

TECHNICAL MANUAL

COMBI OVEN

FX

2014



LEVEL 2



LEVEL 3

Rev.1

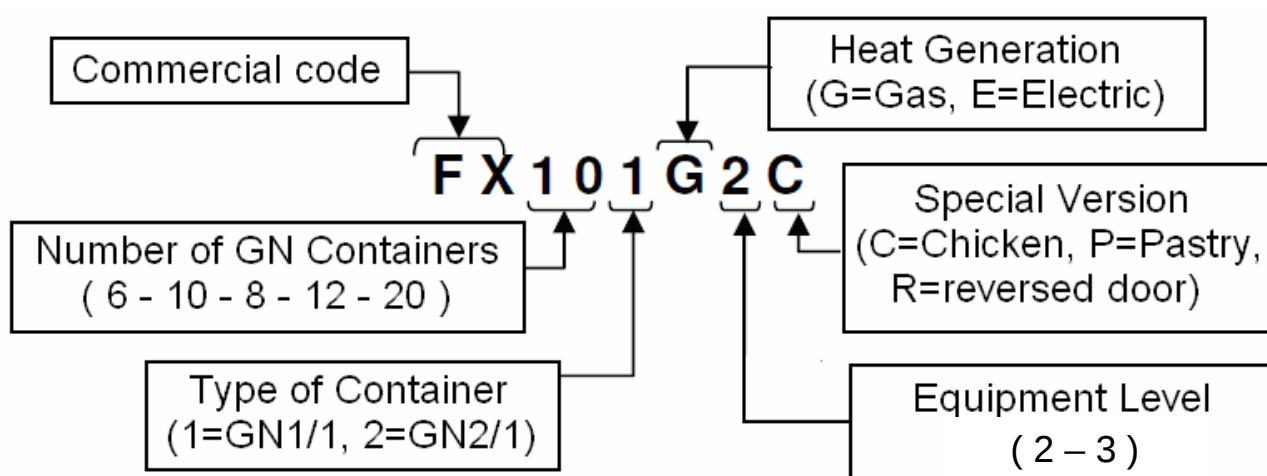
CONTENTS

1.	COMMERCIAL MODEL NUMBER	4
1.1.	Connection diagram electric and gas.....	7
1.2.	Water characteristics.....	9
2.	FUNCTIONAL DIAGRAM COMBI OVEN.....	10
2.1.	Open valve operation.....	11
2.2.	Closed valve operation.....	12
2.3.	Drain cooldown / steam condensing operation.....	14
2.4.	Steam producing operation.....	15
3.	ELECTRONIC BOARDS FOR LEVELS 2-3, INVERTER, FUSES, OVERLOAD RELAYS	16
3.1.	Electronic boards level 3 general layout	16
3.2.	“Service” menu.....	21
3.3.	Explanation table.....	28
3.4.	Inverter	29
3.5.	Electronic boards Level 2 general layout.....	32
3.6.	Explanation table.....	40
3.7.	FX fuses description:.....	41
4.	OPERATION TESTING, ADJUSTING, INSTALLATION REPORT, GAS CIRCUIT ALARM.....	42
4.1.	System operation	42
4.1.1.	Premixed system general principles.....	42
4.1.2.	Power schemes	43
4.2.	System components.....	45
4.2.1.	Gas valve (CSA approved).....	47
4.2.2.	Mixer	48
4.2.3.	Air blower fan.....	49
4.2.4.	Blower control board.....	50
4.2.5.	Combustion control board	51
4.2.6.	General functional diagram	52
4.2.7.	Spark plug and flame detector kit.....	53
4.2.8.	Burner	54
4.2.9.	Heat exchanger	55
4.2.10.	Exhaust extraction kit	56
4.3.	Blower control board: logic operation.....	57
4.3.1.	Ignition standard cycle.....	59
4.3.2.	GAS alarm: F4: flame missing.....	60
4.4.	Gas setup.....	Errore. Il segnalibro non è definito.
4.4.1.	Setup gas	61
4.4.2.	Recommended values of combustion	63
4.4.3.	Adjustment during the test.....	64
4.5.	Problems during the test setup wizard.....	67
4.6.	Gas flue analysis.....	68
4.7.	Installation report.....	69
4.8.	Gas alarms and burner problem solving	71
4.9.	Gas conversion	74
4.10.	Levels 2: Gas test	75

4.11.	Periodic gas flue analysis	78
5.	WASHING CYCLES LEVELS 3.....	79
5.1.	Washing circuit operating and components	79
5.2.	Clean test	82
5.3.	Washing Interruption	83
5.4.	Washing alarms table.....	85
5.5.	Cleaning consumption table.....	88
5.6.	Cleaning warning and cleaning blockage	89
5.7.	Warning descaling.....	91
6.	WASHING CYCLES LEVELS 2.....	92
6.1.	Washing circuit operating and components	92
7.	DISMANTLE AND REASSEMBLY COMPONENTS	94
7.1.	Encoder.....	94
7.2.	Motor	95
7.3.	Door micro-switch	96
7.4.	Door glass frame disassembly	97
7.5.	Component compartment cooling system.....	98
7.6.	Door adjustment.....	99
7.7.	Core probe	100
7.8.	Humidity probe	101
7.9.	Halogen lamp replacement.....	102
7.10.	Lock dismantling	103
7.11.	Lock dismantling 20 trays models.....	105
7.12.	Spark plug replacement	107
7.13.	Blower fan replacement	108
7.14.	CPU and display LCD boards (LIV.3) replacing	109
7.15.	CPU and display LCD boards (LIV.3) replacing (2 nd version).....	115
7.16.	Roll-In adjustment RX201 - RX202.....	117
7.17.	Scheduled recommended maintenance	119
8.	ALARMS	120



1. COMMERCIAL MODEL NUMBER



6 TRAYS 1/1 GN	10 TRAYS 1/1 GN	8 TRAYS 2/1 GN	12 TRAYS 2/1 GN	20 TRAYS 1/1 GN	20 TRAYS 2/1 GN	
FX61E2	FX101E2	FX82E2	FX122E2	FX201E2	FX202E2	
FX61E3	FX101E3	FX82E3	FX122E3	FX201E3	FX202E3	
FX61G2	FX101G2	FX82G2	FX122G2	FX201G2	FX202G2	
FX61G3	FX101G3	FX82G3	FX122G3	FX201G3	FX202G3	
FX61E2C	FX101E2C	FX82E2C	FX122E2C	-	-	SPECIAL VERSION WITH FAT DRAIN (POULTRY)
FX61E3C	FX101E3C	FX82E3C	FX122E3C	-	-	
FX61G2C	FX101G2C	FX82G2C	FX122G2C	-	-	
FX61G3C	FX101G3C	FX82G3C	FX122G3C	-	-	
FX61E2R	FX101E2R	-	-	-	-	SPECIAL VERSION WITH RIGHT OPENING DOOR
FX61E3R	FX101E3R	-	-	-	-	
FX61G2R	FX101G2R	-	-	-	-	
FX61G3R	FX101G3R	-	-	-	-	
FX61E2CR	FX101E2CR	-	-	-	-	SPECIAL VERSION WITH FAT DRAIN AND RIGHT OPENING DOOR
FX61E3CR	FX101E3CR	-	-	-	-	
FX61G2CR	FX101G2CR	-	-	-	-	
FX61G3CR	FX101G3CR	-	-	-	-	
				FX201E2P		SPECIAL VERSION FOR PASTRY
				FX201E3P		
				FX201G2P		
				FX201G3P		

The boxes in green color show the configurations present on the boards (see chapter 3.1 and 3.5).

For the models shown in the yellow boxes see the notes below.

NOTES:

- 1 - All the models lev.2 with fat drain (____2C) have to be configured as the equal standart model (e.g. FX61G2C has to be configured as FX61G2).
- 2 - All the models with right hand side opening door (____R) have to be configured as the equal standart model (e.g. FX101E3R has to be configured as FX101E3).
- 3 - All the models lev.2 with fat drain and right hand side opening door (____2CR) have to be configured as the equal standart model (e.g. FX61E2CR has to be configured as FX61E2).
- 4 - All the models lev.3 with fat drain and right hand side opening door (____3CR) have to be configured as the equal model with fat drain and standart opening door (e.g. FX101G3CR has to be configured as FX101G3C).
- 5 - All the pastry models (____P) have to be configured as the equal standart model (e.g. FX201E2P has to be configured as FX201E2).

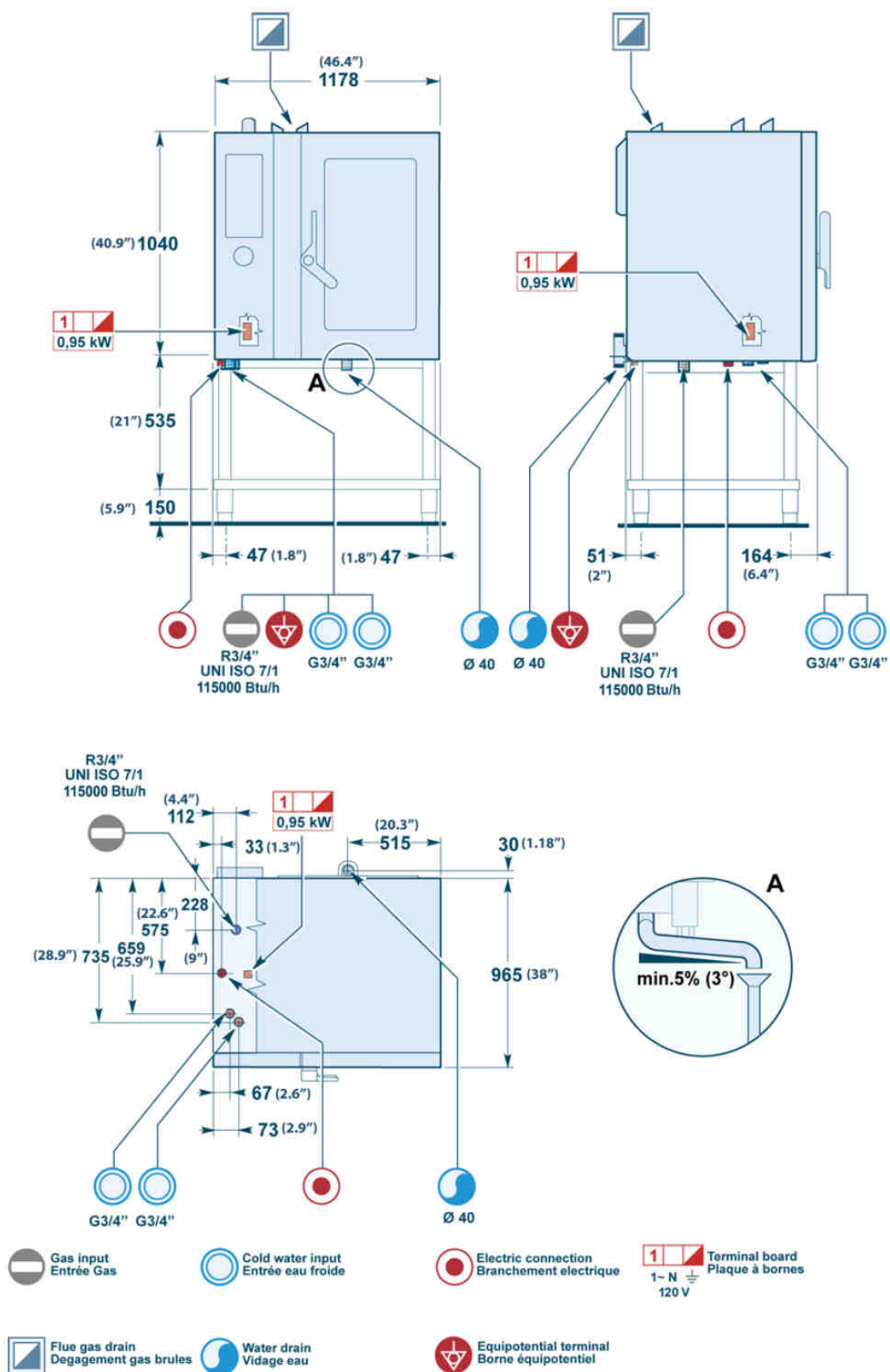
FX – FM POWER COMPARISON

(480V 3Phase for 20x2/1 Electrical Oven; 208V 3Phase for other Electrical Models)

TYPE OF POWER	6x1/1	10x1/1	20x1/1	8x2/1 - 7x2/1	12x2/1	20x2/1
FX GAS POWER (KW)	14	19,5	40	27	33,7	55
FM GAS POWER (KW)	12	18	32	24	28	48
DELTA %	16,7%	8,3%	25,0%	12,5%	20,35%	14,6%
FX ELECTRICAL POWER (KW)	9,4	17,8	35,5	20	26	52
FM ELECTRICAL POWER (KW)	9,4	17,8	35,5	17,9	26	52
DELTA %	0,0%	0,0%	0,0%	11,7%	0,0%	0,0%

OVEN CONNECTION DIAGRAM (FX122E3)

OVEN CONNECTION DIAGRAM (FX122G3)



1.2. Water characteristics

The appliance must be supplied with drinking water having the characteristics shown in the table. If these characteristics are not complied with, the appliance might suffer damage; a water treatment device should therefore be installed.

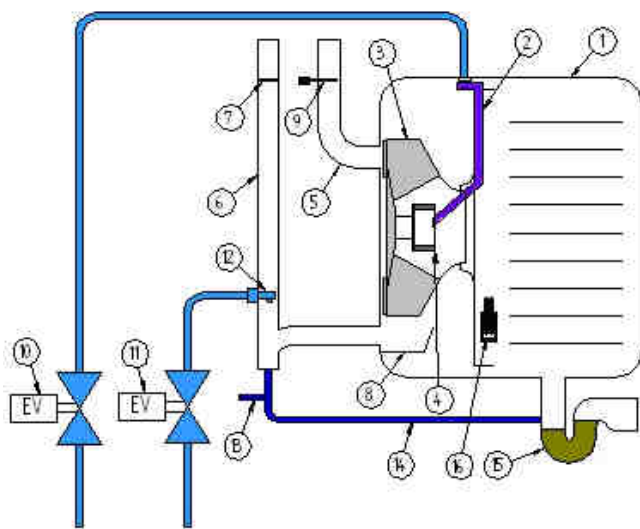
Parameters to be checked		Value
Pressure		200÷400 kPa (30÷ 60 PSI) (*)
Water flow rate (l/h)		9 l/h (FX 61) (*) 12 l/h (FX 101) (*) 17,5 l/h (FX 82) (*) 17,5 l/h (FX 82) (*) 24 l/h (FX 201) (*) 32 l/h (FX 202) (*)
pH		7÷8.5
TDS		40÷150 ppm
Hardness		3÷9°f (1,5÷5°d; 2,1÷6,3°e; 30÷90 ppm)
Langelier Index (recommended) (**)		>0.5
Salt and metallic ion content		
Required	Chlorine	< 0,1 mg/l
	Chlorides	< 10 mg/l
	Sulphates	< 30 mg/l
Recommended (**)	Iron	< 0,1 mg/l
	Copper	< 0.05 mg/l
	Manganese	< 0,05 mg/l

(*) The value refers to the amount of water needed for steam production inside the cooking chamber.

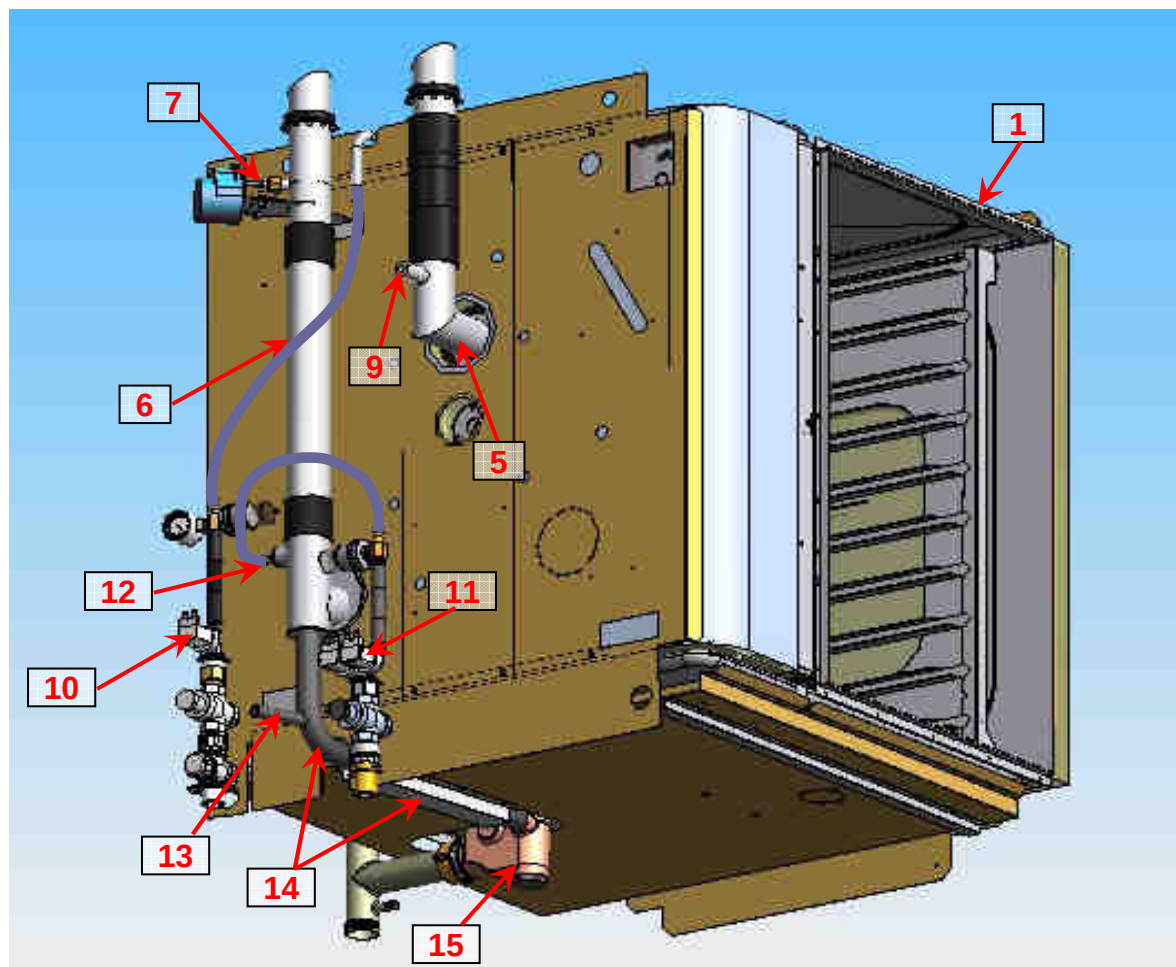
(**) Different values of these parameters may cause corrosion if combined with wrong usage and environment.



2. FUNCTIONAL DIAGRAM COMBI OVEN



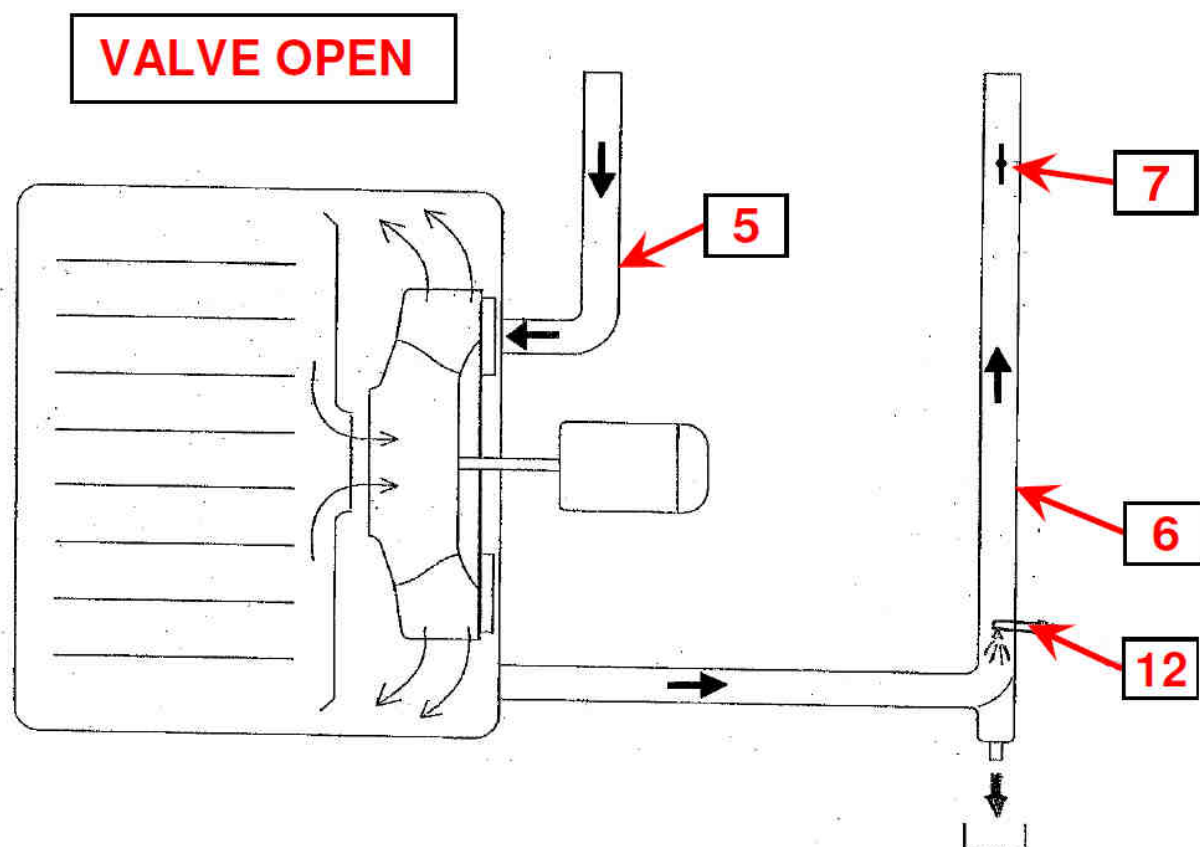
1. Cooking chamber
2. Water inlet pipe
3. Fan
4. Atomizer
5. Air pipe
6. Air outlet pipe
7. Motorised valve
8. Air flow diverter
9. Drain probe
10. Solenoid valve for steam production
11. Solenoid valve for steam condensing / drain cooldown
12. Injector for steam condensing / drain cooldown
13. Washing circuit drain pipe (only lev.3)
14. Condensate drain pipe
15. Siphon
16. Humidity probe (only lev.3)



The system works in two distinct ways depending on whether the motorised valve is opened or closed.

2.1. Open valve operation

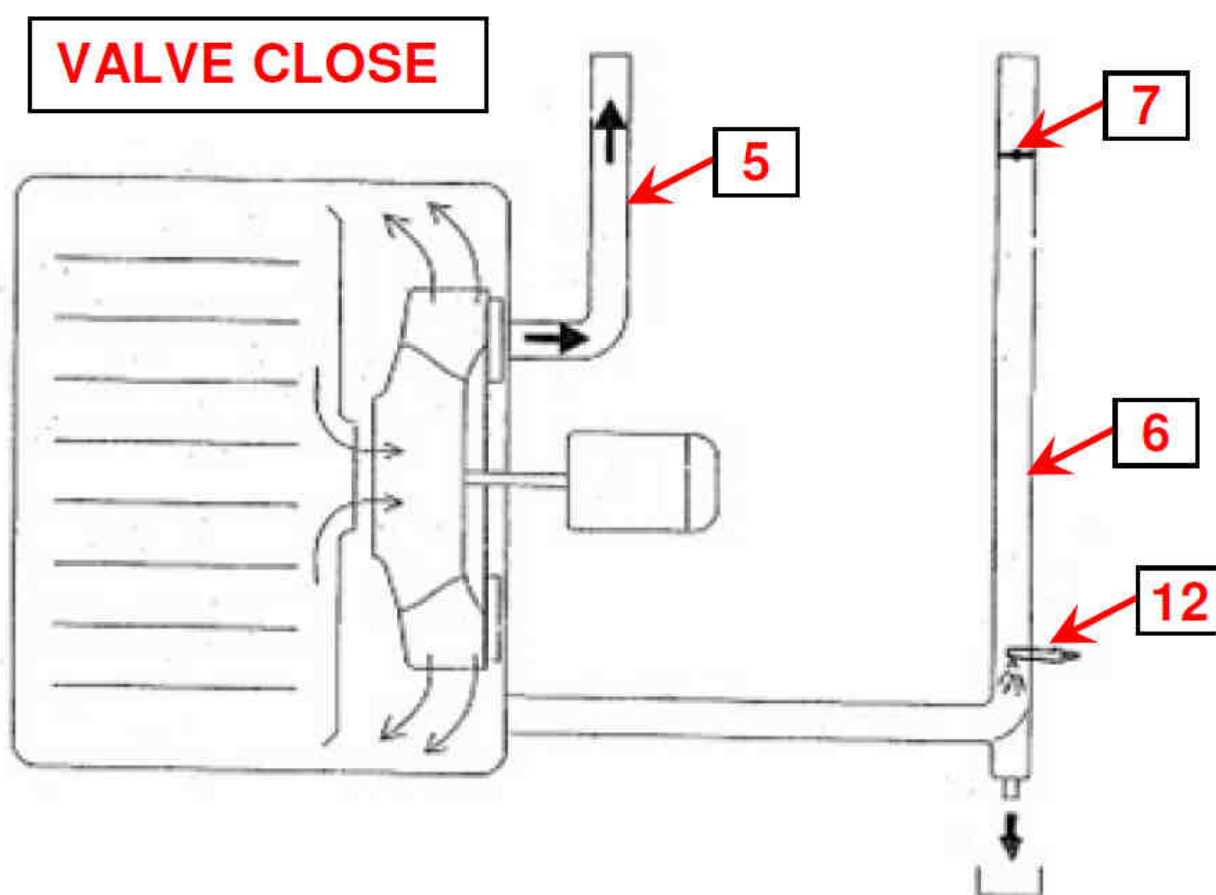
The rotation of the fan creates a vacuum effect in the local area behind his disk back where it faces the suction pipe/exhaust 5. When the butterfly valve 7 is open to this effect a vacuum sucking air flow entering through the pipe 5. Simultaneously the moist air inside the cooking chamber is induced to leave through the vent tube 6, aided by a flow diverter (not shown) placed inside the chamber at the exit hole. Through the injector 12 is sprayed water into the vent pipe - especially at high temperatures - in order to cool and condense the flow of moist air coming out. The condensate is collected on the bottom of the pipe to siphon 6 and conveyed through the rubber hose 14.



2.2. Closed valve operation

With the valve closed, the steam can not escape from the vent pipe 6, or from the tube 5 at least until the pressure inside the cooking chamber is not sufficient to overcome the effect of decompression generated by the rotation of the fan (usually 1,5-2,0 mBar). But when the pressure chamber exceeds the decompression generated by the fan, the steam excess is expelled through the tube 5. The system operates as a closed system, where the overpressure valve (overpressure valve in the FM ovens) is dynamically replaced by the effect of decompression generated by the fan. Even in this mode, water is sprayed by the injector 12 in order to maintain the siphon full.

Note that, unlike than the FM, the condensate tube 14 is connected upstream of the swing of the siphon, as with the motorised valve closed the vent pipe 6 and the drain tube 14 are at the same pressure of the cooking chamber.



The two modes of operation described above are used in different modes of cooking in the following way:

Convection cooking: means the user can determine the % the vent valve is open according to the diagram below .

0% - vent completely open (bar on the display all red)

from 10 to 90% - the valve opens and closes in timed mode, the value shown on the display is the % of time that remains closed.

100% - vent completely closed (bar on the display all grey)

Combi cooking mode: the user can set the desired % of steam - the opening and closing of the vent valve is controlled automatically by the oven, based on values detected from the apposite humidity probe.

Steam cooking: valve remains closed.



2.3. Drain cooldown / steam condensing operation

The inlet water assembly 11 feeds the cooling water injector 12. The opening of the water solenoid valve is timed based on the mode of operation (convection, combi or steam), chamber temperature and the temperature detected by temperature sensor 9.

The inlet water assembly 11 is different depending on the levels:

Level 3

It consists of:

- Back flow preventer (non return valve) EN1717 (for washing)
- Pressure reducer (for washing)
- Double water solenoid valve (one is for washing)
- Pressure switch on the drain cooldown line
- Pressure switch and manometer on the washing water line

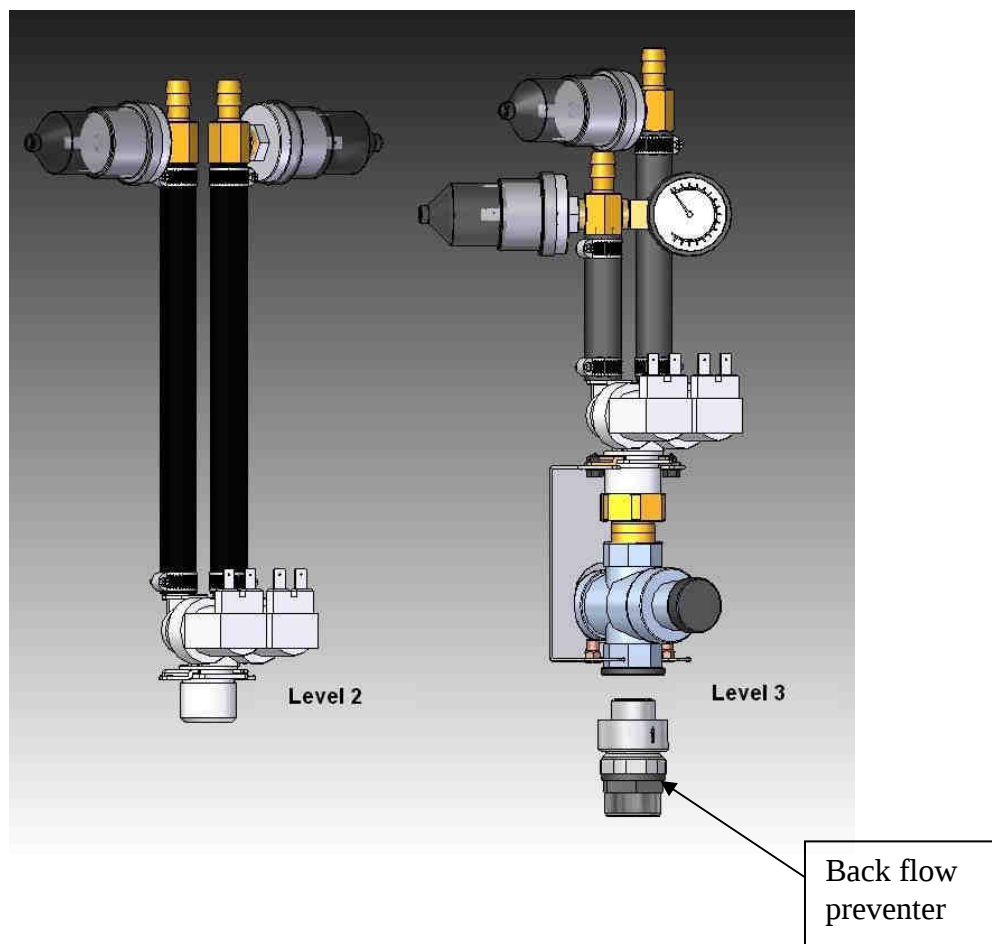
Note: the water pressure adjustment should be done during a washing cycle.

Level 2

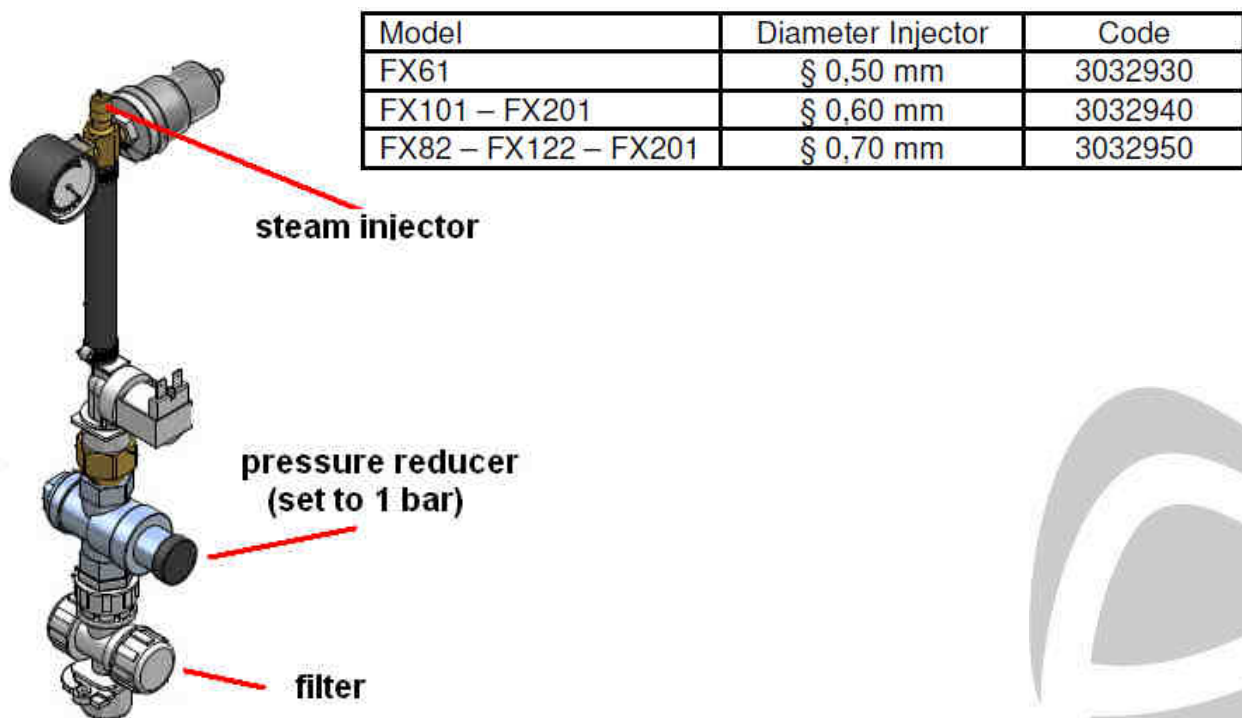
It consists of:

- Double water solenoid valve (one is for cleaning)
- Pressure switch on the drain cooldown line
- Pressure switch on the washing water line
- Pressure reducer (only models FX201-202)





2.4. Steam producing operation



3. ELECTRONIC BOARDS FOR LEVELS 2-3, INVERTER, FUSES, OVERLOAD RELAYS

3.1. *Electronic boards level 3 general layout*

The electronic boards system comprises:

1. panel group:
 - o CPU board 1a
 - o display LCD board 1b
 - o keyboard (glued to the glass panel) 1c
 - o LED board 1d
2. power PCB
3. combustion and fan control PCBs (only gas model)
4. inverter
5. USB connector
6. transformer
7. on/off switch

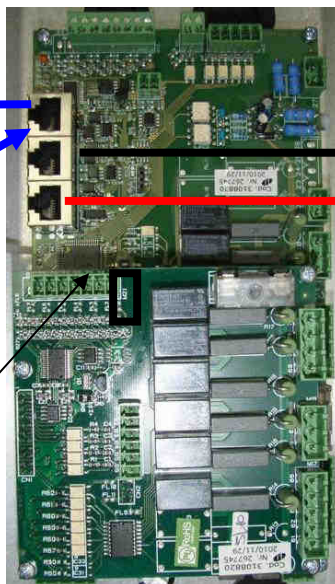
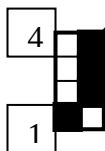




1. Control panel

The control panel has to be connected always on the 1st connector

2. Power board and Switch



4. Inverter



3. Combustion Control board and Blower Control board



5. USB plug



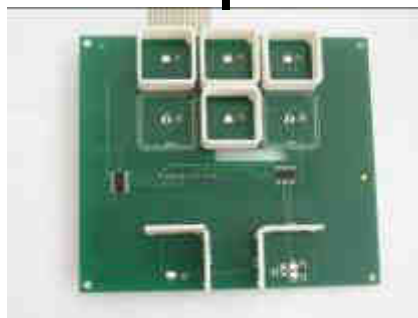
1a. CPU board



1b. LCD display

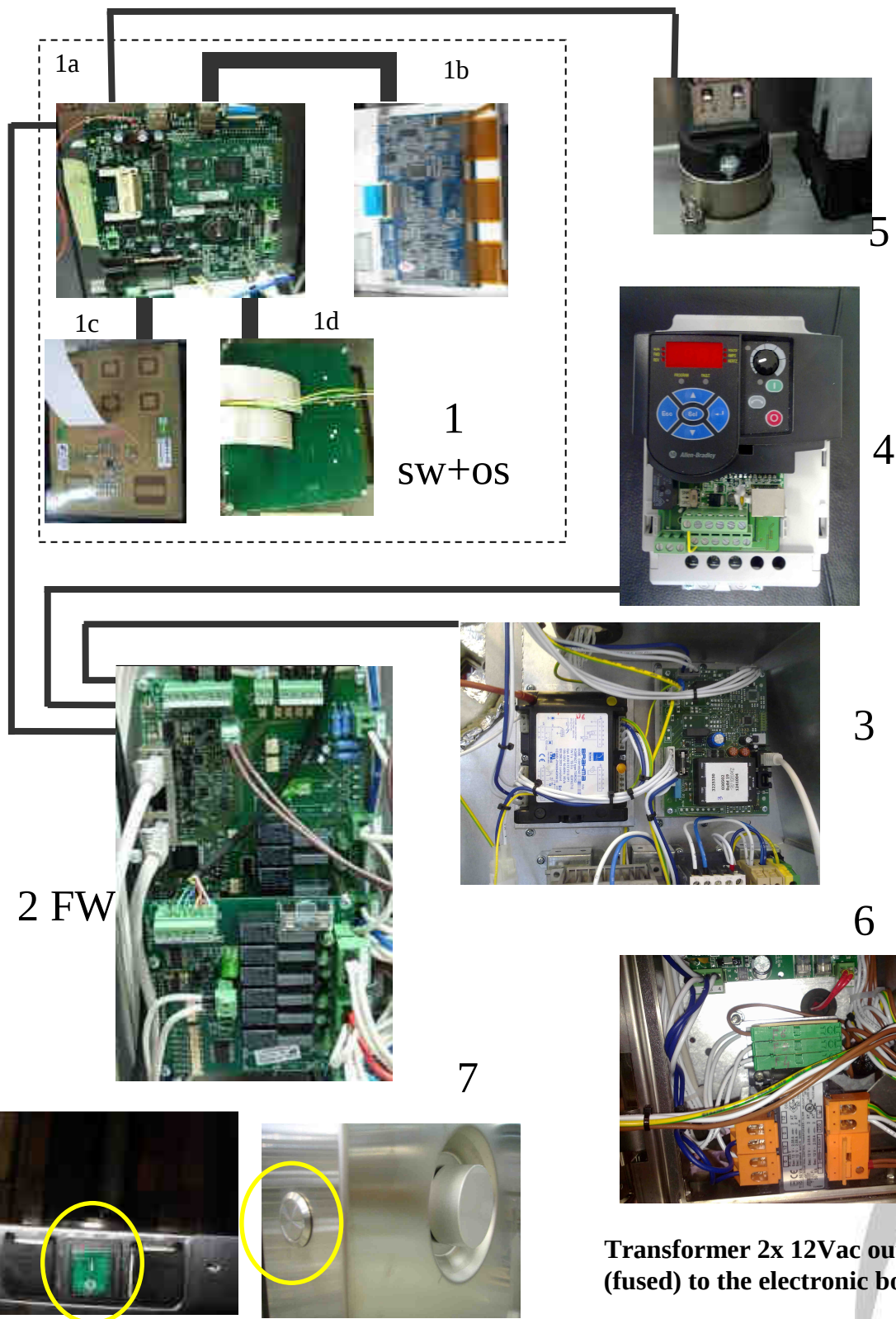


1c. Keyboard



1d. LED board





CPU board (1a) controls the display panel (1b), keyboard (1c) and the LED board (1d). The connections with these boards are made with flat cables. Addition, the CPU board (1a) communicates with the power board (2) through a network cable (RJ45) and with the external USB port (5).

The power board (2) receives all the signals from the oven probes (PT1000 temperature sensors, door micro switch, core food probe, etc.) and controls all organs of the oven through the appropriate relays. It communicates with the CPU board (1a), with the inverter (4) and the combustion and fan control boards (3) (only for gas) via RJ45 network cables.

If there is no communication between the power board (2) and the CPU board (1a) or the board or the inverter or the combustion control board a warning alarm appears E13 (communication error alarms, see table).

The management programme of the oven consists of three parts:

Firmware (FW) – it controls the operation of the oven (inputs and outputs) – it is in the power board (2)

Software (SW) - Contains all the user interface, programs, pictures, etc.. – it is in the CPU

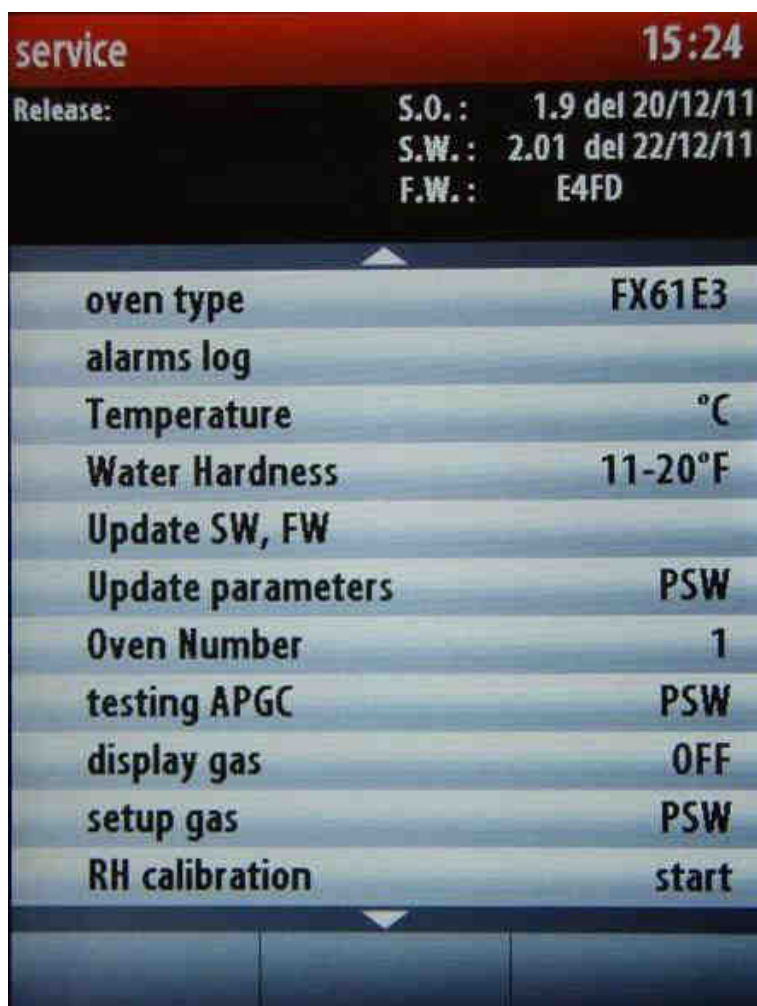
Operating System (OS) – it is in the CPU

Versions of OS, SW and FW are shown in the upper part of the Service menu.



3.2. "Service" menu

From the main page you enter menu "Service" by typing the password "**SAAP**" and the following screen appears:



On this page you will find information and different options for the oven:

Versions:

O.S.: 1.9

The operating system, indicates the date issued and version used in that machine. The issue date of O.S. is unique and allows the user to know the last upgrades of the oven.

SW: 2.01

SW: Software of the LCD display board, indicates the date issued and the version of software installed on the CPU (1a).

The issue date of the SW is unique and allows the user to know the last upgrades of the software interface of oven.

FW: E4FD

FW: Firmware of power PCB, reports the checksum of the firmware version installed on the power board. The checksum of the FW of the power board are unique and allow the user to know the level of the firmware update of the oven.

Oven Type (Configure oven type):

From this window you have to select the type of the oven. **The selection of the type of oven must be done every time you replace any board (1a, 2, 3, 4)** to realign the parameters of that oven.

The selection of the oven automatically starts the configuration process during which the devices present are tested. At the end of the configuration the oven shows the list of devices found: **check that the devices are the same as those installed.**

If the devices do not match check again the oven and repeat the process of configuration.



The following table lists the types of oven that is possible to configure.

Oven model	Inverter 101	Inverter 102	Comb. control 21	Comb. control 22	Drain valve
FX61E3	X				
FX82E3	X				
FX101E3	X				
FX122E3	X				
FX201E3	X	X			
FX202E3	X	X			
FX61E3C	X				X
FX82E3C	X				X
FX101E3C	X				X
FX122E3C	X				X
FX61G3	X		X		
FX82G3	X		X		
FX101G3	X		X		
FX122G3	X		X		
FX201G3	X	X	X	X	
FX202G3	X	X	X	X	
FX61G3C	X		X		X
FX82G3C	X		X		X
FX101G3C	X		X		X
FX122G3C	X		X		X

How to configure the type of oven

The setup process of the oven must be done after replacing one of the following components: CPU board, power board, inverter, combustion control board. It is required to make all the boards communication with one another and to select the correct operating parameters of the oven.

Operate as follow:

- Enter the service menu
- Select the "oven type"
- Select the type of oven

- Wait until the end of the procedure and check the list of devices in comparison with the table below.
- If you get the alarm E20 during the procedure, reset with the reset button and repeat the procedure by pressing the function "repeat configuration". If the problem persists, then switch off the oven, wait 30 seconds and then switch it on.
- NOTE: When You change inverter and/or gas blower control, E20 will always appear during configuration process and a switch-off / switch-on procedure it's always required before repeat configuration.
- Verify the items found and control the wiring of the components not detected.
- If at the end of the procedure, the screen does not match the table below, check the wiring and repeat the configuration by pressing "repeat configuration".
- If the configuration is correct (the screen corresponds to the table) press "OK".

Alarm log: Selecting this voice you get the list of the last thirty alarms that have occurred on the oven. The list will show you the alarm code, date and time.

alarms log			19:04
code	date	time	
GAS: 24	16/10/2009	13:20	
GAS: 5	16/10/2009	13:11	
E13b	06/10/2009	12:31	
GAS: 24	06/10/2009	12:30	
E13a	01/10/2009	15:47	
GAS: 24	01/10/2009	15:36	
GAS: 5	29/09/2009	14:56	
E13a	29/09/2009	14:52	
E13b	29/09/2009	14:51	
GAS: 5	29/09/2009	14:46	
GAS: 24	29/09/2009	12:20	
GAS: 4	23/09/2009	11:54	

Temperature: Allows you to configure the temperature unit used in the normal operation of the oven. The choices can be °C or °F. To change the setting, put the cursor on the line "Temperature" and select the new unit pushing the knob.

Water Hardness: Allows you to set the parameter of hardness of water. This determines the quantity of chemicals and water used during washing,

Update SW, FW: This selection start the process of updating the software on the CPU (1a) and the firmware on the power board.

Before performing the upgrade the USB stick (recommended max. size 4GB) should be inserted into the connector (**the stick must be formatted FAT or FAT32 and contain a directory "AngeloPo" with all the necessary files inside**).

How to update software and firmware

To update the software and firmware, proceed as follows:

- Enter the service menu
- Insert the key into the USB connector
- Select "Update SW, FW"
- Wait until the end of the procedure and follow the instructions that appear on the display
- During this procedure the message "turn off and on the oven" will appear. This has to be done by the green power switch. Attention! Don't remove the USB Stick! (if you switch from version 1.x to 2.x, the system will require a second reboot, again without removing the USB stick!)
- Remove the USB stick only when the complete update has been finished (when the main menu is displayed)

Update parameters: This selection starts the procedure for updating parameters of the boards without the USB stick. It is performed normally **when you change the power board 2 or the CPU 1a** in order to align the parameters of the boards. To activate the update enter the password **FA53**.

How to update the parameters (SW and FW alignment)

This procedure allows the user to align the parameters of the boards after replacing the CPU board or power board. The procedure is performed after replacing the card, as follows:

- Enter the service menu
- Select " Update parameters "
- Enter the password "FA53"
- Wait until the end of the procedure and follow the instructions that appear on the display

When the procedure has finished, turn off and on the oven as written on the display.

Oven Number: identification number of the oven **within a network of ovens**. It is used during HACCP data download as not to create conflicts within the network and to uniquely identify the data from each appliance.

Testing APGC: this choice is subject to Password and is used only at the end of the test cycle into the factory before the oven is shipped to the final customers.

Display gas: allows visual check, during normal operation of the machine, the parameters and the states of the gas unit. It must be repeated each time the machine is switched on.

Gas setup: this option allows you to enter into the gas setup, the password is **SI74**.

RH% Calibration: This selection allows you to activate the calibration procedure of the UR probe (humidity probe). The procedure takes about 10 minutes to run. The procedure is performed with the oven cold and finish with the oven at 230 ° C. **This procedure should be performed every time you replace the UR probe or whenever you replace the power board (2).**

Clean test: See chapter 6.3.

Pump unit selection: set 0 if is installed the black/brown pumps unit, set 1 if is installed the blue pumps (first version).

T/RH display: This option is for internal use of Angelo Po .

Counters: displays the numbers of washing programs performed and the working times at low and high temperature.

3.3. *Explanation table*

When a component is replaced must perform the procedures indicated below - attention: these procedures should be performed after replacement of the component and in the order listed below.

ITEM REPLACED	PROCEDURES TO FOLLOW
CPU board (1a)	Update parameters Configure oven type Gas setup
Display LCD board (1b)	None
LED board (1d)	None
Power board (2)	Update parameters Configure oven type RH calibration (humidity probe)
Combustion and blower control PCB (3)	Configure oven type
Inverter (4)	Configure oven type
USB connector (5)	None

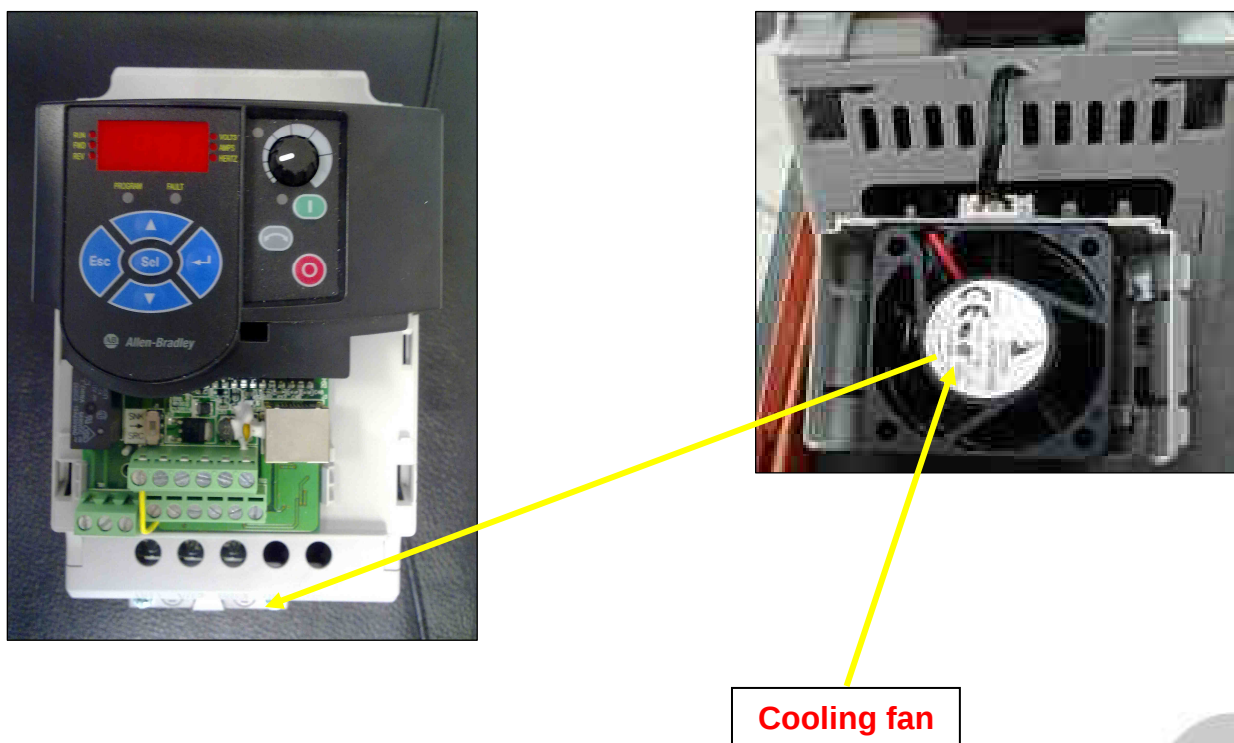
Note: After replacing one of the items listed above, at the first ignition of the oven you may see alarms E13 and / or E20. After following the procedures listed in the table the alarms should no longer appear.

3.4. Inverter

The inverter keyboard is disabled as the operating parameters are sent to the inverter via power board. This component allows us to select up to five motor speeds and the static way of cooking, with fan stops (when the heating element is inactive).

The inverter is equipped with a heat dissipater and a cooling fan situated at the bottom of the item. The inverter inner temperature is monitored by an internal temperature sensor, if the temperature exceeds 50° C, the inverter blocks (show the alarm E06: 8 see alarms table).

The over temperature alarm may be due to rupture of the cooling fan, in which case you can replace the single cooling fan.



Once you remove the power supply on the oven, you have to wait 3 minutes before starting maintenance on the inverter or the motor due to electrical hazards.

Inverter alarm table		
E06:3	The inverter bus voltage is unsteady around the nominal value	check the power supply voltage (120V / 208-240V /480V AC). If necessary replace the inverter.
E06:4	the inverter bus voltage has dropped below the minimum allowable	check the power supply voltage (120V / 208-240V /480V AC)
E06:5	the inverter bus voltage has raised up to the maximum allowable	check overvoltage from the power supply (120V / 208-240V /480V AC) or from the motor (100- 240V AC)
E06:6	The inverter is not able to turn the motor	check that the motor is free to move. Check that the three phases are connected to the motor.
E06:7	Motor overload	check that the motor is free to move and doesn't touch any other item
E06:8	Excessive heating of the dissipater	Verify cooling fan of the electric compartment, Verify cooling fan inside the inverter if it is clean and works properly
E06:12	The output current too high	check that the motor is free to move and doesn't touch any other item
E06:13	Found leakage currents too high between one of the phases and earth.	check that one or more phases of the motor or of the power supply wires are not short circuited to the ground/frame
E06:33	Automatic restart failed	There was an alarm 3, 4, 5, 6, 7, 8, 12, 63 or 64, but the automatic restart was unsuccessful. Remove the cause of these alarms and restart.
E06:38	Phase U short circuited to GND	check the correct connection of the motor and check that the phase U of motor supply is not short circuited to the GND
E06:39	Phase V short circuited to GND	check the correct connection of the motor and check that the phase V of motor supply is not short circuited to the GND
E06:40	Phase W short circuited to GND	check the correct connection of the motor and check that the phase W of motor supply is not short circuited to the GND

Inverter alarm table		
E06:41	between phases a UV excess current flows	check the correct connection of the motor and that the phases U and V of the motor power supply are not short circuited together
E06:42	between phases a UW excess current flows	check the correct connection of the motor and that the phases U and W of the motor power supply are not short circuited together
E06:43	between phases a VW excess current flows	check the correct connection of the motor and that the phases V and W of the motor power supply are not short circuited together
E06:63 E06:64	Overcurrent limits exceeded High current limit exceeded 150% for 1 minute or 200% for 3 seconds	check that the motor is free to move and doesn't touch any other item
E06:70	inverter power section faulty	Check if the inverter data voltage and verify the power supply (120V / 208-240V /480V AC). If necessary replace the inverter.
E06:71	Excessive communication errors	Check if the cable connecting the serial BUS line is properly connected and/or take away from other voltage wires.
E06:81	Communication loss	Check if the cable connecting the serial BUS line is properly connected and/or take away from other voltage wires.
E06:100	Inverter checksum error	Replace the inverter
E06:122	Inverter control section faulty	Replace the inverter
E06:255	Inverter blocked	check the connection between terminal 1 and terminal 11 on the inverter.

3.5. *Electronic boards Level 2 general layout*

The system of electronic boards includes:

1. control panel assembly, it is made of:
 - o CPU board 1a
 - o keyboard (glued to the glass panel) 1b
2. power PCB
3. combustion and fan control PCBs (only gas model)
4. inverter
5. transformer
6. on/off switch



2. Power board

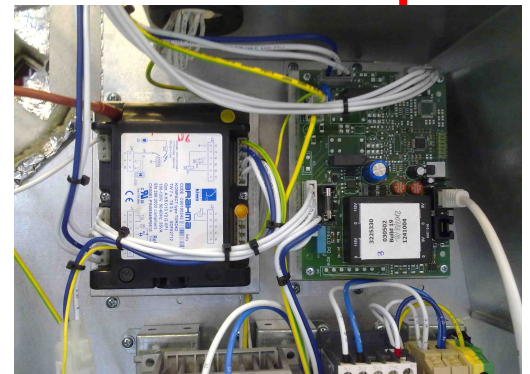
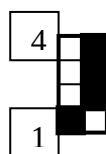


2. Power board



1. Control panel

The control panel has to be connected always on the 1st connector



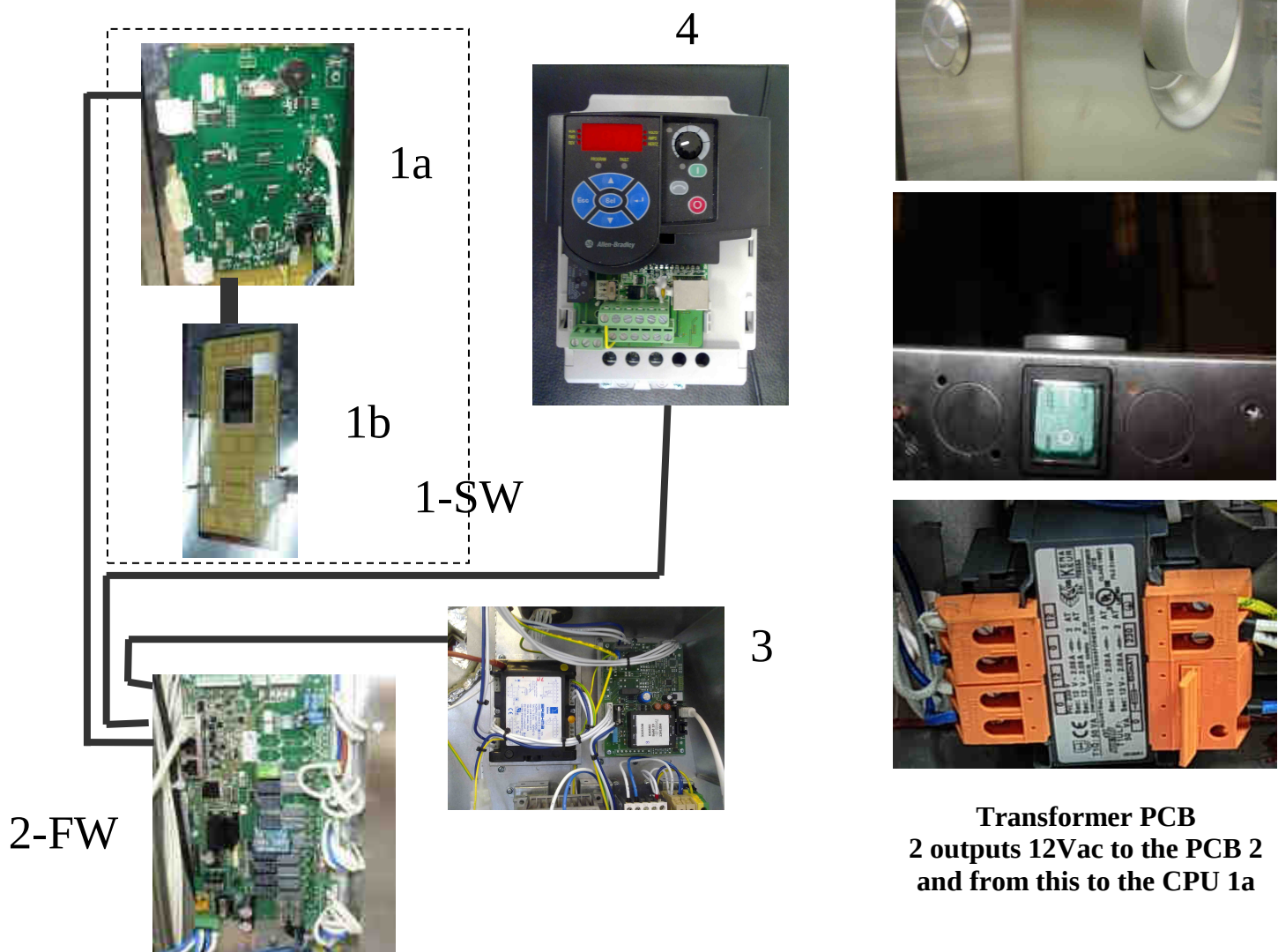
3. Combustion control board and blower control board



1a. CPU board

1b. Keyboard





CPU board (1a) included the display and keys with LED backlighting. It is connected to the keyboard (1b) with two flat cables and to the power card (2) with a network cable (RJ45).

The power board (2) receives all the signals from the oven probes (PT1000 temperature sensors, door micro switch, core probe, etc.) and controls all organs of the oven through the appropriate relays. Communicates with the CPU card (1a), with the inverter (4) and the combustion and fan control boards (3) (for gas model only) via RJ45 network cables.

If there is no communication between the power board and the CPU board or the combustion control board the alarm E13 appears (communication failed error).

The management program of the oven consists of two parts:

Firmware (FW) – it controls the operation of the oven (inputs and outputs) – it is in the power board (2)

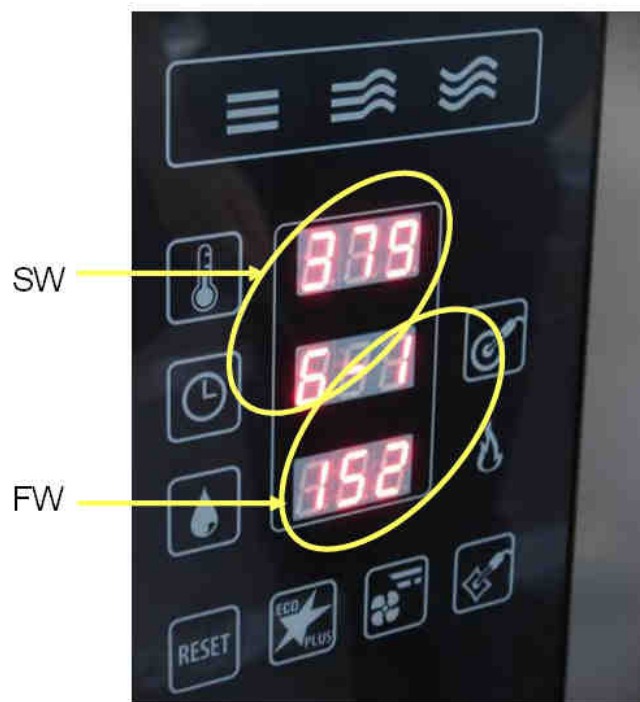
Software (SW) - Contains all the user interface, programmes, pictures, etc.. – it is in the CPU

The following procedure allows:

- a) to set the temperature measurement unit (°C or °F)
- b) to enable / disable the automatic preheating,
- c) to display the SW and FW versions

- With the oven on in standby mode, push for at least 4 seconds the "reset" button, when it is released the display turns off

- a) Press the "temperature" button and turn the knob to change the temperature unit setting (° C or ° F).
- b) Press the "time" button and turn the knob to set the automatic preheating
- c) Hold the "washing" button for at least 3 sec to see the SW and FW versions.



- d) Press "cooldown" and turn the knob to enable / disable the cooldown with water injection during cooking.
- Wait without pressing any button for to come back to normal mode.

Update parameters procedure (alignment of the power board with the CPU) - only boards 2nd generation (after March 2014)

After a replacement of the CPU or power board the alignment of the boards has to be done.

- 1) With the oven on in standby mode, push for at least 4 seconds the "reset" button, when it is released the display turns off.
- 2) Press the "vacuum probe" button in order to start the procedure ("-" will run on the lower display). During the upgrade no key is active. The update will start only if there is no E13 alarm (communication failure).
- 3) After the update the display turns off again.

SW update - only boards 2nd generation (after March 2014)

The SW update from USB stick has to be done as following:

- 1) With the oven on in standby mode, push for at least 4 seconds the "reset" button, when it is released the display turns off.
- 2) Press the "steam injection button" to enter into the SW update from USB , the first screen displays " USb " flashing. To leave the procedure just press again "steam injection button". If during " USb " flashing you insert a USB stick and the board recognizes it , the flashing stops and the message " USb " is steady and also turns on the START / STOP button in green color. **The stick (recommended max. size 4GB) must be formatted FAT or FAT32 and contain a directory "AngeloPo_L1_L2" with all the necessary files inside).** .

3) Press the START / STOP in order to start the update procedure (“-“ will run on the lower display)

4) The update must includes the CPU and the power board, no key is activated during the update.

5) After the update the display turns off again.

How to configure the type of oven

The setup process of the oven must be done after replacing one of the following components: **CPU board, power board, inverter, combustion and fan control board.**

It is required in order to make all the boards communicate and to select the correct operating parameters of the oven.

Operate as follows:

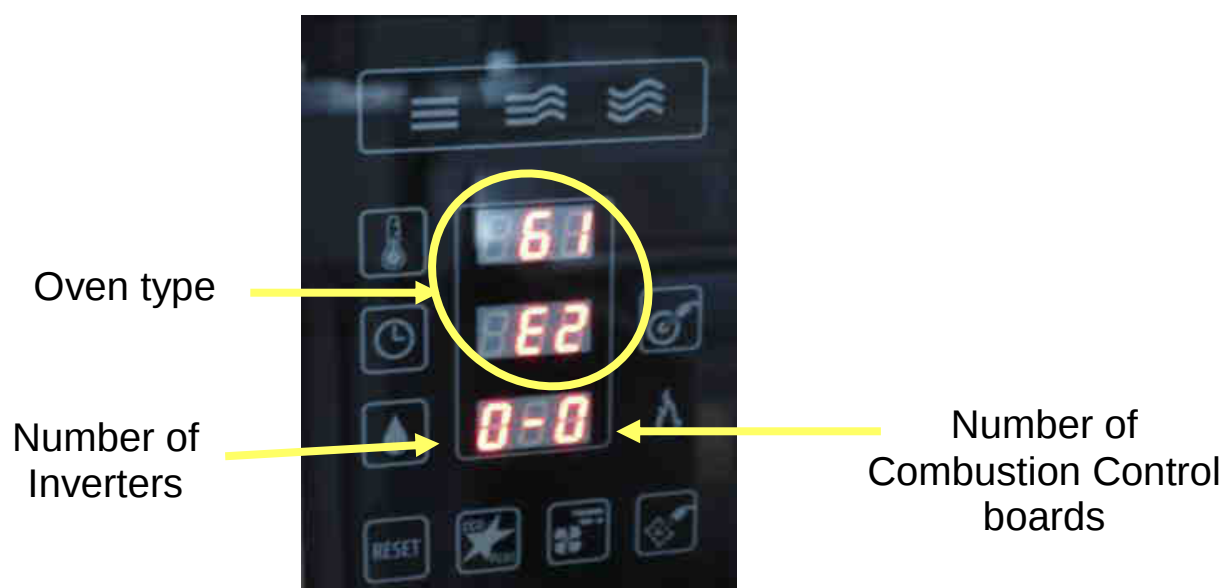
- o With the oven on and in standby mode hold down (simultaneously) the keys "convection" and "reset" for 4 seconds to enter the configuration screen.
- o Select using the knob the model of the oven in the display and confirm pushing the knob.
- o Wait for the end of the configuration process and compare what appears on the display with the table below.
- o If the configuration is incorrect check the connections between the boards and press the knob to repeat the configuration.
- o If the configuration is correct press the "start / stop" button to exit.



Oven configuration table

Tab 2

Oven model	Display indication
61E2, 82E2, 101E2, 122E2	1 - 0
201E2, 202E2	2 - 0
61G2, 82G2, 101G2, 122G2	1 - 1
201G2, 202G2	2 - 2



3.6. *Explanation table*

When a component is replaced you must perform the procedures indicated below - attention: these procedures should be performed after replacement of the component and in the order listed below.

ITEM REPLACED	PROCEDURES TO FOLLOW
CPU board (1a)	Update parameters procedure (alignment of the power board with the CPU) - only boards 2 nd generation (after March 2014) Oven configuration procedure Gas setup procedure
Power board (2)	Update parameters procedure (alignment of the power board with the CPU) - only boards 2 nd generation (after March 2014) Oven configuration procedure
Inverter (4)	Oven configuration procedure
Combustion and fan control PCBs (3)	Oven configuration procedure

Note: After replacing one of the items listed above, at the first ignition of the oven you may see alarms E13 and / or E20. After following the procedures listed in the table the alarms should no longer appear.



3.7. FX fuses description:

Power board:

F3- pcb relay and halogen light transformer fuse (250mAT)

F4- steam production water solenoid, quenching water solenoid, motorised valve (3,15AT)

F5- General fuse for oven aux circuits, heating elements contactors, first chamber inverter and/or combustion control contactors, washing water solenoid (6,3AF)

Power Board Expansion module (level 3 only):

F1- General fuse for low power contactors, detergent / sanitiser pumps, external fats drain valve, second chamber aux circuits (inverter contactor and/or combustion control contactor) (3.15 AT)

230V/12V PCBs power supply Transformer

F1- On board 230V Primary fuse (630mAT)

F4, F5- Outputs (on wiring) fuses (3,15 AT)

Wiring (only electric models):

F1, F2- fuses on phase L1 and L2 (10AT Class CC 600 Volts)

F6- "Neutral" (→ L2 Phase) 230V pcb I/O fuse: on wiring, close to F4, F5 (3,15 AT)

On 480 Volts model only:

F3- fuse on phase L3 (10AT Class CC 600 Volts)

F7- fuse (2A 500 Volts)

ONLY gas models:

T3 120V/230V Aux Transformer: on board primary fuse:

- 2.5AT on 160VA Transformer (for models FX61G, FX101G and FX82G gas Ovens)

- 6,3 A T on 330VA Transformer (other models gas Ovens)

Blower control pcb:

F1- board general fuse (4A F), blower and combustion control board supply circuits.

Combustion control pcb:

F1----- board general fuse (6,3A T), protects also gas valve supply circuit.

NOTE: T=slow, F=fast.

4. OPERATION TESTING, ADJUSTING, INSTALLATION REPORT, GAS CIRCUIT ALARM

4.1. System operation

4.1.1. Premixed system general principles

FX oven gas system is a "total premix", this means that the gas is completely mixed with the necessary air to have "good" combustion and then the air-gas mixture is ignited at the burner.

Therefore the relationship between the quantity of air and the amount of mixed gas is constant and must be properly adjusted to avoid being too rich (risk of production of CO) or too poor (unstable flames).

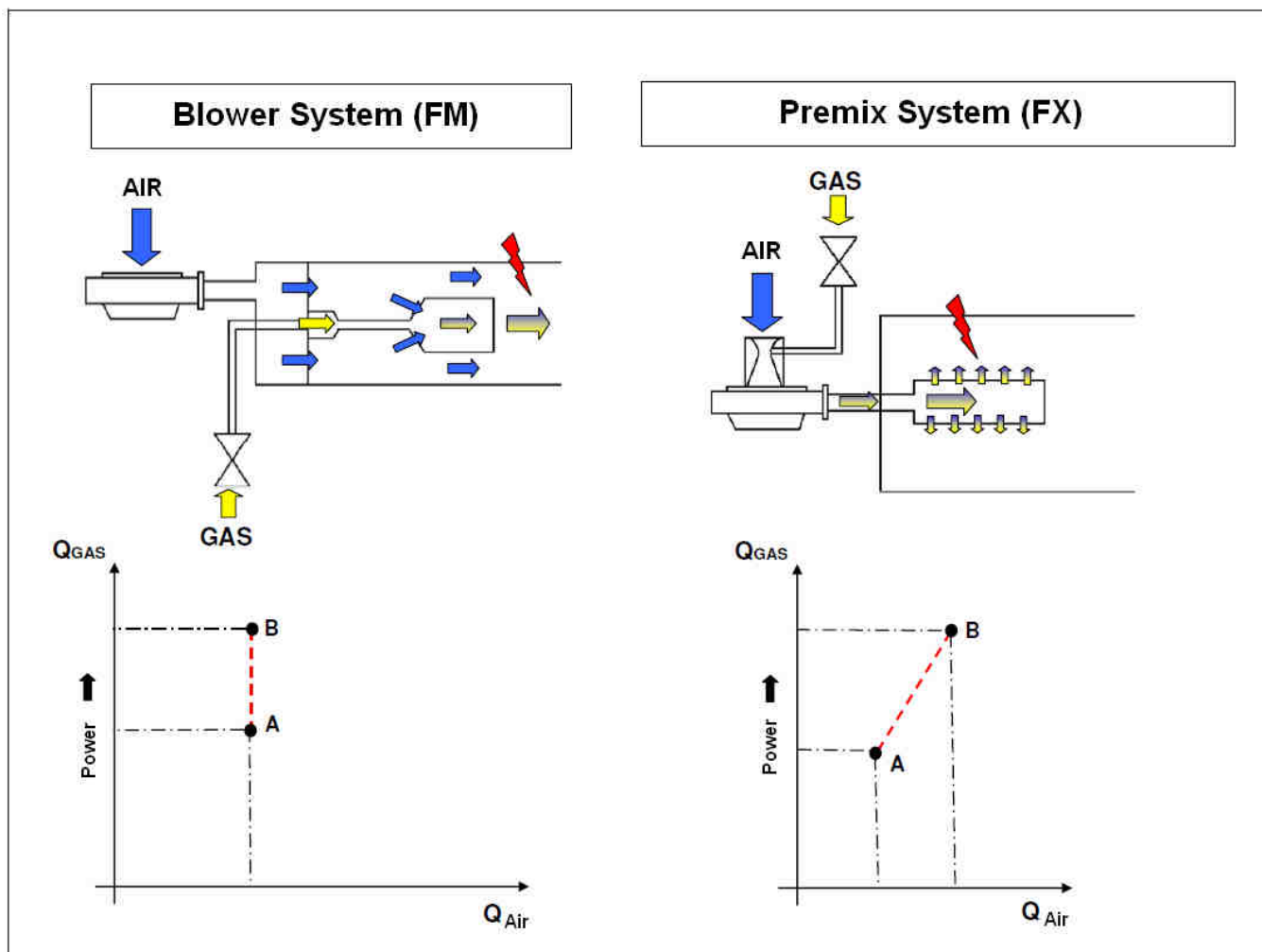
In the diagram below we highlight the major differences between the blown system (FM) and premixed system (FX): In the blown system the gas and air inlet circuit to the burner are separated, while in the premixed system both flow into the mixer before going into the burner.

Consequently, in the blown system to adjust the gas flow and the combustion quality it is enough to adjust the gas valve output pressure or replace the nozzle.

In the premixed system, however, the gas valve output pressure is zero because of the vacuum created by the fan and therefore, only at low speeds (when the influence of the blower decreases), the combustion is controlled by the gas valve offset. To make this adjustment it is necessary to use a gas flue analyzer.

Furthermore, an electronic variable-speed blower, controlled by the power board, allows you to change the quantity of the air-gas mixture.





4.1.2. Power schemes

As it is evident from the diagram above, in the pre-mixed system air and gas are sucked in and mixed together by a fan. It is possible to control the quantity of the air-gas mix because the fan rotation speed is electronically controlled, to obtain a variation of gas flow and thus the power of the burner.

There are 3 different power levels:

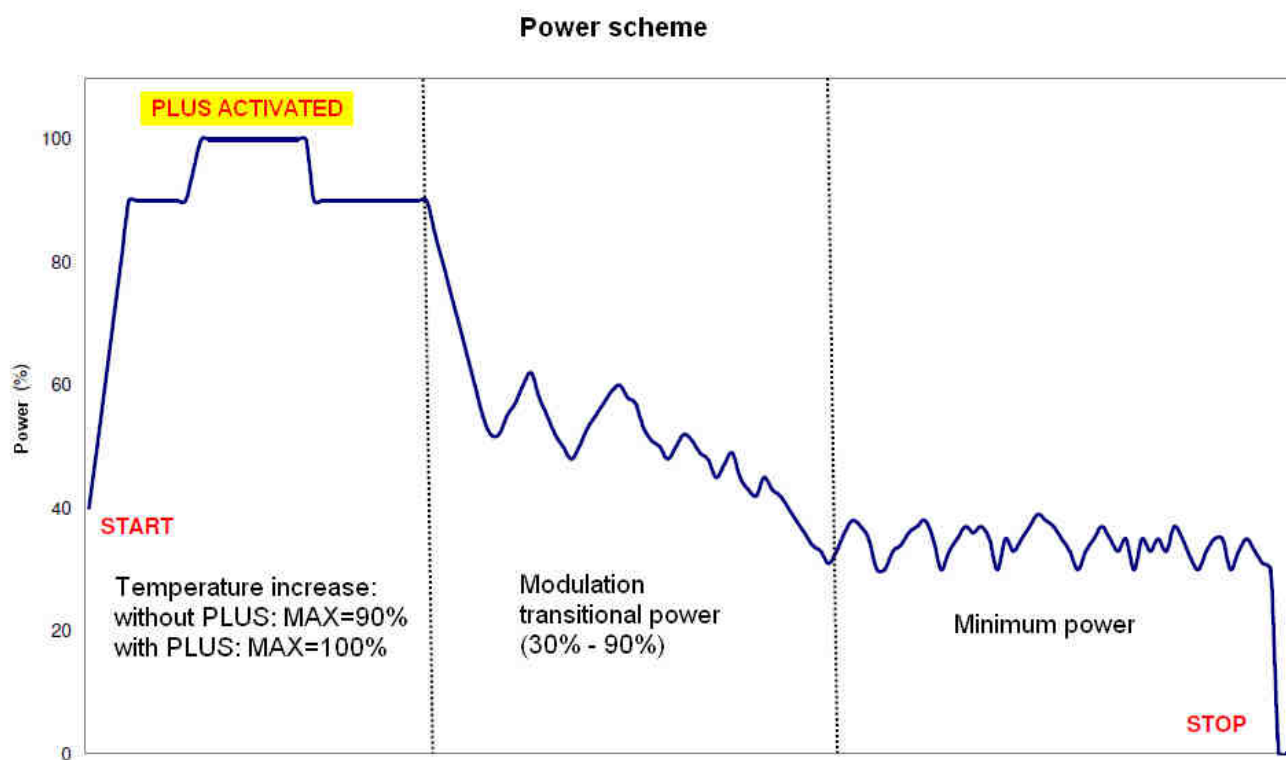
- Full power*: operating at maximum capacity and blower engines at full speed, the inlet gas circuit is in total decompression and the gas valve adjustment of the valve does not cause significant differences. The combustion is totally dependent on the nozzle installed.

- Modulation Transitional power: the system is able to control all the range of power from minimum to maximum with the control of the rotation speed of the blower fan by the power board. In this way the combustion is "good" at any range of power.
- Minimum power: The minimum power is set at 30-40% of maximum. In this case, the vacuum created by the blower decreases and the effect of the valve offset adjusting becomes more important. The proper adjustment of the valve is essential. For details concerning the valve adjustment, see the section 4.4.3. Valve offset adjusting.

* With the PLUS function turned off the oven works with maximum set at 90% of maximum power, to use 100% of the power it is necessary to enable the PLUS function.

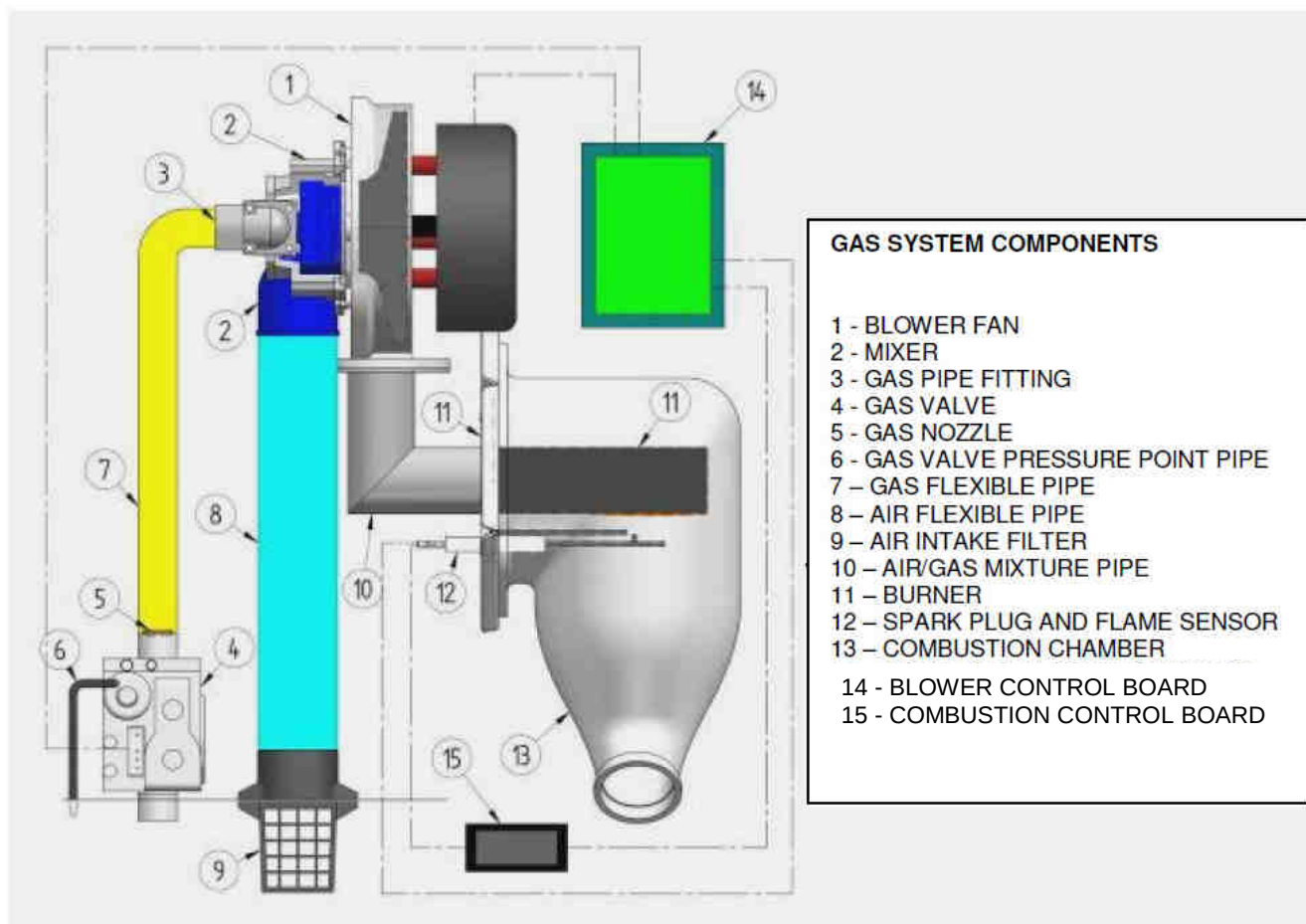
NOTE:

- The burner ignition occurs at a power of about 10% higher than the minimum (40-50%).



4.2. System components

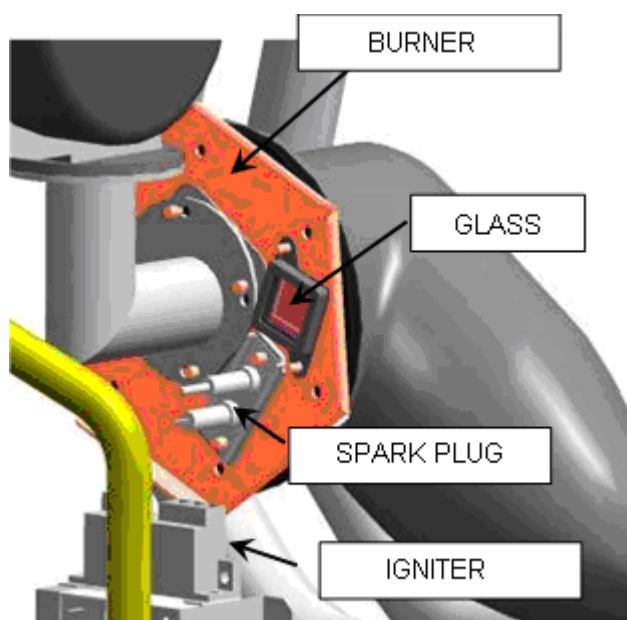
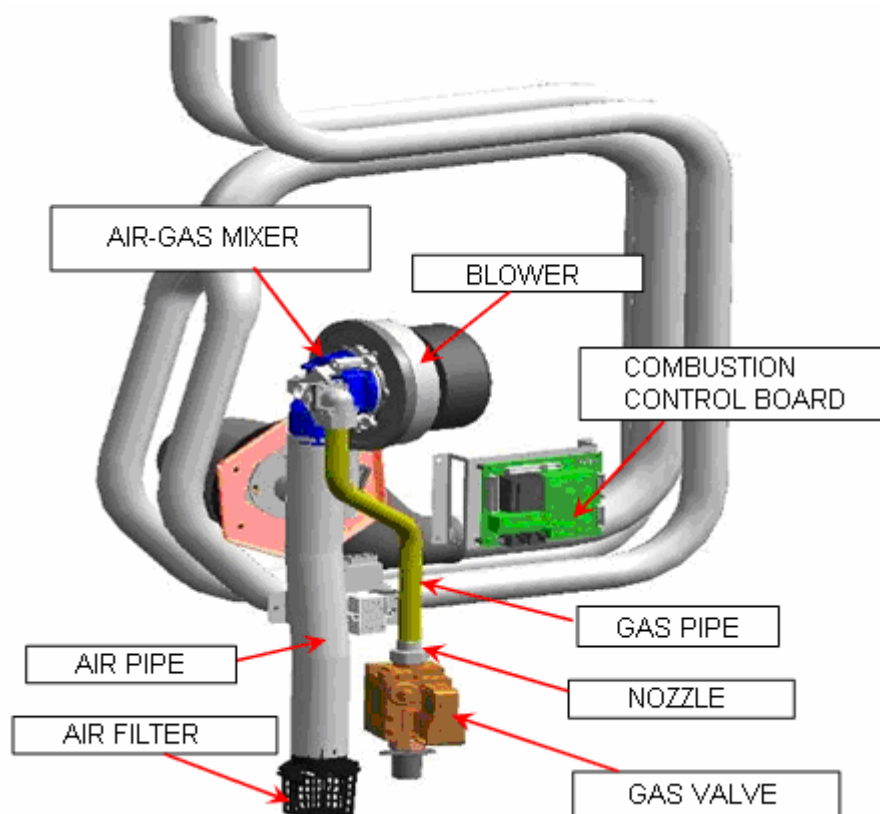
The picture shows all the components of the gas system.



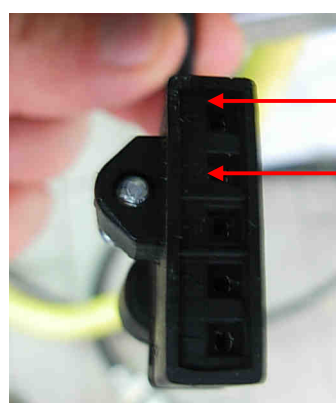
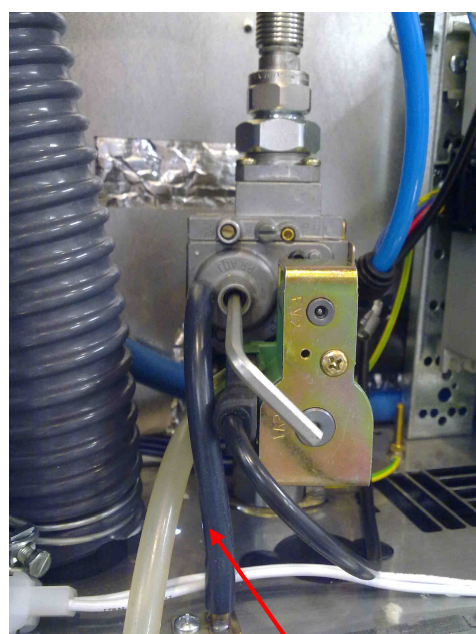
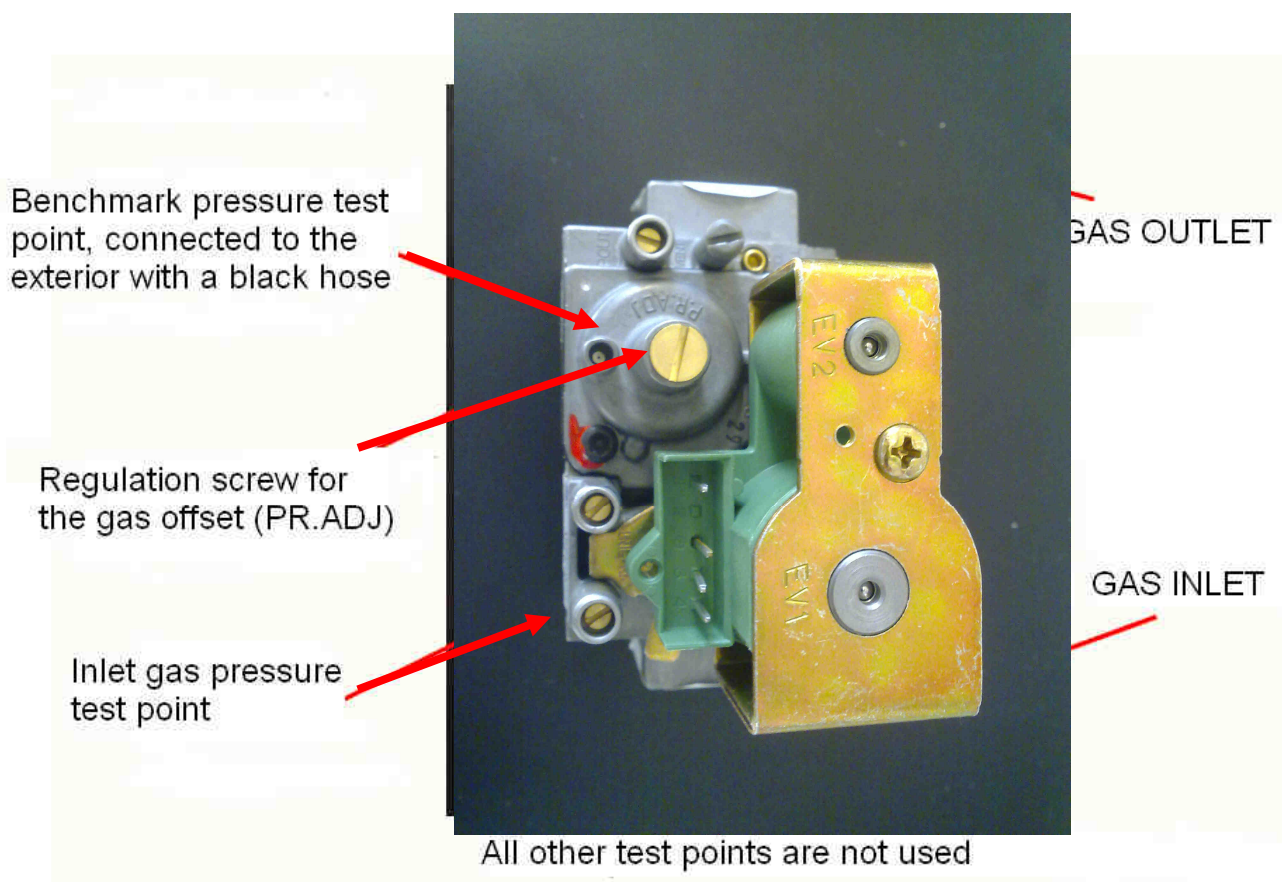
Attention:

- Always check before every intervention that all components are securely attached (electrical connectors, screws, clamps, fittings, insulation materials ..)
- Be sure the air inlet filter (9) and the exit of the gas valve pressure test point pipe (6) are totally clean (if necessary clean them properly).
- As the gas inside the tube (7) and the fitting (3) is at negative pressure, in case of leak to find it don't use flame because it could be sucked in the mixer and cause a fire / explosion.

Functional diagram gas system



4.2.1. Gas valve (CSA approved)

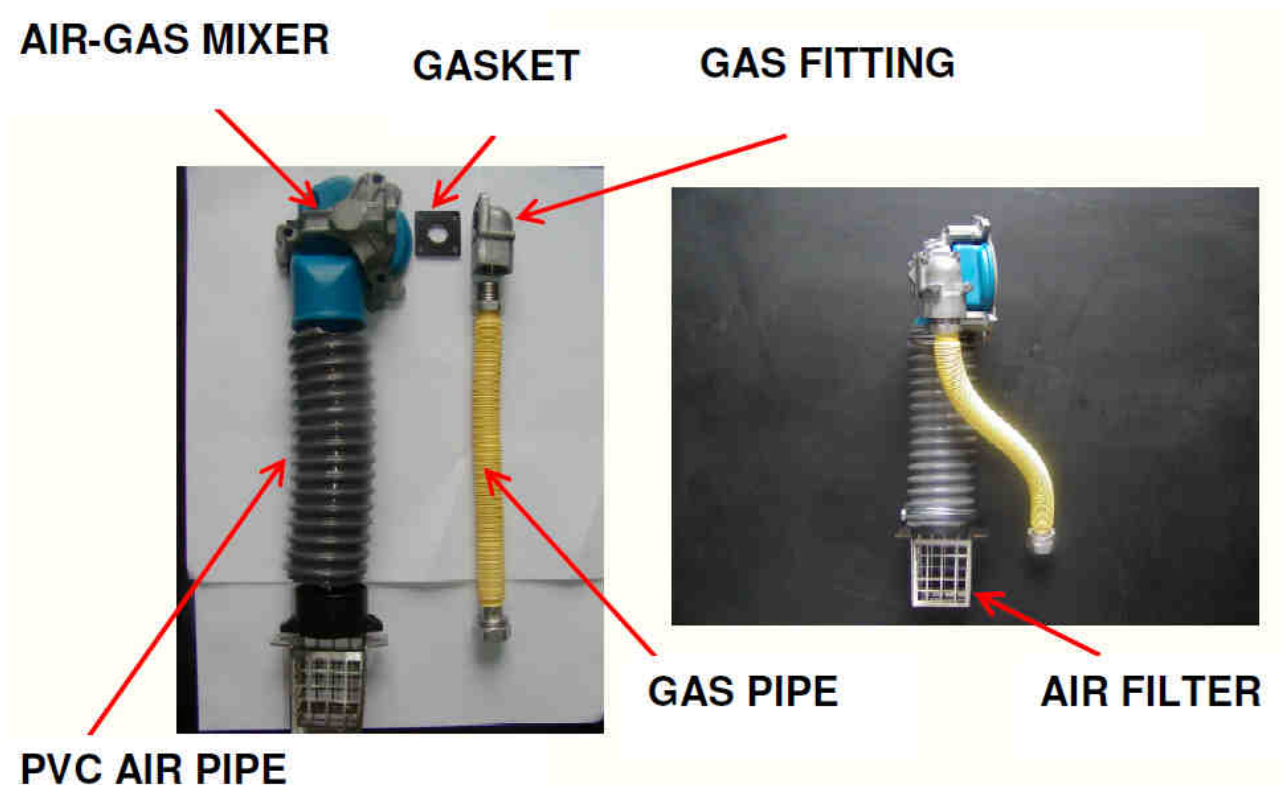


NOTE:

- For any details concerning the valve adjustment, see the section 4.4.3. Valve offset adjusting.
- Be sure the air inlet filter (9) and the exit of the gas valve pressure test point pipe (6) are totally clean (if necessary clean them properly).

ATTENTION!: Each replacing of the gas valve is necessary to make the wizard test (see the section 4.4.1), check the combustion and even the gas valve offset adjusting.

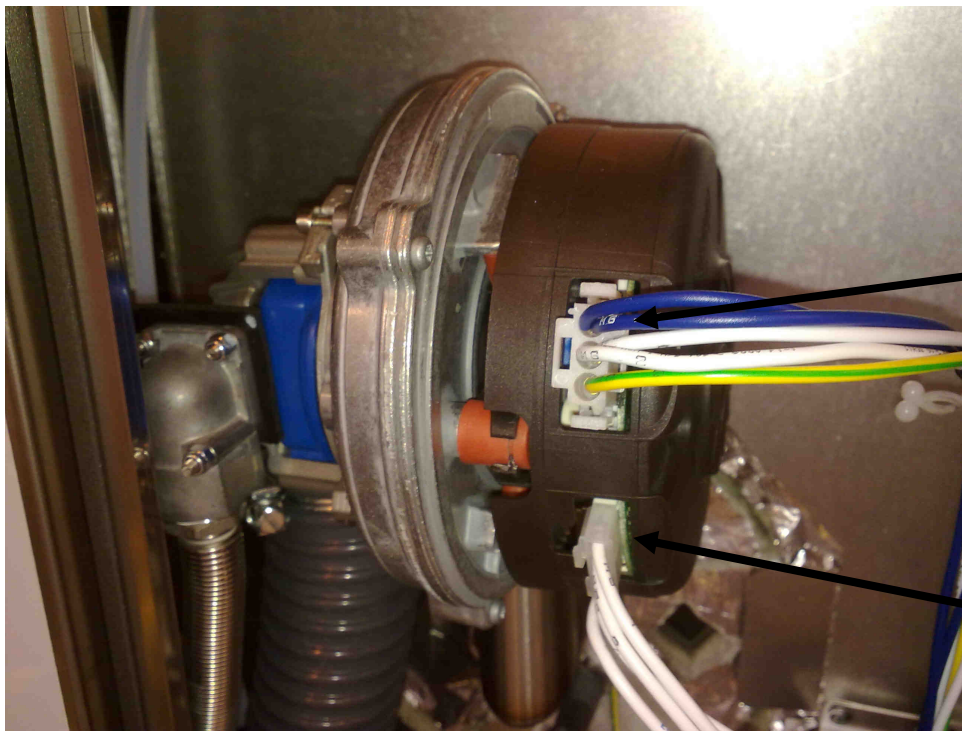
4.2.2. Mixer



NOTES:

- Check that the combustion air filter is always clean and not clogged.
- Check that the draft air tube is free of cuts or tears and that the clamps are tight
- Check the connections tightness; do not use flames on gas burner because they could be sucked into the mixing circuit and cause fire / explosion.

4.2.3. *Air blower fan*



**Power supply 115
volts AC**

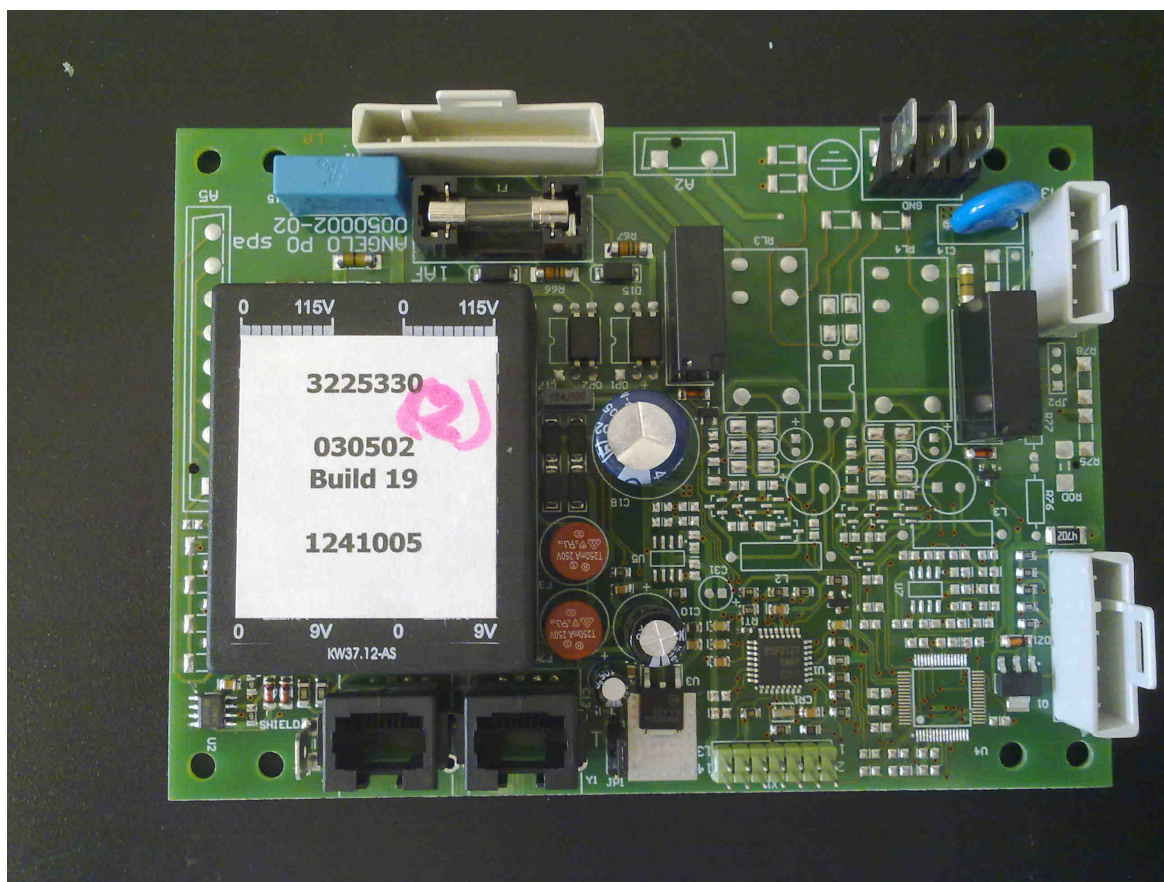
Modulation control

NOTES:

- Do not force the connector of the modulation control, it is one way inserting.
- The blower speed is controlled by the blower control board.



4.2.4. Blower control board

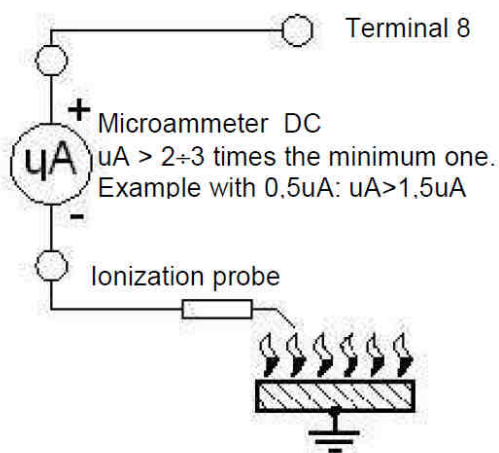


NOTES:

- During the installation it's necessary to respect the correct connection of phase and neutral (non inverted). If the connection is inverted the microAmpere reading of the flame detector will be lower as it should be.
- On the level 3 models the microAmpere reading can be displayed. It is possible to activate this function from the Service menu; the reading needs to be divided by 10 (e.g. $32 / 10 = 3,2$ microAmpere).



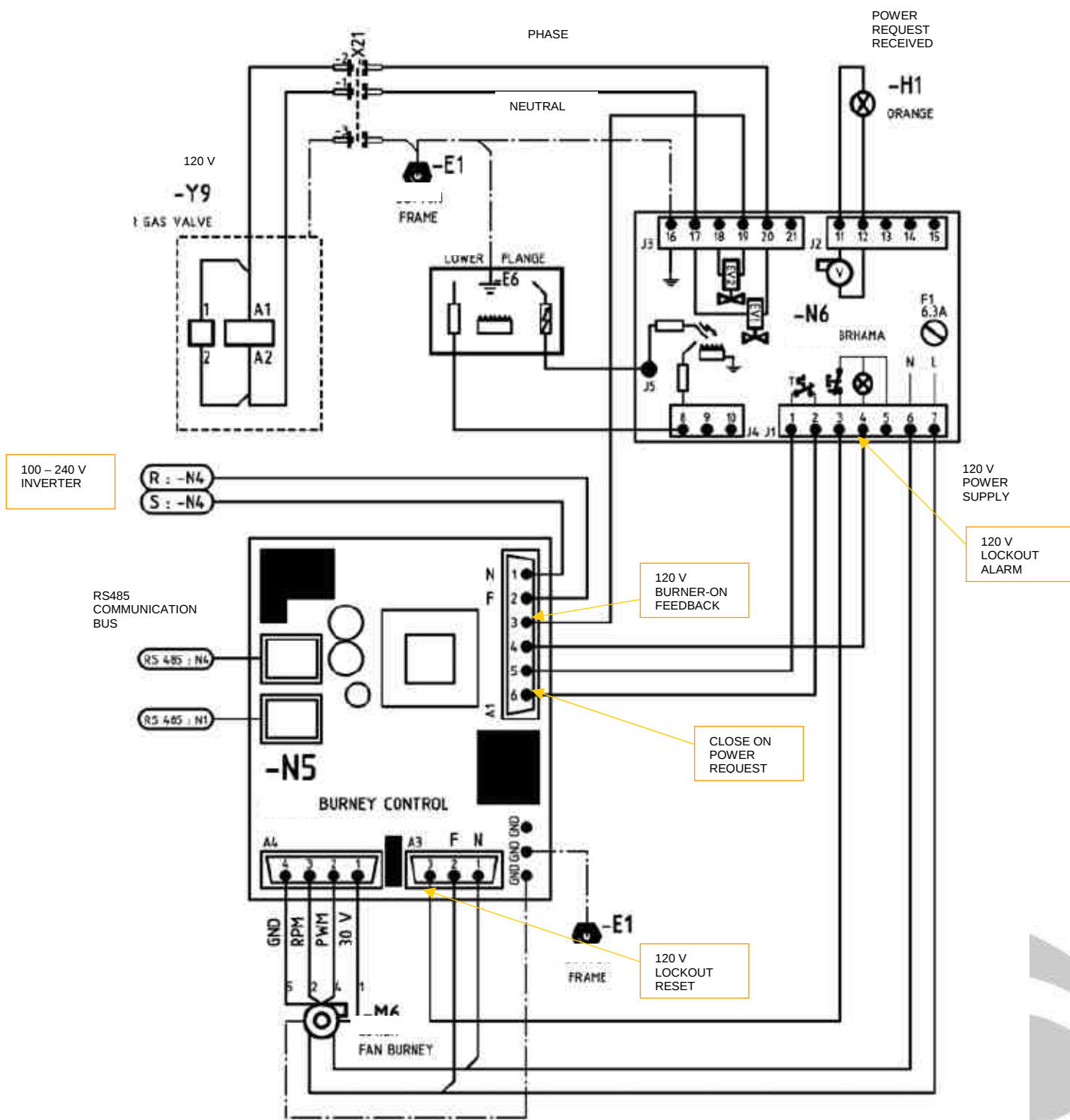
- The reading must be about 3,5 μA DC; in order to check it, take the mesure in series between the flame detector and the terminal n°8 on the combustion control board, as shown in the drawing.



4.2.5. Combustion control board



4.2.6. General functional diagram



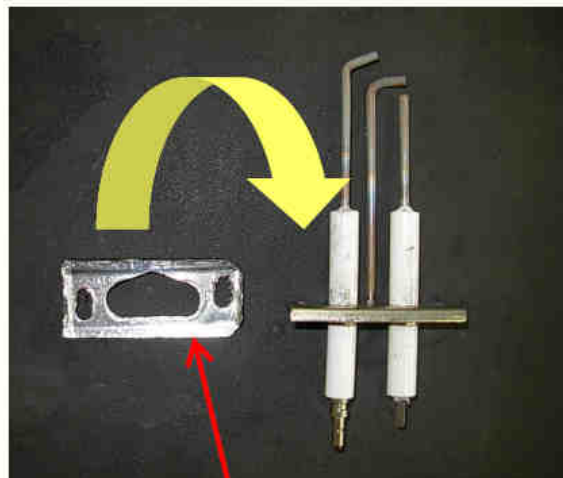
4.2.7. Spark plug and flame detector kit

Flame sensor



Ignition spark

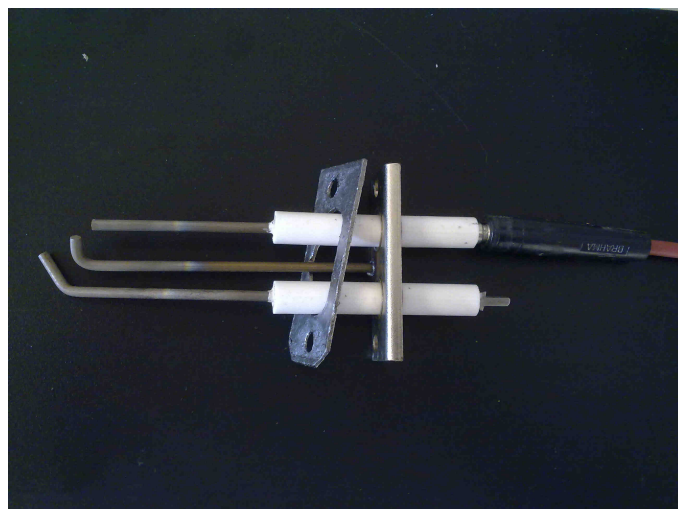
Electric arc – distance
between the electrodes
 $3 \pm 0,5\text{mm}$



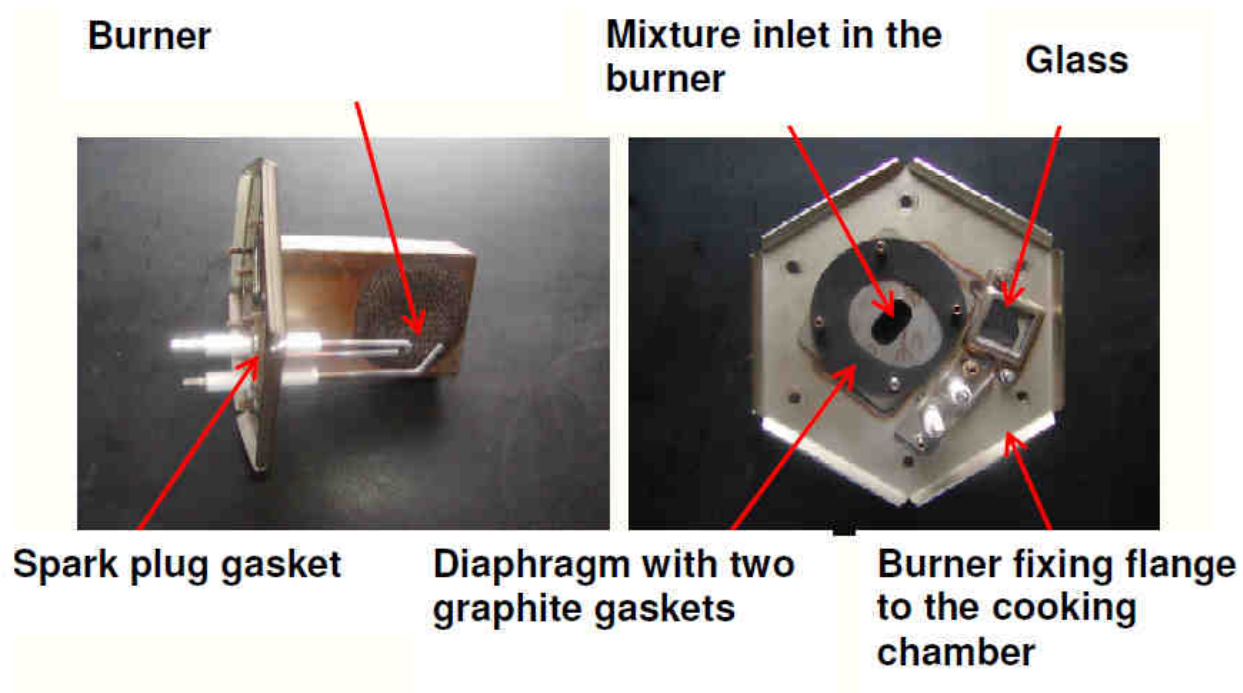
Graphite gasket

NOTES:

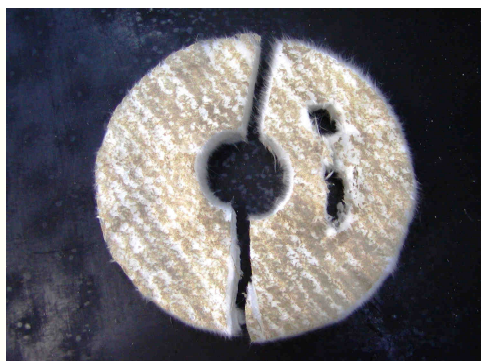
- During gas system maintenance check the spark plug conditions, dismantle the part and if necessary replace it (e.g.: if the distance between electrodes is too high or if the flame detector is deformed). Please refer to details in section 5.11. Spark plug replacement.
- The spark plug needs scheduled maintenance, see section 4.10.
- We recommend the replacement of the gasket each spark plug replacement.
- The spark plug kit is one way fixing (see picture).



4.2.8. *Burner*



INSULATING MATERIAL



NOTES:

- Replace the insulation panel at any replacement of the spark plug kit, if necessary.

4.2.9. Heat exchanger



Materials:
Stainless steel
AISI310S and
AISI316L

Combustion area

Flame

FX heat exchangers are more efficient because they have more exchange surface than FM ones:

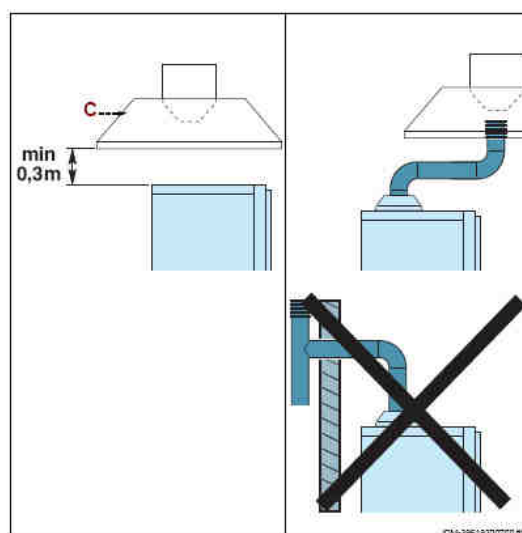
61: +18%
101: +13%
82: +22%
122: +10%
201: +13%
202: +10%

4.2.10. Exhaust extraction kit

If the oven is not positioned under a fume hood, you can use the Exhaust extraction kit to make a connection to an exhaust system. It is absolutely prohibited the direct connection to the outside.



A type installation only!



4.3. Blower control board: logic operation

The logic of the Blower control board and Combustion control board offers several steps: there are 11 steps as reported in the table below and each one of these corresponds to a check / audit and controls to the blower and to the gas.

STEP	Blower fan	Blower fan speed	Gas valve	Description
0	OFF	0	OFF	STANDBY: ignition not required
1	OFF	0	OFF	CONTROL: : ignition required, check blower fan speed (lower than 500 rpm). As soon as the check is finished it pass to step 2, other wise after 20" appears the GAS:F24.
2	ON	Ignition speed	OFF	START: blower fan start and the ignition speed has been checked. As soon as the check is finished it pass to step 3, other wise after 30" appears the alarm GAS:F24.
3	ON	Ignition speed	OFF	PURGING: the blower fan runs at the ignition speed, then if there are no alarms, then pass to step 4.
4	ON	Ignition speed	OFF/ON	IGNITION: The Blower control pcb set the Burner Control Board to start phase. After a wait of 7 sec. at the blower purging speed, then the Burner control pcb opens Gas Valve and spread out the spark. If the flame sensor recognize the flame then the Burner Control pcb feedback it to Blower Control pcb, and STEP 5 is selected. Otherwise recycle: 7secs/3secs 7sec.Gas+Spark=OFF + 3sec.Gas+Spark =ON. The max number of ignition attempts are 3. If No flame was detected, then STEP 10 (postpurge) is selected before set 6 and 7 and 8 Steps.
5	ON	Target speed	ON	WORKING: ignition done successfully. Blower Control pcb set up required the blower speed and the power of the burner. This step will remain until the power is requestd and/or until an alarm occurs, then step 10 is selected.
6	OFF	0	OFF	STOP: burner turned off. The blower is set to stop. The blower control check for alarm from Burner Control

				and Check the fan speed less then 500rpm. If alarm then set STEP 7. If no alarm then step 0 = Standby is selected.
7	OFF	0	OFF	LOCKOUT: the burner is locked. Internal safety check is performed. After 5 secs. if the alarm is recoverable then Step 8 is selected. If not recoverable then alarm is displayed and remain in this status.
8	OFF	0	OFF	UNLOCKABLE: ignition is locked until RESET.
9	OFF	0	OFF	RESET: RESET activated and pass to phase STANDBY
10	OFF	Ignition speed	OFF	POSTPURGE: always activated for about 13 secs. and then it pass to STEP 6 = if Stop is selected or it pass to STEP 4 if it needs to recycle

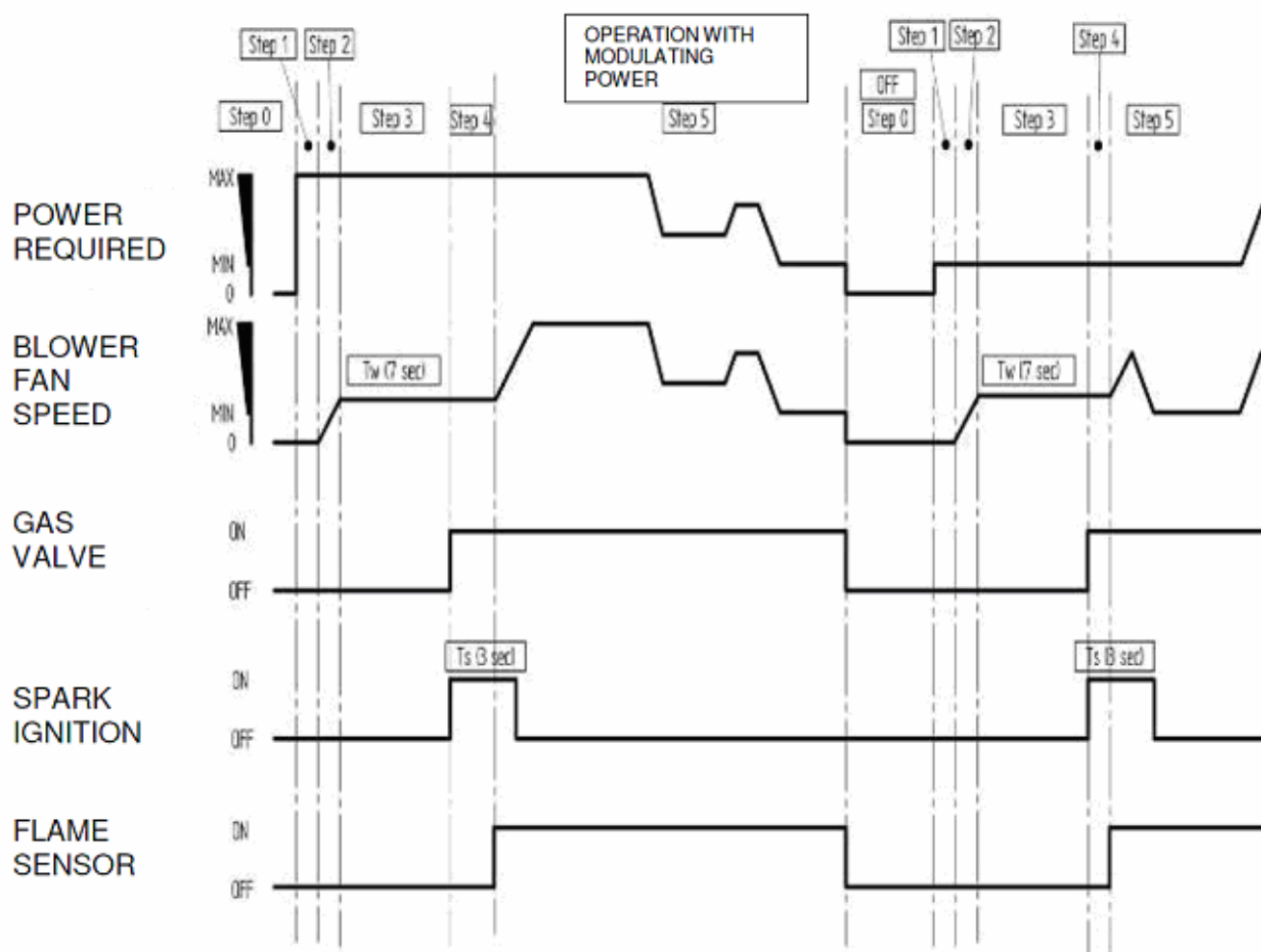
The combustion control board is controlled by the power board with the following commands:

- Burner ignition
- Burner off

The combustion control board start with the state "0" STANDBY, and when the power board requires turning on the burner, go to the state "5" OPERATIVE, once detected the presence of the flame. All intermediate states are done. When in state "5", depending on the need for power / temperature, the power board drive the combustion control board which controls the blower speed. When the oven reaches the temperature, the burner turns off and the combustion control board goes in state "10" = postpurge and then in step "6" and then returns available in the state "0". If there is any alarm then step 7 and 8 are selected.

If there are problems the board turn on state "7" or "8" (Locked Steps), showing alarm. For example GAS: F4 can be reset from the panel.

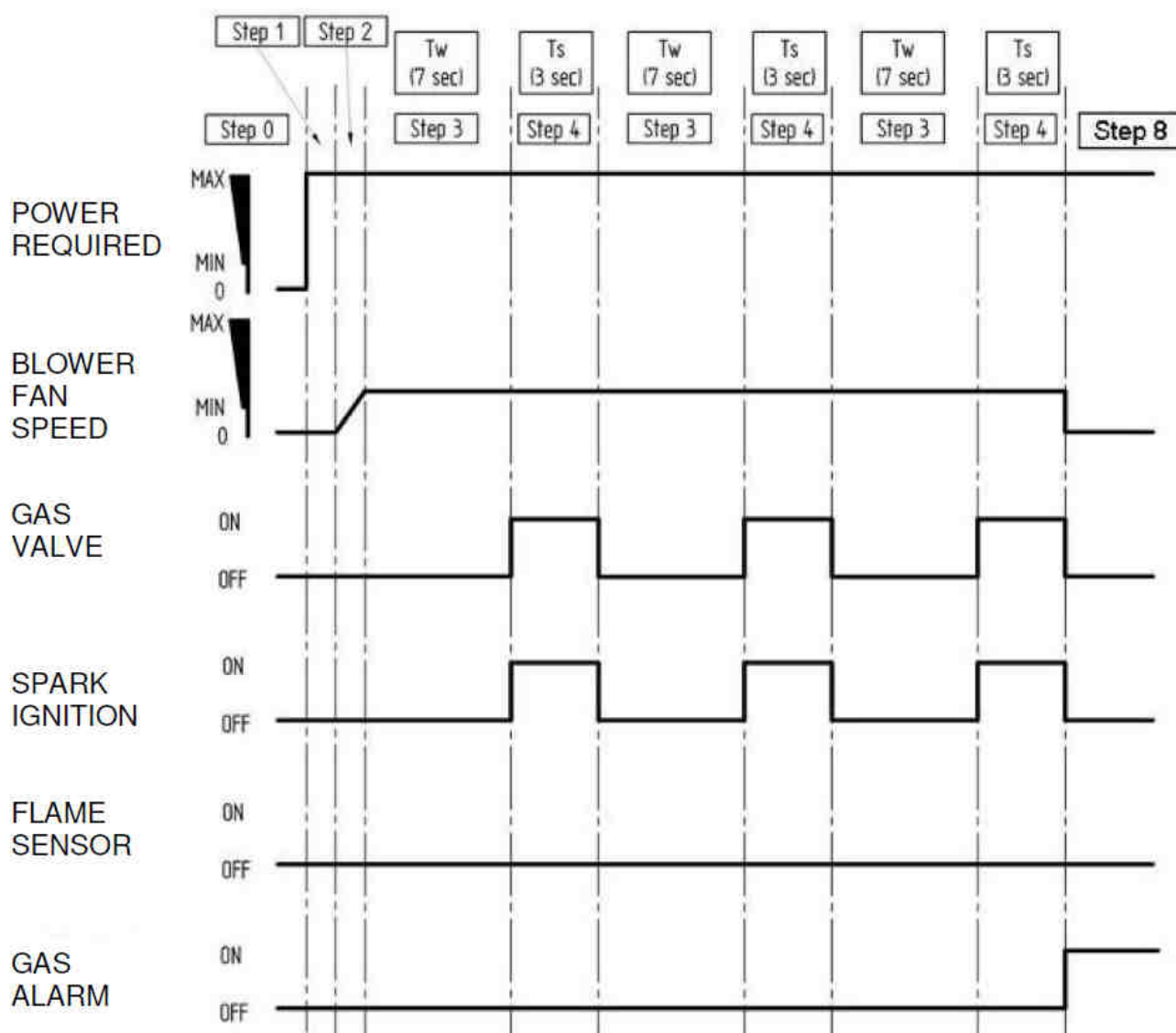
4.3.1. Ignition standard cycle



The diagram shows 2 ignition cycles (step 1-5): the first operational phase (step 5) has a modulating working, the second, the minimum power range working.

The difference between the two cycles is the speed of the blower, which varies with the required power.

4.3.2. GAS alarm: F4: flame missing



The diagram shows an ignition cycle where there is no detection of flame. During the cycle you have 3 ignition attempts (spark), each one preceded by purging of the combustion chamber (necessary for removing from the combustion chamber the gas released previously).

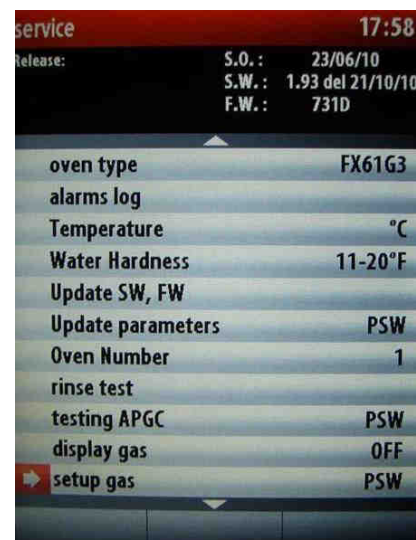
After these 3 attempts the combustion control board goes into state "8" the combustion is blocked and the display shows the alarm GAS: F4. The alarm can be reset by the user. The causes may be different, for details please refer to section 4.8 Gas Alarms.

4.4. Gas setup

4.4.1. Setup gas

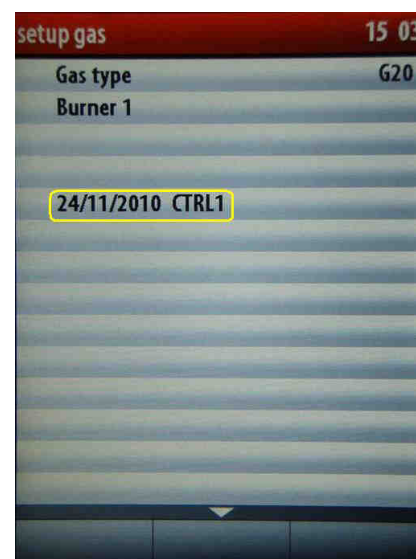
To ensure that the gas system functions correctly safely, the user is required to install the equipment performing the following test wizard:

1. Prepare the flue gas analyzer and place a magnet in correspondence of the door micro-switch, allowing the procedure to be carried out with the door open. (take care to avoid burns or injuries, see paragraph 4.6).



2. Enter Service menu (Password: **SAAP**) and choose "setup gas" (Password: **SI74**).

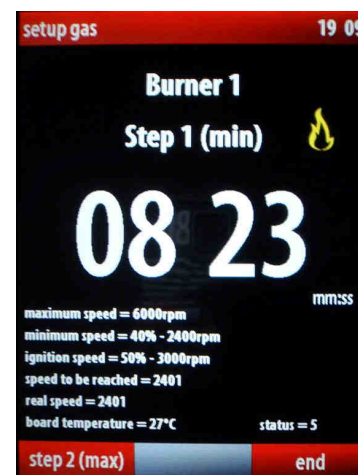
3. On the next screen check that the type of gas is set to G20, if you use a different gas from the pull down menu select the gas used (see section 6. Change of Gas).



4. To start the wizard, select "Burner 1. (For models FX201G3 and FX202G3 perform first the procedure on the burner 1 and thereafter on the burner 2).

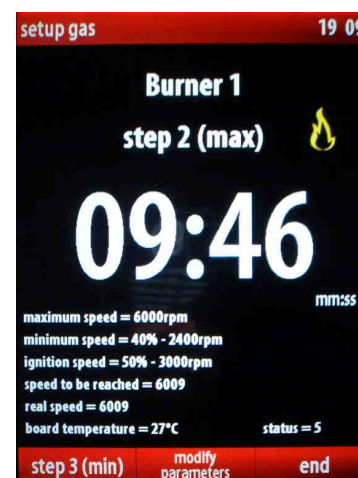
5. Now you are into the setup wizard: Step 1:

- check correct ignition
- Verify the stability of the minimum power
- Check combustion values (CO,CO₂) with oven cold
- Fill in the installation report with the values found



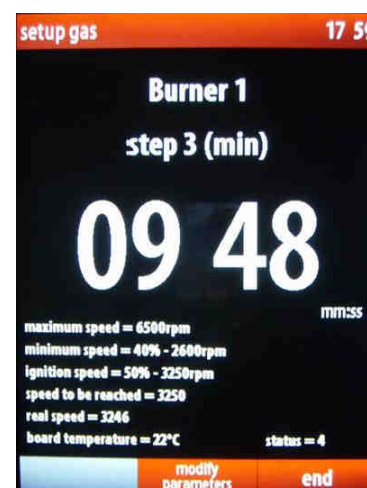
6. Step 2:

- Verify the stability of the maximum power
- Check combustion values (CO,CO₂) at maximum power
- Fill in the installation report with the values found



7. Step 3:

- Verify the correct ignition
- Verify the stability of the minimum power with the oven warm
- combustion values (CO,CO₂) at minimum power with the oven warm
- Fill in the installation report with the values found



For the flue gases analysis see section 4.6. Combustion products analysis.

The screen shows the parameters that govern the blower (Minimum speed, Maximum Speed, Ignition Speed), in addition to the speed to be achieved (set point) and the actual speed. Verify that the ignition occurs at the correct speed and that the minimum and maximum speeds reached match those settings.

If the gas system doesn't function properly or the flue combustion values are not included in the ranges indicated, follow the instructions in section 4.4.3 Adjustments.

4.4.2. Recommended values of combustion

Here below there are listed the values of combustion (CO₂, CO) recommended by "Angelo Po", values taken should be as closely as possible to these values. It is recommended to take the measure after 2-3 minutes that the flame has stabilized, in fact at the ignition it could measure higher values of CO which could affect the measurements. The system, if well adjusted, should take values of CO below 100 ppm, if they are higher act as described in the following paragraph. Similarly, if the values of CO₂ have a difference greater than $\pm 0.5\%$ ($\pm 0.8\%$) compared to the recommended action following the directions described in the next section.

FX61G.		CO ₂ %	Range CO ₂ %	CO ppm
Natural Gas G20	minimum	9,3%	$\pm 0,5$	0÷100
	Maximum	10,7%	$\pm 0,8$	0÷100
Propane G31	minimum	11,2%	$\pm 0,5$	0÷100
	Maximum	12,0%	$\pm 0,8$	0÷100
FX101G.		CO ₂ %	Range CO ₂ %	CO ppm
Natural Gas G20	minimum	10,1%	$\pm 0,5$	0÷100
	Maximum	10,3%	$\pm 0,8$	0÷100
Propane G31	minimum	13,0%	$\pm 0,5$	0÷100
	Maximum	12,7%	$\pm 0,8$	0÷100
FX82G.		CO ₂ %	Range CO ₂ %	CO ppm
Natural Gas G20	minimum	8,9%	$\pm 0,5$	0÷100
	Maximum	10,0%	$\pm 0,8$	0÷100
Propane G31	minimum	11,2%	$\pm 0,5$	0÷100
	Maximum	11,6%	$\pm 0,8$	0÷100
FX122G.		CO ₂ %	Range CO ₂ %	CO ppm
Natural Gas G20	minimum	8,5%	$\pm 0,5$	0÷100
	Maximum	9,3%	$\pm 0,8$	0÷100
Propane G31	minimum	12,1%	$\pm 0,5$	0÷100
	Maximum	12,1%	$\pm 0,8$	0÷100
FX201G.		CO ₂ %	Range CO ₂ %	CO ppm
Natural Gas G20	minimum	9,8%	$\pm 0,8$	0÷100
	Maximum	10,3%	$\pm 0,8$	0÷100
Propane G31	minimum	11,1%	$\pm 0,8$	0÷100
	Maximum	11,8%	$\pm 0,8$	0÷100
FX202G.		CO ₂ %	Range CO ₂ %	CO ppm
Natural Gas G20	minimum	9,3%	$\pm 0,8$	0÷100
	Maximum	9,2%	$\pm 0,8$	0÷100
Propane G31	minimum	11,5%	$\pm 0,8$	0÷100
	Maximum	11,1%	$\pm 0,8$	0÷100

4.4.3. Adjustment during the test

Values of the minimum ignition failure: Offset Adjust gas valve (PR.ADJ.)

If the combustion values at minimum power do not correspond to the recommended offset adjusting of the valve is needed.

To do this with a screwdriver unscrew the protective brass cap and take a 4mm Allen wrench.

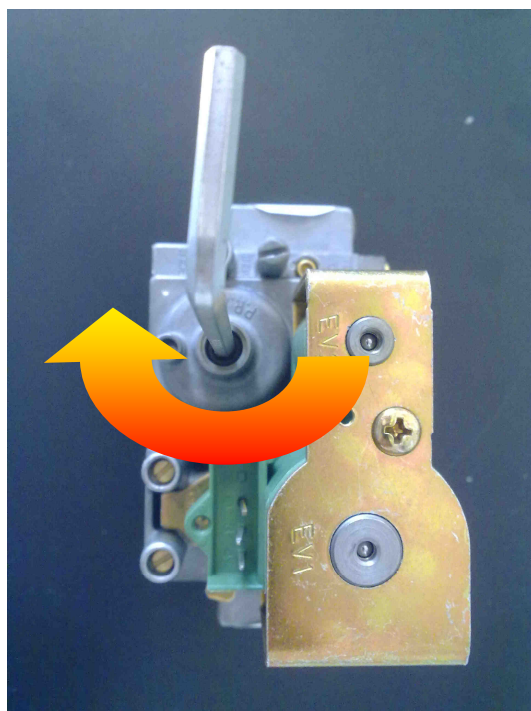
At this point, if the CO₂ is lower than the recommended value, screw clockwise (see figure at right), to enrich the mixture.

If the CO₂ is higher unscrew slowly to lessen the mixture.

The adjustment is very sensitive and you should make small movements (a quarter turn rotation involves a variation of about 1% CO₂) and wait for the gas analyzer to detect the change and stabilize.

Once done repeat the wizard test.

When the adjustment is finished refit the protective cap of the screw.

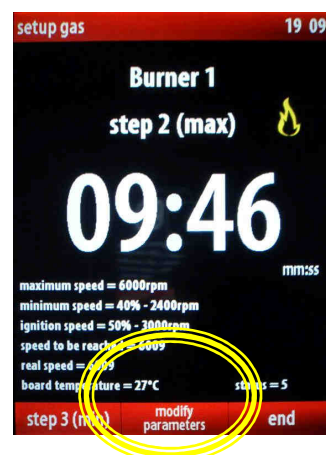


Attention: the pressure adjustment screw PR.ADJ. has no effect on increasing the power of the oven.

Change the parameters of the combustion control board

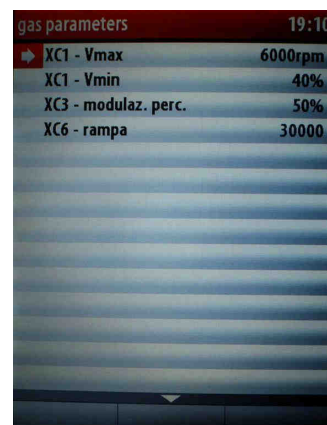
This adjustment must be done only and exclusively upon contact with Service Angelo Po.

The wizard test (see section 4.4.1), In the "Step 2" and "Step 3", activate the button "Modify Parameters".



By clicking the button it is possible to change the parameters that govern the blower speed:

- Maximum speed
- Minimum speed
- Ignition blower speed
- Acceleration



Select the parameter you want to change and set a different value depending on the problem (see next paragraph).

Attention: never increase the maximum blower speed over the value set by the factory.



Parameters combustion control board FX Gas

Rotation speed [rpm]	FX61G3	FX101G3	FX82G3	FX122G3	FX201G3	FX202G3	Range
VMin Methane - Propane	40%	40%	30%	30%	40%	30%	30% - 65%
VMax Methane	6500	7000	6500	6500	7000	6700	5500rpm - 7000rpm
VMax Propane	6000	6000	6000	6000	6500	6000	
VAcc Methane - Propane	50%	50%	40%	40%	50%	40%	35 - 60%
Ramp	30000					10000-30000	



4.5. Problems during the test setup wizard

The oven at minimum turns off	1. Increase the pressure adjustment (PR.ADJ.) until the oven stays on at the minimum. (see section 4.3.1.) 2. Verify type of gas and inlet gas pressure. 3. Check gas nozzle. 4. Check the gas pipe fixing. 5. Check the wiring of the flame sensor. 6. Check that the outlet pressure of the gas is free. 7. Clean the blower fan air intake. 8. Increase the blower fan speed at minimum (see section 4.3.2.)
At maximum power the flame blows out or "break away" from the burner.	1. Check gas nozzle. 2. Verify type of gas and inlet gas pressure. 3. Measure the CO and CO2 values and compare them with min/max value in the table. (see chapter 4.2.)
ALARM E27: Gas test missed	Check that the chamber temperature has not exceeded 200 °C in which case do a cool down, and then rerun the test. Check that the 10 minutes timeout is not expires.
In case of other alarms see "GAS ALARM TABLE"	
Important: At the end of each intervention on the gas system must perform the procedure for testing gas by measuring the CO and CO2, and verify that the data is within the fields declared by the manufacturer.	

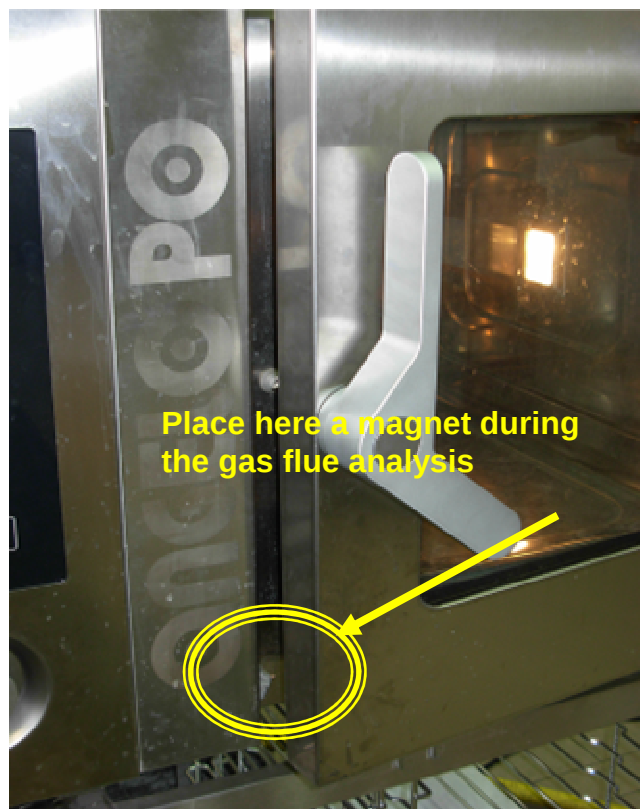
4.6. Gas flue analysis

During the installation the technician is required to analyse the combusted gas. To do this a portable analyzer fitted with a probe and printer is needed. It is advisable to prepare an extension pipe in order to avoid damages to the probe, a cause of the high temperature of the gas (about 400 ° C).

During the setup procedure wizard (described in section 4.1), it is recommended to keep the engine speed (minimum or maximum) for 2-3 minutes and only then insert the probe for the acquisition of CO₂ and CO values. Wait until the measure has stabilized (about 1 minute).

- The gas analyzer should be calibrated and checked periodically to make precise measures.
- Recommended analyzer: Testo 327-2.





4.7. *Installation report*

When first installed, the installer must fill in all parts of the following installation report and send it to "Angelo Po" within 7 days for the activation of the Warranty.

It presents data connection, and in particular must show the power supply, if possible, the mains water pressure (and other available data, e.g. Water hardness or presence of water treatment system) and the type of vent (if directly under a hood or connection).

The type of gas and the combustion gas analysis must be indicated.

INSTALLATION/WARRANTY REPORT

Date of Installation: \ \

Customer:
Address: T
own/City: Post Code Nation:
Telephone: Fax:
Invoice n°: Model: Serial Number:

CONNECTION DATA

Electric power supply

Voltage: V

Frequency: ☐ 60Hz

Water connection

Pressure: psi (facultative)

Type of flue (cf. chap. 7 instruction book)

- ☐ A direct discharge under suction hood.
☐ A direct discharge under suction hood with fumes evacuation fittings kit.

Type of Gas and Supply Pressure (cf. chap. 7 instruction book)

Note: the appliance is inspected in the factory and set-up for power supply with G20. If used with other gas, replace the nozzle.

X	TYPE OF GAS	NOZZLE REPLACED	TYPE OF GAS SET	PRESSURE MEASURED
	Methane – P = 3,5-10,5 inch water column			
	Propane – P = 8-13 inch water column			

INSPECTION

System Sealing Check (cf. chap. 7 instruction book)

- ☐ Performed

Analysis of Combustion Products (cf. chap. 7 instruction book)

Note: Activate the fumes control procedure from the control panel. The analysis of the combustion products must be carried out by an authorised technician. If the values of CO measured exceed the max limit indicated contact the after-sales centre.

PHASE	CO2 (%)	CO (ppm)	
Phase 1 – minimum cold			CO max: 300 ppm
Phase 2 – maximum			CO max: 300 ppm
Phase 3 – minimum hot			CO max: 300 ppm

Instrument Used (mark and model):

This form, relative to the appliance indicated above, filled-in completely must be sent to Angelo Po SpA within 7 days from installation in order to activate the warranty.

Certification: the under-signed, in quality of technician of an Angelo Po authorised after-sales centre, certifies that all of the items on this form have been filled-in correctly and that the unit is installed correctly.

Installer Technician: AAC: Signature:

4.8. Gas alarms and burner problem solving

During burner control cycle a 120V orange lamp, connected to pins 11 and 12 on the Blower control pcb, is activated when the burner control is correctly supplied AND if no alarm comes from the burner AND if the power is required from blower control board.

During operation the burner control board has a status signal (a small coloured led) located under a plastic lens. The colour blink messages are the followings:

- 1) **GREEN**, slow blink: burner in STOP status, no alarm, waiting for power request.
- 2) **GREEN**, fast blink: burner in START status, no alarm, but low flame signal (less then about 1.5 microA). Ignition cable faulty, spark plug, combustion values out of range, not good ground connection, e.m. interference on ground net
- 3) **GREEN**, fixed light: : burner in START status, no alarm from burner, good flame signal.
- 4) **ORANGE** : burner is in IGNITION step.
- 5) **RED**, fixed light: Lockout Status.
- 6) **RED**, fast blink: Lockout Status, leakage currents from flame signal wire or from his plug. Check insulation vs. gnd of flame detector plug and/or its wire.
- 7) **RED/ORANGE** alternate blinkining status: supply voltage out of range (100-130 V on pins 6 to 7).

BURNER CONTROL DIAGNOSTICS MODE

In Lockout Status (RED, fixed light) a fast pressure on the plastic lens push button is an alternate local mode to reset the burner control board, but it do non reset the alarm on other pcb.

In Lockout Status (RED, fixed light) a pressure on the plastic lens push button for more than 5 seconds actives a diagnostic display routine.

The blinking code is the following:

1 fast light + 1 long light = Failure on ignition step, no Flame.

3 fast light + 1 long light = Failure before ignition step or leakage currents from flame signal wire or from his plug.

From 8 to 14 fast light + 1 long light: internal failure. Change the burner control board.



GAS alarm table

	Alarm Code	PROBLEM	SOLUTION
1	GAS:F4	The blower fan is working but there is no ignition spark or no flame in the burner.	1. Check if the Burner control board is correctly supplied 2. Check connection wires between Burner control and Blower control board. 3. Check Orange light on pins 11-12. 4. Check fuse link on Burner control board. 5. Check the insulation of ionization measure plug and its wire. 6. Check ground on pin 16 of Burner control board. 7. Check continuity of high voltage HF cable (max 1,5 k-Ohm) on the igniter and on the spark plug. 8. Check the spark plug ground connection 9. Check diagnostics on Burner Control board. 10. Dismantle the spark plug and check the electrodes.
		The blower fan is working but the spark spread out of the burner	1. Check continuity of high voltage HF cable (max 1,5 k-Ohm) on the igniter and on the spark plug. 2. Check the spark plug ground connection. 3. Check ground on pin 16 of Burner control board. 4. Dismantle the spark plug and check the electrodes.
		The blower fan is working and the spark is good but there is no flame ignition.	1. Check the inlet gas pressure. 2. Check gas valve power supply 3. Check gas nozzle 5. Increase gas pressure regulation (PR.ADJ.) until the burner ignition. (see section 4.3.1.) 6. Check gas pipe fixing 7. Check that the outlet pressure of the gas is free 8. Clean the blower fan air intake 9. Check outputs of heat exchanger on the top of the oven
		Detonation at the ignition	1. Dismantle and check the spark plug. 2. Check combustion and gas parameters.
		The flame is lighting but after some seconds the flame goes off.	1. verify the flame detector cable 2. verify the correct power connection (see chapter 4.2.3) 3. check the small led on the burner control board for status informations and/or diagnostic mode. 4. measure the ionization current.

2	GAS:F5	Flame signal missing during the working	1. always reset the alarm and try new cycle. 2. verify the flame detector cable 3. check the small led on the burner control board for status informations and/or diagnostic mode. 4. measure the ionization current.
3	GAS:F6	Overtemperature near the blower control board.	Check that the cooling fans in the components compartment are working properly. Check and cleaning air vents under the dashboard and below the components compartment.
4	GAS:F10	Internal breakage of the Blower control board	Always reset the alarm and try other cycle. If the alarm comes back, then replace the Blower control board
5	GAS:F11	Flame signal detected before start	Check the wirings to the flame sensor. If necessary replace the combustion control board.
6	GAS:F20	Flame signal detected after the stop.	Check the wirings to the flame sensor. If necessary replace the combustion control board.
7	GAS:F24	Blower fan speed out of control or blower fan blocked.	Check the power supply and control wirings to the air blowing fan. If necessary replace the blower fan.
8	GAS:F26	Blower fan out of control: the blower fan doesn't stop after 30 seconds from its off.	Check the correct wirings to the blower fan. If necessary replace the blower control board.
9	GAS:F30	Operating parameters of the burner control board corrupted.	Replace the Blower control board.
10	GAS:F47	Feedback timeout from Burner Control Board to Blower control board.	a. Check if the Burner control board is correctly supplied b. Check connection wires between Burner control and Blower control board. c. Check Orange light on pins 11-12. d. Check fuse link on Burner control board. e. Check wires between burner control board and blower control board. (Pins 4-4 and Pins19-3 between two pcb).

Note: For the 20 grid models appears with the alarm also the number of the burner; 1 stands for the lower burner and 2 stands for the upper burner.

4.9. Gas conversion

All equipment is tested and adjusted to work with Natural gas (G20), where it is required to use a propane gas, follow the instruction below:

1. Gas nozzle replacement: Unscrew the gas pipe (Photo 1), remove the Natural gas (G20) nozzle and put in place the replacement nozzle (photo 2), then tighten the pipe. The nozzle works also as seal.

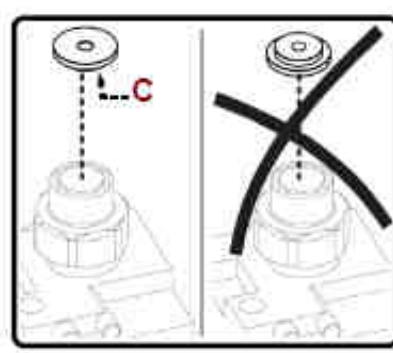
The nozzle must be mounted as shown in photo 3.



PICTURE 1



PICTURE 2



PICTURE 3

Injectors	FX61G3	FX101G3	FX82G3
G20	Ø635 - 3147120	Ø605 - 3141800	Ø635 - 3147120
G31	Ø465 - 3141630	Ø485 - 3153010	Ø485 - 3153010

Injectors	FX122G3	FX201G3	FX202G3
G20	Ø640 - 3147130	Ø640 - 3147130	Ø615 - 3141820
G31	Ø500 - 3167720	Ø465 - 3141630	Ø480 - 3153000

2. Setting the type of gas on the display:

- o enter menu “Service” (Password:SAAP),
- o enter menu “Setup gas”(Password:SI74),
- o select the type of gas used from the menu “Type of gas”

3. Perform analysis of flue gas (see section 4.6)

4.10. Levels 2: Gas test

The gas system has the same features and the same components even in Level 2. Change the interface mode from the wizard test (see Section 4.1), tests and measurements of combustion must be carried out as described in the same way as level 3.

Below shows the wizard step by step:

1. **Start Procedure**: when in STOP, enter the menu “GAS TEST” pushing together and holding for 3 seconds the buttons STEAM and REGENERATION.
2. **Type of gas**: the first display shows the kind of gas: turning the knob is possible to choose the type of gas G20, G25, G30, G31 and Out; the selection is confirmed with enter with the knob.



3. **Burner selection**: after the type of gas, on the first display it is possible to choose the burner to test: CC1, CC2 e Out; the selection is confirmed with enter with the knob.



4. **Display parameters**: after the burner selection it is possible to see the parameters: first display shows the fan blower maximum speed, Vmax; the value is divided for 10 i.e. in the picture the speed is 6.000 rpm. The second display shows the fan blower minimum speed Vmin and the third display shows the fan blower ignition speed Vignition, both the values expressed in percentage.



5. **Start testing**: the START/STOP button is on, press it to start the testing phases.

6. **STEP 1**: Ignition and burner at minimum power.
Go to step 2 with button ECO.



7. **STEP 2**: Burner at maximum power. Go to step 3 with button ECO.



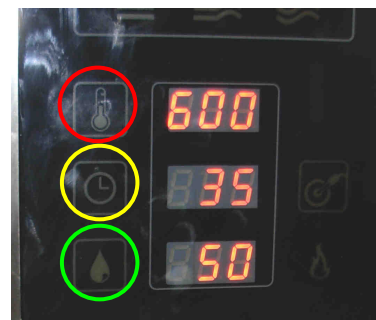
8. **STEP 3**: Off, Ignition and burner at minimum power.



9. **End Procedure**: to finish the Test press START/STOP button. To exit from the Test confirm Out.



10. **Change the dei parameters of the gas board**: This adjustment must be done only in according with Service Angelo Po. The parameters into “Step 2” and “Step 3”, are modifiable: press the button TEMPERATURE (red) to change the maximum speed, TIME (yellow) to change the minimum speed, HUMIDITY (green) to change the ignition speed.



If you experience anything abnormal, please refer to section 4.4 (Problems during the test procedure).

4.11. Periodic gas flue analysis

For gas ovens only it is required to check the combustion once at year. On the expiry of one year from the last "setup GAS" every time the oven will be switched on, a warning "CAUTION! Call for service for checking gas (CO₂ and CO)" will appear on the display. To remove the warning it is necessary to make the gas flue analysis and perform the Setup Gas.



When you will see this warning on the display you can erase it temporarily by pressing button RESET, and you can work normally with the oven until next switching on.

To remove the warning for longer time you must perform Setup Gas and make gas flue analysis.

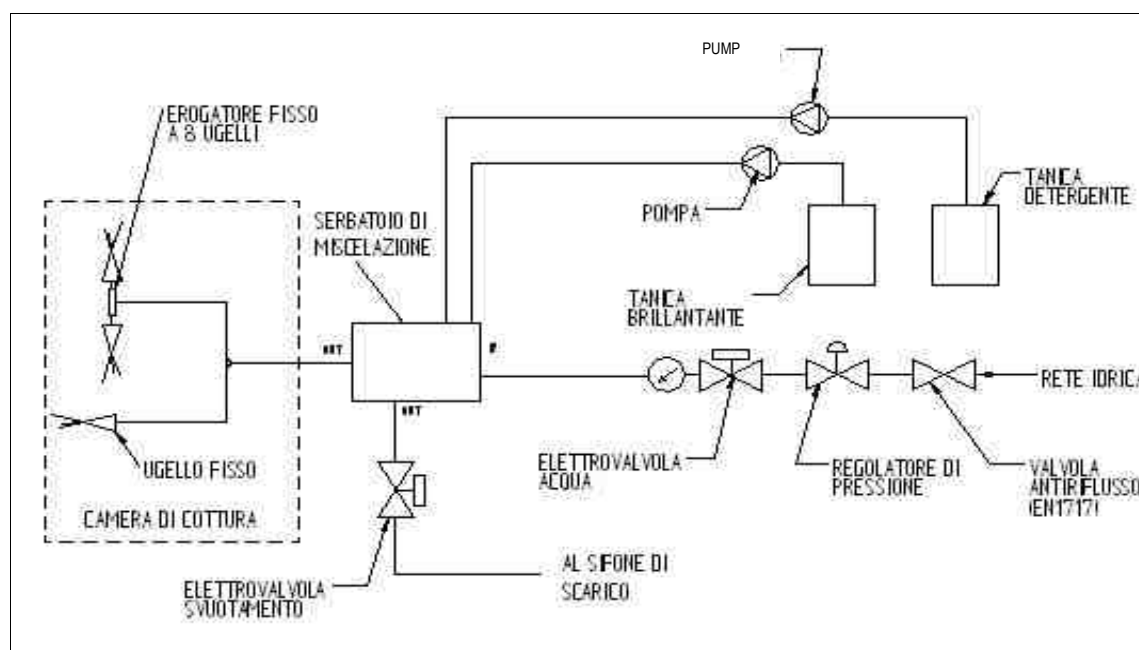
For gas ovens level 2 the message "Att" "Ctr" "GAS" (Attention Gas Control required) will appear after 2500 working hours. Also in this case you can erase it temporarily by pressing button RESET, and you can work normally with the oven until next switching on. To remove the warning for longer time you must perform Setup Gas and make gas flue analysis.

5. WASHING CYCLES LEVELS 3

5.1. Washing circuit operating and components

The washing circuit consists of the following components:

- Non-return valve (in the water inlet assembly) prevents the contamination of the water mains. If there is a decompression in the water supply network the valve drains the fluid outside of the circuit downstream of itself, preventing a possible flow back into the water network.
- Pressure adjustment (in the water inlet assembly).
- Water solenoid valve (in the water inlet assembly).
- Detergent dispenser (pump unit): peristaltic pump type.
- Sanitizer dispenser (pump unit): same as previous.
- Mixing tank.
- Drain solenoid valve (pump unit): normally close valve. It drains the contents of the tank into the pipe connected to the siphon.
- Fixed sprinkler into the cooking chamber: 8 nozzles sprinkler.
- Fixed sprinkler closed to the heat exchanger: it is near to the pipe for the steam production. Through this pipe the chemical reaches the nebulizer cleaning in the heat exchanger compartment.



In general, the washing cycle has the following stages:

- 1 – initial rinsing
- 2 – detergent sprinkling
- 3 – intermediate rinsing
- 4 – sanitizer sprinkling
- 5 - final rinsing
- 6 - drying

All these stages are separated by operating at low temperature with steam to soften the fat in the cooking chamber.

The washing cycle doesn't start if the temperature into the cooking chamber is more than 100°C.

In more intense washing programs the phases of detergent and sanitizing dispensing are repeated several times in the following format:

Soft clean: 1 detergent dispensing + 1 sanitizer distribution (small amounts)

Basic clean: 1 detergent dispensing + 1 sanitizer distribution

Medium clean: 2 detergent dispensing + 1 sanitizer distribution

Standard clean: 3 detergent dispensing + 2 sanitizer distribution

Descaling: 1 sanitizer distribution



The detergent and sanitizing distribution is made as follows:

- Product load. The pump sends the chemicals into the empty tank, this phase takes a few minutes. The total amount of chemicals is less than the tank capacity.
- Distribution. After stopping the pump, the water solenoid valve opens for a few seconds. The water pressure (1.5 bar nominal Max 2 bar) passes through the tank and mixed with the product, carries it into the chamber through the appropriate sprinklers.
- Emptying the tank. After finishing the distribution, the tank, still full of water and residual chemical, is flushed through the solenoid valve until the next stage.

Rinsing is accomplished by operating the solenoid water for several minutes. The water circulates through the tank and the dispensing circuit, and finally is distributed in the chamber through the sprinklers.

The circuit is also fitted the following safety:

- Water pressure switch: it is downstream of the solenoid water and detects the presence of pressure in all the phases in which the water valve is open (or supply rinsing detergent / sanitizer).
- Level sensor: it is a float sensor located inside the tank. It checks the chemicals loading and the emptying phases of the tank. During loading, if the level sensor doesn't switch, after a predetermined time, the display shows alarm (E21 or E22). During the emptying phase of the tank, after a fixed time the display, if the level sensor doesn't switch, shows an alarm (alarm E24).

NOTE:

- Since version 2.xx each time you switch on the oven, it runs for 5 seconds the dosing pumps, then it opens for 0.5 seconds the rinsing solenoid valve and then it empties the tank for 20 seconds.

5.2. Clean test

The procedure for testing pumps (available in the service menu) is used to verify the working of the washing circuit.

It consists of 4 steps:

step 1 – detergent pump working

During this stage it is possible to check that the detergent pump works and that after a few minutes the liquid level in the tank increases (if the suction pipe is empty, it takes about 2-3 minutes to fill it).

step 2 – sanitizer pump working

During this stage it is possible to check that the sanitizer pump works and after a few minutes the liquid level in the tank increases (if the suction pipe is empty, it takes about 2-3 min to fill it).

step 3 – rinsing

During this stage it is possible to check that there are no leaks in the connections of the pipes, no obstructions into the nozzles and that the water pressure is regulated.

Step 4 – tank emptying

During this stage it is possible to check that the liquid level into the tank drops until the tank is empty.

During all stages the status of the float shows on the display: it must be open when the tank is empty, it must be closed when the liquid level in the tank exceeds half.



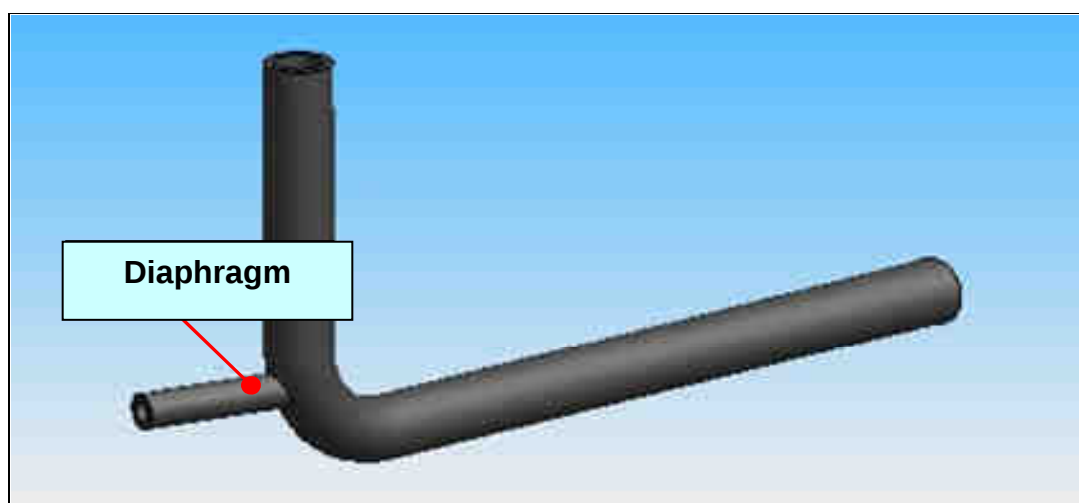
5.3. Washing Interruption

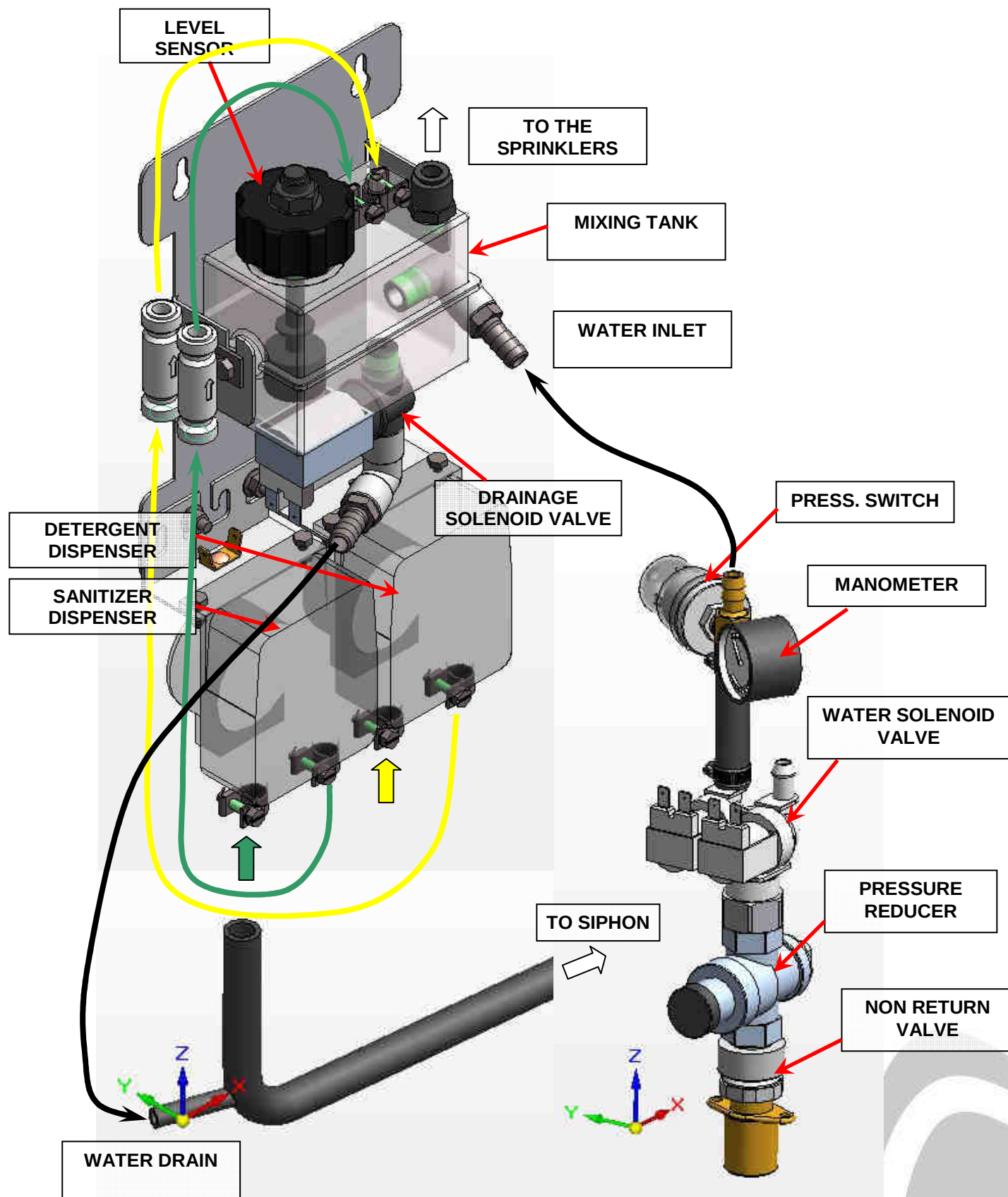
In the case of washing interruption an alarm appears and the menu is blocked (you can not access the menus for cooking). To exit the menu follow one of these steps:

- Run and leave the washing program to finish
- Run the "emergency rinse" by pressing the button (consisting in the dispensing of water for 4 minutes).
- Switch off and turn on the oven. **WARNING:** in this case it is recommended to manually rinse the chamber with plenty of water to remove any chemical residue due to the interruption of the wash.

NOTE: The rubber hose that leads to the condensation to the siphon is fitted with a diaphragm closing the branch connection to the drain circuit of the washing. In case of replacement, before proceeding to the assembly must drill the diaphragm with a bit of appropriate diameter (Ø 9-10 mm).

WARNING: on oven level 2 the diaphragm does not have to be drilled.





5.4. Washing alarms table

Washing cycle control alarms table			
	Alarm code	Problem	Solution
1	E21	The washing cycle has been interrupted because the float didn't switch during the detergent load phase.	Check the pipe position and the level of cleaner in the tank; top up if necessary and restart the washing cycle. Carry out the CLEAN TEST
2	E22	The washing cycle has been interrupted because the float didn't switch during the sanitizer load phase.	Check the pipe position and the level of cleaner in the tank; top up if necessary and restart the washing cycle. Carry out the CLEAN TEST
3	E24	The washing cycle has been interrupted because the float didn't switch during the tank unload phase.	Possible obstruction in the oven drain. Carry out the CLEAN TEST
4	E25	Circuit loading incomplete	Carry out the CLEAN TEST
5	E26	The washing cycle has been interrupted during the rinsing stage, caused by "missing water"	Carry out the CLEAN TEST



Problems during the "CLEAN TEST"			
6	-	During phase 1 the detergent pump doesn't work. (the motor doesn't turn).	Check pump wiring. Check voltage on pole 68 on power board.. Check fuse F1.Check power supply on pump cables. Chamber temperature must be under 100°C.
7	-	During phase 1 the detergent pump works but the tank is not filled on time.	Check the pipe position and the level of cleaner in the tank. Check if there is a leakage on the piping. If previous check are OK, replace the pump inner tube or the whole pump.
8		During phase 1 the detergent pump works but the float doesn't switch.	Wait until the tank is filled until at least half. Check the wiring of the float (inputs 81 and 82 on power board). Unplug the connector and check that the resistance of the float (with the tank above half) must be in short. Replace the float.
9	-	During phase 2 the sanitizer pump doesn't work. (the motor doesn't turn).	Check pump wiring. Check voltage on pole 66 on power board.. Check fuse F1.Check power supply on pump cables. Chamber temperature must be under 100°C.
10	-	During phase 2 the sanitizer pump works but the tank is not filled on time.	Check the pipe position and the level of cleaner in the tank. Check if there is a leakage on the piping. If previous check are OK, replace the pump inner tube or the whole pump.
11	-	During phase 2 the sanitizer pump works but the float doesn't switch.	See point 9
12	-	During phase 3 the water doesn't fill the tank.	Check the pressure of water supply, control the power supply rinse solenoid (terminal 17 on the power board), check fuse F5, check the pressure regulator. Replace the solenoid.

Problems during the "CLEAN TEST"			
13	-	During Phase 3 the water reaches the tank regularly but it appears the alarm E26.	Check the pressure of water supply, check that the injectors are still present in the chamber, check the pressure regulator (it must be calibrated to 1.5 bar), check wiring and switching of pressure switch (must be wired to the C and NO to terminals 37 and 41 of the power board)
14	-	During Phase 4 the water level into the tank doesn't flow down.	Check wiring and power supply of the drain solenoid valve (terminal 63), check fuse F1, make sure the drain pipe is not crushed, check that the sprinklers in the chamber not all clogged, check the siphon of the oven is not obstructed, replace the coil of the drain solenoid valve (if not just replace the whole solenoid valve).
15	-	During Phase 4 the liquid level into the tank flow down but the float level sensor doesn't switch.	Replace the float level sensor.



5.5. Cleaning consumption table

CLEANING CONSUMPTION FX Lev.3 - 2012				
FX61-101	Consumption (kg)			Duration
	Deterg [kg]	Sanit [kg]	H2O [L]	Minutes
Standard	0,60	0,40	73	125
Medium	0,40	0,20	63	85
Basic	0,20	0,20	63	62
Soft	0,20	0,20	52	40
Descaling	0,00	0,20	23	31
Semiauto Washing	man	0,00	28	28
TMC long rinse	0,00	0,00	16	12
Short rinse cycle	0,00	0,00	11	3
FX82-122-201	Consumption (kg)			Duration
	Deterg [kg]	Sanit [kg]	H2O [L]	Minutes
Standard	0,98	0,66	82	138
Medium	0,66	0,33	70	93
Basic	0,33	0,33	70	67
Soft	0,33	0,33	57	45
Descaling	0,00	0,33	25	34
Semiauto Washing	man	0,00	31	28
TMC long rinse	0,00	0,00	17	12
Short rinse cycle	0,00	0,00	12	3
FX202	Consumption (kg)			Duration
	Deterg [kg]	Sanit [kg]	H2O [L]	Minutes
Standard	1,38	0,66	155	138
Medium	0,92	0,33	132	93
Basic	0,46	0,33	132	67
Soft	0,46	0,33	110	45
Descaling	0,00	0,33	48	34
Semiauto Washing	man	0,00	56	28
TMC long rinse	0,00	0,00	34	12
Short rinse cycle	0,00	0,00	28	3

Drain cleaning function:

Selectable only for the cleaning programs Standard and Medium. For all oven sizes the consumption of detergent increases 0.13 kg.

5.6. *Cleaning warning and cleaning blockage*

The blockage screen appears after a time set by user, by which you must clean the oven. The warning screen is a pre warning and appears by a time set by the user (time before the blockage screen appears). Here following the two screens:



The timing of these two types of alarms can be set by the user by going to "settings", "user parameters", typing the password "APGC" and entering the following screen:

5.7. Warning descaling



The warning screen appears after a time set by user, by which you should run a descaling.
In the alarm log the warning is registered with “W02”.

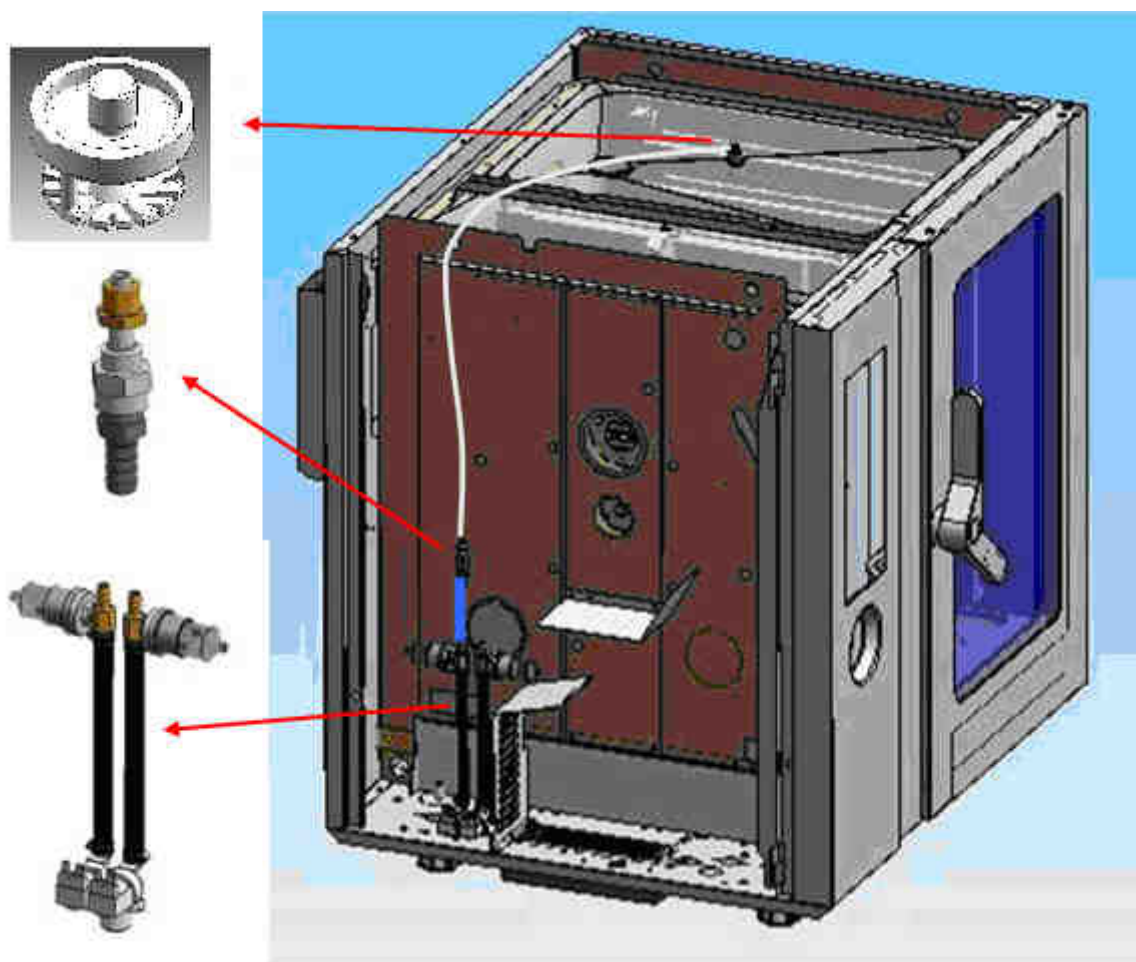


6. WASHING CYCLES LEVELS 2

6.1. *Washing circuit operating and components*

The washing circuit in the level 2 oven consists of the following components:

- Water solenoid valve (water inlet assembly)
- Pressure switch (water inlet assembly)
- A hose connection (to connect the rubber hose with the Teflon tube)
- Fixed sprinkler in the cooking chamber



The operation of the circuit is similar to the FM: the oven is running automatically heated and holding the temperature most suitable for washing and rinsing, while the application of the chemicals must be done manually by the operator when the display shows the letters CLE.

The automatic rinsing is made simultaneously by opening the solenoid valves for rinsing and steam production.

In case of low pressure or broken solenoid valve the alarm E26 will appear.

The level 2 ovens have 2 cleaning programs: "CLE" "Pr" "P01" and "CLE" "Pr" "P02" selectable with the cleaning button. The cleaning program P02 performs twice the cleaning program P01.

CLEANING CONSUMPTION FX Lev.2 - 2012	
FX61-101	H2O [L]
CLE-STD-P01	28
CLE-PLS-P02	46
FX82-122-201	H2O [L]
CLE-STD-P01	31
CLE-PLS-P02	52
FX202	H2O [L]
CLE-STD-P01	56
CLE-PLS-P02	93

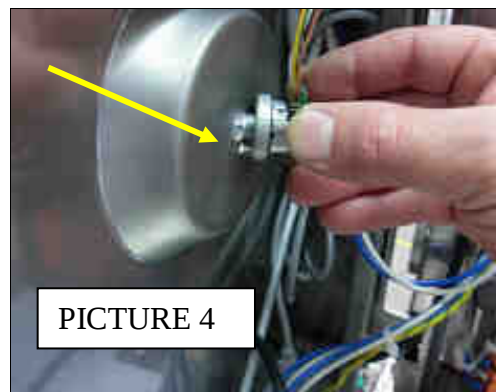
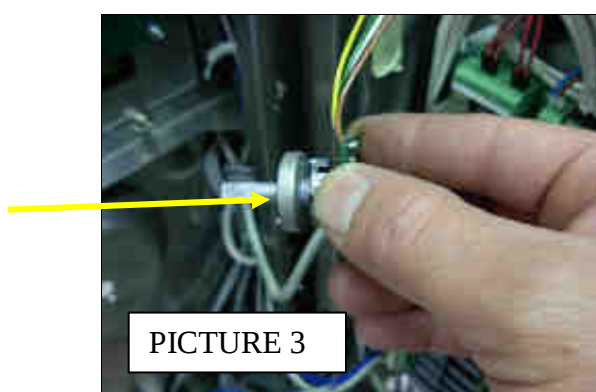
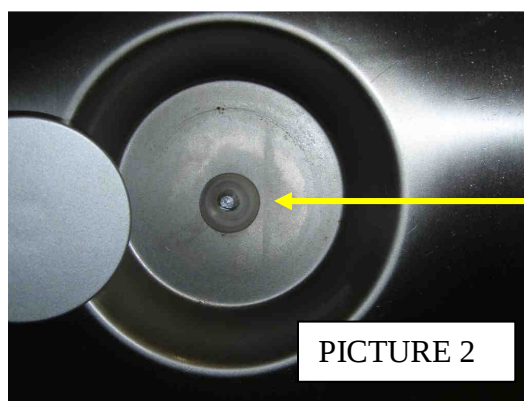
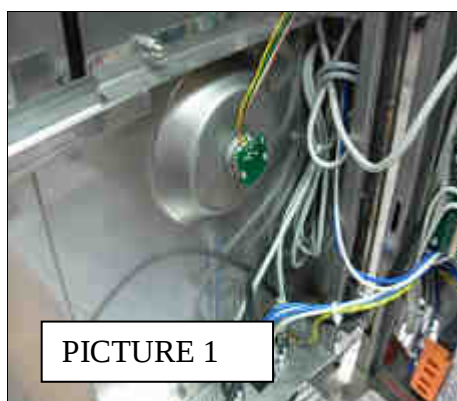


7. DISMANTLE AND REASSEMBLY COMPONENTS

7.1. Encoder

To replace the encoder, follow the instruction below:

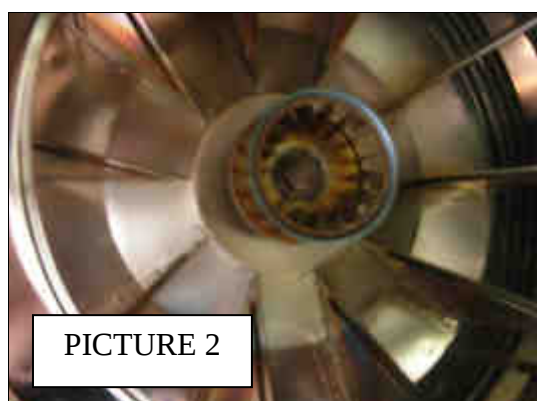
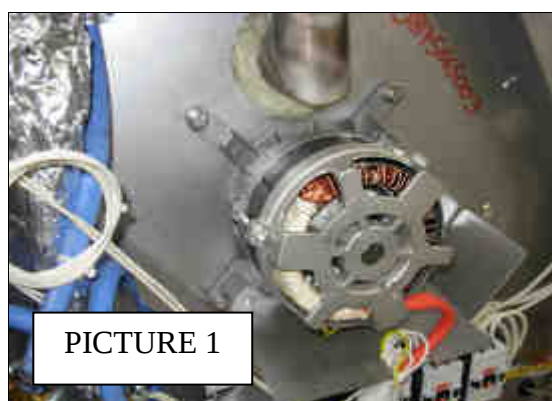
1. Encoder from the back (picture 1);
2. Encoder from the front, don't forget the washer (picture 2);
3. the pin on the encoder goes into the hole on the spacer (picture 3) ;
4. All the assembly should be put in place with the pin into the hole on the dashboard (picture 4).



7.2. Motor

To replace the motor, follow the instruction below:

1. motor from the left hand side, electrical components compartment (picture 1);
2. to disassemble the motor, unscrew the fixing screw on the motor shaft (picture 2);
3. pay attention to the washers, they should all be replaced when the motor is (picture 3);
4. Assembly sequence of the shaft sealing system: brass bushing, Corteco, Viton gasket, present in the components compartment (see photo 4). When replacing the Corteco it needs flattening with MOLIKOTE 41. For removal, you should use the extractor p/n 6003060.



7.3. Door micro-switch

To replace the door micro-switch, follow the instruction below:

1. micro-switch position in the dashboard inner side (picture 1);
2. micro-switch holder fixing screws (picture 2);

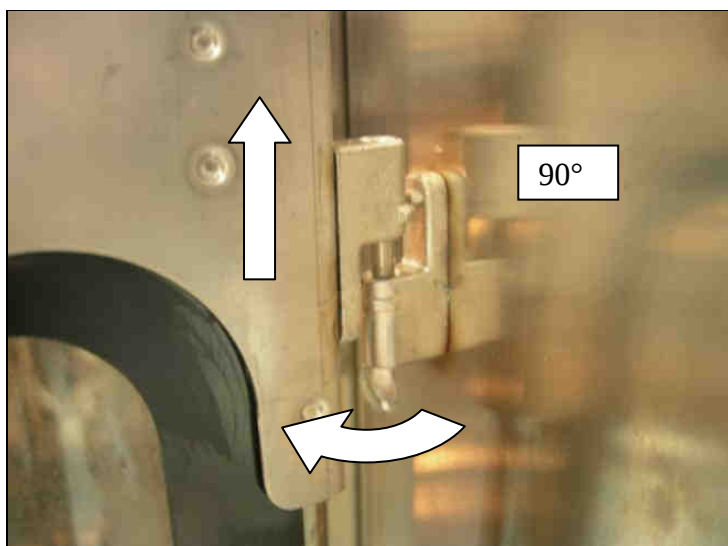


NOTE: the magnet for the micro switch is inside the door assembly.



7.4. Door glass frame disassembly

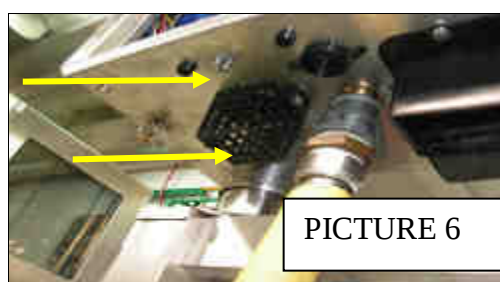
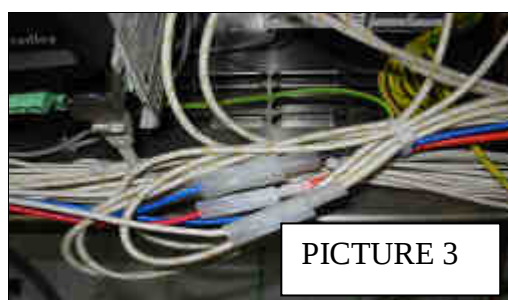
Pull off the inner glass with its frames glued. To do this you must open the inner glass at about 90 ° to the door. Then lift up the hinge pins from the parade support.



7.5. Component compartment cooling system

Cleaning and parts of the component compartment cooling system and air intake slots:

1. cooling fan of the display board (picture 1) always ON even when the oven is in stand-by.;
2. cooling fan of the component compartment (picture 2) always ON even when the oven is in stand-by.;
3. air intake slots into the component compartment (picture 3);
4. air box connected to the air intake slots into the component compartment (picture 4), cleaning recommended;
5. air intake slots outside on the bottom of dashboard, cleaning recommended (picture 5);
6. air intake filter and air intake filter for gas valve (picture 6).



NOTE: If the cooling motor breaks the following alarm will appear: "components compartment over temperature E10" (see chapter Alarms).

7.6. Door adjustment

The right door adjustment (models FX 61/101/82/122) is done in three points:

1 - To check the adjustment on the right, measure with a gauge the distance between the inner edge of the door and the fascia, as shown in the two following figures (photos 1 and 2). This distance should be between 15 and 16 mm, both high and down.

If one of the two distances measured is not into this range, proceed with the adjustment by loosening the screw top or bottom;

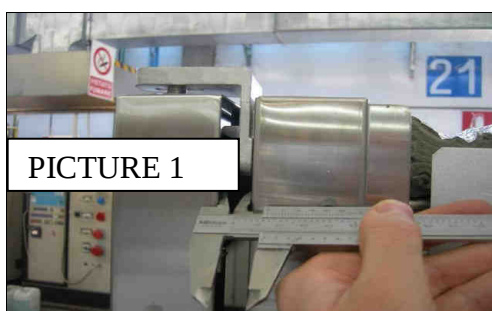
2 - To check the adjustment on the left, measure with a gauge the depth between the outer face of the door and the front of the oven (photos 3).

Attention: the gauge must be in horizontal position. The measure must be:

between 60 and 61mm for models 61/101

between 65,5 and 66,5mm for models 82/122

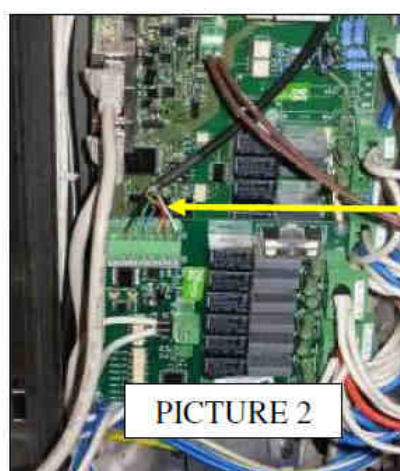
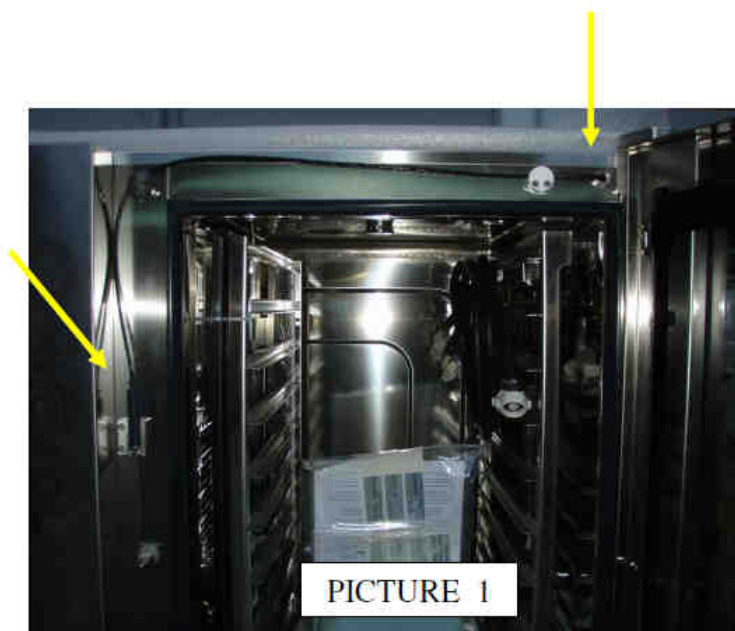
3 - If the measure is not in this range, you should adjust the door by screwing or unscrewing the pin on the fascia of the oven making sure that the pin is horizontal (see photo 4). When the adjustment is done, work with the oven on steam to check the tightness of the door gasket.



7.7. Core probe

To replace the core probe, follow the instruction below:

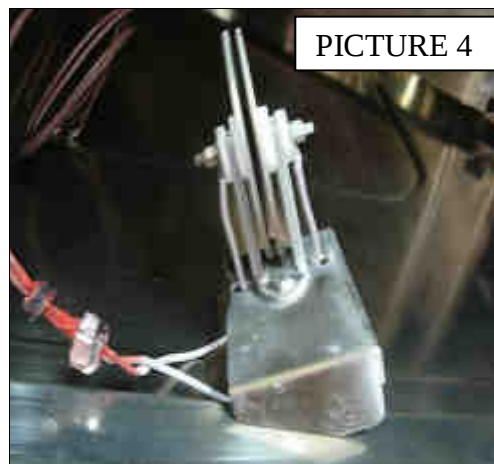
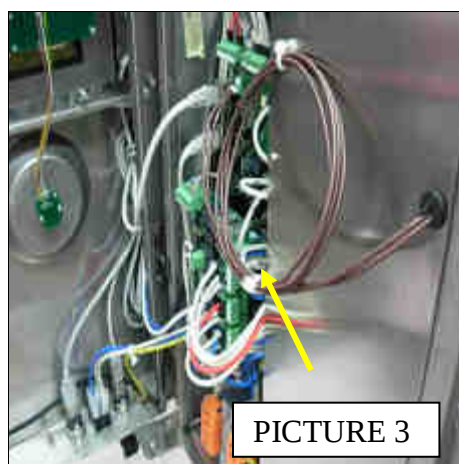
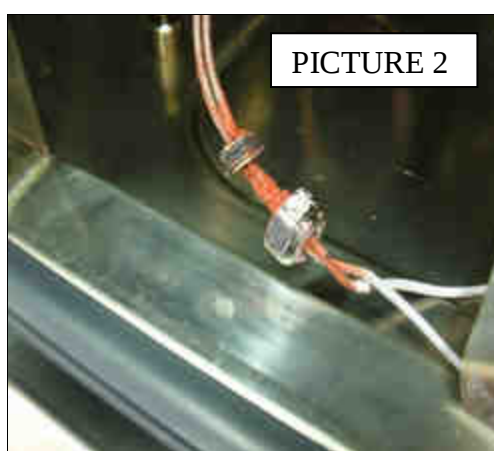
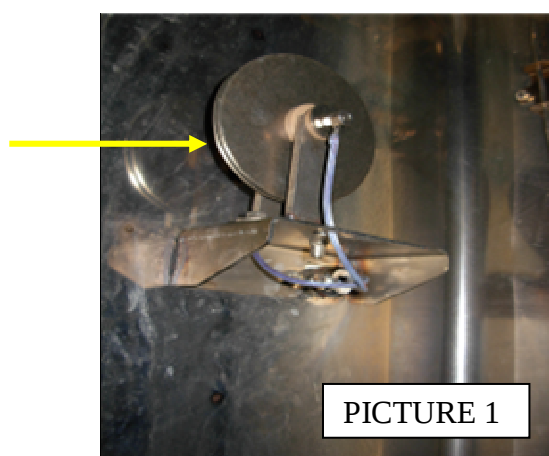
1. the probe cable goes into the pipe (picture 1) without gasket and pass on the teflon bushing;
2. the correct positioning of the probe is shown in the picture 2;
3. the terminals of the probe are connected to the power board, the white one on the plug 73, for the others is the same.



7.8. Humidity probe

To replace the humidity probe, follow the instruction below:

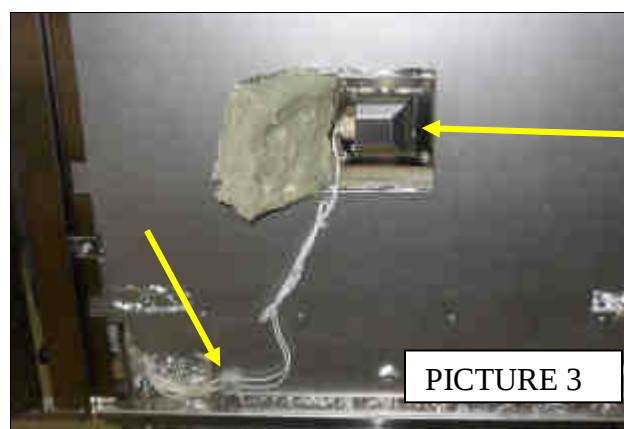
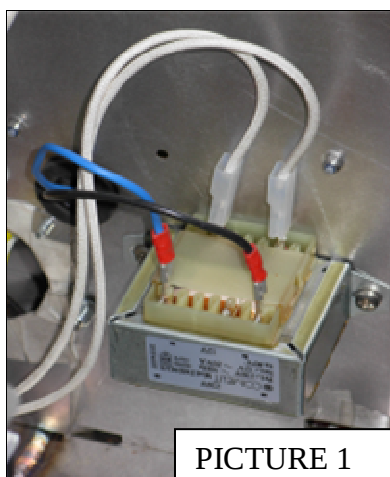
1. the humidity probe is inside the chamber, behind metal panel (picture 1).
2. the terminals of the probe are connected to the power board (picture 3).



7.9. Halogen lamp replacement

To replace the halogen lamp, follow the instruction below:

1. halogen lamp transformer primary 230 V ~ , secondary 12 V ~, halogen lamp protection fuse on the power board 250 mA (picture 1);
2. to replace the lamp, unscrew the glass fixing nuts into the chamber (picture 2);
3. under the right hand panel it is possible to work on the lamp holder and the plug (picture 3).



7.10. Lock dismantling

To replace the lock, follow the instruction below:

1. remove the cap of the handle using a thin screwdriver (picture 1);
2. unscrew the handle securing screw (picture 2);
3. remove the blocking lock by unscrewing the three screws on the door (picture 3);
4. remove the safety clamp on the lock assembly (picture 4); CAUTION: Be careful not to pull out the whole body of the lock assembly from his housing.
5. install the handle on the lock assembly taking care to engage the pin on the spring (pictures 5a and 5b);
6. fix the handle on the lock with the screw adding Loctite 243 (picture 6);
7. mount the lock – handle assembly on the door with the three screws. Add on each screw Loctite 243 (pictures 7a and 7b). Before securing the screws control the vertical alignment of the handle.





PICTURE 5a



PICTURE 5b



PICTURE 6



PICTURE 7a



PICTURE 7b



7.11. Lock dismantling 20 trays models

To replace the lock, follow the instruction below:

1. remove the cap of the handle using a thin screwdriver (picture 1);
2. unscrew the handle securing screw (picture 2);
3. disassemble the handle from its seat (picture 3)
4. remove the blocking lock by unscrewing the three screws on the door (picture 4);
5. pay attention to the washers on lock of the handle (picture 5);
6. Unscrew the screw rear handle lock for its removal (picture 6);
7. to access the lock assembly (picture 7) remove the panel behind the lock (picture 8);



PICTURE 1



PICTURE 2

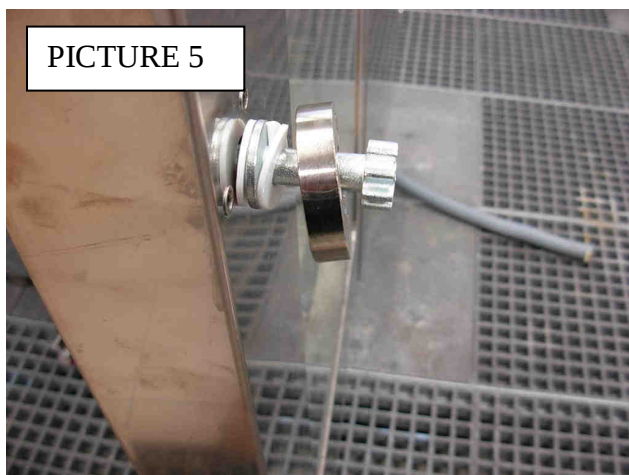


PICTURE 3

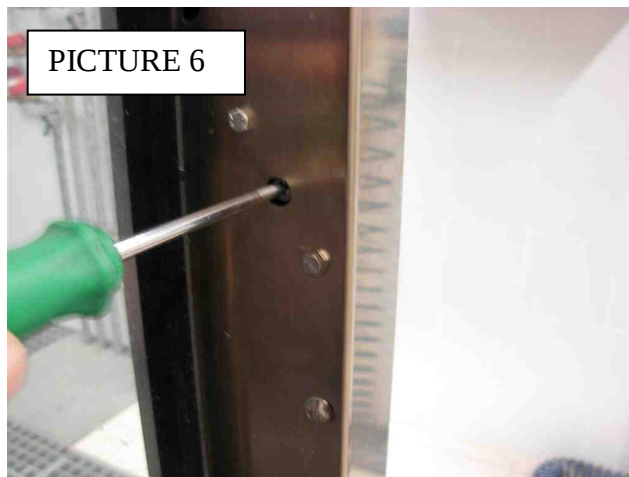


PICTURE 4

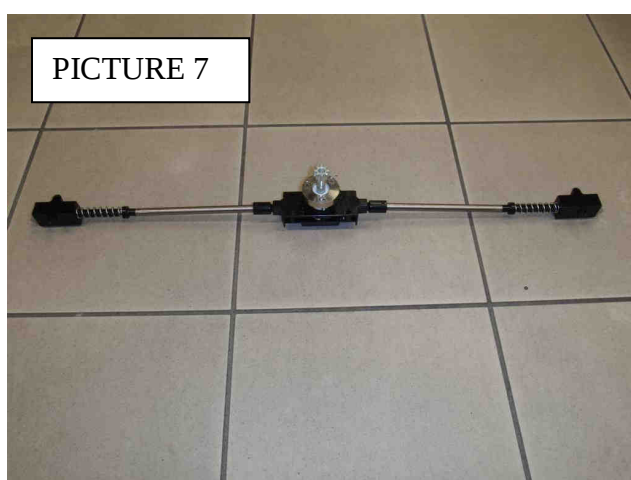
PICTURE 5



PICTURE 6



PICTURE 7



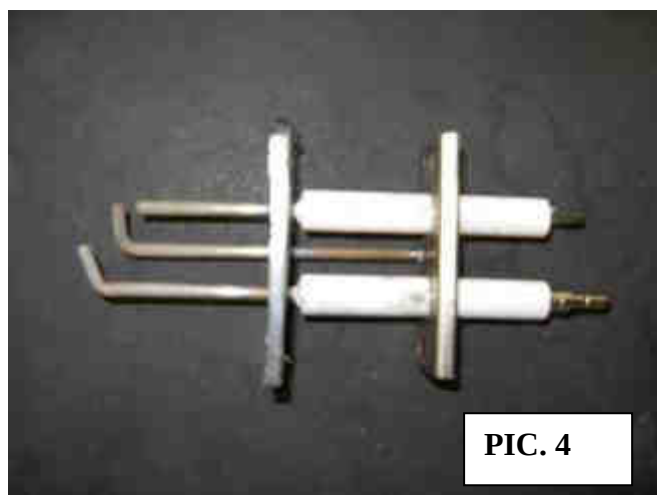
PICTURE 8



7.12. Spark plug replacement

To replace the spark plug, follow the instruction below:

1. Disconnect the ignition and flame sensor wires from the spark plug (picture 1).
2. Disconnect the ground terminal. (picture 2)
3. Unscrew the nuts on the spark plug fixing pins. (picture 3)
4. Take off the spark plug and remove the gasket. (picture 4)

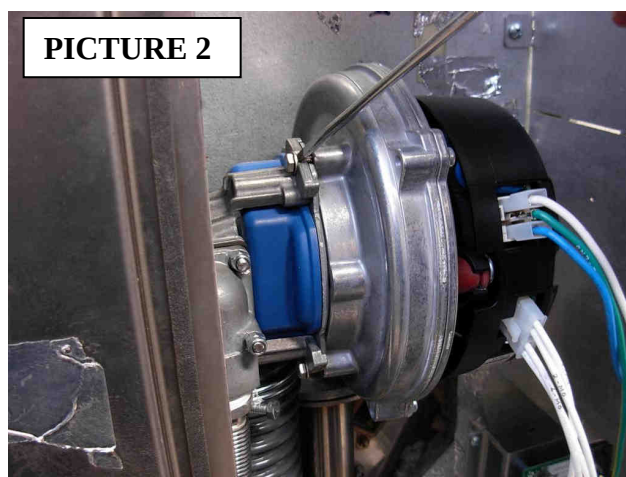
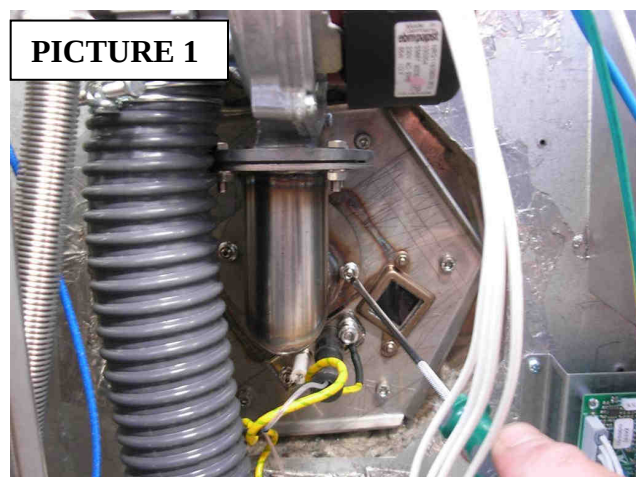


NOTE: with the spark plug always replace the gasket too.

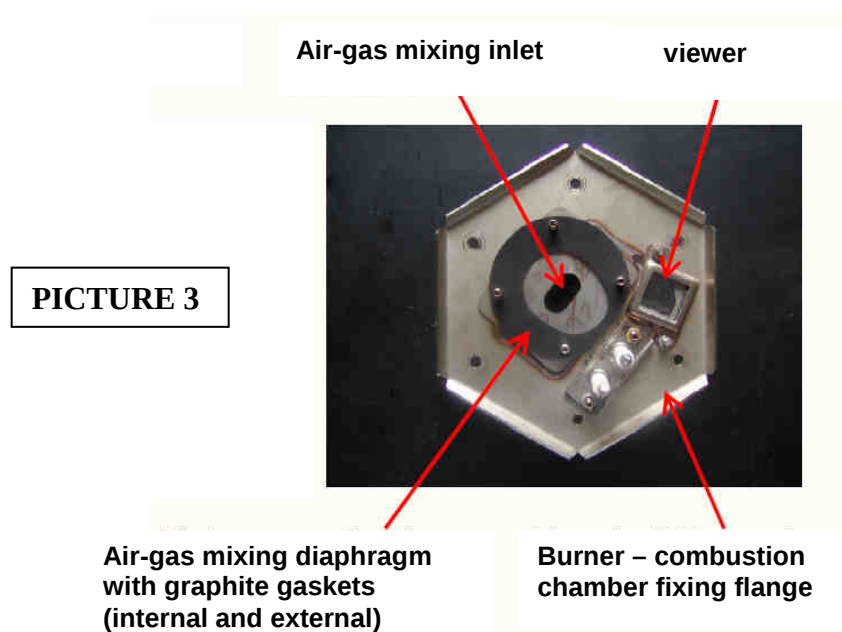
7.13. Blower fan replacement

To replace the blower fan follow the instruction below:

1. Unscrew the 4 nuts (picture 1)
2. Unscrew the 3 screws (picture 2)
3. Disconnect the wires and replace the blower fan



NOTE: when replacing check that the size of diaphragm installed is correct (see picture 3 and table)



	FX61G3	FX101G3	FX82G3
Diaphragm	Ø16 - 3138640	Ø20 - 3138660	Ø24 - 3138650
	FX122G3	FX201G3	FX202G3
	Ø30 - 3138670	Ø19 - 3171770	Ø25 - 3172410

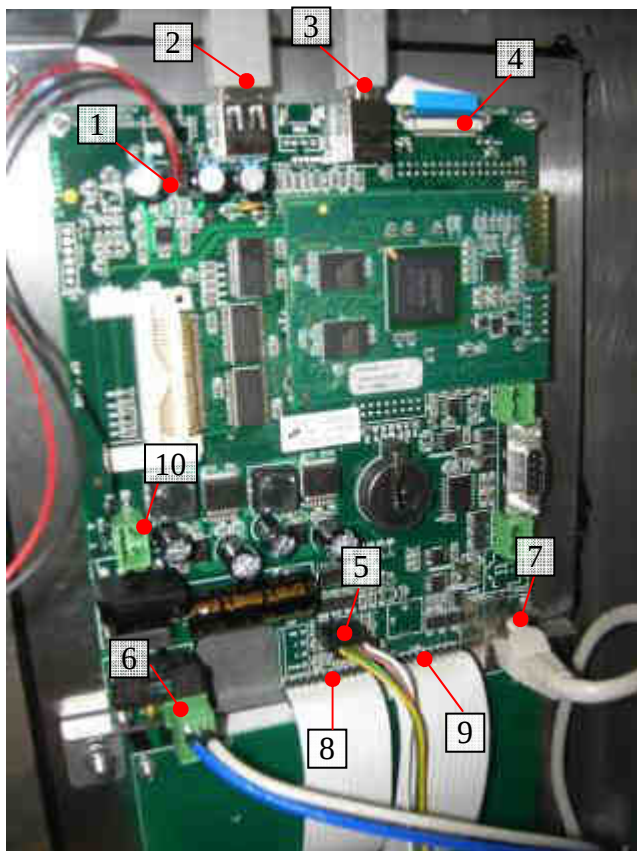
7.14. CPU and display LCD boards (LIV.3) replacing

To access the replacement of such components, unscrew the two screws TE M5 placed on the bottom of the dashboard that opens like a book.



CPU board Replacing (1st version)

Before removing the CPU board, disconnect all the cables as shown in the picture.



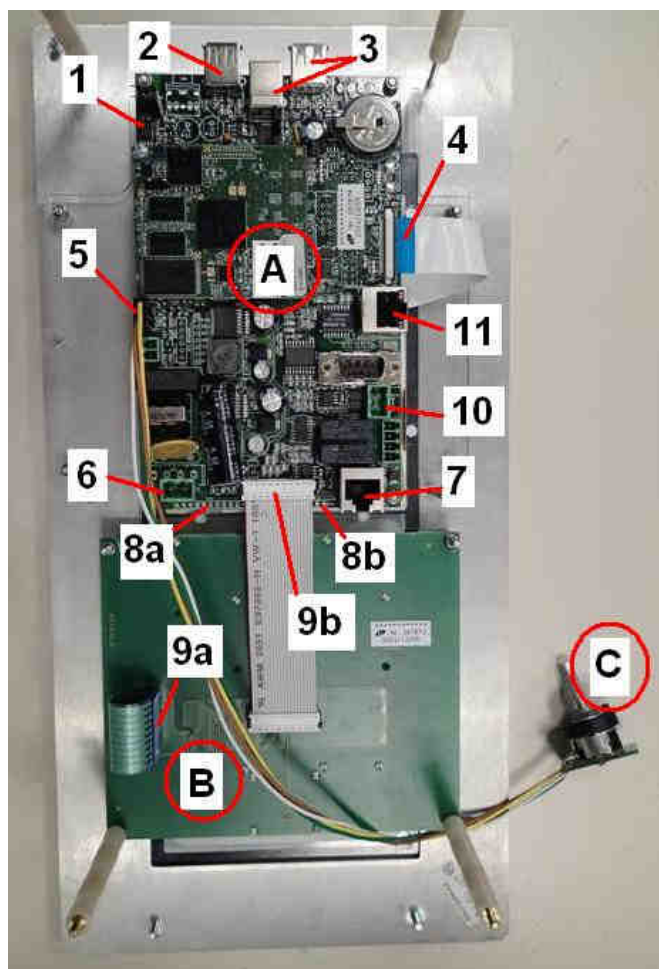
- 1 – Loudspeaker cable
- 2 – USB cable
- 3 – USB cable (optional)
- 4 – LCD display flat cable
- 5 – Encoder cable
- 6 – 0-24V power supply cable
- 7 – Net cable (connection with the power board)
- 8 – Keyboard flat cable
- 9 – LED board flat cable
- 10 – External buzzer connection (optional)

WARNING: DO NOT CONNECT THE POWER SUPPLY TO THE PLUG 10.



CPU board Replacing (2nd version)

Before removing the CPU board, disconnect all the cables as shown in the picture



- 1 – Loudspeaker cable
- 2 – USB cable
- 3 – USB cable (optional)
- 4 – LCD display flat cable
- 5 – Encoder cable
- 6 – 12V AC power supply cable
- 7 – Communication cable (connection with the power board)
- 8a – Keyboard flat cable (1st version)
- 8b – LED board flat cable (1st version)
- 9a - Keyboard flat cable (2nd version)

9b - LED & Keyboard board flat cable (2nd version)

10 – Connection with blast chiller (optional)

WARNING: DO NOT CONNECT THE POWER SUPPLY TO THE PLUG 10.

11 – Network cable (optional)

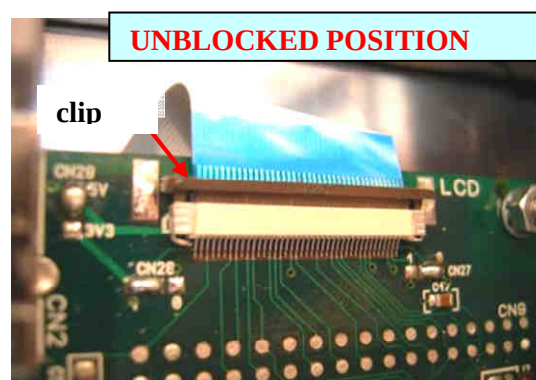
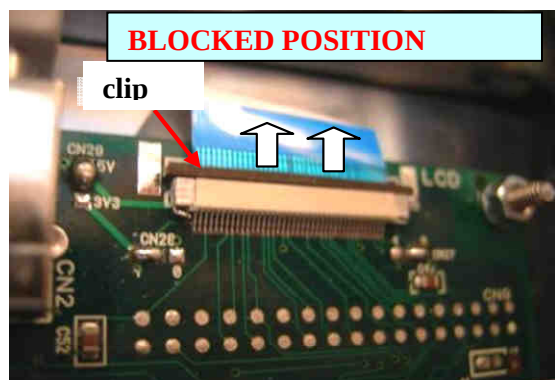
A – CPU

B – Keyboard

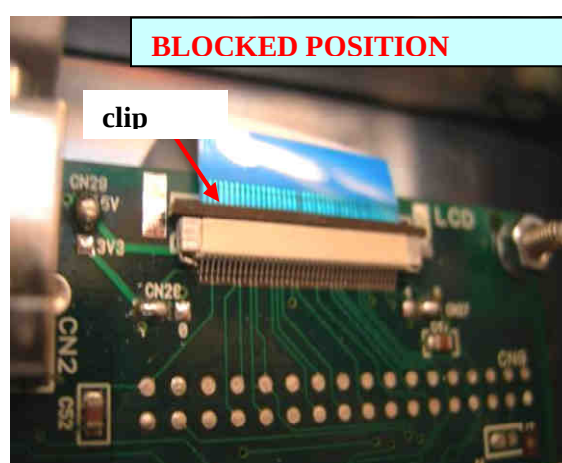
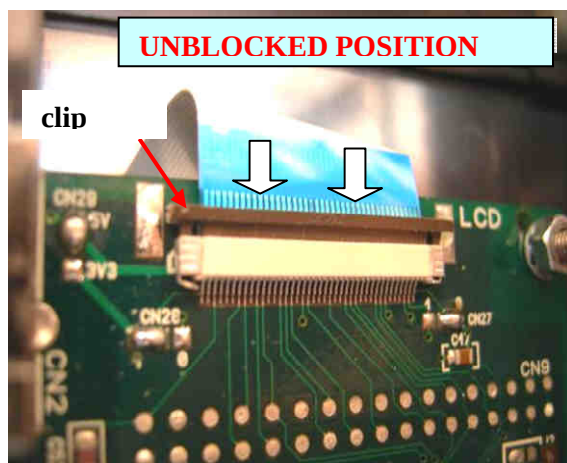
C - Encoder

Flat cable connection on the LCD display

To remove the flat cable (4) connecting the LCD, must unlock the buckle lock moving it upward. At this point, the flat is free.

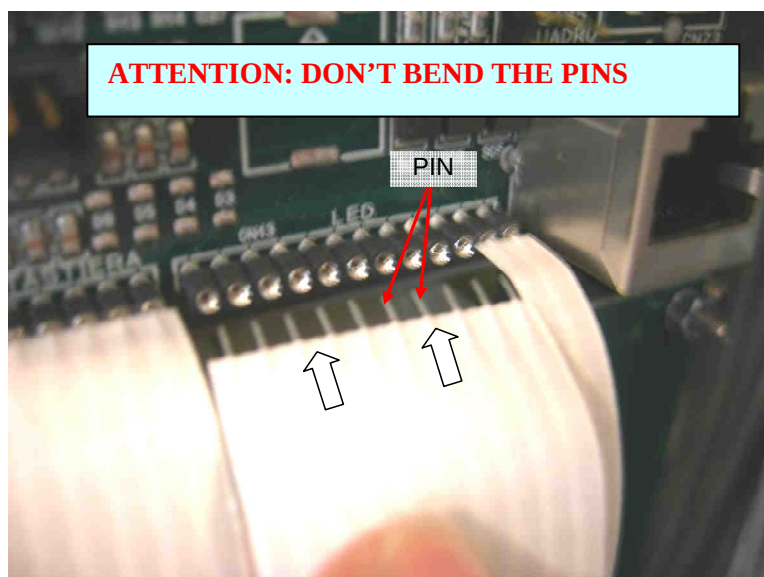


To reconnect the flat it must be threaded into the connector until it comes to the bottom. Then lock the cable pushing the clip down as shown in the photo below.



Flat cable connection on the LED board and keyboard

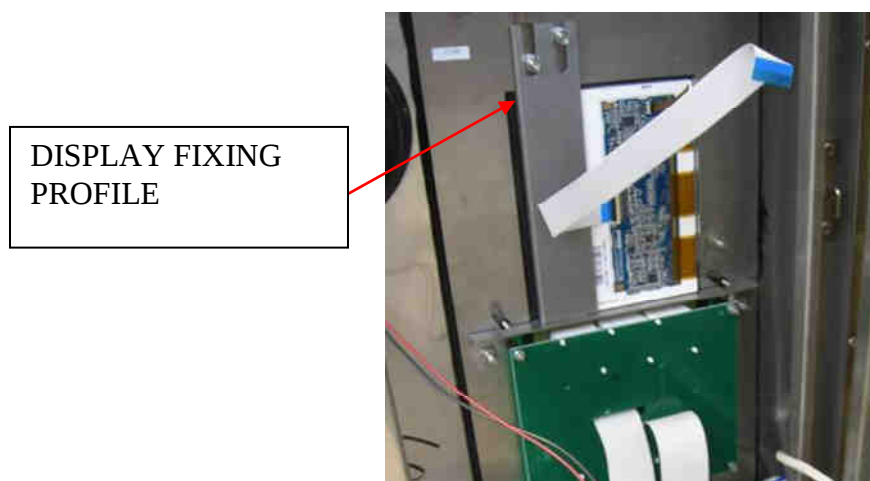
Connecting the flat cables (8) and (9) pay attention not to bend the pins of the cables.



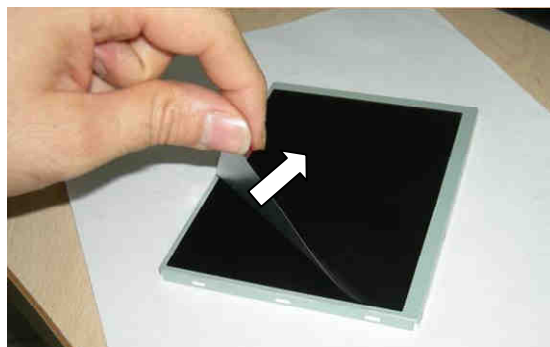
LCD display replacing

To remove the LCD screen, first remove the CPU board.

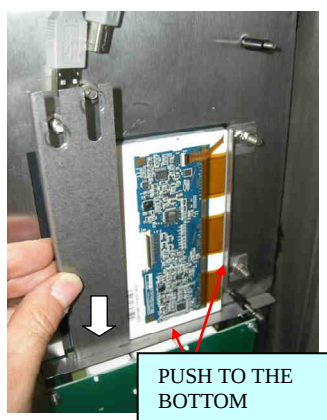
To remove the display you must remove the metal profile shown in the picture.



Remove the protecting plastic film before install the new display.

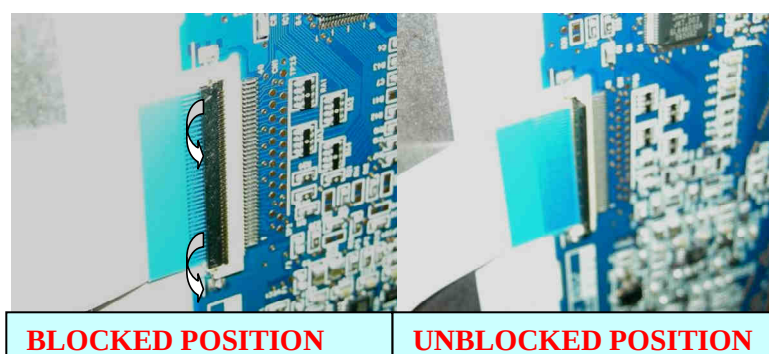


Put the display on the adjustable references down and right and move it on the centre of the window panel.



Thread the block profile and secure it with nuts (do not over-tighten the nuts to avoid damage to the display).

To remove the flat connection from the display plug, unlock the clip by rotating it as shown in the picture. Remember to lock again the flat cable.



7.15. CPU and display LCD boards (LIV.3) replacing (2nd version)

Since March 2014 we have introduced new CPU boards and Keyboards. The new cards are compatible with the previous version. The new CPU has connectors for flat cables (keyboard) type of old and new.



KIT CPU for updating ovens 1st version

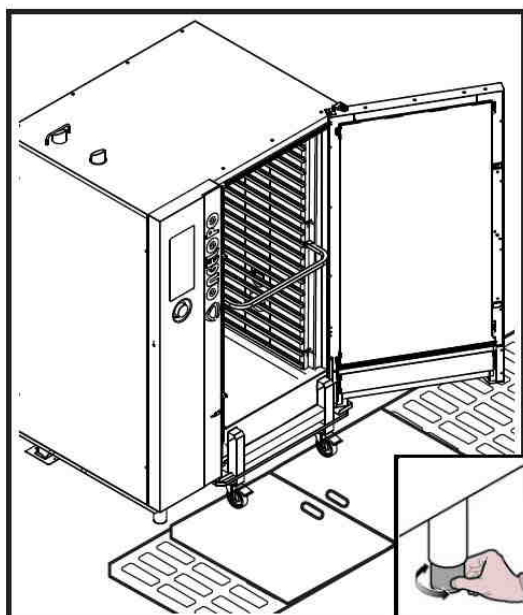
The new CPU can be used to update older versions using an adaptation kit:



CPU board mounted with KIT



7.16. Roll-In adjustment RX201 - RX202



IMPORTANTE:

Se prima dell'apparecchio da pavimento si trova una griglia di scarico, nella zona di inserimento la struttura carrellata occorre applicare un dispositivo per superarla.

ATTENZIONE:

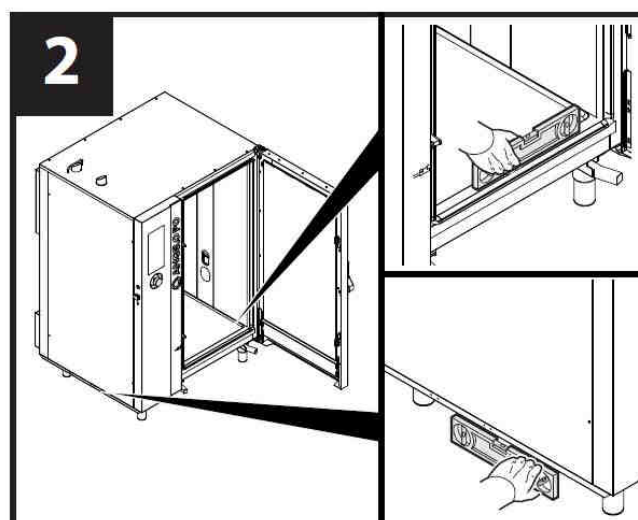
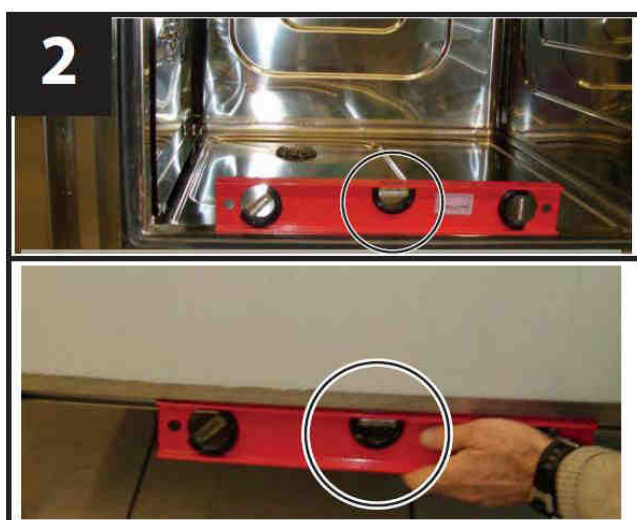
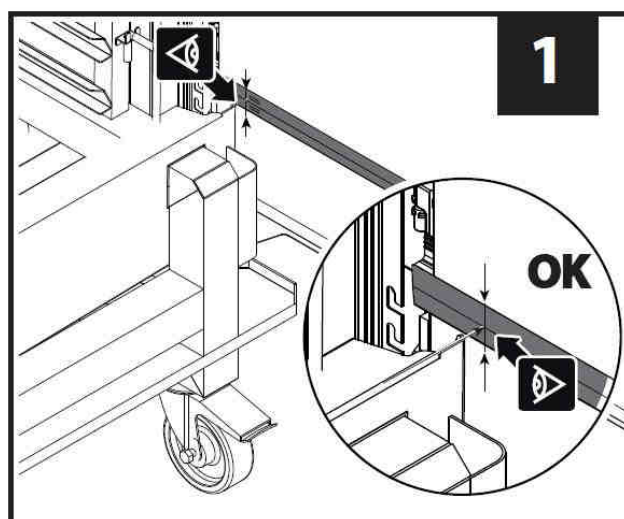
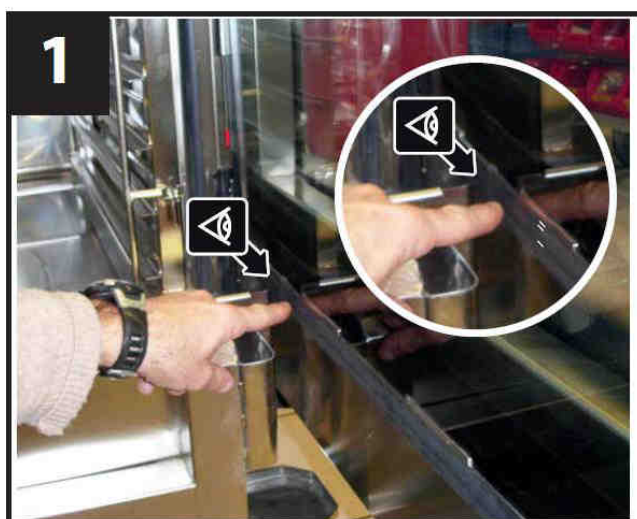
Evitare fonti di vapore nell'aria del filtro dell'aria di raffreddamento. L'umidità aspirata potrebbe provocare un malfunzionamento dell'apparecchio.

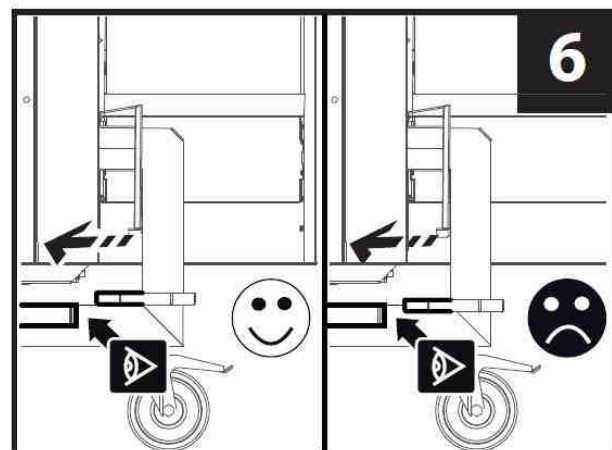
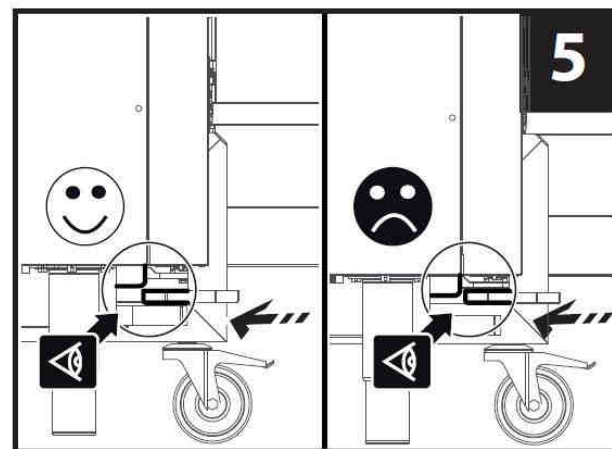
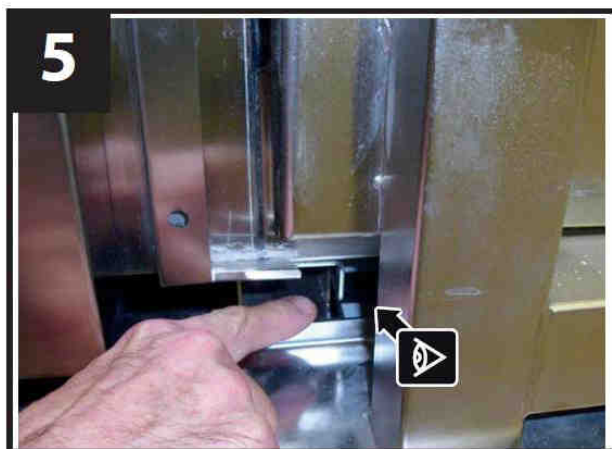
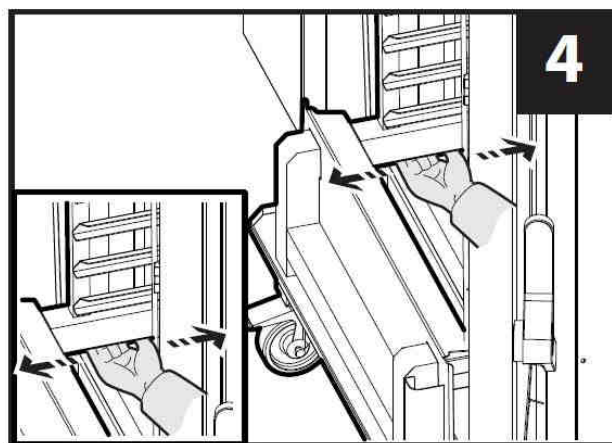
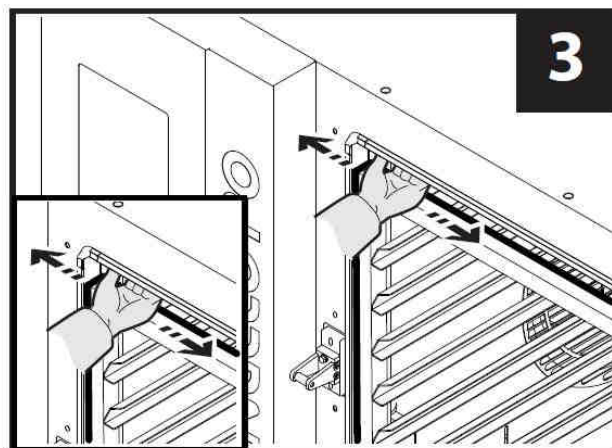
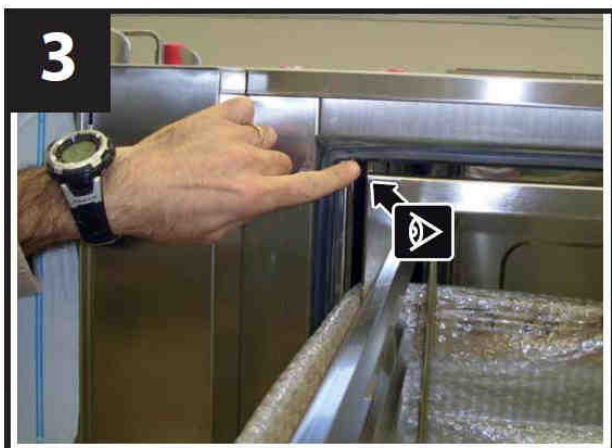
IMPORTANT:

If the unit first floor there is a drain grate, in the area of the insertion structure roundup takes apply a device to overcome it.

WARNING:

Avoid sources of steam in the air of the cooling air filter. The moisture intake may cause a malfunction.





7.17. Scheduled recommended maintenance

		Yearly	Every two years	Chapter/ Paragraph
All models	Cleaning air intakes	X		7.5
	Open the dashboard and replace the seal – clean and check possible steam leakage	X		7.14
	Check components compartment cooling fans working	X		7.5
	Check motorized valve status and working	X		2 pic.7
	Check core probe status and working (where present)	X		7.7
	Check door gasket and steam leakage during cooking.	X		7.14
	Visual check of the cooking chamber	X		
	Check tightening of the fan fixing screw	X		7.2
	Check tightening, status and cleaning of the humidity probe	X		7.8
	cleaning siphon and drain lines	X		2 pics14-15
	cleaning of water intake filter	X		2 pic.10
	Check door adjustment	X		7.6
	Check lamp gasket	X		7.9
Gas models only	check incoming gas pressure and system tightness until gas valve	X		4.2
	Check and tightening gas system fixing screws (blower fan, gas inlet, air-gas mixing inlet)	X		4.2.2
	Cleaning combustion air intake (filter underneath the oven)	X		7.5
	Check and cleaning gas valve air intake	X		7.5
	Check CO and CO2 performing gas flue analyzes	X		4.11
	Spark plug and gasket replacement and wires check	X (LPG)	X (Natural gas)	7.12
	Visual check of heat exchanger gasket	X		
Electric only	Check resistance cables tightening	X		
	Check resistance gasket seal and screws tightening	X		
Level 3 only	Check alarms list in the menu service	X		3.2
	Replace the pipes in the peristaltic pumps		X	
	Run pump test procedure – check the pumps working	X		5.2
	Check possible leaks on the fittings of the pumps	X		5.2
	Check and possible adjustment rinse water pressure	X		5.2
	Disassemble multi-injector sprinkler and check possible obstructions	X		5.2
	Clean inverter air intakes	X		3.4

8. ALARMS

Alarm on display	Problem (on the manual)	Solution (on the manual)	Note (on the manual)	Note for Service
H2O	No water in the chamber, or water pressure too low	Check that mains water is present or adjust the pressure; if the problem persists inform the after-sales service.	Convection cooking cycles can still be carried out.	Check correct working conditions of chamber water solenoid valve and pressure switch. The terminals Common and Normally Open of pressure switch must be connected with wires n° 37 and 40 to the power PCB. Verify the inlet water supply pressure and the adjustment of the water pressure reducer (about 1 bar). Check voltage on the terminal n° 9 of the power PCB; check the fuse 3,15 A on the power PCB.
H2O.	No water in the drain, or water pressure too low	Check that mains water is present or adjust the pressure; if the problem persists inform the after-sales service.	Convection and steam cooking cycles can still be carried out.	Check correct working conditions of chamber water solenoid valve and pressure switch. The terminals Common and Normally Open of pressure switch must be connected with wires n° 37 and 39 to the power PCB. Verify the inlet water supply pressure and the adjustment of the water pressure reducer (about 1 bar). Check voltage on the terminal n° 10 of the power PCB; check the fuse 3,15 A on the power PCB.
GAS	No mains gas, or gas pressure too low, or flame detection failure.	Press reset button (the button may have to be pressed several times); if the problem persists inform the after-sales service.	Stop cooking if this message is repeated more than once.	See chapter 4.8 (alarm gas chart)

Alarm on display	Problem (on the manual)	Solution (on the manual)	Note (on the manual)	Note for Service
OPE	Oven door opening or closure request.	Open or close the oven door. Inform the after-sales service if this message continues to be displayed.	The cooking cycle does not start until the door has been opened or closed as required.	Check the door magnetic micro switch, to be correctly connected to the power PCB by wires 42 and 43. It could be interruption or short circuit.
CLE W01 W02	Cleaning alarm	---	---	See chapter 5.6 (cleaning warnings)
E01:CC	The cooking chamber probe has failed or is not properly connected. (Short circuit)	Inform the after-sales service.	The oven's functions are disabled so no cooking cycles can be carried out.	Check the chamber probe. The resistance value must be about 1100 Ohm at 25°C. The probe is connected to the terminals 44 and 45 of the power PCB.
E01:--	The cooking chamber probe has failed or is not properly connected. (Circuit open)	Inform the after-sales service.	The oven's functions are disabled so no cooking cycles can be carried out.	Check the chamber probe. The resistance value must be about 1100 Ohm at 25°C. The probe is connected to the terminals 44 and 45 of the power PCB.
E02:CC	The product core probe has failed. (Short circuit)	Check the position of the product core probe or inform the after-sales service if it is faulty.	Cooking cycles with product core probe cannot be carried out.	Check the core probe. The resistance value must be about 1100 Ohm at 25°C. On the ovens level 2, the probe is connected to the terminals 46 and 47 of the power PCB. On the ovens level 3, the multipoint core wires are connected to terminals 74-75-76-77-78 (wires red-yellow-blue-green-black) of the expansion PCB, and the white one is connected to terminal 73.

Alarm on display	Problem (on the manual)	Solution (on the manual)	Note (on the manual)	Note for Service
E02:--	The product core probe has failed. (Circuit open)	Check the position of the product core probe or inform the after-sales service if it is faulty.	Cooking cycles with product core probe cannot be carried out.	Same as above
E03:CC	The steam discharge probe has failed. (Short circuit)	Inform the after-sales service.	Convection and steam cooking cycles can still be carried out.	Check the drain probe. The resistance value must be about 1100 Ohm at 25°C. The probe is connected to the terminals 48 and 49 of the power PCB.
E03:--	The steam discharge probe has failed. (Circuit open)	Inform the after-sales service.	Convection and steam cooking cycles can still be carried out.	Same as above.
E04	The motor-operated valve is not positioned correctly.	Switch on the oven again and if the problem persists inform the after-sales service.	Convection and steam cooking cycles can still be carried out.	Check that the motor-operated valve is not blocked. The motor is connected to pole 11. The micro-switch terminals C and NC are connected to the terminals 37 and 38 of the power PCB. Verify the 3,15 A fuse (delayed) on the relays PCB.
E05	Safety thermostat failure.	Inform the after-sales service.	The oven's functions are disabled so no cooking cycles can be carried out.	Reset the safety thermostat. Check that the thermostat capillary is not bent, squeezed or broken. Test the oven at the maximum temperature for some minutes.
E06	Motor overload tripped.	Inform the after-sales service.	The oven's functions are disabled so no cooking cycles can be carried out.	Reset the motor overload protection relay (L1 and L2) or reset the alarm from the keyboard (L3). For L3 only, check the inverter alarm list. Check the motor to rotate free and the 3 phases in case of 3 phases power supply.

Alarm on display	Problem (on the manual)	Solution (on the manual)	Note (on the manual)	Note for Service
E07	Power board alarm	Inform the after-sales service.	The oven's functions are disabled so no cooking cycles can be carried out.	Control the dip switch settings of the power board. The switches 1, 2, 3, and 4 of the DP1 must be set to OFF.
E08	The vacuum probe has failed.	Press reset button. Check if the vacuum probe is correctly connected to the plug on the control board.	Connect and disconnect the vacuum probe only when the oven is not working. If the problem persists, call the after-sales service.	Check the vacuum probe. The resistance value must be about 1100 Ohm at 25°C. The probe is connected to the terminals 50 and 51 of the panel PCB. Verify the connector terminals are clean and be sure to follow the user instructions.
E10	Electrical component compartment has overheated.	The oven solves the problem on its own.	The oven's functions are enabled so cooking cycles can be carried out.	The chamber heating will be temporarily disabled. Check the panel board cooling fan. Remove and clean the air gratings located on the front of the oven. This alarm will be automatically reset when the temperature drops down.
E11	Electronic circuit board diagnostics tripped.	Inform the after-sales service.	The oven's functions are disabled so no cooking cycles can be carried out.	This alarm will appear in the case the alarm E10 has not been removed and the temperature on PCB has risen up to 69°C. Follow the above instructions.
E13	Electronic circuit board diagnostics tripped.	Inform the after-sales service.	The oven's functions are disabled so no cooking cycles can be carried out.	Communication failure between the boards or peripheral devices. Verify electrical connections. E13 = Power Board - CPU E13a= Inverter 1 E13b= Combustion control board 1 E13c= Inverter 2 E13d= Combustion control board 2

Alarm on display	Problem (on the manual)	Solution (on the manual)	Note (on the manual)	Note for Service
E14	Electronic circuit board diagnostics tripped.	Inform the after-sales service.	The oven's functions are disabled so no cooking cycles can be carried out.	PCB temperature probe failure. Replace the power board or the CPU board. E14V = CPU E14Q = power board
E19	The humidity probe has failed.	Inform the after-sales service.	The oven's functions are enabled so cooking cycles can be carried out.	Check the connector terminals on the probe and on the power board.
E20	Configuration error	Inform the after-sales service.	The oven's functions are disabled so no cooking cycles can be carried out.	Found inconsistencies between the type of oven and installed boards. Verify the installed boards (display, power board) and devices (inverter and combustion control), verify their proper connection on net cables and repeat the configuration of the oven.
E21 – E26	Washing cycle alarms			See chapter 5.4
E27	Gas test missed			See chapter 4.8 (alarm gas chart)
E28	Valve not working	Press reset button	The oven's functions are enabled so cooking cycles can be carried out. Washing programs are disabled.	Check the connector terminals on the valve and on the power board.

Alarm on display	Problem (on the manual)	Solution (on the manual)	Note (on the manual)	Note for Service
E29	Core probe not inserted	Press reset button	The oven's functions are enabled so cooking cycles can be carried out.	---
E30 – E38	Electronic circuit board diagnostics tripped.	Press reset button	If the problem persists inform the after-sales service.	Protections against electromagnetic interferences. Check all the ground wiring of the equipment. In case of gas version, please check ignition electrode and cover protections to be properly fitted. Check all the wirings relative to the ignition system. Check the correct insulation of the cable.
E80 – E85	---	---	Inform the after-sales service.	---

