disposal system. |

SELF-COMBUSTION INSIDE THE FLUE.

| ELEMENTS TO CHECK | ORIGIN |
|---|--|
| Hood fitting/flue gas channel Flue gas channel Flue | <ul style="list-style-type: none">• Periodical cleaning not performed. |

WATER INSIDE THE BOILER.

| ELEMENTS TO CHECK | ORIGIN |
|--------------------------|--|
| Flue Chimney | <ul style="list-style-type: none">• In total or partial absence of the chimney, the flue is not realised with start parallel to the appliance.• Inadequate chimney. |
| Pump thermostat | <ul style="list-style-type: none">• Pump start-up at temperatures that are too low (condensate is created). |

USEFUL ADVICE

1. The temperature of the thermostat that controls the pump **must never be set**, for any reason, **below 55 °C** to keep condensation from forming which could corrode the boiler interior.
2. The boiler must have a pump and the warranty becomes null and void if it is mounted without connecting the thermostat on the electric panel of the boiler.
3. When priority is to be given to DHW (only models prepared), take the thermostat to 80 °C and burn small pieces of dry wood in order to increase the flame. After use of the DHW, lower the thermostat to 55-60 °C.
4. It is good practice to liven up the flame by "moving" the wood using the relevant irons.
5. **Never empty the water inside the boiler so as not to compromise the duration of the same.**

ALL LIABILITY IS DECLINED REGARDING PROBLEMS DERIVING FROM THE FAILURE TO APPLY THE STANDARDS CONTAINED IN THIS MANUAL.

WARRANTY CERTIFICATE

KLOVER s.r.l. guarantees the quality of materials, good construction and functionality of the boiler for the duration of 5 years, under the following conditions:

- The boiler which, on its unquestionable judgement, has material or construction faults will be repaired or replaced; with exclusion of all cost for interventions at domicile, transport, reset (hydraulic disassembly, assembly operations, any masonry and any other intervention necessary) and accessory materials;
- The warranty excludes the ceramic glass and ceramic-majolica coverings, because as they are very fragile to blows, they can be damaged even accidentally, the control board, all electric components and everything that is not part of the boiler and not produced by ourselves;
- Incorrect installation carried out by unqualified staff, tampering, failure to comply with the Standards contained in this guide and those regarding “state-of-the-art installation”, make all warranty rights become null and void; the same for damage deriving from external factors.
- Direct or indirect “reimbursement” is excluded in all cases whatever the nature or cause; For the appliances that require an intervention at domicile, the user must pay “a contribution for transfer expenses” in force at the date of the intervention. Within the first month of the warranty the repairs at domicile will be performed free of charge, except for interventions not covered by the warranty as previously specified, which are the total responsibility of the user;
- Remember that the goods are transported under the customer’s responsibility, even if delivered carriage free, therefore we are exonerated from any responsibility for damage caused by loading and unloading, accidental blows, storage in unsuitable places etc;
- The warranty must only be considered valid if the attached card is returned **within 10 days** from the date of purchase fully filled-in;
- The competent Law Court for any disputes is Verona.

KLOVER S.R.L.

WOOD BURNING FIREPLACE HEATING SYSTEMS and THERMO
COOKERS

WOOD and PELLET BURNING THERMO STOVES
WOOD BURNING BOILERS

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