Coffee Machine

Service
Service
Service

Gaggia Anima

ServiceManual

TYPE	12NC	DESCRIPTION	TYPE	12NC	DESCRIPTION
RI8760/01	886876001010	GAG ANIMA CMF BK 230 WE	RI8759/01	886875901010	GAG ANIMA CLASS OTC ANT 230V
RI8760/01	886876001020	GAG ANIMA CMF BK 230 WE	RI8759/05	886875905710	GAG ANIMA CLASS OTC AN 220 CN
RI8760/05	886876005710	GAG ANIMA CMF BK 220 CN	RI8759/06	886875906470	GAG ANIMA CLASS OTC AN 220 KR
RI8760/05	886876005210	GAG ANIMA CMF BK 220 CN	RI8762/01	886876201010	GAG ANIMA PREST.OTC SS 230 WE
RI8760/06	886876006470	GAG ANIMA CMF BK 220 KR	RI8762/01	886876201020	GAG ANIMA PREST.OTC SS 230 WE
RI8760/06	886876006570	GAG ANIMA CMF BK 220 KR	RI8762/03	886876203530	GAG ANIMA PREST.OTC SS 240 AU
RI8760/18	886876018150	GAG ANIMA CMF BK 240 UK	RI8762/03	886876203630	GAG ANIMA PREST.OTC SS 240 AU
RI8760/18	886876018250	GAG ANIMA CMF BK 240 UK	RI8762/06	886876206470	GAG ANIMA PREST.OTC SS 220 KR
RI8760/40	886876040460	GAG.ANIMA CMF BK 100V JP	RI8762/06	886876206570	GAG ANIMA PREST.OTC SS 220 KR
RI8760/41	886876041240	GAG ANIMA CMF BK 127 BR	RI8762/18	886876218150	GAG ANIMA PREST.OTC SS 240 UK
RI8760/41	886876041340	GAG ANIMA CMF BK 127 BR	RI8762/18	886876218250	GAG ANIMA PREST.OTC SS 240 UK
RI8760/42	886876042240	GAG ANIMA CMF BK 220 BR	RI8762/41	886876241240	GAG ANIMA PREST.OTC SS 127 BR
RI8760/42	886876042340	GAG ANIMA CMF BK 220 BR	RI8762/41	886876241340	GAG ANIMA PREST.OTC SS 127 BR
RI8760/46	886876046540	GAG ANIMA CMF BK 120 US	RI8762/46	886876246540	GAG ANIMA PREST.OTC SS 120 US
RI8760/46	886876046740	GAG ANIMA CMF BK 120 US	RI8762/46	886876246740	GAG ANIMA PREST.OTC SS 120 US
RI8761/01	886876101010	RGAG ANIMA DLX AMF SS 230 WE	RI8763/01	886876301010	GAG ANIMA XL OTC EXT.SL 230 WE
RI8761/01	886876101020	RGAG ANIMA DLX AMF SS 230 WE	RI8763/05	886876305710	GAG ANIMA XL OTC EXT.SL 220 CN
RI8761/05	886876105710	GAG ANIMA DLX AMF SS 220 CN	RI8763/06	886876306470	GAG ANIMA XL OTC EXT.AN 220 KR
RI8761/05	886876105210	GAG ANIMA DLX AMF SS 220 CN	RI8763/41	886876341240	GAG ANIMA XL OTC EXT.SL 127 BR
RI8761/40	886876140460	GAG.ANIMA DLX AMF SS 100V JP	RI8763/42	886876342240	GAG ANIMA XL OTC EXT.SL 220 BR
RI8761/46	886876146540	GAG ANIMA DLX AMF SS 120 US	RI8763/46	886876346540	GAG ANIMA XL OTC EXT.SL 120 US
RI8761/46	886876146740	GAG ANIMA DLX AMF SS 120 US			

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Technical specification

Power supply and output:	230V ~ 50Hz 1900W / 120-127V ~ 60Hz 1300W / 220V ~ 50-60Hz 1900W / 100V ~ 50-60Hz 1200W
Power consumption:	During heating phase- approx. 5.6 A
Boiler: Stainless steel	230-220V ~ 1900W / 120-127V ~ 1300W / 100V ~ 1100W for coffee, hot water and steam dispensing
Safety system:	2 thermostats at 190°C one shot
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/S GW 230V, 50 Hz / 220V, 50-60Hz / 100V 50-60Hz and Type EP5/S 120-127V, 60Hz, approx. 13-15 bar with reciprocating piston and thermal switch 100°C 48 W.
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:	Can be set by the consumer
Adjustable spout height:	110-150 mm
Housing material	Thermoplastic material
Size (w x h x d)	221 x 340 x 430 mm (CMF-AMF-OTC) 221 x 386 x 430 (XL)
Weight	7,5 kg (CMF-AMF-OTC) 8 Kg (XL)
Power Cord length	1200 mm
Cup size	Up to 152 mm
Water tank	1.8 litres (CMF-AMF-OTC) 2.5 litres (XL) - Removable type
Water fileter	Brita Filter 12NC-996530010484(RI9113/60 for EUR-ASIA) / 12NC-996530010528(RI9113/67 for US-CAN)
Coffee bean hopper capacity	250 g (CMF-AMF-OTC) 500 g (XL)
Coffee grounds drawer capacity	15 pucks
Milk carafe capacity	0,5 l (OTC-XL)
Energy Efficiency Label	A (AMF-CMF) B (OTC-XL)
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).

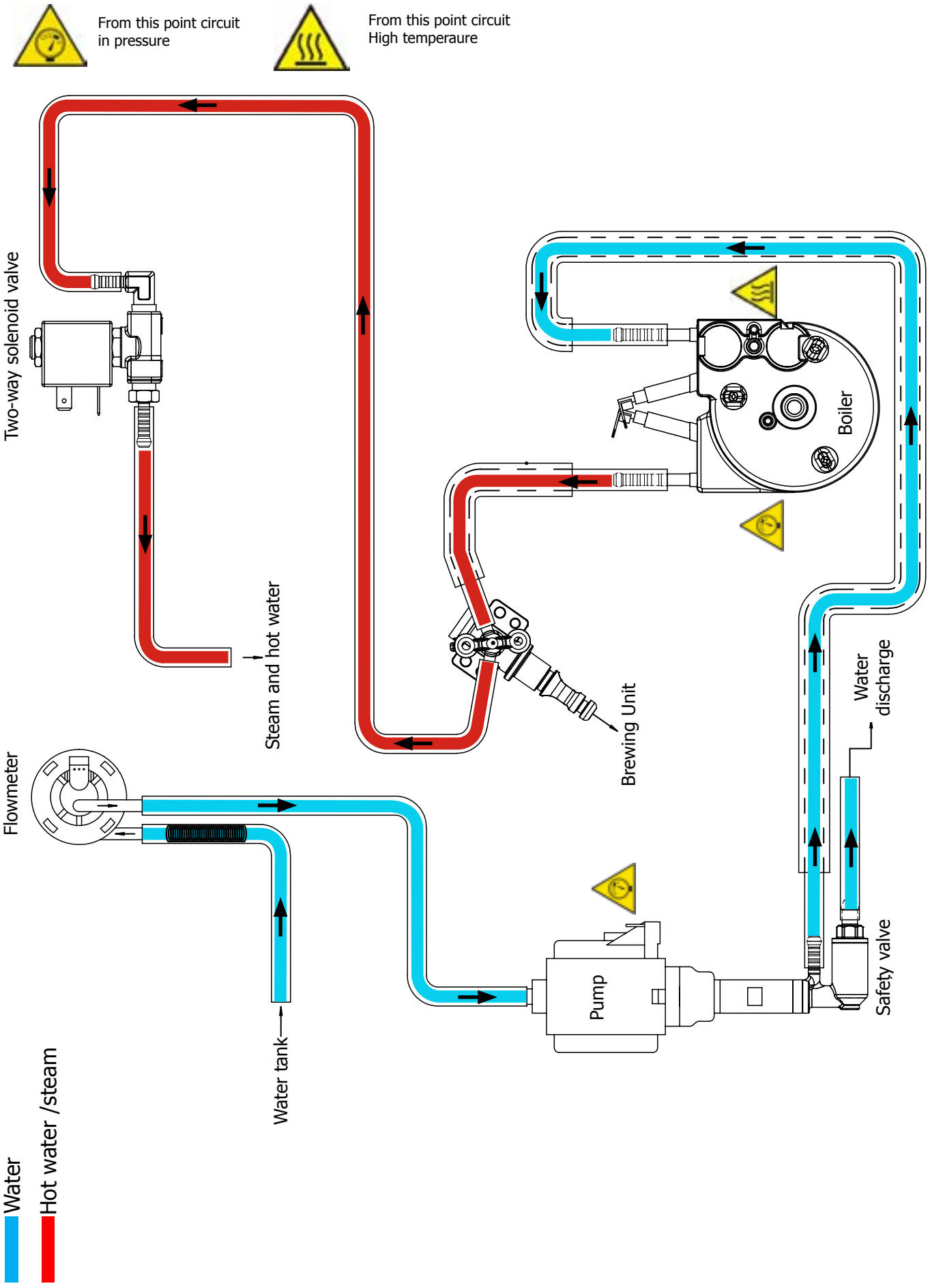
During the machine disassembly the operator has to pay attention to hot and under pressure parts.
All parts involved can be find in the hydraulic circuit below schema.

The machine hydraulic circuit can reach maximum pressure of 16/18 bar.

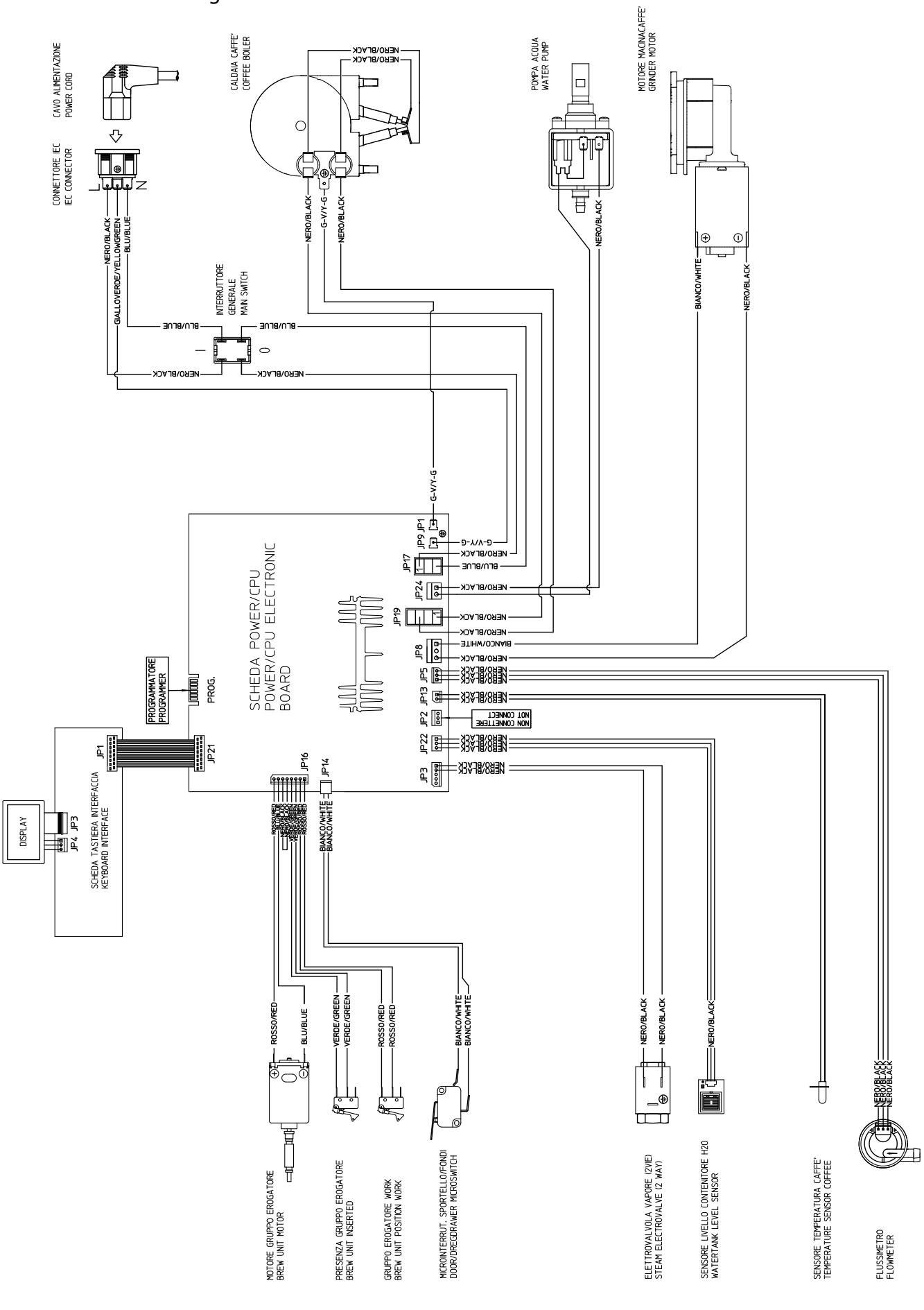
When the machine arrives at the Service Center in descaling mode interrupted, or making Descaling , take EXTREME CARE to avoid any unintentional contacts with the descaler.

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



1.5. Electrical diagram

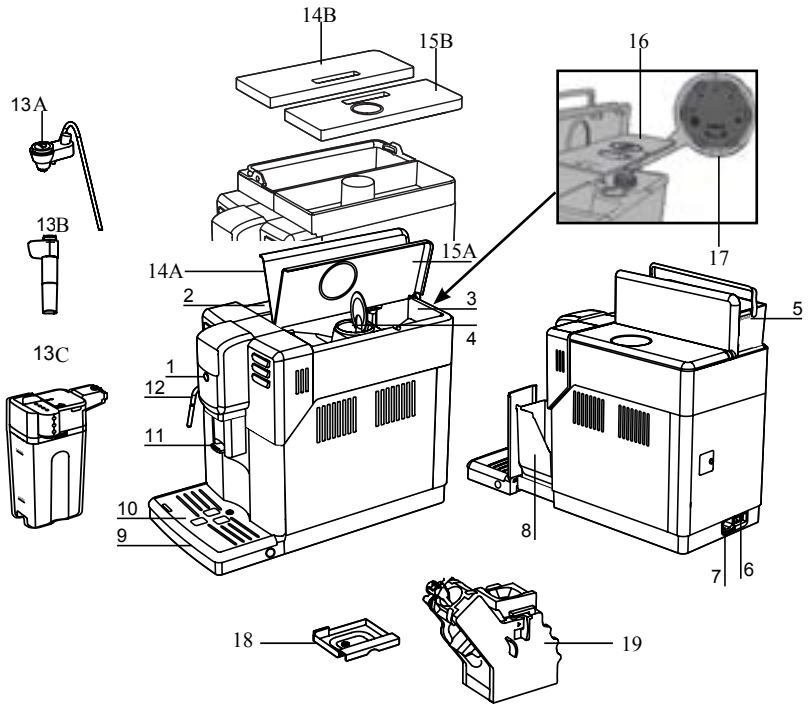


1.6. Service POLICY grid as used for coffee machine

For IN WARRANTY repairs is raccomanded to use when and where possible the single components, available in the exploded views of the coffee machines or of the specific components. If you find the information "SEE THE EXPLODED VIEW E....." in the assembly description field, it means that the single components of the assembly are available in the other pages of the exploded view. It's possible to use the assembly only if there is a specific Symptom Cure that include this possibility or when the single components are not available for the order.

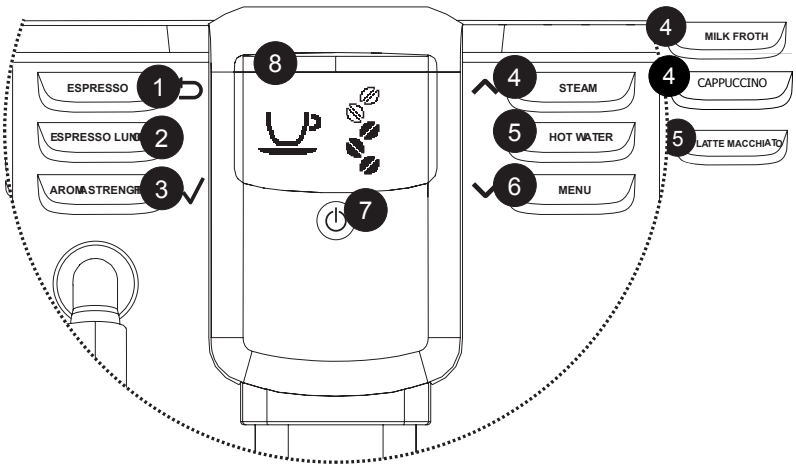
1.7. External machine parts

1	STAND-BY button
2	Water tank seat
3	Coffee bean hopper (CMF AMF OTC) UP TO SN TW901646728088 230V (Alwais used for 120-220V)
4	Pre-ground coffee compartment (CMF AMF OTC)
5	Removable water tank
6	Main switch
	I. ON
	0. OFF
7	Power cord socket
8	Coffee grounds drawer
9	Drip tray
10	Drip tray grill
11	Coffee dispensing spout
12	Steam/hot water dispensing spout
13A	Automatic milk frother (AMF)
13B	Classic milk frother (CMF)
13C	Caraffe (OTC/XL)
14A	Water tank lid (CMF AMF OTC)
14B	Water tank lid (XL)



15A	Coffee bean hopper lid (CMF AMF OTC)	17	Grind setting knob From SN TW901646728089 230V		
15B	Coffee bean hopper lid (XL)				
16	Bean hopper From SN TW901646728089 230V	18	Coffee residues drawer		
		19	Brew group		

Display

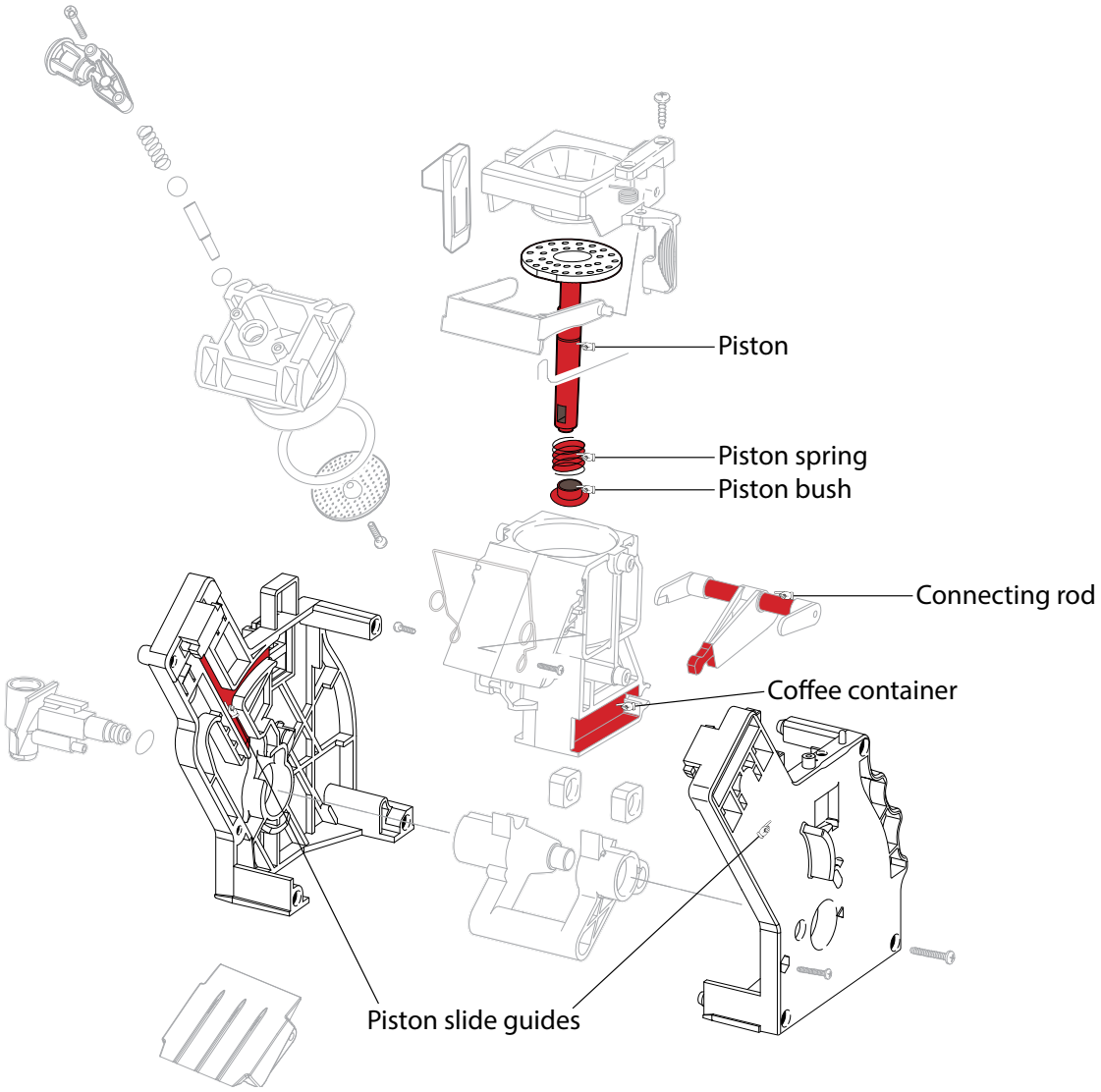


1		ESPRESSO button
		ESC button
2		ESPRESSO LUNGO button
3		AROMA STRENGTH button
		OK button
4		STEAM button (CMF)
		MILK FROTH button (AMF)
		CAPPUCCINO button (OTC XL)
		UP button
5		HOT WATER button (CMF AMF)
		LATTE MACCHIATO button (OTC XL)
6		MENU button
		DOWN button
7		STAND-BY button
8		Display In the example: Main menu; ready for brewing

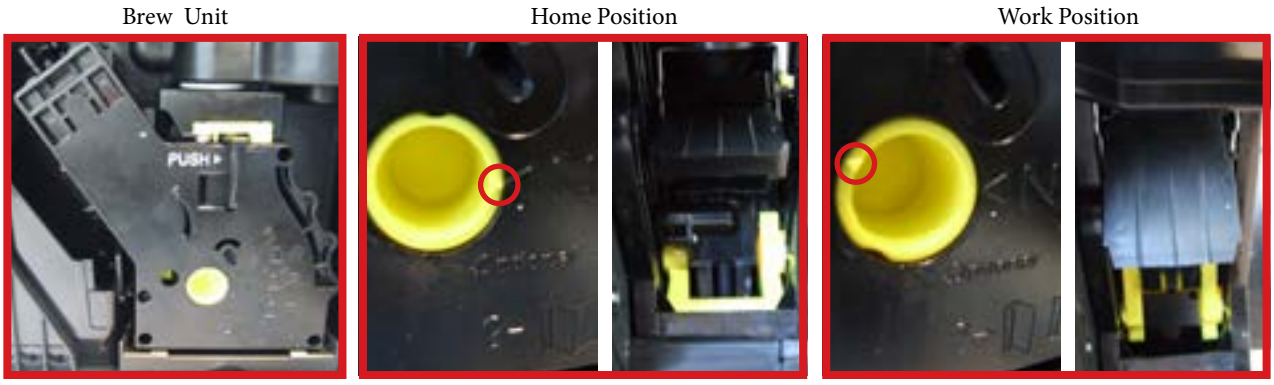
1.8. Error codes

ERROR CODES	DESCRIPTION
01	The coffee grinder is blocked
02	The grinder is disconnected (Only coffee grinder without electronic sensor)
03	The brewing unit is blocked in work position
04	The brewing unit is blocked in home position
05	The hydraulic circuit is clogged
10	The temperature sensor is in short circuit
11	The temperature sensor is opened
14	The temperature was up to 170°
15	The machine doesn't heat up
19	The net is not stable
22	The keyboard is not recognized

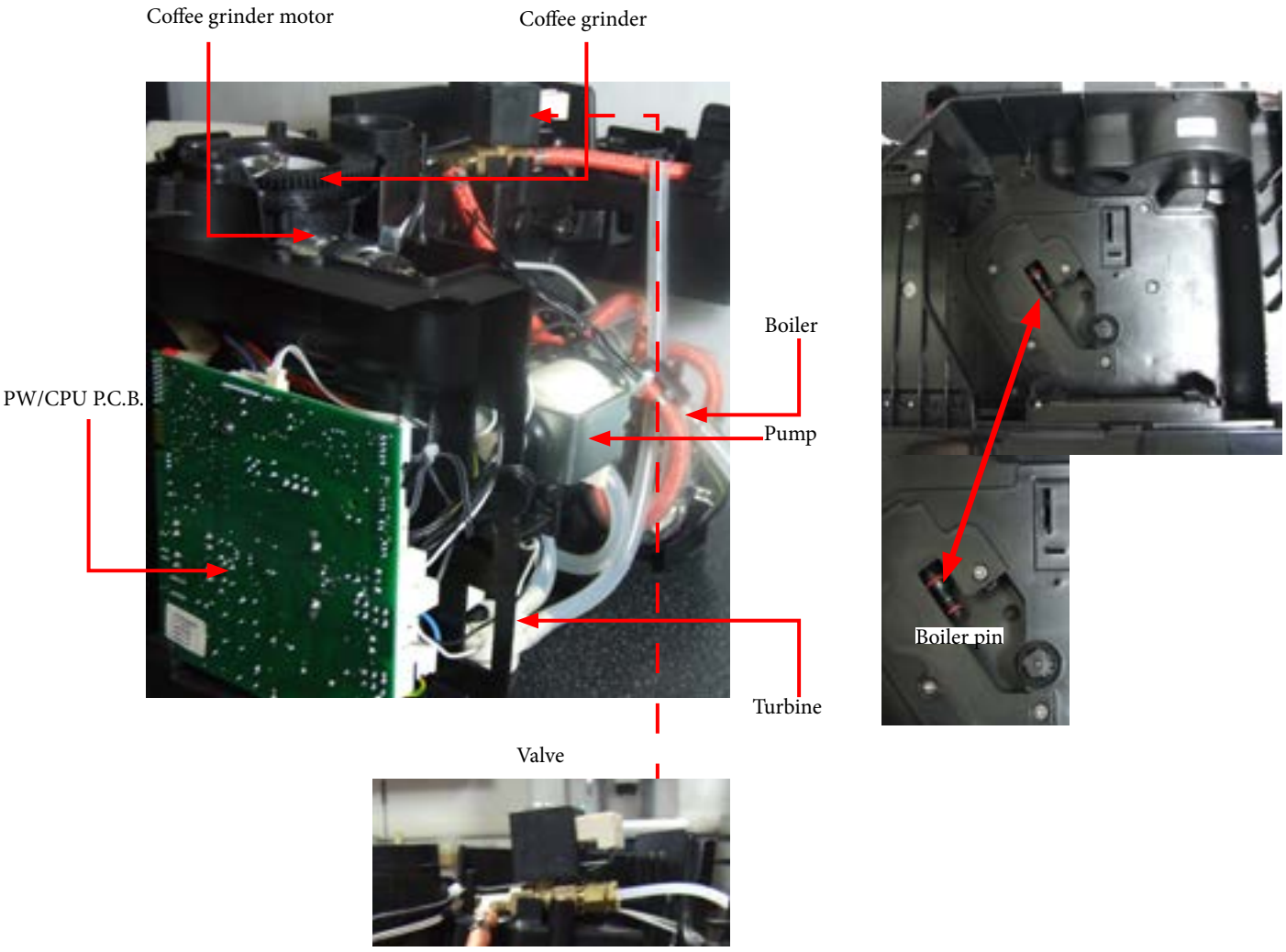
1.9. Brew Unit mainteinance: Where to grease.



1.10. Position of the Brew Unit



1.11. 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;

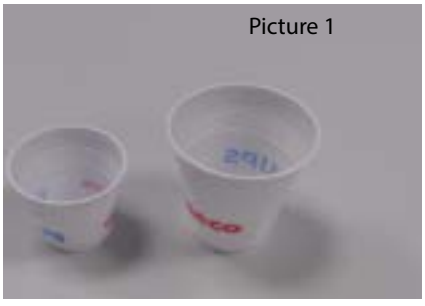
4. Test measurement: from end of dispensing to the end of rotations must be completed within 12 seconds.

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).

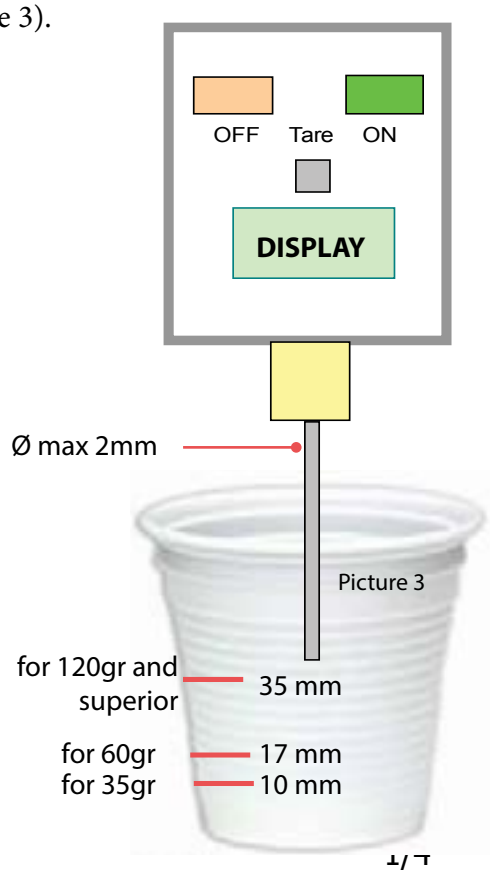
Limits of acceptability
The acceptance limits are divided by features and products and are the following:

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:

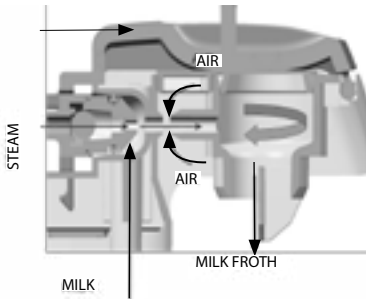
- Manual system (pannarello)
- Semi-Automatic system (cappuccinatore)
- Automatic system (carafe, Pinless wonder system)

Milk temperature in the beaker:

System with Pinless Wonder: With milk at Trefr. (about 4-10 °C): $\rightarrow\Delta \geq 45$

how does it work:

1. The milk is heated in the first chamber of the carafe thanks to the steam.
2. Then, it is mixed with air and frothed in the middle chamber.
3. Finally, in the outlet chamber, the 'typhoon effect' perfects the milk texture by removing the large bubbles



Height of the milk cream in the beaker:

Manual system (pannarello) ≥ 15mm on 100gr. of brewed product

Semi-automatic system (cappuccinatore) ≥ 20mm on 100gr. of brewed product

Automatic system: carafe, Pinless wonder system ≥ 20mm 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.

Semi-automatic systems (cappuccinatore)

Pours milk at Trefr. in a container ; with the machine in steam mode:

1. Open the steam knob to discharge water circuit for 4 sec. then close the knob.
2. Insert the silicone tube in the milk container, placing a beaker of 250 ml capacity and with an inner diameter of 70 mm under the cappuccino maker and open the steam knob.
3. After having provided 100gr. of product, close the knob and check the result obtained on milk.

Note: The same applies to machines which have a steam key on the user interface and a solenoid valve in place of the steam tap.

Automatic: Carafe, Pinless Wonder System

After setting the machine to brew of 100gr. of product:

1. Launch the "hot milk" function.
2. Collect the product in a beaker with a 250ml of capacity and with an inner diameter of 70 mm, and verify the result obtained on milk. Carry out the test using milk at a Trefr..

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	Default quantity coffee (Grams)	Default quantity milk (Seconds)	User programmable
Espresso	40 +/- 10gr		Yes
Espresso lungo	80 +/- 10gr		Yes
Cappuccino	50 +/- 10gr	34 seconds	Yes for both product
Latte macchiato	30 +/- 10gr	40 seconds	Yes for both product
Froth milk		34 seconds	Yes
Hot water	Continues until the water supply has been exhausted (capacitive sensor)		
Steam	Max 180 seconds		

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	Yes
Boiler temperature during Standby	Boiler OFF

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

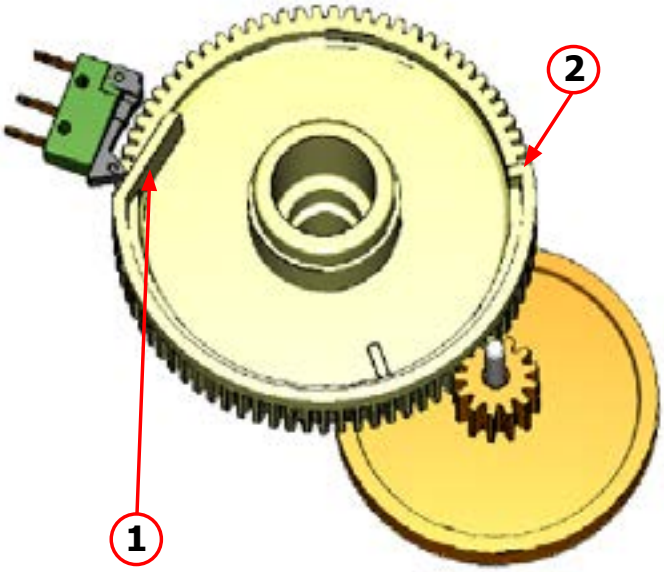
CHAPTER 3

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

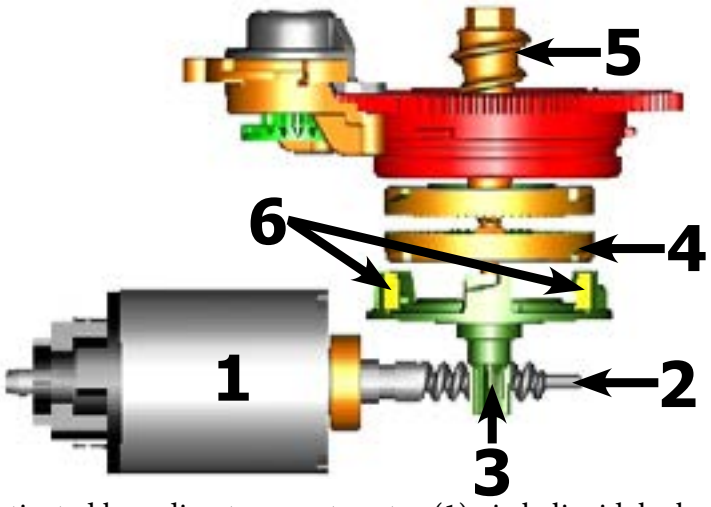
- Dispensing position: 2

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

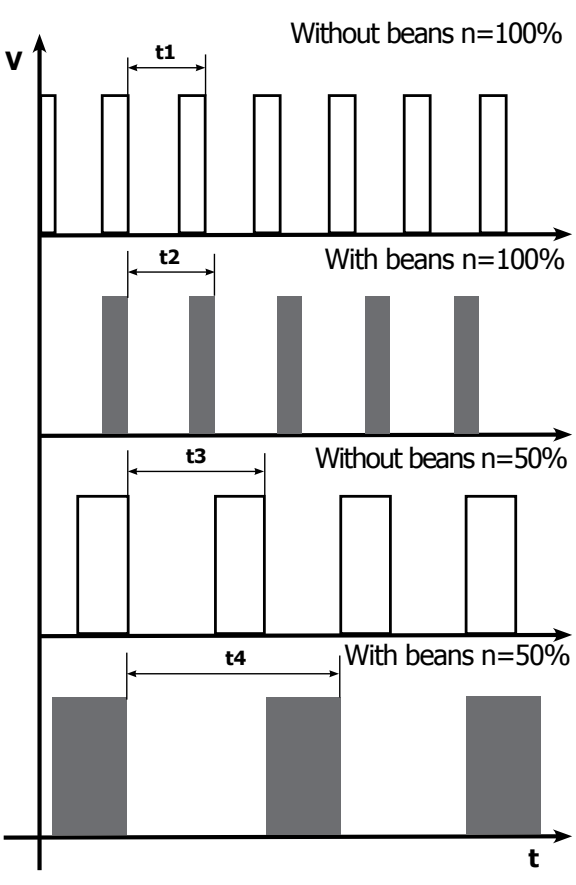
A thermistor, NTC type (Negative temperature coefficient), is used as a temperature sensor; in the event of overheating this reduces boiler element power consumption. The electronic system detects the current boiler temperature from the drop in voltage of the sensor and adjusts it accordingly. Heating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

3.3. Coffee grinder 100-120-127V



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) 100-120-127V

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 and setting by the user:

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.
3. Aroma selected by the user.

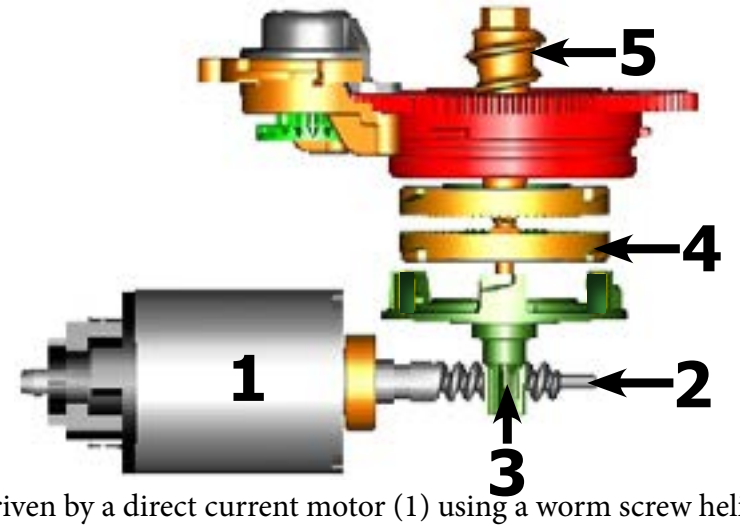
The algorithm compares the maximum average value of the power consumed by the gear motor with the value listed in the table for the selected aroma, in order to calculate the new grinding pulse value for the next coffee produced.
If the power consumption value is less than the minimum current value, the 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.
If the "pre-ground" flavour is selected by the user, no modification will be made.

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) TO APPLY TO MED AROMA				
		3 levels	**5 levels**	**+2**	**0**	**-4**	**-10**	**-10 and CYCLE ABORTED**
Aroma of the grinded product	**A**	Light	Very Light	MAX_CURRENT_mA <150mA	<=150mA MAX_CURRENT_mA <=250mA	MAX_CURRENT_mA >250mA	MAX_CURRENT_mA >800mA	MAX_CURRENT_mA >1000mA
	B	Med	Light	MAX_CURRENT_mA <250mA	<=250mA MAX_CURRENT_mA <=350mA	MAX_CURRENT_mA >350mA	MAX_CURRENT_mA >800mA	MAX_CURRENT_mA >1000mA
			Med					
	C	Strong	Strong	MAX_CURRENT_mA <350mA	<=350mA MAX_CURRENT_mA <=500mA	MAX_CURRENT_mA >500mA	MAX_CURRENT_mA >800mA	MAX_CURRENT_mA >1000mA
			Very Strong					

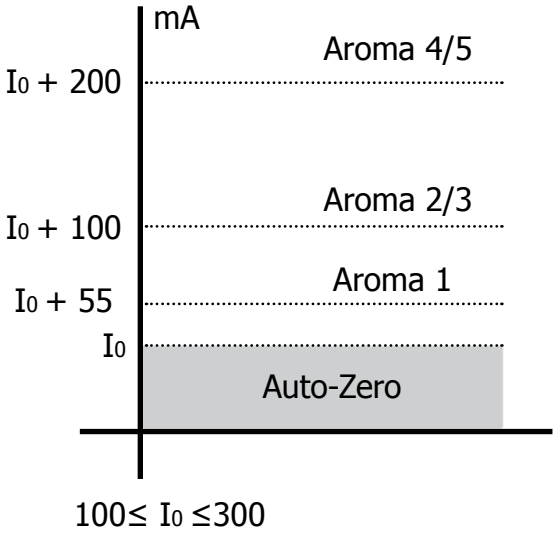
Important:
For perfect operation, machine adjustment should take place in the area of the fields highlighted in green (A, B, C). When the type or brand of coffee is changed, there may be variations in the size of the beans and their stickiness or roasting level. This leads to variations in power consumption (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. Coffee grinder for 220-230V



The coffee grinder is driven by a direct current motor (1) using a worm screw helicoidal wheel transmission (2).
The worm screw (2) drives a plastic gear wheel (3), which turns the lower grinder (4) and the increment pin (5)

3.7. Autodose system description 220-230V



I_0 = current when the BU is moving without load, i.e. without coffee. It occurs, for example, during the rinsing phase of coffee spout.

Current targets:

Aroma 1→55mA
Aroma 2/3→ 100mA
Aroma 4/5→ 200mA
100 mA ≤ I_0 ≤ 300 mA

If the BU current is ≤ the current target→ the grinding time ↑
If the BU current is ≥ the current target→ the grinding time ↓

1) When the system get the stability (i.e. the system got the current target) the coffee doses should be:

A1	A2/3	A4/5	
7,5	9,0	10	±1,5 grams

with medium grinding (500±60µm) and using coffee of test.

2) the 3 grinding times are always:

$$T_1 < T_2 < T_3$$

beside, every grinding time is, respectively:

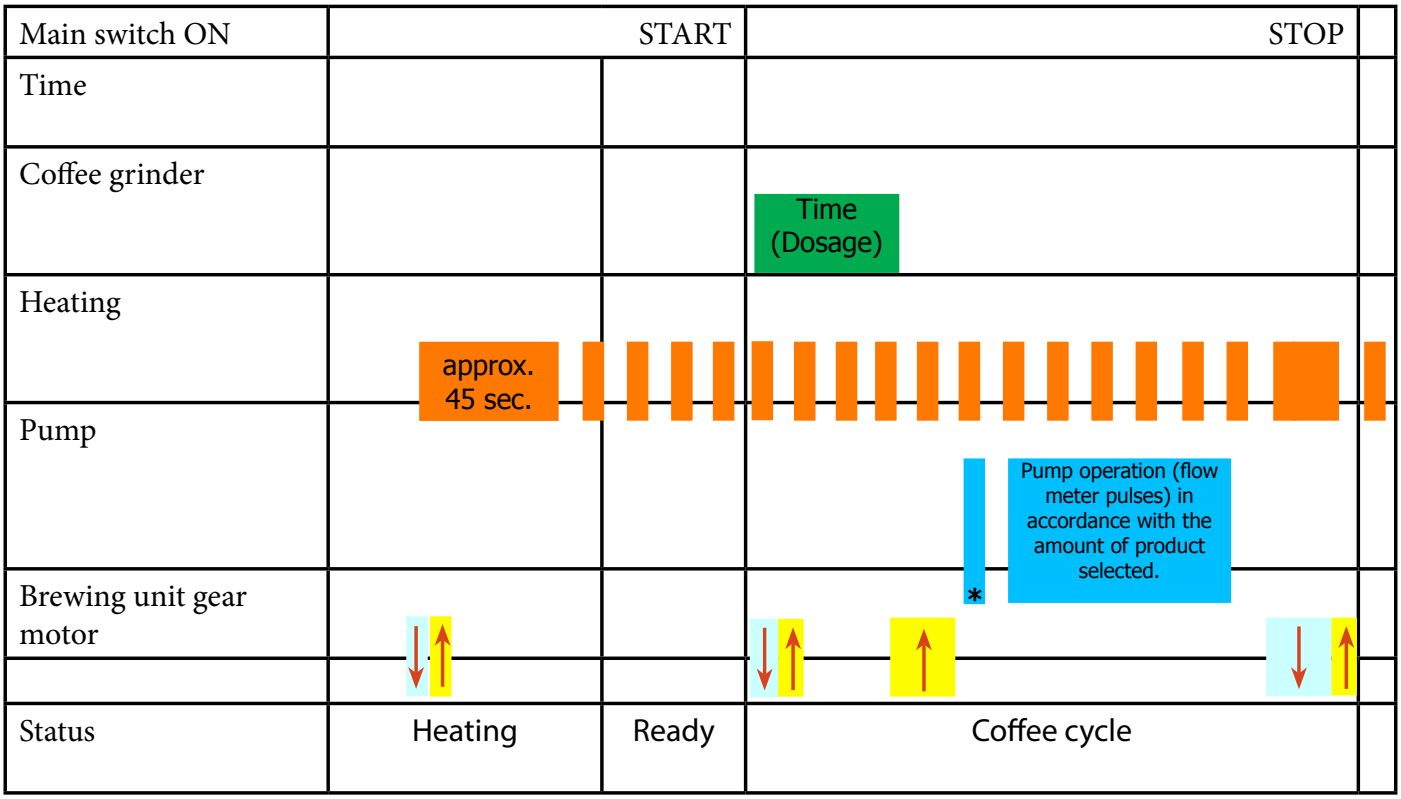
4,0s ≤T_3 ≤10s (10000ms)
3,5s ≤T_2 ≤9s (9000ms)
3,0s ≤T_1 ≤8,1s (8100ms)

			DOSE ADJUSTMENT			
	5 levels		Grinder Time	Min Grinder Time	Max Grinder Time	Curret target
Aroma of the grinded product	Aroma1	Very Light	T_1	3s	8,1s	I_0 + 55mA
	Aroma2	Light	T_2	3,5s	9s	I_0 + 100mA
	Aroma3	Med				
	Aroma4	Strong	T_3	4s	10s	I_0 + 200mA
	Aroma5	Very Strong				

3.8. Coffee lack detection and coffee grinder blocked 220-230V

When the coffee grinder is working, the software monitors the current consumption. If the current value is very low, the machine concludes that coffee is missing; if the current value is very high, the machine concludes that the coffee grinder is blocked; instead, if the current value is in the middle, the machine concludes that all is ok and it goes on to do the product.
Because the current consumption of grinder changes depending on the situations (motor new or old, cold or hot, etc., coffee blends), these current thresholds are not static, but dynamic.

3.9. Coffee cycle



Notes: * Only with Pre-brewing

Coffee cycle

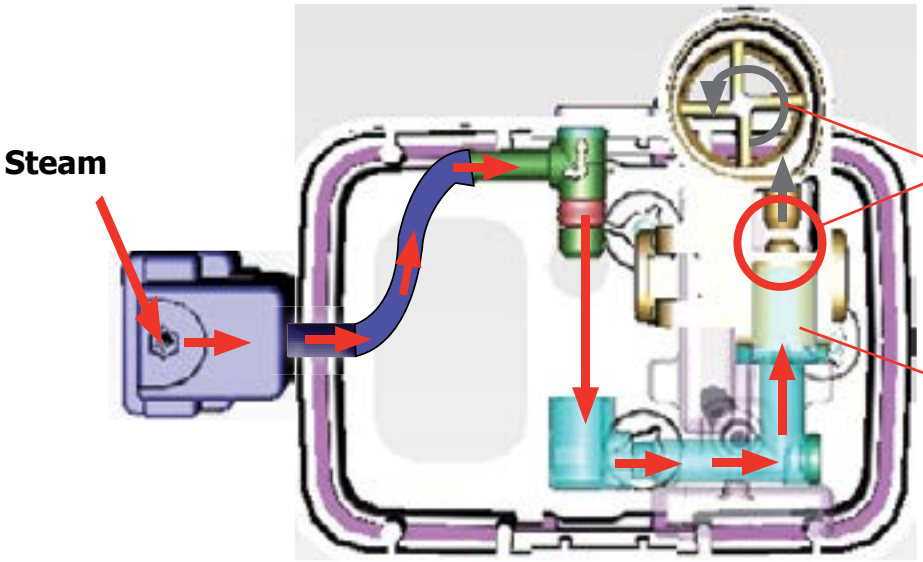
see below the steps related both coffee and milk cycle:

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);
3.1. The solenoid valve opens (For milk products);
3.2. The dispensing milk phase starts (For milk products);
3.3. The solenoid valve closes (For milk products);
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);

Note: For milk products, the consumer can the milk and coffee order.

3.10. Milk Carafe

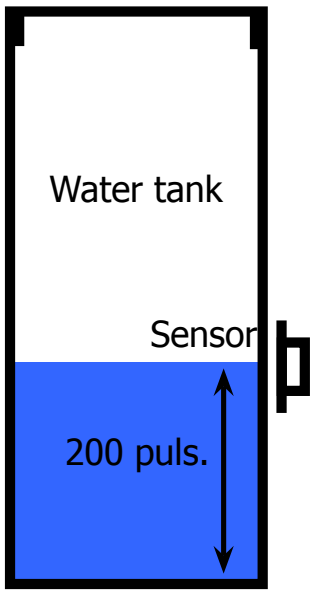
1)Steam input
2)Bring the cappuccino maker into dispensing position
3)Milk tank



The milk is heated by the steam and taken towards the emulsion chamber where it is mixed with air and transformed into foam

The steam passes through the pipe creating a sucking effect that pulls the milk upwards

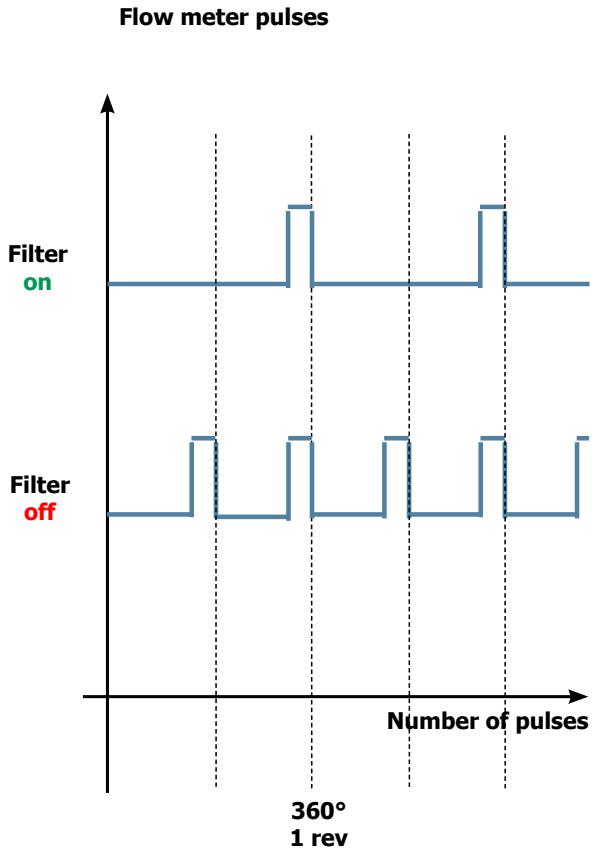
3.11. Water level detection (water tank)



"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.

3.12. Descaling request



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

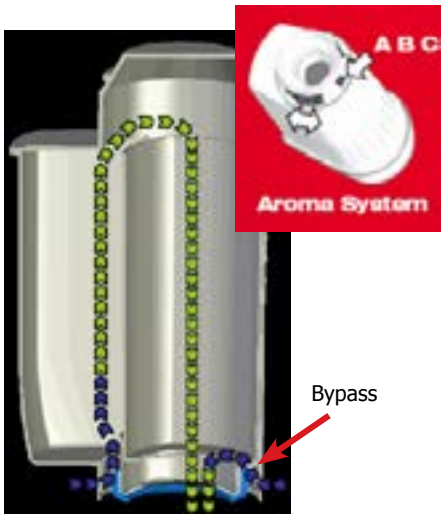
The water hardness is set on the basis of the regional water hardness analysis (1, 2, 3, 4).

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.

3.13. 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.

3.14. Descaling cycle frequency

Descaling cycle frequency			
Hardness	**WATER HARDNESS**	**Without water filter**	**Not reactivating the filter**
1	Soft (up to 7°dH)	240 litres (480,000 pulses)	210 litres (420,000 pulses)
2	Medium (7° - 14°dH)	120 litres (240,000 pulses)	105 litres (210,000 pulses)
3	Hard (15° - 21°dH)	60 litres (120,000 pulses)	52.5 litres (105,000 pulses)
4	Very hard (over 21°dH)	30 litres (60,000 pulses)	26.25 litres (52,500 pulses)
The default water hardness level is 4. Each litre of water corresponds to approximately 2,000 pulses.			

CHAPTER 4

DIAGNOSTIC MODE

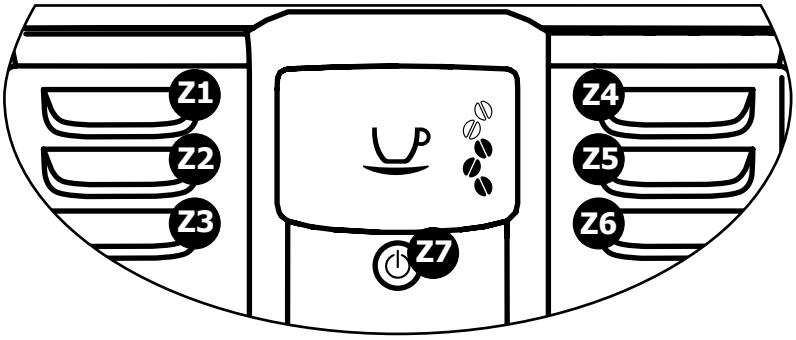
4.1. Test Mode

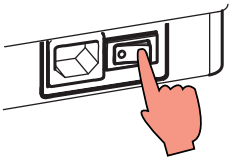
Introduction

This document describes the Test Mode of the Anima (CMF,AMF, OTC and XL) Coffee Machine.
This application is used in order to test the machine in its mechanics and electronic components.

To enter Test Mode

The machine enters in Test mode by holding pressed together **Z1** and **Z6** buttons while switching on the machine by the main switch on the backside of the CA.
Once entered in Test Mode, the display shows the firmware version (Level 0).





The Test Mode is organized into **6 different** pages, each level the coffee machine can execute different commands:

Page 0: The display shows:

a) Firmware version.
b) Version of machine (Focus ⇒ CMF, Class ⇒ AMF, Top ⇒ OTC).
c) Voltage of PCB.
d) Main supply frequency (50 or 60 Hz).

Page 1: Keyboard and display's colour test:

a) Z1 button
b) Z2 button
c) Z3 button
d) Z4 button
e) Z5 button
f) Z6 button
g) Z7 button
h) Backlight colors

Page 2: Input signals test:

a) Water level sensor
b) Micro-switch door closed/opened
c) Microswitch presence of the Brew Unit

Page 3: Low voltage loads test:

a) Brew Unit movement upward and downward (24V DC)

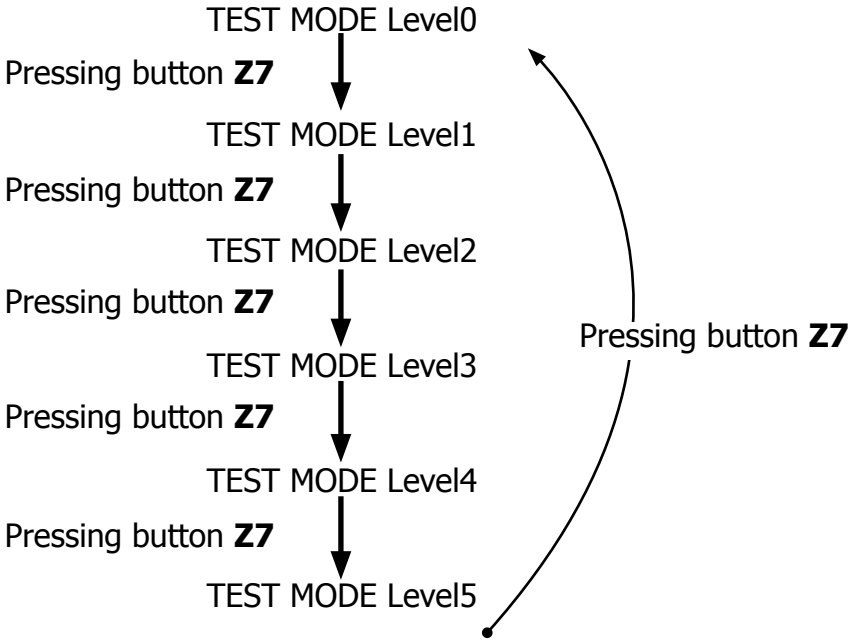
Page 4: High/Low voltage loads test (Pump, E.Valve) :

a) Pump (230V AC and 120V AC)
b) DC Solenoid valve 24V (The door must be closed !!)
c) Flow-meter

Page 5: **High voltage loads test (Heater , Grinder):**

a) Heater (230V AC and 120V AC)
b) Grinder (320V DC and 170V DC)

The user can change the page by pressing the **Z7** button.
Page 0 is accessible only entering Test Mode from power-off mode; at the start up all loads are turned off.



Page 0 (FIRMWARE)

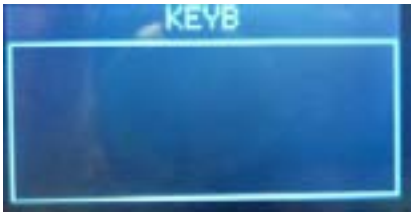
Verify the firmware version

Firmware version on the display.
The machine model is shown (Focus ⇒CMF, Class ⇒AMF, Top ⇒OTC).
The voltage of the main supply "120V or 230V"
The frequency of the main supply is shown (50 or 60 Hz)

ERROR: If in machine model field is written "Unknow" and backlight of display is Red, check the jumper in interface OR the software code (could be wrong).

The firmware version is the same as the label on MicroController
ERROR: The firmware version is different from the label on MicroController; change the CPU_POWER Boards !

Press **Z7** " ⏻ " to move to the next screen

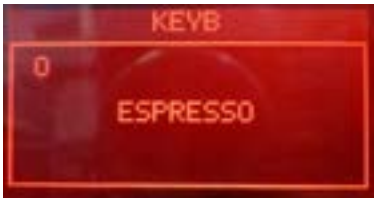


The machine passes to the Page 1 (KEYBOARD)
ERROR: The page does not change; Check the interface board and the flat cable (JP21)

Page 1 (KEYBOARD)

Start condition

Press buttons from 1 to 7
Only when a button is pressed a O appears on the relative position of button pressed.
In the middle of display appears the name of the button pressed and the backlight color changes from WHITE to RED.
When a button is pressed, also the Stand-By led (RED) turn ON.



Note: Press button Z7 as the last once, since it makes change the test page.
Note: If 2 or more buttons are pressed the name that appears on display could be wrong.

ERROR: If nothing appears on display; check the interface board and the flat cable (JP21).

ERROR: If during the movement the backlight remain WHITE check the wiring (JP1) from the interface board and the display.

ERROR: The name displayed is wrong; check the position of jumper in interface in JP5. It must be the same of machine model.

Press **Z7** " ⏻ " to move to the next screen

The machine passes to the level 2 (INPUTS)

Page 2 (INPUTS)

Start condition

Insert a full Water Tank.

The indication H20 changes from "N" to "Y".
NOTE: the switching from "N" to "Y" requires about 1-2 seconds.

ERROR: The indication TANK-H2O doesn't change; check the capacitive sensor (fixing) and the wiring (JP23)

Insert the BrewUnit
The indications **BU-P** changes from "N" to "Y".
Note: removing the BrewUnit the indication from "Y" to "N" requires about 2-3 seconds to switch.
ERROR: Check the BU presence Microswitch and the wiring (JP16).

Close the Door and Dreg Drawer
The indication **DOOR** change from "N" to "Y"
ERROR: The indication **DOOR** does not change; check the Microswitch for the door and the wiring (JP14).
Note: without the Dreg Drawer correctly inserted the DOOR indication cannot change!

Close the Beans door (only for 120V)
The indication BEAN-C change from "N" to "Y"
ERROR: The indication BEAN-C does not change; check the reed for the door and the wiring (JP25)

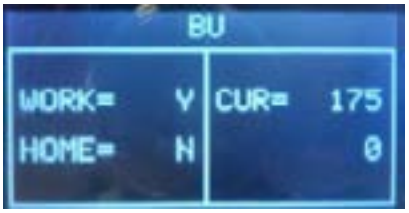
Press **Z7** " ⏻ " to move to the next screen

The machine passes to the Page 3 **(BU PAGE)**

Page 3 (BU)

Start condition

Press the Z1 button to move the BU to Work
IMPORTANT NOTE: If the DREGDRAWER is not inserted or the DOOR is not closed the BU test cannot be performed. If these 2 inputs are not in the right position, a warning message will be shown and the display turns to red.



When the BU reaches the work position the indication **WORK** changes from "N" to "Y", the number of the current is less than 200mA (without BU) or 300mA (with BU).

ERROR: The indication **WORK** doesn't change and remain "N", the display backlight changes from white to red; Check the work microswitch (broken?), the BU motor (blocked?) and the wiring (JP16).

ERROR: (**Without BU**) The absorbed current is more than 200mA, the display backlight changes from white to red; check the BU and the motor.

ERROR: (With BU) The absorbed current is more than 300mA, the display backlight changes from white to red; check the BU and the motor

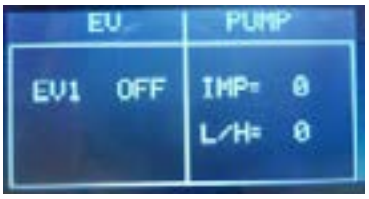
Press the Z3 button to move the BU to Home
When the BU reaches the home position the indication **HOME** changes from "N" to "Y", the number of the current is minus than 200mA (without BU) or 300mA (with BU).

ERROR: The indication **HOME** doesn't change and remain "N", the display backlight changes from white to red; Check the work microswitch (is broken), the BU motor (is blocked) and the wiring (JP16

ERROR: (Without BU) The absorbed current is higher than 200mA, the display backlight changes from white to red; check the BU and the motor.

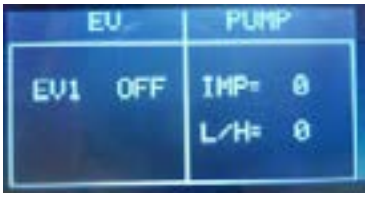
ERROR: (With BU) The absorbed current is higher than 300mA, the display backlight changes from white to red; check the BU and the motor.

Press **Z7** " ⏻ " to move to the next screen



The machine passes to the Page 4 **(EV - PUMP)**

Page 4 (EV - PUMP)



Start condition

Press the Z1 button to open the Electro Valve
IMPORTANT NOTE: If the DREGDRAWER is not inserted or the DOOR is not closed the EV test cannot be performed. If these 2 inputs are not in the right position, a warning message will be shown and the display turns to red.

It is possible to hear the "click" from Electro Valve. The indication beside the **EV1** changes from "OFF" to "ON".

Press and Release the Z4 button to switch on the pump (100 impulses)
The water goes out from the pipe and the indication **IMP** shows increasing numbers. The indication L/H must be within the range 10-18.

ERROR: The display backlight changes from white to red and the impulse remains 0; If water comes out the pipe: check the wiring from the flowmeter to the CPU/POWER board (JP5). If no water comes out the pipe: check the pump and the wiring from the pump to the CPU/POWER board (JP24).

ERROR: The L/H is zero or very low; the Electro Valve does not open. Check the wiring from the Electro Valve to the CPU/POWER board (JP3) and the Electro Valve.

Press **Z7** " ⏻ " to move to the next screen

230V

The machine passes to the level 5 (Heater-Grinder)

Press the Z4 button to switch on the grinder.
The grinder rotates and in the indication **GRINDER** the number increasing up to 5000 (5seconds test). The other numbers inside the **GRINDER** box are not important for this test.

ERROR: The number remains 0 or the grinder does not run, the display backlight changes from white to red; check the Grinder and the wiring from the Grinder to the CPU/POWER board (JP8)

Check the temperature
The number shows the heater temperature.

ERROR: In the indication **HEATER** appears **"SHORT"**, the **NTC** temperature-sensor is shorted, the display backlight changes from white to red; check the wiring from the NTC temperature-sensor to the CPU/POWER board (JP13).

ERROR: In the indication **HEATER** appears **"OPEN"**, the **NTC** temperature-sensor is detached or broken, the display backlight changes from white to red; check the wiring from the NTC temperature-sensor to the CPU/POWER board (JP13).

Press the Z1 button to switch on the Heater
The absorbed current (Amperometer on the main supply) is OK, the indication **HEATER** changes from "OFF" to "ON" and the temperature starts increasing.

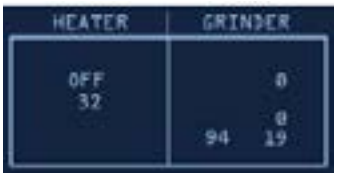
If temperature is over 100°C, the backlight change from WHITE to RED. This is a ALERT message to avoid heating the HEATER element over dangerous temperature.

ERROR: the absorbed current is KO or the temperature does not increase; check the wiring from the heater to the CPU/POWER board (JP19) and the wiring of the NTC temperature-sensor (JP13).

Press the **Z5** button for 3sec to reset a parameter of the Grinder

The aging parameter of the grinder is setted to his initial value ⟶ a screen with the text "RESET GRINDER PARAMETERS" is showed for 3sec.

ERROR: The display doesn't change

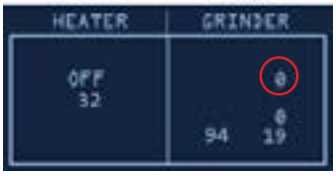


120V

Start condition

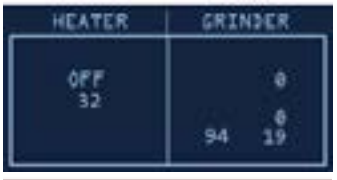
Press the Z4 button to switch on the grinder

IMPORTANT NOTE: If the COFFEE BEANS Cover is not inserted the Grinder test cannot be performed. If this input is not in the right position, a warning message will be shown and the display turns to RED.



The grinder rotates and in the indication **GRINDER** the **number** increasing up to 40. The other numbers inside the GRINDER box are not important for this test.

ERROR: The number remains 0 or the grinder does not run, the display backlight changes from white to red; check the Grinder and the wiring from the Grinder to the CPU/POWER board (JP8)

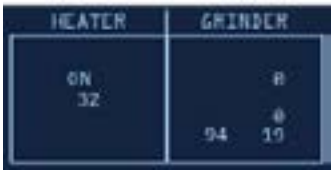


Check the temperature

The number shows the heater temperature

ERROR: In the indication HEATER appears "SHORT", the NTC temperature-sensor is shorted, the display backlight changes from white to red; check the wiring from the NTC temperature-sensor to the CPU/POWER board (JP13).

ERROR: In the indication **HEATER** appears "**OPEN**", the NTC temperature-sensor is detached or broken, the display backlight changes from white to red; check the wiring from the NTC temperature-sensor to the CPU/POWER board (JP13).



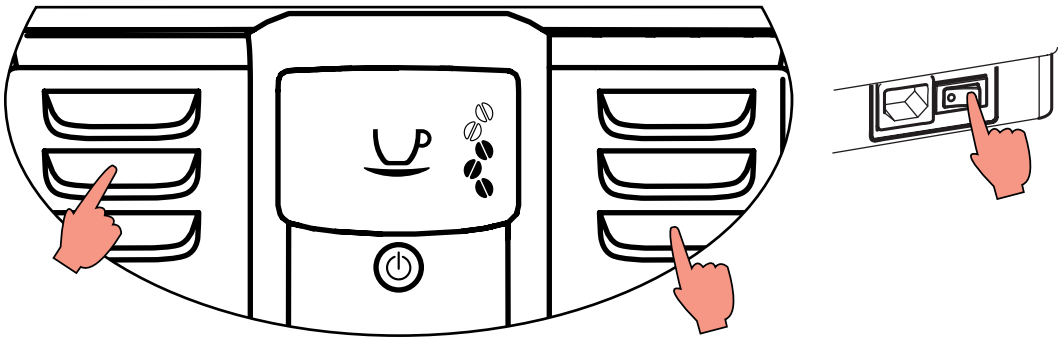
Press the Z1 button to switch on the Heater
The absorbed current (Amperometer on the main supply) is OK, the indication **HEATER** changes from "OFF" to "ON" and the temperature starts increasing.

If temperature is over 100°C, the backlight change from WHITE to RED. This is a ALERT message to avoid heating the HEATER element over dangerous temperature.

ERROR: the absorbed current is KO or the temperature does not increase; check the wiring from the heater to the CPU/POWER board (JP19) and the wiring of the NTC temperature-sensor (JP13).

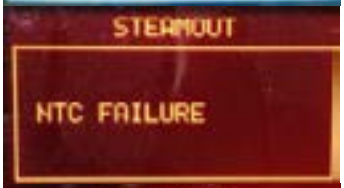
4.2. SteamOut

This document describes the Steam-Out procedure; the application is used in order to empty the heater.



To enter in SteamOut
The machine enters in Steam-Out mode by holding pressed together:
the **"ESPRESSO LUNGO"** button and the **MENU** button;
while switching on the machine by main switch behind the machine.

Once entered the Steam Out mode the display shows the **"STEAM OUT"** indication. Buttons can be released



IMPORTANT NOTE: to execute the Steam-out procedure the Ntc sensor must work correctly; if some errors occurs on Ntc during the steam-out, the procedure can't continue and an error message is shown on the display.

IMPORTANT NOTE: to execute the Steam-Out procedure the DREGDRAWER must be in place and the DOOR must be closed.
If these 2 conditions are not respected a warning message is shown on the display and the Steam-Out is interrupted.

The machine starts the Steam Out and in the display appears the indication "ON".
While the Steam Out runs the Electro valve is opened and water comes out the Water/Steam pipe.

When the Steam Out is complete the message "COMPLETE" is shown on the Display.The Electro valves automatically closes and the machine can be switched off.

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.

The main Diagnostic Parameters description is available on the GDA_114331.
You can find it both in AYS or by using the below link.

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.

CHAPTER 6

MACHINE REPAIR FLOW

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 (Saeco Service Center SSC)
	6	Opening machine
Repair	7	Repairing the fault(s) encountered (view Symptom Cure)
	8	Checking any modifications (view Symptom Cure, new software, etc.) **Refer Annex tabs per family (if available)**
	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 SDA_97832*
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
- Accesoires	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** Minuto Family (all platform); Incanto Family New .; Pico Baristo ; Gran Baristo; Intelia V2 ; Philips 2000 – 2100 ; Incanto Executive.; Moltio Family (all Platform) **Please also check for GDA_113455**
Claim Administration	22	**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 coresponding IRIS code should be claimed first.**
Cleaning	24	Clean water reservoir, bean reservoir, brew chamber and conveyor
	25	Clean and dry brew unit, coffee bin and drip tray
	26	External cleaning (housing surface)
Safety check	27	Earth leakage, Isolation test, resistor of earth wire grounding, as requested in certain country's (VDE, ISO) or H-POT TEST
Visual	28	Check the mains cord for damages
Packing	29	Packing
	30	Check completeness (accessories) according income log refer #3
	31	Neatly pack the product
Documentation	32	Info for Consumer by packed ? e.g. service brochure, FAQ, NFF letter, s/c etc....
	33	Descaling instruction with changed procedure (S/C) if available
Repair report	34	Is there an answer to **ALL** consumer questions/complaints (see complaint)
	35	add set statistic and give, if needed clear instruction towards consumer
	36	Is it indicated which documents are added
	37	Are there tips how to prevent issues

CHAPTER 7

DISASSEMBLY

7.1. Outer Shell

Anima OTC

Anima XL

Remove the water tank, coffee container cover, drip tray, dreg drawer, brewing unit and caraffe.

Upper cover

Remove the cover as in the photo. In case of any issues please you can try with the alternative way below described.

Cover a screwdriver with adhesive paper to prevent scratching the chromed shell and Remove the cover as in the photo.

Remuve the cap, unscrew the screw shown and remove the steam tube.

Unscrew the screw shown and remove the cover.

Unscrew the screw shown

Press the sides and remove the cover and dispenser. Insert as before to reassemble the dispenser in the rail and then the coverage.

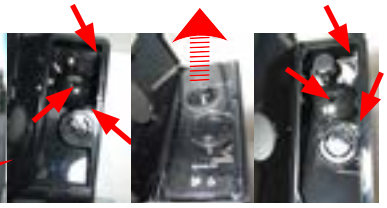
Unscrew the screws shown

Remove the insert the upper cover

FROM S/N.
TW901646728089
Only 230V

UP TO S/N.
TW901646728088
Always used for
120-220V

Remove the support
KYB assy. and
disconnect the flat cable.



UP TO S/N.
TW901646728088
Always used for
120-220V

FROM S/N.
TW901646728089
Only 230V

Unscrew the screws shown, raise the top cover and remove the water circuit connections.

For all Models UP TO S/N.TW901646728088 see SDA_112764. For 230V models from S/N.TW901646728089 the position of water level sensor has been moved to avoid its oxidation (not inserted the rubber cover).
remove the electrical connections.

7.2. Dispenser

Unscrew the screws shown and remove the dispenser

unlock where highlighted and remove the cover in the dispenser

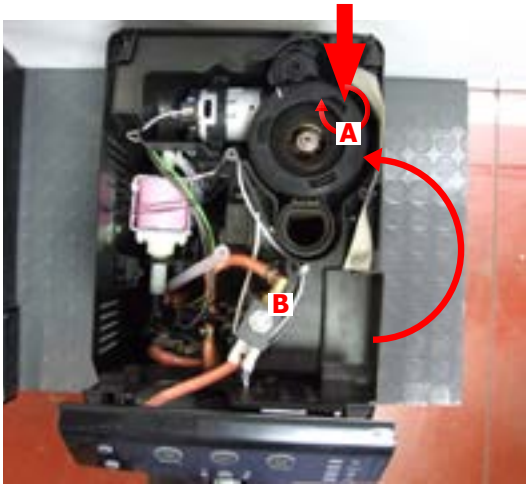
7.3. Coffee grinder

Raise the coffee grinder and remove the connections.

When reassembling the coffee grinder, make sure the spring is repositioned correctly (see photo).

The new machines have a coffee grinder with the screw to prevent the disassembly of the upper coffee grinder support (see photo).

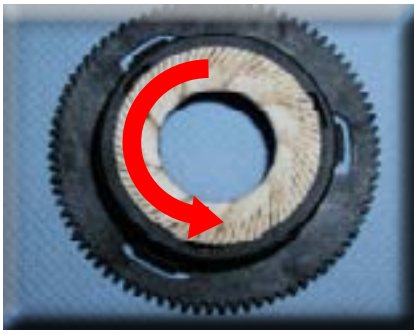
7.4. Grinder blades



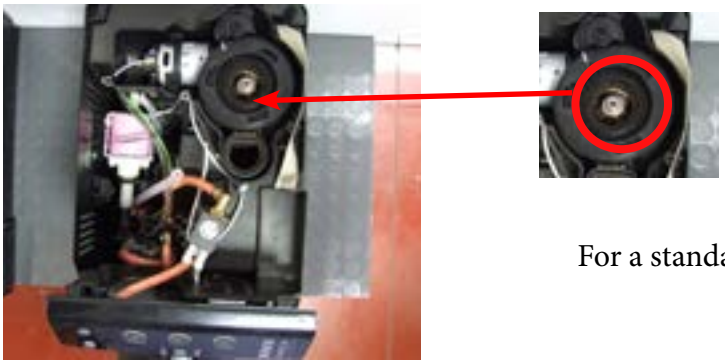
Caution in the new coffee grinder with the screw, Unscrew this last, before disassembly of the upper coffee grinder support.

To extract the top support of the appliance, press on the grinding adjustment spindle (A) and turn the support anticlockwise until it unhooks.

Turn the grinder blades anticlockwise out of the support.

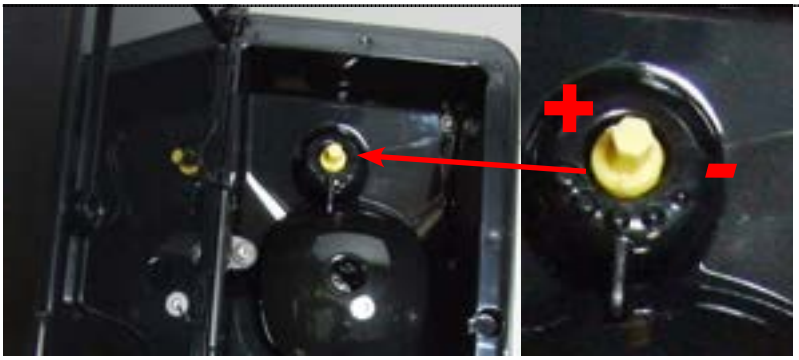


Turn the grinder blades clockwise out of the support. The bayonet connections can be accessed from the rear.



For a standard adjustment, both markings must be aligned.

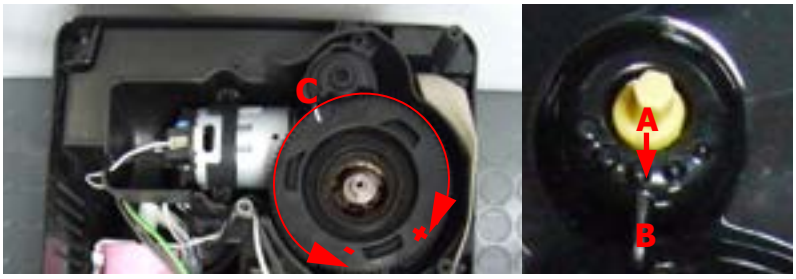
7.5. Coffee grinder adjustment

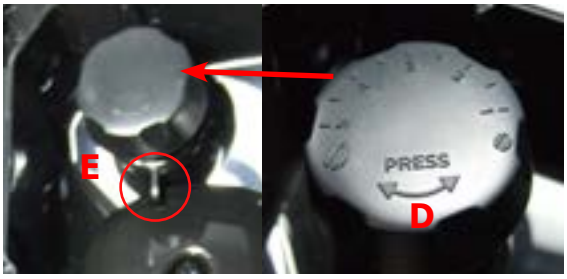


For all Models UP TO S/N.TW901646728088 the grinding adjustment can be set by the user (only with the coffee grinder in operation) by pressing and turning (only by one click at a time) the insert inside the coffee bean hopper with the aid of the wrench supplied.

For 230V Models from S/N.TW901646728089 the grinding adjustment can be set by the user pressing and turning the grinder adjustment knob

Adjustment by a service center





To adjust grinding further, the engineer can work directly on the coffee grinder by pressing and turning the ring nut (C) shown. (clockwise + to increase the particle size of the coffee and anticlockwise - to decrease it).
If there are any remains of coffee powder between the two grinding blades it is recommended to tighten by max. two marks at a time.
Lastly, move the arrow (A) on the adjustment knob to the center of the adjustment dots on the cover (B) for all Models UP TO S/N.TW901646728088, instead for 230V Models from S/N.TW901646728089 ascertain that the center line of the "PRESS" (D) is in correspondence of the fin (E).

7.6. Carafe connection and hot/steam water dispenser

Slide out the fork as illustrated

Loosen the screws holding the carafe connection

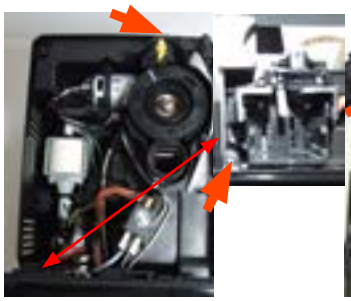
When reassembling the assembly to be careful to correctly position the spring.

hot water dispenser

Removes the covers shown

unscrew the screws shown

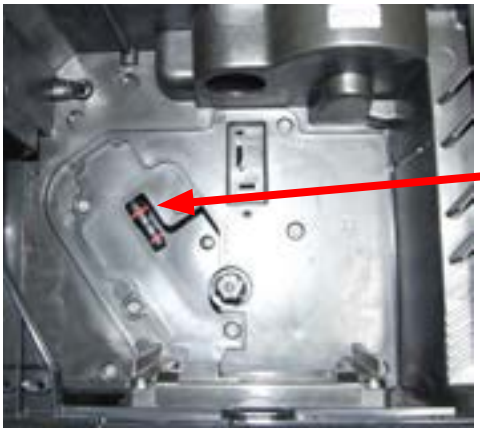
7.7. Central plate

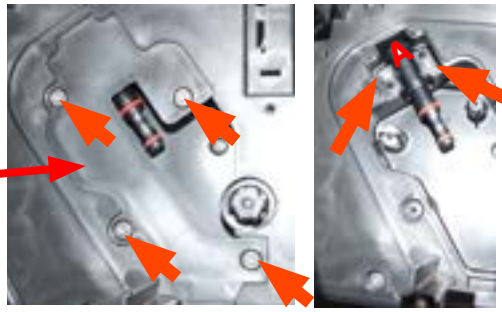


unscrew the screws shown

Lift up the center plate

7.8. Pin boiler

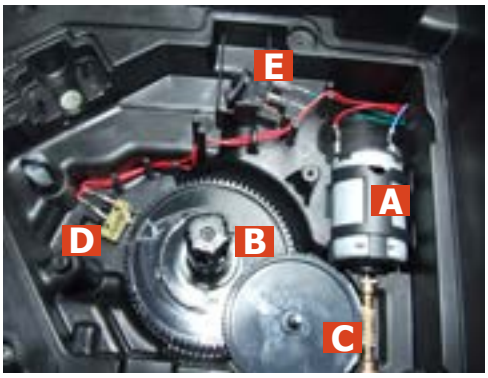




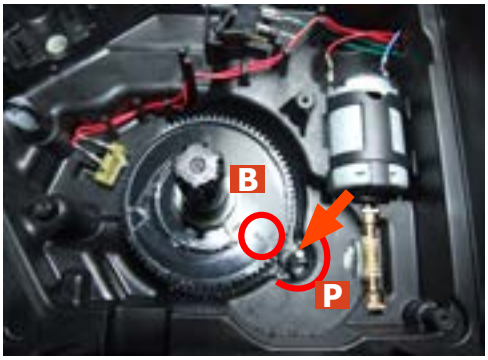
Loosen the screws as illustrated and remove the boiler pin.

7.9. Gear motor

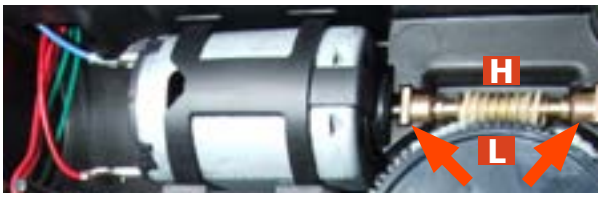
Loosen the screws as illustrated and remove the gear motor cover.



The following are located inside the compartment protected by the casing:
- Electric motor (A) with gears (B) and (C) for transmission and timing of the dispenser.
- Brewing unit present microswitch (E).
- Microswitch (D) 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.

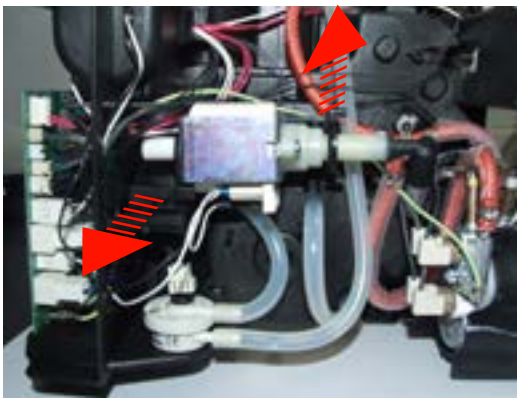


Replace the gear (B), making sure that the imprint of the arrow is aligned with the opening containing the pin (P).

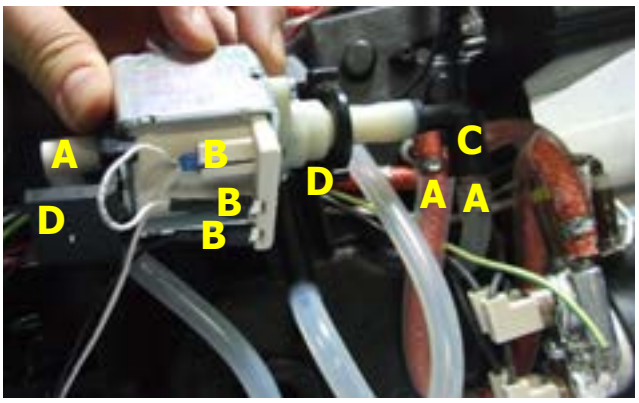


When replacing the motor and the transmission shaft, make sure the guide runners (L) are in the right position.
Grease the shaft thoroughly and evenly.

7.10. Pump

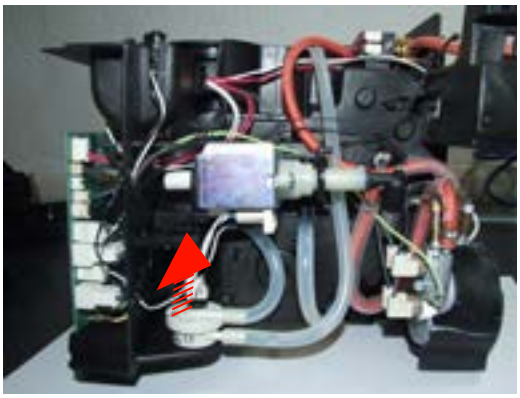


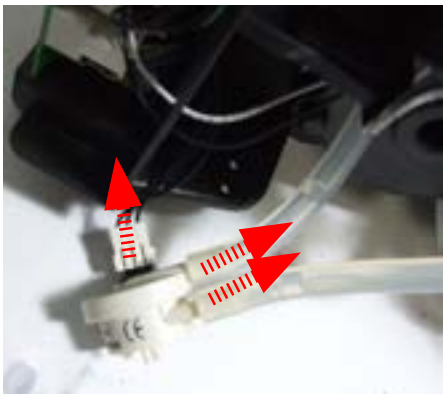
Unhook the pump from the supports.



Disconnect the water circuit connections (A) and electrical connections (B), loosen the safety valve (C) and slide the pump off the brackets (D).

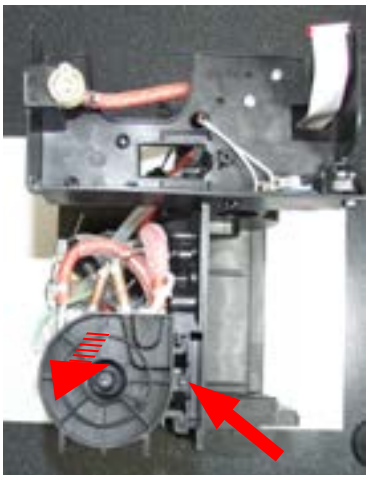
7.11. Flow-meter





Lift the flow meter out of the casing assembly and remove the electrical and water circuit connections.

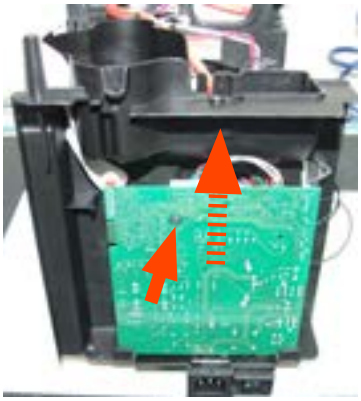
7.12. Boiler



Unscrew the screw shown at unthread the support boiler

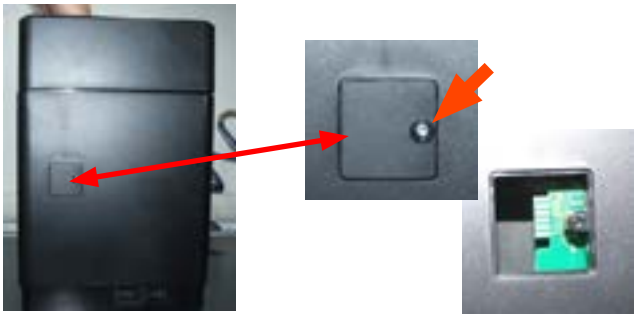
Unscrew the screw shown and remove the electrical and water circuit connections.

7.13. CPU board



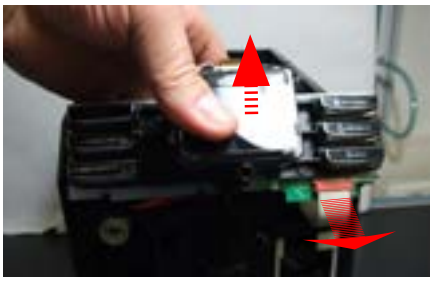
Loosen the screws slide the card off the support and disconnect the electrical connections.

7.14. Programming access

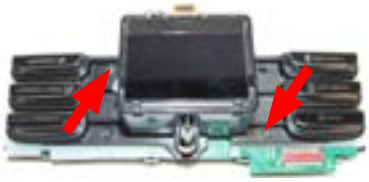


Loosen the screw for remove the cover.

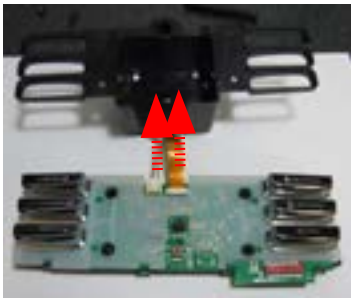
7.15. KYB interface and display



Remove the support KYB assy. and disconnect the flat cable.

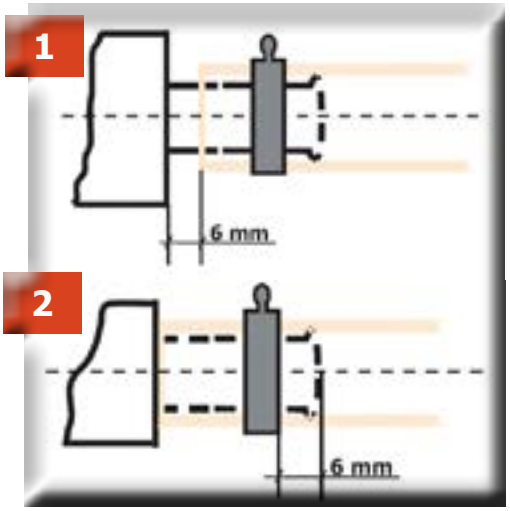


Loosen the screws for remove the cover.



Disconnect the electrical connections.

7.16. Fitting and removing Oetiker clamps



1) Boiler connection.

2) Other connections.

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

Tighten the clamp as illustrated.