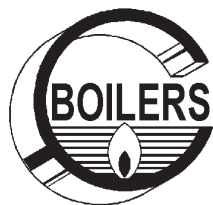
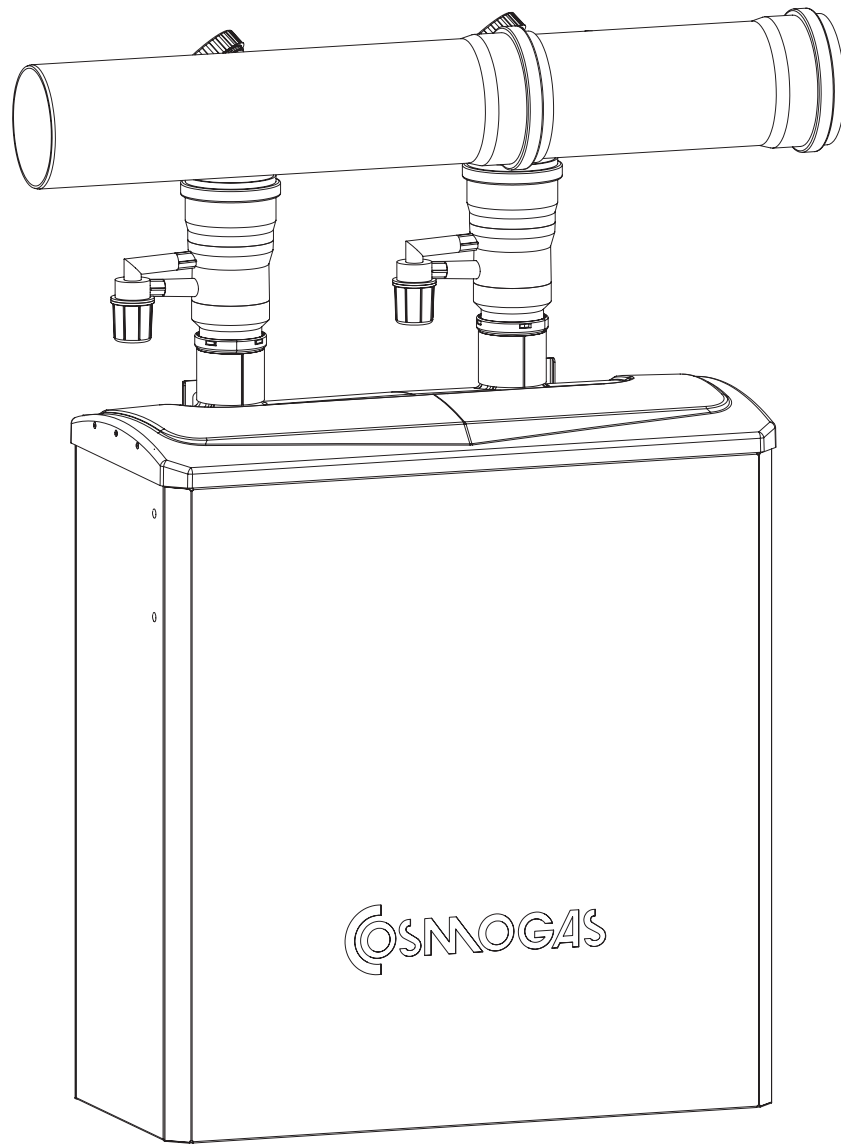


INSTALLATION AND MAINTENANCE MANUAL FOR GAS BOILERS



PLEASE READ THE MANUAL CAREFULLY AS IT CONTAINS IMPORTANT INFORMATION REGARDING SAFETY, INSTALLATION, USE AND MAINTENANCE



**DUALDENS series
models:**

- DUAL 2-34**
- DUAL 4-50**
- DUAL 6-70**
- DUAL 8-90**

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1 - GENERAL SAFETY WARNINGS



If you smell gas

- Close the gas cock.
- Ventilate the room.
- Do not use any electrical appliance, including telephone.
- Immediately call a qualified technician or the gas board from another room or building. Otherwise call the fire brigade.

If you smell combustion gases

- Switch off the appliance.
- Ventilate the room.
- Call a qualified technician.

In the installation room, it is forbidden to use extractor fans, chimneys and any other device that may cause a pressure decrease in the room. Installation, modifications

- ☞ The installation, setting or modification of the gas appliance must be carried out by qualified technicians, in compliance with local and national standards and with the instructions of this manual.
- ☞ Never leave any packaging or replaced parts within the reach of children.
- ☞ Seal the setting devices after each setting.
- ☞ It is compulsory to connect the appliance discharge to a flue gas discharge pipe. Failure to observe this rule may seriously put the safety of individuals and animals at risk.
- ☞ Flue pipes must not be modified in any way.
- ☞ The user, in accordance with these instructions, must keep the appliance in satisfactory running order and ensure reliable and safe operation.
- ☞ The user is responsible for employing a qualified technician to carry out maintenance work on the appliance in compliance with local and national norms and the matters stated in this manual.
- ☞ We highly recommend arranging a regular annual maintenance contract with a qualified technician
- ☞ The manufacturer cannot be held responsible for any damage to people, animals or property caused by incorrect installation or inadequate maintenance.

☞ Before carrying out any cleaning or maintenance operation, disconnect the appliance from the mains by using the specific switches.

☞ Do not obstruct the intake/discharge pipe ends.

Explosive or highly flammable products

Do not store nor use explosive or highly flammable materials such as paper, solvents, paints, etc. in the same room as the appliance

In case of breakdown

In the event of a breakdown and/or malfunctioning of the appliance, disconnect it and do not attempt to repair it in any way whatsoever. Contact only qualified technicians. Should any part be replaced during repair, make sure that only original spare parts are used. Failure to observe the above may compromise the appliance safety.

Qualified technician.

A qualified technician has specific technical skills on components for electrical systems, gas burning systems and for civil heating and hot water production systems for sanitary and hot water use. Such personnel must have the legally required qualifications.

Technical drawings

All drawings included in this manual, relating to the electrical, hydraulic and gas installation systems, are to be considered purely indicative. All safety devices, ancillary parts and electrical, hydraulic and gas pipe diameters must always be checked by a professionally qualified technician, in order to ascertain compliance with the applicable norms and laws.

☞ This manual is an integral and essential part of the product and must be kept with care by the user, for any future consultation. Ensure that this manual is handed over to the new owners and/or installer if the appliance is to be transferred or moved for any reason whatsoever.

☞ Any kit or option added subsequently must be original Cosmogas spares.

☞ This appliance must only be used for the purpose it has been expressly designed for: heating water for closed circuits meant for public and private places central heating, sanitary and domestic hot water production for civil use

☞ The manufacturer cannot be held contractually or otherwise responsible for any damage caused by incorrect installation or use and for failure to comply with the manufacturer's instructions or applicable local and national legislation.

☞ For safety reasons and to safeguard the environment, all packaging must be disposed of in special sorted refuse collection centers.

1.1 - National installation laws

- Fire prevention rules issued by the fire brigade.
- Decree D.M. dated 1/12/75
- Decree D.M. dated 22/01/2008 no. 37 (former Law dated 05/03/1990 no. 46)
- Law dated 09/01/91 no. 10
- Presidential Decree dated 26/08/93 no. 412
- Decree D.M. dated 12/04/96
- Presidential Decree dated 21/12/99 no. 551
- Legislative decree dated 19/08/05 no. 192
- Legislative decree dated 21/12/06 no. 331
- Standard CEI 64-8

2 - GENERAL INFORMATION

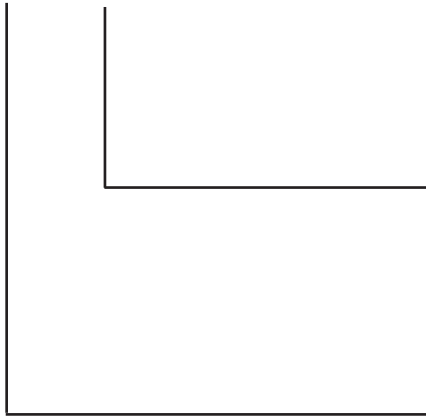
2.1 - Introduction

Congratulations! You have effectively purchased one of the best products on the market. Every single part is proudly designed, built, tested and assembled in the COSMOGAS factory, thus guaranteeing optimum quality control. Thanks to the on-going research carried out by COSMOGAS, this product has been conceived and is

now considered to be the best in its class with regards to environmental protection, as it belongs to class 5 (less polluting) as established by the UNI EN 297 (and EN 483) standard and has a high output, 4 stars as per EC directive 92/42/EEC. Great importance was also given to the end of the appliance life. All components can be easily separated in homogeneous elements, that can be fully recycled.

2.2 - Description of models

DUAL X-XX




2-34 = Boiler with modulating heat input between 2.5 and 28 kW
4-50 = Boiler with modulating heat input between 4.4 and 51 kW
6-70 = Boiler with modulating heat input between 6 and 69.6 kW
8-90 = Boiler with modulating heat input between 8 and 90 kW

Gas condensing boiler, for indoor and outdoor, with sealed chamber and pre-mix burner for central heating.

2.3 - Manufacturer

COSMOGAS srl
Via L. da Vinci 16
47014 - Meldola (FC) Italy
Tel. 0543 498383
Fax. 0543 498393
www.cosmogas.com
info@cosmogas.com

- Symbol indicating activity

 Symbol indicating important information

2.5 - Maintenance

Regular annual maintenance of the appliance is recommended for the following reasons:

- to maintain high performances and manage the heating system efficiently (with low fuel consumption);
- to obtain high operating safety;
- to keep the combustion environmental compatibility level high;

Offer a regular maintenance contract to your customer.

2.6 - Warranty

See chapter 15.

2.4 - Key to symbols used



CAUTION !!!

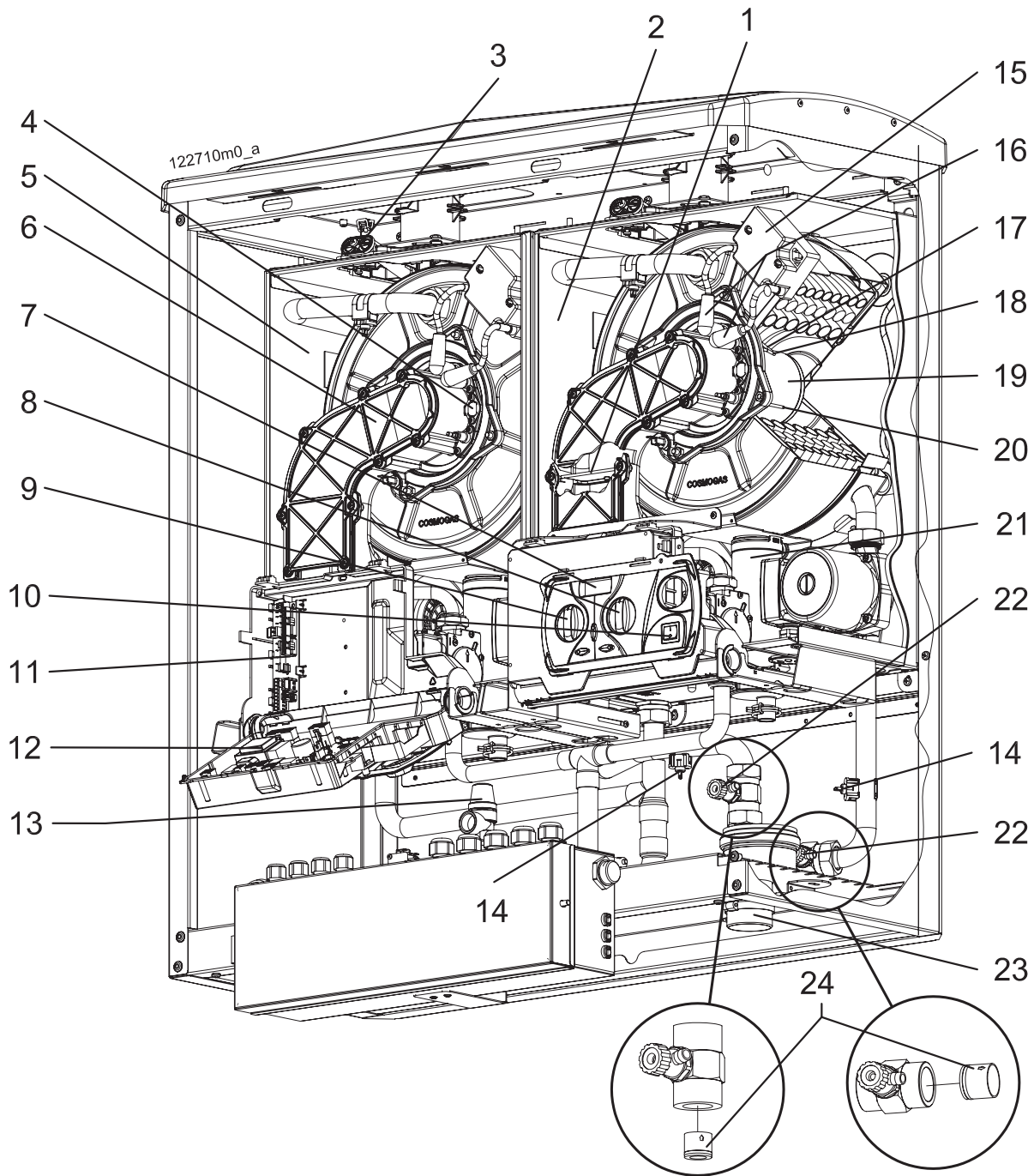
Danger: electric shock failure to observe this warning may compromise the smooth running of the appliance or cause serious damage to individuals, animals or property



General danger !

Failure to observe this warning may compromise the smooth running of the appliance or cause serious damage to individuals, animals or property.

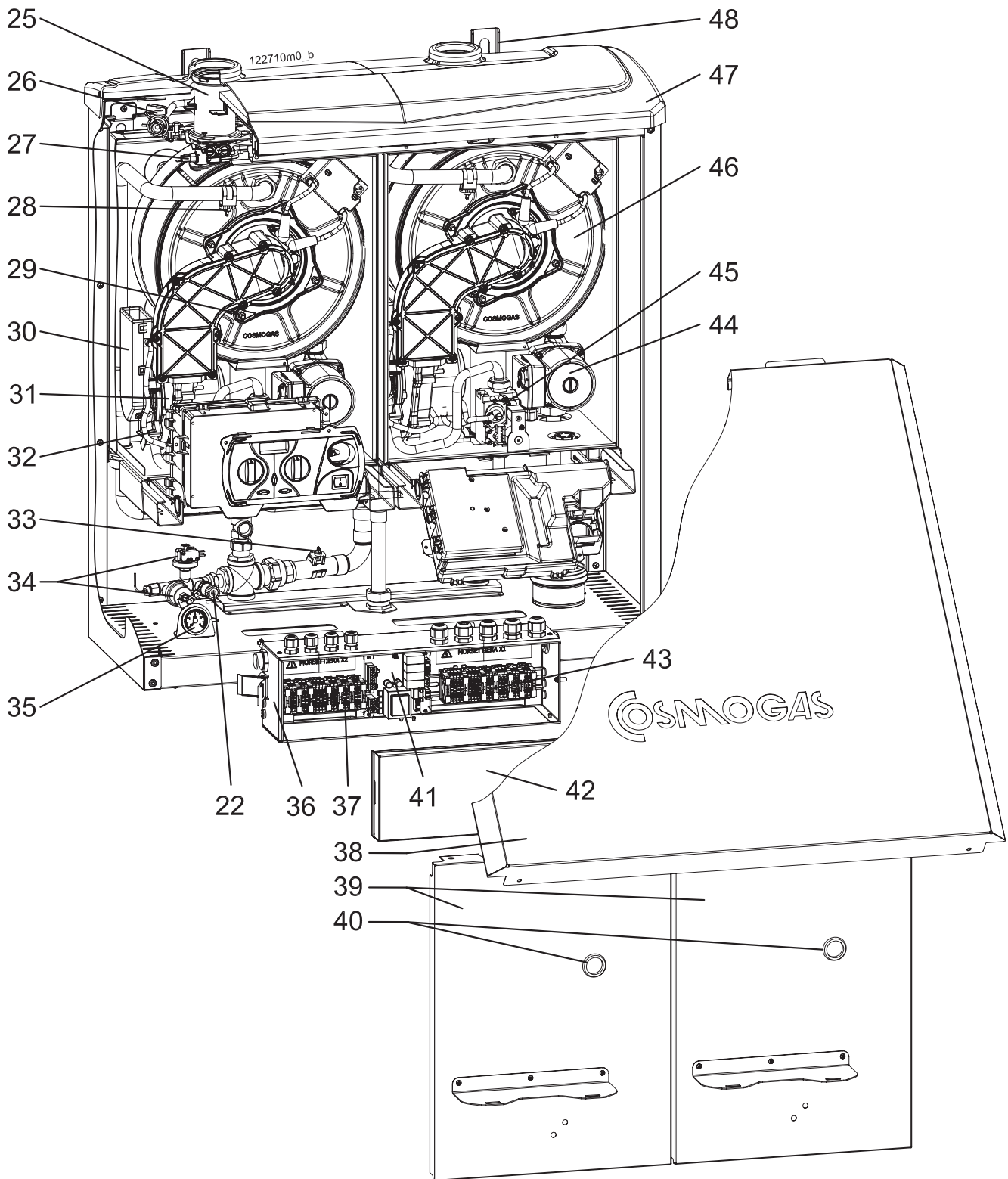
3 - MAIN COMPONENTS



- | | |
|--|-----------------------------------|
| 1 One way flue gas valve | 12 Thermal element control unit |
| 2 MASTER thermal element | 13 Safety valve |
| 3 Combustion connection for analysis | 14 Return temperature sensor (U8) |
| 4 Burner porthole | 15 Spark generator |
| 5 SLAVE thermal element | 16 Start-up cables |
| 6 Air gas collector | 17 Left ignition glow plug |
| 7 Display | 18 Right ignition glow plug |
| 8 Domestic hot water temperature and start knob
(active only on the master) | 19 Burner |
| 9 Heating temperature and start knob
(active only on the master) | 20 Detector glow plug |
| 10 Single thermal element switch | 21 Condensation collection trap |
| 11 Thermal element wiring board | 22 Boiler drain cock |
| | 23 Condensation discharge pipe |
| | 24 One way valve |

Figure 1 - Boiler internal components

3 - MAIN COMPONENTS



- 25 Flue gas discharge connection
- 26 Thermal element manual air discharge
- 27 Flue gas safety sensor (U7)
- 28 Thermal element heating supply sensor (U1)
- 29 Heating safety sensor (U6)
- 30 Air collector
- 31 Blower
- 32 Air gas mixer cock
- 33 Boiler supply sensor (U2)
- 34 Pressure switch
- 35 Water gauge
- 36 Connection electrical panel

- 37 24 V connection terminal board
- 38 Cabinet cover
- 39 Sealed chamber closure
- 40 Burner sealed chamber porthole
- 41 Cascade control board
- 42 Connection panel cover
- 43 230 V connection terminal board
- 44 Circulating pump
- 45 Gas solenoid valve
- 46 Heat exchanger
- 47 Upper cover
- 48 Support brackets

Figure 1 - Boiler internal components

4.1 - Function and intended use of the appliance

This product is a gas condensing appliance for central heating production. If properly connected to a water heater (see fig. 9 and 10), it can also be used for civil use domestic hot water production.

Fit the boiler to the heating system by choosing to the most suitable characteristic residual curve head (see fig. 3, 4, 5 and 6).

4.1.1 - Hydraulic separator

If the system is to be subject to a water flow higher than that suppliable by the pump, it is necessary to place an hydraulic separator between the boiler and the system (see figures 8 and 9, detail "20").

4.1.2 - Connection in series

Boilers can be connected also in series according to the scheme shown in figure 10.

4.1.3 - Domestic hot water production

In order to produce domestic hot water, it is necessary to connect a water heater following one of the schemes shown in figures 9 and 10.

To set the domestic water temperature, follow the procedure in section 7.5.

4.1.4 - System types

According to the model, it is possible to create the following system types:

With this boiler we can create a system for central heating only (see figures 7 and 8) or a system for central heating and domestic hot water production (see figures 9 and 10). In both cases, the central heating system can be high or low temperature (see section 5.8 on how to set the boiler).

4.1.5-ON/OFF remote control

This boiler can be connected to remote systems for heating supply temperature setting.

Moreover, in order to improve the heating service quality, the boiler is equipped with an external temperature sensor (see section 5.14.4) to adjust the supply temperature automatically, according to the external one; in this case, the room thermostat can perform either an ON/OFF or a two-step type room temperature compensation.

For further information on the Climatic thermoregulation, please refer to section 7.8.

4.2 - Installation precautions

In order to guarantee the proper operation of the appliance, observe the following indications:

- ☞ It must be connected to a heating system and possibly to a domestic hot water mains system, compatibly with the appliance specifications, performance and power rating.
- ☞ Before installation, thoroughly flush the heating system, and the plumbing one if necessary, in order to remove any residue or impurity which might compromise the smooth running of the boiler.
- ☞ This appliance can be installed indoor or outdoor, in a place where it is partly protected from rain, snow and hail, such as balconies, porches etc. (see figure 15 for an example).
- ☞ Refer to figure 11 for minimum clearance distances for installation and future maintenance.



CAUTION !!!

Do not expose the appliance to external temperatures below 0°C. It can be exposed to temperatures down to - 10°C if properly running.

4 - OPERATION

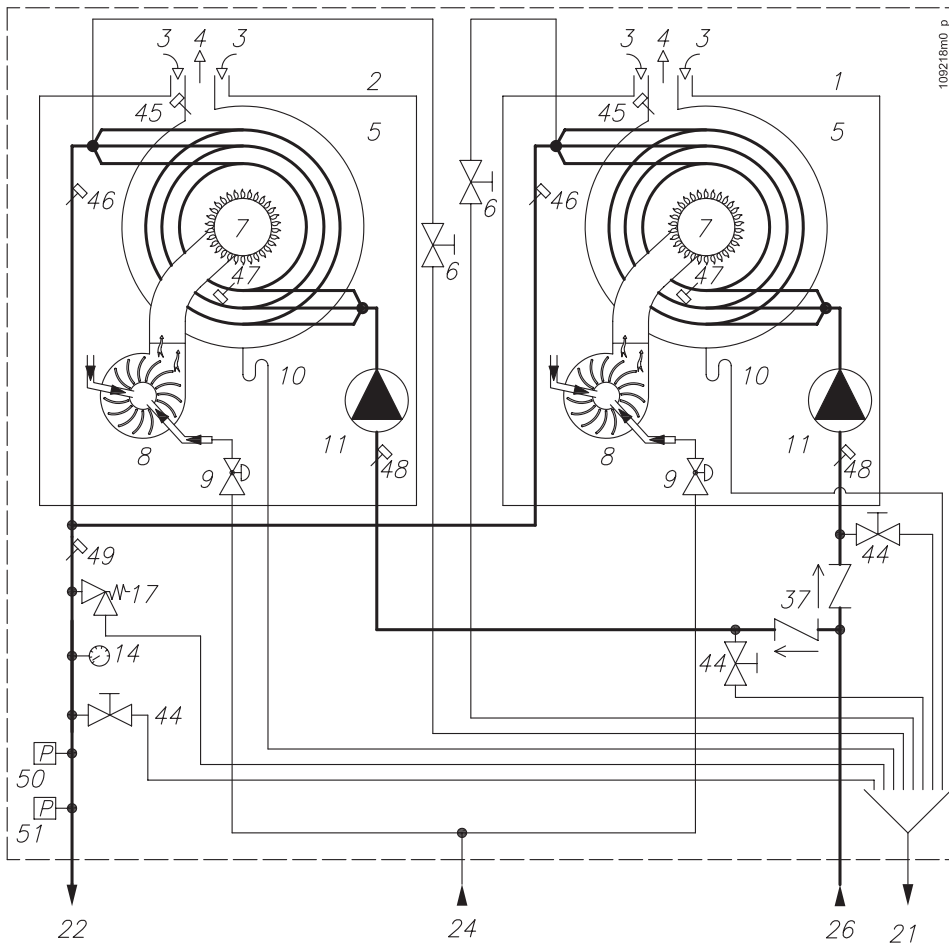


Figure 2 - DUALDENS hydraulic diagram

Key:

- 1 - MASTER element
- 2 - SLAVE element
- 3 - Comburent air intake
- 4 - Flue gas discharge
- 5 - Sealed chamber
- 6 - Manual outlet valve
- 7 - Burner
- 8 - Fan
- 9 - Gas valve
- 10 - Condensation collection trap
- 11 - Pump
- 14 - Pressure gauge
- 17 - Safety valve
- 21 - Condensation discharge
- 22 - Heating circuit supply
- 24 - Gas supply
- 26 - Heating circuit return
- 37 - Check valve
- 44 - Drain cock
- 45 - Flue gas sensor (U7)
- 46 - Thermal element supply temperature sensor (U1)
- 47 - Safety temperature sensor (U6)
- 48 - Return temperature sensor (U8)
- 49 - Boiler supply temperature sensor (U2)
- 50 - MASTER module pressure switch
- 51 - SLAVE module pressure switch

4 - OPERATION

4.3 - Characteristic curves of the heating system residual head

The residual head on the boiler connections, is indicated in the graphs in figures 3, 4, 5 e 6 for the different flow rates.

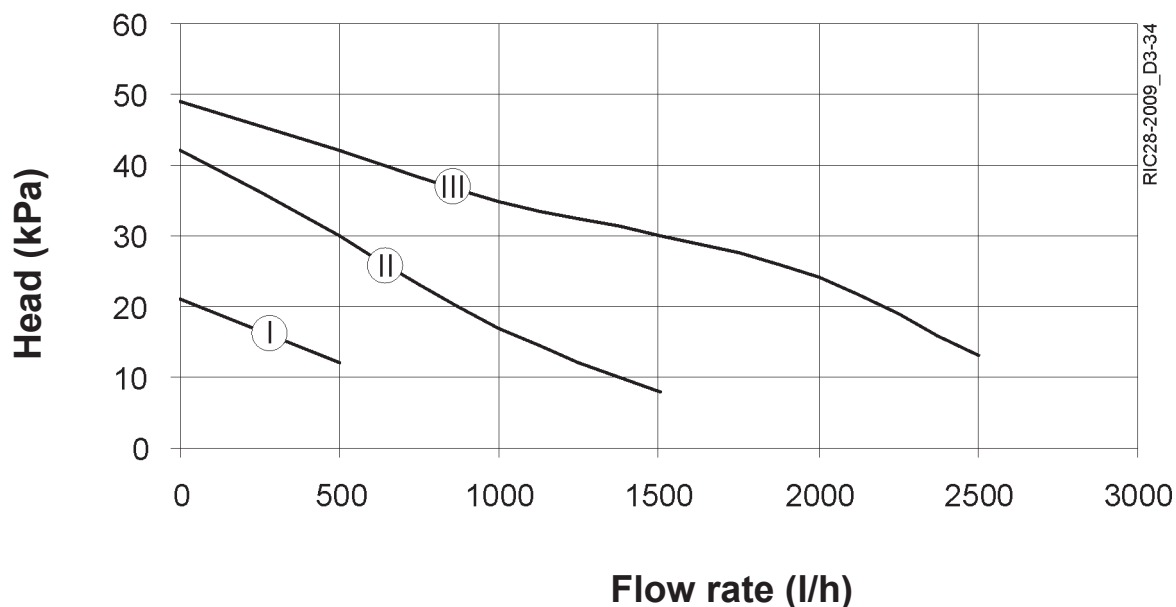


Figure 3 - Diagram of the system residual head for model DUAL 2-34 (the three curves correspond to the three circulator speeds)

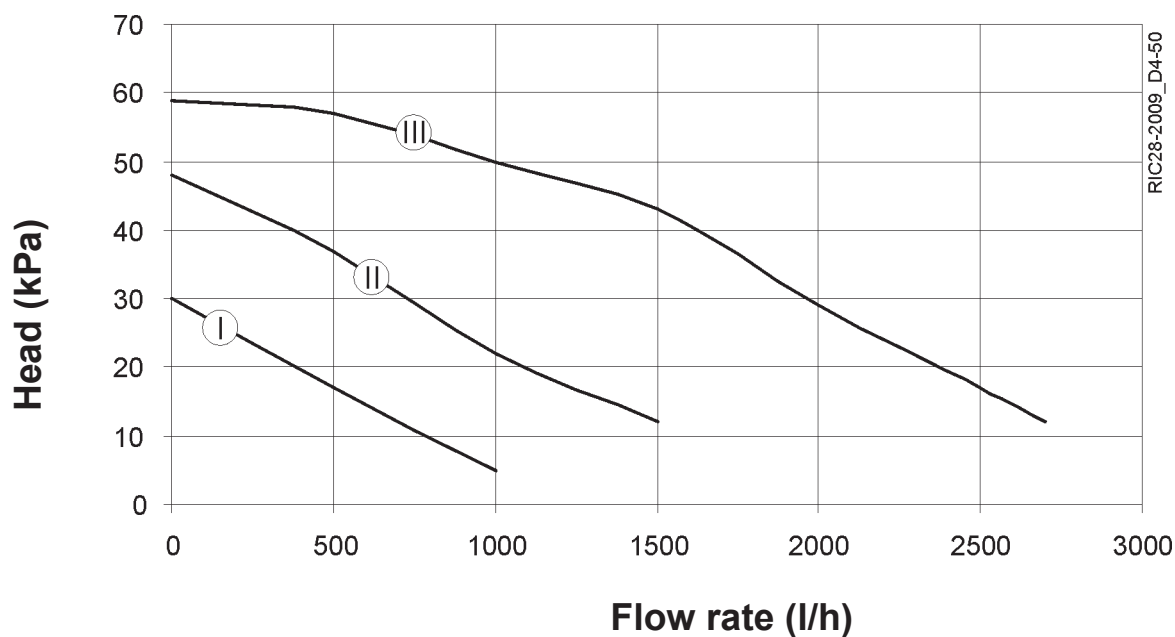


Figure 4 - Diagram of the system residual head for model DUAL 4-50 (the three curves correspond to the three circulator speeds)

4 - OPERATION

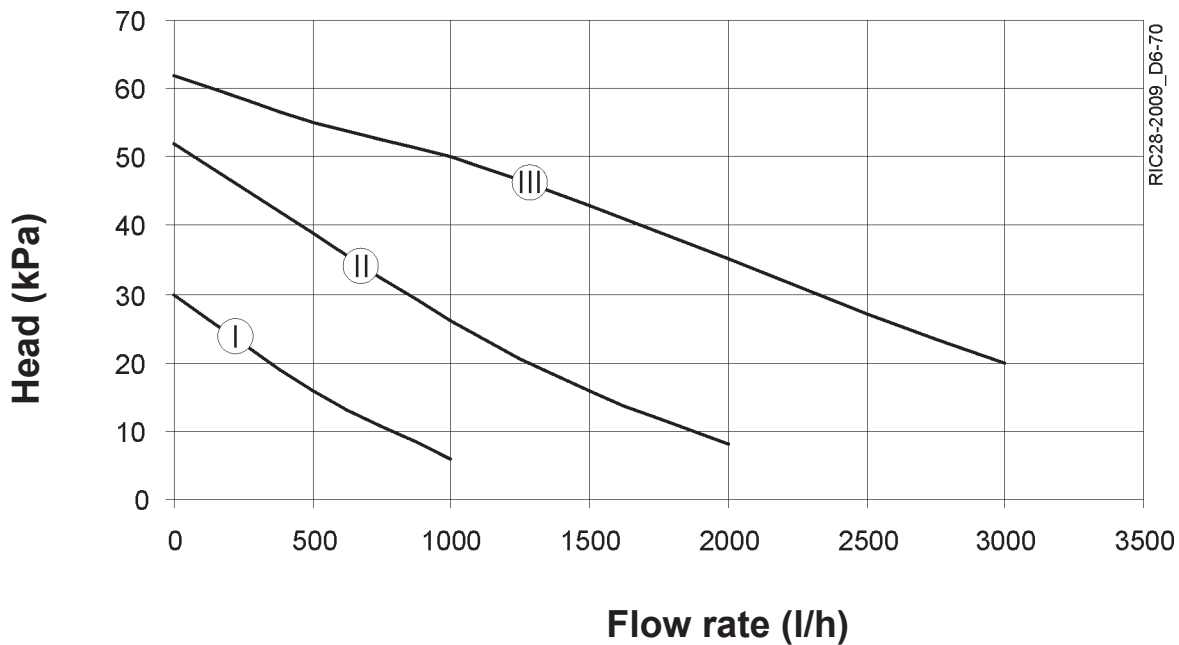


Figure 5 - Diagram of the system residual head for model DUAL 6-70 (the three curves correspond to the three circulator speeds)

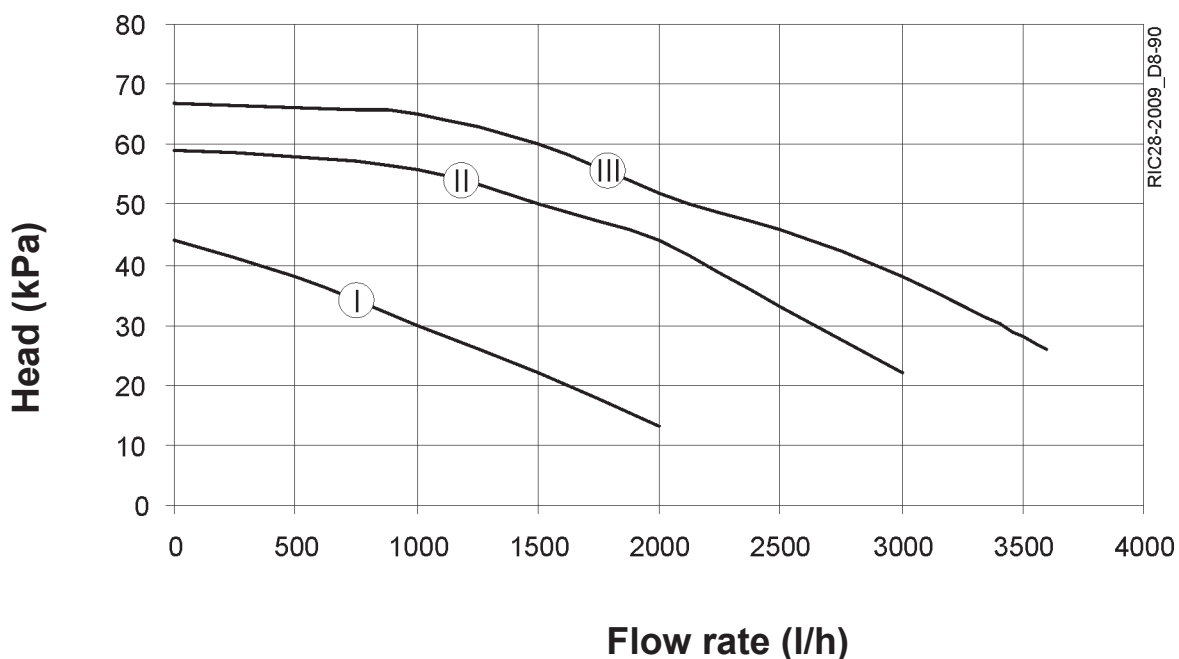


Figure 6 - Diagram of the system residual head for boiler DUAL 8-90 (the three curves correspond to the three circulator speeds)

4 - OPERATION

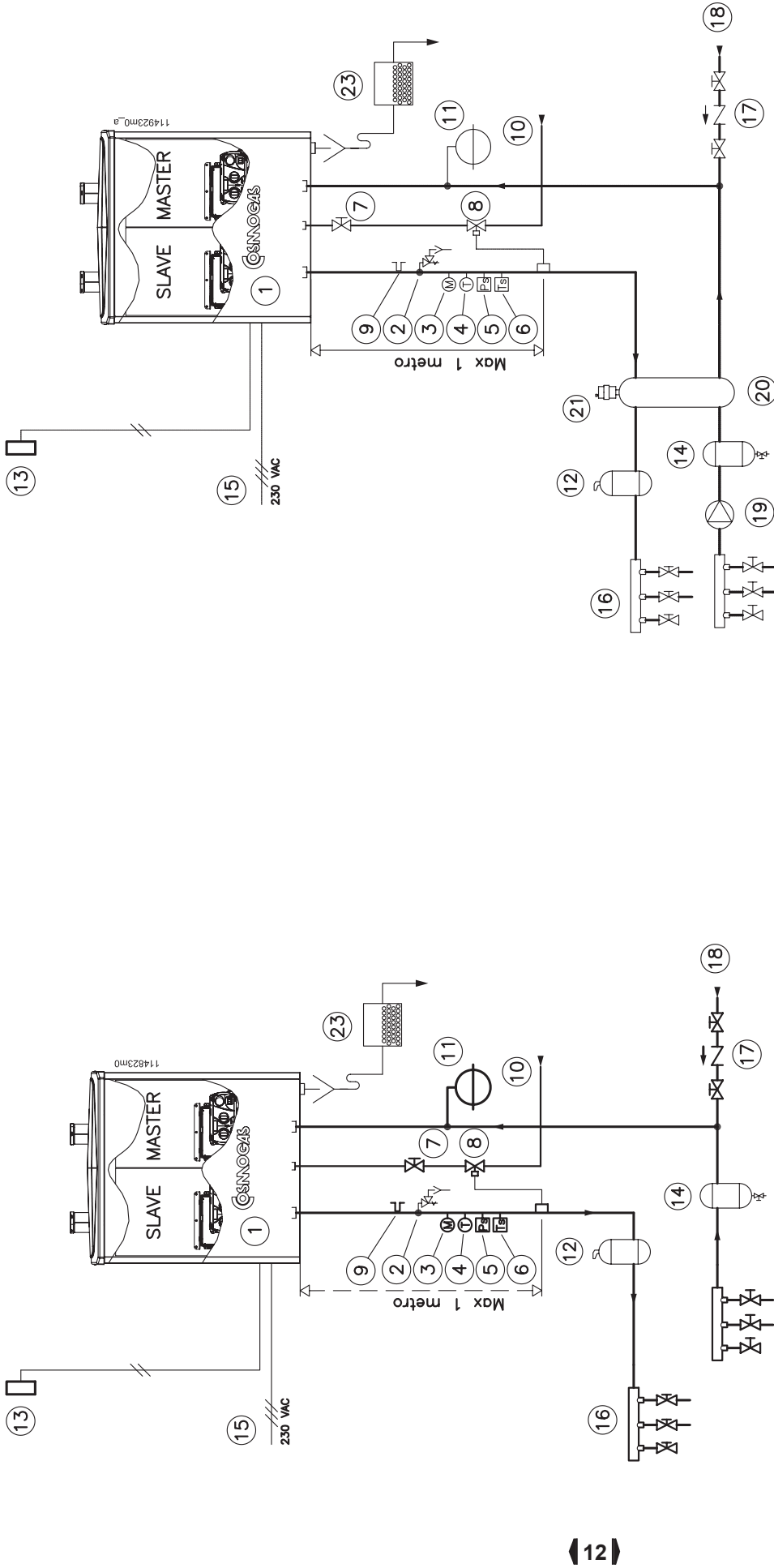


Figure 7 - Example of basic connection diagram

KEY Figures 7 and 8

- 1 DUALDENS series boiler
- 2 ISPEL safety valve
- 3 ISPEL pressure gauge
- 4 ISPEL thermometer
- 5 ISPEL safety pressure switch
- 6 ISPEL safety thermostat
- 7 Gas cock
- 8 ISPEL gas shut-off valve
- 9 ISPEL socket
- 10 Gas inlet
- 11 Expansion tank
- 12 Micro-bubble separator

Figure 8 - Example of connection diagram with hydraulic separator

- 13 External probe
- 14 Filter
- 15 Power supply
- 16 Low or high temperature thermal system
- 17 System water supply
- 18 Domestic cold water
- 19 Heating circuit pump
- 20 Hydraulic disconnecter
- 22 Air outlet valve
- 23 Condensation neutralizer

4 - OPERATION

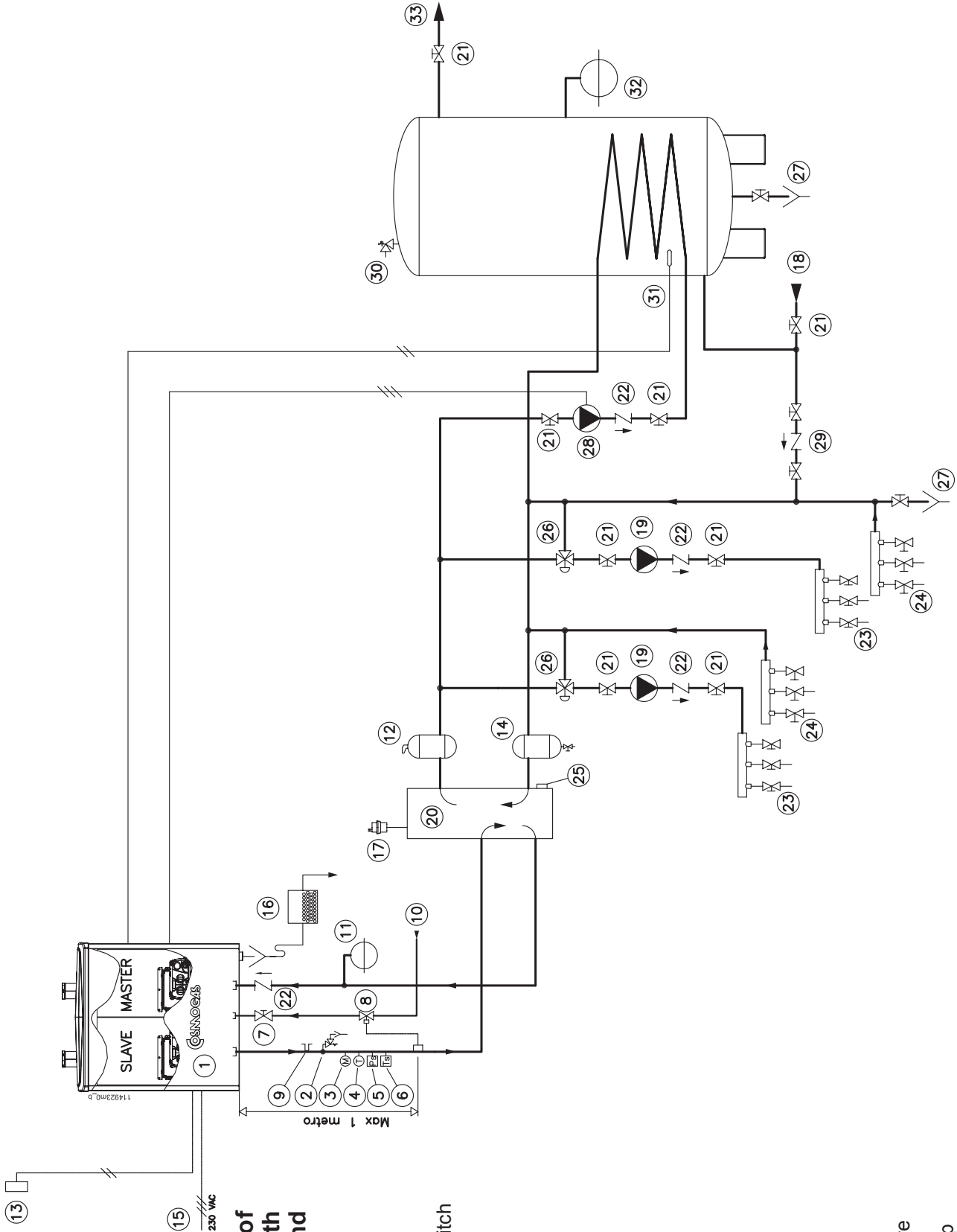


Figure 9 - Example of connection diagram with hydraulic separator and water heater

- 1 DUALDENS series boiler
- 2 ISPESEL safety valve
- 3 ISPESEL pressure gauge
- 4 ISPESEL thermometer
- 5 ISPESEL safety pressure switch
- 6 ISPESEL safety thermostat
- 7 Gas cock
- 8 ISPESEL gas shut-off valve
- 9 ISPESEL socket
- 10 Gas inlet
- 11 Expansion tank
- 12 Micro-bubble separator
- 13 External probe
- 14 Filter
- 15 Power supply
- 16 Condensation neutralizer
- 17 Air outlet valve
- 18 Domestic cold water
- 19 Heating circuit pump
- 20 Hydraulic disconnect
- 21 Shut-off valve
- 22 Check valve
- 23 Heating system supply
- 24 Heating system return
- 25 Sludge discharge cap
- 26 Heating system mixer valve
- 27 System drainage
- 28 Water heater loading pump
- 29 System loading unit
- 30 Water heater safety valve
- 31 Water heater temperature sensor
- 32 Domestic water circuit expansion tank
- 33 Domestic hot water outlet

4 - OPERATION

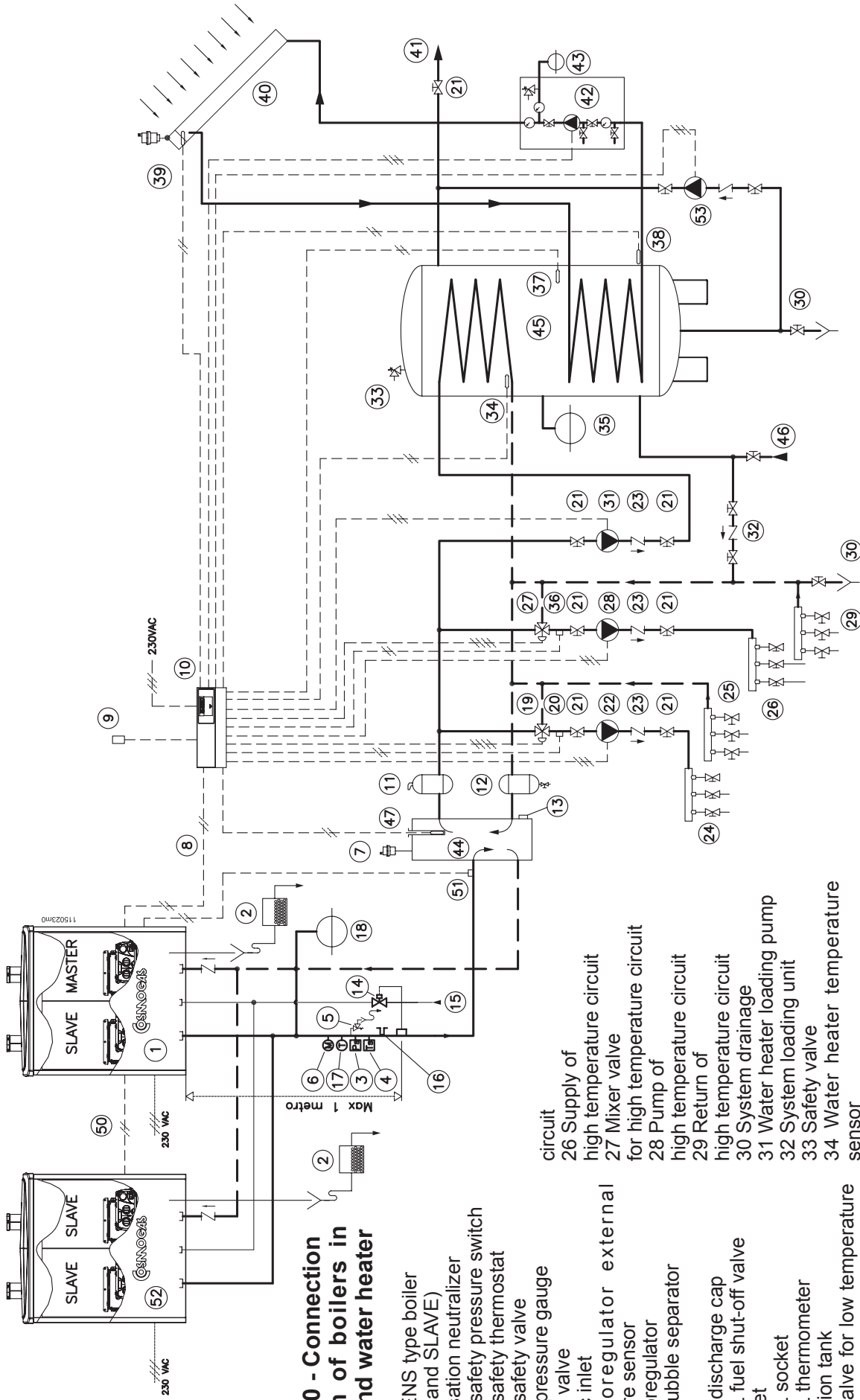


Figure 10 - Connection diagram of boilers in series and water heater

- 1 DUALDENS type boiler (MASTER and SLAVE)
- 2 Condensation neutralizer
- 3 ISPESEL safety pressure switch
- 4 ISPESEL safety thermostat
- 5 ISPESEL safety valve
- 6 ISPESEL pressure gauge
- 7 Air outlet valve
- 8 0-10 Vdc inlet
- 9 Thermoregulator external temperature sensor
- 10 Thermoregulator
- 11 Micro-bubble separator
- 12 Filter
- 13 Sludge discharge cap
- 14 ISPESEL fuel shut-off valve
- 15 Gas inlet
- 16 ISPESEL socket
- 17 ISPESEL thermometer
- 18 Expansion tank
- 19 Mixer valve for low temperature circuit
- 20 Temperature sensor for low temperature circuit
- 21 Cock
- 22 Pump of low temperature circuit
- 23 Check valve
- 24 Supply of low temperature circuit
- 25 Return of low temperature circuit
- 26 Supply of high temperature circuit
- 27 Mixer valve for high temperature circuit
- 28 Pump of high temperature circuit
- 29 Return of high temperature circuit
- 30 System drainage
- 31 Water heater loading pump
- 32 System loading unit
- 33 Safety valve
- 34 Water heater temperature sensor
- 35 Domestic water circuit expansion tank
- 36 Sensor of high temperature circuit
- 37 Water heater temperature sensor
- 38 Return temperature sensor of the solar circuit
- 39 Temperature sensor of the solar panel
- 40 Solar panel
- 41 Domestic hot water outlet
- 42 Safety and loading unit of the solar circuit
- 43 Expansion tank of the solar circuit
- 44 Hydraulic disconnect
- 45 Water heater
- 46 Domestic cold water inlet
- 47 Thermoregulator supply probe
- 50 Communication bus between the two boilers
- 51 MASTER boiler type probe
- 52 DUALDENS type boiler (SLAVE and SLAVE)
- 53 Pump for antilegionella disinfection

5 - INSTALLATION

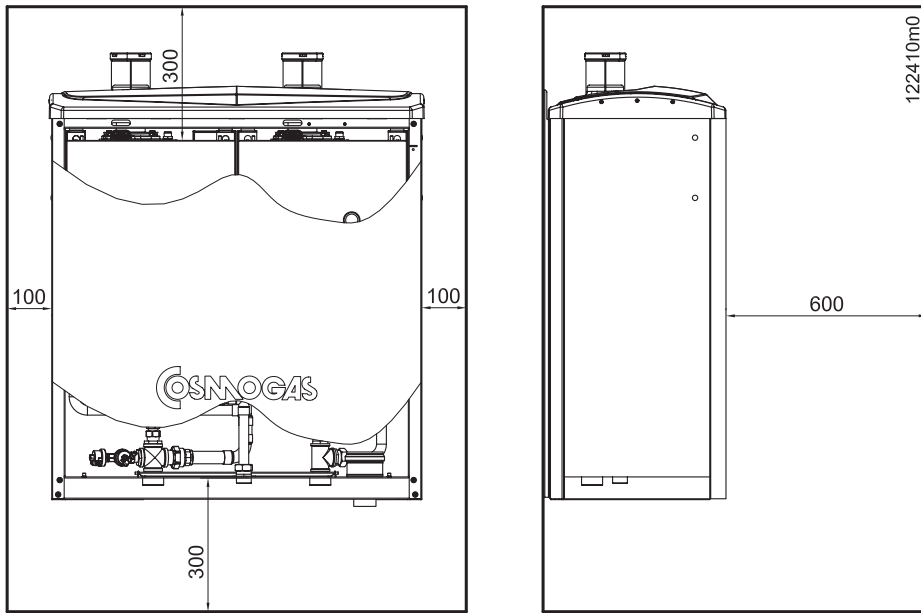


Figure 11 - Minimum clearance distances

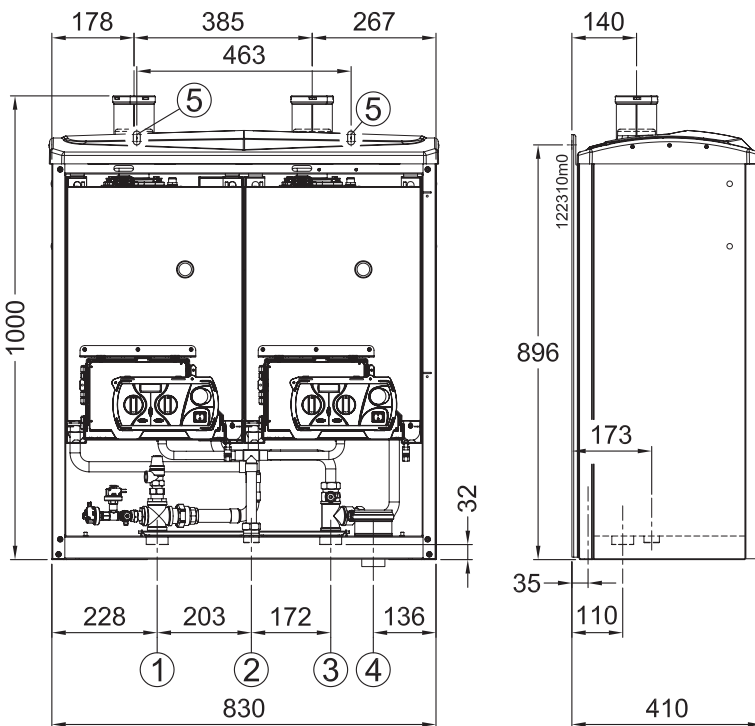
5.1 - Opening the packaging

The appliance is supplied in a cardboard packaging. Open it up following the instructions given on the closing flaps.

5.2 - Dimensions and minimum clearance distances

Leave some free space around the boiler for installation or maintenance operations, as shown in figure 11.

5.3 - Choosing the place of installation



- 1 = 1" 1/2 heating supply pipe
- 2 = 1" gas pipe
- 3 = 1" 1/2 heating return pipe
- 4 = Discharge
- 5 = Support mounts

Figure 12 - Boiler dimensions and connection distances



CAUTION !!! The appliance must always be installed with its own casing. It can be installed indoor or outdoor, in a partly protected place (see figure 15) so that it is not directly exposed to weather agents like rain, hail or snow.



CAUTION !!! If the appliance is installed in a geographic area with high freeze risk, the appliance shall always be running.



CAUTION !!! The boiler must be installed exclusively on a solid, vertical wall, which can bear its weight.

When choosing the room and position for installation, account must be taken of the following factors:

- connection of flue gas discharge pipes;
- connection of gas supply pipe;
- connection to the water mains;
- connection to the central heating system;
- connection to the domestic hot water system;
- electrical connection;
- connection of the discharge for the boiler produced condensation;
- electrical connection to the room thermostat;
- connection of the safety valve discharge;
- connection of the external temperature sensor;
- connection of the various additional safety devices required by the national and local standards (see also section 1.1).

5 - INSTALLATION

5.4 - Supply and return



CAUTION!!! This boiler is supplied with safety valve set at 3.5 bar. Therefore, it shall not be installed with a head greater than 35 m.



CAUTION!!! COSMOGAS cannot be held responsible for any damage caused by incorrect use of additives in the heating system.



CAUTION!!! The system downstream of the appliance must be made with materials resistant to temperatures up to 97°C. Otherwise (e.g. plastic tubings), it will be necessary to fit the boiler with a manual reset device locking the system as it reaches the maximum allowed temperature.

Thoroughly wash out the system, before connecting the heating pipes, to flush out any deposits (hemp, radiator casting residue, etc.) which might damage the appliance. Thorough flushing is also required when replacing an appliance.

Figure 12 illustrates the correct position of the supply and return pipes.

☞ Install a metallic mesh filter on the return pipe to prevent any system residue from returning to the boiler.

☞ Do not use the appliance for adding any type of additive to the system.

5.5 - Water supply

Have the connection to the water mains pressure checked and install a proper pressure reducer if necessary.



CAUTION!!! The connection of the heating system (and thus of the thermal module) to the water mains, shall be done by interposing a device that should prevent back flows into the drinking water system, as required by the current antipollution safety standards.

5.5.1 - Recommendations for the characteristics of the system water

Filling the heating system is an extremely delicate operation that shall never be undervalued, neither in case on mere replacement of the heating generator, nor in case of a new installation. A wrong evaluation of the system water may even damage the system and the thermal module. Systems are rarely perfectly tight so damaging water leaks and oxygen infiltration may occur.

The main parameters negatively affecting the system life are:

- simultaneous presence of different metals (copper, brass, steel and aluminium) causing a galvanic corrosion in aqueous environment.

- The presence of free oxygen, due to air infiltrations on fittings or seals, is a typical corrosion agent, particularly active with temperatures between 50 and 70° C.

- The loss of water, which translates into frequent fill-ups, can provoke both corrosion and incrustations according to the type of water used to fill up. In any case, the amount of water loss (and consequent fill-ups) shall be kept under control, particularly in case of an automatic fill-up system. In this case, we recommend you to install a counter indicating the refilled water quantity.

Natural or water added impurities. Drinking water can often contain even high concentrations of chlorides and sulphates, which can speed up corrosion of metal surfaces. Further undesired components may have been introduced into the system before or during installation (building material, metal chips, sawdust, grease, deposits and dirt whatsoever). Even welding residues may cause corrosion in both new and modified or repaired systems. In old systems designed to work with radiators having very large diameter piping, the huge quantity of water more often leads to the formation of sludge and deposits.

Sludge and incrustations The presence of black deposits (magnetite) shows that there is a limited corrosion but the high specific gravity of this oxide can lead to cloggings that are difficult to remove, especially in hot areas. Incrustations are due to water hardness, i.e. to the presence of calcium and magnesium salts. Calcium, in the form of carbonate, settles on the hottest parts of the system. The magnetite often strengthens incrustations. Iron oxide instead indicates

corrosion due to oxygen (water has a reddish color).

Frequent losses. In case of frequent losses, hydrogen and/or air cumulate on the upper part of the heat exchanger and of the radiators, thus preventing a complete heat exchange. When the galvanic corrosion process starts, the water level in the system decreases and gases cumulate in the upper part of the heat exchanger and in the radiators. Air presence is due to the fact that the system may not be perfectly tight. A slow drop of the system pressure caused by a leakage is often difficult to detect, especially when the leakage is small (in winter, for example, the leakages on the radiators' valves are sometimes not visible because they dry due to the radiator or boiler heat. However, these microleakages let air infiltrate into the system. Microleakages mainly occur on joints and in particular on the circulator suction side (air outlet valves, sealings with o-ring, loading valves). In such cases, in order to prevent damage, the system shall be protected using a proper corrosion inhibitor.

5 - INSTALLATION

5.5.2 - In order to guarantee the correct operation of the system, please make sure that:

- 1) the system is leakage-free or at least that the most evident leakages have been removed;
- 2) in case there is an automatic fill-up system, it has to be fitted with a liter counter in order to know exactly how much water is lost in case of leakage;
- 3) the system filling and fill-ups are made with softened water in order to reduce the global water hardness. Water **shall** also be conditioned in order to keep the pH value within the established threshold and to avoid corrosion;
- 4) the system is equipped with efficient impurities and air removal systems, both in new and replaced systems: filters, micro-impurity separators and micro-bubbles separators;
- 5) Avoid discharging the system water when carrying out ordinary maintenance operations, even if they seem to be trifling quantities: when cleaning the filter, for example, fit the system with proper shut-off valves both upstream and downstream of the filter;
- 6) When you suspect that the system is dirty or particularly clogged, and as you refill it with treated water, always carry out an analysis of the system water before opening the communication between new generator and system. This analysis is meant to assess whether the chemical and physical characteristics of the water require to empty the system completely, to use the water already in the system or to chemically wash the system with mains water and a detergent.

If the analysis of a sample of the water to be used for system loading has the following values:

- $9.6 < \text{pH} < 10.5$ (if the system is in contact with aluminium, the pH value is to be below 8.5)
- $\text{Ca}^{++} + \text{Mg}^{++} : < 0.5^\circ\text{f}$
- $\text{OH} + 1/2 \text{CO}_3 : \text{from } 5 \text{ to } 15^\circ\text{f}$
- $\text{P}_2\text{O}_5 : \text{from } 10 \text{ to } 30 \text{ mg/l}$
- $\text{Na}_2\text{SO}_3 : \text{from } 10 \text{ to } 50 \text{ mg/l}$

then you can continue loading. If the characteristics are different, you should use an inhibitor.

5.5.3 Water treatment in thermal systems for public use

The water treatment in thermal systems for public use must always be carried out, both in case of replacement of the generator and in case of new systems. During the project phase, according to the characteristics of the raw water, all the treatment plants and the chemical conditioning components to obtain water with the following characteristics:

- Aspect: possibly limpid;
- pH: higher than 7 (with radiators with aluminum elements or light alloys, pH must be lower than 8.5);
- Conditioning components: in the concentrations established by the *supplier*.

If the characteristics of the water are not known, the following problems are likely to occur:

1. DEPOSITS

$1^\circ\text{fr} = 10\text{mg/kg CaCO}_3$

$30^\circ\text{fr} = 300 \text{ mg/kg CaCO}_3$

In a system with 1000 liters of water the content of CaCO_3 is 300 g, which will set down on the heat exchanger surface if they are not treated appropriately, because it is the hottest part of the system.

2. CORROSION

Corrosion is normally favored by the presence of oxygen, by contact between different metals or by the presence of chlorides.

3. DEPOSITS

These are insoluble organic and inorganic substances: SLUDGES, PROCESS RESIDUES.

5.6 - Discharge of the thermal circuit

To avoid continuous renewal of water and subsequent oxygen and limestone, it is recommended to limit as much as possible every discharge of the thermal circuit.

5.7 - Expansion tank



CAUTION!!! Fit the system with a properly sized expansion tank, in compliance with the national and local installation standards.

5.8 - Radiant panel-type systems (or low temperature)



CAUTION !!! When installing the boiler in a low temperature system, make sure the switch 6 (SWITCHES) is on ON (see figure 19).

With this setting, the boiler will adjust the supply temperature between 20°C and 45°C . No adjustment carried out from the control panel (not even in climate adjustment mode) will be able to supply water at a temperature of more than 45°C .



CAUTION!!! If the boiler is installed in a radiant panel-type system with plastic piping, precautions must be taken against corrosion caused by water

oxygenation: make sure the system is made with plastic piping having oxygen permeability not greater than 0.1 g/m^3 at 40°C . Should the pipe not meet these characteristics, it is fundamental to isolate the radiant panel circuit from the boiler by means of a plate heat exchanger.

5.9 - Gas



CAUTION!!! It is forbidden to operate the boiler with a gas type different from the stated ones.



CAUTION!!! Check that the gas type and the supply pressure are those required for the boiler.

There are two possible situations:

A - the gas type and the supply pressure match those of the boiler setting. In this case proceed with connections;

B - the gas type and the supply pressure do not match those of the boiler setting. In this case, the boiler shall be converted to the type of gas and the supply pressure matching the available ones.

A special conversion kit is available on request from your salesman or directly from COSMOGAS.

- ☞ Before installation, we recommend thorough flushing of the gas supply pipe;
- ☞ an on-off cock must be installed on the gas supply pipe;
- ☞ to avoid damage to the appliance gas control unit, carry out a leak test at a pressure of no greater than 50 mbar;
- ☞ if testing of the gas system must be carried out at a pressure of more than 50 mbar, use the cock situated immediately upstream from the boiler, to isolate the same from the system.

Figure 12 shows the position of the appliance gas fitting.

The sections of piping making up the gas supply system must always provide sufficient gas to cover the required maximum.

5 - INSTALLATION

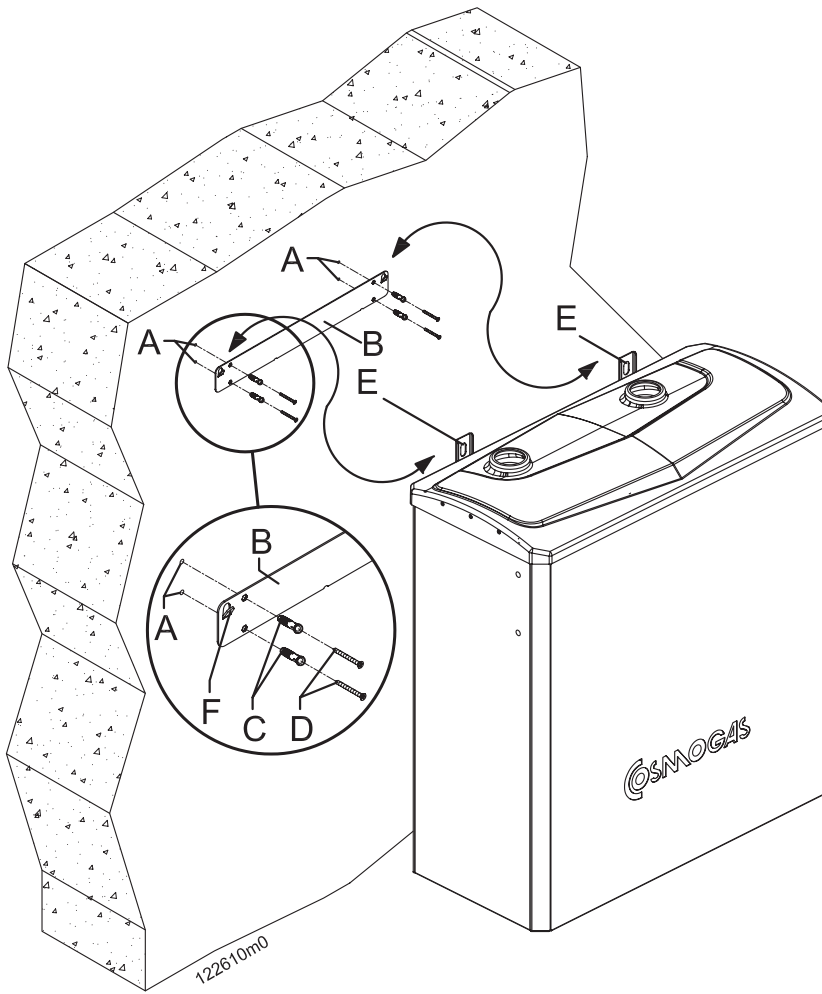


Figure 13 - Support bracket

5.10 - Assembling the appliance

Refer to figure 13:

- ensure that the template is square with the room;
- mark holes for the wall dowel plugs and the hydraulic fittings;
- drill the holes "A" and insert the wall dowel plugs "C";
- secure support bracket "B" by using screws "D";
- Hang the boiler to the hooking "F" by means of the holes "E";
- Make the water connections;

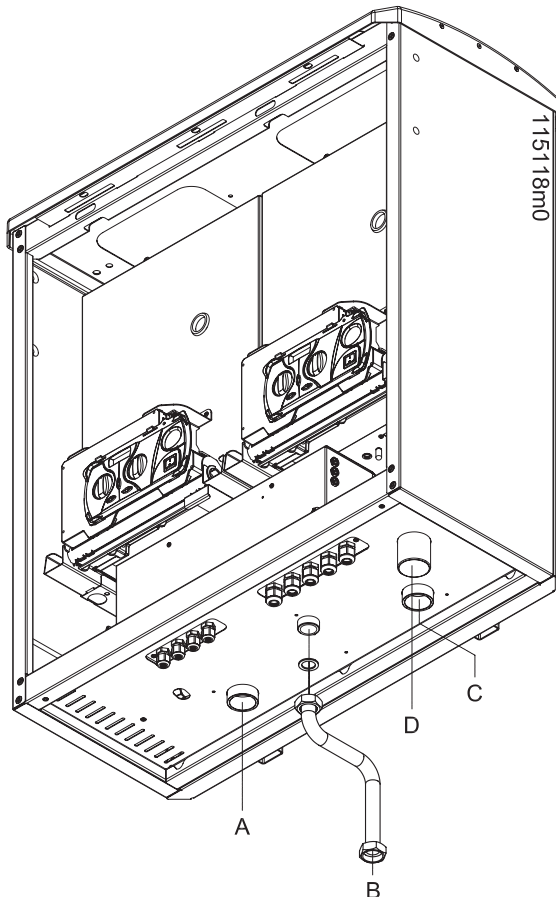


Figure 14 - Gas and water connections

5.11 - Gas and water connections

The standard boiler is supplied with the fittings shown in figure 14, where:

- A = heating supply pipe (1"1/2)
- B = gas fitting (1")
- C = heating return pipe (1"1/2)
- D = condensation discharge (Ø 50)

5 - INSTALLATION

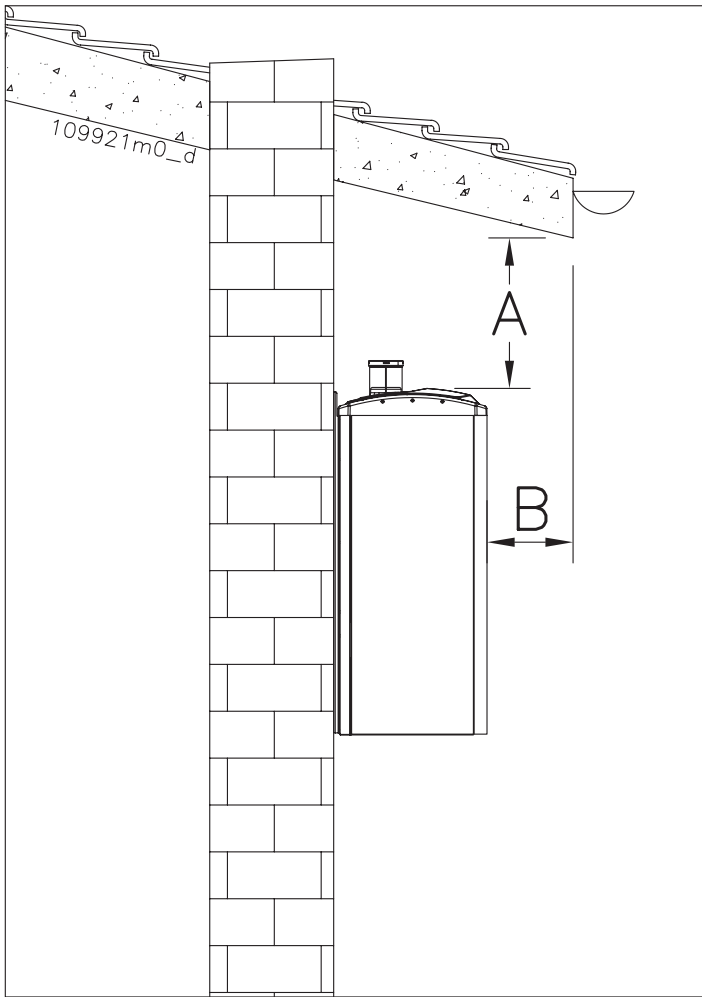


Figure 15 - Example of partly protected place

During installation, distances “A” and “B” shall be calculated in order to prevent rain from reaching the boiler.

5.12 - Condensation discharge

The boiler is fitted with a trap for condensation removal (see figure 1 detail 21) and combustion residues release prevention, whose end corresponds to pipe “D” shown in figure 14. This end must be conveyed into another odor trap to prevent smells from returning to the room. In particular, the condensation drainage system must:

- ☞ for residential rooms and office rooms with more than 10 users, it can be connected to the domestic drainage system by means of a special trap with separation meant to prevent system pressurization (trap ready inside the boiler) and the return of sewer smells (external trap). If the office room has less than 10 users, install a condensation neutralizer before the system connection to the domestic drainage (check condensation acidity value and quantity in chapter 9).
- ☞ be made with a proper diameter pipe;
- ☞ be installed so as to avoid fluid freezing. Outdoor sections should therefore be checked; discharge into gutters or downpipes is forbidden;
- ☞ slope continuously towards the point of discharge; avoid high points that may put the piping under pressure;

5.13 - Safety valve

The thermal module is protected against overpressure, by a safety relief valve set at 3.5 bar (see figure 1, detail “13”).

The safety relief valve is connected to the condensation discharge.

An additional safety valve, properly sized, can be required by enforced national and/or local regulations (see figures 7, 8 and 9, detail 2).

5 - INSTALLATION

5.14 - Electrical connections: General information



CAUTION!!! The appliance is only electrically safe when it is correctly connected to an efficiently earthed system, carried out in compliance with current safety standards.

This is an essential safety requirement which must be checked. If in doubt, have the electrical system thoroughly checked by a qualified technician.

- ☞ Have a qualified technician check that the electrical system is appropriate for the electric power, indicated on the rating plate, required by the appliance.
- ☞ The appliance must be connected to the power supply by means of a mobile plug; use of adapters, multiple plugs, extensions etc. is not allowed.
- ☞ The appliance must be connected to the power supply by means of a three-pole electrical cable with double insulation, a minimum section of 1.5 mm² and resistant to a minimum temperature of 70°C (feature T).
- ☞ To connect to the power supply, use a bipolar switch with a contact opening distance of at least 3mm in compliance with current standards on the subject.
- ☞ Respect the polarity between phase and neutral when connecting the appliance.
- ☞ Make sure the heating and water piping is not used as earth plates for the electric or telephone system. This piping is completely unsuitable for this purpose and, in addition, could rapidly lead to serious corrosion damage to the boiler, piping and radiators.



CAUTION !!! The boiler has no protection against lightning strikes.

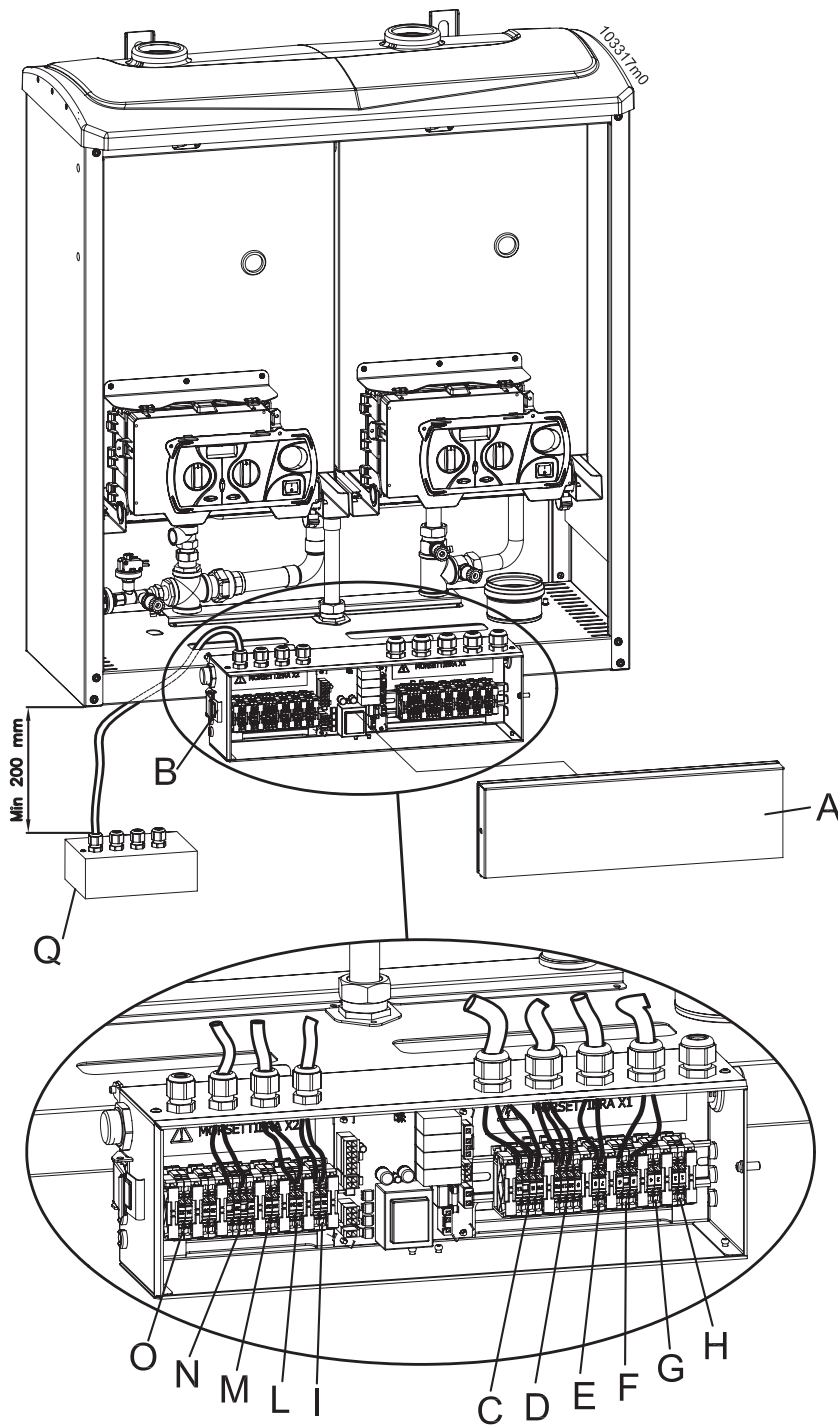


Figure 16 - Electrical connections

- A = Connection panel cover
- B = Cover closing laces
- C = Main power supply
- D = Water heater-pump connection
- E = ISPEL safety thermostat connection
- F = ISPEL pressure switch connection
- G = Function contact
- H = Warning contact
- L = External probe
- M = Room thermostat
- I = Water heater probe
- N = Bus
- O = Analogical inlet 0-10 vdc

5 - INSTALLATION

5.14.1 - Connecting the power supply cable

To connect the remote control cable to the power supply, proceed as follows (refer to figure 16):

- use a three-pole cable with double insulation and a minimum section of 1.5 mm²;
- disassemble the boiler casing following the instructions in section 8.3 and access the electrical terminal board;
- lay the power cable "C" as shown in figure 16;
- strip the cable being careful to leave

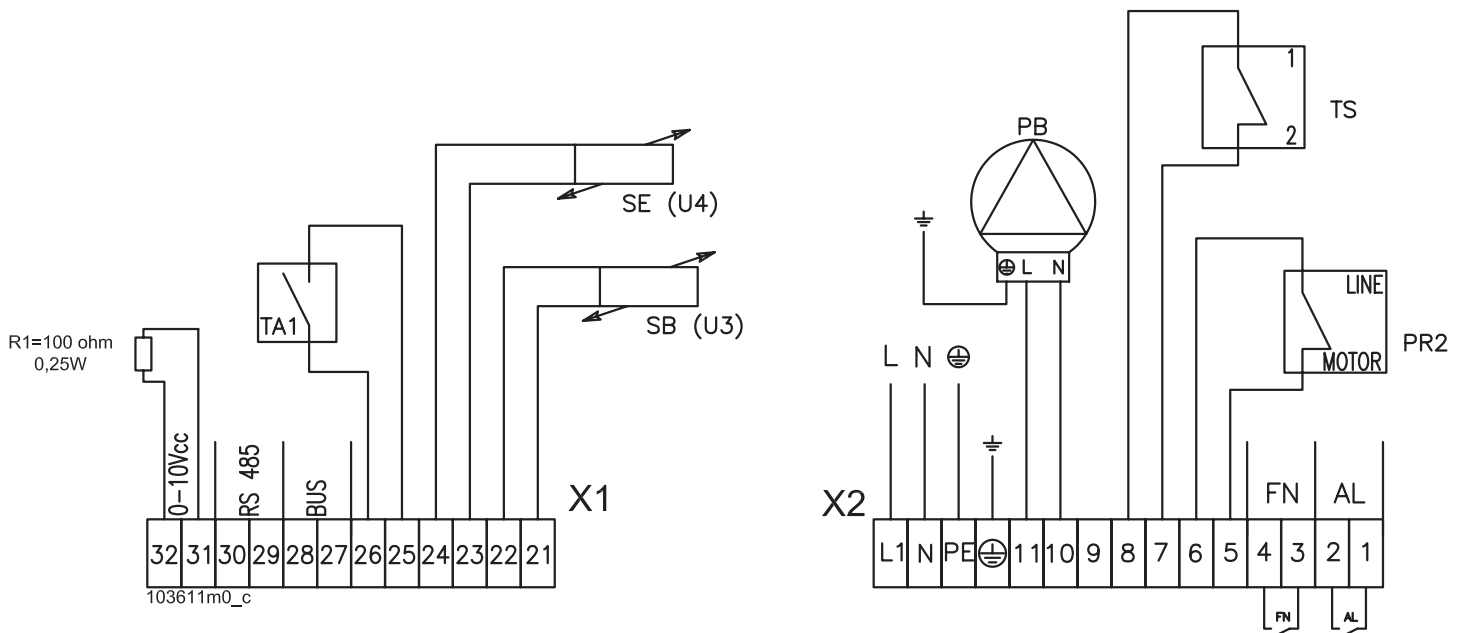
- the earth wire (yellow green) 20 mm longer than the other 2;
- connect the yellow green cable to the earth terminal;
- connect the brown cable to terminal L1;
- connect the blue cable to terminal N;



CAUTION !!! Should the phase conductor "L1" be inverted with the neutral conductor "N", the boiler will be locked-out (E21).



CAUTION !!! If the system grounding is not efficient the boiler will be locked-out (E23).



AL = Output for warning signal: it activates each time that a thermal element is locked out or shows an error;
 FN = Output for warning signal: it activates each time that a thermal element has the burner on;
 PR2 = ISPEL safety pressure switch
 TS = ISPEL safety thermostat
 PB = Boiler pump
 N and L = Power supply to the thermal module

X1 = 230Vac Terminal board
 X2 = Very low safety voltage terminal board
 SB (U3) = Boiler temperature sensor
 SE (U4) = External temperature sensor
 TA1 = Room temperature thermostat contact
 BUS = PC or remote control input
 RS 485 = Data input (not available)
 0-10Vcc = Analogical signal input 0-10Vcc

Figure 17 - Electrical connections

5 - INSTALLATION

5.14.2 - Choosing the room thermostat/time-programmable thermostat

The boiler is designed to work with any room or time-programmable thermostat having contacts for the boiler cable connections and the following features:

- open/closed (ON/OFF);
- clean (not powered);
- closed when heating is required;
- electrical specifications 24Vac, 1A.

5.14.3 - Connecting the room thermostat/time-programmable thermostat

Install the room thermostat in a part of the house where the temperature is as near to average room temperature as possible and **not** in an area subject to sudden temperature changes, away from outside windows or doors (see figure 18).

To connect the room thermostat cable, proceed as follows (refer to figure 16):

- use a bipolar electrical cable with a minimum section of 1.5 mm² which leads from the boiler to the room thermostat/time-programmable thermostat. Maximum allowed

length is 20 m; For longer lengths, up to 100 m, it is necessary to use a shielded cable with an earthed shield.

- disassemble the boiler casing following the instructions in section 8.3 and access the interior part of the electrical box;
- get the cable to pass via a free cable clamp, not used by other wires;
- strip the cable;
- connect the 2 cable ends to the "TA" terminals (see figure 16).



CAUTION!!!

Since the cables of the room thermostat/time-programmable thermostat are subject to extremely low safety voltage (24Vcc), they must run through ducts different from the 230Vac power supply cables.

5.14.4 - External temperature sensor connection

Install the external temperature sensor outside the house, on a wall facing NORTH or NORTH-EST, at a height of between 2 and 2.5 meters from the ground; on buildings with several floors, install near the upper half of the second floor. Do not install the sensor above doors, windows or ventilation outlets nor directly under balconies or gutter pipes. Do not plaster the external temperature sensor. Do not install the sensor on walls without overhangs, or not protected from rain.

If the sensor is installed on a wall still to be plastered, it is necessary to install it with an adequate shim or remove it before plastering.

To connect the cable of the external temperature sensor, proceed as follows:

- lay a bipolar electrical cable with a minimum section of 1.5mm² which leads from the boiler to the external temperature sensor. Maximum allowed length is 20 m; For longer lengths, up to 100 m, it is necessary to use a shielded cable with an earthed shield.



CAUTION!!!

Since the cables are subject to an extremely low safety voltage (24Vcc), they must run through ducts different from the 230Vac power supply cables.

- connect the bipolar cable to the terminals "L" shown in figure 16;
- connect the bipolar cable to the ends of the external temperature sensor.

Set the boiler so that it detects the external temperature sensor, as follows:

- press down the button for 12 seconds

Reset

until the display flashes and shows; **U I**;

- then press and release the button several times **Reset** until the following parameter appears **CH**;

- using buttons **+** and **-** change the parameter value **CH** from 00 to 01 or 02 according to the desired type of climate thermoregulation (see chapter 7.8);

- press button **Reset** repeatedly until exiting the menu, as shown by the flashing of the display.

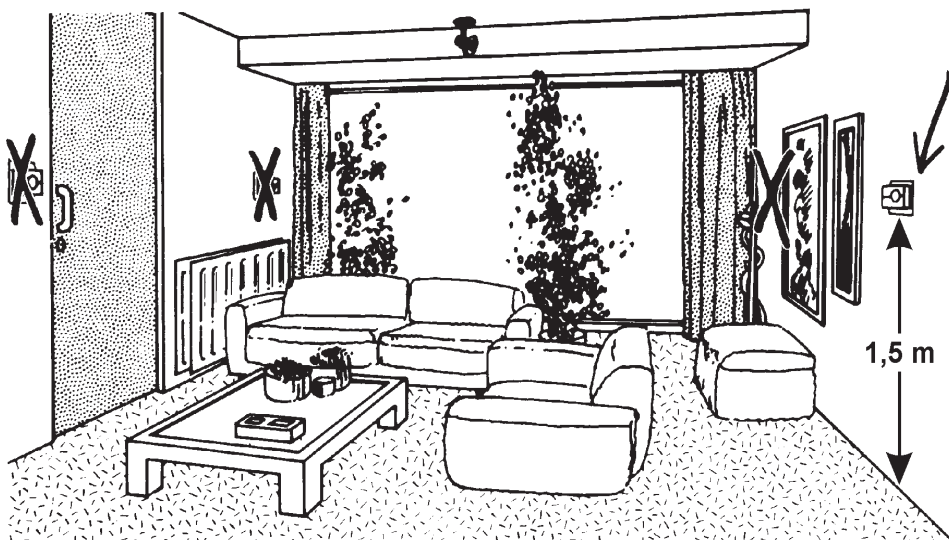


Figure 18 - Correct positioning of the room thermostat/time-programmable thermostat

5 - INSTALLATION

5.14.5 - Remote control 62101051 (on request)

The 62101051 remote control is a device which can control remotely the setting commands of the heating and domestic water of the MASTER thermal element.

Once the remote control is connected, all operations to set the temperature of the heating and domestic hot water, should be carried out directly on it, as specified in Chapter 7.4.

To connect the remote control cable, proceed as follows (refer to figure 23):

- use a bipolar electrical cable with a minimum section of 1.5. mm² which leads from the thermal boiler to the remote control. The cable must be shielded with an earthed shield on the side of the thermal module. The maximum length permitted is 100 m;
- disassemble the boiler casing and access the electrical terminal board, following the instructions in section 8.3;
- connect the 2 ends of the cable to terminals 27 and 28 of the terminal board X2 (see figure 16, detail N).
- connect the other two ends of the cable to terminals 3 and 4 of the remote control.



CAUTION!!!

Since the remote control cables are subject to extremely low safety voltage (24Vcc), they must run through ducts different from the 230Vac power supply cables.

5 . 1 4 . 6 - Communication among thermal elements

Thermal elements (called SLAVE) are controlled by the MASTER thermal element, via data connection (BUS). When a SLAVE thermal element, for whatever reason, loses communication with the MASTER thermal element, after 15 minutes an error occurs and its display shows A 02.

5.14.7 - External thermal controller

For better management and rational use of energy, the Combidens thermal module can be controlled by any external temperature controller (see fig. 10, detail "10") with 0-10Vdc analog output. By connecting the output terminals "31" and "32" of the terminal board X2 as shown in Figure 16, detail "O" (follow polarity), the Combidens thermal module is self regulated according to the demand generated by the thermal controller.

NOTE - A 100 ohm 0.25W electrical resistance is connected to terminal "31" and "32", which is to be cut off to enable the 0-10Vdc connection

Settings for the 0-10Vdc signal transmission coming from the thermal controller are simple. These are:

- 0 - 2 Vdc voltage; the thermal module is not connected to the thermal controller and it keeps working in an autonomous way;
- 2 to 3 Vdc voltage; for the thermal module it is the stand-by control, i.e. no heating request from the thermal controller. The thermal module is connected to communication with the thermal control. The controls on the MASTER thermal element instrument panel are disabled automatically;
- 3 to 10Vdc voltage; the thermal module causes the variation of the supply temperature between 20°C and 87°C. The thermal module is connected to the communication with the thermal controller. The controls on the MASTER thermal element instrument panel will still be disabled;



ATTENTION!!! Before connecting the thermal module to the thermal controller it is necessary to carry out the following operations:

- remove the casing following the instructions given in section 8.3;
- access the electrical board of the MASTER thermal panel;
- set SWITCH No. 1 on OFF and SWITCH No. 5 on ON (see figure 19);



CAUTION!!!

Since the 0-10Vdc signal cables are subject to extremely low safety voltage, they must run through ducts different from the 230Vac power supply cables.

5.14.8 - Digital output, WARNING contact

In the connection terminal board of the thermal module there are terminals "1" and "2" (see detail "H" shown in figure 23). Such terminals are connected to an internal relay contact. When a thermal element of the module stops working the contact is closed. Such information can be used by the installer to remote control an alarm in a visible and/or audible area.

5.14.9 - Digital output, FUNCTION contact

In the connection terminal board of the thermal module there are terminals "3" and "4" (see detail "G" shown in figure 23). Such terminals are connected to an internal relay contact. The contact is closed when a thermal element has the burner on. Such information can be used by the installer to control remotely an alarm in a visible and/or audible area which should be interpreted as a "thermal module on".

5.15 - Connecting the boiler to a water heater

The boiler can be connected to a water heater with secondary exchanger.

The water connection must be carried out as per figures 9 and 10.

For the electrical connection proceed as follows (refer to figure 16 unless otherwise specified):

- disconnect the boiler from the power supply;
- access the internal components by following the instructions in the specific section 8.3;
- move switch 1 to ON (see figure 19 detail "D");
- move switch 5 to OFF (see figure 19);
- lay a bipolar electrical cable with a minimum section of 1.5mm² which leads from the boiler to the temperature sensor of the water heater and connect it on the boiler to terminals "I" (see figure 16);
- connect the other end of the cable to the temperature probe of the water heater;
- insert the temperature sensor probe in the water heater socket;
- lay a three-pole electrical cable with a minimum section of 1.5mm² which leads from the boiler to the water heater loading pump;

- connect the cable to the water heater pump contacts;
- connect the other cable end to the boiler (detail "D" shown in figure 16), considering that:
 - the terminal 10 is the domestic water control;
 - the terminal 11 is neutral.



CAUTION!!!

Since the cables of the water heater temperature sensor are subject to extremely low safety voltage (24Vcc), they must run through ducts different from the 230Vac diverter valve power supply cables.

5.15.1 - Antilegionella

If the boiler is connected to a domestic water heater, a disinfection cycle against the legionella bacterium will be performed. This cycle brings the water heater to a temperature of 60°C (temperature at which said bacteria die) at least once a week. Therefore, water (at certain times) may reach the user at a temperature higher than that set on the domestic water control.

When the boiler is started for the first time, the disinfection cycle against the legionella bacterium is carried out even after 2 hours of operations.

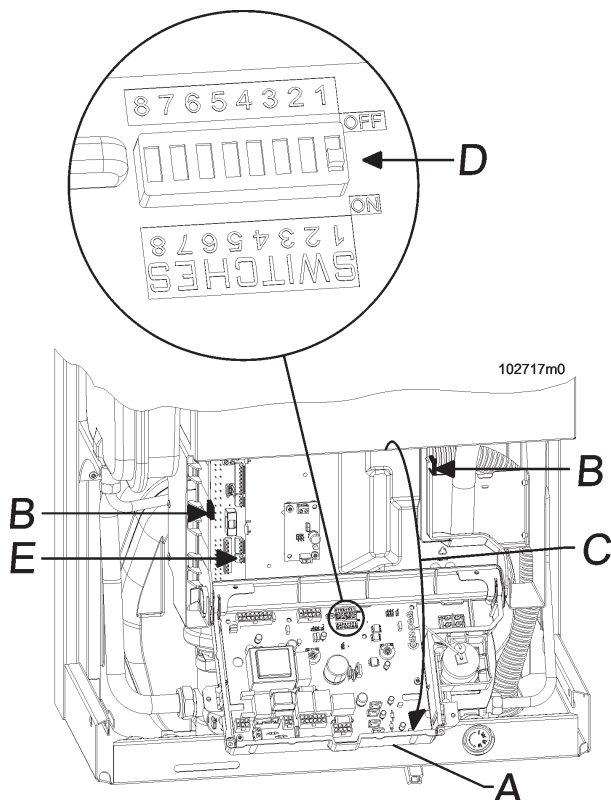
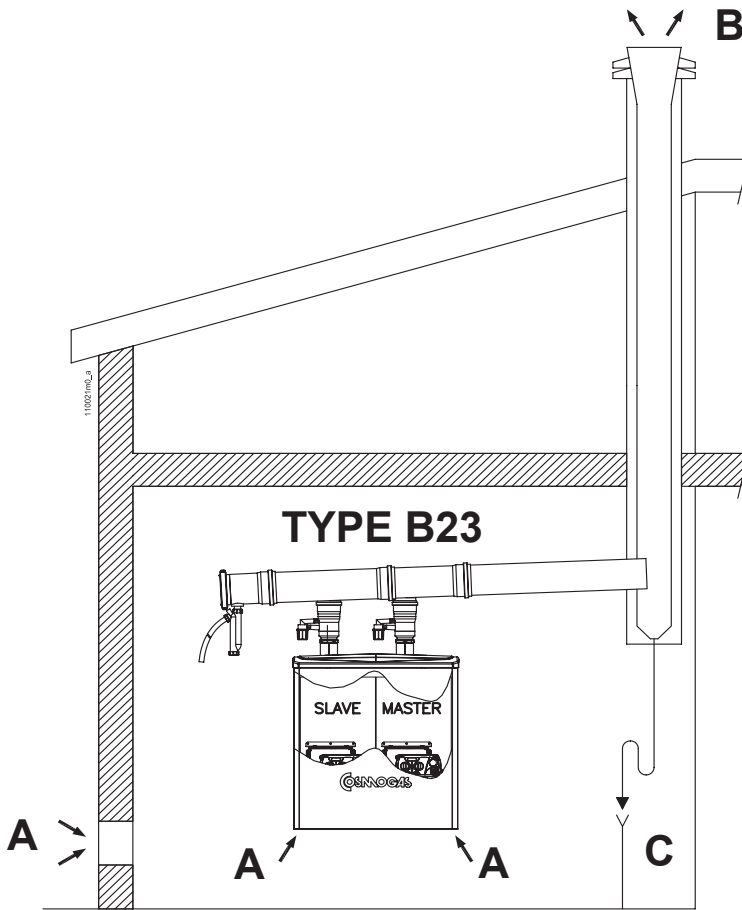


Figure 19 - Boiler adjustment switches

5 - INSTALLATION



5.16 - Venting systems

CAUTION!!! All venting systems must be connected in compliance with current national and local standards.

CAUTION!!! The temperature of the fumes in this appliance can reach, in certain conditions, 110°C. Hence, pipes in plastic material able to reach such a high temperature must be used.

CAUTION!!! This is an air condensing boiler. To build the gas discharge system use stainless steel AISI 316L or polypropylene plastic materials in order to avoid corrosion due to the condensation acidity.

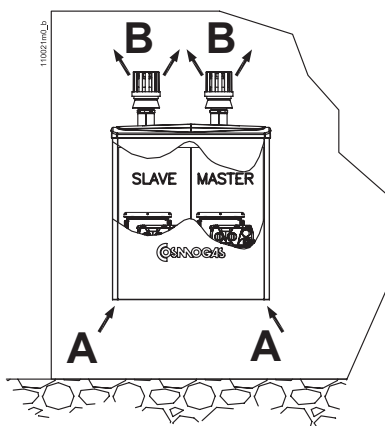
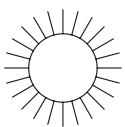
Remember that this type of appliance must have discharge and intake pipes supplied by the appliance manufacturer.

Any other types of pipes, if used, must be approved.

The approved types of flue gas discharge outlet for the boiler are given in the table of technical features at the end of the manual, under the heading "type", and on the boiler rating plate, again under the heading "type". The symbols used to define the type of discharge outlet are as follows:

- B23, comburent air intake from the environment in which the appliance is installed and flue discharge outside.

During operation, especially in Winter, again due to high efficiency, white smoke maybe discharged. This is a purely natural phenomenon and not a reason for concern, as it is steam from the gas fumes condensing on contact with the outside air.

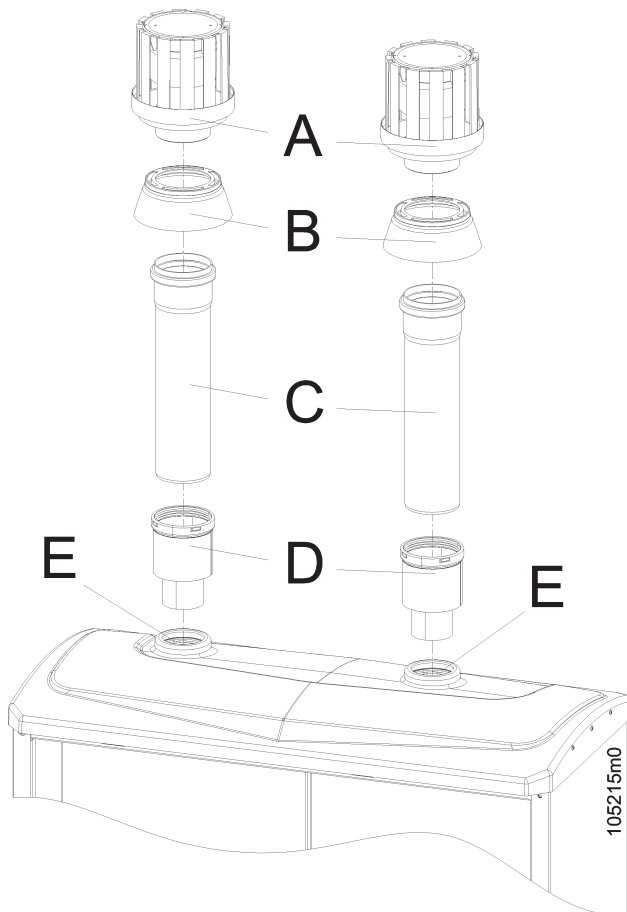


TYPE B23

- A= Comburent air**
- B = Combustion residue**
- C = Condensation discharge**

Figure 20 - Approved discharge/intake systems

5 - INSTALLATION



- A - Anti-wind terminal
- B - Lower part of terminal
- C - Extension Ø80x500 in PP
- D - Reduction Ø80/60 with antirain
- E - Flue gas discharge of thermal elements

Figure 21 - Installation of the "Singolo 80 PP" system

5.16.1 - System "SINGOLO 80 PP"(polypropylene)

The appliance is supplied without fittings for connecting flue gas discharge. A special kit is available on request for connecting the thermal module to a "SINGOLO 80 PP" system, to be installed as shown in figure 21, as follows:

- pour 100 cm³ of water in the "E" opening in order to fill up the "21" trap of figure 1;

NOTE - the flue gas discharge seals are made of EPDM rubber. In order to improve the sliding of the pairings it is recommended to lubricate with soapy water. DO NOT USE PRODUCTS (OIL OR GREASE) WITH HYDROCARBONS, THEY CAN DESTROY THE SEAL.

- Assemble details "A", "B" and "C"
- Insert the assembled terminal within the detail "D"
- Insert it in the detail "E"

NOTE - Detail "C" is 50 cm high. If the thermal module is installed in a windy area it is advisable to shorten it by at least 35 cm.

5 - INSTALLATION

5 . 1 6 . 2 - "Polypropylene flue gas collector" system

The standard appliance is not supplied with fittings for connecting flue gas discharge outlets/air intakes. A special kit is available on request for connecting the boiler to a "Polypropylene flue gas discharge" system, to be installed as shown in figure 22, as follows:

- pour 100 cm³ of water in the "P" opening in order to fill up the trap "21" of figure 1;

NOTE - the flue gas discharge seals are made of EPDM rubber.

In order to improve the sliding of the pairings it is recommended to lubricate them with soapy water.

DO NOT USE PRODUCTS (OIL OR GREASE) WITH HYDROCARBONS, THEY CAN DESTROY THE SEAL.

- prepare the fitting "E", cutting it at height "A", according to the scheme in figure 23 or 24, depending on the side from which fumes are to be discharged (respecting height "A" the flue gas collector is tilted by 3% and the distances of the flue gas collector will correspond to the height indicated in figure 23 or 24);

- insert the detail "G" inside "P";
- insert detail "F" inside "G";
- Insert detail "E" in "F";
- connect "C" and "B" and then insert both in "E";
- connect "A" and "B";
- use brackets "N" and "O" to support and direct the flue gas collector;

NOTE - bracket "N" must be installed on the right and bracket "O" must be installed always on the left.

- connect a properly calculated chimney to the "C" output.

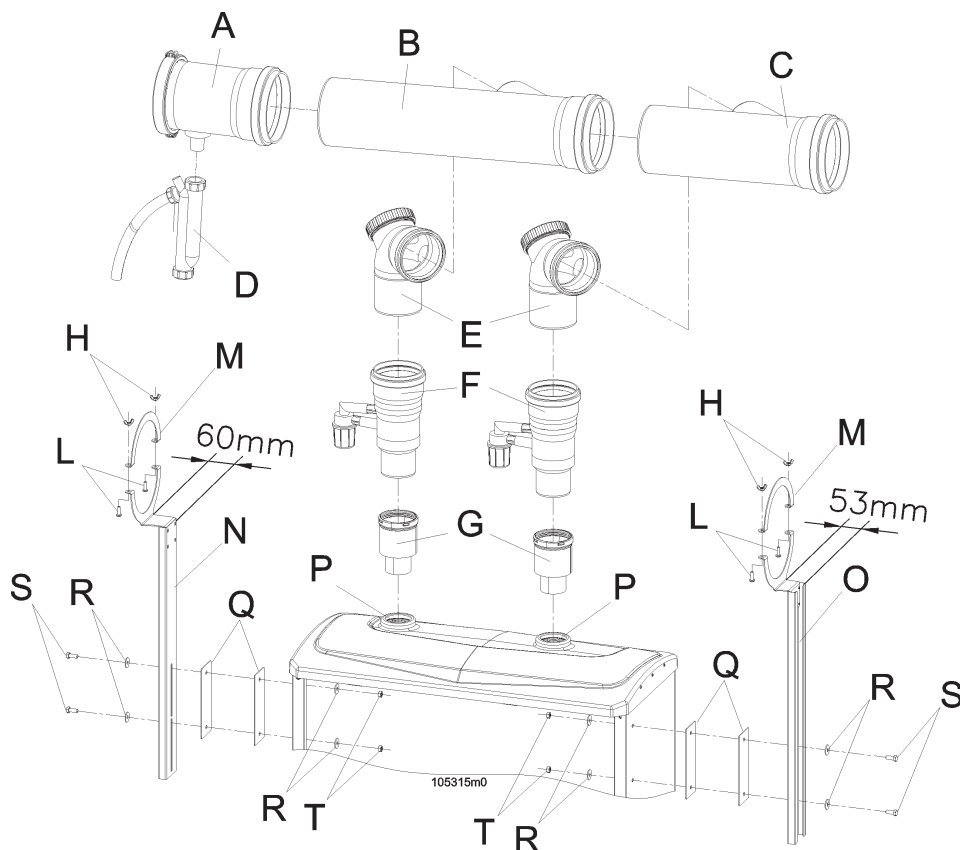
☞ Protect the flue gas collector from direct sunlight as it is in polypropylene.

☞ Horizontal sections must always be pitched by at least 3% towards the condensation drainage system.

☞ The boiler comes supplied with a condensation collector which must be fitted to a discharge pipe (see figure 14 detail "D").

CAUTION!!! Since the flue gas is in polypropylene, when exposed to sunlight, it must be protected from UV radiation and possibly against the risk of frostbite.

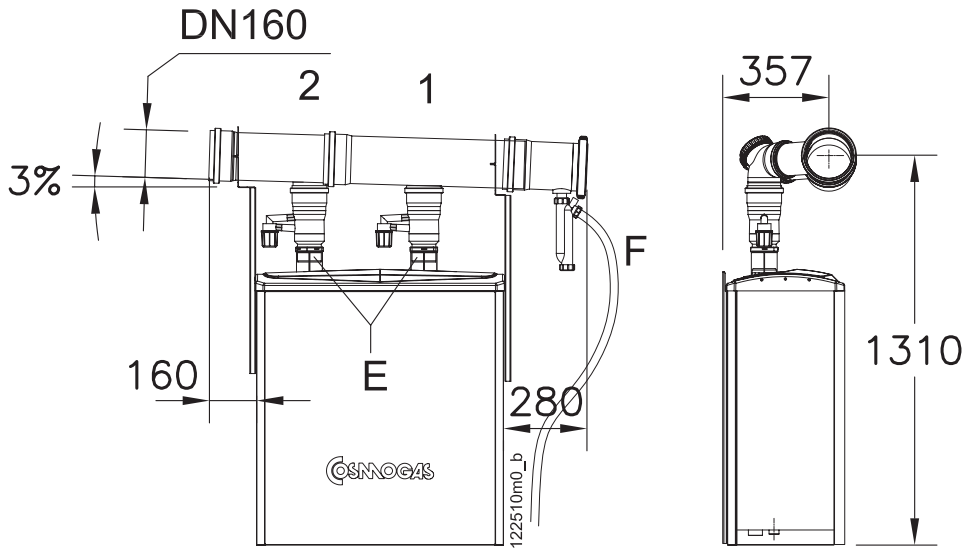
CAUTION!!! The temperature of the discharge pipe during operations may reach 110°C. Insert protective heat insulating sheathing if it has to pass through walls which are vulnerable to such temperatures.



- A - Collector closing terminal with condensation discharge
- B - Long collector with inlet tee
- C - Short collector with inlet tee
- D - Condensation discharge trap
- E - Intake with inspection
- F - Check valve
- G - Reduction
- H - Fixing nuts
- L - Fixing bolts
- M - Fixing collar
- N - Left fixing bracket and height regulation
- O - Right fixing bracket and height regulation
- P - Flue gas discharge
- Q - Spacers
- R - Washers
- S - Fixing bolts
- T - Nuts

Figure 22 - Installation of the "Polypropylene flue gas discharge" system

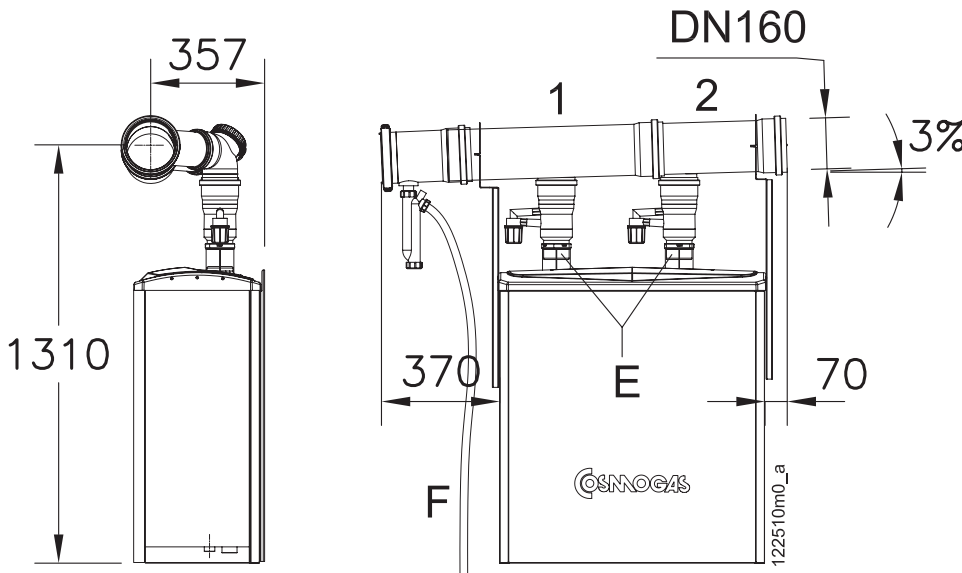
5 - INSTALLATION



5.16.3 - Condensation discharge of the collector

The condensation discharge coming from the flue gas collector (see figures 23 and 24 detail "F") can be conveyed to the condensation discharge collector of the thermal module. In any case it shall be treated as the condensation discharge of the thermal element (see section 5.12)

Figure 23 - Installation of the "Polypropylene flue gas discharge" system with left output



KEY figures 23, 24 and 25

A - Position where fitting "E" should be cut in order to have a 3% tilt and the distance indicated in figure 23 and 24)

**E - Flue gas discharge
F - Condensation discharge.**

Figure 24 - Installation of the "Polypropylene flue gas discharge" system with right output

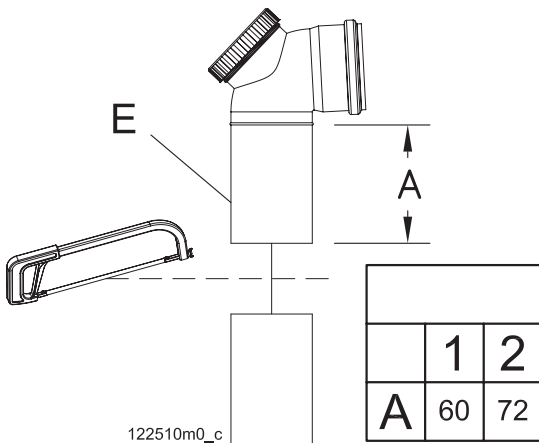


Figure 25 - Preparation height "A" for component "E"

6 - START UP

6.1 - Start-up

Before operating the appliance, carry out the following operations.

6.1.1 - Instructing the user

Instruct the user about the correct use of the appliance and of the system in general. In particular:

- ☞ Hand over the Installation and user manual and all documentation included in the packaging.
- ☞ Instruct the user regarding the special measures for flue gases discharge, specifying that they shall not be modified.
- ☞ Inform the user on how to check the water pressure necessary in the system and on all necessary measures for filling and bleeding air.
- ☞ Inform the user on how to correctly adjust temperatures, controls/room thermostats and radiators to save energy.

6.1.2 - Condensation discharge trap filling

The trap located inside the boiler (see figure 1 detail 21) must be filled with water in order to create the head able to prevent flue gases from bleeding out of pipe "D" shown in figure 22.

6.1.3 - Filling up of the heating system

If FILL appears on the display then the thermal module is powered, it means that it is necessary to fill up the heating system. By using only clean water, coming from the water network, proceed as follows:

- slightly open all the cocks "26" as described in figure 1;
- open the supply cock of the system and wait until all the air is expelled from discharge cock "26" of figure 1
- close all cocks "26" as shown on figure 1 and wait for the pressure of the thermal module to reach about 1.5 bar (FILL appears on the display);
- check that there is no water leaking from the fittings.
- bleed the radiators;
- Check the pressure gauge reading of the boiler once again. If it has dropped, re-fill again until it reads 1.5 bar.



CAUTION!!! The addition of any chemical substance, such as anti-freeze, must be carried out according to the product instructions. These substances must never be inserted directly into the thermal module.

6.2 - General warnings concerning gas supply

When starting up the boiler for the first time, have a qualified technician check the following:

- ☞ That the boiler is powered for the type of fuel it is designed for.
- ☞ That the gas supply pressure (with boiler on and boiler off) is within the maximum and minimum values given in the table in chapter 9 at the end of the manual.
- ☞ That the gas supply system is provided with all safety devices and controls required under current national and local standards.
- ☞ That the flue gas discharge terminal and the comburent air intake terminal are free from any blockage.
- ☞ That the connection of the condensation discharge is connected.



CAUTION!!! If you smell gas:

- A - Do not use any electrical appliance, including telephones or any object which might cause sparks;**
- B - Immediately open doors and windows to create a current of air to rapidly clear all gas from the room;**
- C - Immediately call a qualified technician or the gas board from another room or from a neighbor's house. Otherwise call the fire brigade.**

6.3 - Gas type indicated for the boiler.

On the front of the boiler there is a label indicating the type and supply pressure of the gas to be used for the boiler.

The boiler can have the following two labels:

2H-G20-20mbar

METHANE

meaning that the appliance is set for use with gas type H of the second family (methane), at a supply pressure of 20 mbar.

3P-G31-37mbar L.P.G.

meaning that the appliance is set for use with gas type P (propane, also known as LPG) of the third family, at a fixed supply pressure of 37 mbar.

6.4 - Conversion of the appliance from methane to LPG or viceversa

In order to change the gas follow these instructions keeping in mind that these operations must be executed on all the thermal elements of the module:

- disconnect from the mains supply;
- access the instrument panel (see figure 35);
- move the switch "7#" (see figure 19) from position OFF to position ON;
- Connect the power supply to the thermal module;

- the display shows **64** followed by a number;

- using buttons **+** and **-** set the values as:

DUAL 2-34 methane = 53

DUAL 4-50 methane = 50

DUAL 6-70 methane = 54

DUAL 8-90 methane = 58

DUAL 2-34 lpg = 65

DUAL 4-50 lpg = 52

DUAL 6-70 lpg = 57

DUAL 8-90 lpg = 60

- press the button **Reset**;
- disconnect from power supply;
- move the switch "7" (see figure 19) on OFF;
- connect to power supply;
- checking gas supply pressure following instructions on section 6.6;
- set the level of CO2 following the instructions in section 6.8;

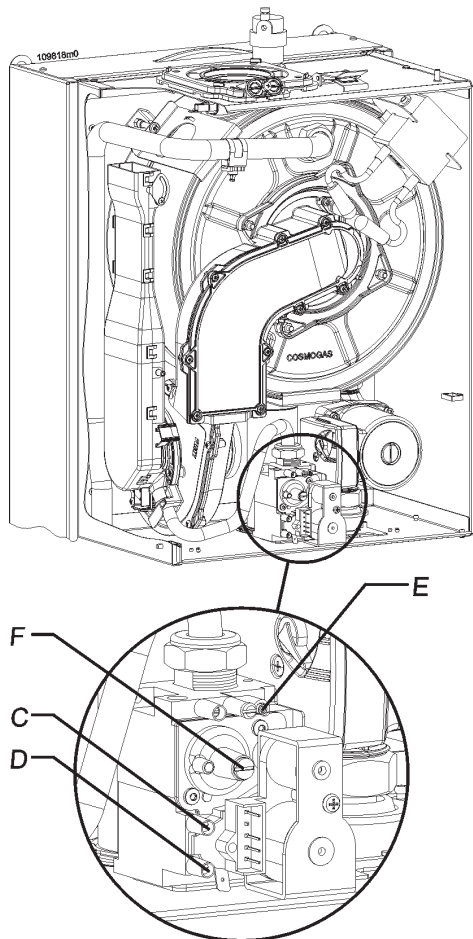
- press button **Reset** to bring the boiler back to normal operating conditions.
- highlight the new settings on the appliance.

6.5 - Start up

- open the gas cock;
- power to the boiler;
- if the display shows E 21, it means that the phase/neutral polarity has not been observed; Exchange them;
- at start up, the display shows a F for 2 minutes during which the system is bled. If you want to bypass this phase, just press the + and - buttons together until the F begins to flash. Then press the RESET button;
- rotate knobs "8" and "9" shown in figure 1 to the desired temperature;
- the heating service starts only when the room thermostat calls for heating. If the external temperature sensor is connected, check that the calculated temperature is greater than the minimum heating temperature (see figure 32);
- if the pump operation indicator (see section 7.16) is on and the pump (see figure 1 detail "44" is not running, it is necessary to unlock it;
- if the pump warning light (see section 7.16) is on and the radiators do not heat up, repeat air bleeding operations on both the boiler and the radiators.

6.5.1 - Self drainage

Every time the appliance is powered, a 2 minute self drainage procedure is started to bleed air from the system. The procedure starts and stops the pump to better remove air.



- C - Service pressure connection
- D - Supply gas pressure inlet
- E - CO2 adjusting screws Maximum power
- F - CO2 adjusting screws to maximum power

Figure 26 - Gas valve

6.6 - Checking the gas supply pressure and adjusting it if necessary

The gas supply pressure must match that given in the table in chapter 9 at the end of this manual. To check it, proceed as follows:

- close the gas cock;
- access the boiler internal components by following the procedure in section 8.3;
- loosen the pressure connection "D" (see figure 26);
- connect a pressure gauge with a definition of at least 0.1 mbar (1 mmH₂O);
- open the gas cock;
- check that the pressure does not exceed the value given in the table in chapter 6 under the heading "Maximum gas supply pressure";
- turn on the boiler and generate a request for heating (rotate knob "9" shown in figure 1 to the maximum) and make sure the room thermostat is in heating call status;
- press buttons **+** and **-** together for more than 10 seconds until **F** is displayed;
- press button **+** until you display **t**. Now the boiler is forced to maximum power for 10 minutes;
- Repeat the procedure for the "SLAVE" thermal element;
- check that the pressure does not drop below the "Minimum gas supply pressure" indicated in the table in chapter 9 at the end of the manual.

If the supply pressure does not fall within the above values, operate upstream of the appliance to bring the pressure back within the maximum and minimum range.

Once checked, close the pressure connection "D" (see figure 26) and verify whether there is any gas leakage.

6 - START UP

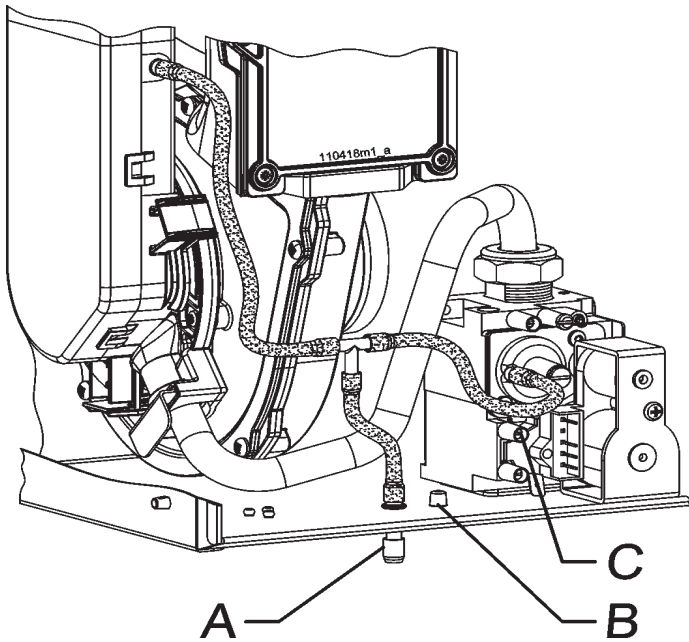


Figure 27 - Pressure connection of comburent air

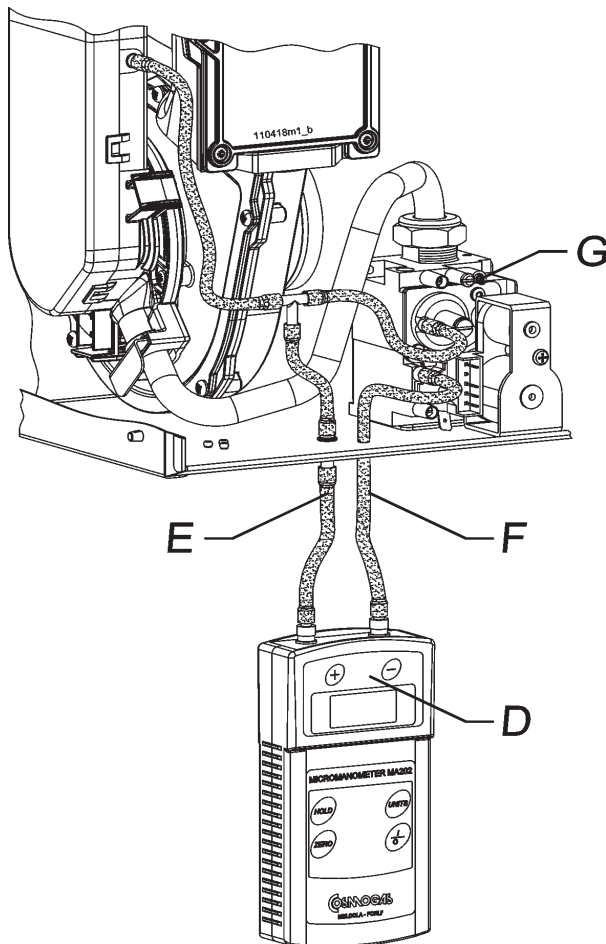






Figure 28 - Control of comburent air pressure

6.7 - Checking the comburent air pressure

As the boiler air/gas ratio is factory set, the gas pressure on the burner is checked indirectly, i.e. the comburent air pressure inside the boiler is checked and must correspond to what is indicated in the table in chapter 9 under the heading "Comburent air pressure".

To check the pressure proceed as follows (refer to figures 27 and 28):

- use a differential pressure gauge with a precision of at least 0.1 mbar (1 mmH₂O);
- close the gas cock;
- remove cap "B";
- loosen the pressure connection screw "C";
- insert a pipe "F" going from the pressure gauge to the pressure connection "C" passing through the opening of cap "B" (as per figure 28);
- remove cap "A" from the pressure connection and connect the differential pressure gauge;
- the connection shall be made as per figure 28, by meticulously observing the pressure polarity displayed on the pressure gauge;
- **reassemble the casing "39" shown in figure 1. This is fundamental to have a reliable reading;**
- turn on the boiler;
- press buttons  and  together for more than 10 seconds until  is displayed;
- now the fan is forced to the maximum power for 10 minutes, with burner off;
- compare the pressure value on the pressure gauge to the value indicated in the table in chapter 9, "Comburent air pressure";
- should pressure be at a lower value, then check for obstructions in the comburent air/flue gas discharge circuit;
- press button  to bring the boiler back to normal operating conditions;
- after carrying out the check, reassemble the unit.

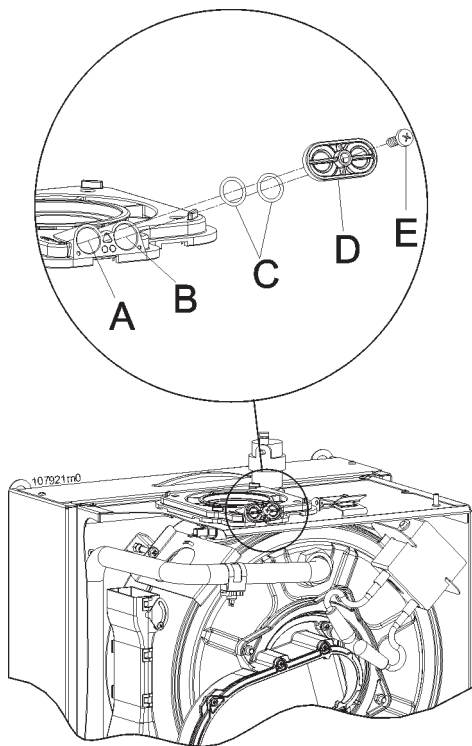


Figure 29 - Combustion analysis connection

6.8 - Checking CO2 level and adjusting it if necessary

Under normal operating conditions and at altitudes below 1,000 m, the boiler has a CO2 level (carbon dioxide) in flue gases which is given in the table in chapter 9, at the end of the manual. A different value may lead to malfunctioning. To check that value it is necessary to carry out a combustion analysis. Proceed as follows:

- connect a combustion analyzer to the special connection on the flue gas discharge connection "B" shown in figure 29;
- generate a heating request, otherwise open the domestic hot water cock to the maximum;
- press buttons **+** and **-** together for more than 10 seconds until **F-** is displayed;
- press button **+** until the display shows **t-** (in case of heating request) or **S-** in case of domestic hot water request.

Now the boiler will run for 10 minutes at maximum power.

- wait until the CO2 level stabilizes;
 - compare the measured value with that given in the table in chapter 9, headed "CO2 level".
- If the measured value differs from the read one, bring it back within the values given in the table in chapter 9 by proceeding as follows:
- use screw "E" shown in figure 26;
 - turn it clockwise to reduce the level of CO2. Turn it anti-clockwise to increase the level of CO2.
 - press button **-** until the display shows **t-**, or **S-** in case you were trying in domestic water mode. Now the boiler will run for 10 minutes at minimum power;
 - Check the CO2 value, it shall reduce by 0.5% as compared to the value read at maximum power. Otherwise use screw "F" shown in figure 26 to adjust the CO2 value (rotate it clockwise to increase or anti-clockwise to decrease)
 - Check the CO2 level again at maximum power and further adjust it if necessary.
 - Once done, seal the screws "E" and "F" shown in figure 26 with red paint or equivalent method;
 - press button **Reset** to bring the boiler back to normal operating conditions.



CAUTION!!! During this phase, if the boiler delivered power is much greater than the system power consumption, the boiler turns continuously off as it reaches the maximum allowed temperature (45°C for low temperature systems, 85°C for radiator type systems), or the flue gas safety thermostat activates locking out the boiler (L06). This may happen also in case you perform the analysis in domestic hot water mode, when the domestic water flow is low or the domestic cold water temperature is very high.

To obviate this problem, set the heating power according to the real needs of the system, as indicated in the following section, and carry out the test analysis of CO2 or combustion efficiency setting the above mentioned forcing to t- (letter "t" with dash) or S- (letter "S" with dash) for domestic water.

6.9 - Adjusting the heating capacity

To best exploit the boiler potentialities, we suggest to set the maximum heating power to the real needs of the system. Proceed as follows:

- access the “Installer menu (see section 7.15);
- press button **Reset** until the parameter **P** is displayed;
- using buttons **+** and **-** set the **P** value to the system power needs, according to the table shown in figure 30;
- press the **Reset** button ;
- Perform the same procedure on both thermal elements.

Example: using the radiator and heat dispersion calculation, the installer realizes that the system needs only 60kW;

- choose the column corresponding to the boiler model (e.g. for DUAL 8-90 choose column “8-90”);
- cross it with the “Necessary power” column corresponding to 60kW and you get a **P** value of 59;
- set the parameter **P** to value 59 on both thermal elements by following the above procedure.

Necessary power (kW)	BOILER MODEL			
	2-34	4-50	6-70	8-90
88				97
84				92
80				86
76				81
72				76
68			96	70
64			89	65
60			81	59
56			74	54
52			67	49
48		95	59	43
44		85	52	38
40		75	44	32
36		65	37	27
32		55	30	22
28	92	45	22	16
24	76	35	15	11
20	60	25	7	5
16	44	15		
12	28	5		
8	12			

Figure 30 - “P” values to obtain the correspondent power needed by the system (to be set on both thermal elements)

7.1 - Warnings for use

- Check the system pressure on the water gauge frequently and make sure that the indication is always between the minimum and maximum levels specified in section 9 when the system is cold. Should pressure drops occur frequently, ask a qualified technician to check the system for leaks.

☞ Every time you reopen the gas cock, wait a few minutes to check whether there is gas in the room. If not, proceed with the thermal module start up.

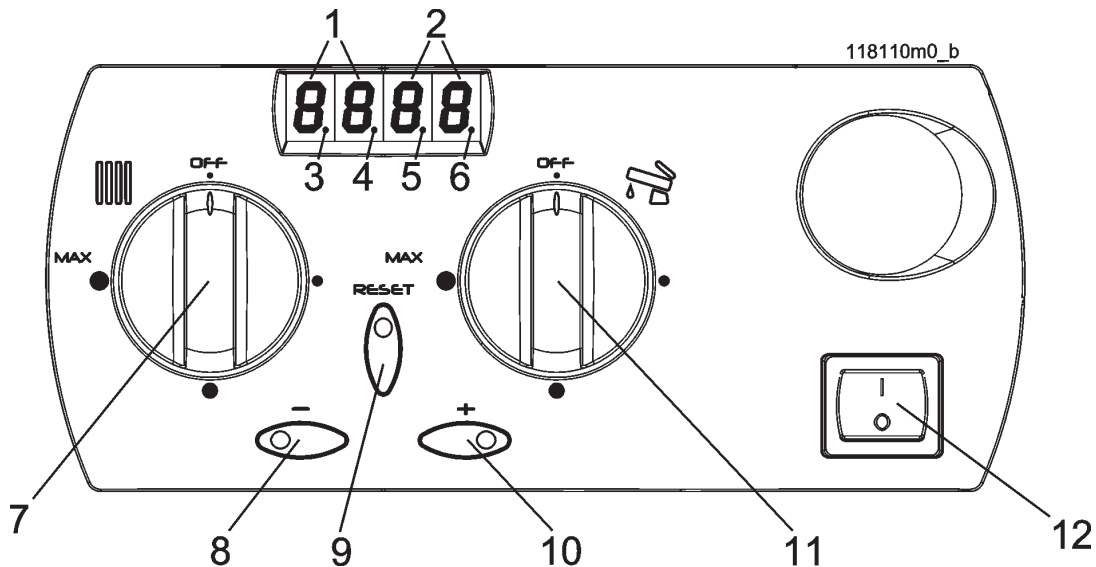
☞ Do not touch the flue gas discharge during and after usage of the thermal module (for a certain period), as they may still be hot.

☞ Do not wet the thermal module with water or other fluids.

☞ Do not lay any object onto the thermal module.

☞ Forbid use of the thermal module to children and unskilled people.

7 - USE



- 1 - Parameter display.
- 2 - Display of values adopted by parameters.
- 3 - Burner status indicator. On = burner on, flashing = burner off.
- 4 - Domestic water service status indicator. On = domestic water active, Off = domestic water inactive.
- 5 - Decimal indicator of the displayed value
- 6 - Heating service status indicator. On = heating active, Off = heating inactive
- 7 - Start and heating temperature knob.
- 8 - Button to decrease parameter values.
- 9 - Button to reset shutdowns and to scroll the parameter list.
- 10 - Button to increase parameter values.
- 11 - Domestic hot water temperature and start knob.
- 12 - Main switch.

Figure 31 - Control panel

7.2 - Overview

According to the architecture with which it is prepared, the thermal module command and control operations can be performed as follows:

- by using the MASTER boiler control panel (see section 7.5 and 7.6);
- by using the remote control (see section 7.4)
- by using an external thermoregulator via 0-10Vdc analog signal (see section 5.14.7).

In all above cases, during normal operation, the MASTER boiler display reads:

- "c" followed by the supply temperature (probe U2), when in heating mode;

- "d" followed by the water heater temperature (probe U3) when in domestic water mode (water heater loading).

In normal operating conditions, the SLAVE thermal element always displays a "c" followed by the boiler temperature (probe U1). The thermal element is preset to

standard parameters. It is however possible to change or look at the parameters via the "User menu" (see section 7.14).

While functioning, the display "1" shown in figure 31 shows the status of the thermal element, whereas display "2" (see figure 31) shows the parameter value. The different operating statuses are indicated in the table in section 7.14.

Within the "User menu" (see section 7.14) it is possible to check the latest locks or errors occurred.

In addition to the operating modes, the instrument panel provides important information on the current functioning of the boiler, via the indicators "3", "4", "5" and "6" shown in figure 38. In particular:

- the indicator "3" displays whether the burner is running (on) or off (flashing);
- the indicator "4" displays whether the domestic water service is active or inactive;
- the indicator "6" displays whether the thermal element pump is running (on) or nor (off).

7.3 - Precautions against freezing

If you leave the house and turn the power and gas supplies off, the appliance will not be protected against freezing. Thus, in case of turning off with temperatures that may possibly drop below zero, you should empty the system. Contact a qualified technician.



CAUTION!!!

It is absolutely forbidden to introduce chemical additives, such as anti-freeze or others, into the domestic water circuit.

7 - USE

7.4 - Remote control (on request)

If the thermal module is connected to the remote control shown in figure 35, the adjusting functions of the heating and domestic water temperatures can be performed directly from the remote control as indicated below:

- the heating adjustment is performed directly by means of knob "A" shown in figure 35.

- the domestic water adjustment is performed directly by means of knob "C" shown in figure 35.

Furthermore, you can reset any alarm by pressing the RESET button (see figure 35, detail "B")

There are two warning lights on the remote control which have the following meaning:

- green led on: heating service running and correct communication between thermal module and remote control;

- green led flashing every 7 seconds: correct communication between thermal module and remote control;

- red led on: thermal module locked out. You can reactivate it by pressing the RESET button (see figure 35, detail "B"). Should the lock-out occur frequently, please contact a qualified technician;


- red led flashing: thermal module lock-out longer than 5 minutes (contact a qualified technician);

- red led and green led flashing: low pressure to the heating system. Please refer to section 6.1.3. to restore the correct pressure.

In order to assess the type of lock corresponding to the lit led, check the error type on each thermal element and refer to sections 7.16.1 (locks) and 7.16.2 (errors).

7.5 - Adjusting the domestic water system

To adjust the domestic water temperature (if possible) turn the knob "11" shown in figure 31. As soon as you touch the knob,

 flashes on display "7" shown in figure 1 and the set temperature is displayed.

The domestic water system temperature range is between 45°C and 70°C.

7.6 - Adjusting the heating system

In case a thermoregulator is present, refer to the relevant instructions. Otherwise,

using the parameter **CH** in the "Installer menu" (see section 7.15), you can select different operating modes for the heating service:

- CH = 00 "Thermostatic adjustment": the heating system supply temperature is adjusted manually by rotating the knob "7" shown in figure 31. By opening and closing the room thermostat, the boiler pump is stopped or started accordingly, in order to adjust the room temperature;

- CH = 01 "Climatic adjustment": the heating system supply temperature is adjusted automatically by the external temperature sensor, according to an algorithm shown in figures 32 and 33. The supply temperature corresponds to the calculated temperature. By opening and closing the room thermostat, the boiler pump is stopped or started accordingly. When the "Calculated temperature" drops below the "Minimum heating temperature", the heating service ends. It restarts automatically as the "Calculated temperature" rises again above the "Minimum heating temperature";

- CH = 02 "Climatic adjustment with room compensation": the heating system supply temperature is adjusted automatically by the external temperature sensor, according to an algorithm shown in figures 32 and 33.

The supply temperature corresponds to the calculated temperature. By opening the room thermostat the heating supply temperature is reduced by a fixed value. The boiler pump is always on. When the "Calculated temperature" drops below the "Minimum heating temperature", the heating service ends. It restarts automatically as the "Calculated temperature" rises again above the "Minimum heating temperature".

7.7 - Thermostatic adjustment

The boiler is factory set with parameter **CH** to 00, i.e. the boiler supplies hot water to the heating system at a fixed temperature, which is adjusted via the knob "7" shown in figure 31. A room thermostat would act directly on the boiler inner pump to adjust room heating.

In order to take full advantage of the boiler performances, we suggest you to use the knob "7" shown in figure 31 to adjust the temperature at a value which is just sufficient to obtain the desired room temperature. Should the season temperature become colder, gradually increase the set temperature value by means of the knob "7". Proceed in reverse order as the season temperature becomes warmer.

7.8 - Climatic adjustment

Set the parameter **CH** to 01 by means of the "Installer menu". The heating supply temperature is adjusted automatically by the external temperature sensor. The relationship between external temperature and supply temperature (calculated temperature) corresponds to the graphs shown in figures 32 and 33. In order to adapt the line to the different houses/climatic conditions, it is necessary to set all adjustment parameters according to the indications in the next sections.

7 - USE

7.8.1 - Climatic adjustment: precautions when adjusting

To carry out a correct automatic supply temperature setting, the line setting values of figures 32 and 33 which are suggested later shall be set immediately. Should these values give no satisfying result, then proceed with the necessary modifications considering that:

- each parameter is to be adjusted gradually;
- wait at least 24 hours after each variation to see the result;
- the closer is the adjustment line to the real building needs, the more comfortable will be the building heating and higher the energy savings.
- by means of the knob "7" shown in figure 31 you can carry out some small corrections "b" as shown in figures 32 and 33, i.e. you can shift the line parallelism upwards or downwards in steps of 1°C, up to a maximum of 10°C.

7.8.2 - Climatic adjustment: parameter setting

By using the user menu (see section 7.14) set:

- **0A** = "Line angle", adjustable between 0.1 and 5.0. The suggested starting values are: 0.6 for "low temperature" systems; 1.6 for high temperature systems;

- **0b** = "Minimum heating temperature", adjustable between 20°C and 60°C. The suggested starting values are: 30°C for "low temperature" systems; 40°C for high temperature systems;

- **0c** = "Maximum heating temperature" adjustable between 30°C and 80°C. The suggested starting values are: 45°C for "low temperature" systems; 80°C for high temperature systems.

By using the installer menu (see section 7.15) set:

- **Ln** = "Reaction" of the supply temperature to the external temperature variations. Adjustable between 1°C and 10°C. A low "reaction" value allows you to have a constant house temperature which is however slow in reaching the heating capacity and in reacting to external temperature variations. A high "reaction" value ensures that the heating capacity is reached fast even though temperature oscillations inside the house may occur. We suggest to keep this

value between 1 and 2;

- **br** = "Fixed point" is the heating supply temperature when the external temperature is 20°C. It is also called "Fixed point" because it is the fulcrum of the line angle. The suggested starting values are: 33°C for "low temperature" systems and 50°C for "high temperature" systems;

7.8.3 - Climatic adjustment: adapting to the different climatic zones

The previously suggested values are valid for houses having a fair insulation and for climatic zones whose external temperature calculating the thermal requirements is -5° (using these data the correspondence to the graphs shown in figures 32 and 33 is ensured). Should the climatic zone be different, adjust

the curve incline (parameter **0A**), so as to obtain a supply temperature of 80°C (45°C in case of "low temperature" systems), when the external temperature is that of the calculation basis of the thermal requirements.

7.8.4 - Climatic adjustment: turning the heating service on and off

The climatic adjustment service is fully automatic, even as far as the turning off at the end of the season and the restarting at the beginning of the season is concerned. According to the calculation algorithm, if the "Calculated temperature" is lower than the "Minimum heating temperature" (parameter **0b**), the heating service turns off. When the "Calculated temperature" exceeds again the "Minimum heating temperature"

(parameter **0b**), the heating service reactivates.

If the heating service does not activate or deactivate according to one's own needs, it is sufficient to rotate the knob "7" shown in figure 31 to increase or reduce the calculated temperature in order to meet the "Minimum heating temperature" beforehand or afterwards.

7.8.5 - Climatic adjustment with room compensation

Set the parameter **Ln** to 02 by using the "Installer menu" (see section 7.15). Everything works exactly as described in the previous sections on "Climatic adjustment", except for the boiler pump which is always on. The opening of the room thermostat contact will cause the line shown in figures 32 and 33 to parallelly shift downwards. The value by which the line can shift downwards

can be adjusted on parameter **Ln** specified in the "Installer menu" (see section 7.15). The parameter **Ln** can be set to values between 1°C and 20°C. The suggested values for this parameter are:

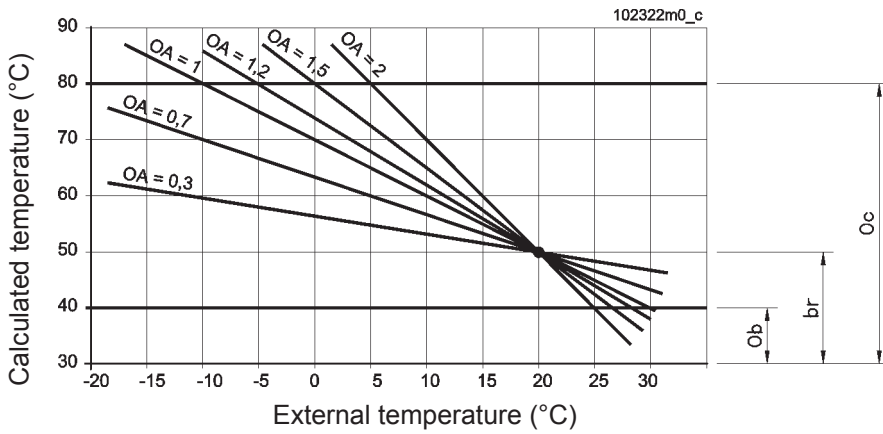
- 10°C for radiator-type systems (high temperature)
 - 3°C for radiant panel-type systems (low temperature).
- Too high values for this parameter can lead to instable room temperature. Too low values can make the room thermostat action useless.

7.9 - Turning off

The thermal module shall be powered also in downtime periods as the control system performs the circulators anti-freeze and anti-locking functions.

In case of prolonged absence, we suggest to disconnect the thermal module from gas and power supply and to empty it (this operation shall be performed only by a qualified operator).

7 - USE



Key to figures 32 and 33

- OA = Line inclination
- Ob = Minimum heating temperature
- Oc = Maximum heating temperature
- br = "Fixed point" line angle fulcrum
- b = Line parallel shift (actionable by means of the knob on the control panel)

Figure 32 - Climatic adjustment graph (influence of the parameter "OA" adjustment)

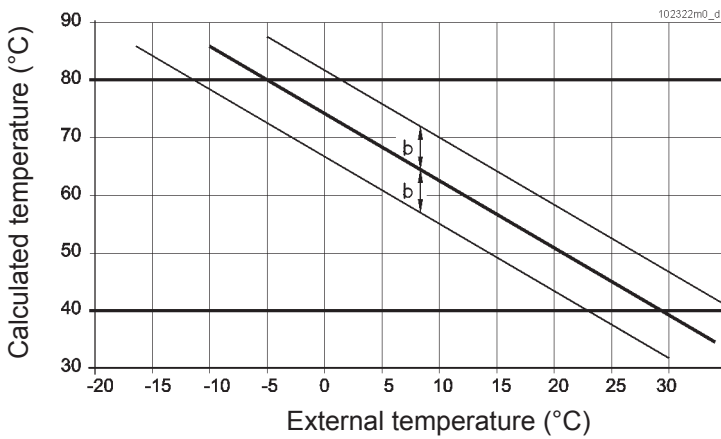
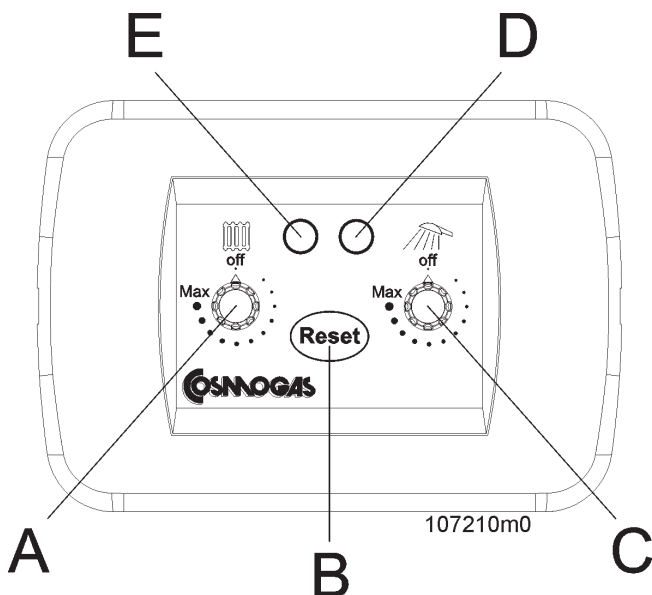


Figure 33 - Climatic adjustment graph (influence of the parameter "b" adjustment)



KEY to figure 34

- A - Heating temperature knob
- B - RESET button
- C - Domestic hot water temperature knob
- D - Green led (see section 7.4 for details)
- E - Red led (see section 7.4 for details)

Figure 34 - Remote control

7 - USE

7.10 - Thermal element settings (SWITCHES)

The appliance can be set in different architectures by means of a single control board (detail "12" in figure 1). To this purpose, inside the control board there is a series of electric straddles (see figure 19 detail "D") identified by the writing SWITCHES, whose positioning (ON or OFF) determines the appliance operating mode.



CAUTION !!!

Changing these straddles may cause malfunction of the boiler and thus of the system. Therefore, only a qualified technician having a detailed knowledge of the appliance and of the system operation should change them.

SWITCHES	Position	Description
1	OFF	Appliance with instantaneous production of D.H.W.
	ON	Appliance with production of D.H.W. by means of a water heater
2	OFF	Appliance with instantaneous production of D.H.W.
	ON	Position not available for this series of appliances
3	OFF	Minimum heating pressure pressure gauge, inhibited or manual system supply
	ON	Minimum heating pressure pressure gauge, engaged or automatic system supply
4	OFF	MWL or EBM fan
	ON	FIME fan
5	OFF	Combined boiler, heating and d.h.w.
	ON	Boiler for heating only
6	OFF	Heating service operating between 30°C and 80°C
	ON	Heating service operating between 20°C and 45°C
7	OFF	Appliance TYPE change service, inhibited
	ON	Appliance TYPE change service, enabled
8	OFF	Supply temperature limited to 80°C
	ON	Supply temperature limited to 87°C

7.11 - Timing of the various functions

In order to preserve the appliance, better the generated comfort and increase energy savings we have introduced delay timings during operation. These timings are:

- Pump postcirculation: every time the room thermostat determines the end of an heating service, the pump runs for further 3 minutes;
- Heating delay: every time a domestic water service ends, the systems waits 2 minutes before reactivating the heating service;
- Anti-locking pump and diverter valve: every 24 hours the heating pump and the domestic water pump (if present) are forced for 15 seconds.
- Antilegionella; if the boiler is connected to a domestic water heater, every seven days the heater is brought to a temperature of 60°C to perform the disinfection against the legionella bacterium.
- Start-up delay: In all operating modes, except for the domestic water one, every time the burner turns off, it waits 3 minutes before restarting.

7.12 - Anti-freeze protection



CAUTION !!!

In order for the anti-freeze protection to be efficient, it is necessary to leave the appliance connected to the gas and power supply and to set the two knobs "8" and "9" shown in figure 1 to OFF.

On reaching a boiler temperature of 7°C, the heating pump (and the domestic water pump if present) automatically turns on. If the temperature further drops under 2°C, the burner will also turn on, so as to protect the boiler from the effects of freezing weather conditions.

7.13 - Energy Saving

In order to reduce the energy waste produced by the display "7" shown in figure 1, it is possible to set it so that it stays off unless errors or adjustments are to be displayed. To turn it off proceed as follows:

- access the "Installer menu" (see section 7.15);
- set the parameter **S** to a value other than zero, considering that each value will correspond to the display delay expressed in minutes after entering the Energy Saving mode.

7.14 - "User menu"

As you access the "User menu", the display "7" shown in figure 1 starts to flash, indicating the successful mode switch to the user. To access the "User" menu just:

- press button **Reset** for 2 seconds until the display starts to flash;
- press and release the **Reset** button several times until the desired parameter is displayed;
- by means of the **+** or **-** buttons it is possible to change the value of the parameter.
- Press the **Reset** button to confirm the

modified parameter then pass on to the next parameter.

Once the end of the menu has been reached, with the last **Reset**, the display stops flashing, thus indicating that the user exited the menu.

If no button is pressed for more than 60 seconds, the menu will be automatically exited. If not confirmed using the button

Reset, any datum variation will be lost. The following parameters can be modified or consulted from this menu:

PARAMETER	DESCRIPTION	DISPLAYING ON DISPLAY "7" shown in figure 1
0a	Line incline adjustment as per figures 32 and 33 (visible only with active climatic adjustment. See section 7.8).	Setting range: 0,1-5,0
0b	"Minimum heating temperature" adjustment (visible only with active climatic adjustment. See section 7.8).	Setting range: See section 7.8.2
0c	"Maximum heating temperature" adjustment (visible only with active climatic adjustment. See section 7.8).	Setting range: See section 7.8.2
b	Line parallelism adjustment as per figures 32 and 33 (visible only with active climatic adjustment. See section 7.8).	Display only The adjustment is made by means of the knob "9" shown in figure 1 and the possible values are between -10°C and +10°C
c	Displaying the calculated heating temperature (if the climatic adjustment is active, see section 7.8) or the set temperature by means of the knob "9" shown in figure 1.	Display only It can assume values between 20°C and 80°C
d	Displaying the set domestic water temperature by means of the knob "8" shown in figure 1.	Display only It can assume values between 40°C and 70°C
E	Displaying the last registered error.	Display only It can assume the values indicated in section 7.16.2
L	Displaying the last block occurred.	Display only It can assume the values indicated in section 7.16.1

7.15 - "Installer menu"



CAUTION !!!

Changing these parameters could cause malfunction of the boiler, and thus of the system. Therefore, only a technician having a detailed knowledge of the appliance should change them.

Thanks to the boiler microprocessor, this parameter menu is available to the technician for the analysis of the operation and of adaptation of the appliance to the system.

As you access the "Installer menu", the parameter display "7" shown in figure 1 flashes, thus indicating the successful mode switch.

To access the "Installer menu" just:

- hold the button **Reset** for 12 seconds until the parameter **U I** is displayed;
- by continuously pressing and releasing the button **Reset** the parameter list is scrolled;
- Once the parameter has been identified, it can be changed using the button **+** or **-**;
- By pressing and releasing the button **Reset**, the modified parameter is confirmed and one passes on to the next parameter.
- Once the end of the menu has been reached, with the last **Reset**, the display "7" shown in figure 1 stops flashing, thus indicating that the user exited the menu.

If no button is pressed for more than 60 seconds, the menu will be automatically exited. If not confirmed using the button **Reset**, any datum variation will be lost. The following parameters can be modified or consulted from this menu:

7 - USE

PARAMETER	DESCRIPTION	DISPLAYING ON DISPLAY "7" SHOWN IN FIGURE 1
U1	Boiler and heating supply temperature measured by sensor U1	Value in °C (cannot be changed)
U2	Not present in this boiler model	Value in °C (cannot be changed)
U3	Temperature of a possible water heater, measured by sensor U3	Value in °C (cannot be changed)
U4	External temperature, measured by sensor U4	Value in °C (cannot be changed) (can be displayed only if the climatic adjustment is active, as specified in section 7.8)
U5	Measured ionization current	Value from 0 to 99 (30 corresponds to a current of 1uA, 99 corresponds to a current of 5.5 uA) (cannot be changed)
U6	Boiler temperature, gauged by U6 sensor	Value in °C (cannot be changed)
U7	Flue gas temperature, measured by sensor U7	Value in °C (cannot be changed)
U8	Return temperature, measured by sensor U8	Value in °C (cannot be changed)
tY	Type of basic setting of the control board	Can be changed following the instructions in the gas change kit
r t	Status of room thermostat contact	00 = open contact (heating service off) 01 = closed contact (heating service on)
F	Measurement of fan rotation speed	Value in g/(1'x100) (rpm/100) (cannot be changed)
P	Power set for heating service	Adjustable following to the instructions of section 6.9
CH	Operating mode of the heating service	Can be changed: 00 = thermostatic adjustment (see section 7.7); 01 = climatic adjustment (see section 7.8); 02 = climatic adjustment with room compensation (see section 7.8.5);
Cn	Reaction to the external temperature variations	Can be changed from 1 to 10 (active only with climatic adjustment). See section 7.8.2 on how to adjust it.
br	Angle fulcrum of the climatic adjustment line	Can be changed: from -9 to 65 (active only with climatic adjustment) See section 7.8.2 on how to adjust it.
t n	Temperature reduction due to the opening of the room thermostat	Can be changed: from 1 to 20 (active only with climatic adjustment with room compensation) See section 7.8.5 on how to adjust it.
L	Boiler knobs' status	Can be changed: 01 = knobs present; 00 = knobs absent
S	Energy saver of display "7" shown in figure 1	Can be changed: 00 = display always on; any other value corresponds to the display turn off delay expressed in minutes (see also section 7.13)
PS	Parameter not available for this boiler model	For this boiler model it should be left at 03

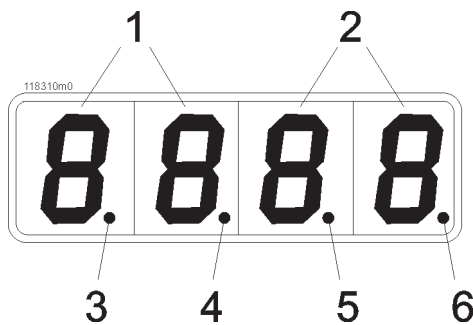
7 - USE

7.16 - Diagnostics

During the appliance normal operation, the display "7" shown in figure 1 continuously shows the appliance working status by means of the following indications:

PARAMETER	DESCRIPTION	DISPLAYING ON DISPLAY "7" SHOWN IN FIGURE 1
0	Boiler in stand-by or paused (no heating nor domestic water request)	Boiler temperature (°C)
P	Anti-freeze function active	Boiler temperature (°C)
A	Boiler not locked out but in warning status (turn OFF the domestic hot water to restore heating). Should this not solve the problem, contact a qualified technician.	01 = Boiler temperature (°C) Domestic hot water active for more than 120 minutes (turn OFF the domestic hot water to restore heating). Make sure that no cock is leaking. Should this not solve the problem, contact a qualified technician. 02 = Interruption of the communication between in series boilers
FILL	Caution !!! system pressure too low, carry out the loading (see section 6.1.3)	No display
d	Domestic water service on	Domestic water temperature (°C)
C	Heating service on	Heating temperature (°C)
L	Boiler locked out. Press button Reset to reset. Should the lock-out occur frequently, please contact a qualified technician	Lock code (see section 7.16.1 for decoding).
E	Boiler faulty. Contact a qualified technician.	Error code (see section 7.16.2 for decoding).
F	Self drainage procedure on (see section 6.5.1). It will end in 2 minutes	Boiler temperature (°C)
AL	Antilegionella procedure on (see section 5.15.1). It will end as soon as the water inside the water heater reaches a 60°C temperature.	Water heater temperature (°C)

DISPLAY (detail "7" shown in figure 1)



- 1 - Parameter display.
- 2 - Display of values adopted by parameters.
- 3 - Burner status indicator.
On = burner on;
flashing = burner off.
- 4 - Domestic water service status indicator.
On = domestic hot water active;
Off = domestic hot water off.
- 5 - Decimal indicator of the displayed value.
- 6 - Heating service status indicator.
On = heating active;
Off = heating off.

7 - USE

7.16.1 - Diagnostics: "L" locks

"L" code	Lock description	Checking	Solutions
L01	No flame detected after three consecutive start-up attempts.	<p>Check: gas supply pressure (see section 6.6), sparks on the ignition electrodes (see section 8.6); correct pressure of the comburent air (see section 6.7); 220Vac power supply to the gas valve; electrical resistance of the two gas valve coils of 0.88 Kohm and 6.59 Kohm</p> <p>If the burner turns on and off after a start-up attempt, check: that the ionization current value is greater than 60 (follow the procedure in section 8.9.4).</p>	<p>If the supply pressure is not correct, restore it by operating upstream of the appliance; if the comburent air pressure is not correct, remove any possible obstruction from the comburent air intake/flue gas discharge circuit; if current to the gas valve is not 230Vac, replace the control board; if the electrical resistance of the gas valve is not 0.88 Kohm and 6.59 Kohm, replace the valve.</p> <p>If the ionization current is lower than 60, check the CO2 (follow section 6.8) and restore the correct value, check the ionization glow plug and replace it if necessary, check the integrity of the cables of the ionization current electric circuit.</p>
L02	Flame lost three times.	<p>Check: that the ionization current value is greater than 60 (follow the procedure in section 8.9.4)</p> <p>Check: that the flue gas discharge is properly protected to prevent obstructions caused by wind gusts.</p>	<p>If the ionization current is lower than 60, check the CO2 (follow section 6.8) and restore the correct value, check the ionization glow plug and replace it if necessary, check the integrity of the cables of the ionization current electric circuit.</p> <p>If the flue gas discharge is on a vertical wall, protect it with a windproof grill; if the flue gas discharge is on the roof, check that it is not on a reflux area and that the windproof chimney cap, if present, is really efficient.</p>
L03	Boiler temperature exceeds 95°C.	Check that the pump is working	Restore water circulation or replace the control board
L04	Gas valve control relay		Replace the control board
L05	Safety relay or earth inefficient	Check the grounding of the appliance	If the grounding is efficient, replace the control board.
L06	Flue gas sensor exceeds 110°C	Check that the electrical resistance of the flue gas sensor corresponds to the graph in section 8.10; check that the boiler efficiency is greater than 96% as necessary	Replace the sensor if it is not within the correct values; if the boiler efficiency is below 96% and the operating parameters are correct, replace the primary heat exchanger and place a filter on the intake of the heating return fitting.
L07	Flue gas sensor electric circuit, broken	Check that the electrical resistance of the flue gas sensor corresponds to the graph in section 8.10;	Replace the sensor if it is not within the correct values;
L08	Spark generator relay		Replace the control board
L09	RAM memory		Replace the control board
L10	E2prom memory damaged		Replace the control board
L12	E2prom memory damaged		Replace the control board
L13	Program error		Replace the control board
L14	Program error		Replace the control board
L15	Program error		Replace the control board
L16	Program error		Replace the control board

7 - USE

"L" code	Lock description	Checking	Solutions
L17	Temperature difference between U1 and U6	<p>Check that the electrical resistance of the two sensors corresponds to the graph in section 8.10;</p> <p>Check that the heating circuit flow rate is not too low; If one or both sensors are not within the correct values, replace them;</p>	Should the temperature difference between U1 and U8 be greater than 13°C to maximum power and the heating circuit flow rate be low, increase the flow rate;
L18	Program error		Replace the control board
L19	Gas valve: flame heard for 10 seconds after closing the valve		Replace the gas valve or the control board
L20	Gas valve: flame heard before opening the gas valve.		Replace the gas valve or the control board
L25	U1 and U6 increase their temperature too fast.	<p>Check that the heating circuit flow rate is not too low;</p> <p>Check that the pump is running;</p>	<p>Should the temperature difference between U1 and U8 be greater than 13°C to maximum power and the heating circuit flow rate be low, increase the flow rate;</p> <p>Replace the pump or the control board</p>
L32	Program error		Replace the control board
L33	Fan rotation error	Check that it is powered at 300 Vdc.	If the fan is powered differently, replace the board.
L45	Heating circuit loading time more than 10 minutes.	Check the calibrating pressure of the pressure switch: when pressure drops below 0.6 bar the message FILL shall be displayed; check that there is no water leaking from the heating system.	Replace the pressure switch if it is not properly calibrated; repair any possible leaking in the system.
L46	Heating circuit load repeated 16 times in 24 hours	Check the calibrating pressure of the pressure switch: the message FILL shall be displayed when pressure drops below 0.6 bar and disappear when pressure rises above 1.5 bar; check that there is no water leaking from the heating system	Replace the pressure switch if it is not properly calibrated; repair any possible leaking in the system.
L47	Electric circuit of the flue gas temperature sensor U7 open for more than 60 minutes	Check that the electrical resistance of the flue gas sensor corresponds to the graph in section 8.10	Replace the sensor if it is not within the correct values.

7 - USE

7.16.2 - Diagnostics: "E" errors

"E" code	Lock description	Checking	Solutions
E01	Circuit of the boiler temperature sensor U1, broken.	Check that the electrical resistance of the sensor corresponds to the graph in section 8.10; check the electrical cables connecting the probe to the control board	Replace the probe electrical resistance if it does not correspond; repair the electric circuit if damaged; if none of the previous cases is true, replace the control board
E02	Circuit of the boiler supply temperature sensor U2, broken.	Check that the electrical resistance of the sensor corresponds to the graph in section 8.10; check the electrical cables connecting the probe to the control board	Replace the probe electrical resistance if it does not correspond; repair the electric circuit if damaged; if none of the previous cases is true, replace the control board
E04	Circuit of the heating return temperature sensor U8, broken	Check that the electrical resistance of the sensor corresponds to the graph in section 8.10; check the electrical cables connecting the probe to the control board	Replace the probe electrical resistance if it does not correspond; repair the electric circuit if damaged; if none of the previous cases is true, replace the control board
E07	Circuit of the water heater temperature sensor U3, broken.	Check that the electrical resistance of the sensor corresponds to the graph in section 8.10; check the electrical cables connecting the probe to the control board	Replace the probe electrical resistance if it does not correspond; repair the electric circuit if damaged; if none of the previous cases is true, replace the control board
E08	Circuit of the boiler temperature sensor U6, broken.	Check that the electrical resistance of the sensor corresponds to the graph in section 8.10; check the electrical cables connecting the probe to the control board	Replace the probe electrical resistance if it does not correspond; repair the electric circuit if damaged; if none of the previous cases is true, replace the control board
E11	Circuit of the boiler temperature sensor U1, short-circuited.	Check that the electrical resistance of the sensor corresponds to the graph in section 8.10; check the electrical cables connecting the probe to the control board.	Replace the probe electrical resistance if it does not correspond; repair the electric circuit if damaged; if none of the previous cases is true, replace the control board
E12	Circuit of the boiler supply temperature sensor U2, short-circuited	Check that the electrical resistance of the sensor corresponds to the graph in section 8.10; check the electrical cables connecting the probe to the control board	Replace the probe electrical resistance if it does not correspond; repair the electric circuit if damaged; if none of the previous cases is true, replace the control board.
E13	Wrong temperature reading.		Replace the control board
E14	Circuit of the heating return temperature sensor U8, short-circuited	Check that the electrical resistance of the sensor corresponds to the graph in section 8.10; check the electrical cables connecting the probe to the control board	Replace the probe electrical resistance if it does not correspond; repair the electric circuit if damaged; if none of the previous cases is true, replace the control board.
E15	Circuit of the external temperature sensor U4, short-circuited	Check that the electrical resistance of the sensor corresponds to the graph in section 8.10; check the electrical cables connecting the probe to the control board	Replace the probe electrical resistance if it does not correspond; repair the electric circuit if damaged; if none of the previous cases is true, replace the control board.

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"E" code	Lock description	Checking	Solutions
E16	Wrong temperature reading.		Replace the control board
E17	Circuit of the water heater temperature sensor U3, short-circuited.	Check that the electrical resistance of the sensor corresponds to the graph in section 8.10; check the electrical cables connecting the probe to the control board.	Replace the probe electrical resistance if it does not correspond; repair the electric circuit if damaged; if none of the previous cases is true, replace the control board.
E18	Circuit of the boiler temperature sensor U6, short-circuited.	Check that the electrical resistance of the sensor corresponds to the graph in section 8.10; check the electrical cables connecting the probe to the control board.	Replace the probe electrical resistance if it does not correspond; repair the electric circuit if damaged; if none of the previous cases is true, replace the control board
E19	E2prom memory damaged		Replace the control board
E20	Flame with gas valve closed Replace the gas valve		
E21	Phase and neutral, inverted.		Invert phase and neutral
E22	Mains frequency different from 50Hz	Have the system mains frequency checked.	If the mains frequency is different from 50Hz contact the electricity distributor; if the mains frequency is 50Hz, replace the control board.
E23	No ground connection Have the system grounding	checked. Restore the correct system	grounding. If the grounding is efficient, replace the control board.
E30	Wrong temperature reading.		Replace the control board
E31	Wrong temperature reading.		Replace the control board
E32	Wrong temperature reading.		Replace the control board
E33	Wrong temperature reading.		Replace the control board
E42	Program error or inefficient grounding	Have the system grounding checked.	Restore the correct system grounding. If the grounding is efficient, replace the control board.
E50	Boiler TYPE selection error	Check the SWITCHES as described in section 7.10.	If the selector switches are in the correct position, replace the control board
E51	Reset button pressed too often in a short time		

8 - MAINTENANCE

8.1 - General warnings

Regular annual maintenance of the heating systems is necessary for the following reasons:

- to maintain high performances and to manage the heating system efficiently (with low fuel consumption);
- to obtain high operating safety;
- to keep the combustion environmental compatibility level high;



CAUTION!!! Maintenance operations shall only be carried out by qualified technicians.



CAUTION!!! Before any maintenance operation, disconnect the appliance from the mains supply by means of the nearby appropriate switch.



CAUTION!!! Close the gas cock before any maintenance operation.

8.2 - Assembling the casing

The standard boiler is supplied with the casing assembled

8.3 - Disassembling the casing and accessing the internal components

To access the internal parts of the boiler, proceed as follows (refer to figure 35):

- Unscrew screws "A"
- Pull out casing "B" from the bottom pulling first towards yourself and then downwards;

To access the main electrical connection terminal boards

- Rotate the connection panel "C" downwards
- Open hook "D"
- Open the left side cover "E" and pull it to the right;

To access the internal components of the MASTER and SLAVE modules control panel

- Use hooks "F" and rotate panels "G";

To access the modules electrical connection board

- Unscrew screws "H" and remove the cover;

To access the module control board

- Pull the tongues "L" to the side then pull the access cover towards yourself while opening the panel.

To access the internal components of the sealed chamber

- Pull out the cover "M" first from the bottom towards yourself, then lift it until it comes out of the upper fastening pins;

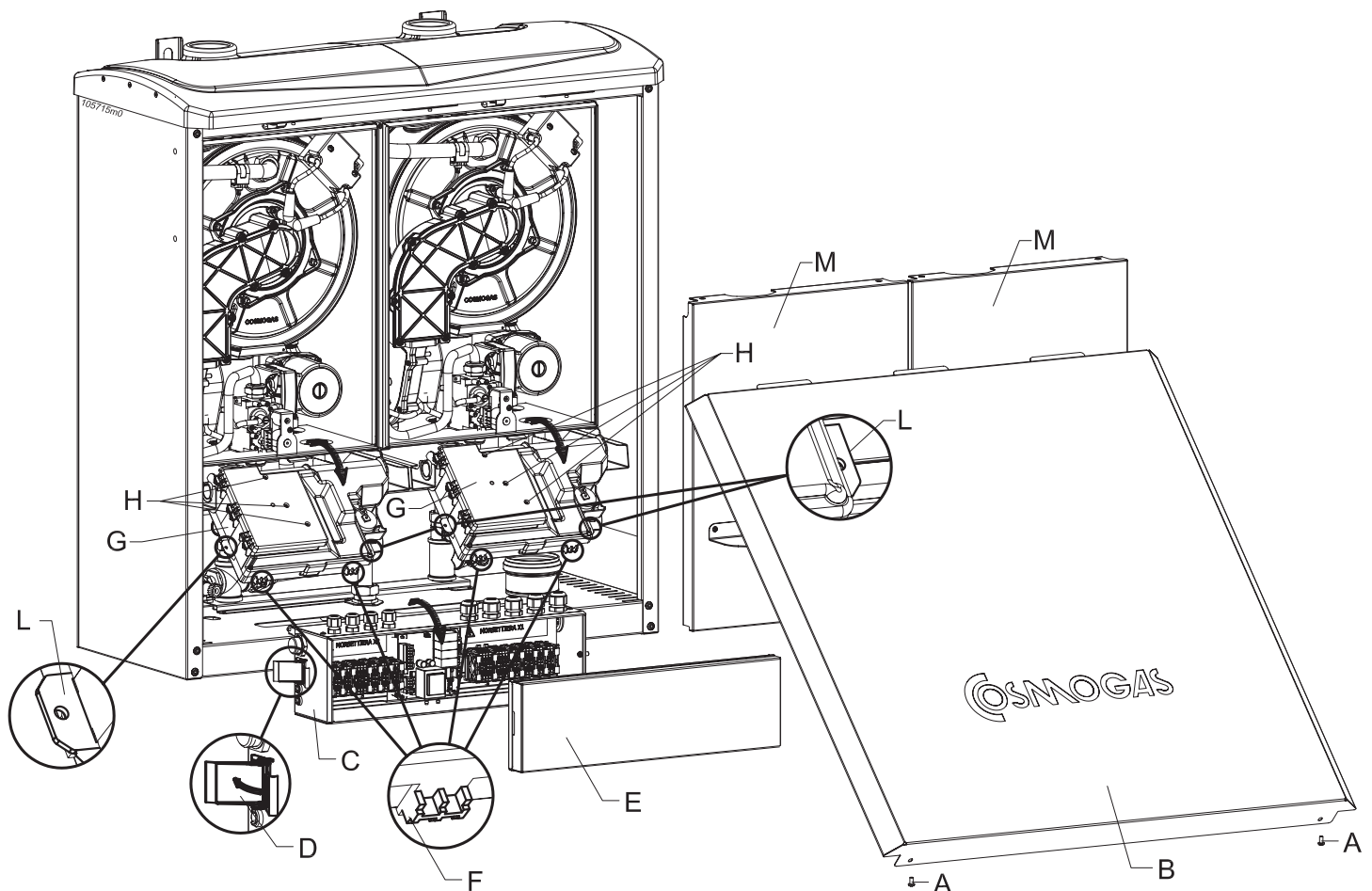
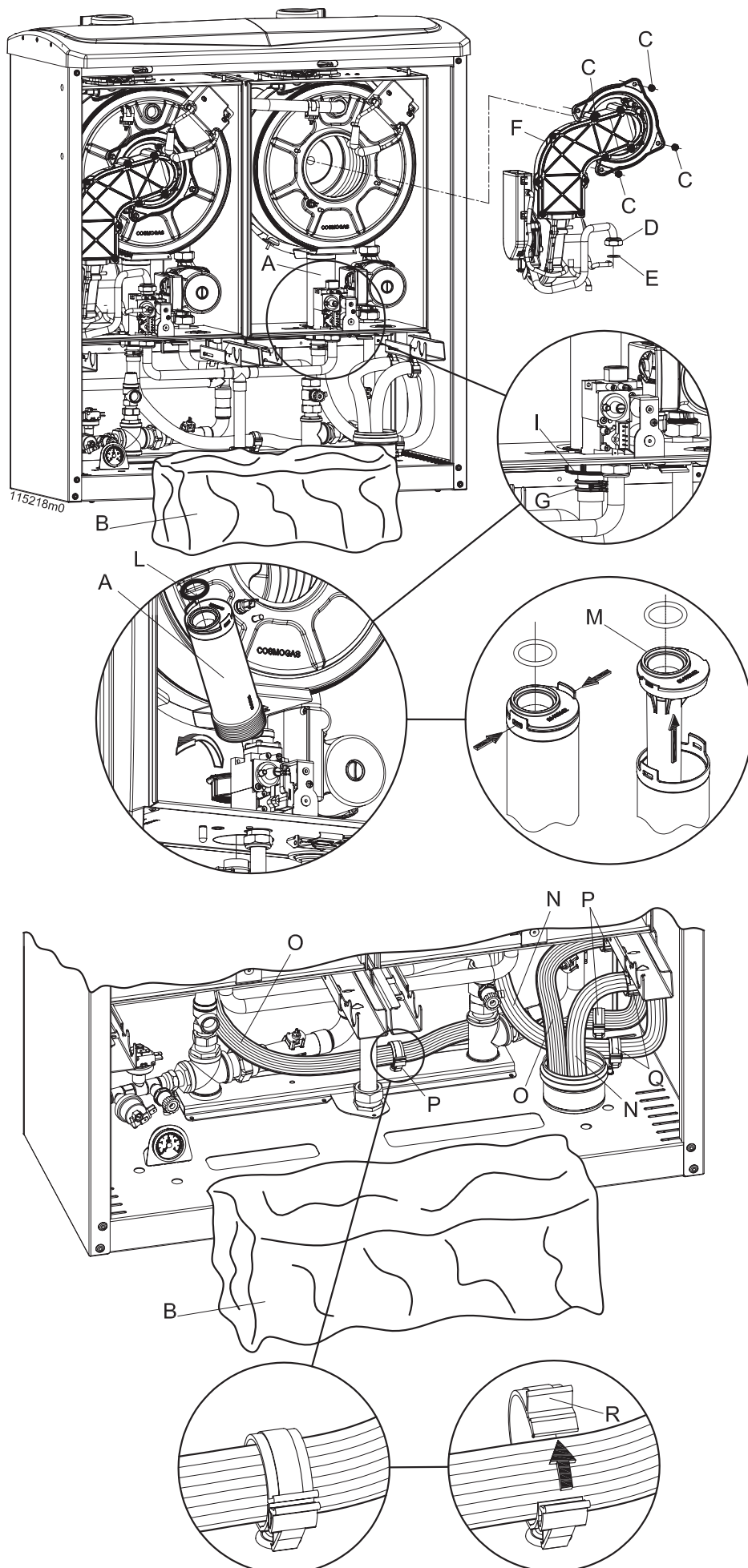


Figure 35 - Casing assembly and disassembly and access to the internal components



8.4- Cleaning the condensate conveyor trap

For a correct cleaning of the trap for the collection and conveying of the combustion condensates, proceed as follows in both thermal elements (where not otherwise specified, refer to figure 36):

- perform a domestic water service forcing as described in section 8.9.3 with the purpose of lowering the liquid level inside the trap "A";
- access the internal components by following the instructions in section 8.3;
- unscrew fitting "D";
- disconnect the cables from the ignition and burner plugs (see figure 1 details "17", "18" and "20");
- disconnect the cable from the safety sensor "F" (see figure 37);
- unscrew the four nuts "C";
- extract the whole fan and burner unit, detail "F" remembering to disconnect the fan power cable during the extraction;
- rotate the electrical board (detail "C" shown in figure 35) as indicated in section 8.3 and cover it with a waterproof sheet "B", to prevent water drops from filtering and wetting the electric components inside it;
- loosen spring "G" by using pliers and push it downwards;
- pull the condensation pipes "O" and "N" downwards by opening the special locks "P" and "Q", paying attention to their positioning in order to reassemble them once finished;
- unscrew ring nut "I";
- pull trap "A" upwards paying attention because it contains condensate water that may come out as you rotate it outwards;
- open the trap and clean its interior;
- reassemble everything by proceeding in reverse order, making sure that the seal "L" is put back in the proper seat and rearranging the two pipes "O" and "N" as indicated before;
- restore the liquid level inside the trap by pouring 100 cm³ of water (a glass) from the flue gas discharge or from its central opening, proceeding as indicated in section 6.1.2.

Figure 36 - Condensate collection trap preparation and disassembly

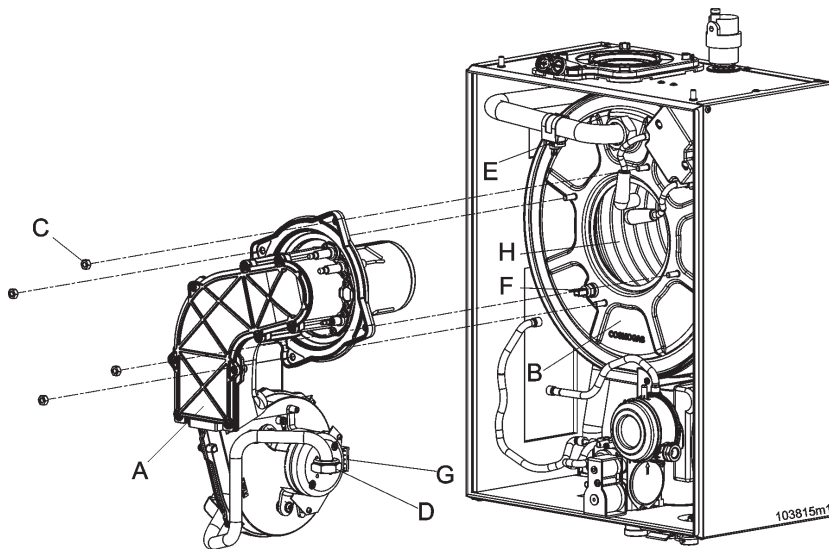


Figure 37- Fan-burner unit disassembly

8.5 - Cleaning the burner and the primary heat exchanger, flue gas side

To correctly clean the burner and the heat exchanger body (flue gas side), proceed as follows (refer to figure 37 unless otherwise specified):

- access the internal components by following the instructions in section 8.3;
- unscrew nut "D";
- disconnect the cables from the ignition and from the detector glow plug (see figure 1 details 17, 18 and 20);
- disconnect the cable from the safety sensor "F";
- unscrew the four nuts "C";
- extract the whole fan and burner unit, detail "A";
- Clean the combustion chamber interior "H" by means of a cylindrical plastic bristle brush;
- remove any unburned residue from the combustion chamber "H" by means of a vacuum cleaner;
- with the same vacuum cleaner clean the burner surface and the area around the electrodes;
- reassemble the components by proceeding in reverse order;
- open the gas cock;
- restore normal electrical power.
- make sure that there are no gas leaks from the removed joints;

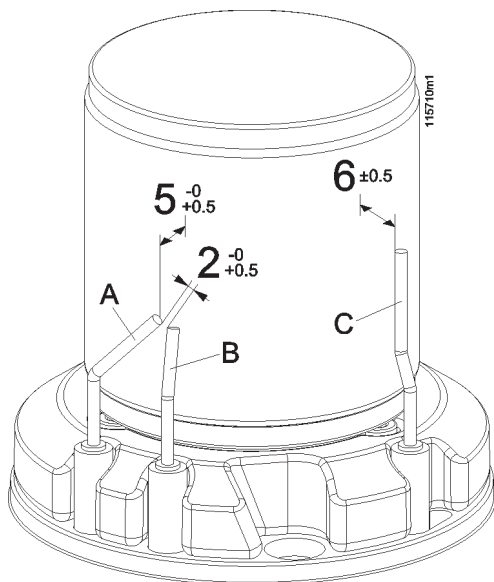


Figure 38 - Electrode positioning on the burner

8.6 - Correct positioning of the ignition and ionization electrodes

To ensure an efficient appliance operation, the correct electrode positioning is fundamental (please refer to figure 38):

- ☞ the distance between the ignition electrodes tips "A" and "B" must be between 2 and 2.5 mm;
- ☞ the distance between the ignition electrodes and the burner surface must be between 5 and 5.5 mm;
- ☞ the distance between the ionization electrode and the burner surface must be between 5,5 and 6,5 mm.

8 - MAINTENANCE

8.7 - Pump motor replacement

Should it be necessary to replace the circulating pump, proceed as follows (refer to figure 39)

- empty the heating circuit by following the procedure in section 8.8;
- access the appliance internal components by following the instructions in section 8.3;
- remove screws "B";
- pull the pump "A" outwards;
- disconnect the electrical wires from the pump body.

8.8 - Emptying the appliance

To empty the boiler from the heating side, proceed as follows:

- cool down the water inside the boiler by closing the room thermostat and turning the knob "9" shown in figure 1 to the minimum. Wait until the temperature on the display "7" in figure 1 is at least 40°C;
- turn off the boiler;
- access the internal components by following the procedure in section 8.3;
- connect a flexible rubber hose to the discharge cock "22" (see figure 1) and place the other end in a sink plughole or similar;
- open the discharge cock "22" (see figure 1);
- open the bleeding valves of the radiators. Start from the upper

radiators and continue with the lower ones;

- After draining out all the water, close the radiator bleed valves and the discharge cock "22" (see figure 1);

CAUTION!!! Do not recover and/or re-use water drained from the heating circuit for any purpose as it could be contaminated.

8.9 - Forcing

For the purpose of carrying out some specific verifications described throughout the manual, it is possible to perform some forcing of the appliance operation.

8.9.1 - Self drainage

The self drainage procedure can be reset by pressing the buttons **+** and **-** together for 10 seconds until the letter F appears on the display. Then press button **Reset**.

8.9.2 - Fan

It is possible to turn on only the fan by pressing the buttons **+** and **-** together for 10 seconds, until the letter F appears on the display. Now the fan will be on for 10 minutes. Press button **Reset** to exit the forcing beforehand.

8.9.3 - Minimum and maximum power

It is possible to force the appliance operation to the minimum or maximum power both in heating and in domestic water service. Proceed as follows:

- generate a request for the service you want to force:
 - heating: close the room thermostat and rotate knob "9" shown in figure 1 to the maximum;
 - domestic water: rotate knob "8" shown in figure 1 to the maximum and open the hot water cock completely;
- press buttons **+** and **-** together for more than 10 seconds until **F** is displayed;
- press button **+** until the display shows:
 - **t** to force heating to the minimum power;
 - **T** to force heating to the maximum power;
 - **S** to force domestic water to the minimum power;
 - **S** to force domestic water to the maximum power;
- press button **Reset** to bring the boiler back to normal operating conditions.

8.9.4 - Verifying the ionization current

During the minimum and maximum power verifications (see section 8.9.3), the display shows the letter t or S corresponding to the checked service and at the same time the ionization current value on the lower part of the display. To value 30 corresponds a 1 uA current, to value 99 corresponds a 5.5 uA current. Such value shall always be comprised between 75 and 80.

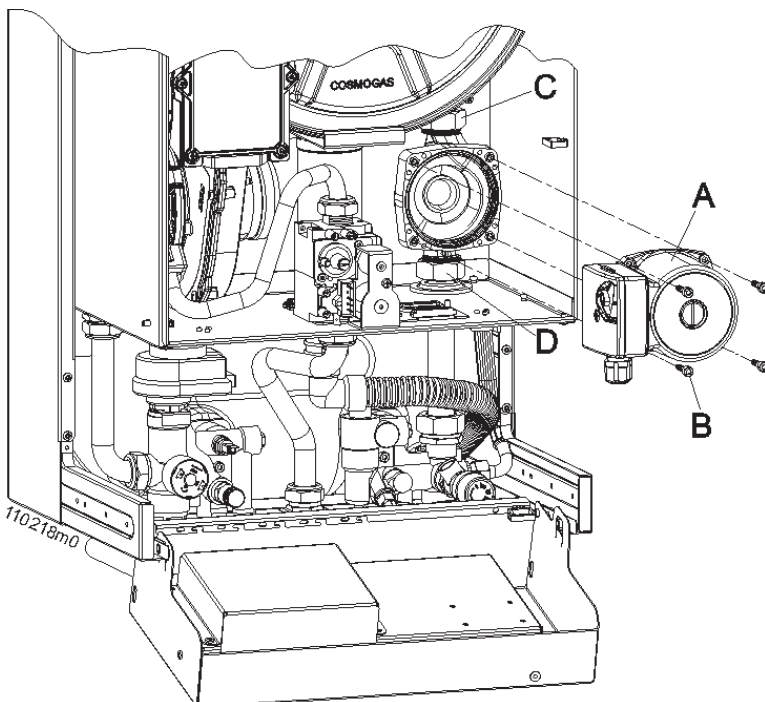


Figure 39 - Pump motor replacement

8 - MAINTENANCE

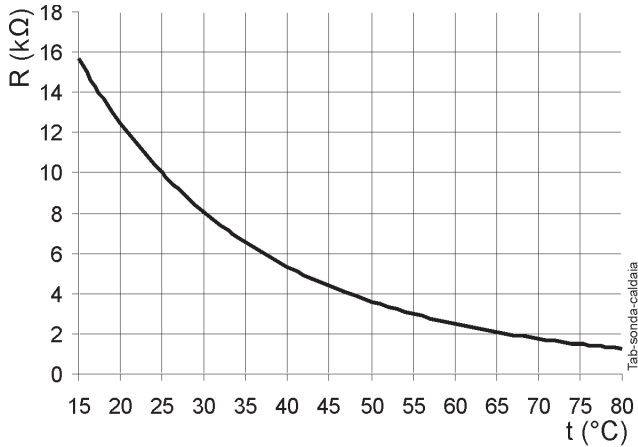


Figure 40- Water sensor curve

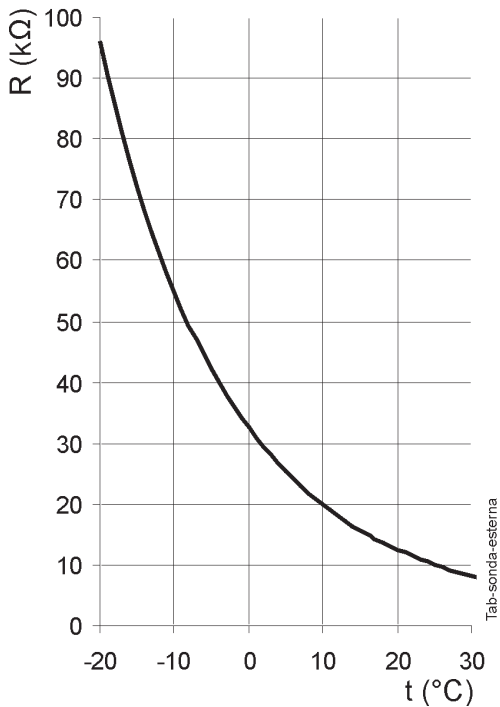


Figure 41 - External temperature sensor curve

8.10 - Water temperature measuring probe

A number of sensors measuring temperature are present on the boiler's heat exchanger. The electrical resistance existing between the two sensor contacts shall correspond to the values in figure 40.

The temperature probes are: U1; U3, U5, U6, U7 and U8 whose positioning can be verified in figures 1, 42 and 43.

8.11 - External temperature sensor

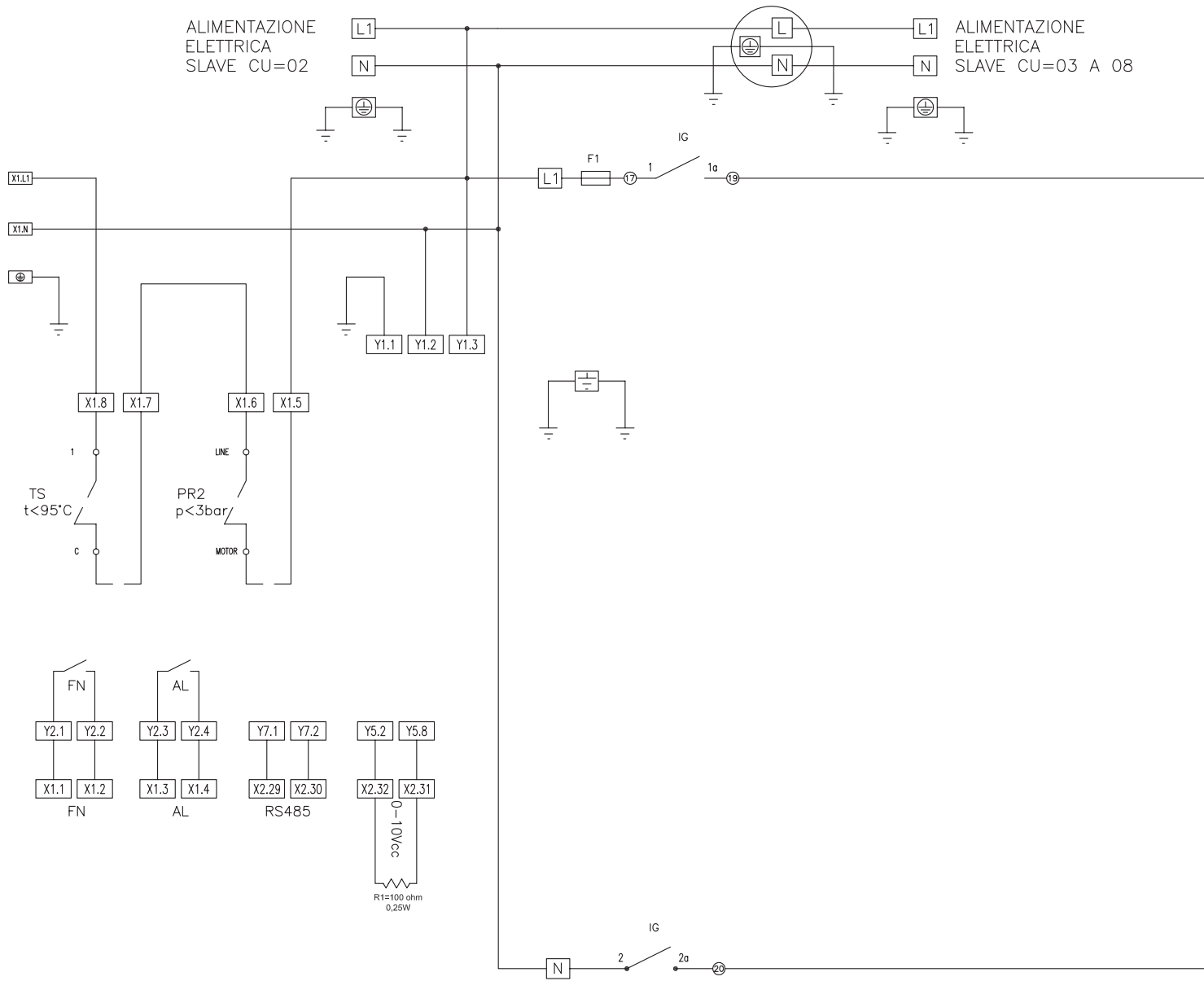
The external temperature sensor (U4) can be connected to the boiler (see section 5.12.5 and 7.8). The electrical resistance existing between the two sensor contacts shall correspond to the values in figure 41.

8.12 - Verifying the combustion efficiency

☞ According to the national laws regarding the maintenance of gas appliances, combustion efficiency shall be checked regularly;

To do so proceed exactly as described in section 6.8 and check the CO₂ as well as the combustion efficiency which shall be greater than 96%.

8.13 - Functional wiring diagram



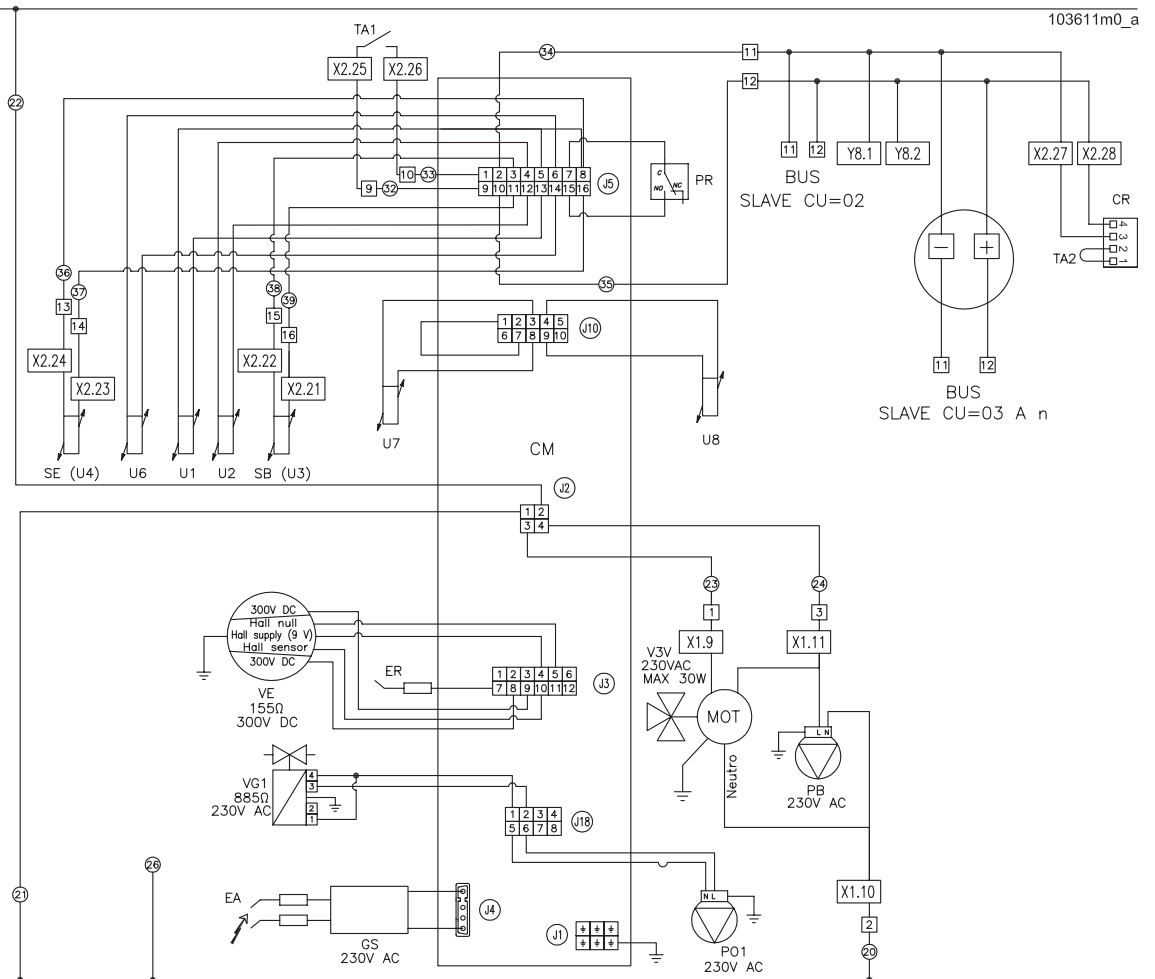
0-10Vcc - Analogical signal input
 0-10Vcc
 AL - Warning electrical contact
 BUS - Connection for PC
 CM - Control board
 CR - Remote control (on request)
 EA - Ignition electrodes
 ER - Detector electrode
 F1 - Power supply fuse 1.6A
 FN - Function electrical contact
 GS - Spark generator
 IG = Main switch
 J1 - 6-pole connector

J2 - 4-pole connector
 J3 - 12-pole connector
 J4 - 4-pole connector
 J5 - 16-pole connector
 J10 - 10-pole connector
 J18 - 8-pole connector
 U1 - Boiler unit probe 1
 U2 - Boiler supply probe
 SB(U3) - Water heater probe (on request)
 SE (U4) - External temperature sensor
 U6 - Boiler unit probe 2
 U7 - Flue gas temperature sensor

U8 - Return temperature sensor
 PB - Water heater pump
 PO1 - Circulating pump
 PR - No-water pressure switch
 PR2 - ISPESEL safety pressure switch
 TA1 - Room thermostat bridge inside boiler
 TA2 - Room thermostat bridge on remote control (on request)
 TS - ISPESEL safety thermostat
 VE - Fan
 VG1 - Gas valve
 V3E - External diverter valve for domestic water/heating

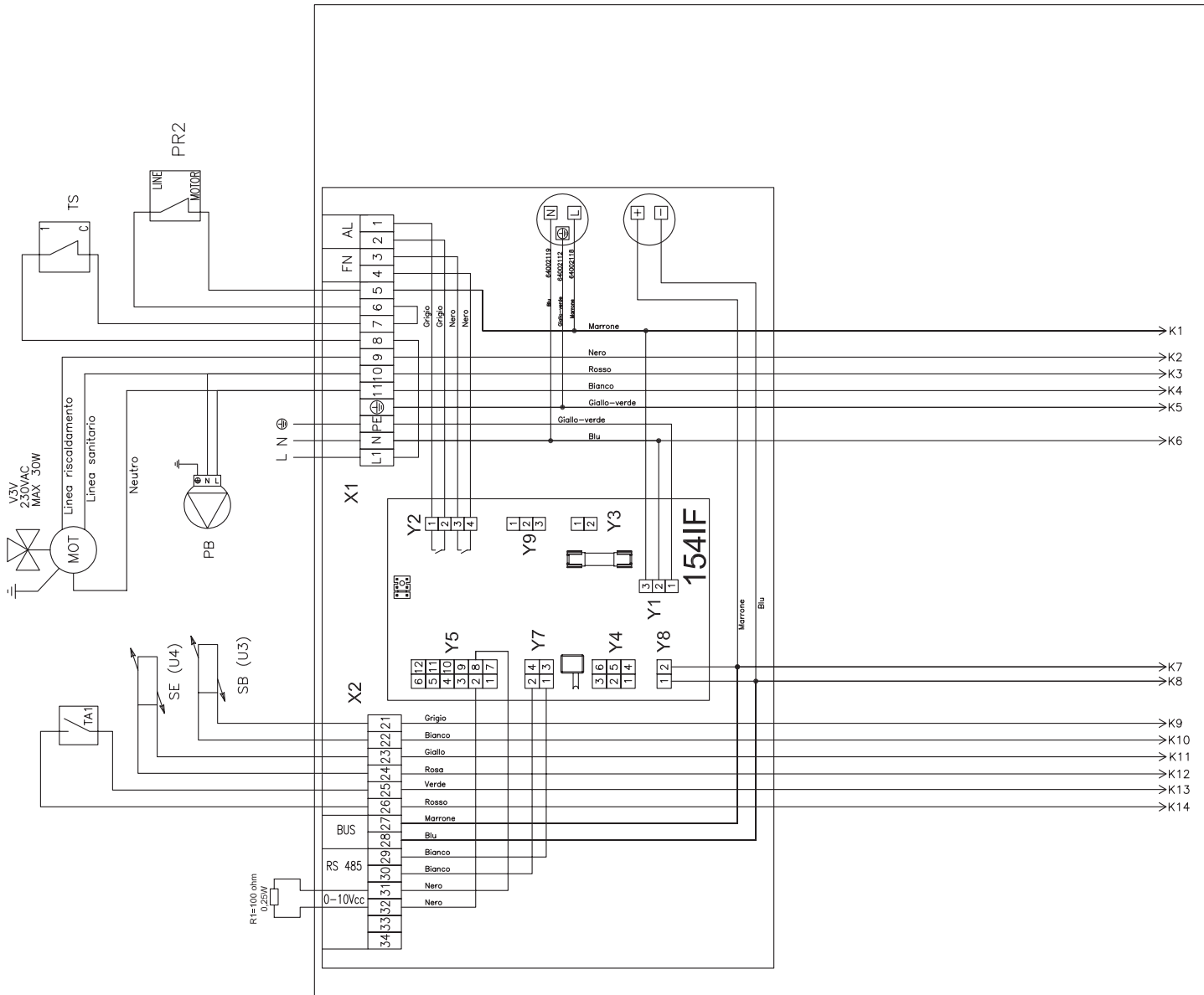
Figure 42 - Functional wiring diagram

8 - MAINTENANCE



8 - MAINTENANCE

8.14 - Multiwire wiring diagram



CAUTION!!! For a correct reading of the wiring diagram, we have indicated the K references followed by a number (see example to the side) in order to identify the correct cable continuation on the following page.

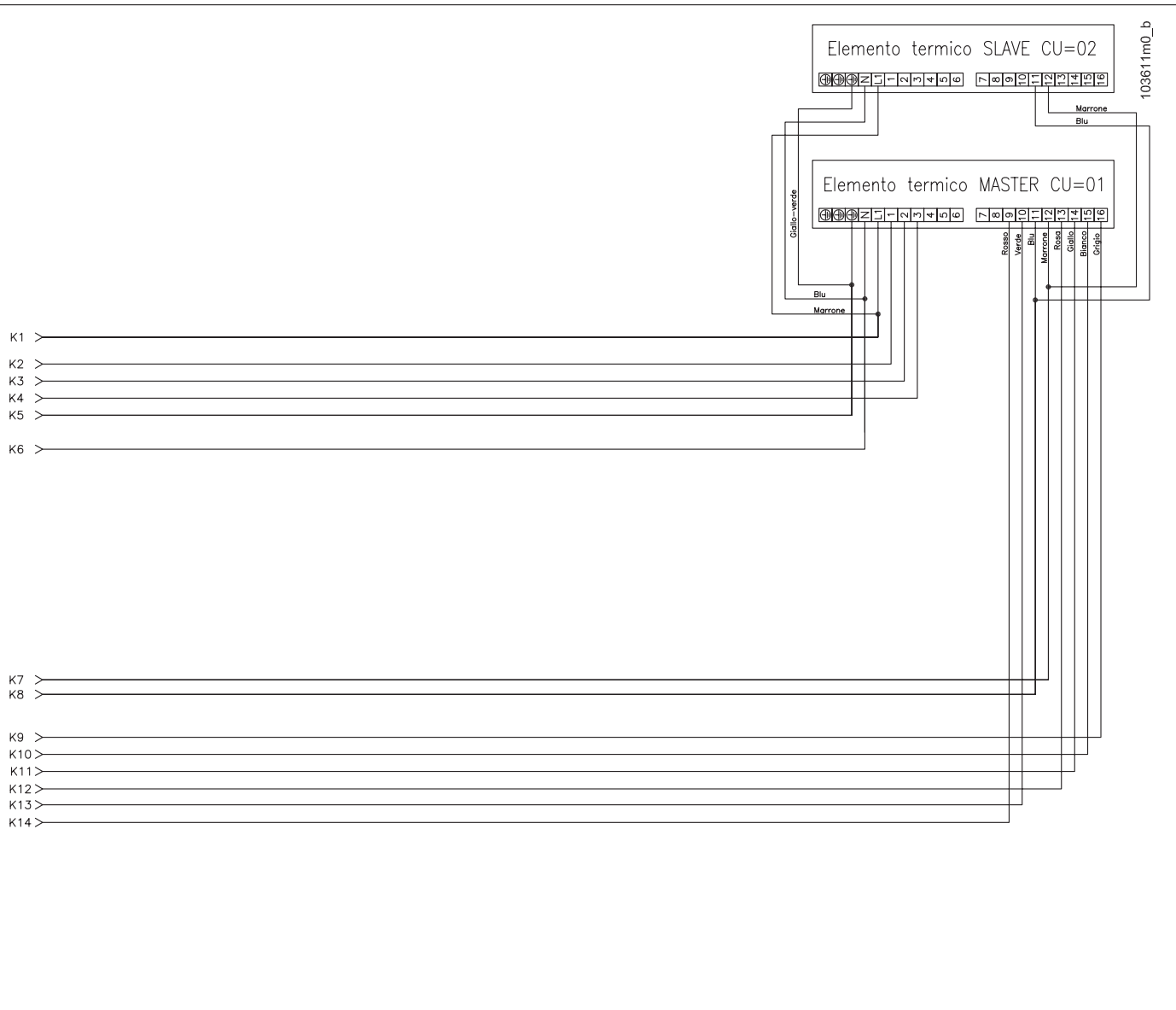
102611m2_g1



Key - see key to figure 42

Figure 43 - Multi-wire wiring diagram

8 - MAINTENANCE



9 - TECHNICAL DATA

MODEL		DUAL 2-34	DUAL 4-50
Country of delivery		ITALY	ITALY
Type		B23	B23
Category		II2H3P	II2H3P
EC-type certificate (PIN)		0694BR1222	0694BR1222
(Nominal) heat input "Q"=	kW	28	51
Minimum heat input	kW	2,5	4,4
(Nominal) output heat (80/60) "P" =	kW	27,6	49,4
(Nominal) output heat (50/30) "P" =	kW	28,8	52,0
Efficiency at 100% of load (80/60)	%	97,9	96,8
Efficiency at nominal output heat (50/30)	%	103,1	104
Minimum output heat (80/60)	kW	2,4	4,3
Minimum output heat (50/30)	kW	2,7	4,6
Efficiency at minimum output heat (80/60)	%	97	97,1
Efficiency at 30% of load	%	109,7	108,8
Efficiency at minimum output heat (50/30)	%	105	104
Certified efficiency (92/42/EEC)	stars	★★★★	★★★★
Chimney loss burner on (80/60)	%	1,5	1,5
Chimney loss burner off	%	0,2	0,2
Casing loss burner on	%	0,5	0,5
Casing loss burner off	%	0,1	0,1
Gas flow rate	Methane m ³ /h	2,96	5,4
	LPG kg/h	2,18	3,96
Gas supply pressure (mbar)	Methane mbar	20	20
	LPG mbar	37	37
Gas supply minimum pressure (mbar)	Methane mbar	15	15
	LPG mbar	25	25
Gas supply maximum pressure (mbar)	Methane mbar	30	30
	LPG mbar	45	45
Comburent air pressure	Methane mbar	11,4	8,8
	LPG mbar	9,8	6,8
Primary heat exchanger water content	l	4+4	4+4
Primary heat exchanger weight	kg	11+11	11+11
D.h.w. setting range with water heater	°C	40-70	40-70
Project temperature	°C	95	95
Maximum heating temperature	°C	80	80
Minimum heating temperature	°C	20	20
Maximum heating pressure "PMS" =	bar	4	4
Minimum heating pressure	bar	1	1
Nominal power supply voltage	V	230	230
Nominal power supply frequency	Hz	50	50
Absorbed electric power	W	250	250
Electrical protection degree		IPX5D	IPX5D
Flue gas pipe diameter (split)	mm	80	80
Flue gas pipe max length (split)	m	40	40
Curve equivalent length	m	45° curve = 0.5m, 90° curve =1m	
CO (0% O2 with methane)	ppm	1	8
NOx (0% O2 with methane) (class 5 EN 483 and 297)	ppm	11	13
CO2 (%) maximum power/minimum power	Methane	8,5/9,0	8,5/9,0
	LPG	10/10,5	10/10,5
Maximum flue gas temperature at boiler outlet	°C	80	90
Flue gas mass flow	kg/h	50	84
Head available at discharge	Pa	60	60
Maximum condensate flow	l/h	3,8	6
Condensate average acidity degree	PH	4	4
Boiler weight	kg	98	98

9 - TECHNICAL DATA

MODEL		DUAL 6-70	DUAL 8-90
Country of delivery		ITALY	ITALY
Type		B23	B23
Category		II2H3P	II2H3P
EC-type certificate (PIN)		0694BR1222	0694BR1222
(Nominal) heat input "Q"=	kW	69,6	90
Minimum heat input	kW	6,0	8,0
(Nominal) output heat (80/60) "P" =	kW	68,0	87,8
(Nominal) output heat (50/30) "P" =	kW	72,4	93,6
Efficiency at 100% of load (80/60)	%	97,8	97,50
Efficiency at nominal output heat (50/30)	%	104	104
Minimum output heat (80/60)	kW	5,9	7,9
Minimum output heat (50/30)	kW	6,2	8,32
Efficiency at minimum output heat (80/60)	%	98	99
Efficiency at 30% of load	%	108,2	110,10
Efficiency at minimum output heat (50/30)	%	104	106
Certified efficiency (92/42/EEC)	stars	★★★★	★★★★
Chimney loss burner on (80/60)	%	1,5	1,5
Chimney loss burner off	%	0,2	0,2
Casing loss burner on	%	0,5	0,5
Casing loss burner off	%	0,1	0,1
Gas flow rate	Methane m ³ /h	7,36	9,51
	LPG kg/h	5,40	6,99
Gas supply pressure (mbar)	Methane mbar	20	20
	LPG mbar	37	37
Gas supply minimum pressure (mbar)	Methane mbar	15	15
	LPG mbar	25	25
Gas supply maximum pressure (mbar)	Methane mbar	30	30
	LPG mbar	45	45
Comburent air pressure	Methane mbar	8,2	6,6
	LPG mbar	7,2	5,4
Primary heat exchanger water content	l	4+4	4+4
Primary heat exchanger weight	kg	11+11	11+11
D.h.w. setting range with water heater	°C	40-70	40-70
Project temperature	°C	95	95
Maximum heating temperature	°C	80	80
Minimum heating temperature	°C	20	20
Maximum heating pressure "PMS" =	bar	4	4
Minimum heating pressure	bar	1	1
Nominal power supply voltage	V	230	230
Nominal power supply frequency	Hz	50	50
Absorbed electric power	W	250	380
Electrical protection degree		IPX5D	IPX5D
Flue gas pipe diameter (split)	mm	80	80
Flue gas pipe max length (split)	m	40	40
Curve equivalent length	m	45° curve = 0.5m, 90° curve =1m	
CO (0% O2 with methane)	ppm	15	15
NOx (0% O2 with methane) (class 5 EN 483 and 297)	ppm	17	15
CO2 (%) maximum power/minimum power	Methane	8,5/9,0	8,5/9,0
	LPG	10/10,5	10/10,5
Maximum flue gas temperature at boiler outlet	°C	90	100
Flue gas mass flow	kg/h	118	152
Head available at discharge	Pa	60	60
Maximum condensate flow	l/h	8,7	11
Condensate average acidity degree	PH	4	4
Boiler weight	kg	98	98

10 - EC COMPLIANCE DECLARATION

The undersigned company **COSMOGAS S.r.L.**, with registered offices in Via L. Da Vinci 16 - 47014 Meldola (FC) ITALY,

DECLARES

under its own exclusive liability that the product:

WARRANTY No.	
GAS BOILER MODEL	
MANUFACTURE DATE	

forming the subject matter of this declaration, is compliant with the model described in the type Examination Certificate **CE**, with reference to the table headed “EC type certificate (PIN)” in chapter 9 and in accordance with the provisions of the following Directives: Gas Appliances, (**2009/142/EC** ex **90/396/EEC**), Efficiencies, (**92/42/EEC**), Low Voltage, (**2006/95/EC**), Electromagnetic Compatibility, (**2004/108/EEC**).

(The warranty number matches the serial number)

This declaration is issued in accordance with that established by said Directives.

Meldola (FC) ITALY, (Date of manufacture).

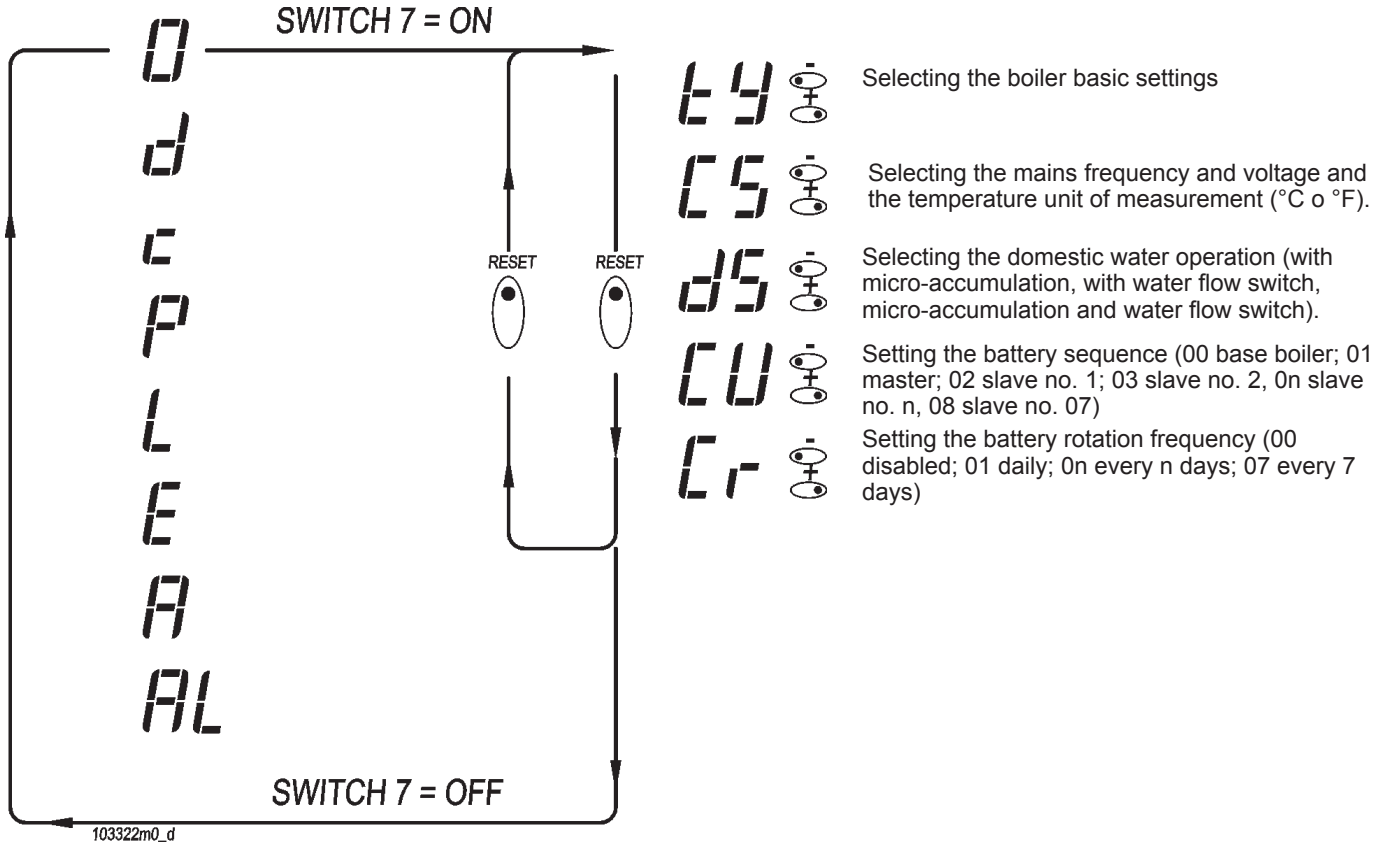


11 - MENU FORCED BY SWITCH 7



CAUTION!!!

Changing these parameters may cause malfunction of the boiler and thus of the system. Therefore, only a qualified technician with the necessary detailed knowledge can change them.



Settings:

EY shall assume the values indicated in section 6.4.

CS can assume the following values:

- 00 - 230Vac, 50Hz, °C;
- 01 - 230Vac, 50Hz, °F;
- 02 - 120Vac, 60Hz, °C;
- 03 - 120Vac, 60Hz, °F

dS can assume the following values:

- 00 - Domestic water with semi-accumulation;
- 01 - Domestic water controlled by a water flow switch;

02 - Domestic water controlled by a water flow switch and equipped with temperature sensor (U3) on the semi-accumulation;

CU can assume the following values:

- 00 - Boiler with normal operation;
- 01 - Battery master boiler (the mastering boiler);
- 02 - Battery slave boiler 1 (first boiler guided by the master one);
- 03 - Battery slave boiler 2 (second boiler guided by the master one);
- 0n - Battery slave boiler n (n boiler guided by the master one);
- 08 - Battery slave boiler 7 (seventh boiler guided by the master one);

Cr can assume the following values:

- 00 - Basic setting for single boiler;
- 01 - The boiler battery rotates the operation every day;
- 0n - The boiler battery rotates the operation every n days;
- 07 - The boiler battery rotates the operation every 7 days;

12 - DIAGRAM OF THE CONTROL MENUS

RESET ¹⁰ Hold the RESET button for the number of seconds indicated

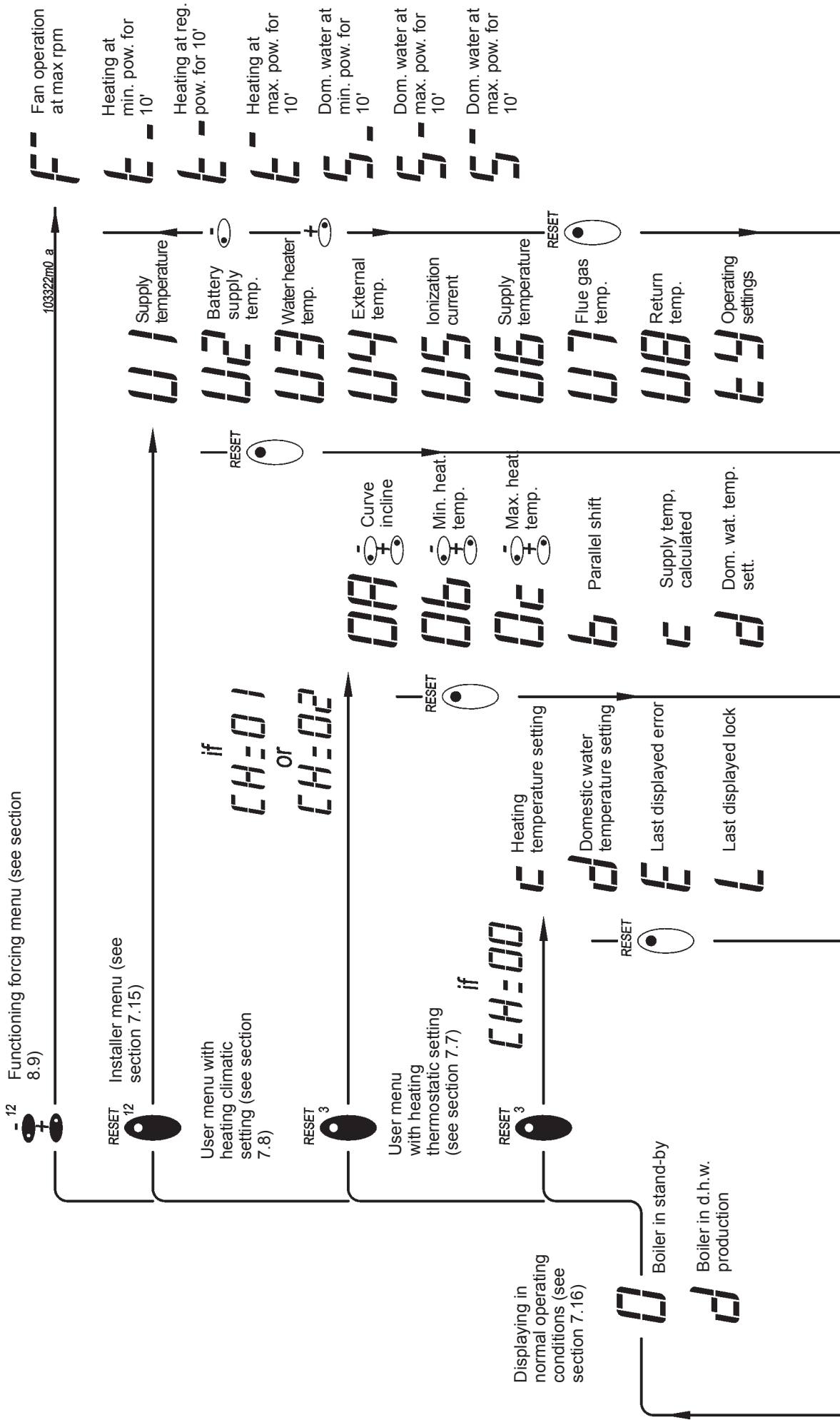
RESET Press and release the RESET button

¹⁰ Hold both the "plus" and "minus" buttons for the number of seconds indicated.

Press and release the "minus" button

Press and release the "plus" button

103922m0_c



P Boiler in heating production

F Boiler in anti-freeze mode

L Boiler locked out

E Boiler in error state

A Boiler in alarm state (see section)

AL Boiler in antilegionella mode

E Last displayed error

L Last displayed lock

r Room therm. status

F Fan speed

P

CH

CA

br

br

L

S

PS

Heating power setting

Heating mode setting

Reaction to the external temperature

Clim. compensation line angle

Temperature reduction from TA opening

Status of the control panel knobs

Display turn off delay expressed in minutes

Parameter disabled

13 - INSPECTION CERTIFICATE

HYDRAULIC INSPECTION CERTIFICATE

In accordance with the Ministerial Decree of 1st December 1975 art. 17, **COSMOGAS srl** manufacturer of wall-mounted and floor-standing boilers operating with gaseous fuels,

CERTIFIES

that this heater was tested by means of the **6** bar hydrotest, on _____, scoring a positive result.

Model _____ serial number _____ Year of manuf. _____

Operating with gaseous fuels type: G20 G25 G30 G31

Heat rating referred to the LHV (heat input): _____ kW

Output heat: _____ kW

Maximum operating pressure: **4** bar

Inspection pressure: **6** bar

Calibrating pressure of the safety valve: **3,5** bar

Alessandrini Arturo
Sole Responsible

14 - ISPEL CERTIFICATE

15.1 - General warranty conditions

COSMOGAS guarantees that all its products are free from manufacturing and material defects for **24** months from the testing and inspection date of the first start-up. Moreover, **COSMOGAS** extends warranty for:

TUBE & SHELL HEAT EXCHANGER BODIES and CRR
guaranteed up to 5 years;

PRE-MIX BURNERS guaranteed up to 10 years;

ATMOSPHERIC BURNERS
guaranteed up to 15 years.

Such warranty extension is valid only if **COSMOGAS** has received the warranty card, properly filled in in every part, certifying the date of first start-up. Within the aforementioned period, **COSMOGAS** will repair or replace any manufactured parts found to be defective, excluding any defects caused by normal wear and tear during operations.

The warranty does not cover compensation for any type of damage which may occur to people or property. The faulty materials replaced under warranty are the property of **COSMOGAS** and must be returned free of charge to our factory, within **30** days of their replacement.

All **COSMOGAS** products are subject to reserved ownership agreement until the purchased appliance has been fully paid for.

15.2 - Instructions for filling in the warranty card

- The installer must stamp the warranty certificate.
- Always request the intervention of one of our authorized technicians for the initial start-up and for warranty validation;

For warranty validation, the technician shall check:

- gas pressure on the burner (or comburent air pressure for pre-mix and condensing boilers);
- water leaks check;
- gas leaks check;

The list of authorized technicians is enclosed with the instruction manual or can be found in the Yellow Pages under "Gas boilers".

- The technician will collect the warranty certificate and forward it to **COSMOGAS**.

15.3 - Warranty limits

The warranty is invalid:

- if the appliance is installed by **non-**qualified technicians;
- if the appliance is not installed in compliance with **COSMOGAS** instructions and/or those established by national and/or local standards in force;
- the running and/or maintenance of the system is not carried out in compliance with these instructions and/or national and/or local standards in force;
- damage to the product has been caused by voltage fluctuations;
- damage to the product has been caused by the use of too hard, too acid or over oxygenated water;
- damage to the product has been caused by thermal shock, defective chimneys and/or flue gas discharge and air intake piping;
- the product has anomalies not dependent on **COSMOGAS**;
- the boiler has been tampered with due to adaptation work, repair work and replacement work using non-original parts;
- the repair work has been carried out by unauthorized personnel.
- The warranty certificate is not forwarded to **COSMOGAS** within **15 days** from the date of **1st** start-up.

COSMOGAS cannot be held responsible for any accident, including those caused by the user, any compensation which does not concern boiler parts with recognized manufacturing defects being excluded. Court of competent jurisdiction: Forlì, ITALY.

WARRANTY CERTIFICATE FOR "COSMOGAS" APPLIANCES

Warranty valid 24 months

TO BE COMPLETED BY THE INSTALLER

The appliance has been installed by qualified technicians in possession of the legally required qualifications, in compliance with the instructions contained in this manual and national and/or local standards in force.

Date _____

Remarks _____

<p>INSTALLER (Stamp)</p> <p>Signature _____</p>

TO BE COMPLETED BY THE SERVICE CENTRE

The appliance has been verified for warranty validation purposes by qualified technicians in possession of the legally required qualifications, in compliance with the instructions contained in this manual and national and/or local standards in force, with the following results:

POSITIVE NEGATIVE

Date _____

Remarks _____

<p>SERVICE CENTRE (Stamp)</p>

Service Centre name and signature

User signature



COSMOGAS s.r.l.
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MELDOLA (FC) ITALY
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