Coffee Machine

GAGGIA BESANA

Service
Service
Service

ServiceManual

Rev. 00 MAY 2019

TYPE	12NC	DESCRIPTION
RI8180/01	886818001010	GAGGIA BESANA 230 WE

Published by Philips

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GAGGIA®

GAGGIA BESANA

Technical specification

Power supply and output:	230V ~ 50Hz 1400W
Power consumption:	During heating phase- approx. 5.6 A
Boiler: Stainless steel	230V ~ 1300W for coffee, hot water and steam dispensing
Safety system:	2 thermostats at 190°C self resetting
Temperature monitoring:	(NTC) variable resistor sensor - transmits the value to the electronic card
Automatic dosage:	Dose adjustment controlled by the electronic system
Gear motor:	2 rotation directions; power supply 24VC
Coffee grinder	Direct current motor with flat ceramic grinder blades
Pump:	Ulka Type EP5/FMGW 230V, 50 Hz
Overpressure valve:	Opening at approx. 16-18 bar
Water circuit filling time:	Approx. 15 sec Max. on first filling cycle
Heating time:	Approx. 45 sec.
Grinding time:	Approx. 8-10 sec.
Auto shut off time:	30 min.
Adjustable spout height:	Up to 95 mm
Housing material	Thermoplastic material
Size (w x h x d)	295 x 325 x 385 mm
Weight	8,6 kg
Power Cord length	800 mm
Cup size	Up to 95 mm
Water tank	1.0 litres - Removable type
Water fileter	Brita Filter 12NC-996530010484
Coffee bean hopper capacity	170 g
Coffee grounds drawer capacity	8 pucks
Energy Efficiency Label	B
Energy saving mode consumption	< 1 Wh
Pump pressure	15 bar
Boiler	Stainless steel type
Safety devices	Thermal fuse
Nominal voltage - Power rating – Power supply	Data stored on the below label placed inside the service door
Serial Number TU901721042631	TU90= product + production location - 1721 = year & Production week - 042631 = unique following number

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CHAPTER 1

INTRODUCTION

1.1. Specific tools and equipment

As well as the standard equipment, the following is required:

12NC	Description	Notes
-	Flathead screwdriver	# 0, # 2
-	Torx screwdriver	(T10,T20)
-	Cutter	
-	Cable tie tightening tool	
-	Pliers for Oetiker clamps	
-	Digital Thermometer	Type K (accuracy for temperature of 0,05 % or ± 0,3°C)
-	Temperature probe	80PK-22 (80AK-A Thermocouple adapter required)
-	Scale	KERN EMB 500-1 or comparable device with a base accuracy of 0,05 % or ± 0,5 g
-	Power meter	Voltcraft EnergyCheck 3000 or comparable device with a base accuracy of 1 % or ± 5W
-	Stopwatch	Basic model
996530009845	Serkit	Tool needed for programming with our service tool

1.2. Maintenance Products

12NC Code	Material	Description
-	Thermal paste	Heat resistance > 200°C
996530067222	Descaler	"ACC SAE DECALCIFIER 5 L 1 UNIT"
132253695601	Jar of Grease	"PARALIQ GB 363"
996530045784	Silicone grease	"ACC TUBE FIN FOOD GREASE 2 400 ML"

1.3. Safety warnings

Please, read the Service manual of the machine before starting any maintenance.
Operation, maintenance and/or repair of this device has to be carried out only by qualified persons, trained for work at or with electric devices.

The technicians to operate under safety conditions, needs to:
1. Use personal safety devices;
2. Disconnect the appliance from the power mains before repairing;
3. Before and after repair, it is recommended to perform dielectric strength tests (This domestic appliance is rated as insulation class 1).

During the machine disassembly the operator has to pay attention to hot and under pressure parts.
All parts involved can be find in the hydraulic circuit below schema.
The machine hydraulic circuit can reach maximum pressure of 16/18 bar.

When the machine arrives at the Service Center in descaling mode interrupted, or making Descaling , take EXTREME CARE to avoid any unintentional contacts with the descaler.

After the product has been repaired, it should function properly and has to meet the safety requirements and legal regulations as officially laid down at this moment.

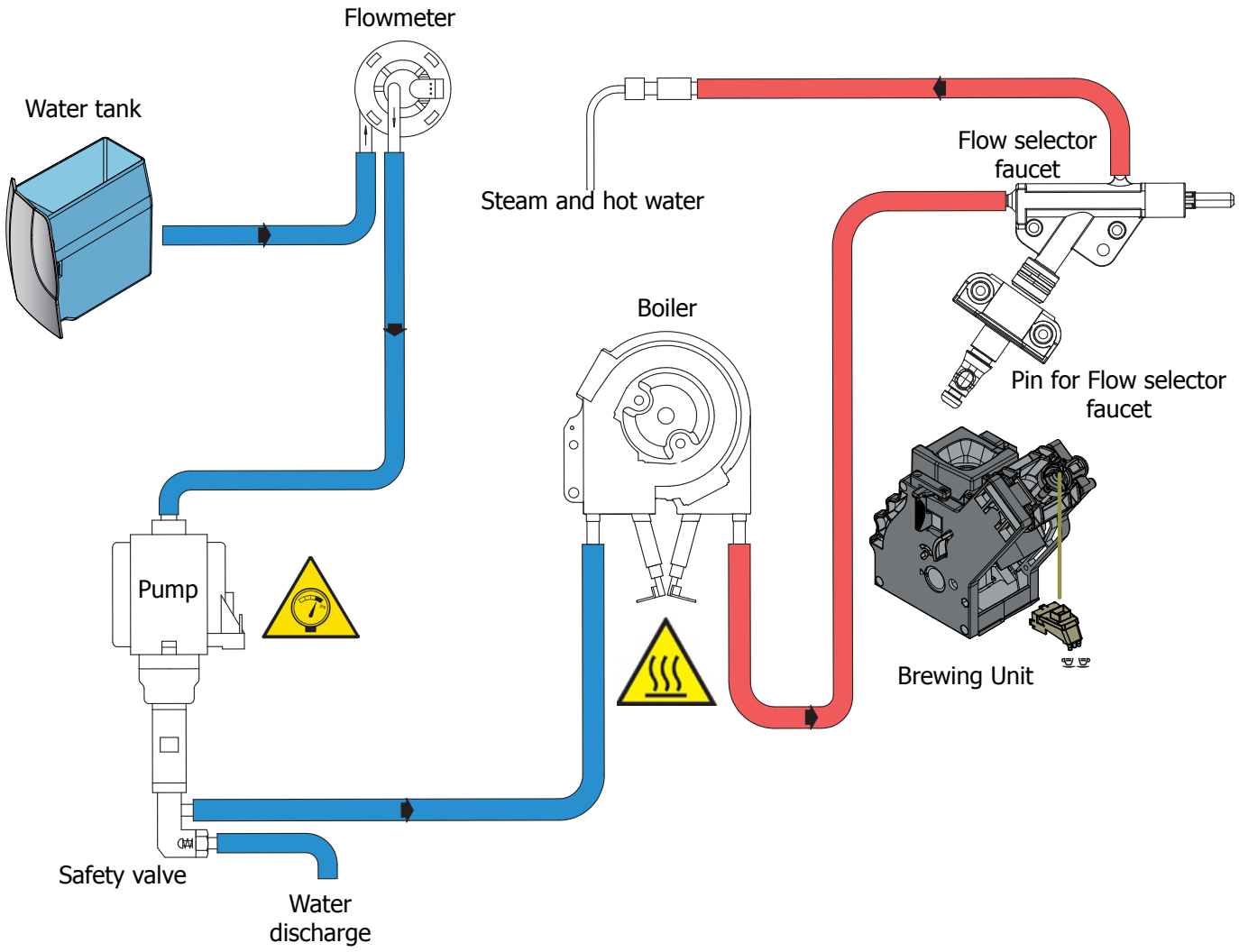
1.4. Water circuit diagram

From this point circuit in pressure

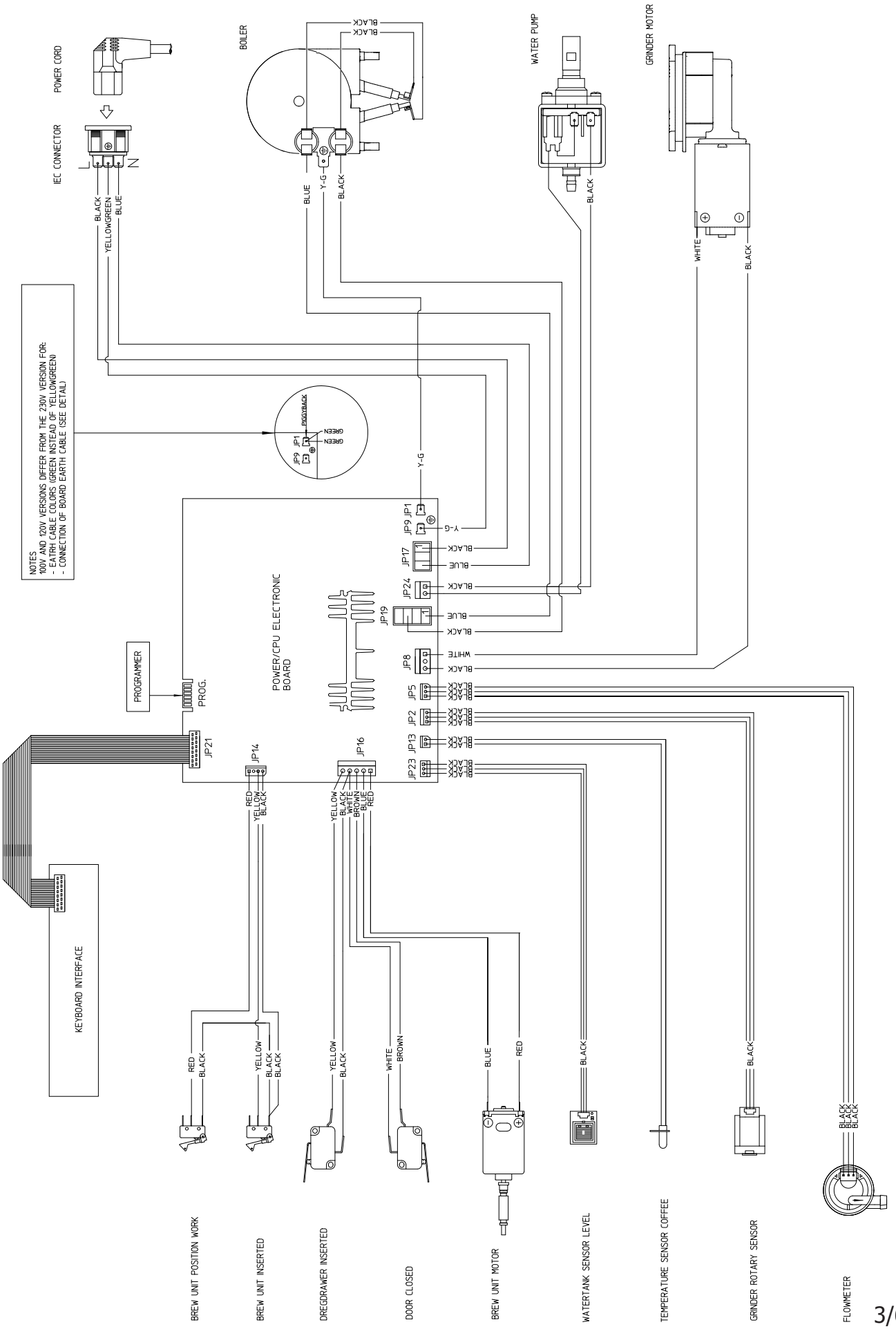
From this point circuit High temperaure

Water

Hot water /steam



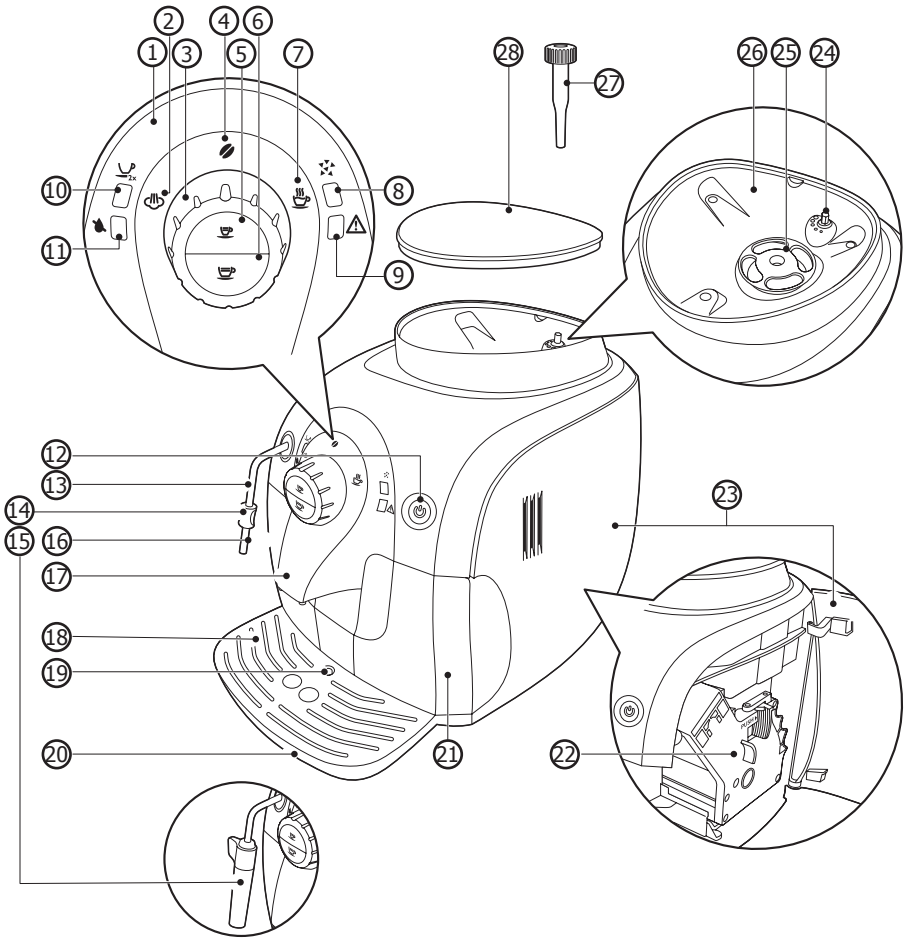
1.5. Electrical diagram



1.6. Service POLICY grid as used for coffee machine

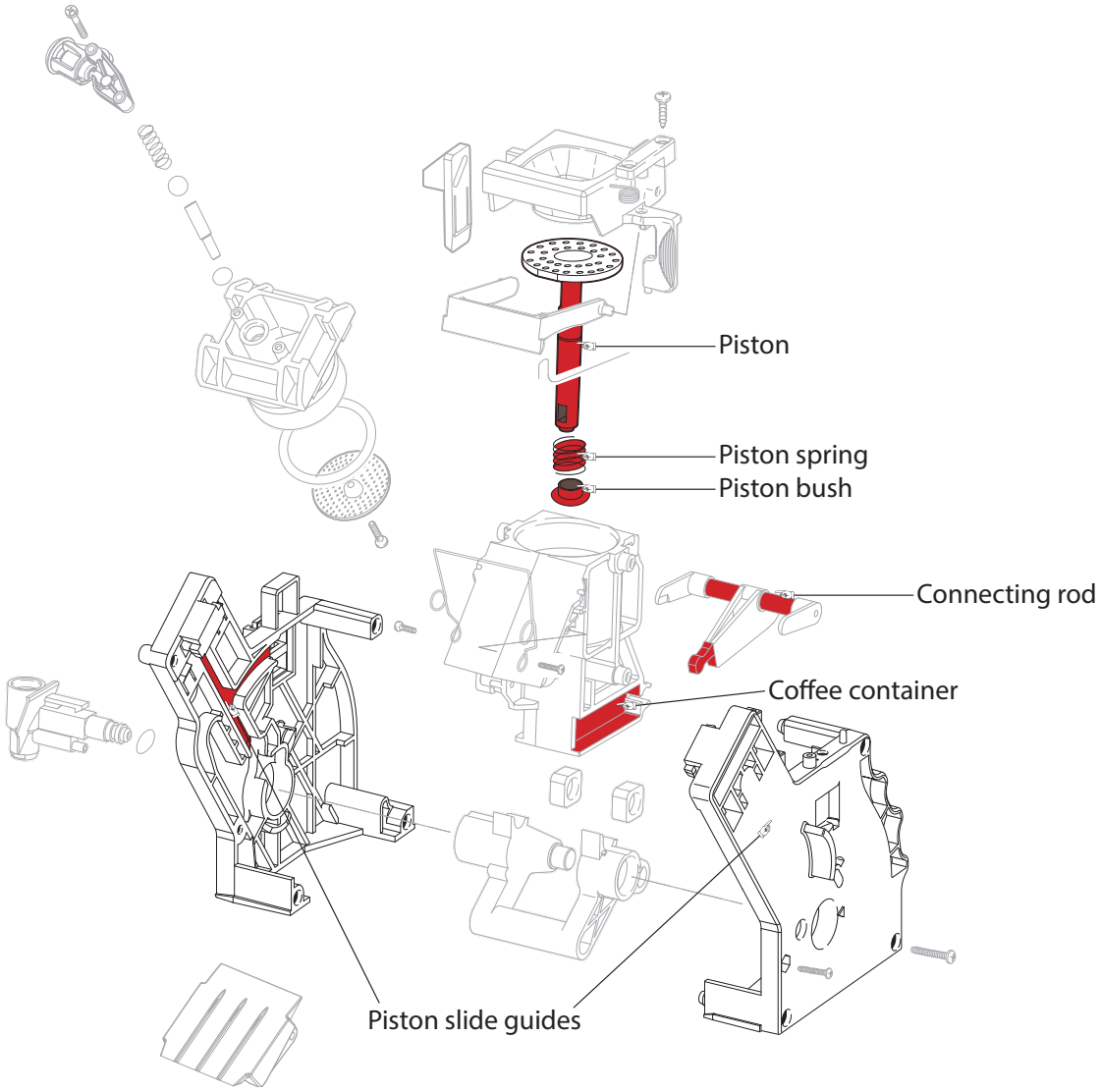
During the repair is always recommended to use, if possible, single parts rather than the correspondent assembly.

1.7. External machine parts

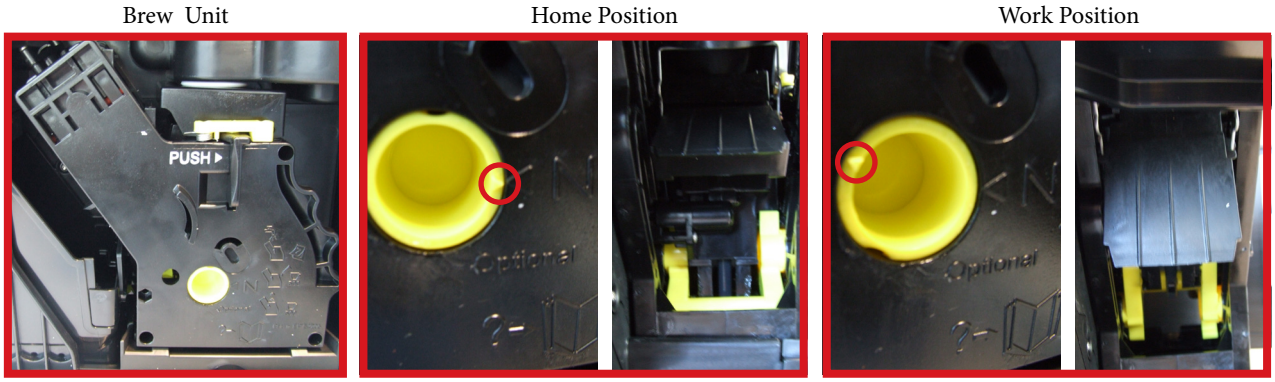


1	Control panel
2	Steam icon
3	Control dial
4	Coffee bean icon
5	Espresso button
6	Regular coffee button
7	Hot water icon
8	Descaling light
9	Warning light
10	2-cup light
11	'Water tank empty' light
12	On/off button with light
13	Hot water/steam wand
14	Protective handle
15	classic milk frother (specific types only)
16	Water tank
17	Coffee spout
18	Drip tray cover
19	'Drip tray full' indicator
20	Drip tray
21	Coffee grounds container
22	Brewing unit
23	Maintenance door
24	Grinding degree adjustment knob
25	Ceramic coffee grinder
26	Coffee bean container
27	Grinding degree adjustment tool
28	Lid of coffee bean container

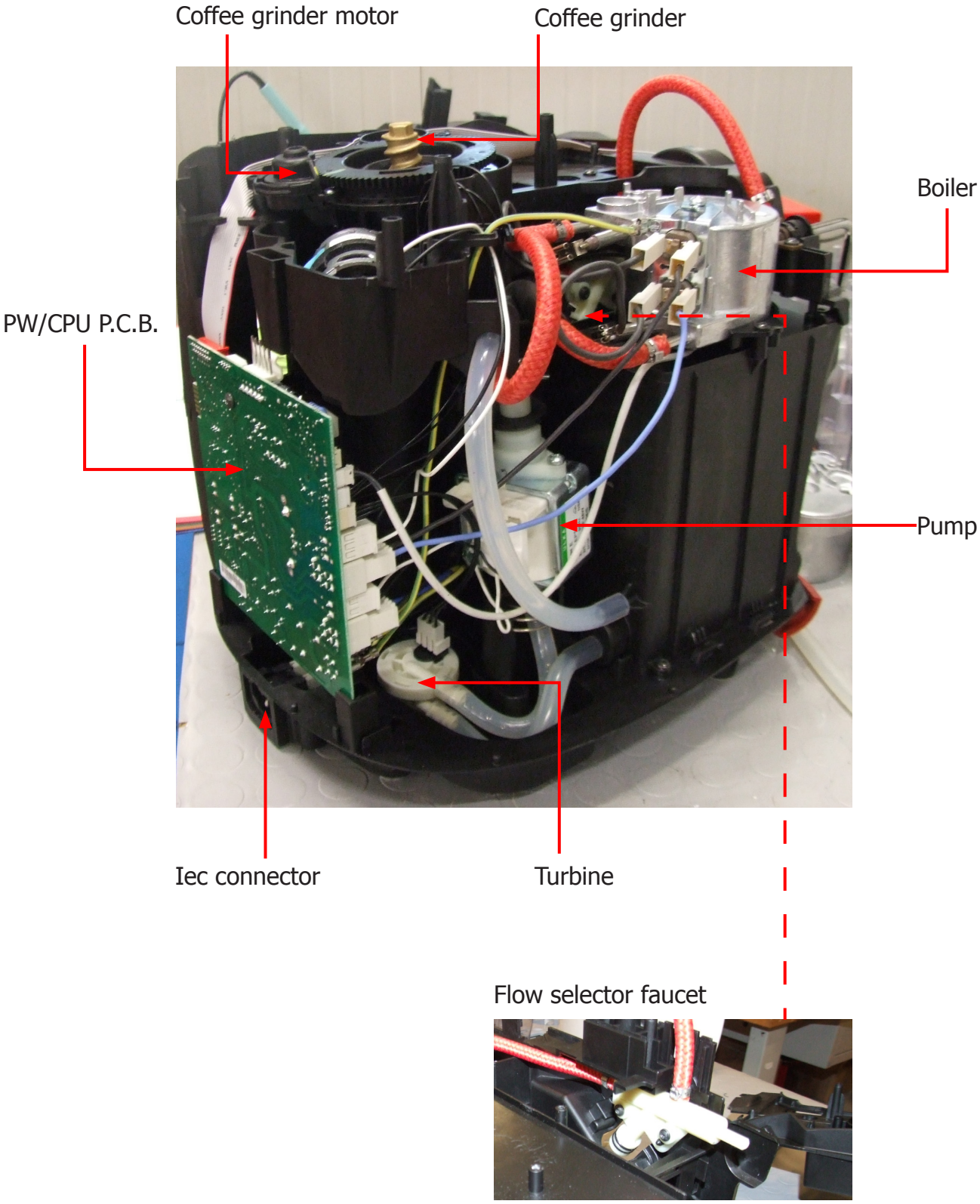
1.8. Brew Unit mainteinance: Where to grease.



1.9. Position of the Brew Unit



1.10. Internal machine parts



CHAPTER 2

TECHNICAL SPECIFICATIONS

2.1. Specification for the measurement of the coffee products temperature.

The below procedure is also contained in the Symptom Cure 97832.

The temperature is influenced by the flow from the dispenser and stratification of temperatures in the glass. In order to consider these phenomena and to introduce measures that allow comparisons in controlled conditions, below guidelines must be followed:
Conditions:

a) Water temperature in tank: 23°C (+/-2°C).
b) It must be used a plastic cup (see picture N°1).
c) It must be used a thermocouple thermometer (e.g. type K - see picture N°2).
d) The coffee machine is tested without any change of parameters or calibrations, which may affect the temperature of products, so the measurement of temperature must be done with machine in default factory setting.

Procedure:

1. The temperature must be measured in the cup, immediately after dispensing. Cup has to be placed on a non-metal surface using a thermocouple thermometer (Picture 1).

2. The temperature in the cup is measured by immersing the probe of the thermometer up to touch the bot tom.The probe then must be moved in a circular motion for 5/6 rotations. At the of the rota- tions, stop in the center of the cup (Picture 2).

3. The highest temperature measured during the rotations is the value we are searching for, and that must be reported;

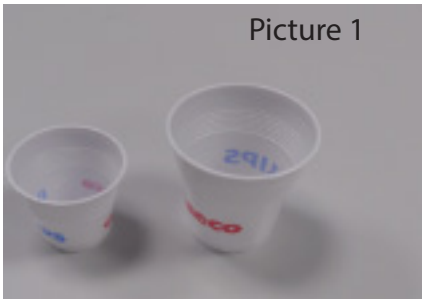
4. Test measurement: from end of dispensing to the end of rotations must be completed within 12 seconds.

5. The distance of the probe from the bottom of the glass is a function of the quantity of coffee dis- pensed: 10mm for 35gr - 17mm for 60gr - 35mm for 120gr and superior (Picture 3).

Limits of acceptability
The acceptance limits are divided by features and products and are the following:

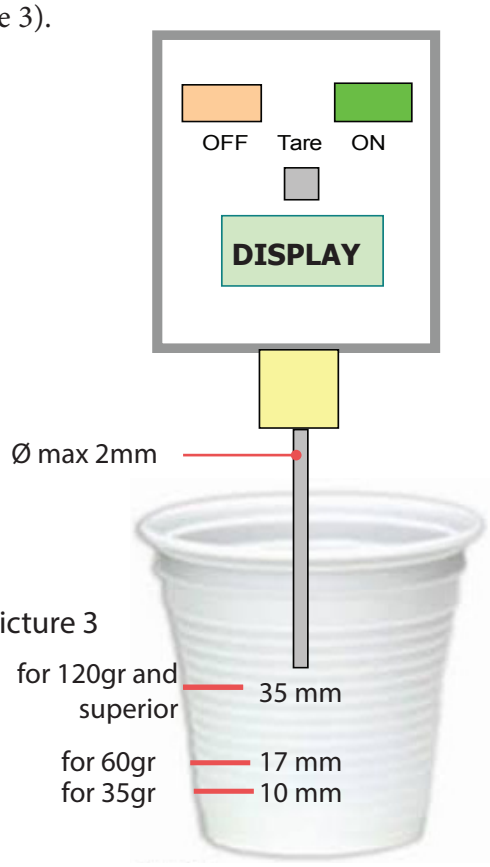
Espresso Coffee Italy Q.ty 25/40 gr.
Temperature of 1st product 69°C ≤ 85°C
Temperature of 2nd product 72°C ≤ 85°C

Coffee Q.ty 70/120 gr.
Temperature of 1st product 69°C ≤ 85°C
Temperature of 2nd product 72°C ≤ 85°C


Picture 1


Picture 2

Picture 3



2.2. Specification for the measurement of the Milk products temperature.

Milk evaluation

To carry out the test, a partially skimmed UHT milk with a percentage of grease between 1.5-1.8% at a refrigerator temperature Trefr. (between 4 to 10°C) must be used.
The milk product must be checked on a beaker of 250 ml of capability and with an inner diameter of 70mm, brewing 100gr of product.

Parameters to be respected:

The parameters to be respected are: milk temperature and height of the cream. Each of these parameters, however, must be evaluated depending on the type of system used for the production of hot milk. Actually three types of devices are present on the appliances:

- Manual system (pannarello)

Height of the milk cream in the beaker:
Manual system (pannarello) ≥ 15mm on 100gr. of brewed product

How to measure the temperature of the milk.

1. The measurement is carried out in the beaker, immediately after the end of milk brew, positioned on a non-metallic surface, using a thermocouple thermometer (eg. Type K). Stop the preparation of mixed product: at the end of milk brewing, where "One Touch product" function is present.
2. The temperature is measured by immersing the probe of the thermometer, positioning the probe inside the beaker at about 10mm from the bottom of the container, then the probe moves in a circular motion for 3-5 turns, stopping at the end, at the center of the beaker. It detects the maximum temperature reached in a time of relief between 3 to 5 seconds. The measurement has to be taken at 10mm from the bottom of the beaker. Stir the milk before measuring to keep a constant temperature.

How to measure the milk cream.

The temperature (Trefr or Tamb) of the milk doesn't affect as much the test result on measuring the milk cream; by convection is assumed to always use milk at refrigerator temperature Trefr..

Manual systems (Pannarello)

Pour 100cc. of milk at Trefr. in a beaker of 250 ml of capacity and with a inner diameter of 70 mm; with machine in steam mode:

1. Open the steam knob to discharger water circuit for 4 sec, then close the knob.
2. Place the beaker with the frother dipped in milk, open the steam knob to maximum and start the chronometer.
3. After about 30 to 60 seconds, close the knob and check the result on milk.

In case the machine allows modify of the emulsion through the menu, use the machine with the default value.
Related to the above testing procedure derives the following table of acceptability:

Manual, Semi-Automatic and Automatic's Milk System	
Grams of Product	Minimun Height of the milk cream
≥ 130	≥ 30mm
120	≥ 25mm
110	≥ 22mm
100	≥ 20mm
90	≥ 16mm
80	≥ 13mm
70	≥ 11mm

2.3. Machine parameters and performance

PRODUCT QUANTITY	Minimum amount (ml)	Default quantity coffee (ml)	Maximum amoun	User programmable
Espresso	35 +/- 10	80 +/- 10	300 +/- 10	Yes
Coffee	35 +/- 10	200 +/- 10	300 +/- 10	Yes
Hot water	Continues until the water supply has been exhausted (capacitive sensor)			
Steam	Continues until the water supply has been exhausted (capacitive sensor			

DREG DRAWER	Description and values
Time-out for dreg drawer	5 sec.
Reset dreg counter	Dreg emptying alarm, if the dreg drawer is removed for more than 5 seconds.

STANDBY	Description and values
Time (default)	15 minutes
Time programmed by Consumer/Service	No
Boiler temperature during Standby	Boiler OFF

WATER TANK	Description
Water reserve (pulses)	200
Water reserve modifiable by Production/Service departments	No
"Fill tank" alarm	Yes
Connect to water mains	No

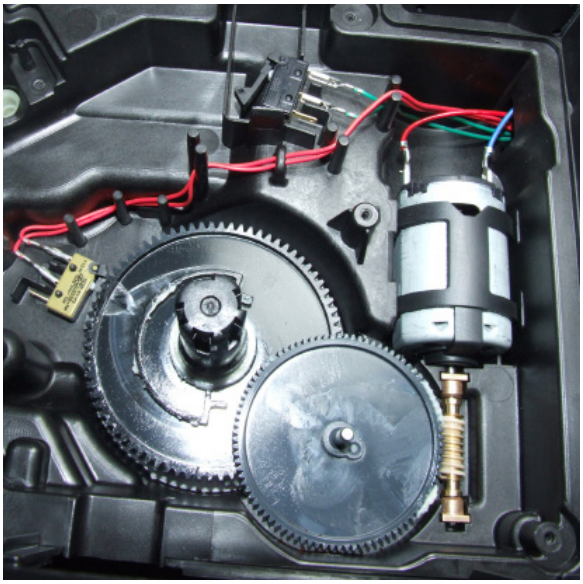
CHAPTER 3

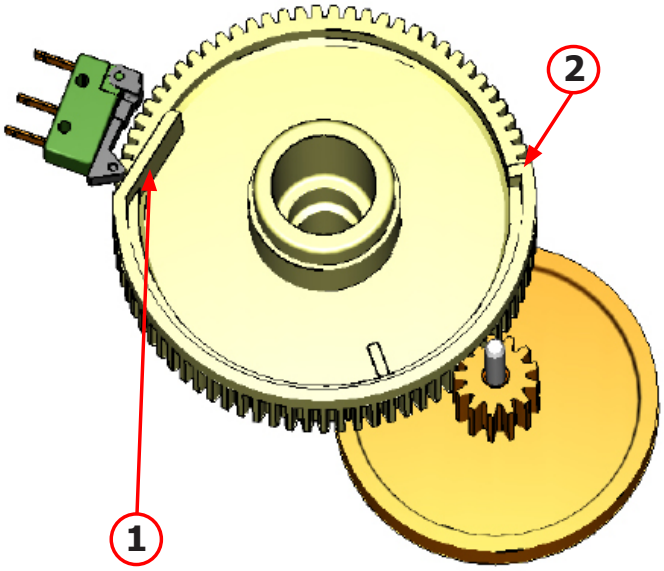
OPERATING LOGIC

3.1. Single microswitch gear motor

Switching on

When the machine is switched on, the gear motor repositions itself as follows:
- It acts on microswitch 1
- The gear motor changes its rotation direction and moves upwards again by approx. 1-2 mm.
- The boiler starts heating to heat the water for approx. 45 sec, in order to reach the optimal temperature.





The gear motor is powered by a direct current motor that engages with the smaller double toothed wheel using a worm screw. The unit is mounted on the axle of the large gear wheel and when a coffee is requested, it moves from the standby position to the dispensing position, and then back to the standby position again. The microswitch indicates to the gear motor when the brew group is in the work position or home position.

- Standby position: 1

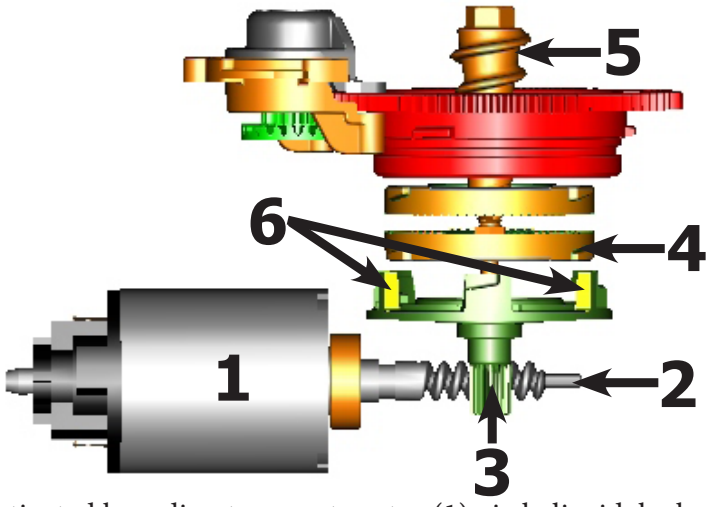
- Dispensing position: 2

3.2. Temperature sensor (adjustment)

Temp. (°C)	R nom (kΩ)	ΔR (+/- %)
20	61.465	8.6
50	17.599	5.9
75	7.214	4.1
80	6.121	3.7
85	5.213	3.4
90	4.459	3.1
100	3.3	2.5
125	1.653	3.9
150	0.893	5.1

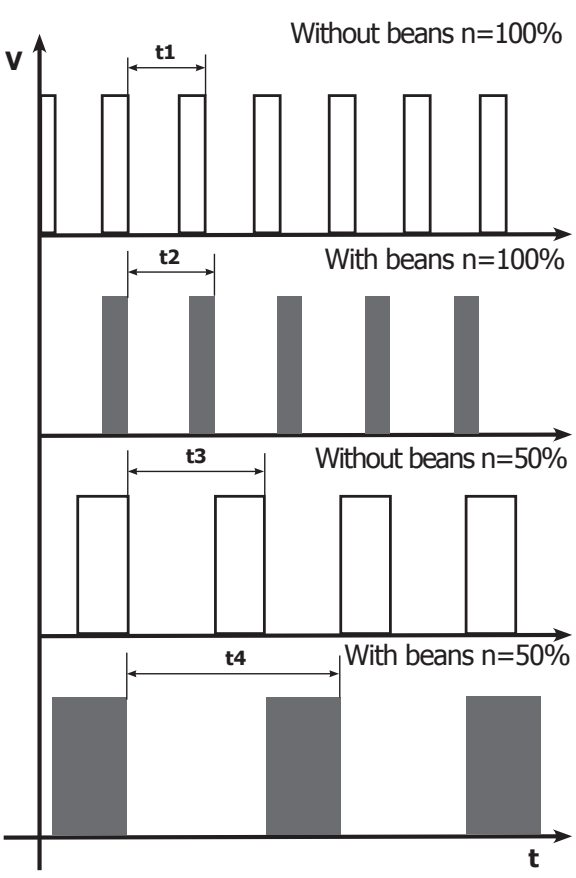
A thermistor, NTC type (Negative temperature coefficient), is used as a temperature sensor; in the event of overheating this reduces boiler element power consumption. The electronic system detects the current boiler temperature from the drop in voltage of the sensor and adjusts it accordingly. Heating element values and corresponding temperatures: see table Temperature sensor (adjustment)

3.3. Coffee grinder



The coffee grinder is activated by a direct current motor (1) via helicoidal wheel transmission and a worm screw (2).
The worm screw (2) activates a plastic toothed wheel (3), which turns the lower grinder blade (4) and the increment pin (5).
There are two magnets (6) in the toothed wheel and with every rotation they transmit two pulses to a Hall sensor, which in turn transmits them to the electronic system.

3.4. Detection of coffee bean absence, dose adjustment, blocked coffee grinder



No coffee
when no coffee beans are present, this is detected by the Hall sensor due to variations in the pulse frequency (with or without coffee).
If there are no coffee beans (operation while empty), the number of rotations and therefore the number of pulses, will be greater
t1 = no coffee signal

If there are coffee beans, the number of rotations will be lower due to the force created during the grinding process
t2 = no signal

t3 and t4 = this reading is taken at the end of each grinding process

Dose quantity adjustment
The dose quantity is adjusted in accordance with the pulses detected (number of rotations proportional to the weak, medium and strong flavour selection)

Blocked grinder blades
If the coffee grinder is blocked for any reason, pulses will no longer be transmitted to the electronic system and the grinder stops

3.5. Dose self-learning (SAS)

The aim of this function is to automatically regulate the average dose of ground coffee (SELF-LEARNING); this takes place with an algorithm based on the following values:

1. Number of coffee grinder pulses during the grinding cycle.
2. Max. average value of the power consumed by the gear motor during the coffee brewing cycle.

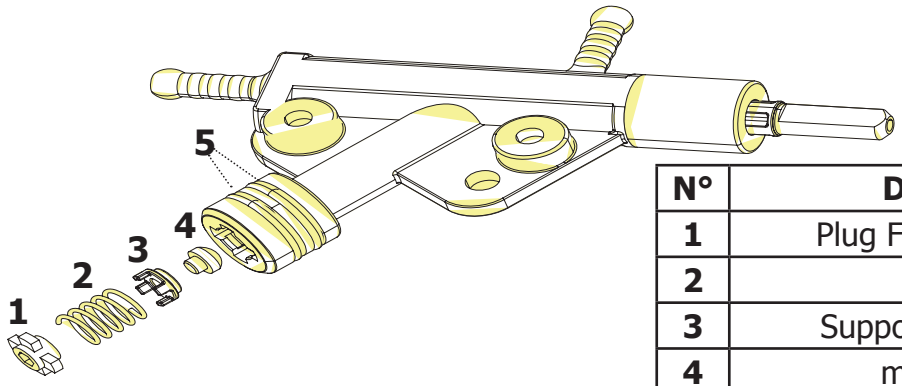
The algorithm compares the maximum average value of the power consumed by the gear motor, in order to calculate the new grinding pulse value for the next coffee produced.
If the power consumption value is less than the minimum current value, the grinding pulses will be increased by 2.
If the power consumption value is greater than the maximum current value, the grinding pulses will be decreased by 4.
If the power consumption value falls within the "over-torque" interval, the product will be dispensed and the grinding pulses will be decreased by 10.
If the power consumption value falls within the "abort cycle" interval, the dreg will be expelled and the grinding pulses will be decreased by 10.

This guarantees that, regardless of the coffee type used, the grinding level setting and the wear on the grinders, the ground coffee dose always remains constant.

		DOSE ADJUSTMENT (NUMBER OF GRINDER IMPULSES)				
	Default level	**+2**	**0**	**-4**	**-10**	**-10 and CYCLE ABORTED**
Aroma of the grinded product		MAX_CURRENT_mA <350mA	<=350mA MAX_CURRENT_mA <=500mA	MAX_CURRENT_mA >500mA	MAX_CURRENT_mA >800mA	MAX_CURRENT_mA >1000mA

Important:
For perfect operation, the adjustment of the machine should be performed by the user according to the type of coffee used. When the type or brand of coffee is changed, there may be variations in the size of the beans and their stickiness or roasting level. This leads to variations in power consumption (mA), with resulting excessive or insufficient doses (until the necessary adjustments have been made to compensate for this change).
Caution: In the case of excessive dosage, powder may be expelled into the dreg drawer. This is not a fault, but can occur during preliminary operation or after a service.

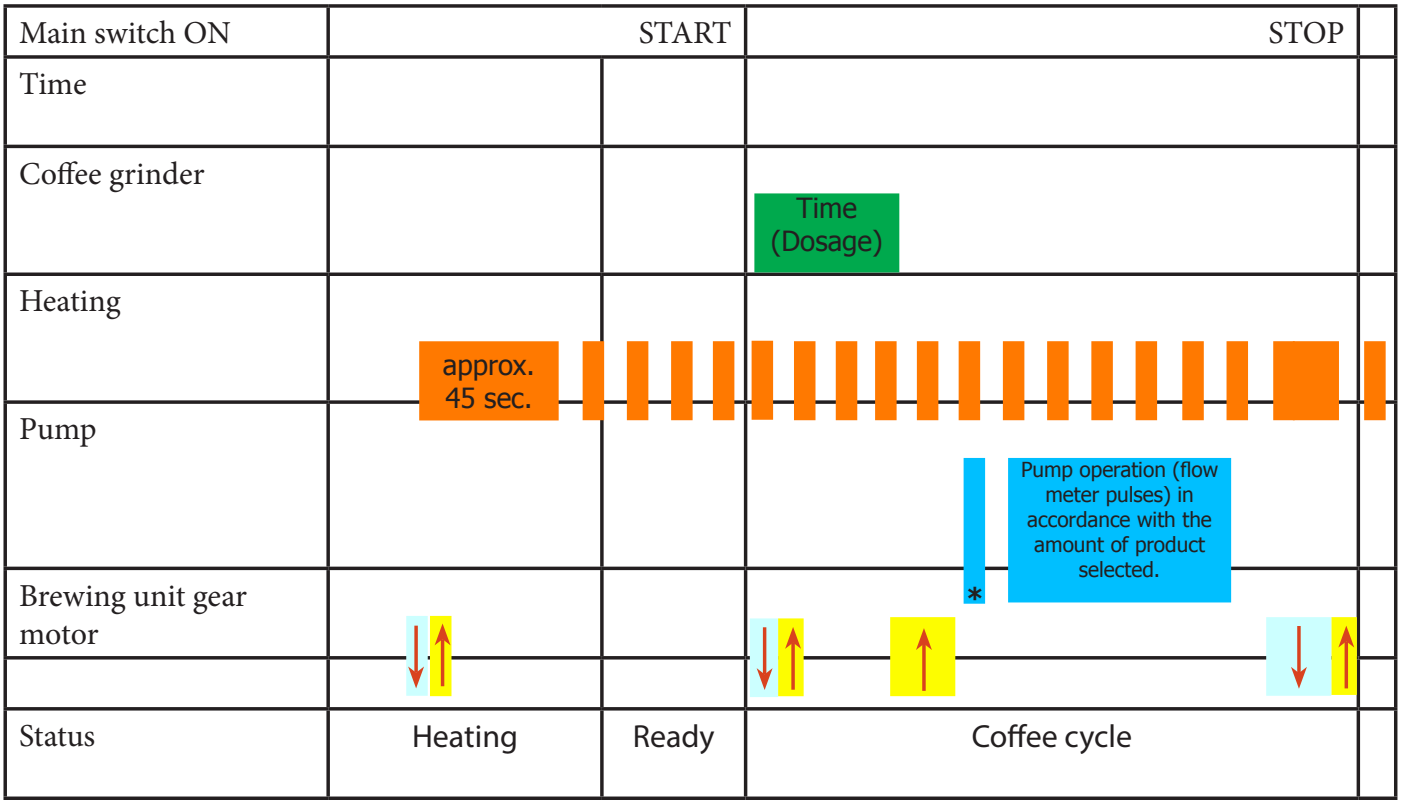
3.6. Flow selector faucet and commands



N°	DESCRIZIONE
1	Plug Flow Selector Faucet
2	Spring
3	Support mushroom valve
4	mushroom valve
5	Gasket

In coffee dispensing the mushroom valve opens at 4bar +/- 0.5
In manual water dispensing
Manual steam delivery

3.7. Coffee cycle

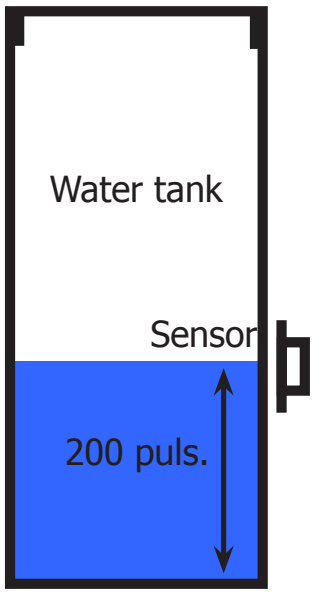


Notes: * Only with Pre-brewing

Coffee cycle

see below the steps related both coffee and milk cycle:
1. The coffee grinder starts the grinding process (controlled by Time);
2. The brewing unit moves to the brewing position;
3. The preliminary dispensing phase starts (short pump activity, short pause);
4. the machine starts dispensing coffee (the pump operation period is defined by the amount of product dispensed);
5. The gear motor moves to its home position (the dregs are expelled automatically);

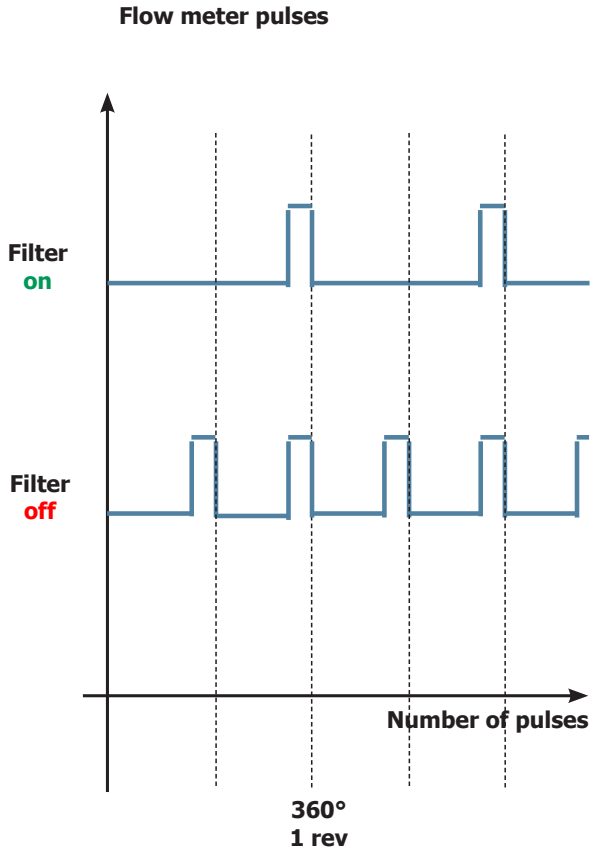
3.8. Water level detection (water tank)



"Water low" message (water reserve)

Function:
The water level is monitored by a capacitative sensor, located one third of the way up the water tank wall.
If the electronics assembly detects, by means of the sensor, that the amount of water in the tank has dropped below the above mentioned level, a water reserve remains available for the dispensing process underway (this will cover 200 flow meter pulses).
The product dispensing process will then come to an end.
If a dispensing cycle ends after the sensor has been triggered (in the reserve) then the display Water low" continues to be displayed during the following dispensing cycle.

3.9. Descaling request



"Descaling" – message with water filter inserted (appliances with display only)

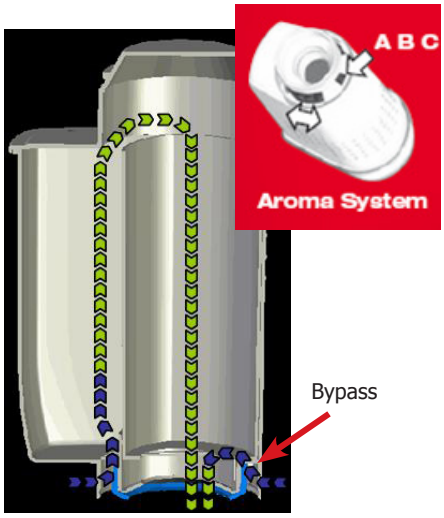
The water hardness is set on the basis of the regional water hardness analysis
(1, 2, 3, 4).

Filter off:
If the function is turned off the electronics assembly monitors the flow meter pulses, recording one pulse each turn.

Filter on:
If the function is turned on the electronics assembly monitors the flow meter pulses, recording one pulse every two turns.

"Change water filter" message
The electronics assembly uses the flow meter impulses to keep track of the amount of water which has flowed through; after the specified amount (set in accordance with the water hardness level), the "Replace filter" message appears.

3.10. Water filter



Function:

- Reduced limescale deposits which take longer to form.
- Improved water quality.
- Improved taste due to the ideal water hardness.

Life span / descaling performance:

- - 10 ° dH
- 60 litres
- 2 months

To achieve the best possible operating mode consistency over the total life span, the water is channelled using a 3-stage bypass (A, B, C) depending on the degree of hardness. See small image.

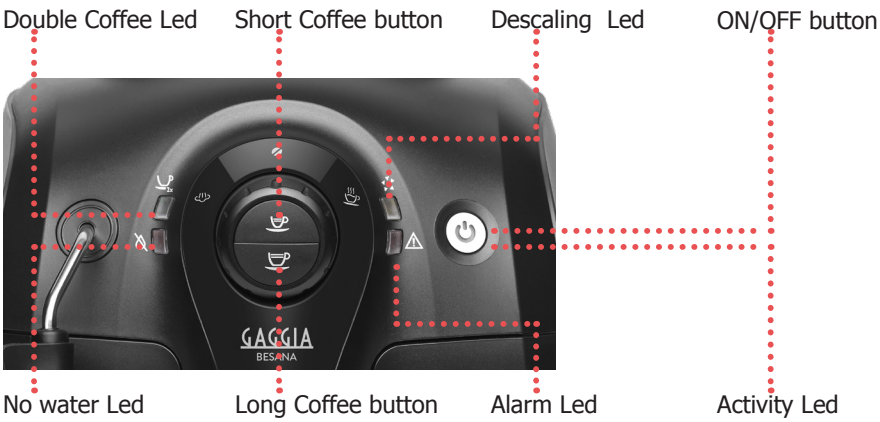
3.11. Descaling cycle frequency

Descaling cycle frequency		
Default Hardness	**WATER HARDNESS**	**Whit or without water filter**
3	Hard (15° - 21°dH)	60 litres

CHAPTER 4

SERVICE MODE

4.1 Test Mode



This document describes the test mode of Gaggia Besana machine. This application is used in order to test the machine in its mechanics and electronic components.

Water Position

Steam Position

The machine enters in test mode by moving the knob in the Water position 

then pushing the COFFEE short button 

and then connecting the machine to the plug 

As long as the COFFEE short button is pressing the machine shows the Led Calc-Clean, Led Activity, Led Alarm, Led NoWater, Led DoubleCoffee, flashing with rotation.
When the COFFEE short button is release the machine pass to the first level of the test.
There are 4 different level, in each level the coffee-machine can execute different commands:

Level 1: The machine can test the input signal:

a) Microswitch present of the brewing unit
b) Microswitch present of the dregdrawer
c) Microswitch door closed/opened
d) Button Short Coffee
e) Button Long Coffee
f) Button ON-OFF
g) Photosensor Water
h) Photosensor Steam (only in Middle-TOP model)

Level 2: The machine can test the loads in low voltage:

a) Brewing unit (24V DC)

Level 3: The machine can test the Pump in high voltage:

a) Pump (120-230V AC)

Level 4: The machine can test the Heater load in high voltage:

a) Heater (120-230V AC)

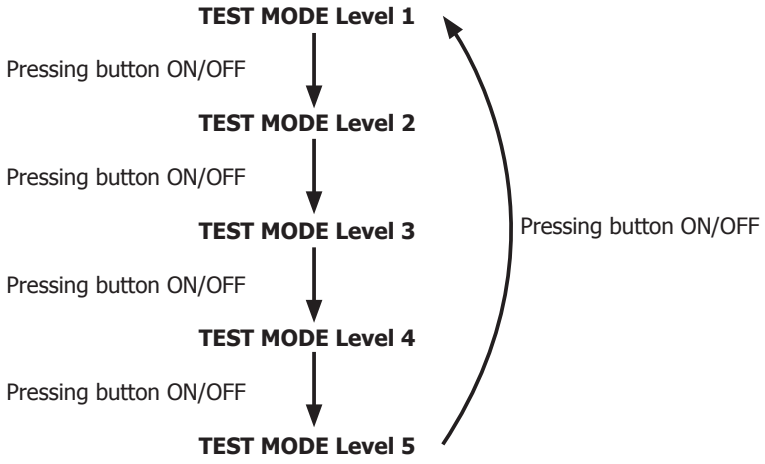
Level 5: The machine can test the Grinder load in high voltage:

a) Grinder (320V DC)

The user can switch the level by pressing the Button ON/OFF:
As long as the button ON-OFF is pressing the machine show the level of the test:

1. **Level 1 :** Led DoubleCoffee ON (G), Led Calc-Clean OFF (O), Led Activity OFF (G), Led Alarm OFF (R), Led Water OFF (R)
2. **Level 2 :** Led DoubleCoffee ON (G), Led Calc-Clean ON (O), Led Activity OFF (G), Led Alarm OFF (R), Led Water OFF (R)
3. **Level 3 :** Led DoubleCoffee ON (G), Led Calc-Clean ON (O), Led Activity ON (G), Led Alarm OFF (R), Led Water OFF (R)
4. **Level 4 :** Led DoubleCoffee ON (G), Led Calc-Clean ON (O), Led Activity ON (G), Led Alarm ON (R), Led Water OFF (R)
5. **Level 5 :** Led DoubleCoffee ON (G), Led Calc-Clean ON (O), Led Activity ON (G), Led Alarm ON (R), Led Water ON (R)

Legend:
(O) = Orange
(G) = Green
(R) = Red



At the start up all loads are turned off. The software allow to have only one load active at the same time.

Level 1 (Input, Led)

Start condition: NO BU, NO drag drawer, No tank, door open.	LED INDICATION				
	Led Activity	Led Descaling	Led Alarm	Led NoWater	Led Double Coffee
	OFF	OFF	OFF	ON	OFF
Action by user	LED INDICATION				
	Led Activity	Led Descaling	Led Alarm	Led NoWater	Led Double Coffee
Insert a full water tank					
Switch on the red led NoWater	OFF	OFF	OFF	OFF	OFF
ERROR: The led NoWater remain on , check the capacitive sensor and the wiring (JP23)	OFF	OFF	OFF	ON	OFF

Insert the BU					
The red led alarm blinks one time	OFF	OFF	One blink	N.A.	OFF
ERROR: The led alarm remains off , check the BU microswitch and the wiring (JP14)	OFF	OFF	OFF	N.A.	OFF
Insert the drag drawer					
The red led alarm blinks one time	OFF	OFF	One blink	N.A.	OFF
ERROR: The led alarm remains off , check the microswitch on the drag drower and the wiring (JP16)	OFF	OFF	OFF	N.A.	OFF
Close the door					
The red led alarm blinks one time. When all micro (3) are closed the green led double coffee remains on.	OFF	OFF	One blink	N.A.	ON
ERROR: The led double coffee remains off, check the microswitch on the door and the wiring (JP16)	OFF	OFF	OFF	N.A.	OFF
Press the coffee short button					
Switch on the activity led	ON	OFF	N.A.	N.A.	N.A.
ERROR: The led activity remain off , check the interface board and the flat cable (JP21)	OFF	OFF	N.A.	N.A.	N.A.
Press the coffee long button					
Switch on the activity led	ON	OFF	N.A.	N.A.	N.A.
ERROR: The led activity remain off , check the interface board and the flat cable (JP21)	OFF	OFF	N.A.	N.A.	N.A.

Action by user	LED INDICATION				
	Led Activity	Led Descaling	Led Alarm	Led NoWater	Led Double Coffee
Move the knob in the water position					
Switch on the activity led	ON	OFF	N.A.	N.A.	N.A.
ERROR: The led activity remain off , check the interface board and the flat cable (JP21)	OFF	OFF	N.A.	N.A.	N.A.
Move the knob in the steam position					
Switch on the activity led temp	ON	OFF	N.A.	N.A.	N.A.
ERROR: The led activity remain off , check the interface board and the flat cable (JP21)	OFF	OFF	N.A.	N.A.	N.A.
Finish condition with tank, BU, drag drawer and door closed. Knob in the central position	LED INDICATION				
	Led Activity	Led Descaling	Led Alarm	Led NoWater	Led Double Coffee
	OFF	OFF	OFF	OFF	ON

Level 2 (Brewing unit)

Start condition: BU, drag drawer and door closed. Knob in the central position	LED INDICATION				
	Led Activity	Led Descaling	Led Alarm	Led NoWater	Led Double Coffee
	OFF	OFF	OFF	OFF	OFF
Action by user	LED INDICATION				
	Led Activity	Led Descaling	Led Alarm	Led NoWater	Led Double Coffee
Press the coffee button to move the BU to work					
When the BU reaches the work position and the current is OK ⇒ the green led activity is switched on.	ON	OFF	OFF	OFF	OFF
ERROR: the BU moves to Home; check the polarity of the motor	N.A.	OFF	OFF	OFF	OFF
ERROR: led activity remains OFF; Check the work microswitch (is broken), the BU motor (is blocked) and the wiring (JP16).	OFF	OFF	OFF	OFF	OFF
ERROR: led alarm Switch ON, check the BU; * with BU the absorbed current is much more 300mA * without BU the absorbed current is much more 200mA	N.A.	OFF	ON	OFF	OFF

Press the long button to move the BU to home					
When the BU reaches the home position and the current is OK ⇒ the green led activity is switched on.	ON	OFF	OFF	OFF	OFF
ERROR: the BU moves to Work; check the polarity of the motor	N.A.	OFF	OFF	OFF	OFF
ERROR: led activity remains OFF; Check the work microswitch (is broken), the BU motor (is blocked) and the wiring (JP16).	OFF	OFF	OFF	OFF	OFF
ERROR: led alarm Switch ON, check the BU; * with BU the absorbed current is much more 300mA * without BU the absorbed current is much more 200mA	N.A.	OFF	ON	OFF	OFF

Finish condition	LED INDICATION				
	Led Activity	Led Descaling	Led Alarm	Led NoWater	Led Double Coffee
	N.A.	N.A.	OFF	N.A.	N.A.

Level 3 (Pump)

Start condition:	LED INDICATION				
	Led Activity	Led Descaling	Led Alarm	Led NoWater	Led Double Coffee
	OFF	OFF	OFF	OFF	OFF

Action by user	LED INDICATION				
	Led Activity	Led Descaling	Led Alarm	Led NoWater	Led Double Coffee

Press the coffee button to switch on the Pump					
The led activity flashing	Flashing	OFF	OFF	OFF	OFF
ERROR: the led activity remains OFF and the led alarm swithc ON; check the pump, the flowmeter, the wiring from the flowmeter to the CPU/POWER board (JP5) and the wiring from the pump to the CPU/POWER board (JP24)	OFF	OFF	OFF	OFF	OFF

Finish condition	LED INDICATION				
	Led Activity	Led Descaling	Led Alarm	Led NoWater	Led Double Coffee
	N.A.	N.A.	OFF	N.A.	N.A.

Level 4 (Heater)

Start condition:	LED INDICATION				
	Led Activity	Led Descaling	Led Alarm	Led NoWater	Led Double Coffee
	OFF	OFF	OFF	OFF	OFF

Action by user	LED INDICATION				
	Led Activity	Led Descaling	Led Alarm	Led NoWater	Led Double Coffee
Check the temperature					
The red led General Alarm remains OFF	OFF	OFF	OFF	OFF	OFF
ERROR: The temperature sensor is shorted or opened, the led GenAlarm switch ON; check the wiring from the heater to the CPU/POWER board (JP17-3) and the other wiring	OFF	OFF	ON	OFF	OFF
Press the coffee button to switch on the Heater					
The user checkers that the absorbed current is OK	N.A.	N.A.	N.A.	N.A.	N.A.
ERROR: the absorbed current is KO; check the wiring from the heater to the CPU/POWER board (JP17-3) and the other wiring	N.A.	N.A.	N.A.	N.A.	N.A.

Finish condition	LED INDICATION				
	Led Activity	Led Descaling	Led Alarm	Led NoWater	Led Double Coffee
	N.A.	N.A.	OFF	N.A.	N.A.

Level 5 (Grinder)

Start condition:	LED INDICATION				
	Led Activity	Led Descaling	Led Alarm	Led NoWater	Led Double Coffee
	OFF	OFF	OFF	OFF	OFF

Action by user	LED INDICATION				
	Led Activity	Led Descaling	Led Alarm	Led NoWater	Led Double Coffee
Press the coffee button to switch on the Grinder					
The led activity flashing	Flashing	OFF	OFF	OFF	OFF
ERROR: the led activity remains OFF and the led alarm swithc ON; check the hall sensor board in the Grinder, the Grinder, the wiring from the hall sensor board to the CPU/POWER board (JP2) and the wiring from the Grinder to the CPU/POWER board (JP8)	OFF	OFF	ON	OFF	OFF

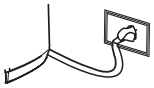
Finish condition	LED INDICATION				
	Led Activity	Led Descaling	Led Alarm	Led NoWater	Led Double Coffee
	N.A.	N.A.	OFF	N.A.	N.A.

4.2 Steam Out

This document describes the procedure of SteamOut in Gaggia Besana machine. This application is used in order to empty the heater.

The machine enters in SteamOut mode by moving the knob in the water position 

then pushing the COFFEE LONG button 

and then connecting the machine to the plug. 

As long as the COFFEE LONG button is pressing the machine shows all LEDS ON: Led Activity, Led Double Coffee, Led Alarm, Led NO_Water, Led CalclClean.

When the COFFEE LONG button is release the machine starts the Steam Out: Led CalcClean flashing. During this phase if the knob is moving in the central position the steam out procedure will be interrupted and the red led "General Alarm" will be switched On, in order to continue the steam out procedure move back the knob in the water position.

When the steam out procedure is completed the Led Double Coffee switch on and the Led CalcClean switch OFF.

Now is possible to switch off the machine or repeat the procedure moving the knob in the central position and after moving again the knob in the water position.

CHAPTER 5

ESPRESSO PHILIPS SERVICE CENTER

5.1. Espresso Philips Service Center (EPSC)

The EPSC is a Service tool developed to upload the SW on the machine and run the diagnostic mode.
It can be downloaded from the following link: https://www.epsc.philips.com/ServiceCenterPortal/
The application can be used only in combination with the Saeco Programming Device:
Cod. 996530009845 “KIT PROGRAMMER SERKIT SSC2”.
It can be ordered as Spare part and includes the programmer + connection cables.
All details related to the registration and operation are explained in the enclosed Quick start guide (QSG).

Espresso Philips Service Center– Quick Start Guide

Press the icon to view the document
To open the attached document is necessary to save the service manual on your PC.

Main Parameters description & standardization in the EPSC diagnostic tool.

Press the icon to view the document
To open the attached document is necessary to save the service manual on your PC.

The main Diagnostic Parameters description is available on the GDA_114331.

CHAPTER 6

SERVICE AND MAINTENANCE

6.1. Repair Flow

Proces stap	Saeco no.	Action
Intake	1	Visual inspection (transport damage) take care for pictures
	2	Check Type/serialnumber
	3	Log all available accessory, counter check with info from consumer
Diagnosis	4	**Check product for consumer complaint and main function** (NFF contact consumer)
	5	Run Diagnostic to get error codes and relevant set statistics (EPSC) refer SDA_114585
	6	Opening machine
Repair	7	Repairing the fault(s) encountered (view Service information in EPSC)
	8	Checking any modifications (view Service information, new software, etc.) **Refer EPSC**
	9	**Basic Functional test while the appliance is open** (linked to consumer complaint or what you may have detected)
Coffee		*Make e 2 cups at the same time. Are the volumes equal*
- Crema		*Blow on the coffee. Does the crema come back together*
		Is the crema colour correct (Hazelnut)
- Temperature		*Is the coffee temperature within spec refer* chapter 2.1 of service manual
Steam		*Does the steam work*
Hot Water		*Does the hot water work*
Milk		*(if applicable)*
- Cappuccino		*Does the cappuccinatore produce good froth*
	10	check water circuit for any leakage, such as Oetiker clamps, boiler and valve connection and hoses
	11	Check mechanism for good movement and unexpected noise
	12	Assembly
Inspection	13	Do cabinet parts fit well together
- visual	14	Check for damages
- Power check	15	Will the set switch on
- Accessories	16	Do the accessories match with the intake
- Consumer complaint	17	Check the product for the consumer complaint
Quick Functional test	18	Make 2 cups at the same time. Are the volumes equal
Coffee	19	Is the sound normal ?
Leakage	20	Did the product leak during the testing
Steam Out	21	**Steam out** before shipping out, if temperature is below 0° to prevent any damaged due to frozen water. **No need for those families:** Gaggia Velasca (Only 230V) and Babila (120-230V) **Please also check for GDA_113455**
Reset Error code	22	New devices have the possibility to reset the error code, once captured it need to be reset to see if it appear afterwards again
Claim Administration	23	**Provide precise IRIS code, according dedicated code table for Garment Care products. The location code from the part you have worked on MUST be completed always with the part reference from exploded view !** **Primary fault and corresponding IRIS code should be claimed first.**
Cleaning	25	Clean water reservoir, bean reservoir, brew chamber and conveyor
	26	Clean and dry brew unit, coffee bin and drip tray
	27	External cleaning (housing surface)
Safety check	28	Earth leakage, Isolation test, resistor of earth wire grounding, as requested in certain country's (VDE, ISO) or H-POT TEST
Visual	29	Check the mains cord for damages
Packing	30	Packing
	31	Check completeness (accessories) according income log refer #3
	32	Neatly pack the product
Documentation	33	Info for Consumer by packed ? e.g. service brochure, FAQ, NFF letter, s/c etc.…
	34	Descaling instruction with changed procedure (S/C) if available
Repair report	35	Is there an answer to **ALL** consumer questions/complaints (see complaint)
	36	add set statistic and give, if needed clear instruction towards consumer
	37	Is it indicated which documents are added
	38	Are there tips how to prevent issues

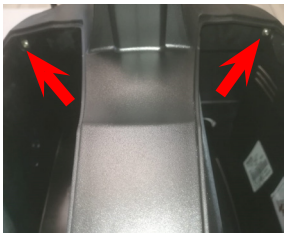
CHAPTER 7

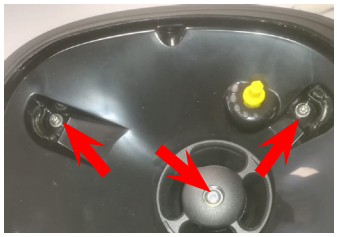
DISASSEMBLY

7.1. Outer shell

Remove the dreg drawer, water tank, drip tray, coffee container lid, brewing unit and the pannarello.

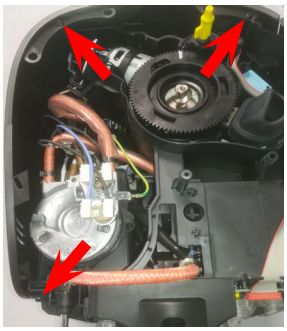
Upper cover





Unscrew the highlighted screws and slip off the upper cover casing.

Side cover



Unscrew the highlighted screws and slip off the side cover casing.

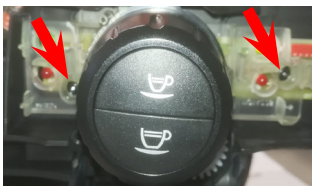
Service door

Open the service door and slip off it.

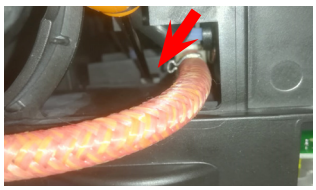
7.2. KYB interface

Slip off the righ and left guide and the flat cable.

Using a flat screwdriver, slip off the crown that holds the steam/water gear.



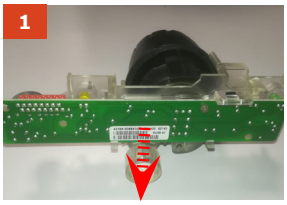
Unscrew the highlighted screws.

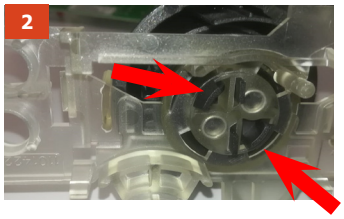


Using a flat screwdriver, slip off the coffee dispenser.

Lower the coffee dispenser and slip off the water/steam gear and KYB assy.

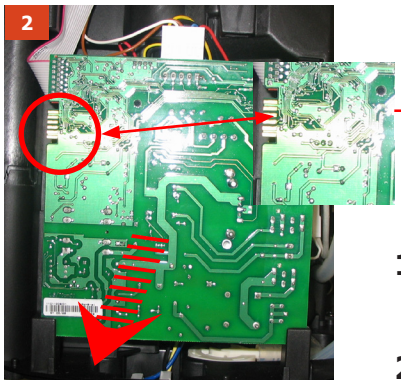
7.3. The control knob and coffee keys





1) Slip off the KYB;
2) Slip off the buttons;
3) Slip off the control Knob.

7.4. Power P.C.B.



To reprogram the P.C.B. connect the S.S.C

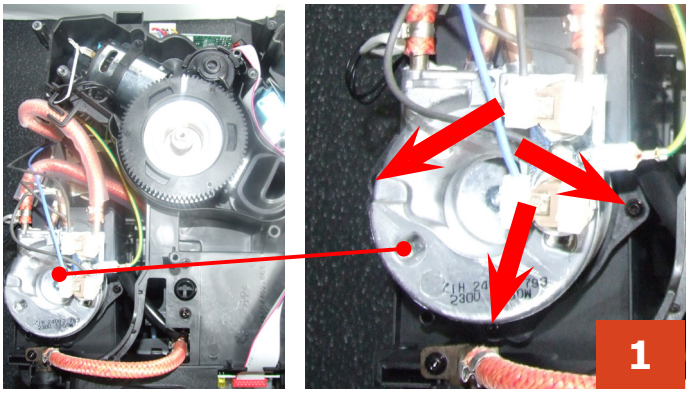
1) Loosen the screw shown and remove the P.C.B. protection.

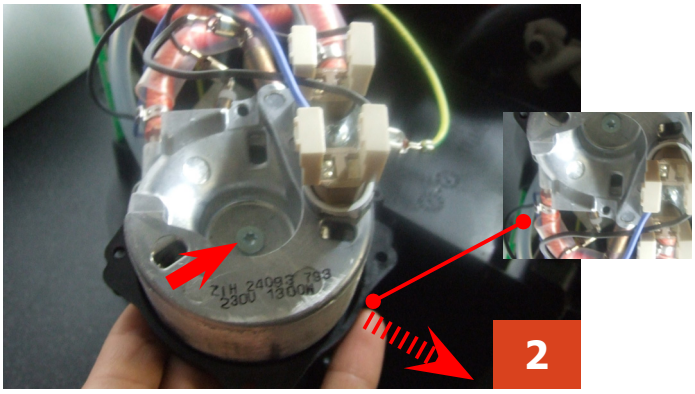
2) Slide out the P.C.B., removing all connections.

7.5. Coffee dispenser

Using a flat screwdriver, slip off the coffee dispenser.

7.6. The boiler

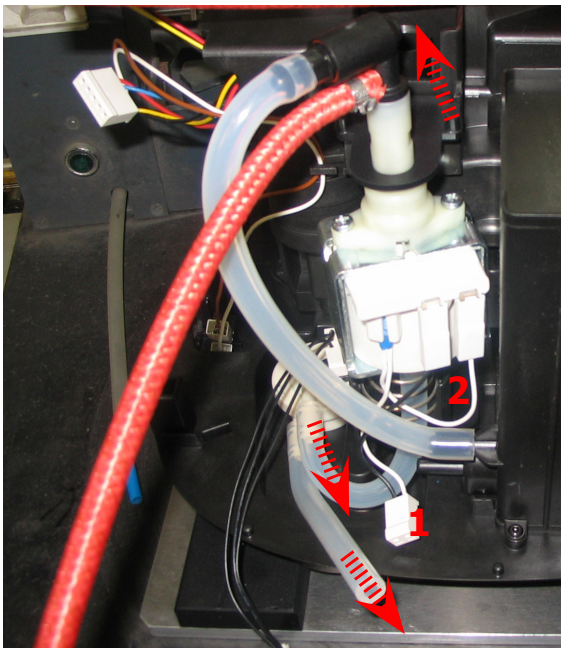




1) Loosen the screws shown.

2) Loosen the screw and remove the plastic support. Disconnect the hydraulic and electrical connections.

7.7. Pump and turbine



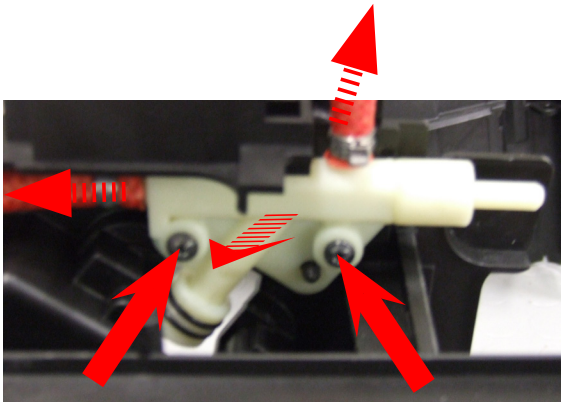
Slide out the support as shown.

Remove connection **1**, slide out the silicone hoses.

To prevent annoying vibrations when reassembling the pump, take extra care when positioning spring **2**.

At this point, the turbine may also be removed from its recess.

7.8. Flow selector faucet

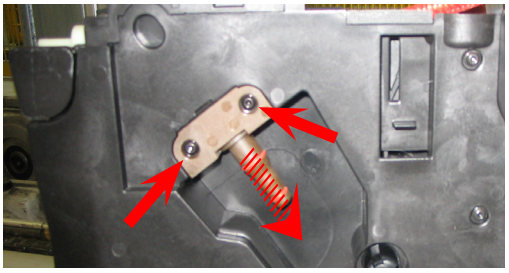


Loosen the screw and disconnect the hydraulic connections, remove the flow selector faucet.

7.9. Casing bottom insert

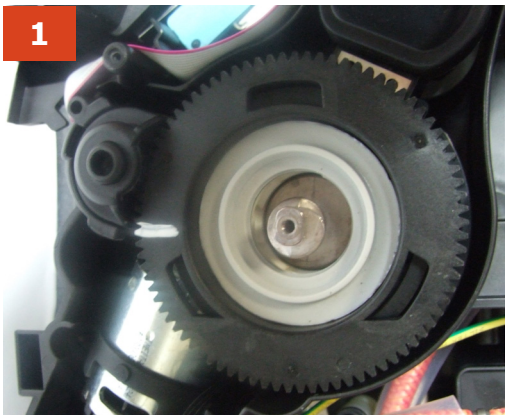
1) Loosen the screw shown;
2) Loosen the screw shown and disonnect the hydraulic connections;
3) Loosen the screw shown and disonnect the electrical connection

7.10. Pin boiler

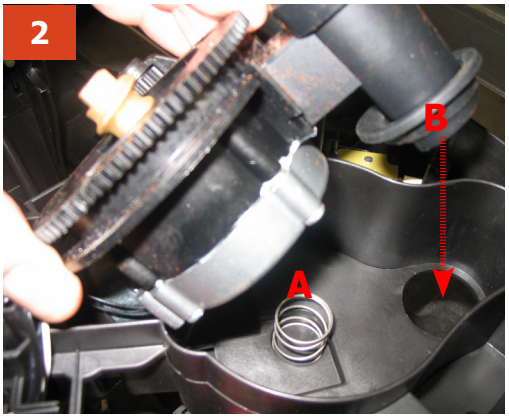


Loosen the screws shown and remove the pin boiler.

7.11. Coffee grinder

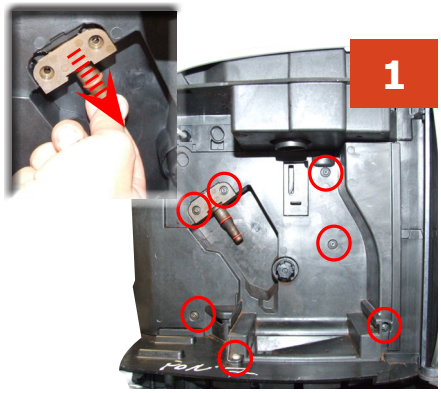


1) To remove the coffee grinder, simply slide it out and remove its connections.

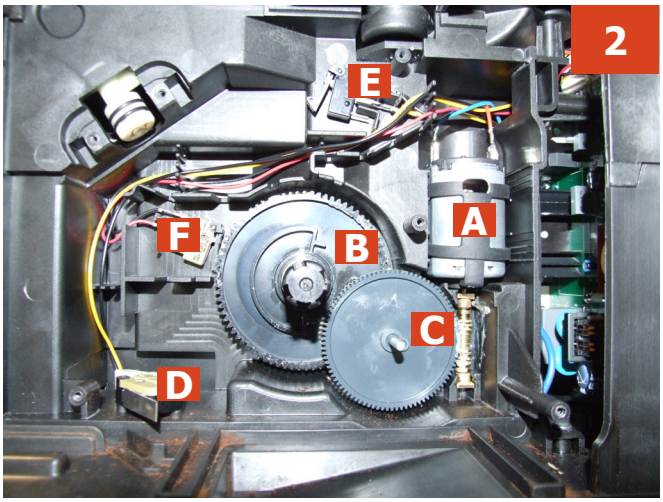


2) When replacing it, make sure the spring (A) and the coffee pipe (B) are positioned correctly.

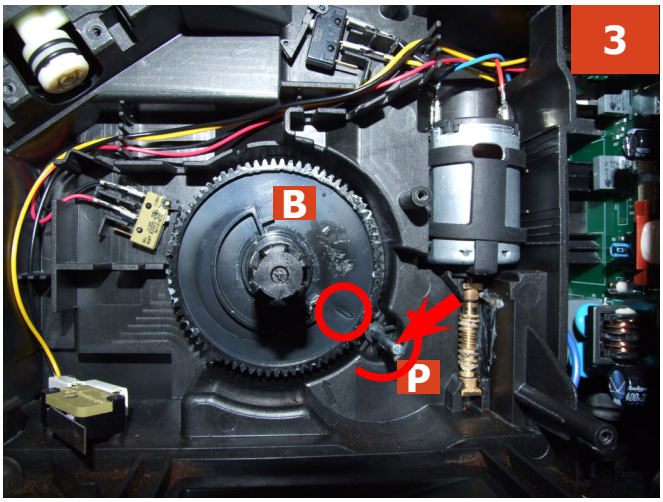
7.12. Gearmotor



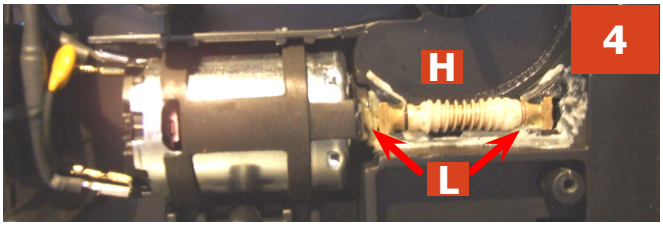
1) Loosen the screws holding the boiler pin in place, remove it and loosen the other screws shown



2) The following are located inside the compartment protected by the casing:
- Brew drive (A) with gears (B) and (C) for transmission and timing of the dispensing head.
- Grounds drawer present microswitch (D).
- Brewing unit present microswitch (E).
- Microswitch (F) detecting brewing unit home and work positions.
- Remove the gear (C) that meshes with the motor transmission shaft
- Remove the large gear (B)
- Remove the motor (A), complete with transmission shaft

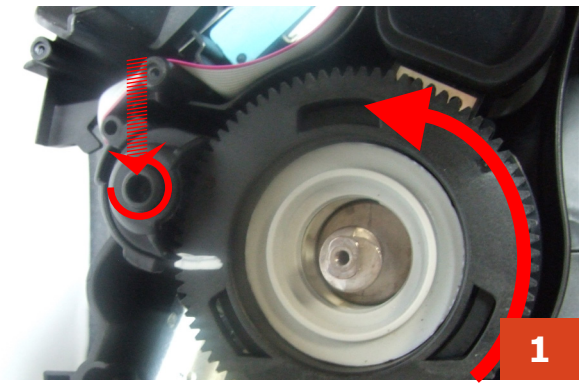


3) Replace the gear (B), making sure that the imprint of the arrow is aligned with the opening containing the pin (P)

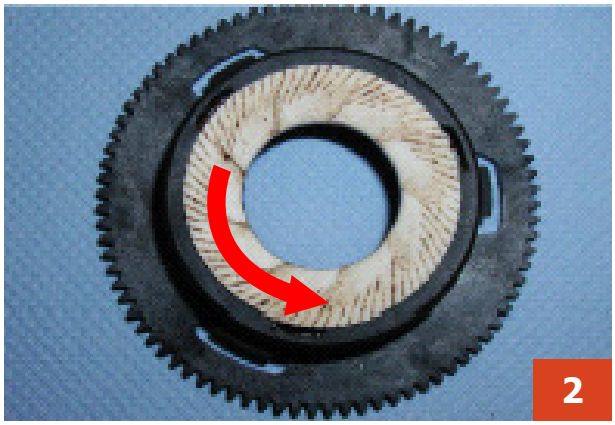


4) When replacing the motor and the transmission shaft, make sure the bearings (L) are in the right position.
Grease the shaft thoroughly and evenly

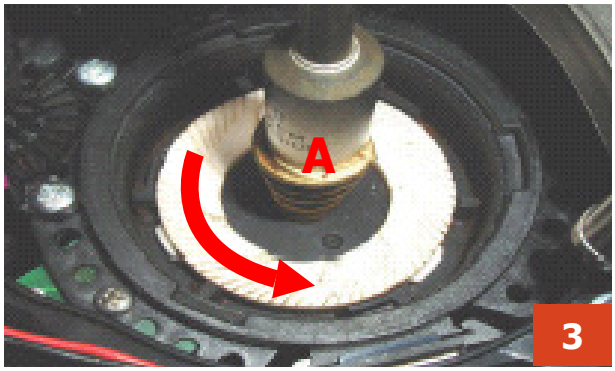
7.13. Grinder adjustment/assembly and disassembly



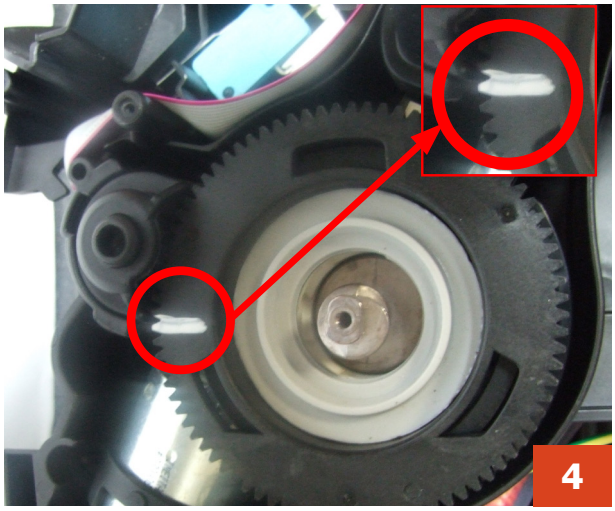
1) To remove the upper grinder support, using a hex key push down and turn clockwise to release the grinder support from the bayonet coupling



2) To remove the grinder blade from the upper support, turn it anti-clockwise until it detaches from the bayonet coupling

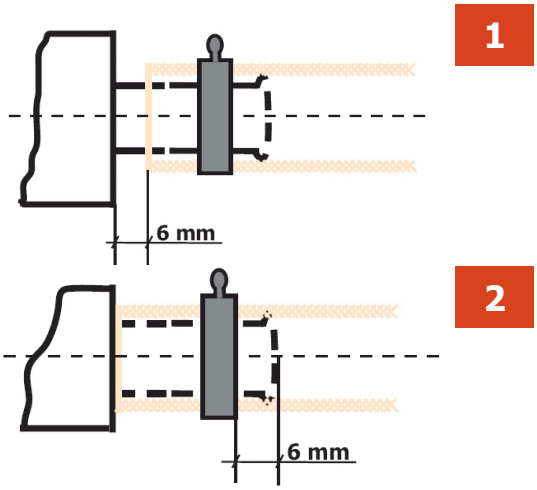


3) To remove the lower grinder blade, keep the increment pin (A) locked in position and turn the grinder blade anti-clockwise, until it detaches from the bayonet coupling



4) When refitting the upper grinder support, make sure you reposition it so that the mark is as illustrated in the photo

7.14. Oetiker clamps assembly and disassembly



1) Boiler connection

2) Other connections

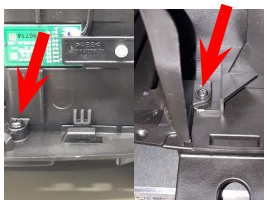
Replacing the hoses

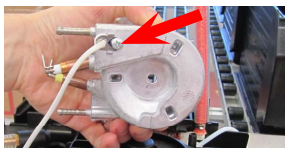
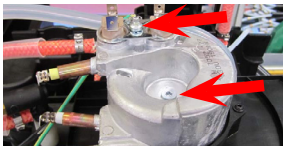
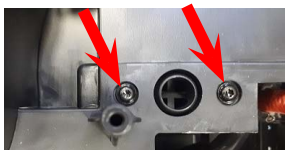
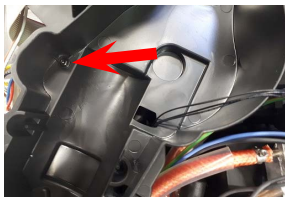
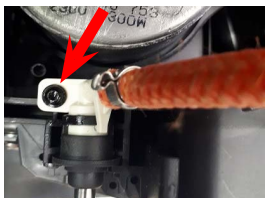
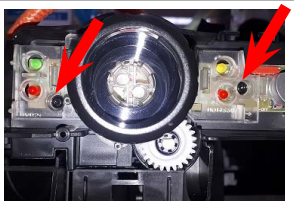
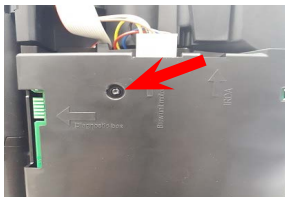
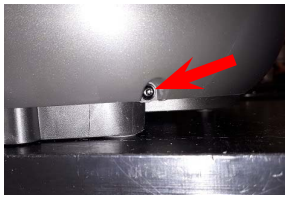
1) Use a suitable pair of pliers to remove the clamp (as illustrated)

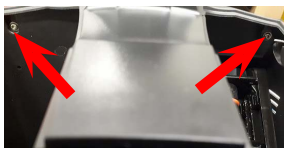
2) Tighten the clamp as illustrated

7.15. Tightening torques

The purpose of this paragraph is to define the correct tightening torque of each screw present on the Gaggia Besana machine models.
A manual dynamometer must be used to check the tightening torque.

Screw	Quantity	Image	tightening torque
Flow selctor faucet.	2		0,5 Nm ± 0,1
Mounting plate cover 1	6		0,65 Nm ± 0,1
Mounting plate cover 2	1		0,6 Nm ± 0,1
Mounting plate	1		0,7 Nm ± 0,1
Casing bottom insert	2		0,6 Nm ± 0,1
Capacitiv sensor	1		0,4 Nm ± 0,05
Safety valve	1		1,0 Nm ± 0,1
Boiler support	3		0,6 Nm ± 0,1

Screw	Quantity	Image	tightening torque
Temperature sensor	1		2,0 Nm ± 0,5
Boiler and thermostat	2		1,5 Nm ± 0,5
Coffee grinder plate 1	2		0,6 Nm ± 0,1
Coffee grinder plate 2	1		0,6 Nm ± 0,1
Steam/water tube support	1		0,7 Nm ± 0,1
KYB	2		0,6 Nm ± 0,1
Power board protection	1		0,6 Nm ± 0,1
Left side cover 1	1		0,7 Nm ± 0,1
Left side cover 2	2		0,7 Nm ± 0,1

Screw	Quantity	Image	tightening torque
Left side cover 3	1		0,6 Nm ± 0,1
Upper cover casing 1	2		0,6 Nm ± 0,1
Upper cover casing 2	2		0,7 Nm ± 0,1
Bean container finger protection	1		1,2 Nm ± 0,1