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GLOBAL VENDING

**AFTER-SALES SERVICE**



# SERVICE MANUAL

## ESPRESSO COFFEE BREWER UNITS

**" Z – 3000 "**

**N&WGLOBAL VENDING SPA – SERVICE MANUAL –H&C FUNCTIONAL UNITS**

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# ESPRESSO COFFEE BREWER UNITS Z 3000

## ESPRESSO

The espresso coffee brewer unit Z3000 is practically an evolution of the Z 2000 model, but with radical changes made to allow also the development of the units with variable chamber and operation with coffee capsules.

The outside shapes were changed, and in the variable chamber version also the upper filter and the brewing chamber. In addition the unit was designed for installation in the machine leaning either to the left or to the right, allowing more option for present and future developments. The operation concept of the base Z3000 unit is very similar to the old model.

The brewer unit comprises:

- 1) **RIGHT AND LEFT SUPPORT**
- 2) **COMPLETE UPPER PISTON**
- 3) **BREWING CHAMBER ASSEMBLY**
- 4) **SIDE SLIDES**
- 5) **ONE WAY LEVER**
- 6) **ROTATING LEVER**
- 7) **OSCILLATING LEVER FOR EJECTING THE USED CAPSULE**
- 8) **RODS**

Two handles are located on the two external sides for controlling the rods, connected to each other by a steel pin. And similarly to the previous model, a brewing chamber heating system is fitted for some specific applications. The new system differs slightly from the previous one, and its shape was changed to be able to adapt it to different models.

**FIG. 1**  
Perspective view  
from ratiomotor's  
connection side



**FIG. 2**  
BREWER UNIT COMPLETELY  
DISASSEMBLED



# DESCRIPTION OF BREWER UNIT OPERATION

In an espresso coffee brewer unit for automatic vending machines, in order to obtain coffee with taste and quality parameters that are as much as possible similar (if not better) than the drinks obtained with a machine used in the bar, as well as the intrinsic characteristics of the brewer unit, there must be some objective conditions to be met, and namely:

- 1) **THE COFFEE QUALITY AND AMOUNT AND ITS GRADE OF GRINDING**
- 2) **THE TEMPERATURE AND CHARACTERISTICS OF THE BOILER**
- 3) **THE BREWING AND DISPENSING TIME**
- 4) **THE WATER AMOUNT**

## 1) THE COFFEE QUALITY AND AMOUNT AND ITS GRADE OF GRINDING:

Coffee quality and amount are ensured by the grinder and doser assembly fitted to the unit, capable of preparing coffee with optimum grade of grinding. The Z3000 unit can function with a dose of 5.5 to 9 g of ground coffee; in any case to obtain an optimum espresso coffee a dose of 6.5 to 7 g is recommended.

## 2) THE TEMPERATURE AND CHARACTERISTICS OF THE BOILER :

The boiler is adjusted to an optimum setting at the factory; however, in specific climate conditions or height from sea level, the setting can be adjusted through the software programming, keeping in mind that the boiler is set to approximately **94°C** by default and that it is advisable to carry out the testing after stabilising the temperature, achieved after two or three on/off cycles.

The boiler must be made of specific material and certified as being food-safe; Necta uses a special bronze alloy that is able to maintain the temperature constant, avoiding any temperature fluctuations and ensuring that the characteristics of the water are not altered.

## 3) THE BREWING AND DISPENSING TIME :

The brewing and dispensing time depend on the water amount settings, the coffee dose and the grade of grinding. The optimum brewing time is between 15 and 18 seconds, which is a consequence of the different parameters and cannot be set directly.

The pre-brewing time is set to 1 second by default, and it refers to the time between opening the solenoid valve and starting the pump. The brewing time can be increased (within a certain range), keeping in mind that an excessive increase does not lead to improved quality and it lengthens the total dispensing time.

## 4) THE WATER AMOUNT :

For an Italian style "**Espresso**" coffee 40 c.c. must be set with a total amount in the cup of about 35 c.c., doses can vary for long coffee selections in other countries, but in this case the coffee **DOES NOT** have the characteristics of a typical "**Espresso coffee**".

## OPERATING CYCLE FOR DISPENSING ESPRESSO COFFEE

When in stand-by, the unit is in the open position and ready to receive ground coffee (see next page).

After grinding the set dose, coffee is released into the brewing chamber, the unit's ratiomotor is activated and by means of the special mechanism the brewing chamber is oscillated by approximately  $30^\circ$  and at the same time the upper filter piston, connected to the handle by means of a steel connecting rod, is lowered and inserted into the brewing chamber, pressing the ground coffee (the lower filter-holder piston is fitted with an elastic system with compensating spring that permits such situation).

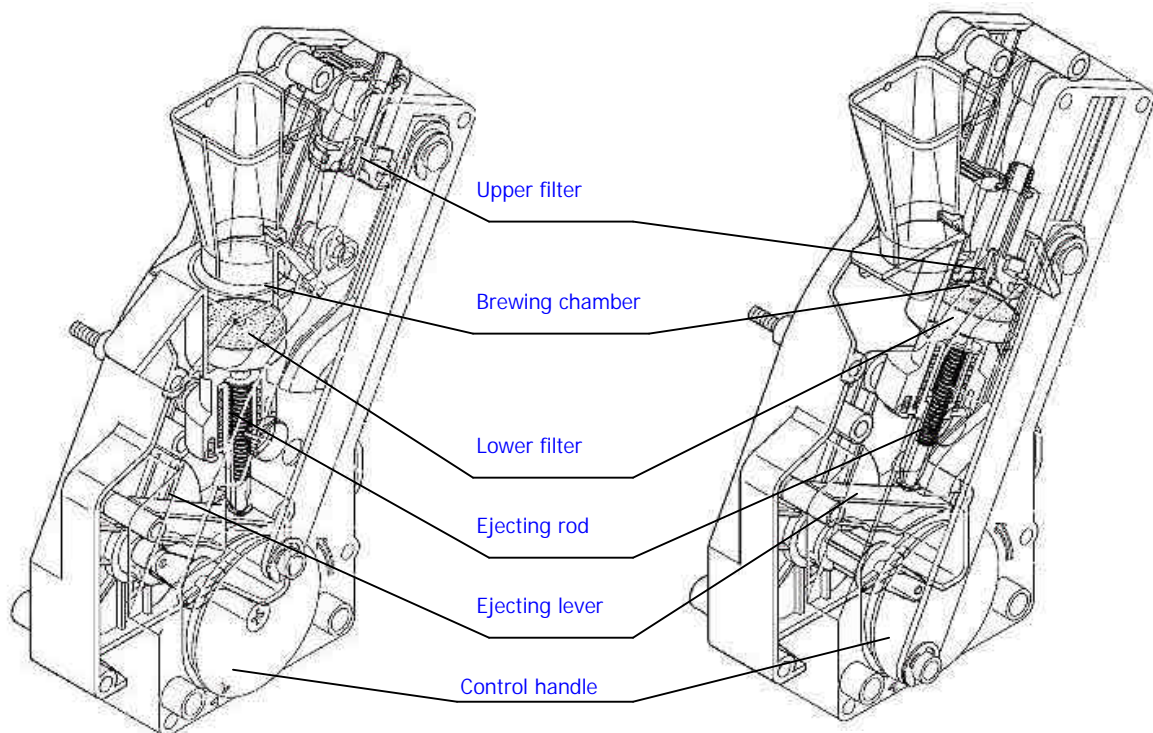
At this point the 3-way solenoid valve opens and a slight layer of hot water wets the coffee dose, preparing for brewing, after approximately one second (adjustable) the pump starts.

The water inlet pressure (12 bar) causes an internal spring (compensation spring) located under the piston inside the brewing chamber to give; this forms a water "cushion" on the top layer of the coffee dose, pressing against it improving brewing and causing the water to filter through the coffee powder perfectly evenly.

After the pump stops (during a 3 second pause), the spring returns into the initial position "squeezing" the spent coffee dose, then the solenoid valve third way opens, discharging the excess water.

Still in this phase, the piston inside the brewing chamber is lifted and frees an opening, thus releasing the internal pressure; this way the so unattractive end dripping, typical of the units made by competitors, is eliminated (patented system).

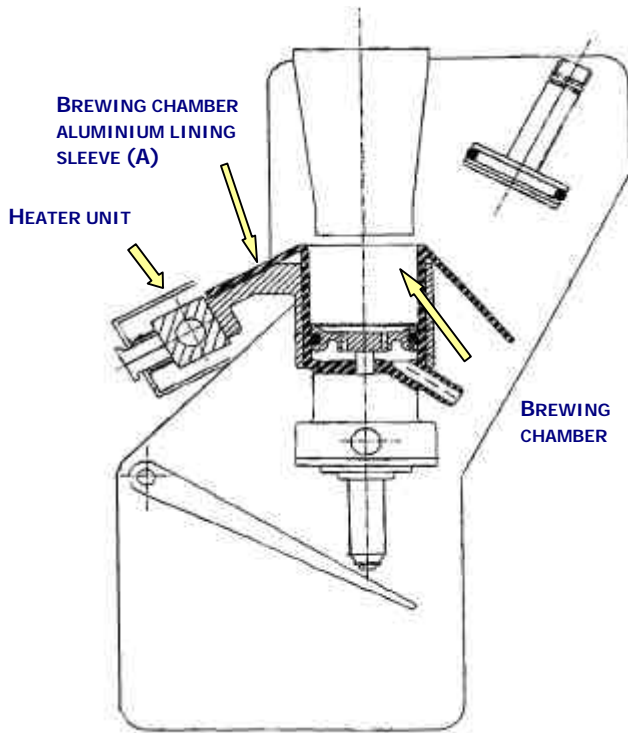
At this point, the ratiomotor is activated and the filter piston opens and moves to the upper dead centre; at the same time the brewing chamber returns to the initial position and, during this phase, a metal rod connected to the piston inside the brewing chamber is pushed by means of a lever causing the filter piston to rise until ejecting the spent coffee dose, which is pushed and dropped by an upper scraper; then a return spring lowers the piston to the initial position, preparing the unit ready for the next selection.



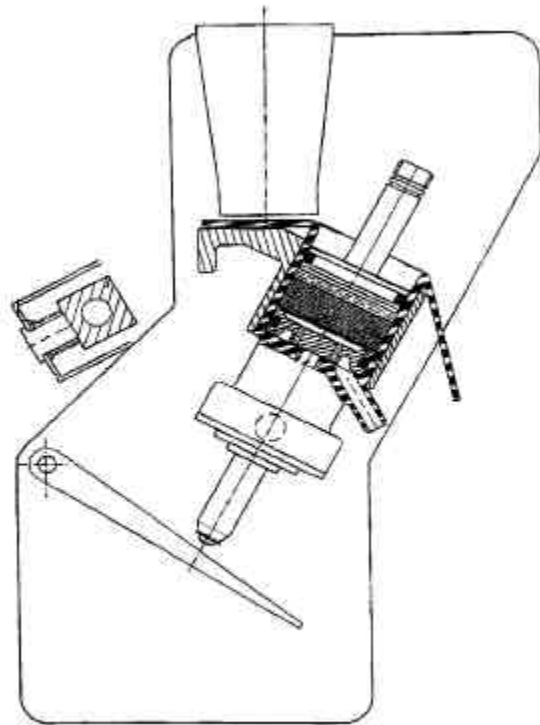
STANDBY AND GROUND COFFEE LOADING PHASE

DOSE COMPRESSION AND BREWING PHASE

## OPERATION DIAGRAM OF HEATING SYSTEM FOR FIRST COFFEE SELECTION



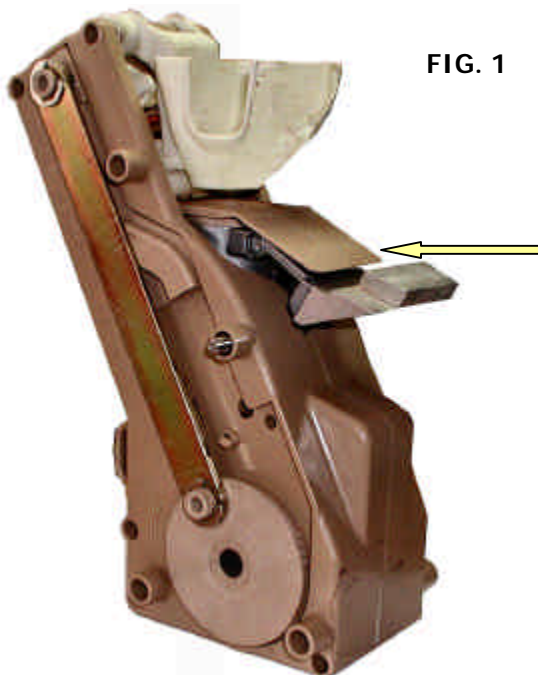
**STANDBY POSITION READY FOR COFFEE LOADING AND TOUCHING THE HEATER SYSTEM**



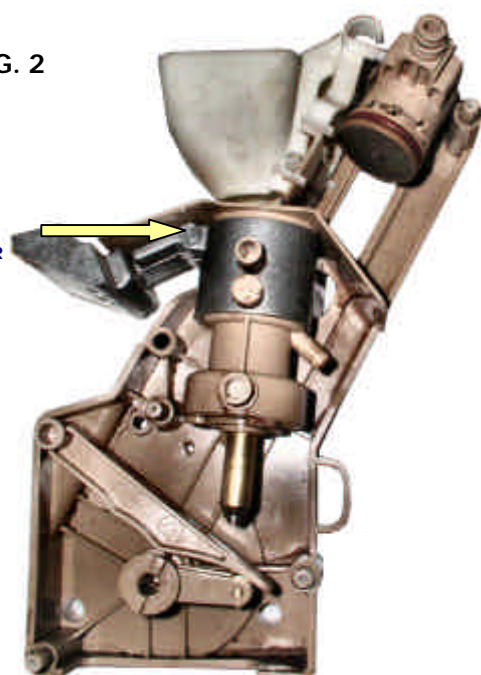
**BREWING AND DISPENSING POSITION, DETACHED FROM THE HEATER UNIT**

The heater system (standard feature in some versions and supplied as a Kit in others) is based on the use of a **230 V AC - PTC** type heating element with an absorption of approximately **25 W** at start-up and **5 W** under running conditions. During the machine standby, the brewing chamber, which is lined with a die-cast aluminium sleeve (**A**) is brought into contact with the heating element positioned on the wall of the boiler assembly; the mechanical contact allows maintenance of the optimum temperature in the brewing chamber. During the brewing and dispensing stage, the aluminium sleeve is detached from the heating element; when the unit is brought back into standby position the thermal contact is resumed, again maintaining the correct temperature.

**NB:** The shape of the part in contact with the heating element may vary according to the machine in which the brewer unit is installed.



**FIG. 1**



**FIG. 2**

**BREWING CHAMBER ALUMINIUM LINING SLEEVE (A)**

# DISASSEMBLY PROCEDURE FOR PERIODIC MAINTENANCE

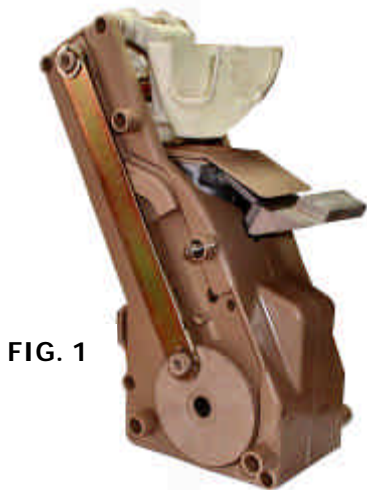


FIG. 1

Remove the brewer unit from the machine and clean all coffee residue

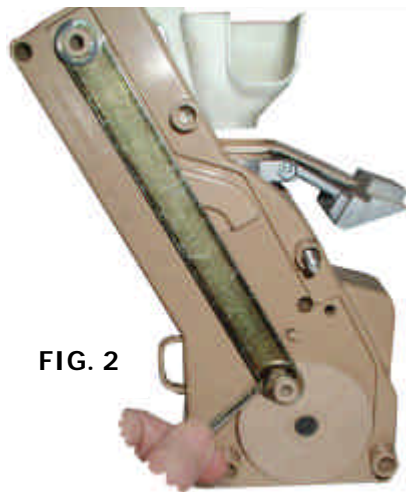


FIG. 2

Release the seeger rings from the connecting rods



FIG. 3

Slide out the rods and lay them aside. Release the other seeger rings that secure the diverting slide



FIG. 4



FIG. 5

Remove the diverting levers (FIG. 4- FIG. 5)



FIG. 6

Using an Allen key, undo the central screw of the external handle

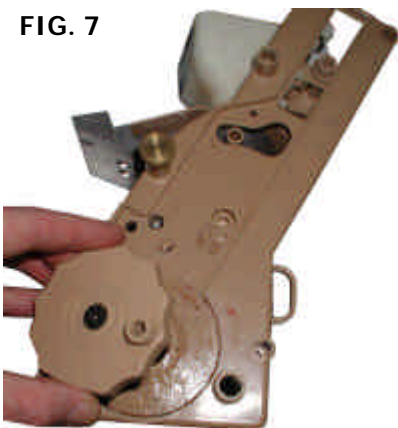


FIG. 7

Remove the external handle wheel

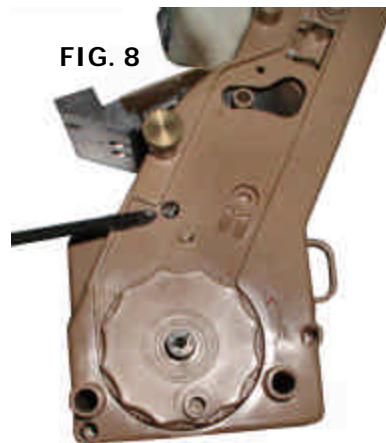


FIG. 8

Undo all screws that secure the two half shells and open the unit (FIG.8 - FIG. 9)



FIG. 9

FIG. 10

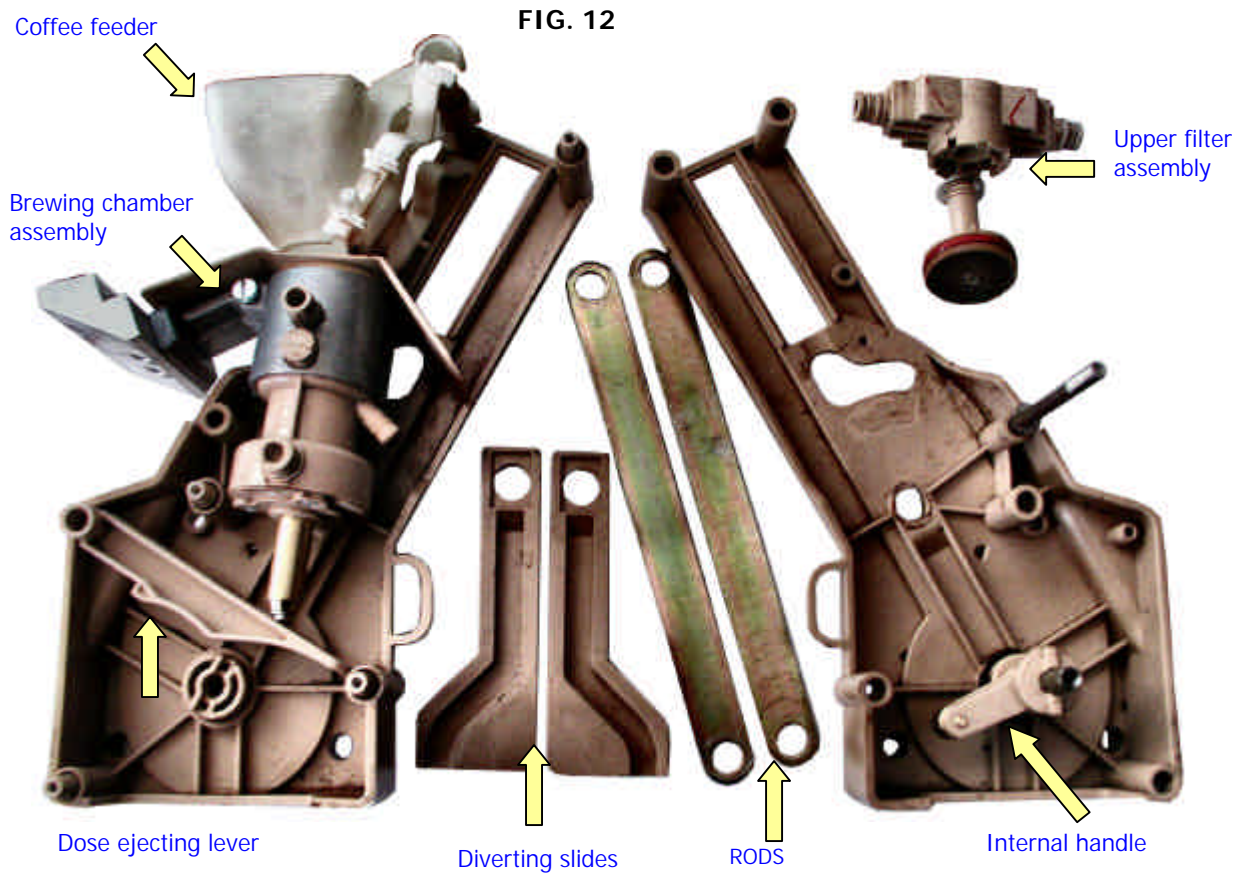


FIG. 11



OPEN THE TWO HALF SHELLS,  
REMOVING ALL INTERNAL  
COMPONENTS

FIG. 12



## SCHEDULED MAINTENANCE OPERATIONS

The brewer unit Z2000 M is very reliable; however, in order to continue to have the initial features, some basic scheduled maintenance is necessary.

The number of cycles to reach before maintenance is only a guideline, as they depend on the type of coffee and its grade of grinding.

### 1) EVERY 2000 COFFEE DISPENSED (OR AFTER ONE MONTH OF OPERATION) REPLACE OR CLEAN THE UPPER FILTER (TOTAL EXPECTED TIME FOR THE OPERATION IS 3 MINUTES)



FIG. 1

Remove the brewer unit from the machine, disconnecting the hydraulic connections and undoing the knurled knob.



FIG. 2

Remove the seeger ring located at the base of the hydraulic coupler. Slide out the entire lower filter until removing it completely



FIG. 3

Using a Phillip's screwdriver, undo the central screw and disassemble the filter



FIG. 5

Remove the O-ring, making sure not to damage it

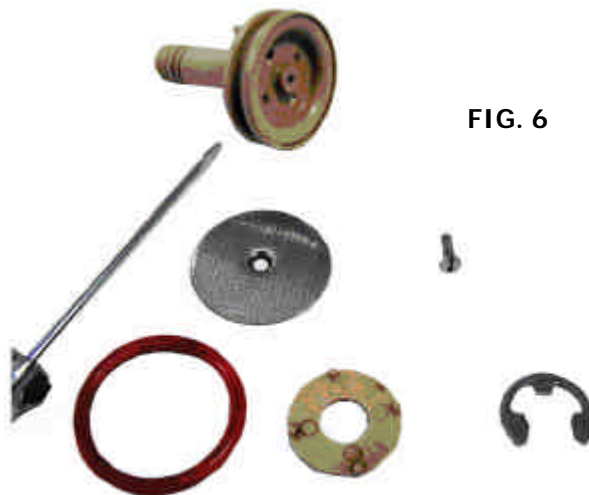


FIG. 6

Remove the filter fastening screw and remove it completely.

Remove the spacer disk, clean all thoroughly, descale the filter or replace with a new one.

Reassemble all parts, if necessary replace the silicone O-ring, slightly lubricating it with special food-safe grease.



**2) EVERY 6000 COFFEE DISPENSED (OR AFTER 6 MONTHS OF OPERATION)**  
**PLANNED OPERATIONS: REPLACE OR CLEAN THE UPPER AND LOWER FILTER, CLEAN THE VENT HOLE**  
**( TOTAL EXPECTED TIME FOR THE OPERATION IS 10 MINUTES )**



**Fig. 1**

Place the brewer unit on a surface and rotate the handle to the upper dead centre. Remove the "seeger" rings stopping the connecting rod



**Fig. 2**

Completely remove the upper steel connecting rod



**Fig. 3**

Completely undo the hexagonal head screw (using a special Allen key)



**Fig. 4**

Slide out the handle wheel and remove it from its seat



**Fig. 5**

Undo all screws (7 pcs) of the upper half-shell and open the two half-shells to access the internal brewing chamber  
 Fig. 5 - 6



**Fig. 6**



**Fig. 7**

Remove the brewing chamber assembly and slide out the seeger ring in the lower part, freeing the lower piston



**Fig. 8**

Remove the lower piston, undo the filter fastening screw and remove the filter, remove the O-ring ( Fig. 8 - 9)  
 Descale the filter, or if necessary replace with a new one.



**Fig. 9**

Clean and lubricate the O-ring (if damaged, replace). Clean and if necessary descale the internal chamber. Reassemble all parts proceeding in the reverse order.

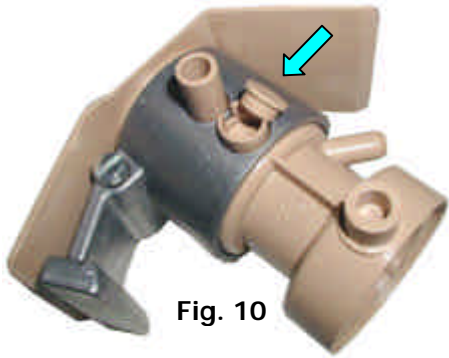


Fig. 10

Remove the small on the body of the brewing chamber, uncovering a small hole. Such hole communicates with the lower portion of the brewing chamber

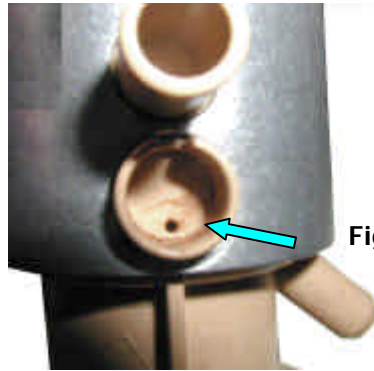


Fig. 11

Using a 0.5 mm bit free from any encrustations. Clean the internal side of the body and of the brewing chamber



Fig. 12

Reassemble all parts, making sure to carry out the operations in the reverse order to disassembly; reassemble the upper half-shell

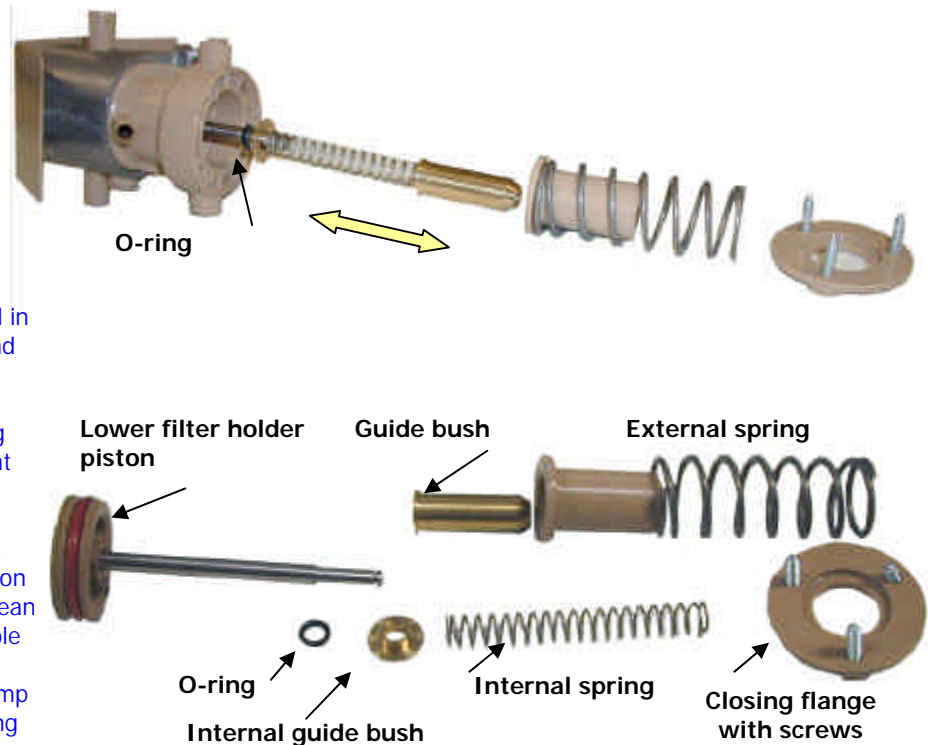
**3) EVERY YEAR (REGARDLESS OF THE NUMBER OF SELECTIONS MADE)  
 PLANNED OPERATIONS: REPLACE OR CLEAN THE UPPER AND LOWER FILTER, DISASSEMBLING THE BREWING CHAMBER AND COMPLETELY DESCALING AND LUBRICATING.  
 ( EXPECTED TIME FOR THE OPERATION IS 14 MINUTES)**



Fig. 13

In addition to the operations scheduled in the previous point, completely clean and ensure that all brewing chamber components are in working order. Remove the lower cover of the brewing chamber, undoing the three screws that keep it closed, making sure to hold the springs inside (it is advisable to use a holding clamp). Remove all components, paying attention to their position. Replace the O-ring, clean all parts, lubricate lightly and reassemble everything proceeding in the reverse order. When reassembling, use the clamp to compact the springs before tightening the screws.

**EXPLODED VIEW OF BREWING CHAMBER COMPONENTS**



**Reassemble all parts, reassemble completely the brewing chamber, refit onto the machine and make some test selections.**