

**AFTER-SALES SERVICE****Hot & Cold**

## SERVICE MANUAL

# **"BRIO 250"**

## **BASIC TECHNICAL MANUAL**

**THE CONTENTS OF THIS DOCUMENT ARE INTENDED FOR NECTA'S AFTER SALES PERSONNEL.**

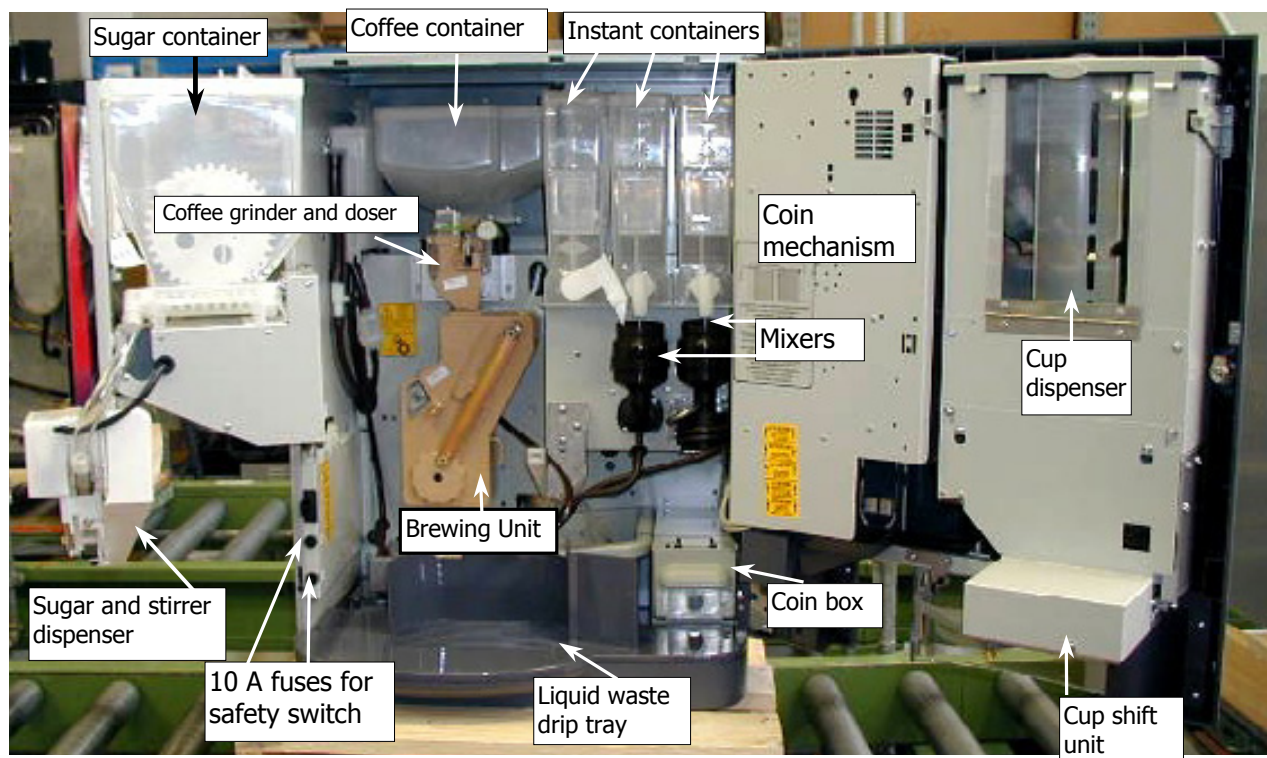
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### **NOTE**

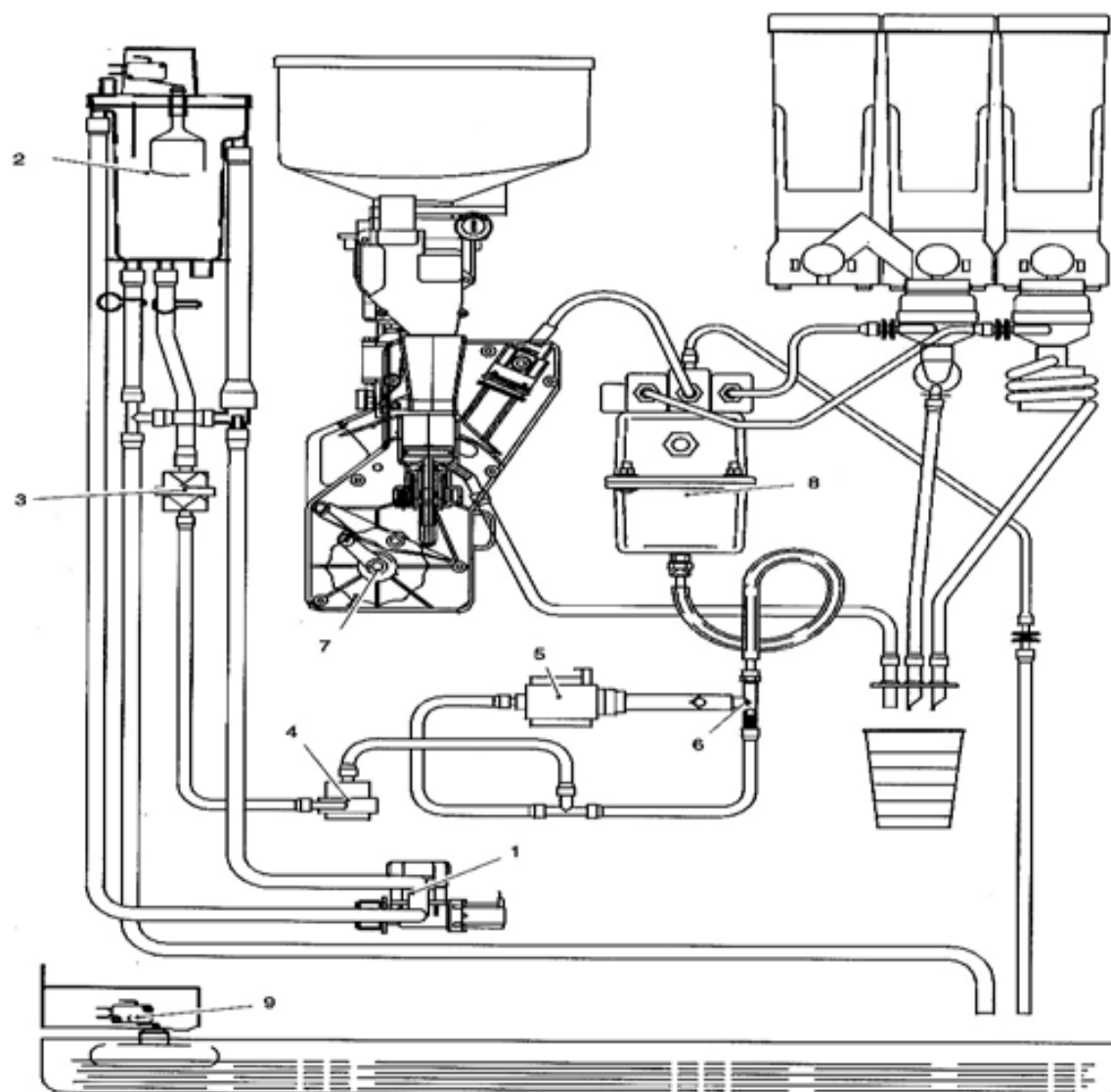
The above systems and functional units are specific to this machine.

All functional units installed but not listed in this document, are also used in other machines in the same range; therefore they will be described in a separate manual for machines belonging to the same range, where all base functional units will be described more in detail.



**BRIO 250: VIEW WITH DOOR OPEN**

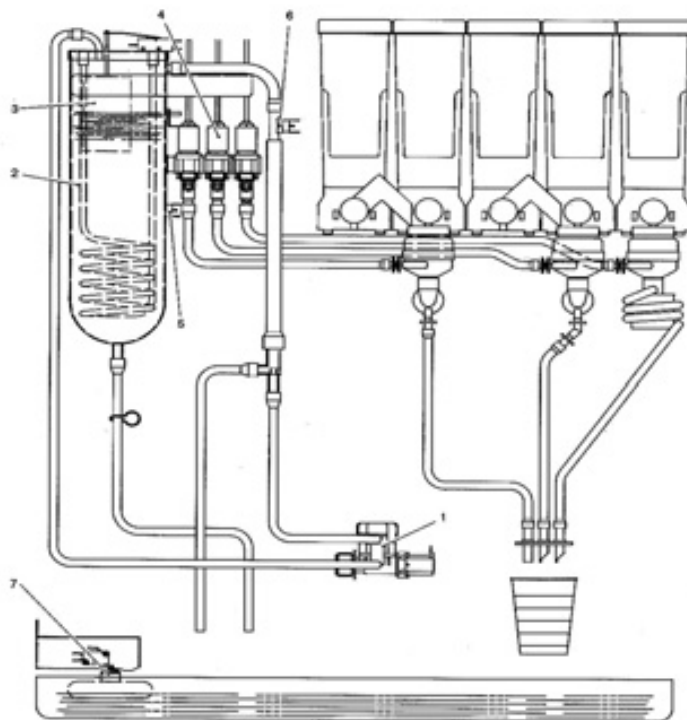
# 1 - HYDRAULIC LAYOUT



**Hydraulic layout "Espresso" version**

## List of hydraulic components

- 1) Water inlet solenoid valve
- 2) Air-break
- 3) Filter
- 4) Volumetric counter
- 5) Pump
- 6) Pump by-pass
- 7) Brewer unit
- 8) Pressure boiler
- 9) Liquid waste tray float



hydraulic Layout **"INSTANT"** version

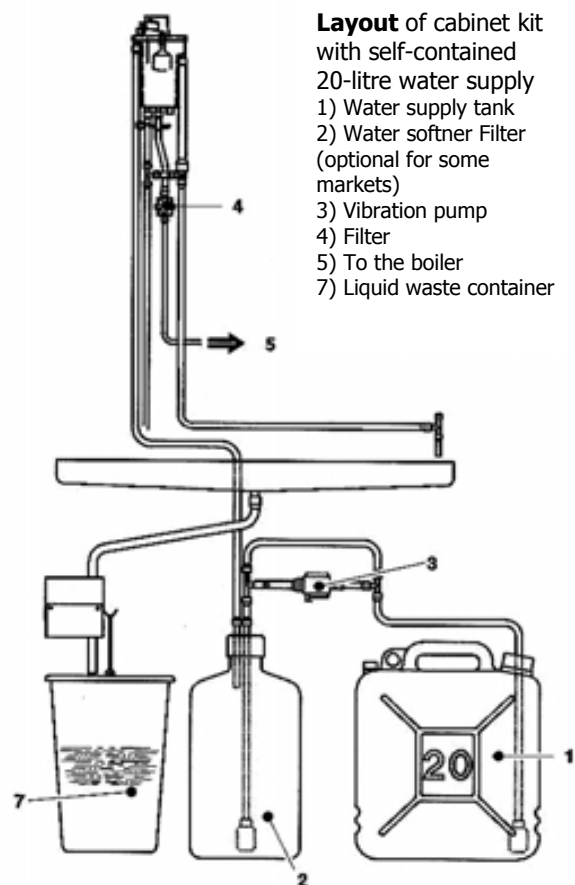
#### List of hydraulic components

- 1) Water inlet solenoid valve
- 2) Boiler with air-break incorporated
- 3) Boiler internal float
- 4) Solenoid valves
- 5) Dry operation safety thermostat
- 6) Anti-boiling thermostat
- 7) Liquid waste tray float

**NOTE:** In the **Espresso** version a pressure boiler and pump are used; the liquid amount drawn from the air-break is calculated by means of a volumetric counter.

In the **Instant** version an open-top boiler fitted with an internal float is used, having also the function of an air-break. The amount of liquid is calculated by opening a solenoid valve counting the time in tenths of a second, according to its rated flow of the valves, set to 12 c.c. /sec.

Self-contained water supply is used in the version with a support cabinet, according to the diagram indicated in the Figure.



## 2 - ELECTRICAL SYSTEMS - CONNECTIONS - CONFIGURATIONS

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

It is protected with a main 10 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

The machine 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 mm<sup>2</sup> section

2) HO5 V V – F " " " "

3) HO5 V V – F " " " "

Fitted with a fixed SCHUKO plug.

NOTE: For **UK** there is a specific plug conforming to the standards in force which is adopted for that specific market.

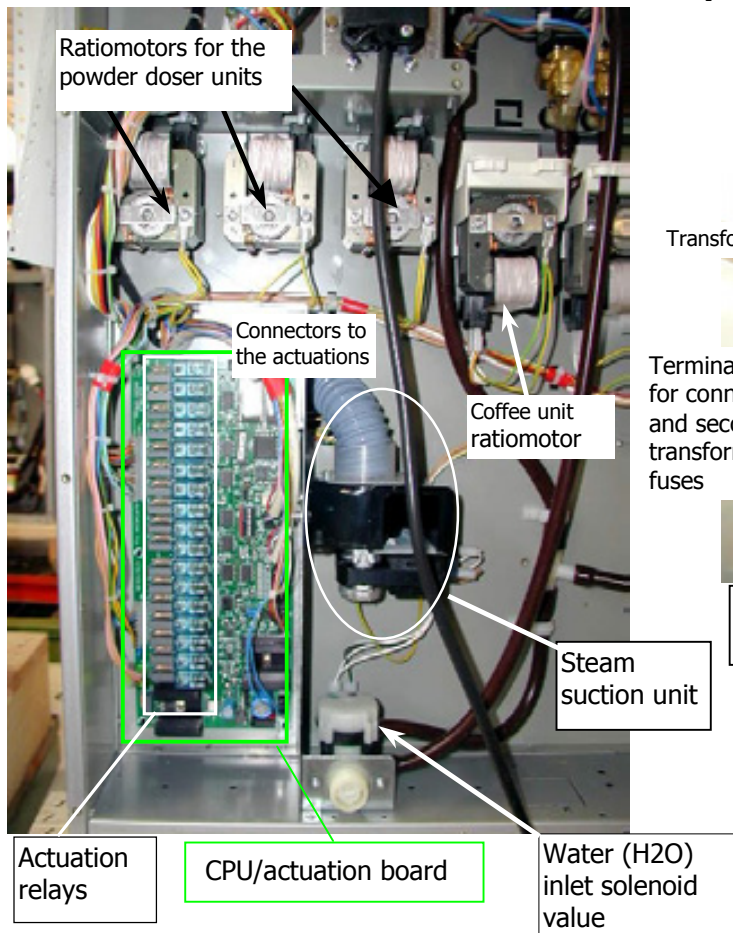
In the event of replacement; cables of exactly the same characteristics must be used.

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

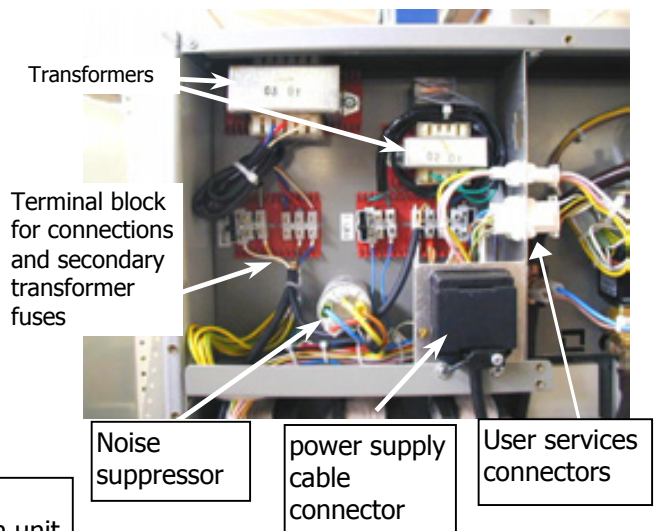
Otherwise the electrical safety certificate and the warranty will be void.

### 2.1 - ELECTRICAL AND BOARD CONNECTIONS:

**View of actuation control board (rear side without casing)**

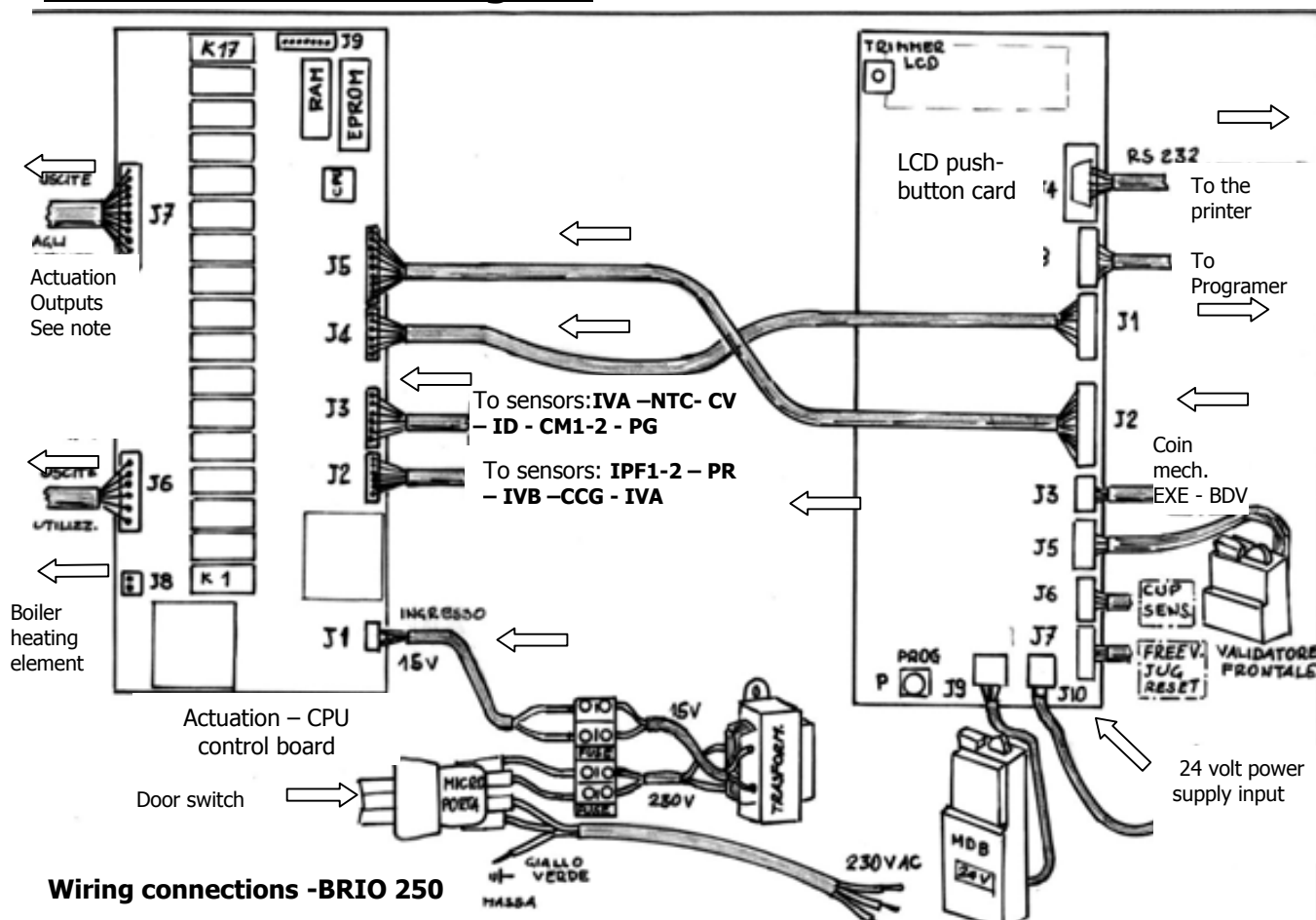


**VIEW OF CONNECTIONS AND POWER SUPPLY COMPARTMENT**



**See page 7 for list of components**

## Board connection diagram

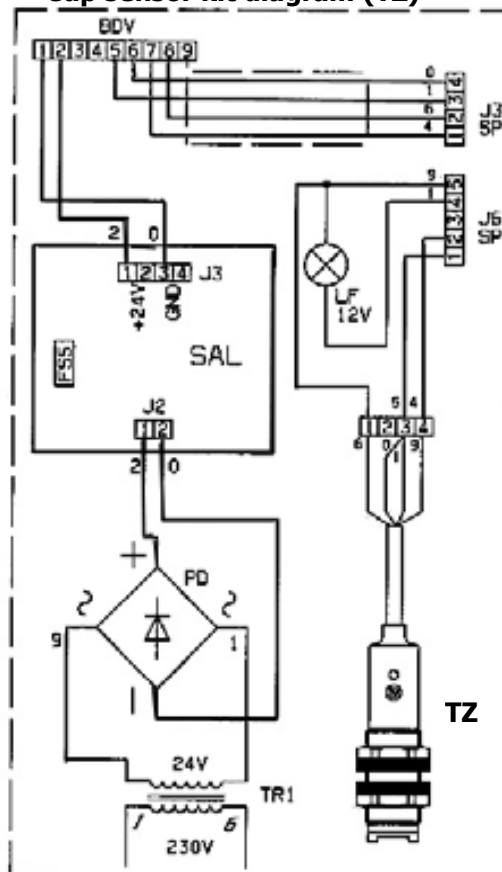


Wiring connections -BRIO 250

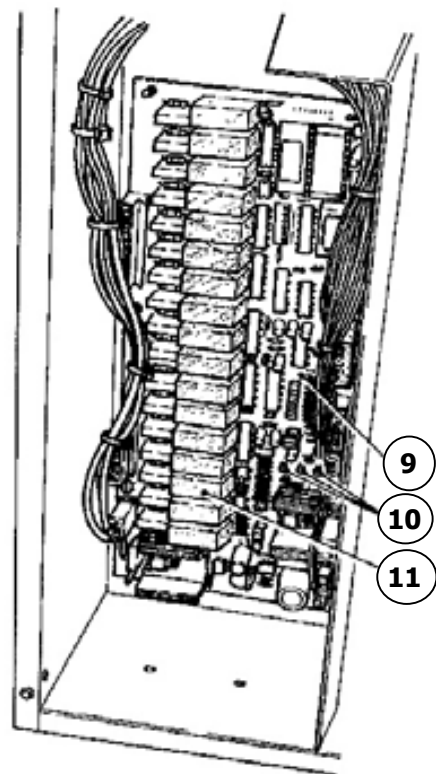
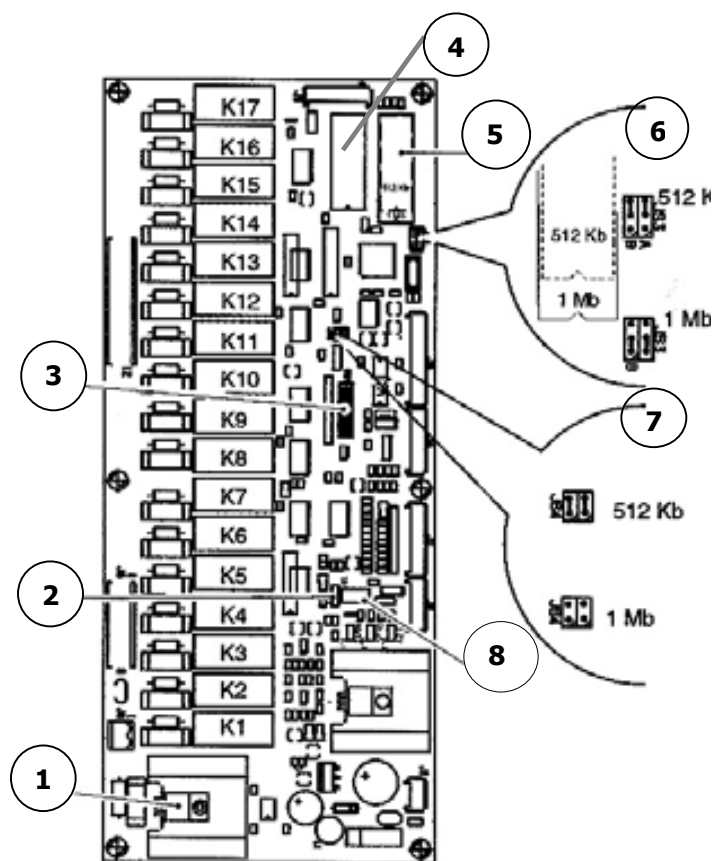
| Code          | Description                        |
|---------------|------------------------------------|
| <b>NTC</b>    | Temperature control probe          |
| <b>CV</b>     | Volumetric counter                 |
| <b>RS 232</b> | Printer or data reading port       |
| <b>IVA</b>    | Water sensor (level) switch        |
| <b>ID</b>     | Coffee dose switch                 |
| <b>IPF</b>    | Liquid waste overflow switch       |
| <b>J1</b>     | Connector for 15 V power supply    |
| <b>IVB</b>    | Cup sensor switch                  |
| <b>EX</b>     | Executive coin mechanism connector |
| <b>PIP</b>    | Programming mode button            |
| <b>CCG</b>    | Mechanical counter                 |
| <b>CMSB</b>   | Cup release motor cam              |
| <b>SAL</b>    | Payment systems power supply board |
| <b>TR</b>     | Transformer                        |
| <b>TZ</b>     | Cup sensor (optional)              |
| <b>PD</b>     | Diode rectifier                    |
| <b>RCC</b>    | ESPRESSO boiler heating element    |
| <b>RCS</b>    | Instant boiler heating element     |

N.B.: Some functions are available only in some versions and in some versions the signal is inverted on J3 (see relevant wiring diagram).

Power supply board connection for serial systems (EXE - BDV)  
Cup sensor kit diagram (TZ)



Actuation and CPU control board



Prospective View from rear without the casing

| Board components legend |                                                 |
|-------------------------|-------------------------------------------------|
| N.                      | Description                                     |
| 1                       | TRIAC - boiler heating element                  |
| 2                       | Jumper - Espresso / Instant configuration       |
| 3                       | MINIDIP - Configuration                         |
| 4                       | RAM                                             |
| 5                       | EPROM                                           |
| 6                       | JS 3 - EPROM size configuration Jumper          |
| 7                       | JS 4 - EPROM size configuration Jumper          |
| 8                       | TRIMMER - for boiler temperature control        |
| 9                       | BOARD - complete                                |
| 10.1                    | RED LED -- boiler heating element actuation     |
| 10.2                    | GREEN LED - blinking with correct CPU function  |
| 10.3                    | YELLOW LED - 12 V power supply                  |
| 11                      | RELAY for actuations (see separate list page 8) |
| 14                      |                                                 |
| 15                      |                                                 |
| 16                      |                                                 |

**Note 1:** Actuations for connector J7  
E4 - EEA - MSCE - ZP - CMSB - PSB - MSB - MSCB - MSV - MF2/3 - MD2/3/4 - MF1

**Note 2:** Actuations for connector J6  
E1 - E2 - M - KSI - PM - MAC - ESC - ER

**Note 3:** Actuations for connector J8  
RCC - RCS

## Reference to relay code and actuations - Espresso / Instant version

| Espresso Configuration |                                              | Instant Configuration |                                                                         |
|------------------------|----------------------------------------------|-----------------------|-------------------------------------------------------------------------|
| RELAY CODE             | Application                                  | RELAY CODE            | Application                                                             |
| <b>K 01</b>            | Three-way solenoid valve for Espresso coffee | <b>K 01</b>           | Whipper 2                                                               |
| <b>K 02</b>            | Coffee release magnet                        | <b>K 02</b>           | Whipper <b>1</b>                                                        |
| <b>K 03</b>            | Coffee grinder motor                         | <b>K 03</b>           | Doser device 1                                                          |
| <b>K 04</b>            | Pump                                         | <b>K 04</b>           | Water inlet solenoid valve<br>(Or pump for self-contained water supply) |
| <b>K 05</b>            | Coffee brewer motor                          | <b>K 05</b>           | Solenoid valve 3                                                        |
| <b>K 06</b>            | Solenoid valve 2                             | <b>K 06</b>           | Solenoid valve 2                                                        |
| <b>K 07</b>            | Solenoid valve 1                             | <b>K 07</b>           | Solenoid valve 1                                                        |
| <b>K 08</b>            | Whipper <b>1</b>                             | <b>K 08</b>           | Whipper <b>4</b>                                                        |
| <b>K 09</b>            | Doser device <b>4</b>                        | <b>K 09</b>           | Doser device <b>5</b>                                                   |
| <b>K 10</b>            | Doser device <b>3</b>                        | <b>K 10</b>           | Doser device <b>4</b>                                                   |
| <b>K 11</b>            | Doser device 2                               | <b>K 11</b>           | Doser device 3                                                          |
| <b>K 12</b>            | Doser device <b>1</b>                        | <b>K 12</b>           | Doser device 2                                                          |
| <b>K 13</b>            | Cup release ratiomotor                       | <b>K 13</b>           | Cup release ratiomotor                                                  |
| <b>K 14</b>            | Stirrer (and sugar) release ratiomotor       | <b>K 14</b>           | Stirrer (and sugar) release ratiomotor                                  |
| <b>K 15</b>            | Cup stacker shift ratiomotor                 | <b>K 15</b>           | Cup stacker shift ratiomotor                                            |
| <b>K 16</b>            | Water inlet solenoid valve                   | <b>K 16</b>           | Solenoid valve 4                                                        |
| <b>K 17</b>            | Whipper motor 2                              | <b>K 17</b>           | Whipper motor 3                                                         |

## Machine control board configuration

### Three electronic boards are installed.

- 1) The **control** board, located at the back of the machine, processes the information from the push-buttons, the payment system and from the sensors installed throughout the machine; it also controls the actuations and the push-button board. It is built on SMT technology.

NB: **SMT** = acronym for: **S**urface **M**ount **T**echnology (some electronic components that are smaller than the standard which can be surface mounted, takes little space, works with precision and reduced problems from electromagnetic disturbance.

- 2) The **push-button** board, located on the inside of the door, controls the alphanumeric display and it processes the push-button and programming button commands; it also supports the coin mechanism connectors and the RS232 printer port.

The board power (**15 V AC Note 2**) is supplied through the transformer, which is protected with two fuses:

**125 mA T** on the primary winding

**1.25 A T** on the secondary winding

The CONTROL BOARD is also fitted with three coloured LEDs to indicate the different functions.

**GREEN** LED N. 10.2: it blinks during normal operation and indicates that the microprocessor functions correctly.

**YELLOW** LED N. 10.3: it glows when there is a 12 V DC power supply to the board

**RED** LED N. 10.1: it glows when the boiler heating element starts

### NOTE 1

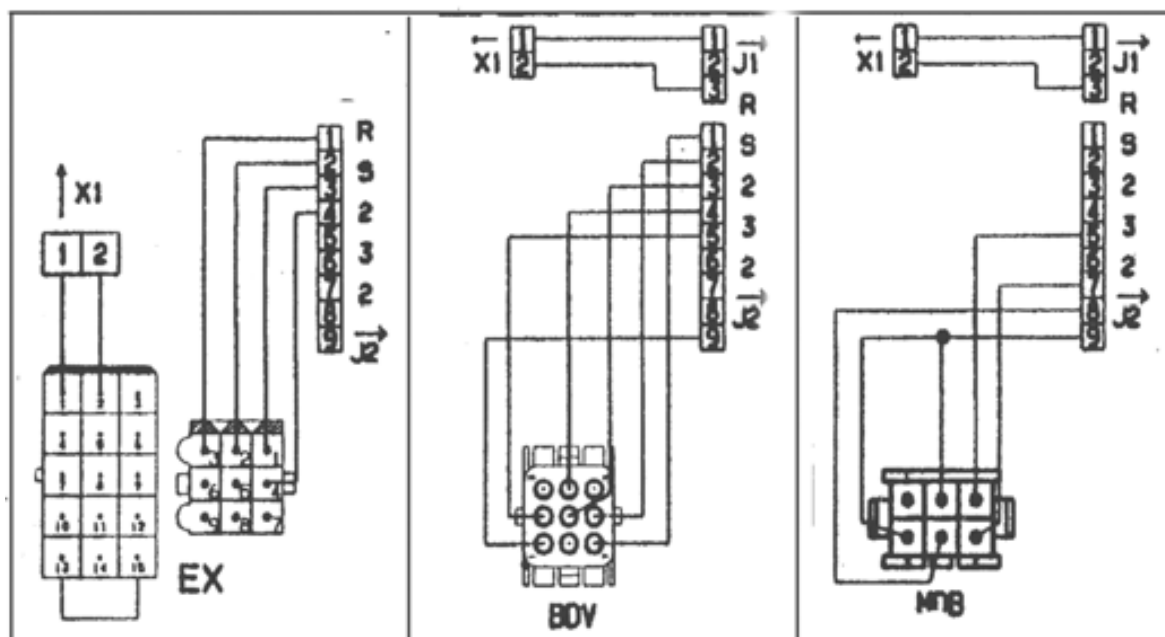
The board also controls the payment system; however, as standard feature only an Executive communication system is controlled.

As optional feature on request the vending machine can be configured for payment systems with protocol: MDB – BDV.

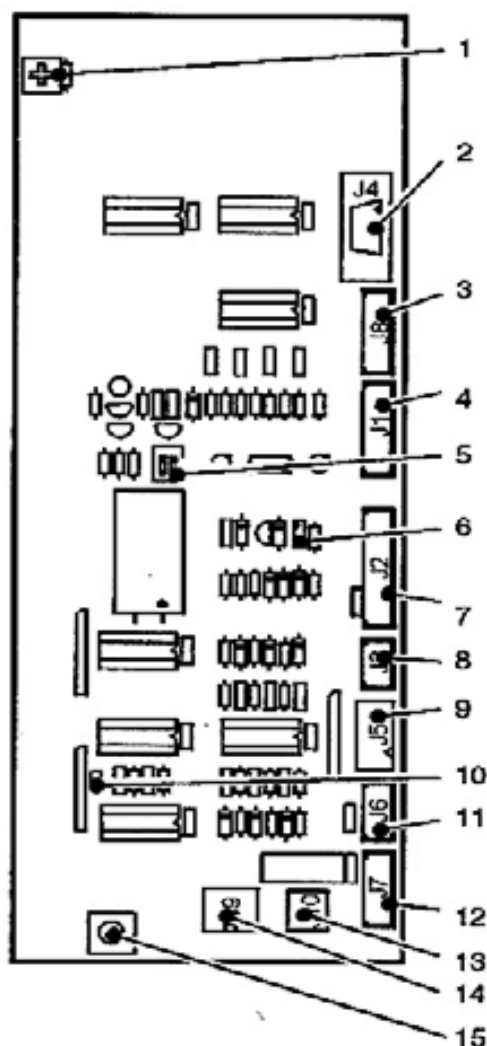
### NOTE 2

The 15 V AC board power supply voltage is rectified directly by the board itself.

### Wiring connection diagram for payment systems with the different protocols



## **Push-button board layout and connections**



- 1- Display contrast trimmer
- 2 -RS 232 Printer port
- 3 - Programmer connector
- 4 - Control board connector
- 5- Payment system conf. Minidips
- 6- Jumper Jp 2
- 7- To control board
- 8- Executive serial interface
- 9- Front validator
- 10 - Jumper Jp 1
- 11- Coin return lamp
- 12- Connector not used
- 13- MDB coin mechanism power supply
- 14- MDB coin mechanism serial connection
- 15- Programming button

### **Machine control board configuration**

The machine control board is designed as an integral part of the control system, therefore comprising the CPU and the actuations by means of relays and triac. It was conceived to be used in different machine models. It is configured at the factory by means of Minidips and Jumpers. In the event of replacement it will be necessary to check that the new board configuration is suitable for the required use.

To check its configuration proceed as follows:

A series of minidips (Ref. 3) are located at the centre of the board permitting its configuration for use in the different versions and countries. A Jumper (Ref. 2) is used to configure either Espresso or Instant.

The board also has provisions for supporting 512 Kb and 1 Mb EPROM's by setting Jumpers JS3 and JS4.

See the following tables for the available configurations

|     |   |   |   |   |   |   |   |   |
|-----|---|---|---|---|---|---|---|---|
| ON  |   |   |   |   |   |   |   |   |
|     |   |   |   |   |   |   |   |   |
|     |   |   |   |   |   |   |   |   |
|     |   |   |   |   |   |   |   |   |
|     |   |   |   |   |   |   |   |   |
|     |   |   |   |   |   |   |   |   |
|     |   |   |   |   |   |   |   |   |
|     |   |   |   |   |   |   |   |   |
| OFF | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |

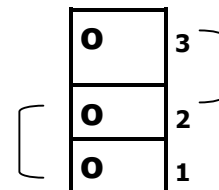
**Configuration minidip Ref. 3:** example of configuration for Spanish, Espresso, stirrer dispensed always, and standard Executive coin mechanism.

#### LANGUAGE CONFIGURATION

| LANGUAGE |         |        |         |
|----------|---------|--------|---------|
| Minidip  | Italian | French | Spanish |
| 6        | OFF     | ON     | OFF     |
| 7        | OFF     | OFF    | ON      |

#### MODEL CONFIGURATION

| Model      | Espresso | Instant |
|------------|----------|---------|
| MINIDIP 5  | OFF      | ON      |
| Jumper (2) | 2 - 3    | 1 - 2   |



Jumper 2 scheme

#### STIRRER CONFIGURATION

| STIRRER   | Dispensed also with unsweetened selections | Not dispensed with unsweetened selections |
|-----------|--------------------------------------------|-------------------------------------------|
| MINIDIP 2 | ON                                         | OFF                                       |

#### PAYMENT SYSTEM CONFIGURATION (FRONT COIN MECHANISM)

| Front                      | ON             | OFF               |
|----------------------------|----------------|-------------------|
| MINIDIP 1                  | -              | Fixed to OFF      |
| MINIDIP 3 (validator only) | Credit control | No credit control |
| MINIDIP 4                  | -              | Validator         |
| MINIDIP 8                  | -              | Fixed to OFF      |

#### PAYMENT SYSTEM CONFIGURATION (SERIAL COIN MECHANISM)

| SERIAL SYSTEM                                | MINI DIP 3 | MINI DIP 4 | MINI DIP 5 |
|----------------------------------------------|------------|------------|------------|
| Executive std.<br>U-Key URW 2                | OFF        | OFF        | OFF        |
| Executive Price Holding<br>Parameter 36 = 2) | OFF        | ON         | OFF        |
| System ECS                                   | ON         | OFF        | OFF        |
| U-Key URW 3                                  | OFF        | OFF        | ON         |

#### IMPORTANT NOTICE

Minidips that are not mentioned must be set to OFF.

### 3 - AIR-BREAK / BOILERS

It is the same functional unit used in the Venezia and Spazio vending machines, therefore with established characteristics and reliability.

It is a functional unit that permits various functions:

Its main function is to keep the water level constant and to signal a water flow interruption from the mains; in the event of such water failure the current selection can be completed.

In addition, it serves the purpose of holding a reservoir of water at normal atmospheric pressure, so that the pump can draw the correct water dose for the selection and deliver it to the Espresso boiler without changes in pressure that may affect the volumetric counter reading.

The dose is measured by means of the volumetric counter.

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

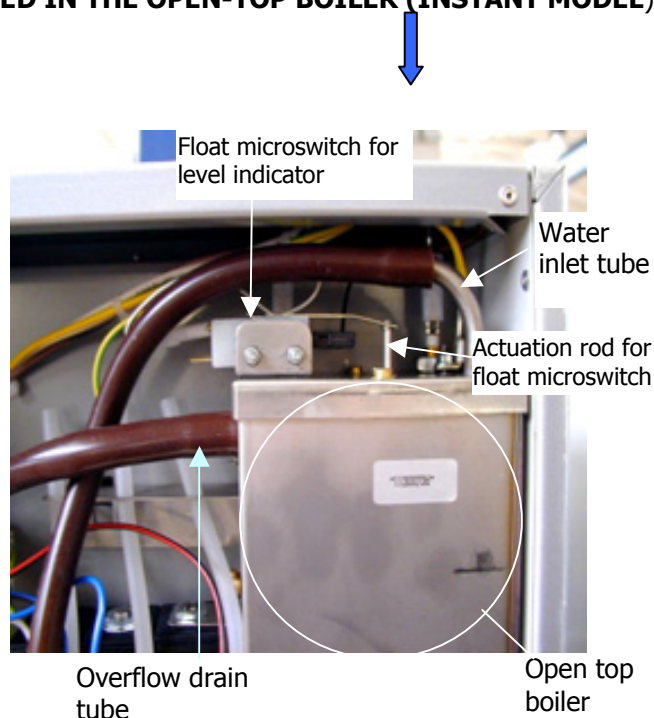
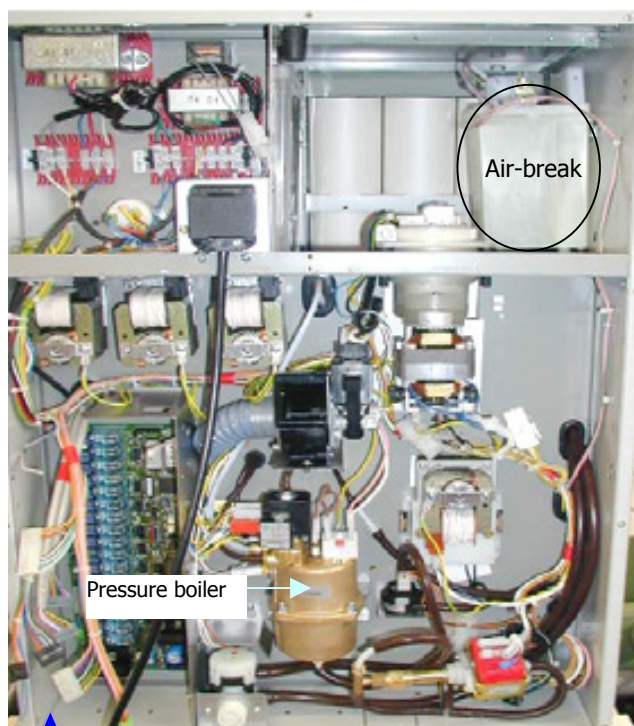
Furthermore, in the event of failure to the maximum level microswitch, an overflow hole allows the water to be conveyed through a tube and to the safety device fitted on the water inlet solenoid valve, thus causing its mechanical lock (such safety device is triggered also in the event of a power failure).

The air-break also causes a signal to be sent to the machine control board necessary for the initial installation and for filling with water. This air break operation initially needs to be done manually.

If upon switching the machine on, the float does not trigger the maximum level microswitch within a set time (e.g. 60 sec) the vending machine locks due to a water failure.

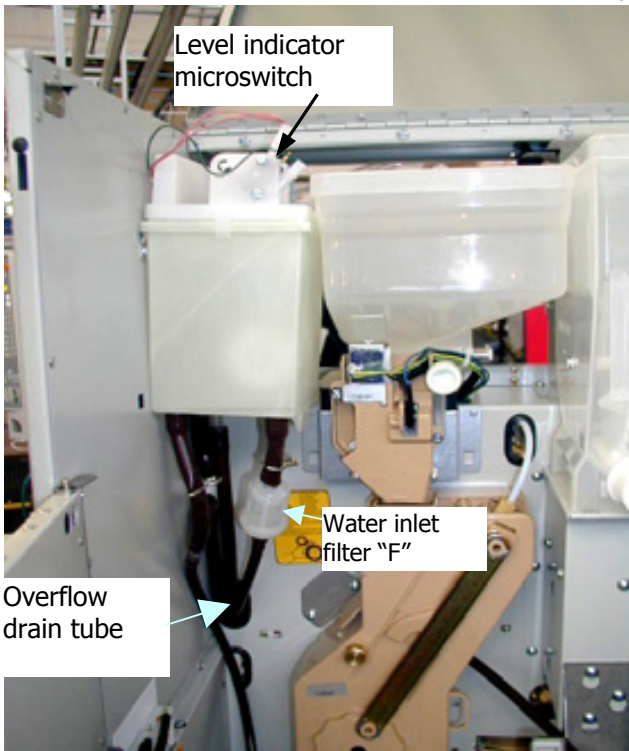
#### Back view without protective casing

##### DETAIL OF AIR-BREAK SYSTEM INCORPORATED IN THE OPEN-TOP BOILER (INSTANT MODEL)



##### REAR VIEW WITHOUT CASING - ESPRESSO VERSION WITH SEPARATE AIR-BREAK

## AIR-BREAK FRONT VIEW WITH DOOR OPEN



### Operating conditions at first start-up:

When the machine is started, a microswitch connected to the float indicates the absence of water to the SW, from the control board a signal is sent to relay K16, which activates the water inlet solenoid valve. Water is delivered to the air-break flowing through filter "F", thus eliminating any foreign matter present in the water (sand, calcium particles, etc.). Upon reaching the maximum level the microswitch is triggered indicating the situation to the SW, then the relay and the solenoid valve are de-energised.

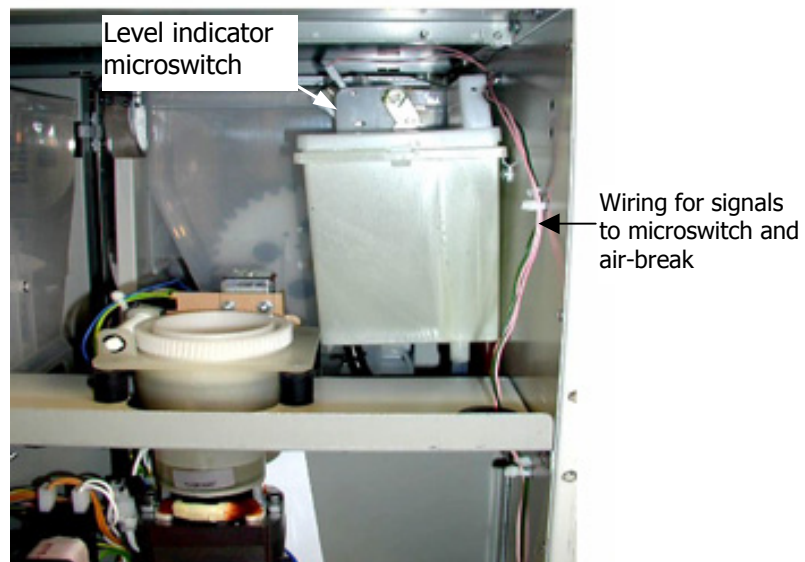
In the event of water not reaching the maximum level within a set time (for example because of water interruption from the mains), the SW disables all functions and sets the vending machine in "Water Failure" condition.

### Stand-by operating condition

With the air-break full, when a selection is made a solenoid valve is activated (2-way or 3-way according to the type of selection) and at the time the pump draws water from the air-break and sends it to the boiler flowing through the volumetric counter, determining the exact amount. When the water falls below a set level, the microswitch is activated starting the re-filling cycle.

**NOTE:** The above cycle applies to the espresso version only, as in the instant version the air-break is incorporated in the boiler and there is no pump, since water for a selection is dispensed by 2-way gravity solenoid valves, the dose computation is by timing according to the valve rated flow (normally between 10 and 12 cc/sec).

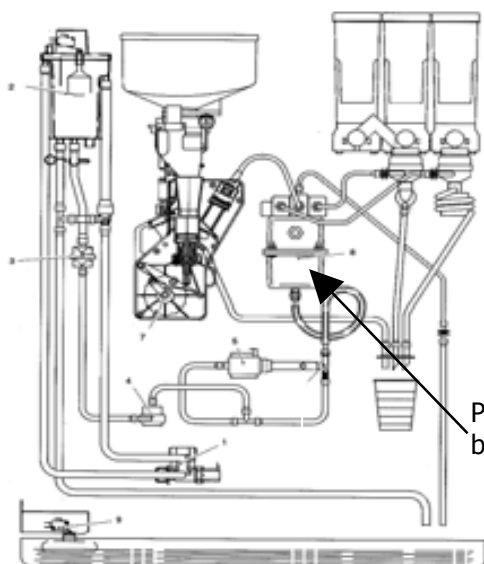
## AIR-BREAK: VIEW FROM REAR SIDE WITHOUT PROTECTIVE CASING AND COFFEE CONTAINER



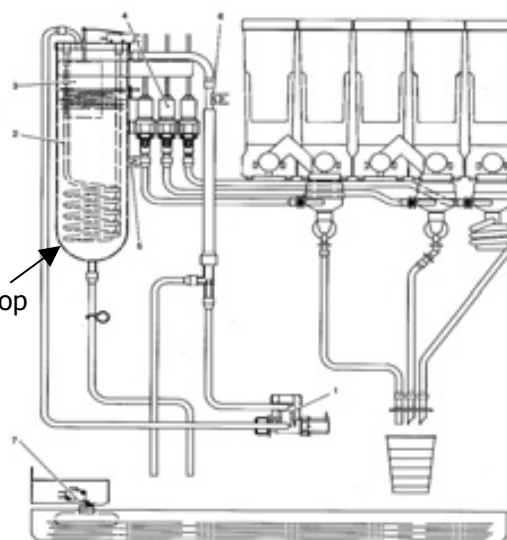
## 3.1 - BOILERS

In the **Brio Espresso** model there is only one **pressure** type boiler identical to the model used for the Venezia vending machine and controlled by an air-break and a vibration pump. Installed power 1200 W  
On the other hand in the **Instant** version there is a specific **open-top** boiler with an incorporated air-break.  
Installed power 1600 W

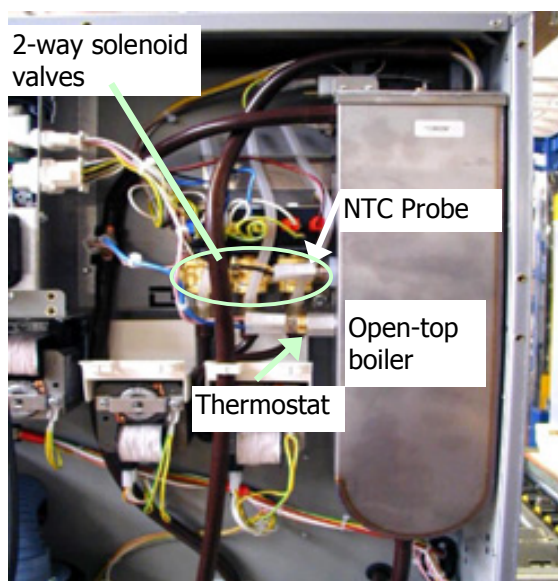
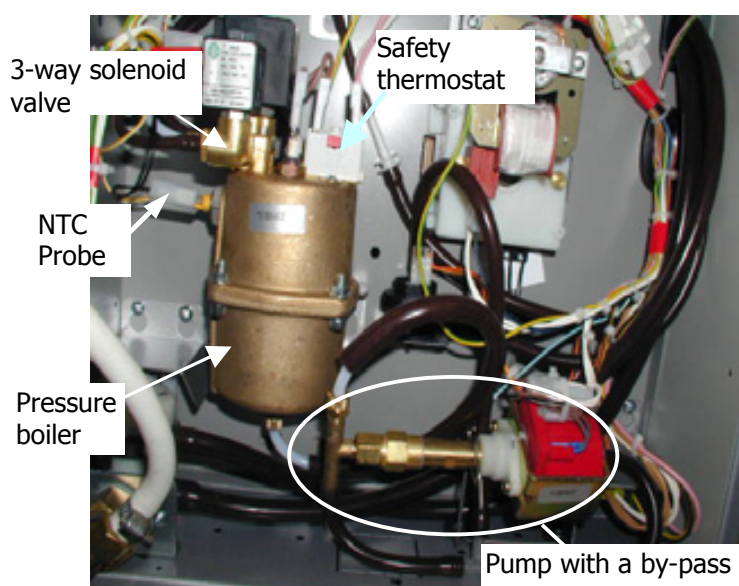
### HYDRAULIC DIAGRAMS - ESPRESSO AND INSTANT VERSIONS



**ESPRESSO**



**INSTANT**



See relevant section in the functional unit manual for details, photos and complete description

NOTE \*

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

As the internal temperature increases the resistance is reduced progressively as indicated in the following table.

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

## 4 - PUMPS AND BY-PASS

**Note:**

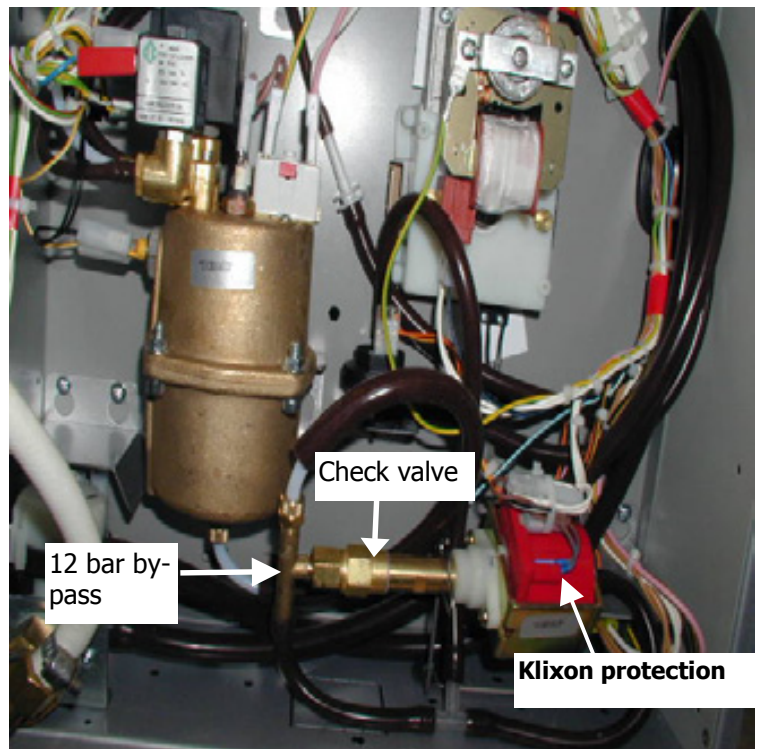
The pump is used in the espresso version only:

In order to supply water to the boiler UNDER PRESSURE the same pump used in the entire range of H & C vending machine is used.

The pump has overheating protection in case of continuous or dry operation by means of a 90° C self-reset klixon.

In order to maintain a constant brewing pressure, it is fitted with a by-pass which is factory set at a pressure of 12 bars; it is also fitted with a check valve additional to the one fitted on the pump.

The pump is activated by **relay K 14**.



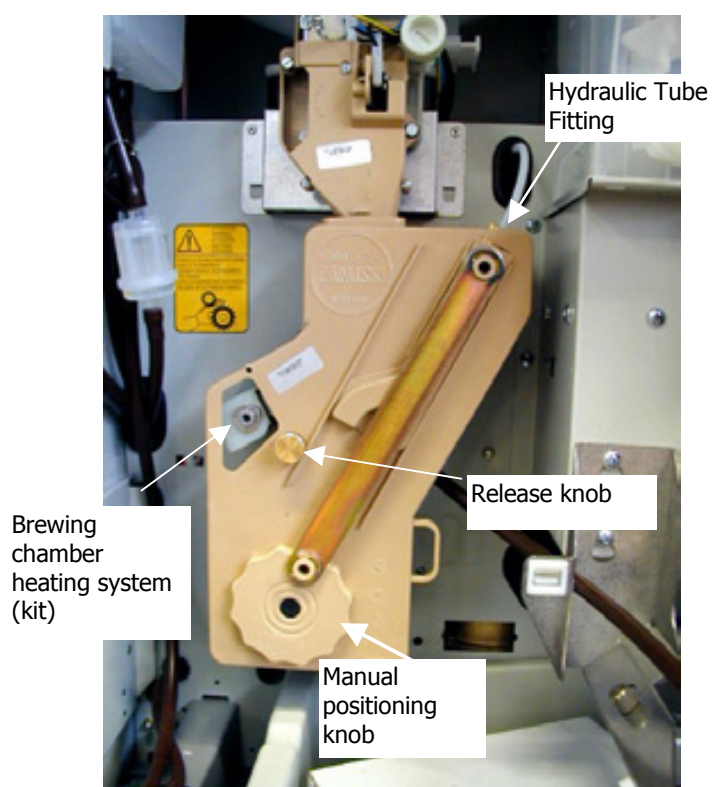
## 5 - ESPRESSO COFFEE BREWER UNIT

The well-known and reliable **Z 2000 M** unit is used

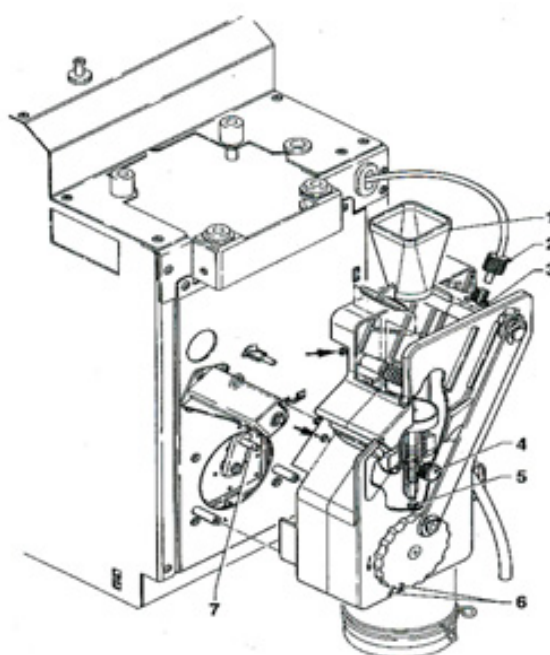
The unit is factory set to accommodate a patented first coffee KIT, based on the use of a very low power consumption heater of the NTC type and having such characteristics as to be able to perform self-adjustments under optimum conditions.

The kit ensures optimum temperature in the brewing chamber, without altering the taste as it happens in currently marketed systems.

See specific section in the functional unit manual for details and further information.



**Detail of brewing unit at the "lower dead centre" ready to receive ground coffee**



**ASSEMBLY DIAGRAM OF UNIT FROM THE BASE**

## 6 - SUGAR AND STIRRER DISPENSING ASSEMBLY



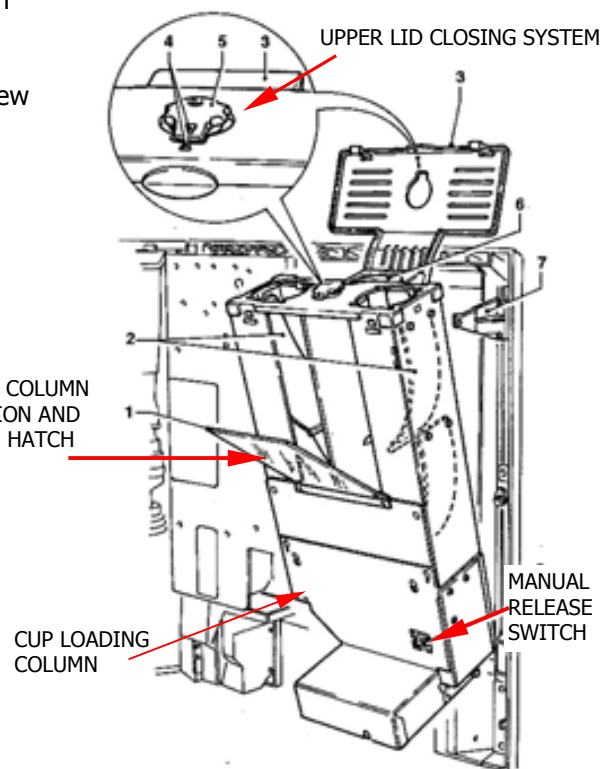
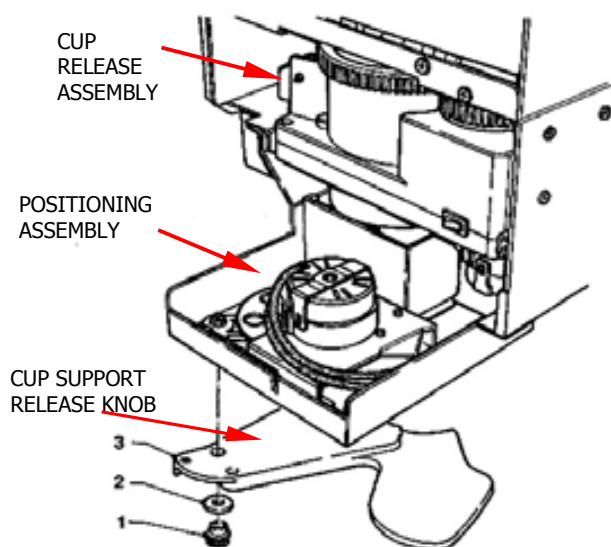
It is a functional unit developed from the unit used in other ranges of the H & C machines, but adapted to this specific application and with the sugar release device incorporated, which works simultaneously. Operation: The release ratiomotor is triggered by relay K 24 and the sugar release spout is rotated at the same time as the activation of the stirrer release system.

See specific section in the functional unit manual for details and further information.

Approximately 250 of the 95 mm stirrers can be loaded in the guide.

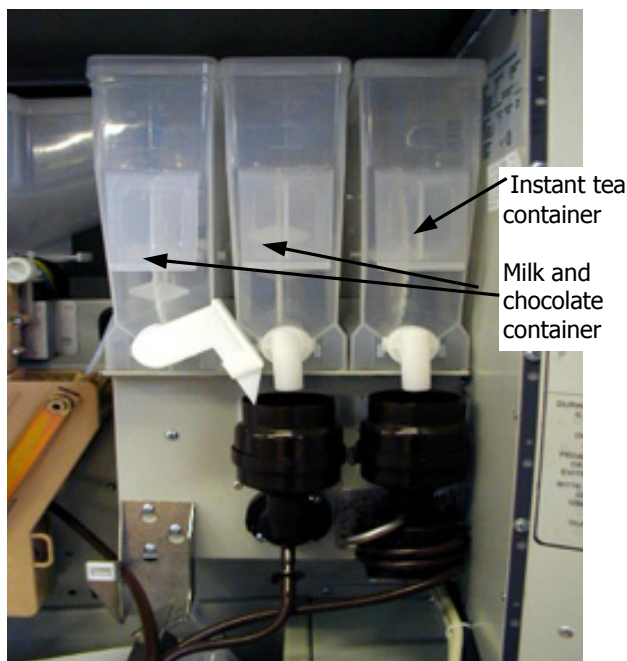
## 7 - CUP DISPENSER ASSEMBLY

It is a new functional unit; developed from the model used in the base Brio, such unit is provided with the functions of containing, releasing and positioning the cups. The main difference is the cup-loading column, to which a new row was added, bringing the total capacity to 250 cups.

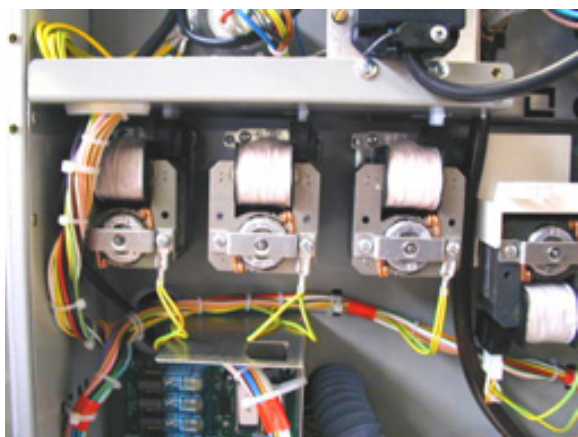
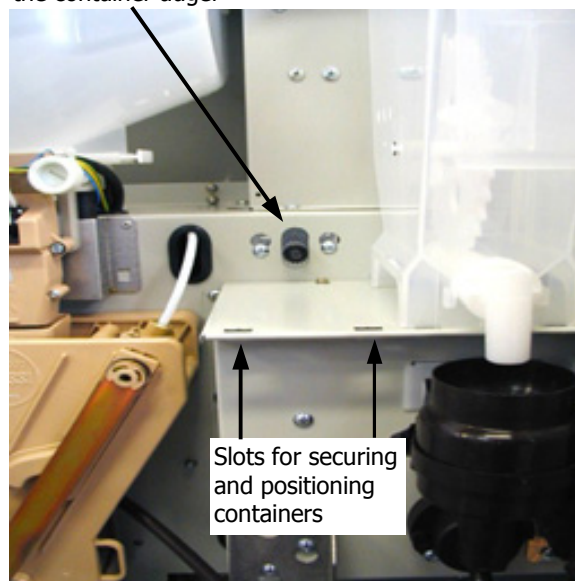


**LOADING POSITION**

## 8 - DOSER DEVICES AND POWDER PRODUCT CONTAINERS



Toothed pinion that drives the container auger



**POWDER DISPENSING RATIOMOTORS  
REAR VIEW**

The powder containers are made of plastic material, certified as being food-safe and inside they are fitted with worm screw systems (auger) to meter the powder.

According to the auger output, depending on the rotation velocity of the motor, a time in tenths of a second must be set in the SW to obtain the required amount (times to obtain average doses for the specific countries are set by default).

The dose can be changed according to needs, setting different times; however it must be taken into account that the dose need to be in the right proportion to amount of liquid used, therefore the time setting cannot be longer than the one for dispensing water, otherwise there is a risk of clogging up the mixers.

By default any time setting greater than the one for dispensing water is "CUT".

Specific containers holding specific products are fitted with

systems (defined as whippers), which are used to prevent clogs or compacted product.

The ratiomotors used are of the induction type (without commutator or brushes) powered with 230 V AC, with good pick-up torque, long operating life and with overheating protection on the coil.

Ratiomotors with different speeds are provided for specific markets and products, especially conceived to obtain the best results with any powder used. This aspect should be taken into account when replacing the motors.

## 9 - MIXER UNIT

Apart from their application, the mixers are the usual excellent and reliable ones used in the entire Necta production.

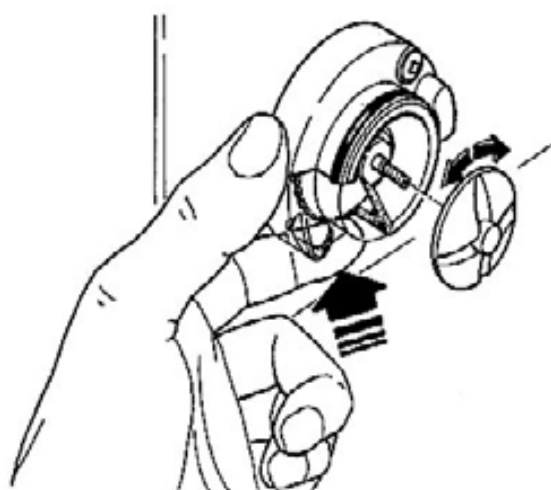
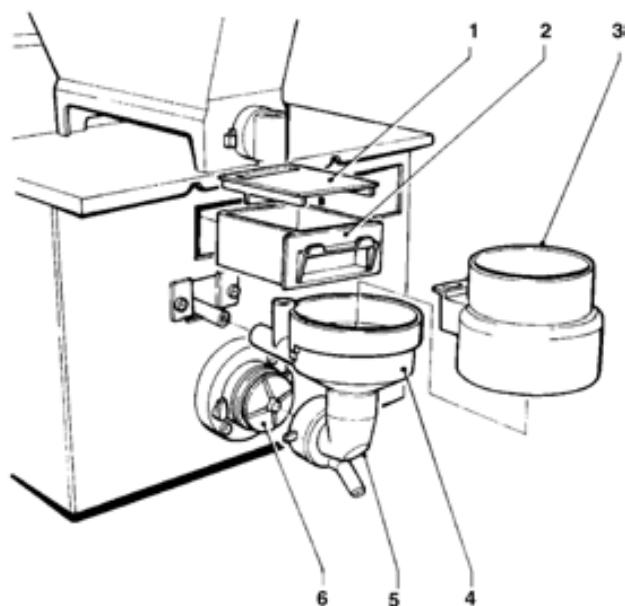
A mixer must have two main features:

- 1) Ease of disassembly and limited number of components to be able to meet the HACCP directive.
- 2) The quality of dispensed products that must have as much as possible the appearance of products served at the bar.

The motors are special high rotation speed commutator motors (20,000 rpm) powered with 230 V AC and fitted with interference suppressors and self-resetting overheating protections.

THE CONSTRUCTION CHARACTERISTICS OF THE MOTORS ENSURE LONG OPERATING LIFE

The motors are activated by relay **K08** (Espresso version) **K03** (Instant version)



**WHEEL DISASSEMBLY DIAGRAM**

- 1 – Drawer cover
- 2 – Powder deposit drawer
- 3 – Powder funnel
- 4 – Water funnel
- 5 – Feeder
- 6 – Mixer wheel

# 10 - POWDER AND LIQUID DOSE TABLES

## Factory "default" settings

| Selection                                  | Notes    | Coffee beans | Coffee Instant | Water c.c.                         | Powder g      | Sugar g | Notes                             |
|--------------------------------------------|----------|--------------|----------------|------------------------------------|---------------|---------|-----------------------------------|
| <b>Short coffee</b><br>Espresso            | Time     | 2 sec.       | --             | 35 sec.                            | --            | 7.5 g   | <b>CDV</b> =<br>Flow-meter pulses |
|                                            | Quantity | 7 g          |                | 60 <b>cdv</b><br>40                |               |         |                                   |
| <b>Long coffee</b>                         | Time     | 2sec.        | --             | 38 sec.                            | --            | 7.5 g   |                                   |
|                                            | Quantity | 7 g          |                | 95 <b>cdv</b><br>60                |               |         |                                   |
| <b>Coffee with milk</b>                    | Time     | 2sec.        | --             | 38 sec.                            | --            | 7.5 g   |                                   |
|                                            | Quantity | 7 g          |                | 60 + 35 <b>cdv</b><br>40+25 c.c.   | 2.0 g of milk |         |                                   |
| <b>Cappuccino</b>                          | Time     | 2 sec.       | --             | 45 sec.                            |               | 7.5 g   |                                   |
|                                            | Quantity | 7 g          |                | 60 + 72 <b>cdv</b><br>40+55        | 6.0 g of milk |         |                                   |
| <b>Instant coffee</b><br>(Instant version) | Time     | --           | 1.3 g          | 22 sec.                            | --            | 7.5 g   |                                   |
|                                            | Quantity |              |                | 55 <b>cdv</b><br>40 c.c.           |               |         |                                   |
| <b>Instant coffee</b><br>Long              | Time     | --           | 1.3 g          | 23 sec.                            | --            | 7.5 g   |                                   |
|                                            | Quantity |              |                | 72 <b>cdv</b><br>55 c.c.           |               |         |                                   |
| <b>Instant coffee</b><br>with milk         | Time     | --           | 1.3 g          | 27 sec.                            |               | 7.5 g   |                                   |
|                                            | Quantity |              |                | 55 + 35 <b>cdv</b><br>40 + 25 c.c. | 2.0 g of milk |         |                                   |
| <b>Cappuccino</b><br>Instant               | Time     | --           | 1.3 g          | 31 sec.                            |               | 7.5 g   |                                   |
|                                            | Quantity |              |                | 55 + 72 <b>cdv</b><br>40+55 c.c.   | 6.0 g of milk |         |                                   |
| <b>Chocolate</b><br>Strong chocolate       | Time     | --           | --             | 32 sec.                            | 23 g          | --      |                                   |
|                                            | Quantity |              |                | 116 <b>cdv</b><br>90 c.c.          | 27 g          |         |                                   |
| <b>Instant tea</b><br>(Optional)           | Time     | --           | --             | 32 sec.                            |               | --      |                                   |
|                                            | Quantity |              |                | 116 <b>cdv</b><br>90 c.c.          | 12.5 g        |         |                                   |
| <b>Milk</b>                                | Time     | --           | --             | 32 sec.                            |               |         |                                   |
|                                            | Quantity |              |                | 116 <b>cdv</b><br>90 c.c.          | 8 g           | 7.5 g   |                                   |

### NOTE 1

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

The liquid dose is determined by the counting of flow-meter pulses (cdv).

The Espresso version uses an electromechanical vibration pump for the water flow; therefore the liquid dose in both versions is measured in flow-meter pulses (**cdv**).

### 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 the volumetric counter is slowed considerably because of the coffee compress reaction that slows down the water flow, triggering the by-pass, 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 default doses set at the factory, some measurements must be made using graduated measuring containers to check the accuracy of the doses.

In the instant version, water is delivered to the mixers from the open-top boiler by means of gravity solenoid valves, and the dose is calculated in tenths of a second, based on the valve rated flow (on average, set to 10-12 c.c. /sec.).

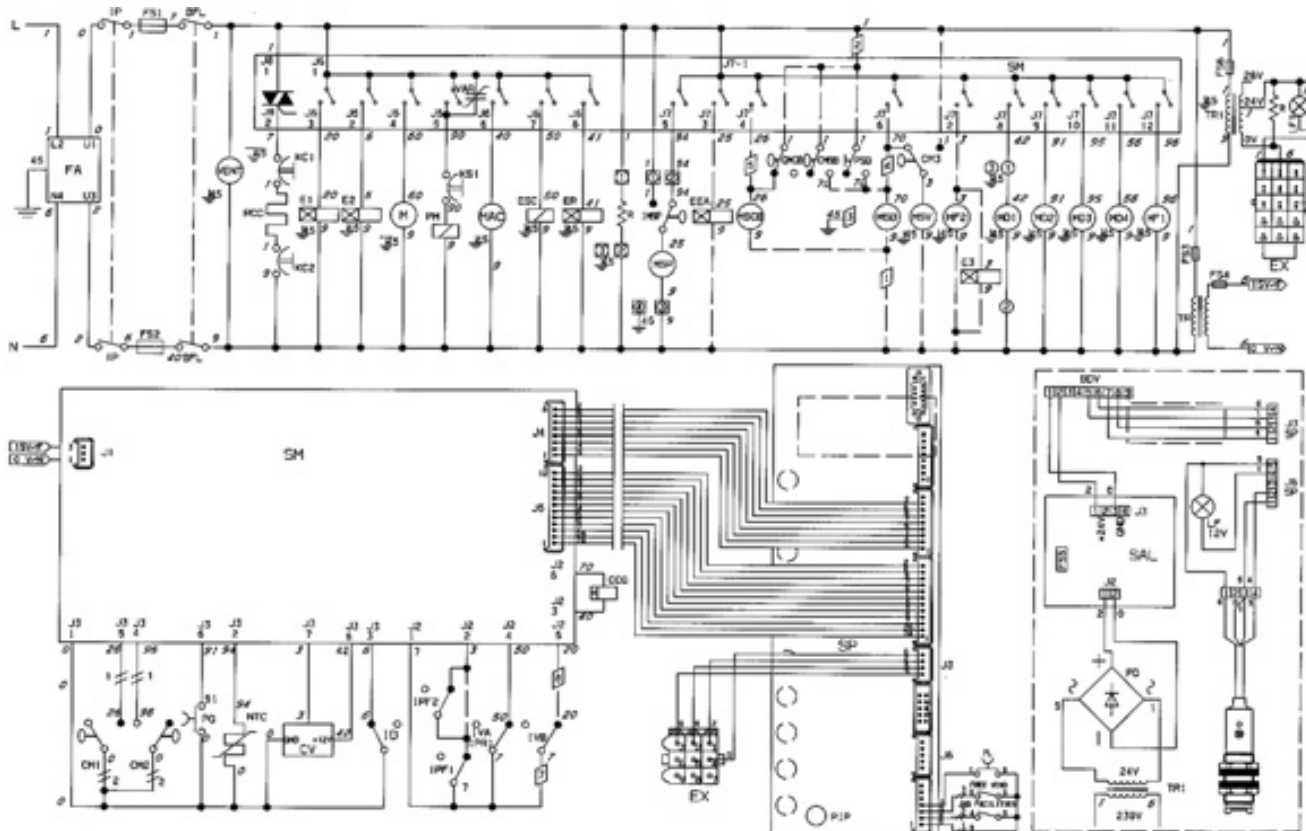
# 11 - TROUBLE-SHOOTING

| <b>Problem</b><br>(And/or indication on the display)                                                | <b>Possible cause</b>                                                                                                                                                                                                        | <b>Solution</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|-----------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>The machine does not go into the boiler heating phase, remaining in the "installation" phase</b> | No water flow from the mains or insufficient pressure (5-85 N/cm <sup>2</sup> )<br>The air-break microswitch is faulty<br>Water inlet solenoid valve locked by the overflow tube and activated by the relevant relay         | Check the presence of one or more of situations indicated and once identified the cause do as follows:<br>Short-circuit the microswitch to check it's functioning<br>Unlock the water inlet valve, undoing the threaded ring and emptying the overflow tube<br>Check for 230 V AC voltage at the solenoid valve power supply ends<br>Check the activation of relay K 12                                                                                                                                                                                                                                                                                      |
| <b>The display indicates the message "No coffee"</b>                                                | The grinder motor is locked because there is no coffee<br>The grinder wheels are locked because of foreign matter in the coffee<br>Grinder motor overheating device triggered<br>The coffee container shutter was not opened | When an espresso coffee selection is made the grinder is activated, conveying coffee to the doser device, the motor lock is activated by the microswitch, which is triggered when the set dose is reached. If such microswitch is not triggered, the system disables all espresso coffee selections, indicating the message "No coffee" on the display. After identifying the cause:<br>Check the wear of the brushes<br>Free the grinder wheels with the utmost care, as blocked wheels would have triggered the overheating protection, which is self-resetting. Open the shutter, add coffee                                                              |
| <b>The display indicates the message "Coffee release failure"</b>                                   | Failure to the release magnet<br>Failure to the coffee dose microswitch<br>Failure to relay K02                                                                                                                              | After grinding and during the attempt of releasing the ground coffee, the doser device plate triggers a microswitch that signals the coffee release<br>If such microswitch is not triggered, there could have been two causes:<br>Failure to the release magnet or overheating protection triggered (resetting is automatic, and after approximately 5 minutes it is reactivated, but the cause of such trigger must be identified).<br>Failure to the microswitch: replace with an identical one designed for the Brio, in the event of using a microswitch with different characteristics considerable discrepancies in the ground coffee doses may occur. |
| <b>The display indicates the message "Boiler failure"</b>                                           | The boiler does not heat<br>Dry operation protection system triggered.                                                                                                                                                       | The machine is locked if after 10 minutes heating the set temperature is not reached.<br>Check the correct operation of the heating element, the thermostat, the probe, and of the actuation triac.                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>The display indicates the message "No cups"</b>                                                  | No cups in the dispenser<br>Microswitch failure<br>The cup column does not rotate                                                                                                                                            | If no cups were loaded when starting the machine, the column rotation ratiomotor is activated to search for a full column and if no cups are found within a 60 sec "time-out", indicated by the specific microswitch, the machine is locked. Excluding the fact of a real lack of cups, the correct microswitch functioning must be checked and in the event of failure they must be replaced with identical characteristic microswitches.<br>In the event of locked ratiomotor, check for the correct actuation of relays K21 and K23.                                                                                                                      |
| <b>The display indicates the message "Espresso unit"</b>                                            | The espresso unit failed to reposition.<br>Failure to the lower dead centre positioning microswitch.<br>Failure to relay K 03                                                                                                | Check the correct operation of the lower dead centre positioning microswitch.<br>Check that the unit stops correctly at the upper dead centre (monitored via SW). If not replace the EPROM (programming may be necessary).                                                                                                                                                                                                                                                                                                                                                                                                                                   |

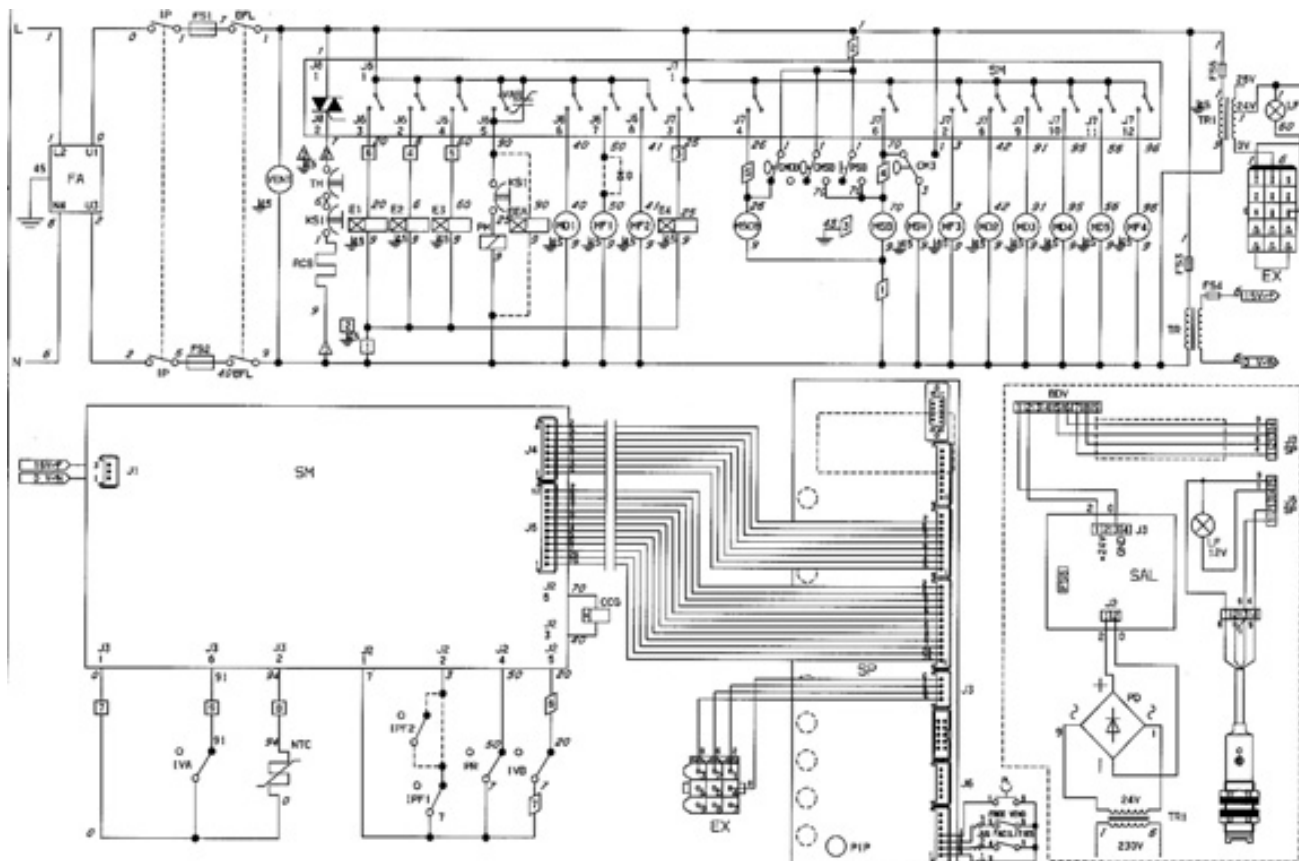
|                                                                                                |                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>The display indicates the message</b><br><b>"Volumetric counter"</b><br><b>(flow-meter)</b> | The coffee dose is not reached within 60 sec.                                                                                                                                                             | The water amount for both espresso coffee and instant drink selections is ensured by a volumetric counter; with the water flow a wheel rotates and through sensors sends a number of pulses corresponding to the water dose programmed in the SW. If such dose is not reached within 60 sec. it means that there is a problem:<br>Check for the correct functioning of the volumetric counter; there must be 5 V AC on the terminals during the counter operation.<br>Check that coffee is not ground too fine and the dose excessive.<br>Check for clogging in the coffee filters. |
| <b>The display indicates the message</b><br><b>"Air-break failure"</b>                         | No water from the mains.<br>Faulty air-break microswitch<br>Failure to the float actuation system.                                                                                                        | If in the period taken to make 6 selections with any dose the microswitch controlled by the air-break float is not triggered<br>The vending machine is locked for air-break failure.<br>The malfunction could occur for lack of water from the mains, or because of a failure to the float microswitch system.<br>Replace the microswitch with one having the same characteristics, otherwise other malfunctions may occur.                                                                                                                                                         |
| <b>The display indicates the message</b><br><b>"RAM data"</b>                                  | Wrong RAM data, which must be retrieved by initialising the EPROM.                                                                                                                                        | Enter into the installation procedure and initialise the software; if the failure persists replace the CPU.                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>The display indicates the message</b><br><b>"Water failure"</b>                             | Models with water supply from the mains:<br>If the air-break microswitch is closed for more than a minute.<br>Models with water supply from an internal tank:<br>If the water level is less than 300 c.c. | Check the water inlet solenoid valve.<br>Check for the correct actuation of relay K 12.<br>Check the air-break microswitch.<br>Check the tank float microswitch.                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>The coffee lacks body and cream and is dispensed too quickly</b>                            | Excessively coarse grinding.<br>Insufficient ground coffee dose.                                                                                                                                          | Inspect the grade of grinding, keeping in mind that it takes between 15 and 20 seconds to dispense optimum espresso coffee.<br>A shorter time means that the grade of grinding is too coarse.<br>With wear the grinding wheels must be adjusted regularly.<br>Check the coffee dose, weighing it at least for 5 consecutive doses; the average weight must be between 6.5 and 7 grams.                                                                                                                                                                                              |
| <b>Coffee is dispensed too slowly and it tastes burnt</b>                                      | Excessive coffee dose.<br>Grinding too fine.<br>Faulty pump by-pass.<br>Clogged coffee filters.                                                                                                           | Inspect the grade of grinding, keeping in mind that it takes between 15 and 20 seconds to dispense optimum espresso coffee.<br>A longer time means that the grade of grinding is too fine.<br>Adjust the grinding wheels.<br>Check the coffee dose, weighing it at least for 5 consecutive doses; the average weight must be between 6.5 and 7 grams.<br>The by-pass is set from the factory to trigger at 12 bars.<br>Lower settings will lengthen the dispensing time and make less cream.<br>Replace the coffee filters.                                                         |
| <b>The mixers clog up</b>                                                                      | The whipper failed to rotate.<br>Powder removal drawer full.<br>Insufficient water to powder ratio.                                                                                                       | Check for the motor overheating protection trigger, if necessary check the cause of such trigger.<br>Empty the powder removal drawer.<br>Check / adjust the water to powder ratio.                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>The display indicates the message</b><br><b>"Coin mech. failure"</b>                        | In the case of serial communication kit, if there is no communication for more than 30 sec.                                                                                                               | Check for correct connections, correct insertion of the protocol card, and SW settings.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>The display indicates the message</b><br><b>"Water leak"</b>                                | If water is drawn from the air-break without a selection being made (or wash cycle) the SW stops the mains inlet solenoid valve to avoid any flooding.                                                    | Such control serves the purpose of preventing water leaks in the hydraulic system that could quickly fill the liquid waste container; as there is no HW control of such situation, carefully check the hydraulic system to find any leaks.                                                                                                                                                                                                                                                                                                                                          |

# 13 - WIRING DIAGRAMS

## Espresso version wiring diagram



## Instant version wiring diagram



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

### **Outline and instructions for use**

#### **Notes: What is indicated by the Ec Directive**

Directives **EEC 93/43 and 96/3** concern 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 a system used to analyse any potential risks in the manufacturing and distribution cycle of food product and to identify 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 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 (Page 25, 26, 27)**

- 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 checklist 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.

## DAILY CLEANING AND HYGIENE

(Expected time 3 min. 30 sec.)



FIG. 1



FIG. 3

Open the door and disconnect the machine from the power supply (FIG 1).

Remove the liquid collection container, empty it and rinse it thoroughly (FIG 2).

Empty the grounds container and rinse it thoroughly (Fig. 4).

Remove the powder dispensing spouts and clean thoroughly. (FIG 3).

If **necessary**, remove the containers, empty them completely and clean thoroughly.

Remove the coffee unit, clean and rinse with a fresh clean sponge damp with hot water.(FIG 5).

Remove the sugar-dispensing spout and clean thoroughly (FIG 6).

Remove and clean the cup shift (FIG 6 & 8).

Remove and clean the dispensing spout assembly.

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

Close the door and make some test selections.

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

FIG. 2

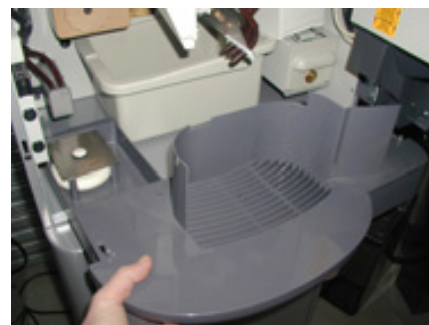


FIG. 4



FIG. 5

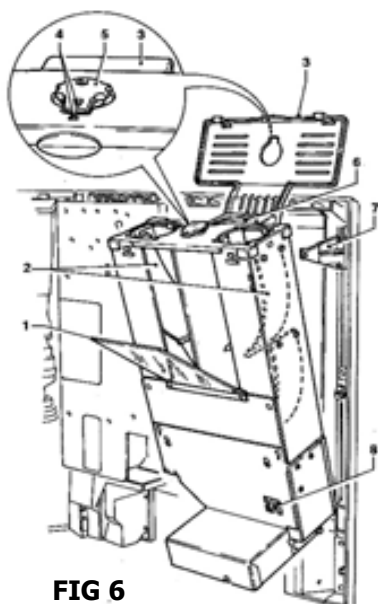
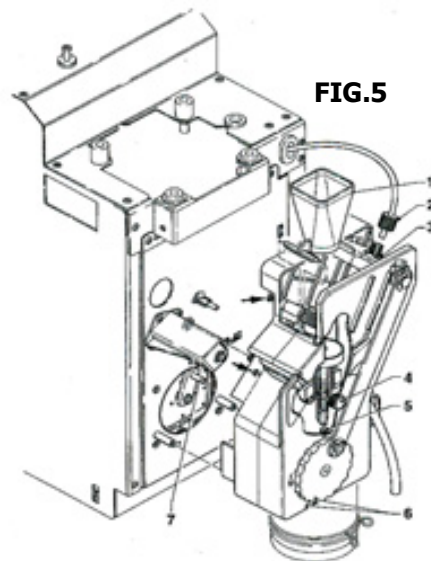


FIG 6

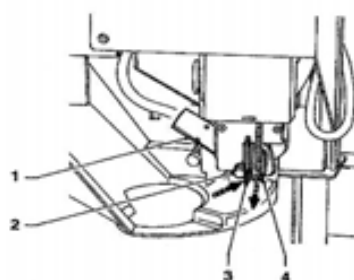


FIG. 7

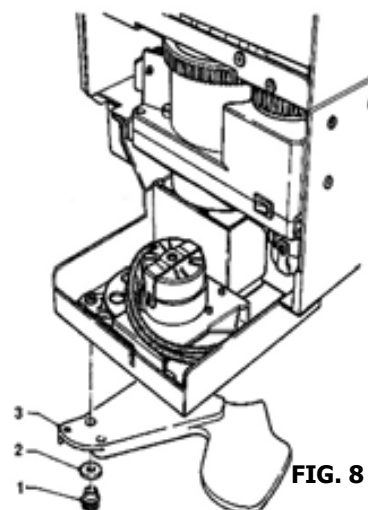
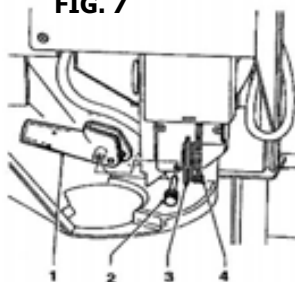


FIG. 8

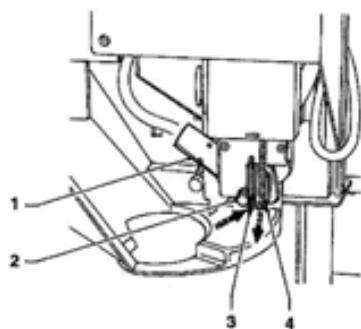
## WEEKLY CLEANING AND HYGIENE

**(Expected time 6 min.)**

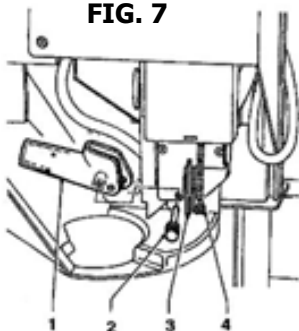


**FIG. 1**

**FIG. 3**

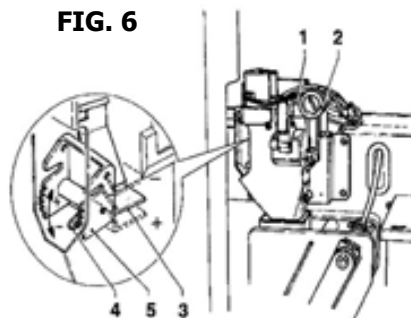


**FIG. 7**



Open the door and disconnect the machine from the power supply (FIG 1).  
Remove the powder dispensing spouts and clean thoroughly using specific hygiene products (FIG 3).  
Remove the containers, empty them completely and clean thoroughly (FIG. 3).  
Remove the liquid collection container (Fig. 2) and the grounds container, empty and clean them with a sponge damp with hot water (FIG 4).  
Empty any residue from the coffee grinder and doser assembly, clean thoroughly and rinse with a fresh clean sponge damp with hot water.  
Remove the coffee dispensing assembly and clean thoroughly (FIG. 6).  
Remove the sugar-dispensing spout and clean thoroughly (FIG. 7).  
Remove and clean the cup shift (FIG 5).  
Remove and clean the dispensing spout assembly.  
Disassemble completely the mixers and clean thoroughly (FIG. 8).  
Empty the powder collection containers, located within the steam suction system, and disinfect (FIG. 8).  
Reassemble all parts, taking care not to touch with your hands any parts that come into contact with food.  
Close the door and make some test selections.  
Carry out a mixer automatic wash cycle according to the pre-set procedures. Enter the operations carried out in the log.

**FIG. 6**



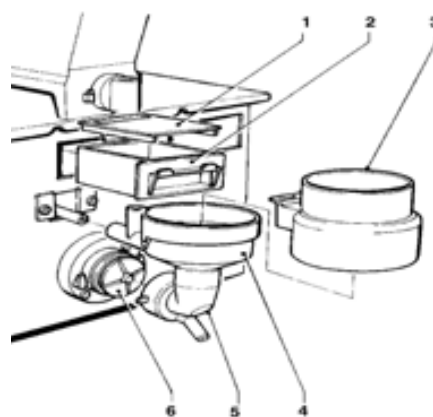
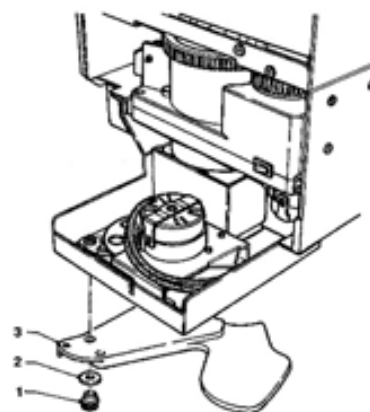
**FIG. 2**



**FIG. 4**



**FIG. 5**

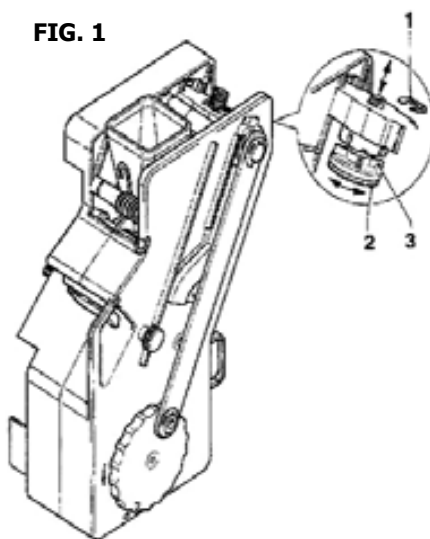


**FIG. 8**

## MONTHLY CLEANING AND HYGIENE (or every 5000 selections)

**Expected time 14 min. (in addition to the time taken for regenerating the filter)**

**FIG. 1**



In addition to the weekly operations, also the following must be carried out:

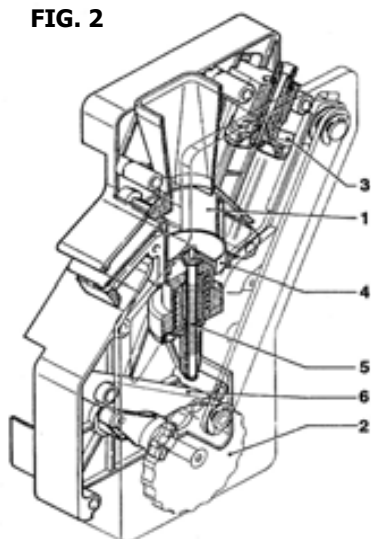
Remove the brewer unit from the machine and disassemble, then clean all residue and rinse thoroughly with hot water, check the filters for clogging and if necessary descale or replace them.

Reassemble all parts and slightly lubricate the piston o-rings using food-safe grease or replace them if even slightly damaged. (FIG. 1-2-3)

**NB: Any filter replacement or disassembly operations must be carried out at the workshop, therefore it is advisable to replace the unit with one already serviced.**

Disassemble the mixers completely, clean and wash using sanitising products, especially the powder removal areas, disassemble completely the wheel and check the state of the seal (Fig. 6), when reassembling do not touch with bare hands (FIG. 5).

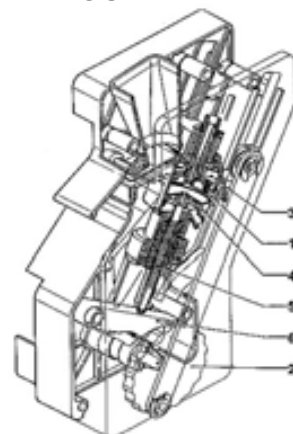
**FIG. 2**



Regenerate the water softener (if installed as optional feature) using the special salt solution, even if the softener efficiency test is still positive (FIG. 4). The softener filter can be contaminated easily and therefore regeneration ensures maximum hygiene. Check and rinse (if necessary replace) the mechanical filter at the water inlet of the air-break (FIG. 6).

During regeneration, it is advisable to completely sanitise the hydraulic system and the water inlet solenoid valves (FIG. 7). Clean and sanitise the entire unit, including the air-break (FIG. 6).

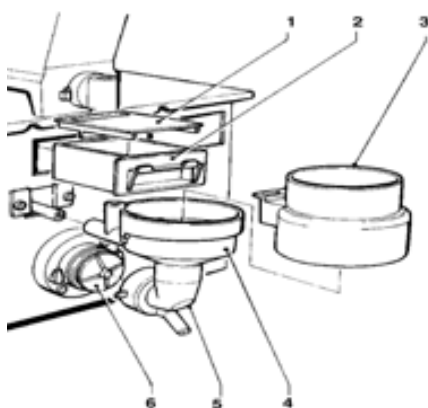
**FIG.3**



**FIG.4**



**FIG,5**



Enter the operations carried out in the HACCP hygiene program log.

**FIG 6**



**FIG 7**

