



SERVICE MANUAL

New Dispenser

"Koro"

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1 - PLANNED MODELS



INSTANT VERSION (OPEN AND CLOSED DOOR)



ESPRESSO VERSION (OPEN AND CLOSED DOOR)

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FRESH-BREWER VERSION (OPEN AND CLOSED DOOR)



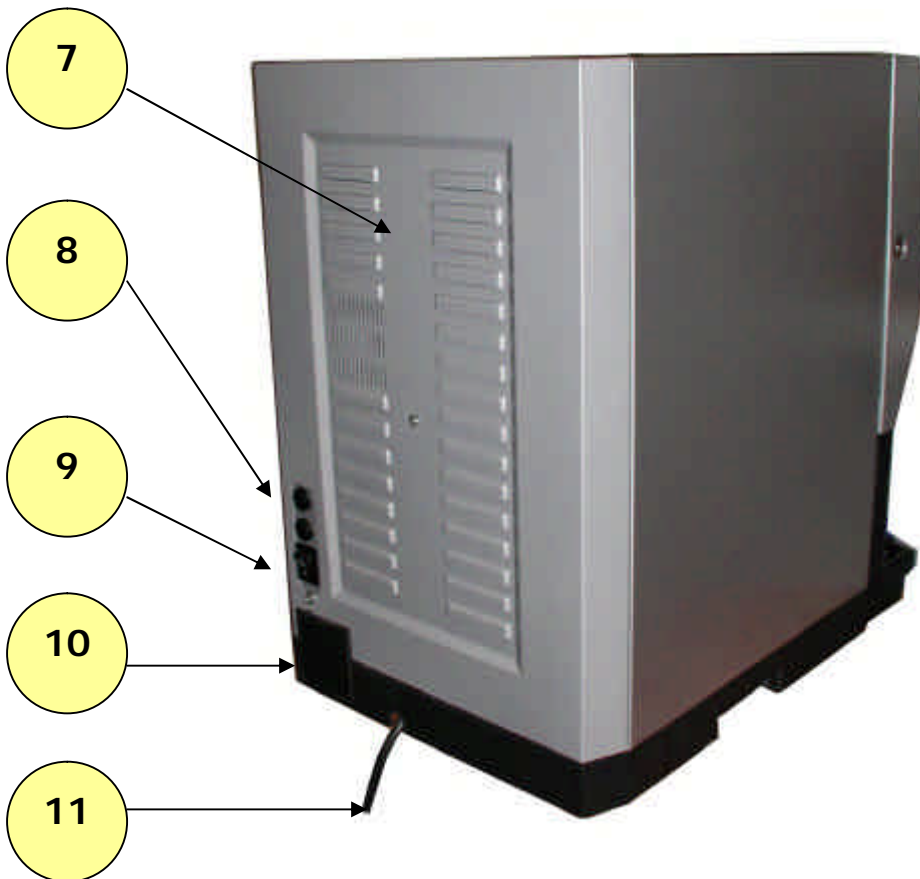
Internal water supply tank

External water supply tank

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2 - MAIN EXTERNAL COMPONENTS



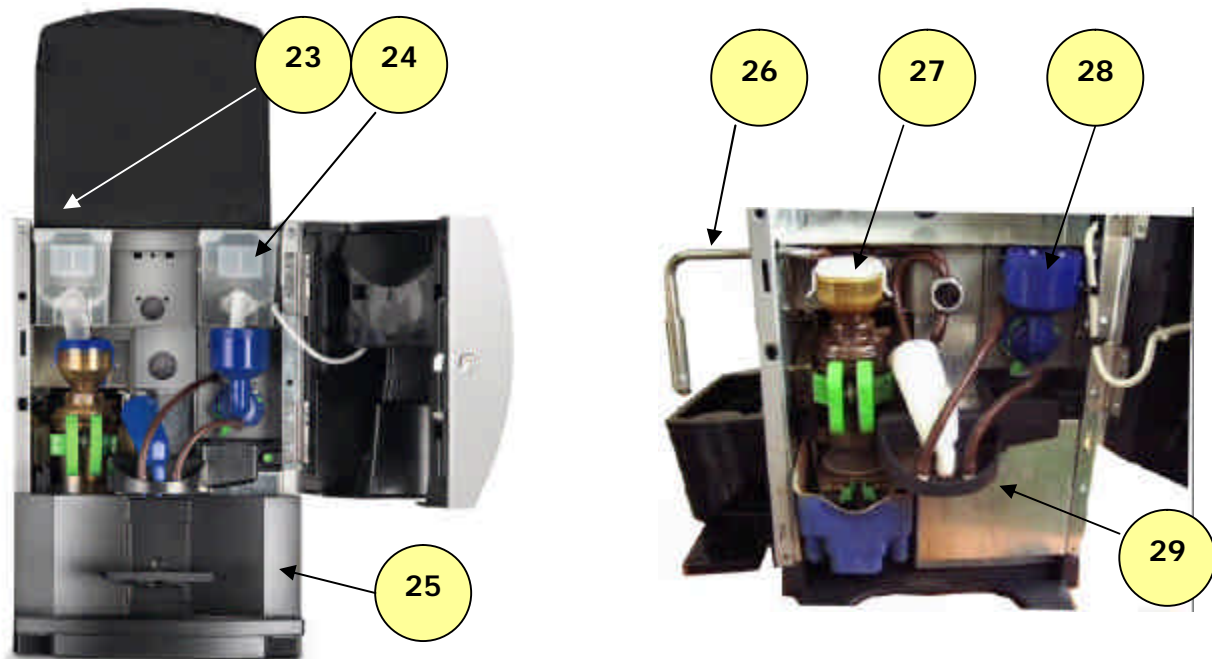
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2.1 - MAIN INTERNAL COMPONENTS



Espresso Version

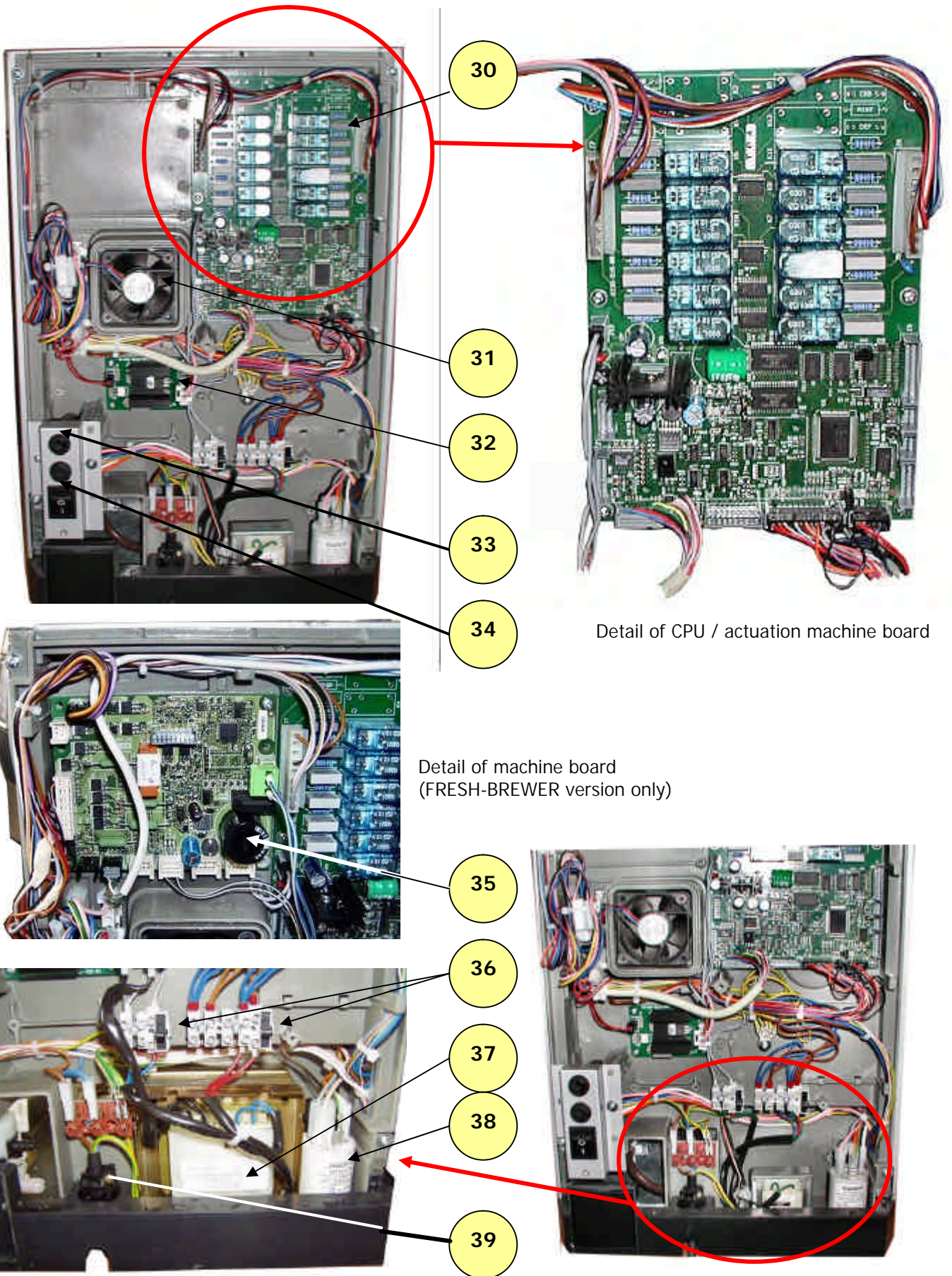


Fresh Brewer Version

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2.2 REAR COMPARTMENT WITHOUT PROTECTIVE CASING

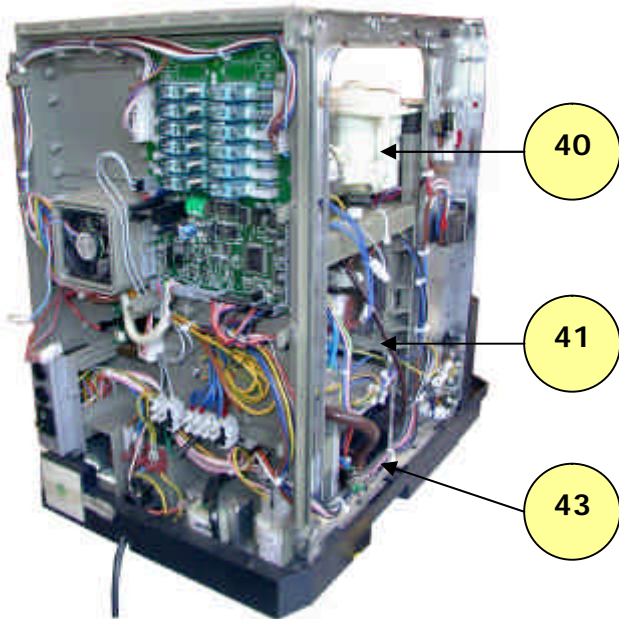


Detail of CPU / actuation machine board

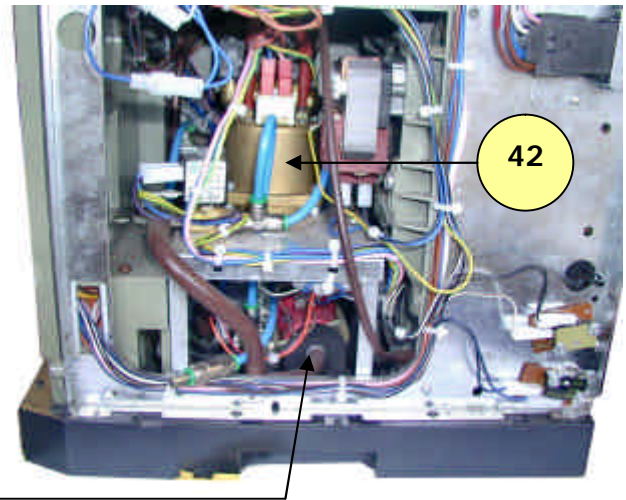
Detail of machine board
(FRESH-BREWER version only)

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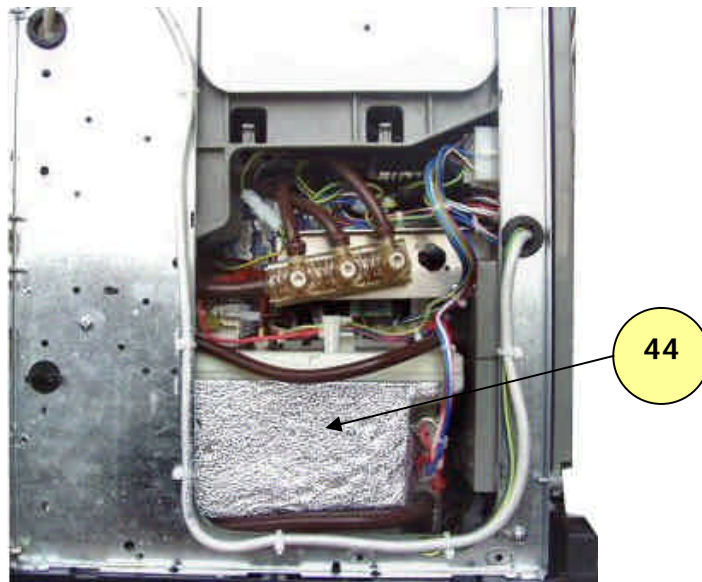
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Perspective view without protective casing



Side view without protective casing
– espresso boiler side



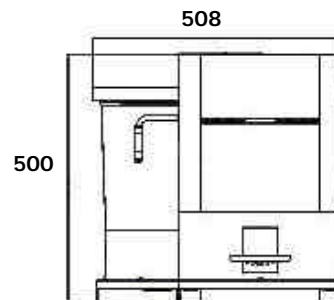
Side view without protective casing
open-top boiler side (FB – Instant)

3 - LIST OF MAIN COMPONENTS

N° Ref.	DESCRIPTION
1	Lock
2	Cabinet
3	User interface
4	Selection keypad
5	Dispensing unit
6	Dispensing compartment
7	Back protective casing
8	Grid fuses
9	Main switch
10	Water inlet solenoid valve
11	Power supply cable
12	Grinder / doser device
13	Instant product container
14	Mixers
15	Door
16	Coffee beans door
17	Coffee beans hopper
18	Decaf coffee door (powder)
19	Water supply tank (espresso)
20	Drip tray
21	Solid waste container
22	Brewer unit Z3000
23	Coffee container for FB (powder)
24	Instant product container
25	Dispensing compartment
26	Hot water nozzle
27	FB unit SIGMA BREWER
28	Mixers
29	Protective casing
30	Actuation board
31	Steam exhauster
32	Boiler heating element actuation board
33	Grid fuses
34	Main switch
35	Sigma Brewer control board (FB version only)
36	Transformer fuses
37	Transformer
38	Grid noise suppressor
39	Power supply cable clamp
40	Coffee grinder unit
41	Espresso boiler compartment
42	Espresso boiler
43	Electromagnetic pump
44	Open-top boiler (Instant & Fresh brewer)

4 – TECHNICAL DATA AND FEATURES

Height	500 mm
Width	508 mm
Depth	528 mm
Overall depth with door open	724 mm
Weight	28 Kg
Power supply voltage	230 V AC - 50 Hz
Installed power	1500 W (espresso) 2400 W (FB / I)



Payment systems used

The machine is pre-set to use (by means of specific kits) payment systems coin mechanisms and 24 V DC validators with protocols EXECUTIVE BDV, MDB

Water supply:

From the mains with a water pressure of 5 to 85 N/cm²

BASE VERSIONS:

Espresso – Instant – Fresh brewer

INSTALLED BOILERS AND TEMPERATURE

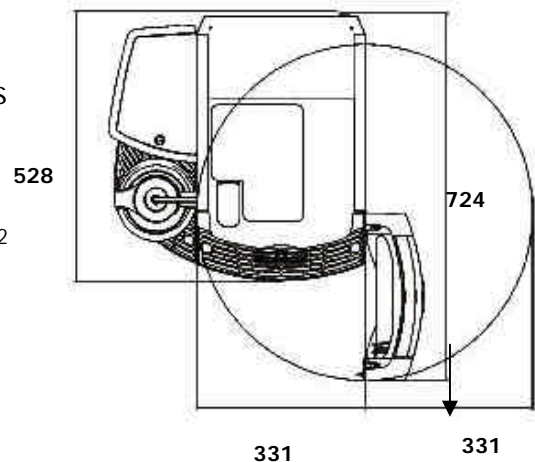
One pressure boiler for the espresso version
One open-top boiler for instant and Fresh-brew versions
Temperature setting via software

SAFETY DEVICES

Main switch (at the back) – Main switch upon opening the door
Water inlet solenoid valve with overflow device
Manual-reset boiler safety thermostat
Manual-reset instant boiler anti-boiling thermostat
Air-break float block
Presence of liquid waste tray – Presence of coffee grounds tray
Boiler sensor control (short-circuit or failure)
Double heating and timing protection for:
Pump – Doser devices – Coffee unit ratiomotor – Coffee grinder – Mixer motors
Fuse protection for: Transformers, electronic boards and main wiring

CONTROLS

Presence of water
Presence of coffee
Operating temperature reached



5 - ELECTRICAL SAFETY AND RELEVANT STANDARDS

The vending machine **New Dispenser** was designed and made in conformity with the provisions of the following directives and related European standards:

MACHINE SAFETY DIRECTIVE EEC 98/37

EN 60529 UNI EN 292 –1-2 IEC 695-2-2

LOW VOLTAGE DIRECTIVE EEC 73/23; EEC 89/392; EEC 89/336

(the low voltage directive covers all equipment powered with voltage below 400 V AC)

The following European standards are applied:

EN 60335-2-14 EN 60335-2-15 EN 60335-2-24 EN 60335-2-75

ELECTROMAGNETIC COMPATIBILITY DIRECTIVE

EN 61000-3-3 EN 61000-4-2 EN 61000-4-3 EN 61000-4-4 EN 61000-4-5 EN 61000-4-11

With regard to **Low Voltage** and **Electromagnetic Compatibility** this vending machine was tested and certified by a certifying body authorised by ministerial decree: **IMQ**.

It is therefore prohibited (on pain of voiding the warranty and the responsibility of the certification) to replace any electrical component with non-original parts during the routine and extraordinary maintenance operations.

Therefore it is also prohibited to:

Tamper with or deactivate the safety systems installed in the vending machine.

Install the vending machine outdoor or in any case in a place that is not protected from the weather.

Use the vending machine for purposes other than those indicated in the sales contract.

Connect the vending machine by means of extension cords or multiple sockets and/or adapters.

Use water jets for cleaning.

Then, it is also compulsory to:

Verify the conformity and suitability of power supply line and of the power outlet.

6 – REQUIREMENT FOR THE USERS

For safety purposes, three different operators with different qualifications have been defined.

USER

The user is practically the final user who buys the products from the machine.

The user must not have any access whatsoever to the inside of the machine.

PERSON RESPONSIBLE FOR REFILLING AND ROUTINE CLEANING

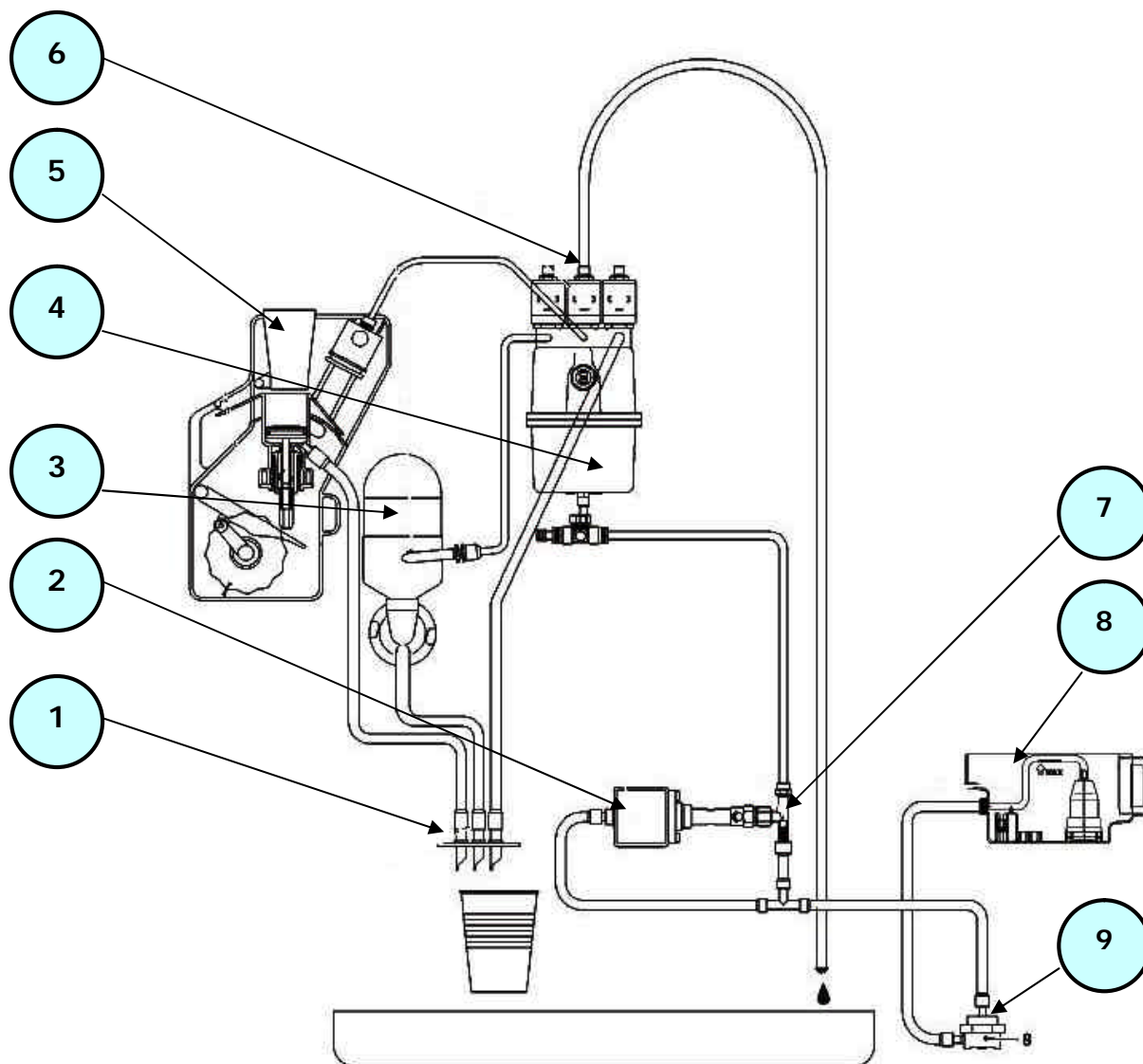
The person responsible for refilling has the key for opening the machine and is in charge of the refilling, cleaning and internal hygiene of the machine.

He must not have any access to energised parts or moving parts.

MAINTENANCE TECHNICIAN

The maintenance technician must be a highly skilled person and must be aware of the electrical hazards in the event of complex technical operations and can operate with the machine switched on and the door open, using the safety key supplied.

7 – HYDRAULIC LAYOUT “ESPRESSO”

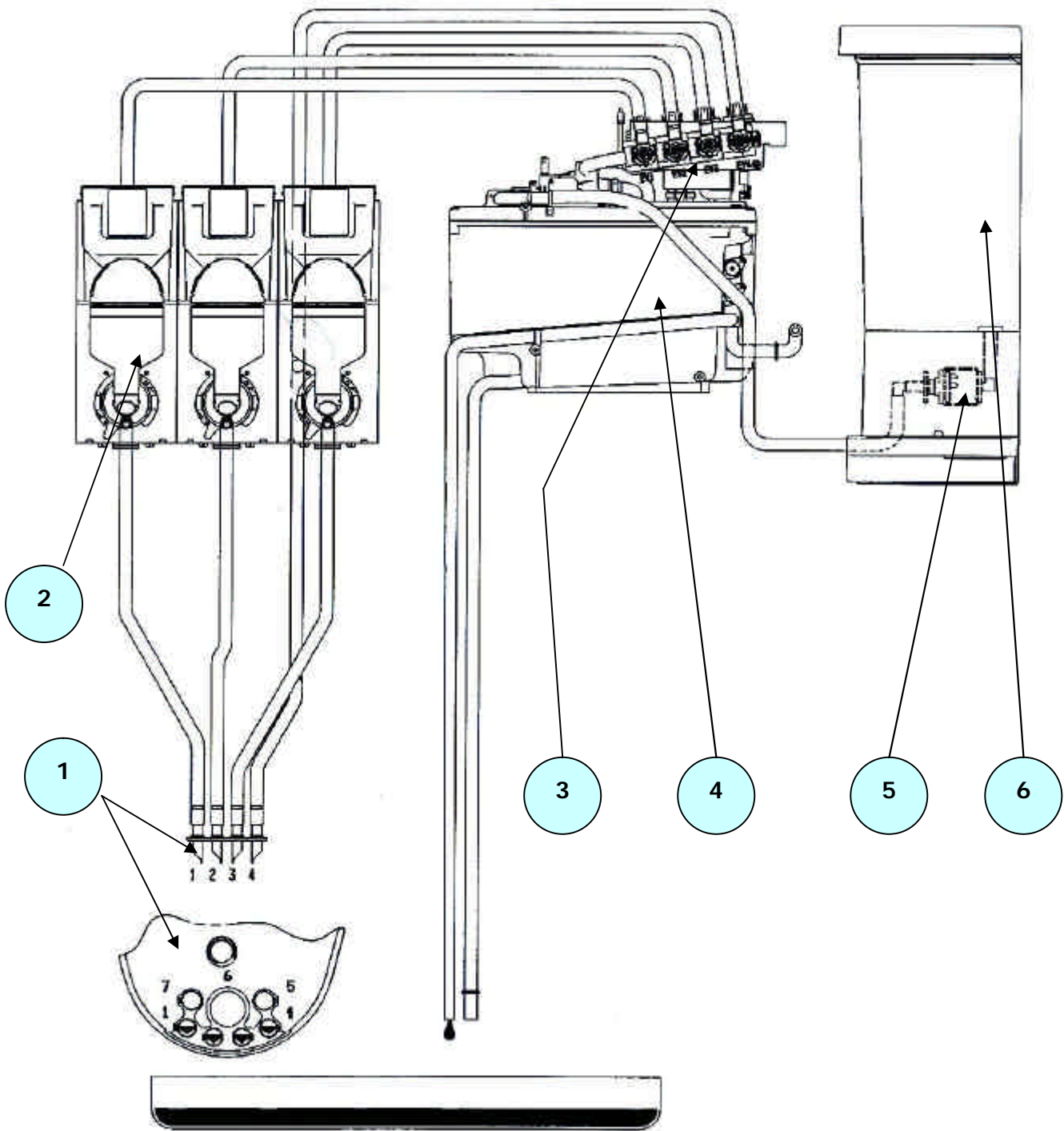


ESPRESSO VERSION COMPONENTS

REF.	DESCRIPTION	REF.	DESCRIPTION	REF.	DESCRIPTION
1	Spouts assembly	2	Pump	3	Mixers
4	Boiler assembly	5	Brewer unit	6	Solenoid valve block
7	Bypass	8	Water supply tank	9	Volumetric counter

N.B. The diagram shown is given only as a reference as it may differ for each version.

8 – HYDRAULIC LAYOUT INSTANT



INSTANT VERSION COMPONENTS

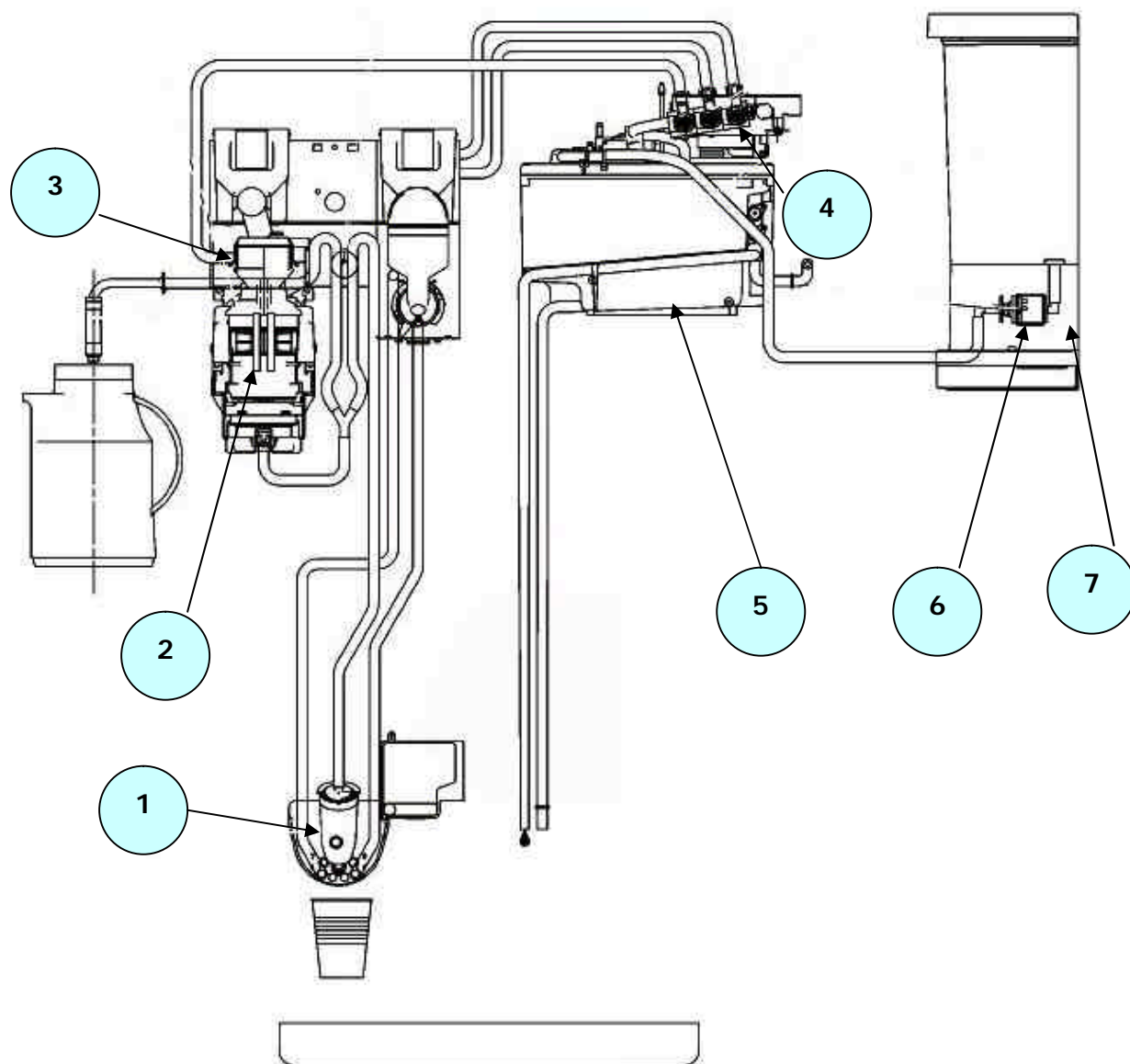
REF.	DESCRIPTION	REF.	DESCRIPTION	REF.	DESCRIPTION
1	Spouts assembly	2	Mixers	3	Solenoid valves
4	Boiler assembly	5	Water supply pump	6	Water supply tank

N.B. The diagram shown is given only as a reference as it may differ for each version.

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9 – HYDRAULIC LAYOUT “FRESH BREWER”

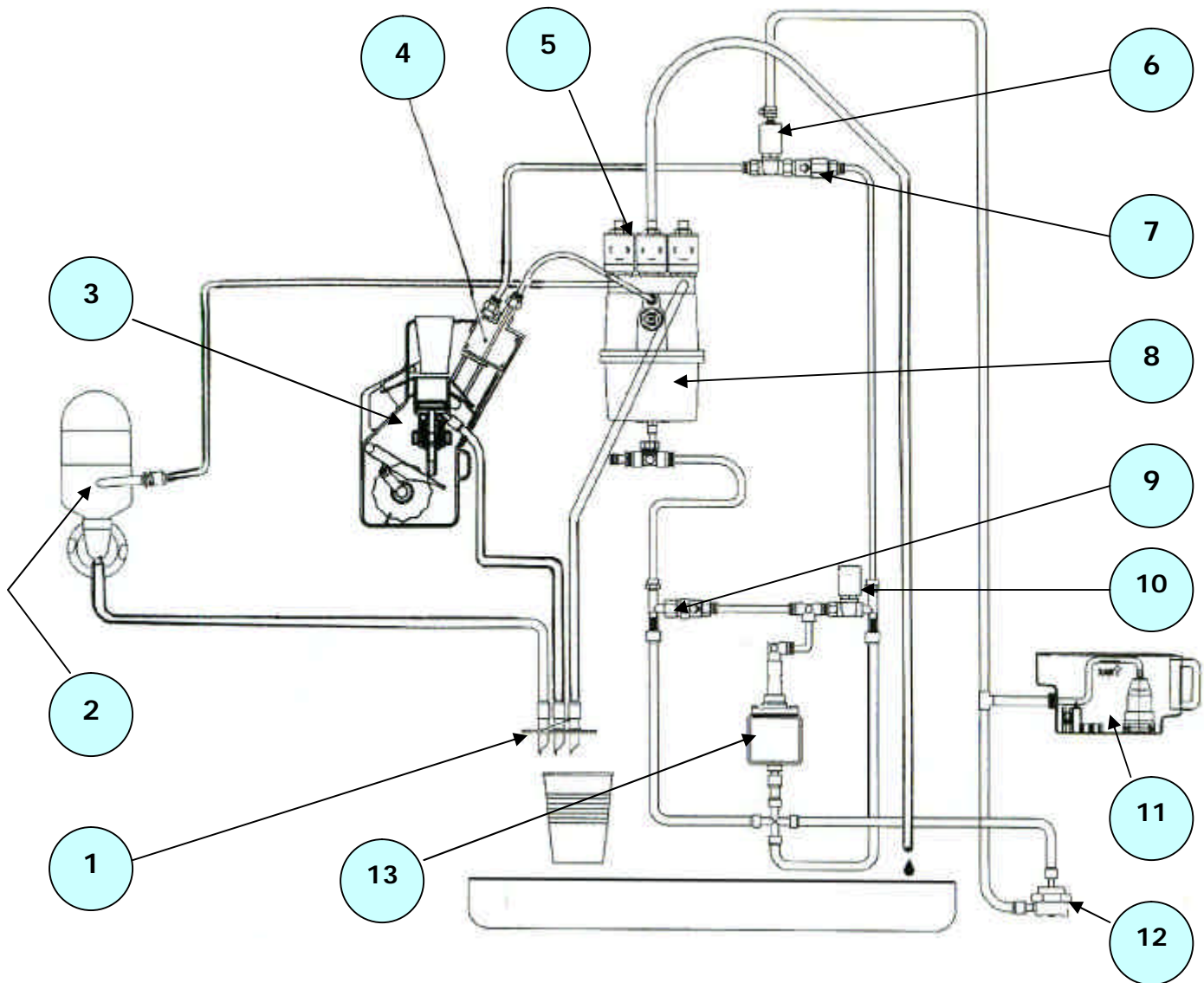


COMPONENTI VERSIONE FRESH BREWER

REF.	DESCRIPTION	REF.	DESCRIPTION	REF.	DESCRIPTION
1	Spouts assembly	2	Sigma Brewer boiler	3	Mixer
4	Solenoid valves	5	Boiler	6	Water supply pump
7	Water supply tank	8		9	

N.B. The diagram shown is given only as a reference as it may differ for each version.

10 – HYDRAULIC LAYOUT “VARIABLE CHAMBER ESPRESSO ”



COMPONENTS OF ESPRESSO VERSION WITH VARIABLE BREWING CHAMBER

REF.	DESCRIPTION	REF.	DESCRIPTION	REF.	DESCRIPTION
1	Spouts assembly	2	Mixer unit	3	Brewer unit
4	Chamber with piston	5	Solenoid valve assembly	6	Discharge solenoid valve
7	By-pass (4 bar)	8	Boiler	9	By-pass (12 bar)
10	Piston solenoid valve	11	Water supply tank	12	Volumetric counter
13	Vibration pump				

This diagram is used exclusively for variable chamber brewer units, as it differs also with regard to the electrical circuit and it is specific to some versions

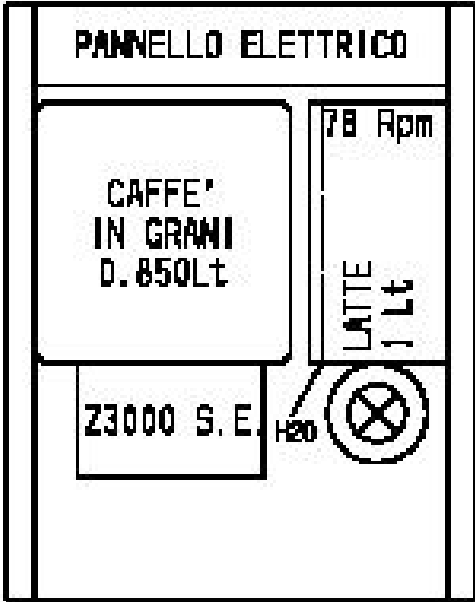
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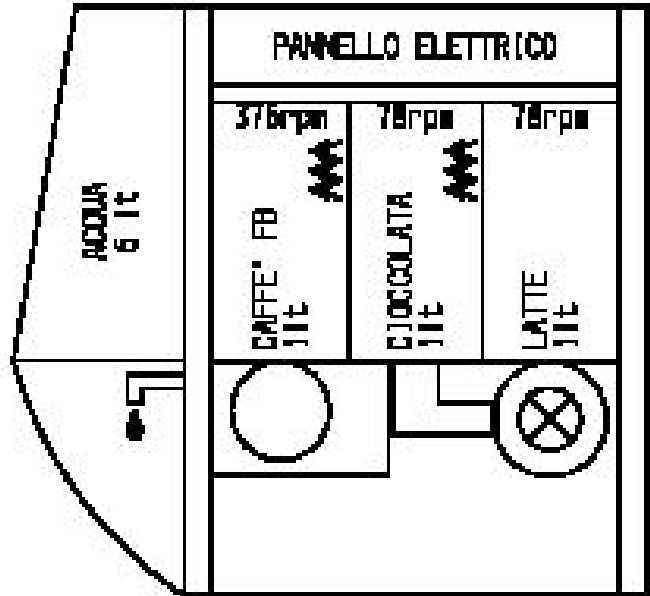
11- INTERNAL LAYOUTS

EXAMPLES OF INTERNAL LAYOUT

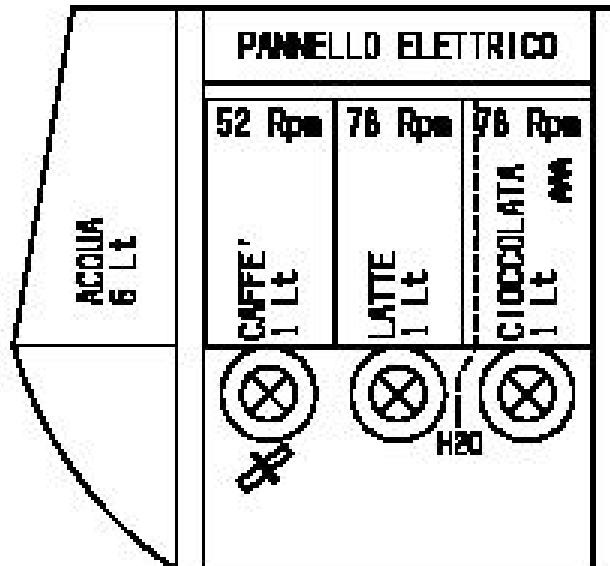
NOTE: THE FOLLOWING I LAYOUTS ARE ONLY GIVEN AS AN EXAMPLE FOR THE PURPOSE OF INDICATING THE CONFIGURATION POSSIBILITIES. REFER TO THE TABLES SUPPLIED WITH THE MACHINE FOR THE ACTUAL LAYOUT.



Layout Koro Espresso



Layout Koro Fresh Brewer



Layout Koro Instant

12 - ELECTRICAL SYSTEMS – CONNECTIONS

The machine is designed to operate under a single-phase voltage of 230 V AC (+5-10V)

It is protected with a main 15 A fuse on both phases.

With regard to the transformer: the primary winding is protected with a 125 mA fuse

the secondary winding is protected with a 1.25 mA fuse

It is fitted with a door opening safety switch.

The power cable can be supplied as standard feature and chosen among the following types:

1) HO5 RN – F copper with a 3 x 1.5 mm² section

2) HO5 V V – F „ „ „ „ „ „ „ „

3) HO5 V V – F „ „ „ „ „ „ „ „

Fitted with a fixed SCHUKO ** plug.

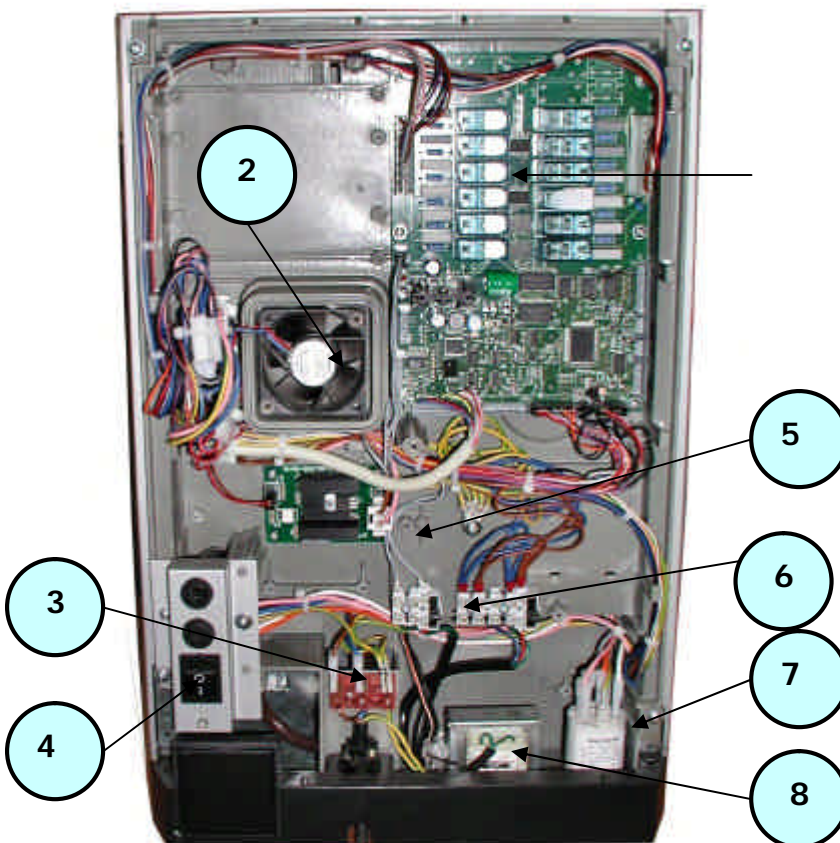
NB **: it is possible that for some specific markets a cable with specific plug be fitted in accordance with the regulations in force in that country.

In the event of replacement cables of exactly the same characteristics must be used.

Since the "KORO" vending machine is approved by an electrical safety certification institute (IMQ), replacements with non-original components are not permitted.

Otherwise the electrical safety certificate and the warranty will be void.

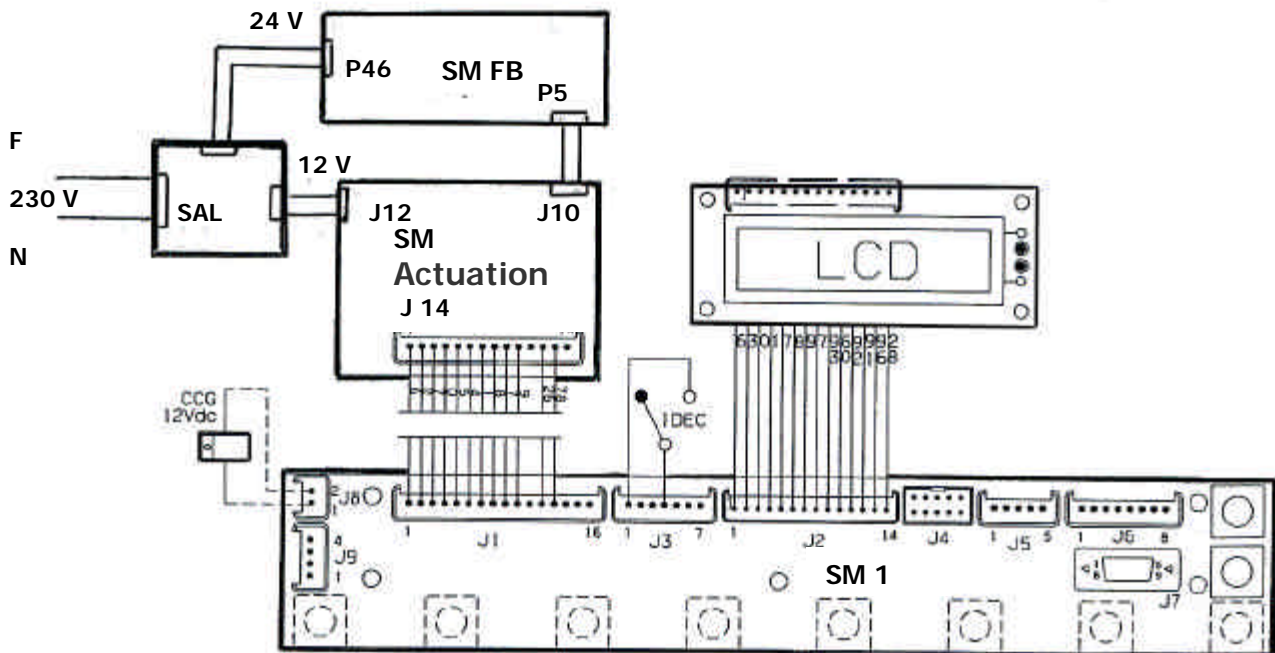
13 – CONNECTION OF ELECTRONIC BOARDS



1	Actuation board
2	Steam exhauster
3	Terminal strip
4	Switch and fuses
5	Boiler control board
6	Secondary winding fuses
7	Noise suppressor
8	Transformer

**View of power supply unit compartment and actuation board
(Espresso version without protective casing)**

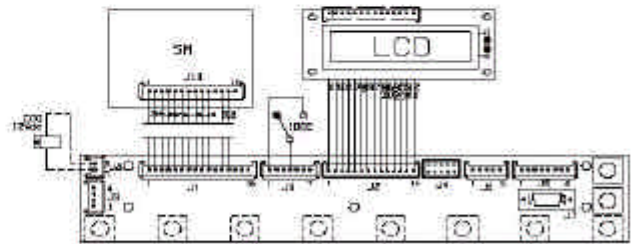
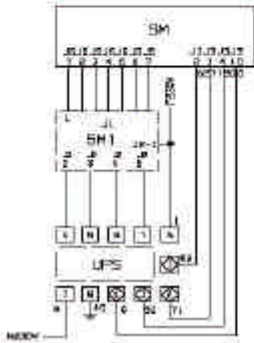
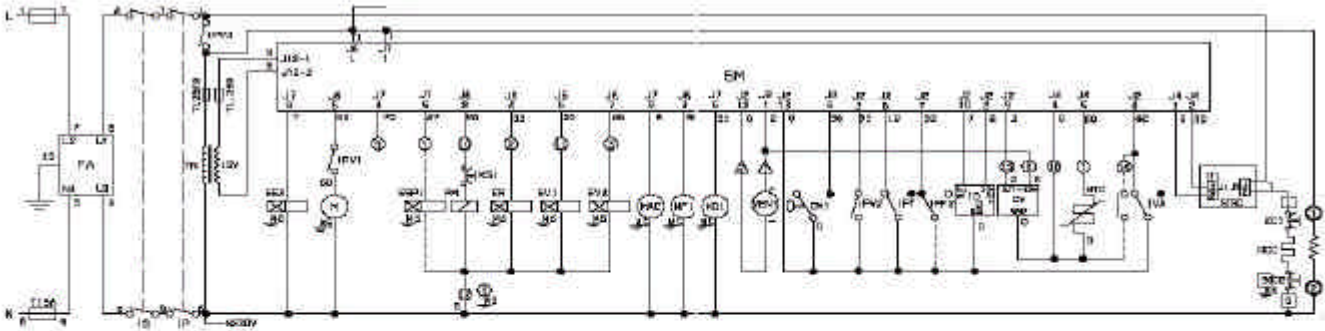
BOARD CONNECTION DIAGRAM



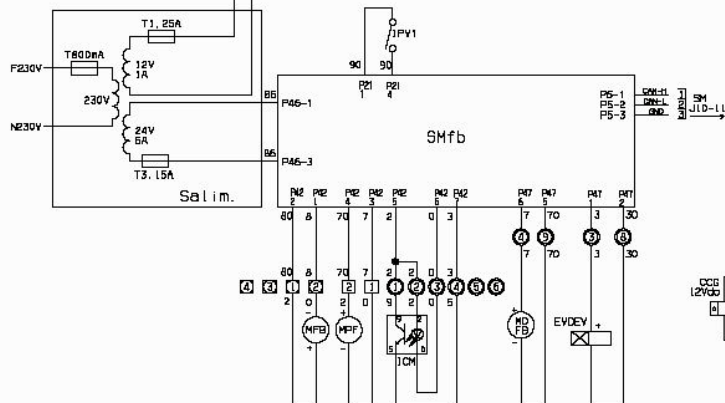
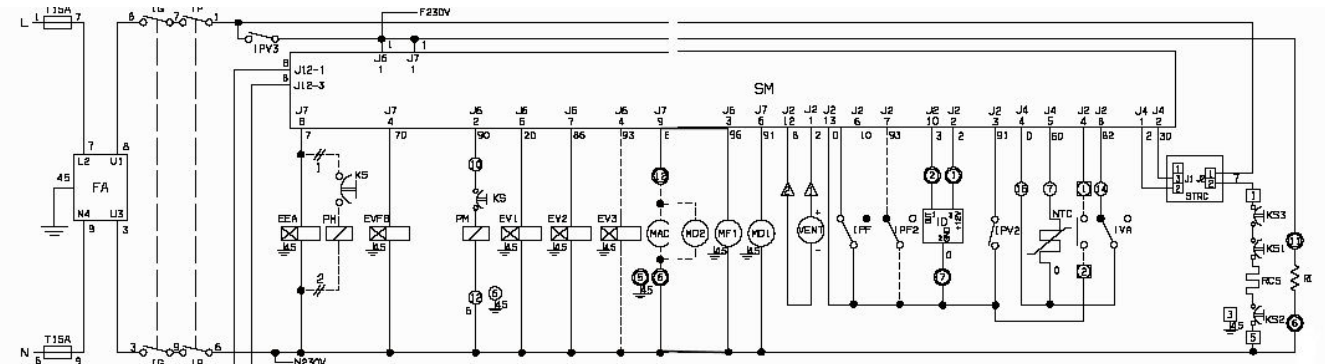
Signal	DESCRIPTION
SAL	Power supply card
SM FB	Sigma brewer control board
SM	Actuation and control board
CCG	Mechanical general counter
SM 1	Push-button and display control card
LCD	Liquid crystal display
IDEC	Decaf. coffee door switch

NB: The above listed codes are indicated in the wiring diagrams and on information sheets supplied with the machine.

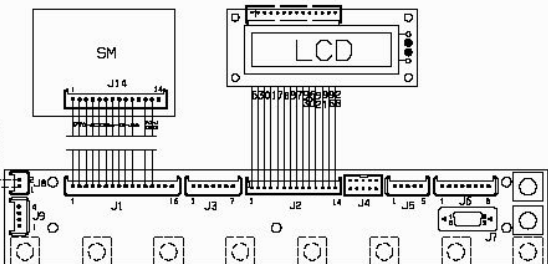
14 - WIRING DIAGRAM



ESPRESSO MODEL



FRESH BREWER MODEL



15 - ACTUATION BOARD - CONFIGURATIONS

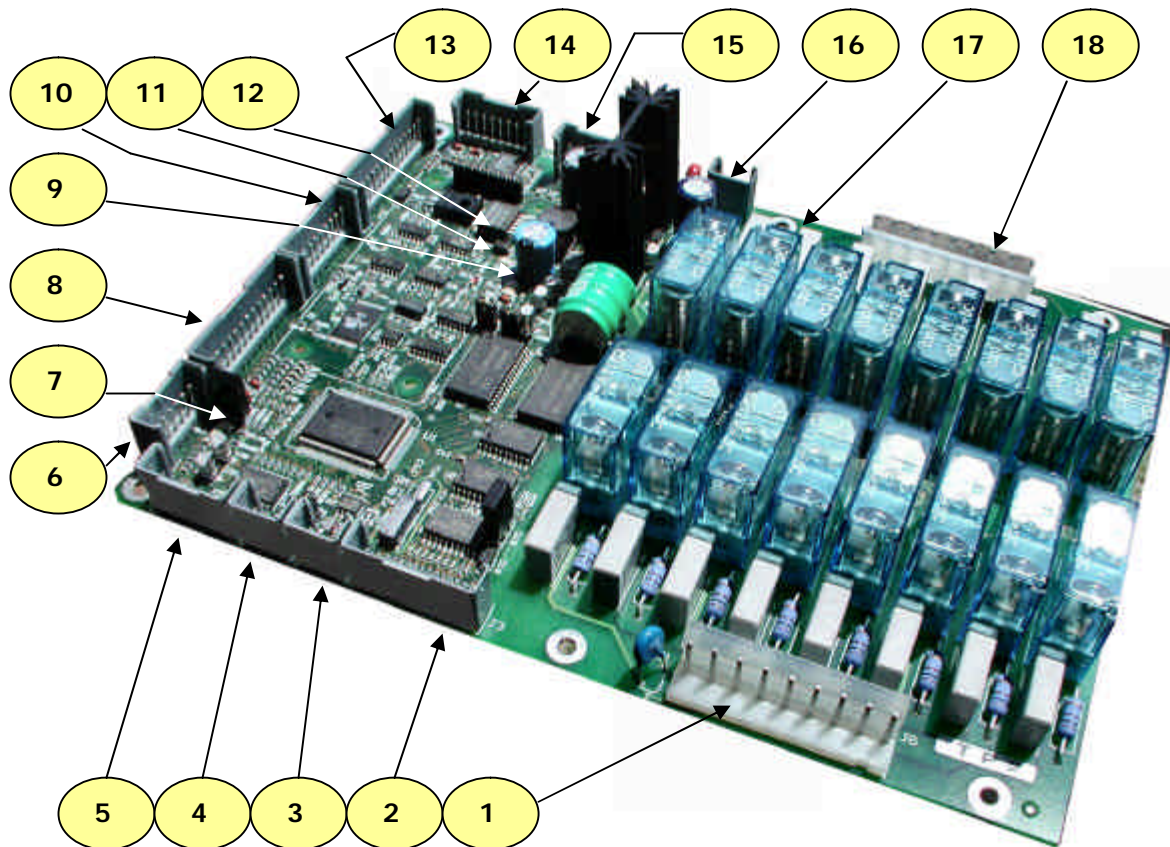
ACTUATION BOARD

This board, placed at the back of the machine, (see Fig. 29) processes the information from the push-button card and from the payment system; it also controls the actuations, the input signals and the boiler board.

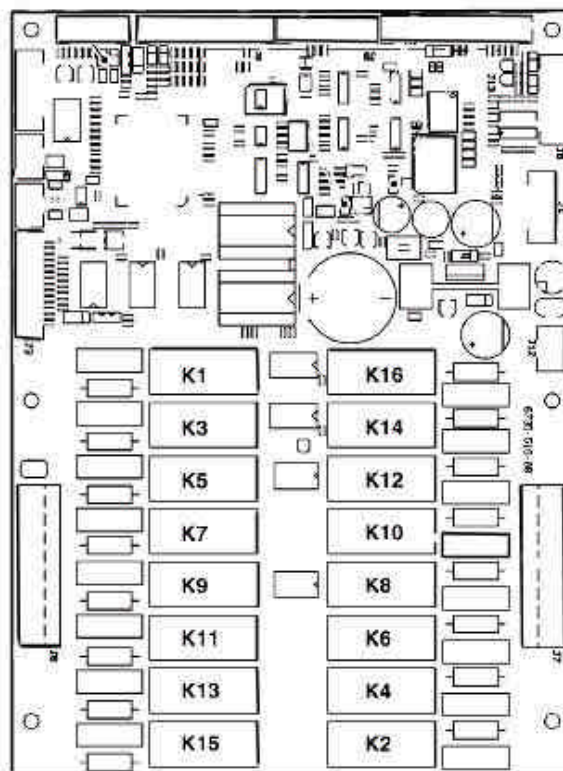
The 15 VAC voltage necessary for operating the board is supplied by the transformer, protected by a 125 mA fuse on the primary winding and by a 1.25 AT fuse on the secondary winding; the voltage is rectified and stabilised directly by the board.

This board houses the Flash EPROM. The control software of the board is installed directly (via RS232) in the microprocessor.

- The red LED (7) indicates the operating status of the boiler heating element;
- The red LED (9) for resetting the CPU glows during the board reset;
- The green LED (11) blinking indicates that the microprocessor is working correctly;
- The yellow LED (12) indicates the presence of 12 V DC.



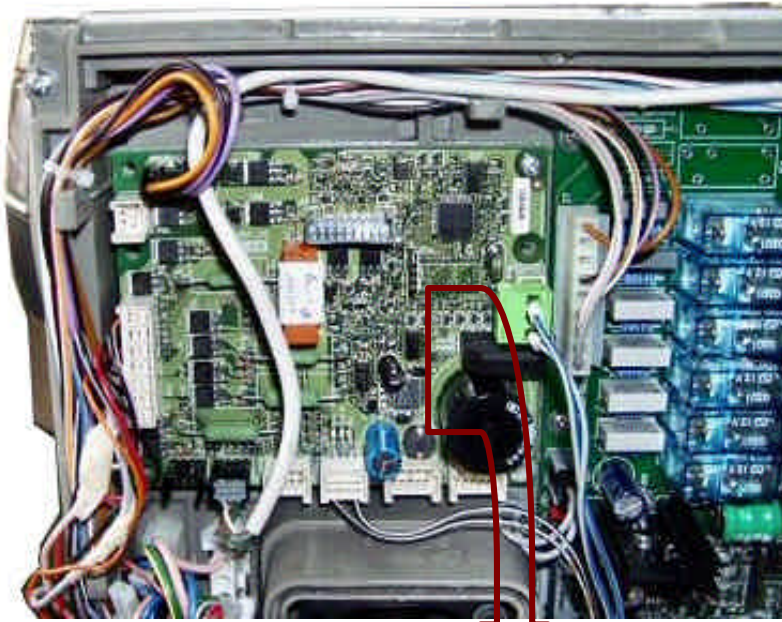
- 1 - 230 V~ power users
- 2 - Input signal
- 3 - Can-Bus connection
- 4 - Can-Bus connection
- 5 - Relay expansion connection
- 6 - Boiler control probes
- 7 - Red LED - boiler heating element
- 8 - Input signal
- 9 - Red LED
- 10 - Not used
- 11 - Green LED
- 12 - Yellow LED
- 13 - To the push-button board
- 14 - Connector for board programming (RS232)
- 15 – Up-Key connector
- 16 - Board power supply (15Vac)
- 17 - Relays K1 to K16
- 18 - Connector for 230 V AC power users



SM1: REFERENCE TO RELAY CODE AND ACTUATIONS - ESPRESSO / FB

ESPRESSO CONFIGURATION		FRESH BREWER CONFIGURATION
K 1	Starting pump	Pump
K 2	Not used	Not used
K 3	Whipper motor 1	Whipper motor 1
K 4	Not used	Not used
K 5	Coffee dispensing solenoid valve	Instant prod. solenoid valve 3
K 6	Discharge solenoid valve 1	Fresh Brewer solenoid valve
K 7	Coffee brewer motor	Not used
K 8	Discharge solenoid valve 2	Not used
K 9	Instant prod. solenoid valve 1	Instant prod. solenoid valve 1
K 10	Doser device motor 1	Doser device motor 1
K 11	Instant prod. solenoid valve 2	Instant prod. solenoid valve 2
K 12	Not used	Not used
K 13	Not used	Not used
K 14	Mains water inlet solenoid valve	Mains water inlet solenoid valve
K 15	Not used	Not used
K 16	Coffee grinder ratiomotor	Doser device 2

16 - SIGMA BREWER CONTROL BOARD



This board, located at the back of the machine, is additional to the actuation board and controls the SIGMA BREWER unit function only for the FB version. (see photo without protective casing)

It processes the information from the brewer unit and controls its functions.

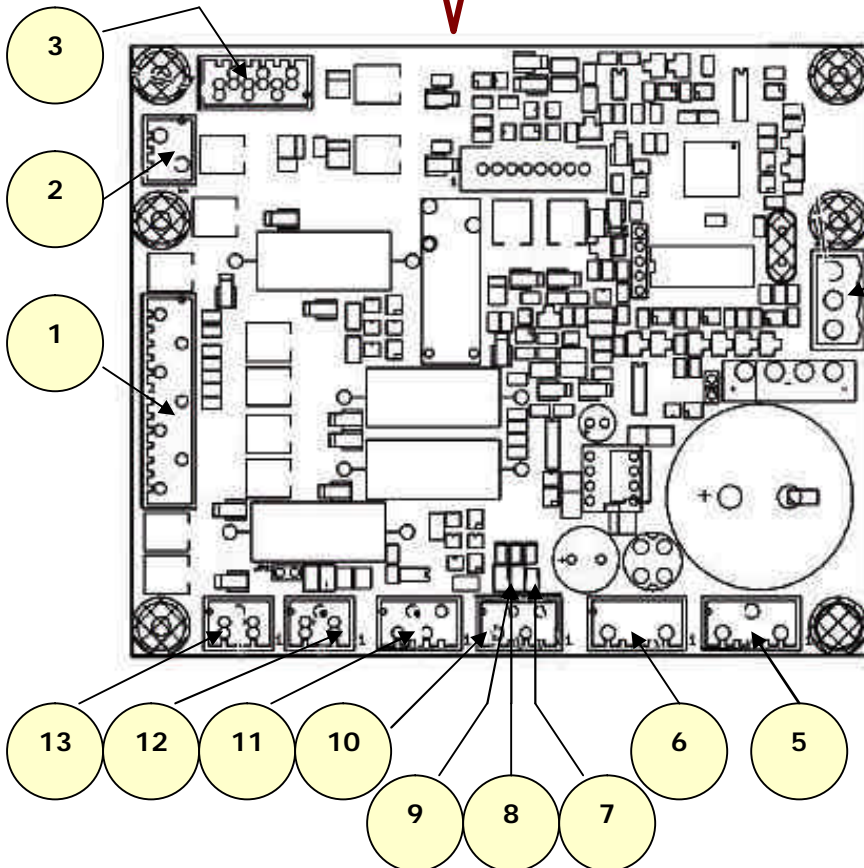
The board also controls the dispensing of fresh product and the flow diverter solenoid valve from spout/external nozzle.

The 24 VAC voltage necessary for operating the board is supplied by the transformer, protected by a 800 mA fuse on the primary winding and by a 3.15 AT fuse on the secondary winding; the voltage is rectified and stabilised directly by the board.

- The green LED (7) indicates the presence of +5 V;
- The green LED (8) indicates the presence of 34 V DC variable;
- The green LED (9) indicates the presence of 34 V DC.

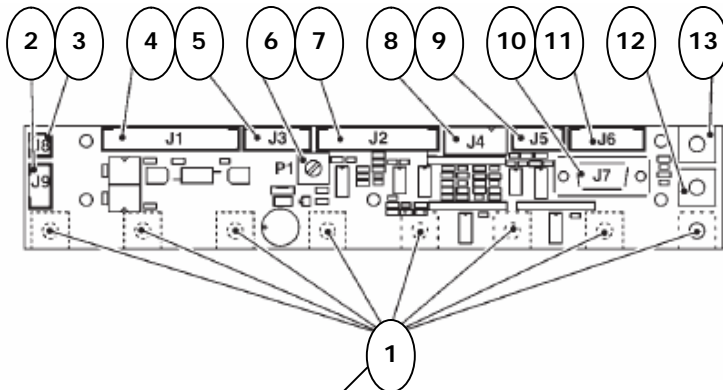
DETAIL OF REAR SECTION

WITHOUT PROTECTIVE CASING

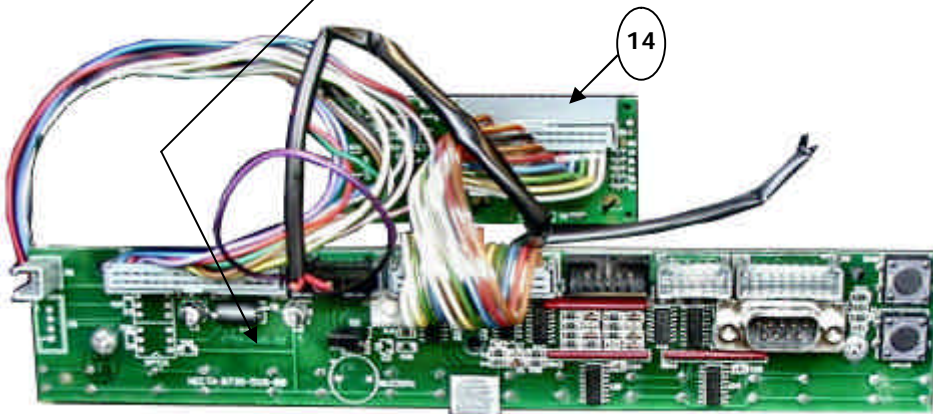


- 1 - To Sigma brewer unit
- 2 - Not used
- 3 - MDFB and EVDEV
- 4 - Board power supply 24Vac
- 5 - Not used
- 6 - Not used
- 7 - Green LED +5V
- 8 - Green LED 34Vdc variable
- 9 - Green LED 34 Vdc
- 10 - Tray detection micro-switch
- 11 - Tray detection micro-switch
- 12 - Can-bus with actuation board
- 13 - Can-bus with actuation board

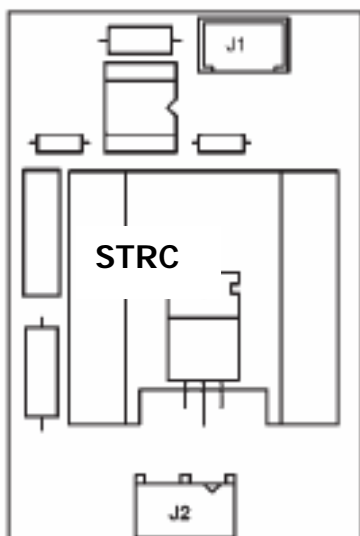
17 - PUSH-BUTTON BOARD



- 1 - Selection buttons
- 2 - Not used
- 3 - To mechanical counter (optional)
- 4 - To actuation/CPU board
- 5 - Input
- 6 - Display adjustment trimmer
- 7 - To display
- 8 - 12 Vdc validators
- 9 - Not used
- 10 - RS232 serial port
- 11 - Not used
- 12 - Programming access button
- 13 - Wash button
- 14 - Display card



18 - BOILER CONTROL BOARD



Triac board

This board is controlled by the machine board and is powered under 230 V AC.

It used for controlling and starting the boiler heating element.

Connector **J2** is connected to a 230V AC phase

Connector **J1** receives the information from the **SM** board that sends a consent signal to activate the triac for the power supply to the heating element.

19 – AIR-BREAK & BOILERS

In the currently coded versions the use of an air-break is not planned; in the instant and fresh brewer versions the open-top boiler is used, which is equipped with a level control system and therefore the relevant functions are incorporated in the boiler (see next paragraph).

In the espresso versions an internal water supply tank is used, having the functions of the air-break.

There will be in any case some versions with water supply from the mains, where an air-break will be fitted; therefore the proper documentation will be supplied later.

The **air-break** is a functional unit that has the function of keeping the water level constant and to have signal indicating the lack of water from the mains, and in such event it allows the completion of the current selection. Furthermore (in the espresso version) it serves the purpose of have a water reserve at atmospheric pressure, so that the pump can draw the water dose needed for the selection and send it to the espresso boiler without pressure changes that may affect the volumetric counter reading.

The water level is ensured by a float that triggers a microswitch, keeping the level between a factory set minimum and maximum (it very important not to replace the microswitch with any one of different mechanical characteristics, as a variety of malfunctions may occur).

Furthermore, in the event of failure to the maximum level microswitch, an overflow hole allows the water to be conveyed through a tube and to the safety device fitted on the water inlet solenoid valve, thus causing its mechanical lock (such safety device is triggered also in the event of a power failure).



Water supply tank for the Espresso version, complete with softener filter and magnetic float



Water supply tank for the Instant & fresh Brewer version

The water supply tanks are preset for the use of internal softener filters and are fitted with a magnetic level signal that trigger a sensor located inside the vending machine.

19.1 – BOILERS

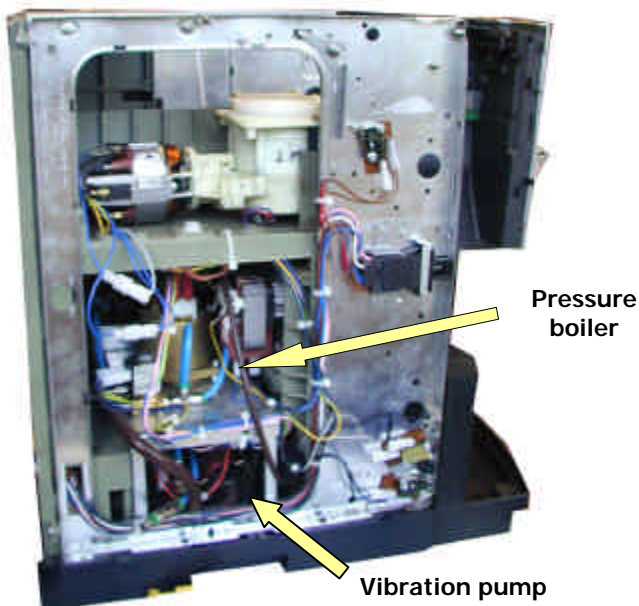
For the **KORO** model there are three base versions:

- 1) **Espresso** version, fitted with a pressure boiler, very similar to the one used in the entire range.
- 2) **Instant** version, fitted with only the open-top instant boiler, also fitted with a new design level control system.
- 3) **Fresh-brew** version, fitted with only the open-top instant boiler used in the Instant version.

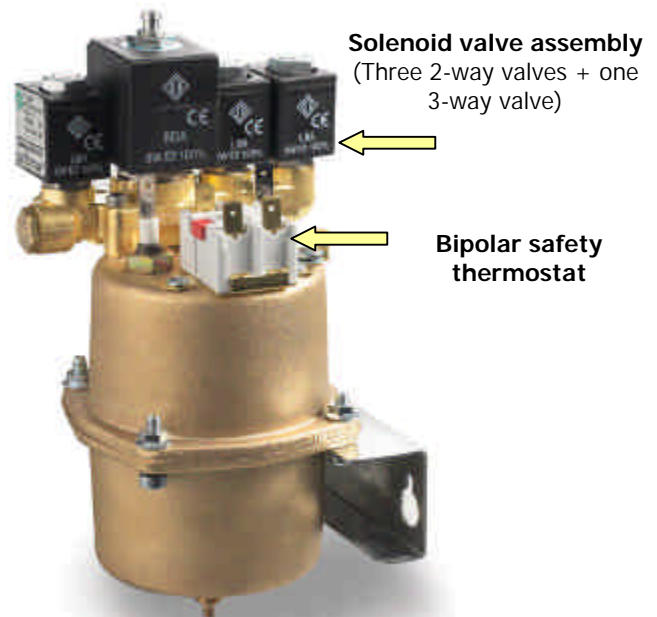
The **espresso** boiler is the same used for **KIKKO** models, therefore with the same well known and established characteristics and reliability.

The open-top boiler for the Instant / FB version is a new and specific design with the feature of being molded from thermoplastic material with specific technical characteristics.

PRESSURE BOILERS

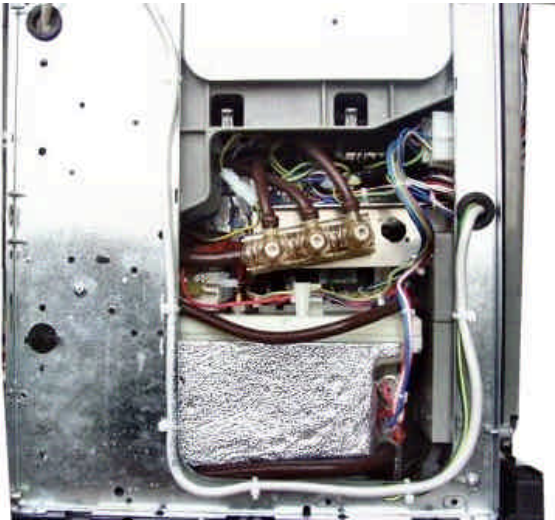


Side view without protective casing
– pressure boiler inspection side



Pressure boiler removed from the machine

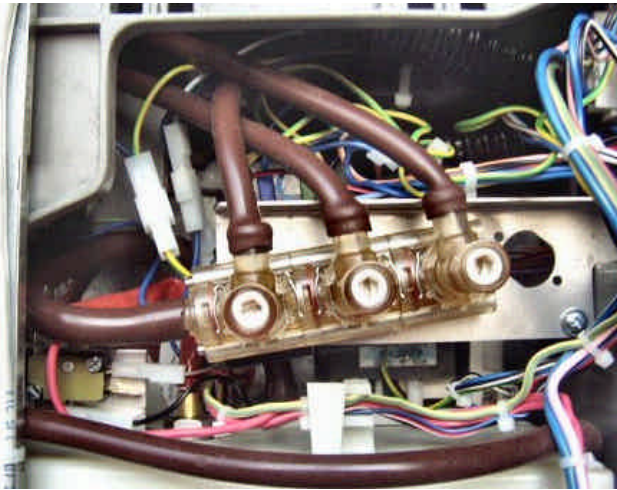
OPEN-TOP BOILER



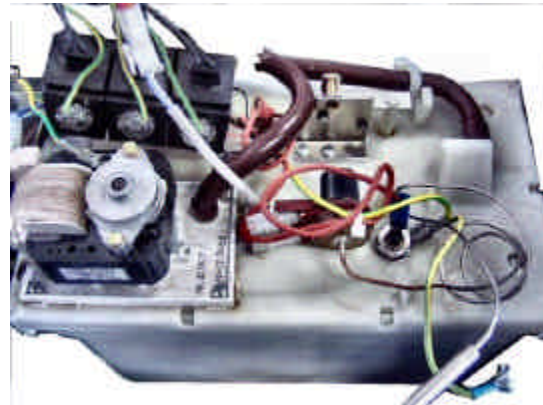
SIDE VIEW WITHOUT PROTECTIVE CASING –
OPEN-TOP BOILER COMPARTMENT



OPEN-TOP BOILER



OPEN-TOP BOILER – DETAIL OF SOLENOID VALVES AND OVERHEATING PROTECTIONS



NOTE: The open-top is made of special thermoplastic material and coated with insulating material for more efficient heat insulation; **two** overheating protections are fitted for safety.

1) Dry operation protection.

2) Anti-boiling protection.

In the event of failure to the control system and boiler without water, thermostat **1** is triggered at approximately 125°C and disconnects the power supply; in order to reactivate everything the malfunction must be identified and the thermostat must be reset by pressing the central red button.

In the event of failure to the control system and the boiler full, upon reaching boiling temperature, as the steam exits from tube A it touches and triggers the two thermostats 2.

Proceed as above to reset them; see specific chapter to identify the type of malfunction. See relevant section in the functional unit manual for details, photos and complete description: **BOILERS**

The internal temperature control (in both boilers) is by means of an NTC type electronic probe fitted with an internal 12K ohm (\pm 4 ohm) resistance at a temperature of 25°C.

Boiler temperature °C	Value in ohm	Allowed tolerance
0	35875	+/-7 ohm
25	12000	+/- 4 ohm
50	2900	"
85	1475	"
90	1260	"
100	963	"

20 – PUMPS AND BY-PASS

In order to supply water to the espresso boiler a vibration pump used, which is the same used in the entire **H&C** range of Necta.

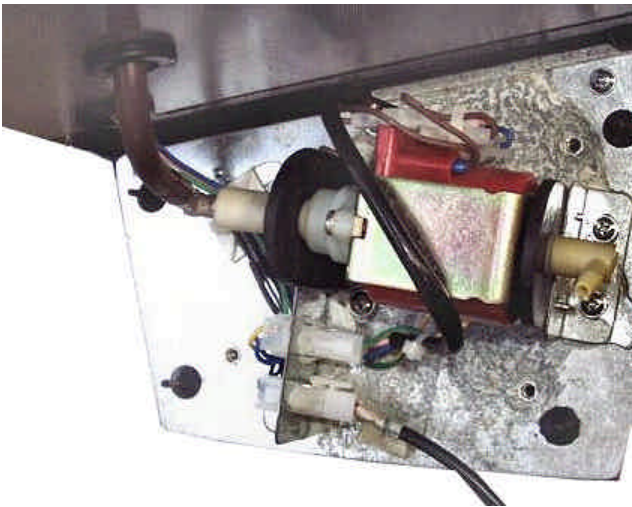
The application is specific, as pump, boiler, TRIAC circuit and connections are positioned inside the espresso module and easily accessible after opening the compartment wall, closed by only two screws and a quick snap fastener (see Page 16)

This solution ensures maximum access for maintenance and hygiene, it also allows the option of using configurations with two espresso modules as an alternative to other two modules, and even mixed modules espresso/instant/fresh-brew.

The pump has overheating protection in case of continuous or dry operation by means of a 90°C self-reset klixon. It is fitted with a by-pass at the outlet to ensure correct and consistent dispensing pressure.

The by-pass is factory pre-set at **12 bar**.

The pump is activated by **relay K 8** (see previous page for the pictures.)



The pump is located in the espresso boiler unit.

In the event of malfunctions the pump can be replaced with a new one.

In order to access to it, the brewer unit must be removed (Fig. 1).

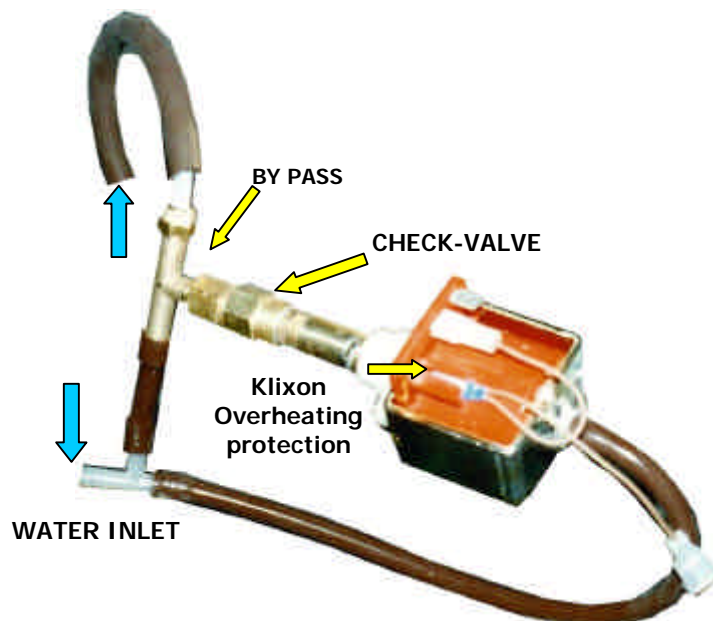
Therefore the boiler unit protective casing must be opened (Fig. 2) undoing the two fastening screws.

The PUMP is located on the left-hand side and is mounted on two rubber anti-vibration elastic supports. Disconnect the connection cables and remove after undoing the special screws.

NEVER change the setting of the bypass, especially adjusted at the factory, if the malfunction is due to clogging from calcium deposits; replace with the complete check-valve spare part set.

If the malfunction was due to triggering of the klixon, replace it with an identical one.

PUMP REMOVED FROM THE BOILER UNIT



21– ESPRESSO & FB BREWER UNITS

The espresso version is equipped with the new **Z3000** unit, used in three specific versions (refer to the specific Z3000 service manual). In any case it is an evolution, with many improvements, of the model Z2000, more specifically planned for the following versions:

- 1) Standard version, which is equivalent to the old Z2000 but with a simpler structure.
- 2) Variable chamber version, which permits brewing with variable coffee doses.
- 3) Larger chamber version, which permits selections with more coffee compared to the maximum possible with the base unit.

A heating system has been designed for all versions, for the purpose of increasing the temperature of the first coffee.

A specific brewer unit for filtered coffee, **SIGMA BREWER**, is used in the **FB** version.

For further details on the functional units refer to the specific H&C functional unit manuals "**BREWER UNITS**".

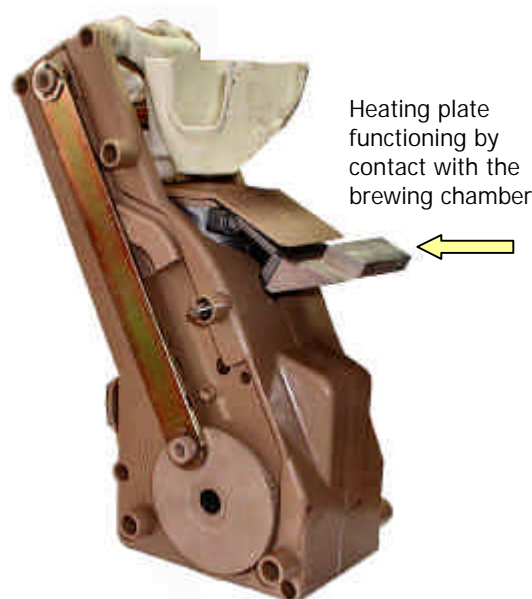
The Espresso brewer unit uses that is ground on the spot by the grinder and doser unit, specifically designed for this model and that also uses a particular method of metering the ground coffee dose.

The FB unit uses specific coffee, already ground to an optimum grade for quick and adequate brewing.



DETAIL OF BASE Z3000 UNIT BEING REMOVED

In order to remove the unit from the vending machine, undo the brass knurled knob, disconnect the unit's hydraulic connections, undoing the upper tube fastening nut and release the dispensing tube. When removing the unit, make sure it positioned at the upper dead centre (Fig. 1). To reposition it, follow the same procedure in the reverse order, again making sure it positioned at the upper dead centre, carefully inserting it onto the special positioning pins.



DETAIL OF SIGMA BREWER UNIT BEING REMOVED



DETAIL OF BREWING CHAMBER BEING REMOVED



DETAIL OF LOWER FILTER BEING REMOVED

BREWING CHAMBER AND FILTER COMPLETELY DISASSEMBLED

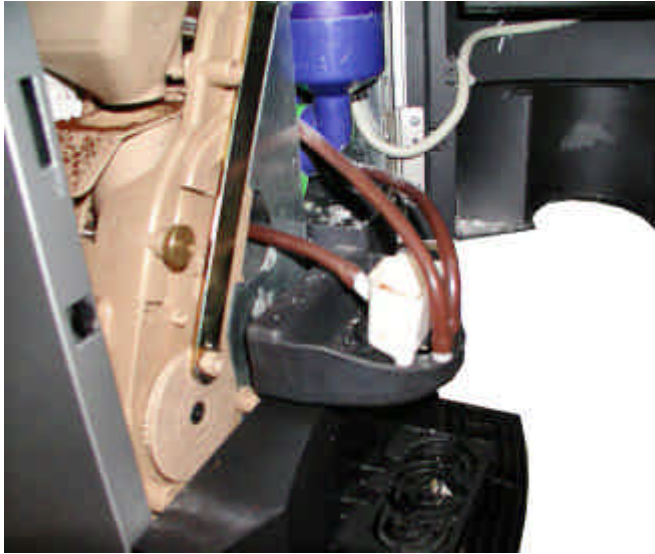


SIGMA BREWER UNIT REMOVED FROM THE VENDING MACHINE

The **SIGMA BREWER** is a new unit especially designed for the vending machine **Koro**, FB version.

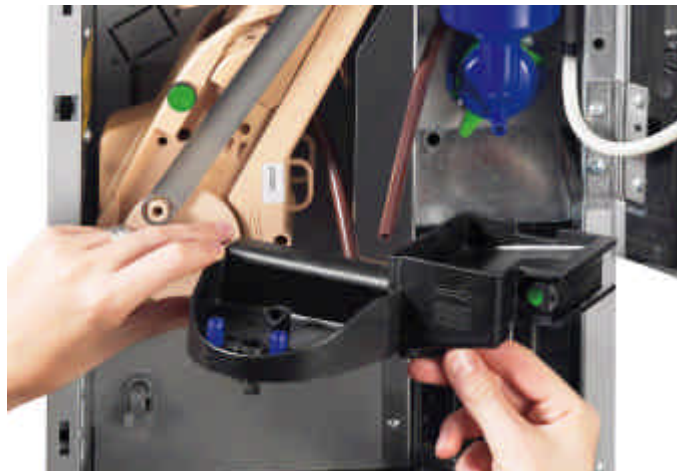
It is a highly innovative and advanced unit that allows disassembly of parts to be cleaned in a few instants. Furthermore, it uses a system with air pressure for brewing; such system permits greater extraction of the coffee flavourings.

22 – SPOUTS ASSEMBLY



Because of the size of the vending machine FIXED SPOUTS have been designed. The spouts are mounted onto a tray that is easy to remove for daily cleaning.

EXTERNAL VIEW OF SPOUTS ASSEMBLY



DETAIL OF SUPPORT TRAY BEING REMOVED

23 – DOSER DEVICES AND POWDER PRODUCT CONTAINERS

In According to new market requirements, it was necessary to design new solutions using quick fastening without any screws, to allow easy access for maintenance, as well as quick changes to the layout by means of preassembled modules.



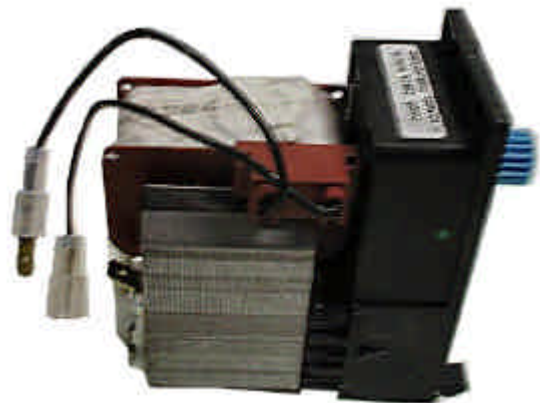
INSTANT PRODUCT CONTAINER OPEN AND BEING REMOVED



MIXER RATIOMOTOR ASSEMBLY BEING REMOVED FROM ITS SEAT



MIXER RATIOMOTOR ASSEMBLY VIEWED FROM BELOW



RATIOMOTOR REMOVED FROM ITS SEAT



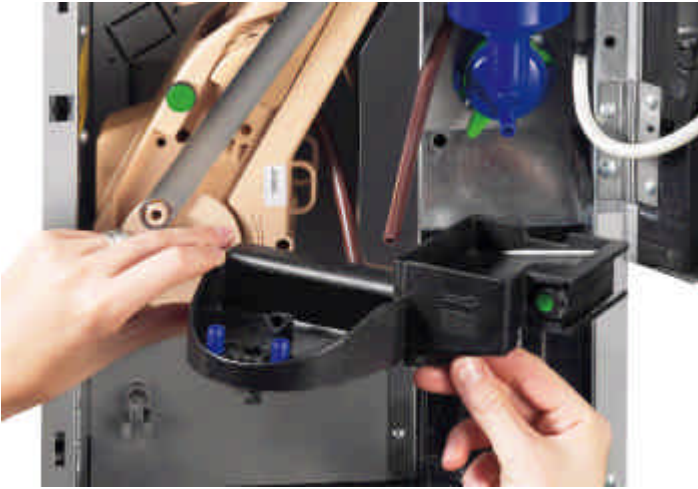
INSTANT PRODUCT CONTAINER OPEN AND BEING REMOVED

Standards components are used, already adopted in other applications, but in a new support and with newly designed specific powder containers, comprising also the mixer assembly.

The system is modular and of the same width as a powder container.

It was designed for quick and easy removal as required by the particular type of machine.

24 – MIXER UNIT



TRAY UNDER THE MIXER BEING REMOVED



**MIXER IN EXTRACTION POSITION:
DETAIL OF RELEASE LEVER**



**MIXER HAVING THE EXTERNAL PARTS THAT NEED
DAILY HYGIENE BEING REMOVED**



PLASTIC COMPONENTS OF DISASSEMBLED MIXER

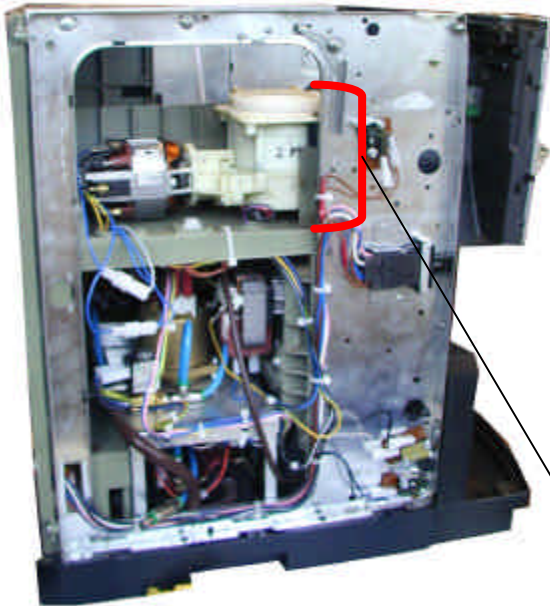
The mixers are newly designed, although many components are developed from the ones used in previous models.

More specifically, the release and opening system of the external assembly is new, while the motor and the water tightness system are identical.

The new system permits easier disassembly for daily cleaning.

For further details and technical information refer to the specific "Service Manual".

25 – DOSER GRINDER UNIT



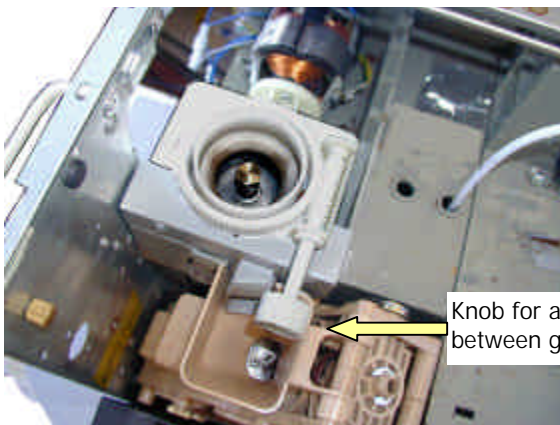
Side view without protective casing
– coffee grinder unit position area

The coffee grinder is a new design and the ground coffee dose is determined via software setting and by means of a sensor that counts the number of revolutions of the grinding wheels (see view below). Therefore, it is very important that the mechanical adjustments to the grade of grinding be checked very frequently. In order to get a dose of 7 grams of coffee a certain number of revolutions is counted; by increasing or decreasing such value the amount increases or decreases. It is therefore possible to set selections with different coffee doses. It is therefore clear that it is very important to keep the adjustment of the grinding wheels constant to obtain accurate coffee doses. Especially in the first period of use (1000-2000 selections), because of the greater wear due to the initial settling. The adjustment can be performed also approximately by regularly checking the weight of the ground coffee and its grade of grinding. The motor winding is fitted with a self-reset overheating protection. Flat-type grinding wheels are used.

For further information refer to the specific manual.



COFFEE GRINDER (VIEW FROM BELOW)
SENSOR SIDE

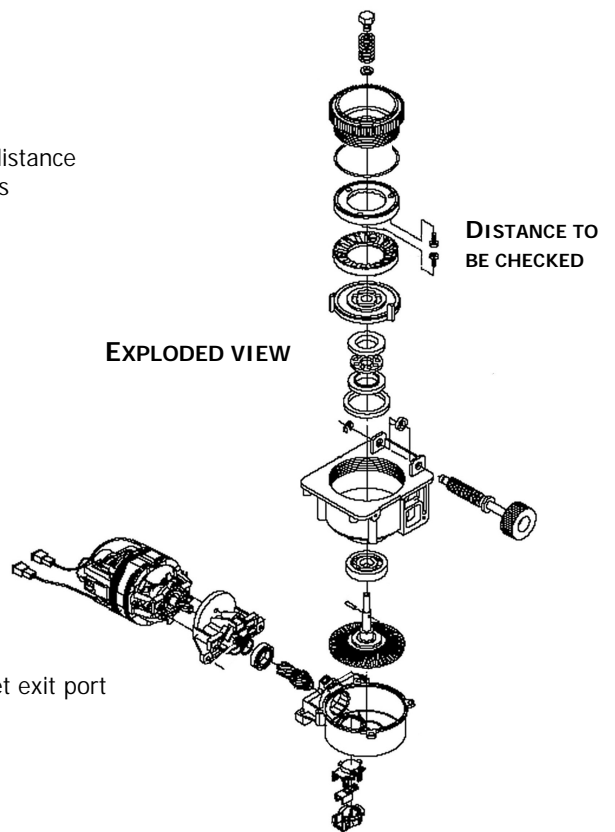


Knob for adjusting the distance
between grinding wheels

COFFEE GRINDER - VIEW IN OPERATING POSITION



COFFEE GRINDER (PERSPECTIVE VIEW)



DISTANCE TO
BE CHECKED

EXPLODED VIEW

26 – POWDER AND LIQUID DOSE TABLES

The software is programmed by default with the most suitable settings for the relevant market. The following table is an example, and are for the Italian market settings, and the correct and updated settings are indicated in the tables supplied with the machine.

Selection	Remarks	Coffee beans	Coffee Instant	Water c.c.	Powder g	Fresh-brew coffee g	Remarks

NOTE 1

The water flow in the mixers is approximately 10 c.c. per second and it is given as a guideline, as there are many variables that can affect the accuracy.

The liquid dose is determined by the flow-meter pulse counting (volumetric counter).

Both versions (Instant and Espresso) use an electromechanical vibration pump (with the espresso boiler) for the water flow, therefore the liquid dose in both versions is measured in flow-meter pulses (**fmp**).

NOTE 2

To be noted that the number of pulses does not change in a linear manner (i.e. double the amount of water does not correspond to double the number of pulses), however the counter varies the accuracy according to the water flow velocity, and namely:

For espresso coffee it is reduced considerably because of the coffee compress reaction that slows down the water flow, while it is accelerated in the instant drinks selections, since there are no obstructions to the water flow. Therefore, in the event of changing the doses set at the factory, some measurements must be made using measuring containers.

27 – ROUTINE & EXTRAORDINARY MAINTENANCE PROGRAM

The vending machine KORO was designed to operate for a long time without malfunctions; however in order to ensure excellent reliability periodic maintenance is necessary.

Such maintenance must be performed according to the number of selections made and the time lapsed.

Periodic and correct maintenance ensures reliability, constant quality and also guarantees safety standards over time.

The following table indicates the functional units that must be subjected to periodic maintenance and the frequency of maintenance. For the operations to be carried out, refer to the specific **Functional unit manuals**.

Name of unit	DESCRIPTION OF OPERATION	N. of selections	Max frequency
Espresso brewer unit	1) Check state of filters and wear of silicone O-ring seal	5000	1 month
	2) Replace upper and lower filters and related seals	8000	6 months
	3) Descale the internal vent hole and lubricate with specific food-safe grease	30.000	annual
Fresh brewer unit	1) Check state of filters and wear of silicone O-ring seal; see details in the functional unit manual for FB coffee brewing	4000	1 month
	2) Open the unit and check the state of wear and internal lubrication and if necessary replace and lubricate	40.000	annual
Mixer unit	1) Check the water tightness in the axial bush and the correct assembly, if necessary replace. 2) Check the wear of the motor brushes and clean off the excess of carbon powder	50.000	annual
Boiler and solenoid valve assembly	If the boilers and the solenoid valves operate with soft water or are fitted with specific softener filters, there should be no need of periodic maintenance; otherwise periodically check the grade of scaling and if necessary proceed to complete descaling	According to the water hardness	Every 6 months
Steam exhauster unit	There is no need of any particular maintenance For perfect functioning, it is necessary that the powder removal boxes be emptied periodically. In addition, daily cleaning ensures also maximum hygiene of the machine.		Every day
Coffee grinder assembly	The motor was designed to operate for more than 200000 grinding cycles and the grinding wheels can ensure correct grinding for at least 50000 cycles. However, these values can vary because of possible impurities in the coffee (pebbles, pieces of hard wood, etc.), therefore it is advisable, except for premature wear, to check and if necessary replace the grinding wheels every 50000 cycles. Every 200000 cycles check the state of wear of the ratiomotor brushes, if necessary replace and clean off the wear residues. In addition, every month check the correct positioning of the grinding wheels and if necessary adjust to the correct setting by means of the knurled knob.	50000	Every year
		200000	
		4000	month

Extraordinary maintenance is carried out in the event of possible malfunctions.

For the most typical problems the vending machine is fitted with sensors that inform the software about any malfunction. The following tables list the possible malfunctions and possible remedies.

28 – TROUBLE-SHOOTING

PROBLEM (and/or indication on the display)	POSSIBLE CAUSE	SOLUTION
The machine does not go into the boiler heating phase and the display shows the message "WATER FAILURE"	If the micro-switch of the air-break (if fitted) float in the instant boiler, or of the float in the water supply tank, is not activate within one minute, the software disables the machine.	Check the following situations: Machine with air-break: check that there is water from the mains; if this is the problem, wait for the water from the mains to be resumed. Otherwise, check the operation of the inlet solenoid valve from the mains, check the operation of the air-break micro-switch Machine with instant boiler: in this case it is the boiler to perform the air-break function. Then, repeat the above checks. Machine with water supply tank: Check the operation of the magnetic float, and of the water supply pump. Check the activation of relays K1 and K14
(espresso versions) The display indicates the message "NO COFFEE"	If the coffee grinder exceeds the grinding speed for longer than 5 seconds, the espresso coffee selections are disabled. All instant product selections remain available.	When an espresso coffee selection is made the grinder is activated conveying coffee directly to the brewing chamber of the Z3000 unit, and the amount is determined by the number of revolutions of the grinding wheels by means of a special sensor. Check the presence of coffee Check the distance between the grinding wheels Check the presence of the sensor Check the functioning of the relay K16
The display indicates the message "WASTE CONTAINER FULL"	When the float in the liquid waste tray triggers the signal micro-switch.	Empty the tray, removing it from the lower section of the cabinet. Check the operation and correct functioning of float and micro-switch.
The display indicates the message "AIR-BREAK"	The machine locks if after 10 selections the float micro-switch does not change position.	Check the following situations: Machine with air-break: check that there is water from the mains; if this is the problem, wait for the water from the mains to be resumed. Otherwise, check the operation of the inlet solenoid valve from the mains, check the operation of the air-break micro-switch Machine with instant boiler: in this case it is the boiler to perform the air-break function. Then, repeat the above checks. Machine with water supply tank: Check the operation of the magnetic float, and of the water supply pump. Check the activation of relays K1 and K14
The display indicates the message "VOLUMETRIC COUNTER"	When the counter does not signal any counting within a time-out set by default.	The water amounts necessary for espresso coffee selections are ensured by a volumetric counter that with the water flow causes a wheel to rotate and sends to the software a number of pulses corresponding to the set water dose; if such dose is not reached within 60 seconds it means that there is a problem. Check that there is water (see above); check that there are no obstructions to the correct flow of water. Check the correct functioning of the impellers. There must be 5 VAC on the terminals during the counter operation. Check that coffee was ground correctly and that dose is accurate. Check that the coffee filters are not clogged.

<p>The display indicates the message "BOILER"</p>	<p>The machine will lock if after the maximum time of heating from the machine start, or from the last selection, there is no signal of correctly reaching the temperature set in the software.</p>	<p>Check that the heating element and the STRC card are functioning correctly. Check that the overheating control systems were not triggered. Check the functioning of the probe (ohm control) Should the overheating protection be triggered before resetting, the cause must be found and eliminated.</p>
<p>The display indicates the message "CAN-BUS BOARD"</p>	<p>Failed dialogue between CPU board and can-bus board that controls the SIGMA BREWER unit.</p>	<p>Check the connections. Check that the power supply is correct. Replace the board.</p>
<p>The display indicates the message "COIN MECHANISM" (only if equipped with a payment system)</p>	<p>The machine will lock if it receives an impulse longer than two seconds on a validator line or there is no communication with the serial coin mechanism for more than 30 seconds (executive protocol). Or 75 seconds (BDV protocol)</p>	<p>Check that connection is correct and the software setting is correct for the protocol. If necessary replace the payment system.</p>
<p>The display indicates the message "GRINDER BLOCKED"</p>	<p>If the coffee grinder does not rotate or rotates too slowly for longer than 5 seconds, the espresso coffee based selections are disabled.</p>	<p>The grinder rotation is controlled by a sensor; if no rotation is detected within 5 seconds, check: That there are no blockages in the grinding wheels. That the overheating control systems on the winding were not triggered. That the sensor works correctly. Check the activation of relay K16</p>
<p>The display indicates the message "ESPRESSO UNIT"</p>	<p>If the unit does not reach the initial standby position after making a selection (checked by a position micro-switch) the espresso based selections are disabled.</p>	<p>The standby position is checked by a position micro-switch, and every time the machine is started the unit is checked. If the change in the "on" condition is not read, check that: the motor is started, the position micro-switch works correctly, the brewing chamber is not clogged with too much coffee. Check the activation of relay K7.</p>
<p>The display indicates the message "RAM DATA"</p>	<p>One or more areas of the RAM memory contain altered or non-compatible data, which is corrected by the software with default setting data; therefore the machine continues to operate with the initial data, but initialise will be required.</p>	<p>Enter into the installation procedure and initialise the software; if the failure persists replace the CPU board.</p>
<p>The display indicates the message "FRESH-BREWER PISTON"</p>	<p>The default position is determined by the micro-switches, and the position is factory preset; if for any reasons they are not triggered, FRESH-BREW coffee selections are disabled.</p>	<p>The standby position is checked by a position micro-switch, and every time the machine is started the unit is checked. check that: the motor is started, the position micro-switch works correctly, the brewing chamber is not clogged with too much coffee. the filter is not clogged. Check the connection with the FB board</p>
<p>The display indicates the message "FRESH-BREWER BRUSH"</p>	<p>The default position is determined by the micro-switches, and the position is factory preset; if for any reasons they are not triggered, FRESH-BREW coffee selections are disabled.</p>	<p>The standby position is checked by a position micro-switch, and every time the machine is started the unit is checked. check that: the brush is new and the motor is activated. That there are not any mechanical blockages. Check the connection with the FB board</p>

<p>For espresso only: Coffee is dispensed too slowly and it tastes burnt.</p>	<p>Excessive coffee dose or ground too finely.</p>	<p>The dose is calculated using an algorithm that counts the number revolutions of the grinder, and the doses are dispensed correctly if the grinder is adjusted with the correct grade of grinding. Check that the distance between the grinding wheels is the factory default one.</p>
<p>For espresso only: The coffee lacks body and is dispensed too quickly.</p>	<p>Coffee dose too small, or ground too coarsely.</p>	<p>The dose is calculated using an algorithm that counts the number revolutions of the grinder, and the doses are dispensed correctly if the grinder is adjusted with the correct grade of grinding. The dispensing time must remain constant. Check that the distance between the grinding wheels is the factory default one; with use the grinding wheels are subject to wear and it will be necessary to reset the correct measurement periodically.</p>
<p>The mixers clog up</p>	<p>Failed rotation of the mixer. Excessive instant product dose. Steam exhaust box clogged. Water to powder ratio not correct.</p>	<p>Check for the motor overheat protection trigger, if necessary check the cause of such trigger. Empty the powder removal box, adjust and check the correct water to powder ratio. Check the logic of the cycles. Check the activation of relay K3.</p>

29 –HACCP DIRECTIVE

HACCP DIRECTIVE (EEC 93/43 and 96/3)

Outline and instructions for use

Notes: What is it and what is indicated by the European Directive

Directives **EEC 93/43 and 96/3** regard the hygiene of food products and are based on the **HACCP** (**Hazard Analysis Critical Control Point**).

The purpose of this directive is to safeguard the consumer health, suggesting a series of actions to be taken by the vending company, aimed at checking, identifying and correcting any critical aspects in the foodstuff chain, from the purchase of products and machines to the dispensing of the product.

The **HACCP** is therefore a system that addresses the analysis of any potential risks in the manufacturing and distribution cycle of food product and the identification of critical points where such risks can occur; the system also highlights the actions to be undertaken and the decisions to be made with regard to such critical points, as well as the implementation of checking and monitoring procedures.

Therefore, each vending company must develop a Company Hygiene Self-control Manual according to the provisions of the directive - and if necessary use the information and recommendations formulated by some associations in the sector. The manual must contain a programming and checking schedule for the vending machine hygiene condition

Important notes:

For a correct use of the machine, the directives must be fully applied. **The operator is responsible for correct operations on a vending machine**

HACCP Directives (EEC 93/43 and 96/3)

Guidelines for correct application

- Ensure hygiene control with a special manual for correct hygiene practices.
- After cleaning, do not touch the surface of any elements that may come into contact with food.
- Wash your hands thoroughly, preferably using disinfectant, before starting any hygiene operations
- Use disposable sterile gloves
- Always use a clean cloth to wipe dry.
- Keep the work area tidy.
- Check that the product packages are intact and not damaged.
- Keep coffee and powder products in a cool, dark and dry place.
- Use products within the recommended time period (see expiry date on the package).
- Always use products from the warehouse according to the principle of "first-in first-out".
- Tightly close and seal any product packages not completely used.
- Coffee and consumables must be kept and transported separate from the cleaning products.
- The product containers must be cleaned regularly (see operation instructions).
- Only fill coffee or other product containers with sufficient amount for the expected use until the next cleaning.

Cleaning the machine (Pages 40, 41 & 42)

- Carefully observe the following cleaning instructions!
- Clean the machine, preferably at the end of the day or in the morning before the machine is used.
- After cleaning, dispense and check a drink (see last check).
- Fill in the check list log for cleaning operations.
- When the display indicates an error message immediately check the trouble-shooting sheet.
- Use only recommended cleaning products approved for foodstuff, preferably liquid; avoid the use of powder and abrasive products.

30 – DAILY CLEANING AND HYGIENE PROGRAM

Daily Cleaning And Hygiene - espresso Version

(Expected time 6 minutes)



Fig. 1

Remove the dispensing compartment and the tray, slide out the internal tank. Clean and rinse the components thoroughly under current water, empty and rinse the tank (FIG. 1 – FIG. 2)



Fig. 2

Remove the coffee grounds container, empty it and rinse it thoroughly (FIG. 3)



Fig. 3

Remove the drip tray located under the mixer, rinse it and eliminate any residue (FIG. 4)



Fig. 4

Slide out the external mixer assembly and disassemble it (FIG. 5 – 6), clean and rinse out thoroughly all residue.

Remove the brewer unit, clean and rinse with hot water (FIG. 7 – 8).

Reassemble all parts, taking care not to touch with your hands any parts that come into contact with food.

Carry out a mixer automatic wash cycle according to the pre-set procedures.

Close the door and make some test selections.



Fig. 7

NB: In order to speed up the operations, it is advisable to replace with components that were already cleaned and sanitised at the workshop, and take to the workshop the dirty components for cleaning and sanitising. The cleaning and hygiene operations must be carried out the evening, after the machine use, or the next morning before starting to use the machine.



Fig. 5



Fig. 6



Fig. 8

31 – DAILY CLEANING AND HYGIENE PROGRAM FRESH BREWER UNIT

Daily Cleaning And Hygiene - Fresh brewer Version

(Expected time 6 minutes)



Fig. 1

Remove the dispensing compartment and the tray, slide out the external tank. Clean and rinse the components thoroughly under current water, empty and rinse the tank (FIG. 1)



Fig. 2

Remove the coffee grounds container, empty it and rinse it thoroughly (FIG. 2)

Remove the brewing chamber and disassemble it, clean and rinse under hot current water (FIG. 3 – 5)



Fig. 3

Remove the lower filter-holder, clean and rinse thoroughly (FIG. 4)

Remove the spouts assembly and the support tray, clean and rinse thoroughly (FIG 7).

Slide out the external mixer assembly and disassemble it (FIG. 6), clean and rinse out thoroughly all residue.



Fig. 4

Reassemble all parts, taking care not to touch with your hands any parts that come into contact with food.

Carry out a mixer automatic wash cycle according to the pre-set procedures. Close the door and make some test selections.



Fig. 5



Fig. 7



Fig. 6

32 – MONTHLY CLEANING AND HYGIENE PROGRAM

Monthly Cleaning And Hygiene (or every 5000 selections)

For all versions: Espresso - Fresh Brewer - Instant

Expected time 18 minutes



FIG. 1

ONCE A MONTH, OR EVERY 5000 SELECTIONS, THE FOLLOWING SCHEDULED MAINTENANCE OPERATIONS MUST BE CARRIED OUT; AS USUAL IT IS ADVISABLE TO CARRY OUT SUCH OPERATIONS AT THE WORKSHOP, AND ON SITE SIMPLY REPLACE THE UNITS WITH THE ONES WHICH WERE ALREADY SUBJECTED TO SCHEDULED MAINTENANCE.

Remove the "Z3000" unit from the vending machine (FIG. 1 – FIG. 2); disassemble the unit completely, remove the upper piston and the lower brewing chamber (FIG. 3 – FIG. 4); carry out the maintenance operations indicated in the specific manual, and more specifically, clean or replace the filters and lubricate the seals.



FIG. 2

Remove the "SIGMA BREWER" unit from the machine; clean thoroughly (see specific manual), more specifically the brewing chamber and the lower filter; check the efficiency of the mechanism and of the position micro-switches. If the filter is clogged for more than 50% must be replaced (FIG. 5)



FIG. 4



FIG. 3

Remove the powder containers, empty and clean them thoroughly in the inside, especially the ports and the auger (FIG. 6)

Remove the grinder and doser assembly, empty any coffee residue, check the state of the grinding wheels, check the efficiency of the sensor that detects the number of revolutions (FIG. 7)

Reset the correct distance between the grinding wheels (see specific manual).

Reassemble all parts, taking care not to touch any parts that come into contact with food.



FIG. 6



FIG. 5



FIG. 7