EN

PATENTED SYSTEM

SICURO top
HEATING SYSTEM

INSTALLATION
USE AND MAINTENANCE
USEFUL ADVICE

TKR 35 fireplace heating system **User guide**

Dear Customer,

First of all we would like to thank you for choosing a "**KLOVER**" product 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.

The manual contains a detailed description of the fireplace heating system 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 fireplace-boiler with minimum fuel consumption.

Enjoy the heat with KLOVER!

DICHIARAZIONE DI CONFORMITÀ

CE

DECLARATION OF CONFORMITY

In accordo con la Direttiva **89/106/CEE** (Prodotti da Costruzione), la Direttiva **2006/95/CEE** (Bassa Tensione) e la Direttiva **2004/108/CEE** (Compatibilità Elettromagnetica).

*According to the Directive **89/106/EEC** (Construction Products), the Directive **2006/95/EEC** (Low Voltage) and the Directive **89/336/EEC** (Electromagnetic Compatibility).*

N° di identificazione - *Identification No.*	:	**TKR-01**
Emesso da - *Issued by*	:	**KLOVER s.r.l.** **Via A. Volta, 8** **37047 San Bonifacio (VR)**
Tipo di apparecchio - *Type of equipment*	:	**Solid fuel closed fireplaces**
Marchio commerciale -*Trademark*	:	**KLOVER**
Modello o tipo - *Model or type*	:	**SP35 – KTP35 – XP35 – TKR35**
Uso - *Use*	:	**Domestic heating**
Costruttore - *Manufacturer*	:	**KLOVER s.r.l.** **Via A. Volta, 8** **37047 San Bonifacio (VR)**
Ente notificato - *Notified body*	:	**NB 1881** **IMQprimacontrol S.R.L.** **I - 31020 Zoppè – San Vendemmiano (TV)** **Via dell'Industria, 55**

Le norme armonizzate o le specifiche tecniche (designazioni) che sono state applicate in accordo con le regole della buona arte in materia di sicurezza in vigore nella CEE sono:

The following harmonised standards or technical specifications (designations) which comply with good engineering practice in safety matters in force within the EEC have been applied:

Norme o altri riferimenti normative *Standards or other normative documents*	Rapporto di Prova ITT *Initial Type Tests Report*
EN 13229 **EN 60335-1 EN 50165** **EN 55014-1 EN 61000-3-2 EN 61000-3-3** **EN 55014-2**	**CPD-08-048**

In qualità di costruttore e/o rappresentante autorizzato della società all'interno della CEE, si dichiara sotto la propria responsabilità che gli apparecchi sono conformi alle esigenze essenziali previste dalle Direttive su menzionate.

As the manufacturer's authorised representative established within EEC, we declare under out sole responsibility that the equipment follows the provisions of the Directives stated above.

San Bonifacio (VR), 19.09.08

Muraro Mario
Chairman of the Board

FIREPLACE HEATING SYSTEMS

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HEATING SYSTEM

mod. TKR 35

KLOVER S.R.L.

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Latest revision: December 2010

GENERAL INDEX

INTRODUCTION

Important security instructions

ATTENZIONE! Read these instructions before installing and using the product.

- **Fireplace heating system 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 *Assembly* 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 fireplace heating system is installed.
- Do not use the appliance as an incinerator or in any other way different to that for which it has been designed.
- Do not use fuels different to those which are recommended
- Do not use liquid fuels
- The 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 fireplace heating system(ceramic glass, loading door) during normal functioning
- Use the appropriate luminous button to switch the electrical panel off. Do not disconnect the power supply cable while the fireplace heating system is running.
- Keep children away from the fireplace heating system 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

Danger due to fireplace heating system functionality

General danger for personal safety.

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

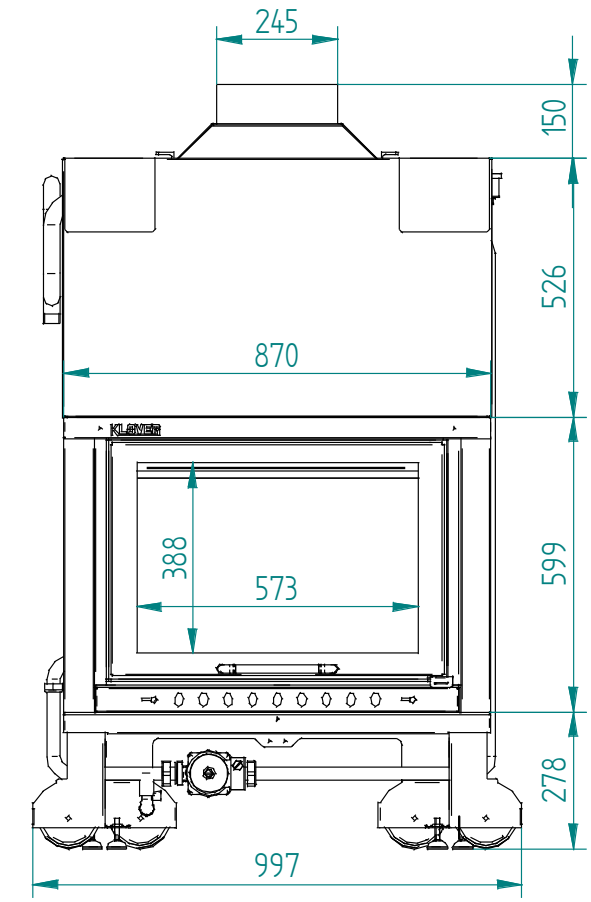
Danger for people and objects due to electric power.

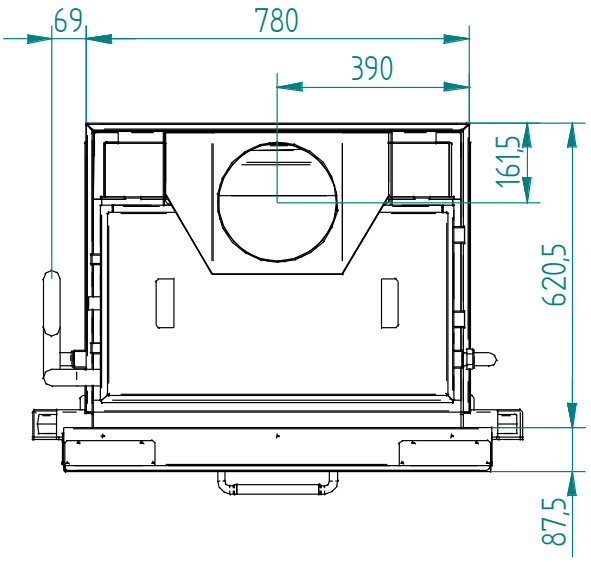
Burns hazard for persons due to hot, pressurised liquids (with temperature not exceeding that of boiling point at atmospheric pressure).

TECHNICAL DATA

Dimensions of the fireplace heating system

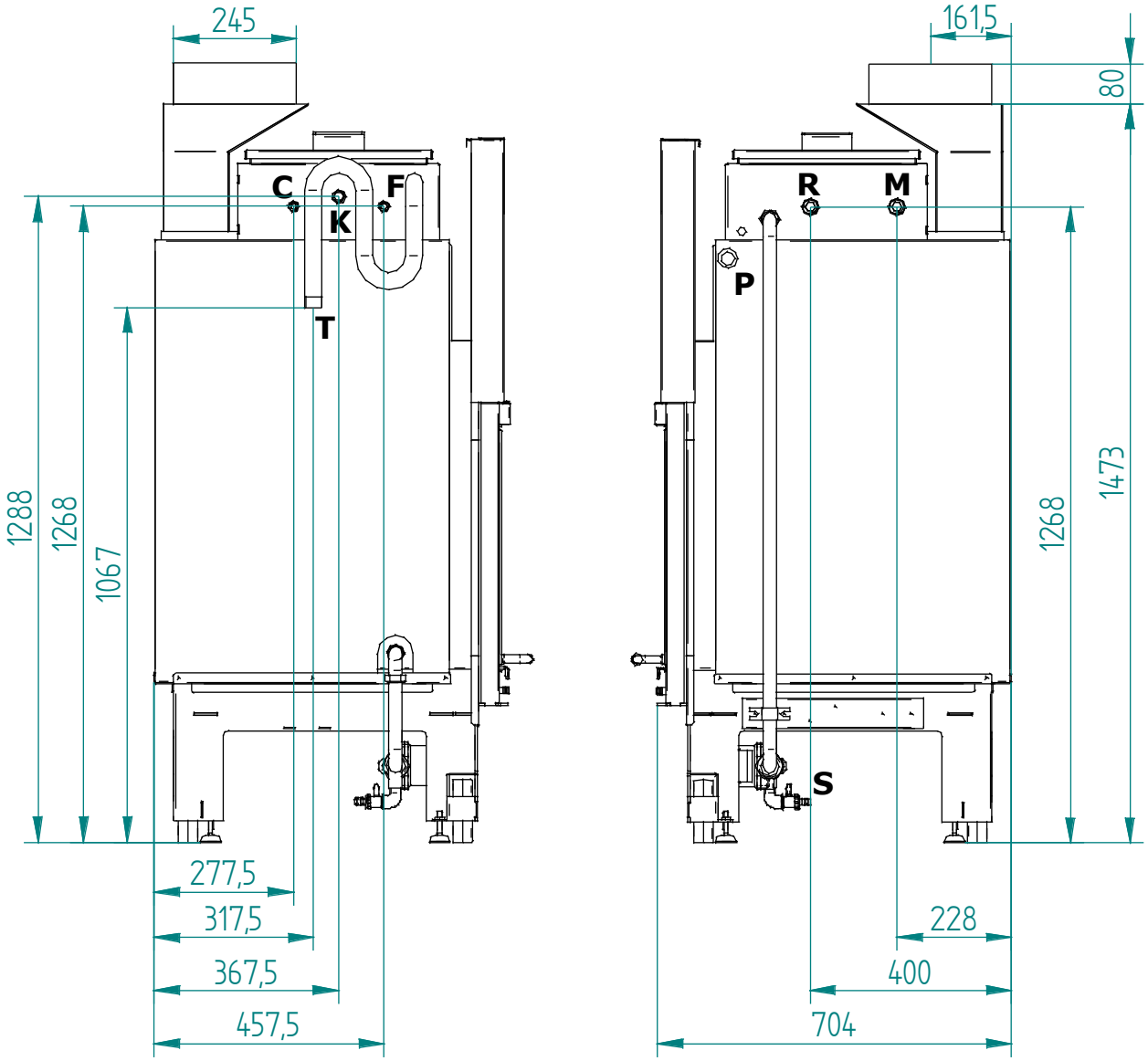
Here below are the fundamental views of the fireplace heating system (front view and view from above) useful to check clearance and detailed dimensions.





Hydraulic connections

LEFT SIDE **RIGHT SIDE**



M = SYSTEM FLOW	1” M GAS
R = SYSTEM RETURN	1” M GAS
S = BOILER DRAIN WITH COCK	
P = CONTROL UNIT BULBS POCKET	
F = DOMESTIC COLD WATER INLET (on prepared models only)	1/2" M GAS
C = DOMESTIC HOT WATER OUTLET (on prepared models only)	1/2” M GAS
K = BOILER BODY LOADING	1/2" M GAS
T = BOILING VENT VALVE	1” M GAS
FLUE EXHAUST	**250mm M**

Technical features

Nominal heat output	kW (Kcal/h)	34,5 (29.700)
Nominal heat output	kW (Kcal/h)	28,5 (24.500)
Heat output yield for heating water	kW (Kcal/h)	17 (14.600)
Heat output yield in the environment due to radiation	kW (Kcal/h)	11,5 (9.900)
Yield	%	83
Nominal capacity	Watt	88
Nominal voltage	V	220
Nominal frequency	Hz	50
Expansion vessel lt/preloading bar		6 / 1
Maximum working pressure/recommended	bar	2,5 / 1,5
CO at 13% of oxygen	%	0,24
Minimum chimney effect	Pa	11
Combustion gas flow	g/s	25,3
Flue gas outlet temperature	°C	216
Hourly consumption of wood	Kg/h	7,2
Wood loading interval	min	60
FLOW/RETURN heating hydraulic connections	Ø	1” M GAS
Boiler body capacity	litres	110
Width (exposed part)	mm	870
Height (exposed part)	mm	600
Depth	mm	710
Minimum safety distance from flammable materials	mm	180
Weight	Kg	350

The data reported above is approximate and not binding. The manufacturer reserves the faculty to make any modifications to the product in order to improve its performance.
The given heat power can change according to the wood used.
The consumption of wood is subject to the quality and degree of dryness of the same

ASSEMBLY

Positioning

The initial phase for the best installation of the fireplace heating system is to determine its optimal location; regarding this the following data needs to be taken into account:

- Possibility of creating an external air vent;
- Possibility of creating a straight flue and possibly coaxial at the fireplace heating system outlet;
- Possibility of creating piping necessary to discharge boiling;
- Proximity to the main liquid collector and /or the boiler if one already exists);
- Proximity or ease of connection to the water system.

Once the best location for the appliance is determined, it is possible to position the fireplace heating system following the indications below.

The appliance must be installed on a floor with suitable load capacity. If the existing building does not fulfil this requirement appropriate measures (e.g. load distribution plate) must be taken.

ATTENZIONE!

The minimum safety distance from inflammable materials must be at least 300 mm from the fireplace heating system.

Appliance installation must guarantee easy access for cleaning the appliance itself, the gas pipes and the flue.

The air extraction devices must not be used in the same room as the appliance, unless an adequate ventilation air supply is envisioned.

Air vent

Modern houses are all equipped with hermetic fittings, which do not allow any air to pass.
To burn one Kg of wood about 15 m^3 of air is required (in fireplaces with closed hearth) and 40 m^3 in fireplaces with open hearth.
If the combustion of the wood inside the combustion chamber is perfect, the amount of carbon dioxide (CO_2) 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 (CO_2) causes the formation of carbon monoxide (CO), a highly toxic substance. Consequently it heats less and pollutes more.

ATTENZIONE!

This is why fireplace absolutely require an external air vent.

To realise the air vent in the wall behind the fireplace heating system, follow the indications given below:

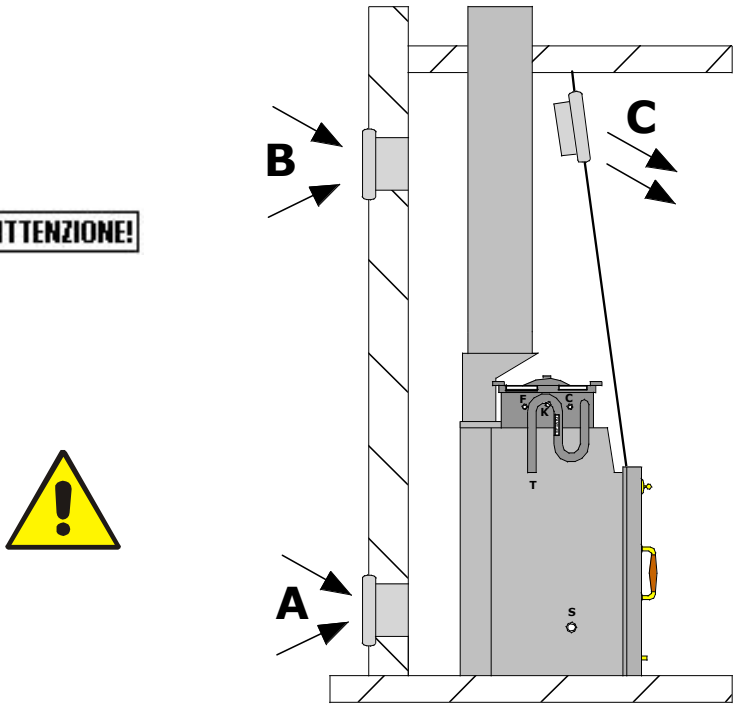
IMPORTANT:
Make an external air vent respecting the following minimum passages:

<u>Solution A:</u> **650 cm^2 (Ø 30 cm)**

<u>Solution B:</u> **390 cm^2 (Ø 22 cm)**

It is also mandatory to create a hood aeration grid "C" with minimum passages, **390 cm^2 (Ø 22 cm)**, without filters or closures;

ATTENZIONE!



N.B.: It is important that the grid communicates with the external air vent without connection via pipes.

If it is not possible to realise the air vent in the wall behind the fireplace heating system, make the hole in a perimeter wall where the fireplace heating system is installed.

ATTENZIONE!

If it not possible to realise the external air vent in the same room where the fireplace heating system is installed, this hole can be made in an adjoining room as long as this room communicates permanently, by means of a transit hole (20cm minimum diameter).

The UNI 10683 Standard PROHIBITS the withdrawal of combustion air from garages, combustible material warehouses, or from activities 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 fireplace heating system must be installed.

Extractor fans can cause functioning problems to the thermo stove when they are installed in the same room or space where the fireplace heating system is found.

Flue and connection to the same

The **Flue** is a fundamental component for correct functioning of the fireplace heating system. The minimum section of the flue must be that indicated in the fireplace heating system technical features (250 mm). Each fireplace heating system must be equipped with its own flue, without other intakes (boilers, fireplaces, stoves, etc…). Flue dimensions are closely related to its height, which must be measured from the fireplace heating system 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:

- 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;

ATTENZIONE!

- Upward alignment after the vertical tract throughout the remaining pathway with 50% minimum gradient. The sub-horizontal alignment part must not have a length greater than ¼ of the effective height of the flue or chimney and it must not however be longer than 2,000 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 it is absolutely necessary that it is insulated in order to avoid the flue gas cooling and the formation of condensate;**

- For the assembly of the flue gas pipes (which go from the appliance to the flue inlet) elements of non-combustible material must be used, which are suitable for resisting combustion products and their condensation;
- It is forbidden to utilise 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 forbidden;
- The assembly of flue pipes must be performed in a way to guarantee the sealing against flue gas for the appliance functioning conditions in low pressure;

- **The assembly of horizontal tracts is prohibited, unless absolutely necessary;**
- It is forbidden 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.

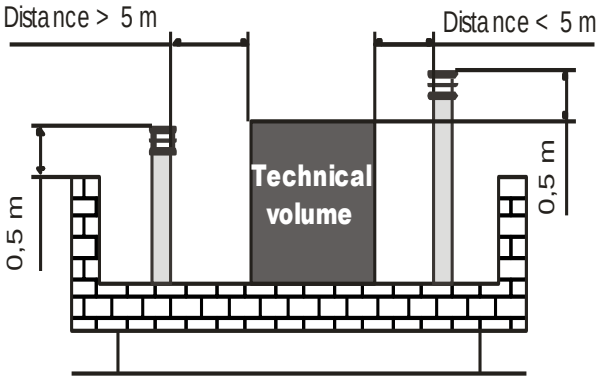
Chimney

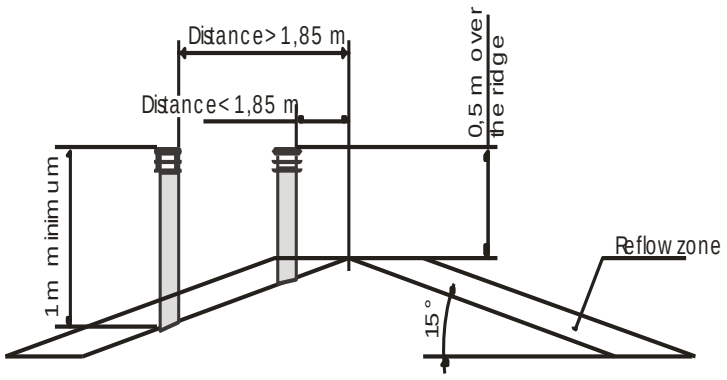
The **chimney** is a device crowning the flue, used to ease dispersion of combustion products.
It must satisfy the following requisites:

ATTENZIONE!

- 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 zone in order to prevent the formation of counter-pressures, which prevent free exhaust of the combustion products into the atmosphere.
It is therefore necessary that the minimum heights, indicated in the following figures, are respected:





CONNECTIONS

Electrical connection

ATTENZIONE!

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

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

Appliance safety is obtained when the same 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 connect the network to the fireplace heating system earth plant and failure to comply with the IEC Standards.

Electric control unit

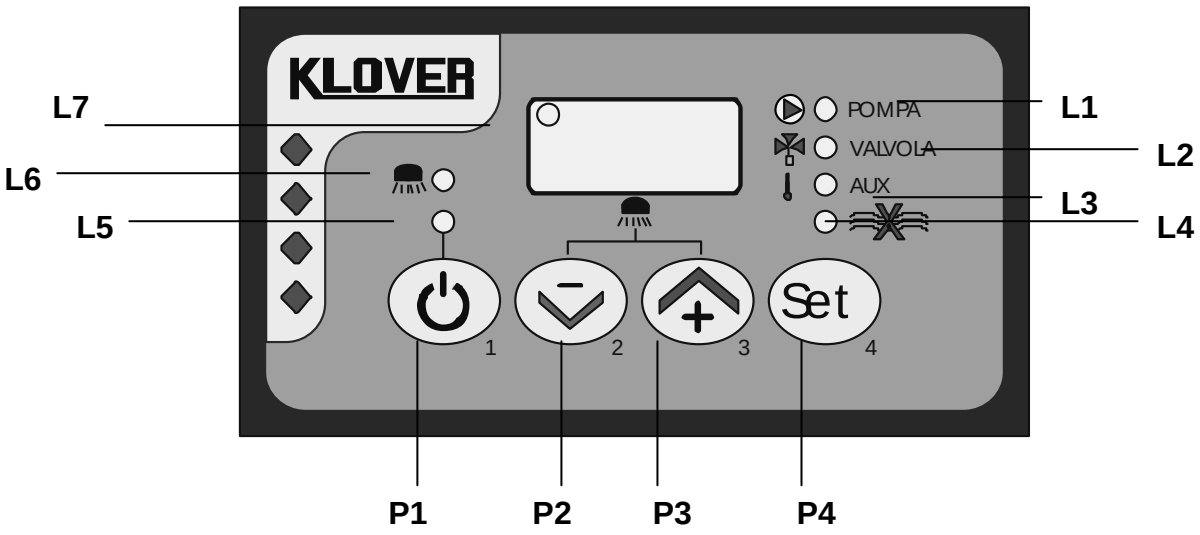
The electric control unit (supplied with the fireplace heating system on request) is used to control and command the start-up of the pump and any motorised 3-way valves.

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);
- **aux thermostat** (used to control any service associated boiler);
- **service thermostat** (used to activate or deactivate the circulation pump on reaching, or not, the temperature we set on the thermostat itself);
- **thermometer** (indicates the temperature of the water inside the fireplace heating system);
- **acoustic alarm** (it activates whenever the water of the body-boiler reaches and exceeds the temperature of 90-95°C);

For the connection to the control unit, consult the layout inside the box of the same.

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.

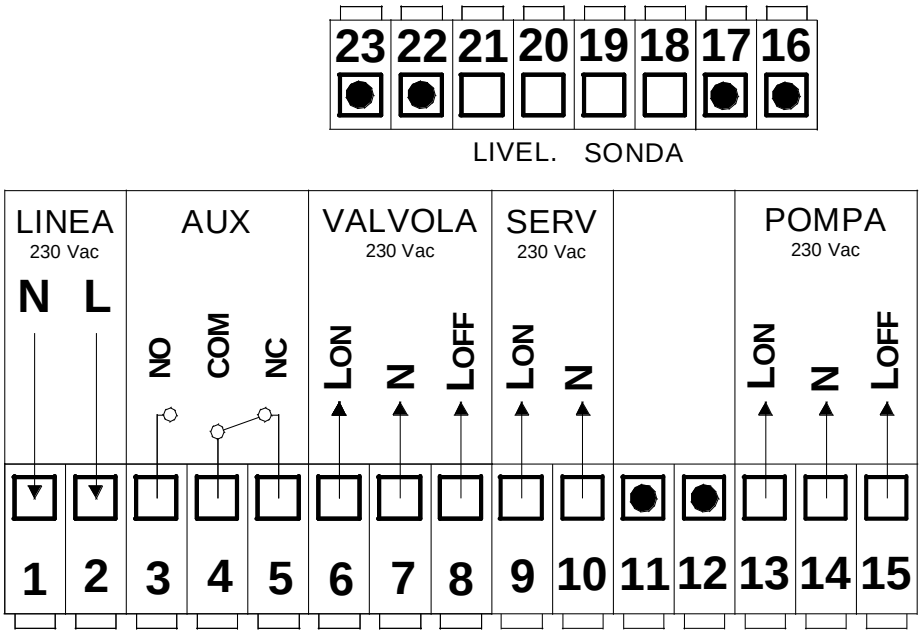
ATTENZIONE! During the normal operation of the fireplace the control unit must ALWAYS be turned on.

- **P2 DECREASE TEMPERATURE** allows to decrease the value of the thermostat indicating the minimum water temperature of the boiler to turn on the pump, switch any 3-way motorized valve to control an associated boiler and to turn on the circulation pump.
- **P3 INCREASE TEMPERATURE** allows to increase the value of the thermostat indicating the minimum water temperature of the boiler to turn on the pump, switch any 3-way motorized valve to control an associated boiler and to turn on the circulation pump.
- **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 pump thermostat has been selected.
- **L2 VALVE LED** The LED is on when the valve thermostat has been selected.

- **L3 AUX LED** The LED is on when the auxiliary 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.



Inputs	**PROBE**	Water Probe: Temperature Range 0 – 100 °C
	H_2O LEVEL	ON/OFF consent: Level switch

Outputs	**PUMP**	System pump:	230 Vac power supply	Clamps **13(FON) - 14(N) - 15(FOFF)**
	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 though 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	**65**	**L2**
AUX thermostat	**A03**	20	**75**	85	**50**	**L3**
SERVE thermostat	**A04**	20	**75**	85	**55**	**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

PARAMETER SETTINGS

ANTI-FREEZE activation thermostat	[°C]	**6**
SAFETY activation thermostat	[°C]	**85**
ALARM activation thermostat	[°C]	**90**
PUMP thermostat hysteresis (A01)	[°C]	**3**
VALVE thermostat hysteresis (A02)	[°C]	**3**
AUX thermostat hysteresis (A03)	[°C]	**3**
SERV thermostat hysteresis (A04)	[°C]	**3**
ANTILOCKING timer	[h]	**168**
ANTILOCKING pump activation time	[sec]	**30**
ANTI-FREEZE Pump OFF time	[min]	**5**
ANTI-FREEZE Pump ON time	[sec]	**20**
Type of Probes (10K blue='0' - 100K grey= '1')	n.	**0**
STANDBY enabling	n.	**1**
ANTI-FREEZE function enabling	n.	**1**
PARAMETERS THAT CANNOT BE MODIFIED		
ANTI-FREEZE thermostat hysteresis	[°C]	**1**
SAFETY thermostat hysteresis	[°C]	**1**
ALARM thermostat hysteresis	[°C]	**1**

TECHNICAL FEATURES

Power supply:	230 Vac ±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: ± 1°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

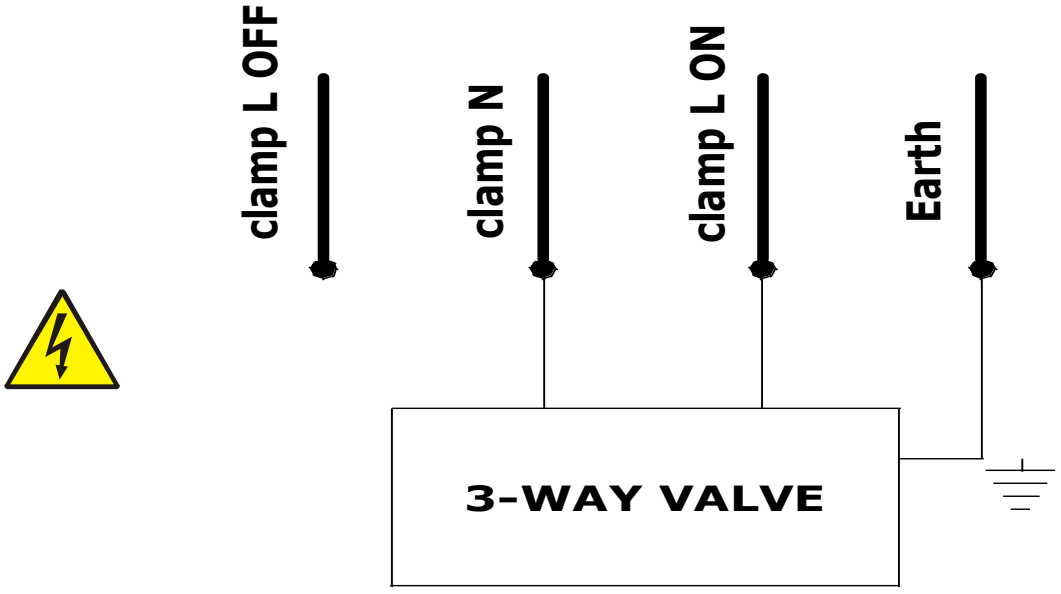
Control of any 3-way valve for the DHW circuit

ATTENZIONE!

The fireplace heating system control unit (supplied on request with he fireplace heating system) is equipped with a control as per standard for any motorised 3-way valve to be installed on the domestic hot water circuit. The control unit electric control board has three clamps (VALVE) to be used to control this 3-way valve. The three clamps on the electric control board have the following function:

- **N = COMMON TO 3-WAY VALVE**
- **L ON = FIREPLACE HEATING SYSTEM SIDE**
- **L OFF = GAS BOILER SIDE**

Below find a connection example using a 3-way valve with spring return. Remember that the hydraulic connection must be made in a way that when the valve is at rest, the water passes from the gas boiler. Only when the fireplace heating system temperature is sufficient (value set on the valve thermostat), the 3-way valve is powered and therefore closes the gas boiler circuit and opens the fireplace heating system circuit.



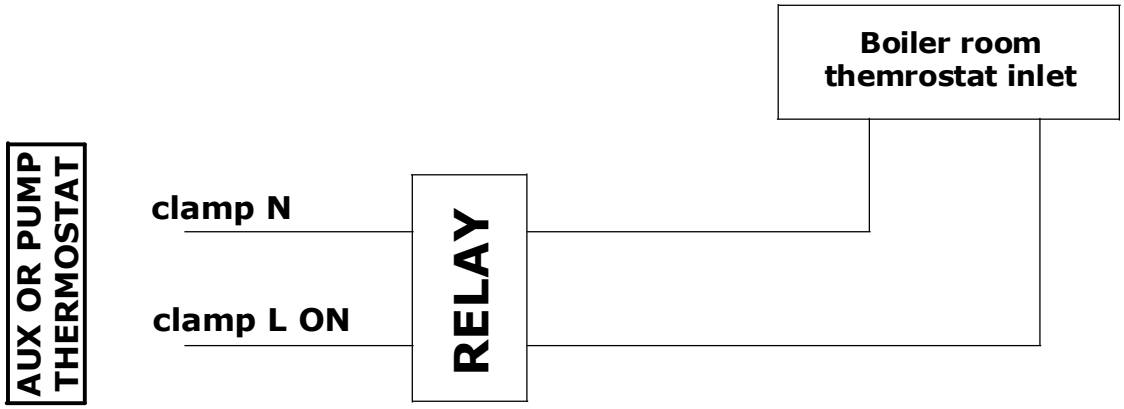
Control of any coupled boiler

ATTENZIONE!

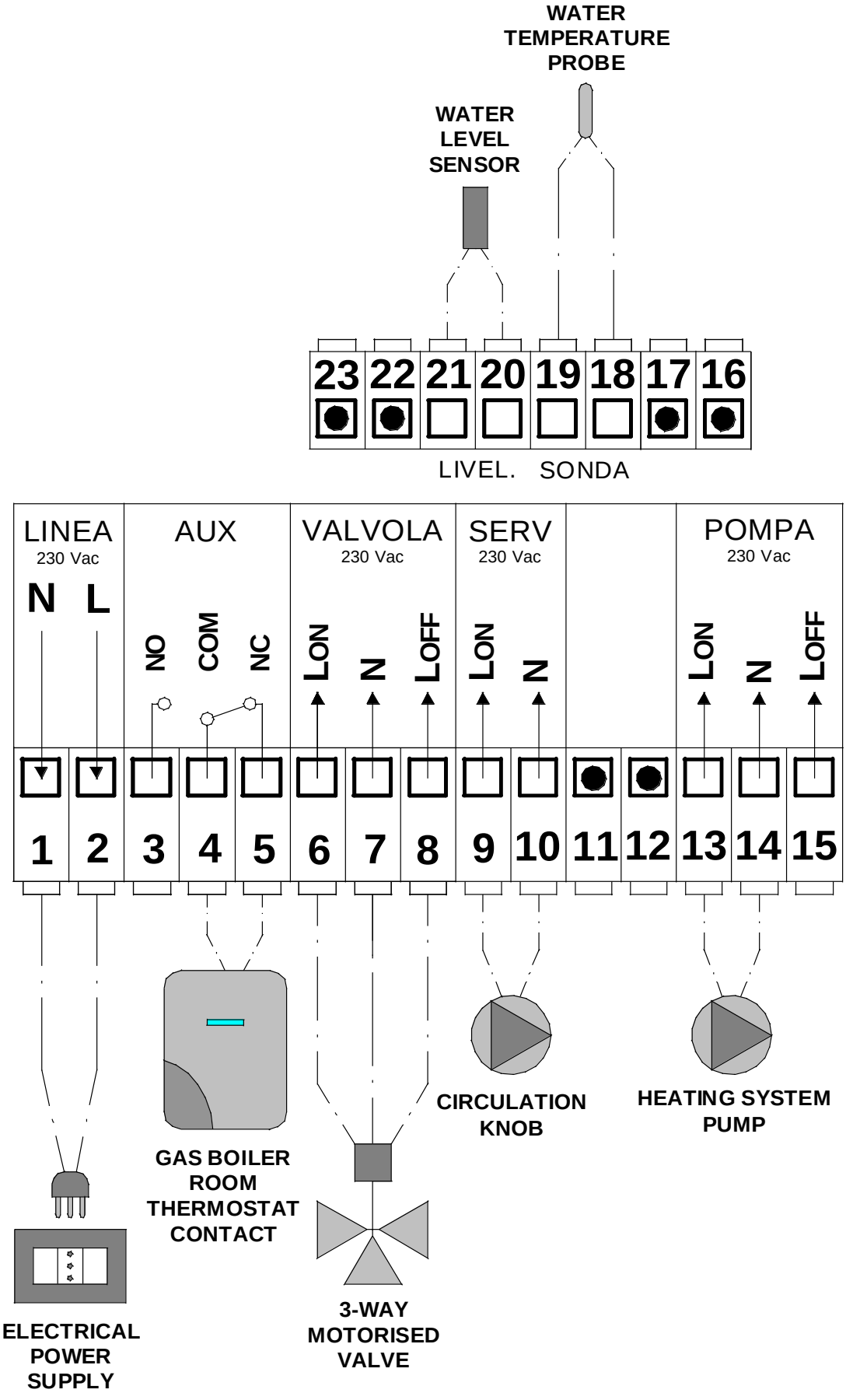
If the fireplace heating system is to be coupled with another boiler already installed in the system (e.g. wall-hung gas boiler), it must be ensured that when the fireplace heating system functions for the heating system, the boiler stops. So the fireplace heating system intervenes on the coupled boiler when the temperature set in the aux thermostat of the wood-burning fireplace heating system control unit is reached. In this way, there will never be two boilers functioning simultaneously in the same system. The coupled boiler will always be able to be used for the production of domestic hot water.

ATTENZIONE!

It is therefore easy to connect the clamps with the two wires connected to a relay that will control the Room Thermostat inlet of the coupled boiler.



Example of electrical connection



LINEA: Connect the 1 and 2 clamps to the electrical power supply.

AUX: This is used to control a boiler associated with the heating system. Therefore connect the 4 and 5 clamps (or 3 and 4 depending on the type of connection to the associated boiler) to the TA (Room Thermostat) contact of the boiler. It is then possible to check the boiler associated with the temperature on the *AUX thermostat*; above the set temperature the associated boiler turns off and on again only below the set temperature

VALVOLA: Connect the 6, 7 and 8 clamps to the 3-way motorised valve. It is used to control a motorized 3-way valve (or two 2-way motorised valves) installed in the dhw system. The valve opens the circuit with temperatures higher than those set on the *VALVE thermostat* (230V voltage on clamps 6 and 7) and close the circuit with lower temperatures (230V voltage on clamps 7 and 8).

SERV: Connect clamps 9 and 10 to the circulation pump. This is used to control the circulation pump installed on the fireplace heating system. The circulation pump will operate at temperatures higher than those set on the *SERV thermostat*. We recommend setting temperatures ranging between 35°C and 40°C for the *SERV thermostat* to optimize the yield for the water and prevent condensation, which would damage the body of the fireplace heating system, from forming.

POMPA: Connect the clamps 13 and 14 to the pump of the heating system. This is used to control the pump installed on the heating system. The heating pump will operate at temperatures higher than those set on the *PUMP thermostat*. We recommend setting the pump thermostat at temperatures greater the 55°C to prevent condensation, which would damage the body of the fireplace heating system, from forming.

SONDA: Connect the water temperature probe to clamps 18 and 19. This is used to detect the water temperature inside the fireplace heating system. if the probe is not connected, the control unit's display shows *"Lo"*; if the probe is in short-circuit, the display shows *"Hi".*

LIVELLOSTATO: Connect the level switch (water level sensor) to clamps 20 and 21. This is used to report the water level inside the body of fireplace heating system has not been reached.

Hydraulic connection

The hydraulic connections must be made in a rational mode. The fireplace heating system 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.

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

IF THE FIREPLACE HEATING SYSTEM 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), DHW SAFETY VALVE (6 BAR).

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

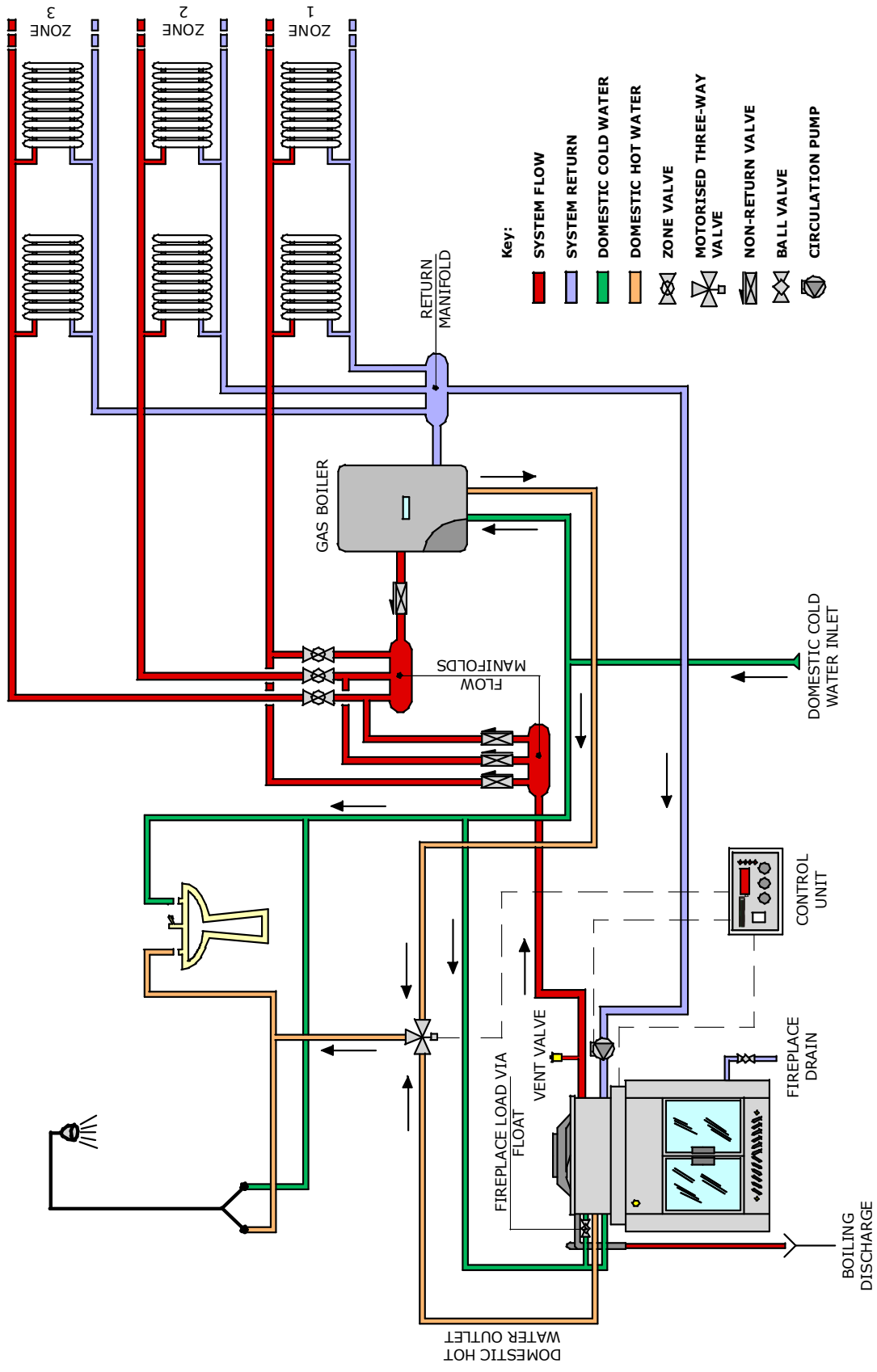
ALL LIABILITY IS DECLINED FOR DAMAGE CAUSED BY INCORRECT ASSEMBLY.

REMEMBER TO INSERT THE CONTROL UNIT PROBES AND BULBS INTO THE APPROPRIATE HOUSINGS.

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 FROM THE FIREPLACE HEATING SYSTEM INLET.

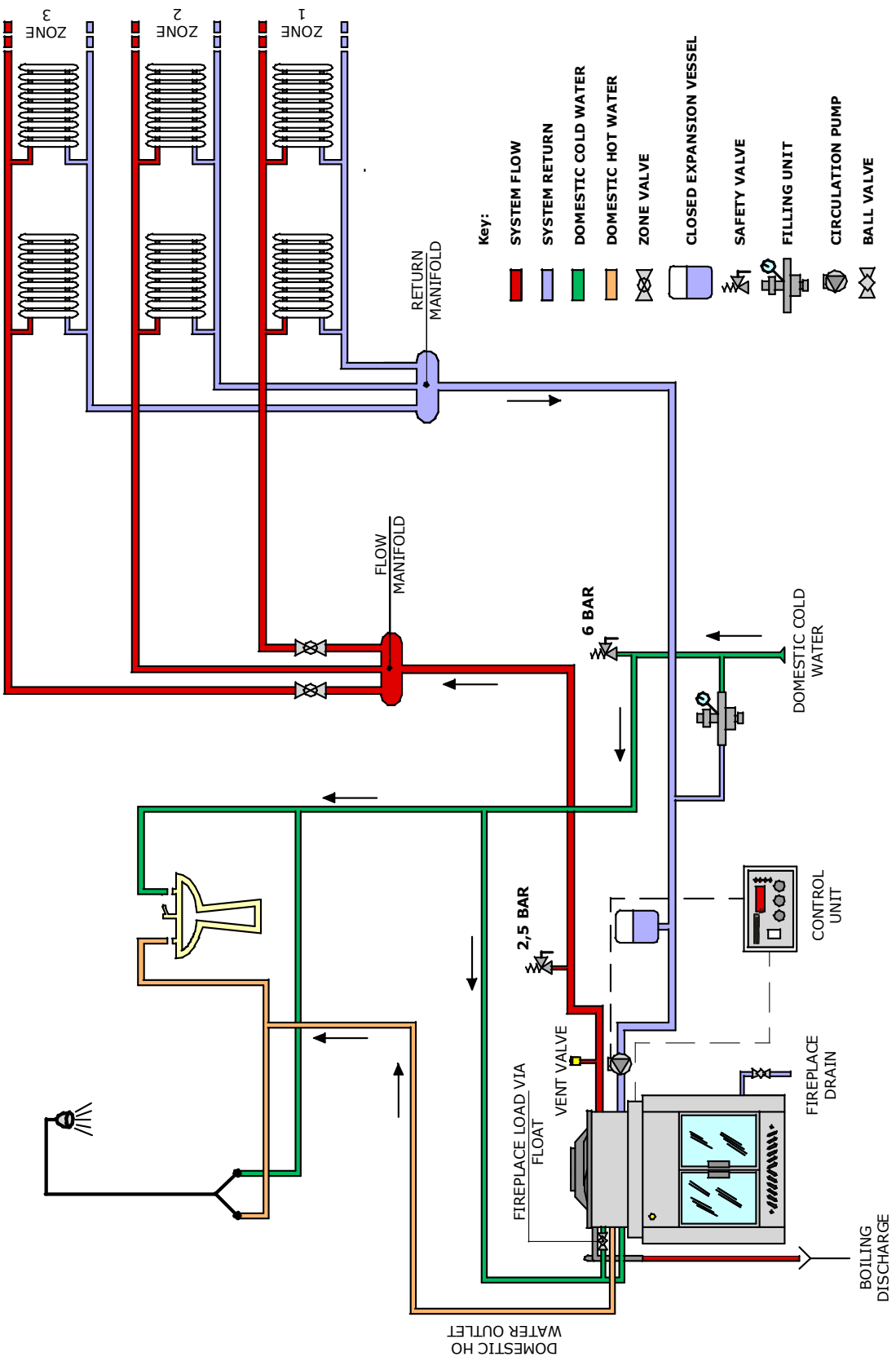
Example of fireplace heating system-boiler connection



THE FOLLOWING MUST BE INSTALLED ON THE HYDRAULIC HEATING PLANT: LOADING UNIT, CLOSED EXPANSION VESSEL SUITABLE FOR THE PLANT AND RELEVANT SAFETY VALVES. THE DHW SYSTEM MUST HAVE A SAFETY VALVE CALIBRATED AT 6 BAR.
(If it is deemed appropriate, the above-mentioned components present in the wall-hung boiler can be made use of).

This layout is purely indicative and does not bind or make KLOVER s.r.l. and its collaborators liable. The plan and consequent set-up must be realised in compliance with the Standards in force.

Example of fireplace heating system connection only



This layout is purely indicative and does not bind or make KLOVER s.r.l. and its collaborators liable. The plan and consequent set-up must be realised in compliance with the Standards in force.

FIREPLACE HEATING SYSTEM COVERING

ATTENZIONE!

When installation has been completed, do not cover the fireplace heating system for at least 6-7 days, in order to verify the tightness of all hydraulic joints of the fireplace heating system itself.

ATTENZIONE!

BEFORE COVERING THE FIREPLACE HEATING SYSTEM, DISASSEMBLE THE TWO DOOR LOCK ANGLES AND CHECK THAT THE STEEL CABLE IS INSIDE THE METAL WHEEL GROOVE.

All of the front part must be on view and able to be inspected. The two angles for inspection of the wheel and steel rope must be easily accessible also after the fireplace heating system has been covered.

ATTENZIONE!

If the fireplace heating system should have defects or breakage, the warranty excludes all hydraulic disassembly and re-assembly works, any masonry work and any other intervention that is made necessary in order to remove the fireplace heating system from the covering.

The plasterboard hood must be easy to inspect and/or disassemble. An inspection hole must be made (see following figure) in order to access the upper part of the fireplace heating system.

An example of covering is given below, indicating the minimum measurements to leave for any inspections of the fireplace heating system:

The inspection hole can be covered with a bracket or aeration grid.

COMMISSIONING

Filling the system for the first time

After having connected the fireplace heating system, fill the system as follows:

- 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 present in the system in order to ensure that there are no air bubbles;

ATTENZIONE!

When installation has been completed, do not cover the fireplace heating system for at least 6-7 days, in order to verify the tightness of all hydraulic joints and of the fireplace heating system itself.

ATTENZIONE!

BEFORE COVERING THE FIREPLACE HEATING SYSTEM, DISASSEMBLE THE TWO DOOR LOCK ANGLES AND CHECK THAT THE STEEL CABLE IS INSIDE THE METAL WHEEL GROOVE.

All of the front part must be on view and able to be inspected. The two angles for inspection of the wheel and steel rope must be easily accessible.

Filling the fireplace heating system

When the system has been filled, then fill the fireplace heating system via the float. It is recommended to install a ball valve in the fireplace 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).**

ATTENZIONE!

Regulate the float dipstick in a way that the exchangers are completely inside the fireplace heating system water.

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

N.B.: IF THE FIREPLACE HEATING SYSTEM 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), DHW SAFETY VALVE (6 BAR).

ATTENZIONE!

Never empty the water inside the fireplace heating system so as not to compromise the duration of the same.

Ignition

Perform the following operations:

- Before switching the fireplace heating system on, make sure that the control unit switch is on;

ATTENZIONE!

- Make sure that there is water in the system;
- Regulate the thermostat that controls the pump to a temperature of 55-60 °C;
- Open the smoke damper completely (optional)**;**
- Open the primary air front slots;
- Open the hatches or lift the vertical sliding door;
- Light the fire using seasoned, thin wood, if possible;
- When the wood has ignited well, close the doors, adjust the smoke damper and the combustion agent air via the front slots;

ATTENZIONE!

NEVER IGNITE THE FIREPLACE HEATING SYSTEM USING ALCOHOL OR OTHER HIGHLY INFLAMMABLE LIQUIDS.

Remember always to open the smoke damper and close the primary air front slots a few seconds before loading the fireplace heating system with new wood in order to prevent the backflow of smoke into the environment.

Boiling

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

- **Open the fireplace heating system smoke damper;**
- **Open the DHW cock and leave the water to run until the temperature in the fireplace body drops** (only for models connected to the DHW plant);

ATTENZIONE!

- **Open the hatches or the vertical sliding door;**
- **Close the primary air front slots completely**

After having ascertained the reason for the high temperature, wait for every thing to go back to normal (temperature below 60°C) check on the control unit that the water level LED is not on and, if necessary, open the cold water load from the float.

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!

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.

Functioning principle

The fireplace heating system is just a wood-burning boiler made in a way to be able to be inserted into a traditional fireplace.
You therefore have the pleasure of seeing the flame through the ceramic glass like in a normal fireplace, but the radiators in the home are also heated and DHW is supplied for all of the family.

ATTENZIONE!

The fireplace heating system can be integrated into an appliance that is already installed (gas boiler, diesel oil boiler or wood-burning etc...) or can function as a unique source of heating for the home.

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 once a year).

Before performing any cleaning or maintenance, make sure that the fireplace heating system is off and completely cold and that the ash is also cold.

The special manufacturing design means it is easier to access the elements. To clean the elements just open the large door and access all parts affected by flue gas.

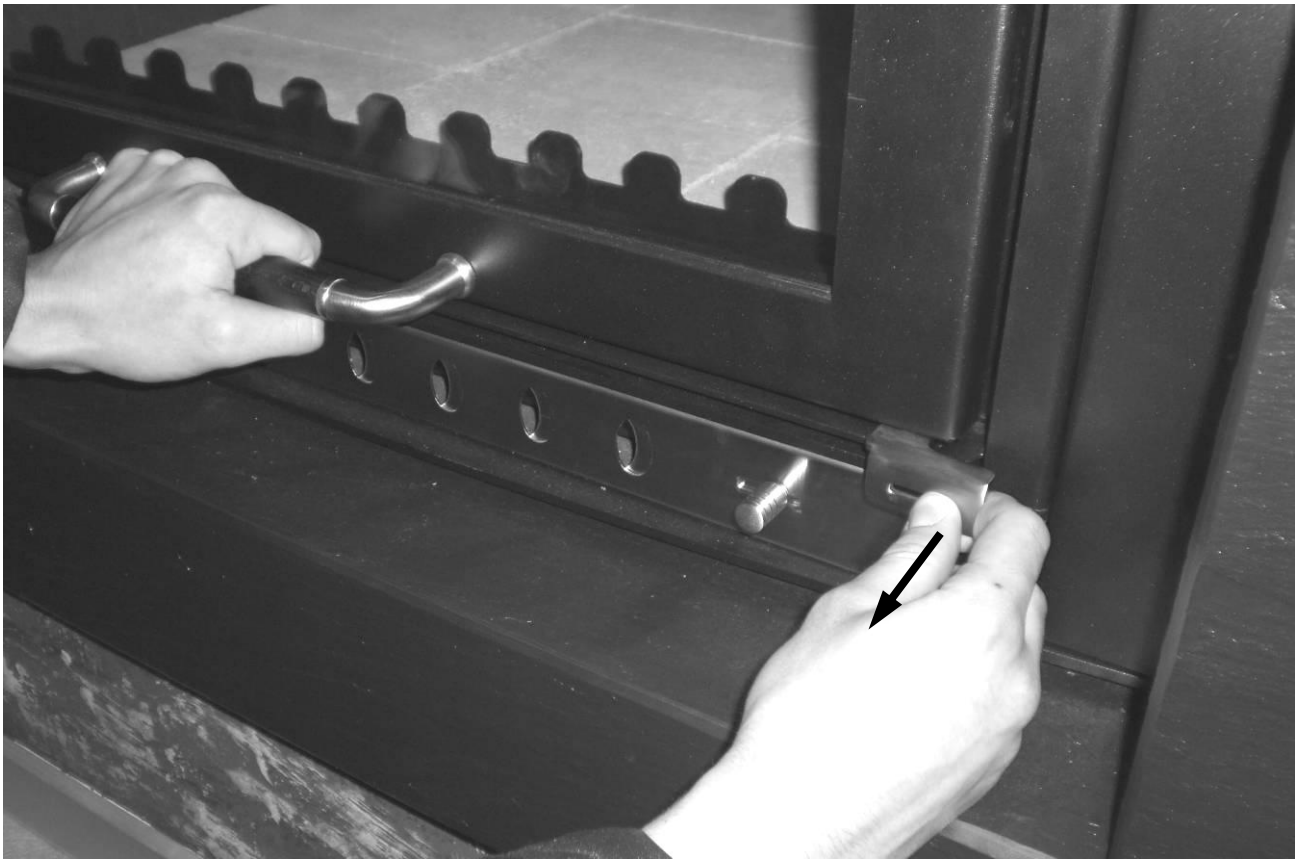
It is possible to reach all points affected by the flue gas by acting as follows:

Use the brush supplied to clean the 4 slanted elements of the flue gas pass inside the combustion chamber.

Any deposits on the walls of the combustion chamber (if particularly resinous wood is burned) can be eliminated by making the fireplace heating system work at maximum conditions for 30-40 minutes (in this case take the thermostat to 85°C) by burning dry wood or, even better, charcoal.
Leave the fire to go out and then scrape the inside walls using a steel spatula.
We recommend you periodically remove ash from the base of the combustion chamber in order to always ensure a efficient flow of combustion agent air.

Cleaning the ceramic glass

Only clean the ceramic glass when the fireplace heating unit is off and completely cold. Use a damp cloth and specific detergent for ceramic glasses. Do not use abrasive sponges. To clean the glass is essential to open the door fitted with a "hinge opening".



To open the hinged door you should release the designated hook as shown in the photo. The vertical sliding door must be open.

To close the hinged door, you should push both at the top and at the bottom - as shown in the photo - making sure that both parts are fixed correctly when they are fastened.

Cleaning the flue

The flue must be cleaned at least once a year at the start of the winter season, and also every time it is necessary.

If it is not cleaned, the functioning of the fireplace heating system and its components may be jeopardised.

ATTENZIONE! **The frequency of cleaning of the fireplace heating system and the flue depend on the quality of the wood used.**

USE TOP QUALITY WOOD IN ORDER TO OBTAIN THE BEST RESULTS.

Maintenance of the boiler body

The fireplace heating system is equipped with a special magnesium anode to protect the boiler body and stainless steel heat exchangers from corrosion due to stray currents in the system.
This anode protects from galvanic corrosion.

MAGNESIUM ANODE

ATTENZIONE!

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.
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 FIREPLACE HEATING SYSTEM 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 fireplace heating system.
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, 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. Top quality woods are beech, ash carpine and acacia.
Avoid resinous woods as they could compromise the duration of the fireplace heating system.
In fact, resinous woods have a rather sooty combustion and therefore, the flue and fireplace heating system must be cleaned more often.

The calorific value of the different types of wood depends greatly on their humidity and consequently the power of the fireplace heating system 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) id 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 fireplace heating system, 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 fireplace heating system 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	• Inexistent; • Gate valve closed; • Accidental obstruction; • Insufficient section.
Air vent (pipe)	• Insufficient section.
Flow regulator	• Closed or badly regulated
Hood gate valve	• Closed or badly regulated.
Wood	• Excessive humidity.
Flue Hood fitting/flue gas channel	• 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	• 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	• 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	• Periodical cleaning not performed.

WATER INSIDE THE FIREPLACE HEATING SYSTEM.

ELEMENTS TO CHECK	ORIGIN
Flue Chimney	• In total or partial absence of the chimney, the flue is not realised with start parallel to the appliance. • Inadequate chimney.
Pump thermostat	• Pump start-up at temperatures that are too low (condensate is created).

ATTENZIONE! To prevent flue gas from escaping at the time of loading the wood, close the primary air front slots completely and fully open the smoke damper.

USEFUL ADVICE

1. The temperature of the thermostat that controls the pump **must never be set below 55 °C.**
2. The fireplace heating system must have a pump and the warranty becomes null and void if it is mounted without connecting the control unit thermostat (use KLOVER control units).
3. When priority is to be given to DHW (for prepared models only), take the pump thermostat to 75°C (or set the DHW function) 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. Open the smoke damper before loading the wood.
5. **Never empty** the content of the water from the fireplace heater system, 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 fireplace heating system for the duration of 5 years, under the following conditions:

- The fireplace heating system 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, ceramic-majolica coverings and refractory bricks, because as they are very fragile to blows, they can be damaged even accidentally, all the gaskets, the control board, all electric components and every thing 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 free to destination, 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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