

WALL HUNG GAS BOILER

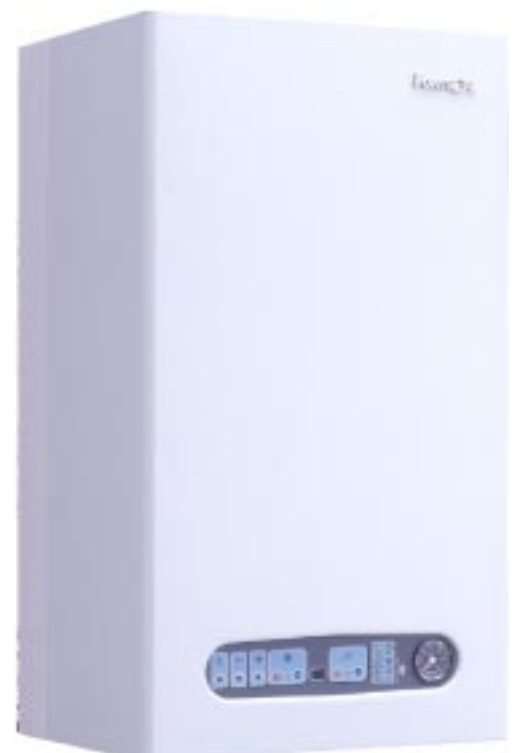
# MINITECH MINIPLUS

MODELS

WITH CONTINUOUS MICROPROCESS MODULATION  
FOR HEATING AND SANITARY HOT WATER PRODUCTION

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technical manual for  
installation, use and maintenance



# TECHNICAL MANUAL FOR INSTALLATION, USE AND MAINTENANCE

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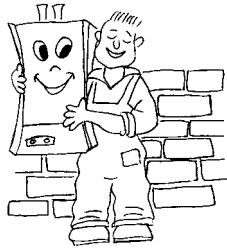
# TECHNICAL MANUAL FOR INSTALLATION, USE AND MAINTENANCE

## **Introduction**

Dear Customer,

Congratulation on your choice and thank you for the trust reposed in our products.

Buying this product you have chosen technology and the best synthesis energy efficiency and functionality in full respect of the strictest European norms on safety



**CAN BE INSTALLED  
EVERYWHERE !!!**

Your boiler is:

- ✓ **versatile:** the combustion circuit is completely sealed so that the boiler can be installed every where without specific requirements and in accordance with the rules in force;
- ✓ **safe:** the boiler is equipped with advanced safety features which it from abnormal operating devices of superior class as compared to the ones usually prescribed, this will guarantee the highest safety for the user.

The following paragraph shall briefly describe briefly describes the functioning principle which characterizes the boiler itself.

Please carefully follow the both use and maintenance instructions in order to commence the warranty period.



**ALWAYS SAFE !!!**

## **Models**

The boiler is available into the following versions::

- ▶ Models S E / S ER :heating only; opened / sealed chamber.
- ▶ Models X E / X ER :heating and hot water production opened /sealed chamber.

"S" model is designed for heating only or for the connection to an external water tank. The boiler electronics controls the changeover valve which could be used to manage the water tank.

"X" model is equipped with a rapid exchange system for hot water instantaneous production, the system can supply 13 l/min with a 25°C heat difference as compared to the inlet water. Hot water demand is detected by a differential pressure switch which is activated with a minimum water flow of 1.6 l/min

# TECHNICAL MANUAL FOR INSTALLATION, USE AND MAINTENANCE

## 1 GENERAL INFORMATION

Please read and retain this manual in order to achieve full satisfaction from the boiler use.

The equipment name, series, model, serial number and technical data are shown on the label located inside the boiler.

The letters following the commercial name define the main features of Your wall-hung boiler according to the scheme below:

Model:

- S E: heating only, natural draught, open combustion chamber (B11BS - EN297);
- X E: heating and hot water instantaneous production, natural draught, open combustion chamber (B11BS - EN297);
- S ER: heating only, forced draught, sealed combustion chamber (C2x, C62 - EN483);
- X ER: heating and hot water instantaneous production, forced draught, sealed combustion chamber (C62x, C62 - EN483).

All the models have the same following features:

- electric ignition;
- continuous flame modulation with microprocessor;
- nominal heat input 25 kW (21.500 kcal/h).

## 2 WARNINGS

This manual is delivered with the boiler and should always be stored in the vicinity of the equipment for proper use and maintenance.

### PRELIMINARY OPERATIONS

Unpack the boiler by removing its cardboard and do not turn it upside down. Always keep the boiler vertical on its lower polystyrene base. Never place the boiler directly on the floor. After unpacking the boiler, make sure that the equipment is intact. When in doubt, contact your supplier. For safety reasons and correct operation, installation must be carried out by professionally qualified technicians, in compliance with current regulations and Manufacturer's instructions.

Manufacturer abdicates any responsibility in case of damage caused by tempering, incorrect use and wrong equipment installation, use and maintenance.

Should failures or malfunctioning occur, turn the equipment off, refrain from making any repairs and call the Service Centre.

**NOTE!** The boiler **COMMISSIONING** must be carried out by the Service Centre technicians within 8 days from the installation of the equipment. After commissioning, the Service Centre shall fill in the guarantee certificate and release part of it, which must be stored, thus starting the guarantee period. Carefully read the conditions specified in the guarantee form. Service during the guarantee period shall be provided if the guarantee slip has been validated during commissioning.

**NOTE!** Maintenance is compulsory and must be executed at least once a year (DPR 412/93, 551/99). Contact the authorised Service Centre. In any case, only technicians who are qualified according to the laws in force can carry out the maintenance activities.

## 3 INSTALLATION

**NOTE!** ONLY authorised and professionally-qualified technicians who know the equipment, have read this manual and comply with the (national and local) laws in force in the place of installation, can install the equipment.

### 3.1 BOILER LOCATION

Open chamber boilers can only be installed in place which comply with current regulations and, in any case, in permanently ventilated places. Use the two screws anchors, supplied with the equipment, to install the boiler on a strong masonry wall. Leave at least 35 cm from the front panel of the front panel of the equipment to facilitate use and maintenance activities; leave at least 40 cm between the top of the equipment and the ceiling and between the bottom of the equipment and the floor and from any other no-removal impediment. When defining the installation height of the boiler, make sure that this its top part cannot be easily reached with one's hands.

**NOTE!** Do not install the boiler in a dusty or very humid environment. If the boiler is installed outdoor, it must be protected against RAIN, ICE, HUMIDITY and DUST; make sure that unauthorised people, children, animals, or anything else which may damage or be damaged by the boiler, cannot easily access the boiler.



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## **3.2 WATER AND COMBUSTIBLE SYSTEM**

The equipment has been designed for the type of combustible gas specified on the plate located inside the shell. Make sure that the available gas type and the gas specified on the equipment match.

The combustible supply piping and the control system must be perfectly sealed and their sections must be suitable for the equipment capacity.

If L.P.G. is supplied, make sure that the second-stage pressure reducer located on the tank-boiler line has a min. capacity of 4 kg/h and 37 mbar (column of water 370) outlet pressure adjustment.

The original gas preset of the boiler can be changed by replacing the gas nozzles and re-calibrating the gas valve minimum pressure.

This operation must be carried out by **qualified technicians**: contact the authorised Service Centre.

The Service Centre must verify the correct operation of the equipment and officially validate the guarantee certificate within 8 days from installation.

For newly-designed water systems, Fig. 1 shows the piping layout when looking at the wall.

Fig. 2 shows how to connect pipes to the wall.

Place the wall mounting jig (delivered with the boiler) on the wall to define the correct location of screw anchors and pipes.

The pressure of the water coming from the water system must be kept under control and below the limit specified on the equipment plate, on the inlet point.

Hence the need for a pressure reducing valve on the equipment cold water pipe.

The circulation device, at speed III, is suitable for the majority of the systems. In single-pipe or very large systems, when the load loss is remarkable or when all radiators are not equally supplied, the circulation of water can be increased by installing an additional pump or replacing the pump supplied with the boiler with an expanded circulation device.

See fig. 3 for available head/flow rate curves of the heating system.

The boiler is equipped with a 7 litres storage tank which is suitable for standard heating system. Specific solutions are needed for larger or vertical systems.

The standard equipment does not include an automatic by-pass valve between the supply and return system.

A special automatic by-pass valve is needed when thermostatic valves are installed on all radiators or when local flow stopping valves are mounted.

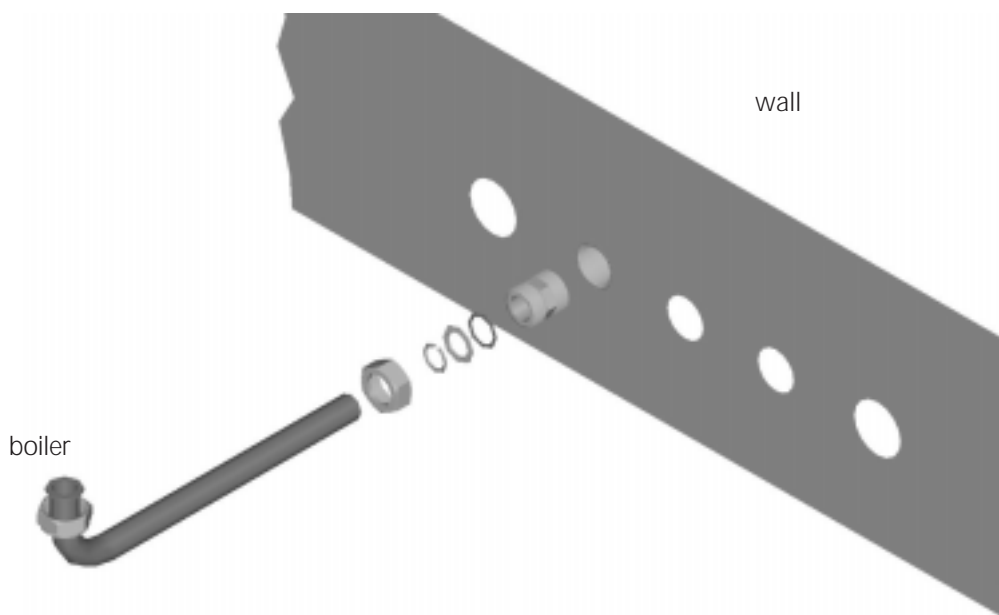


FIGURE 2: Pipes connection to the wall

# TECHNICAL MANUAL FOR INSTALLATION, USE AND MAINTENANCE

Before making the hydraulic connections (heating, sanitary water, relief valve and combustible gas discharge) remove any test water plugs and check the system sealing. In areas where the temperature may reach very low values, add some antifreeze to the heating system water.

Discharge the sanitary system when the boiler is not used for very long periods. To prevent freezing, operate the equipment by means of a room chrono-thermostat.

## 3.3 AIR INLET AND FLUE DISCHARGE

E Models (SE, XE).

The boiler takes the carburant air necessary for its operation from the installation area, where air intakes must be installed, in compliance with current regulation.

**NOTE!** The equipment must be installed in a constantly ventilated environment. Flue discharge  $\varnothing$  130mm, must comply with national and local technical regulation concerning boilers which are not equipped with a fan on the combustion circuit (natural draught).

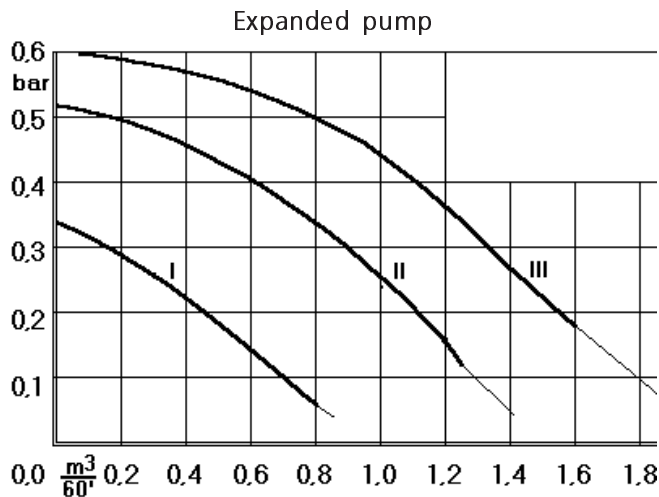
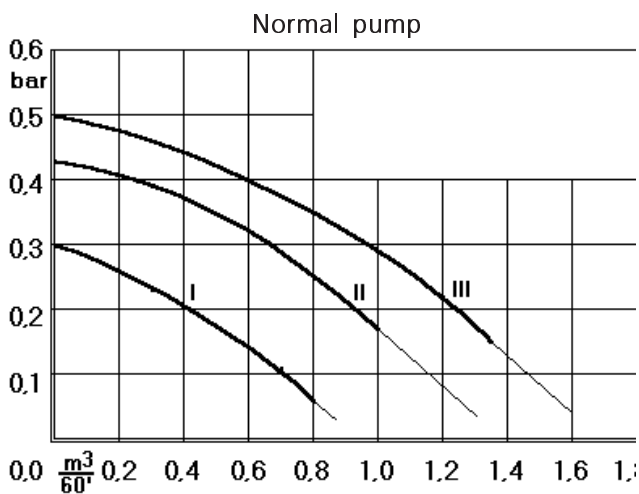
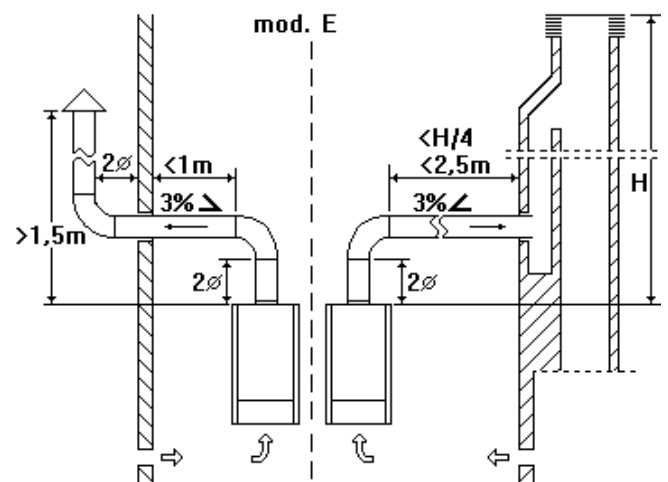


FIGURE 3: heating system available head/flow rate chart.



ER (SER, XER) model

The boiler has a forced draught and a sealed combustion chamber; hence the need for two separate circuits: one for carburant air, taken from external environment and one for combustion flue discharge. These circuits can follow any path within the boiler; they can be very close to each other, or even coaxial. They can be connected to joint ducts for sealed-chamber boilers or go directly to the roof or the wall in compliance with laws in force (fig. 5).

The best (Directive 92/42/CEE) of the sealed chamber boiler can be achieved in all installation conditions (air-flue system, pipe diameter and length) thanks to the presence of an air-intake calibrating diaphragm and an adjustable shutter.

The shutter is located on the front part of the hood (Fig. 4 and 5) and it is placed on the "-" (upper) position by the Manufacturer; to remove it to the "+" (lower) position, lift the lever and turn it clockwise, down to the "+" position. Bigger-diameter pipes can be used to collect and discharge condensate.

# TECHNICAL MANUAL FOR INSTALLATION, USE AND MAINTENANCE

Seal chamber devices are manufactured for air intake and flue discharge(Ø100-Ø60) coaxial systems; however it is possible to realize some double pipe systems with separate air intake (Ø60) and flue discharge pipes (Ø60); in order to do so it is necessary to replace the cap and the collar described on picture 4 with those of picture 5, these latter are supplied with the boiler itself.

**NOTE:** inside the lower sealed part of the boiler, inside the metal casing, there is a 3mm hole which helps keeping the pressure inside the boiler lower than the room one. In this way, gas escapes are in-taken inside the combustion chamber and they are not released into the room.

## PIPES SELECTION FOR "X ER" MODELS

Follow the procedures below in order to realize a proper pipe selection:

- 1) Select one of the four air-flue systems, in compliance with current regulation, as per Fig.6 (C12, C32, C42, C52).
- 2) Measure the total path length of air and flue pipes.
- 3) Select the air-flue pipe diameter/s and refer to Fig.6 to define the aerodynamic resistance  $R$  for each pipe section
- 4) Calculate the total aerodynamic resistance  $R_{tot}$  by adding up the aerodynamic resistance  $R$  of air and flue pipes.
- 5) Compare the calculated  $R_{tot}$  value with the max. value specified in fig.5 for the selected air-flue system. The calculated value should be equal to or lower than the value specified in fig.5. Should this not be then case, increase the pipe diameter and repeat the test starting from point 3 above.
- 6) After passing the above mentioned test, establish how to set the shutter. The cross reference table below specifies the shutter setting depending on the type of air-flue system (coaxial or double pipe),boiler type, total aerodynamic resistance  $R_{tot}$  of the air-flue path.

Sealed chamber with forced draught:

	X ER		
<b>R<sub>tot</sub> systems C12-C32</b>	till 2,0	From 2,0 a 3,0	From 3,0 a 5,0
<b>R<sub>tot</sub> systems C42-C52</b>	till 1,0	From 1,0 a 2,0	From 2,0 a 4,0
<b>Shutter setting</b>	⊖	⊖	⊕

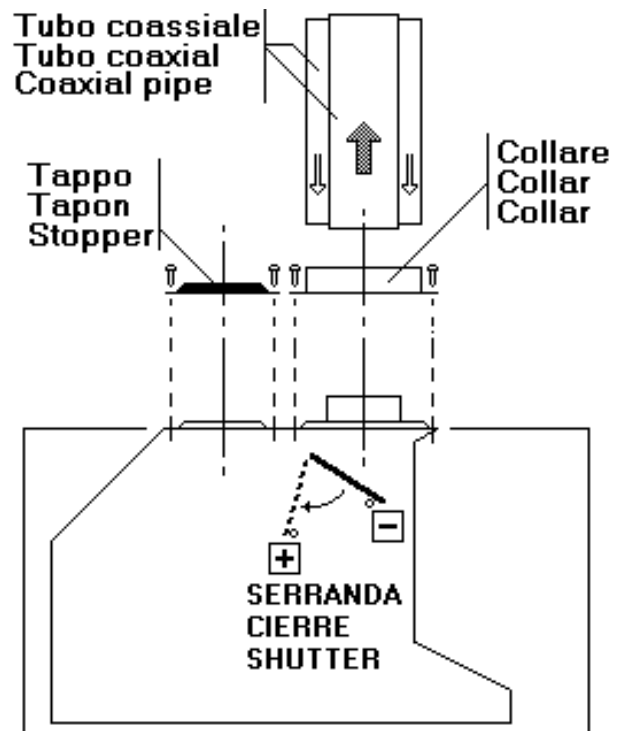


FIGURE 4

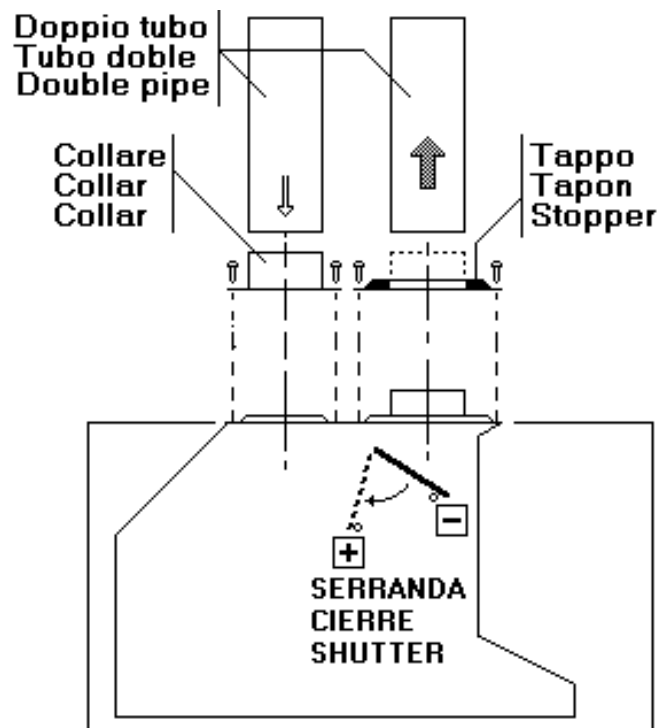
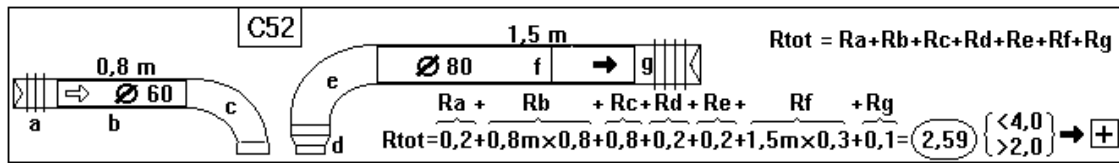


FIGURE 5



# TECHNICAL MANUAL FOR INSTALLATION, USE AND MAINTENANCE

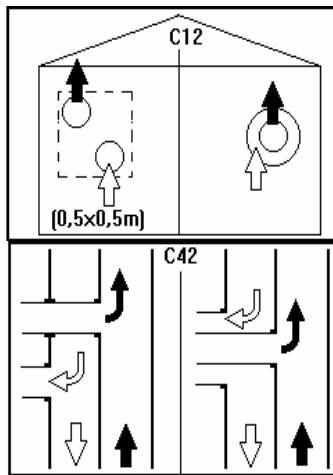


EXAMPLE. Boiler X ER.

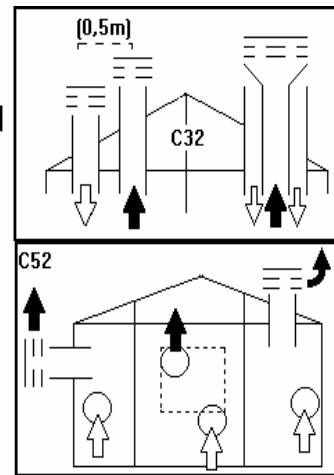
- 1) Selected air-flue system: double pipe C52.
- 2) Total path length: air (a) wind-proof head + (b) 0.8m straight + (c) 90° bend; fumes (e) 90° bend + (f) 1.5m straight, (g) wind-proof-head.
- 3) If  $\phi 60$ mm for air and  $\phi 80$ mm for fumes, R for the various sections is:  $R_a=0.2$ ,  $R_b=0.8 \times 0.8=0.64$ ,  $R_c=0.8$ ,  $R_e=0.2$ ,

- 4)  $R_f=1.5 \times 0.3=4.5$ ,  $R_g=0.1$ ; for  $\phi 80$  fume pipe, the (d) 60-80 reducer section is needed, resistance:  $R_d=0.2$ .
- 5)  $R_{tot}=0.2+0.64+0.8+0.2+0.2+0.45+0.1=2.59$
- 6) According to the table, the diaphragm is not needed because  $R_{tot}$  is higher than 2.0, but the shutter must be moved to the  $\oplus$  position

C12 = horizontal air and flue pipes system. Intake and discharge areas are very close and under the same wind conditions.



C42 = the air-flue intake and discharge system are made through the connection to two collective and separate pipes; one for the air and the other for the flues.



C32 = vertical air-flue pipes. Intake and discharge areas are very close and under the same wind conditions.

C52 = double pipe air-flue system: one for the air and the other for the flues which flow into different pressure

carburant air route      R = aerodynamic resistance of a plain pipe route  
 flue route                      Rtot = total aerodynamic resistance of the pipes inside the air-flue route

FIGURE 6: "ER" MODELS : Rtot TOTAL MAXIMUM ALLOWED AERODYNAMIC RESISTANCE OF THE PIPES INSIDE THE DIFFERENT AIR INTAKE AND FLUE DISCHARGE SYSTEMS

R	$\phi 60$	R	$\phi 80$	R	$\phi 100 - 60$
0,8		0,3		1,0	
0,8		0,2		1,0	
2,0		1,5		0,5	
0,5		0,1		0,4	
0,2		0,1		0,4	
		0,2		0,3	

FIGURE 7: "ER" MODELS: TOTAL AERODYNAMIC RESISTENCE OF SOME PIPES SECTIONS

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NOTE. During installation, make sure that the fumes cannot go back into the equipment near terminal pieces or joints between various pipe sections. When no seals are provided, apply some silicon between two pipes.

## 3.4.ELECTRICAL SYSTEM.

Make sure that the available AC power matches the power specified on the equipment rating plate (230VAC FN 50Hz). Check the grounding line and connect it to the boiler. The manufacturer shall not shoulder any responsibilities for damage caused by lack of compliance with this requirement.

De-energise the equipment and connect it to the electrical system. For the electrical connection, use the terminal strip located in the control panel and pay attention to the indicated electrical connections. Remove the shell and the control panel cover to access the terminal strip.

NOTE : the boiler needs to be powered with a magneto-thermal differential switch (Idn=30mA).

NOTE. Pay attention to the phase and neutral polarity and to the ground connection. Mistakes made during this stage may permanently block the burner.

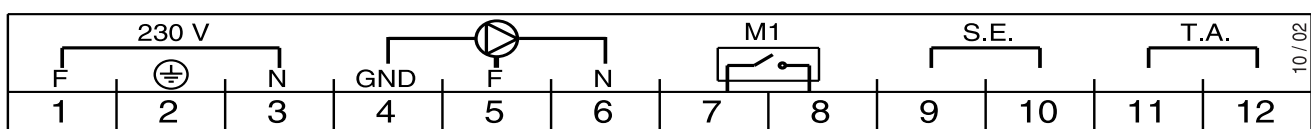
Access to the terminal strip located in the boiler control panel is needed in order to connect the room thermostat TA (or chrono-thermostat). Remove the jumper between terminals 11-12 on the terminal strip, and connect the room thermostat (or chrono-thermostat).

Flow water temperature is adjusted in accordance to the outdoor one (climatic function). In order to do so, it is necessary to mount an outdoor probe (SE), available as optional an option. Use connector 9-10 on the connecting strip to connect the probe. Place it on the outside, north wall of the building, do not absolutely place it on the south one or towards the sun.

NOTE: separate electric cables from power and signal ones (TA, SE) and install them inside separates pipes.

## 3.5.INFORMATION TO BE RESPECTED BEFORE AND DURING THE INSTALLATION OF THE EQUIPMENT ON THE WALL.

- The heating system, and radiators in particular, and the sanitary water system must be thoroughly washed with water and a detergent-degreaser;
- Make sure the external systems are connected to the correct boiler pipes. Ensure that all pipe connections are correct.
- The relief valve inside the boiler must be connected to a dedicated discharge pipe. **The Manufacturer shall not shoulder any responsibilities for damage caused by the relief valve water, when not connected to a discharge system.**
- When the equipment is installed under the heating system units, on-off valves should be installed between the system and the boiler, thus facilitating maintenance activities.
- The sanitary water flow rate must be adjusted (on the flow meter, no.19 Fig.7): when the flow rate decreases, the water temperature increases; when the flow rate increases, the temperature decreases. The flow regulator is not a pressure reducer; therefore, if the water system pressure is too high, external pressure reducers must be installed.
- Make sure that the free space and distances recommended in this manual are respected, to facilitate maintenance activities.
- Make sure that the fume discharge pipe, the chimney and carburant air supply system are clean and efficient.
- With reference to forced-flow equipment, make sure that no other fume discharge pipes are connected to the chimney, with the only exception of chimneys for sealed-chamber boilers.
- Make sure that condensation and rain water in the fume and air pipes are collected and discharged and do not reach the boiler.
- Connect the air intake and fume discharge pipes; make sure that they are stable, but removable; they must not be loose and their sealing over time must be guaranteed.



Terminal strip

# TECHNICAL MANUAL FOR INSTALLATION, USE AND MAINTENANCE

## 3.6 ELECTRONIC CARD SETTING

**NOTE.** The following operations must be carried out by technicians authorised by the Manufacturer. Unauthorised personnel shall not carry out any activities. Wrong operations may jeopardise proper operation of the boiler and render the guarantee certificate null and void. The Manufacturer shall not shoulder any responsibilities in case of equipment damage or damage caused to persons, animals or objects by the equipment as a result of wrong operations.

Before releasing the boiler to the final user, check the card setting or set the card.

### JUMPERS LIST

The METHANE/LPG jumper **J7** (see figure below) selects the modulation current field; disable for methane (gas pressure calibration up to 12mbar); enable for L.P.G. (gas pressure calibration up to 35mbar).

**J19: DO NOT CHANGE THE POSITION SHOWN IN THE FIGURE**

**J18: DO NOT CHANGE THE POSITION SHOWN IN THE FIGURE**

Jumper **J17** enables the function which prevents frequent starting during the heating stage; it is disabled on the standard version. The above mentioned phenomenon may occur if water circulates at low speed or when the system is relatively small: if the function preventing frequent starting is enabled, the boiler keeps the burner off for at least 2.5 minutes, regardless of the water cooling down, detected by the heating system probe.

Jumper **J16** enables the parameter change mode: the display blinks until it is enabled. **Pacc** and **Pmax** can be modified. The start power **Pacc** can be adjusted by pressing the +/- buttons only when the parameter change mode is enabled; it is displayed as a % of the max. power: for methane 25 equals approx. 2.5 mbar, for L.P.G., 50 equals approx. 10.0 mbar.

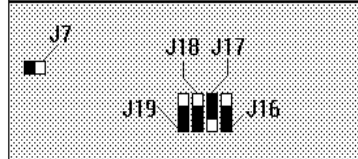
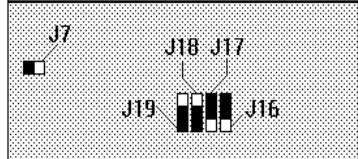
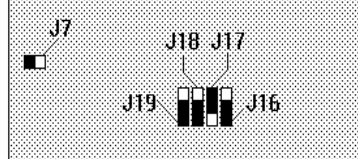
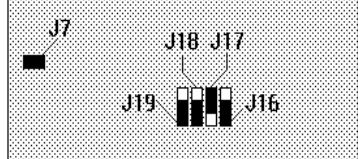
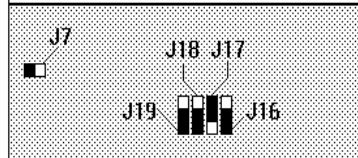
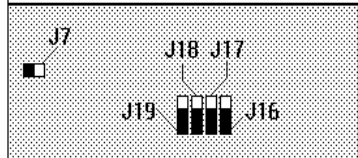
Use a pressure gauge to check the gas pressure accuracy.

Pacc	G20	pG20	G30	pG30	G31	pG31
50%	25-45	2.5 mbar	40-50	8 mbar	45-55	10 mbar

The **Pmax** heating power can be changed by pressing the +/- buttons only when the parameter change mode is enabled; it is displayed as a % of the max. power (it is preset on 99, but this value must drop below 85 to start reducing the max. pressure).

Use a pressure gauge to check the gas pressure accuracy.

Pmax%	G20	pG20	G30	pG30	G31	pG31
100	>85	9,5	>85	33,5	>85	34,0
80	>65	6,0	>70	21	>70	22,0
65	>45	4,0	>60	14	>60	15,5
50	>25	2,0	>50	9,5	>50	10,0

<p><b>J16:</b> PARAMETER CHANGE NOT ENABLED</p>			<p><b>J16:</b> PARAMETER CHANGE ENABLED (Pacc=BURNER START POWER., Pmax=MAX HEATING POWER.)</p>
<p><b>J7:</b> NATURAL GAS Pmax &gt; 85 Pacc = 25-45</p>			<p><b>J7:</b> L.P.G. Pmax &gt; 85 Pacc = 45-55</p>
<p><b>J17:</b> HEATING NOT TIMED</p>			<p><b>J17:</b> TIMED HEATING (off time&gt; 2.5')</p>

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## 3.7 MODIFICATION OF THE BOILER PRESET GAS

This modification must be carried out ONLY by the Service Centre or authorised technicians using the components included in the special kit.

The following procedure can be adopted when setting the boiler for LPG (with the LPG kit) or METHANE (with the METHANE kit).

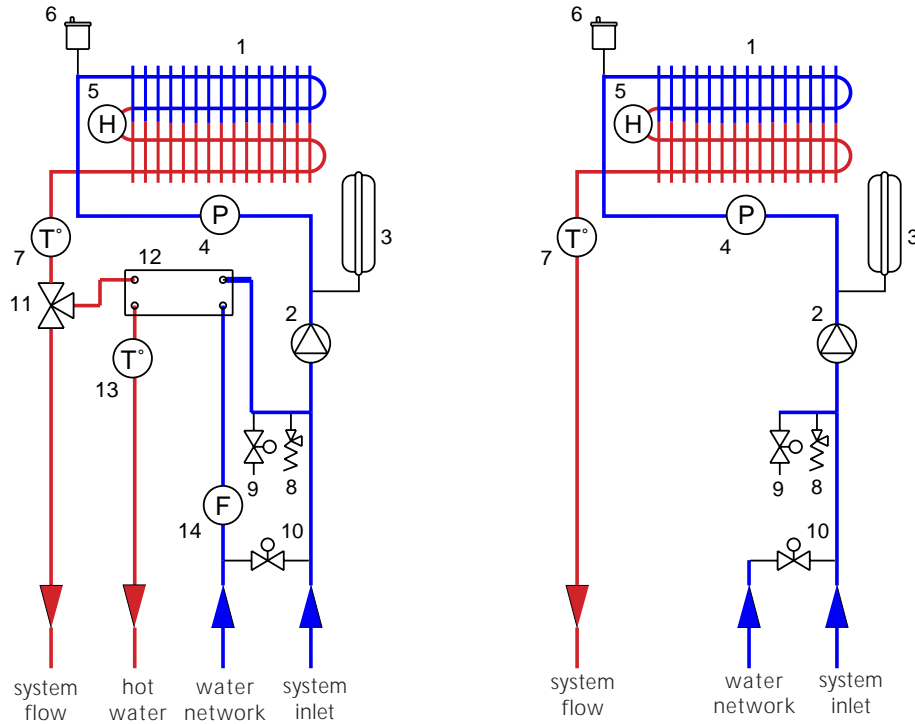
n°	MODELLO	OPERATIONS
1	ER	Remove the front panel of the sealed chamber by loosening its screws.
1	E	--
2	ER	Remove the combustion chamber front panel.
2	E	--
3	E, ER	Remove the burner assembly from nozze-holder manifold.
4	E, ER	Replace the nozzles and copper seals with the parts included in the kit.
5	E,ER	Re-install the burner.

The following operations differ in accordance to the gas valve (HW=Honeywell; SIT= SIT La Precisa)

n°	Gas valve	OPERATIONS
6	HW, SIT	Valid only in countries where the network gas is supplied at two pressures: install or remove the diaphragm located between the discharge pipe and the gas valve (it is included in the kit, when needed).
7	HW, SIT	Select the gas type on the modulation card by moving the jumper J7 (Fig.8)
8	HW, SIT	Remove the modulator cover
9	HW, SIT	Loosen the plug from the gas valve pressure inlet and check the incoming pressure with a pressure gauge (see table below). Check the values when the boiler is working.
10	HW, SIT	Re-install the plug on the pressure inlet, open the gas valve outlet and connect the pressure gauge to it.
11	HW, SIT	Turn the screw/adjustment nut counter-clockwise by 2 revs; turn the electrical system and the heating system on; the flame on the main burner lights.
12	SIT	Check the pressure gauge value and adjust the <b>max. gas pressure</b> screw; this value corresponds to the max. burner power (see table).
13	HW, SIT	Disconnect the modulator and adjust the <b>min. gas pressure</b> by turning the corresponding screw (see table)
14	HW	Press the modulator tip and adjust the <b>max. gas pressure</b> screw; this value corresponds to the max. burner power (see table).
15	HW, SIT	Re-connect the modulator and check the set pressure values.
16	HW, SIT	Re-install the cap and seal the adjustment screws (e.g. with a drop of paint).
17	HW, SIT	<b>On the modulation card:</b> move the jumper J16 (Fig.4) to enable the parameter change mode and follow the instructions provided under section 3.6.
18	HW, SIT	Disconnect the pressure gauge and place the plug on the pressure outlet.
19	HW, SIT	Place the METHANE (N.G.) or L.P.G. stickers near the gas valve and rating plate.

Burner nozzles	Incoming pressure	Max. pressure	Min pressure
N.G. = 1,30 mm L.P.G. = 0,75 mm	N.G. = 20,0 mbar L.P.G. = 37,0 mbar	N.G. = 10,0 mbar L.P.G. = 35,0 mbar	N.G. = 0,9 mbar L.P.G. = 3,6 mbar

# TECHNICAL MANUAL FOR INSTALLATION, USE AND MAINTENANCE



## LEGEND

1	Primary exchanger	4	Water pressure switch	7	Flow probe	10	Filling tap	13	Sanitary probe
2	Pump	5	Safety thermostat	8	Safety Relief valve	11	Diverting valve	14	Flow switch
3	Expansion vessel	6	Air vents	9	Outlet valve	12	Sanitary exchanger.		

FIGURE 9: HYDRAULIC DRAWINGS

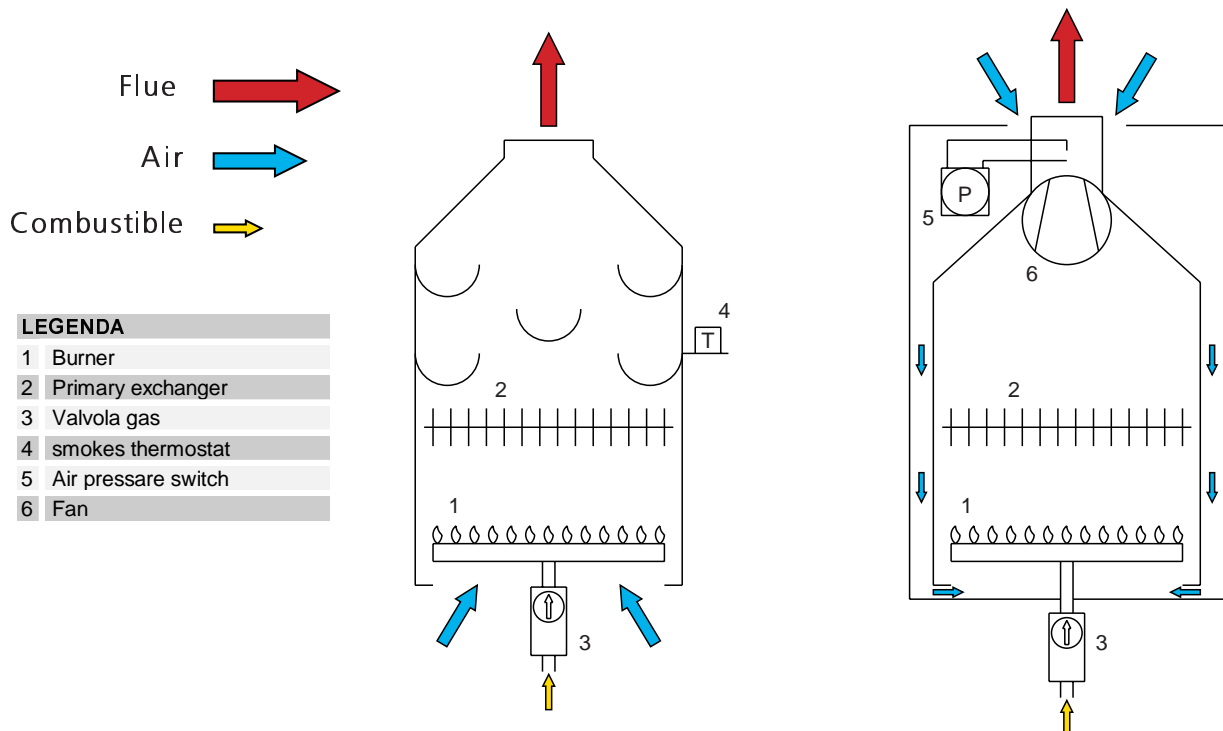
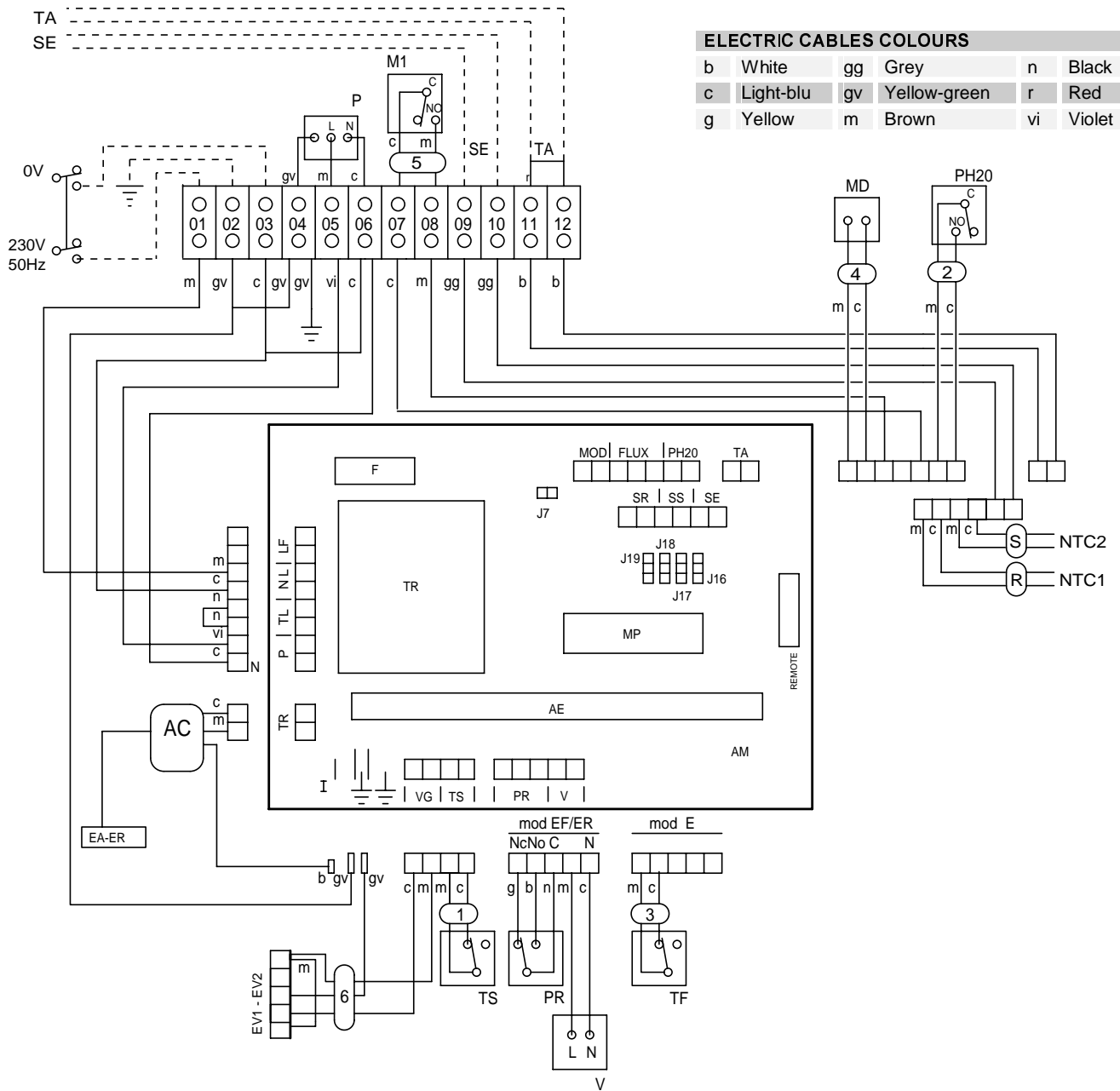


FIGURE 10: COMBUSTIBLE, AIR AND FLUE CIRCUIT DRAWING

# TECHNICAL MANUAL FOR INSTALLATION, USE AND MAINTENANCE



LEGEND			
<b>AC</b>	Starter	<b>MR</b>	Terminal strip
<b>AE</b>	Flame control card	<b>NTC1</b>	Heating probe
<b>AM</b>	Flame modulation card	<b>NTC2</b>	Sanitary probe
<b>DV</b>	Switchover valve	<b>P</b>	Boiler pump
<b>EV1</b>	Gas safety electro valve	<b>pH<sub>2</sub>O</b>	Water pressure switch
<b>EV2</b>	Main gas electro valve	<b>PR</b>	Flue pressure switch
<b>EA</b>	Flame start electrode	<b>SE</b>	Outdoor probe (optional)
<b>ER</b>	Flame detection electrode	<b>TA</b>	Room chrono-thermostat (optional)
<b>F</b>	fuse	<b>TF</b>	Flue thermostat
<b>IG</b>	Main switch (not supplied)	<b>TS</b>	Water safety thermostat
<b>M1</b>	Sanitary priority witches	<b>V</b>	fan
<b>MD</b>	Gas modulation lector valve		

FIGURE 11: ELECTRICAL DRAWING

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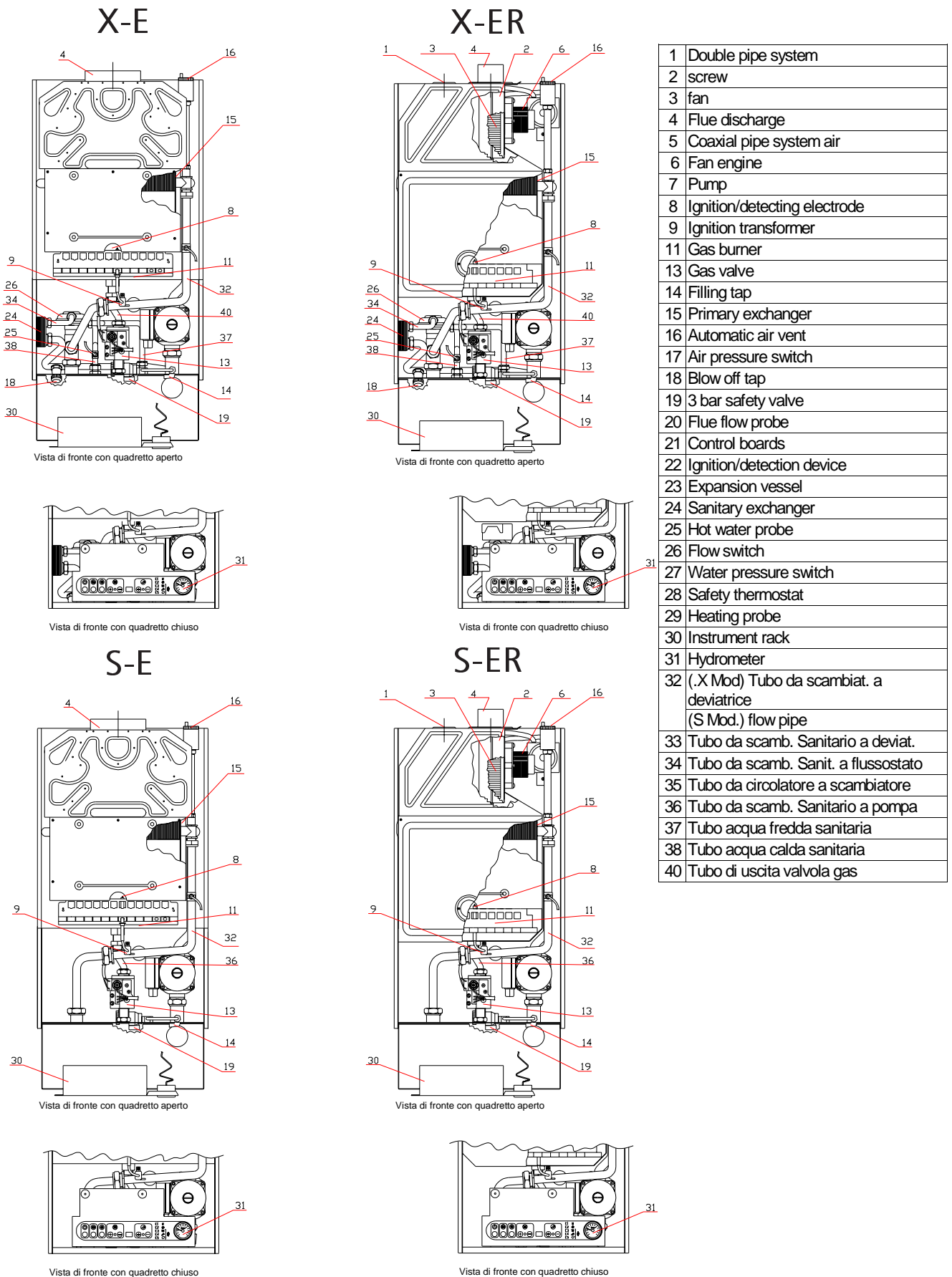


FIGURE 12: COMPONENTS POSITION



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## 4 USE, OPERATION AND MAINTENANCE

Before using the boiler, an authorised Service Centre shall carry out the first start-up operations. A correct start-up procedure is a pre-requisite for a long working life of the boiler.

You can carry out the operations described below, which should be executed as timely as possible and whenever needed, for perfect and complete performance. These operations can be carried out after the first start-up procedure.

Proper operation depends on the activities carried out on:

- 1) FILLING TAP (see 4.1 and 4.2);
- 2) CONTROL PANEL (see 4.2);
- 3) ROOM THERMOSTAT (SEE 4.3).

### Specific information for the X E Model.

When the fume draught is not sufficient, the boiler stops and generates an error signal on the display (E5) which lasts for at least 10 minutes. The boiler starts up again automatically but it stops again if the draught problem still exists.

**NOTE.** In case of multiple stops caused by draught problems, de-energise the system, close the boiler gas valve, call the Service Centre and do not make any re-start attempts. There may be some boiler malfunctioning or the malfunctioning may be due to external conditions (e.g. clogged chimney or air inlets) which may pose some safety risks.

### 4.1 SYSTEM FILLING.

The system filling tap is located in the lower part of the equipment, between the pipes on the right-hand side, near the wall (no.14 Fig.12).

On the pressure gauge (water gauge, no.3, Fig. 12), check that the heating system pressure ranges from 0.8 to 1.2 bar (the equipment does not work below 0.5 bar). If the pressure value is low, open the filling tap (no.14 Fig.12) when the BOILER IS COLD (T= 20°C), until the pressure value reaches 1 bar. Close the tap when the operation is complete.

### 4.2 BOILER USE

#### TO SWITCH ON THE BOILER

- Make sure that the on/off valves on the fuel gas line are all open.

- Switch on the boiler by pressing its external main switch.

- Press the boiler ON/OFF button once. The display shows "On" for 5".

- Press the boiler SUMMER/WINTER button once. The display shows "o", or "oo", for 5":

"o" to start hot water production, press again until "o" (summer) is displayed and only the right-hand warning light is on;

"oo" to start sanitary hot water production AND the heating system, press the button again until "oo" (winter) is displayed and both warning lights go on.

- Follow the procedure below to make sure that the hot water production and heating system meet your needs.

- If the burner does not come on and blocks (error signal E2), solve the possible problems (gas tap closed, no gas...) and press the RESET button (2). Switch the boiler off and call the Service Centre if the boiler blocks repeatedly.

#### TO SWITCH OFF THE BOILER

- For a short stop, press the boiler ON/OFF button once; the display and the warning lights go off. The main boiler functions are disabled.

- For a long-term stop, press the ON/OFF button and the main switch, located out of the boiler; close the fuel gas tap which supplies gas to the boiler.

#### TO KNOW ABOUT THE BOILER OPERATION

Look at the control panel warning lights:

-The Heating leds (n° 5) and the sanitary leds (n° 9) can be:

- off; in this case the relevant functions are not operating
- on; the relevant functions are operating
- flashing; the burner is operating and the boiler is working in order to satisfy the active function that induced the request.

Please observe the display of the instrument board.

It can show:

- a number; it indicates the temperature of the water delivered to the heating equipment. This is displayed when the heating is on (SUMMER/WINTER button (3) set on winter, heating led (5) is on, the contacts of the room thermostat (when present) are closed (heating is requested).
- Two spinning hyphens: the boiler is working with a request of hot sanitary water (led 9 flashing or fixed)
- Two horizontal hyphens: there is neither request of heating (SUMMER/WINTER button (3) set on winter or contacts of thermostat open) nor of hot sanitary water.
- A flashing message, indicating a malfunction (see the paragraph "MALFUNCTION SIGNALLING" in the manual)

#### TO ADJUST THE SANITARY HOT WATER TEMPERATURE

Plus and Minus buttons (+/-) of the control panel (8, 10). They change the water temperature value Ts, within the 30-60°C range. Press the "+/-" button once: the set Ts value is displayed. The value is displayed for 5": during



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this lapse of time the set value can be changed by pressing the "+/-" buttons.

## TO ADJUST THE HEATING SYSTEM

Plus and Minus buttons (+/-) of the control panel (4, 6). They change the temperature value of primary water sent directly (without SE) or indirectly (with SE) to the radiators. Without SE.

When the SE external probe is not connected or has been disabled from its switch, the "+/-" buttons change the supplied water temperature value within the 40 - 80°C range.

Press the "+/-" button once: the set Tm value is displayed. The value is displayed for 5": during this lapse of time the set value can be changed by pressing the "+/-" buttons. The heating system operates according to the fixed reference value of the supplied water temperature Tm.

## With SE (optional, on pre-set boilers).

To benefit from the climatic function, and consequently from a better adaptation of the equipment to the heating needs of the room, an external temperature probe must be installed (SE). This probe is supplied on request. As for the installation and the electrical connection of the SE, please see the booklet of boiler. The trigger box detects the presence of an external probe and starts working on climatic mode. The temperature of delivery varies as a function of the external temperature following a curve which is set up (out?) by two parameters. These parameters can be inserted by the buttons + and - for the regulation of the heating (see diagram):

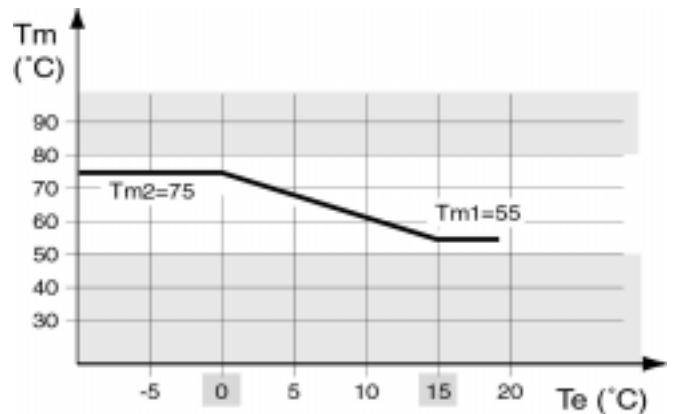
- 1) Water delivery temperature (Tm1) requested when the external temperature (Te) is higher than 15°C
- 2) Water delivery temperature (Tm2) requested when Te is lower than 0° C.

When the heating regulation buttons are pressed the actual value of Tm1 will be shown ????? non capisco l'italiano. After few seconds two hyphens will appear on the display. Once this occurs the value of Tm2 will have to be inserted. Tm1 and Tm2 must always be comprised between 0 and 80° C,  $Tm1 \leq Tm2$ .

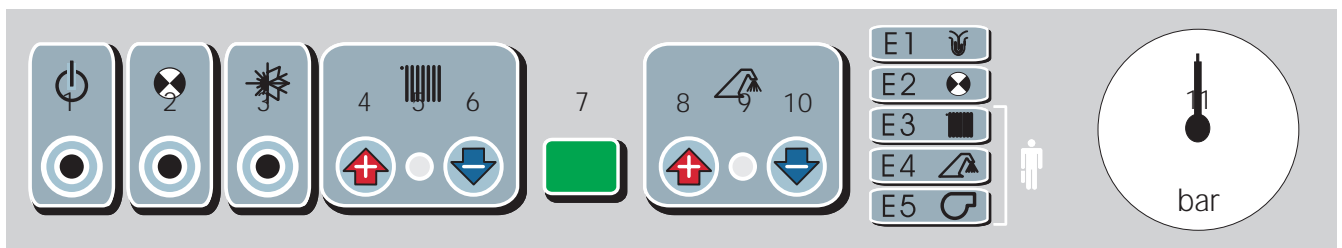
When the external probe is present the climatic function can also be deactivated as follows:

The boiler being off (stand-by,) press contemporarily for five seconds the buttons SUMMER/WINTER and "+" of heating. The message "of" will appear on the display. The function can be activated again by pressing the same two buttons and the appearing message will be "on".

The diagram aside shows an example of climatic regulation with Tm1=55°C and Tm2=75°C. When the external temperature is comprised between 0 and 15° C, the temperature of delivery stays between 55 and 75°C.



This function blocks the burner power modulation on the max. value so that combustion tests can be carried out. To enable this function, turn off the boiler, keep the SUMMER/WINTER button pressed and turn it on again by pressing the ON/OFF button: the display flashes until it is disabled.



- |                                  |                                   |                                    |
|----------------------------------|-----------------------------------|------------------------------------|
| 1 ON / OFF                       | 5 heating function led            | 9 sanitary function led            |
| 2 RESET                          | 6 heating temperature decreasing  | 10 sanitary temperature decreasing |
| 3 SUMMER / WINTER                | 7 display                         | 11 monometer                       |
| 4 heating temperature increasing | 8 sanitary temperature increasing |                                    |

FIGURE 13: CONTROL PANEL

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To disable it, press the SUMMER/WINTER button or turn the boiler (external) main switch off. It also stops when sanitary hot water is collected. The burner goes off when the 85°C temperature is reached.

## **4.3 BOILER OPERATION**

All systems are equipped with a micro-processor controlled adjustable gas valve. The equipment power is continuously modulated up to 30% of the rated value and is automatically adjusted to the sanitary and heating system needs. In case of operation under the min. adjustable power, the burner works in "on-off" mode and the user-set temperature is considered as a reference value. When the sanitary system works in "on-off" mode, the equipment stops at +3° vs. the set temperature and re-starts at -3° vs. the set temperature. When the heating system works in "on-off" mode, the equipment stops at +5° vs. the set (or calculated) temperature and re-starts at -5° vs. the set temperature.

The burner and the pump are simultaneously enabled during the heating and sanitary system operation. During these stages, the temperature is controlled by the heating and sanitary probes, respectively. When the set temperature is very close, the burner switches from the max. power to the min. power. If the temperature keeps increasing, the burner goes off, but the pump does not.

\*\_

To start the heating system, turn on the equipment and set the summer/winter switch and the room thermostat (if installed) on heating enable mode. The burner and circulation device start working and the radiators warm up. The heating system operation is automatically controlled by the room thermostat (if installed) and heating temperature adjustment. When the room thermostat is enabled, the burner and circulation device go off, while the heating temperature adjustment keeps the temperature of the water flowing from the boiler to the radiators constant and identical to the displayed temperature. It controls the modulation, turning off and re-starting of the burner by keeping the circulation device on, so that any system temperature variations are immediately detected.

If the system does not work for 24 hours, the pump starts up for a few seconds, thus preventing any block due to clogging. This function is active even when the on-off button is OFF.

To start the sanitary hot water system, open the tap; the heating system stops temporarily, as long as hot water is collected. When sanitary hot water is produced, the deflection valve switches and the burner and circulation device work simultaneously. The sanitary hot water

temperature is controlled by the sanitary temperature adjustment system, which controls the modulation, turning off and on of the burner. The internal recirculation is active, so that sanitary water temperature variations are immediately detected.

When the heating system is working, hot water can be produced whenever it is requested.

While sanitary hot water is being collected, the heating probe works as a limit thermostat at 85°C, thus preventing primary water over temperature

## **4.4 ROOM THERMOSTAT.**

The room thermostat (or chrono-thermostat) is installed out of the equipment. It is installed 1.5 m above the floor, on an internal wall of the flat, away from sun rays and radiators. It controls the heating system operation by keeping the air temperature in the flat under control. When it is enabled, the heating system is disabled, i.e. the pump and burner go off. It has the same function of the summer/winter key.

The room thermostat has at least three operating positions:

- 0 - heating system disabled (heating system off): only sanitary hot water production is enabled;
- AUTO - on-off operation: the room temperature can be set; usually 20°C;
- I - the room thermostat is disabled (heating system on): the heating system is enabled and controlled by the equipment, i.e. by the heating thermostat.

When no room thermostat is installed, the situation is always as described in - I -.

The room thermostat and timer do not affect the sanitary hot water production.

### **NOTE:**

The room thermostat can control the heating system only when all the following conditions occur:

- the equipment is on (green light),
- the summer-winter switch is on winter,
- the boiler heating system temperature is not too low.

The room thermostat can be replaced by a chrono-thermostat which combines the room thermostat and timer functions (heating system time programmer). In this case, daily times of heating system operation must be set.

When the room thermostat contact opens, the micro-processor executes a 5 second-post circulation to avoid overtemperature of the boiler primary water.

## **4.5 ANTIFREEZING FUNCTION**

The boiler has a function preventing from risks of freezing of the equipment and of its internal parts. In case the temperature of the water, which is pointed out by the delivery probe (?) reaches critical values (5° C), the boiler reacts activating the circulator and then, when necessary, igniting the burner. The function is active even if the boiler is off (STAND-BY), but with the general switch on. The anti-freezing function can anyhow be excluded through the following operation: with boiler off keep pushing for five seconds contemporarily the buttons SUMMER/WINTER

# TECHNICAL MANUAL FOR INSTALLATION, USE AND MAINTENANCE

(3) AND “+” of the sanitary (8); the message “of” will appear on the display. In order to re-activate the function, simply repeat the same operation and the message “on” will appear.

The anti-freezing function does not grant a total protection from freezing due to the fact that this is subordinated to the correct functioning of the boiler. This is not granted, for instance, when the electric or gas supply is interrupted, when the flue gas exhaust pipes are obstructed or when a failure of an internal component occurs. Therefore the custom is that some anti-freezing liquid is added to the equipment, as suggested in the section “INSTALLATION” of the manual.

## 4.6 MAINTENANCE.

**NOTE !** Only skilled technicians can carry out activities inside the boiler

Should a malfunctioning occur, shut down the device, call the Service Centre and do not carry out any maintenance operation: the hot surfaces inside the boiler may cause BURNS and the energised components may cause SHOCKS or SHORT CIRCUITS!

Call the authorised Service Centre for yearly compulsory maintenance.

Before cleaning the shell, de-energise the electrical system and use a wet cloth and soft detergent to remove the dust and build-ups.

Keep the area where the boiler is installed always clean; do not cover air intakes which allow combustion and/or cooling air to enter the system.

**NOTE !** Make sure that unauthorised people, children, animals or anything else which may damage or be damaged by the boiler, cannot easily access the boiler.

## MALFUNCTIONING SIGNAL

E1	Missing water in the radiators or water pressure lower than 0.5 bar; this value can be checked on the water meter (11); no boiler electrical component is enabled; open the tap to increase the water pressure and automatic operation will re-start.
E2	When it flashes, the burner has blocked. Also a figure may blink: it indicates the stored primary temperature when the block occurred; if no figure blinks, the block occurred when sanitary water was being collected; if a figure blinks, the block occurred during the operation of the heating system; this shows whether the block occurred as a result of over temperature or missed flame detection (cold or hot condition). Press the reset button (2) to try and restart the boiler.
E3	When it flashes, the heating probe is disabled or damaged. Reset or replace the probe to re-start the boiler.
E4	When it flashes the sanitary probe is disabled or damaged. The sanitary mode is possible but the hot water temperature is lower. It keeps flashing until the probe is reset or replaced. The function detecting that the probe is not working is enabled only when hot water is collected.
E5	When it flashes, the boiler is not working because of bad draught. In the <b>E model</b> , the flashing stops after 10 minutes and the burners starts working again; after a few minutes it stops again if the problem has not been solved. In <b>EF, ER</b> models, the flashing continues until the problem is solved.
	The temperature values flash when the Pacc and Pmax values are being changed (call the technician) or if the chimney sweep function is enabled.

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TECHNICAL DATA *		SE	SER	XE	XER
Boiler category		II2H3+	II2H3+	II2H3+	II2H3+
Thermal fluid		Water	Water	Water	Water
Maximum water pressure - heating / sanitary	bar	3/ -	3/ -	3/6	3/6
Minimum water pressure - heating / sanitary	bar	0.5/ -	0.5/ -	0.5/0.5	0.5/0.5
Electric power supply	V	230V	230V	230V	230V
Heat input ( Hi ) - Minimum/Nominal	kW	7,5/25	7,5/25	7,5/25	7,5/25
Heat input ( Hi ) - Minimum/Nominal	kcal/h	6450/21500	6450/21500	6450/21500	6450/21500
Heat output (80 - 60 °C)	kW	22,7	23,3	22,7	23,3
Heat output (80 - 60 °C)	kcal/h	19522	20038	19522	20038
Consumption of Natural Gas (G20) - min./ nomin.	m³/h	0,8/2,69	0,8/2,69	0,8/2,69	0,8/2,69
Consumption of Butane (G30) - min./ nomin.	m³/h	0,25/0,78	0,25/0,78	0,25/0,78	0,25/0,78
Consumption of Propane (G31) - min./ nomin.	m³/h	0,27/0,88	0,27/0,88	0,27/0,88	0,27/0,88
Pressure of Natural Gas (G20) 20mbar - min./ max	mbar	0,9/9,5	0,9/9,5	0,9/9,5	0,9/9,5
Pressure of Butane (G30) 30mbar - min./ max	mbar	3,2/27	3,2/27	3,2/27	3,2/27
Pressure of Propane (G31) 37mbar - min./ max	mbar	3,6/33,5	3,6/33,5	3,6/33,5	3,6/33,5
Soft start pressure of Natural Gas (G20)	mbar	2,5	2,5	2,5	2,5
Soft start pressure of Butane (G30)	mbar	8	8	8	8
Soft start pressure of Propane (G31)	mbar	10	10	10	10
Power modulation - min./ max	%	30/100	30/100	30/100	30/100
Expansion vessel	l	7	7	7	7
Electric power absorbed by the pump - min./ max	W	35/80	35/80	35/80	35/80
Electric power absorbed by the fan	W	47	47	47	47
Sanitary water production - Dt 25°C	l/min	-	-	13	13
Sanitary water production - Dt 30°C	l/min	-	-	11	11
<b>Efficiency (Direttiva 92/42/CEE)</b>					
Efficiency at full load (80° - 60° C)	%	90,6	93,3	90,6	93,3
Efficiency at 30% load Tm = 50°C (60° - 40°C)	%	88,4	90,1	88,4	90,1
Combustion efficiency (80° - 60° C ; Ta= 20° C)	%	93,4	95,2	93,4	95,2
Flue gas temperature (air comburent 20°C)	°C	114	127	114	127
Energy lost with burner functioning (80° - 60° C) = Pf	%	6,6	4,8	6,6	4,8
Energy lost though the casing (Tm = 70°C)	%	2,8	1,9	2,8	1,9
Class of efficiency 92/42/CEE		★★	★★★	★★	★★★
<b>Water connection</b>					
Inlet system	in	G 3/4" M	G 3/4" M	G 3/4" M	G 3/4" M
Sanitary water	in	-	-	G 1/2" M	G 1/2" M
Gas inlet	in	G 1/2" M	G 1/2" M	G 1/2" M	G 1/2" M
Sanitary cold water	in	-	-	G 1/2" M	G 1/2" M
Outelet from system	in	G 3/4" M	G 3/4" M	G 3/4" M	G 3/4" M
Flue gas outlet and air inlet (Separated)	mm	130	60 - 60	130	60 - 60
Flue gas outlet and air inlet (Coaxial)	mm	-	100 - 60	-	100 - 60
<b>Dimensions and weight</b>					
Height	mm	700	700	700	700
Width	mm	400	400	400	400
Depth	mm	300	300	300	300
Weigh	kg	27	35	30	38
<b>Settings</b>					
Heating regulation temperature - min./ max	°C	50 / 80	50 / 80	50 / 80	50 / 80
Sanitary regulation temperature - min./ max	°C	-	-	30 / 60	30 / 60

(\*) Tests carried out with Natural Gas (G20)