FLEXIHEAT UK LTD
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Installation, Use and Maintenance Manual for model

R1KG

R1KG 180 - R1KG 240

Floor standing premix condensing boiler

Heating only

CE 0476

R1KG 180_240 - RAD - ING - Manuale - 2306.1_SKM1.4_firm.L224G

SUMMARY

INTRODUCTION

WARNING

Before starting any operation it is mandatory to read this instruction manual, in relation to the activities to be carried out as described in each relevant section. Proper operation and optimal performance of the boiler are ensured by strict compliance with all the instructions given in this manual.

The installation, use and maintenance manual is an integral and essential part of the product and must be delivered to the user.

MANUAL USERS

The manual users are all those who install, use and maintain the boiler.

The boiler must be used and accessed only by qualified operators that fully read and understood the use and maintenance manual, paying particular attention to the warnings.

READING AND SYMBOLS OF THE MANUAL

To ease the understanding of this manual, recurrent symbols where used, in particular:

› On the outer margin of the page is placed a thumb index indicating the type of user to which the instructions in that section address.

› The titles are differentiated by thickness and size in accordance with their hierarchy.

› The images contain important parts described in the text, marked with numbers or letters.

› (See chap. "chapter name"): this entry indicates another section in the Manual that you should refer to.

› Device: this term is used referring to the boiler.

DANGER

It identifies an information related to a general danger that if not complied with, may cause serious personal damage or even death.

ATTENTION

It identifies an information that if not complied with may cause small or medium level lesions to the person or serious deterioration to the boiler.

WARNING

It identifies a precaution information that must be observed in order to avoid damaging the machine or parts of it.

MANUAL STORAGE

The manual must be carefully stored and replaced in case of deterioration and/or low legibility.

If you misplace the use and maintenance manual, you can request it from the Service Centre giving the serial number and model of the boiler indicated on the data plate placed on the right side of its casing.

MANUFACTURER WARRANTY AND RESPONSIBILITY

The technical and functional features of the device are ensured by its use in compliance:

1. with the use and maintenance instructions contained in the manuals accompanying the product, the content of which the customer certifies that he is aware;

2. with the conditions and purposes to which devices of the same type are intended.

For more information on the warranty validity, its duration, the obligations and the exemptions, please consult the First start-up certificate attached to this manual.

The manufacturer reserves:

› the right to modify the tools and relative technical documentation without any obligation to third parties; neither will the company be held responsible for any inaccuracies in this handbook deriving from printing or translation errors;

› the material and intellectual ownership of this manual and forbids its distribution and duplication, even partial, without prior written authorization.

PRODUCT CONFORMITY

Flexiheat declares that its gas boilers comply with the European Directives and with the requirements provided in the European standards below:

› Eco-design Directive 2009/125 CE,

› Energy labelling Directive 2010/30/CE,

› Regulation EU 811/2013,

› Regulation EU 813/2013,

› Regulation EU 2016/426,

› Electromagnetic compatibility Directive 2014/30/CE,

› Performance Directive 92/42/CE,

› Low voltage Directive 2014/35/CE.

The materials used such as copper, brass, stainless steel create a homogeneous, compact and functional assembly, easy to install and manage. In its simplicity, the boiler is equipped with all accessories necessary to render it a veritable independent heating unit. All boilers are tested and delivered with a quality certificate signed by the tester.

1. INSTALLER SECTION

The installation operations described in this section, must be performed only by qualified personnel, having the appropriate technical training in the field for the installation and maintenance of components of civil and industrial domestic hot water production and heating plants.

1.1. INSTALLATION

1.1.1. GENERAL INSTALLATION WARNINGS

ATTENTION

This boiler may be used only for the purpose for which it has been designed: heat water to a temperature below boiling point at atmospheric pressure. Any other use is considered wrong and dangerous. The manufacturer is excluded from any contractual or extra-contractual responsibility for damages caused to people, animals or property due to errors during installation.

ATTENTION

This boiler must be installed only by qualified personnel, having the appropriate technical training in the field for the installation and maintenance of components of civil and industrial domestic hot water production and heating plants.

ATTENTION

After having removed the packing, make sure the device is intact. In case of doubt, do not use the device and contact the supplier.

BEFORE INSTALLING THE BOILER, THE INSTALLER MUST MAKE SURE THAT THE FOLLOWING CONDITIONS ARE MET:

› The device is connected to a heating system and a water supply network appropriate for its power and performance.

› The location must be properly vented through an air vent.

› The air vent must be placed at floor level to prevent it from being obstructed, protected by a grid that does not hamper the useful passage section.

› The device is suitable for use with the type of gas available by checking the boiler data plate (placed on the inner side of the front casing).

› Make sure that the pipes and joints are perfectly sealed, without any gas leaks.

› Make sure that the grounding system works properly.

› Make sure that the electrical system is suitable for the maximum power absorbed by the device, value indicated on the data plate.

1.1.2. BOILER LOCATION ENVIRONMENTAL REQUIREMENTS

The boiler has a thermal power over 35 kW and, therefore, it must be installed only into a heating unit.

The device installation location should be vented due to the presence of threaded joints on the gas supply line. The location should be therefore provided with vents as to ensure air exchange, with output grid in the natural accumulation area of potential gas losses.

WARNING

DO NOT install the boiler in a technical compartment near a swimming pool or a laundry, to avoid that the combustion air is exposed to chlorine, ammonia or alkaline agents that may worsen the corrosion phenomenon of the heat exchanger. Failure to observe this caution will void the warranty of the heat exchanger.

WARNING

If the temperature in the appliance installation location goes below -10 centigrades, please fill the plant with anti-freeze liquid and insert and a frost prtotection kit (see chapter 'ANTI-FREEZE PROTECTION').

WARNING

The manufacturer will not be held responsible for damages caused by incorrect installation not in conformity with the above mentioned instructions and not duly protected from freeze.

1.1.3. REFERENCE LEGISLATION

The installation must be done according to the requirements of current legislation and in compliance with local technical regulations, according to the indications of the good technique.

1.1.4. UNPACKING

WARNING

Please unpack the boiler just before installing it. The Company is not responsible for the damages caused to the device due to incorrect storage.

WARNING

The packing elements (cardboard box, wooden crate, nails, fasteners, plastic bags, expanded polystyrene, etc.) must be kept out of the reach of children as they may be dangerous. Therefore they should be dismantled suitably differentiating them in accordance with the standards in force.

To unpack the boiler, proceed as follows:

› cut the fixing strip (see A-fig.1);

› remove the cardboard box lifting it upwards (see B-fig.1);

› push the boiler on one side and remove the pallet underneath (see C-fig.1).

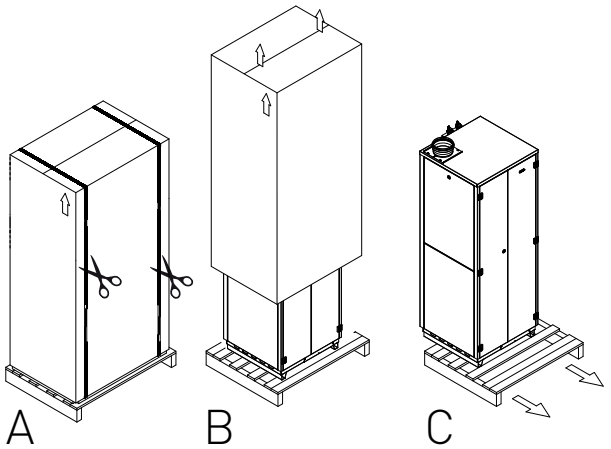
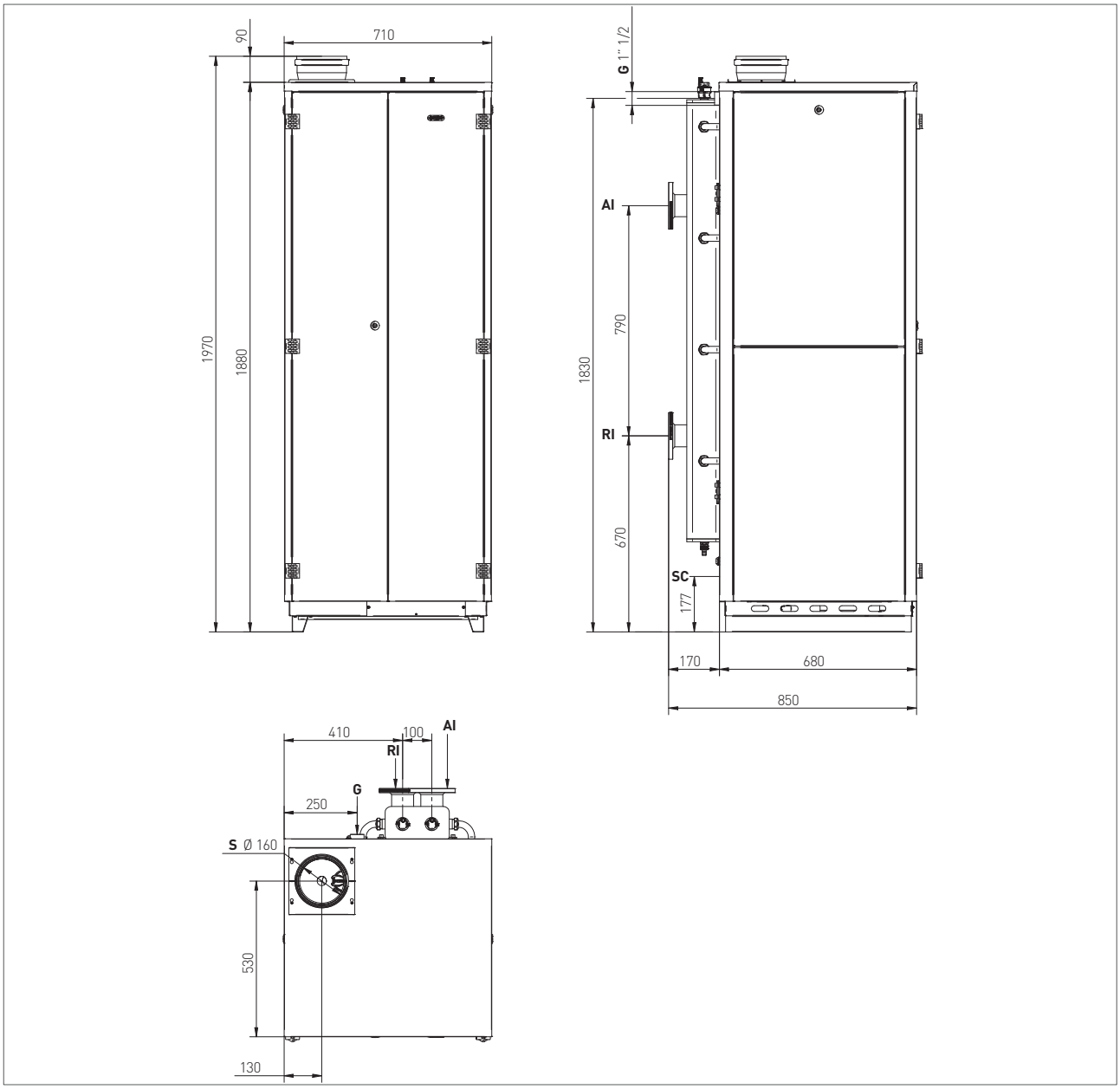


fig. 1

1.1.5. OVERALL DIMENSIONS

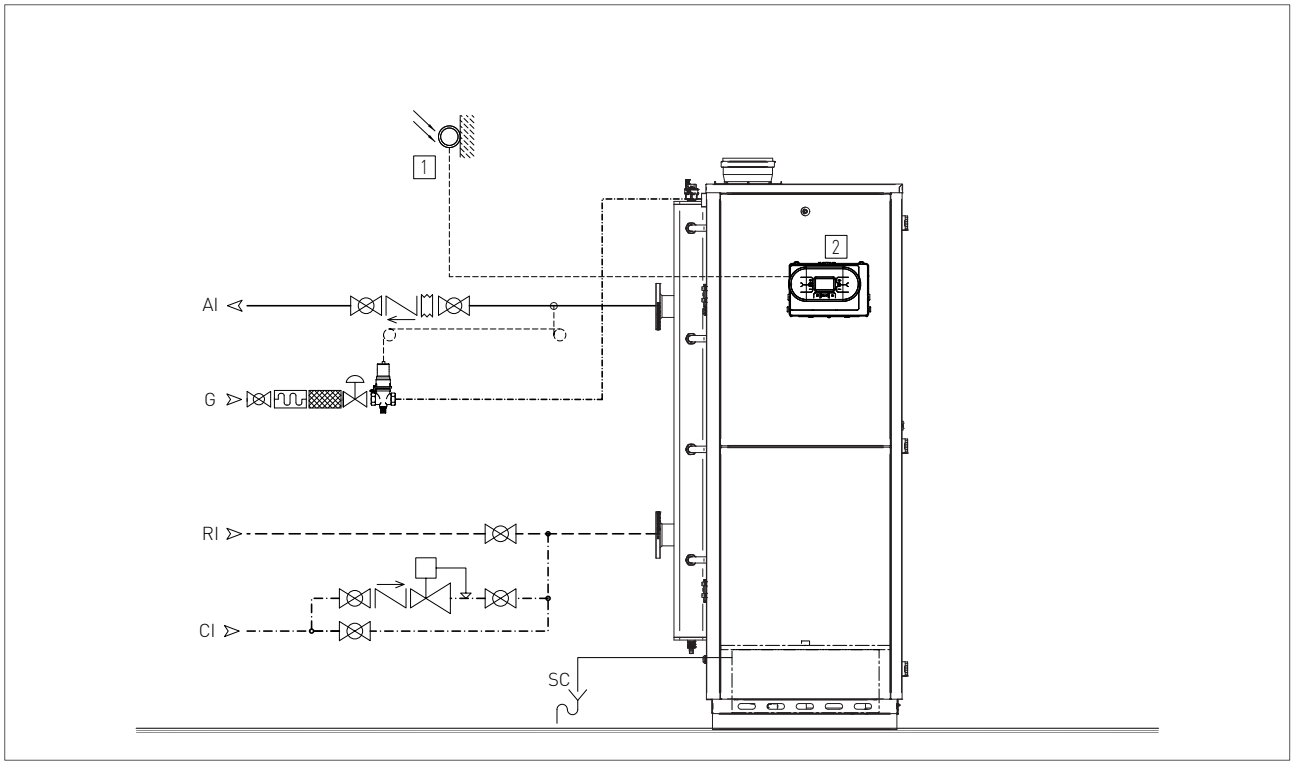


AI	HEATING FLOW	Ø 2"1/2
RI	HEATING RETURN	Ø 2"1/2
G	GAS	Ø 1"1/2
S	FLUE OUTLET	Ø 160 mm
SC	CONDENSATE DRAIN CONNECTION	Ø 29 mm

1.1.6. MECHANICAL SYSTEM DIAGRAM

HEATING ONLY INSTALLATION

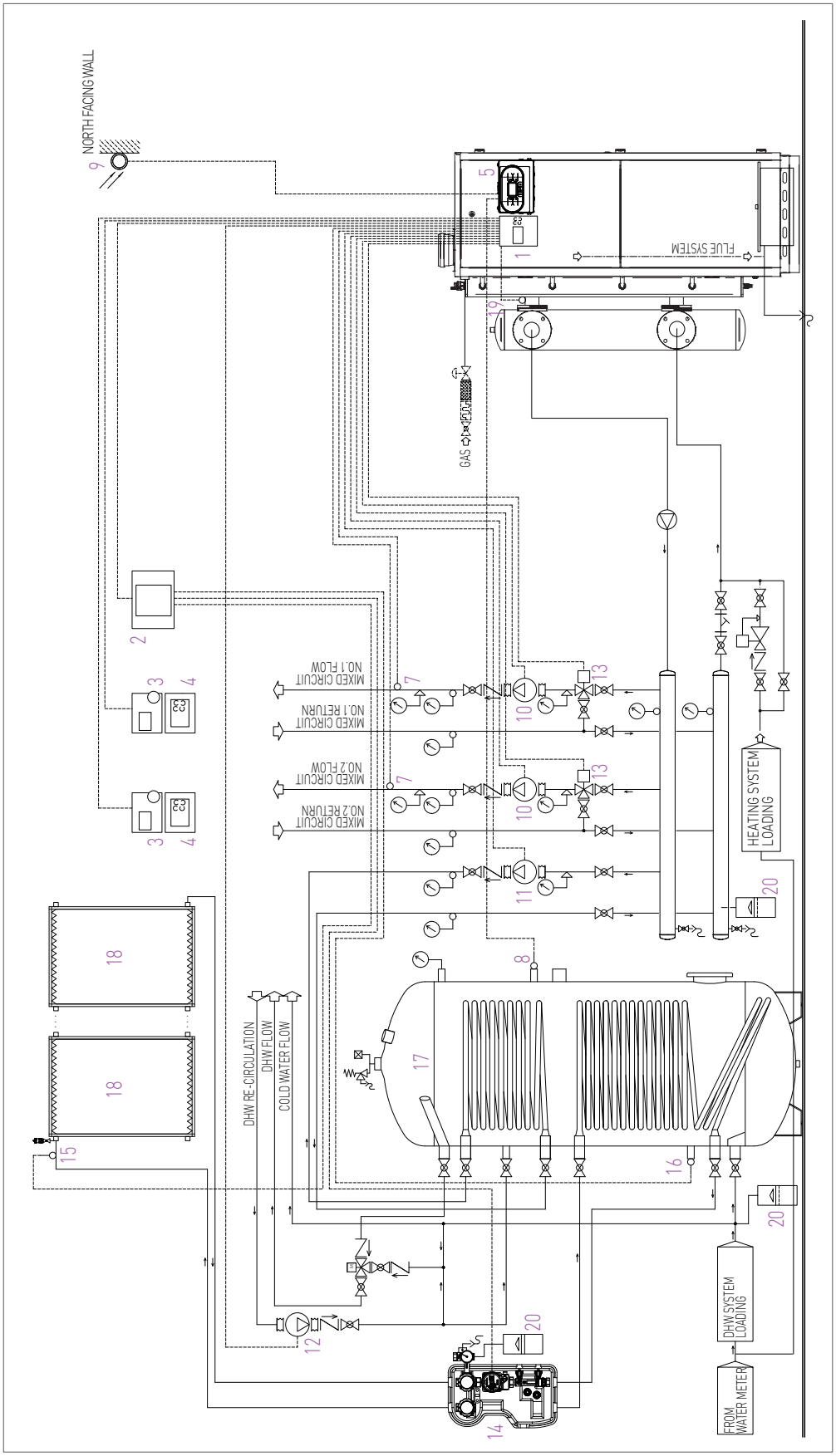
The boiler can manage a heating system at a fixed point delivery temperature or in climatic compensation with an external probe, managing the modulation according to the actually requested thermal load.



DESCRIPTION

1	OUTDOOR SENSOR
2	CONTROL PANEL NO.1
AI	HEATING FLOW
RI	HEATING RETURN
CI	SYSTEM LOADING
G	GAS
SC	CONDENSATE DRAIN CONNECTION

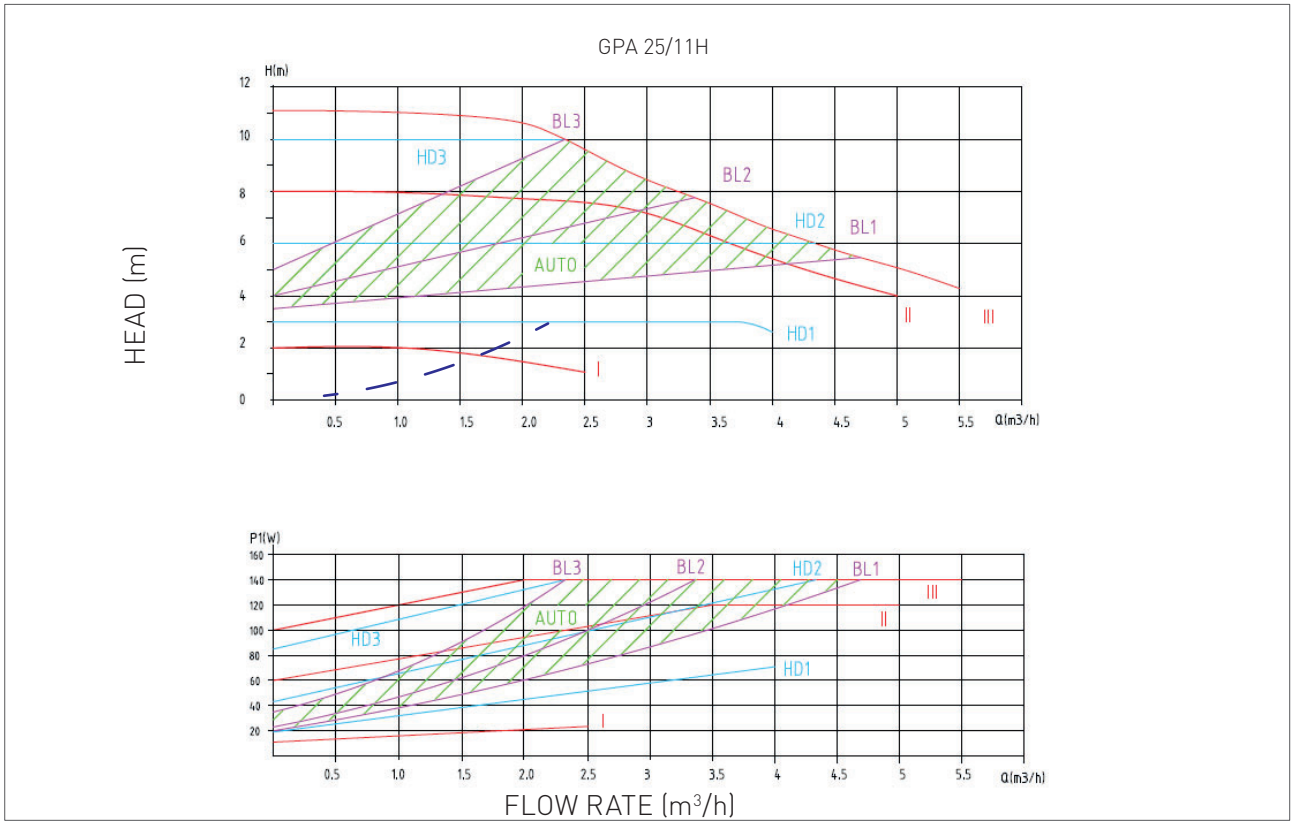
HEATING + DHW AND SOLAR MANAGEMENT



DESCRIPTION

1 SEQUENCE CONTROL AND SYSTEM MANAGEMENT CONTROL BOX (MASTER)
2 SOLAR PCB (SLAVE)
3 ROOM THERMOSTAT
4 ROOM TEMPERATURE CONTROL (ALTERNATIVE TO ROOM THERMOSTAT)
5 CONTROL PANEL NO.1
6 MANIFOLD SENSOR
7 MIXED CIRCUIT SENSOR
8 STORAGE TANK SENSOR
9 OUTDOOR SENSOR
10 MIXED CIRCUIT CIRCULATING PUMP
11 STORAGE TANK LOADING PUMP
12 RE-CIRCULATION LOOP PUMP
13 MIXED CIRCUIT MIXING VALVE
14 SOLAR CIRCUIT PUMP
15 SBS SOLAR PANEL SENSOR
16 SBI SOLAR TANK SENSOR
17 DHW STORAGE TANK
18 SOLAR PANEL
19 SEPARATOR / EXCHANGER SENSOR
20 EXPANSION VESSEL

1.1.7. PUMP HEAD / FLOW DIAGRAM



– – – Load losses of only one active unit

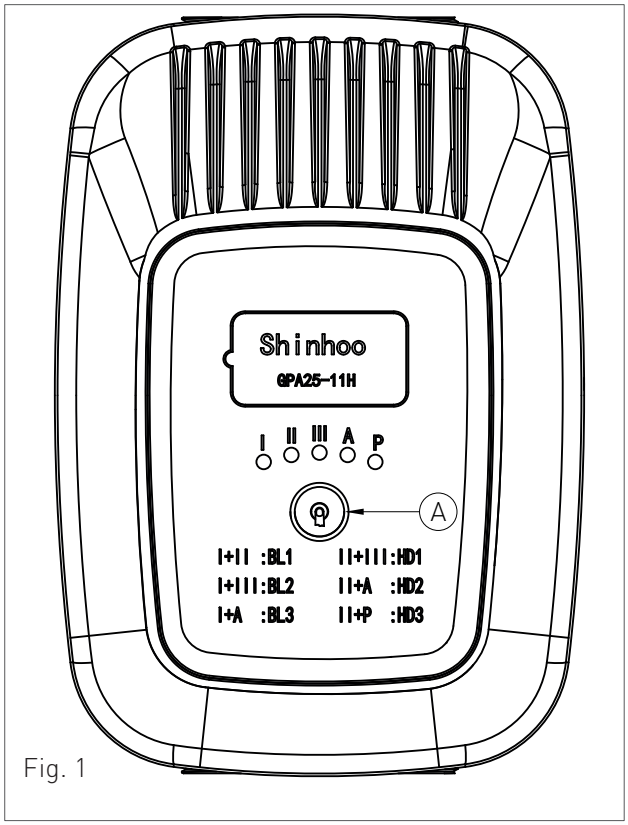


Fig. 1

By pressing the selection button (see 'A' fig. 1), the type of operation corresponding to the reference curve shown in the diagram can be activated, depending on the displayed LED combination.

Note: If the LED 'P' is ON, it indicates that the PWM cable is connected to the boiler board and that pump operation is only managed according to the ΔT set in the boiler board reference parameter.

Failure code	Failure description
Overvoltage protection	When the input voltage is above 278 ± 10V for 2s, the overvoltage protection is activated, the indicator flashes once and the pump stops working. When the voltage is back to 270 ± 5V, the pump goes back to normal operation.
Undervoltage protection (V)	When the voltage is 140 ± 5V for 2s, the undervoltage protection is activated, the indicator flashes twice and the pump stops working. When the voltage is restored to 150 ± 5V, the pump returns to normal operation.
Overcurrent protection (A)	When the current is too high, the overcurrent protection is activated, the indicator flashes 3 times and the pump stops working. After 8s the pump restarts. If the fault has not been rectified, the warning light flashes 3 times and the pump stops running. This cycle is repeated until the fault is rectified.
Phase failure protection	When the motor is out of phase, the phase-failure protection is activated, the warning light flashes 4 times and the pump stops running. After 8s the pump restarts. If the phase failure is repeated 5 times, the pump stops running. The pump must be re-powered.
Locked rotor protection	When the pump speed, within 3s after start-up, is less than 500RPM, the blocking protection is activated, the warning light flashes 5 times and the pump stops running. After 8s the pump restarts. If the rotor blocking failure is repeated 5 times, the pump stops running. The pump must be re-powered.
Water shortage protection	When there is a lack of water inside the pump, the water shortage protection is activated, the warning light flashes 6 times and the pump stops working. After 8 seconds, the pump restarts. If the fault has not been rectified after 5 cycles, the pump will stop running. The pump must be re-powered.

1.1.8. BOILER INSTALLATION

MINIMAL TECHNICAL SPACES

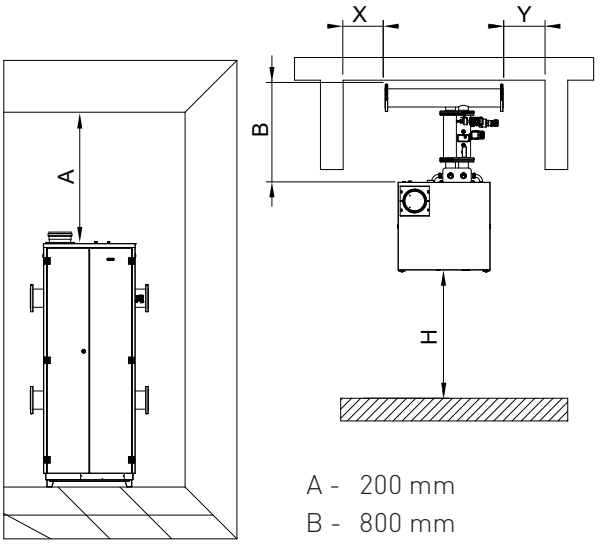
In order to allow the access inside the boiler for maintenance operations, you have to respect the minimum technical spaces indicated in figure 1.

WARNING

Make sure, using a spirit level, that the boiler is properly inclined being levelled (see fig.2) so as to allow the condensate to drain.

WARNING

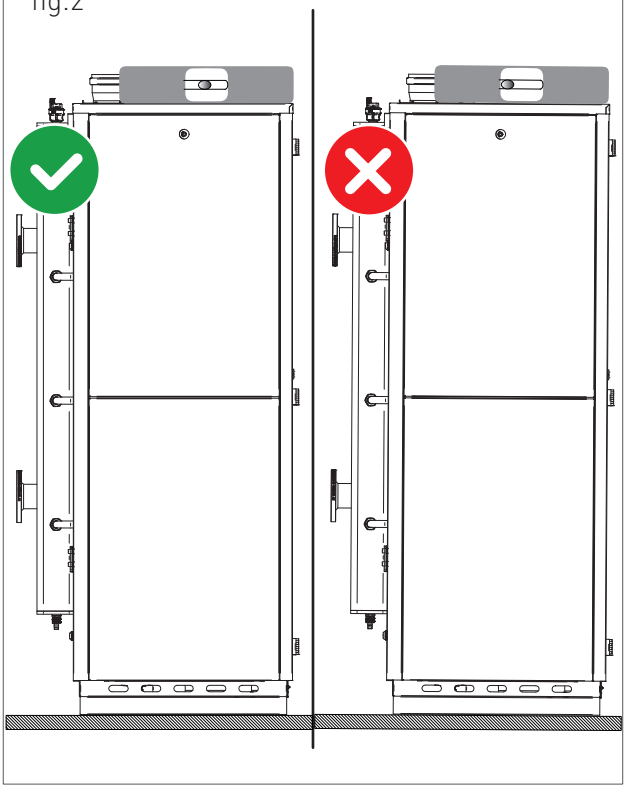
Incorrect inclination of the boiler would cause the condensate to flow incorrectly through the drainage pipe, resulting in condensate stagnating inside the condensing module.



A - 200 mm
B - 800 mm
X - 60 mm
Y - 60 mm
H - 500 mm

fig.1

fig.2



1.1.9. HYDRAULIC CONNECTION

DANGER

Make sure that the water and heating pipes are not used as grounding system for the electrical plant. They are not suitable for such use.

WARNING

To prevent voiding the warranty and ensure proper operation of the boiler, please wash the system (if possible when hot) with suitable pickling or descaling solutions in order to remove the impurities coming from pipes and radiators.

WARNING

If the boiler is installed in a hydrostatic position lower than those of the connected devices (radiators, fan coils, etc.), install the shut-off valves on the D.H.W. and heating circuits to ease the performance of the maintenance operations, if it is necessary only to empty the boiler.

WARNING

When connecting the boiler to water supply, avoid excessive bending and recovery operations from any off axis positioning that may damage the pipes causing leaks, malfunction or early wear.

WARNING

In order to avoid any vibrations and noises, do not use pipes with small diameters or elbows with small radius and significant cut-off of the passage sections.

WARNING

Connect the boiler safety drains to a discharge funnel. The manufacturer is not responsible for any floods due to safety valve opening in case of plant overpressure.

D.H.W. CIRCUIT

In order to prevent limestone build-up and damages to the D.H.W. heat exchanger, the hardness of the domestic supply water should not exceed 15 °f. However, please check the characteristics of the water used and install suitable treating devices.

The heat exchanger coil cleaning frequency depends on the hardness of the supply water and on the presence of solid residues or impurities inside the water that are often present in case of recently installed plants. Based on the characteristics of the inlet water, the installation of suitable water treating devices is recommended, for residues presence please install a line filter.

The pressure of the cold inlet water should be between 0.5 and 6 bar. In case of higher pressure values, please install a pressure reducer upstream from the boiler.

HEATING CIRCUIT

In order to avoid any scale or deposits on the primary exchanger, the hardness of the heating circuit inlet water should not exceed 25 °f. However, please check the characteristics of the water used and install suitable treating devices.

This treatment is mandatory if frequent episodes of return water or partial or total emptying of the plant occur.

WARNING

In case the boiler is installed as part of a low temperature circuit, please install a safety thermostat on the heating flow, which can stop the boiler activity in case of high heating flow temperature. The company assumes no liability for damages caused to persons or property for failure to comply with these instructions.

1.1.10. CHARACTERISTICS OF THE WATER OF THE SYSTEM

For a correct operation of the system, it is necessary to make sure that:

1. The system does not present losses or that the most obvious are at least eliminated;

2. If an automatic filling system is present, a litre meter must be installed in order to precisely know the extent of any losses;

3. The filling in of the system and the top ups are performed with softened water in order to reduce the total hardness. The water must also be treated in order to maintain the pH within the provided threshold so as to avoid corrosion phenomena.

4. Either on new systems or on replacements, the system must be fitted with efficient systems which ensure the elimination of the air and impurities: Y filters, micro impurity separators and micro bubbles of air separators;

5. Avoid draining the water of the system during the routine maintenance even if it is about apparently insignificant quantities: for example, in order to clean the filters, provide the system with adequate shut-off valves;

6. Always perform an analysis of the water of the system before opening the communication between the new generator and the system, in order to establish if the parameters present in the water indicate the need to fully drain the system, to use the water already present in the system or to chemically wash the system using utility water adding a detergent when it is suspected that the system might be dirty or particularly clogged and at the next loading with new treated water.

Water treatment

In order to preserve the integrity of the water-fume exchanger and to guarantee optimal thermal exchanges, it is necessary that the water of the primary circuit, circulating inside the exchanger of the condensate boiler, has the characteristics defined and constant in time. To obtain this, it is fundamental to perform a series of system preparation and maintenance operations such as:

• washing the system;

• check the characteristics of the water of the system;

The type of treatment to be performed will be chosen based on the characteristics of the water to treat, of the type of system and on the requested purity limits

Oxygen

A certain amount of oxygen always enters the system, both during the filling phase and during the use in case of reintegration or presence of hydraulic components without oxygen barriers. The reaction between the oxygen and the stainless steel creates corrosion and forms sludge. While the water fume exchanger is made of stainless steel, and therefore it is not subject to corrosion, the sludge created in the carbon steel system is deposited in the warm points, including the exchanger. This has the effect to reduce the heat capacity and thermally insulate the active parts of the exchanger, which might cause damages.

The precautions to limit the phenomena are:

- Mechanical systems: a deaerator combined with a sludge remover, correctly installed, reduce the quantity of oxygen circulating inside the system.

- Chemical systems: the additives allow the oxygen to dissolve in water.

Hardness

The filling and make-up water hardness brings a certain amount of limestone into the system. It attacks the warm parts of the exchanger, thus creating load losses and thermal insulation losses on the active parts. This phenomena can cause damages.

The filling and make-up water of the system, if it does not fall under the values indicated below, should be softened. Moreover, additives can be added in order to maintain the limestone into the solution. The hardness must be periodically checked and registered.

Acidity	7 < pH < 8.5	
Conductivity	< 400	µs/cm (at 25°C)
Chlorides	< 125	mg/l
Iron	< 0.5	mg/l
Copper	< 0.1	mg/l

If the above indicated limits are exceeded, a water must be chemically treated.

The type of treatment to be performed will be chosen based on the characteristics of the water to treat, of the type of system and on the requested purity limits.

1.1.11. SYSTEM WATER SPECIFICATIONS

WARNING

For system filling use only clean tap water. In order to prevent limestone build-up and damages to the domestic water heat exchanger, the hardness of the domestic supply water should not exceed 15° Fr. However, please check the characteristics of the water used and install suitable treating devices.

WARNING

If the system is filled by adding ethylene glycol-type chemical agents you have to install on the loading system a hydraulic trip unit in order to separate the heating circuit from the domestic circuit.

Before powering up the boiler, fill the system as follows:

1. check that the system air vent valves are not blocked;
2. unscrew the manual air vent valve (1-fig.1) located at the top of each of the condensing exchangers;
3. slightly loosen the plugs of the two air vent valves at the top of the manifold to allow air to vent from the highest point of the system (2-fig.2);
4. open the water mains tap and fill the system by venting all the air;
5. check through the pressure gauge in the system that the system pressure reaches the design value;
6. after performing this operation, make sure that the filling tap is properly closed.
7. Open the radiators air vent valves and check the air venting process. **WHEN THE WATER COMES OUT, CLOSE THE RADIATOR AIR VENT VALVES AND THOSE AT THE TOP OF THE CONDENSING EXCHANGER (1-FIG.1).**
8. If the water pressure in the system drops after the above-mentioned operations, open the filling tap again until the pressure in the gauge reaches the design pressure.

fig. 1

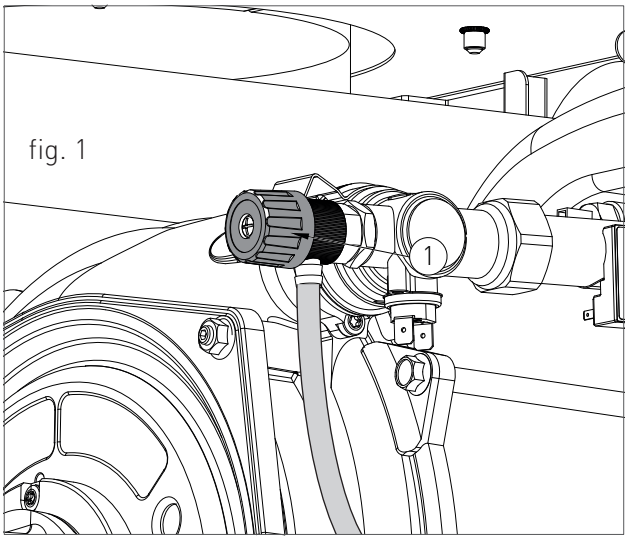
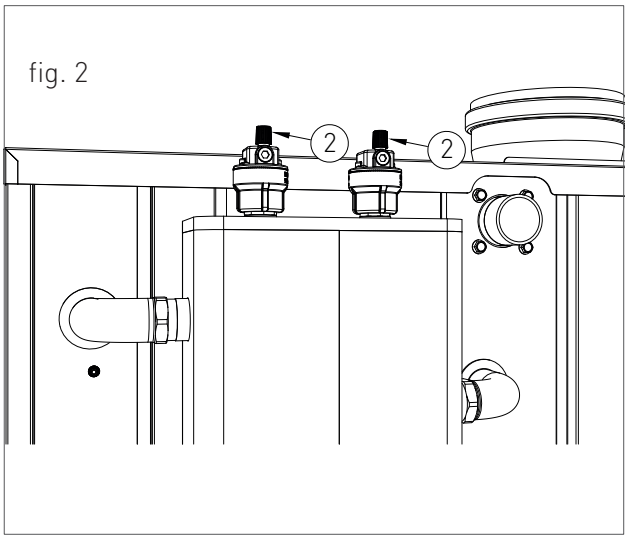


fig. 2



1.1.12. CONDENSATE DRAIN

FILLING THE CONDENSATE DRAIN SIPHON

Before starting the boiler, it is necessary to fill the condensate drain siphon in order to prevent backflow of flue gases through the siphon itself.

Fill the condensate drain siphon as follows:

› Unscrew the "T" cap from the siphon, fill three quarters of the the siphon with water and screw the "T" cap back in;

› Connect the dedicated flexible condensate draining pipe "P" to a waste disposal system.

› The condensate can be drained directly in the sewerage system by inserting an easily serviceable siphon.

WARNING

After the first months of operation of the device, it is recommended to clean the condensate collection siphon from any deposits deriving from the first transit of the condensate inside the technical components of the boiler. Such deposits might cause a malfunction of the siphon.

CONDENSATE DRAIN

The boiler produces a significant quantity of condensate during operation. This condensate has an acid pH of 3-5. Observe the national standard in force and the local regulations for the disposal of the condensate produced by the boiler.

The designer, according to the power of the system and the intended use of the building, is bound to evaluate the acceptance of systems in order to neutralise the acid condensate.

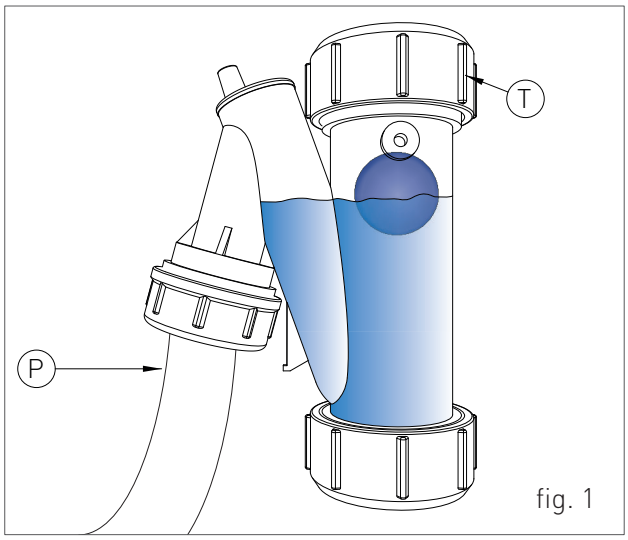


fig. 1

The system must be performed so as to avoid the freezing of the condensate. Before putting into operation the device, check the correct evacuation of the condensate.

WARNING

Before connecting the condensate collection siphon to the drain tube, check that the slope of the boiler is ensured according to the indications from chapter 'INSTALLATION OF THE BOILER'.

WARNING

Correctly connect the condensate collection siphon of the boiler to a draining system by adding the slope to the drain of the condensate of the fume exhaust duct. Where possible, it is recommended to perform such connection by means of a collection glass in order to check the correct discharge of the condensate avoiding stagnations that might cause dangerous returns of the condensate to the boiler.

In order to connect the condensate draining to the draining system, use only corrosion-resistant materials with an adequate diameter.

CONDENSATE NEUTRALISER

The condensate neutraliser box is included (factory fitted) within the boiler. It is complete with granulate and active carbons, for a power up to 350kW (see fig.2). The device allows neutralising the condensate which is collected inside the boiler and/or in the fume discharge systems made of stainless steel, plastic, glass or ceramic.

The acid condensate, inserted into the neutralisation box, follows a mandatory path for two phases; the first one, filtration of nitrates and sulphates by means of active carbons contained in the first tube line, in the second one, the pH is increased.

The acidity of the condensate can be checked by using litmus paper in order to determine the pH. Then, the neutralised condensate can be transported into the sewage system.

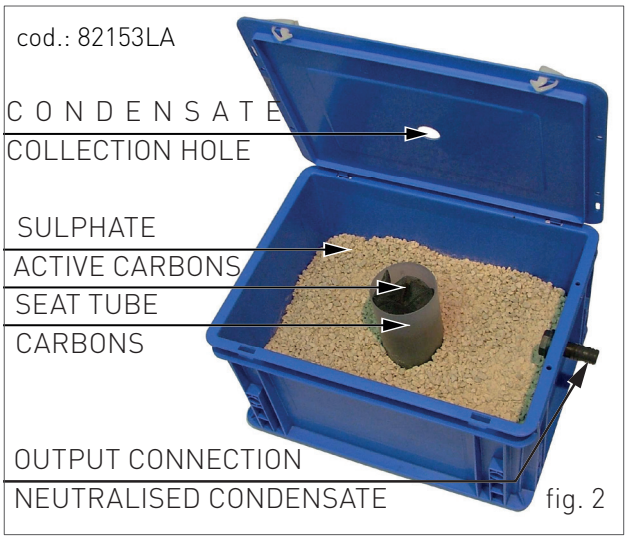


fig. 2

MAINTENANCE

The pH parameters must be comprised between < 7 and 8.5 >.

Every six months, it is necessary to establish the PH of the treated condensate inside the neutraliser. Immerse a litmus paper (or a suitable digital tool) in the condensate near the tapped draining connection for about 2 seconds and thus lay it on a white paper. After about 30 seconds, it is possible to compare with the coloured scale. The neutral point is on the value 6.8-7; at a lower value, the condensate is acid, at a higher value, it is base].

If necessary, replace the active carbon and the reagent granulate.

1.1.13. FROST PROTECTION

The boiler is protected against freezing thanks to the P.C.B. configuration with functions that start the burner and heat the concerned parts when their temperature goes below the minimum pre-set values, protecting the boiler up to an external temperature of -10 °C.

The boiler starts when the heating water temperature goes below 8 °C (this value can be modified through parameter P31), automatically starting the burner until the heating flow water temperature reaches the 30°C and, in presence of a return sensor, until the heating return water temperature reaches the 20°C.

The system starts even if on the display appears "OFF", as long as the boiler is connected to the power (230 V) and gas supply.

For long periods of standby, please empty the boiler and the system.

If the temperature goes below -10° centigrades, please fill the system with anti-freeze liquid (CLEANPASS FLUIDO AG cod. 98716LA) and insert a frost protection kit (cod. 82259LP).

CLEANPASS FLUIDO AG DILUTION PERCENTAGE	
ANTI-FREEZE - PROPYLENE GLYCOL	FREEZING POINT
(%) VOLUME	(°C)
20	-7.5
30	-13
35	-18
40	- 22.5
45	-28
50	-33.5
55	-42
60	-50
RECOMMENDED PERCENTAGE: 20 %	MINIMUM GLYCOL

1.1.14. GAS CONNECTION

DANGER

In order to connect the boiler gas connector to the supply pipe, use a stop seal of an appropriate size and material. The use of hemp, teflon tape or similar materials is strictly forbidden.

BEFORE PERFORMING THE GAS CONNECTION, MAKE SURE THAT:

› the gas supply line complies with the standards and regulations in force;

› the piping section suits the requested capacity and its length;

› the piping is equipped with all safety and control devices required by the standards in force;

› the internal and external seals of the gas inlet system are checked;

› the boiler is suitable for use with the available type of gas by checking the boiler data plate (placed on the inner side of the front casing. If they do not match, please take the necessary measures to adapt the boiler to another type of gas (see chapter GAS CONVERSION);

› the gas supply pressure falls within the values indicated on the data plate.

1.1.15. ELECTRICAL CONNECTION

DANGER

The boiler is electrically safe only if it is properly connected to an efficient earthing system, performed in compliance with the safety standards in force. Check this essential safety requirement is strictly recommended. If in doubt, request an accurate check of the electrical system performed by qualified staff, as the manufacturer is not responsible for any damages caused by lack of earthing system.

› Make sure that the electrical systems is suitable for the maximum power absorbed by the boiler, value indicated on the data plate.

› make sure that the cables section is appropriate for the maximum power absorbed by the boiler and that it is however not lower than 1 mm^2.

› The equipment works with alternating current of 230 V and 50 Hz. The electrical connection must be performed using an all-pole switch with an opening of at least 3 millimetres between contacts placed upstream from the device.

WARNING

Make sure that the live and neutral cables connection is performed in compliance with the wiring diagram (see chapter POWER SUPPLY).

WARNING

It is strictly forbidden the use of adaptors, multiple plugs and/or extensions for the general power supply of the boiler from the electrical network.

1.1.16. POWER SUPPLY

To connect the power supply to the boiler carry out the electrical connections as shown in fig. 1, please proceed as follows:

DANGER

Cut off the voltage from the main switch.

› open the boiler front doors;

› access the switchboard by unscrewing the fixing screws and removing the front panel;

› proceed with the electrical connection as shown in the reference diagram:

- the yellow/green cable to the yellow/green terminal.
- the light-blue wire to the light-blue terminal.
- the brown wire to the brown terminal.

After performing these operations, refit the front panel of the switchboard and close the boiler front doors.

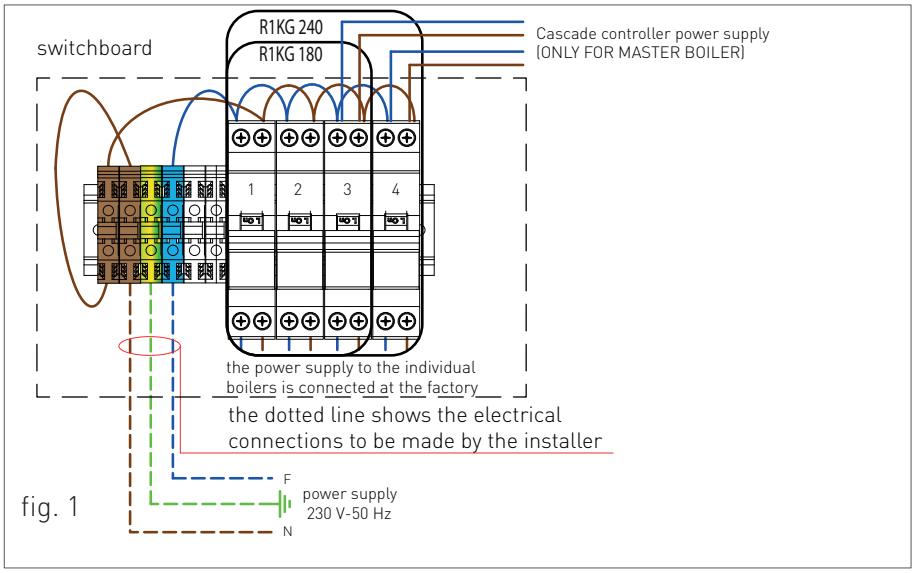


fig. 1

1.1.17. OPTIONAL ELECTRICAL CONNECTIONS

To wire the optional items below:

• (SE) OUTDOOR TEMPERATURE SENSOR CODE 73518LA

inside the control panel no.1 (see 'P1' in fig. 1), the first control panel starting from the top:

DANGER
Cut off the voltage from the main switch.

› open the boiler front doors (see chapter ACCESSING THE BOILER);

› Remove the back plate of the control panel no.1, the first control panel starting from the top (see chapter ACCESSING THE ELECTRONIC P.C.B.);

› After removing the plate, connect the electrical cables to terminal block "B" (see fig. 2):

· For the outdoor temperature sensor connect the two non-polarized conductors to the Se-Se contacts.

After performing this operation, refit the control panel back plate and close the boiler front doors.

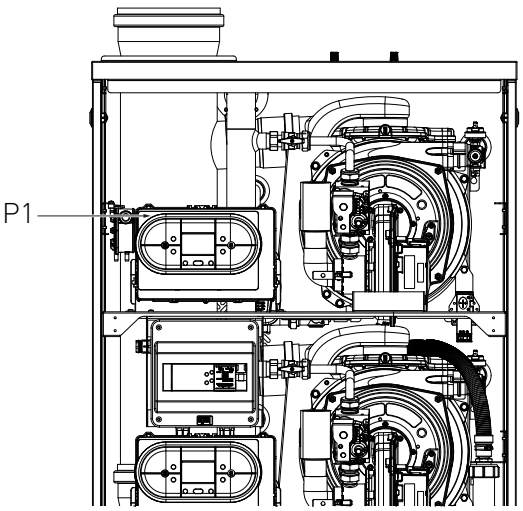


fig. 1

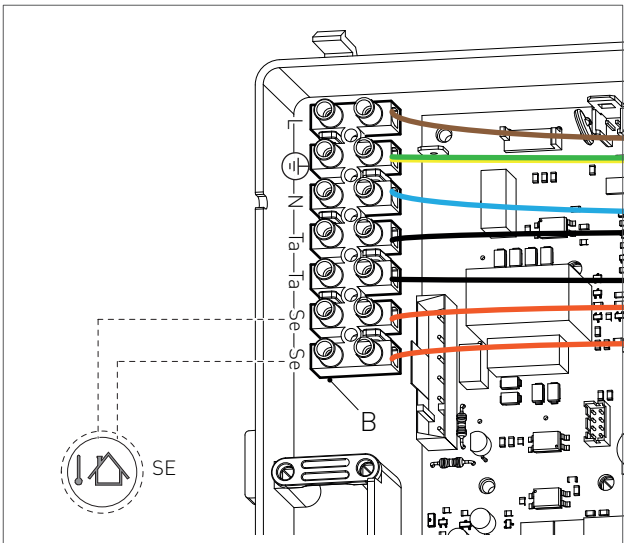


fig. 2

IN CASE OF AN ADDITIONAL BOILER (CASCADE INSTALLATION), CONNECT THE MODBUS CABLE AS FOLLOWS:

DANGER

Cut off the voltage from the main switch.

› Remove the front panels from the switchboard 1 and from the switchboard 2 of the additional boiler (see fig.2);

› connect the two wires A and B to the contacts of switchboard 2 of the additional boiler (see fig. 2);

› After performing this operations, refit the front panel of the switchboard and close the boiler front doors.

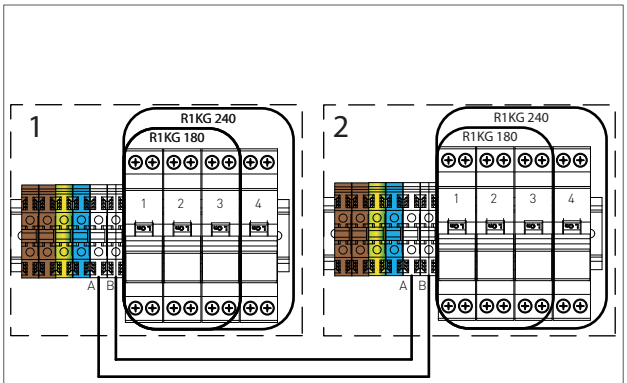


fig. 2

1.1.18. FLUE SYSTEMS

WARNING

To ensure correct operation and perfect efficiency values of the appliance, it is essential to connect the boiler flue exhaust pipe to the flue exhaust duct using dedicated polypropylene flue kits and accessories for condensing boilers.

WARNING

Conventional (aluminium) flue components cannot be used for the flue exhaust of condensing boilers, nor vice versa.

WARNING

Ducts and flues must be correctly sized, designed and built in compliance with the standards in force. They must be made of material suitable for the purpose, with particular resistance to corrosion, internally smooth and hermetically sealed. In particular, the joints must be condensation-proof. In addition, suitable condensate drainage points, connected to a siphon, must be provided to prevent condensate produced in the flue parts from back-flowing into the condensing exchangers/boilers.

› For all flue exhaust ducts/pipes, it is advisable to provide an upward slope (outwards) in order to allow the backflow of the condensate towards the combustion chamber, which is specially designed to receive and discharge acidic condensate.

› When a horizontal-concentric flue system is installed, special attention must be given to the position of the flue exhaust terminal, to respect the slopes of the flue ehaust pipe and to protect the air intake pipe from adverse weather conditions.

› When a vertical flue system is installed, insert a condensate drain siphon at the base of the pipe, connected to the house/building sewage system.

› When connecting the flue exhaust pipe to a flue/chimney, please carefully follow the instructions of the technical standards in force.

› Do not protrude with the flue exhaust pipe inside the flue/chimney, but stop before it reaches the inner surface of the latter.

› The flue exhaust pipe must be perpendicular to the wall of the chimney.

1.1.19. INSTALLATION MODES

The following flue exhaust configurations are available for this boiler type: B23 and B23P (see fig. 1).

› B23- Indoor suction and outdoor discharge.

› B23P- Indoor suction and outdoor discharge, with exhaust system operating under pressure.

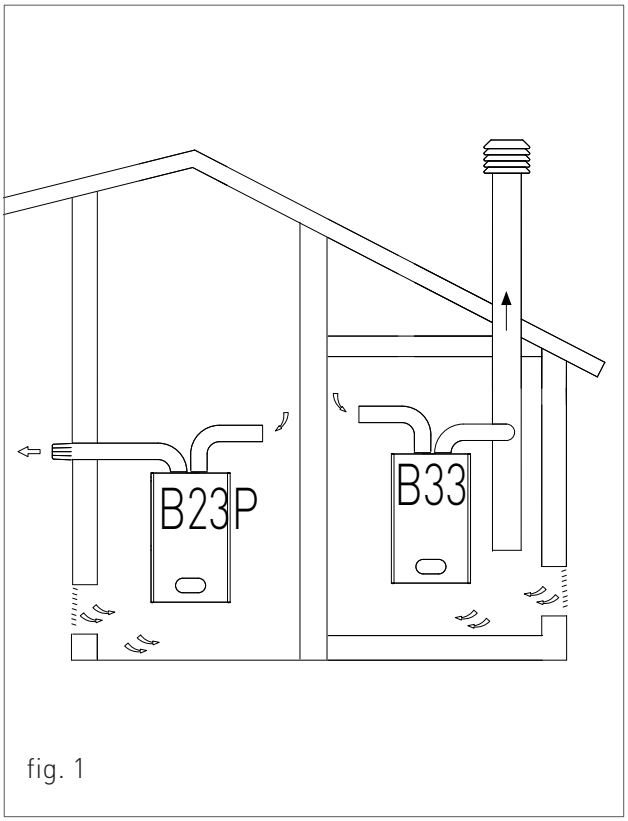


fig. 1

FLUE EXHAUST CONFIGURATIONS FOR B-TYPE APPLIANCES

Gas appliances equipped with a flue pipe connection must have a direct connection to chimneys or flues of guaranteed efficiency; only in the absence of this is it permitted for them to discharge the products of combustion directly outside.

The connection to the chimney and/or flues must meet the following requirements:

- Be sealed and made of materials suitable to withstand over time normal mechanical stress, heat, the action of combustion products and their possible condensate;
- have no more than three changes of direction, including the inlet connection to the chimney and/or flue, made with internal angles greater than 90°. Changes of direction must only be realised through the use of curved elements;
- have the axis of the inlet end section perpendicular to the opposite internal wall of the chimney or flue;
- have, throughout its length, a cross-section no smaller than that of the appliance's exhaust pipe connection;
- have no shut-off devices (dampers);
- for direct discharge to the outside, there must not be more than two changes of direction.

ROOM VENTILATION FOR TYPE B APPLIANCES

Rooms in which gas appliances are installed must have adequate ventilation; it is essential that at least as much air flows in as is required by the combustion of the gas and the ventilation of the room.

The natural inflow of air must take place directly through:

- permanent openings in the walls of the room to be ventilated that face outwards;
- ventilation ducts, single or collective, branched.

Openings in external walls of the room to be ventilated must meet the following requirements:

- have a total net free passage cross-section of at least 6 cm2 per kW of installed heat output with a minimum of 100 cm2;

- be constructed in such a way that the opening vents, both inside and outside the wall, cannot be obstructed;

- be protected e.g. with grills, wire mesh, etc. so as not to reduce the useful cross-section indicated above;

- be located at a height close to floor level and such that they do not disturb the proper functioning of the combustion product exhaust devices; where this position is not possible, the cross-sectional area of the ventilation openings must be increased by at least 50%.

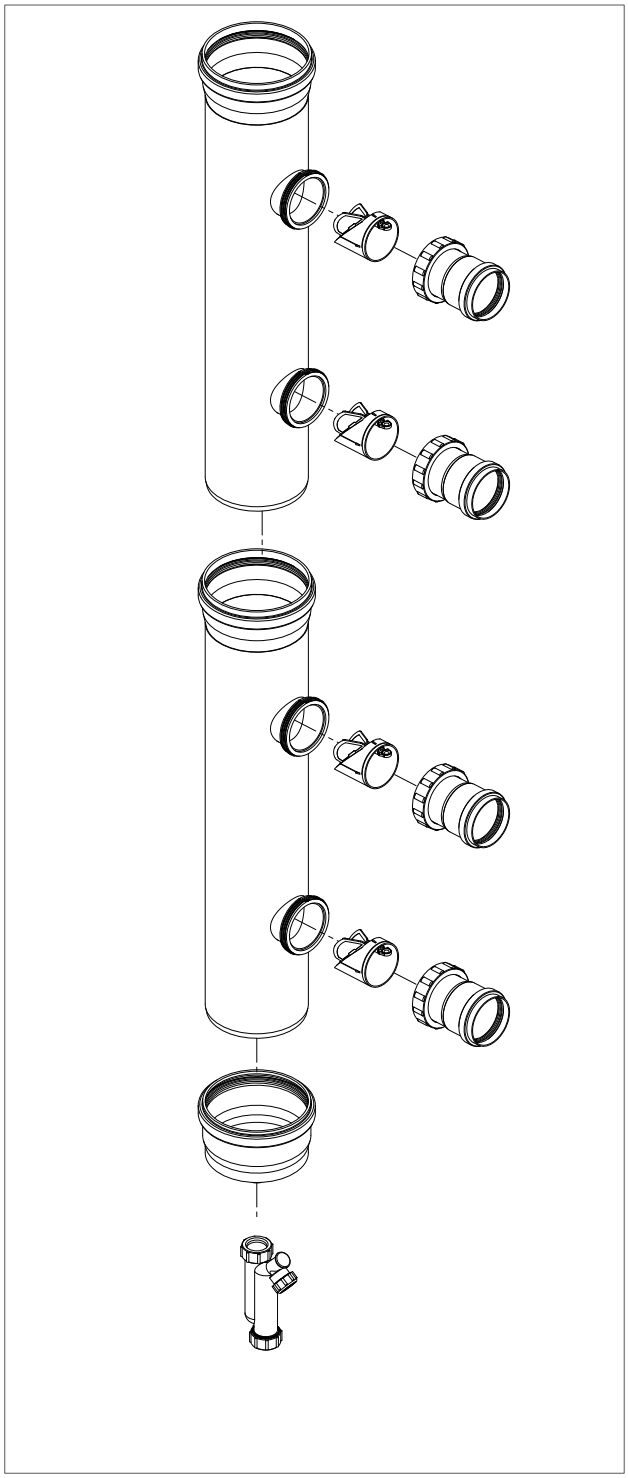
VERTICAL FLUE PIPE Ø 160 WITH INTEGRATED NON-RETURN FLUE DAMPERS

It allows the connection of a Ø 160 mm flue system.

PLEASE SEE THE MAXIMUM DISCHARGE IN THE TABLE IN CHAPTER "TECHNICAL DATA".

WARNING

To ensure proper sealing at all times of the non-return flue dampers inserted in the Ø160 vertical pipe, they must be replaced every 2 years by an authorised service centre.



2. SUPPORT CENTER SECTION

All operations described below relative to first start-up, maintenance and replacement should be performed only by qualified personnel

2.1. FIRST START-UP

2.1.1. PRELIMINARY OPERATIONS FOR FIRST START-UP

The first start-up operations consist in checking the correct installation, adjustment and operation of the device. Proceed as follows:

- check the inner system sealing in accordance with the indications provided by standard and regulations in forced;
- check if the gas used is suitable for the boiler;
- check if the gas capacity and relative pressures comply with those on the plate;
- check the intervention of the safety device in case of lack of gas;
- make sure that the device supply voltage corresponds with that on the plate (230 V – 50 Hz) and that the wiring is correct;
- make sure that the grounding system works properly;
- make sure that the combustion air adduction and fumes and condensate discharge take place properly in compliance with the Local and National Laws and Standards in force;
- make sure that the fumes discharge tube and its connection to the fume exhaust duct comply with the requirements of the Local and National Laws and Standards;
- make sure that the heating system gate valves are open;
- make sure that there is no intake of gaseous products within the system;
- make sure that there are no flammable liquids or materials near the device;
- open the boiler gas tap and make sure that there are no gas leaks upstream from the device (the burner gas connection must be checked while the machine is running);
- in case of new installation of the gas supply network, the air inside the tubes may block the device at its first start-up. You might have to repeat the start-up procedure to purge all the air inside the tube.

2.1.2. BOILER COMMISSIONING

WARNING

Make sure that the system is correctly filled.

Proceed with boiler commissioning as follows:

› check that the gas tap is closed;

› power the boiler;

› make sure the circulator is not blocked;

› if it is blocked, wait that the circulator performs the automatic unlocking function (3 minute duration);

› if the circulator appears to be still blocked, reactivate the automatic unlocking function of the circulator (additional 3 minutes) by shutting off the power supply and then restoring it.

› After completing the above mentioned operations, open the gas tap.

› For the boiler start-up, please refer to the cascade controller manual.

› if the flame is missing the board will repeat the start-up operations after post-ventilation (20 seconds).

› You might have to repeat the start-up operation several times to release all air inside the gas tube. Before repeating the operation, wait at least 5 seconds from the last start-up attempt and unlock the boiler from "E01" error code by pressing the Reset '®' key.

2.1.3. CO2 VALUE CHECK AND CALIBRATION

WARNING

The CO_2 value should be checked for each single condensing exchanger unit.

To check and calibrate the CO2 value to minimum and maximum heating power proceed as follows **for every single unit**:

FOR MINIMUM HEATING POWER

› Activate the chimney sweep function (F07) by holding for 7 seconds the key 'R' (the maximum time of the function is 15 minutes).

› Insert the fumes analyser probe in the suitable 'PF' flue inlet (fig. 1), then make sure that the CO_2 value complies with the indications in "Technical data", otherwise unscrew the protection screw 'A' (fig. 2) and adjust using a 4 Allen wrench the screw '2' (fig. 2) of the Off-Set adjuster. To increase the CO_2 value, turn the screw clockwise and vice-versa if you want to decrease it. Once completed the adjustment, tighten the protection screw 'A' (fig. 2) on the Off-Set adjuster.

FOR MAXIMUM HEATING POWER

› Press the key '⊕' of the heating in order to calibrate the maximum heating power.

› Make sure that the CO_2 value complies with the requirements indicated in chapter "Technical data", otherwise adjust using screw '1' (fig. 2) of the gas flow adjuster. To increase the CO_2 value, turn the screw anti-clockwise and vice-versa if you want to decrease it.

› After each adjustment variation on screw '1' (fig. 2) of the gas flow adjuster you have to wait for the boiler to stabilize itself to the set value (about 30 seconds).

› Then press the key '⊖' of the heating and make sure that the CO_2 value did not change to minimum, if changed repeat the calibration described in the previous paragraph.

› Deactivate the chimney sweep function by switching the boiler to the 'OFF' operating mode using the button '⏻'.

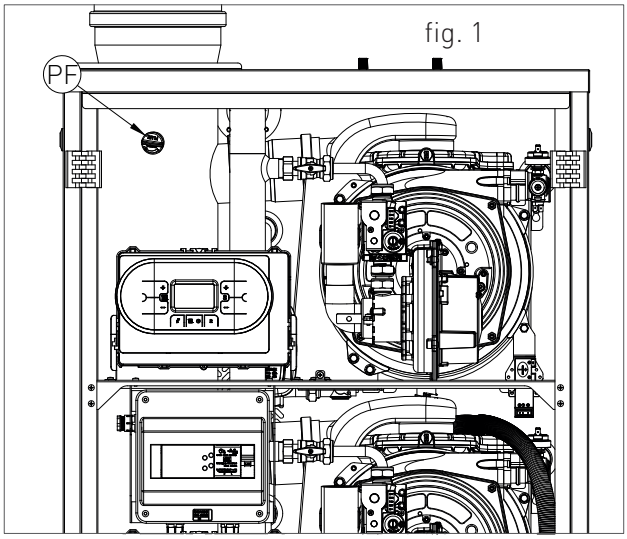


fig. 1

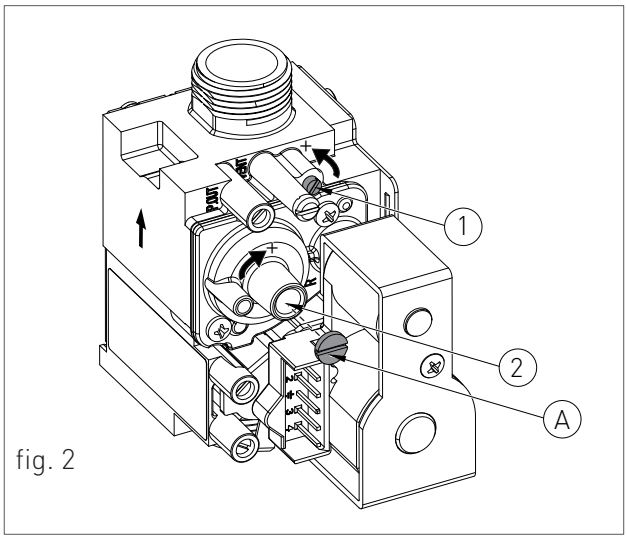
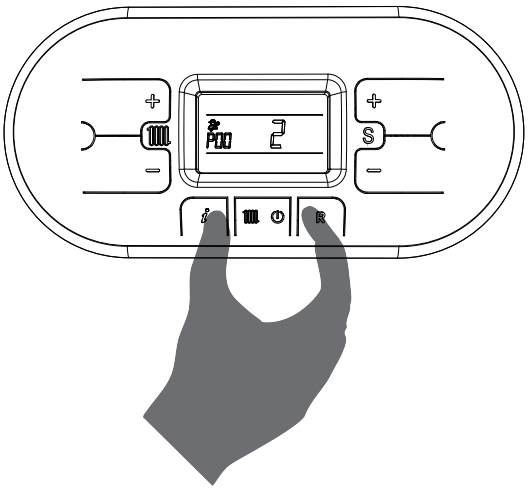


fig. 2

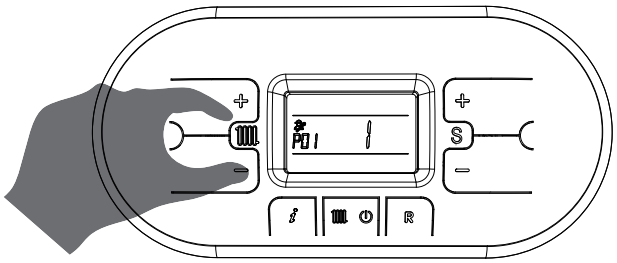
2.1.4. ACCESSING AND PROGRAMMING THE PARAMETERS

To access the parameters menu and adjust their values, follow the procedure below:

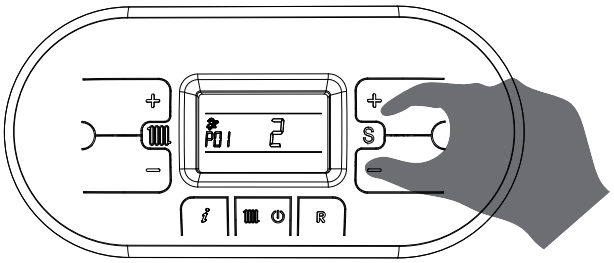
1. Hold at the same time the keys '(i)' and '(R)' until on the display appears the symbol '' 'with the message 'P00', and release the keys '(i)' and '(R)'.



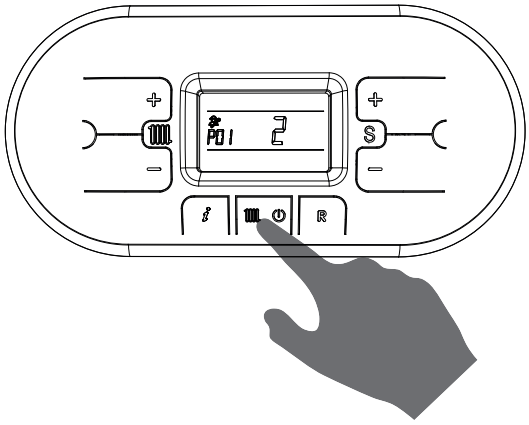
2. Use the keys '⊕' and '⊖' of the heating circuit to select the parameter to be edited.



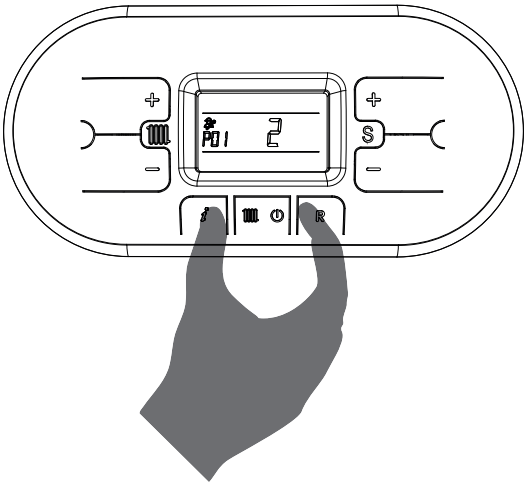
3. Use the keys '⊕' and '⊖' of the symbol 'S' (S) to change the value of the parameter.



4. Press the key '  ' to confirm the action and wait for the display to stop blinking, indication of the fact that the adjustment was implemented.



5. To exit the parameters menu, hold at the same time the keys '  ' and '' and wait for the symbol '  ' to appear on the display.



2.1.5. PARAMETERS TABLE

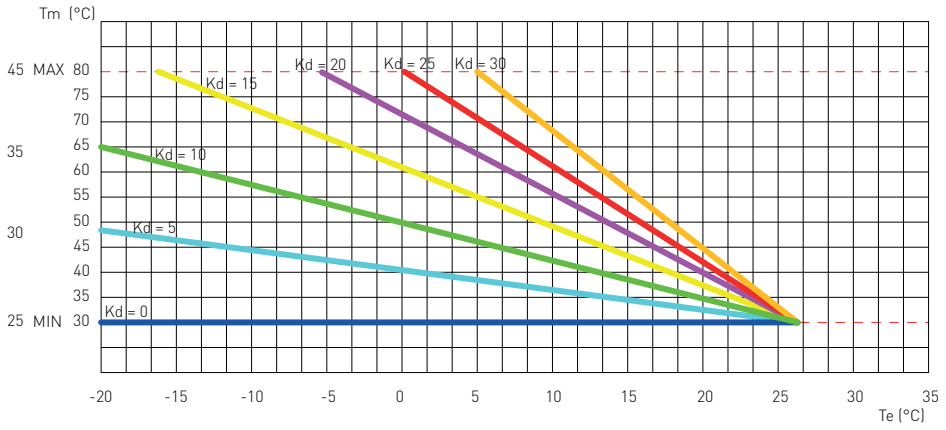
PARAMETER	DESCRIPTION	RANGE	FUNCTION
P00	***BOILER MODEL SELECTION***	0 - 11	0 = 13 KW
			1 = 18 KW (HEAT.) / 24 KW (DOMESTIC)
			2 = 25 KW
			3 = 28 KW
			4 = 34 KW
			5 = 55 KW
			6 = 100 KW
			7 = R1K 18_24-R2K 24-R2KA 24 (IN ALL VERSIONS)
			8 = R1K 25_28-R2K 28-R2KA 28 (IN ALL VERSIONS)
			9 = R1K 34-R2K 34-R2KA 34 (IN ALL VERSIONS)
			10 = R1K 50
			11 = R1K 57 / R1K 60 / R1KG 180 / R1KG 240
P01	***BOILER TYPE SELECTION***	0 - 5	0 = ISTANTANEOUS R2K
			1 = ISTANTANEOUS RKR
			2 = ACCUMULATION IN THE BOILER
			3 = ACCUMULATION IN THE REMOTE STORAGE TANK
			4 = ISTANTANEOUS COMFORT - FAST H2O
			5 = HEATING ONLY

PARAMETER	DESCRIPTION	RANGE	FUNCTION
P02	***GAS TYPE SELECTION*** ***ATTENTION:*** READ THE INSTRUCTION IN CHAPTER 'GAS CONVERSION' BEFORE CHANGING THIS PARAMETER.	0 - 1	0 = NATURAL GAS 1 = LPG
P03	***SETTING THE HEATING TEMPERATURE*** IN CASE THE BOILER IS INSTALLED AS PART OF A LOW TEMPERATURE CIRCUIT, PLEASE INSTALL A SAFETY THERMOSTAT ON THE HEATING FLOW, WHICH CAN STOP THE BOILER ACTIVITY IN CASE OF HIGH HEATING FLOW TEMPERATURE. THE COMPANY ASSUMES NO LIABILITY FOR DAMAGE CAUSED TO PERSONS OR FOR FAILURE TO COMPLY WITH THESE INSTRUCTIONS.	0 - 1	0 = STANDARD (30-80 °C) (SET BY DEFAULT) 1 = REDUCED (25-45 °C) FOR FLOOR SYSTEMS
P04	***HEATING RUN-UP*** THROUGH THIS PARAMETER YOU CAN SET THE TIME, DURING START-UP PHASE, NECESSARY FOR THE BOILER TO REACH THE MAXIMUM SET POWER (ON THE HEATING SIDE).	0 - 4	0 = (DISABLED) 1 = 50 SECONDS 2 = 100 SECONDS 3 = 200 SECONDS (SET BY DEFAULT) 4 = 400 SECONDS
P05	***ANTI-WATER HAMMER SELECTION*** ONCE THIS FUNCTION IS ENABLED, THE DHW CONTACT WILL BE DELAYED FOR A TIME EQUAL TO THE SET VALUE.	0 - 20	0 = DISABLED 1 - 20 = THE VALUE IS EXPRESSED IN SECONDS
P06	***DOMESTIC CIRCUIT PRESERVATION FUNCTION (ONLY FOR ISTANTANEOUS BOILERS)*** THROUGH THIS PARAMETER YOU CAN PRESERVE THE CIRCULATOR THE DIVERTER VALVE IN DOMESTIC POSITION FOR A PERIOD OF TIME EQUAL TO THE POST-CIRCULATION (SEE PARAMETER P09), SO AS TO MAINTAIN THE SECONDARY EXCHANGER HOT.	0 - 1	0 = DISABLED (SET BY DEFAULT) 1 = ENABLED
P07	***HEATING TIMING*** THROUGH THIS PARAMETER YOU CAN SET THE MINIMUM TIME FOR WHICH THE BURNER WILL BE TURNED OFF ONCE THE HEATING TEMPERATURE REACHED THE USER SET TEMPERATURE.	0 - 90	VALUE EXPRESSED IN MULTIPLES OF 5 SECONDS (PRE-SET AT 36 X 5 = 180 SECONDS)

PARAMETER	DESCRIPTION	RANGE	FUNCTION
P08	***POST-CIRCULATION HEATING TIMING*** THROUGH THIS PARAMETER, IT IS POSSIBLE TO SET THE OPERATION TIME OF THE PUMP AFTER THE MAIN BURNER TURNS OFF DUE TO THE ENVIRONMENT THERMOSTAT.	0 - 90	VALUE EXPRESSED IN MULTIPLES OF 5 SECONDS (PRE-SET AT 36 X 5 = 180 SECONDS)
P09	***POST-CIRCULATION DOMESTIC / STORAGE TIMING*** THROUGH THIS PARAMETER, IT IS POSSIBLE TO SET THE OPERATION TIME OF THE PUMP AFTER CLOSING THE TAP OR REACHING THE TEMPERATURE SET IN THE BOILER.	0 - 90	VALUE EXPRESSED IN MULTIPLES OF 5 SECONDS (PRE-SET AT 24 X 5 = 120 SECONDS)
P10	***DOMESTIC FAN MINIMUM SPEED ADJUSTMENT*** THROUGH THIS PARAMETER YOU CAN SET THE FAN MINIMUM SPEED IN DOMESTIC PHASE, THAT CORRESPONDS TO THE MINIMUM BURNER POWER DURING A REQUEST TO OPERATE IN DOMESTIC MODE. THE VALUE IS PRE-SET BASED ON THE SET POWER (SEE PARAMETER P00) AND ON THE GAS TYPE (SEE PARAMETER P02)	SEE CHAPTER ' HEAT CAPACITY DIAGRAM (KW) – ELECTRIC FAN FREQUENCY (HZ)'	THE VALUE IS EXPRESSED IN HERTZ (1HZ = 30 RPM)
P11	***DOMESTIC FAN MAXIMUM SPEED ADJUSTMENT*** THROUGH THIS PARAMETER YOU CAN SET THE FAN MAXIMUM SPEED IN DOMESTIC PHASE, THAT CORRESPONDS TO THE MAXIMUM BURNER POWER DURING A REQUEST TO OPERATE IN DOMESTIC MODE. THE VALUE IS PRE-SET BASED ON THE SET POWER (SEE PARAMETER P00) AND ON THE GAS TYPE (SEE PARAMETER P02)	SEE CHAPTER ' HEAT CAPACITY DIAGRAM (KW) – ELECTRIC FAN FREQUENCY (HZ)'	THE VALUE IS EXPRESSED IN HERTZ (1HZ = 30 RPM)
P12	***HEATING FAN MINIMUM SPEED ADJUSTMENT*** THROUGH THIS PARAMETER YOU CAN SET THE FAN MINIMUM SPEED IN HEATING PHASE, THAT CORRESPONDS TO THE MINIMUM BURNER POWER DURING A REQUEST TO OPERATE IN HEATING MODE. THE VALUE IS PRE-SET BASED ON THE SET POWER (SEE PARAMETER P00) AND ON THE GAS TYPE (SEE PARAMETER P02)	SEE CHAPTER ' HEAT CAPACITY DIAGRAM (KW) – ELECTRIC FAN FREQUENCY (HZ)'	THE VALUE IS EXPRESSED IN HERTZ (1HZ = 30 RPM)

PARAMETER	DESCRIPTION	RANGE	FUNCTION
P13	***HEATING FAN MAXIMUM SPEED ADJUSTMENT*** THROUGH THIS PARAMETER YOU CAN SET THE FAN MAXIMUM SPEED IN HEATING PHASE, THAT CORRESPONDS TO THE MAXIMUM BURNER POWER DURING A REQUEST TO OPERATE IN HEATING MODE. THE VALUE IS PRE-SET BASED ON THE SET POWER (SEE PARAMETER P00) AND ON THE GAS TYPE (SEE PARAMETER P02)	SEE CHAPTER 'HEAT CAPACITY DIAGRAM (KW) – ELECTRIC FAN FREQUENCY (HZ)'	THE VALUE IS EXPRESSED IN HERTZ (1HZ = 30 RPM)
P14	***STARTING STEP ADJUSTMENT*** THROUGH THIS PARAMETER YOU CAN SET THE FAN SPEED DURING START-UP THE VALUE IS PRE-SET BASED ON THE SET POWER (SEE PARAMETER P00) AND ON THE GAS TYPE (SEE PARAMETER P02)	SEE CHAPTER 'HEAT CAPACITY DIAGRAM (KW) – ELECTRIC FAN FREQUENCY (HZ)'	THE VALUE IS EXPRESSED IN HERTZ (1HZ = 30 RPM)
P15	***ANTI-LEGIONELLA FUNCTION (FOR STORAGE BOILERS ONLY)*** THROUGH THIS PARAMETER YOU CAN ACTIVATE/ DEACTIVATE THE "ANTILEGIONELLA" HEAT TREATMENT OF THE STORAGE TANK. EVERY 7 DAYS THE WATER TEMPERATURE INSIDE THE STORAGE IS HEATED BEYOND 60 °C THUS GENERATING A BURNING HAZARD. KEEP UNDER CONTROL SUCH DOMESTICH HOT WATER TREATMENT (AND INFORM THE USERS) TO AVOID UNFORSEEABLE DAMAGES TO PERSONS, ANIMALS AND PROPERTY. A THERMOSTATIC VALVE SHOULD BE INSTALLED AT THE DOMESTIC HOT WATER OUTLET TO AVOID ANY BURNS.	0 - 1	0 = DISABLED 1 = ENABLED (PRE-SET BY DEFAULT ON STORAGE BOILERS ONLY)

PARAMETER	DESCRIPTION	RANGE	FUNCTION
P16	***CLIMATE COMPENSATION CURVE*** ***(ONLY WITH EXTERNAL PROBE CONNECTED)*** YOU CAN CONNECT AN EXTERNAL TEMPERATURE PROBE (SEE CHAPTER 'ELECTRICAL CONNECTIONS') THAT AUTOMATICALLY CHANGES THE DELIVERY TEMPERATURE BASED ON THE EXTERNAL MEASURED TEMPERATURE. THE NATURE OF THE CORRECTION DEPENDS ON THE THERMO-ADJUSTMENT VALUE KD SET (SEE CHART). THE SELECTION OF THE CURVE IS DETERMINED BY THE MAXIMUM DELIVERY TEMPERATURE TM AND THE MINIMUM EXTERNAL TEMPERATURE TE TAKING INTO ACCOUNT THE HOUSE INSULATION DEGREE. THE VALUES OF THE DELIVERY TEMPERATURES TM, REFER TO STANDARD SYSTEMS 30-80 °C OR FLOOR SYSTEMS 25-45 °C. THE SYSTEM TYPE CAN BE SET FROM PARAMETER P03.	0 - 30	(SET BY DEFAULT AT 25) THE NUMBERING OF THE VALUE CORRESPONDS TO 'KD' CURVES ON THE CHART (SEE CHART BELOW).



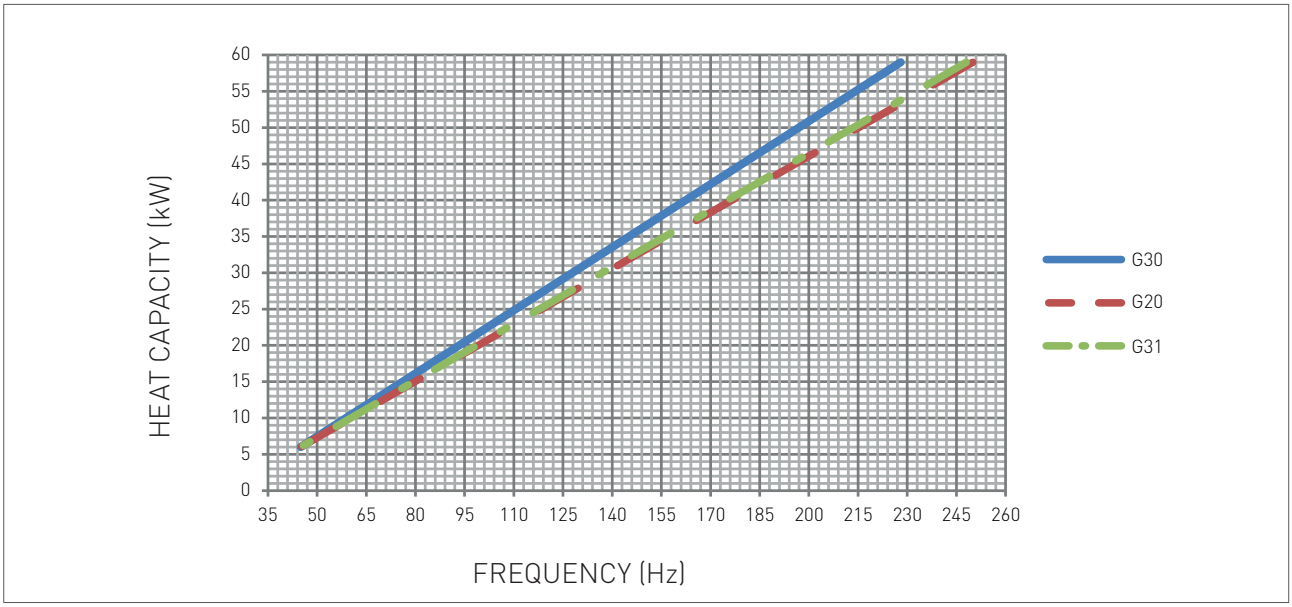
PARAMETER	DESCRIPTION	RANGE	FUNCTION
P17	***DISABLEMENT OF DOMESTIC HOT WATER LINE BY MEANS OF SWITCH (ONLY FOR FAST BOILERS)*** ***(SEE EXCLUSION VIA CONTACT (TP) IN THE CHAPTER "OPTIONAL ELECTRICAL CONNECTIONS")*** BY ENABLING THIS PARAMETER IN THE PRESENCE OF A CONNECTION (FOR EXAMPLE A BOILER CLOCK OR A TEMPERATURE THERMOSTAT) ON BOILER CLOCK SWITCH ON THE BOARD, THE REQUEST FOR BURNER IGNITION ON THE DOMESTIC HOT WATER LINE WILL BE DISABLED UPON BOILER CLOCK SWITCH CLOSURE. ***EXAMPLE 1:*** WITH THE BOILER CLOCK SWITCH OPEN, UPON THE REQUEST FOR DOMESTIC HOT WATER, THE FLOW SWITCH AND THE BOILER WILL TURN ON. ***EXAMPLE 2:*** WITH THE BOILER CLOCK SWITCH CLOSE, UPON THE REQUEST FOR DOMESTIC HOT WATER, THE FLOW SWITCH AND THE BOILER WILL NOT TURN ON.	0 - 1	0 = DISABLED (SET BY DEFAULT) 1 = ENABLED
P18	***ENABLING BUS INDUSTRIAL PILOTING 0 -10V*** THROUGH THIS PARAMETER YOU CAN ENABLE OR DISABLE THE BUS INDUSTRIAL INPUT 0-10 V TO SET THROUGH EXTERNAL BUS THE BURNER POWER OR THE DELIVERY TEMPERATURE.	0 - 2	0 = DISABLED (SET BY DEFAULT) 1 = TEMPERATURE CONTROL MODE 2 = POWER CONTROL MODE
P19	***MINIMUM HEATING SETPOINT*** THROUGH THIS PARAMETER YOU CAN SET THE USER-ADJUSTABLE MINIMUM HEATING TEMPERATURE.	20 - 40	THE VALUE IS EXPRESSED IN °C
P20	***MAXIMUM HEATING SETPOINT*** THROUGH THIS PARAMETER YOU CAN SET THE USER-ADJUSTABLE MAXIMUM HEATING TEMPERATURE.	40 - 90	THE VALUE IS EXPRESSED IN °C
P21	***MAXIMUM DOMESTIC SETPOINT*** THROUGH THIS PARAMETER YOU CAN SET THE USER-ADJUSTABLE MAXIMUM DOMESTIC TEMPERATURE.	45 - 75	THE VALUE IS EXPRESSED IN °C
P22	***SET POINT ΔT DELIVERY-RETURN*** ***(ONLY WITH MODULATING PUMP AND RETURN PROBE CONNECTED)*** THROUGH THIS PARAMETER YOU CAN SET THE TEMPERATURE DIFFERENCE BETWEEN DELIVERY AND RETURN.	0 10 - 40	0 = DISABLED THE VALUE IS EXPRESSED IN °C

PARAMETER	DESCRIPTION	RANGE	FUNCTION
P23	***MODULATING PUMP MINIMUM SPEED (ONLY WITH MODULATING PUMP AND RETURN PROBE CONNECTED)*** THROUGH THIS PARAMETER YOU CAN SET THE MINIMUM SPEED VALUE OF THE MODULATING PUMP DURING A REQUEST TO OPERATE IN HEATING MODE.	50 - 70	THE VALUE IS EXPRESSED IN PERCENTAGE
P24	***MODULATING PUMP MAXIMUM SPEED (ONLY WITH MODULATING PUMP AND RETURN PROBE CONNECTED)*** THROUGH THIS PARAMETER YOU CAN SET THE MAXIMUM SPEED VALUE OF THE MODULATING PUMP DURING A REQUEST TO OPERATE IN HEATING MODE.	70 - 100	THE VALUE IS EXPRESSED IN PERCENTAGE
P25	***D.H.W STORAGE TANK TEMPERATURE SETPOINT (FOR STORAGE BOILERS ONLY)*** THROUGH THIS PARAMETER YOU CAN SET THE PRIORITY STARTING VALUE OF THE STORAGE TANK, COMPARED TO THE USER ADJUSTABLE D.H.W SETPOINT.	3 - 9	THE VALUE IS EXPRESSED IN °C (PRE-SET AT 9°C)
P26	***MODBUS ADDRESS*** BY MEANS OF THIS PARAMETER, IT IS POSSIBLE TO SET THE ADDRESS OF THE BOARD ON MODBUS IN ORDER TO PERFORM A CASCADE SYSTEM.	1 - 16	BOILER NUMBERING FOR MODBUS
P27	***MODBUS COMMUNICATION BAUD RATE*** BY MEANS OF THIS PARAMETER, IT IS POSSIBLE TO SELECT THE MODBUS COMMUNICATION BAUD RATE SUPPORTED BY THE SAME INTERFACE.	0 - 5	0 = 9600 1 = 1200 2 = 2400 3 = 4800 4 = 9600 5 = 19200
P28	***MODBUS MODE***	0 - 2	0 = ENABLED 1 = ENABLED WITH LOCAL SETTINGS 2 = DISABLED (SET BY DEFAULT)

PARAMETER	DESCRIPTION	RANGE	FUNCTION
P29	***ΔT HEATING POSTCIRCULATION*** THROUGH THIS PARAMETER, IT IS POSSIBLE TO SET THE TEMPERATURE DIFFERENCE FROM THE MAIN BURNER SHUTOFF, FOR THE INTERVENTION OF THE ROOM THERMOSTAT, TO THE DISABLING OF THE PUMP IN HEATING MODE.	0 - 25	THE VALUE IS EXPRESSED IN °C (SET BY DEFAULT AT 10 °C)
P30	***ΔT D.H.W./TANK POSTCIRCULATION*** THROUGH THIS PARAMETER, IT IS POSSIBLE TO SET THE TEMPERATURE DIFFERENCE FROM THE CLOSING OF THE TAP OR THE REACHING OF THE TEMPERATURE SET IN THE BOILER TO THE DISABLING OF THE PUMP IN HEATING MODE.	0 - 25	THE VALUE IS EXPRESSED IN °C (SET BY DEFAULT AT 10 °C)
P31	***HEATING MODE ANTI-FREEZE TEMPERATURE SETTING*** THROUGH THIS PARAMETER, IT IS POSSIBLE TO SET THE HEATING WATER TEMPERATURE AT WHICH THE ANTI-FREEZE PROTECTION DEVICE STARTS WORKING.	5 - 12	THE VALUE IS EXPRESSED IN °C (SET BY DEFAULT AT 8 °C)
P32	***ENABLING FLOWMETER*** ***(ONLY WITH FLOWMETER KIT CODE 65-00712 CONNECTED)*** THROUGH THIS PARAMETER IT IS POSSIBLE TO ENABLE THE FLOWMETER FOR MEASURING THE HEATING FLOW RATE AND MANAGE ACTIVATION OF THE BOILER BY THE FLOW RATE ITSELF.	0 - 2	0 = DISABLED (SET BY DEFAULT) 1 = ENABLED 2 = FLOW-SWITCH ENABLING FOR GAS HEAT PUMP (HYBRID BOILER)
P33	***MINIMUM THRESHOLD TO ACTIVATE THE BOILER THROUGH THE FLOWMETER*** ***(ONLY IF PARAMETER P32 IS SET ON THE VALUE '1' OR '2')*** THROUGH THIS PARAMETER IT IS POSSIBLE TO SET THE MINIMUM WATER FLOW RATE REQUIRED TO ACTIVATE THE BOILER.	20 - 68	VALUE EXPRESSED IN HERTZ 20 Hz = 3.5 l/min 23 Hz = 4 l/min 28 Hz = 5 l/min 34 Hz = 6 l/min 39 Hz = 7 l/min 44 Hz = 8 l/min 50 Hz = 9 l/min 55 Hz = 10 l/min 61 Hz = 11 l/min 66 Hz = 12 l/min

PARAMETER	DESCRIPTION	RANGE	FUNCTION
P34	***ACTIVATION OF THE AUXILIARY RELAY ON THE "SVZ" P.C.B. (SEE CHAPTER: OPTIONAL ELECTRICAL CONNECTIONS)*** THROUGH THIS PARAMETER IT IS POSSIBLE TO MANAGE THE TYPE OF FUNCTIONING OF THE AUXILIARY RELAY ON THE "SVZ" P.C.B. (CLAMP M4, PIN 5-6). WHEN THE VALUE OF THE PARAMETER IS SET TO '3', THE ENABLING OR DISABLING OF THE AUXILIARY RELAY IS GIVEN BY THE "TP" CONTACT (CLAMP M14, PIN 55-56, SEE CHAPTER: OPTIONAL ELECTRICAL CONNECTIONS). WHEN THE "TP" CONTACT IS OPEN, THE RELAY STAYS ENERGIZED (WORKING RECIRCULATION PUMP) WHILE WHEN THE "TP" CONTACT IS CLOSED, THE RELAY IS DE-ENERGIZED (NOT WORKING RECIRCULATION PUMP).	0 - 4	0 = DISABLED (SET BY DEFAULT) 1 = HEATING CIRCUIT BOOSTER PUMP 2 = D.H.W. BOOSTER PUMP 3 = RECIRCULATION PUMP 4 = REMOTE LED FOR SIGNALLING BOILER BLOCK (SEE CHAPTER: OPTIONAL ELECTRICAL CONNECTIONS)
P35	***SAFETY CHECK ENABLING FOR INSUFFICIENT CIRCULATION DURING IGNITION*** BY ACTIVATING THIS PARAMETER, THE CORRECT FUNCTIONING OF THE PUMP IS CHECKED AT EACH BURNER IGNITION. THIS CHECK ALLOWS TO PROTECT THE HEAT EXCHANGER AND OTHER PARTS FROM EXCESSIVE NON-DISSIPATED HEAT, IN CASE THE PUMP DOES NOT WORK PROPERLY.	0 - 1	0 = DISABLED 1 = ENABLED (SET BY DEFAULT)
P36	***ACTIVATION AND OPERATING MODE OF THE CONTACT 'CT' THROUGH ACCESSORY COD. 40-00133 (SEE CHAPTER "OPTIONAL ELECTRICAL CONNECTIONS")*** THIS PARAMETER IS AUTOMATICALLY SET TO THE VALUE '1' WHEN THE VALUE OF PARAMETER P00 IS SET TO '11'.	0 - 2	0 = DISABLED (SET BY DEFAULT) 1 = AIR PRESSURE-SWITCH SAFETY (SET BY DEFAULT ONLY FOR R1K 60 / R1KG 180 / RIKG 240) 2 = TELEPHONE DIALER

2.1.6. HEAT INPUT / FAN FREQUENCY DIAGRAM*



*Data on a single unit

GAS TYPE		MINIMUM FREQUENCY	MAXIMUM FREQUENCY	STARTING STEP ADJUSTMENT
G20	Hz	45	250	130
G30	Hz	45	228	140
G31	Hz	45	248	140

2.2. MAINTENANCE

2.2.7. GENERAL MAINTENANCE WARNINGS

DANGER

Before each components cleaning or replacement operation, ALWAYS cut off the POWER, WATER and GAS supply of the boiler.

WARNING

To ensure greater life span and proper operation of the device, during the maintenance operations use only original spare parts.

ATTENTION

To ensure the efficiency and safety of the device, the maintenance operations must be realized on an annual basis. The operations described below, are essential to the validity of the standard warranty and must be performed by professionally qualified personnel in accordance with current legislation

Please perform the following operations once a year:

- Check that the system's water PH is between 6.5 and 8.5;
- check the pre-load pressure of the expansion vessel;
- check the sealing of the water components, and replace if necessary the gaskets;
- check that the wiring is performed in compliance with the requirements in the boiler instruction manual;
- check the wiring inside the control panel;
- remove and clean the burner from oxidation;
- check the integrity and the position of the sealed chamber sealing gasket;
- check the primary exchanger, if necessary, clean it;
- check the operation of the gas light up and safety systems. If necessary, remove and clean the flame detection and light up electrodes from incrustations paying attention to respect the distances with respect to the burner;
- check the sealing of the gas components, and replace if necessary the gaskets;
- visually check the flame and the condition of the combustion chamber;
- if necessary make sure that the combustion is suitably adjusted and if required proceed as indicated in section "CO2 VALUE CHECK AND CALIBRATION";
- periodically check the integrity of the fume exhaustion system for safety and proper operation;

WARNING

To ensure proper sealing at all times of the non-return flue dampers inserted in the Ø160 vertical pipe, they must be replaced every 2 years by an authorised service centre.

- make sure that the permanent ventilation outlets are present, correctly sized and functioning, based on the installed devices. Respect the requirements provided by Local and National legislation;
- check the heating circuit safety systems: limit temperature safety thermostat; limit pressure safety;
- check the proper operation of the condensate draining system, including the devices outside the boiler such as condensate collection devices installed along the path of the fume exhaust duct or neutralization devices for acid condensate. Check that the liquid flow is not obstructed and that there are no combustion gas refluxes inside the internal system.

2.2.8. TECHNICAL DATA

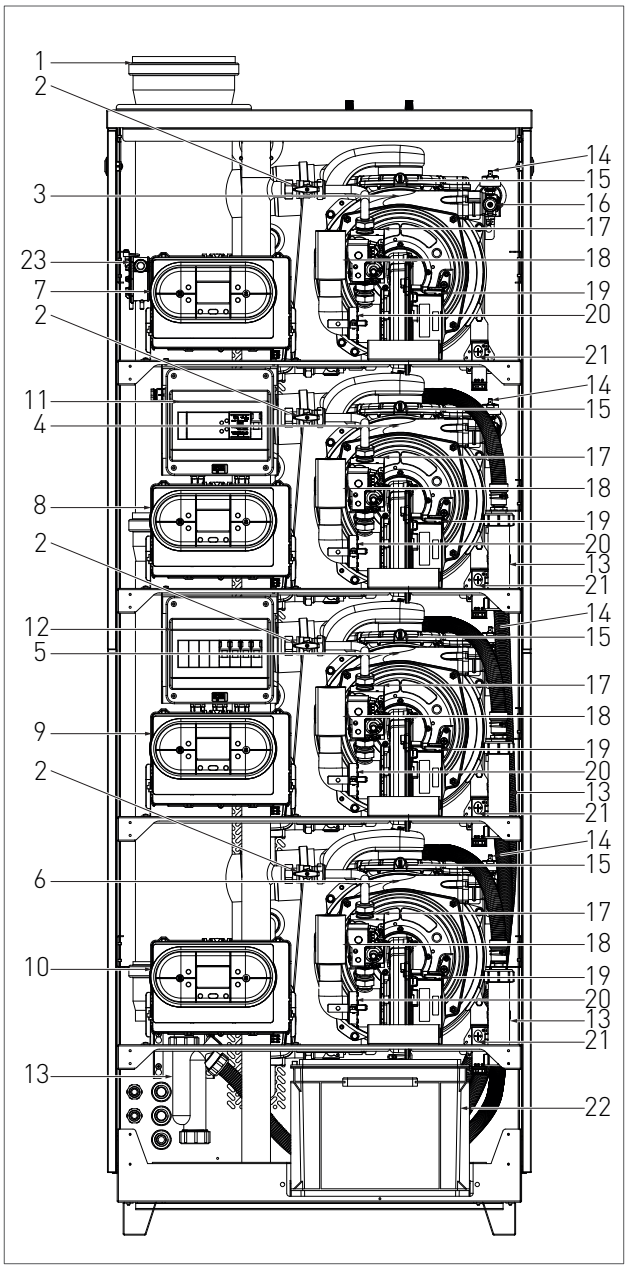
Model		R1KG 180	R1KG 240
Gas category		II2H3P	II2H3P
Flue system type	type	B23-B23p	B23-B23p
Energy efficiency 92/42 CEE	no. stars	4	4
Heat Input max (C.H.)	kW	177	236
Heat Input min (C.H.)	kW	6	6
Heat Input min LPG	kW	6	6
Heat Output max. - 60/80°C	kW	171,96	229,27
Heat Output min. - 60/80°C	kW	5,75	5,75
Heat Output max. - 30/50°C	kW	188,51	251,34
Heat Output min. - 30/50°C	kW	6,44	6,44
Heat Output max at 30% Heat Input average - return 30°C	kW	29,59	39,13
Efficiency at 100% Heat Input - 60/80°C	%	97,15	97,15
Efficiency at 30% Heat Input - return 30°C	%	108,30	108,30
Heat Input average efficiency - 60/80°C	%	97	97
Heat Output max at 30% Heat Input average - return 47°C	%	102,70	102,70
Efficiency at 30% Heat Input average - return 30°C	%	107,80	107,80
Efficiency Heat Output min. - 60/80°C	%	95,80	95,80
Efficiency at 100% Heat Input - 30/50°C	%	106,50	106,50
Efficiency Heat Output min - 30/50°C	%	107,30	107,30
Maximum combustion efficiency	%	97,20	97,20
Minimum combustion efficiency	%	98,20	98,20
Flue efficiency losses with burner on (Heat Input max.)	%	2,80	2,80
Flue efficiency losses with burner on (Heat Input min.)	%	1,80%	1,80%
Fumes temperature - Heat Input max.	°C	81,20	81,20
Fumes temperature - Heat Input min.	°C	58,70	58,70
CO2 - Heat Input max. - G20	%	9,20 - 9,00	9,20 - 9,00
CO2 - Heat Input min. - G20	%	8,90 - 8,70	8,90 - 8,70
CO2 - Heat Input max. - G30	%	11,40 - 11,20	11,40 - 11,20
CO2 - Heat Input min. - G30	%	10,80 - 10,60	10,80 - 10,60
CO2 - Heat Input max. - G31	%	10,20 - 10,00	10,20 - 10,00
CO2 - Heat Input min. - G31	%	9,90 - 9,70	9,90 - 9,70
CO - Heat Input max.	ppm	91	91
CO - Heat Input min.	ppm	1	1
Weighted CO (0% O2)	ppm	12	12
Casing efficiency losses (Heat Input max.)	%	0,05	0,05
Casing efficiency losses (Heat Input min.)	%	2,40	2,40
Fumes mass - Heat Input max.	g/s	26,62 (single unit)	26,62 (single unit)
Fumes mass - Heat Input min.	g/s	2,70	2,70
NOx class	class	6	6

Weighted NOx (0% O2) on GCV mg/kWh	mg/kWh	32	32
Central heating circuit			
Temperature setting - Central heating	°C	30-80 / 25-45	30-80 / 25-45
Max. operating temperature - Central heating	°C	80	80
Max. operating pressure - Central heating	bar	5	5
Min. operating pressure - Central heating	bar	0,3	0,3
Dimensions			
Width	mm	712	712
Depth	mm	830	830
Height	mm	1884	1884
Gross weight	Kg	197	226
Hydraulic Connections			
C.H. Flow	Ø	DN65	DN65
Gas	Ø	1 1/2"	1 1/2"
C.H. Return	Ø	DN65	DN65
Flue systems			
Flue exhaust diameter	mm	160	160
Fan - Max. available pressure	Pa	100	100
Fan - Min. available pressure	Pa	21,5	21,5
Max. Flue length Ø160	m	10	10
Flue bend 90° MF Ø160 - Pressure loss	m	4	4
Electrical specifications			
Voltage-frequency	V/Hz	220-230/50	220-230/50
Electric power with boiler OFF	W	14	14
Max Power consumption	W	324	432
Max Power consumption - boiler pump (100%)	W	165	220
Protection rating	IP	X4D	X4D
Gas supply			
Supply pressure - G20	mbar	20	20
Supply pressure min. - G20	mbar	15	15
Supply pressure max. - G20	mbar	25	25
Fan speed Max. HEATING output - G20	Hz	250	250
Fan speed Min. HEATING output - G20	Hz	55	55
Gas consumption - G20	m^3/h	18,73	24,97
Supply pressure - G30	mbar	28-30	28-30
Supply pressure min. - G30	mbar	25	25
Supply pressure max. - G30	mbar	35	35
Fan speed Max. HEATING output - G30	Hz	228	228
Fan speed Min. HEATING output - G30	Hz	55	55
Gas consumption - G30	kg/h	13,96	18,61
Supply pressure - G31	mbar	37	37
Supply pressure min. - G31	mbar	25	25
Supply pressure max. - G31	mbar	45	45
Fan speed Max. HEATING output - G31	Hz	248	248
Fan speed Min. HEATING output - G31	Hz	55	55

2.2.9. TECHNICAL ASSEMBLY

KEY

1. Ø 160 FLUE EXHAUST CONNECTION
2. GAS TAP
3. CONDENSING HEAT EXCHANGER 1
4. CONDENSING HEAT EXCHANGER 2
5. CONDENSING HEAT EXCHANGER 3
6. CONDENSING HEAT EXCHANGER 4
7. CONTROL PANEL 1
8. CONTROL PANEL 2
9. CONTROL PANEL 3
10. CONTROL PANEL 4
11. MODBUS CASCADE CONTROLLER
12. SWITCHBOARD
13. CONDENSATE DRAIN SIPHON
14. WATER PRESSURE SWITCH
15. FLUE SAFETY THERMOFUSE
16. MANUAL AIR VENT VALVE
17. GAS VALVE
18. AIR INTAKE TUBE
19. FAN
20. VENTURI
21. IGNITION TRANSFORMER
22. CONDENSATE NEUTRALISER
23. AIR PRESSURE SWITCH

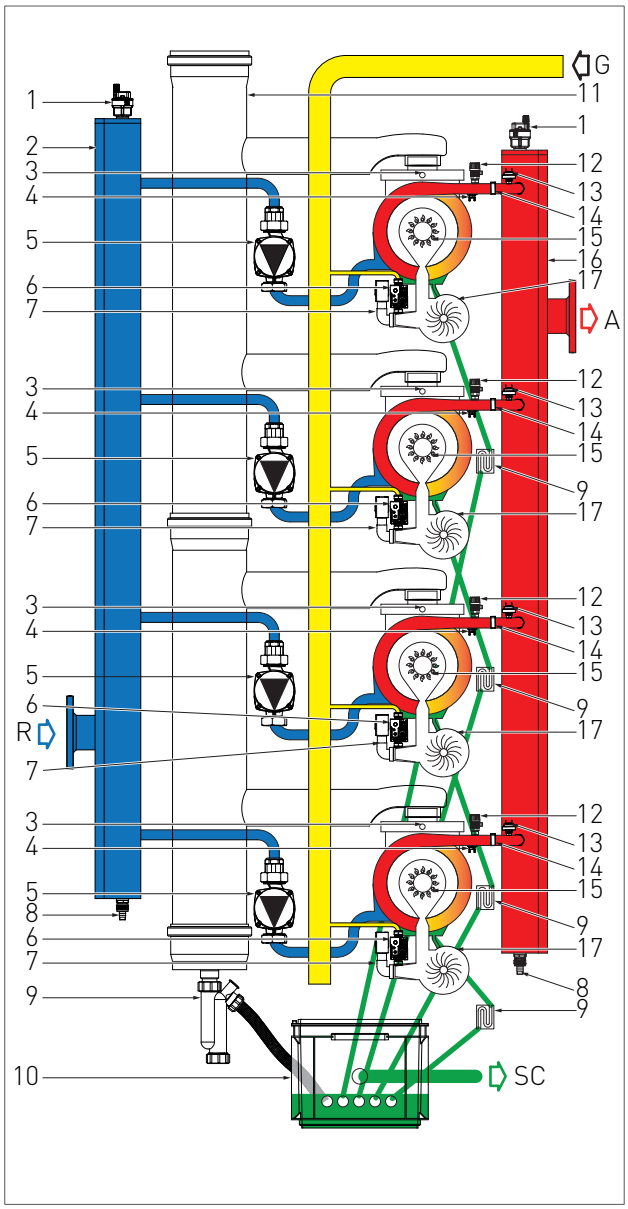


2.2.10. HYDRAULIC BOARD

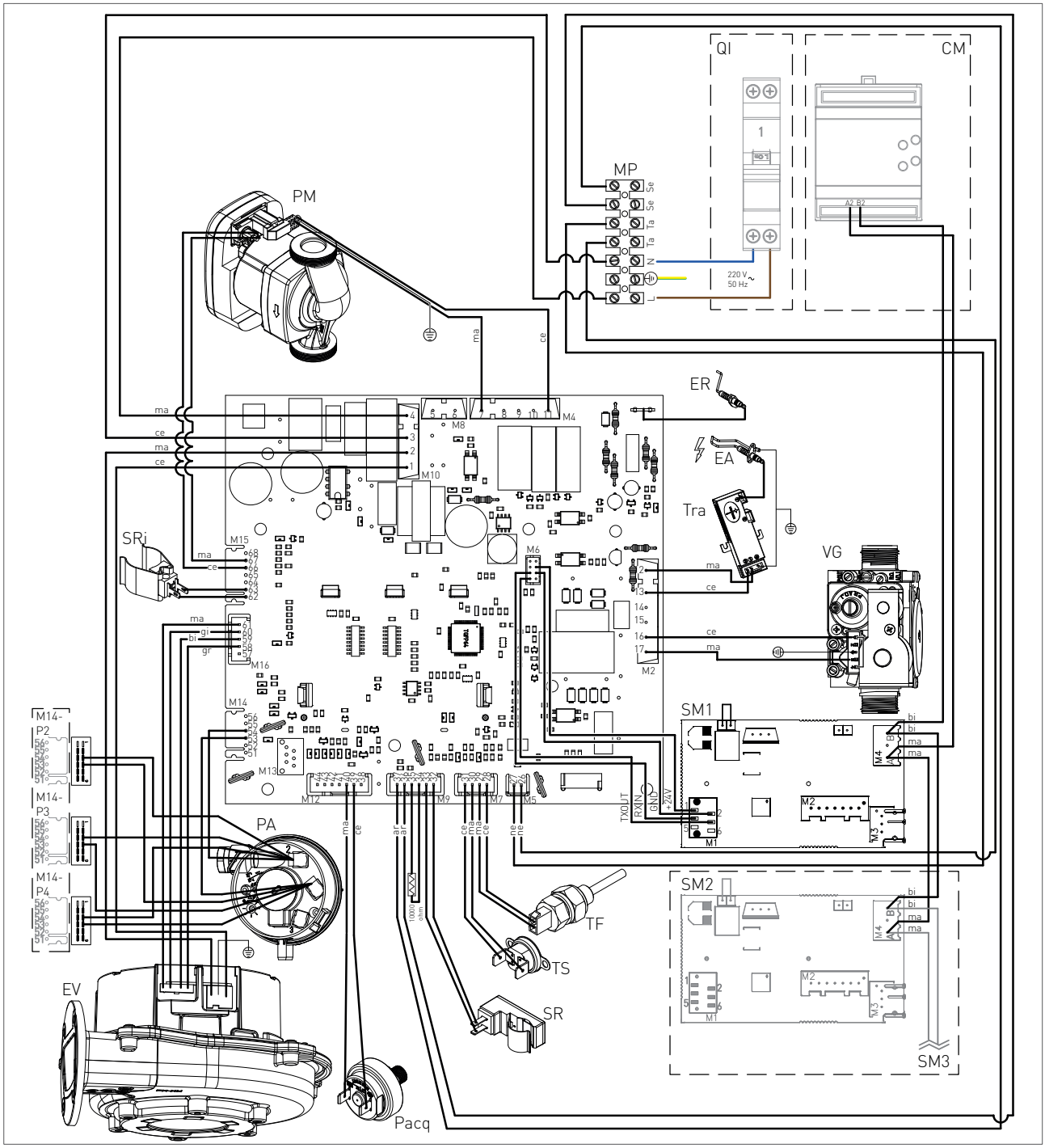
KEY

R. HEATING RETURN
G. GAS
A. HEATING FLOW
SC. CONDENSATE DRAIN

1. AUTOMATIC AIR VENT VALVE
2. HEATING RETURN MANIFOLD
3. FLUE SAFETY THERMOFUSE
4. SAFETY THERMOSTAT
5. CIRCULATING PUMP
6. GAS VALVE
7. AIR INTAKE TUBE
8. SYSTEM DRAINING TAP
9. CONDENSATE DRAIN SIPHON
10. CONDENSATE NEUTRALISER
11. Ø 160 FLUE EXHAUST CONNECTION
12. MANUAL AIR VENT VALVE
13. WATER PRESSURE SWITCH
14. HEATING SENSOR
15. BURNER UNIT
16. HEATING FLOW MANIFOLD
17. FAN



2.2.11. CONTROL PANEL NO.1 - ELECTRONIC PCB ELECTRICAL CONNECTIONS



ER: FLAME DETECTION ELECTRODE
EA: IGNITION ELECTRODE
PM: MODULATING PUMP
VG: GAS VALVE
TRA: IGNITION TRANSFORMER
SM1: MODBUS P.C.B. – CONTROL PANEL NO.1
SM2: MODBUS P.C.B. – CONTROL PANEL NO.2
SM3: MODBUS P.C.B. – CONTROL PANEL NO.3
TS: SAFETY THERMOSTAT
PACQ:WATER PRESSURE SWITCH
SR: HEATING SENSOR
EV: FAN
TF: FLUE SAFETY THERMOFUSE (102°C)
SRI: SYSTEM RETURN SENSOR
QI: SWITCHBOARD
PA: AIR PRESSURE SWITCH
MP: PANEL TERMINAL BLOCK
SE: OUTDOOR SENSOR
TA: ROOM THERMOSTAT
CM: MODBUS CONTROLLER
L: LINE
N: NEUTRAL
M14 TERMINAL (OF CONTROL PANEL NO.2/3/4)
NE: BLACK
CE: BLUE
MA: BROWN
AR: ORANGE
GI: YELLOW
BI: WHITE

2.2.12. ACCESSING THE BOILER

For most of control and maintenance operations, it is necessary to open the boiler front doors. Please proceed as follows (Fig. 1):

› insert the key provided with the unit and open the lock (1) of door 'a';

› open door 'a' and then door 'b'.

To work on the side panels of the boiler, proceed as follows:

› insert the key provided with the unit and open the lock (1) of side panel 'c';

› lift side panel 'c' upwards and pull it out;

› remove the fixing screws (2 - fig.1) located in the front edge of side panel 'd';

› pull side panel 'd' upwards.

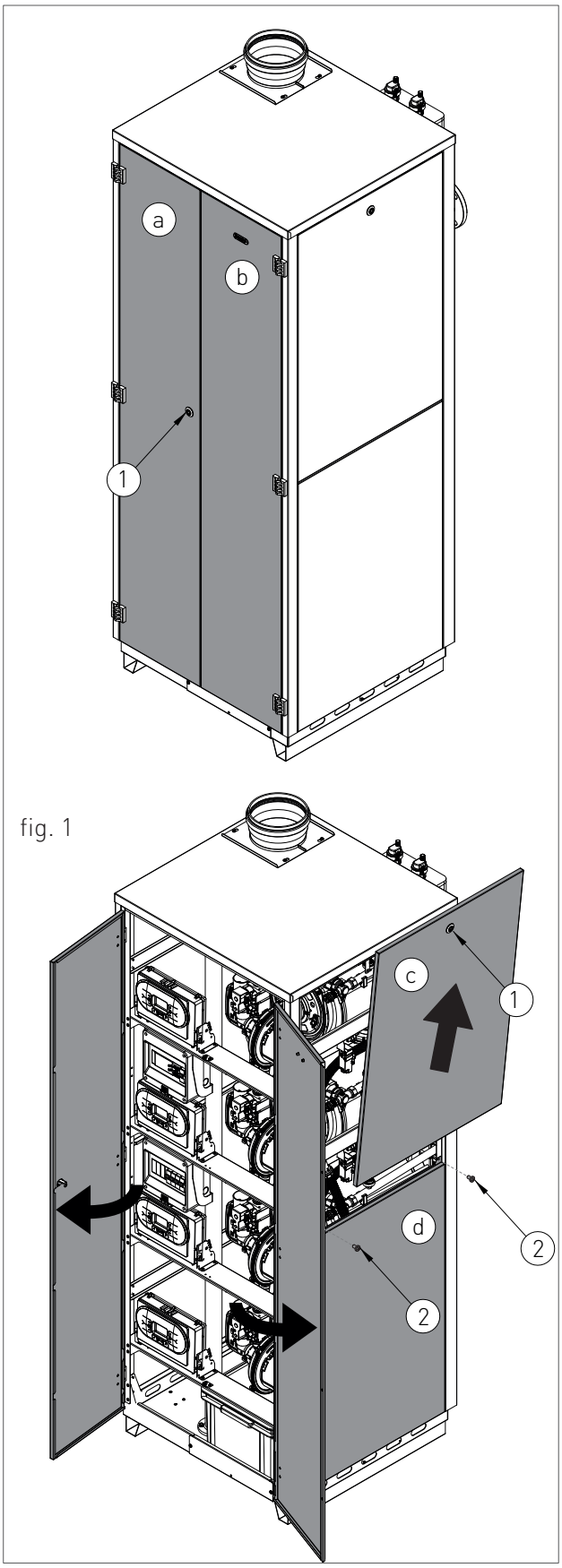


fig. 1

2.2.13. ACCESSING THE ELECTRONIC P.C.B.

To work on the electrical connections of the control panel, proceed as follows:

DANGER
Cut off the voltage from the main switch.

› Grab at the same time the support brackets of the control panel (fig. 1) loosening them and turn the panel downwards;

› unscrew the two fastening screws 1 - fig. 1;

› disengage the four hooks '2' - fig. 1;

› remove the control panel back-plate pulling it upwards.

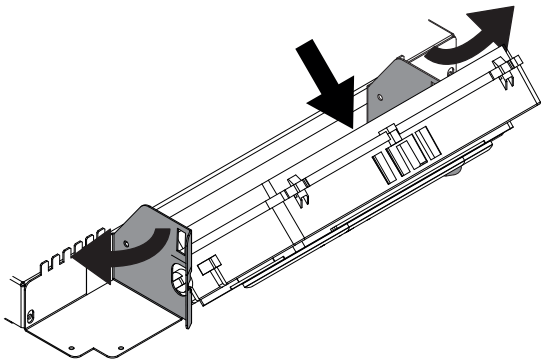
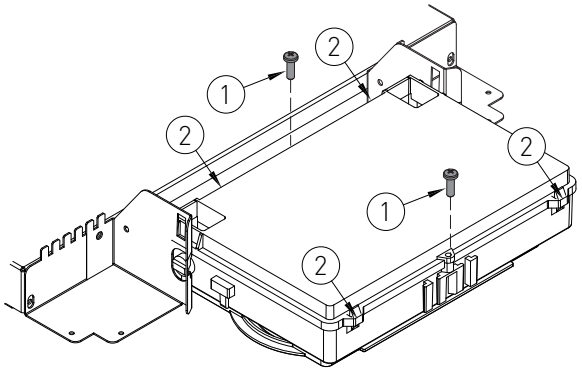
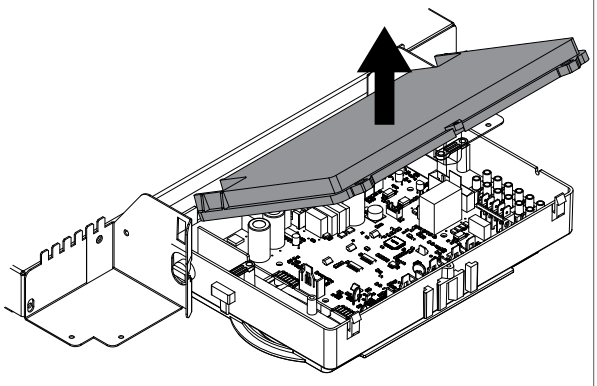


fig. 1





2.2.16. SYSTEM EMPTYING

It is not recommended to empty the heating system as the changes of water generate the increase of limestone deposits inside the exchangers. In case it is necessary to protect against freezing the heating circuit by adding anti-freeze liquid to the system water, these products must be approved by the company.

The possible limestone descaling of the elements of the heat generators must be performed by means of the substances approved by the company, in compliance with what has been specified in the safety data sheet of the used product, ventilating the environment, wearing protective clothing, avoiding mixing different products, protecting the device and the surrounding objects.

Whenever you need to empty the system, proceed as follows:

› turn off the main power supply switch;

› wait for the boiler to cool down;

› connect a flexible tube to the system emptying outlet and connect the other end of the tube to a suitable discharge;

› rotate the RS draining tap of the generator (fig. 1) and, if installed, of the hydraulic compressor and of the collectors of the system;

› open the relief valves of the radiators starting from the one at the top and continuing downwards;

› after draining out all water, close the relief valves of the radiators and the emptying tap;

› if it is necessary to empty only the boiler, close the delivery/return sectioning taps of the heating circuit and open only the draining tap placed on the lower part of the boiler and inserted in the pump collector.

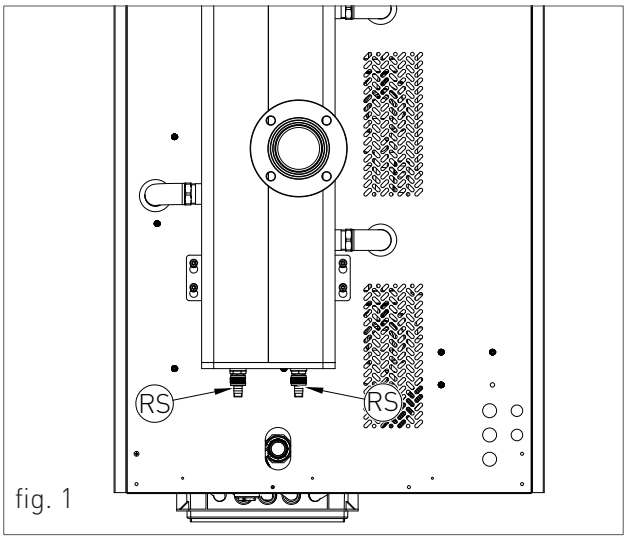


fig. 1

2.2.14. FAULT / ERROR CODES

To display the last 5 fault codes, from the most recent one in chronological order, activate the 'OFF' mode by pressing the FUNCTION '  ' key and hold down the INFO '  ' key for 5 seconds. Use keys '  ' and '  ' of the heating circuit to scroll through the list of stored faults. To clear the fault history, press the RESET '  ' key. To exit display mode press the INFO '  ' key.

CODE	FAULT	POSSIBLE CAUSE	SOLUTION	RESET
E01	***FLAME BLOCK***	**NO FLAME LIGHT UP**		MANUAL RESET (PRESS THE RESET '  ' KEY).
		GAS MISSING;	CHECK THE ADDUCTION NETWORK;	
		MASS OR BROKEN START-UP ELECTRODE;	REPLACE IT;	
		GAS VALVE BROKEN;	REPLACE IT;	
		SLOW LIGHT UP TOO LOW ADJUSTMENT;	ADJUST MINIMUM OR SLOW LIGHT UP;	
		VALVE INFEED PRESSURE TOO HIGH (ONLY FOR GPL BOILERS).	CHECK THE MAXIMUM ADJUSTMENT PRESSURE	
		WITH FLAME LIGHT UP		
		NEUTRAL AND PHASE INVERTED POWER SUPPLY;	PROPERLY CONNECT THE POWER SUPPLY;	
		DETECTION ELECTRODE BROKEN;	REPLACE IT;	
		DETECTION ELECTRODE CABLE DISCONNECTED.	CHECK THE WIRING.	
		ELECTRICAL CURRENT PHASE-PHASE	IF THE TENSION MEASURES BETWEEN NEUTRAL AND GROUND IS ALMOST EQUAL TO THE ONE MEASURED BETWEEN PHASE AND GROUND, YOU HAVE TO INSTALL A PHASE-PHASE TRANSFORMER KIT (COD. 88021LA)	

CODE	FAULT	POSSIBLE CAUSE	SOLUTION	RESET
E02	***SAFETY THERMOSTAT (95°C)***	THERMOSTAT CABLE DISCONNECTED;	CHECK THE WIRING:	AUTOMATIC.
		BROKEN THERMOSTAT.	REPLACE IT.	
E03	***FUMES SAFETY THERMOFUSE (102°C)***	THERMOFUSE BROKEN;	REPLACE IT;	MANUAL RESET (PRESS THE RESET "Ⓡ" KEY).
		THERMOFUSE CABLE DISCONNECTED.	CHECK THE WIRING.	
E04	***WATER MISSING IN THE SYSTEM***	INSUFFICIENT WATER PRESSURE INSIDE THE SYSTEM (LOWER THAN 0.3 BAR);	LOAD THE SYSTEM;	AUTOMATIC.
		WATER PRESSURE SWITCH CABLE DISCONNECTED;	CHECK THE WIRING;	
		WATER PRESSURE SWITCH BROKEN.	REPLACE IT.	
E05	***HEATING PROBE***	BROKEN OR INCORRECTLY CALIBRATED PROBE (RESISTANCE VALUE 10 KOHM AT 25 °C NTC);	REPLACE IT;	AUTOMATIC.
		DISCONNECTED OR WET PROBE CONNECTOR.	CHECK THE WIRING.	
E10	***LOW FLOW RATE***	THE FLOW RATE VALUE DETECTED BY THE FLOWMETER IS LOWER THAN THE VALUE SET AT PARAMETER P33.	INCREASE THE FLOW RATE OR LOWER THE VALUE AT PARAMETER P33.	AUTOMATIC.
E14	***AIR PRESSURE SWITCH***	AIR PRESSURE SWITCH CABLE DISCONNECTED;	CHECK THE WIRING;	MANUAL RESET (PRESS THE RESET "Ⓡ" KEY).
		DISCHARGE OR SUCTION CLOSED;	CHECK THE FUMES DISCHARGE DUCT;	
		AIR PRESSURE SWITCH DEFECTIVE.	REPLACE IT.	

CODE	FAULT	POSSIBLE CAUSE	SOLUTION	RESET
E15	***RETURN PROBE***	BROKEN OR INCORRECTLY CALIBRATED PROBE (RESISTANCE VALUE 10 KOHM AT 25 °C NTC);	REPLACE IT;	AUTOMATIC.
		DISCONNECTED OR WET PROBE CONNECTOR.	CHECK THE WIRING.	
E16	***ELECTRIC FAN***	ELECTRIC FAN BOARD BROKEN;	REPLACE IT;	AUTOMATIC.
		ELECTRIC FAN BROKEN;	REPLACE IT;	
		FAULTY POWER SUPPLY CABLE.	REPLACE IT.	
E18	***INSUFFICIENT CIRCULATION***	EXCHANGER OBSTRUCTED;	CLEAN OR REPLACE THE EXCHANGER;	AUTOMATIC.
		CIRCULATOR BROKEN OR DIRTY IMPELLER.	CLEAN THE IMPELLER OR REPLACE THE CIRCULATOR.	

CODE	FAULT	POSSIBLE CAUSE	SOLUTION	RESET
E21	***ELECTRIC LEAKAGE ON THE HIGH CIRCUIT VOLTAGE***	DEFECTIVE GAS VALVE	TRY TO DISCONNECT THE GAS VALVE CABLE AND START THE BOILER AGAIN. IF THE E01 ERROR OCCURS UPON RE-STARTING INSTEAD OF THE PREVIOUS E21, REPLACE THE GAS VALVE. DISASSEMBLE THE COILS OF THE OLD VALVE TO CHECK IF THEY ARE WET, ALSO CHECK THAT NO WATER ENTERS FROM THE COMBUSTION AIR INTAKE.	AUTOMATIC.
		DEFECTIVE IGNITION TRANSFORMER	TRY TO DISCONNECT THE IGNITION TRANSFORMER CABLE AND START THE BOILER AGAIN. IF THE E01 ERROR OCCURS UPON RE-STARTING INSTEAD OF THE PREVIOUS E21, REPLACE THE IGNITION TRANSFORMER.	
	ELECTRICAL NOISE DUE TO SPARK DISCHARGE	IF AT THE START OF THE IGNITION CYCLE THE BOILER SWITCHES OFF AND TURNS ON AGAIN, THE TRAIN OF SPARKS DISCHARGES TOWARDS THE LOW VOLTAGE CABLES OR TOWARDS THE FRAME INSTEAD OF THE ELECTRODES.	REPLACE THE SPARK ELECTRODES IF THE CABLE LEAKS SPARK OR REPLACE THE IGNITION TRANSFORMER IF SPARK GOES FROM THE TRANSFORMER TO THE SURROUNDING PLATES OR CABLES. CHECK THAT THE DISTANCE BETWEEN THE IGNITION ELECTRODES IS NOT GREATER THAN 5 MM.	
		THE ARC OF THE SPARK IS TOO SHORT	CHECK THAT THE DISTANCE BETWEEN THE ELECTRODES IS BETWEEN 3 AND 5 MM, A DISTANCE LESS THAN 3 MM CAUSES A NOISE WHICH MAKES THE PCB SWITCH OFF. CHECK THAT THE 1000 OHM ANTI-INTERFERENCE RESISTOR IS PRESENT IN THE IGNITION CABLE.	
E22	***P A R A M E T E R S PROGRAMMING REQUEST***	MICRO=PROCESSOR MEMORY LOSS.	PARAMETERS REPROGRAMMING.	MANUAL RESET (CUT OFF THE TENSION).

CODE	FAULT	POSSIBLE CAUSE	SOLUTION	RESET
E31	***INCOMPATIBLE REMOTE CONTROL***	FUNCTION ACTIVE WHEN THE CONNECTED REMOTE CONTROL IS NOT COMPATIBLE WITH THE P.C.B.	REPLACE IT WITH A COMPATIBLE ONE.	AUTOMATIC.
E32	***COMMUNICATION ERROR BETWEEN THE BOILER BOARD AND THE MODBUS BOARD***	NO ELECTRICAL CONNECTION;	CHECK THE WIRING;	AUTOMATIC.
		MODBUS BOARD BROKEN;	REPLACE IT;	
E35	***RESIDUAL FLAME***	FAULTY DETECTION ELECTRODE;	CLEAN IT OR REPLACE IT;	MANUAL RESET (PRESS THE RESET "R" KEY).
		FAULTY DETECTION ELECTRODE CABLE;	REPLACE IT;	
		FAULTY MODULATION BOARD.	REPLACE IT.	
E40	***SUPPLY VOLTAGE***	SUPPLY VOLTAGE OFF THE OPERATION RANGE (≤160 VOLTS).	CHECK THE POWER SUPPLY NETWORK (THE ERROR DEACTIVATES AUTOMATICALLY AS SOON AS THE SUPPLY VOLTAGE FALLS BACK WITHIN THE REQUESTED LIMITS).	AUTOMATIC.
E52	***COMMUNICATION FAULT BETWEEN MODBUS CONTROLLER AND MODBUS CONTROL UNIT***	NO ELECTRICAL CONNECTION;	CHECK THE WIRING;	AUTOMATIC.
		MODBUS CONTROL UNIT BROKEN.	REPLACE IT;	

2.2.15. FUNCTIONS CODES

CODE	FUNCTION	DESCRIPTION
F07	***CHIMNEY SWEEP ACTIVE***	YOU CAN ACTIVATE IT BY HOLDING FOR 7 SECONDS THE RESET '®' KEY AND YOU CAN DEACTIVATE IT BY TURNING OFF THE BOILER. THIS FUNCTION BRINGS THE BOILER TO ITS MINIMUM AND MAXIMUM HEATING POWER FOR 15 MINUTES DEACTIVATING THE MODULATION FUNCTION. GENERALLY USED FOR PERFORMING THE COMBUSTION AND CALIBRATION TESTS.
F08	***HEATING CIRCUIT ANTI-FREEZE***	IT ACTIVATES AUTOMATICALLY WHEN THE HEATING PROBE DETECTS A TEMPERATURE OF 12°C. THE BOILER OPERATES AT MINIMUM GAS PRESSURE WITH THE DIVERTER VALVE SET TO 'WINTER' MODE. IT DEACTIVATES WHEN THE HEATING FLOW WATER TEMPERATURE REACHES THE 30°C AND, IN PRESENCE OF A RETURN SENSOR, WHEN THE HEATING RETURN WATER TEMPERATURE REACHES THE 20°C.
F33	***SYSTEM AIR RELEASE CYCLE***	IT ACTIVATES AUTOMATICALLY AT FIRST BOILER START-UP, PERFORMING FOR 5 MINUTES A SERIES OF CYCLES DURING WHICH THE PUMP IS ACTIVATED FOR 40 SECONDS AND DEACTIVATED FOR 20 SECONDS. REGULAR OPERATION IS ALLOWED ONLY AFTER THIS FUNCTION IS COMPLETED. IT CAN ALSO ACTIVATE DURING NORMAL BOILER OPERATION, IF THE WATER PRESSURE SWITCH CONFIRMATION IS MISSING, WHEN THE CONTACT IS RE-CLOSED, A 2 MINUTES RELEASE CYCLE WILL BE PERFORMED.

2.2.16. GAS CONVERSION

ATTENTION

Make sure that the gas adduction tube is suitable for the new type of fuel with which the boiler is supplied.

› loosen the two screws '1' (fig.1) from the fastening bush, and remove the air suction tube;

› unscrew the tube coupling that connects the gas valve to venturi;

› unscrew the three fastening screws '2' (fig.1) of the venturi 'V' (fig.1) using a 10 key, as shown in figure 2;

› remove the two screws '3' (fig.3) and apply pressure on the rear side of venturi 'C' (fig.3);

› replace the body venturi with the one suitable for the type of supply gas (cod. 30-00424 for methane / cod. 30-00426 for GPL) and make sure the tooth 'D' (fig.3) is adjusted downwards on the aluminium ring nut (see fig.3);

› remount the components following the demounting operations in reverse making sure that gasket 'G' is re-assembled as shown in fig.1;

› set the boiler to operate with the new type of gas, changing the value of the parameter P02 'GAS TYPE SELECTION' from the control panel (see chapters 'DIGITECH CS PARAMETERS TABLE' and 'ACCESSING AND PROGRAMMING THE PARAMETERS');

› adjust the CO2 combustion value as indicated in chapter 'CO2 VALUE CHECK AND CALIBRATION'.

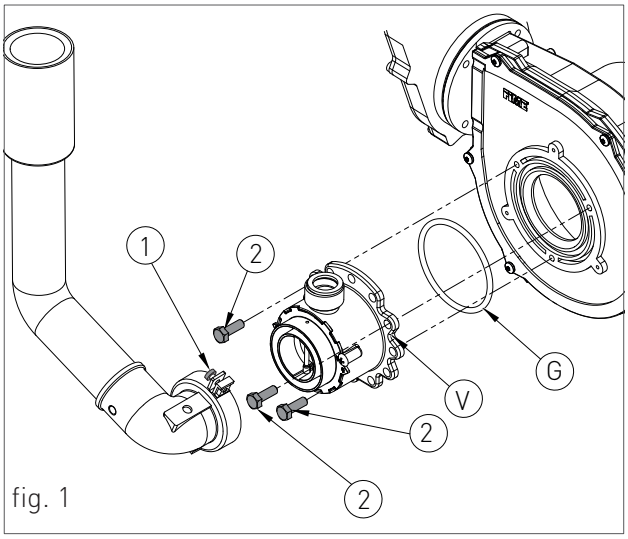


fig. 1

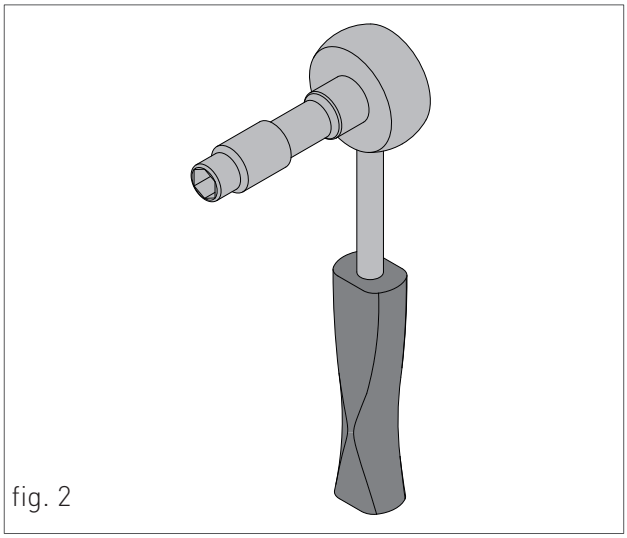


fig. 2

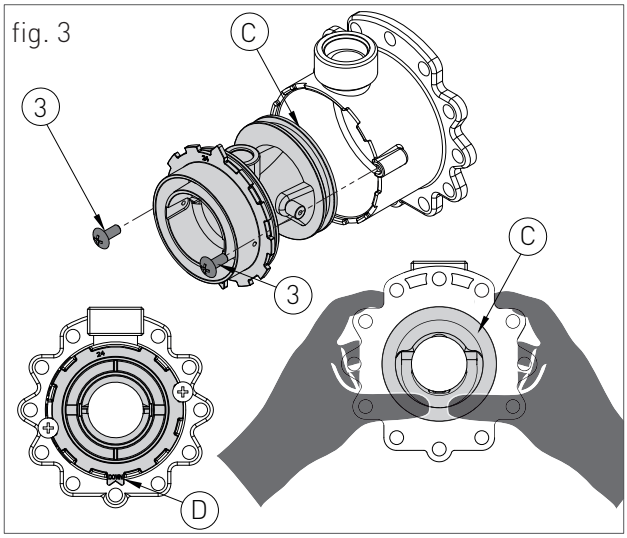


fig. 3

3. USER SECTION

The operations described in this section are addressed to all those who will use the machine. The machine must be used and accessed only by qualified operators that fully read and understood the User section, paying particular attention to the warnings.

3.1. USE

3.1.1. GENERAL USE WARNINGS

WARNING

Before starting the boiler the User must make sure that the First start-up certificate has the stamp of the technical Support Centre proving the testing and the first start-up of the boiler.

WARNING

In order to take advantage of the guarantee provided by the manufacturer, the customer should carefully and exclusively observe the instructions given in the USER section of the manual.

ATTENTION

This machine may be used only for the purpose for which it has been designed: heat water to a temperature below boiling point at atmospheric pressure. Any other use is considered wrong and dangerous. The manufacturer is excluded from any contractual or out of contract responsibility for damage caused to people, animals or property due to incorrect use.

DANGER

The boiler should not be used by persons (including children) with reduced physical, sensory or mental capacities or without suitable knowledge or experience unless they are instructed on the device use or monitored by a person responsible for their safety.

DANGER

DO NOT obstruct the air vents of the location in which the gas device is installed to prevent the formation of toxic explosive mixes.

DANGER

If you sense a gas odour in the location in which the boiler is installed, proceed as follows:

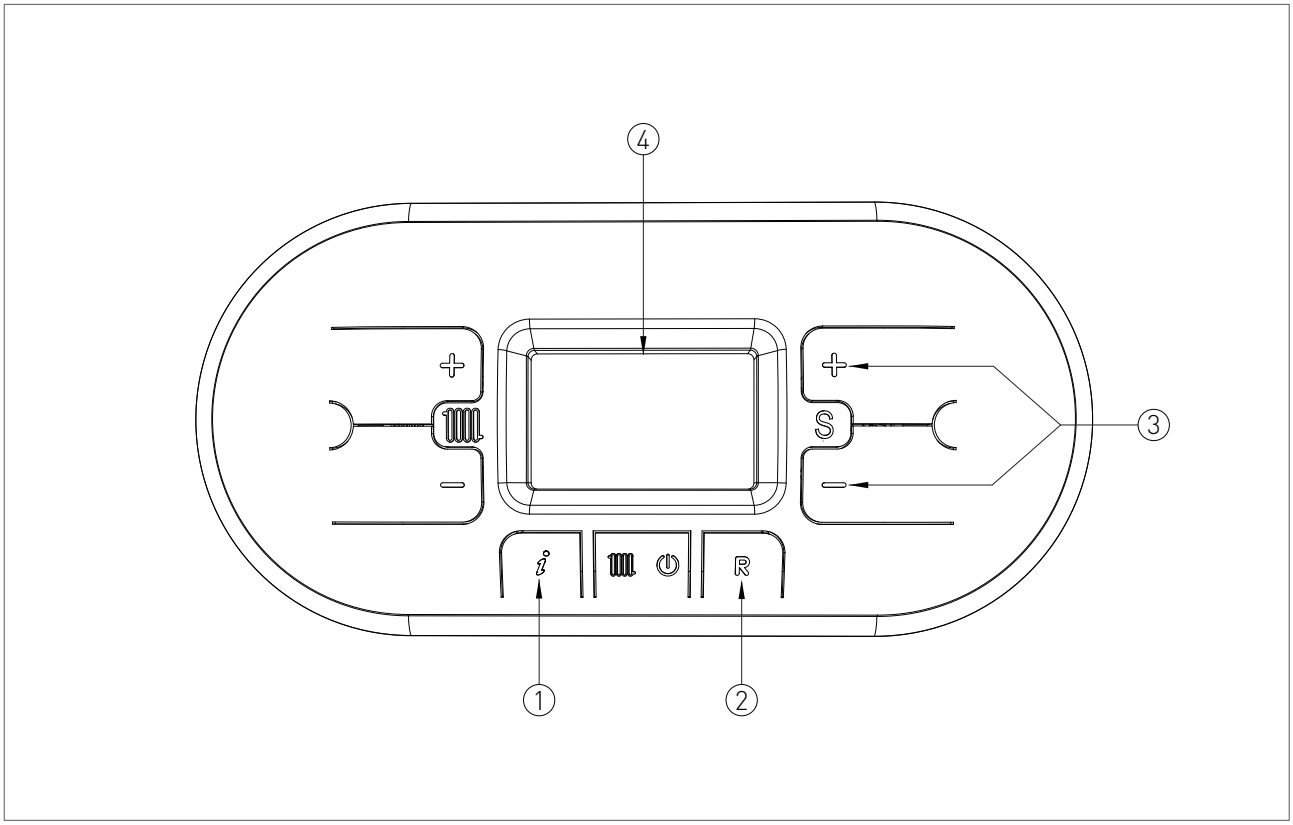
- DO NOT use electrical switches, the telephone or any other device that might generate electrical discharges or sparks;
- Immediately open all doors and windows to create an air exchange that can quickly clean the location;
- Close the gas valves;
- Request immediate intervention of qualified staff.

DANGER

The use of the electrical power boiler implies respecting some fundamental rules such as:

- DO NOT touch the device with wet and/or humid parts and/or with bare feet;
- DO NOT pull the electrical cables;
- DO NOT leave the device exposed to atmospheric agents (rain, sun, etc.) unless specifically intended;
- in case of cable damage, turn off the device and contact qualified professional staff to replace it.

3.1.2. CONTROL PANEL



KEY

1. INFO KEY: PRESS ONCE TO VIEW THE TEMPERATURES AND OTHER INFORMATION (see chapter 'INFO MENU DISPLAY) - HOLD FOR 5 SECONDS, IN OFF OPERATING MODE, TO VIEW THE LAST 5 FAULTS

2. RESET KEY: FAULTS RESET - CHIMNEY SWEEP FUNCTION ACTIVATION (HOLD FOR 7 SECONDS)

3. VALUE OF THE PARAMETERS ADJUSTMENT KEY / HOLD THE KEYS AT THE SAME TIME FOR 5 SECONDS TO ACTIVATE DISPLAY BACK LIGHT FOR 10 MINUTES

4. DISPLAY

3.1.3. DISPLAY ICONS

KEY

1. INDICATION OF PARAMETER NUMBER OR DISPLAYED INFO CODE
2. PARAMETERS PROGRAMMING FUNCTION ACTIVE
3. SIGNALLING CONNECTED SOLAR BOARD / SOLAR COLLECTOR TEMPERATURE DISPLAY (d5)
4. SOLAR PUMP ACTIVE
5. BOILER LOWER TEMPERATURE DISPLAY (d6) / BOILER UPPER TEMPERATURE DISPLAY (d7)
6. EXTERNAL PROBE INSTALLED / EXTERNAL PROBE TEMPERATURE (d1)
7. TEMPERATURE DISPLAY / SET POINT / PARAMETER VALUE
8. MODBUS COMMUNICATION PRESENT
9. INSUFFICIENT SYSTEM WATER PRESSURE SIGNALLING
10. FLAME PRESENT SIGNALLING / IT ALSO INDICATES, ON 3 PERCENTAGE LEVELS, THE MODULATING POWER LEVEL OF THE BOILER (fig.2)
11. ERROR DISPLAY THAT CAN BE RESET
12. OFF OPERATING MODE
13. ERROR DISPLAY THAT CAN NOT BE RESET
14. OPERATION IN HEATING MODE ENABLED

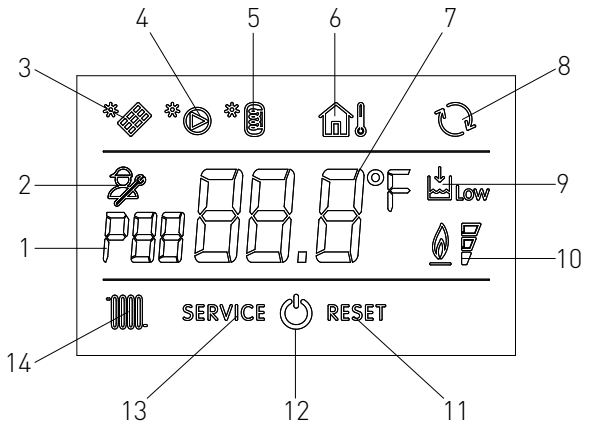


fig. 1

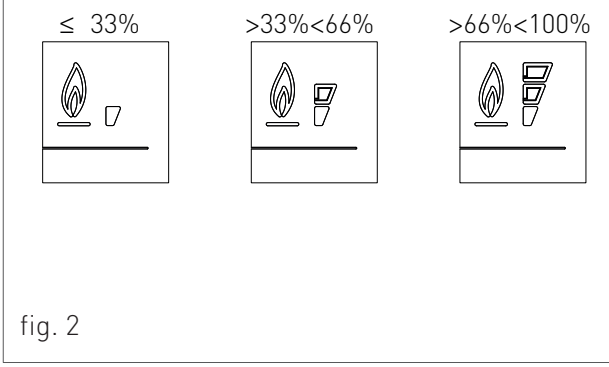


fig. 2

USER

3.1.4. INFO MENU DISPLAY

To view the boiler data from info menu you just have to press the INFO 'ⓘ' key. The info code will be displayed on the left side of the screen and its relative value will be displayed on the centre of the screen. Use keys '⊕' and '⊖' of the heating circuit to scroll through the list of displayed data. To exit display mode press the INFO 'ⓘ' key.

LIST OF DISPLAYED DATA

INFO CODE	ICON	DESCRIPTION
d0		DOMESTIC CIRCUIT PROBE TEMPERATURE
d1		EXTERNAL PROBE TEMPERATURE
d2		FAN SPEED
d3		BOTTOM AREA PROBE TEMPERATURE [IF AREA BOARD INSTALLED]
d4		RETURN PROBE TEMPERATURE
d5		SOLAR COLLECTOR TEMPERATURE [IF SOLAR BOARD INSTALLED] (SCS)
d6		SOLAR BOILER TEMPERATURE (BOTTOM) [IF SOLAR BOARD INSTALLED] (SBSI)
d7		SOLAR BOILER TEMPERATURE (TOP) [IF SOLAR BOARD INSTALLED] (SBSS)
d8		SOLAR COLLECTOR PROBE TEMPERATURE 2 [IF SOLAR BOARD INSTALLED] (SCS2)
d9		EXTRA SOLAR BOILER TEMPERATURE [IF SOLAR BOARD INSTALLED] (SBS3)
dA		INERTIAL STORAGE SENSOR TEMPERATURE
dB		LOW-TEMPERATURE HEATING CIRCUIT RETURN SENSOR TEMPERATURE (IN HYBRID SYSTEM BOX MODE) - HEATING PUMP RETURN SENSOR TEMPERATURE (IN HYBRID DOMESTIC SYSTEM MODE)
dC		HYBRID SYSTEM BOX D.H.W. TANK SENSOR TEMPERATURE - HOT WATER TEMPERATURE OUT OF THE REMOTE TANK TO THE BOILER (ONLY FOR HYBRID DOMESTIC SYSTEM WITH OPTIONAL SENSOR)
dD		POWER SUPPLIED BY THE HEATING PUMP IN KW/H (ONLY FOR HYBRID DOMESTIC SYSTEM)
dE		HEATING FLOW RATE DISPLAY EXPRESSED IN L/MIN (IF THERE IS A FLOWMETER).

3.1.5. START-UP

Before starting the boiler, make sure that it is electrically powered and that the gas taps of each thermal module are open.

For the boiler start-up, please refer to the Radiant cascade controller manual.

3.1.6. INFORMATIONAL NOTE ON ANTI-FREEZE FUNCTION

The boiler is protected against freezing thanks to the electronic board preparation with functions that start the burner and heat the concerned parts when their temperature goes below the minimum pre-set values.

WARNING
This function is available only if:

- the boiler is powered;
- the gas supply is open;
- the pressure of the system is proper;
- the boiler is not blocked.

3.1.7. FAULT / ERROR CODES

The boiler might signal some faults by displaying a code. Below you have a list of the codes and of the operations to be performed in order to unlock the boiler.

CODE	ICON	FAULT	INTERVENTION
E01	RESET	***FLAME BLOCK***	MAKE SURE THAT THE BOILER AND CONTACTOR GAS VALVES ARE OPEN.
			PRESS THE RESET "Ⓡ" BUTTON ON THE CONTROL PANEL TO RESET THE FAULT, AS SOON AS THE ERROR CODE DISAPPEARS FROM THE DISPLAY, THE BOILER WILL START AUTOMATICALLY.
			IF THE BLOCK PERSISTS CONTACT THE TECHNICAL SUPPORT CENTRE.
E02	RESET	***SAFETY THERMOSTAT (95 °C)***	CONTACT THE TECHNICAL SUPPORT CENTRE.
E03	RESET	***FUMES SAFETY THERMOFUSE (102 °C)***	CONTACT THE TECHNICAL SUPPORT CENTRE.
E04	Low	***WATER MISSING IN THE SYSTEM***	IF THE SYSTEM PRESSURE IS BELOW 1.2 BAR, FILL THE SYSTEM AS DESCRIBED IN CHAPTER "SYSTEM FILLING".
			IF THE BLOCK PERSISTS CONTACT THE TECHNICAL SUPPORT CENTRE.
E05	SERVICE	***HEATING PROBE***	CONTACT THE TECHNICAL SUPPORT CENTRE.
E10	SERVICE	***LOW FLOW RATE***	CONTACT THE TECHNICAL SUPPORT CENTRE.
E14	SERVICE	***AIR PRESSURE SWITCH***	CONTACT THE TECHNICAL SUPPORT CENTRE.
E15	SERVICE	***RETURN PROBE***	CONTACT THE TECHNICAL SUPPORT CENTRE.
E16	SERVICE	***ELECTRIC FAN***	CONTACT THE TECHNICAL SUPPORT CENTRE.
E18	SERVICE	***INSUFFICIENT CIRCULATION***	CONTACT THE TECHNICAL SUPPORT CENTRE.
E21	SERVICE	***ELECTRIC LEAKAGE ON THE HIGH CIRCUIT VOLTAGE / ELECTRICAL NOISE DUE TO SPARK DISCHARGE***	CUT OFF THE POWER SUPPLY FROM THE MAIN SWITCH AND THEN RESTORE IT, AS SOON AS THE ERROR CODE DISAPPEARS, THE BOILER WILL RESTART AUTOMATICALLY.
			IF THE BLOCK PERSISTS CONTACT THE TECHNICAL SUPPORT CENTRE.

CODE	ICON	FAULT	INTERVENTION
E22	SERVICE	***PARAMETERS PROGRAMMING REQUEST***	CUT OFF THE POWER SUPPLY FROM THE MAIN SWITCH AND THEN RESTORE IT, AS SOON AS THE ERROR CODE DISAPPEARS, THE BOILER WILL RESTART AUTOMATICALLY. IF THE BLOCK PERSISTS CONTACT THE TECHNICAL SUPPORT CENTRE.
E31	SERVICE	***INCOMPATIBLE REMOTE CONTROL***	CONTACT THE TECHNICAL SUPPORT CENTRE.
E32	SERVICE	***COMMUNICATION ERROR BETWEEN THE BOILER BOARD AND THE MODBUS BOARD***	CONTACT THE TECHNICAL SUPPORT CENTRE.
E35	RESET	***RESIDUAL FLAME***	PRESS THE RESET "Ⓡ" BUTTON ON THE CONTROL PANEL TO RESET THE FAULT, AS SOON AS THE ERROR CODE DISAPPEARS FROM THE DISPLAY, THE BOILER WILL START AUTOMATICALLY.
E40	SERVICE	***SUPPLY VOLTAGE***	CONTACT THE TECHNICAL SUPPORT CENTRE.
E52	SERVICE	***COMMUNICATION FAULT BETWEEN MODBUS CONTROLLER AND MODBUS CONTROL UNIT***	CONTACT THE TECHNICAL SUPPORT CENTRE.

3.1.8. FUNCTIONS CODES

CODE	FUNCTION	INTERVENTION
F08	***H E A T I N G ANTI-FREEZE FUNCTION ACTIVE***	WAIT UNTIL THE OPERATION IS COMPLETED
F33	***SYSTEM AIR RELEASE CYCLE IN PROGRESS***	WAIT UNTIL THE OPERATION IS COMPLETED

3.1.9. MAINTENANCE

To ensure proper boiler safety and efficiency, please contact RADIANT technical support network to check the device every year.

An accurate maintenance should improve system management.

3.1.10. EXTERNAL CASING CLEANING

Clean the cover of the device using a wet cloth and come neutral soap.

WARNING

DO NOT use abrasive or powder detergents as they might damage the plastic cover and control elements.

3.1.11. DISPOSAL INFORMATION

The boiler and all its accessories must be disposed of by differentiating them appropriately according to the recycling regulation in force.

The use of the symbol WEEE (Waste Electrical and Electronic Equipment) indicates that this product can not be dismantled as domestic waste. Proper disposal of this product helps preventing potentially negative consequences for the environment and person's health.

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