One-Touch Drinks®

Rio

Espresso & Chocolate

Technical Information Manual

One-Touch Drinks
P.O Box 118300
Carrollton, TX 75011-8300

(800) 560-5062
Technical support: x3

onetouchdrinks.com
info@onetouchdrinks.com
onetouchdrinks.com

For best results, Rio is recommended for use with One-Touch Drinks consumable products.

To order, go to: onetouchdrinks.com
Or, call: (800) 560-5062

I N D E X

One-Touch Drinks
P.O Box 118300
Carrollton, TX 75011-8300

(800) 560-5062
(972)522-8805
onetouchdrinks.com
info@onetouchdrinks.com

1. INTRODUCTION

The semiautomatic machine **Rio** is one in a series created for making fresh ground espresso coffee and soluble drinks through the mixing of warm water and powder or granulated product from the canisters.

In the rest of the book and for briefness, the elements that are indicated will be named like:

The machines of the series Rio: machine or machines.

The coffee brewer or coffee group: group or brewer.

The electroválvulas (solenoid valves): EV

1.1. DEFINITIONS

Espresso coffee: Infusion of coffee created according to the following conditions:

- 7 g of ground coffee.
- The temperature of the infusion water between 92º C and 96º C.
- The water pressure at 8 kg/cm²
- The delivery water pressure at a 9 kg/cm².
- The infusion time of the coffee between 12 and 20 seconds.
- The volume of water in the infusion 50 ml.

Infusion: this is the name given to the process of passing hot water through the ground coffee to extract its oils and essences.

Volumetric infusion: when the process of infusion uses a constant volume of water.

Coffee tablet: the residual compressed coffee grounds after the infusion process.

Programming mode: when the machine is ready for any of its functions or parameters to be programmed.

Working mode: when the machine is in the working state and ready to prepare any of the services it offers.

1.2 MODELS

The Rio range is made up of three models to create espresso coffee and instant beverages.

- The models with **espresso** coffee group produce espresso coffee **and instant beverages.**
- The **instant** models only create **instant beverages**.

Rio Models: Espresso, Espresso +2, & Instant

1.3 PRINCIPLE TECHNICAL CHARACTERISTICS

- To push a button is enough to create any service; espresso or instant.
- It grinds the coffee when it is ordered.
- Characteristics of each machine model:

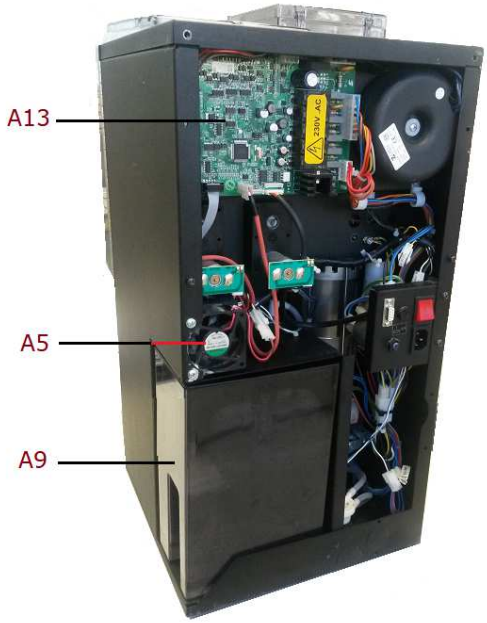
Model	Coffee beans	Instant coffee	Decaffeinated	Chocolate	Milk	Hot water
Espresso	Yes					Yes
Espresso+2	Yes			Yes	Yes	Yes
Instant		Yes	Yes	Yes	Yes	Yes

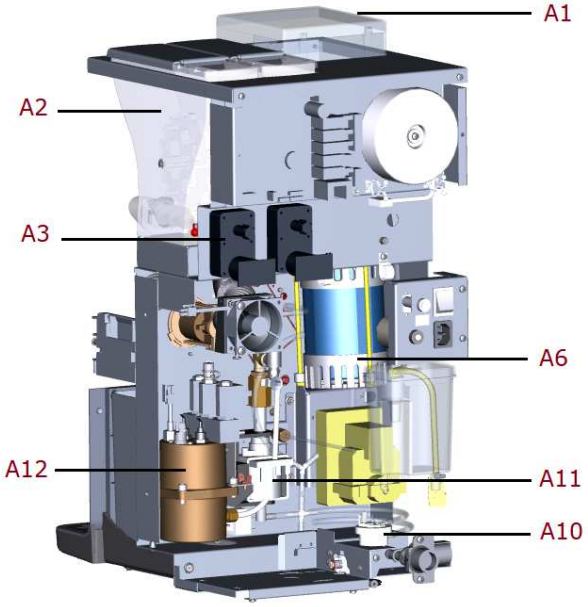
- The water temperature is programmable.
- The ground coffee dose is programmable between 5 g and 8 g.
- Water pump for water pressure is incorporated in the machine.
- Volume dosage of water in the different espresso coffee services is programmable.
- Electrical consumption:

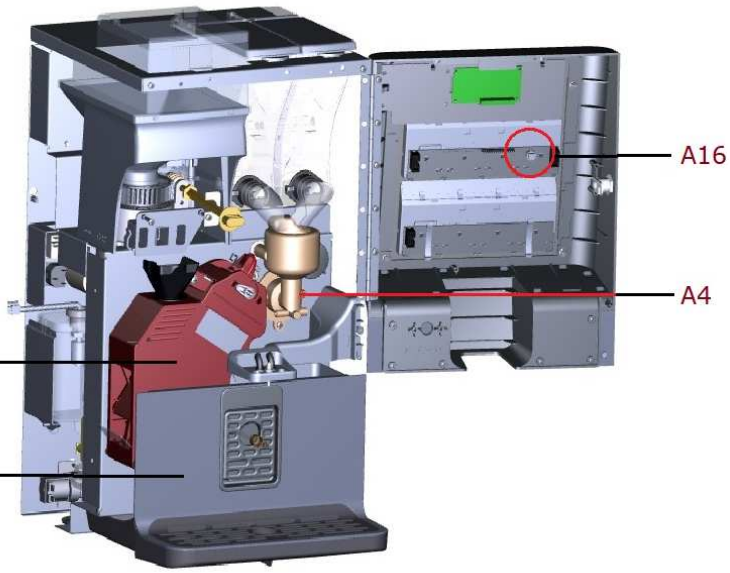
Rio espresso and soluble	Voltage	Power	Longitud
Mains voltage	See characteristics plate		
Heating element	See characteristics plate	1100 W	
Mains flex			1.800 mm

2. DESCRIPTION OF COMPONENTS

2.1. MAIN COMPONENTS







A1. Coffee beans hopper

This has a capacity of 2.4 lb or 1.1 kilograms.

A manual lock allows the user to remove the canister without loosing any beans. Before removing the canister, you must unlock the top cabinet panel which is connected with 4 screws.

A2. Instant product hopper

Each one of the hoppers of instant for instant products has a capacity of 1.6 litres.

The approximate weight of the product (depending on the product) is:

	Rio Capacity in ounces/ grams		
Product	Espresso	Rio Espresso+2	Instant
coffee		2.4 lb or 1.1 kg	14.1 oz/ 400 gr
Decaffeinatted			14.1 oz/ 400 gr
Milk		21.2 oz/ 600 gr	21.2 oz/ 600 gr
Chocolate		28.2 oz/ 800 gr	28.2 oz/ 800 gr

A3. Product extractor

This motor will move the spindle inside the canister to move instant powder out into the mixing bowls. The motors are from Componenti.

Motor manufacturer: Componenti

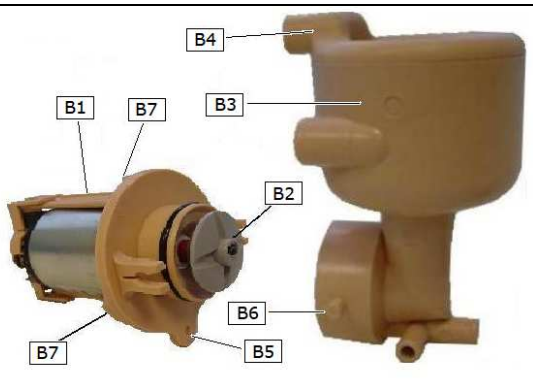
Voltage: 24 V cc

Speed: 140 rpm

A4. Beaters/Mixers/Whippers

The mixing of the products with hot water from the boiler is done with these elements.

B1. Assembly beater motor
B2. Mixer blade impellor
B3. Whipper chamber
B4. Stream hood
B5. Screw
B6. Mixer fixing pivots
B7. Mixing motor clips



A motor spins the mixing blade. Motor technical data:

Motor manufacturer	Mabuchi
Voltage	34 Vcc
Power	20 w
Speed	15.000 rpm

Mixing assy can be removed by pulling untill free the clipping pivots. Then unscrew the fixing screw and twist the motor to the right to set free the clips.

In case of total dissambly; pay attention to the details shown in the pictures next to this text.

As shown in the pictures, grey inside base must be moved to the motor. If not, the base will cause friction provoking a break in the motor.

The tool reference 10040130 can be used as a help.

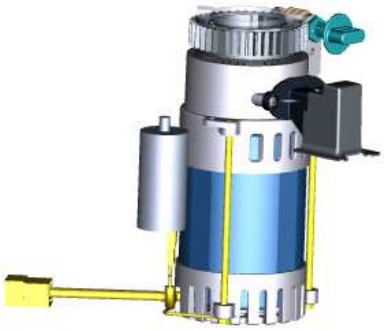
A5. Extractor

Extractor

The steam and vapour that is generated by the beaters can reach the product containers and if they become damp they form lumps in the powder. This consequently results in the irregular extraction of the product. To avoid this, the extractor is used to remove the steam and vapour from the interior of the machine. It works on 24 Vdc

A6. Coffee grinder

The M03 One-Touch Drinks model: . Technical Characteristics



Voltage	230 Vac
Nominal power	400 w
Speed	1250 rpm
Diameter of the grinders	63 mm
Grind points	0.026 mm

Turning the handle anti-clockwise gives a coarser grind and moving it clockwise gives a finer grind. The grinder used in Rio is regulated by time. Grinder programming in function 315 (check details in programming manual)

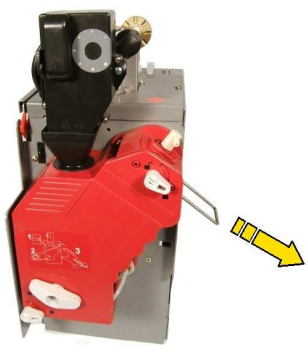
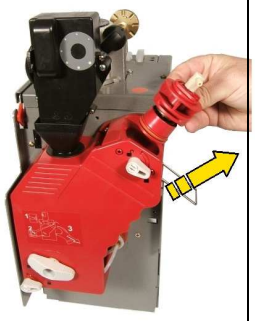
To get the desired amount of coffee for your Service: first adjust the **"grinding point"** using the handle. After set a time for the grinder in the function 315 **"grinding time".** It is advised to scale the ground coffee in each Service. Last, adjust the piston washers in the best position (check in section A7. Coffee Group +Piston).

Turning the handle that adjusts the grinding point will have an effect on ground coffee granulometry, but also on ground coffee Flow. Remember that grinder is controlled by time: 3 seconds of coarse coffee will make more grams than 3 seconds of thin coffee.

It can be said that turning right or left the grinding point handle will vary the amount of coffee ground for your service. In that case, the grinding time set in function 315 must be modify as well to keep getting the desired amount of coffee for each service.

A7. Espresso Group+Piston/Brewer

Made of resin, it is the element that the machine uses to make the espresso coffee. The group has moving parts that are activated by a 24 Vdc motor that moves a crank which moves the coffee from the dosage element to the piston. At the same time it also moves a lever that activates a micro switch; this indicates the position of the infusion element to the control board.

To remove the espress group from its anchor position, both white levers must be turned as indicated in the photograph. If the group was in the brewing position, to remove it, it is necessary to remove the piston first, as indicated a side.	 
	Pull out the clip **Remove the piston**

To put the group back on the machine, it can be in any position and does not matter that it has been turned out of the machine. Just put it in its place and fix its two anchor levers; the engine of the group will position it correctly.

C1. Piston

C2. Group

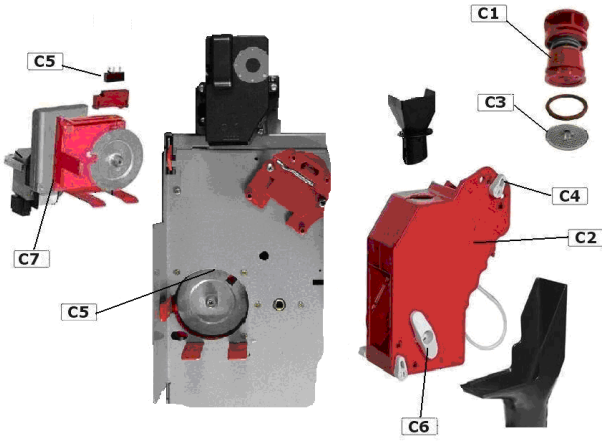
C3. Filter

C4. Holding handle

C5. Position microswitch

C6. group movement handle

C7. Group motor



The piston has a spring and tow spacers that, depending on how it is placed, will vary the capacity of ground coffee the chamber will hold.

The possible regulation of the capacity of the *infusion element*, using the washer, and the position of the dosage handle are shown in the table below:

Dose	Piston washer position		Dosage position
5 g	Under	Under	1
5.5 g	Under	Under	2
6 g	Under	Over	3
6.5 g	Under	Over	4
7 g	Under	Over	5
7.5 g	Over	Over	6
8 g	Over	Over	7

A8. Tray of liquid residues and coffee cakes deposit

Coffee cakes deposit collects "coffee cakes" coming from coffee group. It has capacity for 60 cakes. After 60 coffee services the display will show a message asking to empty the deposit. If the counter want to be disabled use your laptop and the Configurator app to modify the settings cmq file.

Tray of liquids collects all the liquid residues that the machine generates. It has capacity for 1 litre.

Both parts can be removed with the machine lock. Pull the tray to remove both parts.

A9. Water Deposit Container

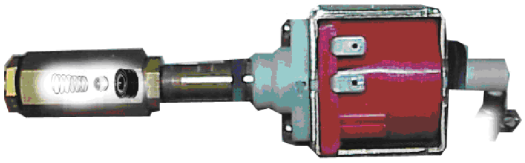
It has capacity for 4 litres. It is at atmospheric pressure and temperature. The water is taken from this deposit to create the espresso coffee and instant beverages.
If you wish to connect the machine to the mains/water network, there is a separate kit available.

A10. Volumetric counter

Its function is to measure the quantity of water that is pumped for the creation of the espresso coffee
A blade inside it spins boosted by the water flow. Two magnets on the blades activate a terminal located on the counter cap. The three terminals on the cap are positive, negative (5V cc) and the _Π_ (square signal symbol). If it is measured between negative and _Π_ when water is pumped through the counter it will have gotten the voltage difference 0V and 5V. In a digital tester it will be shown 2.5V which indicates that the counter is working well.

A11. Water pump

This element has the job of pumping water from the cold water deposit to the hot water boiler. The cold water pushes the hot water towards the EVs for the instant products or towards the *infusion element* for making espresso coffee.



When an espresso coffee is created, the water pressure needed is quite high to be able to pass through the compressed ground coffee in the infusion element. This resistance the coffee offers makes the water pressure in the boiler increase up to a pressure of 9 Kg/cm². At this pressure the by-pass opens allowing a small amount of water to return; sufficient to prevent the water pressure from going over the 9 Kg/cm².

The by-pass is a small hole covered with a ball that is held in place by a spring. This spring will hold a pressure of 9 Kg/cm², but over this pressure it compresses and allows the water to pass.

The pressure of 9 Kg/cm² is considered the ideal for creating espresso coffee.
When the instant beverages are created, there is no resistance offered and so during there creation the water pump works at lower pressures than when creating espresso coffees.

Technical characteristics:

Voltage	230 Vdc
Power	48 w
Working pressure	9 Kg/cm²
Maximum pressure	12 Kg/cm²

The pump has an anti return valve that prevents the return of water from the boiler.

A12. Boiler

The boiler works under pressure and has a capacity of 320 cc. It warms up the water for the creation of the espresso coffee or soluble products.

D1. Electrovalves

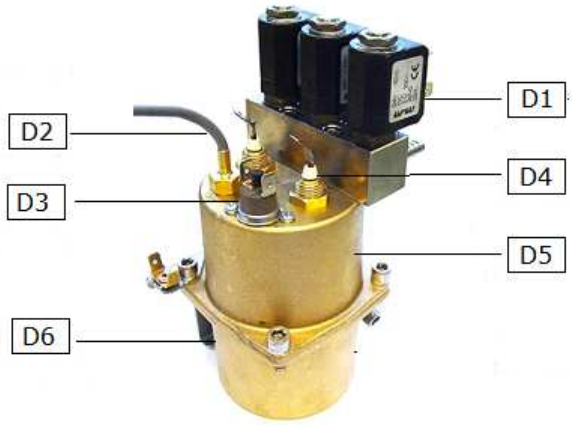
D2. Temperature sensor (PTC)

D3. Clixon, rated at 120º C

D4. 1100 W heatting element

D5. upper cover

D6. lower cover



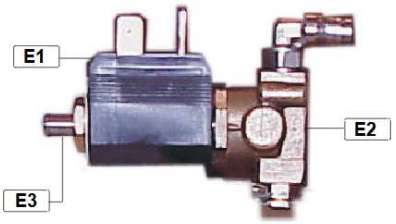
The boiler is made of brass and does not need any device to control the level of water and it fills automatically from the moment the machine is switched on. After this water is used it is replaced with water from the fresh water deposit so the boiler is always full. The BOILER MUST BE EMPTIED IF THE MACHINE WILL BE IN FREEZING TEMPERATURES SO NOT TO BURST THE BOILER.

There are three outlets; one through a 3-way *EV* for the creation of espresso coffee. This *EV* has an outlet from the boiler, another goes to the *infusion element*, and the third that, at rest, allows the *infusion element* to be at atmospheric pressure.

E1. Solenoid

E2. Valve

E3. 3rd outlet

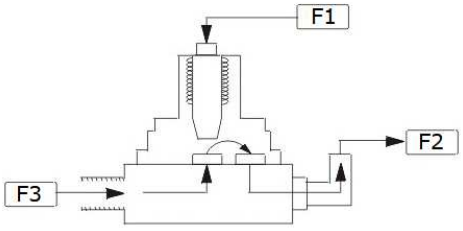


When the machine is in the process of making espresso coffee, the third is closed while the outlet from the boiler and the inlet to the *infusion element* are open to each other.

F1. 3rd outlet closed

F2. To the infusion group

F3. From the boiler



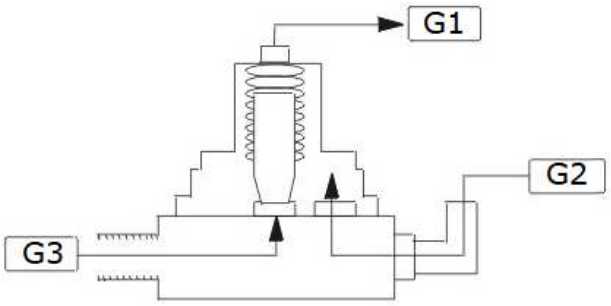
When the machine finishes creating an espresso coffee, the *EV* goes to rest state and closes the outlet from the boiler leaving the *infusion element* open to the third outlet. In this way the water that did not pass through the coffee and was retained in the *infusion element* goes out through the third outlet to the residue bucket.

The water recedes back from the *infusion element* towards the third outlet because of the pressure it was submitted to by the pump in the infusion process.

G1. 3rd outlet open

G2. Infusion element joined to atmospheric pressure

G3. Boiler water closed



Technical Characteristics:

Heating element voltage	230 Vca
Power	1.100 w
Temperature programming	158ºF-201ºF or 70ºC -94ºC
Safety protection with manual reset	248ºF or 120º C
Voltage of 3-way EV	24 Vcc
Power of 3-way EV	10 w
Maximum pressure of EV	14 Kg./cm²
Working temperature of EV	-10º C a 140º C 14ºF 284ºF

Temperature control of the water in the boiler is done with a PTC100. Default temperature from the factory is programmed to 185ºF/ 85ºC, it can be programmed up to 201ºF/ 94ºC.

It must be taken into account that, depending on the altitude were the machine is installed, the water can boil at a temperature below 100ºC/212F.

Altitud (meters) (above sea level)	**Boiling water temperature**	**Max. advised temp. in boiler (F461)**
1500	95ºC	92ºC
1800	94ºC	91ºC
2100	93ºC	90ºC
2400	92ºC	89ºC
2700	91ºC	88ºC

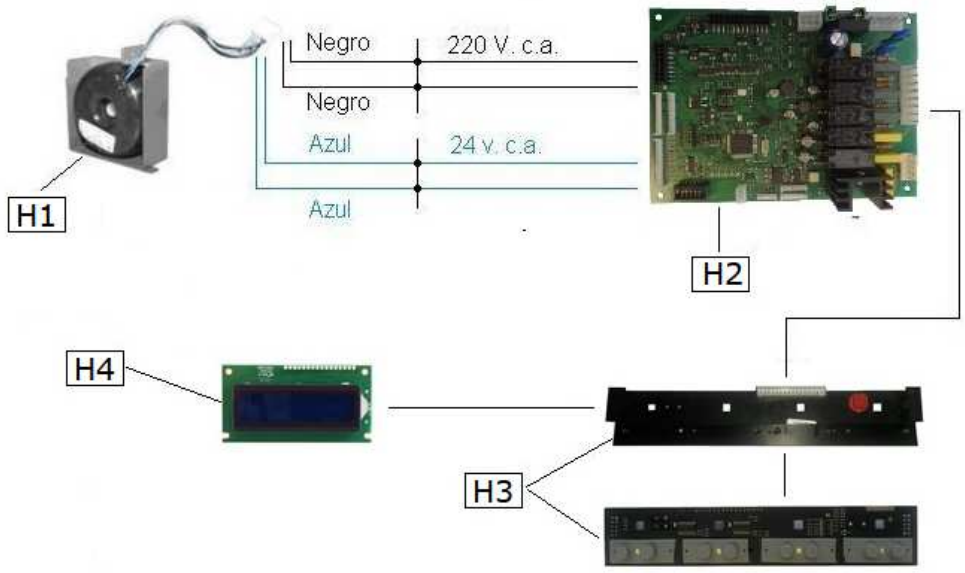
The following table shows the resistance values that the PT100 gives according to the temperature that it is submitted. Boiler Tª can be programmed in **Function 461 with a max. of 94ºC.**

ºC	0	1	2	3	4	5	6	7	8	9
0	100,00	100,39	100,78	101,17	101,56	101,95	102,34	102,73	103,12	103,51
10	103,90	104,29	104,68	105,07	105,46	105,85	106,24	106,63	107,02	107,40
20	107,79	108,18	108,57	108,96	109,35	109,73	110,12	110,51	110,90	111,28
30	111,67	112,06	112,45	112,83	113,22	113,61	113,99	114,38	114,77	115,15
40	115,54	115,93	116,31	116,70	117,08	117,47	117,85	118,24	118,62	119,01
50	119,40	119,78	120,16	120,55	120,93	121,32	121,70	122,09	122,47	122,86
60	123,24	123,62	124,01	124,39	124,77	125,16	125,54	125,92	126,31	126,69
70	127,07	127,45	127,84	128,22	128,60	128,98	129,37	129,75	130,13	130,51
80	130,89	131,27	131,66	132,04	132,42	132,80	133,18	133,56	133,94	134,32
90	134,70	135,08	135,46	135,84	136,22	136,60	136,98	137,36	137,74	138,12
100	138,50	138,88	139,26	139,64	140,02	140,39	140,77	141,15	141,53	141,91
110	142,29	142,66	143,04	143,42	143,80	144,17	144,55	144,93	145,31	145,68
120	146,06	146,44	146,81	147,19	147,57	147,94	148,32	148,70	149,07	149,45
130	149,82	150,20	150,57	150,95	151,33	151,70	152,08	152,45	152,83	153,20
140	153,58	153,95	154,32	154,70	155,07	155,45	155,82	156,19	156,57	156,94
150	157,31	157,69	158,06	158,43	158,81	159,18	159,55	159,93	160,30	160,67
160	161,04	161,42	161,79	162,16	162,53	162,90	163,27	163,65	164,02	164,39
170	164,76	165,13	165,50	165,87	166,24	166,61	166,98	167,35	167,72	168,09
180	168,46	168,83	169,20	169,57	169,94	170,31	170,68	171,05	171,42	171,79
190	172,16	172,53	172,90	173,26	173,63	174,00	174,37	174,74	175,10	175,47
200	175,84	176,21	176,57	176,94	177,31	177,68	178,04	178,41	178,78	179,14
210	179,51	179,88	180,24	180,61	180,97	181,34	181,71	182,07	182,44	182,80
220	183,17	183,53	183,90	184,26	184,63	184,99	185,36	185,72	186,09	186,45
230	186,82	187,18	187,54	187,91	188,27	188,63	189,00	189,36	189,72	190,09
240	190,45	190,81	191,18	191,54	191,90	192,26	192,63	192,99	193,35	193,70
250	194,07	194,44	194,80	195,16	195,52	195,88	196,24	196,60	196,96	197,33
260	197,69	198,05	198,41	198,77	199,13	199,49	199,85	200,21	200,57	200,93
270	201,29	201,65	202,01	202,36	202,72	203,08	203,44	203,80	204,16	204,52
280	204,88	205,23	205,59	205,95	206,31	206,67	207,02	207,38	207,74	208,10
290	208,45	208,81	209,17	209,52	209,88	210,24	210,59	210,95	211,31	211,66
300	212,02	212,37	212,73	213,09	213,44	213,80	214,15	214,51	214,86	215,22
310	215,57	215,93	216,28	216,64	216,99	217,35	217,70	218,05	218,41	218,76
320	219,12	219,47	219,82	220,18	220,53	220,88	221,24	221,59	221,94	222,29
330	222,65	223,00	223,35	223,70	224,06	224,41	224,74	225,11	225,46	225,81
340	226,17	226,52	226,87	227,22	227,57	227,92	228,27	228,62	228,97	229,32
350	229,67	230,02	230,37	230,72	231,07	231,42	231,77	232,12	232,47	232,82
360	233,17	233,52	233,87	234,22	234,56	234,91	235,26	235,60	235,96	236,31
370	236,65	237,00	237,35	237,70	238,04	238,39	238,74	239,09	239,43	239,78
380	240,13	240,47	240,82	241,17	241,51	241,86	242,20	242,55	242,90	243,24
390	243,59	243,93	244,28	244,62	244,97	246,69	245,31	245,66	246,00	246,35
400	247,04									

A13. Control board

Rio range machines have only one pcb, called control board. It is powering the rest of components and managing the machine.
This board is the same as in Active Protein, Columbia or Bravo but with different software.

H1. Transformer
H2. Control pcb
H3. Display
H4. Push buttons board



H1 Transformer "technical characteristics":

Primary	230 Vca
Secondary (blue-blue)	24 Vca
Power	88 VA

A14. Display

All Rio range machines come with a LCD display blue colour. 2 lines with 16 characters each. It is easy to remove it, it is fixed with 4 clic points.

A15. Push buttons board

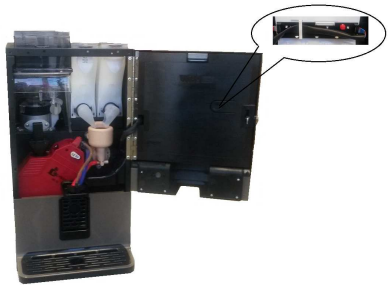
Selection buttons are in a LEDs backlight frame. There are two boards with 4 buttons each.

Product labels are two strips with 4 products each, iluminated by Led strips.

The 2 button boards are connected to the control board.

Remove the display before removing the panel.

A16. Programming button



This button allows the access to the machine programming.

A quick push gives access to operator functions.

Press the button for 5 seconds to get access to all programming functions. Select here the ones you wish to see in operators menu.

The first four selection buttons are used to navigate in the programming functions. (see in programming manual).

2.2. Hydraulic circuit

In the following diagram are represented all the elements of the machine that are needed to control and make the water reach the *infusion element* or the instant beverage beaters.

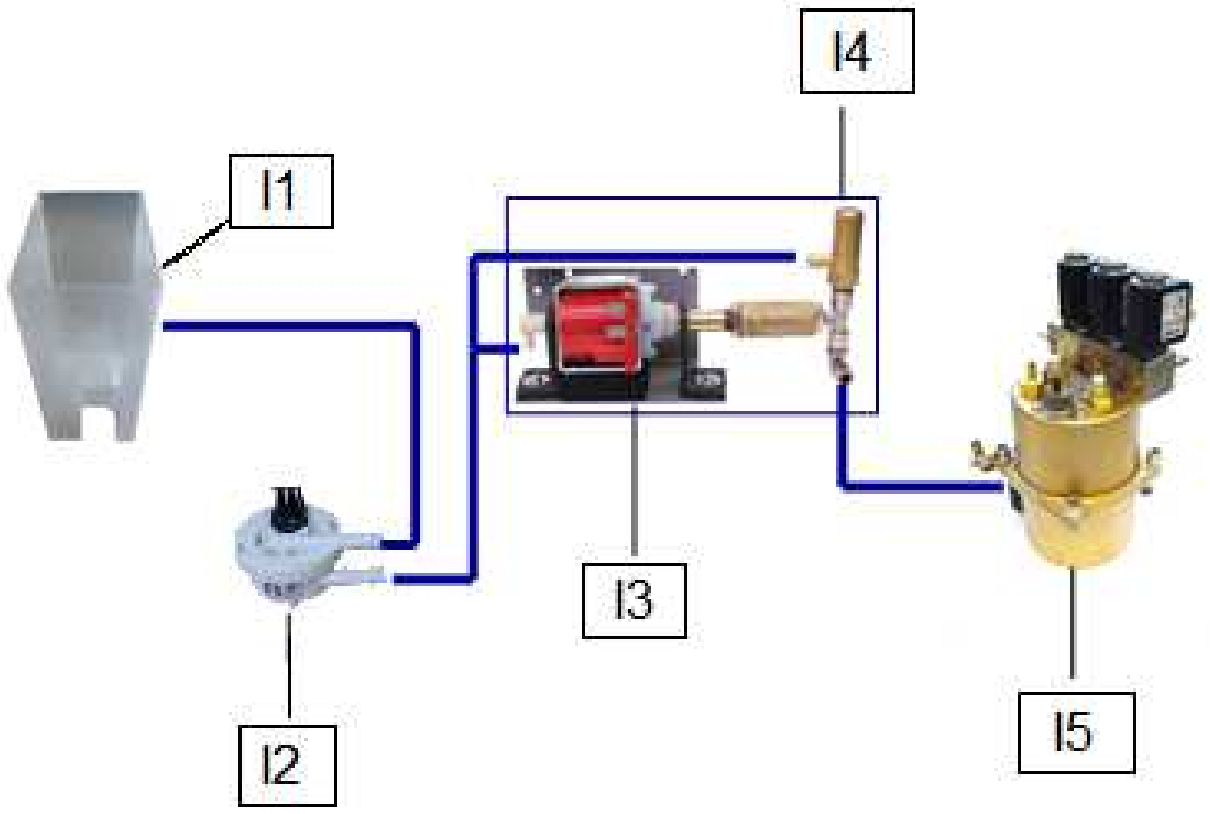
I1. Water deposit

I2. Flowmeter

I3. Pressure pump

I4. Overpressure pump

I5. Boiler



3. INSTALLATION AND SWITCHING ON

3.1. Installation

The power supply of the machine requires a socket, or another system, that allows its disconnection. The method used must guarantee the complete disconnection of both poles. Elemental safety requirements:

a) Never touch any mechanisms with wet hands or feet.

b) Never connect or use the machine barefoot.

c) Never pull on the flex to unplug the machine.

d) Never leave the machine exposed to the elements: sun, rain, snow, etc.

3.2 Water connection

The machine can work with its water deposit of 4 litres (see point A.14) or connected to the mains city water supply. To connect the machine to the mains, use a **¾" male** connection. The mains supply must provide drinking water at a minimum of 5 litres/minute and a pressure of between 0.5 and 10 kg/cm².
Following low voltage safety requirements, the water connection and the socket must be separated by at least 1 meter.

Mains supply KIT

Depending on the quality of the water, hardness, chlorine, bleach, etc, the connection should be complemented with a filter.
If the machine is fitted with a filter, the minimum water pressure should be **1.5 Kg/cm².**

3.3 Electrical connection

The supply voltage of the machine is indicated in the characteristics plate, there is one inside the machine and another on the back. Depending on the machine code and the country, it can operate at 110 or 220 Vac, with a frequency of 50 or 60 Hz. The installation must have:

- An earthed socket
- A minimum power rating of 2000 w
- The installation site must have a breaker switch and a good ground connection

3.4 Filling the product containers

To put products in the containers, you should first lift the cover of the machine. Otherwise, it is necessary to remove the container from the machine.

After filling the containers for instant beverages, it is advised to request a service of each as the first time it's used only a small quantity of product is served.

1. coffee beans hopper
2. soluble product hoppers

1

2

- Now the machine can be switched on.

3.5 Filling the hot water boiler

Start the machine and hot water boiler will be filled automatically. In the espresso coffee machines, the following process occur:

- The volumetric counter is tested, and the boiler is filled with the EVs closed.
- When the counter stops spinning, the boiler is full.
- Then the instant product EVs open to let out the air in the lines and boiler.

4. ERROR MESSAGES

In the following table are the errors that the machine can detect and a description:

LOW TEMPERATURE	**The machine displays this warning for approx. 1 min. on being started up.**
ERROR: NO WATER	**Check the water supply.** **Fill the water tank**
NO COFFEE BEANS	**Load the hopper with coffee** **Check the position of the group outlet shutter**
WASTE BIN FULL	**Remove the waste tray, clean it and refit it**
LONG DISTRIBUTION	**Adjust the grinding time to coarser.** **Clean the group showers** **Check that there is voltage to the input solenoid.**
RESIST. FAULTY	**Element broken or disconnected**
TEMP.SENSOR ERR.	**Probe broken or disconnected**
FAIL.WATER LEVEL	**Check mains pressure.** **Input solenoid or level ball broken or disconnected.**
DOSAGE ERROR.	**Dosser broken or disconnected**
F.ESPRSS.UNT.POS	**The group motor does not work.** **The position detector does not work properly.**
NO WASTE BIN	**The tray is missing or not fitted properly.**

5. CONTROL POINTS

Heating element

-Measured in the **control board** in the conector jp11

-Between pins 1 and 3, will be 220 Vca when heatting element is working. (if 10A fuse is fine)

Erogation pump

-Measured in the **control board** in the conector jp10

-Between pins 1 and 7 will be 220 Vca when ulka pump is working.

Erogation group motor

-Measured in the **control board** in the conector jp10

-Between pins 2 and 7 will be 220 Vca when the group is working.

Coffee doser

-Measured in the **control board** in the conector jp10

-Between pins 3 and 7 will be 220 Vca when doser is activated.

Grinder

-Measured in the **control board** in the conector jp10

-Between pins 4 and 7 will be 220 Vca when grinder is working.

Transformer

-Measured in the **control board** in the conector JP12

-Pins 1 and 2 = 220 Vca (black looms).

-Pins 4 and 5 = 24 Vca (blue looms).

Pressure electrovalve

-Measured in the **control board** in the conector jp8

-Between pins 1 and 4 will be 25 Vcc when la electrovalve is activated.

Volumetric counter

-Measured in the **control board** in the conector jp1.

-Pin 1 corresponds to +, pin 4 is ground and pin 12 is signal.

-When volumetric is turning. The multimeter will show 2,5 Vcc meassuriing between pins 12 and 4.

Doser microswitch

-Measured in the **control board** in the conector jp1.

-Between pins 4 and 11 will be 5 Vcc when doser is full.

-Between pins 4 and 11 will be 0 Vcc when doser is empty.

Group motor microswitch

-Measured in the **control board** in the conector jp1.

-Between pins 4 and 10will be 5 Vcc with group in erogation position.

-Between pins 4 and 10will be 0 Vcc with group in charge position.

Residue tray microswitch

-Measured in the **control board** in the conector jp1.

-Between pins 4 and 9 will be 0 Vcc when tray is in position.

-Between pins 4 and 9 will be 5 Vcc when tray is not in its in position.

Floater microswitch(with hydraulic connection to the mains)

-Measured in the **control board** in the conector jp1.

-Between pins 4 and 8 will be 5 Vcc when there is no water.

-Between pins 4 and 8 will be 0 Vcc with full deposit.

Temperature sensor

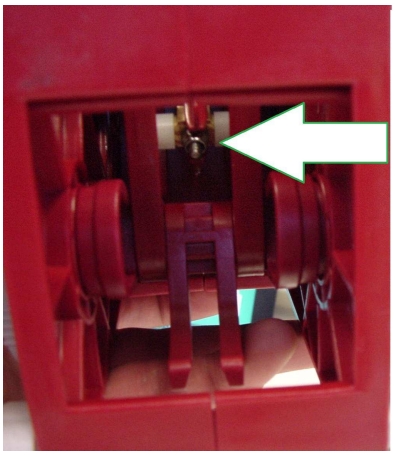
-Measured in the **control board** in the conector jp16.

-Values of resistance(ohms) should be meassured (see values in table of PTC).

6. CLEANING AND MAINTENANCE

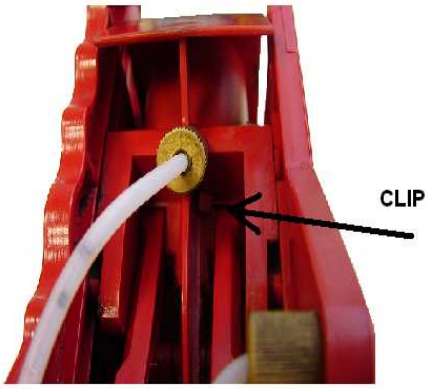
- **Daily**
  - *Solid waste bucket*. Empty the coffee residues and rinse with clean water.
  - *Liquid collector tray*. Clean with a water and dish washing liquid solution.
  - *Beaters*. Carry out various auto-cleaning operations by pressing button "B" on the programming handset.
- **Weekly**
  - *Infusion group*. Remove it from the machine and rinse it under a tap to remove coffee particles. Before replacing the group, dry it with a cloth.
  - *Beaters*. Remove the beaters, the outlet tubes and the chamber from the machine, and clean everything with a water and dish washing liquid solution. If necessary, only use a soft cloth to clean so as not to scratch their surfaces.
- **Three times monthly**
  - *Product hoppers*. Remove them from the machine and empty them. Clean them with water and dish washing liquid solution. Dry them before replacing into the machine. Clean the supports where the hoppers are fitted.
  - *Coffee bean hopper*. Carry out the same as with the product hoppers.
- **Depending on the use of the machine**
  - *Piston filter*. Every 15,000 services, it is recommended to remove and clean it. If necessary, it can be cleaned with a non metallic brush. If the holes are blocked, do not introduce sharp objects into the holes to clean them. It is recommended to replace the filter with a new one when is becomes blocked.
  - *Infusion group filter*. Clean the infusion group filter at the same time as you clean the piston filter. To remove the filter without damaging it, follow the guidelines below: Move the group to the coffee cake extraction position. Hold the group and the lever with one hand while loosening the filter screw with the other. On replacing the screw it is recommended to use Loctite 243 or a similar product to keep it tight.
  - *Piston seal*. Replace every 30,000 services
  - *Group seals*. Replace every 60,000 services. To get to these it is necessary to remove the group filter. They are reachable by following the explanation below.

1. Remove the nut that holds the spindle shaft at the bottom of the group, it is recommended to support with a screwdriver the shower filter at the same time.



2. Push the shaft from the bottom and remove the filter holder.

3. Press on the clips(one on each side) shown in the picture below to release the part where the o-ring gaskets.



4. Once replaced the gaskets, replace lids in the group.

7. WORKING CONDITIONS AND NORMS

The optimum working conditions of this equipment is achieved by fulfilling the following requirements:

- Temperatures:
  - Storage: -25 to + 70ºC.
  - Working: 0 to 50º C.
  - Maximum relative humidity without condensation 85%

- Norms that are met:
  - The coffee machines meet the following EU directives: Directive 73/23/CEE electrical safety and Directive 89/336/CEE electromagnetic compatibility.
  - The mains connection cable has an earth wire as established in the electrical safety norm.
  - The boiler has a temperature sensor that controls the connection and disconnection of the heating element automatically.
  - The boiler has a temperature clixon that disconnects the heating element when it reaches 120º C.
  - EN 60335-2-63:96
  - EN 60 335-1(88) + A2(88) + A5(89) + A6(89) + A51(91) + A52(92) + A53(92) + A54(92) + A55(93)
  - EN 55014-1
  - EN 61000-3-2
  - EN 61000-3-3
  - EN 55014-2:98 (EN 61000-4-2, 4-3, 4-4, 4-5, 4-6, 4-7, 4-8 and 4-11)
  - **CE**

- For the correct working of all the elements, the maximum inclination the machine should have on any of its axis should be ± **5º.**

8. VOLUMETRIC DIMENSIONS

Measurements in inches and weight in pounds:

Model	width	height	depth	weight
Rio Espresso	12 (X)	23.2 (Y)	16.1 (Z)	51.36 lb
Rio Espresso+2	12	23.2	16.1	60 lb
Rio Instant	12	22	16.1	45.6 lb

Measurements in milimeters and weight in kilograms:

Model	width	height	depth	weight
Rio Espresso	305 (X)	590 (Y)	410 (Z)	25,3 kg
Rio Espresso+2	305	590	410	27,2 kg
Rio Instant	305	560	410	20,7 kg