

REPAIR INSTRUCTION

Fully-automatic coffeemaker

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1 SAFETY

1.1 Safety instructions



DANGER

Risk of injury!

- ▶ Connect and operate the appliance only in accordance with the specifications on the rating plate.
 - ▶ Repairs may be carried out by a qualified electrician only!
 - ▶ The user may be put at considerable risk and injured by improper repairs!
 - ▶ Electric shock may occur if live components are touched inside the appliance!
 - ▶ Do not touch components in the appliance. Even the modules can be live!
 - ▶ Before commencing repairs, ALWAYS disconnect the appliance from the power supply!
 - ▶ Components become hot during operation. Before commencing repairs, leave the appliance to cool down.
 - ▶ If tests have to be conducted while the appliance is live, ALWAYS use a residual-current-operated circuit-breaker!
 - ▶ The protective conductor connection must not exceed the standardized values! This is essential for personal safety and appliance function!
 - ▶ When repairs are complete, perform a test in accordance with VDE 0701 or the corresponding national regulations!
-

1.2 Repair instructions



DANGER

Risk of scalding!

- ▶ The milk frother for milk/hot water becomes very hot. After use, leave to cool down before taking hold of it.
 - ▶ Take hold of steam pipe by the plastic part only.
 - ▶ Never point steam pipe towards people
 - ▶ When steam is drawn, it may spray initially.
 - ▶ Whenever steam is drawn, the appliance gives off steam over the collecting tray.
-



CAUTION

- ▶ NEVER attempt repairs by randomly replacing components!
 - ▶ ALWAYS proceed systematically and comply with the technical documentation for the appliance!
 - ▶ As a rule, electronic boards are not repaired but are completely replaced with original spare parts. Exceptions are documented separately.
 - ▶ Components become hot during operation. Before commencing repairs, leave the appliance to cool down.
 - ▶ Following each repair, conduct a leak and performance test.
-

2 INSTALLATION

2.1 Installation

- ▶ The installation location must be level and dry.
- ▶ Protect the appliance from splash water.
- ▶ There must be a minimum filling height of **410 mm**.
- ▶ Connect and operate the appliance only in accordance with the specifications on the rating plate.
- ▶ Operate the appliance indoors and at room temperature only.
- ▶ Do not place the appliance on a hot surface (e.g. heating plate) and never use it close to an open flame.

2.2 Scope of delivery

Accessories included in packing without extra box:

- ▶ 2 Detergent-tablets
- ▶ Test strip for determining the local water hardness
- ▶ 2 Descaler-tablets (for 1 descaling process)
- ▶ Operating instructions in 7 languages, Book 1

3 OPERATION

3.1 Starting the appliance



WARNING

Risk of damage!

Do not use coffee beans which have been glazed, caramelized or treated with other additives containing sugar. These will damage the grinding unit.



Note:

When the appliance is used for the first time or if the appliance has not been used for a prolonged period, the first cup of coffee still does not have the full aroma and should therefore not be drunk.

- ▶ Pull the mains plug out of the cord store at the rear of the appliance and connect according to the specifications on the rating plate.
- ▶ Remove the water tank and fill with fresh, cold, non-carbonated water. Observe “**max**” mark.
- ▶ Attach water tank straight and press all the way down.
- ▶ Fill the bean container with fresh coffee beans. Preferably use espresso beans or bean mixtures for fully automatic machines.
- ▶ Ensure that the rotary knob for drawing steam/hot water is set to **O**.
- ▶ Press mains switch **auto off** at the front of the appliance.



A self test is being performed automatically. The appliance heats up and rinses. The ready to use mode is displayed when both LED s above the coffee dispensing buttons are lit green.

3.1.1 Self-test

- ▶ Brewing unit is initialized.
- ▶ Appliance heats up to operating temperature.
- ▶ Brewing unit is moved to brewing position.
- ▶ Pump starts running and conveys approx. 50 ml water through the coffee outlet.

Brewing unit and coffee outlet are rinsed and heated.

- ▶ Brewing unit drains and moves to home position

Appliance is **ready for use** when the LED above the **stand-by** button is lit green.

3.1.2 Filling the system

When switching on the appliance for the first time and after a service the water pipe system in the appliance must be filled.

LEDs above both **coffee dispensing** buttons are flashing green and LED above “Turn steam/hot water valve” is lit red:

- ▶ Place a cup under the hot water/ steam nozzle.
- ▶ Set rotary knob for drawing steam/hot water to “Steam”. A small amount of water is conveyed and the water pipe system is filled.
- ▶ Set rotary knob for drawing steam/hot water to “**O**”.

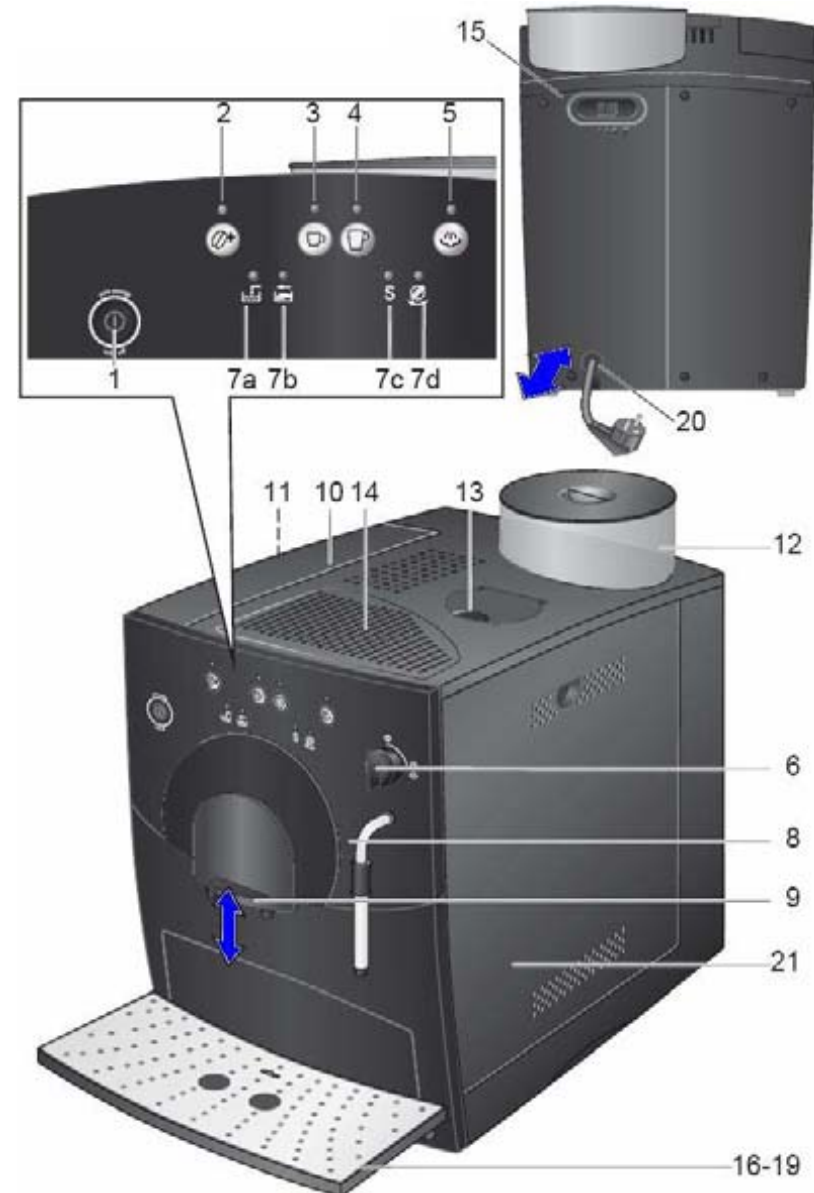
Appliance heats up and is rinsed.

Appliance is **ready for use** when both LED s above the **coffee dispensing** buttons are lit green.

3.2 Controls

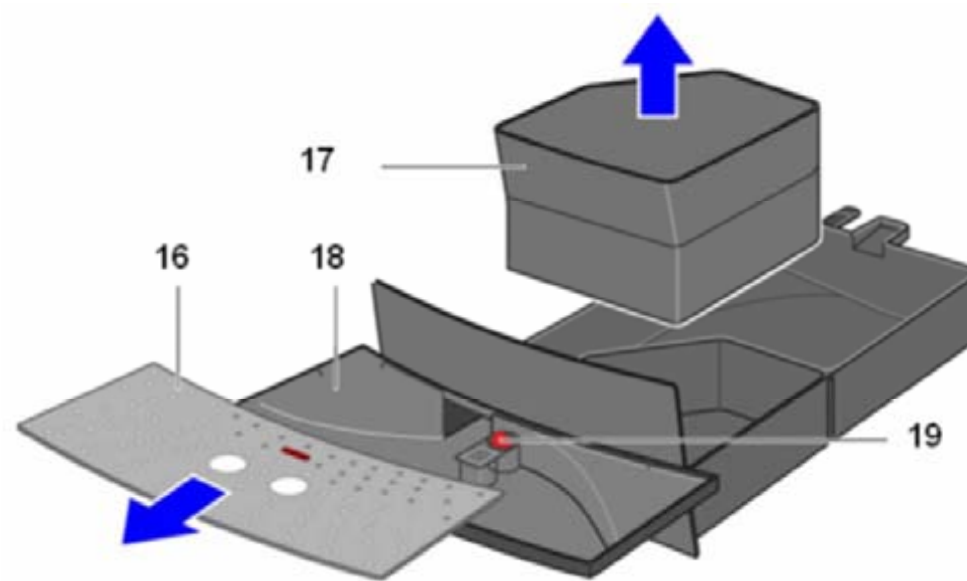
3.2.1 Overview of controls

- 1 Mains switch (**auto-off**)
- 2 Coffee strength button
- 3 Coffee dispensing button (small amount)
- 4 Coffee dispensing button (large amount)
- 5 Steam button (heat up to steam temperature)
- 6 Dial for steam/hot water valve
- 7 LED display
 - a Fill up water
 - b Empty trays
 - c Run the service program
 - d Turn dial (steam/hot water valve)
- 8 Steam pipe with frothing nozzle
- 9 Coffee outlet, height-adjustable
- 10 Cover lid, water tank
- 11 Removable water tank
- 12 Bean container with aroma protection cover
- 13 Slot for cleaning tablets
- 14 Cup shelf with cup heater (passive)
- 15 Slide switch, degree of ground coffee
- 16–19 Drip tray
- 20 Storage compartment for power cord
- 21 Service flap (access to brewing unit)



Overview of controls

- 16 Drip plate
- 17 Container for coffee dregs
- 18 Drip tray
- 19 Float (filling level indicator)



Note!

The filling level of the drip tray is indicated via the float through an opening in the drip plate. The level is not monitored electronically!

3.2.2 Controls

3.2.2.1 Mains switch auto-off

The mains switch at the **front of the appliance** switches the power supply on or off.



When the mains switch has been pressed, a self-test runs: The appliance is initialized, heats up and is rinsed.



Attention!

Risk of damage!

Do **not** actuate the mains switch during the brewing process. When the appliance is switched on again, malfunctions and damage may occur.

- ▶ Do not switch off the appliance with the mains switch until it has been switched off with the standby button.

WARNING

Switching on a cold appliance:

When the **auto-off** button has been pressed, the appliance heats up and is rinsed. Both LEDs for coffee dispensing buttons are flashing. Coffee **cannot** be brewed until the LEDs stop flashing.

Switching on a warm appliance:

If the appliance is switched on with the **auto-off** button, a rinsing process or self-test will not occur as long as the heater is still at

operating temperature. Both LEDs for coffee dispensing buttons are lit green. Coffee can be brewed immediately.

The appliance is not rinsed if:


- ▶ it was still warm when switched on
- or
- ▶ there was **no** coffee from the last brew before the appliance was switched off.

Automatic switch off (auto-off):


If the appliance is not manually switched off, it will switch off automatically after approx. 10 minutes after the last dispensing operation and then rinse.

The pre-set switch-off time can be changed (see section "Automatic Switch-Off auto off").

3.2.2.2 Coffee strength button

 By pressing the button the coffee strength can be changed:

Coffee strength normal:

 LED does not light.

Fixed amount of coffee powder: = 7,6 +/- 1g

Coffee strength strong:

 LED lights.

Fixed amount of coffee powder:: = 12,3 +/- 1g

Bean container empty:

 LED flashing

Bean container is empty and needs to be filled.

3.2.2.3 Coffee dispensing button (small coffee)



If the coffee dispensing button for small coffee is pressed, a coffee brewing process is started. The button LED will start to flash green.

Coffee beans are ground, pre-brewed and conveyed into the cup.

The same amount of liquid can be drawn additionally:

- ▶ To do this, press the coffee on button again within 3 seconds **after** the end of the brewing process

The factory preset amount of liquid (40 ml) can be changed.

- ▶ To do this, press the coffee on button and hold down until the required amount of coffee has run through.

Reset to factory settings ([Reset](#))

If the button is pressed again, the coffee brewing process can be interrupted early. The grinding process is ended, the brewing process is stopped, and the brewing unit is emptied.

3.2.2.4 Coffee dispensing button (large coffee)



If the coffee dispensing button for large coffee is pressed, a coffee brewing process is started. The button LED will start to flash green.

Coffee beans are ground, pre-brewed and conveyed into the cup.

The same amount of liquid can be drawn additionally:

- ▶ To do this, press the coffee on button again within 3 seconds **after** the end of the brewing process


The factory preset amount of liquid (40 ml) can be changed.

- ▶ To do this, press the coffee on button and hold down until the required amount of coffee has run through.


Reset to factory settings ([Reset](#))

If the button is pressed again, the coffee brewing process can be interrupted early. The grinding process is ended, the brewing process is stopped, and the brewing unit is emptied.

3.2.2.5 Steam button


By pressing the  button, steam is generated for frothing or heating.


The appliance heats up for approx. 20 seconds. Then steam can be drawn by rotating hot water/steam production knob.

When the knob has been turned back to , the steam button must be pressed again before more steam can be drawn.

3.2.2.6 Dial for steam/hot water valve


Valve with 2 positions:

 Coffee brewing process (valve closed)

 Hot water/steam production (valve open)








When the hot water/steam production knob has been turned, hot water or steam can be drawn via the steam pipe.

Before steam can be drawn, the steam button must also be pressed.

When the knob has been turned back to , the steam button must be pressed again before more steam can be drawn.

3.2.2.7 LED display

Lit and flashing LEDs indicate the following:

	lit	Water tank is empty and must be filled.
	lit	Trays are full: Empty trays and re-insert.
	flashes	No trays: Re-insert trays.
	lit	Service program must be run:
	flashes	Service program is running
	flashes	Knob must be turned to hot water/steam production.
	lit	Knob must be turned to O.

3.2.2.8 Steam pipe with frothing nozzle

Steam pipe can be swiveled 30° to both sides.

Standard frothing nozzle for drawing hot water and for drawing steam to heat drinks and froth milk.

3.2.2.9 Coffee outlet, height-adjustable

Adjustment range 80 mm–120 mm

3.2.2.10 Cover lid, water tank

Hinged, connected to upper section of appliance

3.2.2.11 Removable water tank

Can be removed at side, 1.8 liter capacity up to “ max” mark

Holder for screw-on water filter (mat. no. 46 1732) available

3.2.2.12 Bean container with aroma protection cover

Transparent, capacity approx. 700 ml (equivalent to approx. 250g of beans)

3.2.2.13 Slot for cleaning tablet

No magnetic sensor for cover monitoring

3.2.2.14 Cup shelf with cup heater

Passively heated by the waste heat from the coffee heater

Temperature > 37 °C after 20 minutes in ready to use mode.

3.2.2.15 Slide switch – degree of ground coffee, 3-stage



Risk of damage!

Beans may become jammed in the grinding unit.

- ▶ **Adjust degree of grinding only while the grinding unit is running!**

WARNING

Irrespective of the degree of roasting and the oil content of the coffee beans used, the coffee mill's degree of grinding must be changed:

- ▶ Light roasting, low oil content finer grinding result
- ▶ Dark roasting, high oil content coarser grinding result



If beans are very oily, a very fine grinding unit setting in conjunction with a large amount of ground coffee may impair the operating sequence!

The new setting does not become noticeable until the second to third cup of coffee.

3.2.2.16 Drip plate

Stainless steel, with opening for float

3.2.2.17 Container for coffee dregs

Capacity 12–14 coffee dregs at medium strength

3.2.2.18 Drip tray

Volume until float indicates limit, approx. 0.7 liters

The presence of the drip tray is monitored by a micro switch. This also occurs in standby.

3.2.2.19 Float (filling level indicator)

The level of the drip tray is indicated via the float through an opening in the drip plate.

The level is not monitored electronically.

3.2.2.20 Storage compartment for power cord

Pull out power cord to required length.

3.2.2.21 Service flap (access to brewing unit)

The service flap is locked in position on the right side of the appliance. To open:

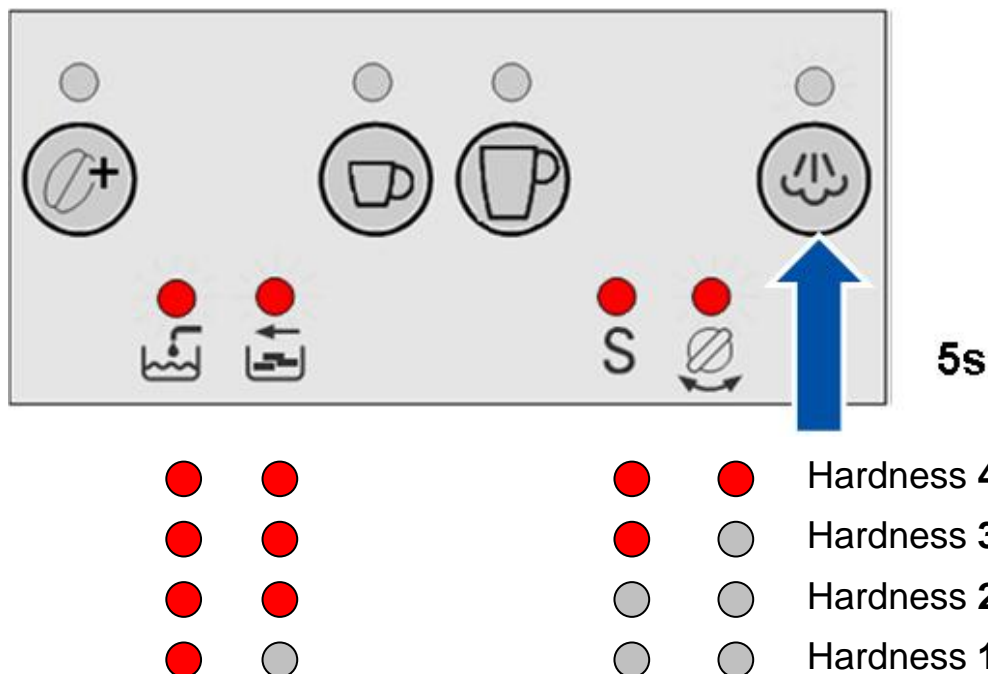
- ▶ Take hold of the recessed grip and
- ▶ pull the service flap outwards.

3.3 Adjusting the water hardness

It is important that the water hardness is set correctly so that the appliance indicates in good time when it requires descaling.

Water hardness 4 has been preset

Determine the water hardness with the enclosed test strip or ask your local water supplier.



- ▶ Press mains switch to turn the appliance on.

Appliance is in ready-to-use mode.

- ▶ Press **steam** button  for at least **5 seconds**.

Number of lit display LEDs indicates the currently set water hardness.

- ▶ Keep pressing steam button until LEDs for the required water hardness light up.

If no button is pressed within 90 seconds, the appliance switches back to ready to use mode without saving the water hardness. The previously set water hardness is retained.

- ▶ Press **coffee strength** button  once.

The set LEDs flash 3 times, the selected water hardness is saved.



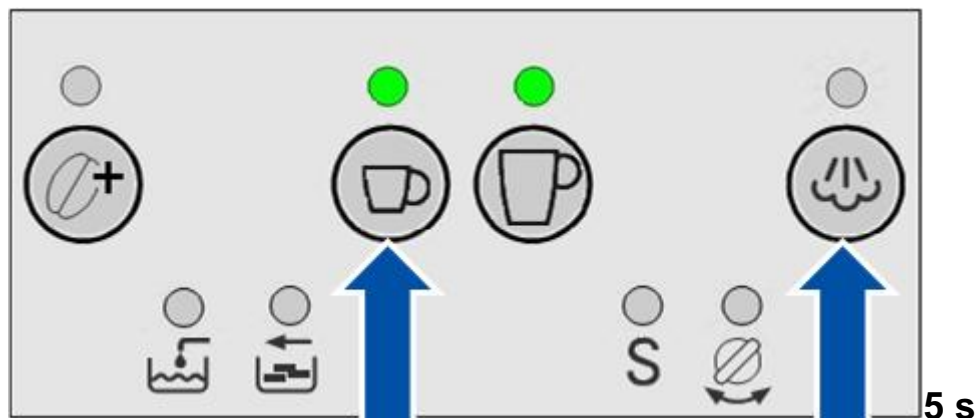
Note:

- ▶ If a water filter is used, **water hardness 1** must be set!

3.4 Adjusting the auto-shut off time

The automatic switch-off time can be changed.

Pre-set automatic switch-off time = 10 min





●	○	○	○	10 min
●	●	○	○	30 min
●	●	●	○	1 h
●	●	●	●	4 h

- ▶ Press mains switch to turn the appliance on.

Appliance is in ready-to-use mode.

- ▶ Press **coffee dispensing button small** and **steam** simultaneously for at least **5 seconds**:

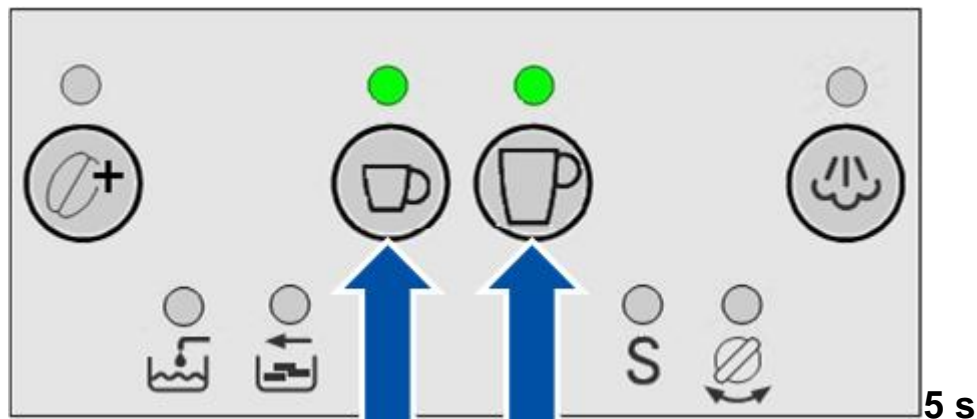
Number of lit display LEDs indicates the currently set switch-off time.

- ▶ Press steam button  to change the selection.
- ▶ Press **coffee strength** button  once to confirm the selection.

LEDs are flashing three times. The selected shut-off time is saved.

If no button is pressed within 90 seconds, the appliance switches back to ready to use mode without saving. The previously set shut-off time is retained.

3.5 Adjusting the brewing temperature





●	○	○	○	- 3K
●	●	○	○	normal
●	●	●	○	+3K

- ▶ Press mains switch to turn the appliance on.

Appliance is in ready-to-use mode.

- ▶ Press both **coffee dispensing buttons small and large** simultaneously for at least **5 seconds**:

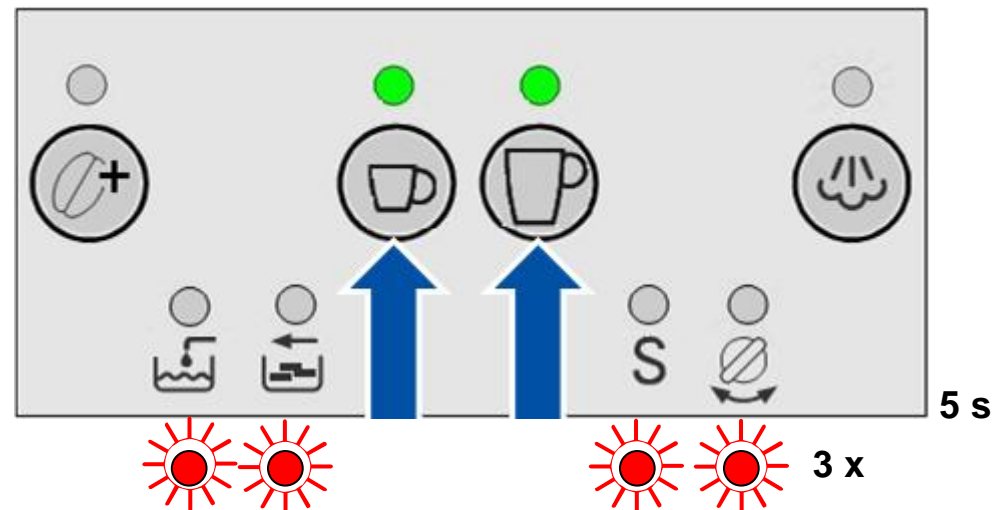
Number of lit display LEDs indicates the currently set brewing temperature. **Pre-set temperature level = normal**

- ▶ Press steam button  to change the selection.
- ▶ Press **coffee strength** button  once to confirm the selection.

LEDs are flashing three times. The selected temperature level is saved.

If no button is pressed within 90 seconds, the appliance switches back to ready to use mode without saving. The previously set temperature level is retained.

3.6 Reset



- ▶ Press mains switch to turn the appliance on.

Appliance is in ready-to-use mode.

- ▶ **Pull out drip tray**
- ▶ Press both **coffee dispensing buttons small and large** simultaneously for at least **5 seconds**: **3 x**

The following values are reset to the factory setting:

- Amount of liquid coffee (small cup = 40 ml, large cup = 125 ml)
- Temperature (to normal)
- Water hardness (to hardness 4)
- Grinder runtime (normal = 6,9 s, strong = 8,8 s)
- Auto-shut off switch off time (to 10 min)

All four LEDs are flashing three times for confirmation.

3.7 Cooling the heater manually

Heater and parts of the tube system become hot during operation. For service activities heater and tube system can be cooled down manually.

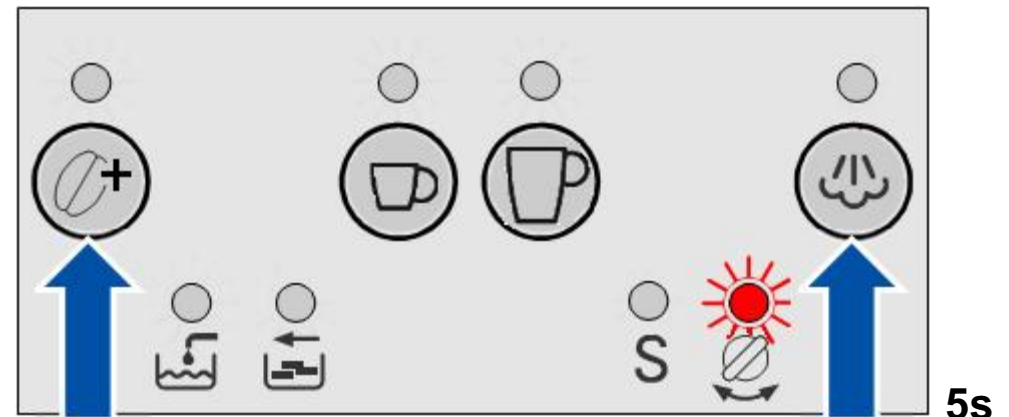
- ▶ Provide a 0.5 liter collecting vessel

3.7.1 Procedure

- ▶ Connect appliance to the mains

Appliance is off.

- ▶ Place collecting vessel under steam nozzle.
- ▶ **Turn dial to open steam valve.**
- ▶ Press mains switch to turn the appliance on.



- ▶ Press **coffee strength button** ☉+ and **steam button** ☉ simultaneously for **5 seconds**.

LED above Open steam tap symbol flashes.

Cold water (maximum 0.5 liters) is conveyed out of the steam pipe. It is not re-heated. Heater and fluid system are cooled manually.

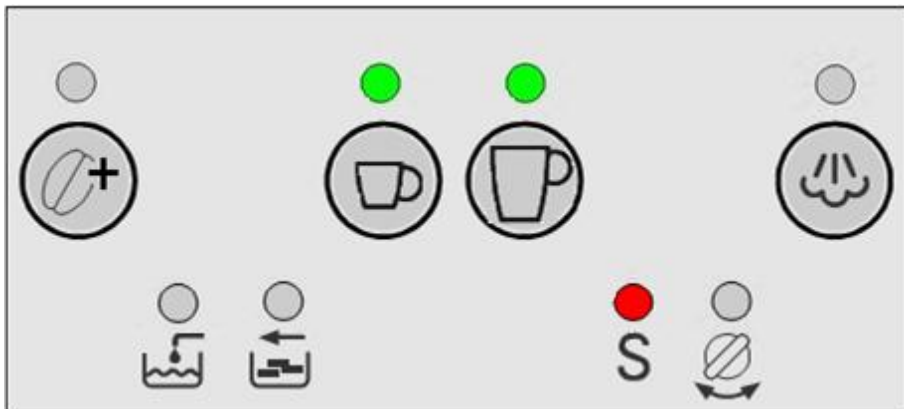
- ▶ Turn dial to close steam valve.

Pump stops. Appliance starts a new heating sequence.

3.8 Service-Program

The service program combines the descaling and cleaning process in one cycle.

If **S** lights up on the display when the appliance is switched on, the service program must be started.



Use liquid descaling agent, mat. no. 310451 or detergent tablets, mat. no. 310575!



Risk of damage!

- ▶ Never interrupt the service program!
- ▶ Never descale the appliance with vinegar or vinegar-based substances.
- ▶ Before starting the service program, remove water filter from the water tank!

WARNING

While the service program is running (approx. 40 min.), the **S** LED flashes.

3.8.1 Service-alarm

The Service alarm is displayed after

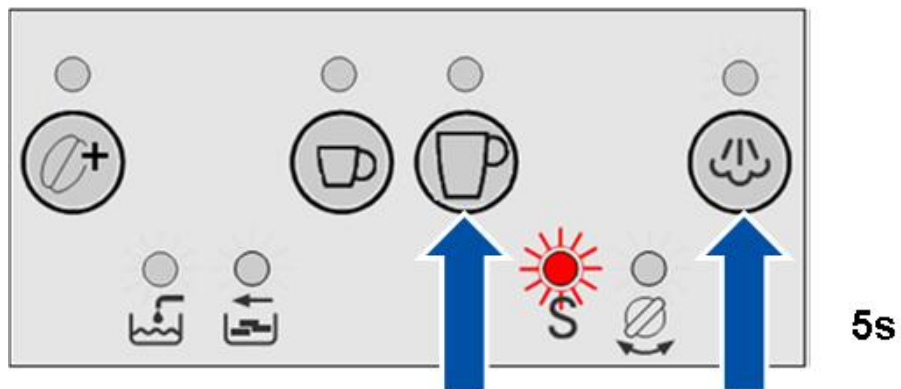
- ▶ **180 coffee** brewing processes; irrespective of the coffee strength and cup size (Cleaning alarm)
- or
- ▶ **120 l** water flow at a water hardness setting of 1
90 l water flow at a water hardness setting of 2
60 l water flow at a water hardness setting of 3
30 l water flow at a water hardness setting of 4

For steam the calculation is as follows: 6.4 seconds of steam production correspond to 1 dl of hot water production.

3.8.2 Starting the service program

Appliance is switched on and ready to use.

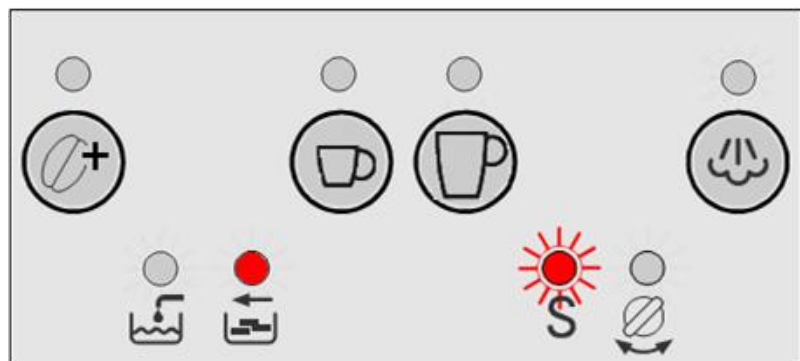
- ▶ Remove drip tray with dregs drawer, empty and re-insert (time frame > 6 seconds)
- ▶ Press **coffee dispensing button large** and **steam** button simultaneously for **5 seconds**.



Button LED: Off

Display LED: S flashes

Appliance is initialized, heats up and is rinsed twice via coffee outlet.



Button LED: Off

Display LED: S flashes, Empty trays is lit

3.9 Maintenance and daily cleaning



Risk of electric shock!

- ▶ Unplug the appliance before cleaning it
- ▶ Never immerse the appliance in water
- ▶ Do not use a steam cleaner

DANGER



Risk of damage!

- ▶ Do not use scouring agents

WARNING

3.9.1 Daily cleaning

- ▶ Wipe the outside of the appliance with a damp cloth. Do not use scouring agents.
- ▶ Rinse out the water tank with water only.
- ▶ Remove, empty and clean the trays for residual water **(21)** and coffee grounds **(20)**.

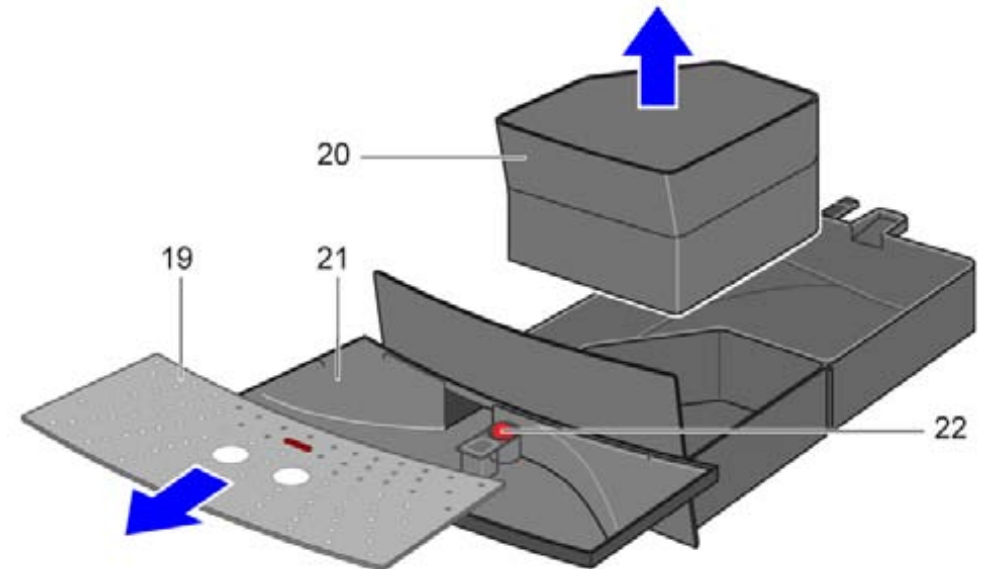
Wash all removable parts by hand only.

- ▶ Wipe out or vacuum the inside of the appliance (tray holders)



Note

If the appliance is cold when switched on, it is automatically rinsed. Brewing unit and coffee outlet are cleaned with approx. 60ml of water.



3.9.2 Cleaning the brewing unit



Risk of damage!

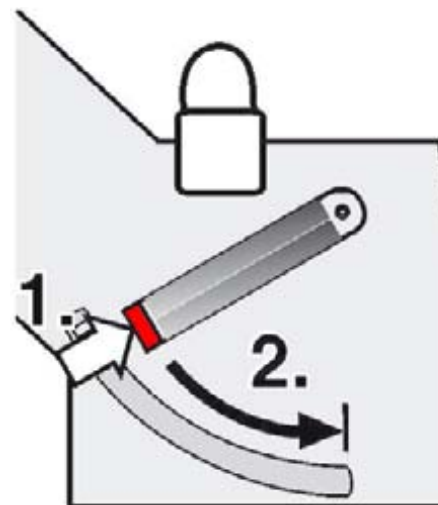
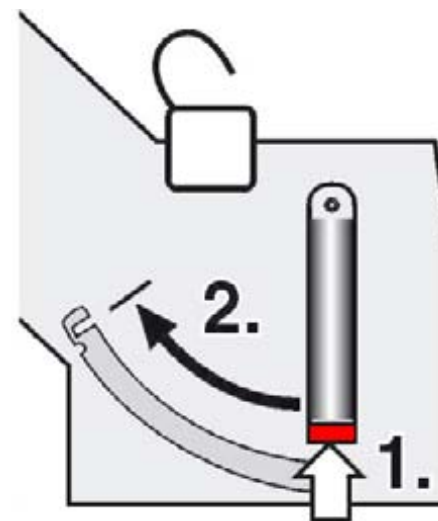
Do not clean the brewing unit in the dishwasher!

WARNING

The brewing unit can be removed for cleaning.

- ▶ Turn off the appliance with the standby-button.
- ▶ Turn the mains switch to off.
- ▶ Open the service flap on the right hand side of the appliance.
- ▶ Press and hold the red button **(1)** down and push the handle up until you hear it engage.
- ▶ Grasp the brewing unit by the handle.
- ▶ Rinse the brewing unit under running hot water. Do not use cleaning agents.
- ▶ Vacuum the inside of the appliance or clean it with damp cloth.
- ▶ Dry and reinsert the brewing unit all the way into the appliance.
- ▶ Press and hold the red button **(1)** down and push the handle down until you hear it engage. The brewing unit is now secure.
- ▶ Reinsert and close the service flap.

If the appliance is cold when switched on again is automatically rinsed, i.e. the system cleans itself.



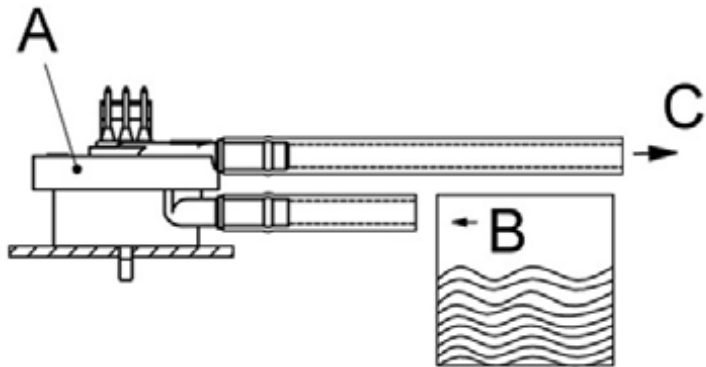
4 COMPONENTS

4.1 Flow meter

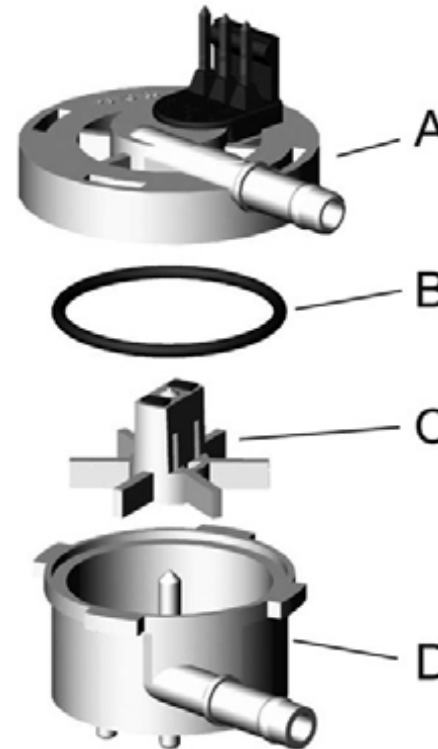


The composition of the coffee mixture is a well guarded secret of the coffee roasting establishments. To ensure that an excellent coffee can be produced from this secret, the coffee beans must be roasted carefully and the coffee machine controlled precisely – unless the dosage is constant, the quality of the coffee cannot be maintained.

The flow meter **(A)** is installed on the suction side between the water tank **(B)** and pump **(C)**. To ensure a precise measurement result, the flow meter must be operated in a horizontal position.



4.1.1 Design and function



Water is pumped in from the water tank and flows through the flow meter.

Water is supplied via the connection pipe in the lower section of the housing **(D)**.

Water is discharged via the connection pipe in the upper section of the housing **(A)**.

The two halves of the housing are sealed with a silicone seal **(B)**.

The fan impeller **(C)** with the two attached magnets is rotated by the water flow.

The Hall-IC in the upper section of the housing **(A)** generates square pulses which measure the actually required amount of water.

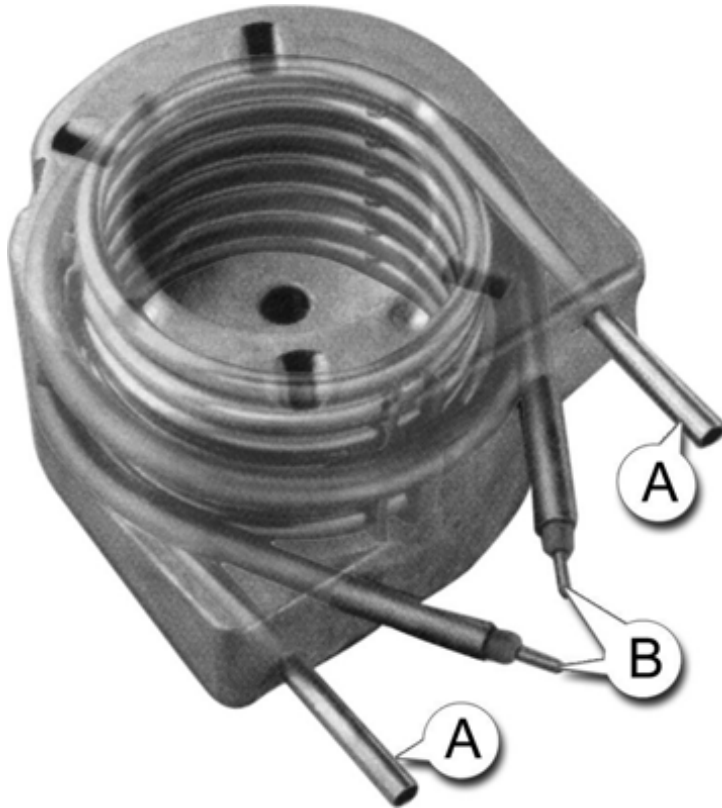


When installing the flow meter, ensure that the direction of flow is correct. An arrow on the flow meter housing indicates the direction of flow.

4.2 Heater and NTC-sensor

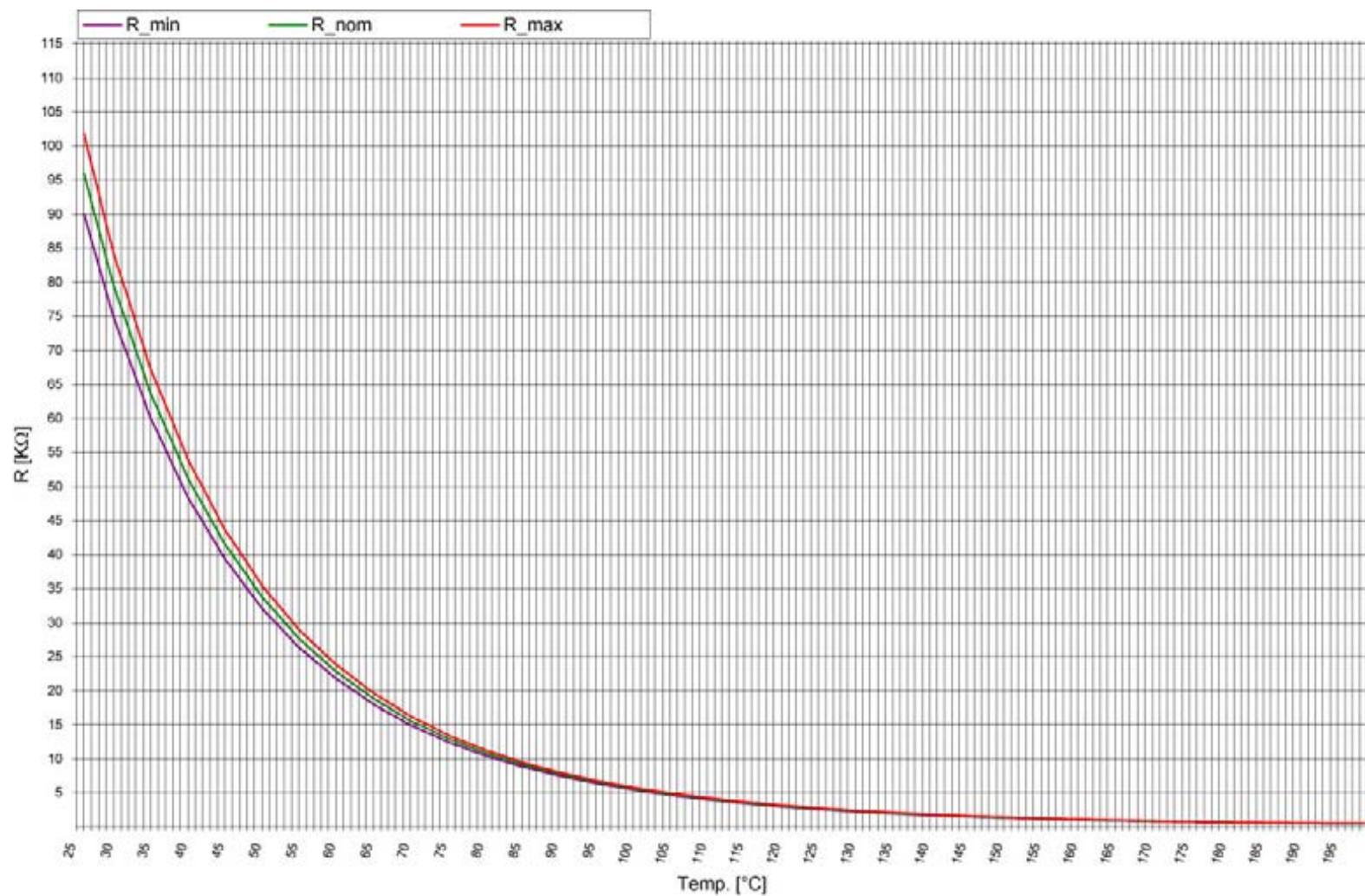
4.2.1 Heater (Instantaneous water heater)

In the instantaneous water heater the water for coffee production or hot water/steam purchase is heated up.



Therefore the water is pumped in a stainless-steel pipe **(A)**, which is cast in together with a heating resistor **(B)** in an aluminum block.

4.2.2 Characteristic of NTC-sensor



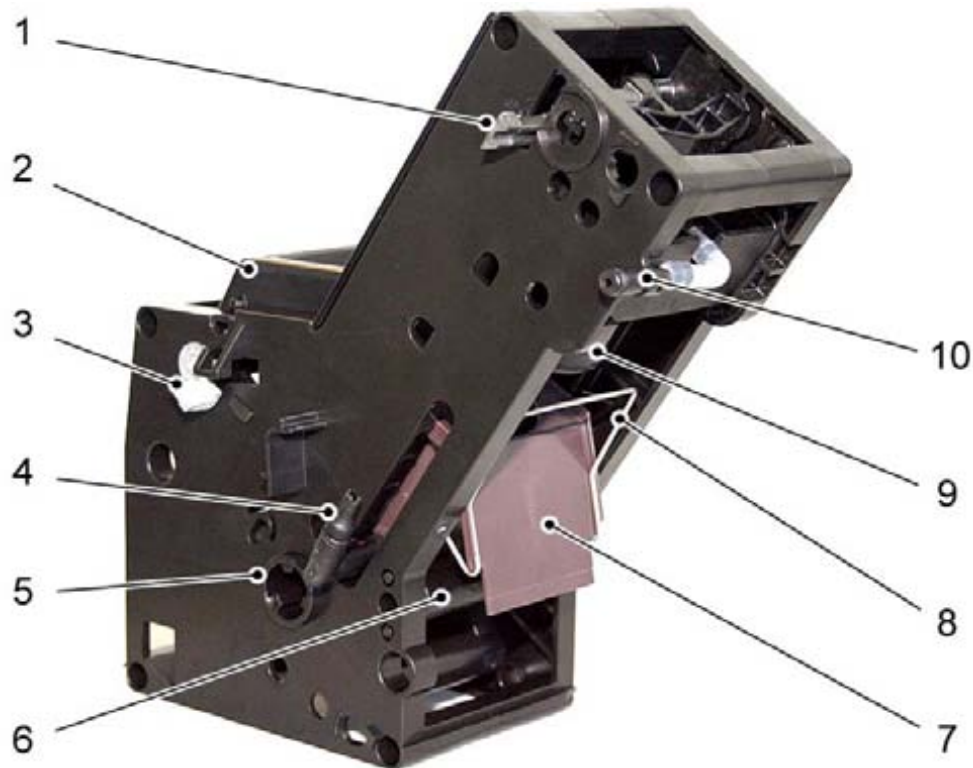
Temperature	R min	R nom	R max
25 °C	93.801k	100k	106.199k
95 °C	6.414k	6.624k	6.834k
140 °C	1.696k	1.771k	1.845k

4.3 Brewing unit

The brewing unit forms the central element in the espresso machine.

The brewing unit extracts the aroma, flavor and bitter agents from the ground coffee and forms the crema.

4.3.1 Operating principle



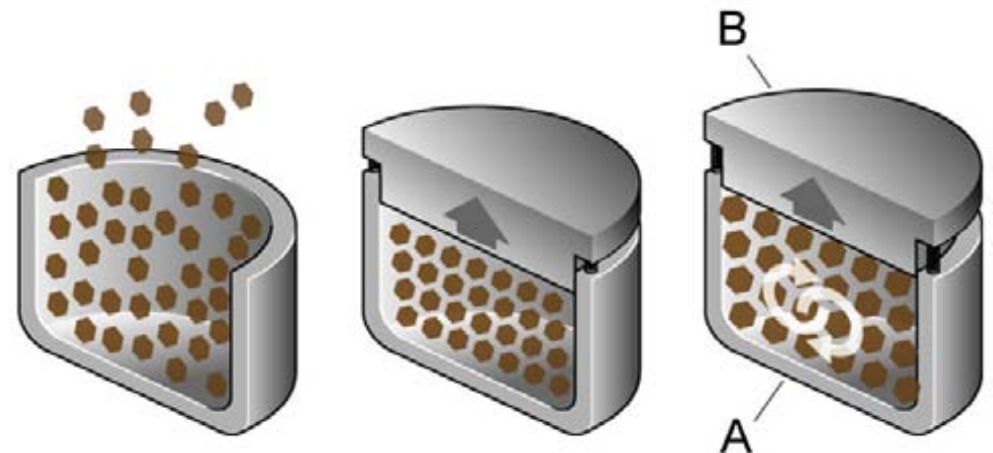
- | | |
|---------------------------------|--------------------|
| 1 Control lever, filling amount | 6 Catch |
| 2 Filling shaft | 7 Discharge chute |
| 3 Locking lever | 8 Stripping handle |
| 4 Water inlet | 9 Brewing head |
| 5 Clutch, drive shaft | 10 Coffee outlet |

Ground coffee pours through the filling shaft (2) into the brewing chamber and is compressed. Hot water is introduced under pressure via the water supply (4) and forced through the ground coffee. The coffee which is produced is conveyed to the coffee outlet (10). To optimize crema formation, the crema valve, which is situated above the brewing head, opens when the pressure reaches 4.5 bar.

At the end of the brewing process the used coffee dregs are emptied into the dregs drawer via the discharge chute (7).

4.3.1.1 Variable brewing chamber

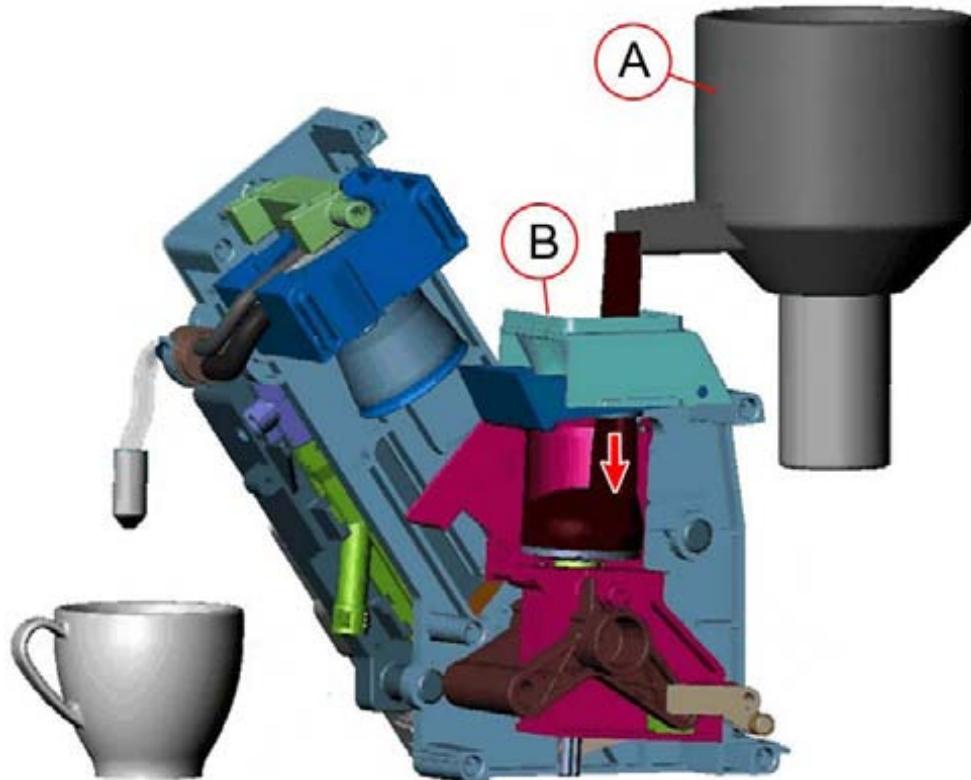
The brewing unit consists primarily of the brewing chamber (A), into which the ground coffee (7 g – 14 g) is metered, and the spring-mounted brewing head (B) which moves upwards to seal the brewing chamber.



The ground coffee is compacted and compressed in the brewing chamber. When hot water is pumped into the brewing chamber, the rising water pressure pushes up the brewing head, increasing the volume in the brewing chamber. This improves extraction of the flavors and formation of the crema.

4.3.2 Sequence of the brewing cycle

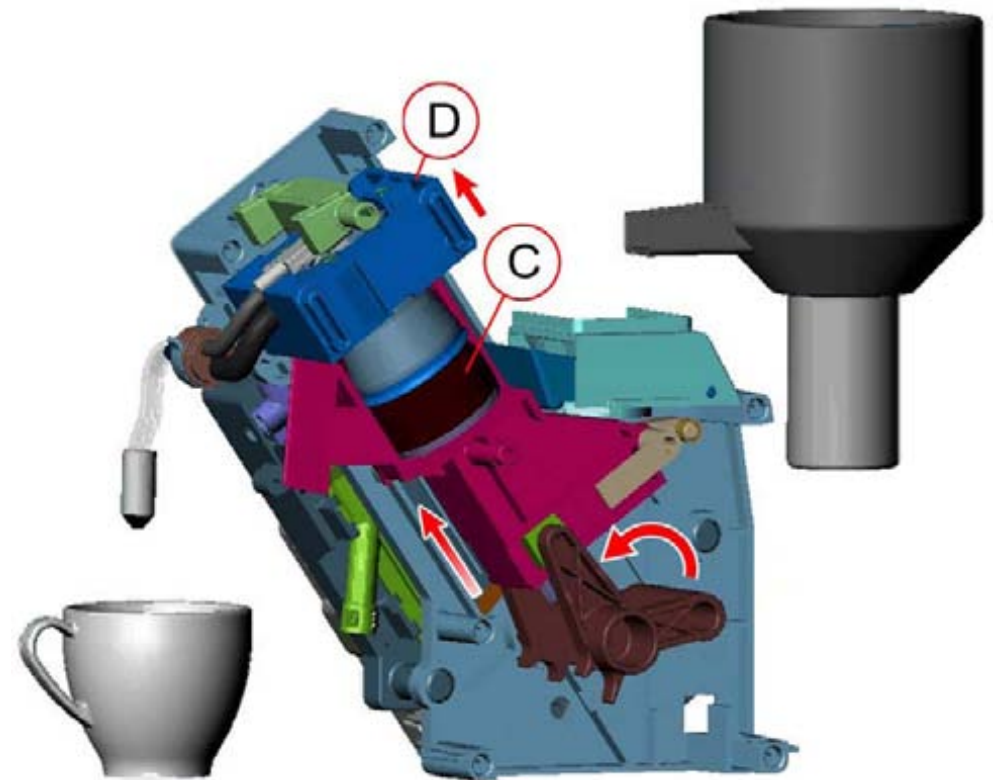
4.3.2.1 Grinding and metering



Coffee beans are ground in the grinding unit **(A)**. The ground coffee is conveyed into the open brewing chamber via the funnel **(B)**. The amount of ground coffee generated depends on the running time of the grinding unit. The brewing unit can process from 7 g to 14 g of ground coffee.

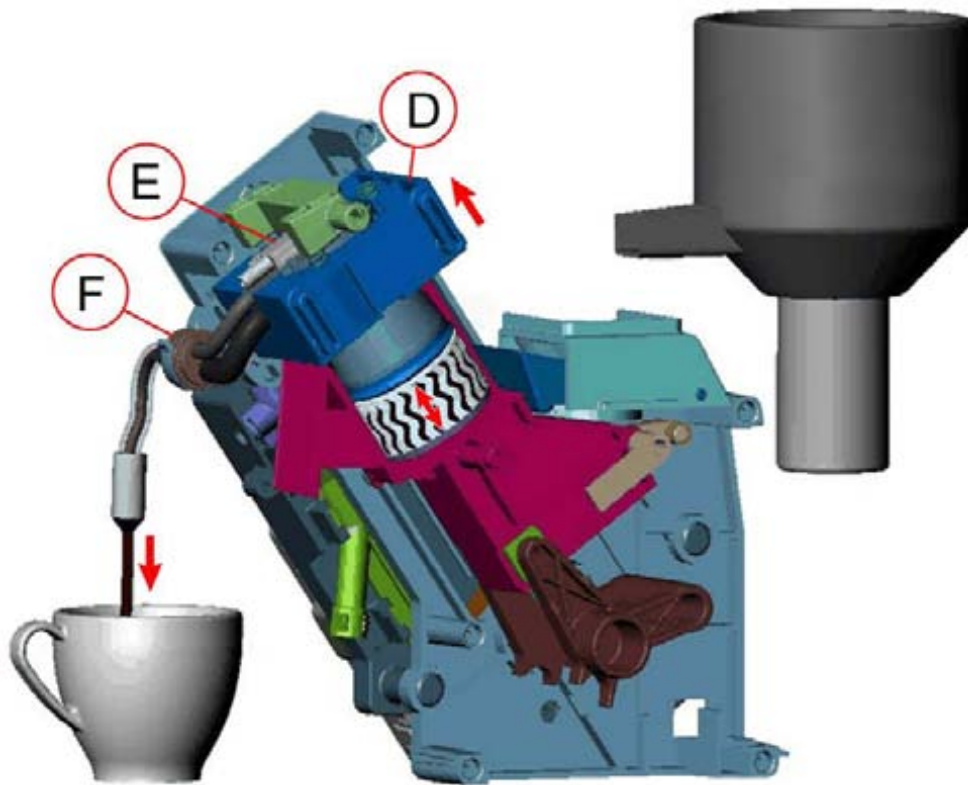
Alternatively ground coffee can be poured in via the powder slot.

4.3.2.2 Compression



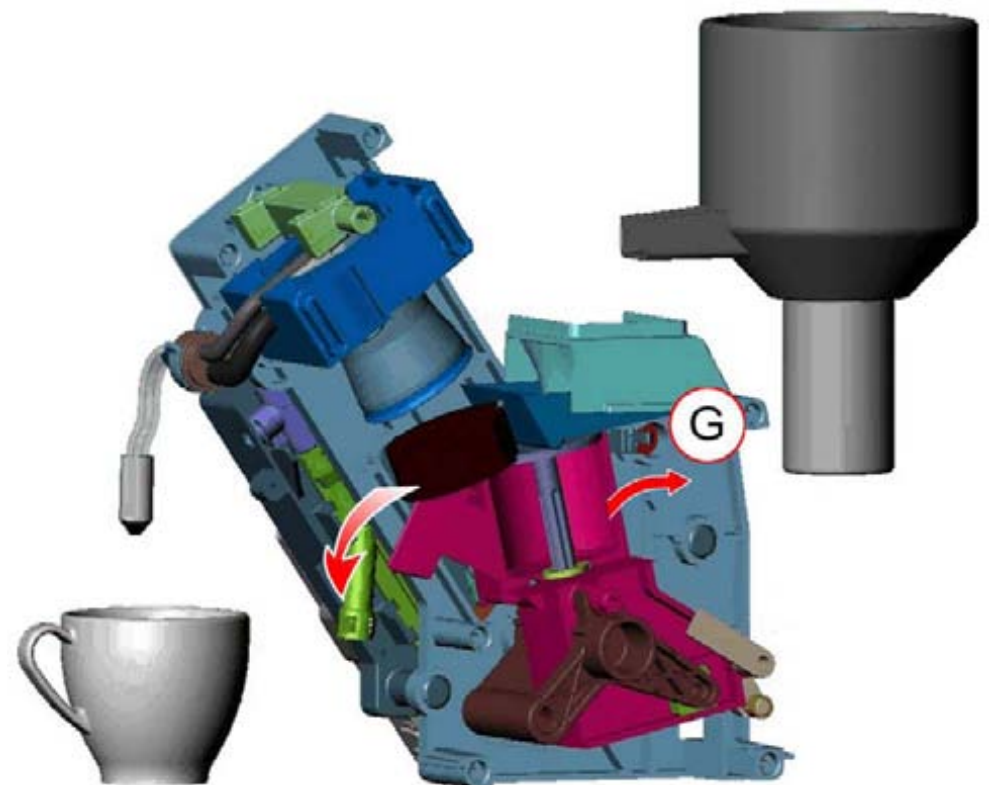
The grinding unit stops. The gears control the brewing unit to the upper end position. In doing so, the ground coffee is compressed in the brewing chamber **(C)**. The pressure applied to the ground coffee causes the spring-mounted brewing head **(D)** to move up. The more powder there is in the brewing chamber, the higher the brewing head is pushed upwards during compression. The actual amount of powder is measured by a slide which is connected mechanically to the brewing head and, if required, corrects the amount during the next brewing process.

4.3.2.3 Brewing



The brewing process starts. The pressure pump conveys the water into the brewing unit. The brewing head **(D)** is moved up by the water pressure, thereby increasing the volume in the brewing chamber. The hot water is mixed with the ground coffee longer and more intensively, thereby improving extraction of the flavors and formation of the crema. If the pressure inside the brewing chamber increases above 4.5 bar, the crema valve **(E)** opens and the coffee can flow to the coffee outlet **(F)**.

4.3.2.4 Emptying



When the programmed amount of water is reached, the pump stops. The pressure in the brewing chamber drops and the coffee dregs are compressed into a solid cake. The drainage valve opens, pressure and residual water are released into the drip tray. When the brewing unit descends, the brewing chamber moves back to the initial position **(G)** and the coffee dregs are emptied into the dregs drawer.

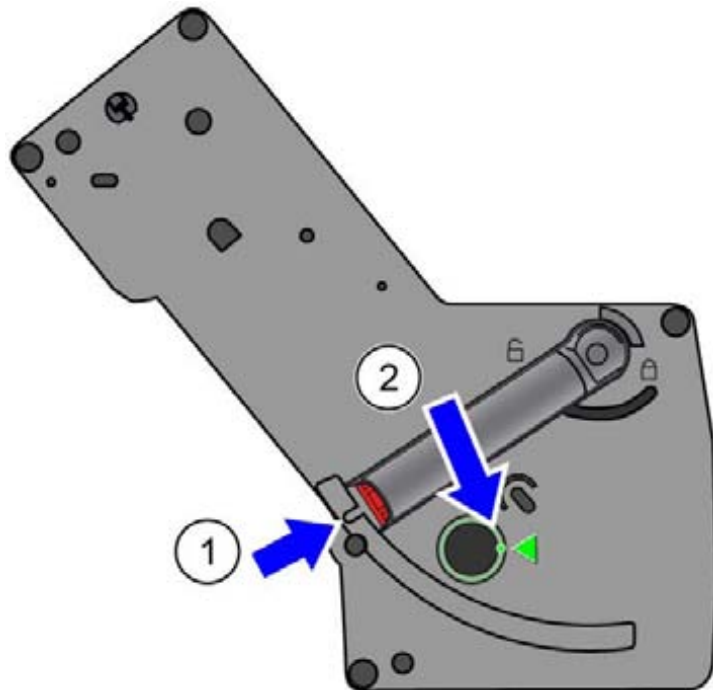
4.3.3 Removing the brewing unit

The brewing unit is accessed by opening the service flap on the right-hand side of the appliance. Once released, the brewing unit can be taken out of the appliance for cleaning.

4.3.3.1 Basic position

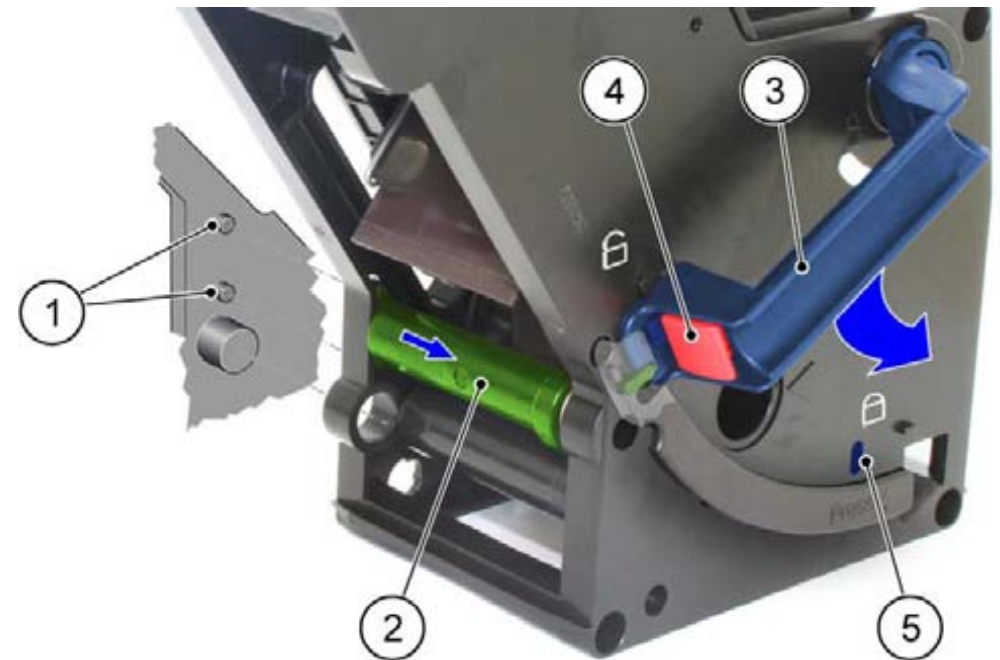
The brewing unit can only be replaced in the basic position.

- ▶ The brewing chamber is located completely underneath the filling funnel.
- ▶ The unlocking lever is engaged in the "locking mechanism open" position (1).
- ▶ The mark on the input shaft is next to the tip of the marking arrow (2).



4.3.3.2 Locking mechanism

When locked, the brewing chamber is prevented from moving. Only when placed in the appliance is the locking mechanism released by two cams (1) in the brewing unit compartment. Lock bolt (2) releases unlocking lever (3). The unlocking lever is released by pressing knob (4). The unlocking lever can be turned downwards, where it engages in recess (5). The brewing unit is locked. A micro switch on the transmission housing monitors the locked status.

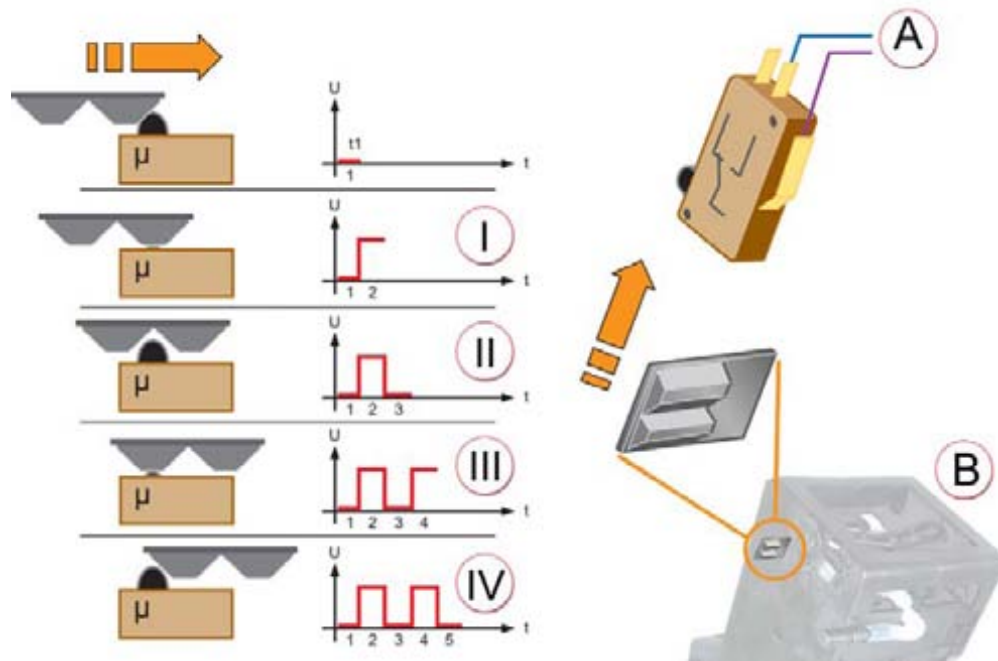


4.3.4 Compensation of the grinding unit running time

The amount of ground coffee which is generated by the grinding unit depends on the running time of the grinding unit.

To ensure that the required amount of coffee is always ground, both with different types of coffee, at different grinding settings and possibly with worn grinding tools, the amount of ground coffee which was actually conveyed to the brewing module (**B**) is measured.

The more powder there is in the brewing chamber, the higher the spring-mounted brewing head is pushed upwards during compression. A micro switch (μ) closes and opens as it moves past via a slide which is connected mechanically to the brewing head.



The electronics module measures the number of the voltage changes (**connection A**) caused by the switching processes which occur immediately before the pressure pump switches on and can therefore detect whether and how much ground coffee has been metered. This value can be compared with the nominal value for the aroma setting. Differences are adjusted by changing the running times of the grinding unit.

4.3.4.1 Switching states

If there is a minimum amount of coffee (<7 g), the brewing head does not move. The switch is not actuated. = Not enough coffee beans. **ADD BEANS** is displayed

- (I) Amount of powder >7 g – <10 g
- (II) Amount of powder 10 g
- (III) Amount of powder >10 g – <13 g
- (IV) Amount of powder >14 g = Too many coffee beans. The running time of the grinding unit must be reduced.

Special cases:

Too hot and too little powder before brewing
Brewing is ended (dry discharge), there is no pumping. The brewing module moves to the grinding position. Auto cooling starts (several ml of water are conveyed) and **SYSTEM TOO HOT** is displayed

Too little powder during 1st brewing process
ADD BEANS is displayed and an additional time of 1.3 sec. is given. Compensation is not active during this and the next brewing process.

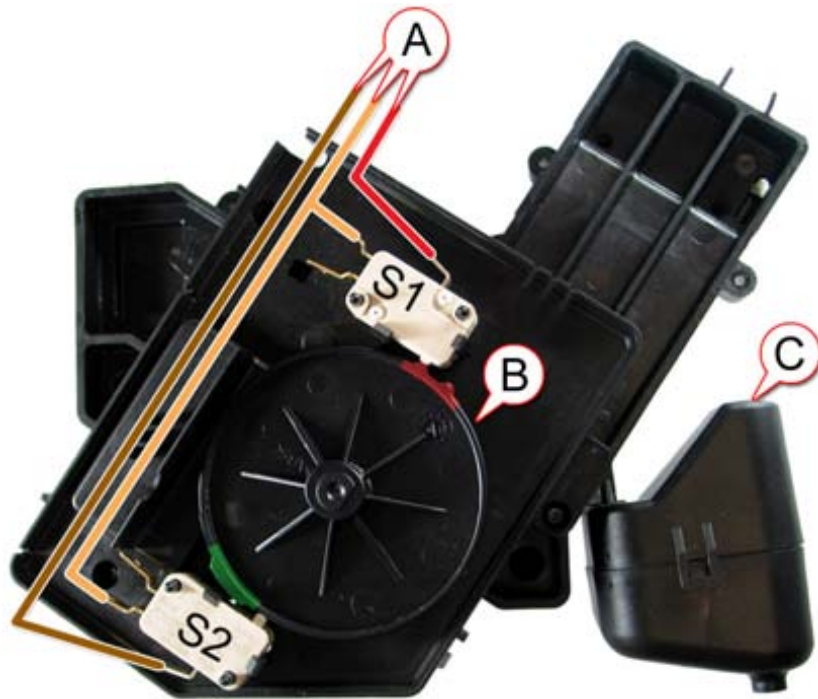
4.4 Gear unit

The gear unit is the drive for the brewing unit.

The gear motor is actuated at ± 16 V DC and transfers its power via gears to a drive shaft which is connected to the brewing unit.

4.4.1 Front housing

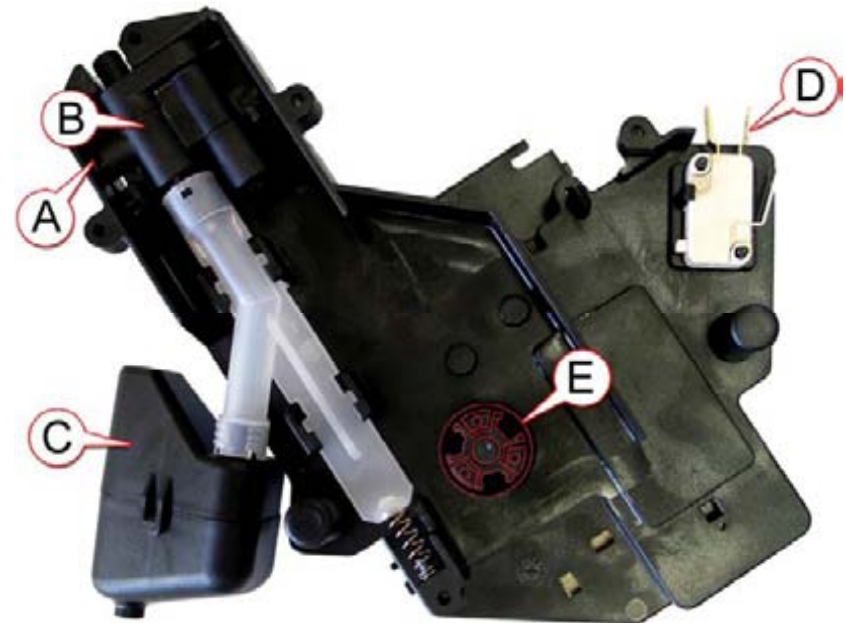
Micro switches (**S1** and **S2**) are attached to the front housing of the gear unit. These micro switches measure the position of the gears and the brewing unit via a cam (**B**) connected to the drive shaft.



Note: From production date **FD8701** on the drip tray is monitored by an additional micro switch in the appliance. If the drip tray is pulled out, the micro switch opens and interrupts the power supply to the gear motor via the power module.

4.4.2 Rear housing

On the rear housing section of the gear unit the drainage valve (**B**) is attached with the expansion chamber (**C**). This valve controls the passage of water from and to the brewing unit. The micro switch (**D**) is actuated by the lock on the brewing unit. The drive shaft (**E**) is the connection to the brewing unit.

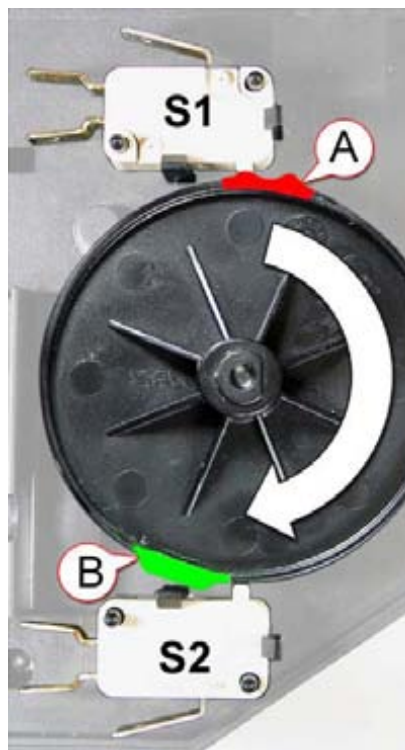


4.4.3 Cam disc on gear unit

The position of the brewing unit is detected with two micro switches S1 and S2. These two switches are able to define three positions.

When the appliance is switched on, the switch status of the micro switches is checked and transmitted to the control module. The brewing unit is moved to the basic position (= initializing).

Basic position



The brewing unit is in the grinding position and can be filled.

Switch **S1** is activated by switch cam **(A)**. Switch **S2** remains open.

S1 ON
S2 OFF

Brewing position



The transmission turns clockwise until switch **S2** is closed by switch cam **(A)** and switch **S1** is open.

The brewing unit is in the brew position. The transmission motor stops. Water can be supplied and coffee can be brewed.

S1 OFF
S2 ON

Drainage position



Once the brewing process is complete, the system is drained.

For this, the motor turns the cam disc back by about 8°, so that the drainage valve is opened again and the remaining water can run into the drip tray.

Switches **S1** and **S2** are closed.

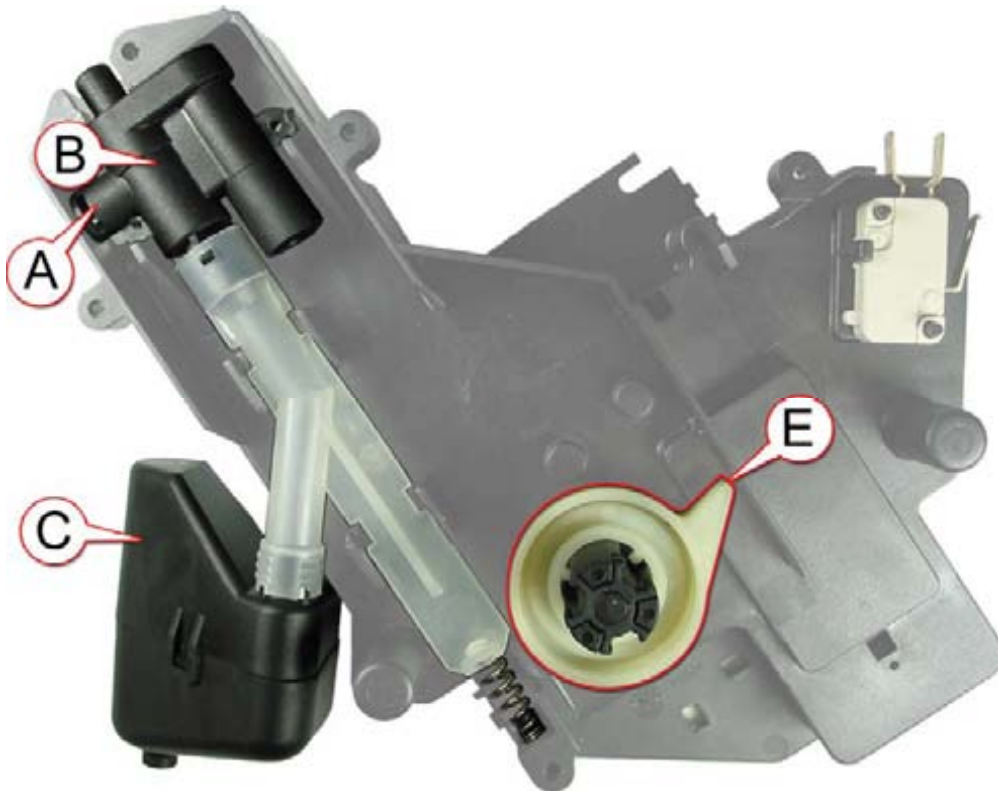
S1 ON
S2 ON

4.4.4 Drainage valve

The drainage valve **(B)** connects the water inlet **(A)** to the brewing unit and drains the system at the end of the brewing cycle.

4.4.4.1 Basic position

When the gears are in the basic position, the drainage valve is open. The cam **(E)** of the actuator must then be in the illustrated position.



Warning! **Malfunction**

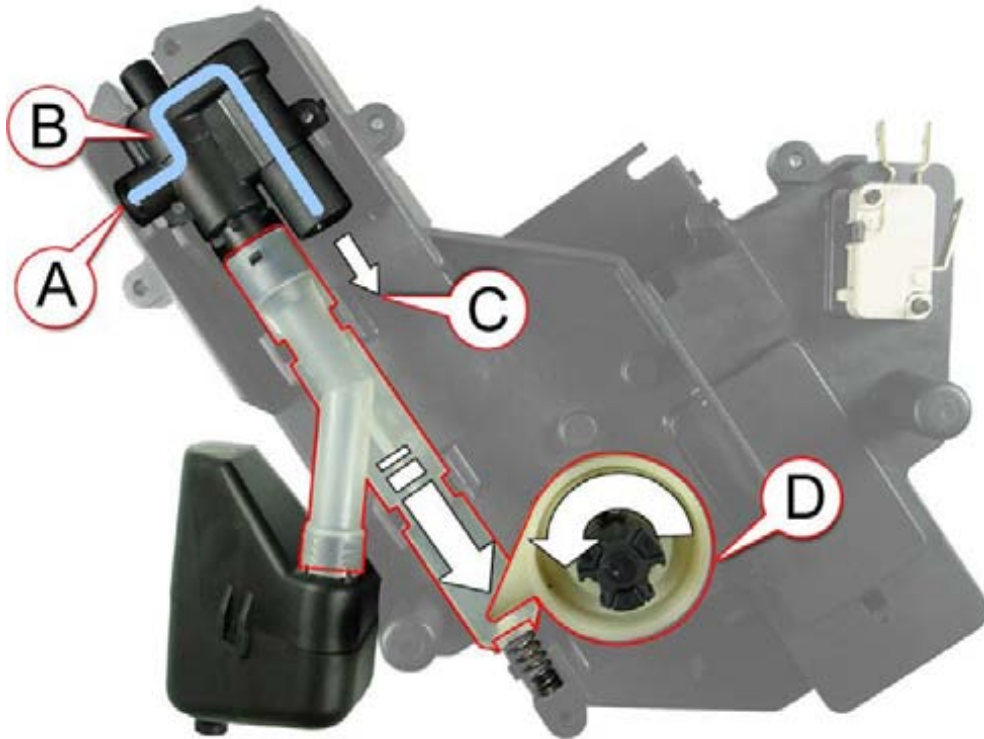
The position of the actuator and therefore its cam **(E)** is not specified permanently on the drive shaft.

The actuator may be in the wrong position. The function sequence may malfunction.

When installing the gears, ensure that actuator is in the correct position, as indicated under “Home position”!

4.4.4.2 Brewing position

When the gears move into the brewing position, the drive shaft rotates with the actuator **(D)** in an anti-clockwise direction.

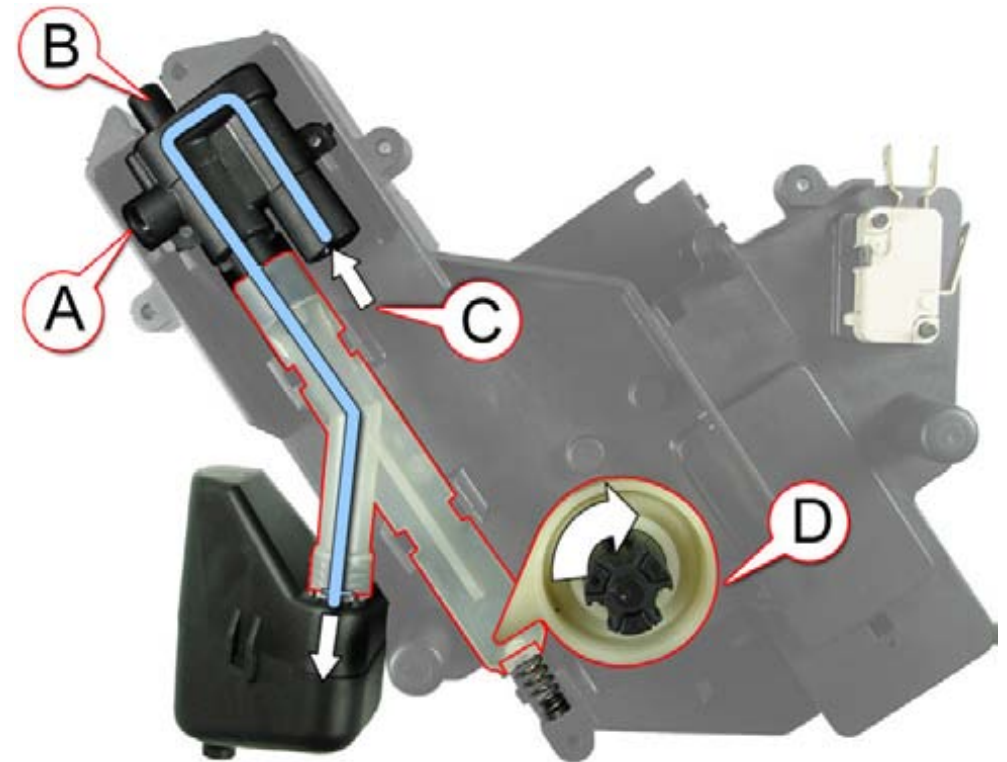


The brewing unit is moved upwards.

The connection to the drainage valve is closed with the water coupling in the brewing unit. The switch cam on actuator **(D)** reaches into the drainage valve control line and closes it. Water can flow from inlet **(A)** through drainage valve **(B)** to outlet **(C)**.

4.4.4.3 Drainage position

Once the brewing process is complete, the water pump switches off.



The transmission motor turns the input shaft with actuator **(D)** back through about 8° and opens the drainage valve.

The pressure is relieved and the water can drain into the expansion chamber and then into the drip tray. To prevent underpressure, air can flow back through valve **(B)**.

Then the transmission turns back in a clockwise direction until it is in the basic position again.

4.5 Steam valve and proximity switch

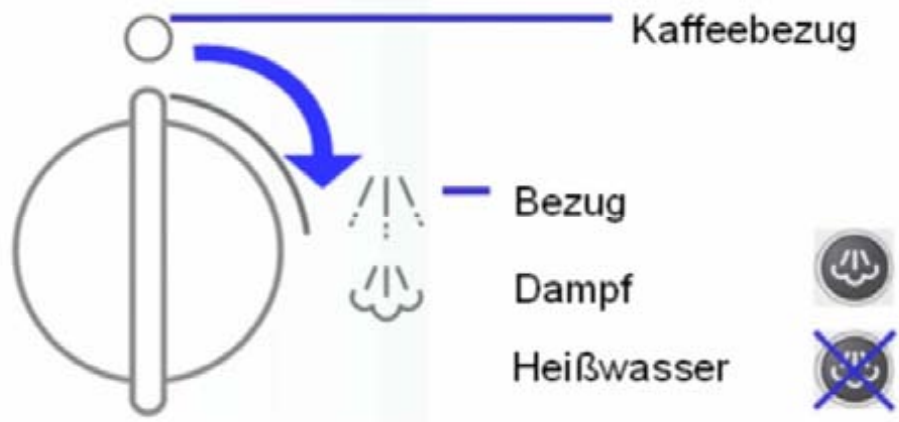
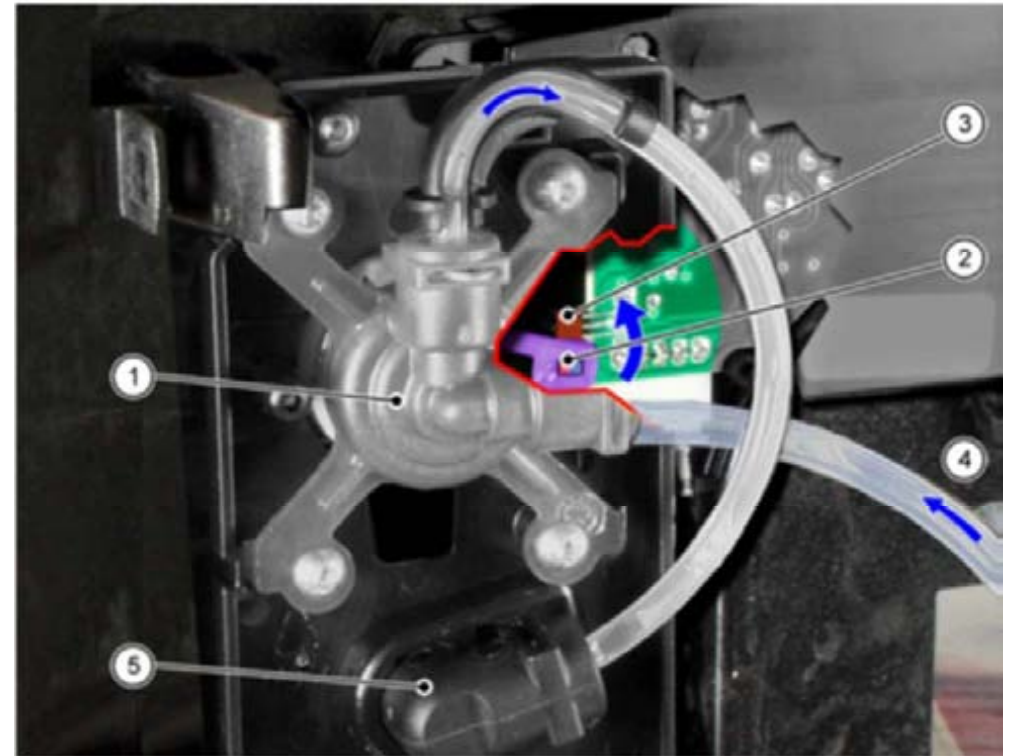
In order for hot water or steam to be dispensed, steam valve (1) must be turned open.

The pump must not start supplying until the steam valve is open.

For this, there is a lever with a magnet (2) on the steam valve which is guided by reed switch (3) in the control board when opening.

Hot water or steam is guided into the steam valve via pressure hose (4) and then on to steam pipe (5).

To dispense steam, first press the steam button and wait for the heat up phase.



4.6 Hot water / steam nozzle

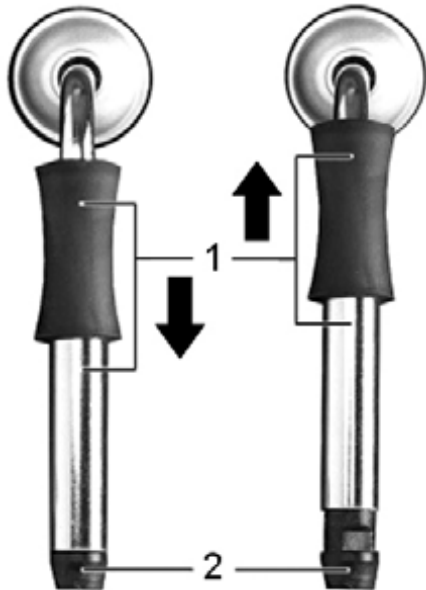


DANGER

Risk of burns!

The nozzle gets very hot.

- ▶ Do not touch the metal parts!



(1) Sleeve with plastic grip

To dispense hot water or to froth milk, move the sleeve downward by the plastic grip.

To warm drinks with steam, slide the sleeve upwards by the plastic grip.

(2) Tip of nozzle with inlet

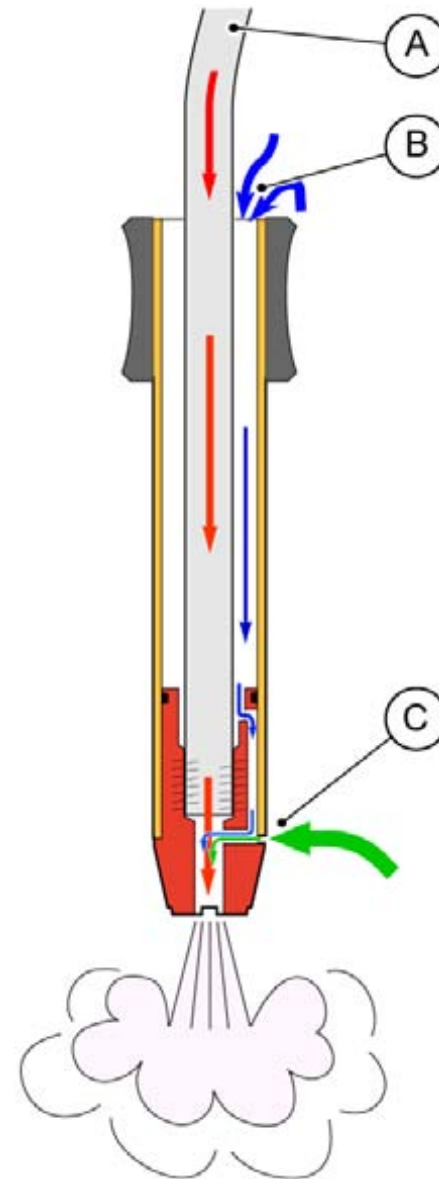
Sucks in milk and mixes with air to make milk froth.



Note:

Every time you froth milk, clean the nozzle immediately afterwards by dispensing hot water. Dried on milk residues are difficult to remove.

4.6.1 Function



The steam flows through steam pipe **(A)** and the connected steam nozzle, thereby creating underpressure inside the steam nozzle.

This underpressure is balanced out by fresh air flowing in through opening **(B)** on the nozzle holder and **(C)** on the tip of the nozzle.

If the nozzle is immersed in cold milk to above side opening **(C)** and steam is dispensed, fresh air flows in through opening **(B)** on the nozzle holder. At the same time, milk is sucked into this air flow through opening **(C)**, mixed with the flow of steam and emitted at the tip of the steam nozzle.

The resulting circulation of sucked in, mixed and emitted milk, warms the milk up. The milk froth is created by the mixing of the milk proteins with air. The proteins are stable up to approximately 76 °C.

They are destroyed by higher temperatures and froth formation is not possible then.

4.7 Water filter (option)

The filter cartridge is screwed directly into the water tank. The filter cartridges can be used for all appliances belonging to this series.

Carbon hardness, contents (e.g. chlorine) which impair taste and odor, heavy metals and other substances are reduced to protect the machine. Important minerals and fluoride are retained.

4.7.1 Filtration when drawing water

The water required for the preparation of coffee is filtered directly before use. The water is drawn in by fins in the lower area of the filter cartridge, filtered by the granulate and conveyed out through the centre of the water tank valve. (= Up flow principle)

4.7.2 Filter specifications

The **filter capacity** at 27° dH is approx. 50 liters (400 brews) or 2 months.

The **filter filling** consists of approx. 100 ml ion exchange resin and silvered activated carbon in the ratio 4:1.

Filter diameter: 27–42 mm

Filter length: 175 mm

Filling volume: 95–100 ml

Filter effect: Carbon hardness

up to 75%

Chlorine

up to 85%

Lead

up to 90%

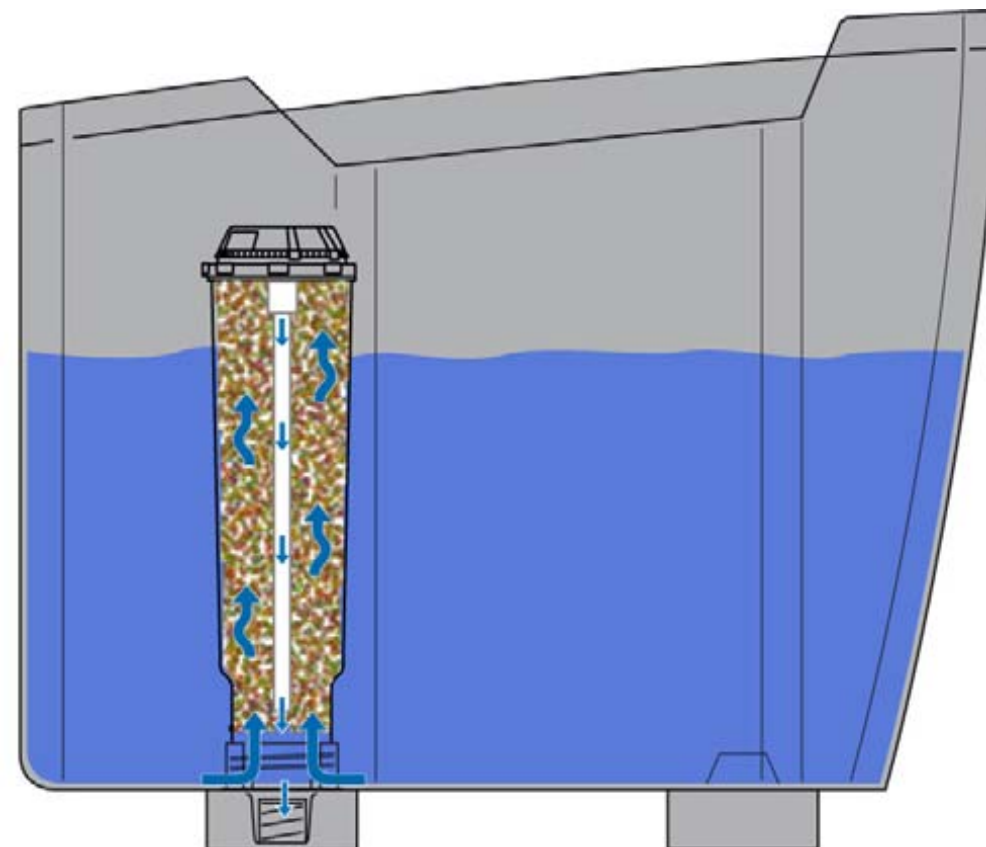
Copper

up to 95%

Aluminum

up to 67%

(Reduction if following substances are in the water)



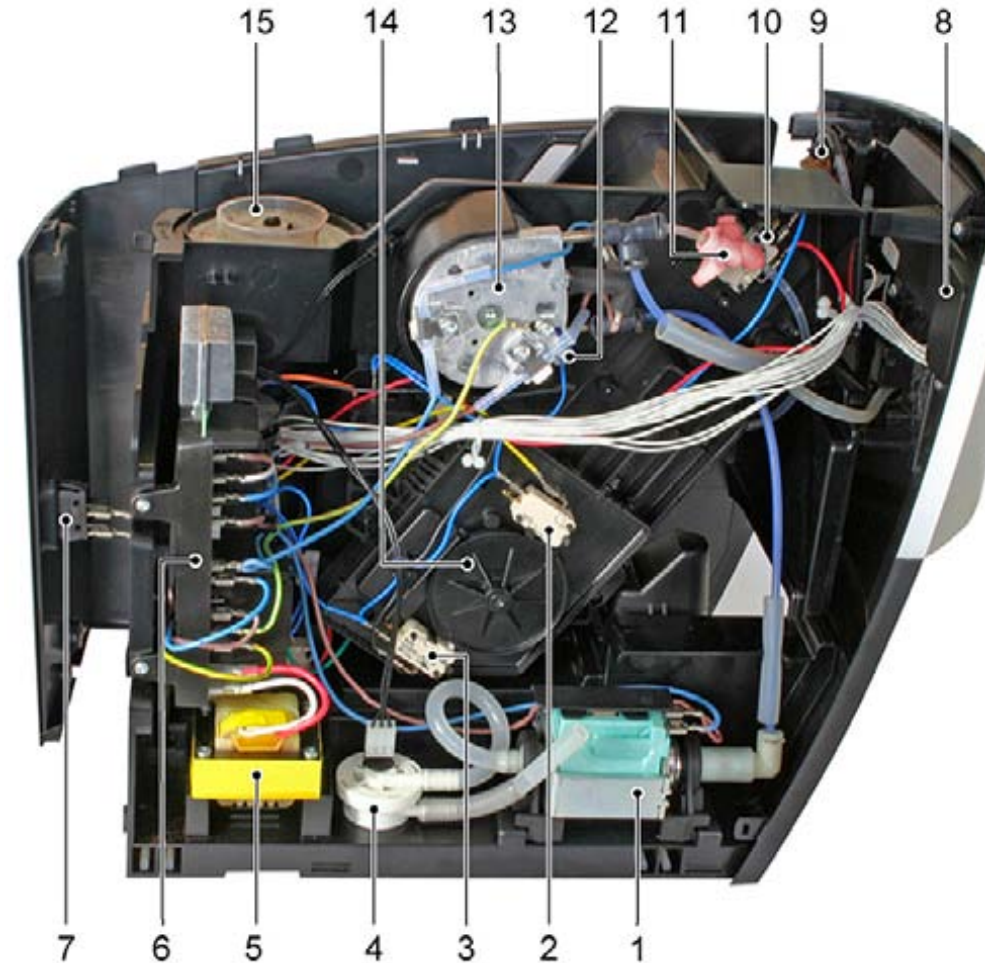
- ▶ Follow the information in the operating instructions for inserting or replacing the water filter!
- ▶ Do not insert filter if the descaling display lights up! First descale the appliance!
- ▶ If the appliance is always operated with the water filter inserted, descale as a precaution once or twice a year!

5 FUNCTIONS

5.1 Construction

5.1.1 Overview, left side

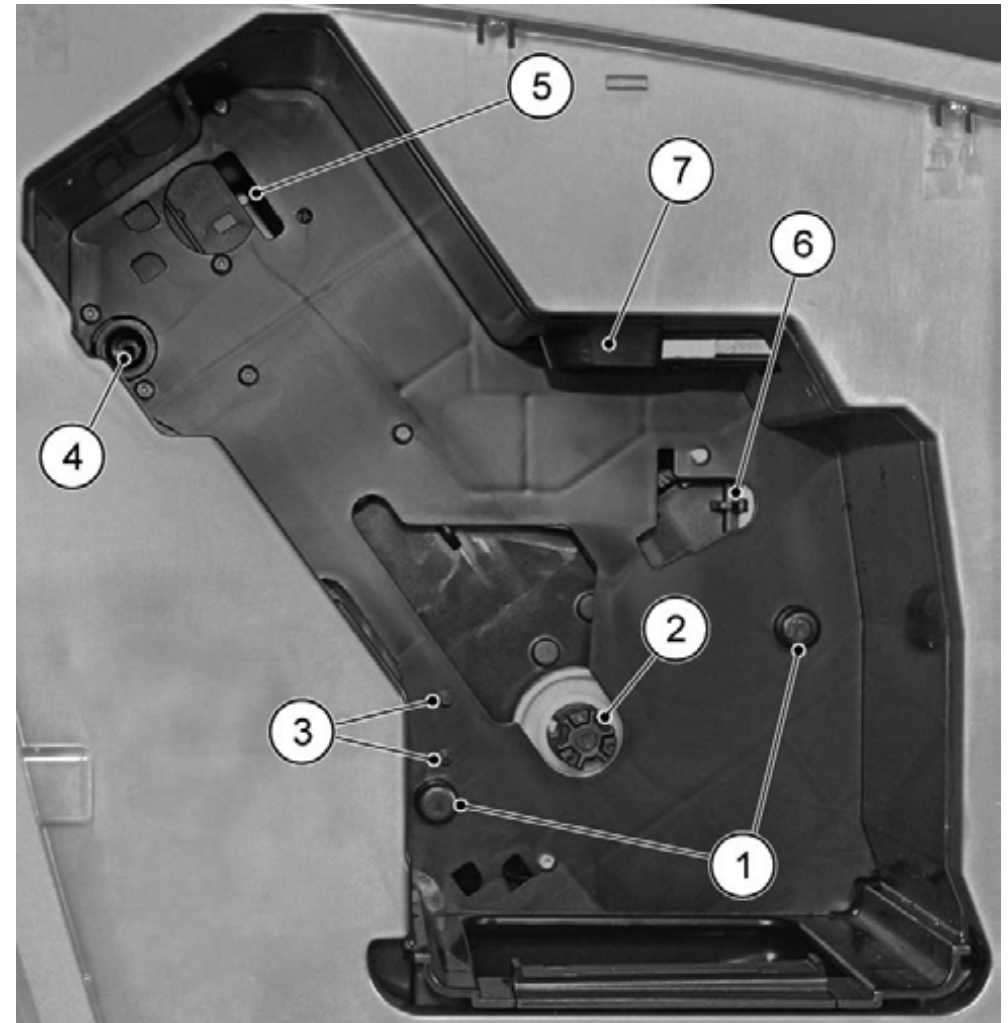
- 1 Pump with temperature monitoring and angle for flow reduction
- 2 Transmission position micro switch
- 3 Transmission position micro switch
- 4 Flow meter
- 5 Transformer
- 6 Electronic main board
- 7 Mains switch (TK/TCA53: Mains switch unit fixed at front panel)
- 8 Control panel
- 9 Steam valve
- 10 Grinding compensation micro switch
- 11 Pressure valve 4 bar
- 12 NTC
- 13 Heating element
- 14 Transmission cam disc
- 15 Grinder with temperature sensor



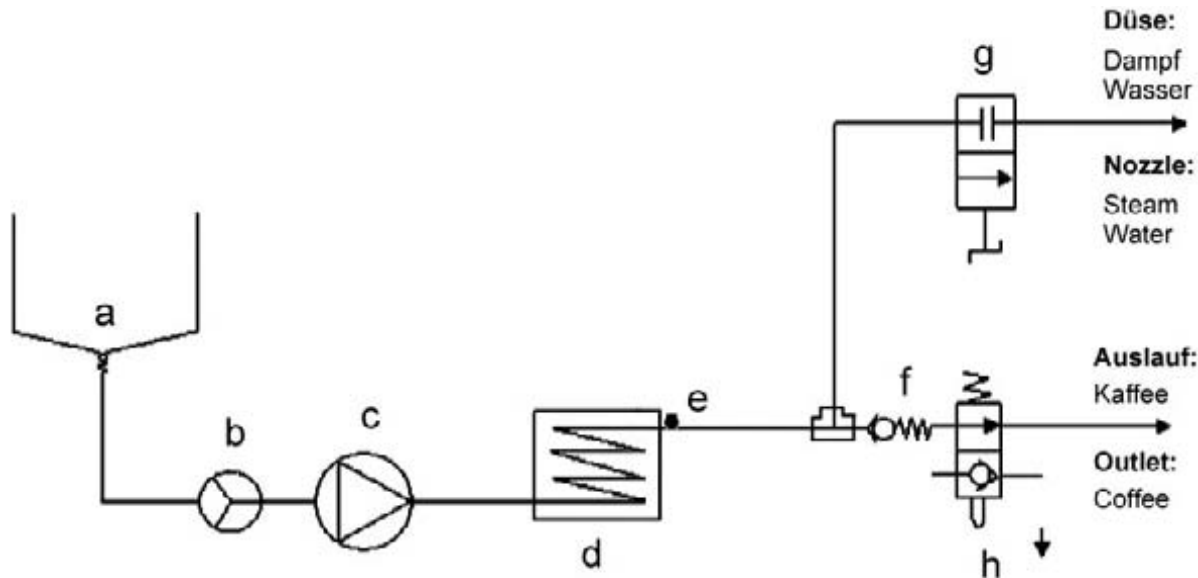
5.1.2 Overview, right side

Once the brewing unit has been removed, the following components are visible:

- | | | |
|---|-------------------------------------|----------------------------------|
| 1 | Centering for the brewing unit | Part of the component bracket |
| 2 | Input shaft for the brewing unit | Part of the transmission unit |
| 3 | Cams for releasing the brewing unit | Part of the component bracket |
| 4 | Coupling for coffee outlet | Screwed to the component bracket |
| 5 | Switch for grinder compensation | Screwed to the component bracket |
| 6 | Brewing unit inserted switch | On transmission housing |
| 7 | Filling duct | Screwed to grinder |



5.2 Fluid system



- a = Wassertank
- b = Flowmeter
- c = Pump with thermofuse
- d = Heater
- e = NTC
- f = Valve 4 bar
- g = Steam valve
- h = Drainage valve

The pump (c) sucks the water out of the water tank (a) via flow meter (b). The water flows through the flow meter thereby causing the impeller inside to rotate. This generates electrical pulses which are used to determine the actual volume of water required.

The pump generates a pressure of 5 - 8 bar. The water is conveyed through a reduction angle and pressure hose to the heating element. The NTC (e) records the temperature at the outlet of the heating element.

After the heating element, the fluid system is divided into a pressure line to steam valve (g) and a pressure line to valve (f) and then to the brewing unit. Valve (f) has an opening pressure of 4 bar and closes off the brewing system when hot water/steam is being dispensed.

At the end of a brewing cycle, the remaining water is drained from the brewing unit into the drip tray via drainage valve (h). **The rest of the system remains full of water.**



Warning:

The appliance must be emptied if there is a risk of frost (e.g. on the way to or from customer services). The heater or the piping may be damaged if the water in the fluid system freezes.

Emptying the fluid system: see appliance test

6 REPAIR

6.1 Replacing the brewing unit

6.1.1 Removing the brewing unit

The brewing unit is not permanently installed in the appliance and can be removed once it has been unlocked.

The service flap on the right-hand side of the appliance give access to the brewing unit.

6.1.1.1 Opening the service flap

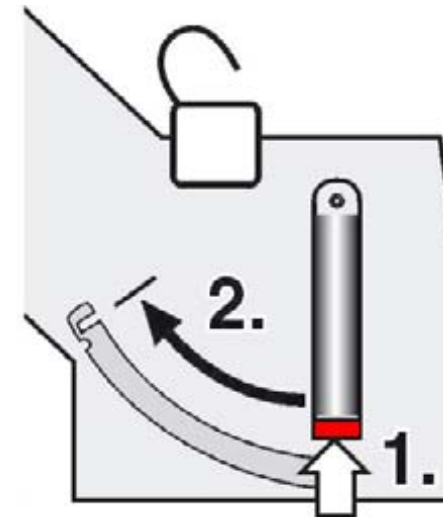
The service flap is clipped into the right-hand side of the appliance.

To open:

- ▶ Reach into the upper recessed handle and
- ▶ pull the service flap outwards.

6.1.1.2 Removing the brewing unit:

1. Press the red knob on the handle and
 2. Turn the handle clockwise until you hear it engage.
- ▶ Pull the brewing unit out of the guide by the handle.



Symbols on the brewing unit indicate whether the lock is open or closed.



Lock closed



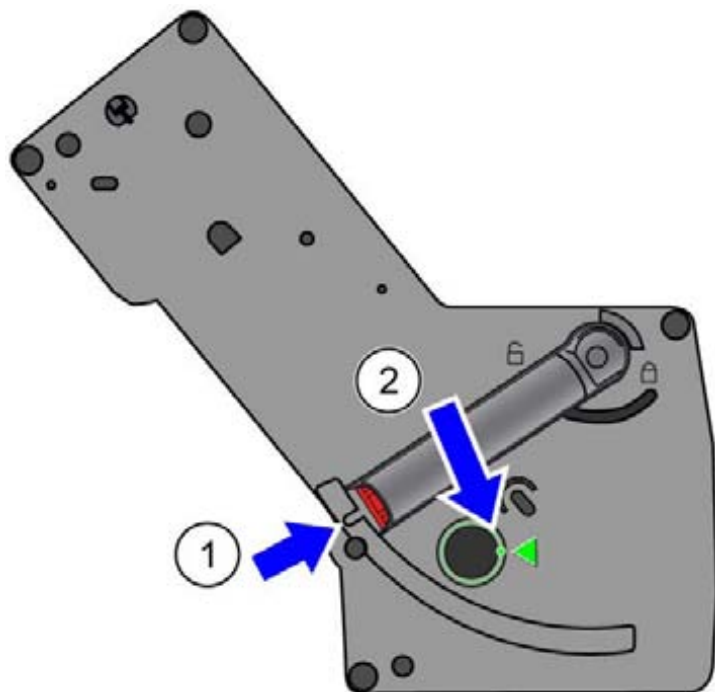
Lock open

6.1.2 Installation of the brewing unit

6.1.2.1 Basic position

The brewing unit can only be inserted in basic position.

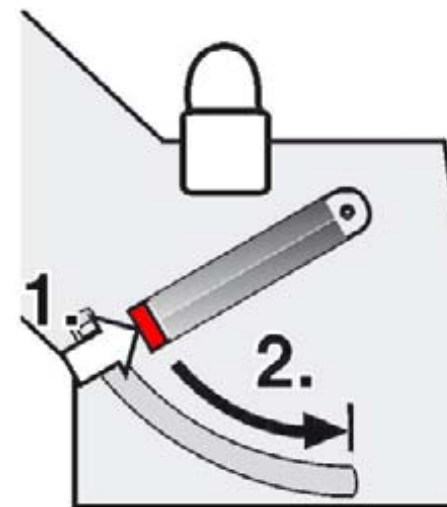
- ▶ The brewing chamber is totally located underneath the filling duct.
- ▶ Handle is engaged in position „Lock open“ (1).
- ▶ Mark on the drive shaft is opposite the peak of the marking arrow (2).



6.1.2.2 Inserting the brewing unit

Slide the brewing unit into the appliance in the basic position and lock in place:

1. Press the red knob on the handle and
 2. Turn the handle anti-clockwise until you hear it engage.
- ▶ First insert the service flap into the lower guide and then press it in at the top.



Symbols on the brewing unit indicate whether the lock is open or closed.



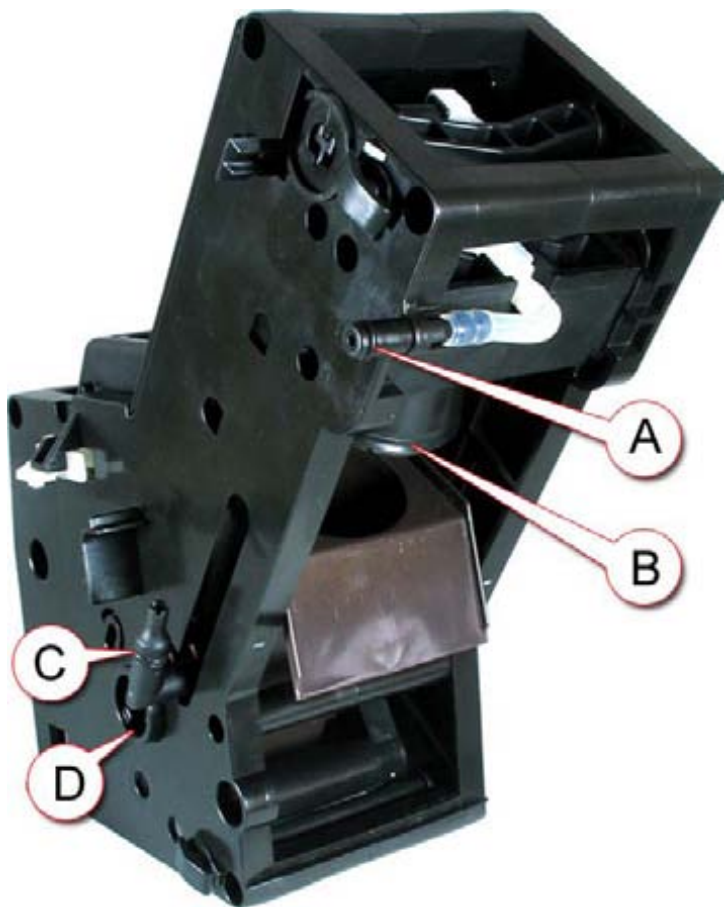
Lock closed



Lock open

6.1.3 Greasing the brewing unit

During a service, the O-ring for the coffee outlet (A), the lip seal surrounding the brewing head (B), the O-ring for the water inlet (C) and the coupling for the input shaft (D) must be thinly greased with food-safe special lubricating grease **PARALIQ® GTE 703 Mat.-no.: 31 0574**.



Note:

After replacing the O-ring for the coffee outlet (A) or for the water inlet (C) they must be thinly greased with food-safe special lubricating grease **PARALIQ® GTE 703 Mat.-no.: 31 0574**.

6.2 General disassembly



Risk of electric shock!

Pull out mains plug before disassembly.

Appliance must not be live!

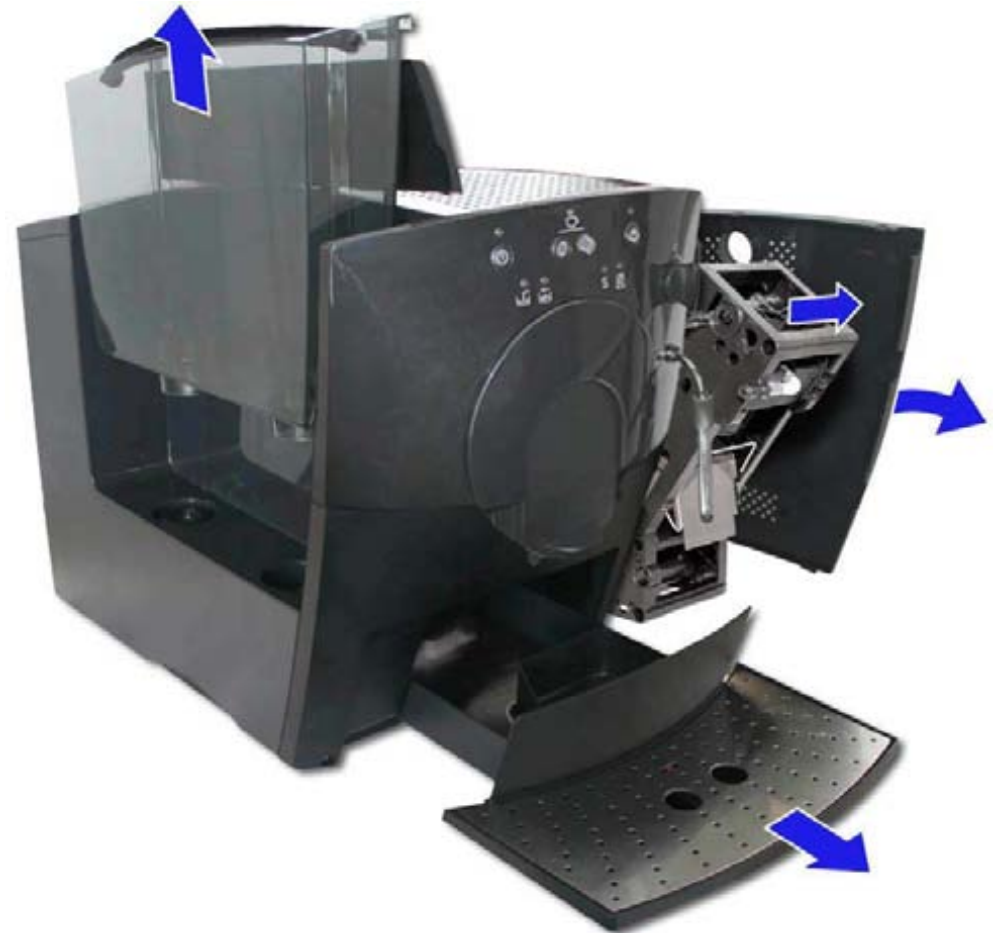
DANGER!

Tools:

- ▶ Torx screwdriver T10
- ▶ Slotted screwdriver
- ▶ Collecting vessel for residual water

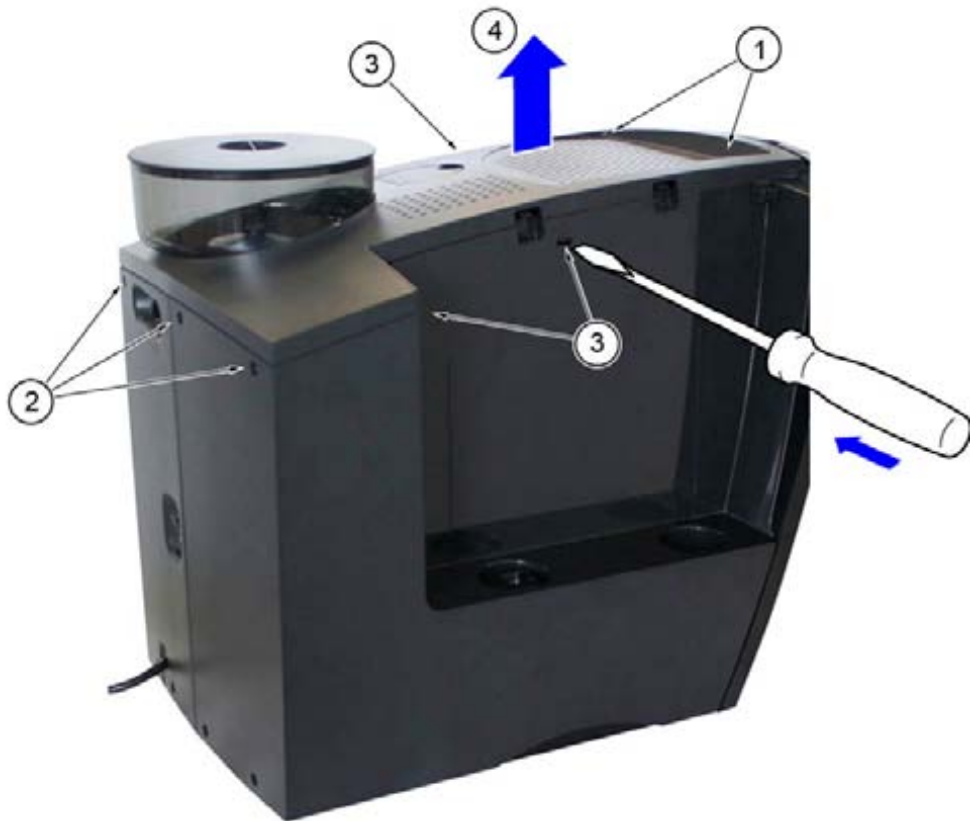
6.2.1 Preparation

1. Remove water tank, drip tray with drip plate and dregs drawer.
2. Open service flap on the right side of the appliance and remove.
3. Release and remove brewing unit.



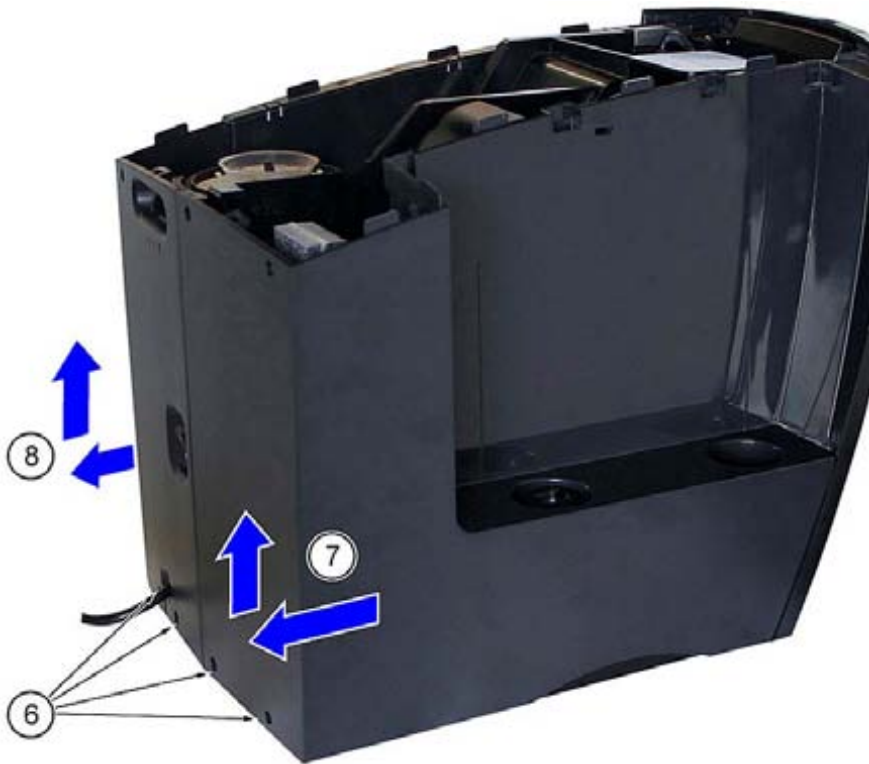
6.2.2 Opening the housing – step 1

1. Loosen two Torx T10 screws on the cup shelf.
2. Loosen three Torx T10 screws on the rear panels.
3. Carefully press in the three locking hooks with a flat screwdriver and loosen upper housing section.
4. Lift off upper housing section; disengage on front panel remove upwards.

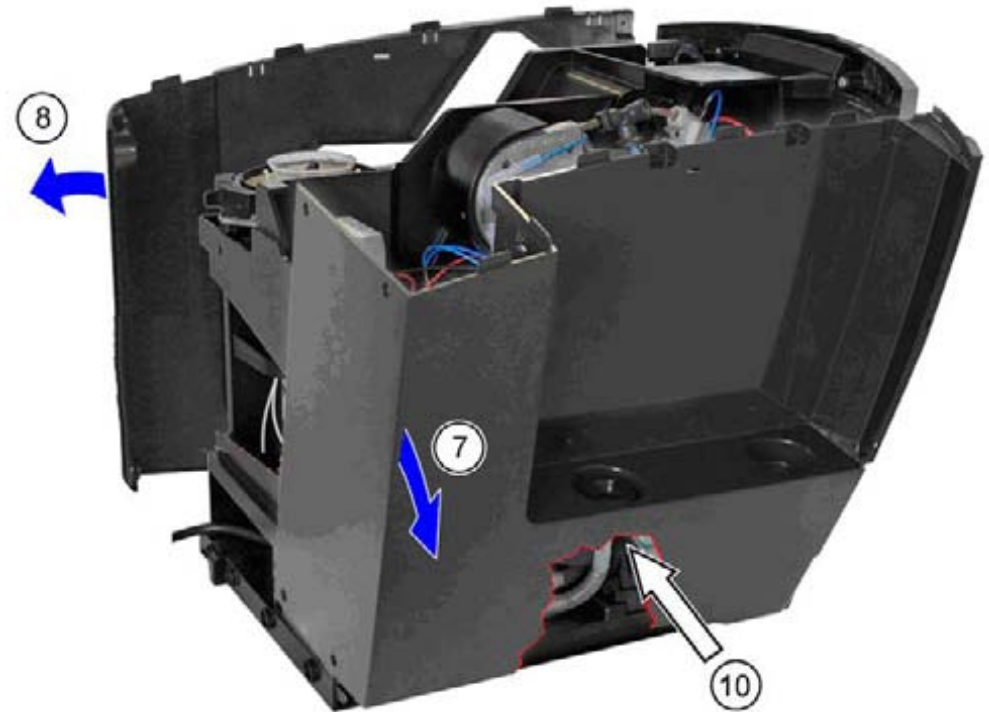


6.2.3 Opening the housing – step 2

1. Loosen two (6) Torx T10 screws on the left (7) and right (8) sides of the housing.
2. Pull left (7) and right (8) sides of the housing to the rear, disengage from the guides of the base group and remove.
Remove intake hose (10) from water tank coupling. Use collecting vessel for residual water.



3. Assemble in reverse sequence



6.3 Replacing the pump

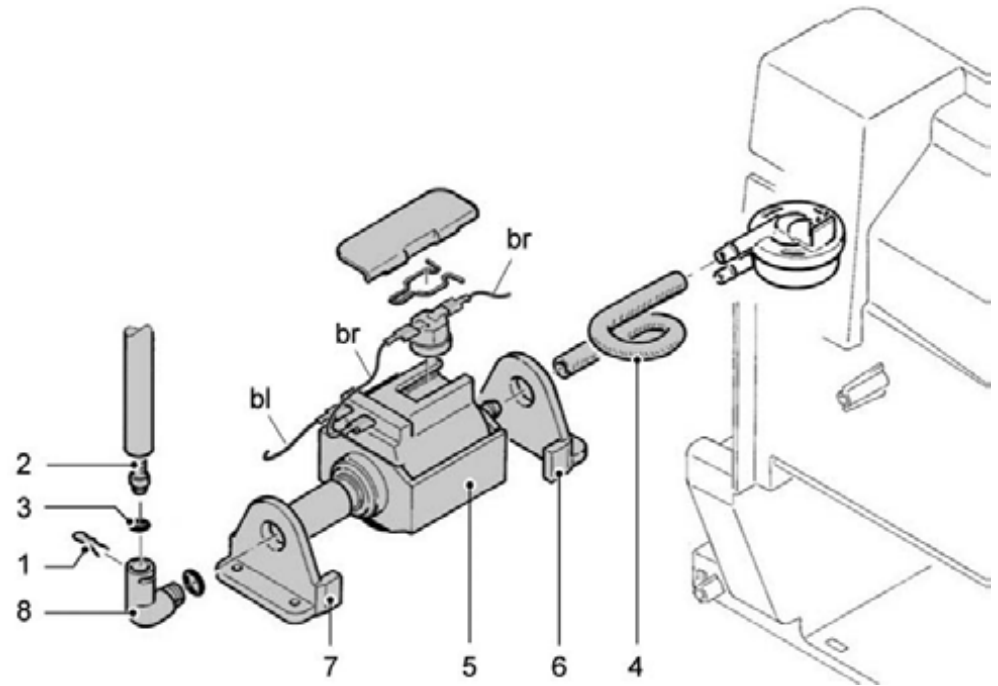
Tools:

- ▶ Pliers
- ▶ Slotted screwdriver

6.3.1 Procedure:

1. Disassemble the appliance as described in the "General disassembly" section.
2. Remove the retaining clip **(1)**, hose **(2)** and O-ring **(3)**.
3. Remove inlet hose **(4)** from the pump.
4. First, pull the pump **(5)** out of the rubber holder **(6)** on the side of the inlet hose.
5. Release the angled hose mount fitting **(8)** from the pump and pull the pump out of the second rubber holder **(7)**.
6. Unplug electrical connections from the pump.
7. Replace the faulty pump.
8. To reassemble, proceed in the reverse order of disassembly.

Note the pin assignment of the pump in the wiring diagram.



The O-ring must be replaced with a new one every time a fluid connection is opened!

6.4 Replacing the thermal fuse



The thermo cut off element (TCO) is a safety element which is used to prevent damage caused by the heater overheating. To ensure correct function, it is essential to install the thermal fuse properly.

- ▶ **Whenever the appliance is repaired, check as a precaution that the thermal fuse is in perfect condition and is correctly installed!**

6.4.1 Checking an installed thermo cut off element:

The following points must be checked:

- ▶ Position and attachment of Teflon hose (must be firmly anchored)
- ▶ Position of thermo cut off element (centered under installation bracket)
- ▶ Quality of the cable connections
- ▶ Bend correct
- ▶ Installation bracket is firmly attached

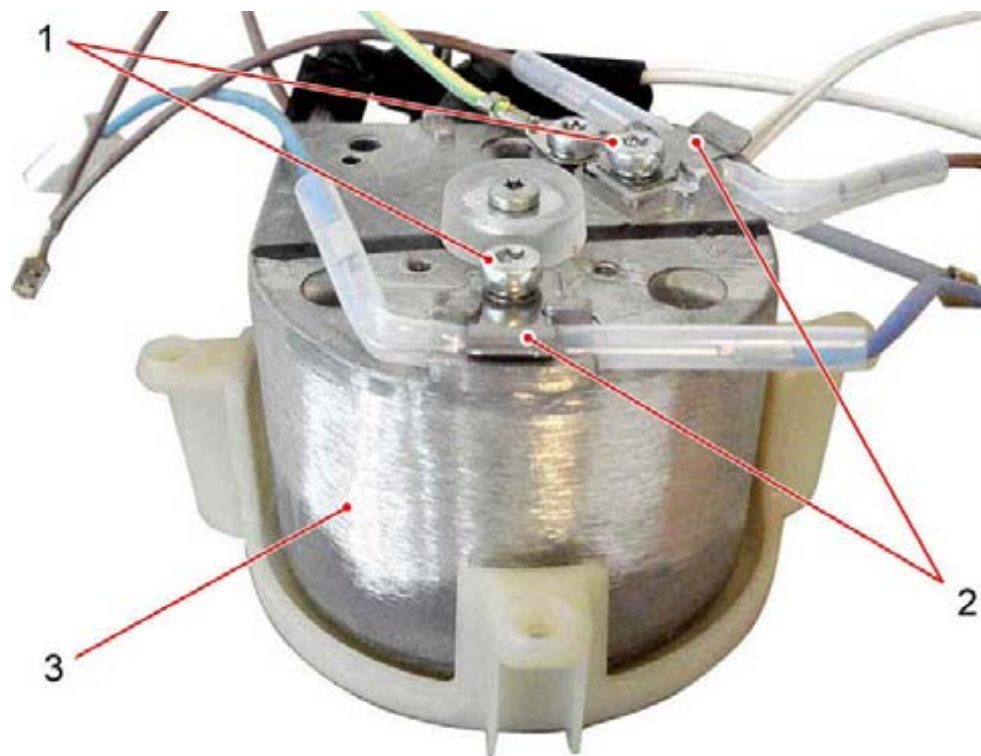
6.4.2 Component

The thermo cut off element is supplied as a pre-assembled component. (Wire color and type may deviate in reality).



6.4.3 Installation location

- 1 Screw with circlip
- 2 Installation bracket
- 3 Heater



6.4.4 Generally

The thermo cut off (TCO) element is a safety element, which will protect the appliance and its surrounding against serious damaging based on an overheating of the heater.

If a thermo cut off element will be defect, please take special care during the repair to eliminate also the root cause of the overheating.

The assembling and exchange of the thermo cut off element must be done accordingly to the following instructions.

6.4.5 How to proceed in repair case

The following listed parts of the heater must be exchanged in any case before the failure analysis will be continued:

- ▶ Both thermo cut off elements (complete with wires)
- ▶ Temperature sensor (NTC)
- ▶ Plastic fluid connectors (including seal ring) at heater inlet and outlet

The heater itself must not be exchanged in any case. But you have to ensure, that the heating element will not be damaged.

The control of the heating element must be done by measuring the power consumption during operation. The respective rated values of the power consumption and voltage must be taken from the declaration on the heater itself.



DANGER

Heater will become hot during measurement!

- ▶ Never touch the heater during measurement!
- ▶ Cool down the heater manually before repair!

The measured power consumption must be within a tolerance of +/- 5% to the nominal power consumption (measured at nominal voltage).

Maximum acceptable temperature of 300°C on heating element must not be exceeded during measurement!

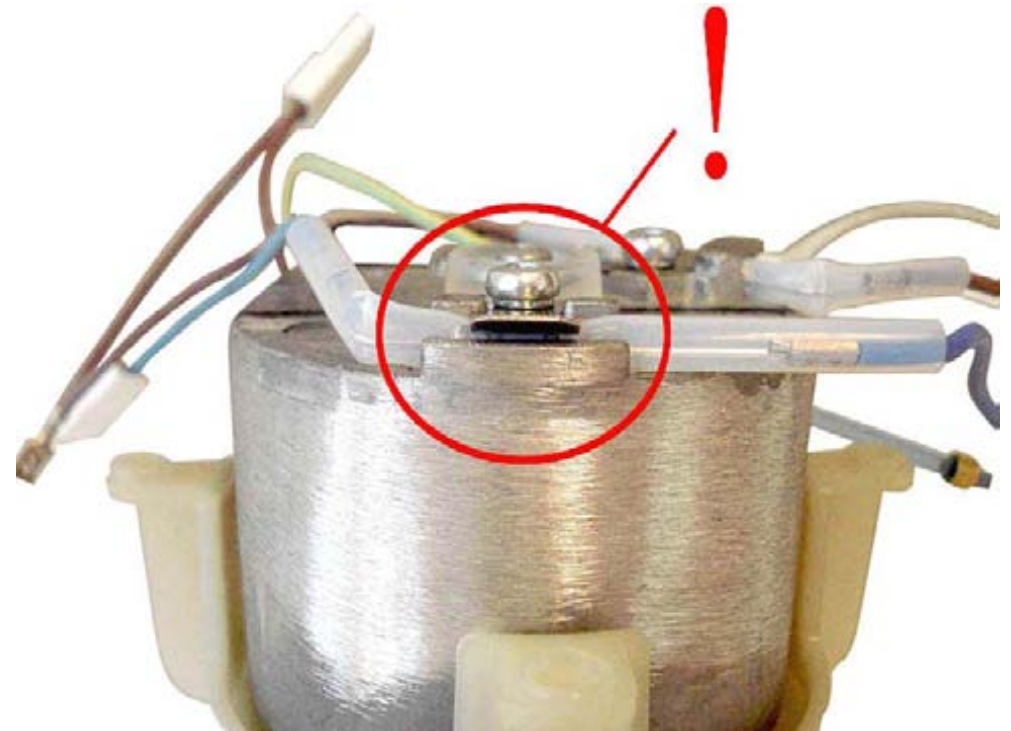
6.4.6 Installing / replacing the thermal fuse:



► **After removing the defective thermal fuse, comply with the following new steps to ensure correct installation:**

1. Check installation position for heater (no dirt or projecting edges permitted).
2. Check installation bracket (no dirt or sharp edges permitted).
3. Check whether it is the correct type of thermal fuse (according to wiring / circuit diagram).
4. Position Teflon hose over the thermal fuse, ensuring that none of the electrically conductive parts remains uncovered (same as the illustrated example of the thermal fuse, slight kinking is used to fix the hose).
5. Before installation, bend connections of the new thermal fuse according to the thermal fuse to be replaced. This must be done with a suitable pair of flat nose pliers. In doing so, comply with the following points:
 - Bend must be at least 5 mm from the housing of the thermal fuse.
 - Teflon hose and thermal fuse must not be damaged.
 - Connections may be bent 1 x only.
6. Position thermal fuse on the mounting surface of the heater, ensuring that the installation bracket is in the centre of the thermal fuse housing (attention: note original position).

7. Insert installation bracket into the designated guide. (Ensure that the bracket is inserted according to the picture)
8. Attach installation bracket with the corresponding screw and circlip.
9. Following installation, check that the installation bracket on the side of the thermal fuse is not situated on the heater (according to following picture).
10. Connect thermal fuse wires to the correct terminals in the appliance.



Important!

Installation bracket must not be situated on the heater

6.5 Replacing the heating element and NTC sensor

Tools:

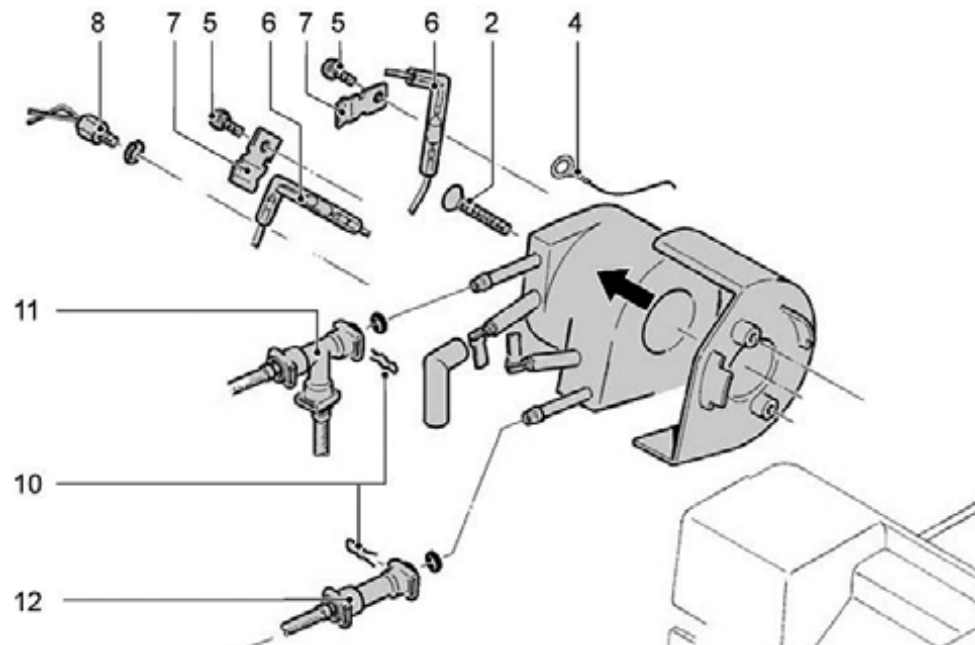
- ▶ Open-ended wrench WAF 8 mm
- ▶ Torx screwdriver T20
- ▶ Allen key WAF 4 mm

6.5.1 Procedure:



Note: Heating element may still be hot. Cool the heating element manually!

1. Disassemble the appliance as described in the "General disassembly" section.
2. Undo Torx T20 screw **(4)** and remove the earthed conductor connection from the heating element.
3. Undo two screws **(5)**, remove thermal fuses **(6)** and retaining clips **(7)** from the heating element.
4. Undo screws M6 x 25 **(2)** and pull the heating element out of the retainer.
5. Remove the electrical connections from the heating element.
6. Remove the retaining clip **(10)** and hose connections **(11)** and **(12)** from the heating element.
7. Disconnect the NTC plug from the electronic circuit board.
8. Unscrew the NTC sensor **(8)** from the heating element and replace it if necessary.
9. Replace the faulty heating element.
10. To reassemble, proceed in the reverse order of disassembly.



Only lightly tighten NTC temperature sensor until the spring washer is flat.



O-rings must be replaced with a new one every time a fluid connection is opened.

6.6 Replacing the electronics board

Tools:

- ▶ Torx screwdriver T10
- ▶ Long-nosed pliers



Risk of damage!

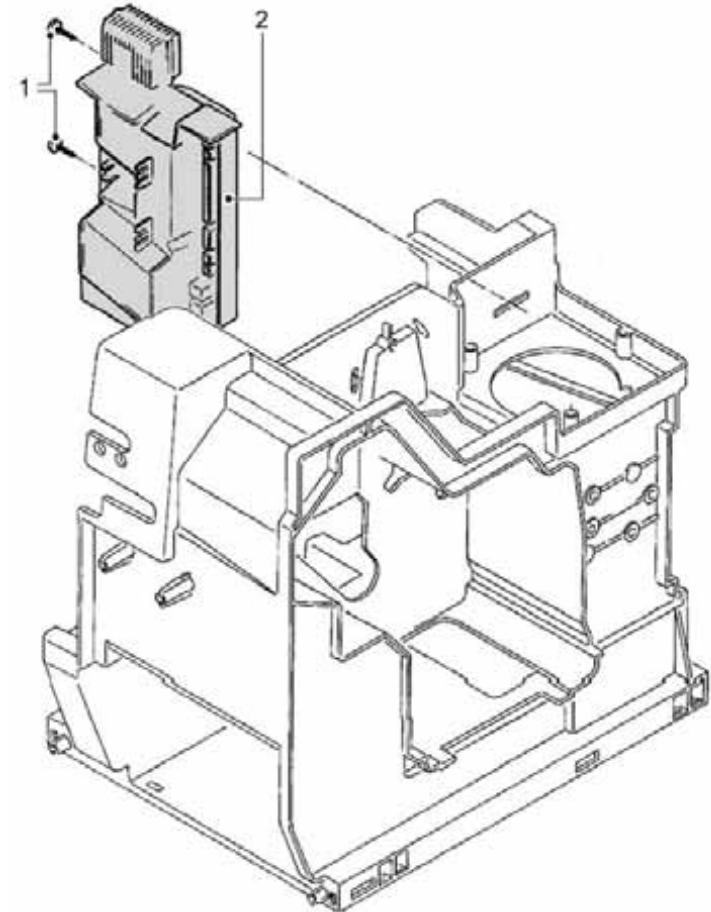
Static voltage may destroy components on the electronics module!

WARNING

▶ **Use earthing strap!**

Procedure:

1. Disassemble appliance as described in the chapter “General disassembly”, Steps 1 and 2.
2. Place earthing strap around your wrist and connect to the earth cable of the unplugged machine! This will prevent a potential difference.
3. Loosen fastening screws **(1)**, Torx T10. Detach housing together with electronics board from the catch and pull out.
4. Disconnect all plugs and plug-in connections on the electronics board **(A)**.
5. Replace the electronics board.
6. Assemble in reverse sequence.
(See “Wiring and connecting diagram”)



6.7 Replacing the power cord

Tools:

- ▶ Slotted screwdriver 5.5 mm
- ▶ Long-nosed pliers

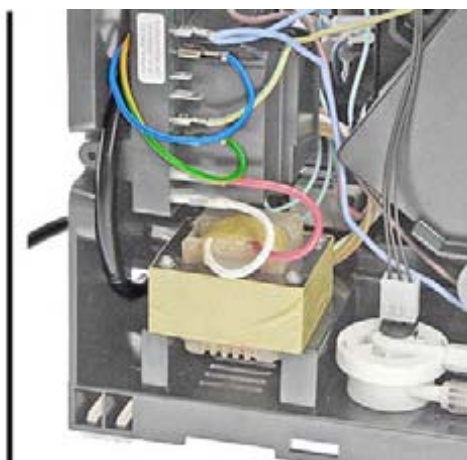
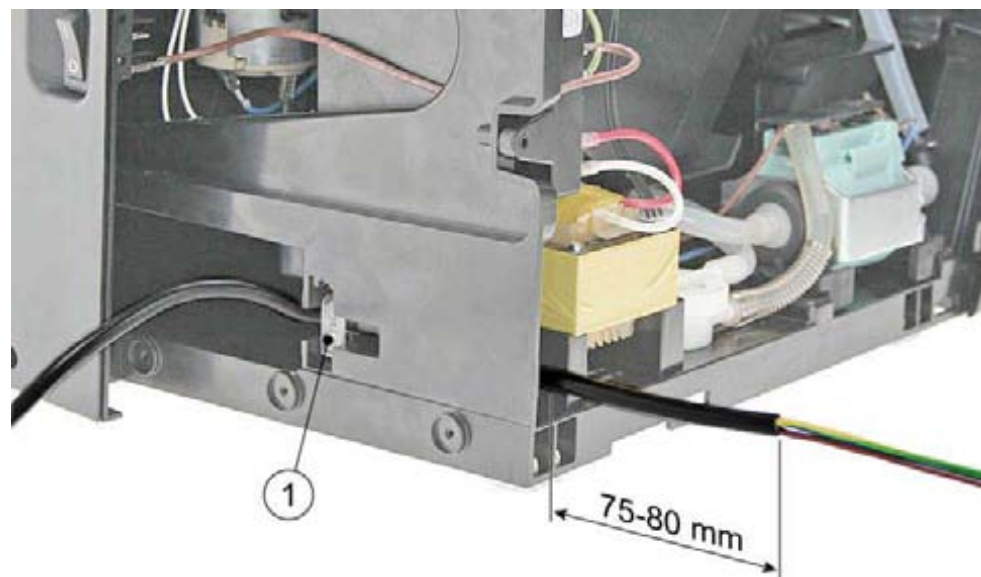
Procedure:



**When installing the power cord:
Install power cord according to the following
installation instructions!**

This ensures that the protective conductor is interrupted last if the power cord is torn off.

1. Disassemble appliance as described in the chapter “General disassembly”, Steps 1 and 2.
2. Disconnect plug-and-socket connections on the power cord from the electronics board and the mains switch.
3. Detach cord grip **(1)** with a flat screwdriver.
4. Pull power cord out of the guide and replace.
5. Insert new power cord and pull through until the insulated end projects **75–80 mm** over the left edge of the housing. Press in cord grip **(1)**.
6. Feed power cord upwards. Pull brown wire **(2)** for the mains switch between housing and electronics board.
7. Connect plugs to the electronics board and mains switch. (See “Wiring and connecting diagram”)
8. Insert power cord over lower fixing plate **(3)** on the electronics board and install as illustrated.



6.8 Replacing the mains switch (auto-off switch)



Risk of electric shock!

Pull out mains plug before disassembly.

Appliance must not be live!

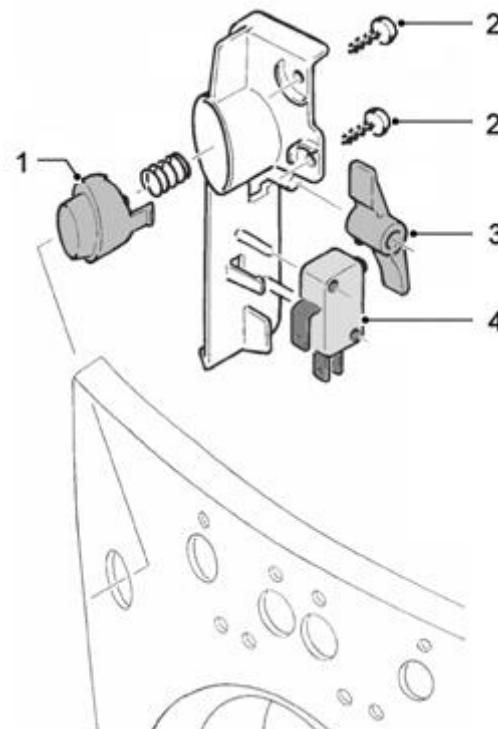
DANGER!

Tools:

- ▶ Torx screwdriver T10
- ▶ Torque wrench, mat. no.: 341227

Procedure:

1. Disassemble appliance as described in the chapter “General disassembly”, Steps 1 and 2.
2. Place earthing strap around your wrist and connect to the earth cable of the unplugged machine! This will prevent a potential difference.
3. Disconnect plug X31 from electronics board.
4. Loosen two screws **(2)** from mains switch support. Pull out mains switch support from housing front panel.
5. Detach mains switch **(4)** from the catch and replace mains switch.
6. Button **(1)** and steering lever **(3)** can be replaced by disengaging them from the mains switch support.
- 7 Assemble in reverse sequence.



Risk of cracking!

Observe tightening torque for screws **(2)** = 1,0 – 1,2 Nm.

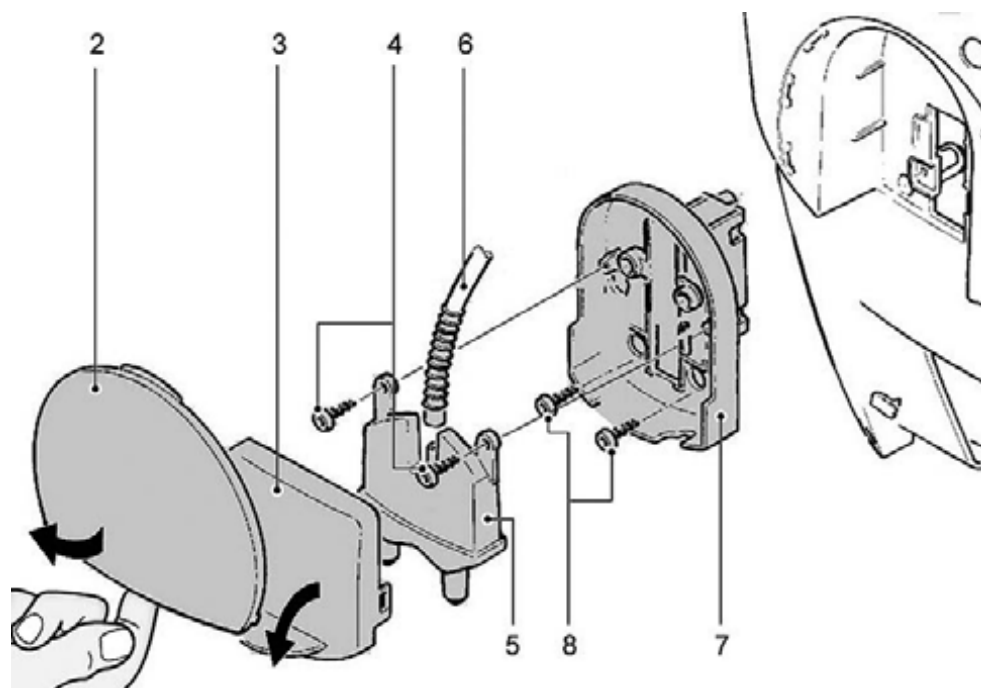
6.9 Replacing the coffee outlet

Tools:

- ▶ Torx-screwdriver T10

6.9.1 Procedure:

1. Pull coffee outlet **(1)** down completely.
2. Reach between coffee outlet **(1)** and cover panel **(2)** from below and pull the cover panel forwards.
3. Reach into outlet cover **(3)** from above and pull off forwards.
4. Undo two Torx T10 screws **(4)** and remove coffee distributor **(5)**. Carefully pull silicone hose **(6)** with anti-kink spring from the coffee distributor.
5. Replace coffee distributor **(5)** if necessary.
6. To release outlet slider **(7)**, push this up completely, undo two Torx T10 screws **(8)** and remove the outlet slider.
7. To reassemble, proceed in the reverse order of disassembly.



Make sure that the silicone hose is routed such that there are no kinks.

Pull the anti-kink spring as far forward as possible so that the silicone hose does not kink when the outlet slider is right at the top. If necessary, push the silicone hose further back into the appliance.

6.10 Replacing the front panel

Tools:

- ▶ Torx screwdriver T10
- ▶ Long-nosed pliers

6.10.1 Procedure:

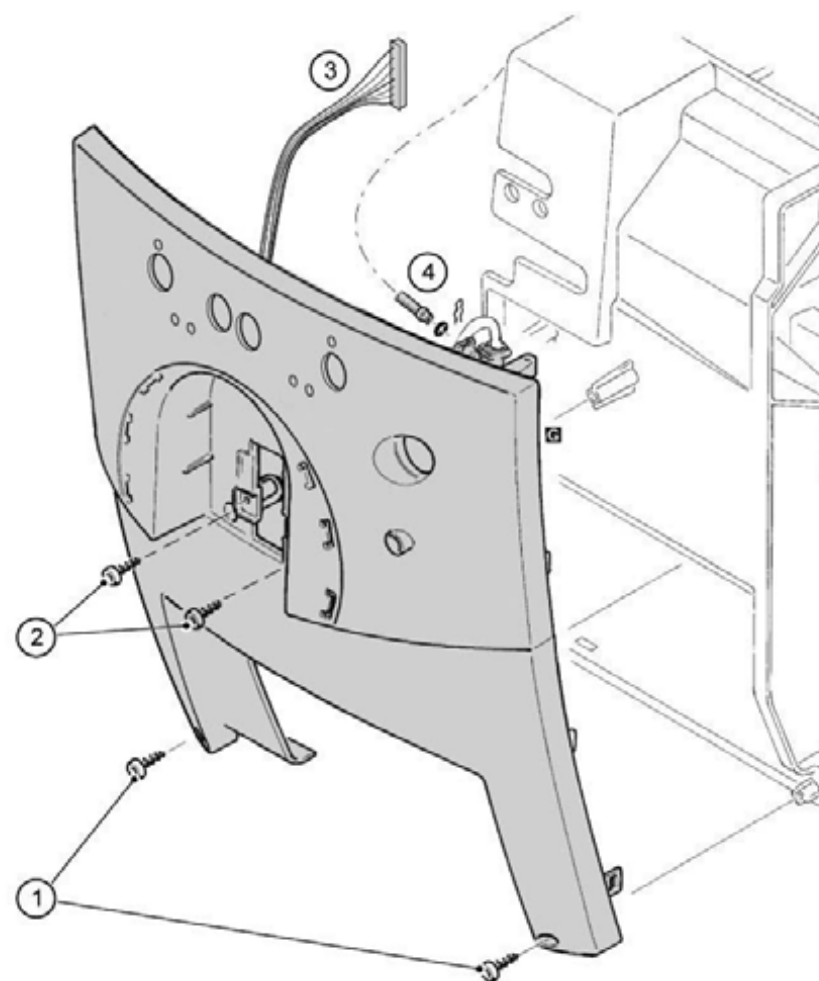
1. Disassemble appliance as described in the chapter entitled "General disassembly".
2. Remove coffee outlet as described in the chapter entitled "Replacing the coffee distributor", Points 1.–4.
3. Loosen two Torx T10 screws **(1)** on the front panel.
4. Pull outlet slide all the way down and loosen two Torx T10 screws **(2)**.
5. Disconnect electric plug-and-socket connection for operating panel **(3)** on electronics board.
6. Loosen retaining clip on pressure hose **(4)** on the steam valve and remove pressure hose.
7. Remove front panel with operating panel and steam valve from the chassis and, if required, replace.
8. Assemble in reverse sequence.

Replacing O-ring on the pressure hose!



Ensure that the hose system is installed without kinks!

Pull the anti-kink spring in the coffee outlet as far forwards as necessary until the silicone hose does not kink when the outlet slide is at the very top. If required, push the silicone hose further back into the appliance.



6.11 Replacing steam valve and operating panel

Tools:

- ▶ Torx screwdriver T10
- ▶ Torque wrench, mat. no.: 341227

6.11.1 Procedure for steam valve:



Note:

Before installing steam valve, open and close 4–5 times!

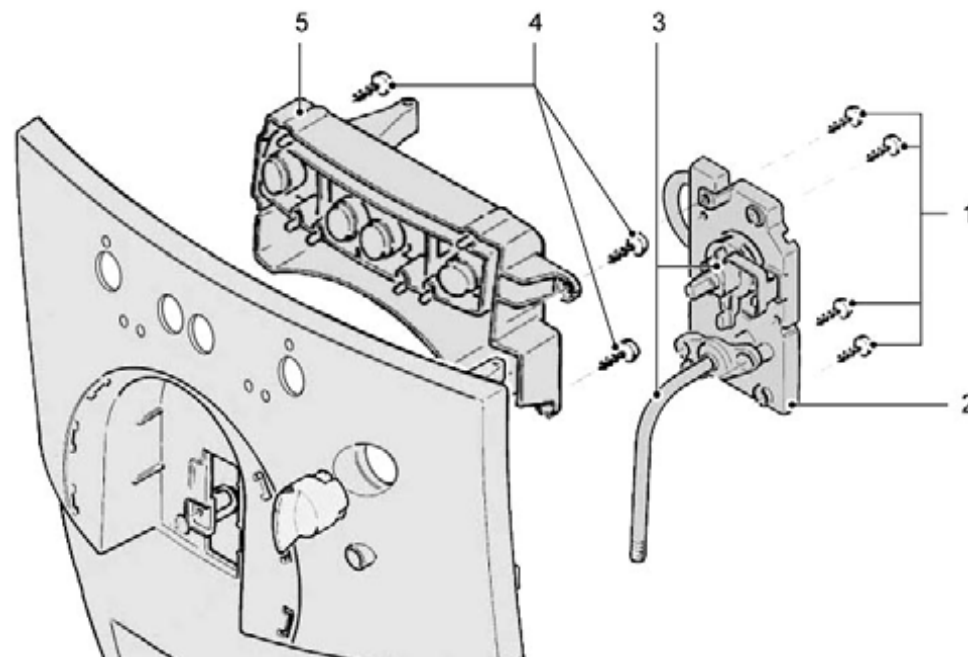
Note tightening torque of the screws (1) and (4)! (1.0–1.2 Nm)

1. Disassemble appliance as described in the chapter “General disassembly”.
2. Unscrew steam nozzle from the steam pipe.
3. Remove front panel as described in the chapter entitled “Replacing front panel”.
4. Loosen four screws **(1)** on the steam valve support plate **(2)**.
5. Remove steam valve support plate complete with steam valve **(3)** and steam pipe from the front panel.
6. Remove defective steam valve from support plate and replace.

6.11.2 Procedure for operating panel:

6. Perform steps 1–5 as described under “Procedure for steam valve”.
7. Loosen four Torx T10 screws **(A)**. Remove operating panel **(5)** from front panel.
8. Disconnect power cord from the operating panel on the electronics board.

9. Insert new operating panel and assemble in reverse sequence.



Note:

Whenever the hose connections are opened, replace the O-rings!

Following installation, check that all controls move easily!

7 FAULT DIAGNOSTICS

7.1 Incoming goods inspection

This receipt check enables you to rapidly locate faults on the machine and to initiate appropriate repair actions:

- ▶ Follow the sequence in the table.
- ▶ Repair any faults and repeat the repair routine to the end.

1. Check appliance for visual damage

- ▶ Housing part broken, damaged or deformed?
- ▶ Power cord or mains plug damaged?
- ▶ Has the customer opened the appliance?

2. Check the mechanical elements

- ▶ Drip tray with dregs container clean, inserted.
- ▶ Buttons and rotary knobs move easily?
- ▶ Cover lid for cleaning tablet slot in place?

3. Fill water tank

- ▶ Water tank calcareous, dirty or leaking?

4. Switching on the appliance

- ▶ Switch on the appliance with the mains switch **auto off**. Appliance initializes, heats up and rinses automatically.
- ▶ How long does the machine require to heat up, rinse? (Standard time approx. 70 seconds)
- ▶ Appliance is in ready-to-use mode if LEDs for both coffee dispensing buttons are lit green.

5. Coffee preparation without beans

- ▶ Press coffee dispensing button small or large.
- ▶ Check clockwise rotation of grinding cone visually.
- ▶ Grinder runtime: Normal = 6,9 s, strong = 8,8 s.
- ▶ Brewing stops. Is “Add beans” message indicated by a flashing LED of coffee strength button?

6. Coffee preparation with beans

- ▶ Fill up beans container with coffee beans.
- ▶ Press coffee dispensing button small or large.
- ▶ Brewing cycle runs?
- ▶ Pre-set filling quantities: Small cup = 40ml, large cup = 125ml. Filling quantities adjustable: Small and large cup 30 – 220 ml.

7. Hot water preparation

- ▶ Open hot water/steam valve.
- ▶ Is the pump functioning?
- ▶ Is hot water running out of the steam pipe? Hot water production stops automatically after approx. 500ml.

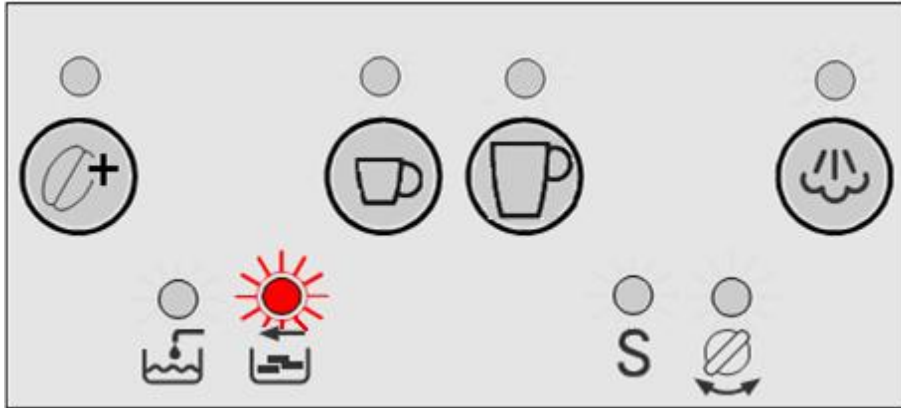
8. Steam generation

- ▶ Press steam button.
- ▶ How long does it require to heat up to steam temperature? (Standard time approx. 20 seconds)
- ▶ Open hot water/steam valve.
- ▶ Is steam flowing out of the steam pipe? Approx. 30 seconds until clock timing regular. Maximum steam production: 180 s.

7.2 System and error messages

7.2.1 System messages

7.2.1.1 Trays missing



LED display: Trays missing flashes

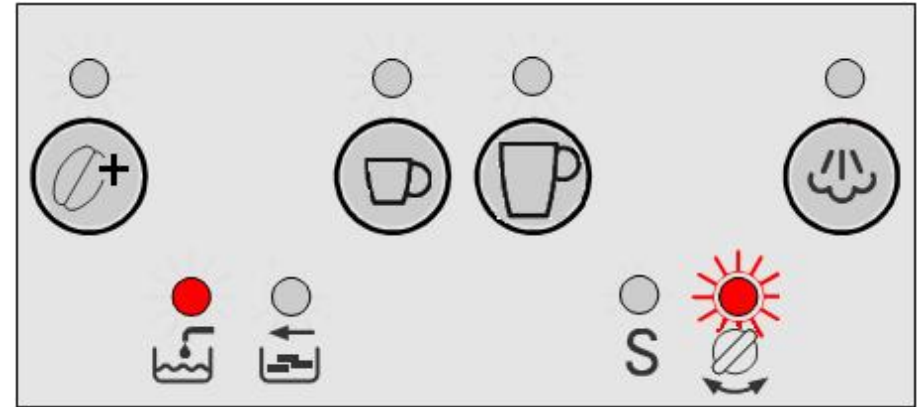
LED button: off

Drip tray not or incorrectly inserted.

- ▶ Insert drip tray all the way

If the TRAYS MISSING display does not go out despite inserted drip tray, check the micro switch for tray detection.

7.2.1.2 Add water



LED display: Add water is lit, Turn dial flashes

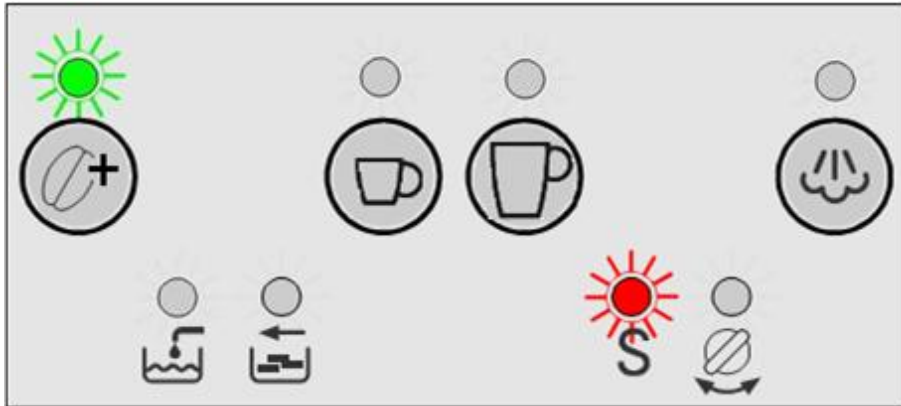
LED button: off

Water tank or water line system empty.

- ▶ Fill water tank, insert and press all the way down. Place a receptacle under the steam nozzle and open the steam valve. System is filled. Close steam tap – appliance is ready for use.

The water level is monitored via the flow meter only.

7.2.1.3 Brewing unit missing



LED display: Service **S** flashes alternating with

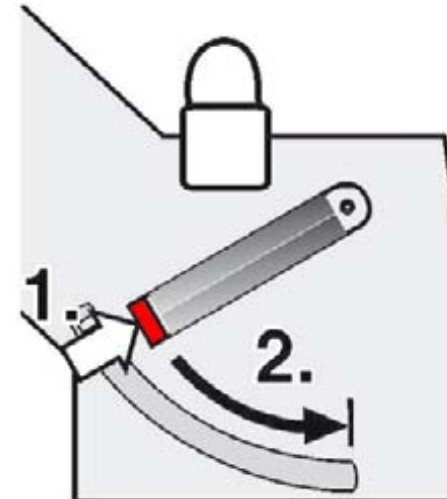
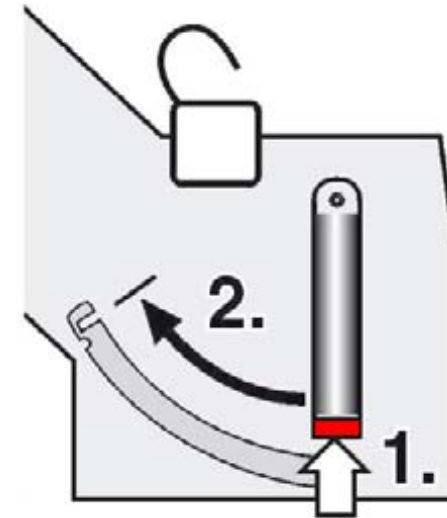
LED button: **Coffee strength**

Brewing unit is not or is incorrectly inserted.

Brewing unit handle is not locked.

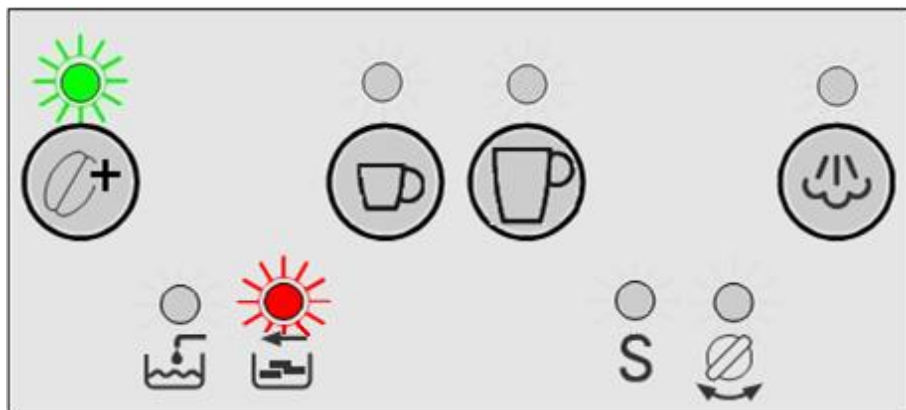
Switch for detecting the lock is defective.

- ▶ Remove brewing unit, re-insert and lock. Ensure it is seated correctly.
- ▶ Rotate handle downwards until it engages.



7.2.2 Error messages

7.2.2.1 Fault 1, NTC fault



LED display: Trays missing flashes

LED button: **Coffee strength** flashes

NTC temperature sensor outside the measurement range.

Appliance too cold (< 5°C) or NTC defective (short-circuit/interruption).

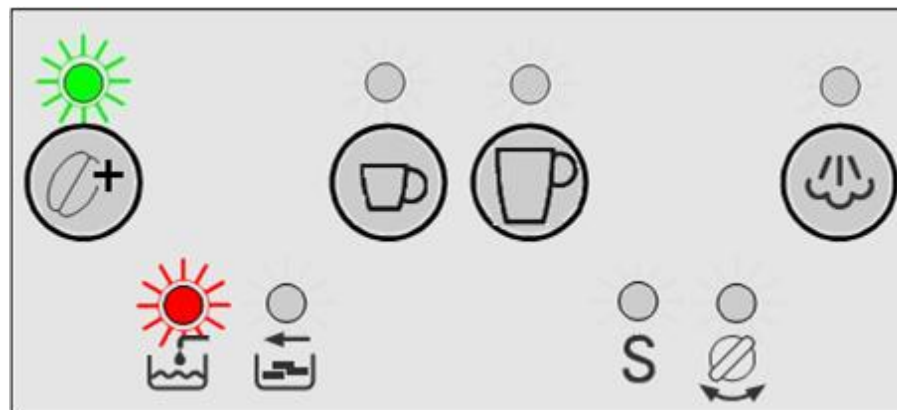
The message is indicated when the appliance is switched following initialization.

If the ambient temperature is too low, the message goes out when the appliance has warmed up to room temperature.

- ▶ Check NTC and wiring

Appliance can only be unlocked again by operating the mains reset (switch off the appliance, pull out the mains plug, wait one minute, plug in the mains switch and switch the appliance on again).

7.2.2.2 Fault 5, heater fault



LED display: Add water flashes

LED button: **Coffee strength** flashes

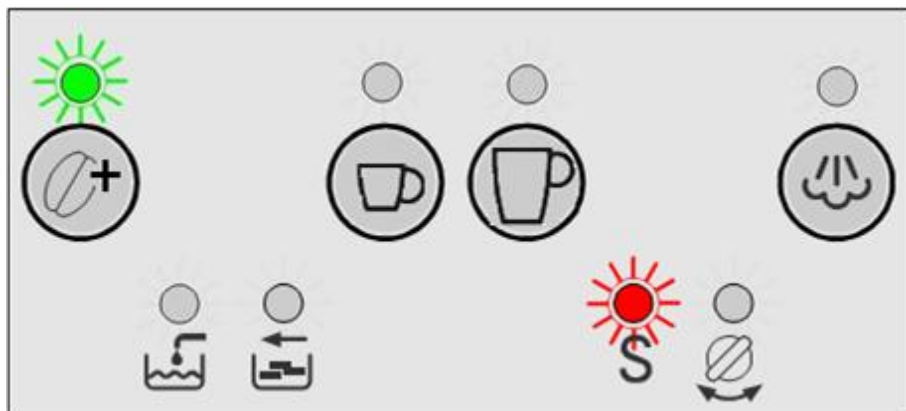
Heater or thermal links defective (interrupted).

Appliance is locked

- ▶ Check heater and thermal links
- ▶ Check wiring

Appliance can only be unlocked again by operating the mains reset (switch off the appliance, pull out the mains plug, wait one minute, plug in the mains switch and switch the appliance on again).

7.2.2.3 Fault 8, initialization fault



LED display: Service **S** flashes

LED button: Coffee strength flashes

Initialization of the brewing unit has failed.

The brewing unit cannot be moved into the upper end position.

Appliance is locked.

Faults during initialization cause the appliance to lock.

Faults during coffee preparation cause the appliance to lock only after three times in succession until the next mains reset.

Possible causes:

- ▶ Incorrect operation – cleaning tablet was inserted too early and blocked the brewing unit.
- ▶ Wrong coffee settings – too much, too finely ground coffee.
- ▶ Wrong grinding unit setting – grinding too coarse, amount too large.

If the message does not disappear after the appliance has been switched off and on,

- ▶ disconnect the appliance completely from the mains, remove and clean the brewing unit.
- ▶ check drive unit motor power supply.

7.3 Measuring the coffee temperature

Test voltage: 230 V +/- 3 V

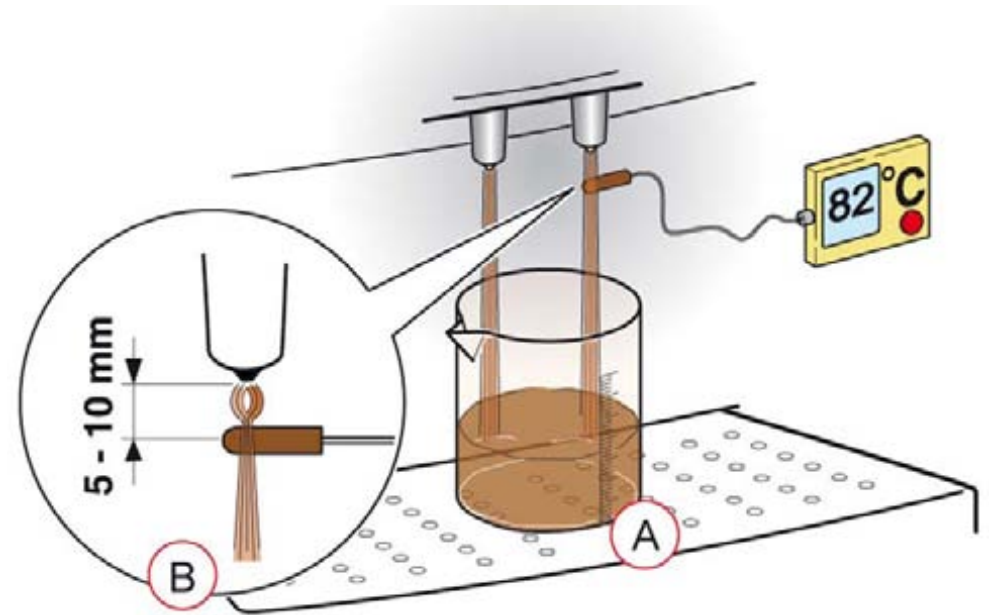
Procedure:

1. Switch on the machine with the mains switch.
2. Wait until heating up and rinsing phases have ended.
3. Set brewing temperature to normal.
4. Place a measuring cup (A) under the coffee outlet.
5. Press the coffee dispensing button to start brewing coffee.
6. Then measure the coffee temperature in the stream approx. 5–10 mm under the coffee outlet (B).

Measure 1st cup approx. 10 seconds after ready to brew (immediately after rinsing).

Measure 3rd cup approx. 60 seconds after ready to brew after 2nd cup.

The maximum temperature is measured during the brewing time.



1 st cup (40 ml espresso)	79 °C +/- 5°
3 rd cup (40 ml espresso)	79 °C +/- 3°
1 st cup (120 ml coffee)	82 °C +/- 5°
3 rd cup (120 ml coffee)	82 °C +/- 3°

7.4 Appliance test (exit diagnosis)

After the repair is finished, an appliance test must be carried out as follows:

7.4.1 Prerequisite:

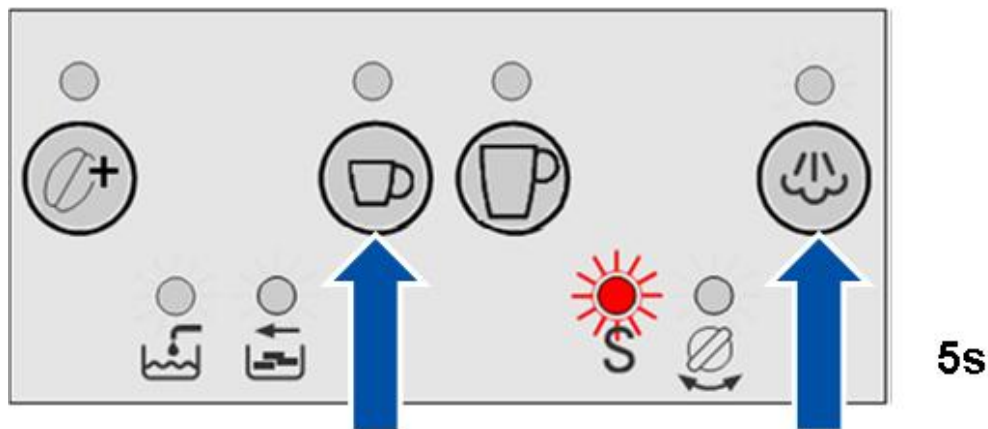
- ▶ Appliance is off.
- ▶ Water tank is filled up and inserted.
- ▶ Original brewing unit is inserted.

7.4.2 Entering the appliance test mode

- ▶ Open steam valve.
- ▶ Switch on the appliance by pressing the **auto-off** button.

Appliance starts, LED for symbol turn dial starts flashing.

- ▶ Press coffee dispensing button small and steam simultaneously for at least 5 seconds.



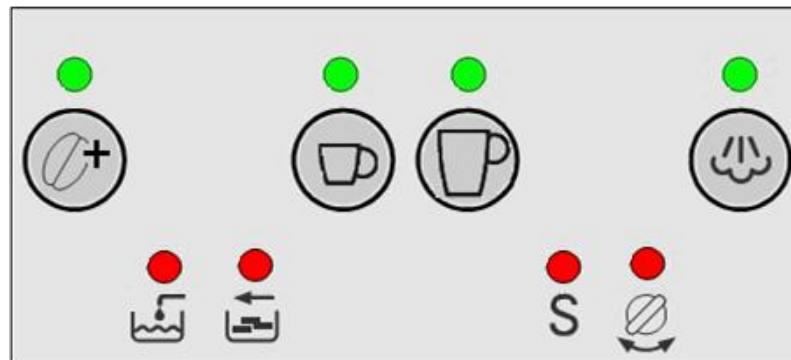
Appliance test mode starts.

LED for symbol turn dial is lit.

7.4.3 Performing the appliance test

- ▶ Close steam valve.

The brewing unit is initialized, the transmission limit switch is tested. All LEDs are lit.



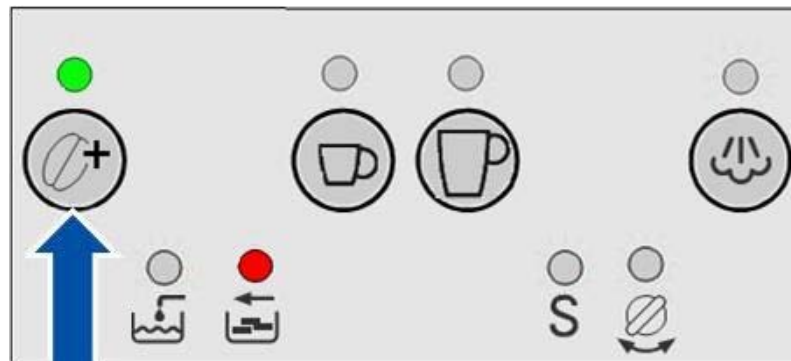
The grinder runs for 5 seconds.

- ▶ Check that the grinding cone is running in clockwise direction.
- Pause for 2 seconds. Appliance heats up. All LEDs are flashing.
- ▶ Check power consumption.

Heater is at ready to use temperature. LED for coffee strength button is lit.

- ▶ Press coffee strength button.

LED for symbol empty trays is lit.

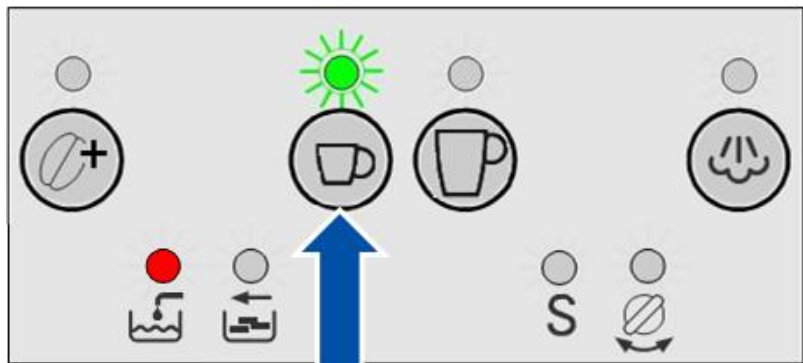


Performing the appliance test

- ▶ Remove the drip tray and refit it

Tray switch is checked.

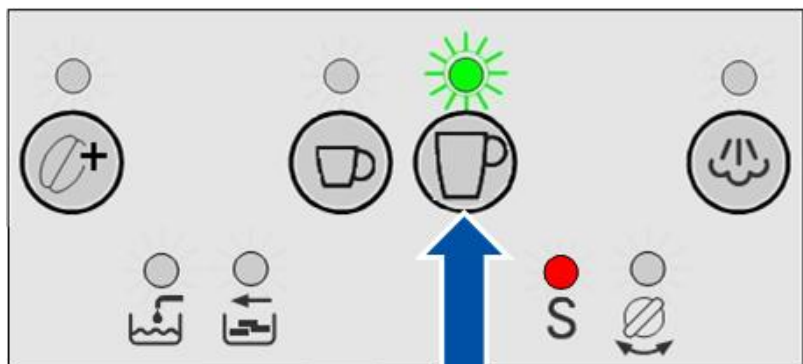
LED for coffee dispensing button small is flashing.



- ▶ Press coffee dispensing button small.

Key function is checked.

LED for coffee dispensing button large is flashing.

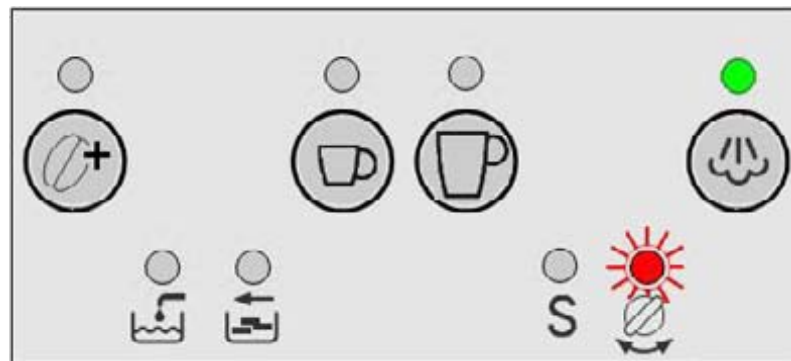


- ▶ Press coffee dispensing button large.

Brewing unit moves into upper end position. Water (125 ml) is pumped through the coffee outlet. The pressure in the brewing chamber operates the switch for grinder compensation.

Switch for grinder compensation is checked.

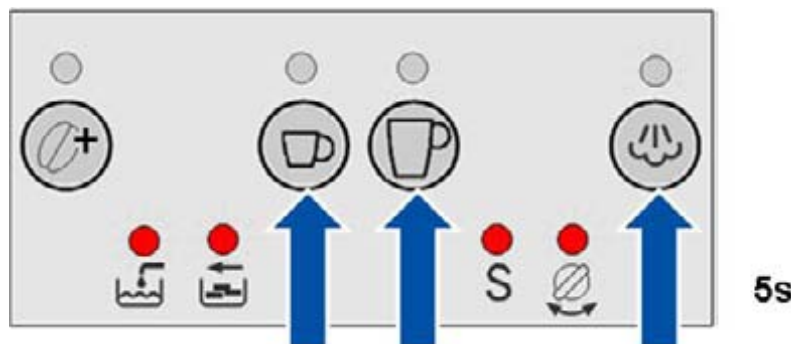
LED for steam button is lit, LED for symbol turn dial starts flashing.



- ▶ Open steam valve by turning the dial.

The appliance begins to produce steam (heating up to steam temperature while the valve is open).

- ▶ Evaporate all the water in the system by producing steam for at least 15 seconds, then interrupt water supply by removing the water tank.
- ▶ Close steam valve after steam production is finished.
- ▶ Press steam button.

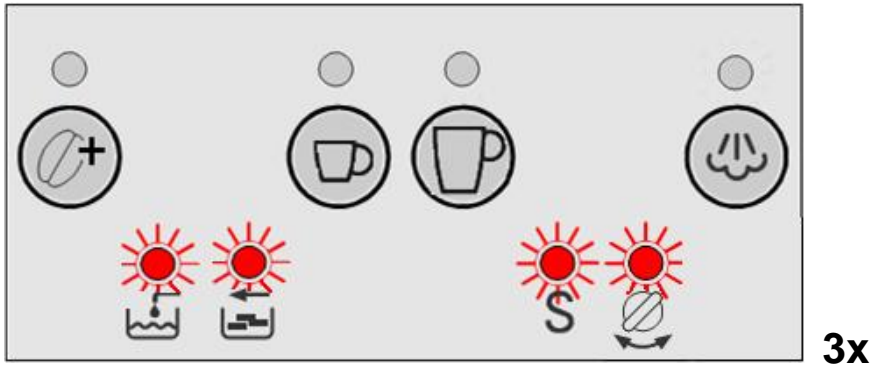


- ▶ End the appliance test by pressing both coffee dispensing buttons small and large together with the steam button for at least **5 seconds** simultaneously.

Performing the appliance test

The software marker for extended grinder time and fill-up system (initial set-up) is set.

All 4 symbol LEDs are flashing 3x for confirmation.



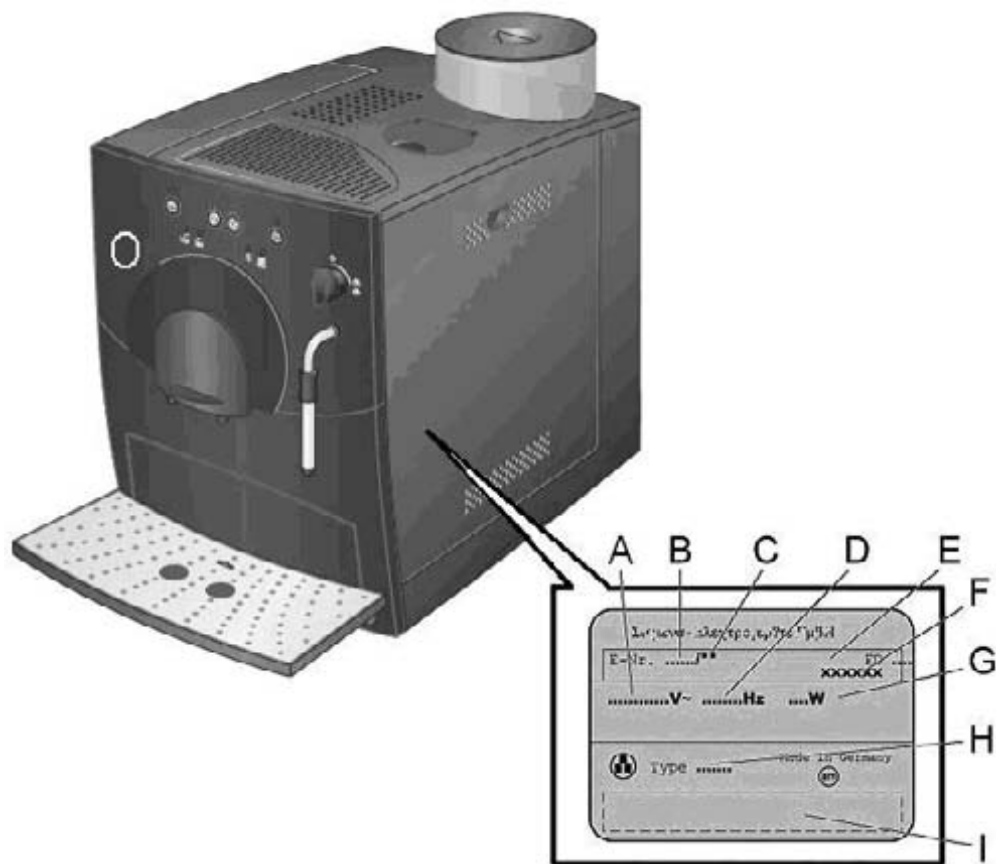
Appliance test is finished.

Appliance is off.

8 TECHNICAL SPECIFICATIONS

8.1 Rating plate

The rating plate is situated on the interior carrier behind the service flap.



A Voltage

B VIB (sales identification designation)

C Customer service index

Newly launched appliances are given the customer service index "01". The customer service index is increased to "02", "03", etc. if customer service makes changes to the appliance.

D Frequency

E Production date according to BSH key.

For example: FD9209 92 = year minus 20 (=2012)

09 = month (September)

F Serial number (optional)

G Power

H Type (works designation)

I Field for approbation number

8.2 Power

8.2.1 Mains voltage

EU 230 – 240 V / 50 Hz

8.2.2 Connected load

1400 W

8.2.3 Power consumption

Heater 1250 W

Pump 65 W

8.2.4 Pump pressure

During coffee preparation 5 - 7 bar

static 15 - 17 bar

8.2.5 Flow rate

120 – 240 ml/min at 12 bar, 230 – 240 V / 50 Hz

8.2.6 Switch-on time

Switch on with rinsing approx. 70 sec.

8.3 Temperatures

8.3.1 Coffee outlet

Measure coffee temperature 5–10 mm below the outlet in the jet

1st coffee 82°C+/-5°

2nd coffee 82°C+/-3°

8.3.2 Hot water

Hot water drawn without interruption >82°C

Hot water drawn after 1st heating-up process >85°C

8.3.3 Steam

Steam production 200 ml, 1 min. (pump clocks) >80°C

8.3.4 Milk

Set point temperature UHT milk 1.5% 10°C +/-5°
(measure in Tetra pack)

Warm 100 ml milk in stainless steel jug < 1 min. 55 – 70°C

Froth up 100 ml milk with steam pipe < 1 min. 55 – 70°C

8.3.5 Cup heater

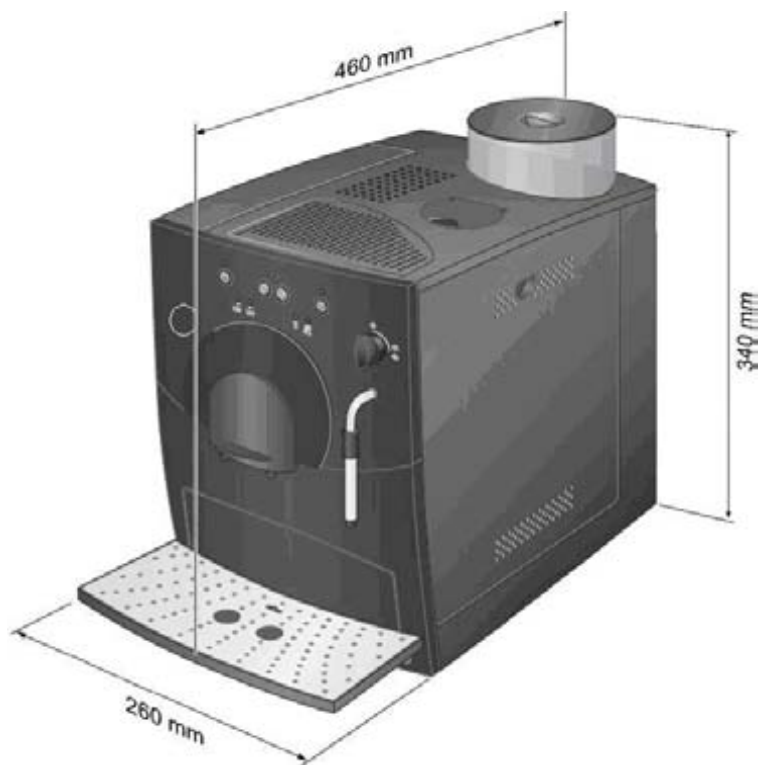
Passive heating via exhaust air from heater > 37 °C after 20 min

8.4 Dimensions and weight

8.4.1 Appliance dimensions

Height	340 mm
Width	260 mm
Depth	460 mm

Height between coffee outlet and drip plate
Approx. 85 mm – 120 mm



8.4.2 Cable length

Approx. 1,1 m

8.4.3 Weight

8,5 kg net
9,5 kg gross

8.5 Filling amounts

8.5.1 Capacity

Water tank	1,8 l
Bean container	approx. 250 g
Drip tray	approx. 400 ml (to float signal) 800 ml max

8.5.2 Cup filling amounts

Filling amounts pre-adjustable 30ml – 220 ml.



Dispensing button Coffee small Default - 40ml



Dispensing button Coffee large Default - 125ml

8.6 Components

Display	Operating voltage	5,0 V DC
Logic module (control unit)	Supply voltage	11,5 V DC
	Operating voltage	5,0 V DC
Drive – brewing unit	Supply voltage	16,0 V DC
	Speed – motor	3000 r.p.m. (no load)
	Transmission ratio	451 : 1 (6.6 r.p.m.)
	Power	4.0 Nm (from spindle)
Transformer	Primary power supply	230 V AC / 50Hz
	Secondary voltage 1	9,0 V AC
	Secondary voltage 2	15,0 V AC
Heater	Supply voltage	230 V AC / 50Hz
	Heat output (steam heater / coffee heater)	1250 W
Pump	Supply voltage	230 V AC /50 Hz
	Pumping capacity	65 W / 15 – 17 bar (static)
Pump thermostat	Switching off limit	115 °C
Crema valve	Opening pressure	4,5 bar
Grinding unit	Supply voltage	230 V DC /50 Hz
	Speed – motor	19,250 r.p.m. (no load)
	Transmission ratio – gears	36 : 1 (~ 490 r.p.m.)