

INSTRUCTION MANUAL

INSTALLATION AND USE OF WALL-HUNG GAS BOILERS WITH CONTINUOUS MICROPROCESS MODULATION FOR HEATING AND SANITARY HOT WATER PRODUCTION

DIGIT

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

The equipment name, series, model, registration number and rating are shown on the label located inside the boiler.

The letters following the commercial name define the main features of Your wall-hung gas boiler with continuous microprocessor.

Model:

- _____ **X E** heating and instantaneous hot water production; electronic modulation; yield: 20,000 kcal/h; natural draught, immediate electronic ignition, open combustion chamber (B11BS - EN297);
- _____ **X EF** heating and instantaneous hot water production; electronic modulation; yield: 20,000 kcal/h; forced draught, immediate electronic ignition, open combustion chamber (B14 – UNI10642);
- _____ **X ER** heating and instantaneous hot water production; electronic modulation; yield: 20,000 kcal/h; forced draught, immediate electronic ignition, sealed combustion 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 Centre.

NOTE. The **FIRST START-UP** of the boiler must be carried out by the Service Centre technicians within 8 days from the installation of the equipment. After the first start-up, 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 first start-up.

NOTE. Maintenance is compulsory and must be executed at least once a year (Law 412/93). 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.

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

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.

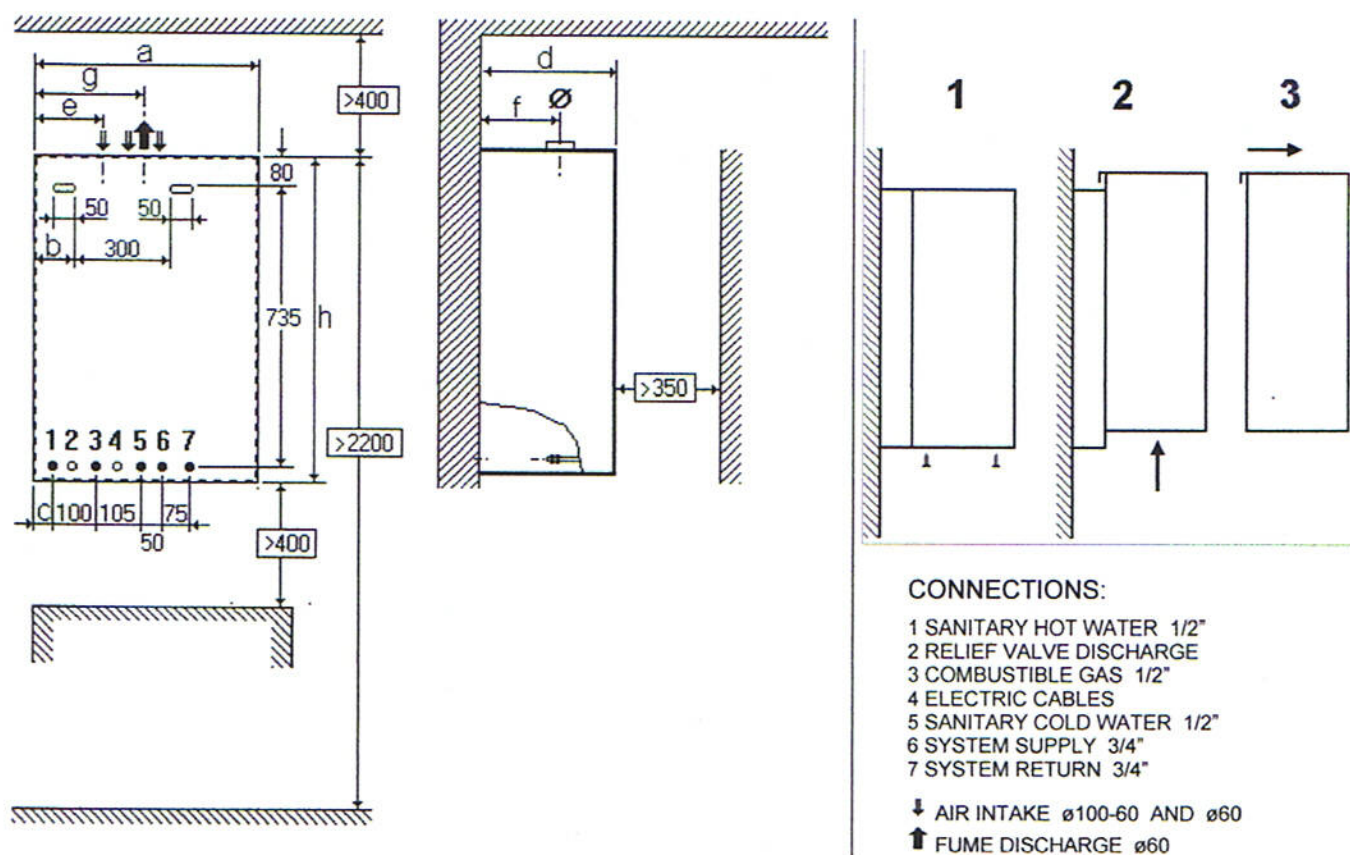
3.1. LOCATION OF THE BOILER

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 unauthorised people, children, animals or anything else which may damage or be damaged by the boiler, cannot easily access the boiler.

FIGURE 1. DIMENSIONS, FREE DISTANCES TO BE MAINTAINED, HYDRAULIC CONNECTIONS, CONNECTIONS FOR AIR INTAKE AND FUME DISCHARGE, SHELL REMOVAL.



	a	b	c	d	e	f	g	h	\varnothing
X E	450	75	55	350	-	225	230	850	130
X EF	450	75	55	350	-	195	270	850	60
X ER	450	75	55	350	160	195	270	850	100-60 \ 60+60

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. 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.

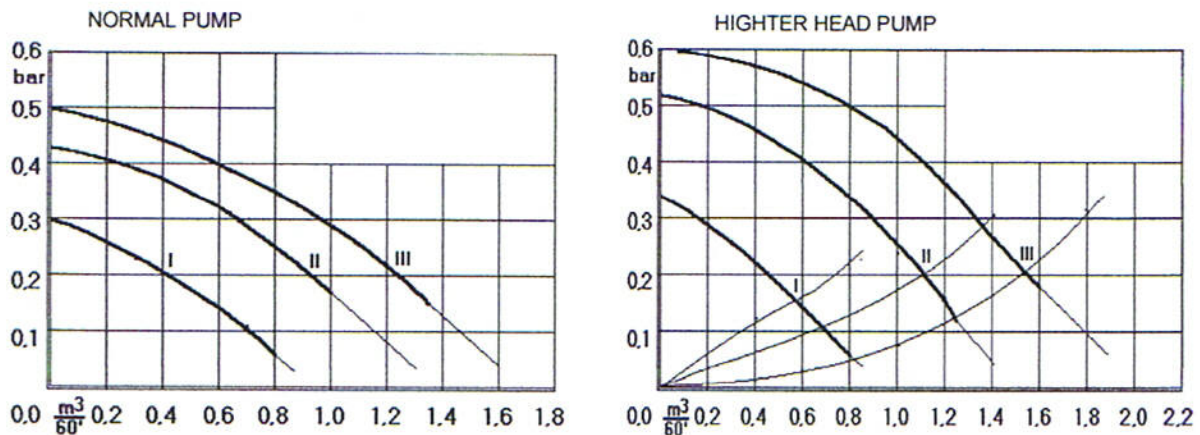
For newly-designed water systems, Fig. 1 shows the piping layout, when looking at the wall (NORMAL CONNECTIONS; pipes must come out of the wall. Place the cardboard template (delivered with the boiler) on the wall to define the correct location of screw anchors and pipes. The metal template with taps is supplied upon request.

When the water system is not new, e.g., when replacing an old wall-hung boiler, the "MULTI-PURPOSE WATER CONNECTIONS" retrofit kit is supplied upon request; this kit includes water joints which can be installed away from the wall, thus helping the installer in making "intersections" with flexible steel pipes or profiled stiff copper tubes.

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 pump which has an higher head available on demand. See Figure 2 for the available head/flow rate curves of the heating system.

FIGURE 2. - HEATING SYSTEM AVAILABLE HEAD/FLOW RATE CHART.



The expansion tank, which is part of the equipment, guarantees proper operation up to a heating system capacity of 140 litres. 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.

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 chrono-thermostat.

3.3. AIR INTAKE AND FUME DISCHARGE.

Model X E.

The equipment is classified as B11BS EN297. It is equipped with a fume safety system, called fume

thermostat, which turns the burner off when temporary or permanent fume discharge problems through the chimney occur. It is a thermal device installed on the hood, but the air taken by the natural chimney draught, through the hood side vents, keeps it cold. When the draught is limited or there is no draught at all, the device gets warm, the abnormal condition is detected and the boiler is temporarily turned off. The stop time depends on environmental conditions and is at least 10 minutes; after this lapse of time, the boiler starts working again. The boiler will stop again if the bad draught cause is still present.

NOTE. Do not disable the fume safety device. If this device is disabled, dangerous consequences may occur: the life of persons and animals inside or outside the installation area may be jeopardised; objects or structures inside or outside the installation area may be damaged.

NOTE. Original spare parts, supplied by the Manufacturer through the service network, must be used when carrying out maintenance activities on the fume safety device.

NOTE. If the fume safety device stops the boiler repeatedly, take all necessary measures to solve the problem and assure proper boiler operation.

NOTE. At the end of any maintenance activity, which directly or indirectly affects the fume safety system, test the device operation. This test may be dangerous if the boiler was not installed in compliance with the laws in force.

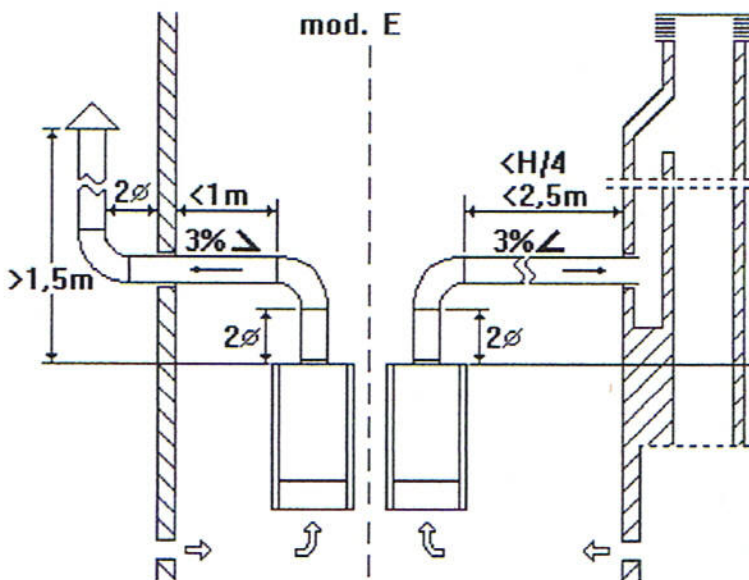
Fume safety device operation test.

- 1) The following is needed:
 - a flat plate which completely covers the boiler $\varnothing 130$ mm fume discharge collar;
 - insulated gloves to disconnect the chimney pipes.
- 2) Set the heating thermostat to the max. temperature, turn on the boiler and let it run at max. power for at least 30 minutes; make sure that the boiler room temperature is approx. 20°C . If boiler power modulation cannot be avoided, turn the heating system off, collect abundant sanitary water and repeat the test.
- 3) Disconnect the fume discharge pipe section above the boiler and immediately close the boiler fume discharge with the plate.
- 4) The fume safety device should shut the boiler down within 120 seconds from total chimney obstruction.
- 5) After the stop, keep the chimney closed and check whether the boiler starts up again. Wait for at least 10 minutes (600 seconds) without opening any doors or windows and make sure that no significant room temperature variations or air movements occur during this lapse of time.
- 6) When the test is over, ventilate the boiler room, re-connect the discharge pipe and all the parts which have previously been tampered with.

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

NOTE. The equipment must be installed in a constantly ventilated environment.

The fume discharge, $\varnothing 130$ mm, must comply with national and local technical regulations concerning boilers which are not equipped with a fan on the combustion circuit.



Model X EF.

The equipment is classified as B14 UNI10642. It is equipped with a fume safety system, called fume pressure-switch which shuts the burner off when temporary or permanent fume discharge problems through the chimney occur. This device detects the air or fume flow which comes out of the boiler discharge system. When the draught is limited or there is no draught at all, the device, goes off, the abnormal condition is detected and

the boiler is temporarily turned off. The boiler is off until a sufficient fume or air flow, guaranteeing proper burner operation, is achieved.

NOTE. Do not disable or change the setting of the fume safety device. Tampering with this device may have dangerous consequences: the life of persons and animals inside or outside the installation area may be jeopardised; objects or structures inside or outside the installation area may be damaged.

NOTE. Original spare parts, supplied by the Manufacturer through the service network, must be used when carrying out maintenance activities on the fume safety device.

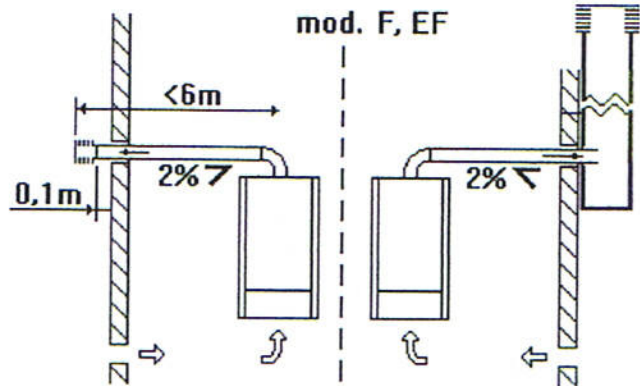
NOTE. If the fume safety device stops the boiler repeatedly, take all necessary measures to solve the problem and assure proper boiler operation.

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

NOTE. The equipment must be installed in a constantly ventilated environment.

The fume discharge must comply with national and local technical regulations concerning boilers which are equipped with a fan on the combustion circuit (forced draught).

When fumes are discharged externally, the max. length of the $\varnothing 60$ mm pipe is 6 meters (horizontal and vertical) and each 90° bend reduces the length by 0.5 m.



Model X ER.

FIGURE 3 a. "X ER" MODELS: MAX. TOTAL ALLOWED AERODYNAMIC RESISTANCE R_{tot} FOR TUBES IN AIR INTAKE AND FUME DISCHARGE SYSTEMS.

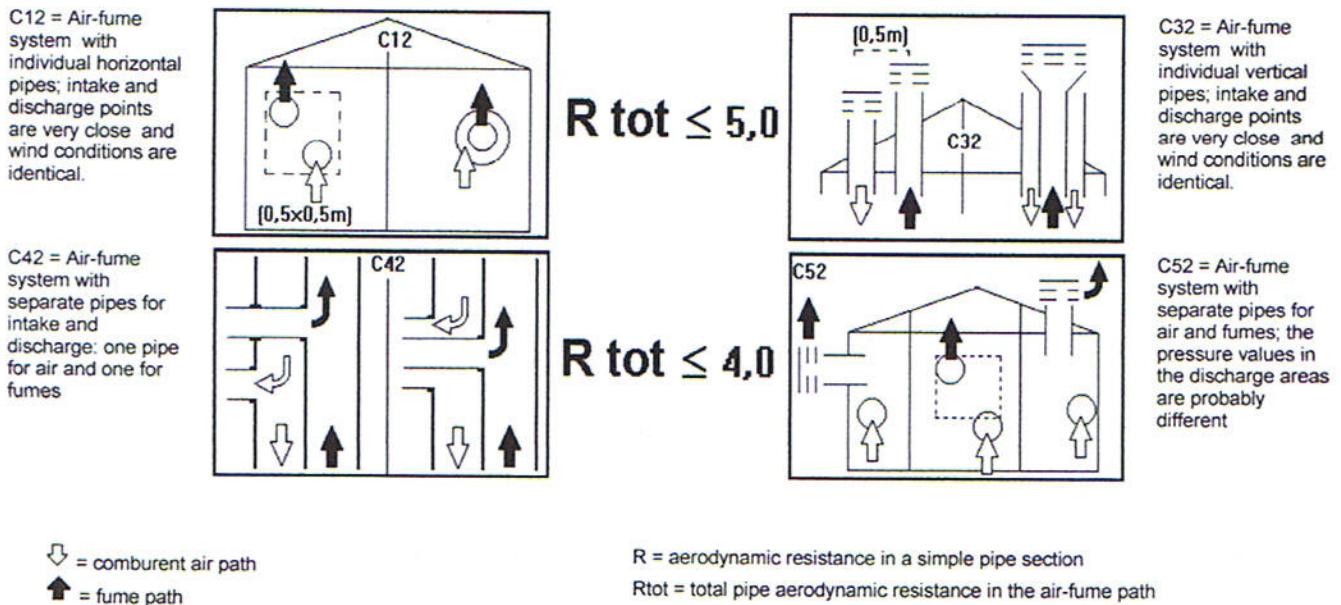


FIGURE 3 b. "X ER" MODELS: AERODYNAMIC RESISTANCE R IN AN ELEMENTARY PIPE SECTION.

R	Ø 60	R	Ø 80	R	Ø 100 - 60
0,8	1,0 m	0,3	1,0 m	1,0	1,0 m
0,8	90° 100	0,2	90° 100	1,0	90°
2,0	90°	1,5	90°	0,5	45°
0,5	45°	0,1	45°	0,4	↑ ↓
0,2		0,1		0,4	Ø 100 Ø 120 Ø 60 Ø 80
		0,2	Ø 60 Ø 80	0,3	0,5 - 1,0 m Ø 120 Ø 80

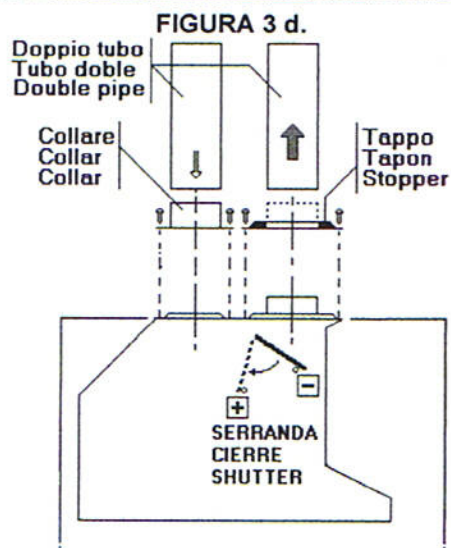
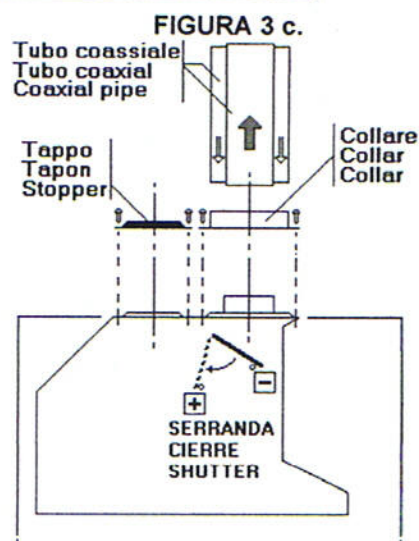
X ER Models.

The boiler has a forced draught and a sealed combustion chamber; hence the need for two separate circuits: one for comburent air, taken from the external environment, and one for combustion fume discharge. These two 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 wall, in compliance with laws in force (Fig.3a).

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

The shutter is located on the front part of the hood and it is placed on the "-" (upper) position by the Manufacturer; to move 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 condensation.

Sealed-chamber systems are supplied with 2 collars, 2 stoppers and 8 self-tapping screws to connect the boiler to the air intake and fume 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 intake and the large collar on the coaxial pipe air intake. To install the DOUBLE PIPE, one for air intake (Ø60 mm) and one for fume discharge (Ø60 mm), place the small collar on the coaxial pipe air intake.



PIPE SELECTION FOR "X ER" MODELS.

1) Select one of the four air-fume systems, in

7 compliance with current regulations, as per Fig. 3a (C12,

C32, C42, C52).

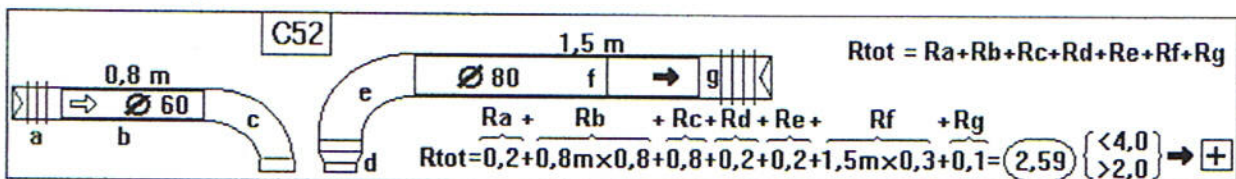
- 2) Measure the total path length of air and fume pipes.
- 3) Select the air and fume pipe diameter/s and refer to Fig. 3b to define the aerodynamic resistance R for each pipe section.
- 4) Calculate the total aerodynamic resistance **R_{tot}** by adding up the aerodynamic resistance R of air and fume pipes.
- 5) Compare the calculated **R_{tot}** value with the max. value specified in Fig. 3a for the selected fume-air system. The calculated value should be equal to or lower than the value specified in Fig. 3a. 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-fume system (coaxial or double pipe), boiler type, total aerodynamic resistance **R_{tot}** of the air-fume path.

Sealed-chamber boilers with forced flow:

R _{tot} systems	X ER		
	up to 2.0	from 2.0 to 3.0	from 3.0 to 5.0
C12-C32	up to 2.0	from 2.0 to 3.0	from 3.0 to 5.0
C42-C52	up to 1.0	from 1.0 to 2.0	from 2.0 to 4.0
Shutter adjustment	[-]	[-]	[+]

EXAMPLE. Boiler X ER.

- 1) Selected air-fume 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 ø60mm for air and ø80mm for fumes, R for the various sections is: R_a=0.2, R_b=0.8x0.8=0.64, R_c=0.8, R_e=0.2, R_f=1.5x0.3=4.5, R_g=0,1; for ø80 fume 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.
- 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 [+] position



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.⁸The 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.

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

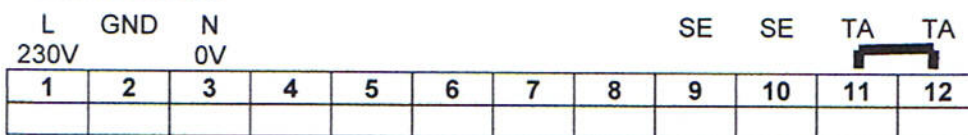
NOTE. Do not use water or gas systems as a ground for the electrical or telephone system.

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

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).

The SE probe, which measures the external temperature, can be installed on pre-set boilers. This probe is identical to the two water probes located inside the boiler. The SE probe should be installed externally, on a building wall, protected from sun rays and wind (sealed cover), so that it can measure the average temperature of the flat walls.

TERMINAL STRIP



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

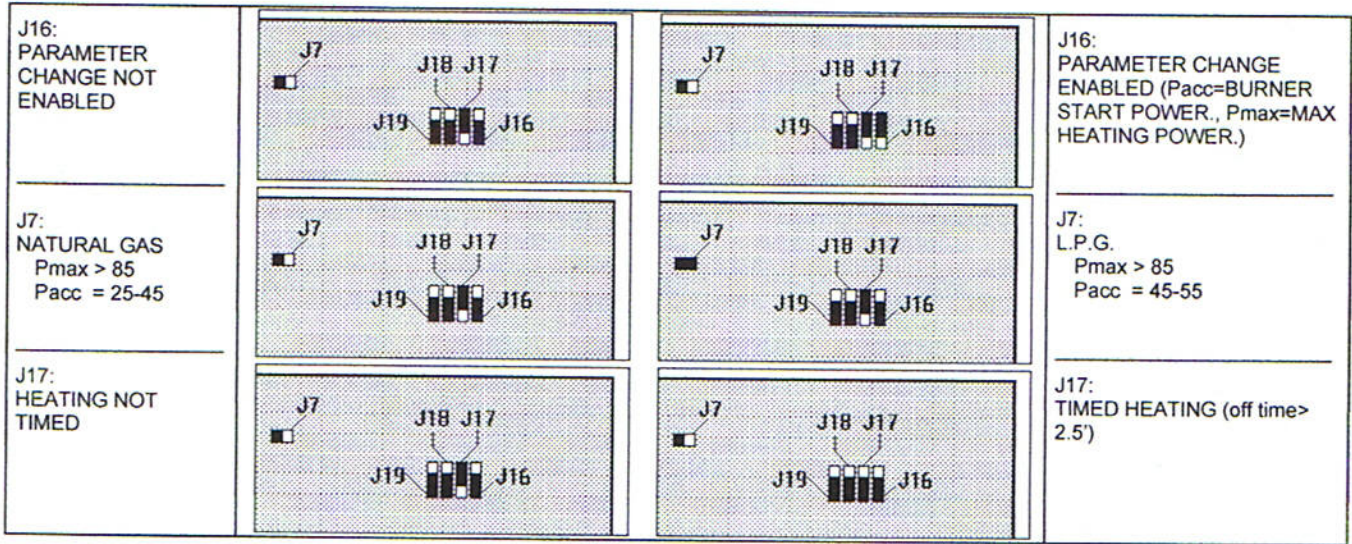
- The heating system, and radiators in particular, and the sanitary water system must be thoroughly washed with water and a detergent-degreaser; after the washing, drain all the washing water.
- Make sure the external systems are connected to the correct boiler pipes.
- The relief valve inside the boiler 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.
- 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 comburent 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.

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.

FIGURE 4. CARD JUMPERS



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 +/- 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.

Pacc	G.N.	p _{G20}	G.P.L.	p _{G31}
50%	25-45	2.5mbar	45-55	10.0mbar

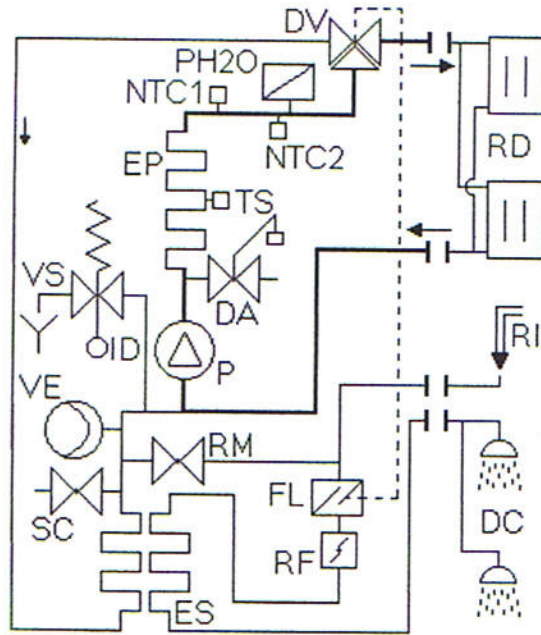
Use a pressure gauge to check the gas pressure accuracy.

The **Pmax** heating power can be changed by pressing the +/- buttons 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).

Pmax	G.N.	p _{G20}	G.P.L.	p _{G31}
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.

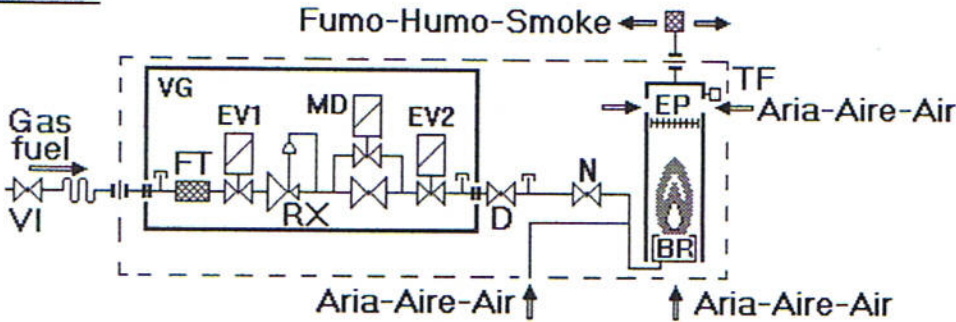
FIGURE 5a.
HYDRAULIC SCHEMATIC DRAWING OF HEATING AND SANITARY WATER
CIRCUITS



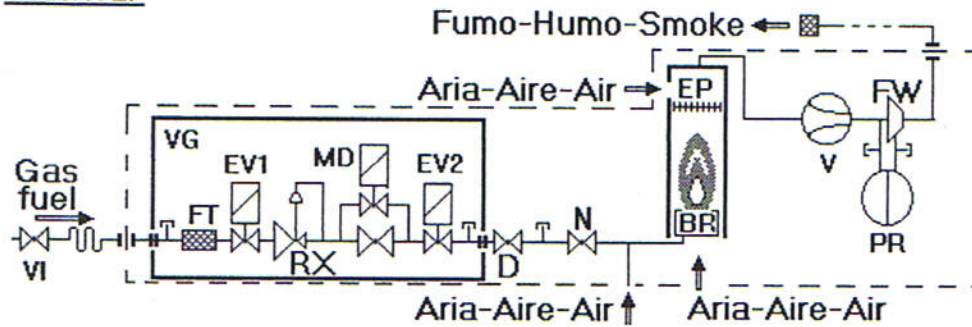
- BR = burner
 - D = diaphragm (*)
 - D2 = secondary air distributor
 - DA = deaerator
 - DC = sanitary hot water
 - DV = deflection valve
 - EP = primary exchanger
 - ES = sanitary exchanger
 - EV1 = safety solenoid
 - EV2 = main solenoid
 - FL = flow meter
 - FT = gas filter
 - FW = flow sensor
 - ID = pressure gauge
 - MD = modulation solenoid
 - N = gas nozzles
 - NTC1 = heating probe
 - NTC2 = safety thermostat
 - P = pump
 - PH20 = water pressure switch
 - PR = fumes pressure switch
 - RD = radiators
 - RF = flow regulator
 - RI = water network
 - RM = filling tap
 - RX = pressure regulator
 - SC = discharge tap
 - TS = sanitary probe
 - V = fan
 - VE = expansion tank
 - VG = gas valve
 - VI = on-off valve
 - VS = pressure relief valve 3 bar
- (*) installed only for countries where RX must be excluded

FIGURE 5b. SCHEMATIC DRAWING OF FUEL, AIR AND FUMES CIRCUITS

Model X E



Model X EF



Models X ER

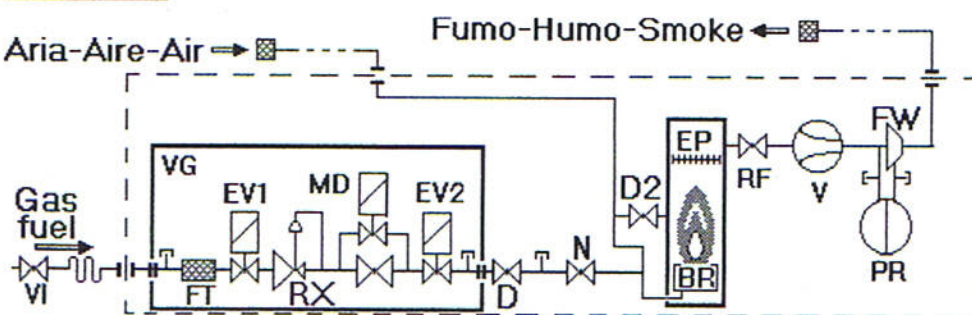
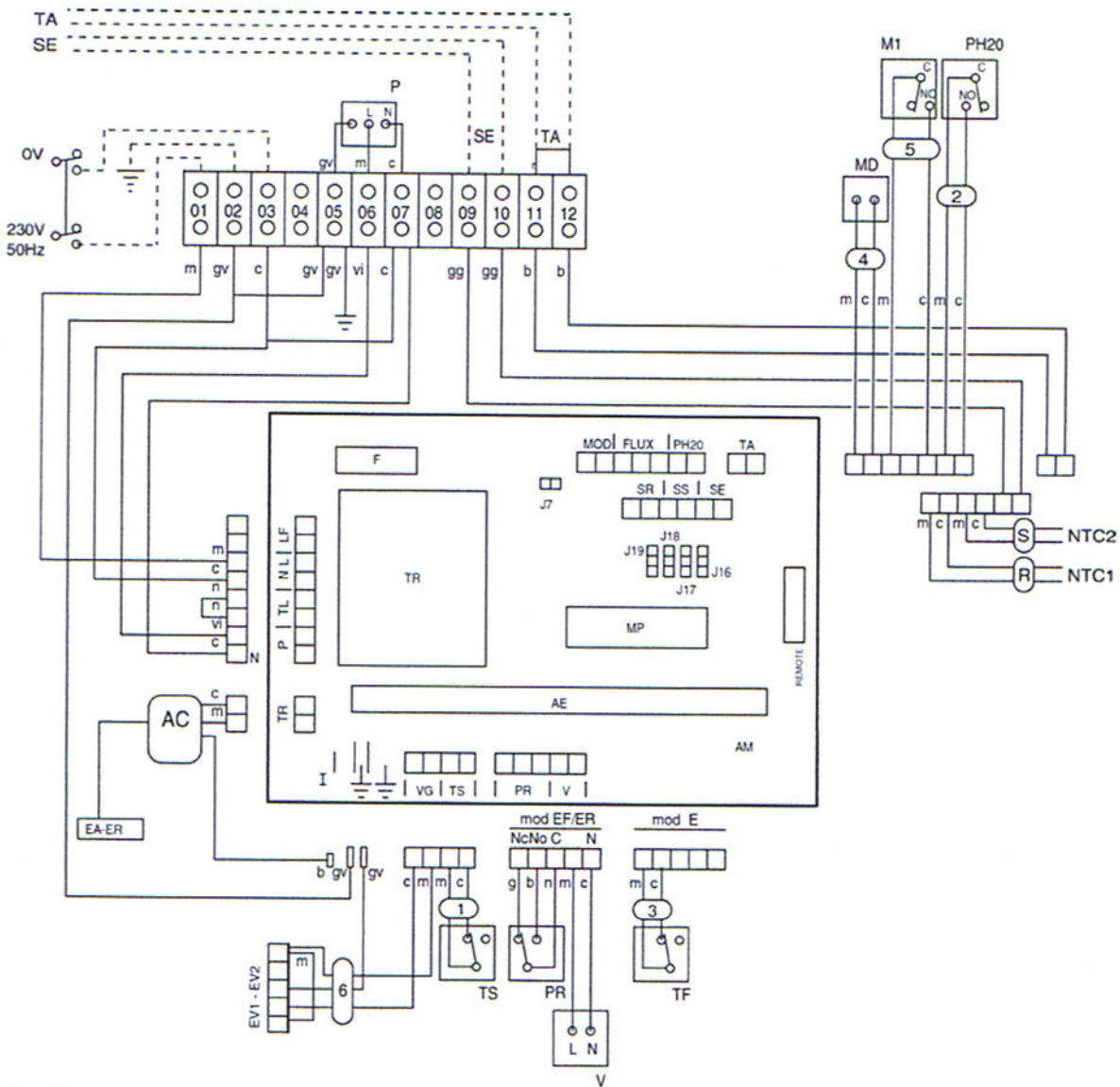


FIGURE 6. WIRING DIAGRAM.

X E / X EF / X ER



Captions.

AC = starter
 AE = flame control card
 AM = flame modulation card
 DV = deflection valve
 EV1 = gas safety solenoid
 EV2 = gas main solenoid
 EA = flame start electrode
 ER = flame detection electrode
 F = fuse
 IG = main switch (not supplied)
 IW = sanitary stand-by switch
 M1 = sanitary priority switches.

MD = gas modulation solenoid
 MR = terminal strip
 NTC1 = heating probe
 NTC2 = sanitary probe
 P = boiler pump (heating)
 PH20 = water pressure switch
 PR = fume pressure switch
 SE = external NTC probe (optional)
 TA = chrono-thermostat (optional)
 TF = fumes thermostat
 TS = water safety thermostat
 V = fan motor

Wires colours.

b = white	gg = grey	n = black
c = sky-blue	gv = yellow-green	r = red
g = yellow	m = brown	vi = violet

3.8 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).

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

	GAS VALVE	OPERATIONS
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.4)
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	Press the modulator tip and adjust the max. gas pressure 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	On the modulation card: 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	N.G. = 20.0 mm	N.G. = 10.0 mbar	N.G. = 0.9 mbar
L.P.G. = 0.75 mm	L.P.G. = 37.0 mm	L.P.G. = 35.0 mbar	L.P.G. = 3.6 mbar

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.

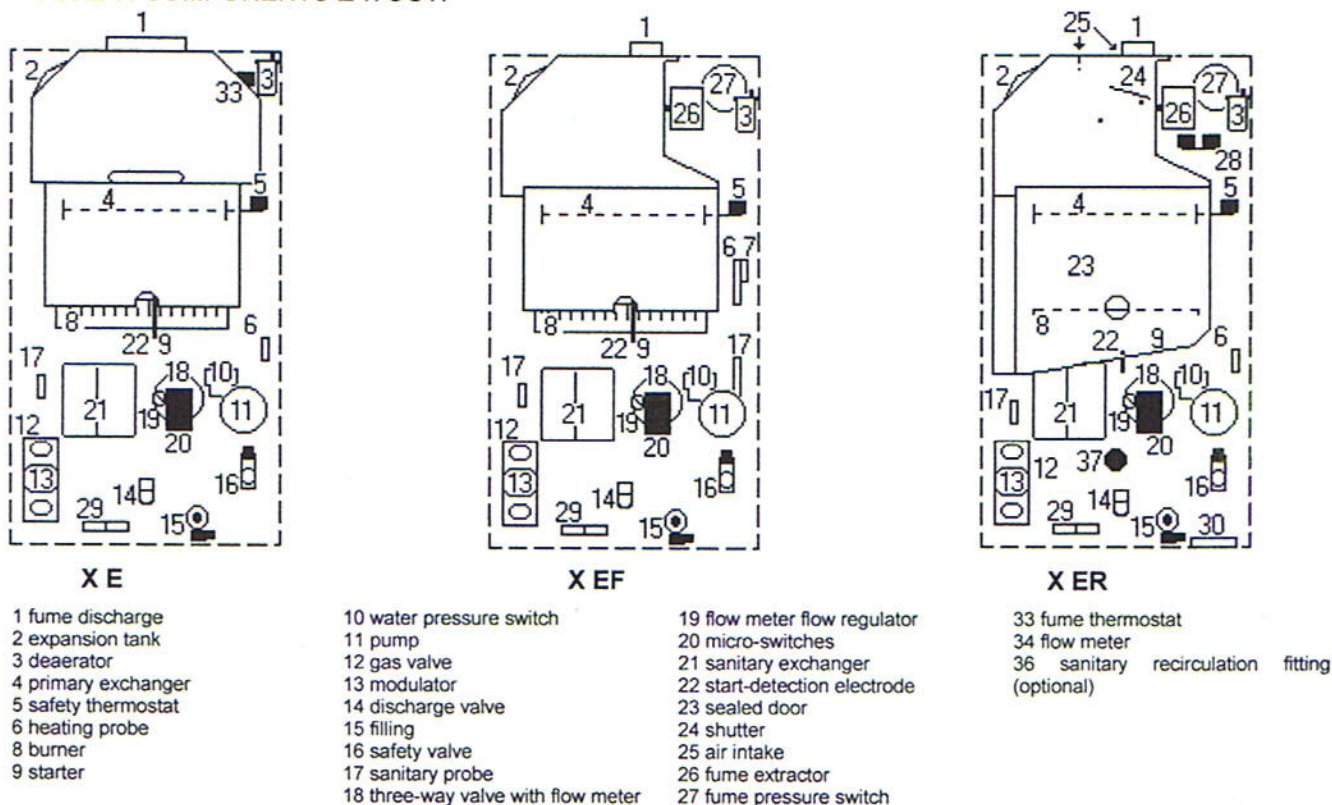
NOTE. In case of multiple stops caused by draught problems, de-energise the system, close the boiler gas valve, call the Service Centre and do not make any re-start attempts. There may be some boiler malfunctioning or the malfunctioning may be due to external conditions (e.g. clogged chimney or air inlets)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

Specific information for the X EF 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.

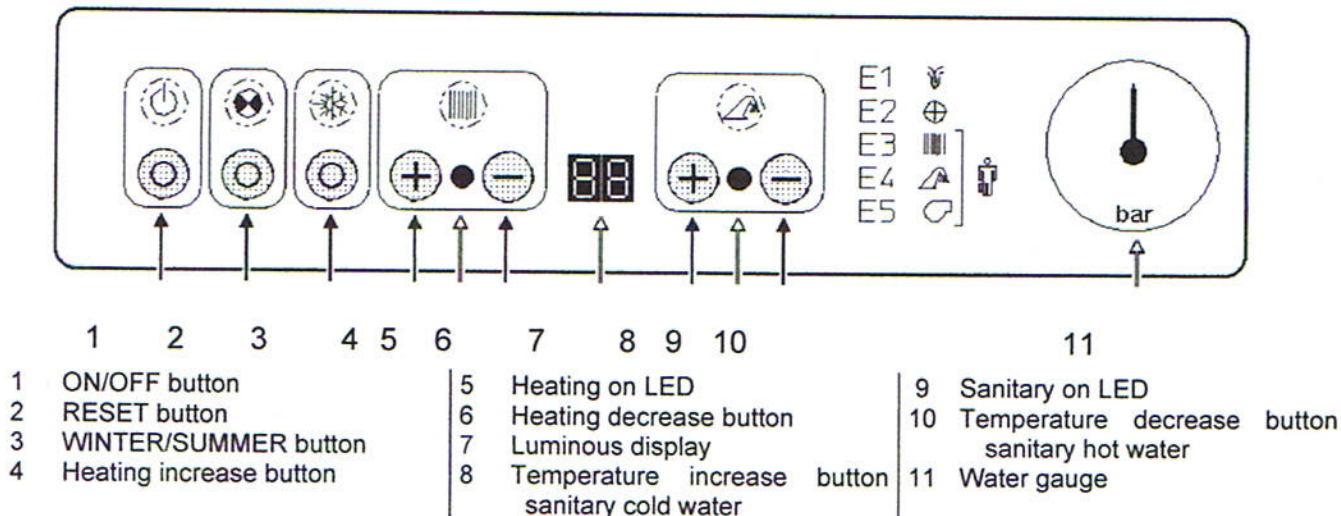
FIGURE 7. COMPONENTS LAYOUT.



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.15 Fig.7).

On the pressure gauge (water gauge, no. 5, Fig. 8), 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.15 Fig.7) when the BOILER IS COLD (T= 20°C), until the pressure value reaches 1 bar. Close the tap when the operation is complete.

FIGURE 8. CONTROL PANEL.



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:

- 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

- "+/-" buttons of the sanitary system (8, 10). They change the water temperature value T_s , within the 30-

60°C range. Press the "+/-" button once: the set Ts value is displayed. The value is displayed for 5": during this lapse of time the set value can be changed by pressing the "+/-" buttons.

TO ADJUST THE HEATING SYSTEM

- "+/-" buttons of the heating system (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).

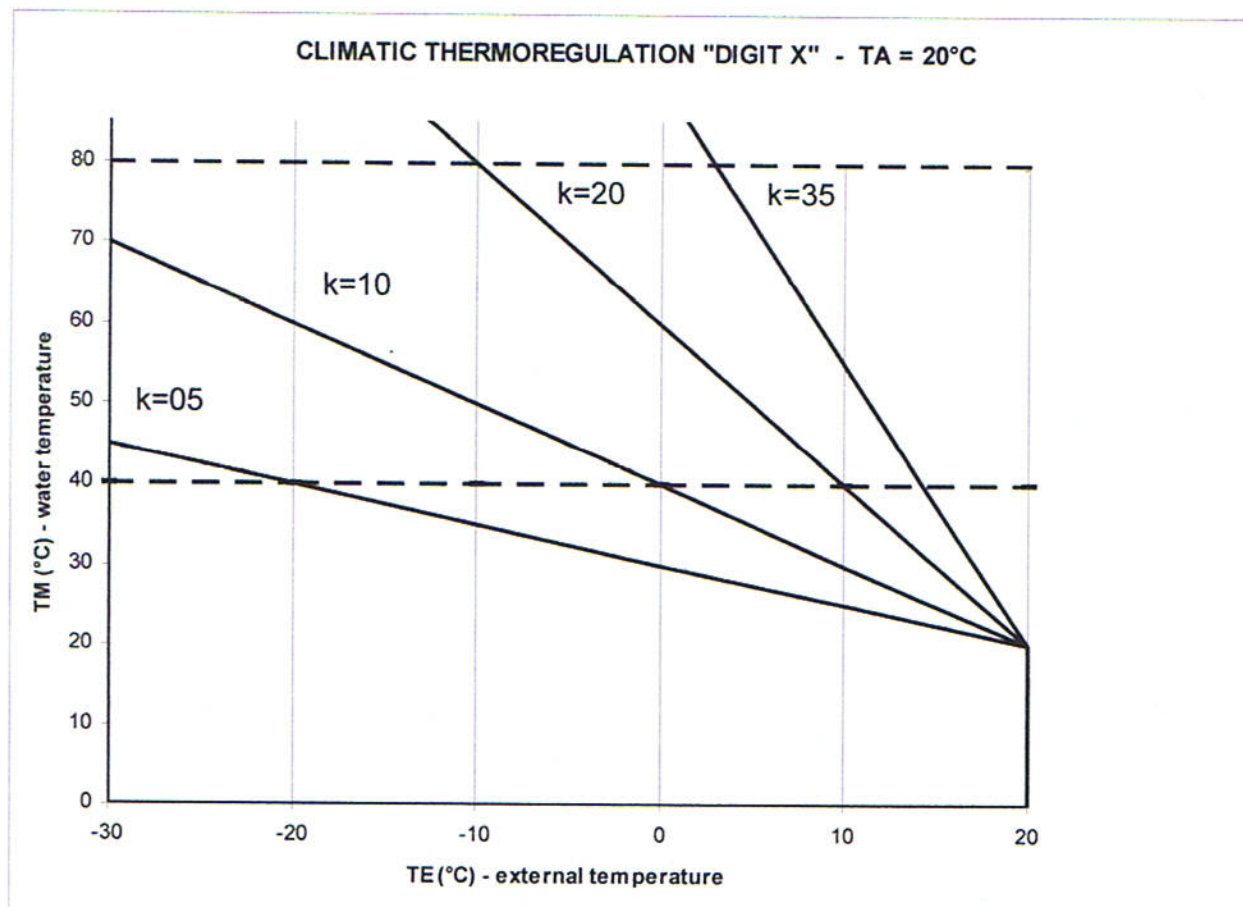
When the SE probe is connected, the heating system operates according to the variable reference value of the supplied water temperature Tm, which depends on the external temperature of the following equation:

$$T_m = (T_a - T_e)K/10 + T_a \quad (\text{see relevant chart}),$$

where Tm= water temperature of the heating system, Ta=requested room temperature, Te=measured external temperature, K/10=building dispersion constant.

Press the "+/-" button once: the set Ta value is displayed. The value is displayed for 5": during this lapse of time the set value can be changed by pressing the "+/-" buttons. When the 5" period of time is over, "—" is displayed for 2", then the K set value is displayed for 5"; during this lapse of time the value can be modified by pressing the buttons. The Ta room temperature (adjustable from 05 to 30) is expressed in degree centigrade; the K coefficient (adjustable from 05 to 35) has no unit. Therefore the user cannot change the Tm water temperature by pressing the +/- buttons of the heating system. When Ta or K set values increase, Tm increases as well.

Examples of automatic temperature adjustment, user-set values:- TA = 20°C ; k = 5/10/20/35.



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 button pressed and

turn it on again by pressing the ON/OFF button: the display flashes until it is disabled. 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.

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 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 E model , 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 EF, ER 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.

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 overtemperature

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 17summer/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 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 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.

5. TECHNICAL DATA

DESCRIPTION OF SAFETY DEVICE	X E	X EF	X ER
Flame presence ionisation detection	+	+	+
Start up at 50% of the power	+	+	+

Fume discharge control device	+	+	+
Safety thermostat on the gas valve circuit	+	+	+
Thermostat and anti-freezing electric resistances			
Thermostat and cooling fan			
Component overtemperature thermostat			
Water pressure switch at 0.5 bar	+	+	+
Relief valve at 3 bar	+	+	+
Sealed combustion circuit			+
Protection shell, against rain and wind			

TECHNICAL FEATURES	X E/ X EF/ X ER
Boiler class	II 2H3+
Rated consumption natural gas (G20)	2.80 cubic metre/h
Min. consumption natural gas (G20)	0.84 cubic meter/h
Rated consumption propane (G31)	2.05 kg/h
Min. consumption propane (G31)	0.62 kg/h
Rated consumption butane (G30)	2.15 kg/h
Min. consumption butane (G30)	0.65 kg/h
Rated thermal capacity Pn	26.4kW
Working power (*)	23.2kW
Power modulation (%)	100-30
Room temperature probes resistance (kΩ)	12-15
Max. pressure Natural gas G20 20mbar	10.0 mbar
Min. pressure Natural gas G20 20mbar	0.9 mbar
Gas pressure at start-up G20	2.5 mbar
Max. propane pressure G31 37mbar	35.0 mbar
Min. propane pressure G31 37mbar	3.6 mbar
Gas pressure at start up G31	10.0 mbar
Max. butane pressure G30 30mbar	29.0 mbar
Min. butane pressure G30 30mbar	3.2 mbar
Gas pressure at start up G30	8.0 mbar
Natural gas burner nozzles (G20)	13 x 1.30 mm
LPG burner nozzles (G31+G30)	13 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 - 6 bar
Expansion tank	8 litres
Sanitary exchanger	immediate
Sanitary flow rate with ΔT = 25 °C	13.3 litri/1'
Sanitary flow rate with ΔT = 35 °C	9.5 litri/1'
Sanitary peak (storage ΔT = -25 °C)	-
Heating system hydraulic connection	G3/4"
Sanitary and gas hydraulic connections	G1/2"
Multi-purpose hydraulic connections	Upon request
Dimensions (cm)	45x85x35

OTHER FEATURES	X E	X EF	X ER
∅ fume discharge (mm)	130	60	60
Fume rated temperature (air 20°C)	110	110	130
Air flow rate (cubic meter/h)	55	52	35
Power(W) 230V 50Hz	130	160	160
Room temperature range (°C)	5+35	5+35	5+35
Loadless weight (kg)	40	43	49
EC certification	99AQ138	99AQ137	99AQ139
Yield at Pn 100% (%)	88.79	87.22	92.61
Yield at Pn 30% (%)	92.34	88.63	93.98
Star classification	★	★	★★

* rated value; actual values for the various models depend on the product: rated thermal power Pn for 100% yield at Pn