

MAX TRONIC

INSTRUCTION MANUAL

**INSTALLATION AND USE OF WALL-HUNG GAS BOILERS
WITH CONTINUOUS MICROPROCESS MODULATION**



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1. OVERVIEW

Thank you for choosing our products! Read and store this manual for future reference, to be fully satisfied with the device performance.

The boiler contains a label with the name of the device, the series, the type, the serial number and the plate technical data.

The main features of your boiler are described hereafter:

MAX SER	MAX XER
Heating only	Heating and hot sanitary water production with 13 lt storage tank
Nominal power 34,8 kW	
Continuous power modulation (30% - 100%) managed by a microprocessor	
Electronic ignition, forced draught, sealed chamber (C12, C32, C42, C52 – EN483)	

2. GENERAL INFORMATION

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

Remove the cardboard box from the top and do not turn the boiler upside down. Keep the boiler vertical on its lower polystyrene base. Do not place the boiler directly on the floor.

After removing the box, make sure that the equipment is not damaged. When in doubt, contact the 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. The equipment must be installed in a suitable environment and connected to proper systems, which comply with laws in force. The Manufacturer abdicates any responsibility in case of damage caused by tampering, 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 Center.

NOTE. Commissioning of the boiler 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 the commissioning.

NOTE. Maintenance is compulsory and must be executed at least once a year. Contact the authorized Service Center. In any case, only technicians who are qualified according to the laws in force, can carry out the maintenance activities.

FOR ADDITIONAL IMPORTANT INFORMATION, READ THE OTHER CHAPTERS OF THIS MANUAL.

3. INSTALLATION

NOTE. ONLY authorized 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. LOCATION OF THE BOILER

The boilers do not have a sealed chamber and can only be installed in places which comply with current regulations and, in any case, in permanently ventilated places.

Use the two screw 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 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 non-removable impediment. When defining the installation height of the boiler, make sure that 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 unauthorized people, children, animals or anything else which may damage or be damaged by the boiler, cannot easily access the boiler.

3.2. WATER AND FUEL SYSTEMS.

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 plate match.

Natural gas (methane) or LPG (propane + butane) are usually requested and the piping rated flow rate is specified. The combustible gas supply piping and the control systems 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 mm) 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 and maximum pressure (see page 10). This operation must be carried out by **qualified technicians**: contact the authorized Service Center. The **Service Center** must verify the correct operation of the equipment and officially validate the guarantee certificate within 8 days from installation.

Hung the wall mounting jig on the wall so that the support hooks and the pipes are place correctly. The wall mounting jig is serially supplied inside each boiler (see figure 1). Insert the four reinforcements (serially supplied) inside the holes made on the upper side of the wall mounting jig and place the hydraulic connections inside the holes made on the lower side. The hydraulic connections must have female connectors (like the ones indicated) on the wall.

FIGURE 1b. Dimensions, respect spaces, hydraulic and electric connections, air inlet and smokes exhaust

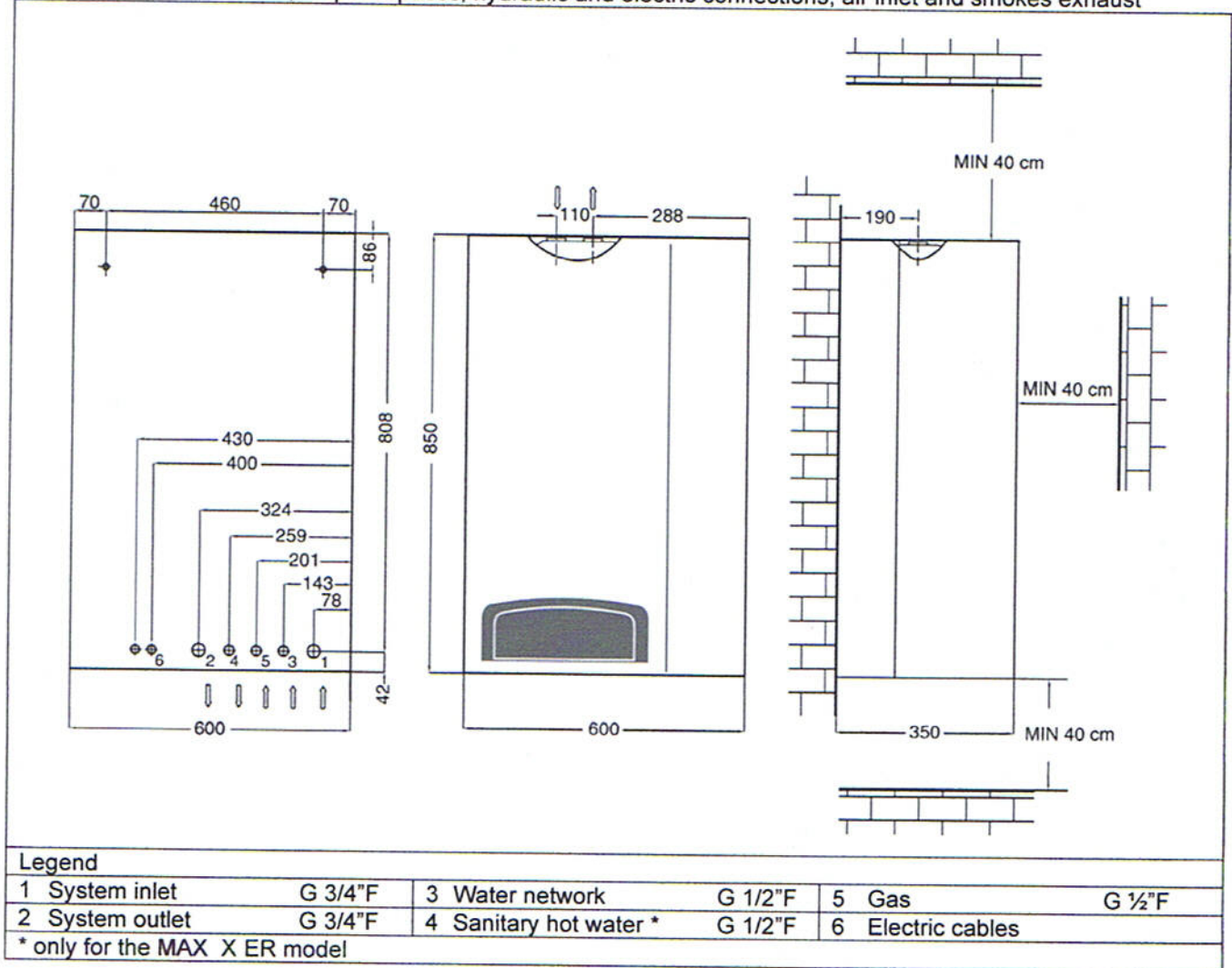


Figure 2 shows the connection system between the boiler and the system. Proceed as follows:

- Unscrew the caps on the boiler so that any liquid loss is avoided and the female connectors are hold.
- Use the female connectors (4 in figure .3) to connect the copper bends to the joints of the boiler and use the "double-cone" connections to join the bends to the system connections. Bends and connections (patented for the use inside gas grids) are supplied together with the boiler.

Figure 3 shows the whole piping series with the shutoff cock. The piping series can be available on demand and their use is strongly recommended.

FIG. 2. Connecting scheme to system

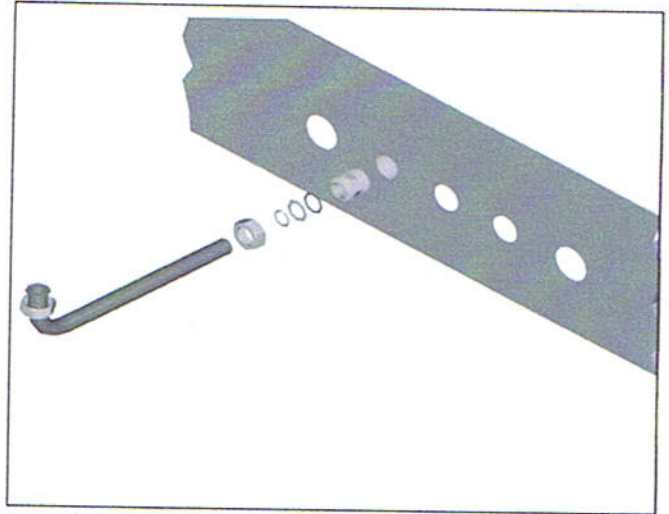
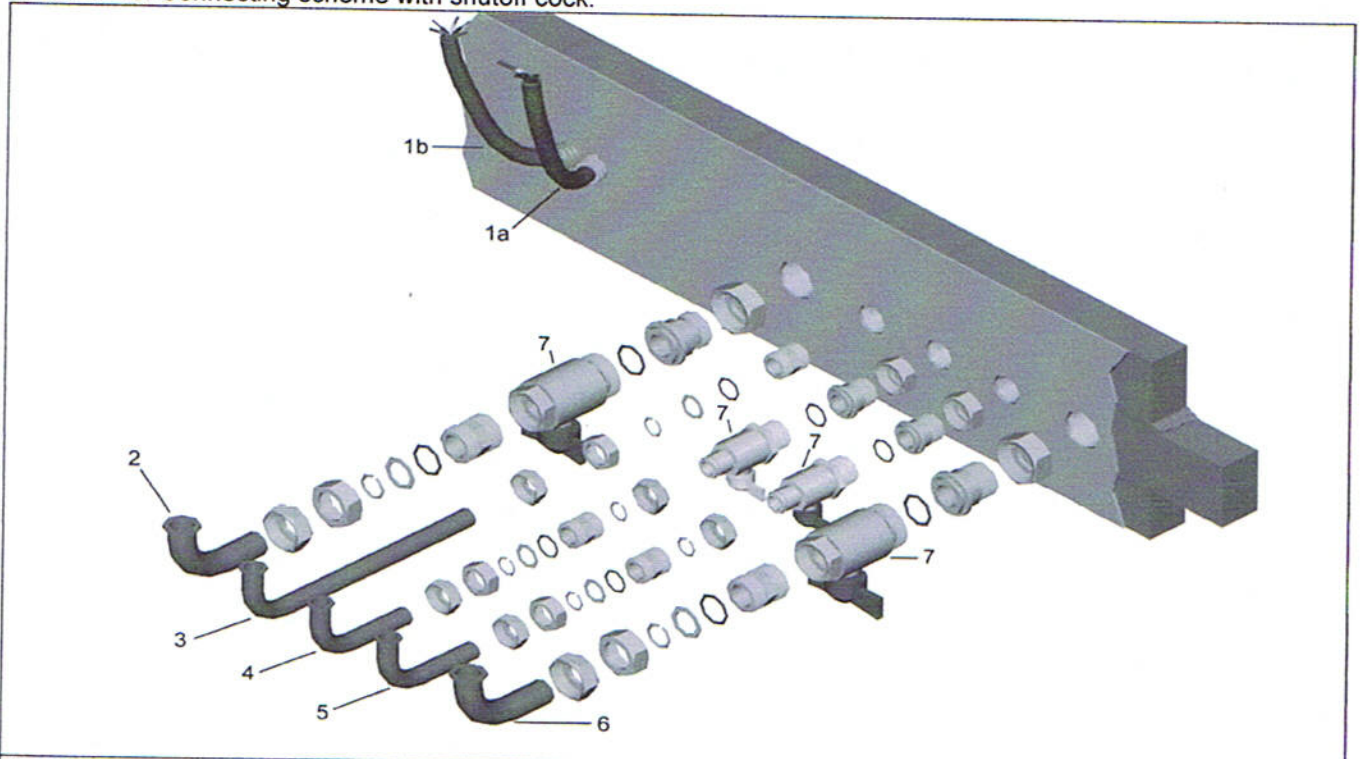


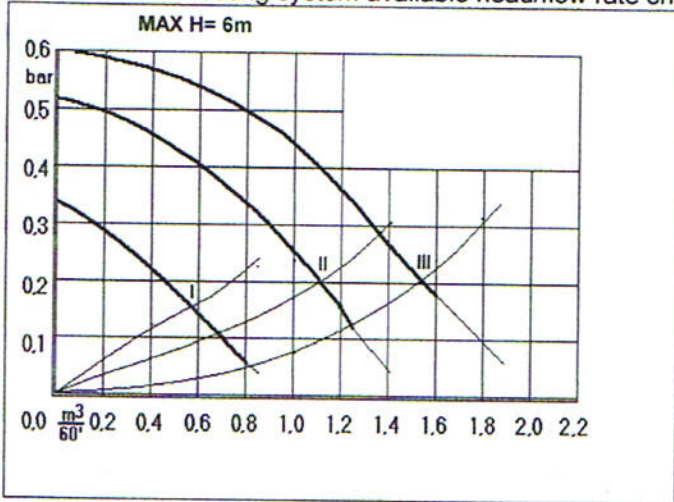
FIGURE 3. Connecting scheme with shutoff cock.



LEGEND							
1a	High tension cables	2	System outlet bend	4	Gas inlet bend	6	Sustem inlet bend
1b	Low tension cables	3	Sanitary outlet bend	5	Inlet	7	Shutoff cocks

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 (head $H=5\text{m}$), 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 pump which has an higher head ($H=6\text{m}$) available on demand. See Figure 4 for the available head/flow rate curves of the heating system.

FIGURE 4. - Heating system available head/flow rate chart.



The expansion vessel, which is part of the equipment, guarantees proper operation up to a heating system capacity of 140 liters. Specific solutions are needed for larger or vertical systems.

The standard equipment does not include an automatic by-pass valve between the inlet and outlet. A special automatic by-pass valve is needed when thermostatic valves are installed on all radiators or when local flow stopping valves are mounted.

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

3.3. AIR INLET AND FLUE GAS DISCHARGE.

The boiler has a forced draught and a sealed combustion chamber; hence the need for two separate circuits: one for carburant air, taken from the external environment, and one for combustion smoke discharge. The two ductworks can be branched from the boiler towards any direction and they can be either closed (Fig. 5a) or concentric (Fig. 5b); they can end with collective tubes for sealed chamber boilers or end directly outside to the roof or to the wall, when the Laws in force allows it.

Sealed-chamber systems are supplied with 2 collars, 2 stoppers and 8 self-tapping screws to connect the boiler to the air inlet and smoke discharge pipes. In both cases, one spare collar and plug will be left. To install the COAXIAL PIPE, install the small stopper on the double pipe air inlet and the large collar on the coaxial pipe air inlet. To install the DOUBLE PIPE, one for air inlet ($\varnothing 60$ mm) and one for smoke discharge ($\varnothing 60$ mm), place the small collar on the coaxial pipe air inlet.

Figure 6a schematizes the main air inlet and smoke discharge systems (please note that their use is restricted by the Law), the figure also indicates the respective maximum air resistances (R_{tot}).

Figure 6b indicates the resistance values of the pipe elementary sections. Use these values to calculate the R_{tot} and make sure that the limit allowed for the system adopted has not been overcome.

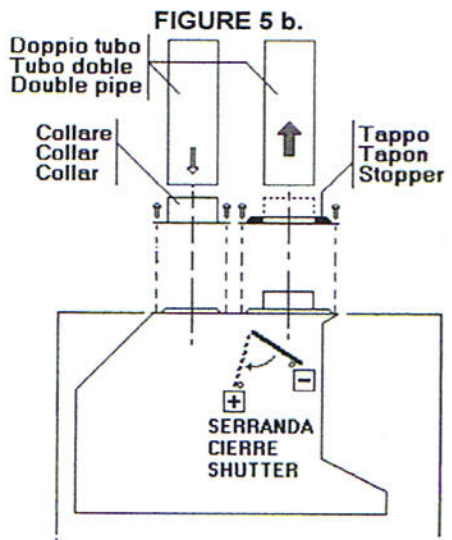
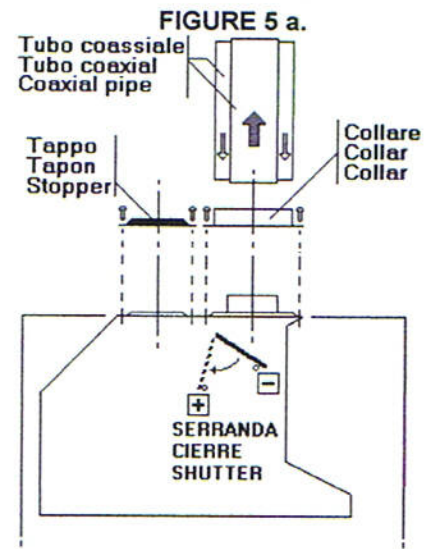
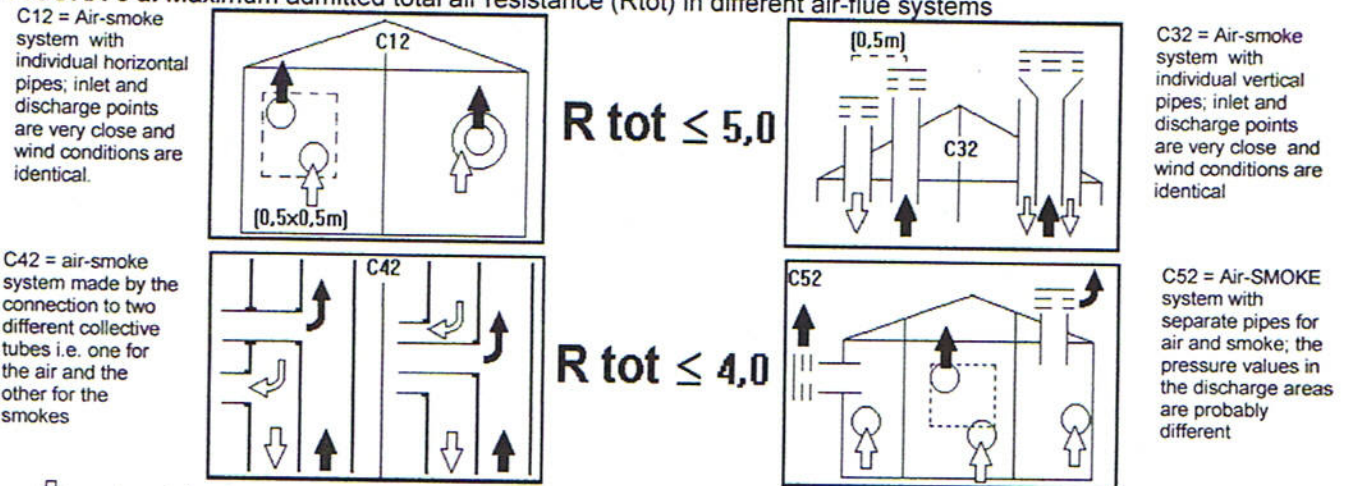


FIGURA 6 a. Maximum admitted total air resistance (R_{tot}) in different air-flue systems



↓ = carburant air path
 ↑ = smoke path

R = air resistance in a simple pipe section
 R_{tot} = total pipe air resistance in the air-smoke path

FIGURE 6 b. Air resistance R in an elementary pipe section

R	Ø 60	R	Ø 80	R	Ø 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	

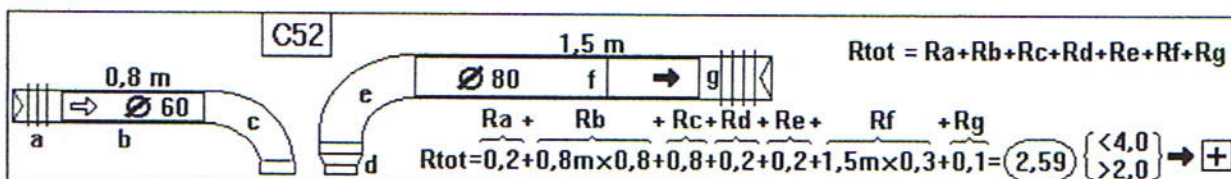
PIPE SELECTION

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

Rtot systems C12-C32	Up to 3,0	from 3,0 to 5,0
Rtot systems C42-C52	Up to 2,0	from 2,0 to 4,0

EXAMPLE

- 1) Selected air-smoke system: double pipe C52.
- 2) Total path length: air (a) wind-proof head + (b) 0.8m straight + (c) 90° bend; smoke (e) 90° bend + (f) 1.5m straight, (g) wind-proof-head.
- 3) If $\varnothing 60$ mm for air and $\varnothing 80$ mm for smoke, R for the various sections is: $R_a=0.2$, $R_b=0.8 \times 0.8=0.64$, $R_c=0.8$, $R_e=0.2$, $R_f=1.5 \times 0.3=4.5$, $R_g=0.1$; for $\varnothing 80$ smoke pipe, the (d) 60-80 reducer section is needed, resistance: $R_d=0.2$.
- 4) $R_{tot}=0.2+0.64+0.8+0.2+0.2+0.45+0.1=2.59$
- 5) $R_{tot}=2.59$ is good for C52 because it is lower than 4.0.



NOTE. During installation, make sure that smoke 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-energize the equipment and connect it to the electrical system. For the electrical connection, use the connecting terminal collocated in the control panel and pay attention to the indicated electrical connections. Remove the shell and the control panel cover to access the connecting terminal.

Power to the boiler should be supplied by a multi-polar switch with a contact-opening distance of at least 3 mm.

NOTE. Do not use water or gas systems as a ground for the electrical or telephone system.

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

A room thermostat (TA) and/or an external probe (SE) can be connect to the boiler; both the thermostat and the probe are available as spare parts. In order to connect the room thermostat (TA), it is necessary to reach the connecting terminal placed inside the boiler keyboard. Spot connectors 11-12 on the connecting terminal, eliminate the occupation bridge and connect the room thermostat (or the chronothermometer). Use connectors 9 and 10 collocated on the same connecting terminal to join the external probe SE. Place the probe on the external wall which corresponds to the living room; do not head it south or place it where it could be irradiated by the morning sun. When in doubt, place it to the north or north-west side.

ATTENTION. Electrical input and control cables (TA, SE) have to be separated between each others and installed inside the

CONNECTING TERMINAL

L	GND	N						SE	SE	TA	TA
230V		0V									
1	2	3	4	5	6	7	8	9	10	11	12

3.5. IMPORTANT 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; after the washing, drain all the washing water.
- Make sure the external systems are connected to the correct boiler pipes.
- 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.
- Make sure that the free space and distances recommended in this manual are respected, to facilitate maintenance activities.
- Make sure that the smoke discharge pipe, the chimney and comburent air supply system are clean and efficient.
- Make sure that no other smoke 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 smoke and air pipes are collected and discharged and do not reach the boiler.
- Connect the air inlet and SMOKE discharge pipes; make sure that they are stable, but removable; they must not be loose and their sealing over time must be guaranteed.

Figure 7 shows the hydraulic circuit of the boiler and its relative connected components, Figure.8 gas-air-smokes circuit; Figure 9 the electric scheme.

FIG. 7 – Hydraulic Schemes

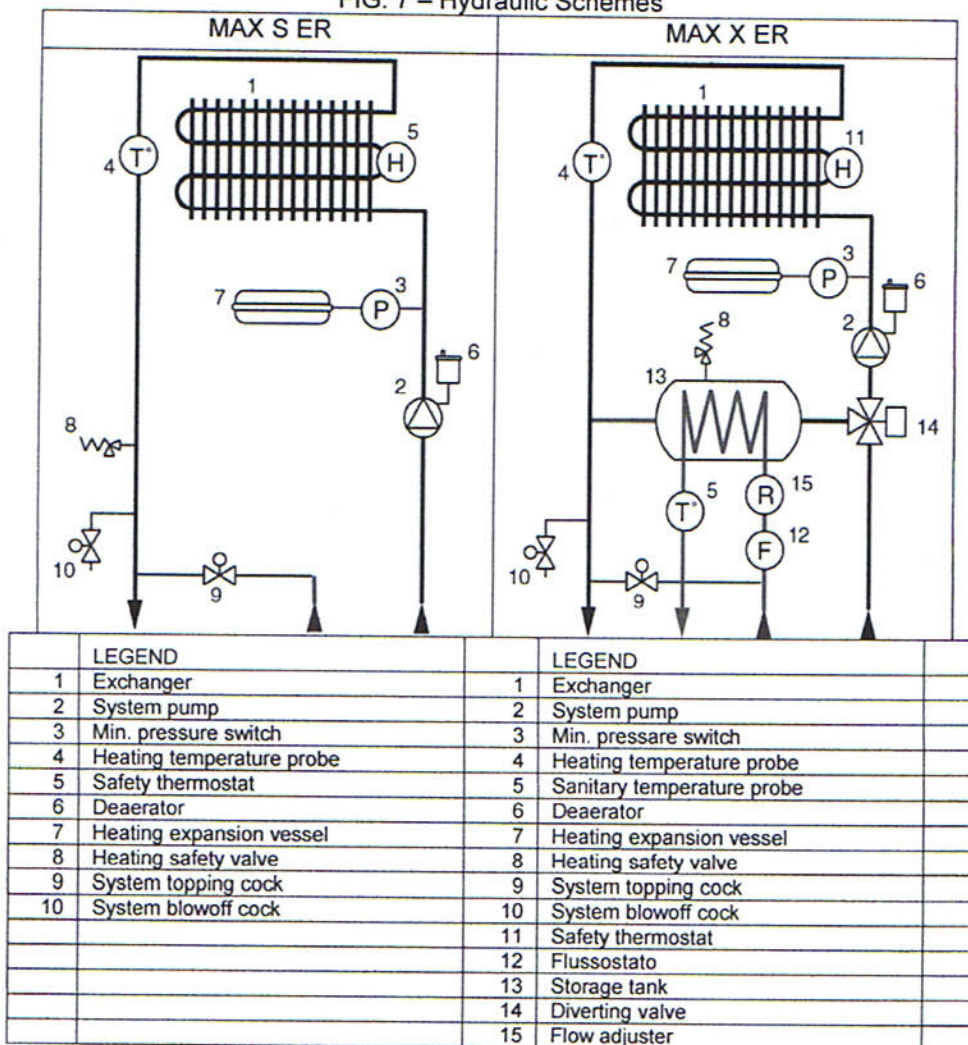
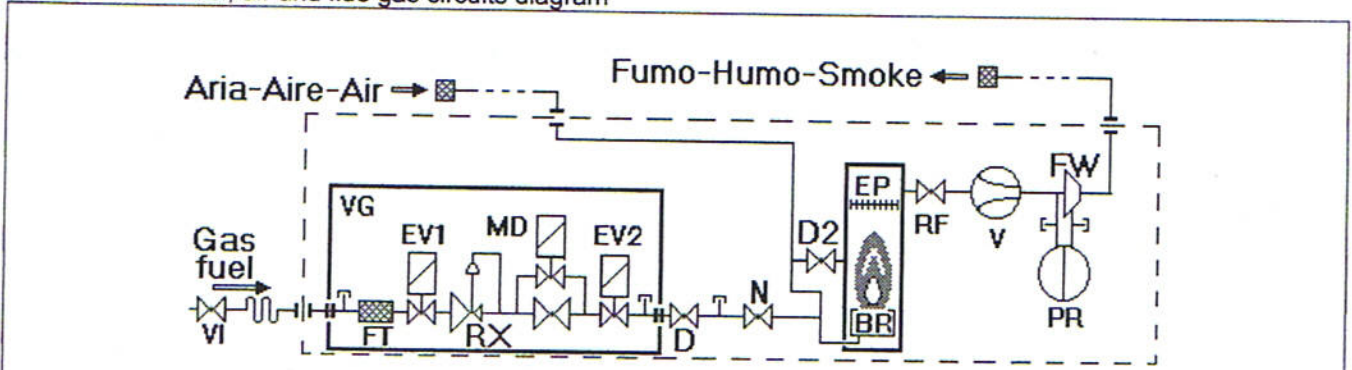


FIGURE 8. Fuel, air and flue gas circuits diagram

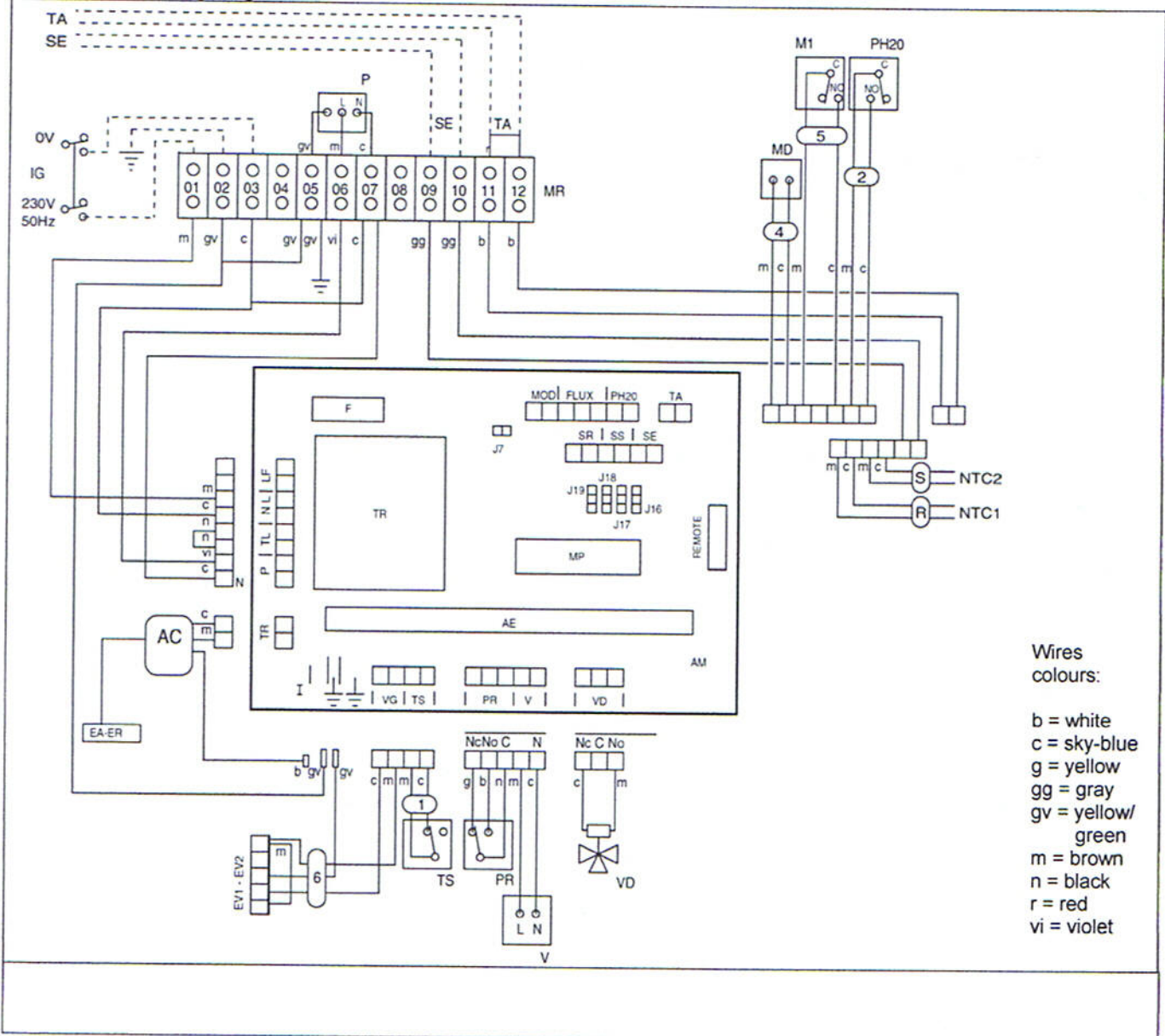


LEGEND

BR = burner	EV2 = main electro-valve	PR = flue gas pressure switch
D2 = secondary air distributor	FT = gas filter	RX = pressure regulator
D = diaphragm (*)	FW = flow sensor	V = fan
EP = primary heat exchanger	MD = modulation electro-valve	VG = gas valve
EV1 = safety electro-valve	N = gas nozzles	VI = cut-off valve

(*) present only in those Countries where it is compulsory to exclude RX

FIGURE 9. Wiring diagram



LEGEND			
AC = starter	ER = flame detection electrode	NTC2 = sanitary probe	TA = chrono-thermostat (optional)
AE = flame control card	F = fuse	NTC1 = heating probe	TS = safety thermostat
AM = flame modulation card	IG = main switch (not supplied)	P = pump	V = fan
EV1 = safety electro-valve	MD = modulation electro-valve	PH2O = water pressure-switch	VD = three-way valve
EV2 = main electro-valve	MR = connecting terminal	PR = smoke pressure switch	
EA = ignition electrode	M1 = microinterruttore fluss_sostato	SE = external NTC probe (optional)	

3.6 ELECTRONIC CARD SETTING.

NOTE. The following operations must be carried out by technicians authorized by the Manufacturer. Unauthorized personnel shall not carry out any activities. Wrong operations may jeopardize 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.

FIGURE 10. Card Jumper

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

The METHANE/LPG jumper **J7** 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 +/- switches 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.

<u>Pacc</u>	<u>G.N.</u>	<u>p_{G20}</u>	<u>G.P.L.</u>	<u>p_{G31}</u>
50%	25-45	2.5mbar	45-55	10.0mbar

Use a pressure gauge to check the gas pressure accuracy.

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

<u>Pmax</u>	<u>G.N.</u>	<u>p_{G20}</u>	<u>G.P.L.</u>	<u>p_{G31}</u>
100%	>85	10.0mbar	>85	35.0mbar
80%	≅65	6.4mbar	≅70	22.4mbar
65%	≅45	4.2mbar	≅60	14.7mbar
50%	≅25	2.5mbar	≅50	10.0mbar

Use a pressure gauge to check the gas pressure accuracy.

3.8 MODIFICATION OF THE BOILER PRESET GAS

This modification must be carried out **ONLY** by the Service Centre or authorized 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).

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

VALV. GAS*	OPERATION
6 HW, SIT	Valid only for 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.10)
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 max. gas pressure screw; this value corresponds to the max. burner power (see table).
13 HW, SIT	Disconnect the modulator and adjust the min. gas pressure by turning the corresponding screw (see table)
14 HW, SIT	Re-connect the modulator and check the set pressure values.
15 HW, SIT	Re-install the cap and seal the adjustment screws (e.g. with a drop of paint).
16 HW, SIT	On the modulation card move the jumper (Fig.4) to change the parameters and adjust them according to the instructions reported in paragraph 3.6
17 HW, SIT	Disconnect the pressure gauge and place the plug on the pressure outlet.
18 HW, SIT	Place the METHANE (N.G.) or L.P.G. stickers near the gas valve and rating plate.

* HW = HONEYWELL VK4105 SIT = 845 Sigma

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

4. USE, OPERATION AND MAINTENANCE.

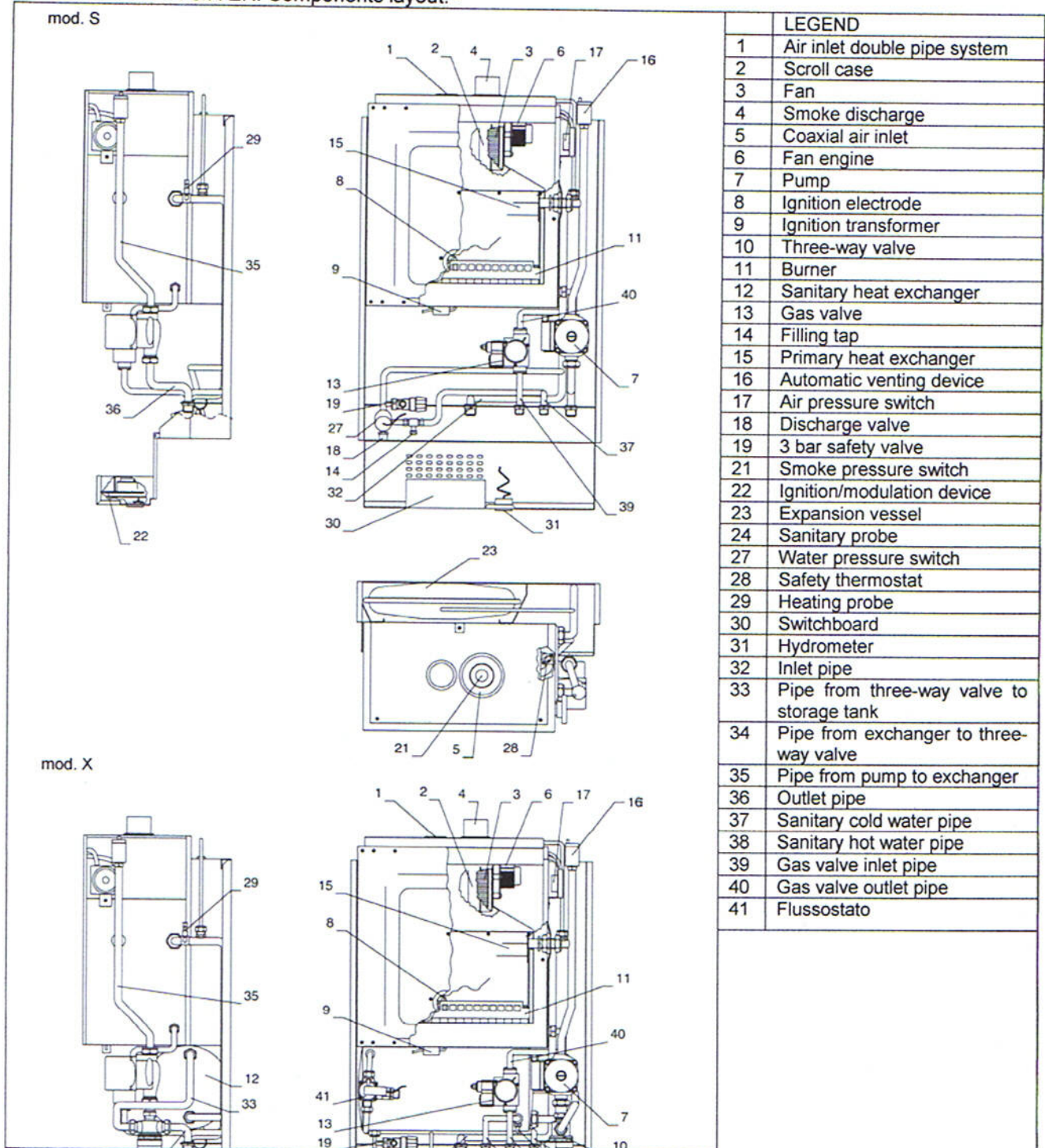
Before using the boiler, an authorized Service Centre shall carry out commissioning operations. A correct commissioning procedure is a pre-requisite for a long working life of the boiler.

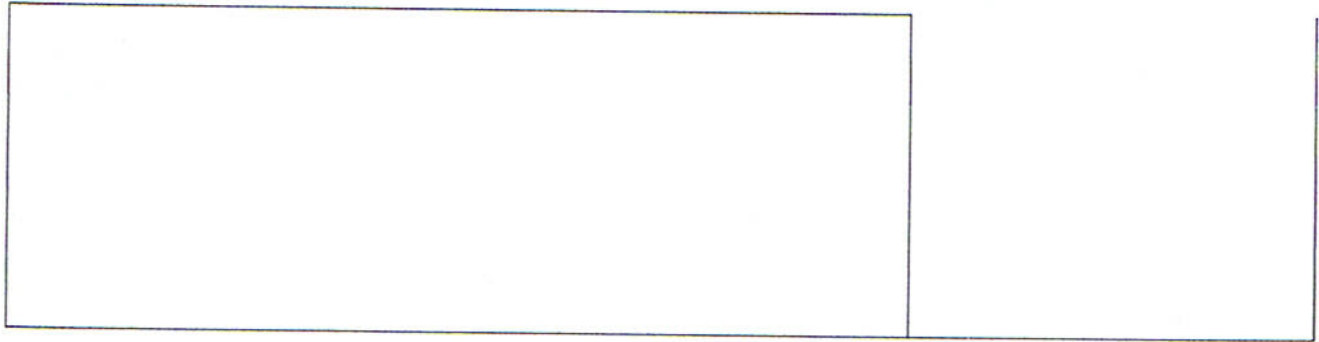
You can carry out the operations described below, which should be executed as timely as possible and whenever needed, for perfect and complete performance. These operations can be carried out after commissioning procedure.

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).

FIGURA 11. MAX S/X ER: Components layout.-



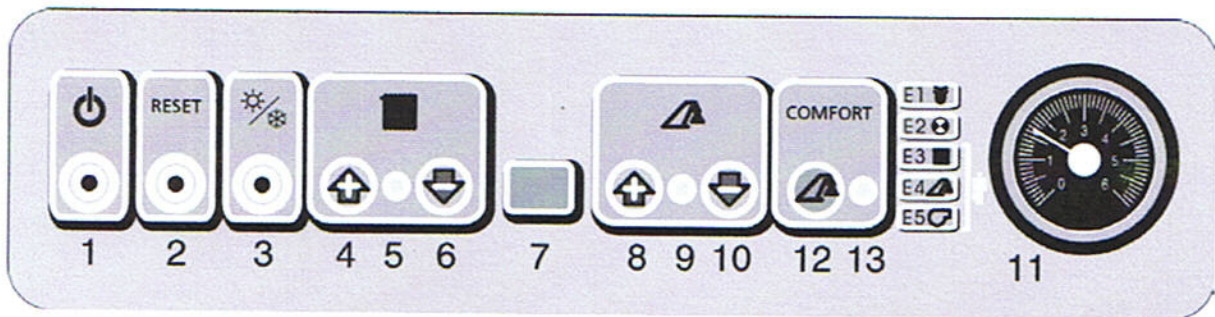


4.1 SYSTEM FILLING.

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.11).

On the pressure gauge (water gauge, no. 11, 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 when the BOILER IS COLD (T= 20°C), until the pressure value reaches 1 bar. Close the tap when the operation is complete.

FIGURE 12. Control Panel.



1	ON / OFF switch	7	Luminous display	11	Hydrometer
2	RESET switch	8	Hot sanitary water switch (increase)	12	Sanitary water COMFORT switch
3	WINTER / SUMMER switch	9	Sanitary on LED	13	COMFORT mode on LED
4	Heating switch (increasing)	10	Hot sanitary water switch (decrease)		
5	Heating on LED				
6	Heating switch (decreasing)				

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 switch once. The display shows "On" for 5".
- Press the boiler SUMMER/WINTER switch 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 switch 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 switch (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 switch once; the display and the warning lights go off. The main boiler functions are disabled.
- For a long-term stop, press the ON/OFF switch 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:

- if only the right-hand warning light is on, only the sanitary hot water production is enabled;
- if the right-hand and left-hand warning lights are both on, the sanitary hot water production and the heating system are enabled.

Look at the control panel display:

- when the display does not show anything, the boiler is on SUMMER mode and no hot water is being taken;
- when the display shows " o", the boiler is on SUMMER mode and hot water is being taken;
- when the display shows "oo", the boiler is on WINTER mode and hot water is being taken;
- if the display shows a figure, the boiler is operating for the heating system and the figure indicates the temperature of the water sent to the radiators (in degree centigrade);
- when the display flashes, a fault has been detected (see MALFUNCTIONING SIGNALS).

TO ADJUST THE SANITARY HOT WATER TEMPERATURE

- "+/-" switches of the sanitary system (8, 10). They change the water temperature value T_s , within the 30-60°C range. Press the "+/-" switch once: the set T_s value is displayed. The value is displayed for 5": during this lapse of time the set value can be changed by pressing the "+/-" switches.

TO ADJUST THE HEATING SYSTEM

The heating system inlet water can be either fixed, set by the user (case A) or modulating in accordance to the outdoor temperature (CLIMATIC FUNCTION), case B:

- A. The heating "+/-" switches (4, 6) can be used in order to change the temperature of system inlet water T_m , adjustable within a range going from 50 up to 80°C. By pressing only once one of the switches, one can view the T_m value that is currently set. This value is shown for 5"; during this time the set value can be changed by further pressing the switches.
- B. CLIMATIC FUNCTION: In order to benefit from the climatic function, (thanks to such function the heating system adjusts itself according to the heating needs of the rooms that one wants to heat) it is necessary to install an external temperature probe (SE), supplied with the boiler on request.
For installation and electric connection of the probe (SE) see paragraph 3.4 (ELECTRIC DIAGRAM page 7).
The electronic board detects the presence of an external probe and operates in climatic mode. The outlet temperature varies in accordance to the outdoor temperature following a curve that can be set through two parameters. The parameters can be set by use of the heating adjustment "+" and "-" switches:
 - 1) Desired outlet water temperature (T_{m1}) when the outdoor temperature (T_e) is higher than 15°C
 - 2) Desired outlet water temperature (T_{m2}) when T_e is lower than 0°C.

By pressing the heating adjustment switches, the current T_{m1} value will be shown; this value can be changed by pressing the same switches. After few seconds the display will show two hyphens (-). At this point the T_{m2} value can be set. Both T_{m1} and T_{m2} must lay within a range comprised between 0 and 80°C, $T_{m1} \leq T_{m2}$.

The climatic mode can be deactivated, even if an outdoor probe is installed, in the following way:

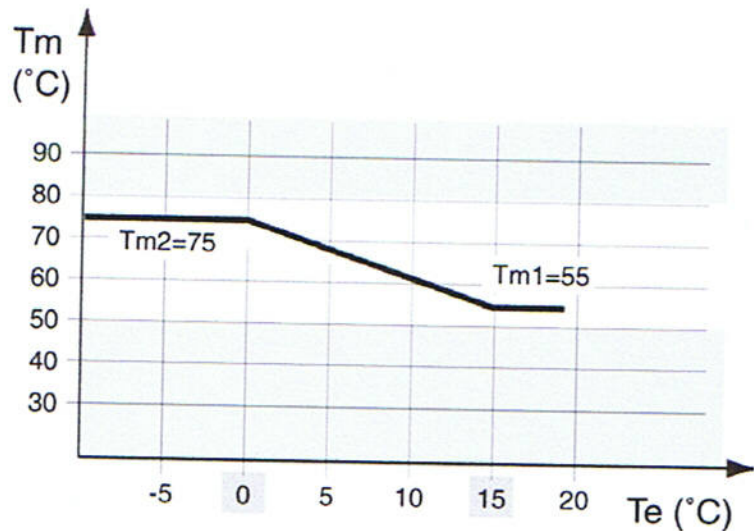
With boiler off (stand-by), press the SUMMER/WINTER switch and the heating "+" switch at the same time for 5 seconds.

The message "of" will appear on the display.

The function can be re-activated by pressing the same switches: in this case the message "on" will appear on the display.

The boiler is pre-set by the manufacturer for use with the climatic function. In other words the climatic function operates soon after an outdoor probe is installed.

The diagram on the right shows a climatic adjustment example with $T_{m1}=55^{\circ}\text{C}$ and $T_{m2}=75^{\circ}\text{C}$. If the outdoor temperature is comprised between 0 and 15°C , the outlet temperature will stay between 55 and 75°C .



ANTIFREEZE FUNCTION

The boiler is equipped with a function that prevents the system or parts of it from freezing.

In case the temperature of the water, detected by the outlet probe, reaches critical values (5°C), the boiler activates the pump and, if necessary, the burner as well.

This function is enabled even if the boiler is off (STAND-BY) but with the main switch "ON". The Climatic function can anyhow be disabled by the following procedure: the boiler off, press the SUMMER/WINTER switch (3) and the sanitary "+" switch (8) at the same time for five seconds; the message "of" will appear on the display. In order to enable the function follow the same procedure and the message "on" will appear on the display.

The antifreeze function does not grant an absolute protection against freeze depending on a correct boiler operation. It is not granted, for instance, if the power supply or the gas supply is absent, or in case there is an obstruction in the flue gas discharge pipe, or in case of a breakdown of one of the internal components.

As a consequence it is always strongly recommended to add some antifreeze liquid in the system (as suggested in the section "INSTALLATION").

COMFORT SWITCH (ONLY X ER MODEL)

The XER model is equipped with a special sanitary heat exchanger with a 13 lt primary water storage tank.

The water inside the storage tank can be kept hot by means of the "comfort" function (switch 12). Please note that the activation of the Comfort function is signalled by the luminous LED (13).

The storage tank allows the water in the serpentine to be maintained hot, thus assuring that hot water is always available. Furthermore it heats the water going to the heat exchanger serpentine without need of waiting for the ignition: this results in an immediate response to the user request for hot water.

In order to keep the water in the storage tank hot, the boiler, if needed, can ignite itself even if there is no request for hot sanitary water. Therefore, in order to minimise the gas consumption, we suggest you to disable this function when you know that you will not request hot water for long periods of time.

TO ENABLE THE "CHIMNEY SWEEP" FUNCTION – FOR TECHNICIANS ONLY

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 switch pressed and turn it on again by pressing the ON/OFF switch: the display flashes until it is disabled. To disable it, press the SUMMER/WINTER switch or turn the boiler (external) main switch off.

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 overtemperature or missed flame detection (cold or hot condition). Press the reset switch (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. 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.

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.

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. The intervention of the room thermostat switches off the burner and the circulator. The thermoregulation of the heating keeps constant the water temperature coming out from the burner to the radiators and the temperature is equal to the one displayed; the thermoregulation controls the modulation, the switch off and the ignition of the burner keeping the circulator active so that any temperature variation can be felt. During the sanitary phase, functioning is activated when the storage temperature decreases to 3° below the preset one. The boiler will modulate keeping the outlet temperature always equal to 85°C so that all the possible powers will be supplied to reestablish the temperature set for the tank within short. Sanitary functioning will cease when the preset temperature is reached. In case of simultaneously demand of both heating circuits and sanitary, this last has priority compared to the first one which will be suspended till the storage temperature is reestablished.

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 switch is OFF.

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 heating timer (optional: built in the control panel) has the same lever but when on the central position (AUTO),

the on-off operation follows the pre-programmed daily times.

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 ignites the burner only if the system inlet water temperature is lower than that the temperature set by the user or than that calculated by the electronic board (enabled climatic function).

4.5 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 inlets 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.

5. TECHNICAL DATA

SAFETY DEVICES LIST

Ionization flame detection
Commissioning at 50% of the power
Flue gas exhaust control device
Safety thermostat on the gas valve circuit
Minimum water pressure switch at ,5 bar
Relief valve at 3 bar
Sealed combustion circuit
3,15 A fuse

TECHNICAL FEATURES

MODEL	MAX S ER	MAX X ER
Boiler class		II 2H3+
Rated consumption natural gas (G20)		3,69 mc/h
Min. consumption natural gas (G20)		1,11 mc/h
Rated consumption propane (G31)		2,70 kg/h
Min. consumption propane (G31)		0,81 kg/h
Rated consumption butane (G30)		2,83 kg/h
Min. consumption butane (G30)		0,85 kg/h
Rated thermal capacity Pn		34,8 kW
Working power		32,0 kW
Power modulation(%)		100-30
Max. pressure natural gas G20 mbar		10,0 mbar
Min. pressure natural gas G20 mbar		0,9 mbar
Gas pressure at start-up G20		2,5 mbar
Max propane pressure G31 37 mbar		35,0 mbar
Min. propane pressure G31 37 mbar		3,6 mbar
Gas pressure at start-up G31		10,0 mbar
Max butane pressure G30 30 mbar		29,0 mbar
Min. butane pressure G30 30 mbar		3,2 mbar
Gas pressure at commissioning G30		8,0 mbar
Natural gas burner nozzles (G20)		18 x 1,30 mm
LPG burner nozzles (G20)		18 x 0,75 mm
Max. heating temperature		80°C
Heating water pressure: Min - Max		0,5-3,0 bar
Sanitary water pressure: Min - Max	-	0,4 – 5 bar
Primary expansion vessel		12 l
Sanitary exchanger	-	Accum. primario 13 l
Sanitary flow rate with □T = 25°C	-	17,9 l/1'
Sanitary flow rate with □T = 35 °C	-	12,8 l/1'
Heating system hydraulic connections		G3/4"
Sanitary and gas hydraulic connections		G1/2"
Dimensions (cm)		60x85x35
Flue gas exhaust pipe diameter (mm)		60
Flue gas rated temperature (air 20°C)		130
Air flow rate (cubic meter/h)		47
Power (W) 230V 50Hz		196
Room temperature range (°C)		5+35
Load less weight (kg)	55	69
EC certification		99AQ201
Efficiency Pn 100% (%)		91,54
Efficiency Pn 30% (%)		94,41
Star class	★ ★	★ ★