# AOS OVENS

# - Service Manual -

**CONTENTS:** This document contains the information about parameters that can be read and/or modified by means of user interface, service utilities, ...

**PROJECT REF:** AOS ovens

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**DOCUMENT HISTORY:**

| Rel. | Date: | File: | Author: | Note: |
|---|---|---|---|---|
| 005 | 06/04/2004 | AOS service manual (ENG).005 | A. Canova | New features from firmware 2.7, 2/1 gas ovens, added appendix B-C-D |
| 006 | 05/07/2004 | AOS service manual (ENG).006 | A. Canova | New calibrations for AOS061G and AOS101G, updated appendix C-D, added appendix E-F-G |
| 007 | 18/02/2005 | AOS service manual (ENG).007 | A. Canova | Updated appendix D, calibration of AOS061G and added appendix H-I |
| 008 | 13/06/2005 | AOS service manual (ENG).008 | A. Canova | Updated calibrations for AOS101G, AOS201G, AOS102G, AOS202G; firmware 2.80 |
| 009 | 14/09/2006 | AOS service manual (ENG).009 | A. Canova | Firmware 2.90; new value for hAcA for AOS201G-G20 and for Stbo for AOS101G-G25; new procedure for param. programming, updated appendix D, F; added appendix J |
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# INDEX



# 1. Programming the default parameters

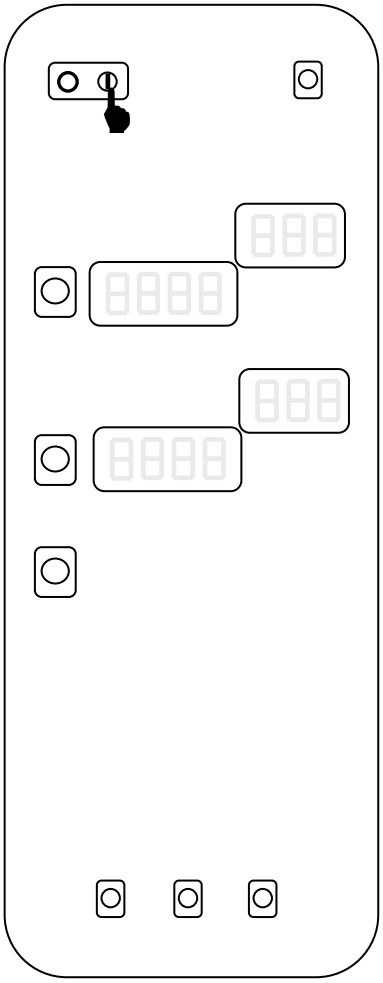


Fig. 1

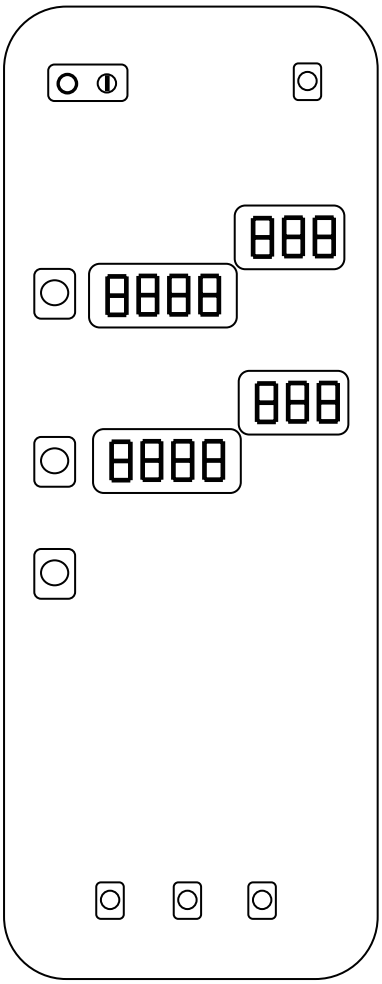


Fig. 2

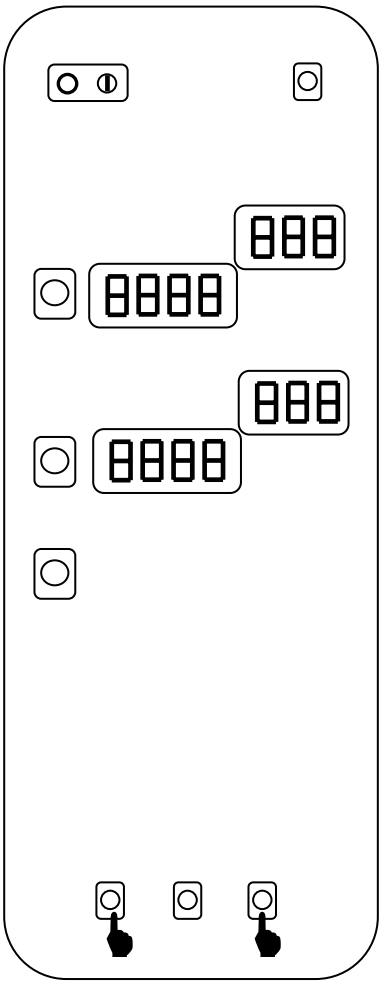


Fig. 3

Switch on the oven (fig. 1).
Just after the switching on, a lamp test will take place (fig 2).
At this point, during the lamp test phase, press the external service buttons (fig.3) till you hear a beep.

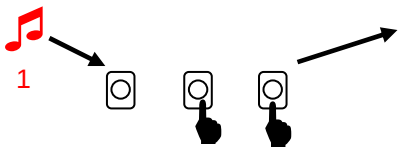



Fig. 4

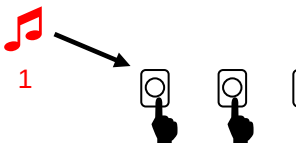



Fig. 5

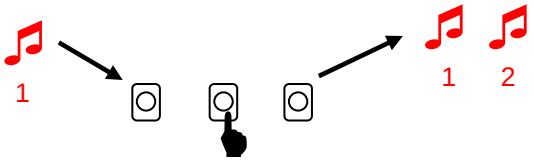



Fig. 6

At this point press the right buttons till you hear a beep (fig. 4).
Press then the left service buttons till the beep (fig. 5).
At this point release the left buttons keeping pressed the middle one (fig. 6) till you hear 2 beeps.
Release the middle button and on the temperature display you will see “PdEF”: the oven will switch off and on automatically.

## 2. Advanced programming

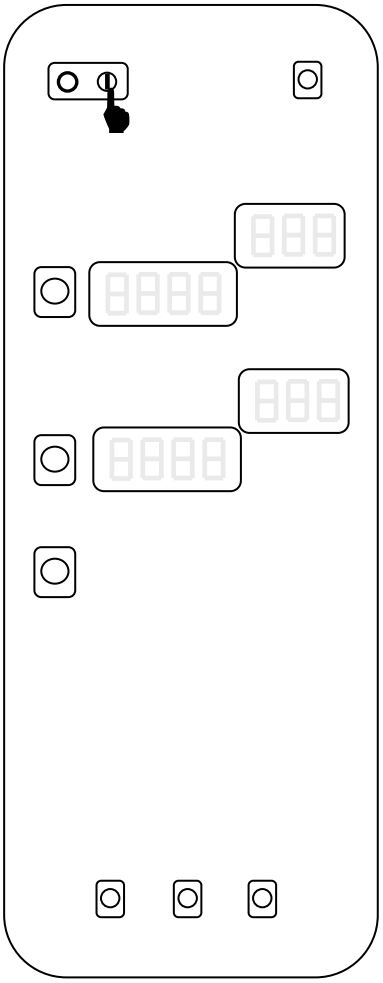


Fig. 7

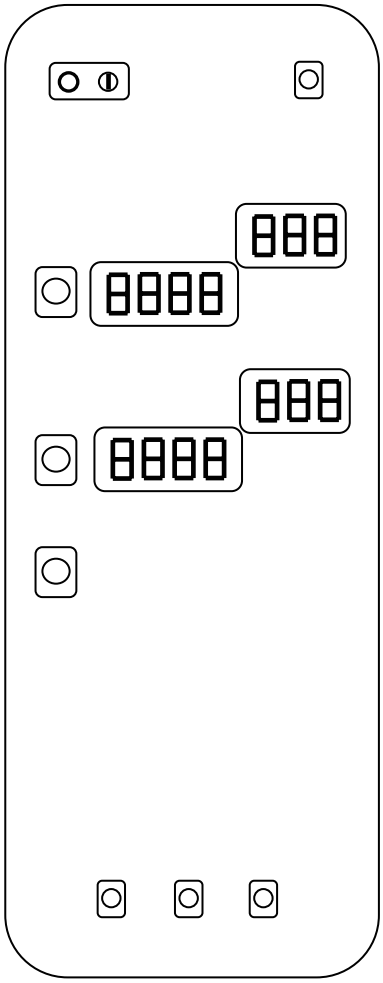


Fig. 8

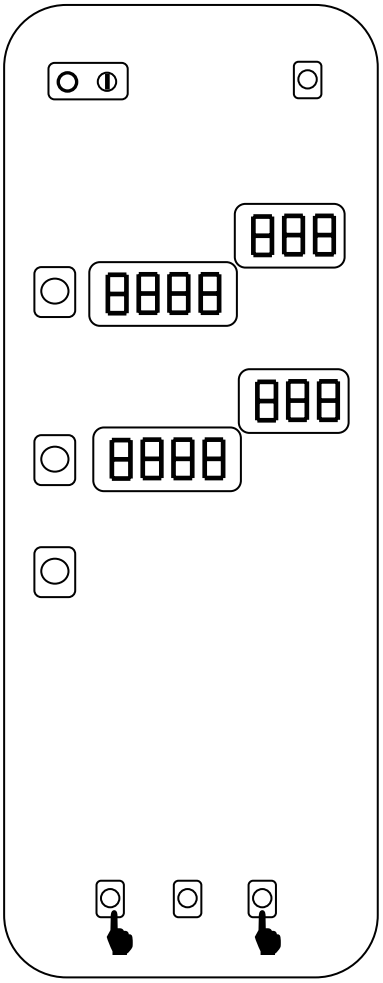


Fig. 9

The procedure to enter in advanced programming is similar to the procedure for programming the defaults parameters.
Switch on the oven (fig. 7).
Just after the switching on, a lamp test will take place (fig. 8).
At this point, during the lamp test, press the external service buttons (fig.9) till you hear a beep.

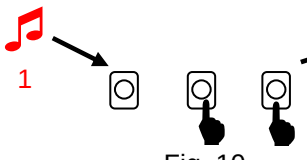



Fig. 10

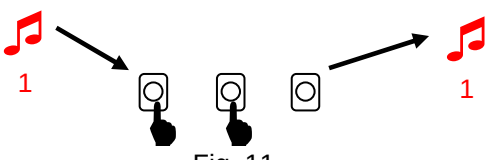



Fig. 11

At this point press the right buttons till you hear a beep (fig. 10).
Press then the left service buttons till the beep (fig. 11).
Release the button and on the temperature display you will see “P  1” while on the little display the name of the parameter will appear (fig. 12).
With the external service buttons it is possible to scroll the list of the parameters.

Pressing the middle button it is possible to see the value of the parameter (fig. 13) and pressing at this point the external buttons it is possible to modify the value. Press again the middle button returning to the displaying of the number of the parameter to store the new value.
Switch off the oven to exit from programming.

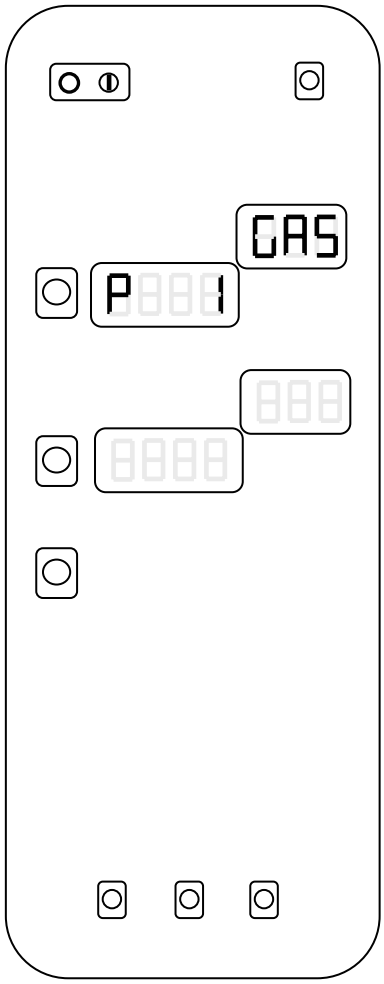


Fig. 12

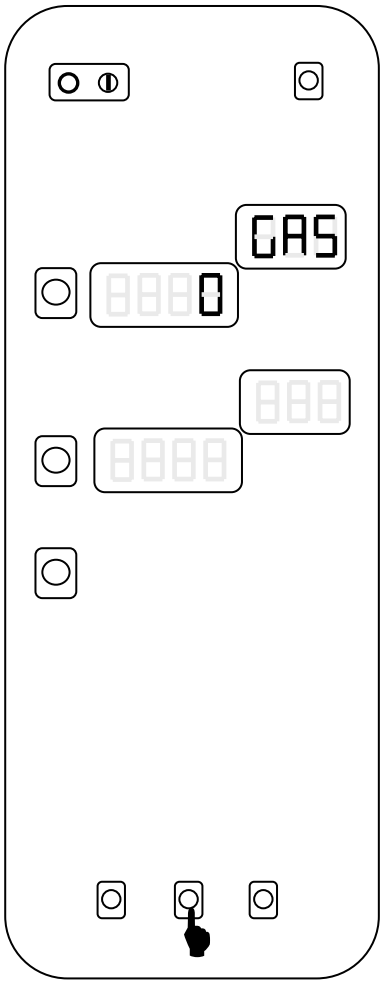


Fig. 13

## 3. By-pass calibration (only for lev. B ovens)

In order to calibrate the by-pass probe on lev. B oven, follow these steps:

1) Switch on the oven
2) Enter in parameter programming and set parameters **cort** and **OCA1** to 0
3) Exit from programming and switch on again the oven
4) Wait for the end of the pre-heating cycle
5) Select a steam cycle (100 °C)
6) Select continuous time (indication “cont” on time display)
7) Press and hold down the left service buttons and at the same time press the START button (fig. 14); the oven will give a long beep
8) Release the service buttons and wait for the stabilization of the temperature reading by the by-pass probe
9) When the temperature has stabilized, press the three service button together in order to memorize the value (fig. 15); the oven will confirm the storing with a long beep

10) Allow the oven to work for several minutes in steam mode checking the oven cavity temperature, which should stabilize at the water boiling point. If this reading is greater or less than the correct water boiling point[1], a corrective value can be stored in the parameter **OCA1**. From firmware release 2.90, pushing the 3 service buttons to store the bypass temperature, the microprocessor will calculate and store also the value of **OCA1**.
11) Set parameter **cort** to 1.
12) Set the altitude above sea level of the site on parameter **SEAL**

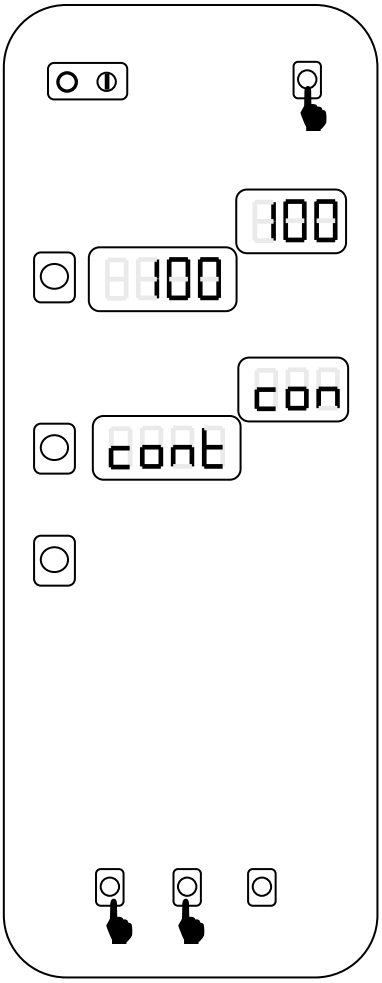


Fig. 14


Fig. 15

## 4. Lambda probe calibration (only for lev. A ovens)

The calibration of the lambda probe is necessary (from firmware 2.6) for the right working of the oven in case of cycle with set point under 100 °C. With this procedure we have to find the point of 0% of humidity.
The procedure is done in a way similar to the by-pass calibration. These are the steps:

1) Set an hot air cycle, 150 °C, time over 15 minutes, open flap;
2) Start the cycle pressing together the left and middle service buttons and the START button. The oven will give a long beep;
3) Wait around 10-15 minutes to dry completely the cavity;
4) Close the flap and wait around 20 seconds to stabilize the humidity inside the cavity;
5) To store the value press together the 3 service buttons. The oven will confirm with a long beep.
6) Stop the cycle with the START button.

This calibration is very important and has to be done with care. If the dry point (0% of humidity) is not correctly stored, the reading of the relative humidity could be overestimated or underestimated.

[1] See Appendix A

# 5. Offset calibration (only for lev. A ovens)

In order to adjust the offset of the cavity probe, enter in parameter programming and set parameters **cort** and **OCA1** to 0.
Then run a steam cycle for several minutes and check the cavity temperature, which should stabilize at the water boiling point. If the stabilized cavity temperature is less or greater than the correct water boiling point[2], a corrective value can be stored in parameter **OCA1**.
After this, set parameter **cort** to 1and set parameter **SEAL** (altitude above sea level).

# 6. Error codes

Errors can be divided into 2 categories: errors (they stop the appliance) and warnings (they do not stop the appliance)

## 6.1. Errors

**EE2P**: Communication error with the EEPROM
**E**---: If the controller detects one or more parameters which have values not permitting the minimum operational requirements, an error code will appear on the display, i.e. “E---” followed by the parameter number. Enter the programming mode and set the correct value according to the parameter list.
**EtUC**: Cavity over temperature; cavity temperature exceeded value stored in parameter **cot**.
**EtUB**: Boiler over temperature; boiler temperature exceeded value stored in parameter **bot**.
**EFUN**: Activation of the thermal protection of the motor. On the little temperature display it will appear “UP” or “DOWN” according it is the thermal protection of the upper motor (and the motor of 6-10 grid ovens) or lower motor on 20-grid oven. The thermal protection has an automatic reset but in order to continue with the cooking process, parameter **ALFn** has to be reset to 0.
**Etc**: Tripping out of cavity limiter
**Etb**: Tripping out of boiler limiter
**ESCH** or **ETBR**: Over temperature on the electronic board; check the cooling fan and the ventilation openings on the bottom of the control panel.
**Ept1**: cavity probe in open circuit (only the steam cycle – 100 °C can be selected)
**Ept2**: boiler probe in open circuit (only hot air cycle can be selected)
**Ept3**: meat probe in open circuit (only time cooking can be selected)
**Ept4**: by-pass probe in open circuit (only hot air, regeneration or low temperature steam cycle can be selected)
**Ept8**: NTC probe in short or open circuit
**ECAD**: A/D converters not working
**E PM**: Communication error with PWM system
**E SL**: Water level probe error. If the boiler heating elements or burners are on for a tiem over that one defined in parameter **tbon** without a water charging phase, this error message is activated. To reset it, parameter **ALFn** has to be reset to 0.
**burn CAUP**: Reset of cavity burner (gas oven) (the upper one in the 20 grid ovens)
**burn CAdo**: Reset of lower cavity burner (gas oven) in 20 1/1 and 2/1 ovens
**burn boUP**: Reset of boiler burner (gas oven) (the upper one in 20 2/1 ovens)
**burn bodo**: Reset of lower boiler burner (gas oven)

## 6.2. Warnings

**EH2O**: Before the starting of the cleaning system and during its working, there are some check points of the water pressure. If the water pressure is too low this warning message appear on the display. Check the water pressure (1.5÷2.5 bar), check the correct working of the water pressure switch, check if there are obstructions on the cleaning water inlet pipe (its inner diameter must be 20 mm). From firmware release 2.50, EH2O is a warning message and no more an error causing the stopping of the cleaning cycle.
**EFLP**: Cavity ventilation flap failure; check the motoreducer or the micro switch that detects the close position of the flap. If the motoreducer does not close the flap within the time set in parameter **FLto**, EFLP error appears.
**ECLO**: Clock error, it appears if the clock was never adjusted
**EPrG**: Error in reading the phases of a multiphase recipe

[2] See Appendix A

**EIND**: Error in reading the index of the recipes
**EDES**: Error in reading the description of a recipe
**ERAM**: Communication error with the RAM
**nFIP**: Communication error of recipe display
**DOOR**: Open door (from firmware 2.6 only the led on the control panel switches on)
**FILL**: Safety level probe of the boiler out of water
**PrEH**: Preheating phase of the boiler; from firmware 2.90 it indicates the preheating phase of the cavity if the warning message appears on temperature display.
**OPEN**: boiler drain activated
**COOL**: Cavity cooling phase
**dEt**: low level of detergent
**rAI**: low level of rinser
**rCLN**: request for a cleaning cycle (manual or automatic); parameter **FCLn** is set to a value different from da 0.
**LOAD**: end of pre-heating phase of the cavity; if nothing is done, the cavity is maintained at the pre-heating set-point.
**Strt**: push START button.

# 7. Firmware version

In order to check the version of the firmware, switch on the oven and wait for the lamp test and the end of the start-up phase (4 lines on the temperature display). When on the temperature display, the actual cavity temperature appears, pressing the three service buttons together on the display temperature the firmware version will appear. Pressing again these buttons, the board temperature will be displayed.

# 8. Working temperatures

While the oven is working, it is possible to see the temperature of the several probes pressing the service buttons. See the following figures:

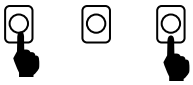


Fig. 16
Temperatura del boiler

Fig. 17
Temperatura del by-pass

Fig. 18
Temperatura dello spillone

Fig. 19
Temperatura della scheda

# 9. Service utilities

From firmware release 2.50, some useful utilities are present for troubleshooting and diagnostic of the oven.
These additional features can be divided in 2 set: utilities that can be activated with the oven switched on, utilities that can be activated with the oven in parameter programming

## 9.1. Utilities that can be activated with oven switched on

With the oven switched on and not in a cooking phase, pressing simultaneously the following buttons it is possible to activate the detergent, rinser pumps and water valve of the cleaning system:

- Steam cycle, combi cycle, temperature buttons (fig. 20): activation of detergent pump
- Steam cycle, combi cycle, time buttons (fig. 21): activation of rinser pump
- Steam cycle, combi cycle, utility buttons (fig. 22): activation of water valve of the cleaning system

These routines are achievable only on lev. A ovens, i.e. with the parameter **dCLn** set to 0, closed door and cavity temperature less than 80 °C and, from firmware release 2.90, with the oven not blocked with password.

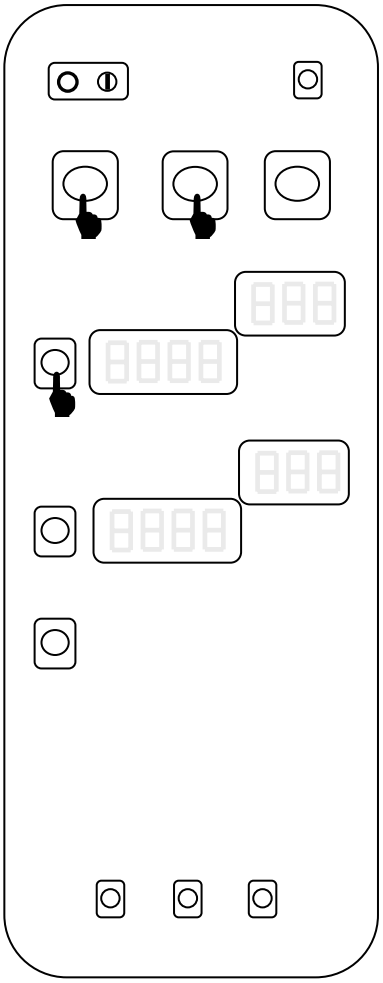


Fig. 20

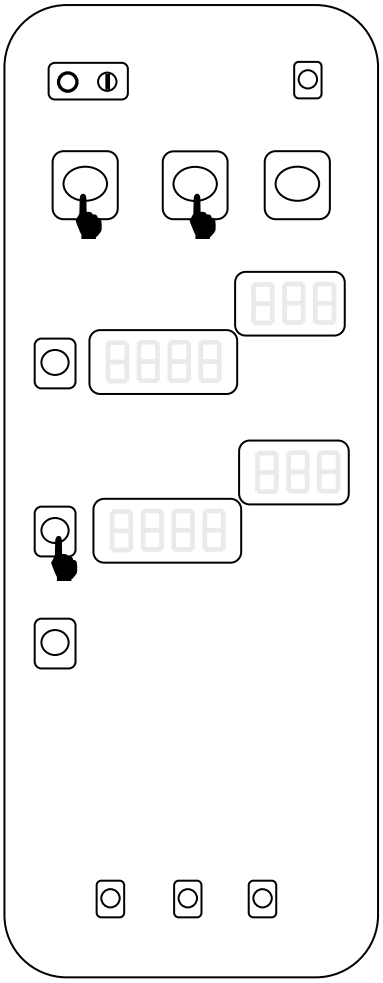


Fig. 21

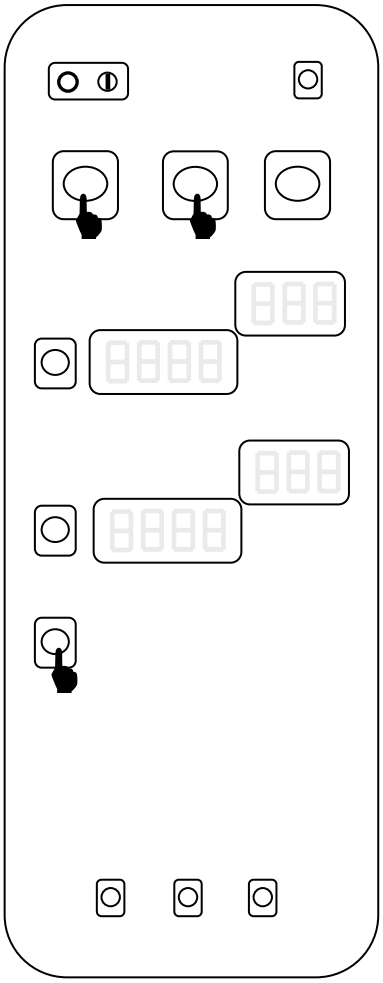


Fig. 22

## 9.2. Utilities that can be activated in parameter programming

- Pressing the steam cycle and hot air cycle buttons, all the output relays are sequentially activated and on the time display it will be displayed the activated relay with the message **do1**, **do2**, ... (**dox**=**RLx** on the EWD)
  From firmware release 2.7 this utility is changed as follows:
  - o The steam cycle button acts as main switch: if it is released, the test stops.
  - o Each time the hot air cycle button is pressed, the next relay is activated and remains activated till the next pressure of the hot air cycle button.
  - o If the hot air cycle button is kept pressed, the relays are sequentially activated.
- Pressing the time buttons, the time will be displayed
- Pressing the utility button, on the time display a 4-characters message will be displayed while on the little display will be shown a number with the following meanings

| Big display | Meaning of the number on the little display |
|---|---|
| **ntc** | PCB temperature |
| **Prb1** | First meat probe temperature (lev. A) |
| **Prb2** | Second meat probe temperature (lev. A) |

| Big display | Meaning of the number on the little display |
|---|---|
| **Prb3** | Third meat probe temperature (lev. A) |
| **Prb4** | Fourth meat probe temperature (lev. A) |
| **Prb5** | Fifth meat probe temperature (lev. A) |
| **Prb6** | Sixth meat probe temperature (lev. A) |
| **CEL1** | First cavity temperature |
| **CEL2** | Second cavity temperature |
| **boL1** | First boiler probe |
| **boL2** | Second boiler probe |
| **byP** | Bypass probe |
| **Prb** | Single-point meat probe (lev. B) |
| **HuM** | KS contactor is activated for 15 s and the lambda probe is fed and after a while the cavity humidity will be displayed |

If one of the probes is detecting the same temperature of the ntc probe (PCB temperature), the meanings are the following:

1) Probe in short circuit
2) Probe not connected (for example **Prb** on a lev. A oven)
3) Probe at the same temperature of the ntc probe

- If the led “open door” is switched on in parameter programming mode, it means that the safety level probe of the boiler is detecting water
- If the led “scale alarm” is switched on in parameter programming mode, it means that the working level probe of the boiler is detecting water

## 10. Selection of the language for the recipe menu (lev. A)

Starting from firmware release 2.30 on lev. A ovens it is possible to select a language for the menu of the recipes. To select the language, set parameter **LanG** to the correct value for the desired language (see the relevant parameter list).

## 11. Cleaning cycle (lev. A ovens)

Each cleaning cycle can be divided into the repeating of 3 fundamental phases[3]:

**Phase A**

- Washing phase controlled through the parameters **CLt1** (time of detergent injection) and **CLt2** (time of detergent + water injection)

**Phase B** (like Phase A but with the final sub phase with 20 seconds of water)

- Washing phase controlled through the parameters **CLt1** (time of detergent injection) and **CLt2** (time of detergent + water injection)

**Phase C**

- Rinsing and drying phase controlled through the parameters **CLt3** (time of rinse aid injection) and **CLt4** (time of water injection)

The cleaning cycles are composed according the following table:

| Cycle | Name of the program | Composition of the phases |
|---|---|---|
| SOFT CYCLE | CLEAN 1/SOFT | A+C |
| MEDIUM CYCLE | CLEAN 2/MEDIUM | 2A+C |
| STRONG CYCLE | CLEAN 3/STRONG | 2A+2B+C |
| EXTRA–STRONG CYCLE | CLEAN 4/X-STRONG | 2A+4B+C |

At the end of a cleaning cycle (at the end of the acoustic signal) the oven enter a stand-by state (from firmware 2.40), i.e. the boiler heating elements are not fed, the user interface shows only the time and the

[3] At the beginning of each phase the cavity is brought at a certain temperature with a COOLING phase without water or with an hot air cycle

ON-OFF button led is the only lit up led. The exit from this stand-by state takes place with an action from the user: pressing of a button of the user interface or opening the oven door.

**NB**: To check the correct water installation, make sure the rotating wash arm does not turn below 100 rpm (120 rpm max.)

# 12. Cycles, utilities, important parameters

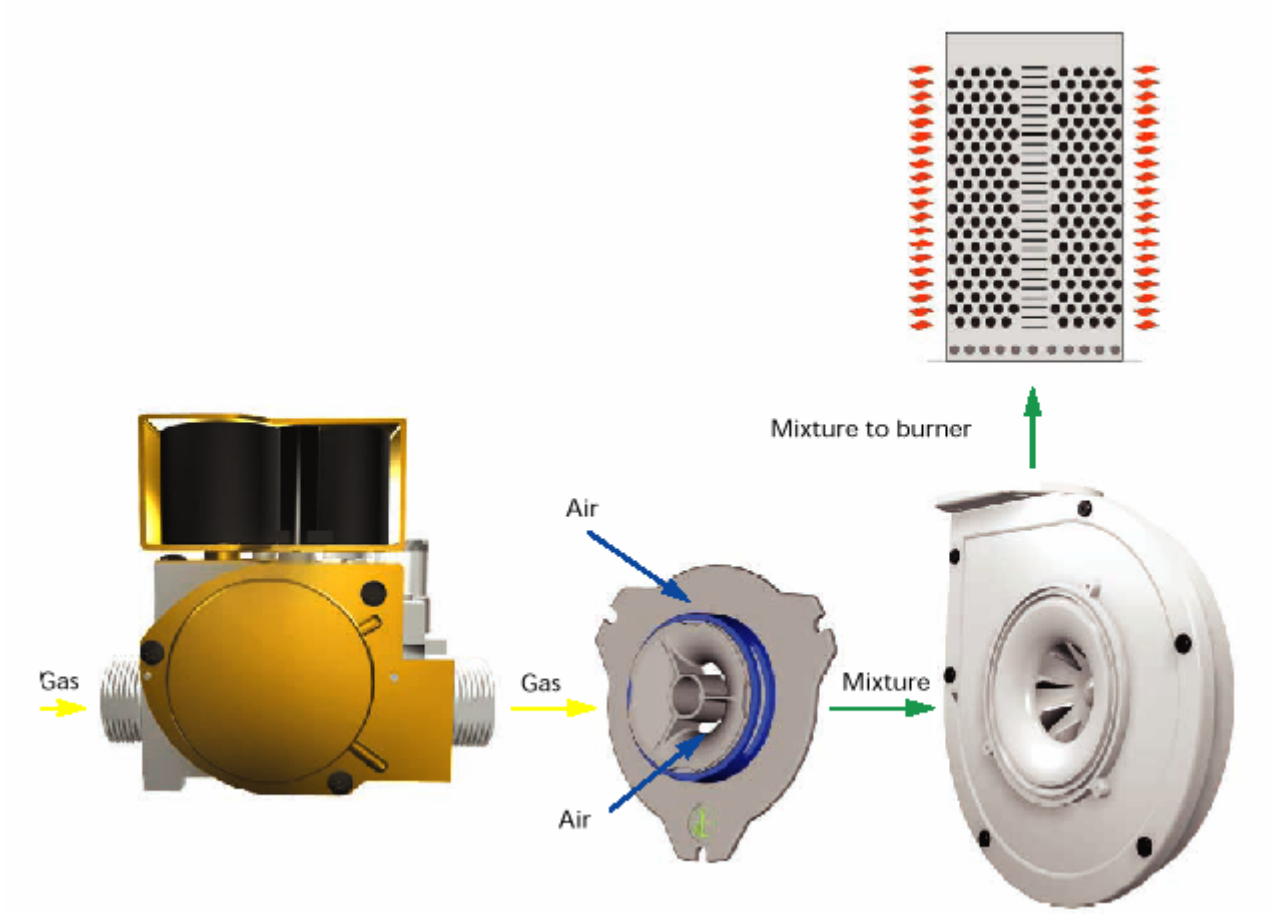
**Hot air cycle**: Only the cavity heating elements/burners are working. The maximum temperature is 300 °C; if the set point is over 250 °C, the maximum working time that can be set is given by parameter **dutM**. If on a lev. A oven a humidity value is set, the lambda probe will control only the cavity flap.
**Steam cycle**: The maximum set point temperature is 100 °C (130 °C from firmware 2.6). Boiler heating elements/burners are controlled with the lambda probe (lev. A ovens) or with the by-pass probe (lev. B ovens) for a set point of 100 °C; for set point lower than 100 °C, the boiler is controlled with the cavity probe.
**Combi cycle**: Boiler and cavity heating elements/burners are working. Cavity heating elements/burners are controlled with the cavity probe; boiler heating elements/burners are controlled by the lambda probe (lev. A ovens) or by the by-pass probe (lev. B ovens). The maximum set point is 250 °C. From firmware 2.6, for a set point lower than 100 °C, to obtain the required steam the humidifier is used (not the boiler).
**Regeneration cycle**: In this cycle boiler and cavity heating elements/burners work alternatively during the first rising (parameter **rIGb** – it defines the boiler working time – e parameter **rIGc** – it defines the cavity working time) till the set point is reached. After the set point is reached, boiler and cavity works in parallel to maintain temperature and humidity.
**DELTA-COOKING cycle**: This cooking cycle is used with the meat probe and hot air, steam or combi cycle. For this cycle it is set a Delta temperature (let's call it D) and not a cavity set-point. The cavity will be thermostatically controlled to have in any moment a cavity temperature that is D °C over the meat probe temperature.
**COOL**: The cavity-cooling mode takes place with the fan running and water injection from the temperature of 180 °C (parameter **trMA**) to the temperature of 40 °C (parameter **trMn**). Passing from a cooking cycle to a steam cycle, an automatic cooling phase will take place if the cavity temperature is over 3 °C (parameter **dSAc**) from the set point of the steam cycle.
**Boiler automatic drain**: The automatic boiler drain takes place each 2 hours of working of the boiler heating elements/burners (parameter **dbon**) and if the water temperature is lower than 50 °C (parameter **tcdb**). Then the boiler is automatically filled.
**Board cooling**: The cooling fan is activated starting from the temperature defined in parameter **Sbc**.
**Boiler preheating**: After the filling of the boiler, the water is heated up to 85 °C (parameter **SPHb**) and maintained at this temperature if the boiler is not used.
**Hour counters**: The hour counter parameters are the following:

- **hAir**: hot air mode hour counter
- **hStM**: steam mode hour counter
- **hcMb**: combi mode hour counter

**Parameter PPM**: Setting this parameter to 1, the Energy Optimiser function is enabled (with Sicotronic system) in the foreseen electric ovens. The 2 high voltage digital inputs named IND4 (X10-11/5) and IND5 (X10-11/6) and the 2 output relays RL5 and RL24 are used. RL5 is closed each time the oven has to use the heating elements at half or full power while RL24 is closed when the heating elements have to be used at full power (independently from Sicotronic system). IND4 and IND5 are the high voltage inputs of the commands from Sicotronic system: if on IND4 and IND5 are present 230V the oven is working normally; if only one is at 230V the oven is forced from Sicotronic system to work at half power (with no visualization on the display); if both IND4 and IND5 are at 0V, the oven is forced to cut all the heating elements
**Parameter dEMO**: If enabled (set to 1), this parameter makes the oven working in demo function i.e. the user interface is fully working but the oven does not make any real function (no load is activated).
**Parameter tbon**: Timeout for E SL error; if it is set to 0 the control is disabled (from firmware 2.80).
**Parameter AbSP**: Setting this parameter to 1, the selected cooking cycle starts closing the door without pressing the START/STOP button (from firmware 2.80).
**Parameter dSPS**: Setting this parameter to 1 the pre-heating of the boiler is disabled when the oven is not in cooking mode, so the pre-heating will start at the beginning of a combi or steam mode or of a recipe that provided the use of those modes in one of its steps (from firmware 2.80).

# 13. Gas system




The gas system is made with low emission burners. The main components are:

- SIT gas valve type SIGMA 848
- DC burner fan that is intaking air through a calibrated mixer where the air–gas mixture is created; then the fun conveys the mixture to the burner
- A cavity and a boiler heat exchanger made with a corrugated tube for increasing the efficiency
- An ignition rod and a detection rod
- An ignition device.

Starting with a cooking cycle, the POW board of the oven activates the ignition device which activates the burner fan whose speed is controlled with a PWM signal.
The POW board activates the ignition device. From pin 8 of the ignition device a high voltage output is carried to the digital input section of the POW board (X10/5÷8) and to the switching feeder for the burner fans.
With an high voltage input on X10/5÷8, the POW board generates on X9/2÷5 a PWM signal to control the speed of the burner fans, i.e. controlling the quantity of sucked gas and air. The PWM signal changes according to the status of the burner, i.e.:

- Start of the burner: controlled with parameters **StcA** (start of cavity burners) and **Stbo** (start of boiler burners).
- Full power of the burner: controlled with parameters **FucA** (full power of cavity burners) and **Fubo** (full power of boiler burners)
- Half power of the burner: controlled with parameters **hAcA** (half power of cavity burners) and **hAbo** (half power of boiler burners)

The quantity of sucked gas is controlled with those parameters (which are determining the speed of the burner fans), with the injector/diaphragm inserted at the outlet of the gas valve and with the calibration of the offset value on the gas valve.
The quantity of sucked air is controlled with the above parameters and with the calibrated aerator on the mixer.
The ignition sequence is then the following:

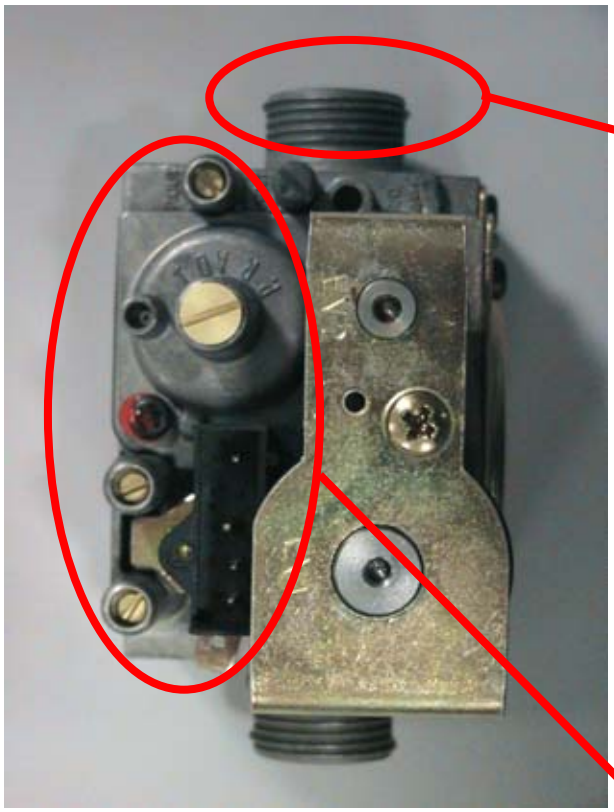
- The POW boards activates the ignition device
- After 1.5 s, the ignition device activates the fans that start at the speed determined with parameters **Stxx**
- The spark starts for 4 s and after these 4 s there are 2 s for flame detection
- If the flame is detected, the start speed is maintained for around 6 s and after this time the fans are carried to their working speed (half or full power)
- If the flame is not detected, the fan keep on running for an interpurge phase of 15 s; after this phase there is a stop of the fan for 1 s and the ignition sequence is repeated. If the flame is still not detected there will be again 15 s of interpurge phase and then the last ignition attempts before the reset signal.

In case of loosening of the flame signal during working, only one re-ignition attempts takes place.
In case of conversion to different type of gas, besides the injector/diaphragm also the parameters, which control the PWM signal, have to be changed according to appendix G and the offset pressure has to be set.

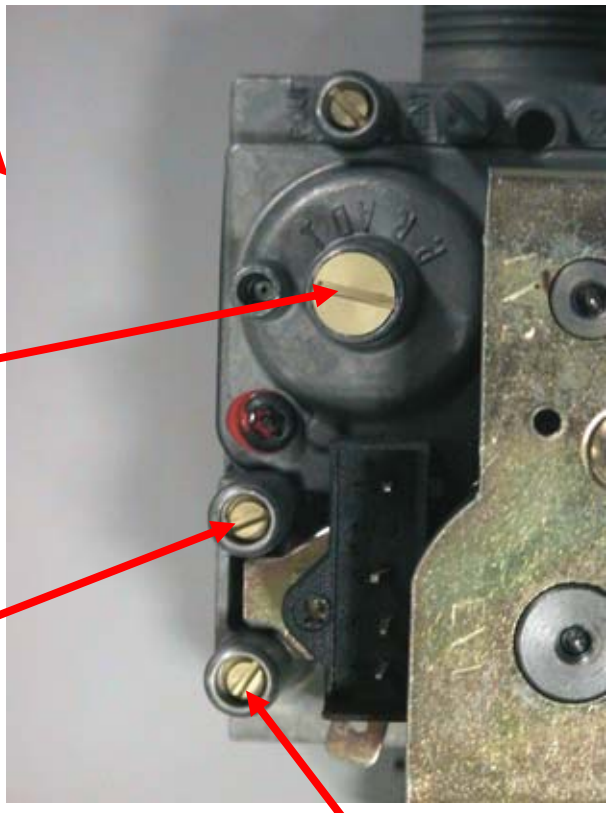
NB: On 10 1/1 and 20 1/1 ovens, changing from natural gas to LPG or G30 a flow reducer flange (fig. 24 - enclosed in the oven) with hole of diameter 21 mm must be put between the cavity burner fan and the cavity burner; on 10 2/1 and 20 2/1 ovens, changing from natural gas to LPG or G30 a flow reducer flange (fig. 25 - enclosed in the oven) with hole of diameter 25 mm must be put between the cavity burner fan and the cavity burner

## 13.1. Gas valve



Injector



Remove this threaded cap to get access to the offset adjustment screw

Offset pressure test point

Inlet pressure test point

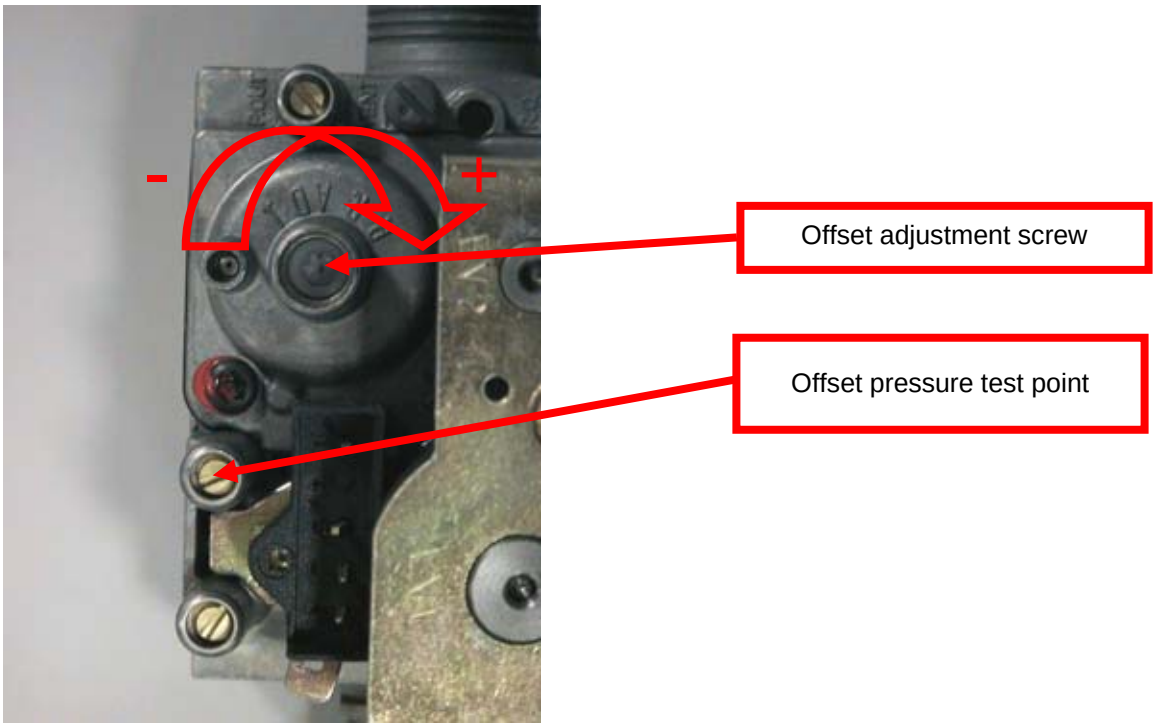




Fig. 23 - Injector


Fig 24 - LPG flange 1/1


Fig. 25 - LPG flange 2/1

## 13.2. Offset pressure calibration

For the adjustment of the offset pressure, connect a manometer with a resolution of 1 Pa (100 Pa=1 mbar) to the offset pressure test point after loosening the sealing screw. To adjust the cavity gas valve offset, set an hot air cycle, half power; to adjust the boiler gas valve offset select a steam cycle, half power. Wait around 3 minutes for the stabilization of the pressure before adjusting it turning slowly the screw indicated in the picture above.

## 13.3. Use of manometer (for offset pressure measure)

Fig. 26 – Manometer 0S0388

Using the pressure inlet signed with "**+**" and with negative reading on the display as in the fig. 27-28, this means we are measuring **– 0.16 hPa** = **– 16 Pa**:


Fig. 27


Fig. 28

Using the pressure inlet signed with "**+**" and with positive reading on the display as in the fig. 29-30, this means we are measuring **+ 0.16 hPa** = **+ 16 Pa**:


Fig. 29


Fig. 30

Using the pressure inlet signed with "**–**" and with negative reading on the display as in the fig.31-32, this means we are measuring **+ 0.16 hPa = + 16 Pa**:

Fig. 31


Fig. 32

Using the pressure inlet signed with "–" and with positive reading on the display as in the fig. 33-34, this means we are measuring **– 0.16 hPa = – 16 Pa**:

Fig. 33


Fig. 34

## 14. Change of the microprocessor board

In case of changing of the microprocessor board, the following operations/calibrations have to be done:

1) Default parameter programming
2) Change parameters according parameter list
3) Lambda probe calibration for lev. A ovens (from firmware 2.6)
4) By-pass calibration (lev. B ovens) and cavity offset (parameter **OCA1**) or only cavity offset for lev. A ovens.

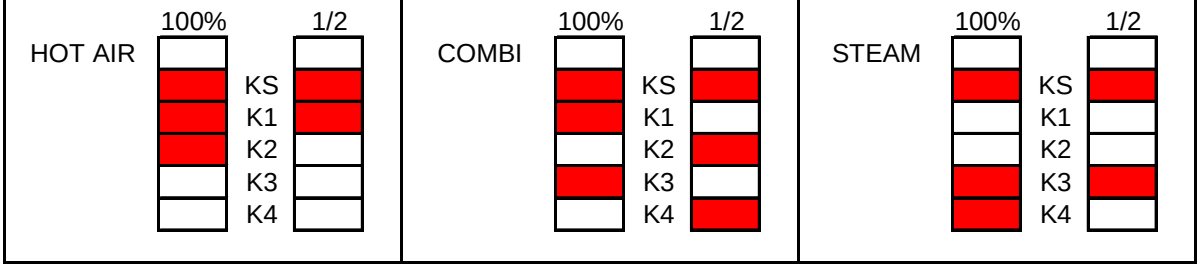
  

# APPENDIX A – WATER BOILING POINT

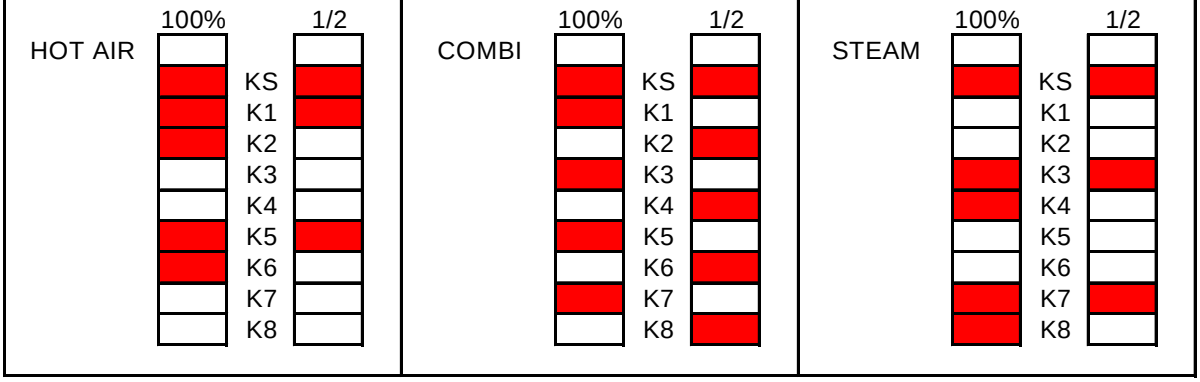
| Height (m) | Water boiling point (°C) |
|---|---|
| 0 | 100.00 |
| 300 | 98.90 |
| 500 | 98.30 |
| 800 | 97.50 |
| 1000 | 96.80 |
| 1500 | 95.00 |
| 2000 | 93.50 |

# APPENDIX B – CONTACTORS DIAGRAM

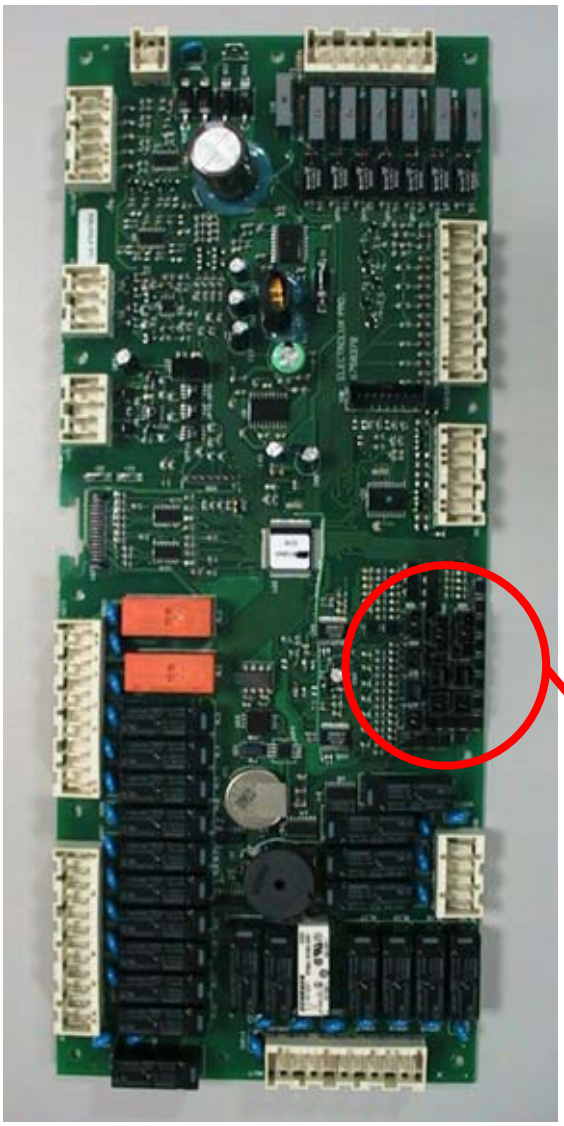
## Contactors used on AOS061E_, AOS101E_, AOS102E_

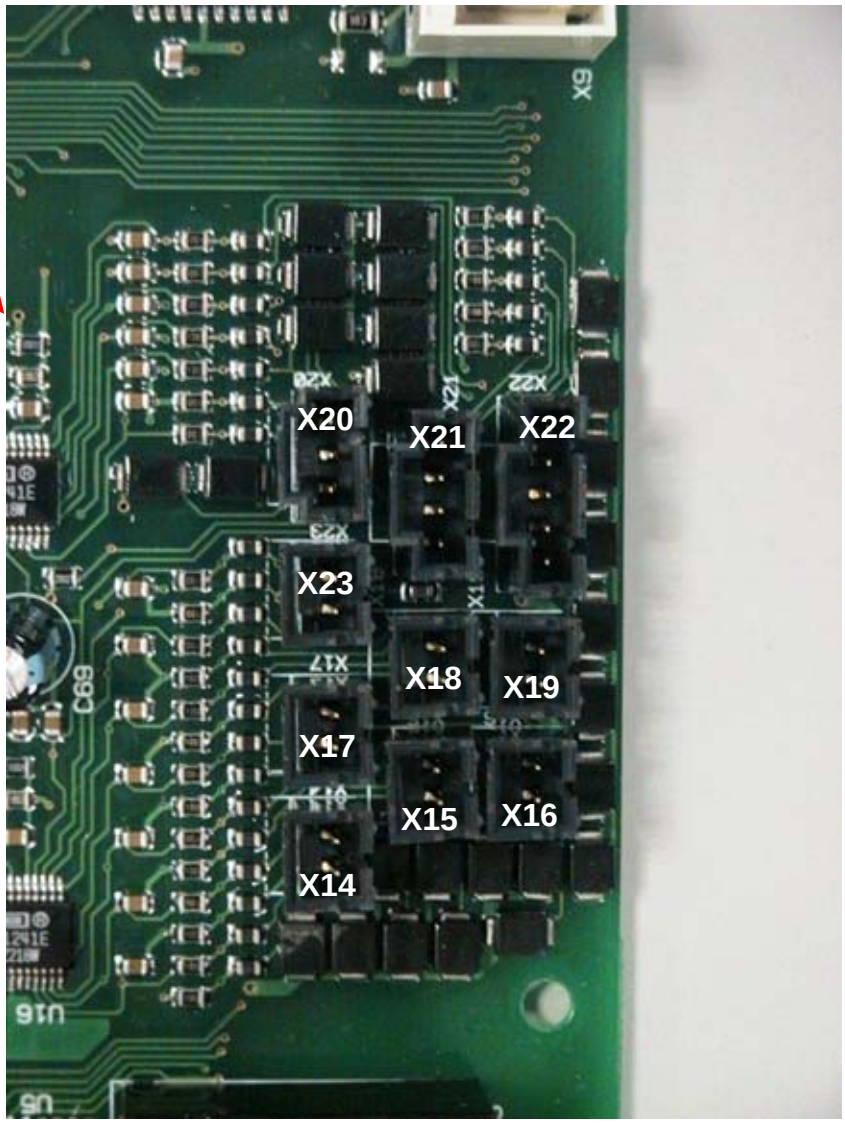



## Contactors used on AOS201E_, AOS202E_



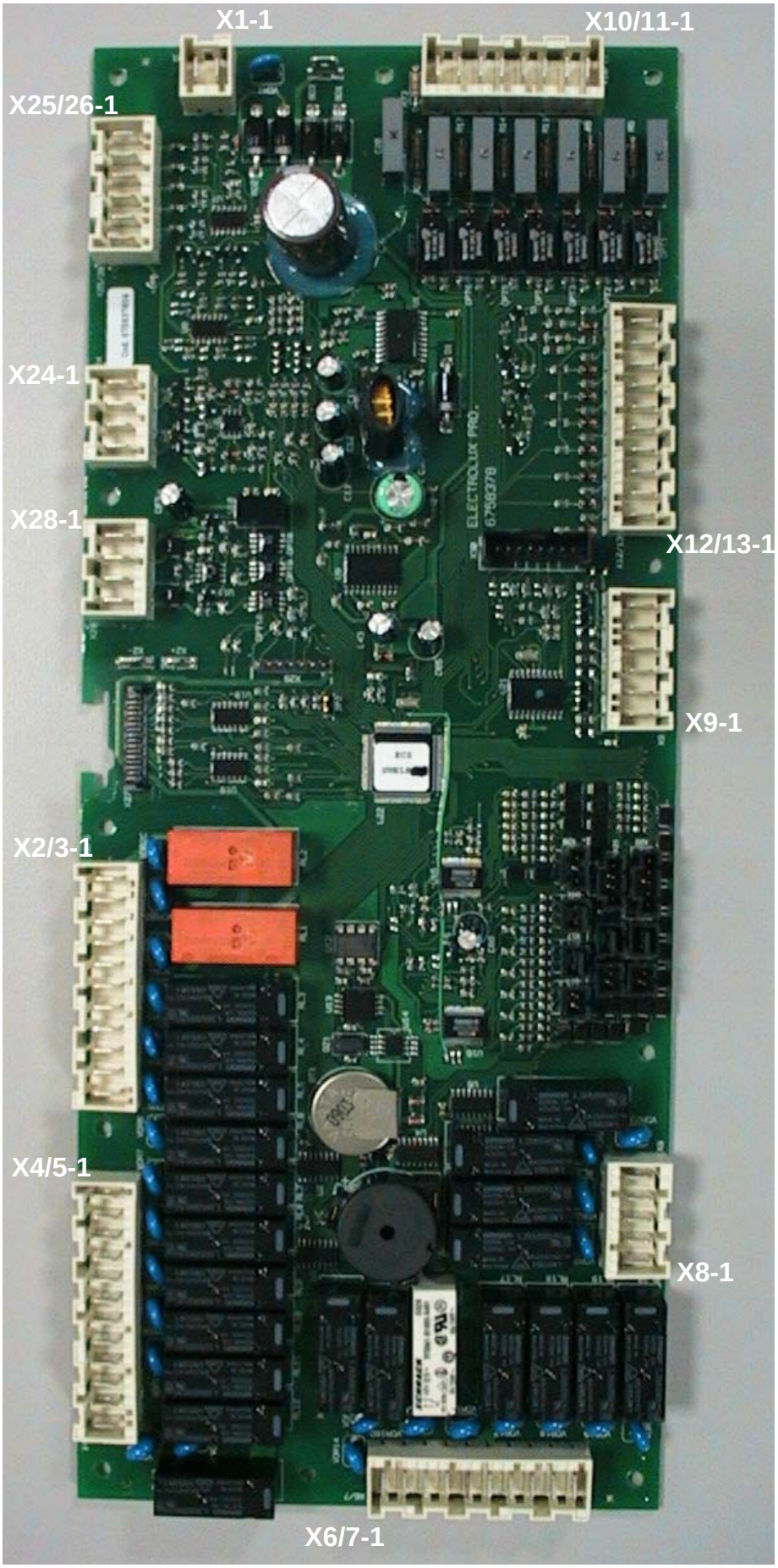
# APPENDIX C – CONNECTIONS ON MAIN BOARD






Put a jumper to make a short in the not used connections.



| Connector | Description |
|---|---|
| X1 | Main board supply (24 Vac) |
| X2/3 | Power supply to cavity fan motors, cooling fans, cavity flap motor, switching feeder for the lambda probe |
| X4/5 | Power supply to coils of cavity/boiler heating element contactors or cavity/boiler burner gas valves, steam condensing valve, humidifier valve, cavity lamps |
| X6/7 | Power supply to boiler water filling valves, boiler drain valve |
| X8 | Power supply to cleaning system |
| X9 | Output of PWM signal for burner fans |
| X10/11 | High voltage digital input, i.e. thermal protection of the cavity fan motors and command signal of the burner fans from the ignition devices |
| X12/13 | Low voltage digital input, i.e. cleaning system water pressure switch, cavity limiter, boiler limiter, door micro switch and micro switch of the cavity flap |
| X14 | Connection of bypass probe |
| X15 | Connection of cavity probe |
| X16 | Connection of boiler probe |
| X17 | Connection of single point meat probe |
| X18 | Connection of second cavity probe |
| X19 | Connection of second boiler probe |
| X20, X21, X22 | Connections of multi point probe |
| X23 | Connection of lambda probe |
| X25/26 | Connections of water level probes |
| X28 | RS485 connection |

# APPENDIX D – TROUBLESHOOTING

| Oven | Problem | Analysis | Probable anomaly | Checks/causes |
|---|---|---|---|---|
| AOS | Humidity bar always of red or blue colour (or switched off) | | | 1) Check if the lambda probe is fed: 9.5 Vdc from the relevant switching feeder<br>2) If 9.5 Vdc are not present, check if the switching feeder is supplied with 230 Vac from the main board<br>3) Check the fuse on the switching feeder<br>4) Check the connection of the probe on the main board<br>5) Check the connections on the lambda probe<br>6) Change the lambda probe<br>7) If the humidity bar is switched off, check if parameter **LAMb** is set to 1 |
| AOS | In the recipe menu the cleaning programs are not present | | Parameter **dCln** set to 1 | Check and set parameter **dCln** to 0 |
| AOS | The user interface board does not switch on | | | 1) Check the correct connection of the power supply cables of the user interface board on the main board<br>2) Check he connection of the flat cable on the main board |
| AOS | The oven does not switch on and the ON/OFF led is off | | Main board not powered | 1) Check if voltage is present (24 Vac) at the main board input (X1 connector)<br>2) Check voltage output (24 Vac) on the transformer<br>3) Check F1 fuse |
| AOS | The oven does not switch on and the ON/OFF led is on | Switching off and switching the oven on again after few minutes, the oven starts again | Overtemperature of the main board | 1) Check the working of the cooling fan<br>2) Check the openings on the bottom of the control panel are not clogged |
| | | The previous analysis had a negative result | Defective electronic component on the main board | Change main board |

| Oven | Problem | Analysis | Probable anomaly | Checks/causes |
|---|---|---|---|---|
| AOS | The user interface board does switch on but no load is activated | | Fuse F2 burnt | Check fuse |
| AOS | In the recipe menu only signs like "P: Sxx" o "Sxx" are appearing | | EEPROM of the main board is not programmed | Change EEPROM or main board |
| AOS elt | Heating of the boiler is slow | | Heating element burnt | Check that all the branches of the boiler heating elements are working |
| | | | Contactors not working | Check correct working of the contactors (see appendix B) |
| AOS elt | Heating of the cavity is slow | | Heating element burnt | Check that all the branches of the cavity heating elements are working |
| | | | Contactors not working | Check correct working of the contactors (see appendix B) |
| AOS gas | The fan of a burner is working always at the maximum speed | | PWM signal not present | 1) The connector of PWM signal (X9) on the main board is not connected<br>2) PWM signal cable is interrupted |
| AOS gas | The fan of a burner does not start | | The fan is not powered (24 Vdc) | 1) Check if the fan is powered: 24 Vdc from the relevant switching feeder.<br>2) Check fuse on the relevant switching feeder if 24 Vdc are not present |
| | | | PWM signal at 0 | 1) Exchange the PWM cable between cavity and boiler fan to check if the fan starts<br>2) Check if high voltage digital signal is present on X10/11-5÷8<br>3) Close the gas tap, disconnect connector X9 and try to start the burner: the fan has to run at the maximum speed. If this is not happening, change fan. If the fan starts, change main board. |

| Oven | Problem | Analysis | Probable anomaly | Checks/causes |
|---|---|---|---|---|
| AOS gas | The cavity burner is whistling or grumbling | | Gas-air mixture not correct | 1) Check PWM parameters for the cavity burner<br>2) Check offset pressure<br>3) Check injector<br>4) Check aerator<br>5) With LPG on 10-20 grid ovens (1/1 or 2/1), check the presence of the flange after the burner fan<br>6) Set to 0 the parameter **Sbc** in order to have the cooling fan always working supplying with air the burners |
| AOS gas | The boiler burner is whistling or grumbling | | Gas-air mixture not correct | 1) Check PWM parameters for the boiler burner<br>2) Check offset pressure<br>3) Check injector<br>4) Check aerator<br>5) Set to 0 the parameter **Sbc** in order to have the cooling fan always working supplying with air the burners<br>6) Check integrity of the gasket of the boiler burner |
| AOS gas | The main board is switching off/on by itself | | Coupling of high voltage and low voltage circuits | 1) Check the separation between high voltage and low voltage cables<br>2) Check integrity of ignition cables: they must not be cracked discharging towards inner components of the oven<br>3) Reinforce the insulation of the ignition cables with a silicon pipe |

| Oven | Problem | Analysis | Probable anomaly | Checks/causes |
|---|---|---|---|---|
| AOS gas | Burner does not light | Burner fan is working, "burn xxx" error after the 3 ignition attempts | Gas tap is closed | Open gas tap |
| | | | Not correct injector | Check injector |
| | | | Not correct aerator | Check aerator |
| | | | Not correct values in the PWM parameters | Check PWM parameters |
| | | | Too low setting for the offset pressure | Check offset calibration |
| | | | Gas valve is not opening (the offset pressure during ignition is very high - around 1.00 hPa) | 1) Check the ignition device is well fixed and connected to the gas valve<br>2) Faulty gas valve |
| | | Burner fan is working, no ignition attempts | No continuity on the bridge between terminals 5-6-7 of the ignition device | Restore continuity |
| | | Burner fan is not working, "burn xxxx" error after the 3 ignition attempts | Burner fan not powered (24 Vdc) | 1) Check that the relevant switching feeder TR_Fx is powered through fuse F2<br>2) Check fuse on TR_Fx<br>3) Check that 24 Vdc are present at the output of TR_Fx (J1-1 e J1-2, J1-3 e J1-4) and at the input on the fan (with connector X9 disconnected and 24 Vdc present at the input on the burner fan, this has to run at the maximum speed - see also the following point 1)<br>4) Check correct connections between TR_Fx and the burner fan |
| | | | PWM signal at 0 | 1) Close the gas tap, disconnect connector X9 and try to start the burner: the fan has to run at the maximum speed. If this is not happening, change burner fan.<br>2) If with X9 disconnected the fan starts, check connections on X9 and if they are correct change main board |

| Oven | Problem | Analysis | Probable anomaly | Checks/causes |
|---|---|---|---|---|
| | | Burner fan is not working, "burn xxxx" error appears with no ignition attempts after reset | Ignition device not powered | 1) Check limiter connections<br>2) Check the relevant relay on the main board |
| | | | Lack of 230 Vac signal on X10/11 | 1) Ignition device is not giving the 230 Vac signal from terminal 8, change ignition device<br>2) Check connection from ignition device to TR_Fx and to X10/11 |
| AOS gas | The burners switch on only for few seconds and then they switch off | The problem occurs on all the burners (cavity and boiler) | Inversion of Phase-Neutral | Check cables on main terminal board |
| | | The problem occurs only on a cavity burner or on boiler burner | Detection problem | Change the ignition device with one working device to check if the problem persists |
| | | | | Check detection rod and integrity of relevant cable |
| AOS gas | Oven is always loading water, water in the cavity overflowing from the boiler | Water level probe are not detecting water | Water level probes covered with scale or other | Check water level probes |
| | | | Broken probe cable | Check continuity of the cable |
| | | | Water level system on main board not working | Make a short between X25/26-1 and X25/26-3: the fast filling valve has to close; make a short between X25/26-2 and X25/26-3: the slow filling valve has to close. If this is not happening change main board but before check also next point |
| | | Noise on ground circuit | Bad ground connection of some devices inside the oven, mainly the switching feeder TR_Fx or TR_HC are not connected to ground | Check the ground connections |
| | | | | |
| | | | | |
| | | | | |

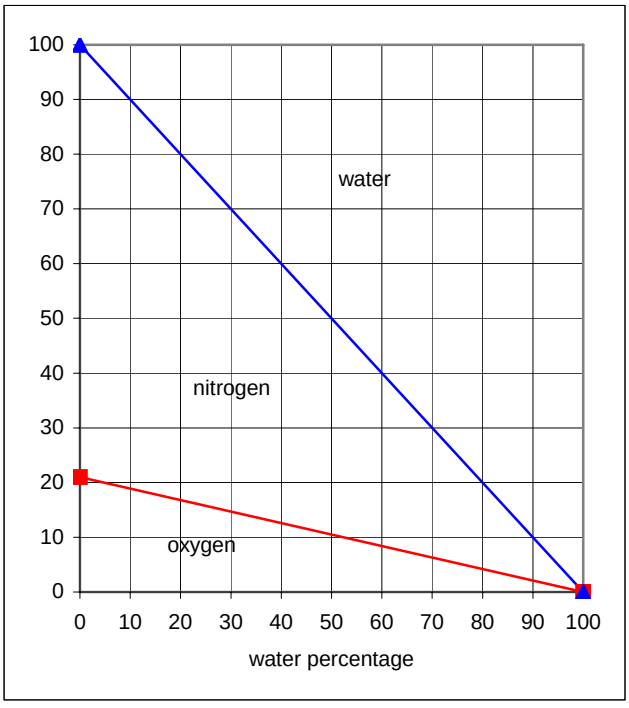
  

# APPENDIX E – LAMBDA PROBE

In the lev. A AOS ovens the lambda probe is used to measure the humidity. How does it work?

The lambda probe permits measurement of oxygen concentration through a solid electrolyte (ceramic element)
The ceramic part of the probe is in the form of a tube closed at one end. The inside and outside surfaces of the ceramic sensor have a microporous platinum layer (electrode). The platinum layer, which is in contact with the analyzed gas, is covered with a highly porous protective ceramic layer.
The ceramic sensor ($ZrO_2$ – solid electrolyte) is heated from inside by means of a ceramic heater so that the temperature of the sensor ceramic remains above 350 °C. Starting from 300°C, the $ZrO_2$ sensor becomes conductive for the oxygen ions so that if there is a different concentration of oxygen at the two sides of the sensors (one side is in contact with the analyzed gas, the other side is in contact with the external), a voltage is generated.

Since the Oxygen/Nitrogen ratio in the air is constant, a measurement of the concentration of oxygen enables the percentage of a third gas (in this case water vapor) to be determined. In fact the addition of a third gas to a sample of air has the effect of reducing in a proportional manner the presence of oxygen and nitrogen so that, as said, determining the relative concentration of oxygen allows the amount of the third introduced gas of the mixture to be determined (see the diagram).


Connections on the lambda probe:
- Pin 1: not used
- Pin 2-3: connections to the main board (connector X23)
- Pin 4-5: connections to the switching feeder

# APPENDIX F – PARAMETER DESCRIPTIONS

| Name | Description |
|---|---|
| 5060 | Frequency |
| 6Prb | Presence of 6-point meat probe (1=yes for lev. A, 0 for lev. B) |
| AbSP | Flag to enable starting of cooking closing the door (0=disable; 1=enable) |
| Addr | RS485 address |
| AL1E | Flag to enable detergent/rinser level probes (0=disable; 1=enable) when the relevant sensors are installed |
| ALFn | Activation of cavity motor thermal protection |
| APPL | Level of the oven |
| APPM | Type of oven |
| bAud | RS485 bit rate |
| bot | Max. steam generator overheating (ETUB alarm) |
| chr1 | First character of the password |
| chr2 | Second character of the password |
| chr3 | Third character of the password |
| chr4 | Fourth character of the password |
| chr5 | Fifth character of the password |
| chr6 | Sixth character of the password |
| chr7 | Seventh character of the password |
| chr8 | Eighth character of the password |
| CLPr | Length of cooling with humidifier after a steam phase in an automatic cleaning cycle |
| CLt1 | Length of detergent injection (phase A) |
| CLt2 | Length of detergent+water injection (phase A) |
| CLt3 | Length of rinser+water injection (phase C) |
| CLt4 | Length of water injection (phase C) |
| Cort | Flag to enable cavity temperature displaying adjustment |
| Cot | Max. cooking chamber overheating (ETUC alarm) |
| Cu | Parameter q of SCELOFF=SCEL-(q+m*dT/dt) (FUZZY-LOGIC) |
| Dbon | Delay for boiler drain |
| dCLn | Flag to disable automatic cleaning cycles (1=disable) |
| dEMO | Flag to enable DEMO (0=disable; 1=enable) |
| dScb | Temperature range (from set) above which the middle power is activated in combi mode |
| dSod | Flag to disable the oven stops when door is open in convection, steam and combi mode: (0=the oven stops) |
| dSPS | Flag to disable pre-heating of the boiler when the oven is in stand-by mode (0=enable pre-heating; 1=disable) |
| dtoF | Max. cooking chamber temperature derivative value for heating elements to be switched OFF (FUZZY-LOGIC) |
| Dton | Max. cooking chamber temperature derivative value for heating elements to be switched ON (FUZZY-LOGIC) |
| dtSb | Delay for activation of fast filling during opening of boiler drain valve |
| dutM | Maximum length of a phase with cavity temperature over 250 ºC |
| E2PP | Flag to enable storing/erasing of recipes on EEPROM (0=enable; 1=disable) |
| EcLn | Temperature for starting time computation of phase 1 during semi-automatic cleaning |
| EMME | Parameter m of SCELOFF=SCEL-(q+m*dT/dt) (FUZZY-LOGIC) |
| EnFL | Presence of motorised cavity flap (1=yes) |
| Ertc | Flag to enable RTC (1=enable) |
| FAHr | Temperature unit (°F = 1, °C = 0) |
| FCLn | Minimum time to force a cleaning cycle (0=no cleaning cycle) |

| Name | Description |
|---|---|
| FrE | PWM frequency |
| Fubo | PWM value at full power of boiler burners |
| FucA | PWM value at full power of cavity burners |
| GAS | Define if the oven is GAS heated (1) or ELECTRIC heated (0) |
| hAbo | PWM value at middle power of boiler burners |
| HAbP | Steam condenser engagement in "hot air" mode |
| hAcA | PWM value at middle power of cavity burners |
| HAFd | Bypass temperature variation for humidification during hot air mode + open flap |
| HAFI | By pass isteresys in hot air+open flap mode |
| HAFS | Bypass base temperature for humidification during hot air mode + open flap |
| hAir | Hot air hour counter |
| hboL | Boiler hour counter |
| HbYP | Max humidity value to stop the boiler |
| HCCP | HACCP Mode |
| hcMb | Combi hour counter |
| Hdut | Flag to enable heater duty cycle (0=disable; 1=enable) |
| hStM | Steam hour counter |
| HUIM | Pulse length of manual humidifier |
| HUon | ON phase of the humidifier with combi cycle beetween 50 and 100 degrees |
| I | Parameter i of SCELON=SCEL(1+p/400)-i (FUZZY-LOGIC) |
| ISG | Define if the oven is an ISG oven (0 means oven with boiler) |
| LAMb | Presence of lambda probe (1=yes) |
| LAnG | Language for the menu |
| Man | Flag to enable manual cookings (0=disable; 1=enable) |
| MHUM | Flag manual humidifier 0=Off 1=On |
| MISG | Max temperature allowed for water injection in ISG |
| nMod | Define if the modification of store program is disable |
| nPrG | Max number of programs |
| OCA1 | OFFSET of first cavity probe |
| OCA2 | OFFSET of second cavity probe |
| OLbd | Calibration of the lambda probe |
| OPr1 | OFFSET of first probe of 6-point meat probe |
| OPr2 | OFFSET of second probe of 6-point meat probe |
| OPr3 | OFFSET of third probe of 6-point meat probe |
| OPr4 | OFFSET of fourth probe of 6-point meat probe |
| OPr5 | OFFSET of fifth probe of 6-point meat probe |
| OPr6 | OFFSET of sixth probe of 6-point meat probe |
| PASS | Flag to enable password (0=disable, 1=enable) |
| PAUT | Flag to enable special programs, i.e. preheating programs and Low temperature (0=disable; 1=enable) |
| pdEr | Sample period to calculate the derivative value (FUZZY-LOGIC) |
| PFAC | Flag to enable factory preset recipes (0=disable; 1=enable) |
| PI | Parameter p of SCELON=SCEL(1+p/400)-i (FUZZY-LOGIC) |
| PPM | Flag to enable Peak Power Management (0=disable; 1=enable) |
| PrEH | Flag to enable cavity preheating during cooking (0=disable; 1=enable) |
| Sbc | Cooling temperature set for board ventilation |
| SbYP | Bypass temperature with max. cooking cavity steam temperature (calibration) |
| SEAL | Altitude above sea level |
| SInC | Boiler temperature that detect presence of scale |
| SPHb | Preheating temperature of the boiler |

| Name | Description |
|---|---|
| SPHF | Boiler temperature during leavening |
| Stbo | PWM value at start of boiler burners |
| StbP | Steam condenser engagement in "boiler" mode |
| StcA | PWM value at start of cavity burners |
| StoF | Minimum time for "switch off" of boiler |
| Ston | Minimum time for "switch on" of boiler |
| tbon | Timeout for E SL alarm, water level probe alarm |
| tcdb | Max water temperature for boiler drain |
| tCMS | Limit of cavity temperature set for working at high temperature |
| thMA | Define the max. temperature limit for the manual injection of water |
| tPrm | Print frequency (0=no print) |
| trMA | Define the max. temperature for water injection during cooling phase |
| trMn | Define the min. temperature for water injection during cooling phase |

# APPENDIX G – GAS CALIBRATIONS

## AOS061G

### CAVITY BURNER

| GAS | Injector | Aerator | OFFSET (hPa) | Parameters | | |
|---|---|---|---|---|---|---|
| | | | | StcA | hAcA | FucA |
| G20 | 6.50 | Yellow | - 0.20 | 35 | 30 | 60 |
| G25 | 7.80 | Yellow | - 0.20 | 35 | 30 | 60 |
| G30 | 5.30 | Yellow | - 0.25 | 40 | 28 | 43 |
| LPG | 5.30 | Yellow | - 0.13 | 40 | 28 | 43 |

### BOILER BURNER

| GAS | Injector | Aerator | OFFSET (hPa) | Parameters | | |
|---|---|---|---|---|---|---|
| | | | | Stbo | hAbo | Fubo |
| G20 | 6.50 | Yellow | - 0.20 | 55 | 35 | 78 |
| G25 | 7.80 | Yellow | - 0.20 | 55 | 35 | 78 |
| G30 | 5.30 | Yellow | - 0.28 | 55 | 36 | 66 |
| LPG | 5.30 | Yellow | - 0.18 | 55 | 36 | 66 |

## AOS101G

### CAVITY BURNER

| GAS | Injector | Aerator | OFFSET (hPa) | Parameters | | |
|---|---|---|---|---|---|---|
| | | | | StcA | hAcA | FucA |
| G20 | 7.00 | Red | - 0.25 | 80 | 26 | 100 |
| G25 | 8.00 | Red | - 0.25 | 80 | 26 | 100 |
| LPG2/G30 | 5.50 | Red | - 0.07÷ 0.00 | 23 | 26 | 100 |
| LPG1 | 5.70 | Red | - 0.15÷ - 0.08 | 23 | 26 | 100 |

### BOILER BURNER

| GAS | Injector | Aerator | OFFSET (hPa) | Parameters | | |
|---|---|---|---|---|---|---|
| | | | | Stbo | hAbo | Fubo |
| G20 | 7.00 | Red | - 0.10 | 50 | 50 | 100 |
| G25 | 8.00 | Red | - 0.10 | 50 | 50 | 100 |
| G30 | 5.70 | Red | - 0.28 | 33 | 45 | 74 |
| LPG | 5.70 | Red | - 0.15 | 33 | 45 | 74 |

**LPG conversion for cavity burner for AOS101G**
For LPG installations, put the ø 21 flow reducer flange between cavity burner fan and cavity burner. Change the PWM parameters.
Then change the injector with the 5.70 one and calibrate the offset in the range - 0.15 ÷ - 0.08 hPa so as to eliminate possible whistles/noises (row LPG1). After you have found the best working condition, cool down and verify ignitions with cold burner.
If the previous setting does not eliminate whistles or noise, change the 5.70 injector with the 5.50 one and use the calibrations of LPG2/G30 row: calibrate the offset in the range - 0.07 ÷ 0.00 hPa so as to eliminate possible whistles/noises (row LPG1). After you have found the best working condition, cool down and verify ignitions with cold burner.

## AOS201G

### UPPER CAVITY BURNER

| GAS | Injector | Aerator | OFFSET (hPa) | Parameters | | |
|---|---|---|---|---|---|---|
| | | | | StcA | hAcA | FucA |
| G20 | 7.00 | Red | - 0.25 | 80 | 35 | 100 |
| G25 | 8.00 | Red | - 0.25 | 80 | 26 | 100 |
| LPG2/G30 | 5.50 | Red | - 0.07÷ 0.00 | 23 | 26 | 100 |
| LPG1 | 5.70 | Red | - 0.15÷ - 0.08 | 23 | 26 | 100 |

### LOWER CAVITY BURNER

| GAS | Injector | Aerator | OFFSET (hPa) | Parameters | | |
|---|---|---|---|---|---|---|
| | | | | StcA | hAcA | FucA |
| G20 | 7.00 | Red | - 0.25 | 80 | 35 | 100 |
| G25 | 8.00 | Red | - 0.25 | 80 | 26 | 100 |
| LPG2/G30 | 5.50 | Red | - 0.07÷ 0.00 | 23 | 26 | 100 |
| LPG1 | 5.70 | Red | - 0.15÷ - 0.08 | 23 | 26 | 100 |

### BOILER BURNER

| GAS | Injector | Aerator | OFFSET (hPa) | Parameters | | |
|---|---|---|---|---|---|---|
| | | | | Stbo | hAbo | Fubo |
| G20 | 8.00 | Blue | 0 | 42 | 45 | 100 |
| G25 | 8.50 | Blue | 0 | 42 | 45 | 100 |
| G30 | 6.15 | Blue | - 0.15 | 30 | 37 | 72 |
| LPG | 6.15 | Blue | 0 | 30 | 37 | 72 |

**LPG conversion for cavity burner for AOS201G**
For LPG installations, put the ø 21 flow reducer flange between cavity burner fan and cavity burner. Change the PWM parameters.
Then change the injector with the 5.70 one and calibrate the offset in the range - 0.15 ÷ - 0.08 hPa so as to eliminate possible whistles/noises (row LPG1). After you have found the best working condition, cool down and verify ignitions with cold burner.
If the previous setting does not eliminate whistles or noise, change the 5.7°0 injector with the 5.50 one and use the calibrations of LPG2/G30 row: calibrate the offset in the range - 0.07 ÷ 0.00 hPa so as to eliminate possible whistles/noises (row LPG1). After you have found the best working condition, cool down and verify ignitions with cold burner.

## AOS102G

### CAVITY BURNER

| GAS | Injector | Aerator | OFFSET (hPa) | Parameters | | |
|---|---|---|---|---|---|---|
| | | | | StcA | hAcA | FucA |
| G20 | 7.00 | Red | - 0.17÷ - 0.10 | 45 | 43 | 100 |
| G25 | 8.50 | Red | - 0.17÷ - 0.10 | 45 | 43 | 100 |
| G30 | 5.70 | Red | - 0.25÷ - 0.18 | 60 | 43 | 100 |
| LPG | 5.70 | Red | - 0.10÷ - 0.02 | 60 | 43 | 100 |

### BOILER BURNER

| GAS | Injector | Aerator | OFFSET (hPa) | Parameters | | |
|---|---|---|---|---|---|---|
| | | | | Stbo | hAbo | Fubo |
| G20 | 7.00 | Red | 0 | 43 | 50 | 100 |
| G25 | 8.50 | Red | 0 | 43 | 50 | 100 |
| G30 | 5.70 | Red | - 0.15 | 35 | 45 | 78 |
| LPG | 5.70 | Red | 0 | 35 | 45 | 78 |

**LPG conversion for cavity burner for AOS102G**
For LPG installations, put the ø 25 flow reducer flange between cavity burner fan and cavity burner. Change the PWM parameters.
Then change the injector with the 5.70 one and calibrate the offset in the range - 0.10 ÷ - 0.02 hPa so as to eliminate possible whistles/noise. After you have found the best working condition, cool down and verify ignitions with cold burner.

## AOS202G

### UPPER CAVITY BURNER

| GAS | Injector | Aerator | OFFSET (hPa) | Parameters | | |
|---|---|---|---|---|---|---|
| | | | | StcA | hAcA | FucA |
| G20 | 7.00 | Red | - 0.20 | 45 | 43 | 100 |
| G25 | 8.00 | Red | - 0.20 | 45 | 43 | 100 |
| G30 | 5.70 | Red | - 0.20 ÷ - 0.15 | 40 | 43 | 95 |
| LPG | 5.70 | Red | - 0.10 ÷ - 0.05 | 40 | 43 | 95 |

### LOWER CAVITY BURNER

| GAS | Injector | Aerator | OFFSET (hPa) | Parameters | | |
|---|---|---|---|---|---|---|
| | | | | StcA | hAcA | FucA |
| G20 | 7.00 | Red | - 0.20 | 45 | 43 | 100 |
| G25 | 8.00 | Red | - 0.20 | 45 | 43 | 100 |
| G30 | 5.70 | Red | - 0.25 ÷ - 0.20 | 40 | 43 | 95 |
| LPG | 5.70 | Red | - 0.15 ÷ - 0.10 | 40 | 43 | 95 |

### UPPER BOILER BURNER

| GAS | Injector | Aerator | OFFSET (hPa) | Parameters | | |
|---|---|---|---|---|---|---|
| | | | | Stbo | hAbo | Fubo |
| G20 | 7.50 | Red | - 0.05 ÷ 0.00 | 40 | 50 | 100 |
| G25 | 8.50 | Red | - 0.05 ÷ 0.00 | 40 | 50 | 100 |
| LPG2/G30 | 5.80 | Red | - 0.07 ÷ - 0.02 | 40 | 45 | 90 |
| LPG1 | 6.00 | Red | - 0.07 ÷ - 0.02 | 40 | 45 | 90 |

### LOWER BOILER BURNER

| GAS | Injector | Aerator | OFFSET (hPa) | Parameters | | |
|---|---|---|---|---|---|---|
| | | | | Stbo | hAbo | Fubo |
| G20 | 7.50 | Red | - 0.05÷0.00 | 40 | 50 | 100 |
| G25 | 8.50 | Red | - 0.05÷0.00 | 40 | 50 | 100 |
| LPG2/G30 | 5.80 | Red | - 0.07÷- 0.02 | 40 | 45 | 90 |
| LPG1 | 6.00 | Red | - 0.07÷- 0.02 | 40 | 45 | 90 |

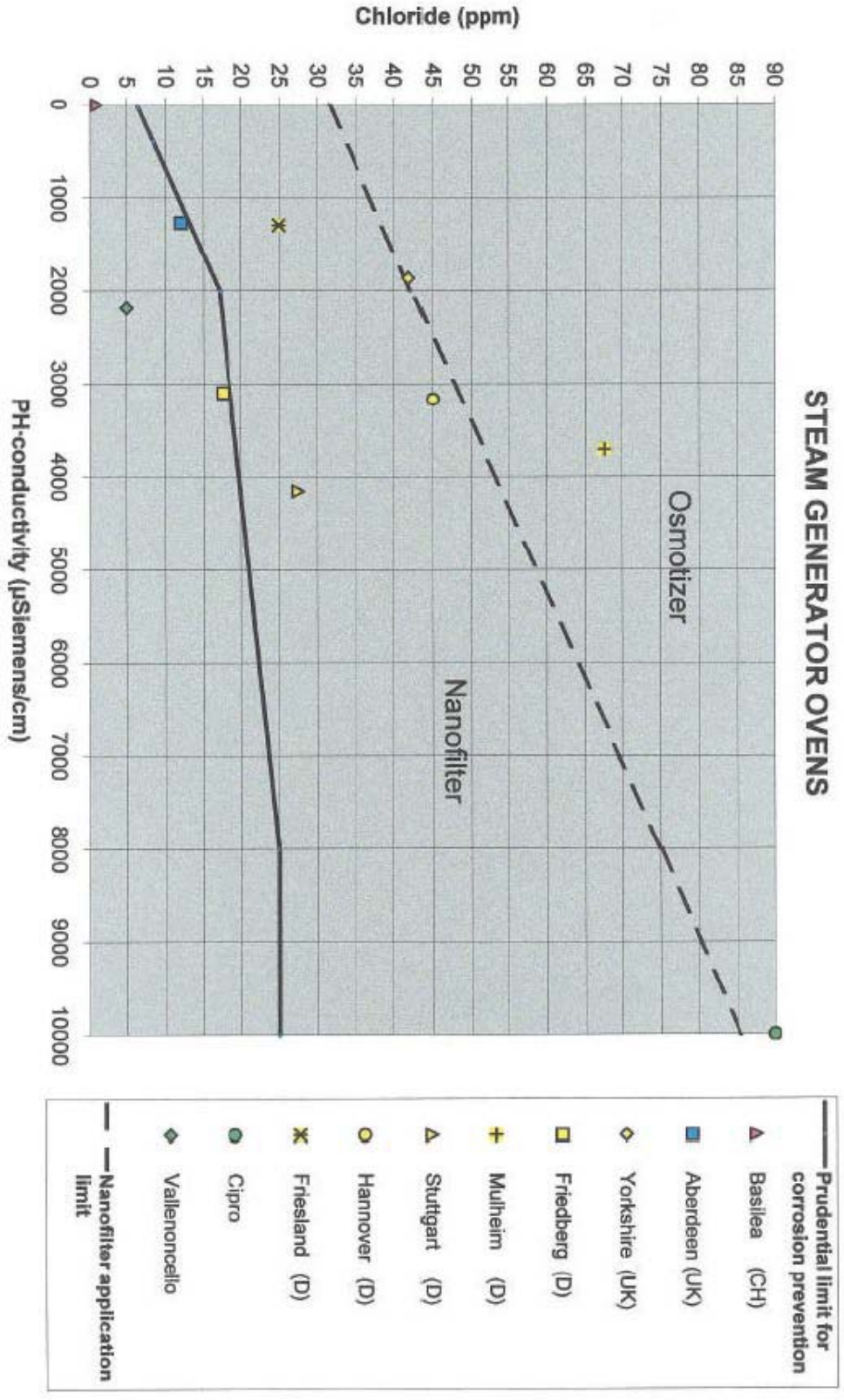
  

**LPG conversion for cavity burners for AOS202G**
For LPG installations, put the ø 25 flow reducer flange between cavity burner fan and cavity burner. Change the PWM parameters.
Then change the injector with the 5.70 one and calibrate the offset in the range - 0.10 ÷ - 0.05 hPa (upper cavity boiler) and - 0.15 ÷ - 0.10 hPa (lower cavity boiler) so as to eliminate possible whistles/noise. After you have found the best working condition, cool down and verify ignitions with cold burner.

**LPG conversion for boiler burners for AOS202G**
Change the PWM parameter.
Then change the injector with the 6.00 one and calibrate the offset in the range - 0.07 ÷ - 0.02 hPa (upper and lower boiler burner) so as to eliminate possible whistles/noise (row LPG1). After you have found the best working condition, cool down and verify ignitions with cold burner.
If the previous setting does not eliminate whistles or noise, change the 6.00 injector with the 5.80 one and use the calibration of LPG2/G30 row: calibrate the offset in the range - 0.07 ÷ - 0.02 hPa (upper and lower boiler burner) so as to eliminate possible whistles/noise. After you have found the best working condition, cool down and verify ignitions with cold burner.

# APPENDIX H – WATER TREATMENT



Summary table:

| **Graph** | Not required | Not required | Nanofilter | Nanofilter | Osmotizer | Osmotizer |
|---|---|---|---|---|---|---|
| **Hardness** | < 5°F | > 5°F | < 5°F | >5°F | < 5°F | > 5°F |
| **Treatment** | Not required | Softener | Nanofilter | Nanofilter | Osmotizer | Osmotizer |

# APPENDIX I – CONNECTION TO HACCP SYSTEM

The AOS oven (from firmware 2.7) can be predisposed for the HACCP system through 4 parameters:
**HCCP**: defines the type of HACCP, i.e.

0: no system
1: HACCP Basic (with printer 881457 – 880048 for US market, i.e. 120V/1ph/60 Hz)
2: HACCP Advanced or Integrated

**bAud**: bit rate of RS485 connection
**Addr**: address of the appliance in the HACCP Advanced network
**tPrn**: print frequency in case of HACCP Basic (value in seconds)

In case of HACCP Basic, i.e. setting **HCCP** to 1, to use the printer 881457 (or 880048) and print with the printing frequency given through parameter **tPrn**, set on the printer the following parameters:
**PROTOCOL = 8,E,1**
**BAUD RATE = 9600**
**PRINT = REVERSE**
**40 COLUMNS (font 9x24)**
**RS485 INTERFACE NO id**

In case of HACCP Advanced or Integrated, i.e. setting **HCCP** to 2, the address of the oven in the AHCCP network has to be set in the parameter **Addr**.

# APPENDIX J – RELAY DESCRIPTIONS

| AOS ELECTRIC OVENS | |
|---|---|
| | |
| | |
| RL 1/do1 | FAN MOTOR POWER SUPPLY |
| RL 2/do2 | HALF/FULL SPEED FAN MOTOR |
| RL 3/do3 | COOLING FAN/S |
| RL 4/do4 | SAFETY CONTACTOR (KS OR KS1&KS2) /LAMBDA FEEDER |
| RL 5/do5 | N/A |
| RL 6/do6 | CAVITY VENT VALVE |
| RL 7/do7 | K2/K6 CONTACTOR/S (FOR CAVITY) |
| RL 8/do8 | K4/K8 CONTACTOR/S (FOR BOILER) |
| RL 9/do9 | K1/K5 CONTACTOR/S (FOR CAVITY) |
| RL 10/do10 | K3/K7 CONTACTOR/S (FOR BOILER) |
| RL 11/do11 | CAVITY UMIDIFIER SOLENOID VALVE |
| RL 12/do12 | STEAM CONDENSER SOLENOID VALVE |
| RL 13/do13 | CAVITY LAMPS |
| RL 14/do14 | BOILER SLOW WATER FILLING |
| RL 15/do15 | BOILER FAST WATER FILLING |
| RL 16/do16 | BOILER AUTOMATIC DRAIN VALVE |
| RL 17/do17 | N/A |
| RL 18/do18 | N/A |
| RL 19/do19 | N/A |
| RL 20 /do20 | N/A |
| RL 21/do21 | DETERGENT PUMP |
| RL 22/do22 | RINSE PUMP |
| RL 23/do23 | WATER SOLENOID VALVE (CLEANING SYSTEM) |
| RL 24/do24 | N/A |
| | |

| AOS GAS OVENS | |
|---|---|
| | |
| | |
| RL 1/do1 | FAN MOTOR POWER SUPPLY |
| RL 2/do2 | HALF/FULL SPEED FAN MOTOR |
| RL 3/do3 | COOLING FAN/S |
| RL 4/do4 | LAMBDA SWITCHING FEEDER |
| RL 5/do5 | N/A |
| RL 6/do6 | CAVITY VENT VALVE |
| RL 7/do7 | CAVITY IGNITION DEVICE RESET |
| RL 8/do8 | BOILER IGNITION DEVICE RESET |
| RL 9/do9 | CAVITY IGNITION DEVICE POWER SUPPLY |
| RL 10/do10 | BOILER IGNITION DEVICE POWER SUPPLY |
| RL 11/do11 | CAVITY UMIDIFIER SOLENOID VALVE |
| RL 12/do12 | STEAM CONDENSER SOLENOID VALVE |
| RL 13/do13 | CAVITY LAMPS |
| RL 14/do14 | BOILER SLOW WATER FILLING |
| RL 15/do15 | BOILER FAST WATER FILLING |
| RL 16/do16 | BOILER AUTOMATIC DRAIN VALVE |
| RL 17/do17 | N/A |
| RL 18/do18 | N/A |
| RL 19/do19 | N/A |
| RL 20/do20 | N/A |
| RL 21/do21 | DETERGENT PUMP |
| RL 22/do22 | RINSE PUMP |
| RL 23/do23 | WATER SOLENOID VALVE (CLEANING SYSTEM) |
| RL 24/do24 | N/A |
| | |