Electrolux Distriparts

SERVICE MANUAL

COOKING

Built-in ovens and Cookers

THEORETICAL DESCRIPTION OF THE KRONOS SYSTEM

(OVC1000)

Corso Lino Zanussi, 30
I - 33080 PORCIA /PN (ITALY)
Tel +39 0434 394850
Fax +39 0434 394096

Publication number
599 37 14-83

IT/SERVICE/FV

SOI

Edition: 09.2005

TABLE OF CONTENTS

1 - INTRODUCTION

1.1 - PURPOSE OF THIS MANUAL

The purpose of this Manual is to provide a general theoretical overview of the new KRONOS system.
This new system comprises different hardware and software versions, depending on the type of application (e.g. normal oven, steam oven, pyrolytic oven). This Manual contains all the general functional and theoretical information; for a description of the specific functions and characteristics, a series of specific Manuals will be issued.

1.2 - ESD

Electrostatic Discharge and its effect on the components

The interface for the control unit is not fitted with an internal device to protect against electrostatic discharge (multiple connectors - see drawings on pp. 19, 20 and 21). When effecting repairs, therefore, the service engineer must check for stabilization of the potential on the oven casing (i.e. discharge any static electricity by touching the oven casing) in order to prevent the possibility of overload, which might damage the control unit.
The same care is necessary when handling control units supplied as spare parts (i.e. not yet fitted to the oven), which must be removed from the protective bag in ESD only after stabilizing the potential (i.e. discharging any static electricity) and only then installed in the appliance.
Important: The theory behind the process of electrostatic charge and discharge is not discussed in this Manual, since the tangible effects are considered to be more important. However, the effects are felt frequently when touching a metal handle and feeling the electrostatic discharge in the form of a minor shock.
But what happens when stabilization of the potential takes place with semi-conductor components (i.e. components on a circuit board, such as integrated circuits, microprocessors etc.)?
Stabilization of the potential takes place across the internal structure of the component. This does not necessarily lead to the immediate destruction of the component; subsequent malfunctions across damaged internal connections may be more harmful, and these occur only as a result of overheating or current overloads.
It is true that almost all sensitive semi-conductor components (such as MOS circuits) have been improved by the addition of protective measures, but the internal structures of these components are today smaller than, for example, ten years ago, which tends to increase their sensitivity to the previous levels.

Important!

Which components are susceptible to damage by static electricity during repairs?
All circuit boards featuring accessible control and command connections (door switches, food probes etc.), bare tracks and microprocessors, as well as any other circuits with free access.

Examples:

- Programmers with accessible connections for the food probe and the door switch.
- Programmers whose control processors are accessible (due to their high costs, the protective systems are only partial).
- W.O.E.C. control units.
- S.O.E.C. control units.
- C.H.E.C. control units.
- KRONOS control units
- R.H.E.A control units.

2 - DESCRIPTION OF THE KRONOS SYSTEM

2.1 - INTRODUCTION

KRONOS is an integrated control system for ovens. The system consists of an electronic programmer, which is controlled by a programmable microprocessor (via a customized programme). This enables the user to select the type of heating element, the cooking temperature, the cooking time and the cooking programmes (recipes) pre-programmed for particular cooking methods. The system also features multilingual text messages, as well as error codes that are displayed in the event of a malfunction in order to facilitate the identification of the fault.

2.2 - BASIC BLOCK DIAGRAM

The system comprises a series of components, and may be represented as shown in Fig. 1 below.
The system's control logic (hardware and software) is contained in the control unit.
The system features control buttons, a display and a buzzer.
The power board directly controls the high-power loads (heating elements) via relays, and the low-power loads (fans and oven lamps) via triacs.
The sensors (oven sensor and meat probe, if featured) transmit the data relative to the various temperatures to the system, thus ensuring that the operation of the appliance is controlled correctly.

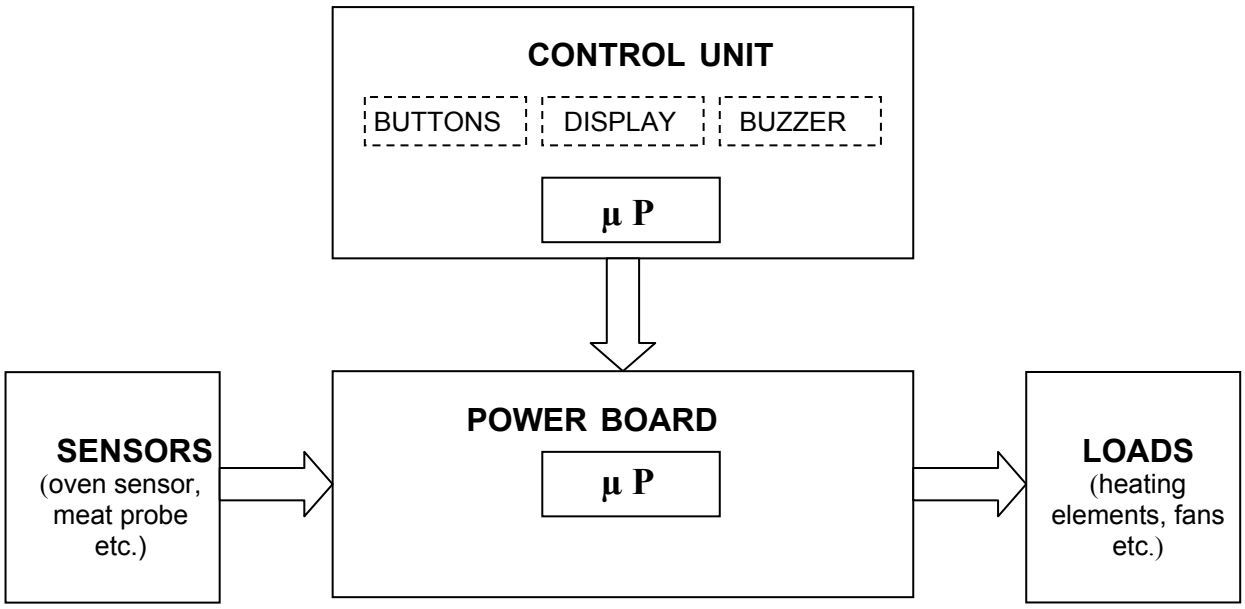


Fig. 1

The diagram in Fig. 2 represents the system as a whole, including the external units for the development of the software and for programming (these operations are performed during production).
It may be observed that external interfaces are possible on certain models to meet styling requirements.

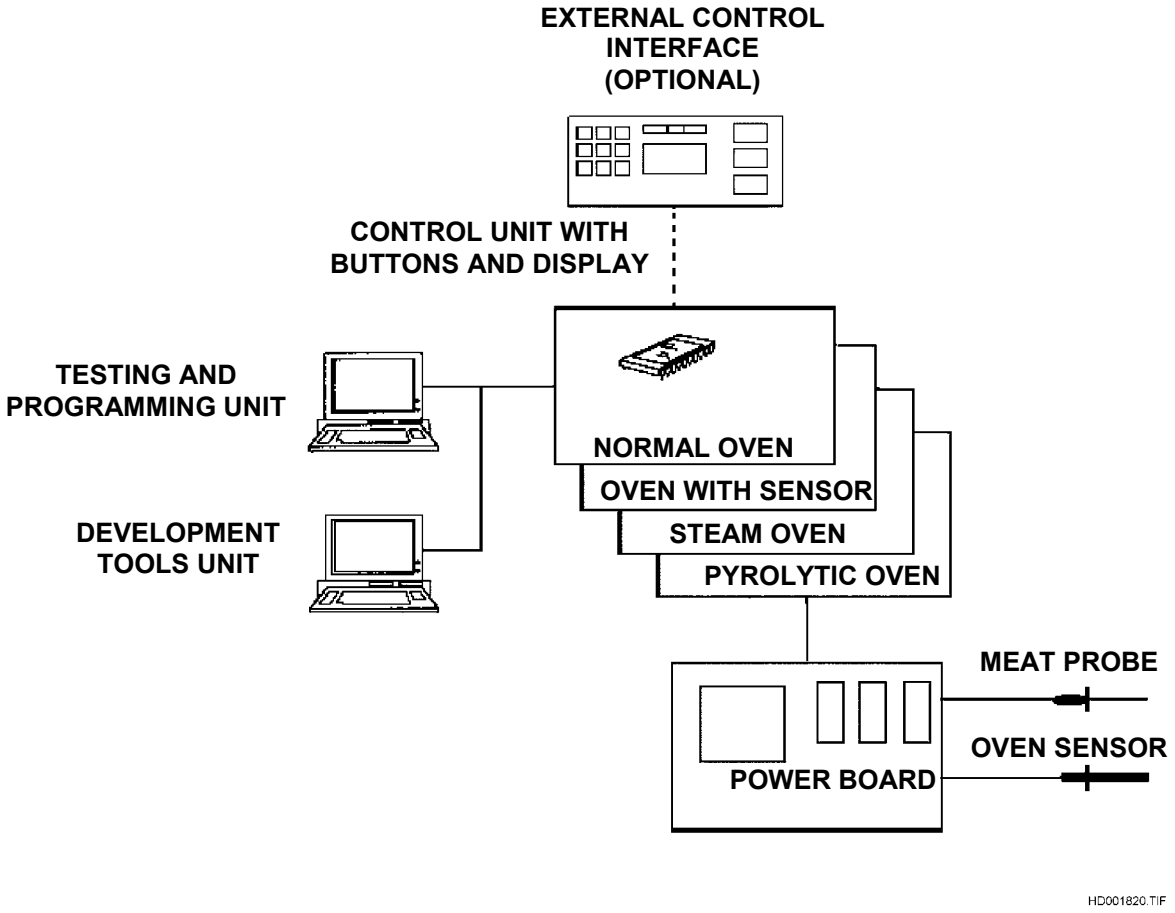


Fig. 2

2.3 - CUSTOMIZED VERSIONS

The flexibility of the hardware-software system makes it possible to produce numerous applications with different levels of performance and complexity.

2.3.1 - TWO LEVELS FOR THE CONTROL UNIT

This control system consists of two levels in which the complexity varies according to the control unit used.

- **LEVEL 2 CONTROL UNIT**

Main functions:

- Sequential function selection with indication on the display.
- Selection of the temperature.
- Programmable cooking.
- Cooking with meat probe.
- Single LCD display indicating the cooking symbols.
- Rapid heating.
- Demo function.
- Autodiagnostics and error codes.

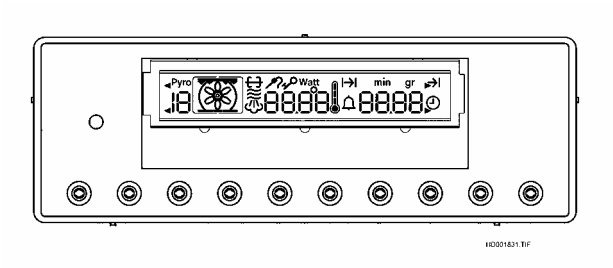


Fig. 3

- **LEVEL 3 CONTROL UNIT**

Main functions:

- Sequential function selection with indication on the display.
- Selection of the temperature.
- Programmable cooking.
- Cooking with meat probe.
- Dual LCD display with text and symbols.
- Recipes.
- Rapid heating.
- Demo function.
- Autodiagnostics and error codes.

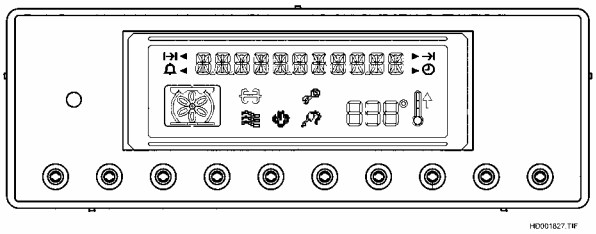


Fig. 4

2.3.2 - THREE TYPES OF OVEN

The various control unit levels can be applied to different types of product:

Normal oven
Oven with meat probe
Pyrolytic oven

2.4 - VARIOUS APPLICATIONS

2.4.1 - NORMAL OVEN

Depending on the models, these types of ovens may feature any of the three levels of control unit. This gives the following possible combinations:

- Normal oven with level 2 control unit (LCD display with symbols)
- Normal oven with level 3 control unit (dual display with symbols and text)

2.4.1.1 - NORMAL OVEN WITH LEVEL 2 CONTROL UNIT

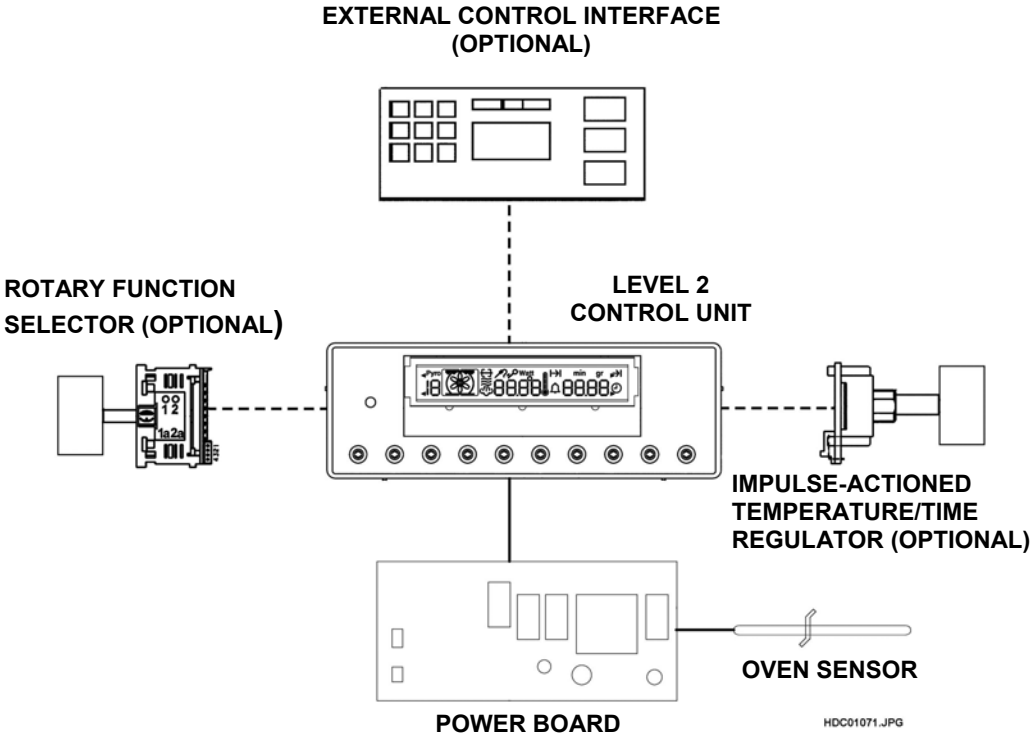


Fig. 5

2.4.1.2 - NORMAL OVEN WITH LEVEL 3 CONTROL UNIT

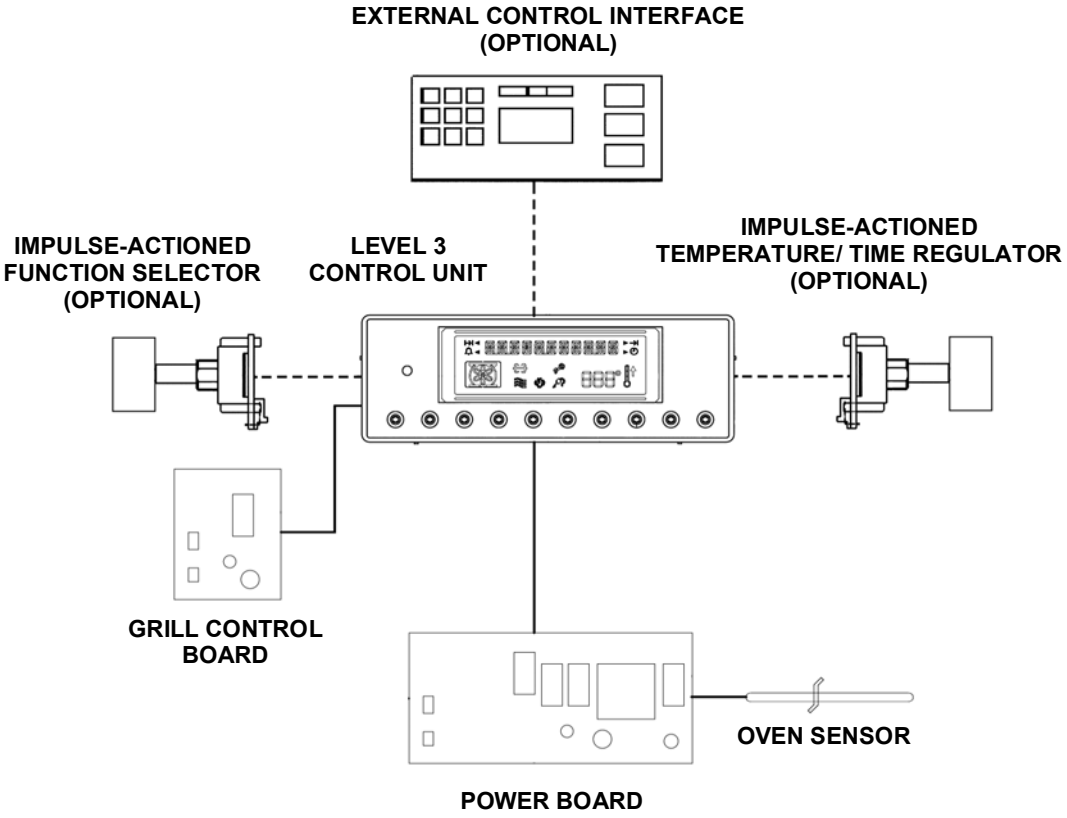


Fig. 6

HD0001837.TIF

2.4.2 - PYROLYTIC OVEN

Depending on the models, these types of ovens may feature any of the two levels of control unit. This gives the following possible combinations:

- Pyrolytic oven with level 2 control unit (LCD display with symbols).
- Pyrolytic oven with level 3 control unit (Dual display with symbols and text).

2.4.2.1 - PYROLYTIC OVEN WITH LEVEL 2 CONTROL UNIT

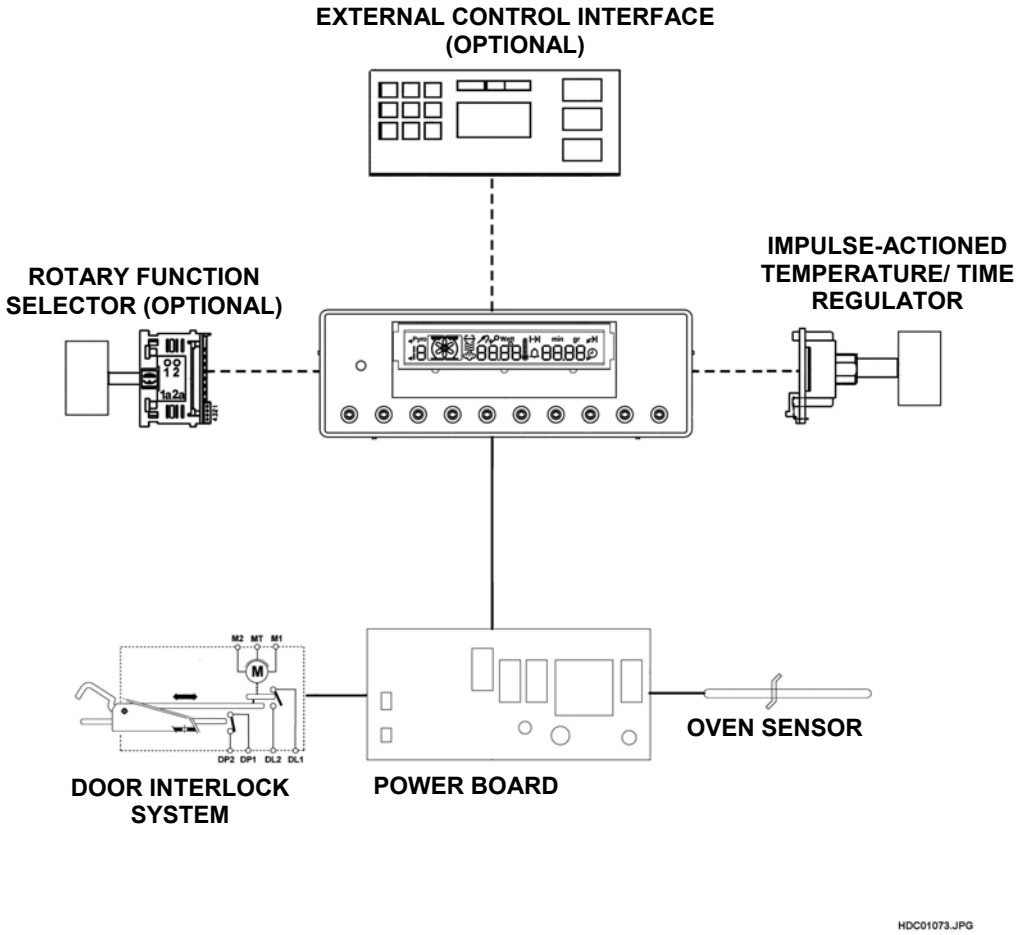


Fig. 7

2.4.2.2 - PYROLYTIC OVEN WITH LEVEL 3 CONTROL UNIT

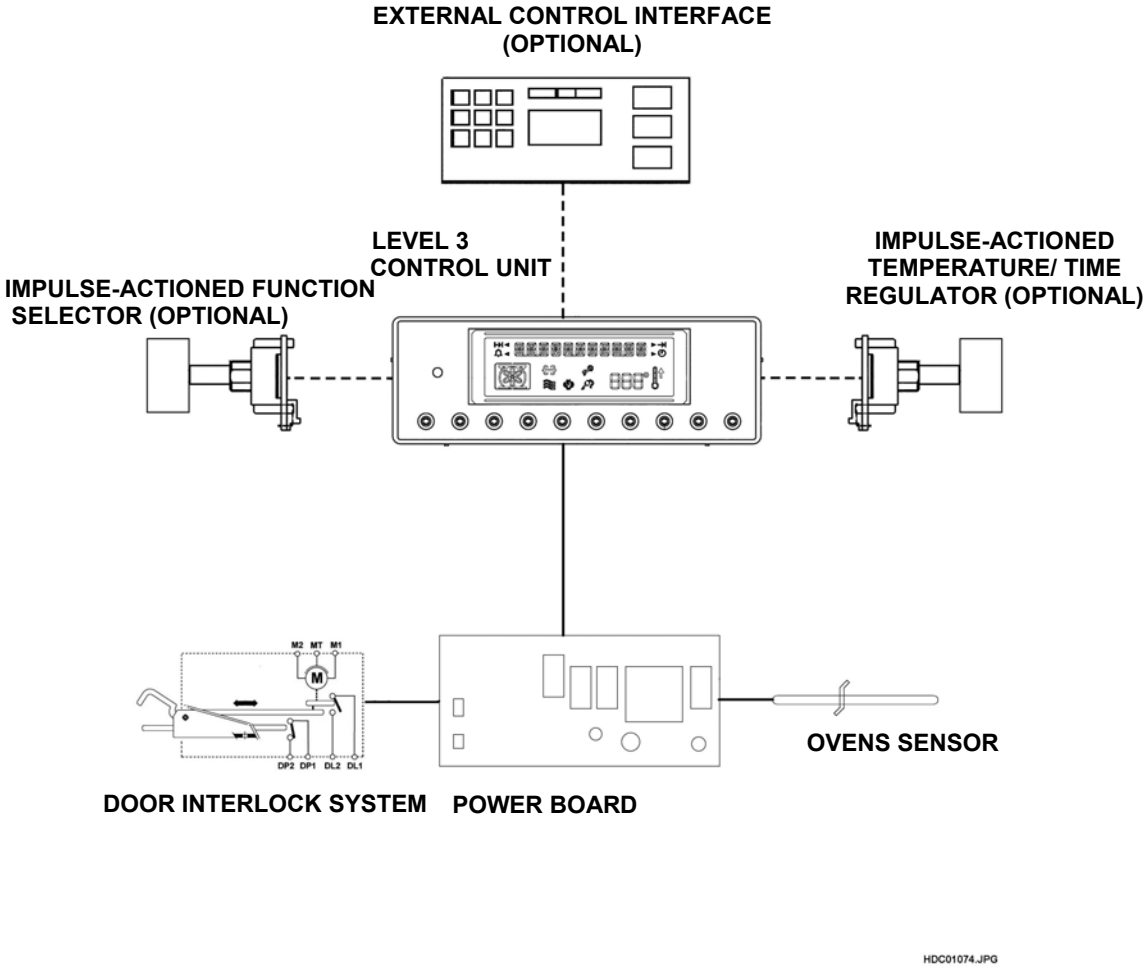


Fig. 8

2.5 - SUMMARY TABLE FOR THE VARIOUS APPLICATIONS

	TYPE OF OVEN	
CONTROL UNIT	**NORMAL OVEN**	**PYROLYTIC OVEN**
LEVEL 2	**CAP. 2.4.1.1**	**CAP. 2.4.2.1**
LEVEL 3	**CAP. 2.4.1.2**	**CAP. 2.4.2.2**

2.6 - CONTROL UNIT

The control unit contains a low-voltage board which includes logic circuits, a display and a buzzer. The unit is inserted into a plastic casing fitted to the front panel of the appliance.
This module is connected using connectors and wiring to the power board (relays and triacs).
The system memory contains information relative to the customization selected for the appliance to which the system is fitted.
A further feature is the system of autotesting and diagnostics used to identify possible faults and display the relative error codes; in certain cases, the functions may be disactivated.
The KRONOS system may be fitted with one of two types of control unit:

2.6.1 - LEVEL 2 CONTROL UNIT

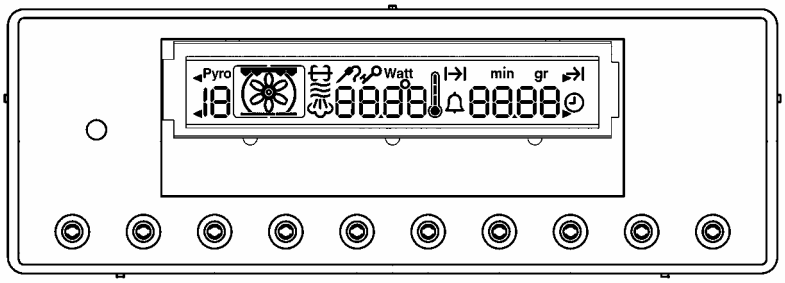


Fig. 9

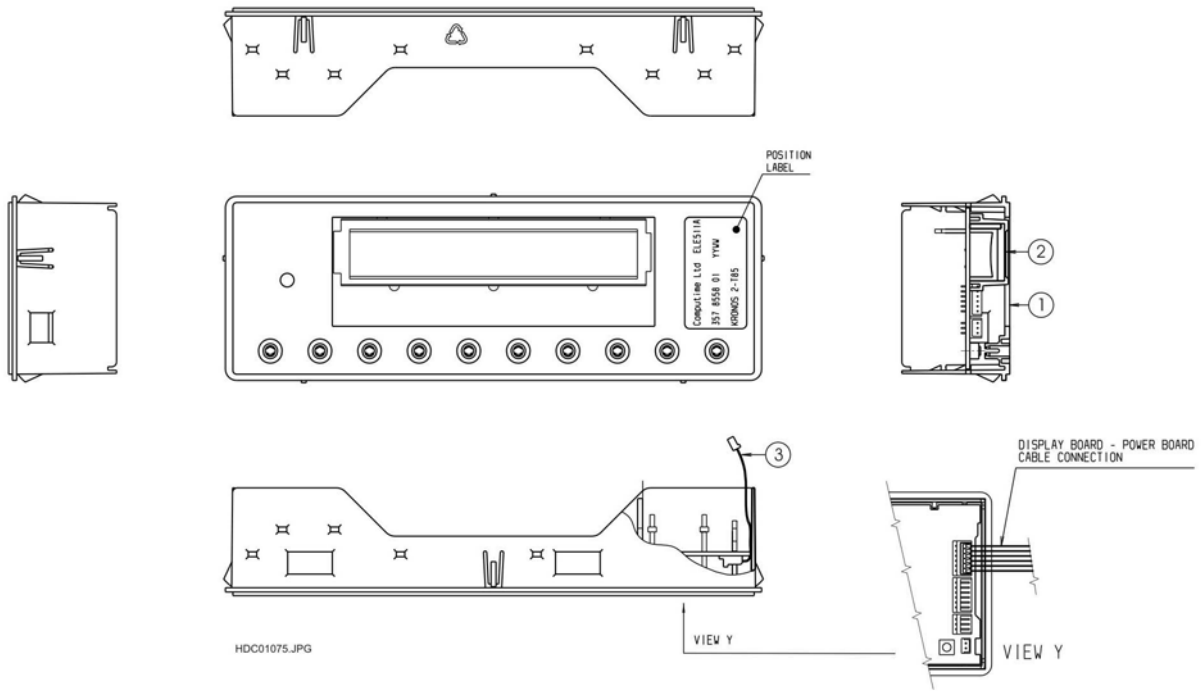


Fig. 10

1 - PLASTIC CASING
2 - BOARD FOR LEVEL 2 CONTROL UNIT
3 - DISPLAY BOARD CABLE – 6-POLE DISPLAY BOARD

2.6.2 - LEVEL 3 CONTROL UNIT

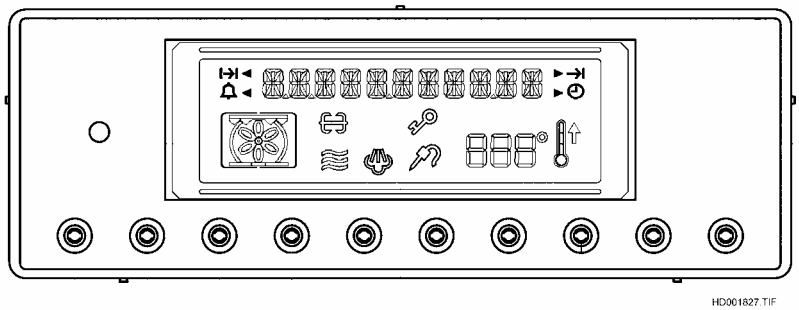


Fig. 11

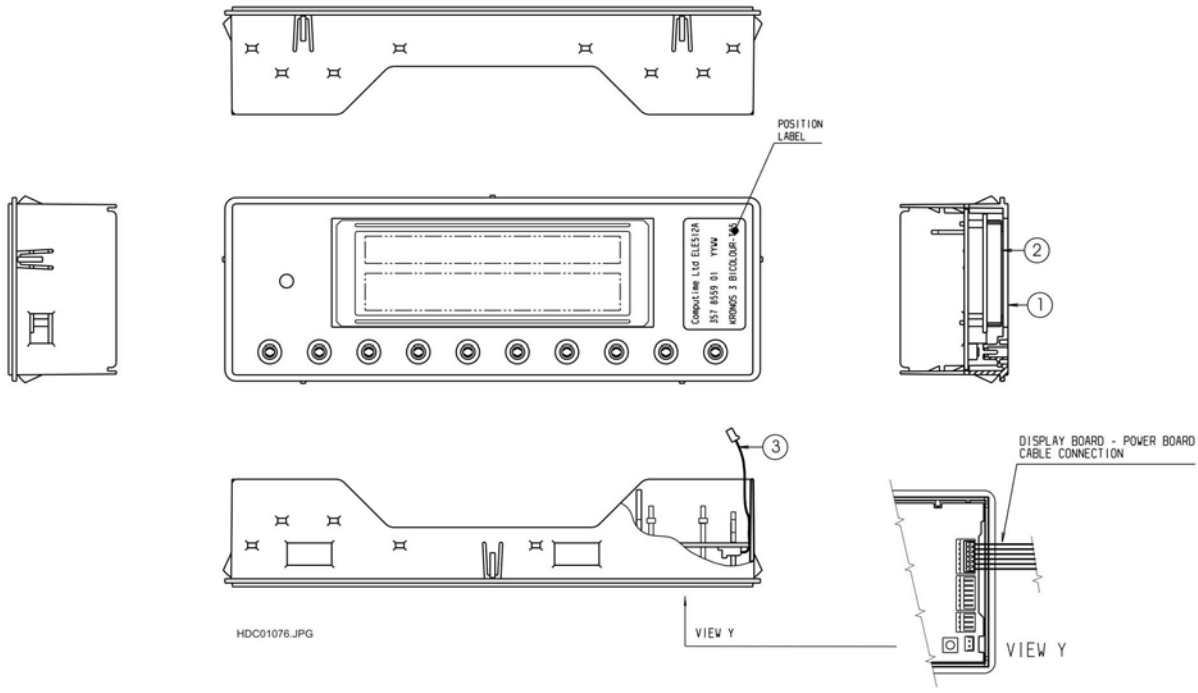


Fig. 12

1 - PLASTIC CASING
2 - BOARD FOR LEVEL 3 CONTROL UNIT
3 - CABLE FOR DISPLAY BOARD - 6-POLE POWER BOARD

2.7 - OVC1000 POWER BOARD (RELAYS AND TRIACS)

The function of the power board is to control the operation of the heating elements, the convection fan, the tangential cooling fan and the oven lamp according to the information received from the control/display board.
The power board comprises a power supply section (which also supplies low voltage to the control/display board), four relays which control the operation of the high-voltage components (heating elements). RL1 is a general safety relay, while RL2, RL3, RL4 and RL5 control the operation of the various heating elements according to the software customization applied to the various models. The board is also fitted with four triacs which control the low-voltage components (oven lamp, fans and spit).
All the functions of the board are controlled by an internal microprocessor.
The following components may also be connected to the power board: steam control board, meat probe interface and door interlock for the pyrolysis function.

CONNECTIONS TO THE BOARD

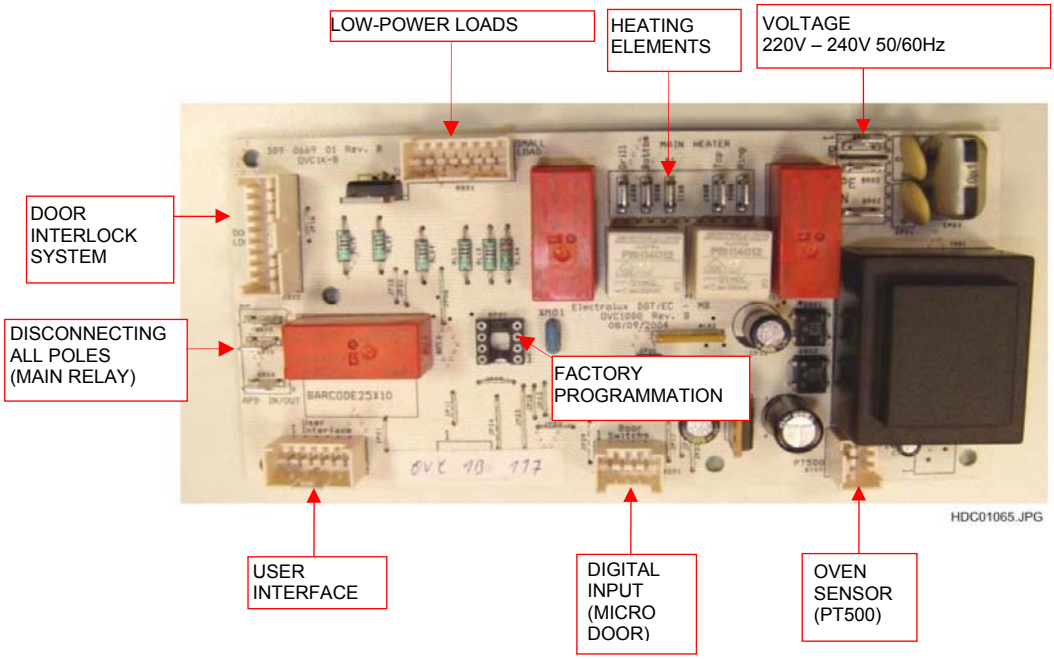


Fig. 13

REFERENCE TO CONNECTORS

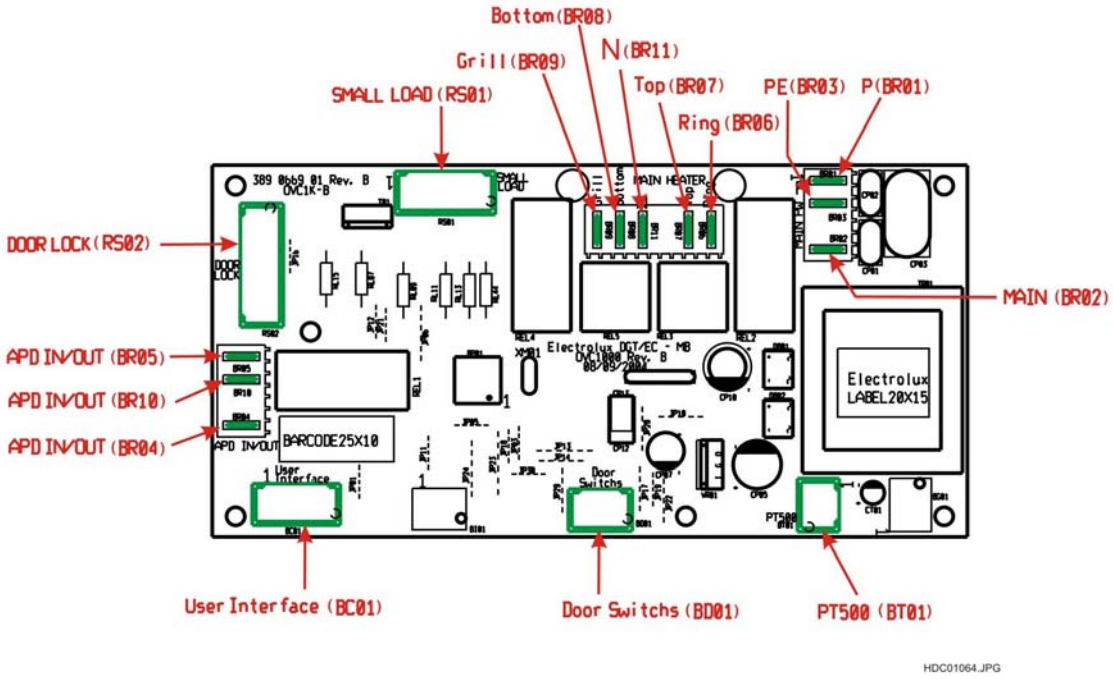


Fig. 14

APD IN /OUT (BR04)	- CONTACT (1) RELAY RL1 (PHASE).	N (BR11)	- COMMON CONNECTION TO HEATING ELEMENTS.
APD IN /OUT (BR05)	- CONTACT (2) RELAY RL1.		
APD IN /OUT (BR10)	- CONTACT (2) RELAY RL1.	P (BR01)	- POWER SUPPLY (PHASE).
Botton (BR08)	- CONNECTION TO LOWER HEATER.	PE (BR03)	- POWER SUPPLY (EARTH).
DOOR LOCK (RS02)	- DOOR INTERLOCK SYSTEM CONNECTOR.	PT500 (BT01)	- OVEN SENSOR (PT500).
		Ring (BR06)	- CONNECTION.
Door Switchs (BD01)	- CONNECTION TO MICRODOOR PORTA.	SMALL LOAD (RS01)	- CONNECTION TO LOW-POWER LOADS (LAMP AND MOTORIS.
Grill (BR09)	- CONNECTION TO GRILL HEATER.	Top (BR07)	- CONNECTION TO UPPER HEATER.
MAIN (BR02)	- POWER SUPPLY (NEUTRAL)	User Interface (BC01)	- CONNECTION TO CONTROL UNIT/DISPLAY.

POSITIONS OF THE RELAYS

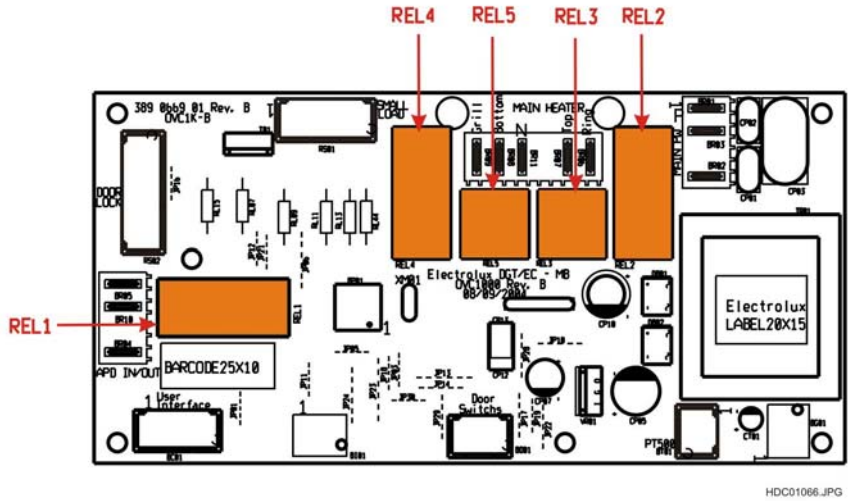


Fig. 15

RL1	- SAFETY MAIN RELAY	RL4	- GRILL HEATER
RL2	- CONVECTION HEATER RELAY	RL5	- LOWER HEATER RELAY
RL3	- UPPER HEATER RELAY		

(*) The elements controlled vary according to the application and the software installed.
(see the various customized versions on the specific Service Manuals).

2.8 - OVEN TEMPERATURE SENSOR

The KRONOS system controls the temperature inside the oven by means of a temperature sensor fitted to a bracket. The support bracket is screwed to the interior of the oven cavity.
The sensor is a PT500 type with a platinum resistor, and provides the control board with the data necessary to perform the following functions:

- Cycling of the heating elements in order to reach the necessary oven temperature.
- Disconnection of the heating elements in the case of overheating or malfunction of the sensor.
- Delay in switching the cooling fan on and off.
- Detection of relay malfunctions.

The temperature sensor is encapsulated in a sealed metal casing, which must be connected to an earth wire.

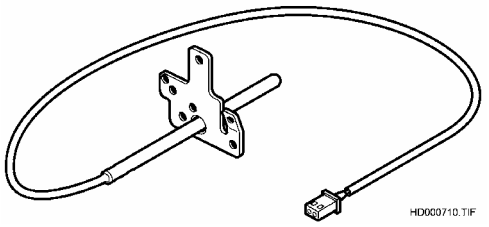


Fig. 16

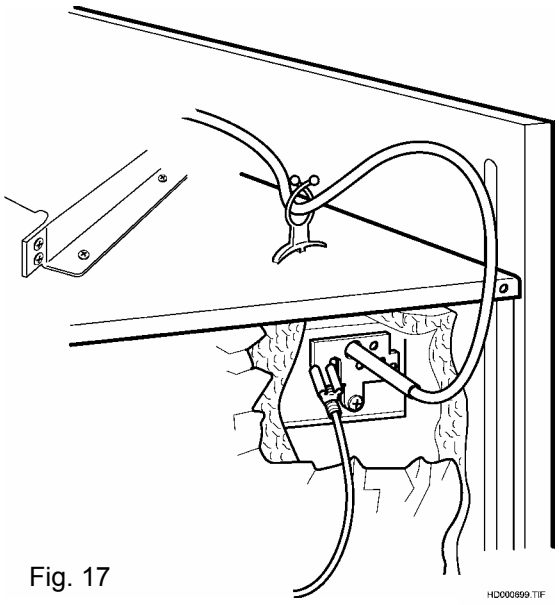


Fig. 17

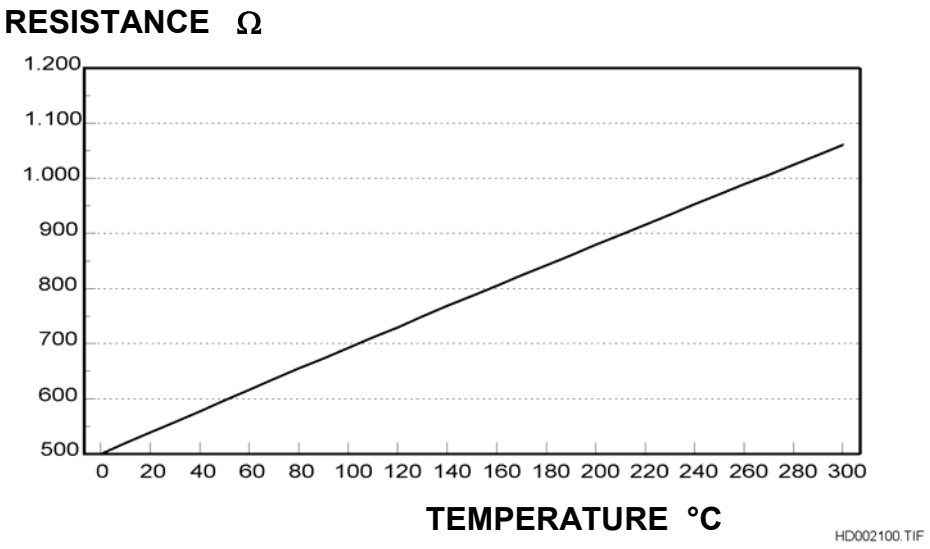


Fig. 18

2.9 - TECHNICAL DATA

2.9.1 - AUTO SWITCHING-OFF

The auto switching-off function has the following settings:

Selected temperature	**Auto switching-off**
30 -115°C	After 12 hours
120 - 195°C	After 8 hours and 30 minutes
200 - 245°C	After 5 hours and 30 minutes
250 - 280°C	After 3 hours

3 - CONTROLS

3.1 - CONTROLS - LEVEL 2 CONTROL UNIT

3.1.1 - CONTROL PANEL (LEVEL 2)

The control panel shown in Fig. 19 refers to the standard version.

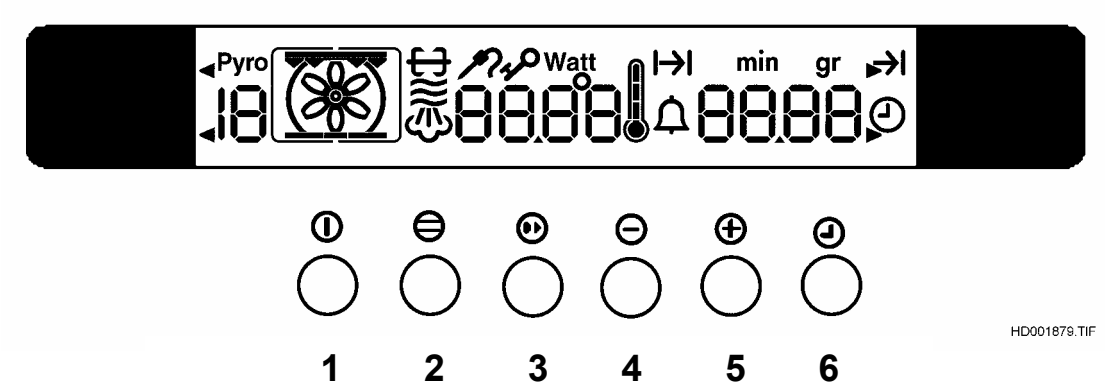


Fig. 19

3.1.2 - KEY FUNCTIONS LEVEL 2

1 - ON/OFF key
Switches the oven ON and OFF

2 - FUNCTION key
Selects the cooking functions

3 - RAPID HEATING key
Heats the oven rapidly

4 - "-" key (back)
To decrease the temperature and time of day

5 - "+" key (forward)
To increase the temperature and time of day

6 - CLOCK key
Used to set the "minute-minder", "end of cooking", "cooking time" functions and the time of day.

3.1.3 - DESCRIPTION OF DISPLAY - LEVEL 2

Figure 20 illustrates all the symbols used on the various appliances.
The positions of the keys and the symbols that are activated depend on the software customization (refer to chapter 5).

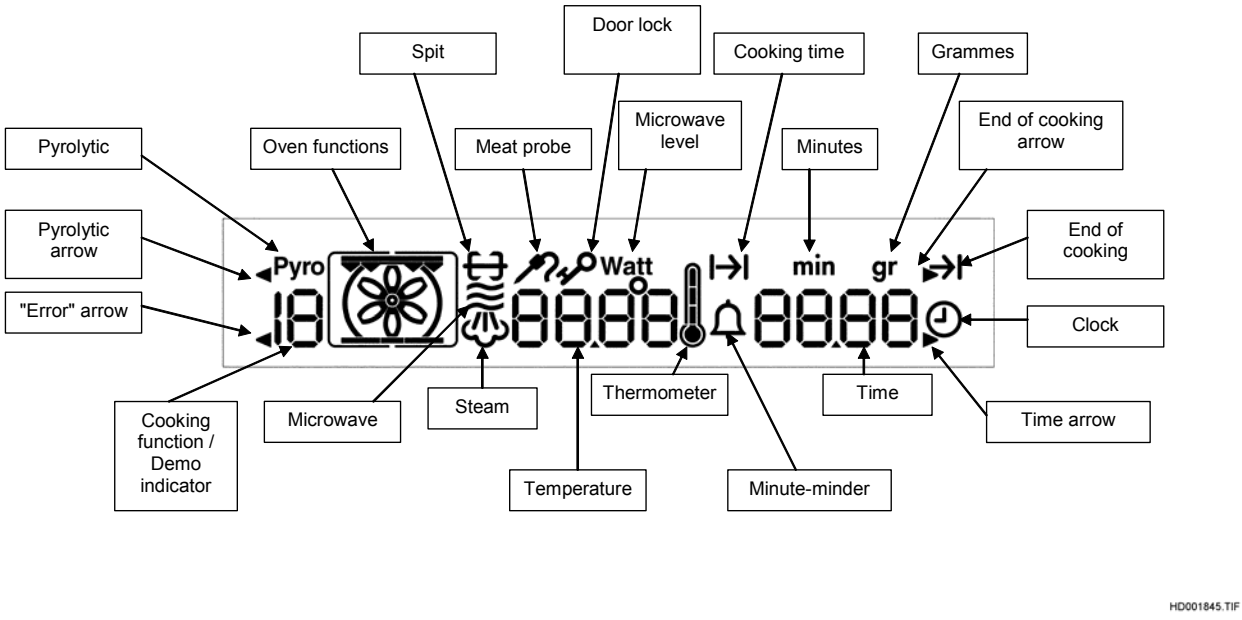


Fig. 20

3.2 - CONTROLS - LEVEL 3 CONTROL UNIT

3.3.1 - CONTROL PANEL (LEVEL 3)

The control panel shown in Fig. 21 refers to the standard version.

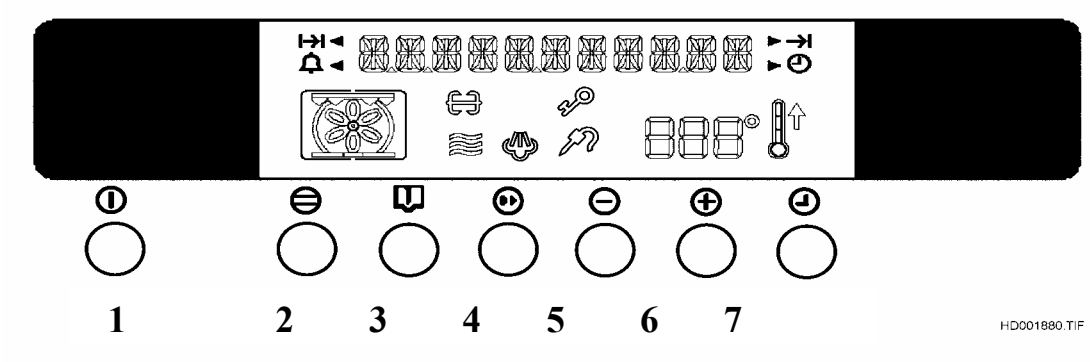


Fig. 21

3.3.2 - KEY FUNCTIONS

1 - ON/OFF key
Switches the oven ON and OFF

2 - FUNCTION key
Selects the cooking functions

3 - RECIPES key
Used to select the recipes

4 - RAPID HEATING key
Heats the oven rapidly

5 - "-" key (back)
To decrease the temperature and time of day

6 - "+" key (forward)
To increase the temperature and time of day

7 - CLOCK key
Used to set the "minute-minder", "end of cooking", "cooking time" functions and the time of day.

3.2.3 - DESCRIPTION OF DISPLAY - LEVEL 3

Figure 22 illustrates all the symbols used on the various appliances.
The positions of the keys and the symbols that are activated depend on the software customization (refer to chapter 4).

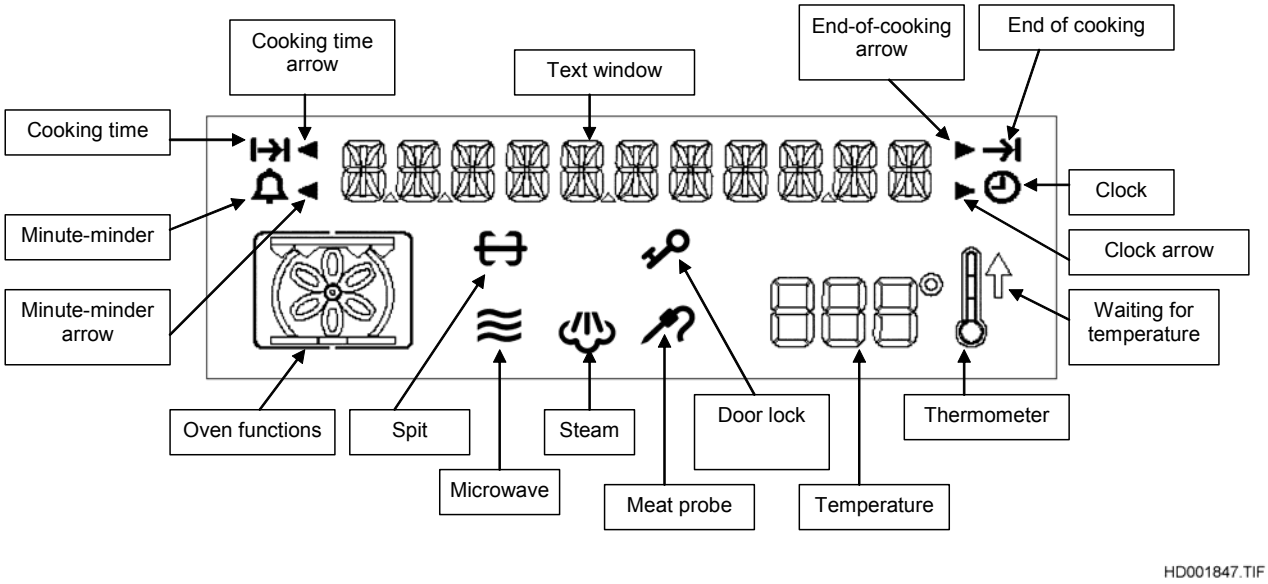


Fig. 22

4 - DIFFERENCES IN THE VARIOUS APPLICATIONS

4.1.1 - LEVEL 2 NORMAL OVEN

4.1.1.1 - CONTROL PANEL LEVEL 2 NORMAL OVEN

Example of normal oven level 2 (Multiplus).

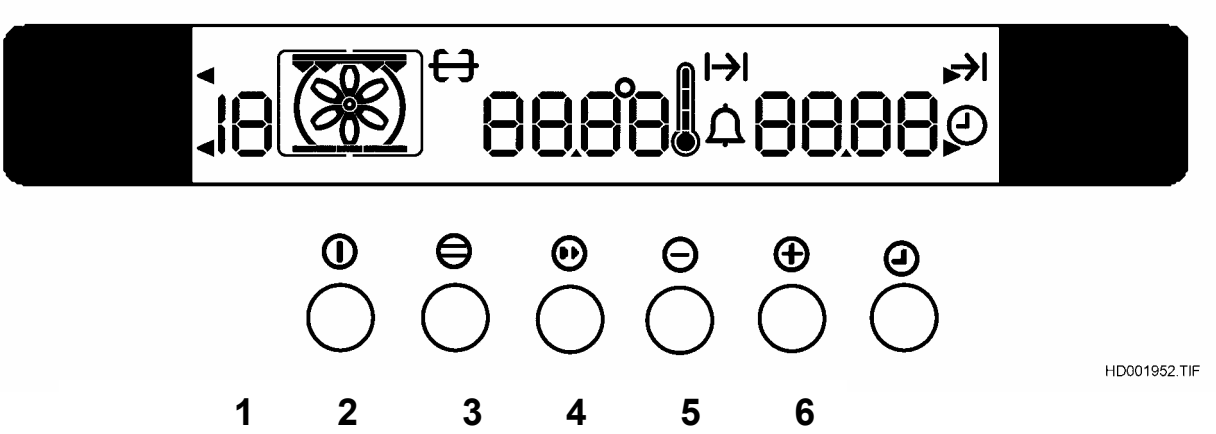


Fig. 23

4.1.2.2 - KEY FUNCTIONS - NORMAL OVEN – LEVEL 2

1 - ON/OFF key
Switches the oven ON and OFF

2 - FUNCTION key
Selects the cooking functions

3 - RAPID HEATING key
Heats the oven rapidly

4 - "-" key (back)
To decrease the temperature and time of day

5 - "+" key (forward)
To increase the temperature and time of day

6 - CLOCK key
Used to set the "minute-minder", "end of cooking", "cooking time" functions and the time of day.

4.1.1.3 - DESCRIPTION OF DISPLAY - NORMAL OVEN - LEVEL 2

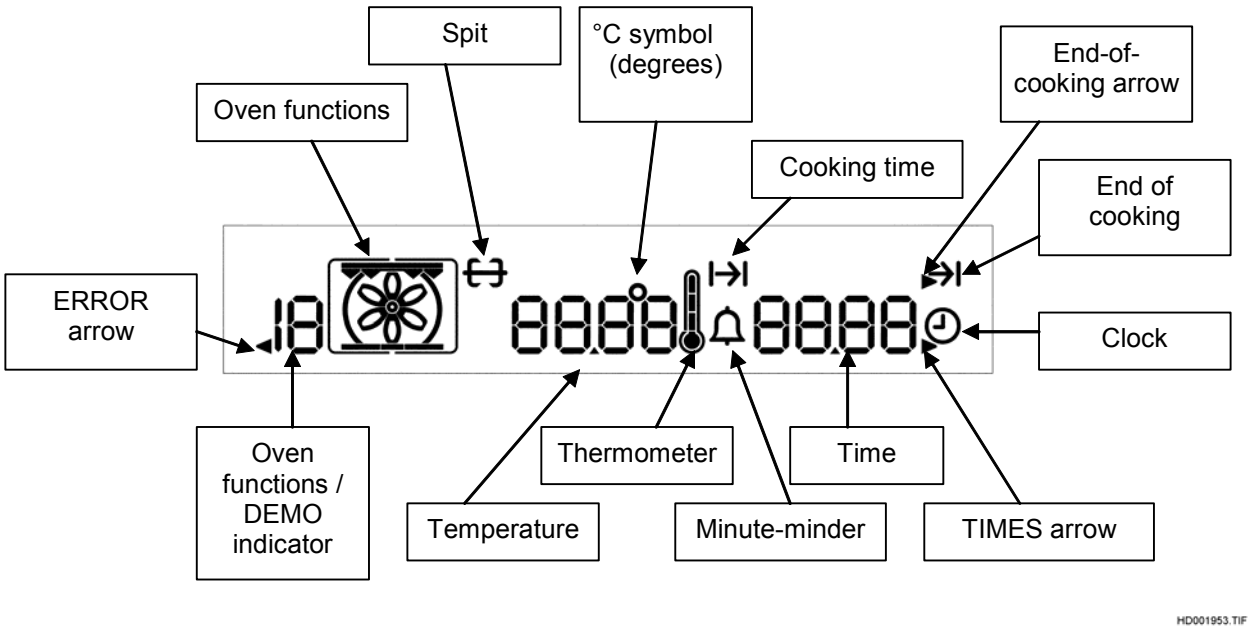
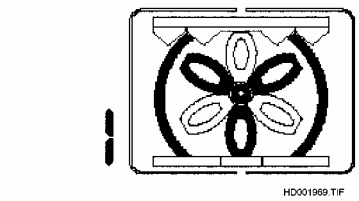


Fig. 24

4.1.1.4 - COOKING FUNCTIONS - NORMAL OVEN - LEVEL 2

The normal oven features nine (or ten) cooking functions which can be selected in the sequence described below:

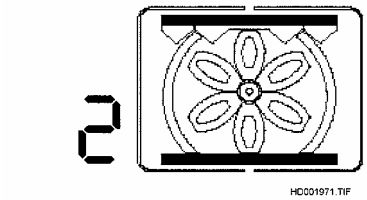
Fan cooking



Elements activated:
Oven lamp
Circular heating element
Convection fan

Pre-set temperature: 175 °C

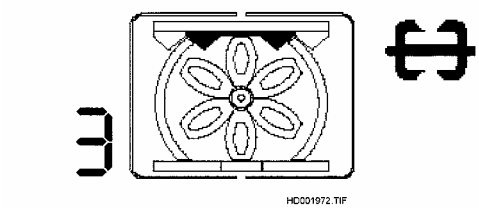
Traditional cooking



Elements activated:
Oven lamp
Upper heating element
Lower heating element

Pre-set temperature: 200 °C

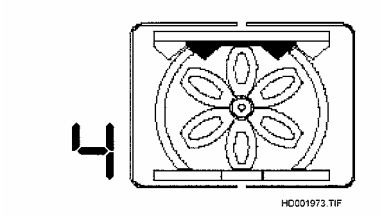
Grill with spit



Elements activated:
Oven lamp
Grill
Spit

Pre-set temperature: 250 °C

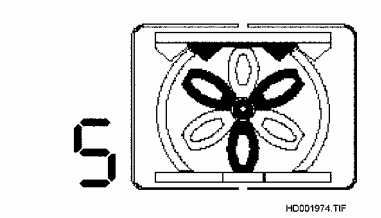
Grill



Elements activated:
Oven lamp
Grill heating element

Pre-set temperature: 250 °C

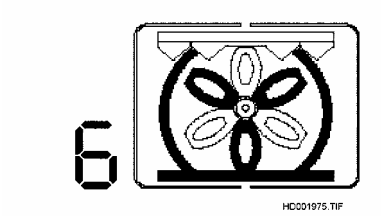
Grill + Fan



Elements activated:
Oven lamp
Grill
Convection fan

Pre-set temperature: 180 °C

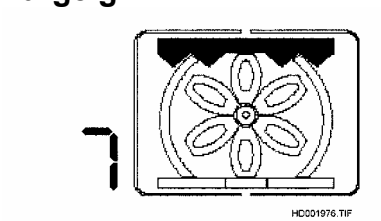
Pizza



Elements activated:
Oven lamp
Circular heating element
Lower heating element
Convection fan
N.B. In the Italian version, the lower and circular heating elements switch on alternately in order to save energy.

Pre-set temperature: 175 °C

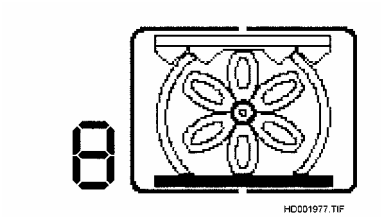
Large grill



Elements activated:
Oven lamp
Grill heating element
Upper heating element

Pre-set temperature: 250 °C

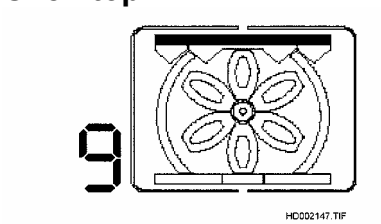
Oven bottom



Elements activated:
Oven lamp
Lower heating element

Pre-set temperature: 250 °C

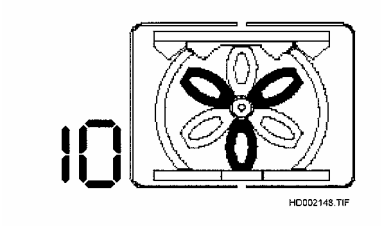
Oven top



Elements activated:
Oven lamp
Upper heating element

Pre-set temperature: 250 °C

Defrosting



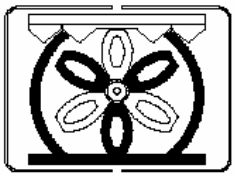
dEF

Elements activated:
Oven lamp
Convection fan

Pre-set temperature: 30 °C

SPECIAL FUNCTIONS:

Rapid heating (European version)

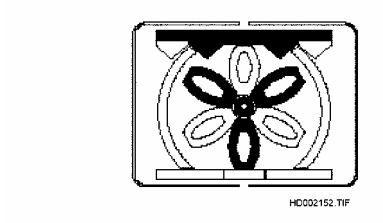


FHU

Elements activated:
Oven lamp
Circular heating element
Lower heating element
Convection fan

The figure illustrates the elements that are effectively in operation when the RAPID HEATING function has been selected, although the display indicates only the first function selected.

Rapid heating (Italian version)



FHU

Elements activated:
Oven lamp
Upper heating element
Grill heating element
Convection fan

The figure illustrates the elements that are effectively in operation when the RAPID HEATING function has been selected, although the display indicates only the first function selected.

N.B.: Some models could not feature all the functions or these may have a different sequence.

4.1.2 - NORMAL OVEN - LEVEL 3

4.1.2.1 - CONTROL PANEL - NORMAL OVEN - LEVEL 3

Example of normal oven - level 3 (Multiplus)

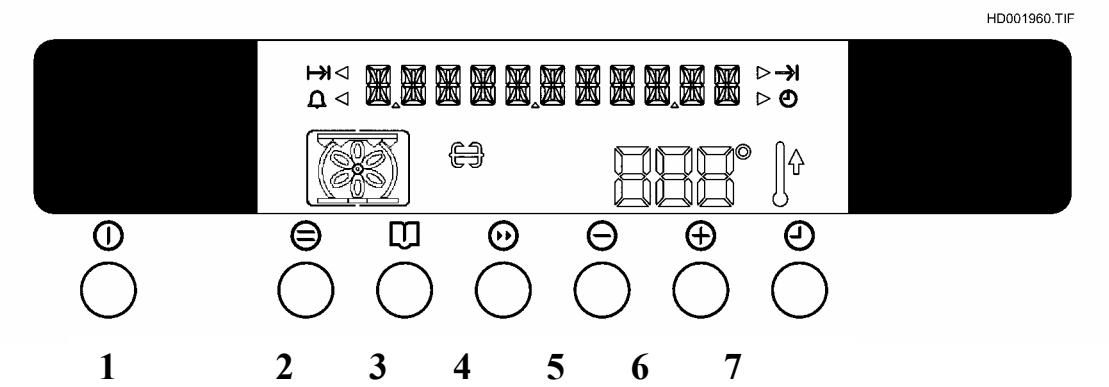


Fig. 25

4.1.2.2 - KEY FUNCTIONS - NORMAL OVEN - LEVEL 3

1 - ON/OFF key
Switches the oven ON and OFF

2 - FUNCTION key
Selects the cooking functions

3 - RECIPES key
Used to select the recipes

4 - RAPID HEATING key
Heats the oven rapidly

5 - "-" key (back)
To decrease the temperature and time of day

6 - "+" key (forward)
To increase the temperature and time of day

7 - CLOCK key
Used to set the "minute-minder", "end of cooking", "cooking time" functions and the time of day.

4.1.2.3 - DESCRIPTION OF DISPLAY - NORMAL OVEN - LEVEL 3

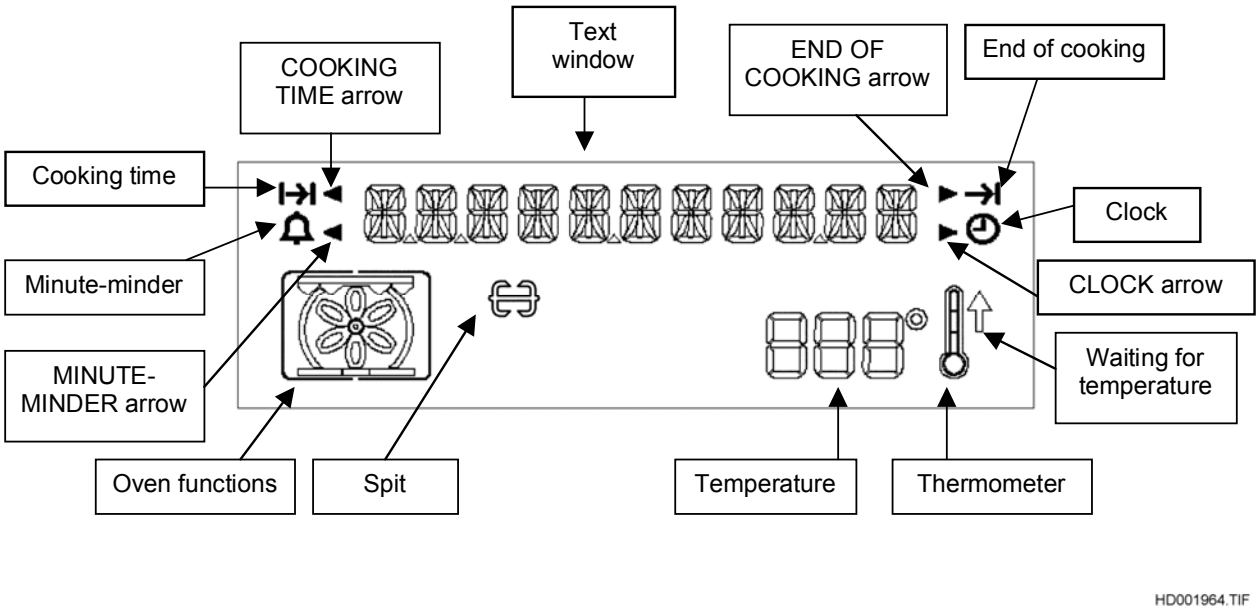
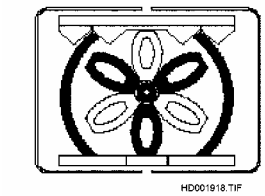


Fig. 26

4.1.2.4 - COOKING FUNCTIONS - NORMAL OVEN - LEVEL 3

The normal oven features nine (or ten) cooking functions which can be selected in the sequence described below:

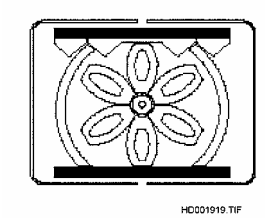
Fan cooking



Elements activated:
Oven lamp
Circular heating element
Convection fan

Pre-set temperature: 175 °C

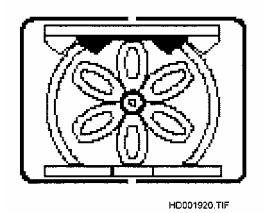
Traditional cooking



Elements activated:
Oven lamp
Upper heating element
Lower heating element

Pre-set temperature: 200 °C

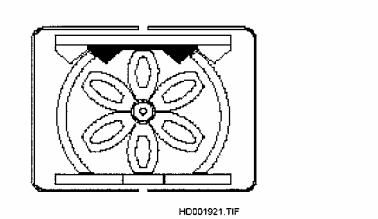
Grill with spit



Elements activated:
Oven lamp
Grill
Spit

Pre-set temperature: 250 °C

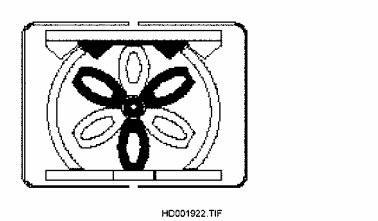
Grill



Elements activated:
Oven lamp
Grill heating element

Pre-set temperature: 250 °C

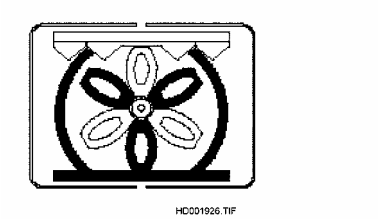
Grill + Fan



Elements activated:
Oven lamp
Grill heating element
Convection fan

Pre-set temperature: 180 °C

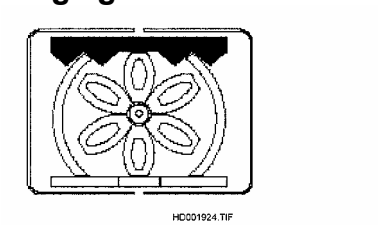
Pizza



Elements activated:
Oven lamp
Circular heating element
Lower heating element
Convection fan
N.B. In the Italian version, the lower and circular heating elements switch on alternately in order to save energy.

Pre-set temperature: 175 °C

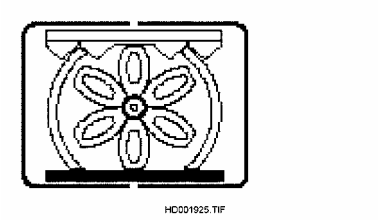
Large grill



Elements activated:
Oven lamp
Grill heating element
Upper heating element

Pre-set temperature: 250 °C

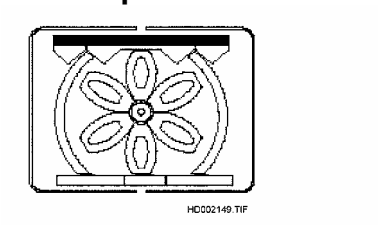
Oven bottom



Elements activated:
Oven lamp
Lower heating element

Pre-set temperature: 250 °C

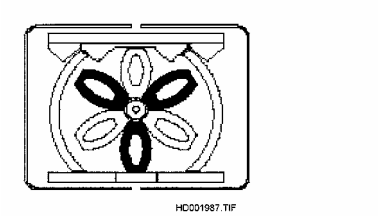
Oven top



Elements activated:
Oven lamp
Upper heating element

Pre-set temperature: 250 °C

Defrosting

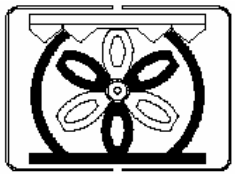


Elements activated:
Oven lamp
Convection fan

Pre-set temperature: 30 °C

SPECIAL FUNCTIONS

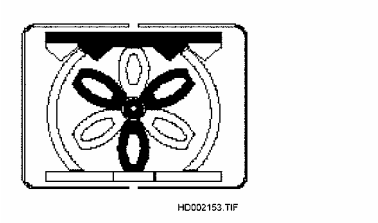
Rapid heating (European version)



Elements activated:
Oven lamp
Circular heating element
Lower heating element
Convection fan

The figure illustrates the elements that are effectively in operation when the RAPID HEATING function has been selected, although the display indicates only the first function selected.

Rapid heating (Italian version)



Elements activated:
Oven lamp
Upper heating element
Grill heating element
Convection fan

The figure illustrates the elements that are effectively in operation when the RAPID HEATING function has been selected, although the display indicates only the first function selected.

NOTE: Some models could not feature all the functions and these may have a different sequence.

4.2 - PYROLITIC OVEN

4.2.1 - PYROLYTIC OVEN - LEVEL 2

4.2.1.1 - CONTROL PANEL – PYROLYTIC OVEN - LEVEL 2

Example of pyrolytic oven – level 2 (Multiplus).

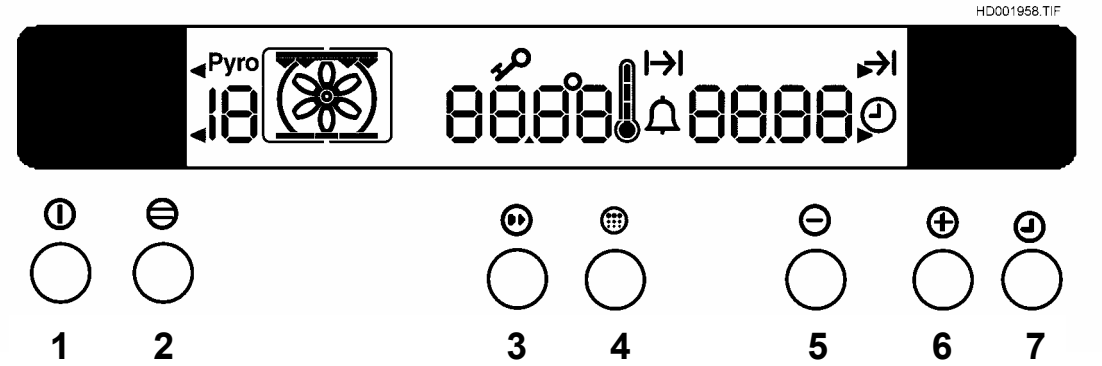


Fig. 27

4.2.1.2 - KEY FUNCTIONS - PYROLYTIC OVEN - LEVEL 2

1 - ON/OFF key
Switches the oven ON and OFF

2 - FUNCTION key
Selects the cooking functions

3 - RAPID HEATING key
Heats the oven rapidly

4 - PYROLYTIC key
Used to select the "PYROLYSIS" function

5 - "-" key (back)
To decrease the temperature and time of day

6 - "+" key (forward)
To increase the temperature and time of day

7 - CLOCK key
Used to set the "minute-minder", "end of cooking", "cooking time" functions and the time of day.

4.2.1.3 - DESCRIPTION OF DISPLAY - PYROLYTIC OVEN - LEVEL 2

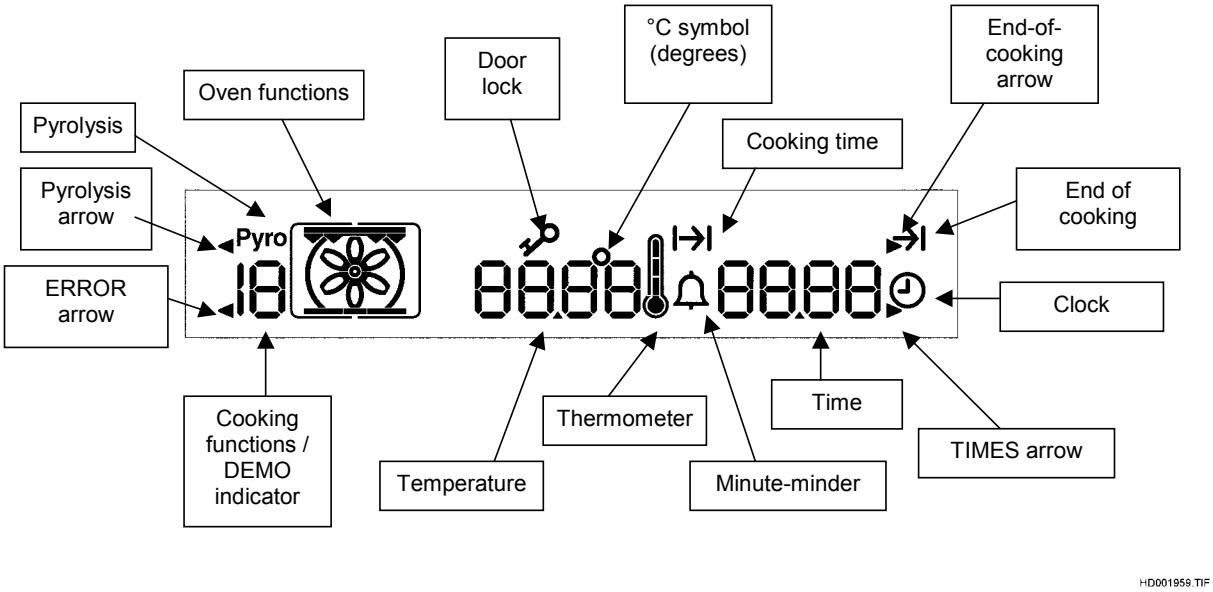
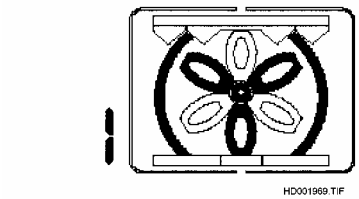


Fig. 28

5.4.2.4 - COOKING FUNCTIONS - PYROLYTIC OVEN - LEVEL 2

The Pyrolytic oven features nine (or ten) cooking functions (as in the normal version), which can be selected in the sequence described below:

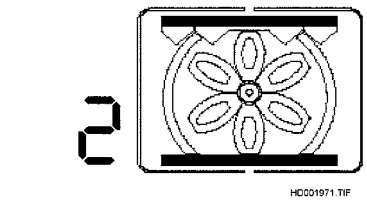
Fan cooking



Elements activated:
Oven lamp
Circular heating element
Convection fan

Pre-set temperature: 175 °C

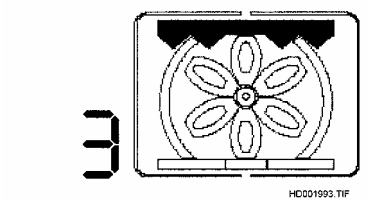
Traditional cooking



Elements activated:
Oven lamp
Upper heating element
Lower heating element

Pre-set temperature: 200 °C

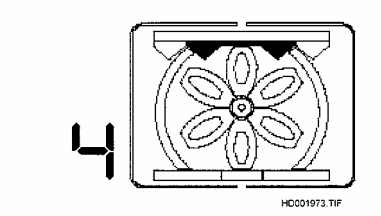
Large grill



Elements activated:
Oven lamp
Grill heating element
Upper heating element

Pre-set temperature: 250 °C

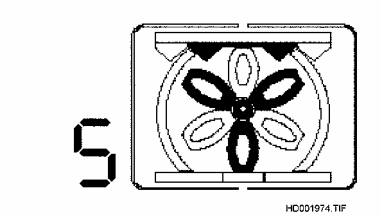
Grill



Elements activated:
Oven lamp
Grill heating element

Pre-set temperature: 250 °C

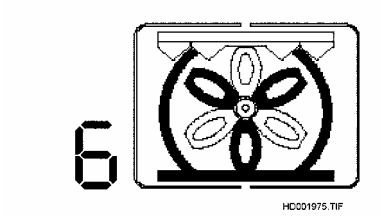
Grill + Fan



Elements activated:
Oven lamp
Grill heating element
Convection fan

Pre-set temperature: 180 °C

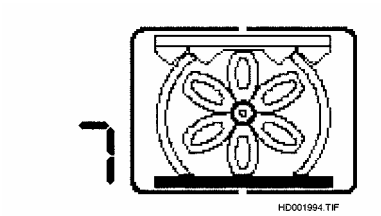
Pizza



Elements activated:
Oven lamp
Circular heating element
Lower heating element
Convection fan

Pre-set temperature: 175 °C

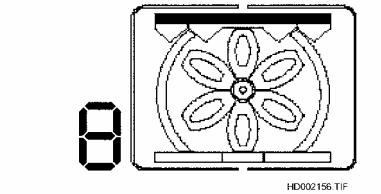
Oven bottom



Elements activated:
Oven lamp
Lower heating element

Pre-set temperature: 250 °C

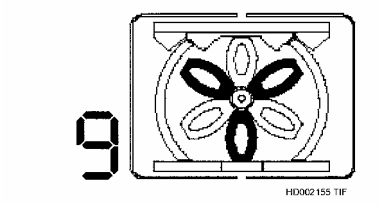
Oven top



Elements activated:
Oven lamp
Upper heating element

Pre-set temperature: 250 °C

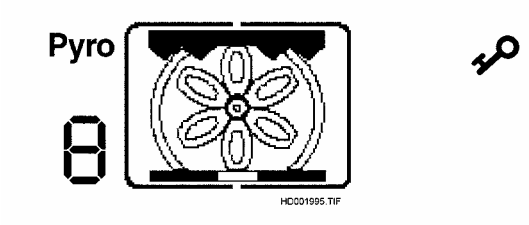
Defrosting



Elements activated:
Oven lamp
Convection fan

Pre-set temperature: 30 °C

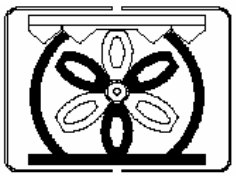
Pyrolytic



Elements activated:
Oven lamp
Upper heating element at 100%
Grill heating element at 80%
Lower heating element at 20%

SPECIAL FUNCTIONS:

Rapid heating (European version)

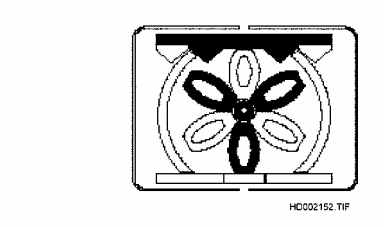


FHU

Elements activated:
Oven lamp
Circular heating element
Lower heating element
Convection fan

The figure illustrates the elements that are effectively in operation when the RAPID HEATING function has been selected, although the display indicates only the first function selected.

Rapid heating (Italian version)



FHU

Elements activated:
Oven lamp
Upper heating element
Grill heating element
Convection fan

The figure illustrates the elements that are effectively in operation when the RAPID HEATING function has been selected, although the display indicates only the first function selected.

N.B.: Some models could not feature all the functions and these may have a different sequence.

4.2.2 - PYROLYTIC OVEN - LEVEL 3

4.2.2.1 - CONTROL PANEL - PYROLYTIC OVEN - LEVEL 3

Example of pyrolytic oven – level 3 (Multiplus)

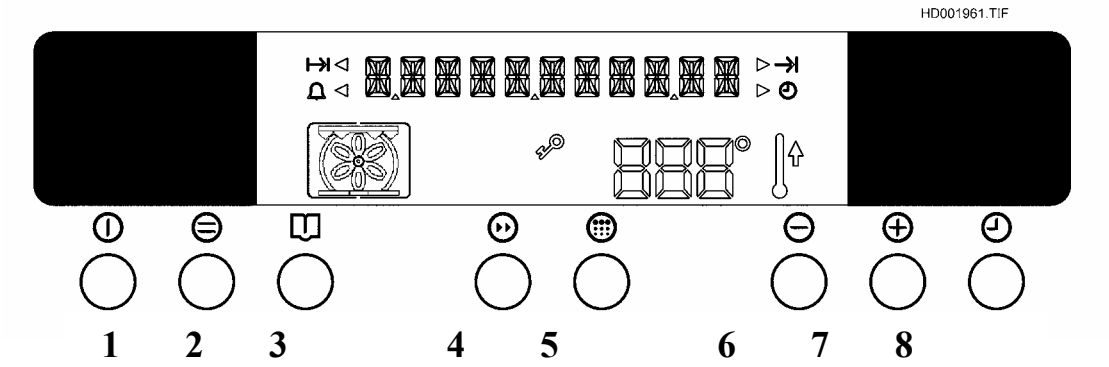


Fig. 29

4.2.2.2 - KEY FUNCTIONS - PYROLYTIC OVEN - LEVEL 3

1 - ON/OFF key
Switches the oven ON and OFF

2 - FUNCTION key
Selects the cooking functions

3 - RECIPES key
Used to select the recipes

4 - RAPID HEATING key
Heats the oven rapidly

5 - PYROLYTIC key
Used to select the "PYROLYSIS" function

6 - "-" key (back)
To decrease the temperature and time of day

7 - "+" key (forward)
To increase the temperature and time of day

8 - CLOCK key
Used to set the "minute-minder", "end of cooking" e "cooking time"

4.2.2.3 - DESCRIPTION OF DISPLAY - PYROLYTIC OVEN - LEVEL 3

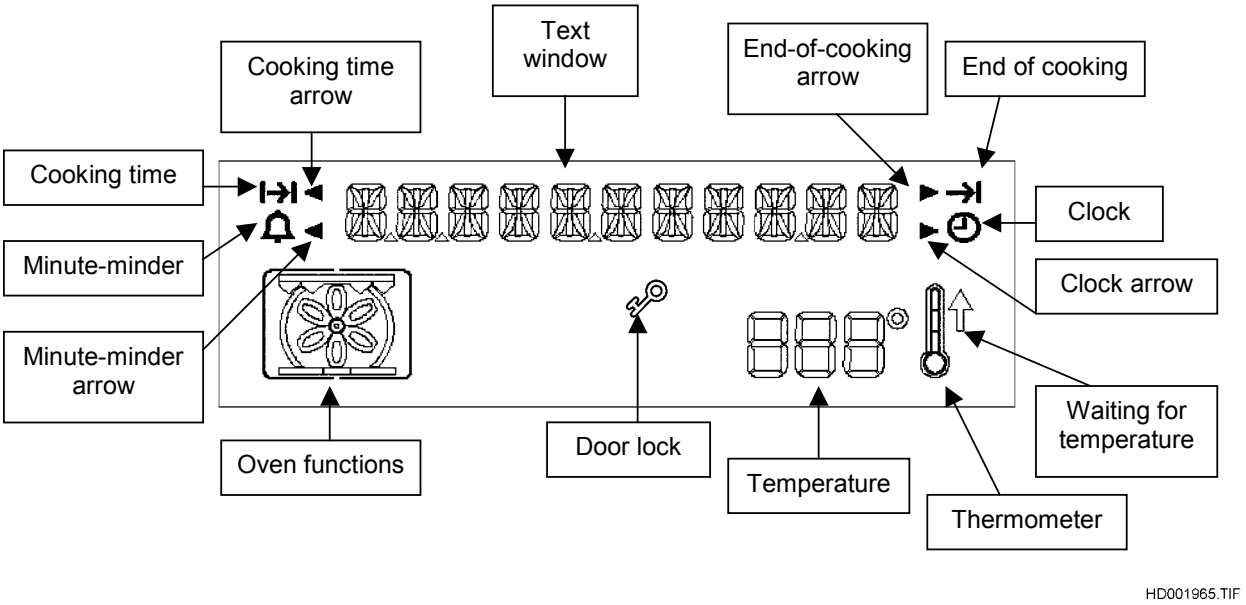
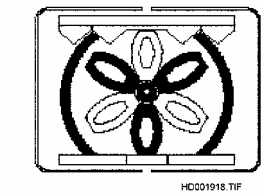


Fig. 30

5.4.3.4 - COOKING FUNCTIONS - PYROLYTIC OVEN - LEVEL 3

The Pyrolytic oven features nine (or ten) cooking functions (as in the normal version), which can be selected in the sequence described below:

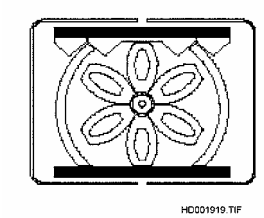
Fan cooking



Elements activated:
Oven lamp
Circular heating element
Convection fan

Pre-set temperature: 175 °C

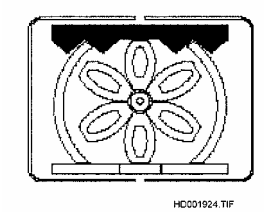
Traditional cooking



Elements activated:
Oven lamp
Upper heating element
Lower heating element

Pre-set temperature: 200 °C

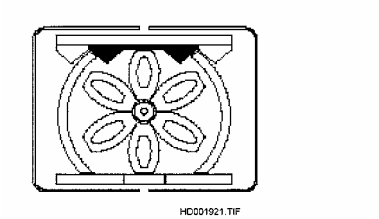
Large grill



Elements activated:
Oven lamp
Grill
Upper heating element

Pre-set temperature: 250 °C

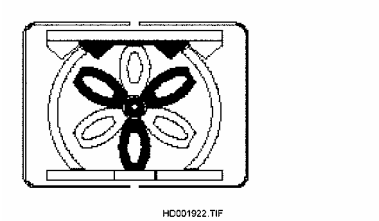
Grill



Elements activated:
Oven lamp
Grill heating element

Pre-set temperature: 250 °C

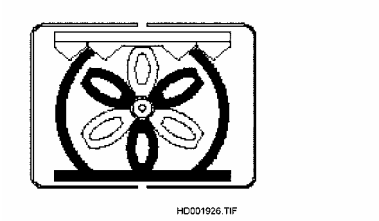
Grill + Fan



Elements activated:
Oven lamp
Grill heating element
Convection fan

Pre-set temperature: 180 °C

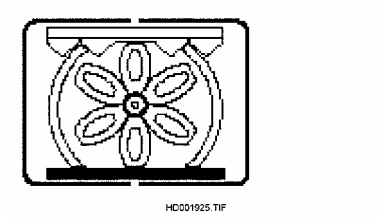
Pizza



Elements activated:
Oven lamp
Circular heating element
Lower heating element
Convection fan

Pre-set temperature: 175 °C

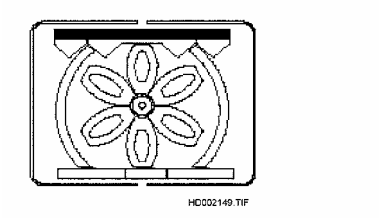
Oven bottom



Elements activated:
Oven lamp
Lower heating element

Pre-set temperature: 250 °C

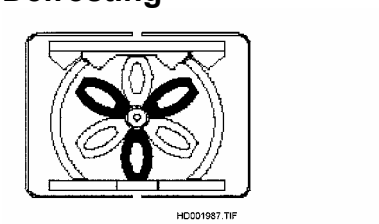
Oven top



Elements activated:
Oven lamp
Upper heating element

Pre-set temperature: 250 °C

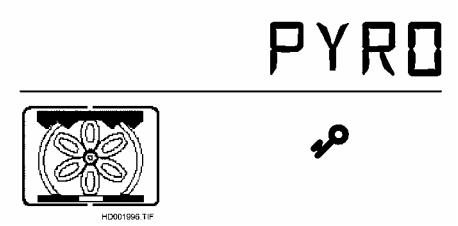
Defrosting



Elements activated:
Oven lamp
Convection fan

Pre-set temperature: 30 °C

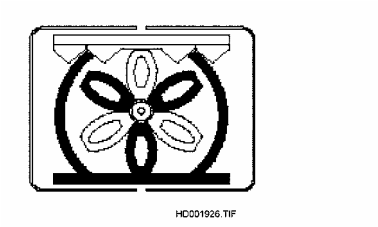
Pyrolytic



Elements activated:
Oven lamp
Upper heating element at 100%
Grill heating element at 80%
Lower heating element at 20%

SPECIAL FUNCTIONS:

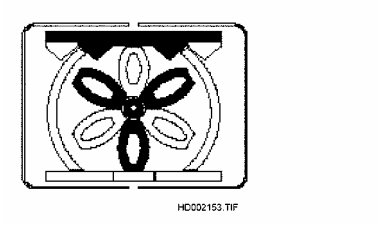
Rapid heating (European version)



Elements activated:
Oven lamp
Circular heating element
Lower heating element
Convection fan

The figure illustrates the elements that are effectively in operation when the RAPID HEATING function has been selected, although the display indicates only the first function selected.

Rapid heating (Italian version)



Elements activated:
Oven lamp
Upper heating element
Grill heating element
Convection fan

The figure illustrates the elements that are effectively in operation when the RAPID HEATING function has been selected, although the display indicates only the first function selected.

N.B.: Some models could not feature all the functions and these may have a different sequence.

5 - FUNCTIONAL DIAGRAMS

5.1 - FUNCTIONAL DIAGRAMS - NORMAL OVEN

5.1.1 - FUNCTIONAL DIAGRAM - NORMAL OVEN - LEVEL 2

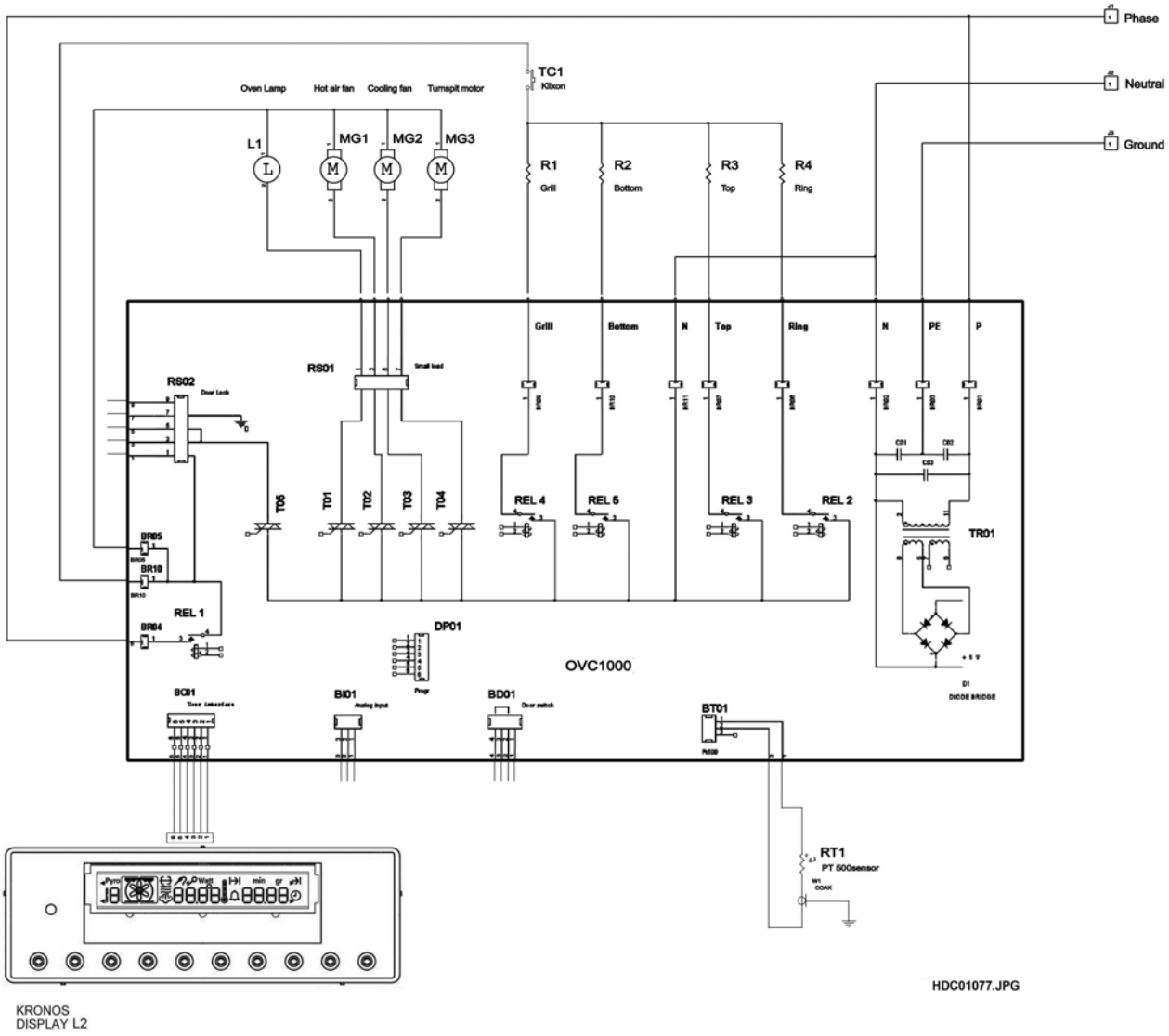


Fig. 31

KEY

DISPLAY L2	- KRONOS CONTROL UNIT LEVEL 2.	
Ground	- MAINS (EARTH).	
L1	- OVEN LAMP.	
MG1	- CONVECTION FAN	
MG2	- TANGENTIAL COOLING FAN.	
MG3	- SPIT MOTOR	
Neutral	- MAINS (NEUTRAL).	
Phase	- RETE (FASE).	
RT1	- OVEN SENSOR PT500.	
R1	- GRILL HEATING ELEMENT.	
R2	- LOWER HEATING ELEMENT (BOTTOM).	
R3	- UPPER HEATING ELEMENT (CEILING).	
R4	- CONVECTION HEATING ELEMENT (CIRCULAR).	
OVC1000	- POWER BOARD.	
REL1	- SAFETY MAIN RELAY.	
REL3	- CONTROL RELAY FOR UPPER HEATING ELEMENT.	
REL5	- CONTROL RELAY FOR LOWER HEATING ELEMENT.	
REL2	- CONTROL RELAY FOR CONVECTION HEATING ELEMENT.	
REL4	- CONTROL RELAY FOR GRILL HEATING ELEMENT.	
TC1	- SAFETY THERMOSTAT.	
TO1	- CONTROL TRIAC FOR OVEN LAMP.	
TO2	- CONTROL TRIAC FOR CONVECTION FAN.	
TO3	- CONTROL TRIAC FOR TANGENTIAL COOLING FAN.	
TO4	- CONTROL TRIAC FOR SPIT MOTOR	
TO5	- CONTROL TRIAC FOR DOOR INTERLOCK	
TR01	- LOW-POWER TRANSFORMER	

5.1.1.1 – FUNCTIONAL DESCRIPTION – NORMAL OVEN - LEVEL 2

The mains power supply to the system goes to the power board, which provides low-voltage power to the control unit. The heating elements of the oven are protected by a safety thermostat (TC1) which disconnects the power circuit in the event of overheating caused by a malfunction in the electronic system.
When a cooking function is selected the relays and triacs for the corresponding function, which are mounted on the power board, are activated.
Also connected to the power board is the PT500 temperature sensor, whose resistance varies with the temperature inside the oven. When the electronic system detects that the resistance of the PT500 sensor corresponds to the selected temperature, it switches off the heating elements.
If the temperature inside the oven exceeds 120°C, triac TO3 activates the tangential fan (MG2), which provides extra cooling for the exterior of the oven casing (muffle) in the areas where the various electrical components are located.
At the end of a programmed cooking function, or when the appliance is switched off, the tangential cooling fan remains in operation until the temperature at the centre of the oven falls below 110°C.
In the event of a malfunction, such as a fault in a relay or the temperature sensor, the system is able to detect the malfunction according to the signal received from the temperature sensor; in this case, safety relay REL1 disconnects the appliance from the power supply.
The system is also able to display an error code that identifies the fault that has occurred (see "Error Codes").

5.1.2 - FUNCTIONAL DIAGRAM - NORMAL OVEN - LEVEL 3

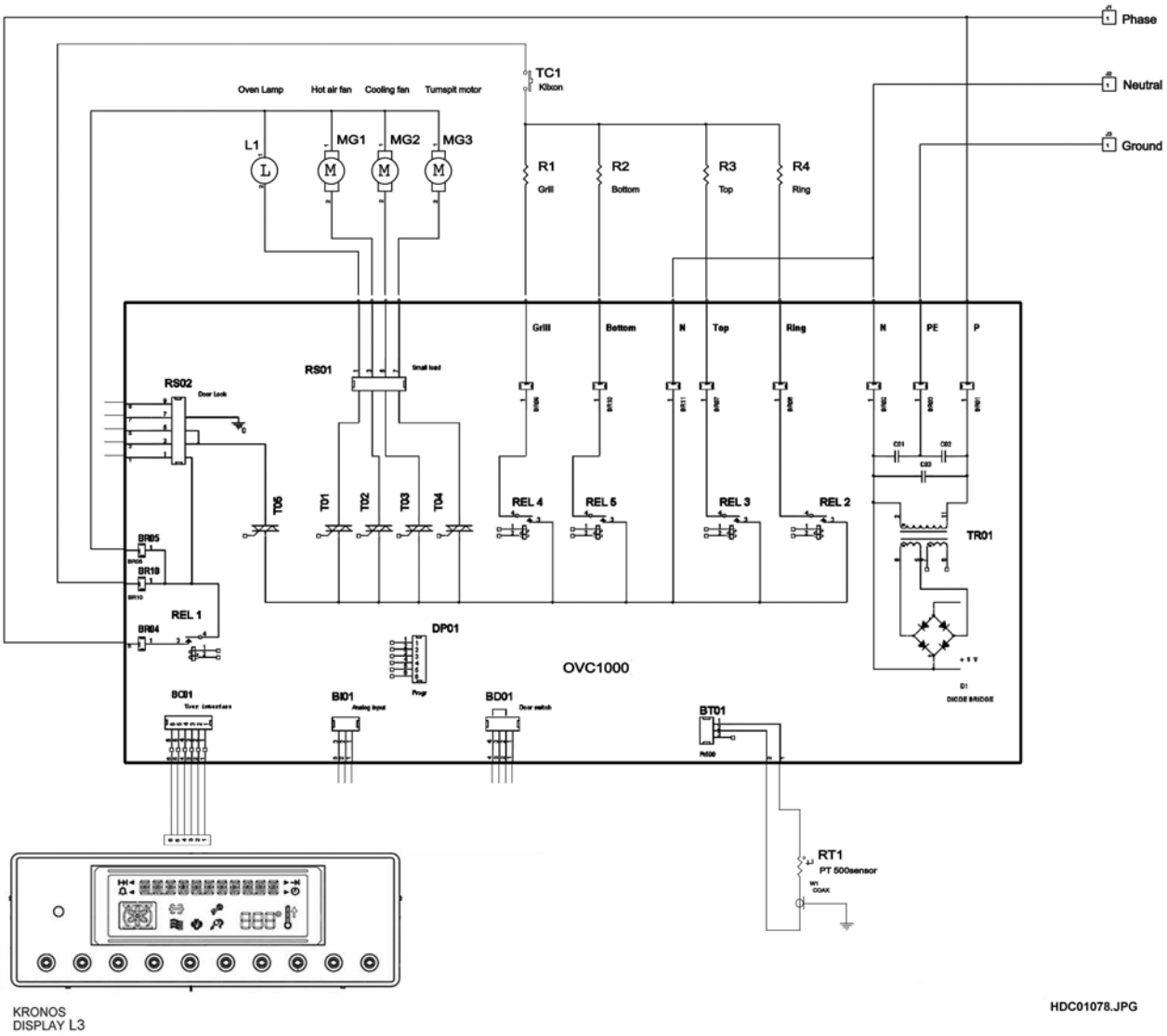


Fig. 32

KEY

DISPLAY L3	-	KRONOS CONTROL UNIT LEVEL 3.
Ground	-	MAINS (EARTH).
L1	-	OVEN LAMP.
MG1	-	CONVECTION FAN
MG2	-	TANGENTIAL COOLING FAN.
MG3	-	SPIT MOTOR
Neutral	-	MAINS (NEUTRAL).
Phase	-	RETE (FASE).
RT1	-	OVEN SENSOR PT500.
R1	-	GRILL HEATING ELEMENT.
R2	-	LOWER HEATING ELEMENT (BOTTOM).
R3	-	UPPER HEATING ELEMENT (CEILING).
R4	-	CONVECTION HEATING ELEMENT (CIRCULAR).
OVC1000	-	POWER BOARD.
REL1	-	SAFETY MAIN RELAY.
REL3	-	CONTROL RELAY FOR UPPER HEATING ELEMENT.
REL5	-	CONTROL RELAY FOR LOWER HEATING ELEMENT.
REL2	-	CONTROL RELAY FOR CONVECTION HEATING ELEMENT.
REL4	-	CONTROL RELAY FOR GRILL HEATING ELEMENT.
TC1	-	SAFETY THERMOSTAT.
TO1	-	CONTROL TRIAC FOR OVEN LAMP.
TO2	-	CONTROL TRIAC FOR CONVECTION FAN.
TO3	-	CONTROL TRIAC FOR TANGENTIAL COOLING FAN.
TO4	-	CONTROL TRIAC FOR SPIT MOTOR
TO5	-	CONTROL TRIAC FOR DOOR INTERLOCK
TR01	-	LOW-POWER TRANSFORMER

5.1.2.1 - FUNCTIONAL DESCRIPTION - NORMAL OVEN - LEVEL 3

The mains power supply to the system goes to the power board, which provides low-voltage power to the control unit. The ehating elements of the oven are protected by a safety thermostat (TC1) which disconnects the power circuit in the event of overheating caused by a malfunction in the electronic system.
When a cooking function is selected the relays and triacs for the corresponding function, which are mounted on the power board, are activated.
Also connected to the power board is the PT500 temperature sensor, whose resistance varies with the temperature inside the oven. When the electronic system detects that the resistance of the PT500 sensor corresponds to the selected temperature, it switches off the heating elements.
If the temperature inside the oven exceeds 120°C, triac TO3 activates the tangential fan (MG2), which provides extra cooling for the exterior of the oven casing (muffle) in the areas where the various electrical components are located.
At the end of a programmed cooking function, or when the appliance is switched off, the tangential cooling fan remains in operation until the temperature at the centre of the oven falls below 110°C.
In the event of a malfunction, such as a fault in a relay or the temperature sensor, the system is able to detect the malfunction according to the signal received from the temperature sensor; in this case, safety relay REL1 disconnects the appliance from the power supply.
The system is also able to display an error code that identifies the fault that has occurred (see "Error Codes”).

5.2 - FUNCTIONAL DIAGRAM – PYROLYTIC OVEN

5.2.1 - FUNCTIONAL DIAGRAM – PYROLYTIC OVEN - LEVEL 2

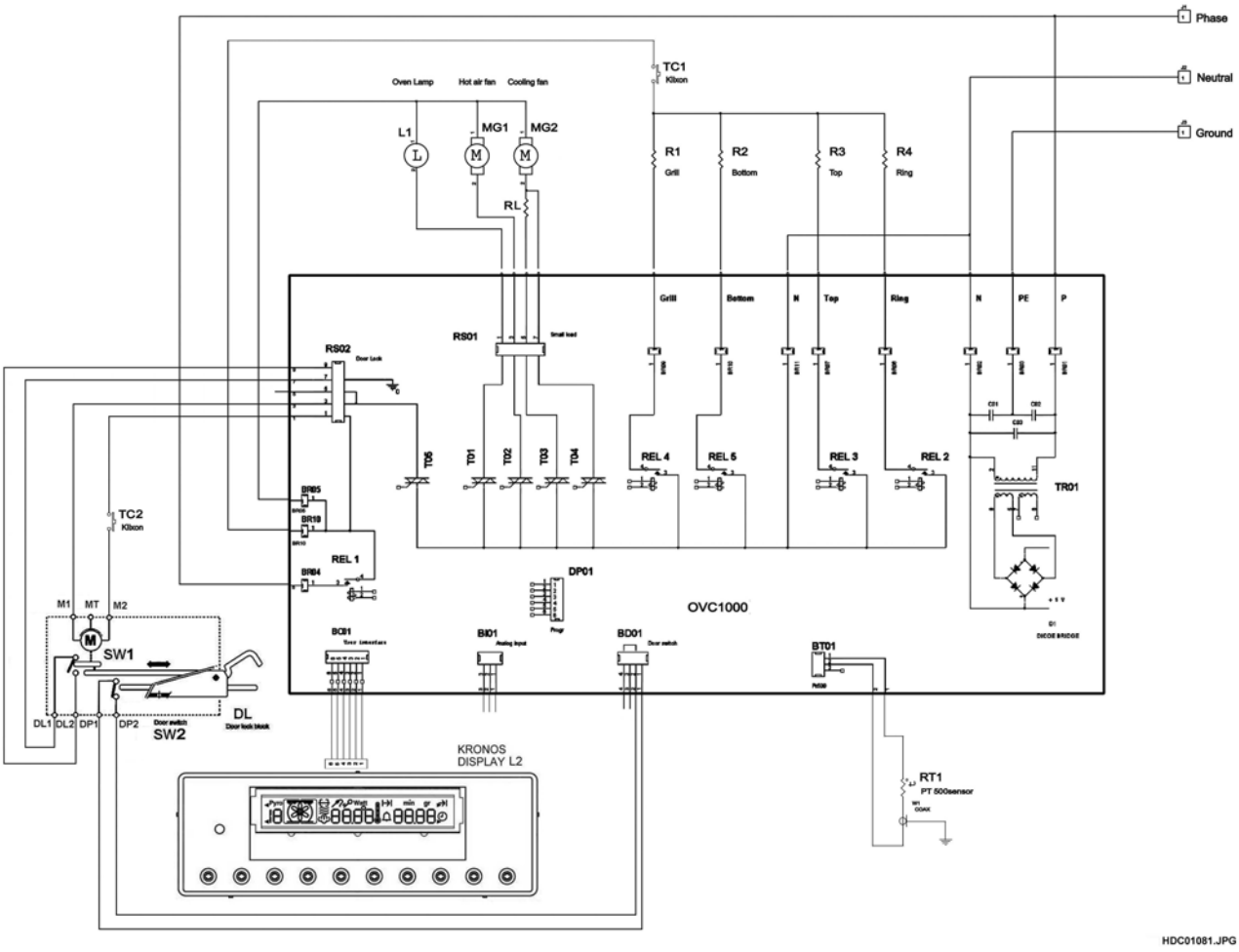


Fig. 33

KEY

DISPLAY L2 - KRONOS CONTROL UNIT LEVEL 2.
DL - DOOR INTERLOCK ASSY
Ground - MAINS (EARTH).
L1 - OVEN LAMP.
MG1 - CONVECTION FAN
MG2 - TANGENTIAL COOLING FAN.
MG3 - SPIT MOTOR
Neutral - MAINS (NEUTRAL).
Phase - RETE (FASE).
RT1 - OVEN SENSOR PT500.
R1 - GRILL HEATING ELEMENT.
R2 - LOWER HEATING ELEMENT (BOTTOM).
R3 - UPPER HEATING ELEMENT (CEILING).
R4 - CONVECTION HEATING ELEMENT (CIRCULAR).
OVC1000 - POWER BOARD.
REL1 - SAFETY MAIN RELAY.
REL3 - CONTROL RELAY FOR UPPER HEATING ELEMENT.
REL5 - CONTROL RELAY FOR LOWER HEATING ELEMENT.
REL2 - CONTROL RELAY FOR CONVECTION HEATING ELEMENT.
REL4 - CONTROL RELAY FOR GRILL HEATING ELEMENT.
RL - FAN HEATING ELEMENT (DOUBLE SPEED)
SW1 - MICROSWITCH DOOR INTERLOCK.
SW2 - MICROSWITCH DOOR CLOSED.
TC1 - SAFETY THERMOSTAT.
TC2 - DOOR INTERLOCK THERMOSTAT
TO1 - CONTROL TRIAC FOR OVEN LAMP.
TO2 - CONTROL TRIAC FOR CONVECTION FAN.
TO3 - CONTROL TRIAC FOR TANGENTIAL COOLING FAN.
TO4 - CONTROL TRIAC FOR SPIT MOTOR
TO5 - CONTROL TRIAC FOR DOOR INTERLOCK
TR01 - LOW-POWER TRANSFORMER

5.2.1.1 – FUNCTIONAL DESCRIPTION - PYROLYTIC OVEN - LEVEL 2

The mains power supply to the system goes to the power board, which provides low-voltage power to the control unit. The entire circuit of the oven is protected by a safety thermostat (TH1) which disconnects the power circuit in the event of overheating caused by a malfunction in the electronic system.
When a cooking function is selected, the relays and triacs for the corresponding function, which are mounted on the power board, are activated.
Also connected to the power board is the PT500 temperature sensor, whose resistance varies with the temperature inside the oven. When the electronic system detects that the resistance of the PT500 sensor corresponds to the selected temperature, it switches off the heating elements.
Also connected to the power board is the door interlock assy for the pyrolytic function (triac TO5).
The TC2 thermostat avoids that false signals make the door open during the pyrolysis cycle (see page 21 of Service Manual 599360764).
The microswitch SW2 transmits the information of door closet to the power board.
If the temperature inside the oven exceeds 120°C, triac TO3 activates the tangential fan (MG2), which provides extra cooling for the exterior of the oven casing (muffle) in the areas where the various electrical components are located**.**
During pyrolytic function, the tangential fan MG2 is activated at the maximum speed by the triac T04 as soon as the function is activated.
At the end of a programmed cooking function, or when the appliance is switched off, the tangential cooling fan remains in operation until the temperature at the centre of the oven falls below 110°C.
In the event of a malfunction, such as a fault in a relay or the temperature sensor, the system is able to detect the malfunction according to the signal received from the temperature sensor; in this case, safety relay REL1 disconnects the appliance from the power supply.
The system is also able to display an error code that identifies the fault that has occurred (see "Error Codes").

5.2.2 - FUNCTIONAL DIAGRAM – PYROLYTIC OVEN – LEVEL 3

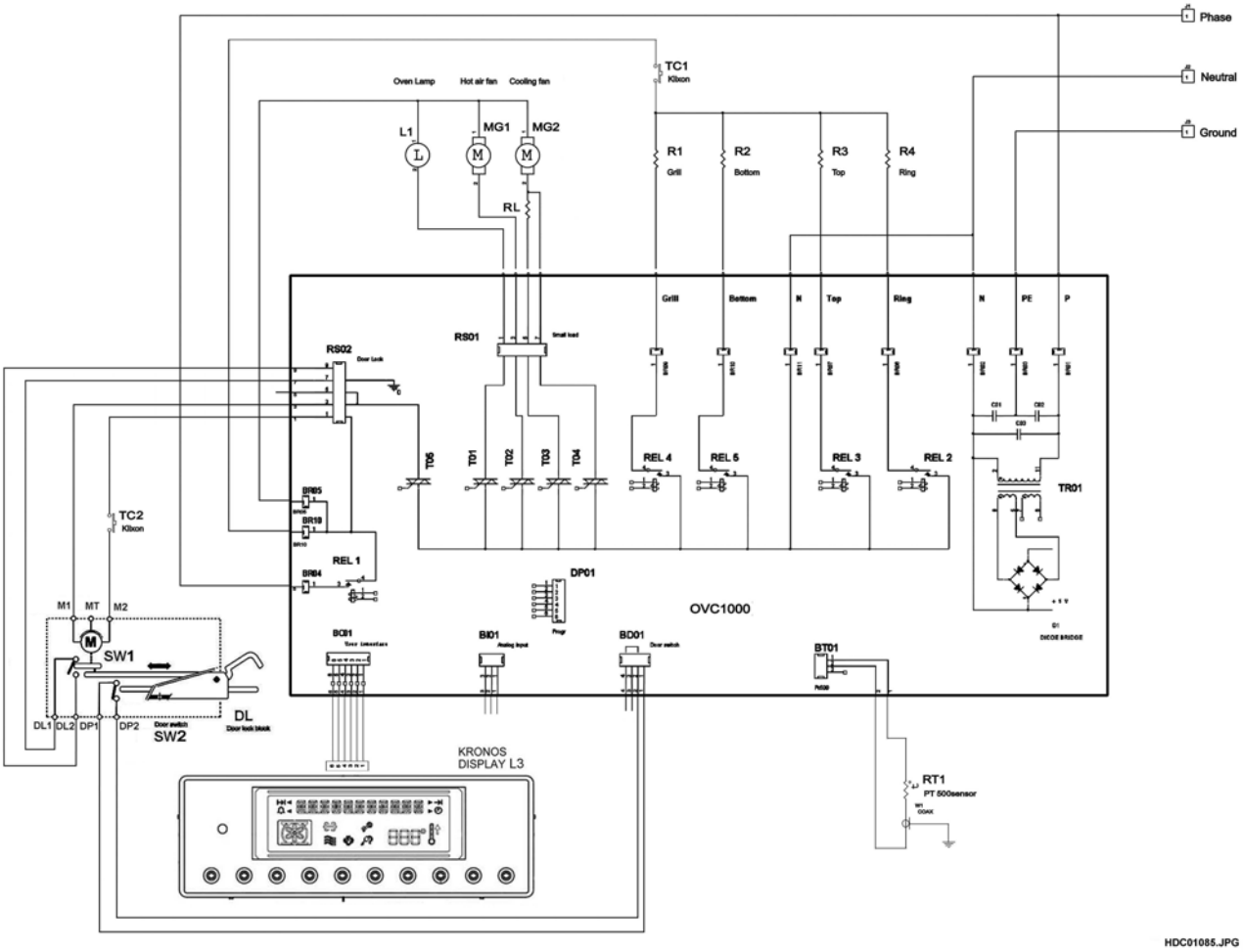


Fig. 34

KEY

DISPLAY L3 - KRONOS CONTROL UNIT LEVEL 3.
DL - DOOR INTERLOCK ASSY
Ground - MAINS (EARTH).
L1 - OVEN LAMP.
MG1 - CONVECTION FAN
MG2 - TANGENTIAL COOLING FAN.
MG3 - SPIT MOTOR
Neutral - MAINS (NEUTRAL).
Phase - RETE (FASE).
RT1 - OVEN SENSOR PT500.
R1 - GRILL HEATING ELEMENT.
R2 - LOWER HEATING ELEMENT (BOTTOM).
R3 - UPPER HEATING ELEMENT (CEILING).
R4 - CONVECTION HEATING ELEMENT (CIRCULAR).
OVC1000 - POWER BOARD.
REL1 - SAFETY MAIN RELAY.
REL3 - CONTROL RELAY FOR UPPER HEATING ELEMENT.
REL5 - CONTROL RELAY FOR LOWER HEATING ELEMENT.
REL2 - CONTROL RELAY FOR CONVECTION HEATING ELEMENT.
REL4 - CONTROL RELAY FOR GRILL HEATING ELEMENT.
RL - FAN HEATING ELEMENT (DOUBLE SPEED)
SW1 - MICROSWITCH DOOR INTERLOCK.
SW2 - MICROSWITCH DOOR CLOSED.
TC1 - SAFETY THERMOSTAT.
TC2 - DOOR INTERLOCK THERMOSTAT
TO1 - CONTROL TRIAC FOR OVEN LAMP.
TO2 - CONTROL TRIAC FOR CONVECTION FAN.
TO3 - CONTROL TRIAC FOR TANGENTIAL COOLING FAN.
TO4 - CONTROL TRIAC FOR SPIT MOTOR
TO5 - CONTROL TRIAC FOR DOOR INTERLOCK
TR01 - LOW-POWER TRANSFORMER

5.2.2.1 - FUNCTIONAL DESCRIPTION - PYROLYTIC OVEN - LEVEL 3

The mains power supply to the system goes to the power board, which provides low-voltage power to the control unit. The entire circuit of the oven is protected by a safety thermostat (TH1) which disconnects the power circuit in the event of overheating caused by a malfunction in the electronic system.
When a cooking function is selected, the relays and triacs for the corresponding function, which are mounted on the power board, are activated.
Also connected to the power board is the PT500 temperature sensor, whose resistance varies with the temperature inside the oven. When the electronic system detects that the resistance of the PT500 sensor corresponds to the selected temperature, it switches off the heating elements.
Also connected to the power board is the door interlock assy for the pyrolytic function (triac TO5).
The TC2 thermostat avoids that false signals make the door open during the pyrolysis cycle (see page 21 of Service Manual 599360764).
The microswitch SW2 transmits the information of door closet to the power board.
If the temperature inside the oven exceeds 120°C, triac TO3 activates the tangential fan (MG2), which provides extra cooling for the exterior of the oven casing (muffle) in the areas where the various electrical components are located**.**
During pyrolytic function, the tangential fan MG2 is activated at the maximum speed by the triac T04 as soon as the function is activated.
At the end of a programmed cooking function, or when the appliance is switched off, the tangential cooling fan remains in operation until the temperature at the centre of the oven falls below 110°C.
In the event of a malfunction, such as a fault in a relay or the temperature sensor, the system is able to detect the malfunction according to the signal received from the temperature sensor; in this case, safety relay REL1 disconnects the appliance from the power supply.
The system is also able to display an error code that identifies the fault that has occurred (see "Error Codes”).

6 - ERROR CODES

The KRONOS system performs a series of internal diagnostics routines; in the event of abnormal operation, the system displays the corresponding error code.
The error code is shown on the display as shown in the figures relative to the various levels of appliance (see Figg. 46 and 47).

The table below shows the various error codes:

ERROR CODE	DESCRIPTION OF MALFUNCTION
F02	Door closing system (only on pyrolytic ovens)
F03	EEPROM memory on control unit
F04	Temperature Range of oven sensor (5 seconds)
F05	Overheating detected (> 350°C on normal ovens) (> 530°C on pyrolytic ovens)
F08	Communication interrupted between control unit and power board.
F09	Software compatibility between control unit and power board
F10	Triac faulty (on power board)

Examples of various error codes relative to the various levels:

Error code (F05) on Level 2 control unit

Fig. 35

Error code (F05) on Level 3 control unit

Fig. 36

7 - DIAGNOSTICS

7.1 - DIAGNOSTICS ON LEVEL 2 NORMAL CONTROL UNIT

To activate the diagnostics test routine for the normal version, proceed as follows:

Press and hold down buttons FHU and  simultaneously within some seconds after the switching on:
The test is performed in the following sequence:

Switching on

Fig. 37

Activation of the test

Fig. 38

Displaying of display segments

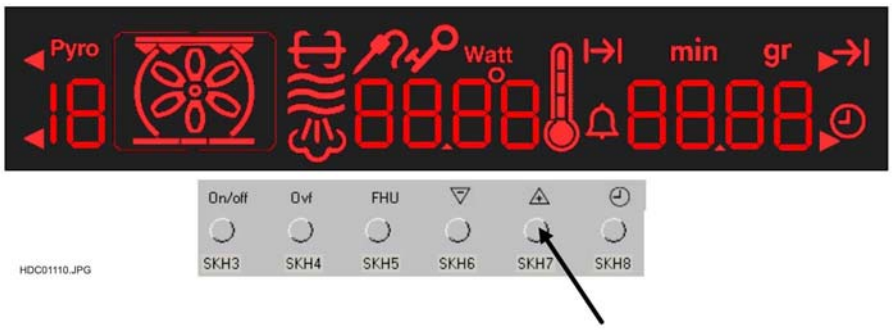


Fig. 39

Displaying of programme code

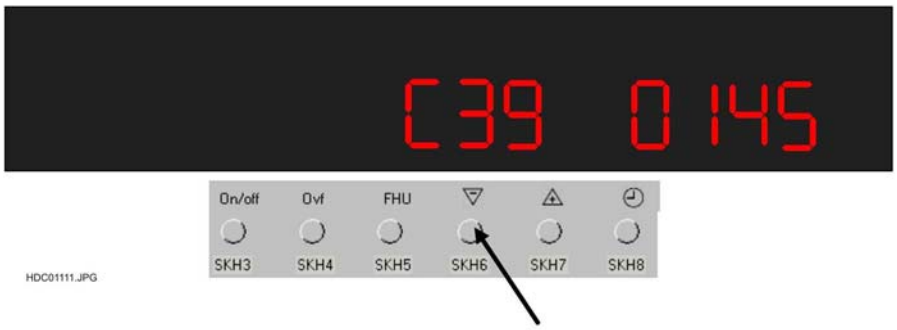


Fig. 40

Temperature of sensor (25)

Fig. 41

Power and auxiliary loads test

Fig. 42

End of test

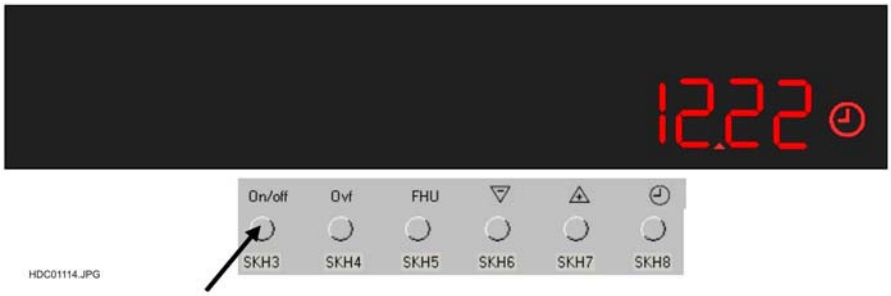


Fig. 43

7.2 - DIAGNOSTICS ON LEVEL 2 NORMAL CONTROL UNIT

To activate the diagnostics test routine for the pyro version, proceed as follows:

Press and hold down buttons FHU and simultaneoulsy within some seconds after the switching on:
The test is performed in the following sequence:

Switching on

Fig. 44

Activation of the test

Fig. 45

Displaying of display segments

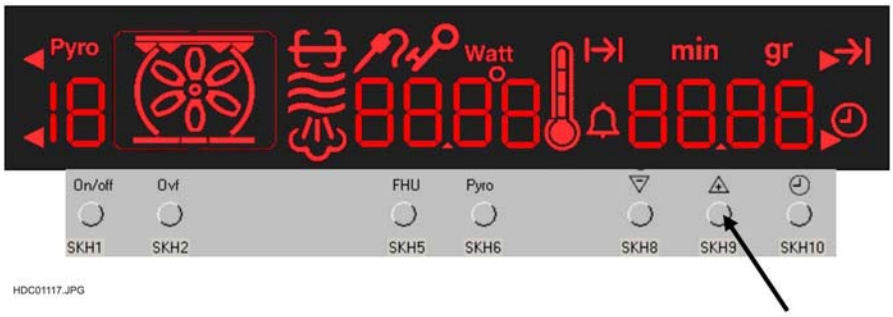


Fig. 46

Displaying of programme code

Fig. 47

Door closed not blocked (02) Temperature of sensor (25)

Fig. 48

Door open not blocked (02) Temperature of sensor (25)

Fig. 49

Door blocked

Fig. 50

Power and auxiliary loads test

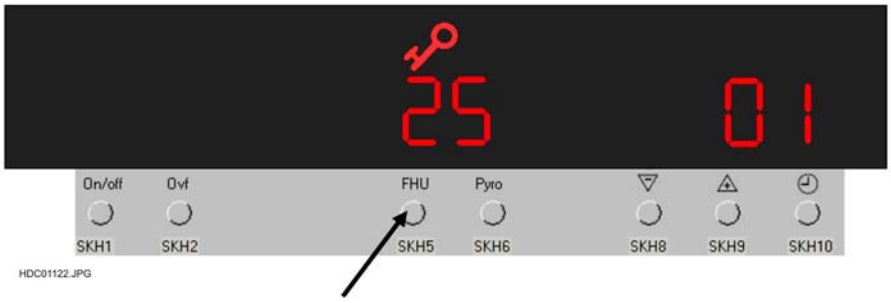


Fig. 51

Disconnect door interlock

Fig. 52

End of test

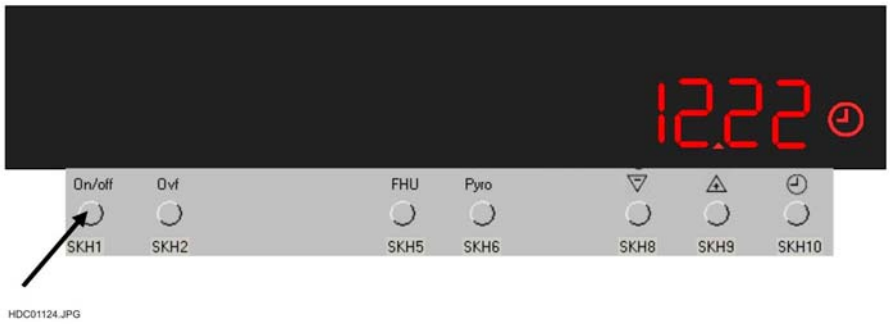


Fig. 53

7.3 - DIAGNOSTICS ON LEVEL 3 NORMAL CONTROL UNIT

To activate the diagnostics test routine for the normal version, proceed as follows:

Prss and hold down buttons FHU and simultaneously within some seconds after the switching on:
The test is performed in the following sequence:

Switching on

Fig. 54

Activation of the tes

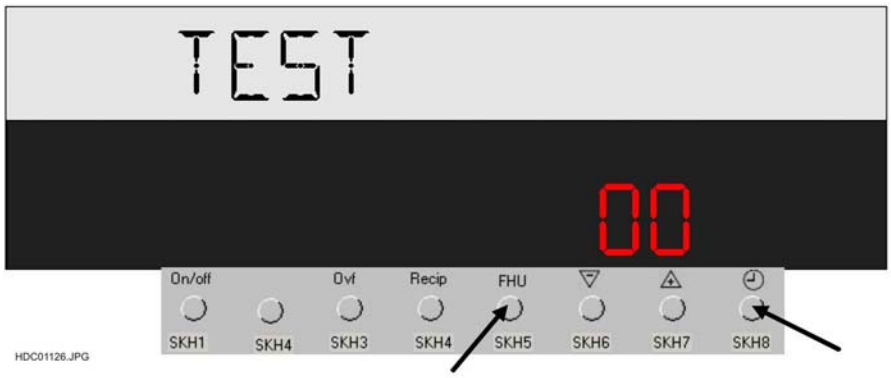


Fig. 55

Displaying of display segments

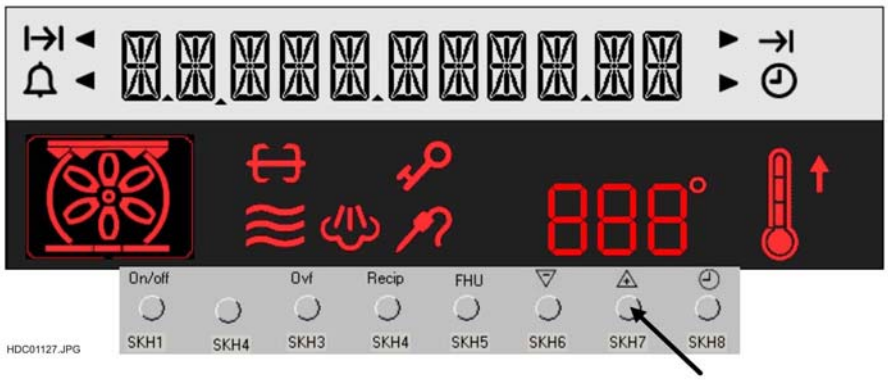


Fig. 56

Displaying the programme code and Temperature of sensor (25)

Fig. 57

Power and auxiliary loads test

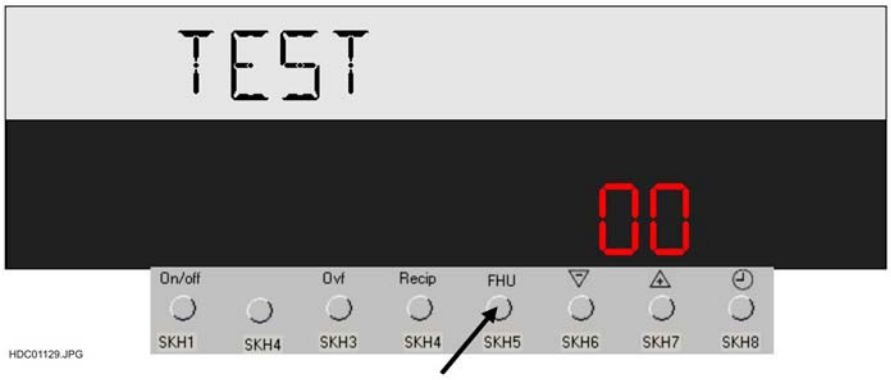


Fig. 58

End of test

Fig. 59

7.4 - DIAGNOSTICS ON LEVEL 3 PYROLYTIC CONTROL UNIT

To activate the diagnostics test routine for the pyro version, proceed as follows:

Press buttons FHU and simultaneously within some seconds after the switching on:
The test is performed in the following sequence:

Switching on

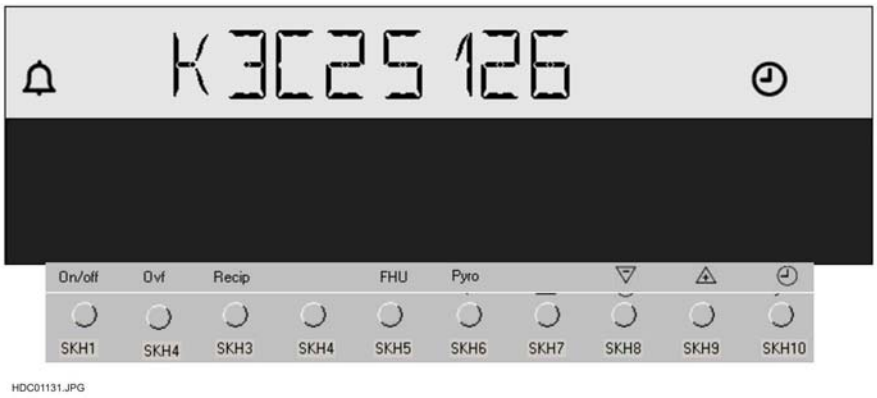


Fig. 60

Activation of the test

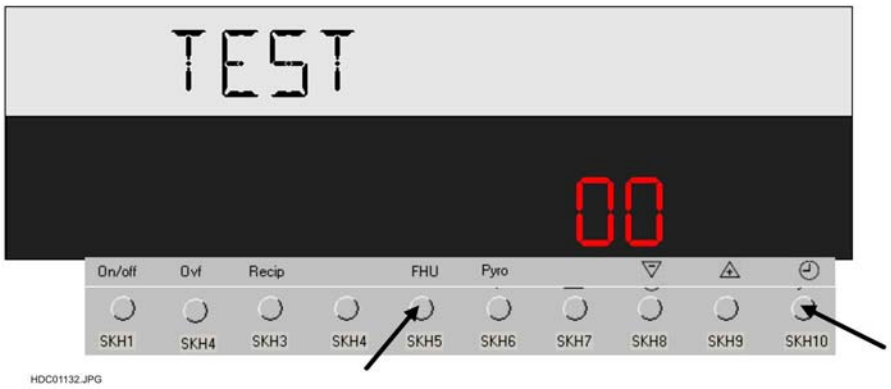


Fig. 61

Displaying of the display segments

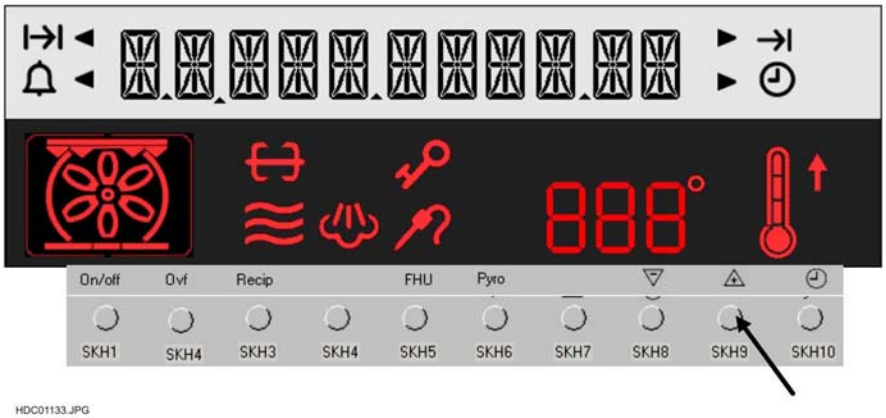


Fig. 62

Displaying of programme code and Temperature sensor (25)

Fig. 63

Door closed not blocked (00) Temperature of sensor (25)

Fig. 64

Door open not blocked (02) Temperature of sensor (25)

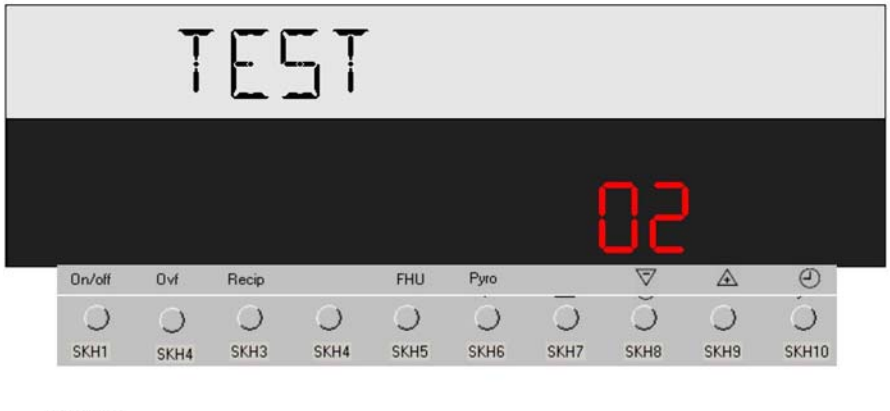


Fig. 65

End of test

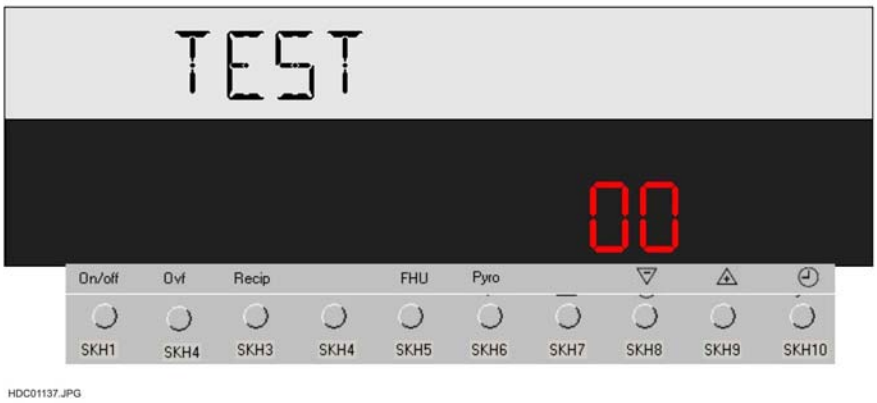


Fig. 66

8 - ACCESS/KRONOS: ORGANIZATION OF SERVICE MANUALS

In view of the quantity of theoretical, technical and practical information relative to the various combinations for the structure of the ACCESS/KRONOS system, this information has been subdivided into Service Manuals describing the general concepts, and separate Service Manuals containing specific information relative to each group of appliances.
Only the specific Service Manuals should be used for a specific appliance.

The various Service Manuals are as shown in the diagram below: