

REPAIR INSTRUCTION

Fully-automatic coffeemaker

1	SAFETY	2	5.3	Temperature	48
1.1	Safety instructions	2	6	REPAIR	49
1.2	Repair instructions	2	6.1	Replacing the brewing unit	49
2	INSTALLATION	3	6.2	General disassembly	52
2.1	Installation	3	6.3	Replacing the pump	55
2.2	Scope of delivery	3	6.4	Replacing the thermal fuse	56
3	OPERATION	4	6.5	Replacing the heating element and NTC sensor	59
3.1	Starting the appliance	4	6.6	Replacing the electronics board	60
3.2	Controls	5	6.7	Replacing the power cord	61
3.3	Displays and operating logic	12	6.8	Replacing the coffee outlet	62
3.4	Adjusting water hardness	20	6.9	Replacing the front panel	63
3.5	Reducing temperature	21	6.10	Replacing steam valve and operating panel	64
3.6	Reset	21	6.11	Appliance test	65
3.7	Manually cooling the heater	22	7	FAULT DIAGNOSTICS	67
3.8	Service programme	23	7.1	Incoming goods inspection	67
3.9	Maintenance and daily cleaning	28	7.2	Incoming goods inspection	68
4	COMPONENTS	30	7.3	System and error messages	69
4.1	Flowmeter	30	7.4	Measuring the coffee temperature	73
4.2	Heater and NTC-sensor	31	8	TECHNICAL SPECIFICATIONS	74
4.3	Brewing unit	33	8.1	Rating plate	74
4.4	Gear unit	38	8.2	Power	75
4.5	Steam valve and proximity switch	42	8.3	Temperatures	75
4.6	Hot water / steam nozzle	43	8.4	Consumption values (230 V/50 Hz models)	76
4.7	Water filter	44	8.5	Dimensions and weight	77
5	FUNCTIONS	45	8.6	Filling amounts	77
5.1	Construction	45	8.7	Components	78
5.2	Fluid system	47			

1 SAFETY

1.1 Safety instructions



Danger!

- ▶ 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!
- ▶ 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 standardised 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!
- ▶ Following each repair, conduct a leak and performance test.

1.2 Repair instructions



Caution!

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



Risk of scalding!

Hot water / steam nozzle or auto-cappuccinatore frothing-up nozzle (optional) become very hot. Take hold of the nozzles by the plastic parts only, not by the metal parts. Keep body parts away from the nozzles and do not aim it to yourself or anyone else.

When steam or hot water is released, the nozzles may initially sputter!

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

3 OPERATION

3.1 Starting the appliance



WARNING

Risk of damage!

Do not use coffee beans which have been glazed, caramelised 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.
- ▶ Set the mains switch at the rear of the appliance to **I**.

LED above **stand-by** button lights up dim red.

- ▶ Ensure that the rotary knob for drawing steam/hot water is set to **O**.
- ▶ Press Standby button.



3.1.1 Self-test

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

Brewing module and coffee outlet are rinsed and heated.

- ▶ Brewing module 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 **stand-by** button and “Turn steam/hot water valve” flash:

- ▶ 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**”.

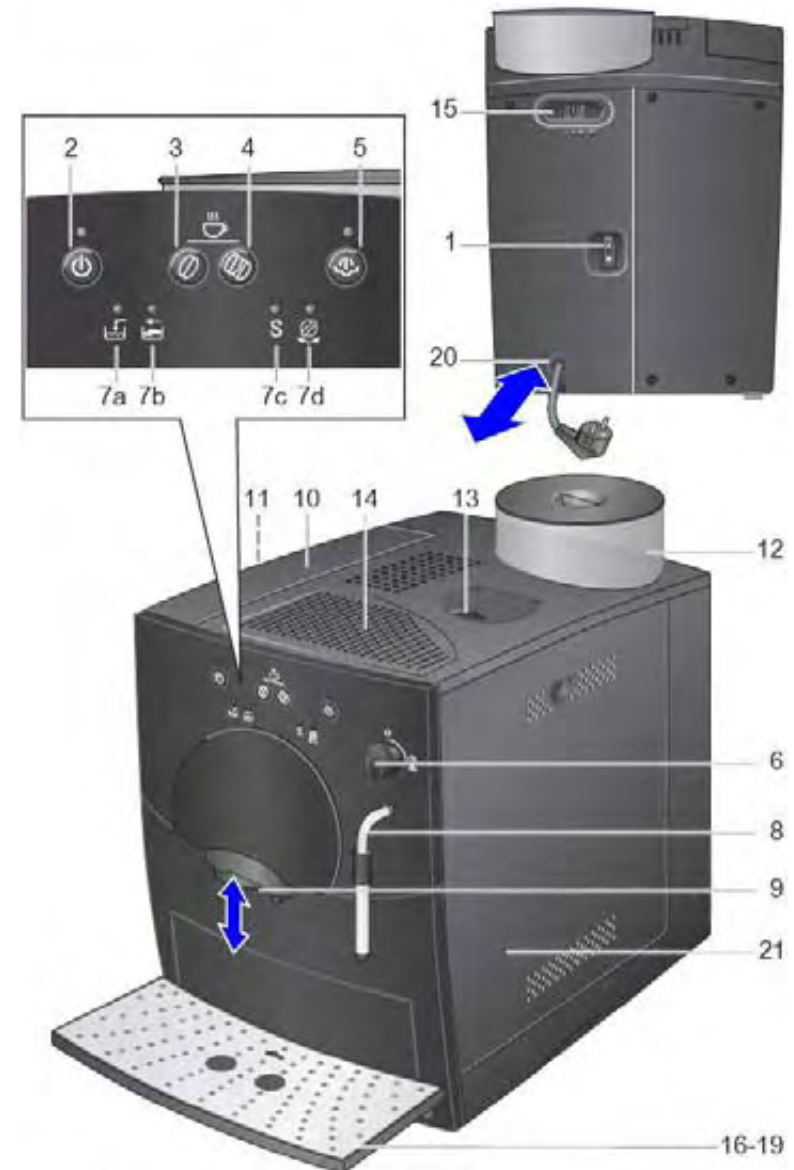
LED above **stand-by** button flashes, appliance heats up and is rinsed.

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

3.2 Controls

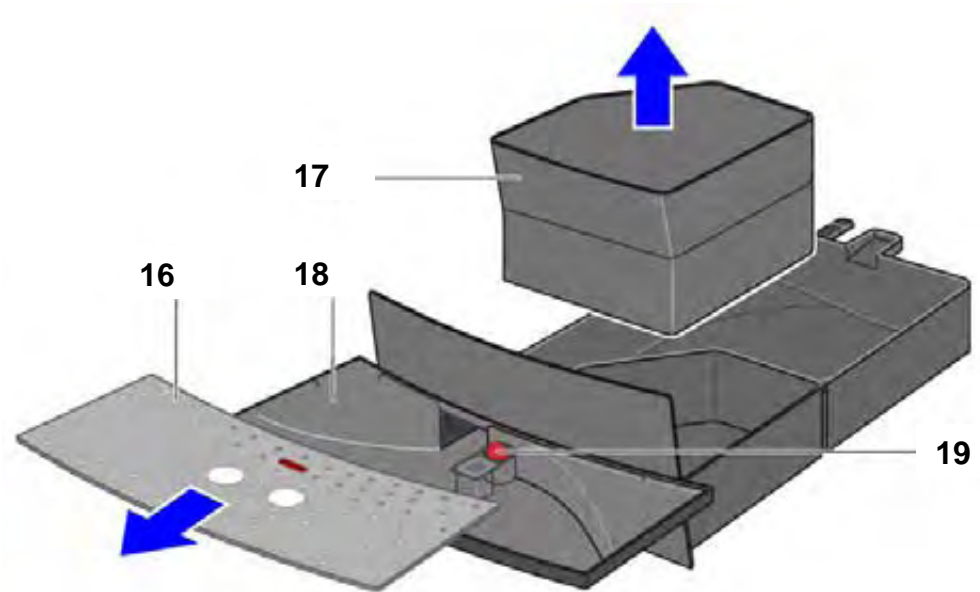
3.2.1 Overview of the controls

- 1 Mains switch I / O
- 2 Standby button
- 3 Coffee on button (mild)
- 4 Coffee on button (strong)
- 5 Steam button
- 6 Hot water/steam production knob
- 7 LED display
 - a Fill water
 - b Empty trays
 - c Run Service programme
 - d Turn steam/hot water valve
- 8 Steam pipe with frothing nozzle
- 9 Coffee outlet, height-adjustable
- 10 Cover, water tank
- 11 Water tank
- 12 Bean container with aroma protection cover
- 13 Slot for detergent tablets
- 14 Cup shelf with cup heater
- 15 Slide switch, degree of ground coffee
- 16–19 Drip tray
- 20 Store for power cord
- 21 Service flap (access to brewing module)



3.2.2 Overview of the controls

- 16 Drip plate
- 17 Drawer for coffee dregs
- 18 Drip tray
- 19 Float for level indicator



Note!

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

3.2.3 Controls

1. Mains switch

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

When the mains switch has been switched on, the Standby button lights up dim red. The appliance is in standby mode.



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

2. Standby button



The **Standby** button switches on and starts the appliance or switches it from brewing mode to standby.

When the **Standby** button has been pressed, a self-test runs: The appliance is initialised, heats up and is rinsed. The LED of the **Standby** button flashes during this process.

If the LED is lit green, the appliance is ready for use.

Switching on a cold appliance:

When the **Standby** button has been pressed, the appliance heats up and is rinsed. The button flashes. Coffee **cannot** be brewed until the button stops flashing.

Switching on a warm appliance:

If the appliance is switched on with the **Standby** button, a rinsing process or self-test will not occur until the heater has reached the operating temperature. The **Standby** button is lit constantly. 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:

Appliance automatically switches to standby after 3 hours.

Controls

3. Coffee on button (mild)



If the coffee on button (mild) is pressed, a coffee brewing process is started with a small amount of ground coffee.

Amount of ground coffee saved permanently: mild = 7.6 +/- 1g

- ▶ Press 1 x for a cup of mild coffee.

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

4. Coffee on button (strong)



If the coffee on button (strong) is pressed, a coffee brewing process is started with a large amount of ground coffee.

Amount of ground coffee saved permanently: strong = 12.3 +/- 1g

- ▶ Press 1 x for a cup of strong coffee.

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

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

The same amount of liquid can also be drawn:

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

The already used ground coffee is brewed.

The factory preset amount of liquid (125 ml) can be changed.

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

Programming range 30–220 ml

Reset to factory setting


- ▶ Remove drip tray
- ▶ Simultaneously press Mild + Strong “on” buttons and hold down for 5 second

LEDs flash

- ▶ Re-insert drip tray
- ▶ Switch on appliance with standby button

Controls

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 **O**, the steam button must be pressed again before more steam can be drawn.

6. Hot water/steam production knob

Valve with 2 positions

O 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 **O**, the steam button must be pressed again before more steam can be drawn.

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 programme must be run:



flashes

Service programme is running



flashes

Knob must be turned to hot water/steam production.



lit

Knob must be turned to **O**.

8. Steam pipe with frothing nozzle

Steam pipe can be swivelled 30° to the side.

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

Controls

9. Coffee outlet, height-adjustable

Adjustment range 80 mm–120 mm

10. Cover, water tank

Hinged, connected to upper section of appliance.

11. Water tank

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

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

12. Bean container with aroma protection cover

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

13. Slot for cleaning tablet

No sensor for cover monitor

14. Cup shelf with cup pre-heater

Passively heated by the waste heat from the coffee heater

Temperature > 37 °C after 20 minutes

15. Slide switch – degree of ground coffee, 3-stage



WARNING

Risk of damage!

Beans may become jammed in the grinding unit.

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

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 or third cup of coffee.

Controls

16. Drip plate

Stainless steel, with opening for float

17. Drawer for coffee dregs

Capacity 12–14 coffee dregs at medium strength

18. Drip tray

Volume until float indicates limit, approx. 0.7 litres

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

19. Float for 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.

20. Store for power cord

Pull out power cord to required length.

21. Service flap

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

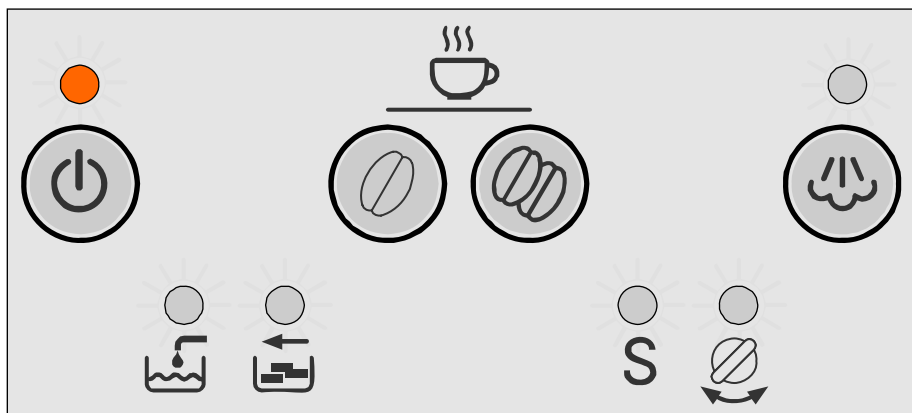
To open:

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

3.3 Displays and operating logic

3.3.1 Standby

Set mains switch to I



LED button: Standby is lit dim red

LED display: No display

3.3.1.1 Options

Press Standby button: The appliance is initialised, heats up and is rinsed

Press Coffee mild button: No response, appliance is off

Press Coffee mild button for 5 seconds: **Service programme starts**

Press Coffee strong button: No response, appliance is off

Press the “Steam” button: No response, appliance is off

Press Steam button for 5 sec.: **Water hardness setting starts**
Setting corresponds to the number of lit LEDs

Press Coffee strong + Steam buttons for 5 sec.: **Temperature reduction by 4°**
Normal temperature = “Add water” and “Empty trays” LEDs are lit. Press Coffee strong button = - 4°/ normal

Open hot water/steam valve: No response, appliance is off

Open hot water/steam valve, press Coffee mild + Steam buttons for 5 sec.: **Start appliance test**

Remove trays: No response, appliance is off

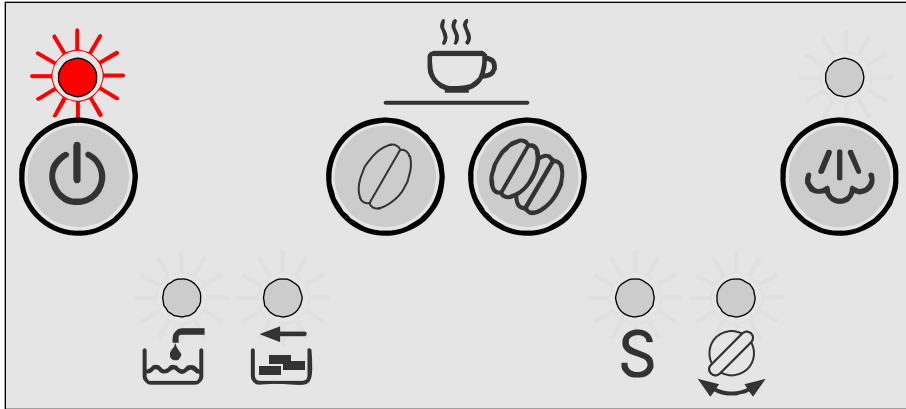
Remove trays, Press Coffee mild + strong buttons for 5 sec.: **Works reset** for amount of coffee, temperature and water hardness

Release brewing unit: No response, appliance is off
Service LED flashes alternately with Standby LED buttons (dim red)

Press Coffee mild + strong + Steam buttons for 5 sec.: **Set software bit for initial operation: = Fill system +1. Grinding unit running time +6 sec.**

3.3.2 Switching on the appliance

Press Standby button



LED button: Standby flashes red

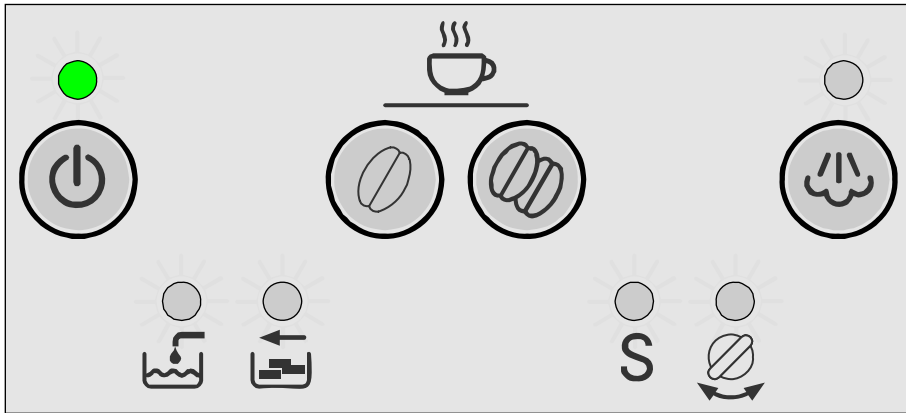
LED display: No display

Appliance: The appliance is initialised, heats up and is rinsed

3.3.2.1 Options

Press Standby button:	Appliance switches to standby
Press Coffee mild button:	No response
Press Coffee strong button:	No response
Press the “Steam” button:	No response
Open hot water/steam valve:	Close steam valve LED is lit
Remove trays:	“Trays missing” LED flashes, heating up is interrupted, brewing unit does not move
Release brewing unit:	Heating up ends. Service LED flashes alternating with Standby LED buttons (dim red)
Lock brewing unit:	Appliance switches to standby

3.3.3 Appliance ready to use



LED button: Standby is lit green

LED display: No display

Appliance: Ready to use

3.3.3.1 Options

Press Standby button:

Appliance switches to standby

Press Coffee mild button:

Brew coffee

Press Coffee strong button:

Brew coffee

If the Coffee mild or Coffee strong button is pressed again within 3 seconds **after** the end of the brewing cycle, the same amount of liquid is brewed through the ground coffee already used.

Press the "Steam" button:

Heat up to steam temperature

Open hot water/steam valve:

Draw hot water

Remove trays:

Standby button LED is lit, "Trays missing" LED flashes

Release brewing unit:

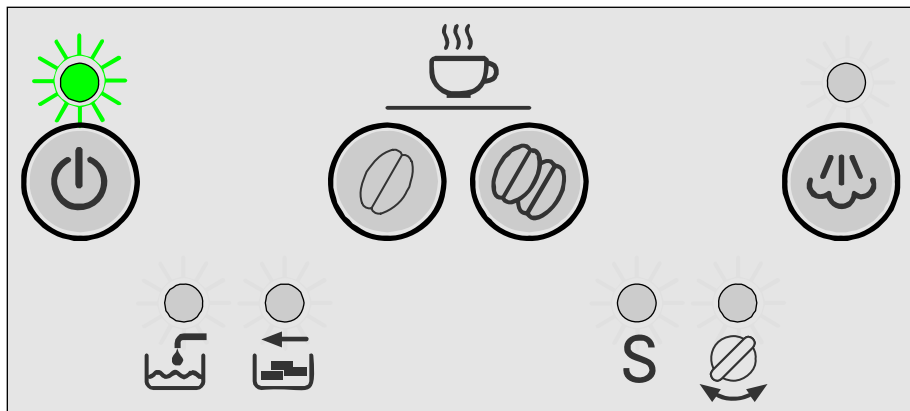
Service LED flashes alternating with Standby LED buttons (dim red)

Lock brewing unit:

Appliance switches to standby

3.3.4 Brewing coffee

Press the Coffee mild or Coffee strong button



LED button: Standby flashes green

LED display: No display

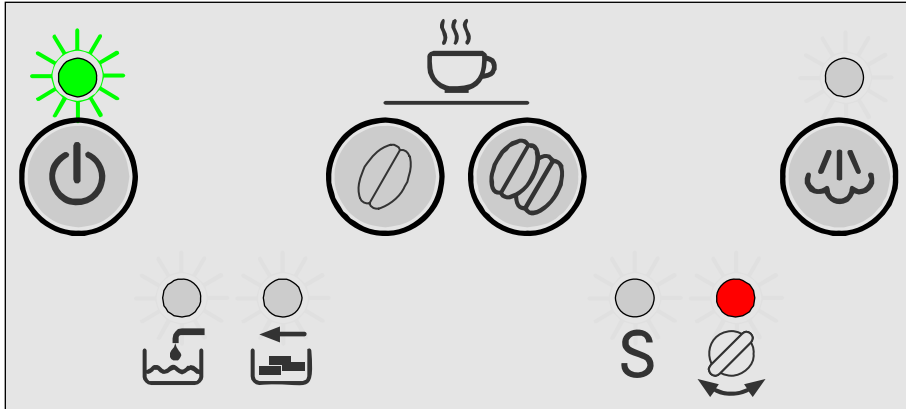
Appliance: Brew coffee

3.3.4.1 Options

- Press Standby button:** The current coffee brewing process is stopped, switches to standby.
- Press Coffee mild button:** The current coffee brewing process is stopped, switches to standby.
- Press Coffee strong button:** The current coffee brewing process is stopped, switches to standby.
If the Coffee mild or Coffee strong button is pressed again within 3 seconds **after** the end of the brewing cycle, the same amount of liquid is brewed through the ground coffee already used.
- Press the “Steam” button:** The current coffee brewing process is stopped, switches to standby.
- Open hot water/steam valve:** The current coffee brewing process is interrupted, Close steam valve LED is lit, grinding is not interrupted.
- Remove trays:** The current coffee brewing process is interrupted, “Trays missing” LED flashes, grinding is not interrupted.
- Remove water tank:** Coffee brewing process is stopped after approx. 10 seconds, “Add water” LED is lit, Open hot water/steam valve LED flashes.
- Adjust filling quantity:** Active is accepted.
- Beans running out:** Current coffee brewing process is completed.

3.3.5 Drawing hot water

Open hot water/steam valve



LED button: Standby flashes green

LED display: Hot water/steam valve is lit

Appliance: Pump is running, heating on
Convey hot water

3.3.5.1 Options

Press Standby button:

Appliance switches to standby

Press Coffee on button:

Brewing is stopped, "Close hot water/steam valve" LED is lit

Press coffee strength button:

Brewing is stopped, "Close hot water/steam valve" LED is lit

Press the "Steam" button:

Brewing is stopped, "Close hot water/steam valve" LED is lit

Remove trays:

Brewing is stopped, "Close hot water/steam valve" LED is lit, "Trays missing" LED flashes

Remove water tank:

Brewing is stopped after approx. 10 sec., "Add water" and "Close hot water/steam valve" LEDs are lit

Release brewing unit:

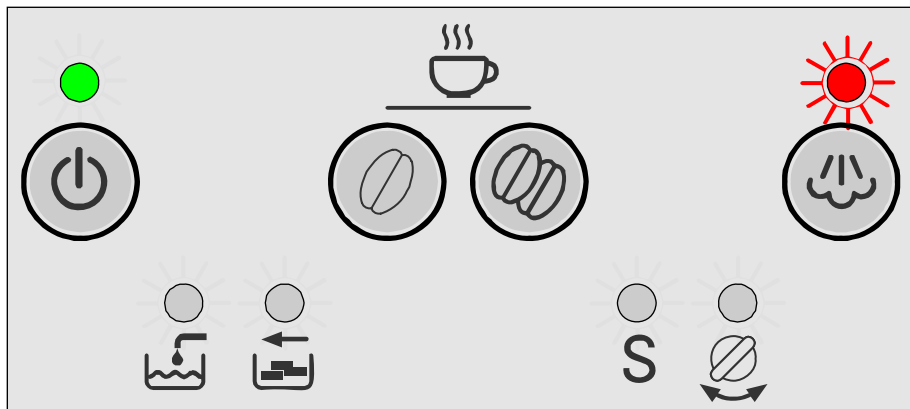
Brewing is stopped, Service LED flashes alternating with Standby LED buttons (dim red)

Lock brewing unit:

Appliance switches to standby

3.3.6 Heating up to steam

Press the "Steam" button



LED button: Standby is lit green, Steam flashes

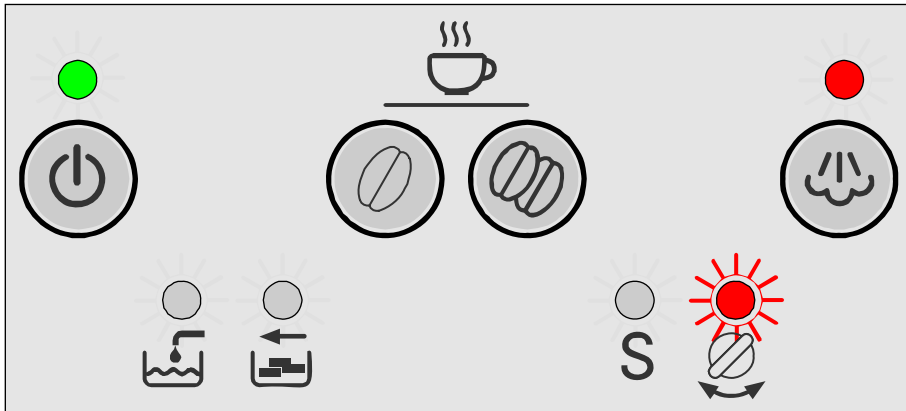
LED display: No display

Appliance: Heat up to steam temperature

3.3.6.1 Options

Press Standby button:	Heating up is stopped, appliance switches to standby
Press Coffee mild button:	Heating up is stopped, appliance switches to standby
Press Coffee strong button:	Heating up is stopped, appliance switches to standby
Press the "Steam" button:	Heating up is stopped, appliance switches to standby
Open hot water/steam valve:	Wait until steam temperature has been reached, then draw steam
Remove trays:	Continues heating, "Trays missing" LED flashes
Remove water tank:	No response
Release brewing unit:	Heating up is stopped, Service LED flashes alternating with Standby LED buttons (dim red)
Lock brewing unit:	Appliance switches to standby

3.3.7 Steam ready



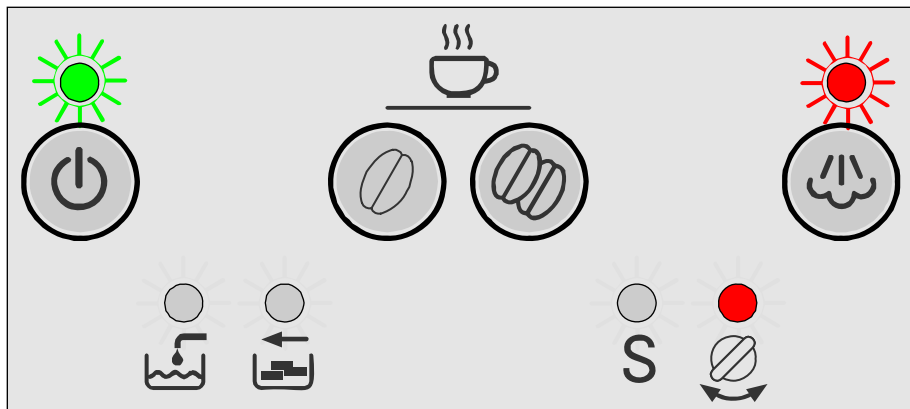
- LED button:** Standby is lit green, Steam is lit
- LED display:** “Open steam valve” flashes
- Appliance:** At steam temperature for approx. 1 minute

3.3.7.1 Options

- Press Standby button: Stopped, appliance switches to standby
- Press Coffee mild button: Stopped, appliance switches to ready to use
- Press Coffee strong button: Stopped, appliance switches to ready to use
- Press the “Steam” button: Stopped, appliance switches to ready to use
- Open hot water/steam valve: Steam is generated, “Close hot water/steam valve” LED is lit
- Close hot water/steam valve is lit: Steam ready ends
- Remove trays: Steam ready continues for approx. 1 minute, “Close hot water/steam valve” and “Trays missing” LEDs flash
- Release brewing unit: Steam ready is stopped, Service LED flashes alternating with Standby LED buttons (dim red)
- Lock brewing unit: Appliance switches to standby

3.3.8 Drawing steam

Open hot water/steam valve



LED button: Standby flashes green, Steam flashes

LED display: Open steam valve is lit

Appliance: Pump is running, heating on
Convey steam

3.3.8.1 Options

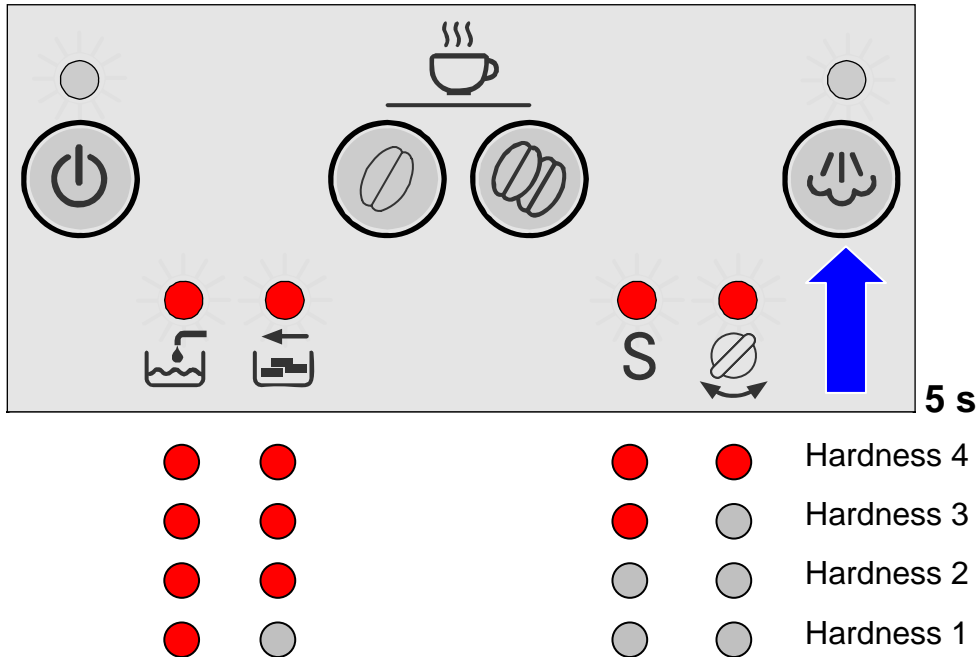
Press Standby button:	Stopped, appliance switches to standby
Press Coffee mild button:	Brewing is stopped, "Close hot water/steam valve" LED is lit
Press Coffee strong button:	Brewing is stopped, "Close hot water/steam valve" LED is lit
Press the "Steam" button:	Brewing is stopped, "Close hot water/steam valve" LED is lit
Close hot water/steam valve is lit	Stopped, appliance switches to ready to use
Remove trays:	Brewing is stopped, "Close hot water/steam valve" LED is lit
Remove water tank:	Brewing is stopped after approx. 30 sec., "Add water" and "Close hot water/steam valve" LEDs are lit
Release brewing unit:	Steam on is stopped, Service LED flashes alternating with Standby LED buttons (dim red)
Lock brewing unit:	Appliance switches to standby

3.4 Adjusting 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.



- ▶ Switch on the appliance with the mains switch.

Appliance is in standby

- ▶ Press Steam button for 5 seconds:

Number of lit LEDs indicates the currently set water hardness.

- ▶ Keep pressing Steam button until the buttons for the required water hardness light up.

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

- ▶ Press Standby button once.

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

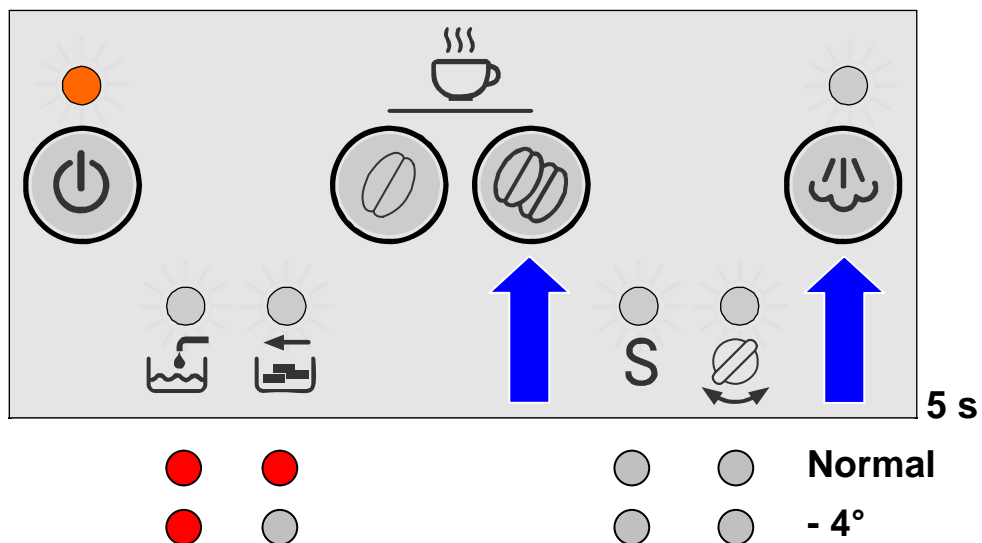


Note:

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

3.5 Reducing temperature

Temperature reduction by 4°



- ▶ Switch on the appliance with the mains switch.

Appliance is in standby

- ▶ Press Coffee strong and Steam buttons for 5 seconds:

Normal temperature: Add water and Trays missing LEDs are lit

- ▶ Press Coffee strong button to reduce the temperature by 4°

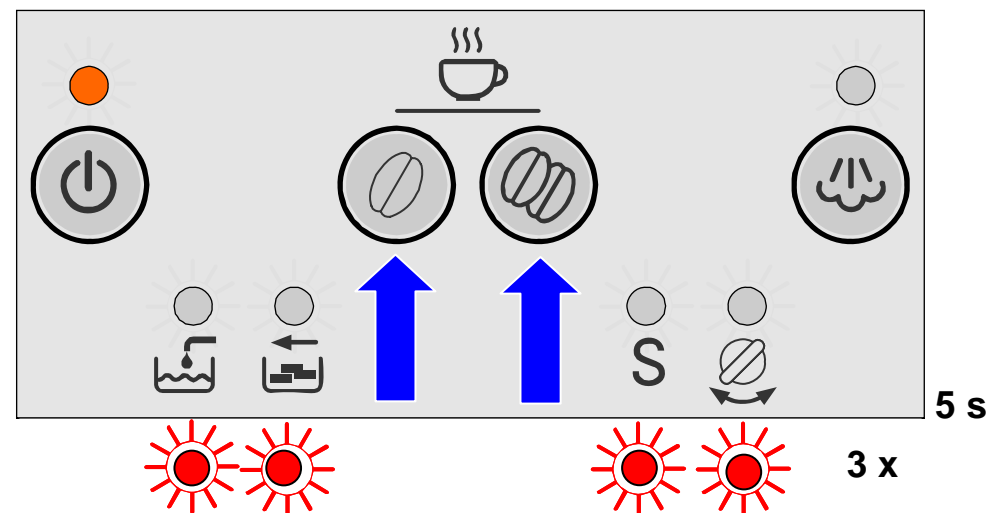
-4°: Add water LED is lit

- ▶ Press Standby button once

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

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

3.6 Reset



- ▶ Switch on the appliance with the mains switch.

Appliance is in standby

- ▶ Remove drip tray
- ▶ Press Coffee mild and Coffee strong buttons for 5 seconds:

The following values are reset to the factory settings:

- Amount of liquid coffee (set to 125 ml)
- Temperature (set to normal)
- Water hardness (set to hardness 4)

All 4 LEDs flash 3 times. Appliance switches back to standby

3.7 Manually cooling the heater

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

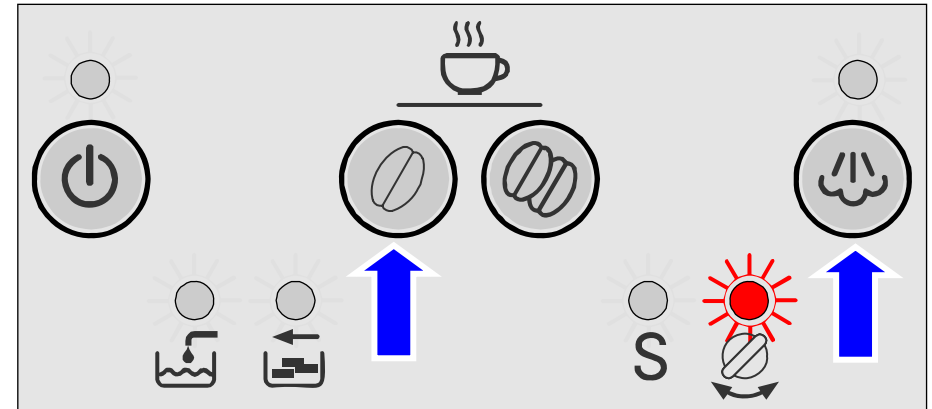
- ▶ Provide a 0.5 litre collecting vessel

3.7.1 Procedure

- ▶ Insert mains plug and set mains switch to “I”

Appliance is in standby. The standby button LED is lit dimly red.

- ▶ Place collecting vessel under steam nozzle.



- ▶ Simultaneously press coffee on MILD ☉ and steam ☁ buttons for **5 seconds**.

LED above Open steam tap symbol flashes for 5 seconds.

- ▶ Open steam tap: (if the steam tap is not opened during this time, the appliance switches back to standby).

Cold water (maximum 0.5 litres) is conveyed out of the steam pipe. It is not reheated, heater is cooled manually.

- ▶ Close steam tap.

Pump stops. Appliance switches back to standby. The standby button LED is lit dimly red.

3.8 Service programme

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

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

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



Risk of damage!

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

WARNING

While the Service programme 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)

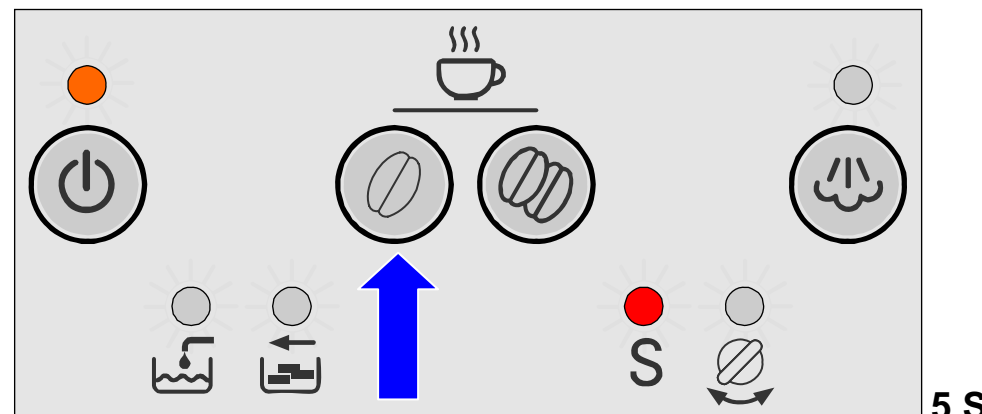
or

- ▶ 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 programme

- ▶ To start the Service programme, switch the appliance to standby.

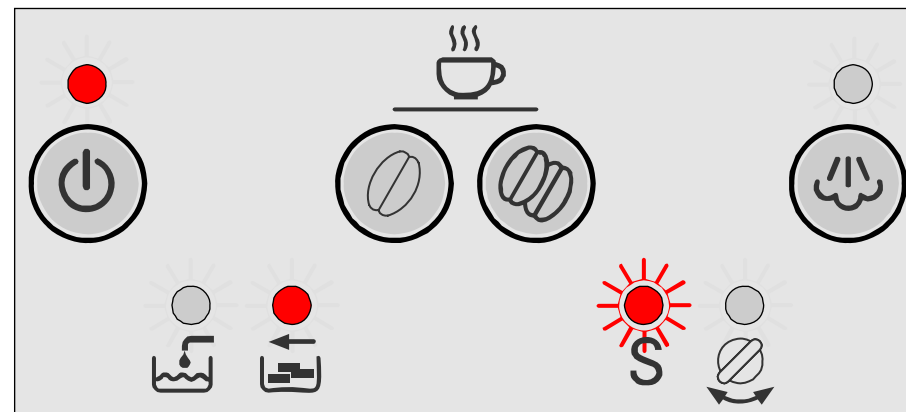


LED button: Standby is lit dim red

LED display: **S** is lit

- ▶ Press Coffee mild button for 5 seconds

The appliance is initialised, heats up and is rinsed.

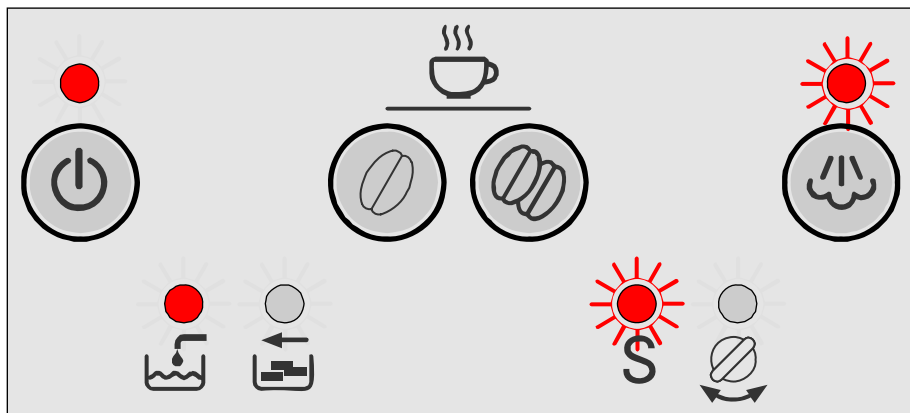


LED button: Standby is lit red

LED display: **S** flashes, Empty trays is lit

3.8.3 Sequence of the Service programme (descaling)

- ▶ Remove drip tray with dregs drawer, empty and re-insert (time window > 6 seconds).



LED button: Standby is lit red, Fill water is lit

LED display: S flashes, Steam flashes

- ▶ Place **one** cleaning tablet in the slot
- ▶ Fill water tank with lukewarm water, add descaling agent and dissolve completely in water (total amount of liquid = 0.5 litres).

or

- ▶ Fill water tank with 0.5 l of ready mixed descaling solution.

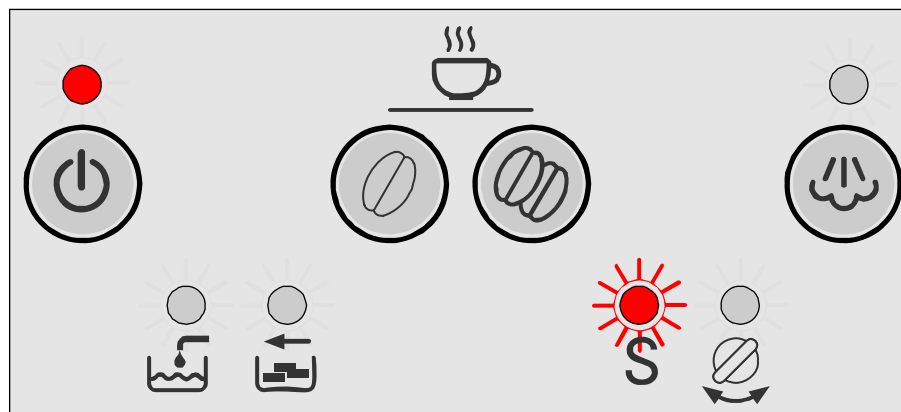


If using descaling tablets, add two tablets. Observe the dissolving time of the tablets (approx. 4–6 minutes)!

- ▶ Press the steam button

Appliance starts the descaling cycle. Duration approx. **10 minutes**.

Service marker is set



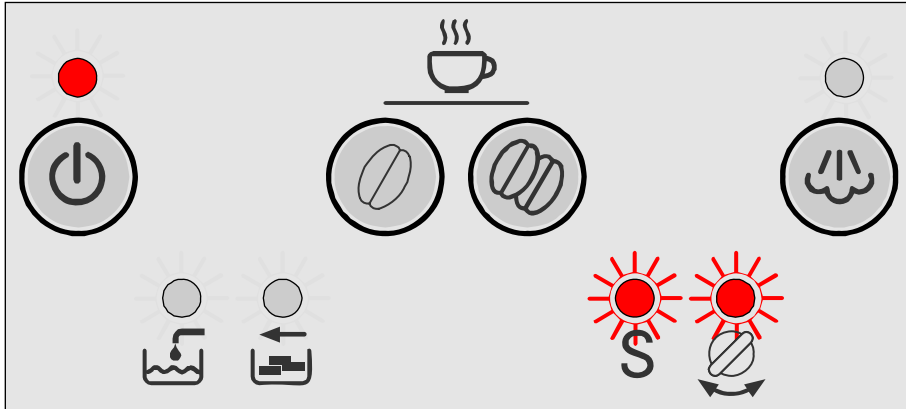
LED button: Standby is lit red

LED display: S flashes

Liquid outlet via drainage valve:	1 x 60 ml
	16 x 15 ml
Total:	300 ml

Descaling via drainage valve ended.

Sequence of the Service programme (descaling)



LED button: Standby is lit red

LED display: S flashes, Turn hot water/steam valve flashes

- ▶ Place an adequately large receptacle (approx. 0.5 litres) under the steam pipe.
- ▶ Turn hot water/steam valve to hot water production

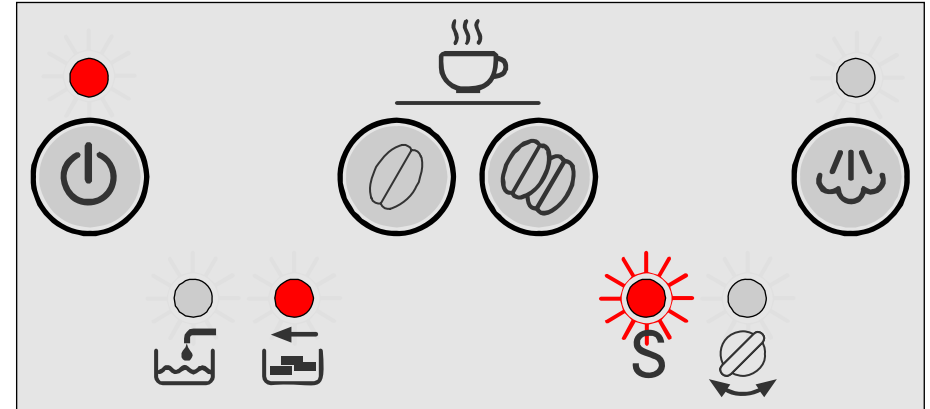
Appliance continues descaling cycle. Duration approx. **5 minutes.**

Liquid outlet via steam pipe: 15 x 20 ml

Total: 300 ml

Descaling ended

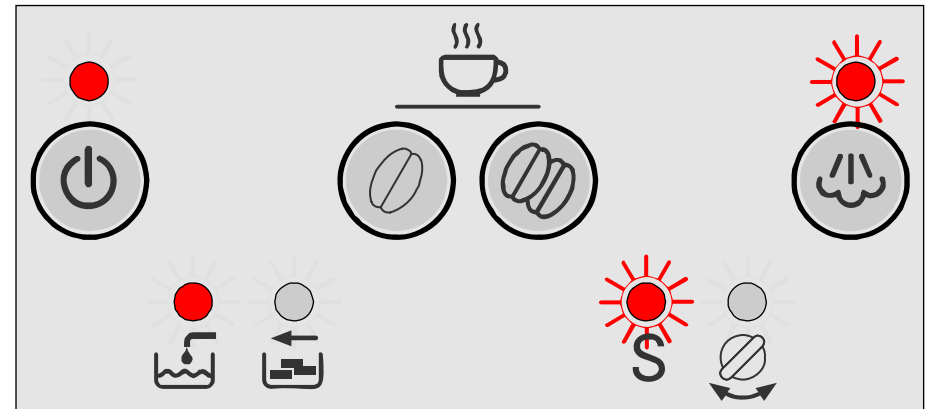
Sequence of the Service programme (rinsing)



LED button: Standby is lit red

LED display: S flashes, Empty trays is lit

- ▶ Remove drip tray with dregs drawer, empty and re-insert (time window > 6 seconds).



LED button: Standby is lit red, Steam is lit

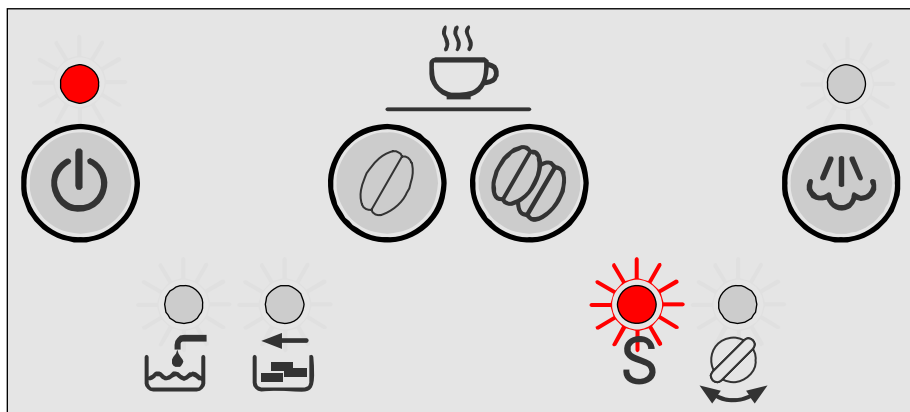
LED display: S flashes, Fill water is lit

- ▶ Empty and clean water tank, fill with fresh water up to the "max" mark and re-insert.

Sequence of the Service programme (rinsing)

- ▶ Place an adequately large receptacle (approx. 0.5 litres) under the steam pipe.
- ▶ Press the “Steam” button.

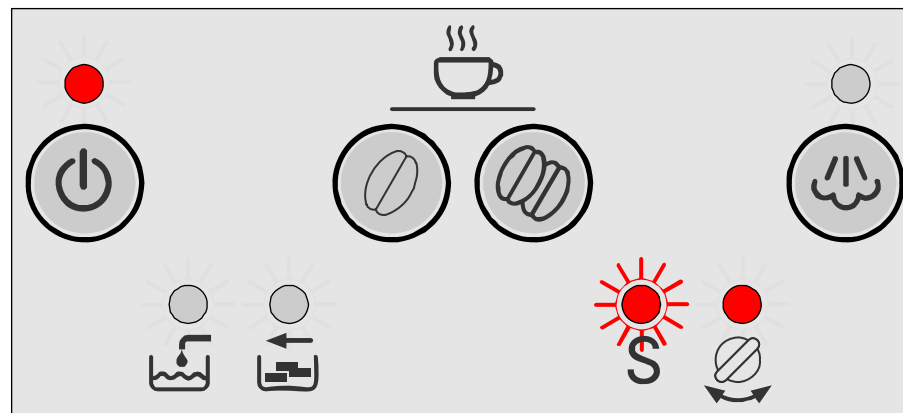
Appliance starts rinsing. 100 ml of water are conveyed.



LED button: Standby is lit red

LED display: S flashes

Rinse cycle via steam pipe has ended when Turn hot water/steam valve LED is also lit.



LED button: Standby is lit red

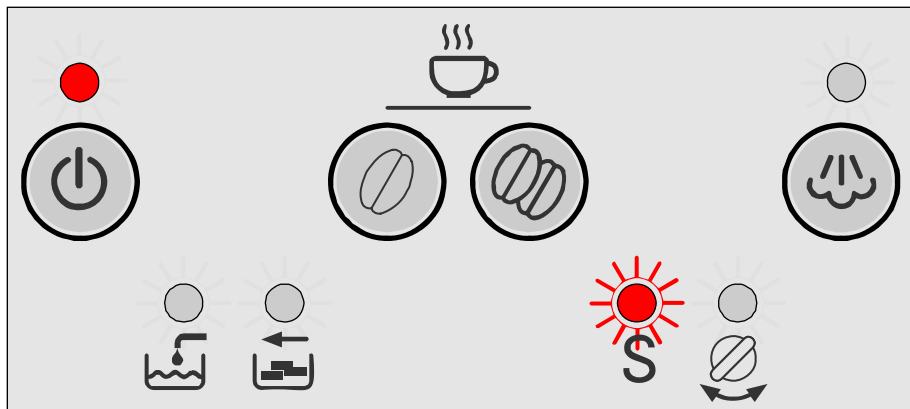
LED display: S flashes, Turn hot water/steam valve is lit

- ▶ Turn hot water/steam valve to **O**

Appliance starts the cleaning process. 100 ml of water are conveyed via the drainage valve.

3.8.4 Sequence of the Service programme (cleaning)

Brewing module is moved to brewing position (drainage position)



LED button: Standby is lit red

LED display: S flashes

Liquid outlet via drainage valve:	1 x 80 ml
	8 x 15 ml
Total:	200 ml

Brewing module is moved back to the home position, then to the brewing position again

Liquid outlet via coffee outlet:	6 x 20 ml
Total:	120 ml

Cleaning cycle has ended when the Empty trays LED flashes

- ▶ Remove drip tray with dregs drawer, empty and re-insert (time window > 6 seconds).

Service marker is deleted

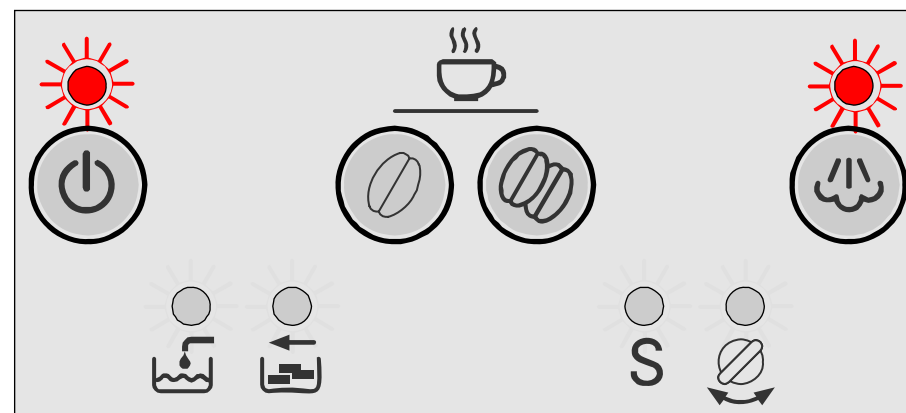
Appliance heats up and is ready for use again when the Standby LED is lit green.

3.8.4.1 Manual rinsing after interruption



If the Service programme was interrupted, e.g. by a power failure, **always** rinse the appliance **before** switching it on again.

- ▶ Press Standby button



LED button: Standby and Steam flash

- ▶ Rinse water tank and fill with fresh water
- ▶ Press the “Steam” button

Appliance is rinsed via drainage valve

LED display: Turn hot water/steam valve flashes

- ▶ Place cup under steam pipe, open hot water/steam valve
- Appliance is rinsed via hot water/steam valve.

LED display: Turn hot water/steam valve is lit

- ▶ Turn hot water/steam valve to **O**

Service marker is deleted

Appliance is rinsed and is ready for use again.

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.



Risk of damage!

- ▶ Do not use scouring agents.

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)**.

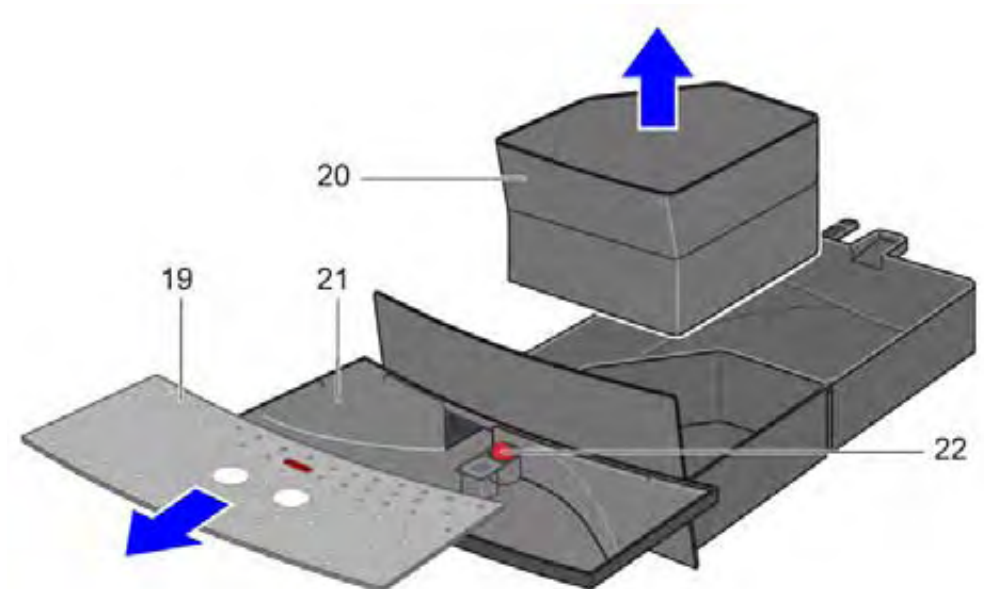
Wash all removable parts by hand only.

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



Note!

If the appliance is cold when switched on with the standby-button, or if it is set to standby after brewing coffee, it is automatically rinsed, i.e. the system cleans itself.



3.9.2 Cleaning the brewing unit

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.

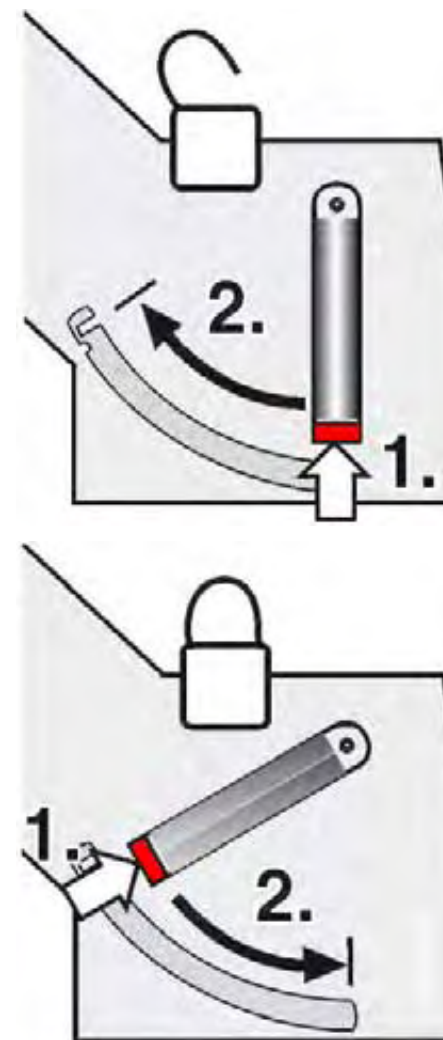


Risk of damage!

Do not place the brewing unit in the dishwasher!

- ▶ 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.



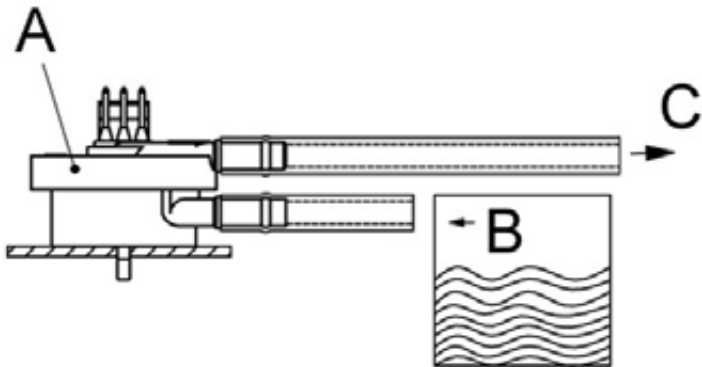
4 COMPONENTS

4.1 Flowmeter

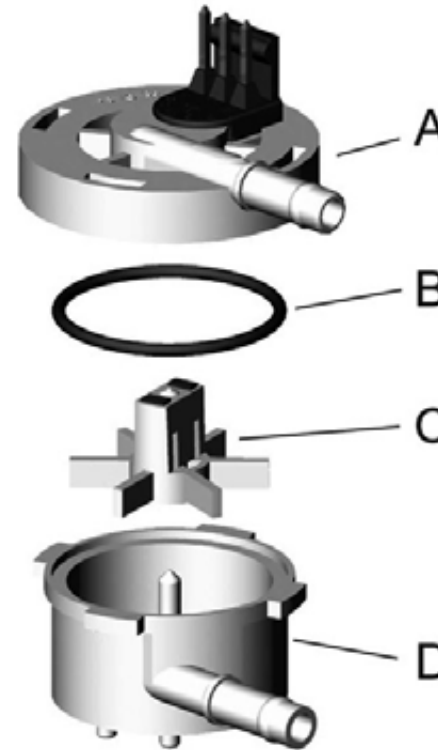


The composition of the coffee mixture is a well guarded secret of the coffee roasting establishments. To ensure that an excellent coffee can be produced from this secret, the coffee beans must be roasted carefully and the coffee machine controlled precisely – unless the dosage is constant, the quality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

The flowmeter **(A)** is installed on the suction side between the water tank **(B)** and pump **(C)**. To ensure a precise measurement result, the flowmeter 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 flowmeter.

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)**.

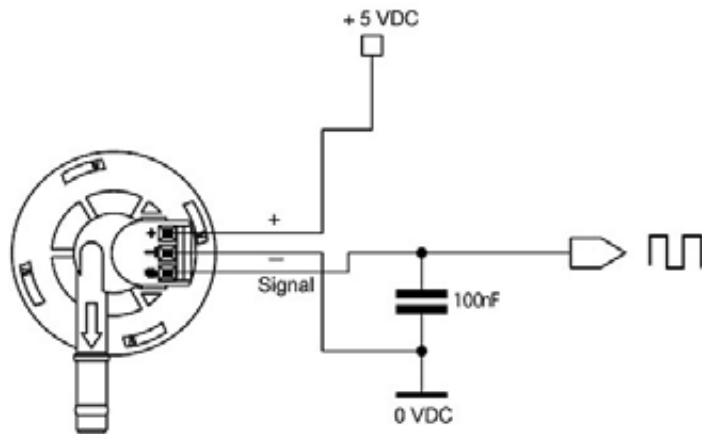
The fan impeller **(C)** with the two attached magnets is rotated by the water flow.

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 flowmeter, ensure that the direction of flow is correct. An arrow on the flowmeter housing indicates the direction of flow.

4.1.2 Connection diagram



The flowmeter itself does not supply an output voltage but simply switches the signal connection to 0 volt earth (actuated) or leaves it open (unactuated). Square pulses are generated in the upper section of the housing via the Hall-IC.

Wrong connection of + voltage, signal and earth destroys the flowmeter.



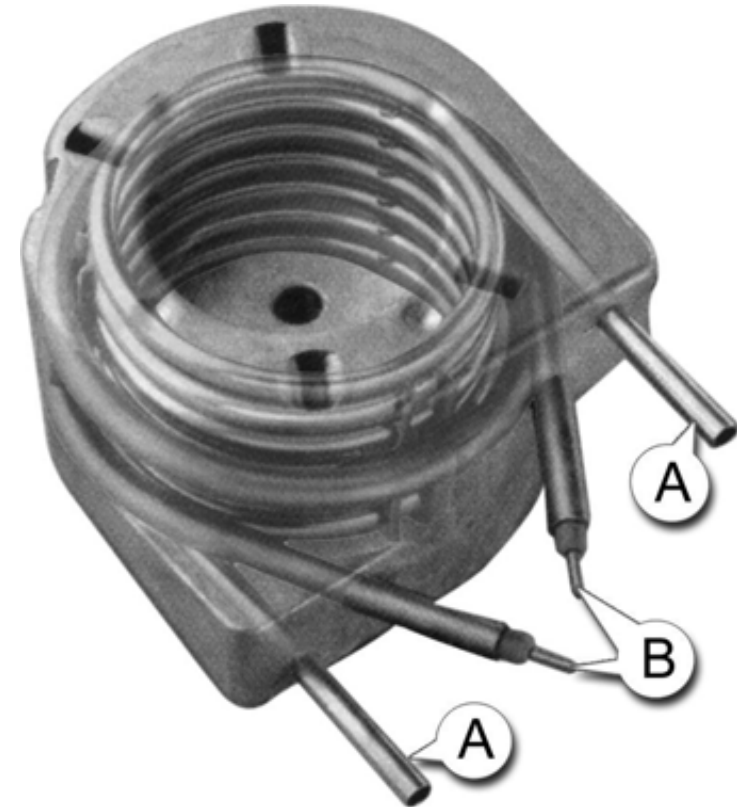
Prevent inductive faults via the cable!

Do not lay the cable together with supply cables to consumers.

4.2 Heater and NTC-sensor

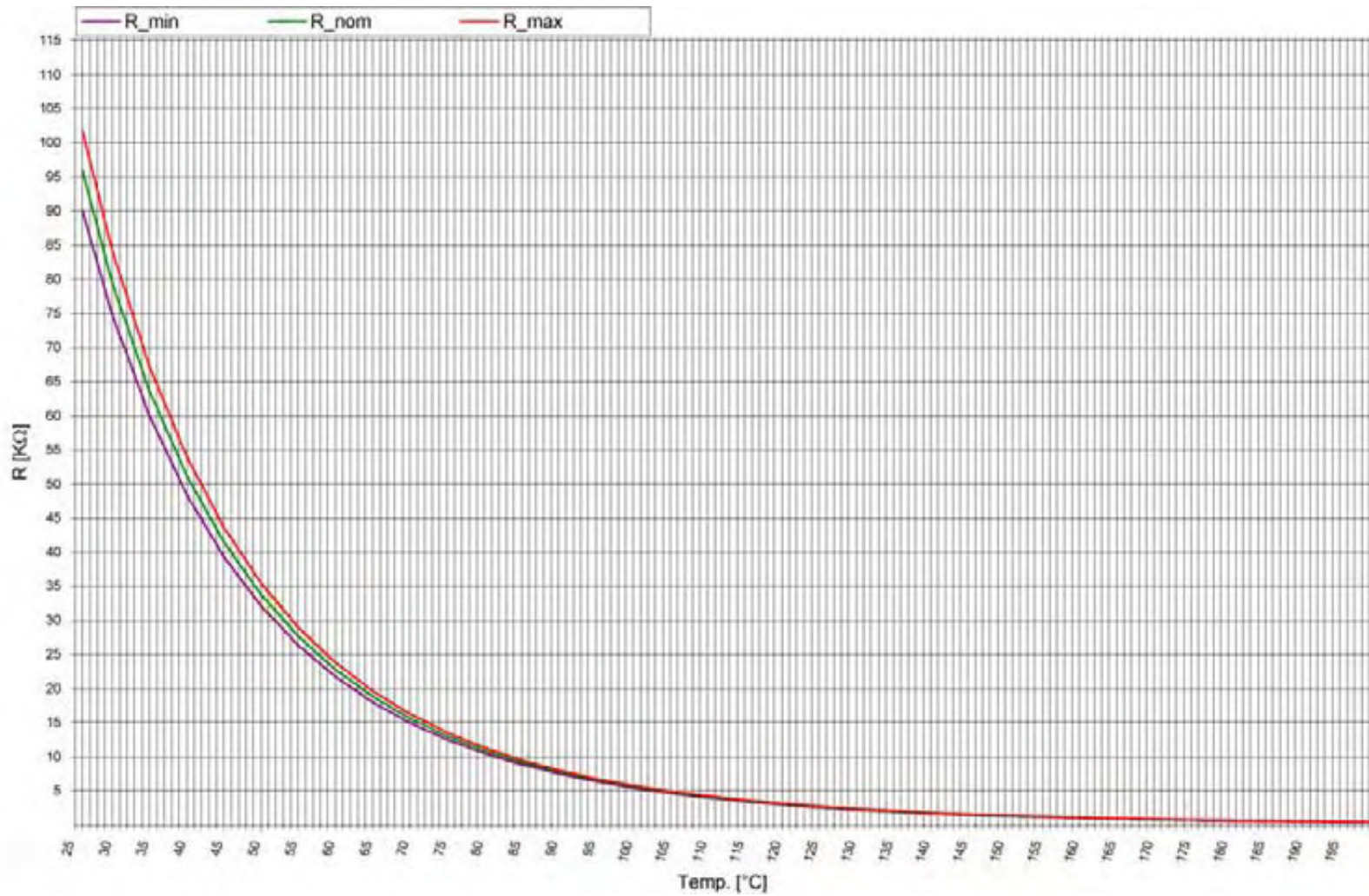
4.2.1 Heater (Instantaneous water heater)

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



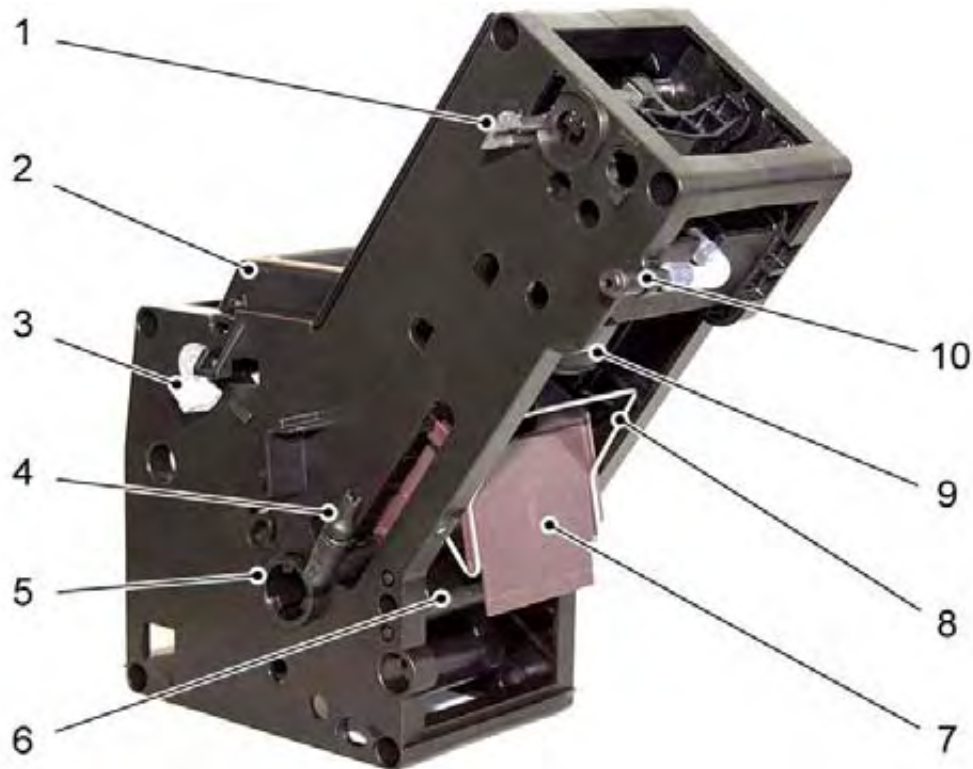
Temperature	R min	R nom	R max
25 °C	93.801k	100k	106.199k
95 °C	6.414k	6.624k	6.834k
140 °C	1.696k	1.771k	1.845k

4.3 Brewing unit

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

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

4.3.1 Operating principle



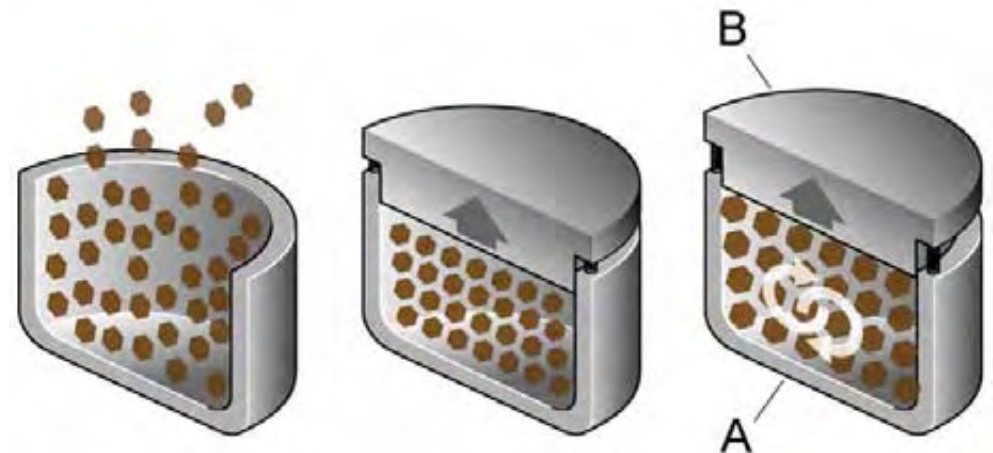
- | | |
|---------------------------------|--------------------|
| 1 Control lever, filling amount | 6 Catch |
| 2 Filling shaft | 7 Discharge chute |
| 3 Locking lever | 8 Stripping handle |
| 4 Water inlet | 9 Brewing head |
| 5 Clutch, drive shaft | 10 Coffee outlet |

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 optimise 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

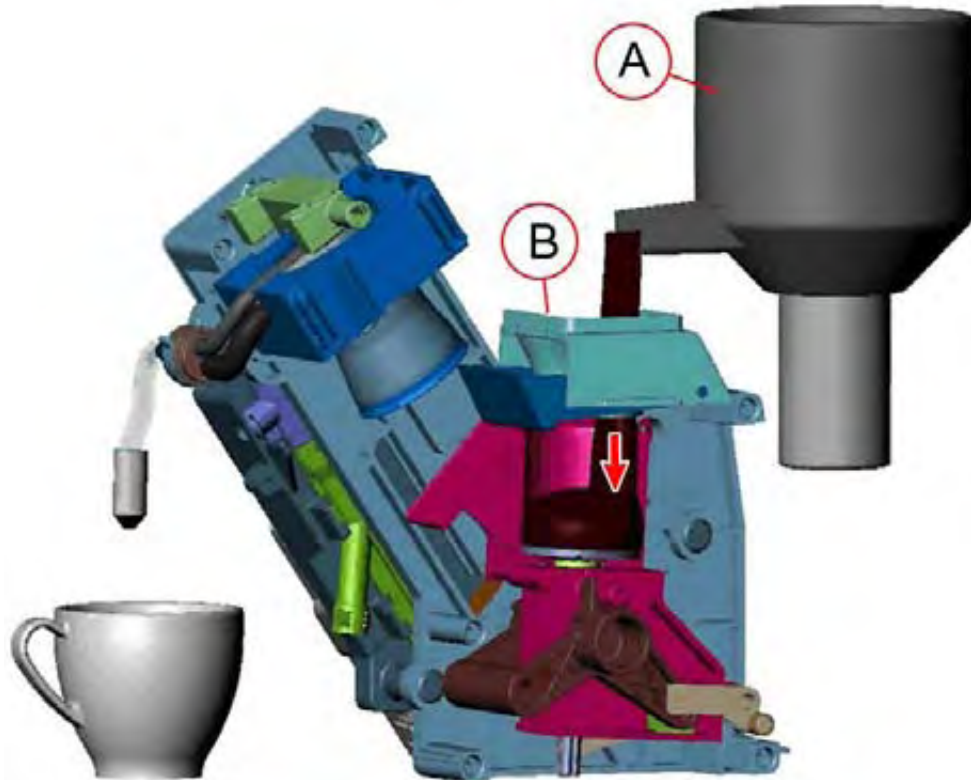
The brewing unit consists primarily of the brewing chamber (A), into which the ground coffee (7 g – 14 g) is metered, and the spring-mounted brewing head (B) which moves upwards to seal the brewing chamber.



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 flavours and formation of the crema.

4.3.2 Sequence of the brewing cycle

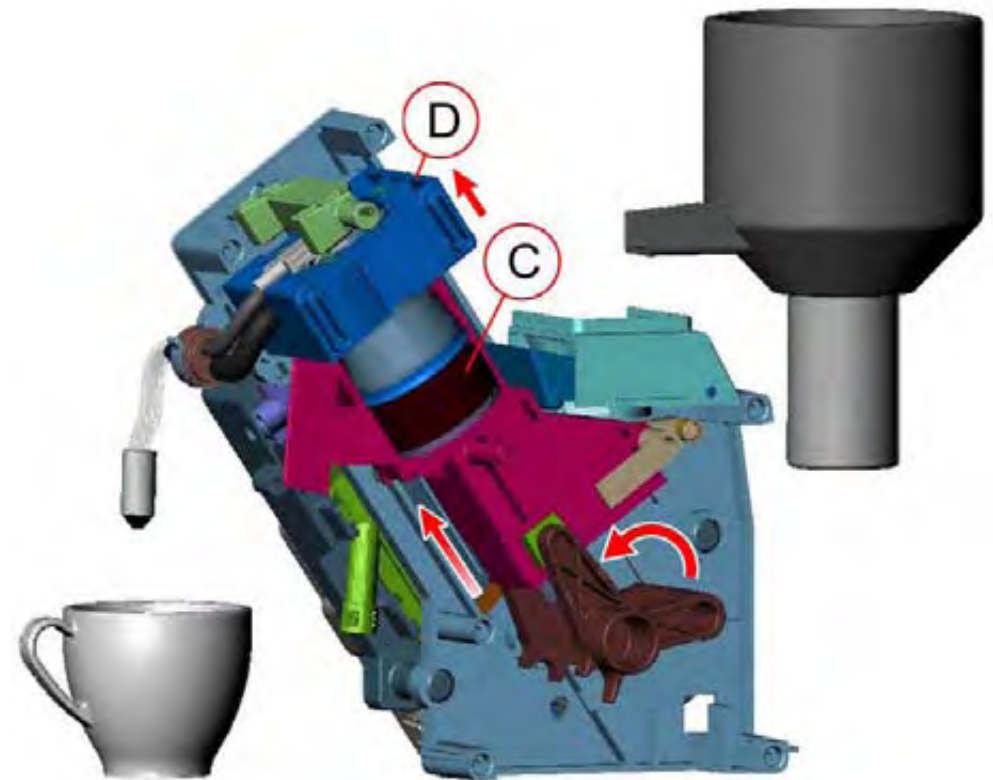
4.3.2.1 Grinding and metering



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.

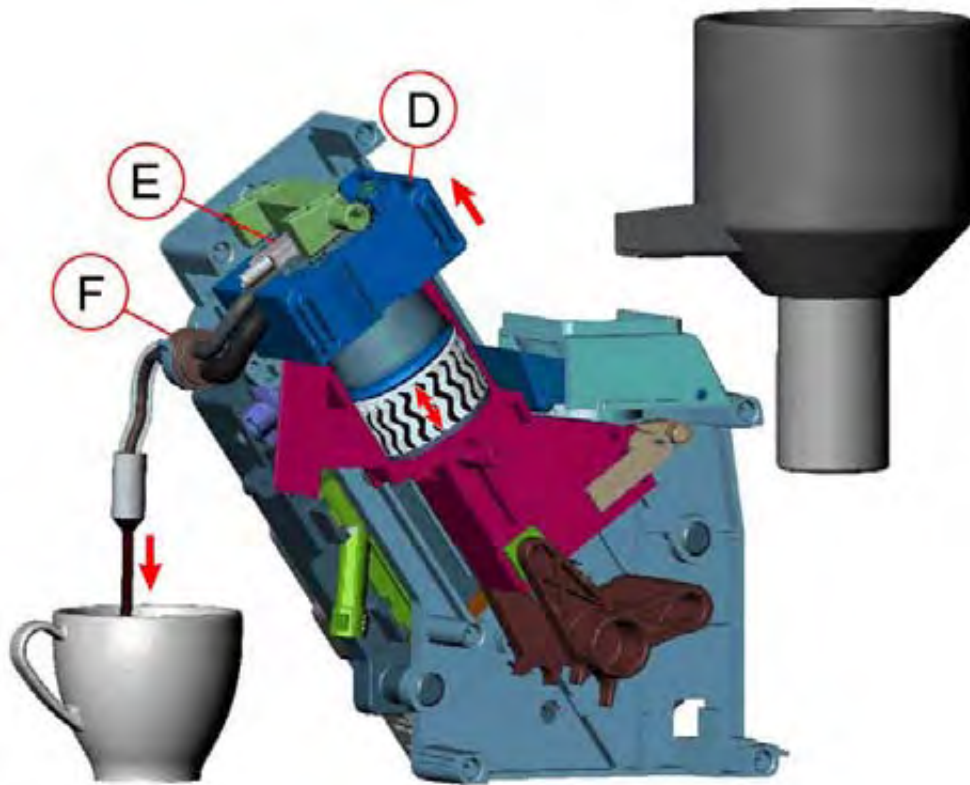
Alternatively ground coffee can be poured in via the powder slot.

4.3.2.2 Compression



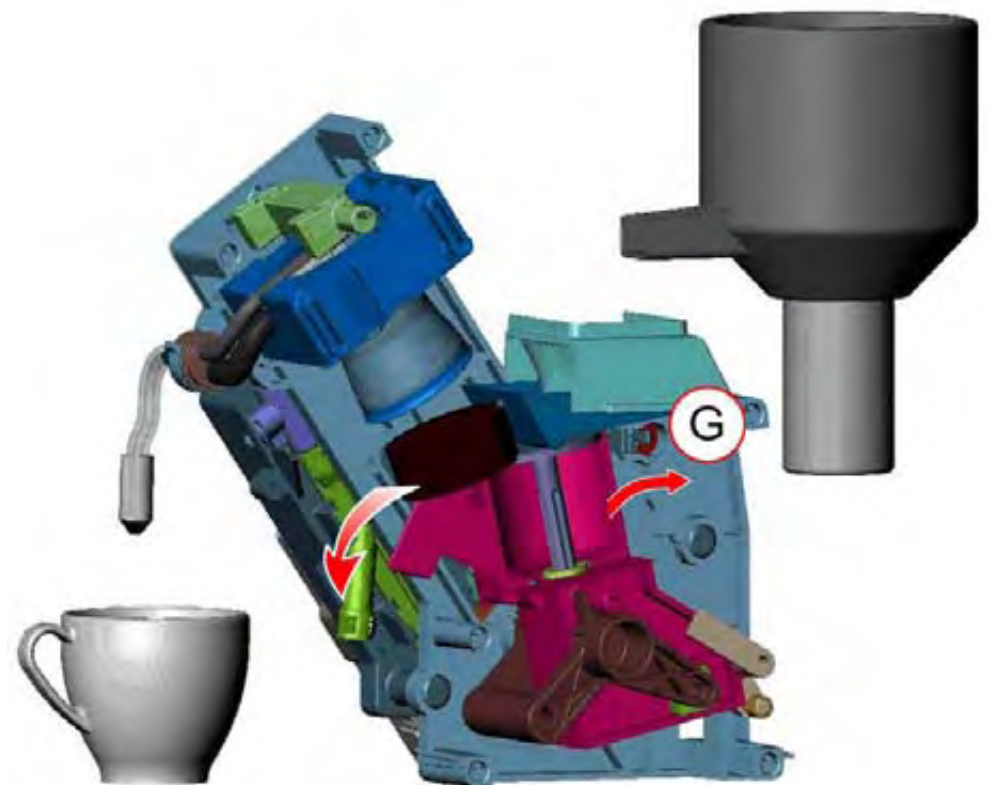
The grinding unit stops. The gears control the brewing unit to the upper end position. In doing so, the ground coffee is compressed in the brewing chamber **(C)**. The pressure applied to the ground coffee causes the spring-mounted brewing head **(D)** to move up. The more powder there is in the brewing 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 flavours 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.

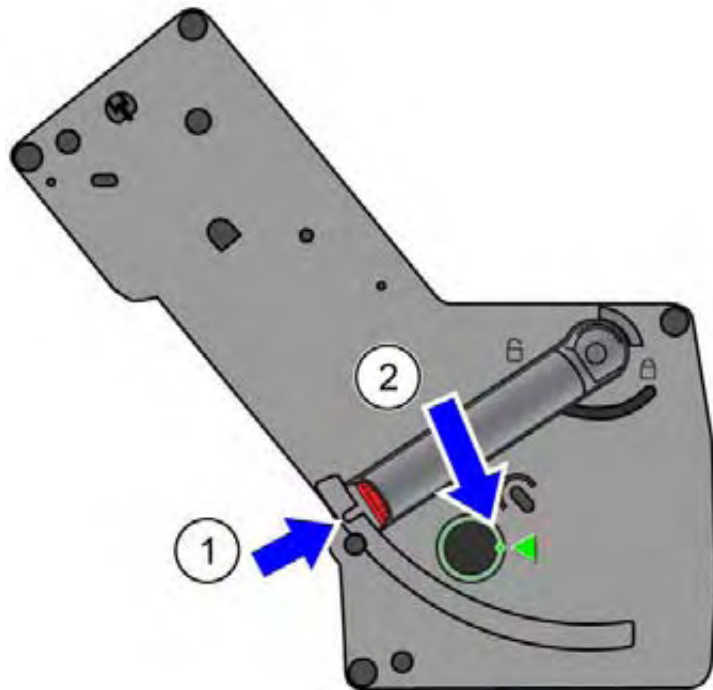
4.3.3 Removing the brewing unit

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

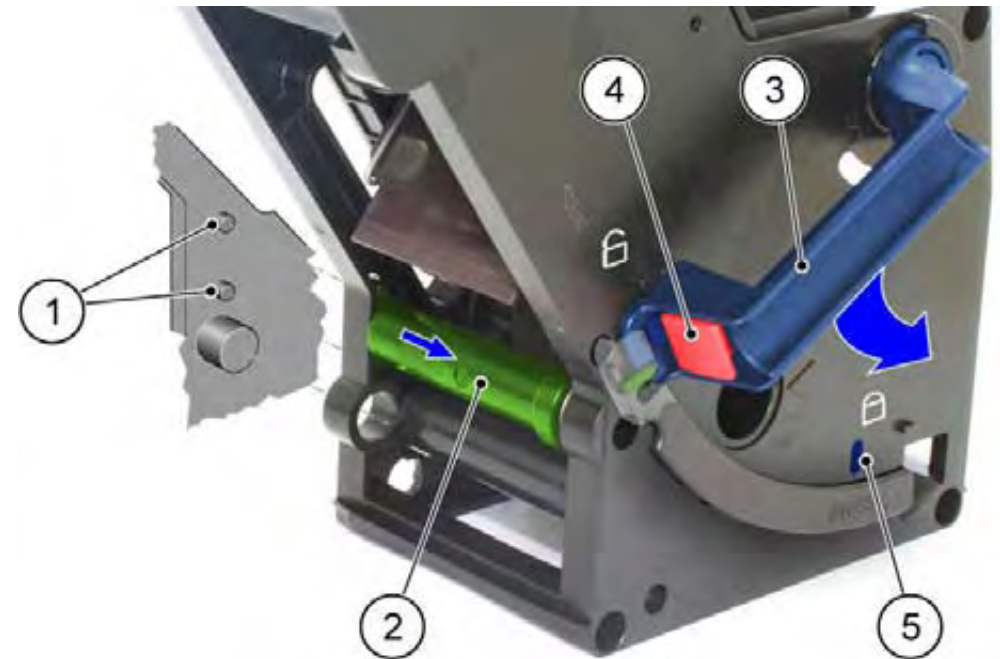
The brewing unit can only be replaced in the basic position.

- ▶ 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 microswitch on the transmission housing monitors the locked status.

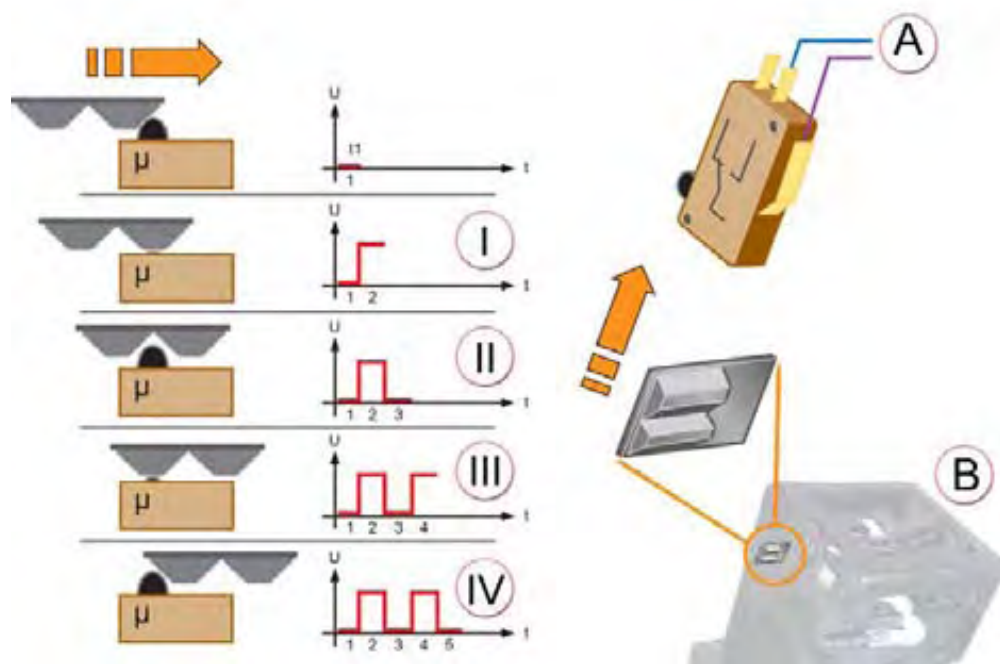


4.3.4 Compensation of the grinding unit running time

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 microswitch (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.

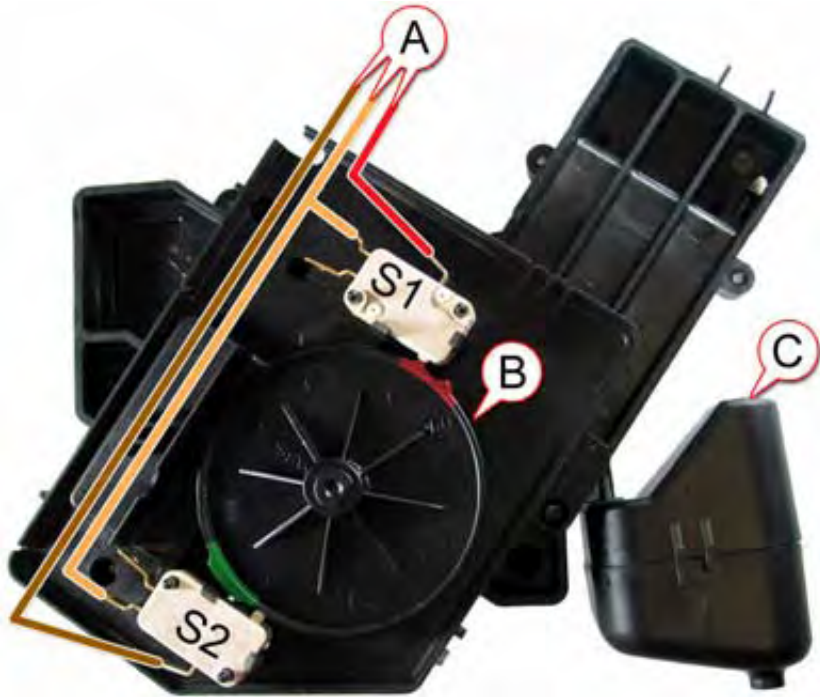
4.4 Gear unit

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.

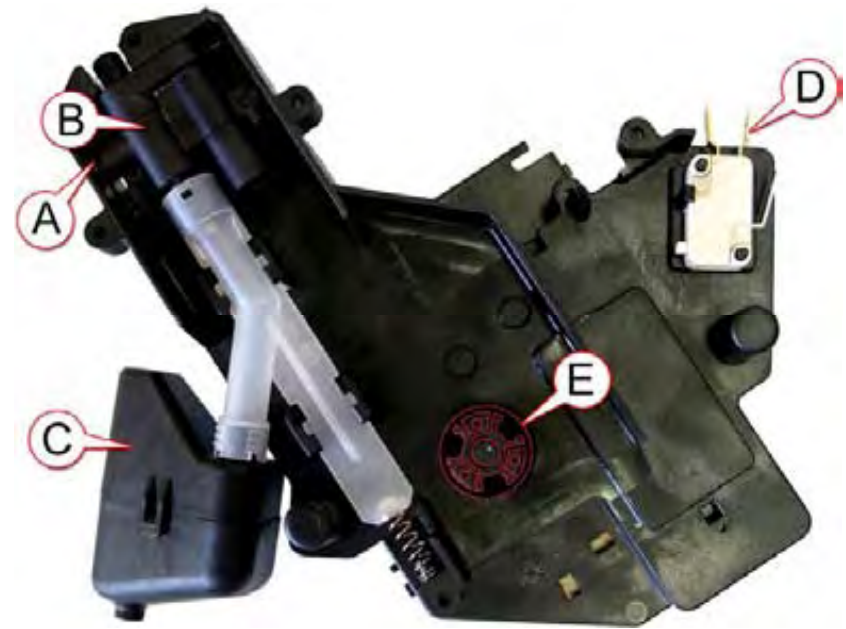
4.4.1 Front housing

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



4.4.2 Rear housing

On the rear housing section of the gear unit the drainage valve (**B**) is attached to the expansion chamber (**C**). This valve controls the passage of water from and to the brewing unit. The microswitch (**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 on the gear unit

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

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

Home 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.

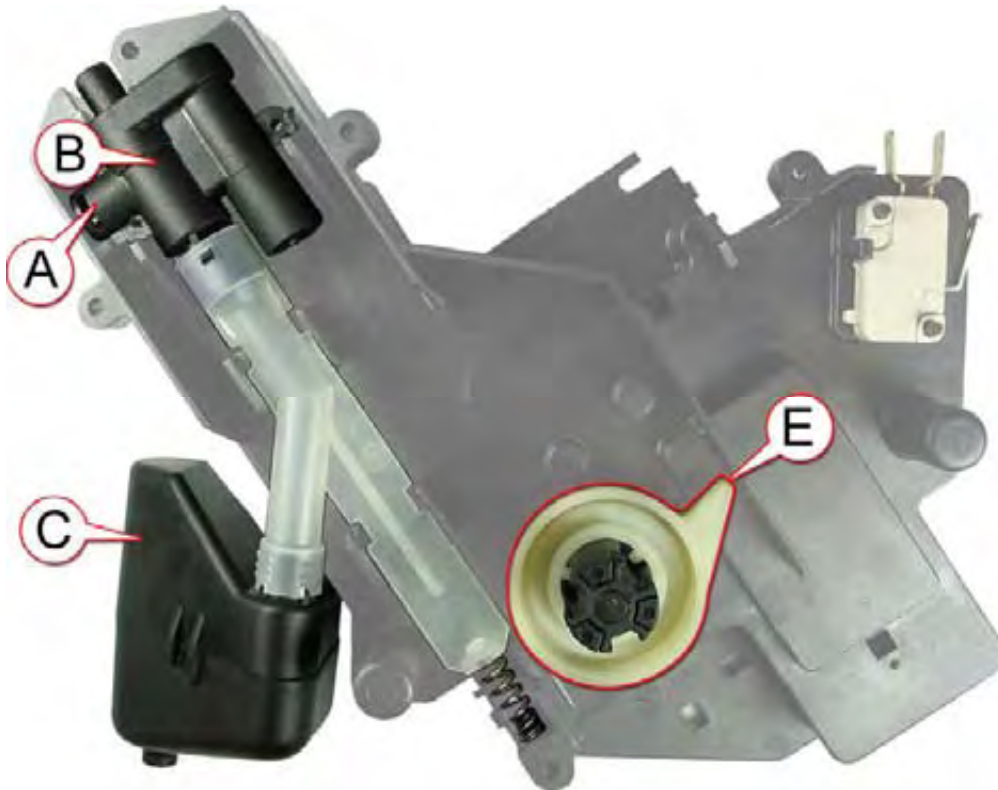
S1 ON
S2 ON

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 Home position

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



Warning! **Malfunction**

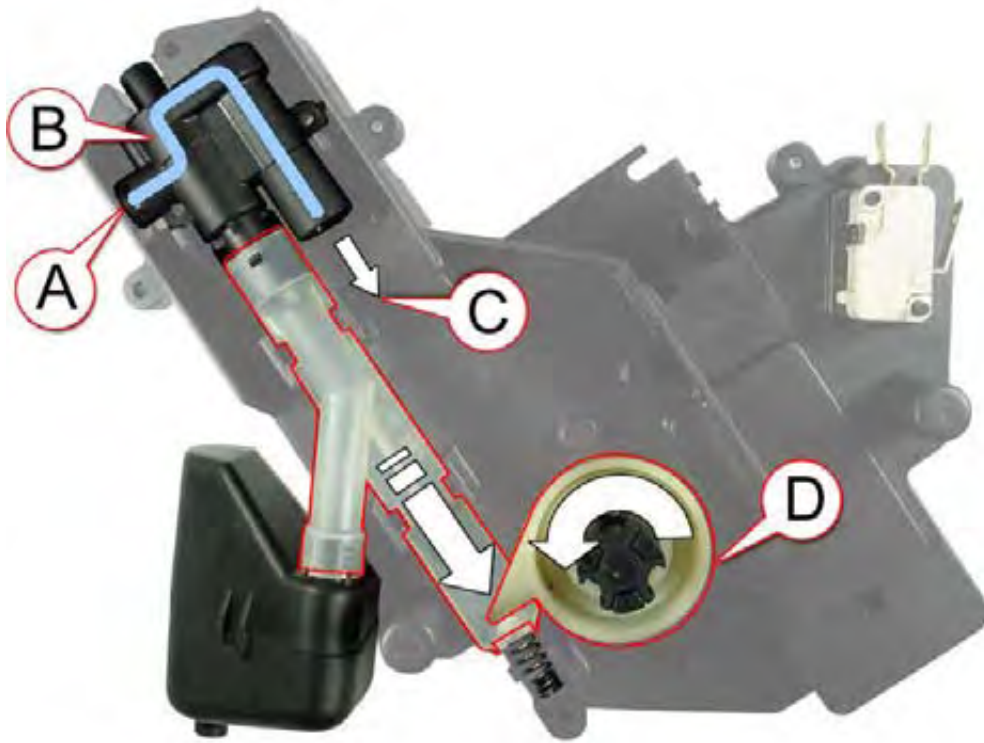
The position of the actuator and therefore the cam **(E)** is not specified permanently on the drive shaft.

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.

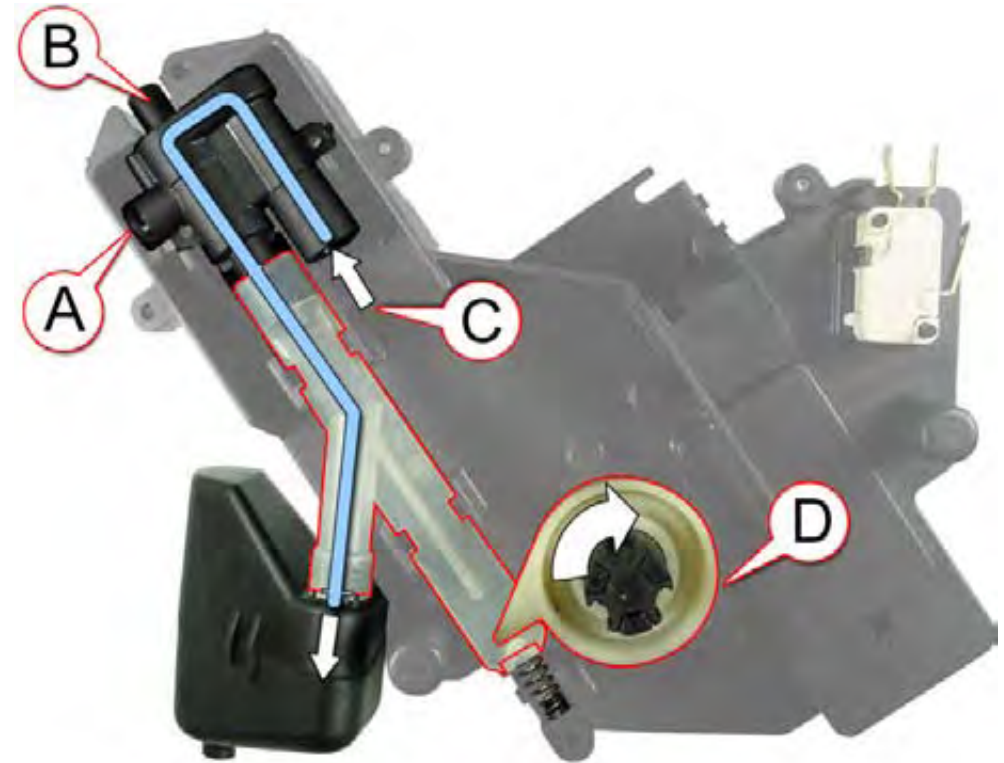


The brewing unit is moved upwards. The connection to the drainage valve is closed with the water

coupling in the brewing unit. The switch cam on tripping device **(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 tripping device **(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

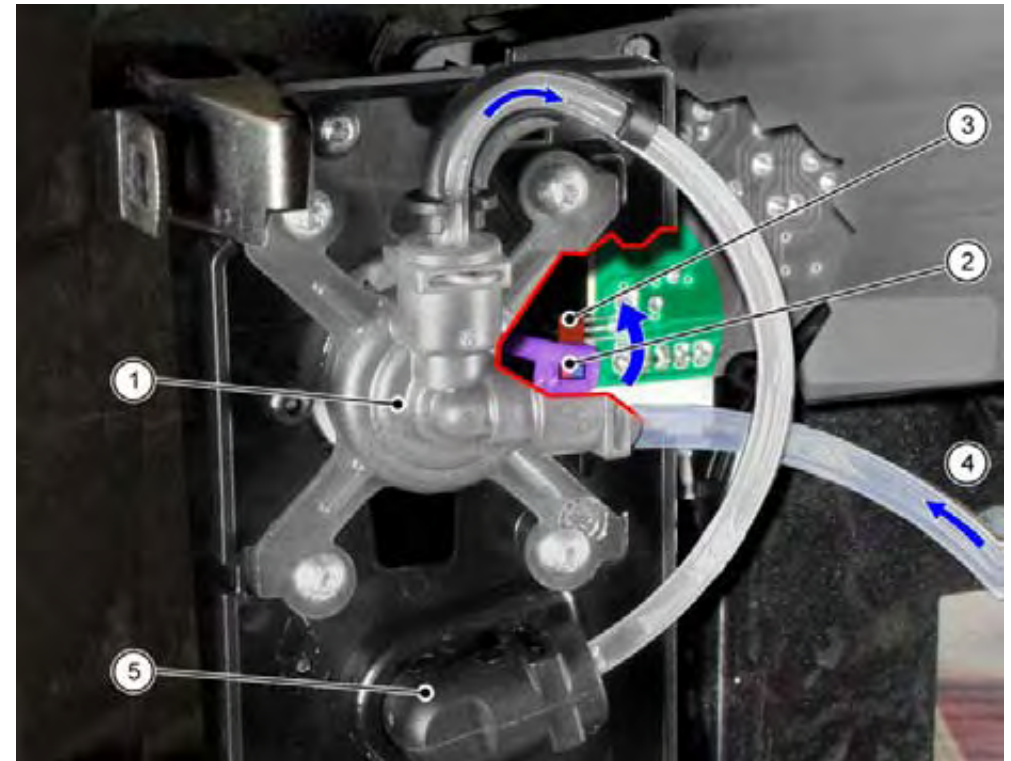
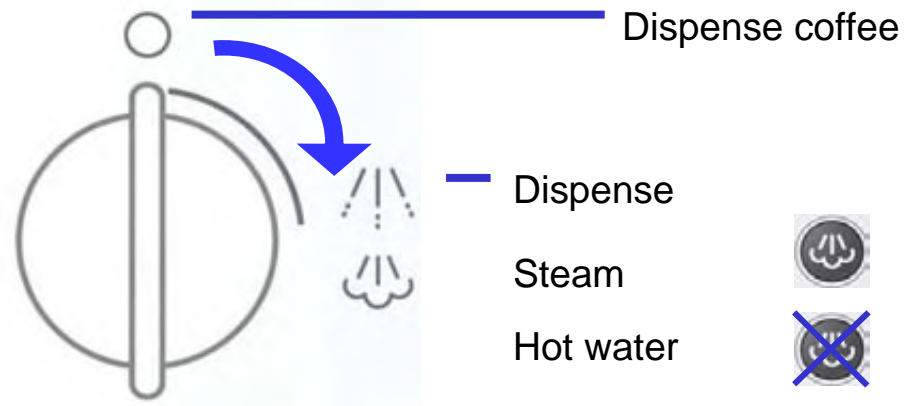
In order for hot water or steam to be dispensed, steam valve (1) must be turned open.

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

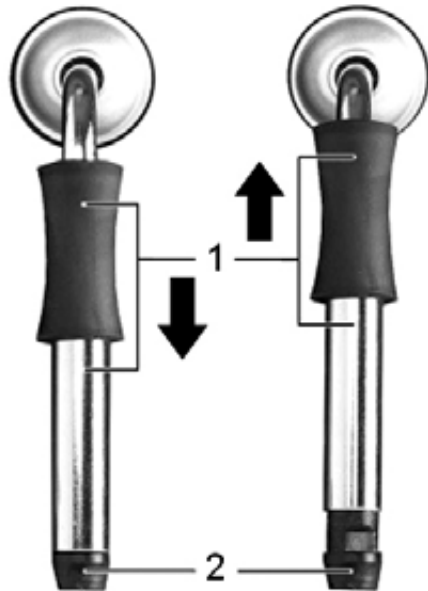


DANGER

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

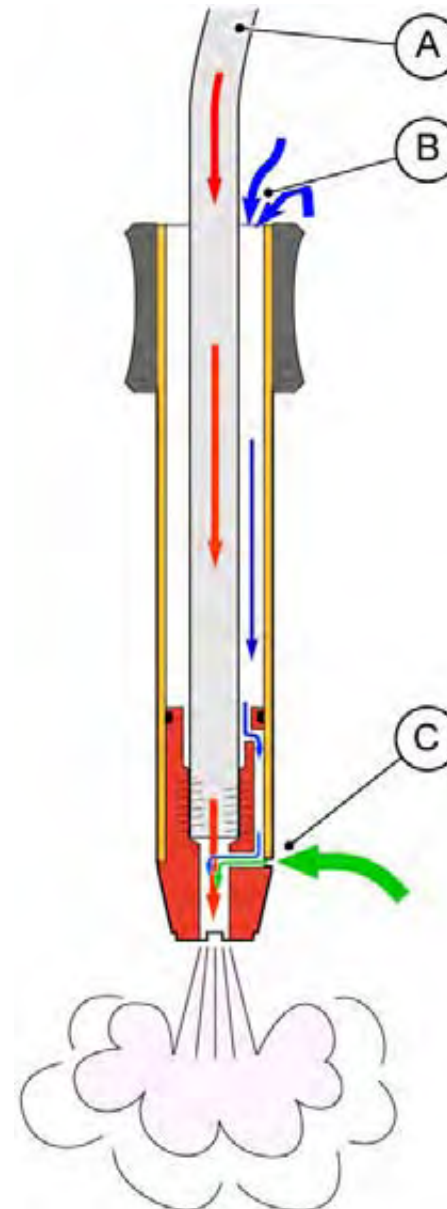
Sucks in milk and mixes with air to make milk froth.



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

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 odour, 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 litres (400 brews) or 2 months.

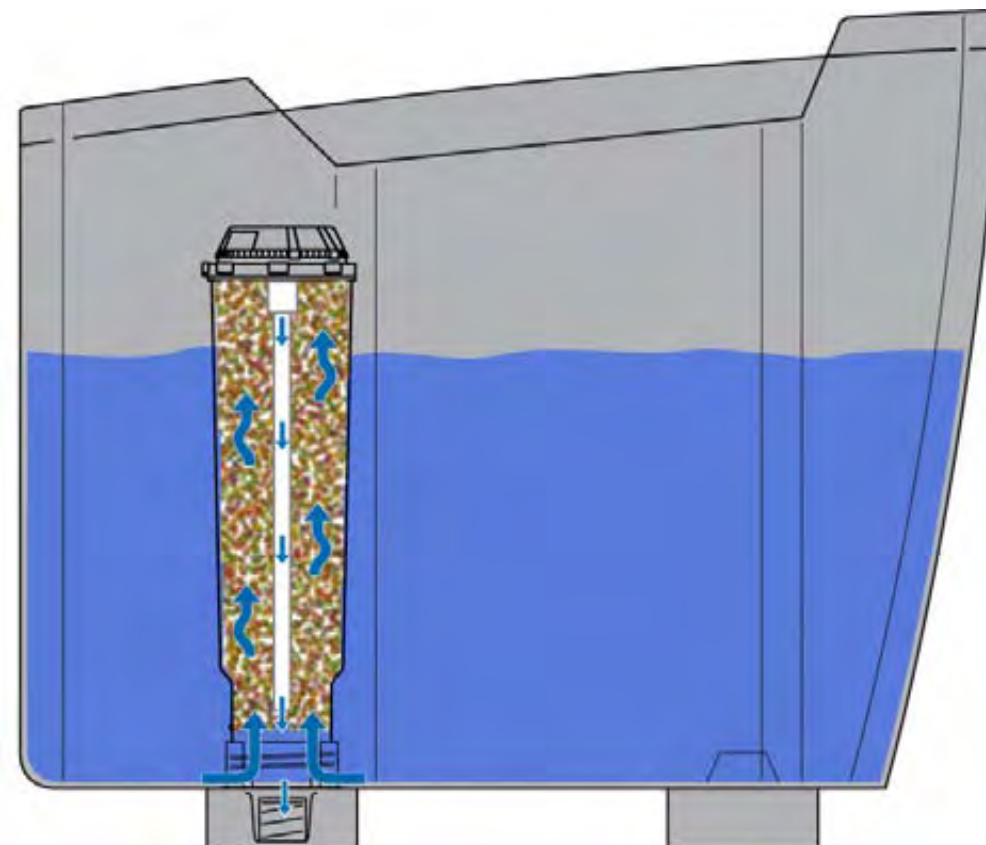
The **filter filling** consists of approx. 100 ml ion exchange resin and silvered activated carbon in the ratio 4:1.

Filter diameter: 27–42 mm

Filter length: 175 mm

Filling volume: 95–100 ml

Filter effect: (Reduction if following substances are in the water)	Carbon hardness	up to 75%
	Chlorine	up to 85%
	Lead	up to 90%
	Copper	up to 95%
	Aluminium	up to 67%



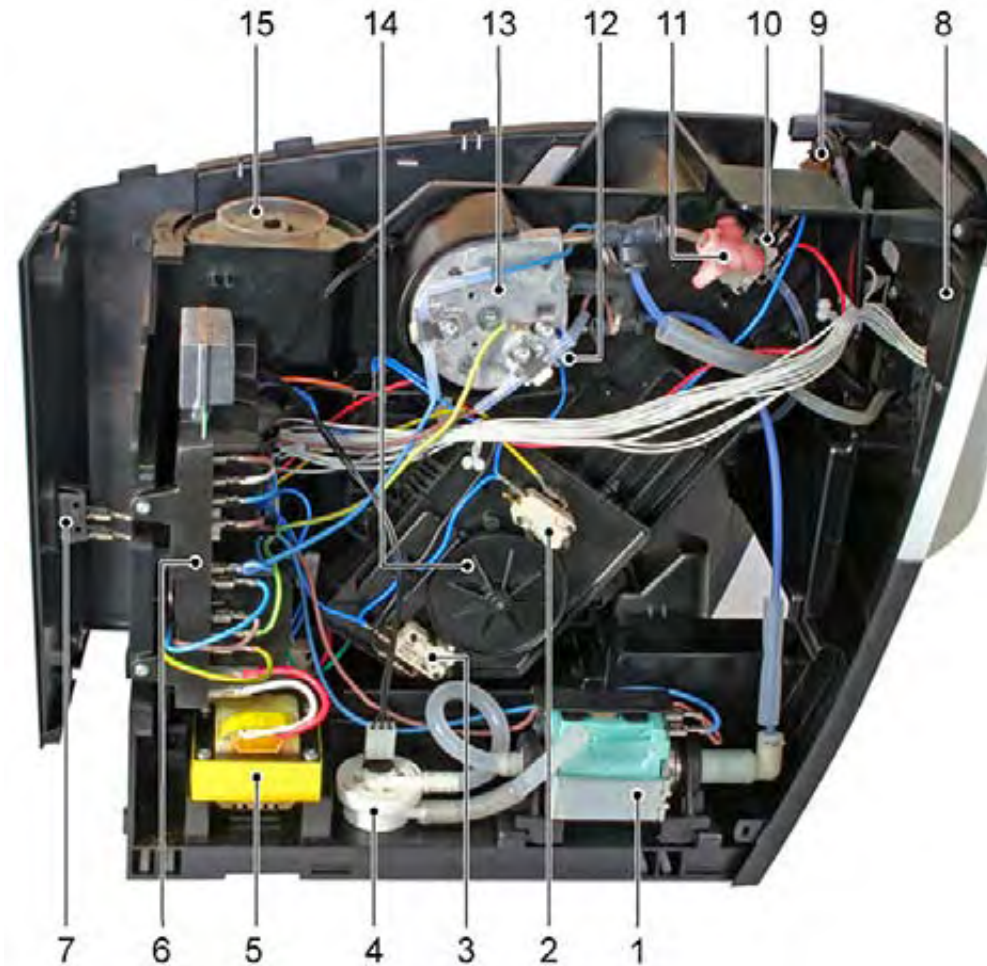
- ▶ Follow the information in the operating instructions for inserting or replacing the water filter!
- ▶ Do not insert filter if the descaling display lights up! First descale the appliance!
- ▶ If the appliance is always operated with the water filter inserted, descale as a precaution once or twice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

5 FUNCTIONS

5.1 Construction

5.1.1 Overview, left side

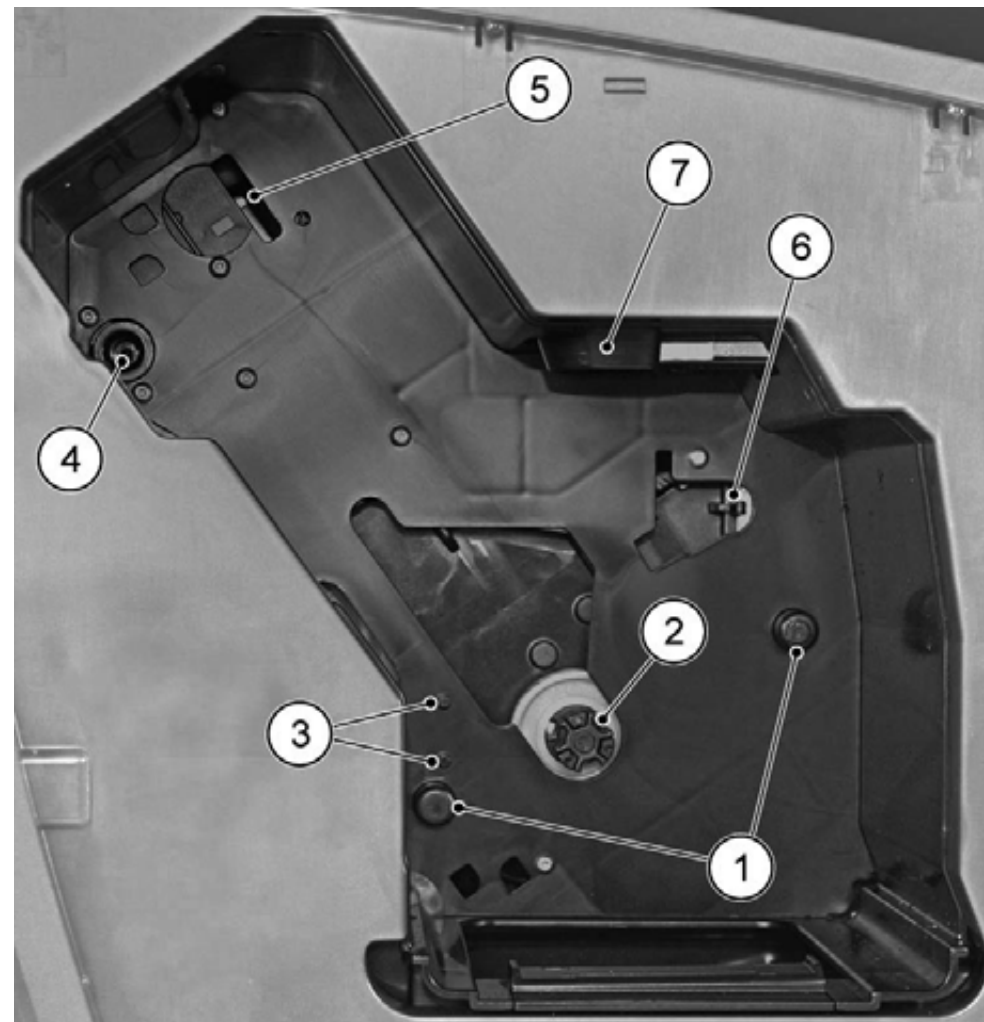
- 1 Pump with temperature monitoring and angle for flow reduction
- 2 Transmission position microswitch
- 3 Transmission position microswitch
- 4 Flow meter
- 5 Transformer
- 6 Electronic main board
- 7 Mains switch
- 8 Control panel
- 9 Steam valve
- 10 Grinding compensation microswitch
- 11 Pressure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



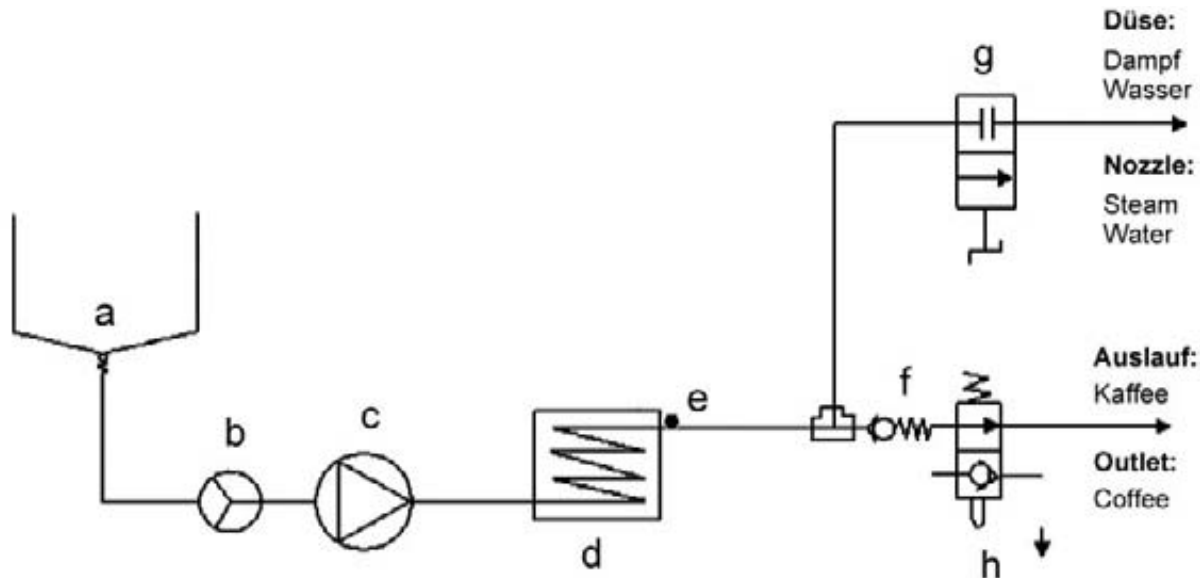
5.1.2 Overview, right side

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

- | | | |
|---|-------------------------------------|----------------------------------|
| 1 | Centring 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:

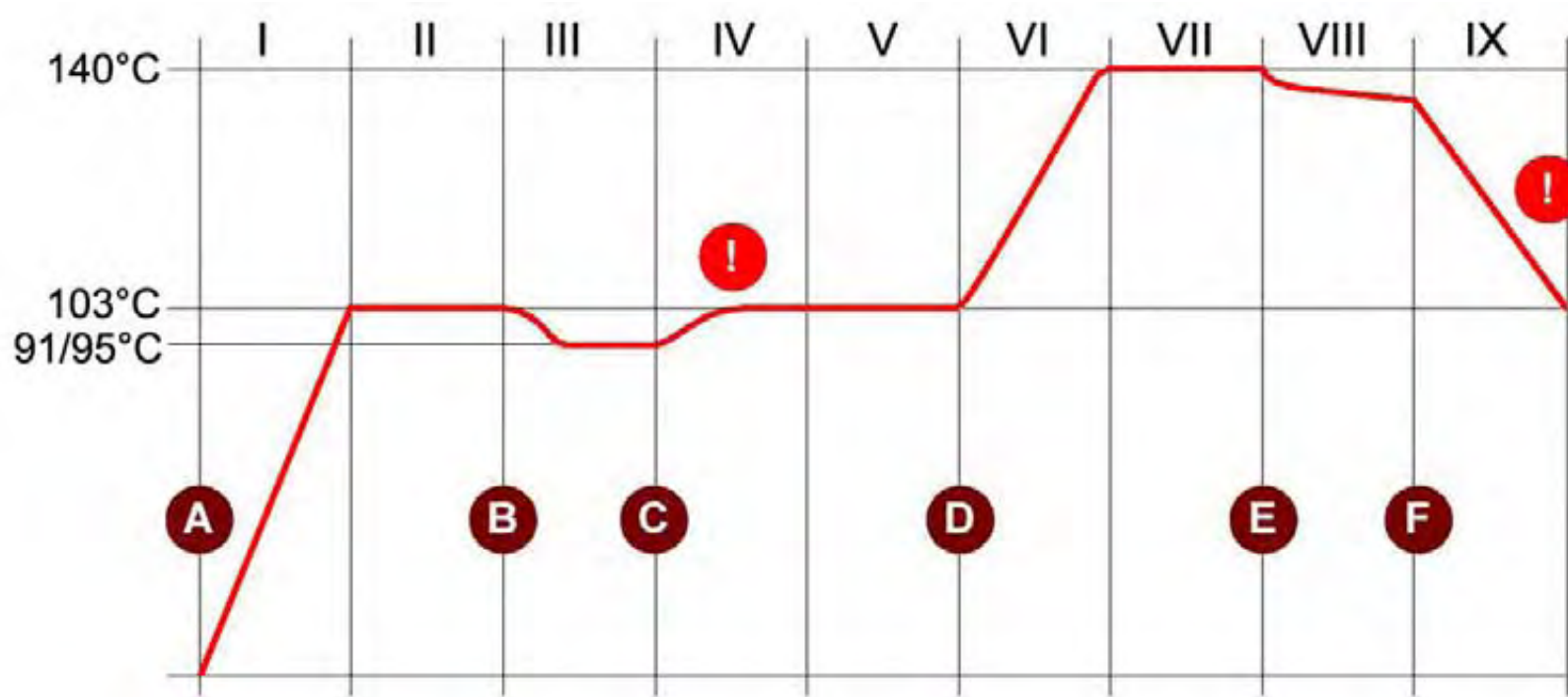
The appliance must be emptied if there is a risk of frost (e.g. on the way to or from customer services). The heater or the piping may be damaged if the water in the fluid system freezes.

Emptying the fluid system: see appliance test

5.3 Temperature

5.3.1 Temperature pattern

The temperature graph indicates the temperature pattern on the heater during operation.



! After coffee has been drawn, the appliance may be briefly disabled from re-heating.

As soon as steam has been drawn, coffee can be brewed again without waiting for the appliance to cool down.

Coffee cannot be drawn after steam has been drawn if there is too little ground coffee in the brewing unit. The brewing process is terminated, there is no pumping. The brewing unit moves to the grinding position.

- I Heating up
- II Ready to use
- III Draw coffee (91 °C) / draw hot water (95 °C)
- IV Re-heating
- V Ready to use
- VI Heating up to draw steam (140 °C)
- VII Steam ready
- VIII Drawing steam
- IX Cooling down after drawing steam

- A Switch on, press **Standby** button. Heating up process begins
- B Press coffee dispensing button or draw hot water
- C Stop drawing coffee / hot water
- D Press **steam** button, heating up process begins
- E Open steam valve for steam production.
- F Close steam valve to stop steam production, cooling down process begins

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

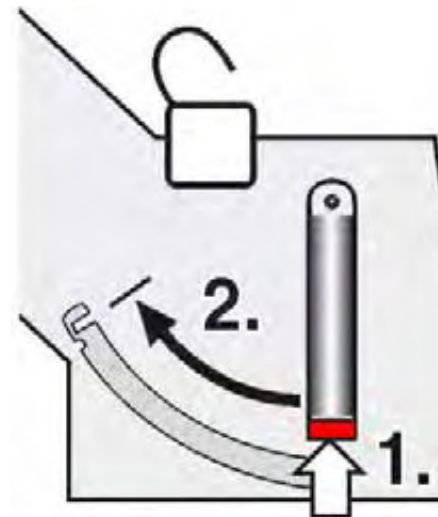
The service flap is clipped into the right-hand side of the appliance.

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



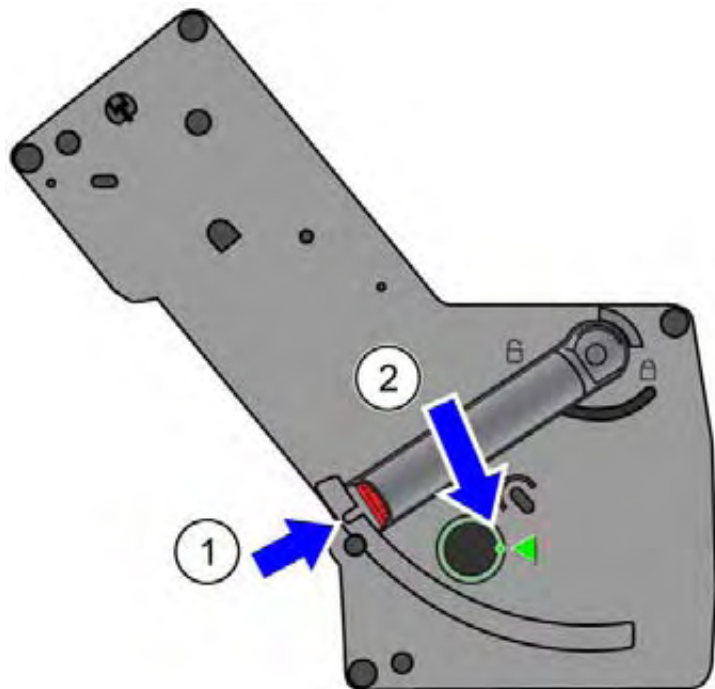
Lock open

6.1.2 Installation of the brewing unit

6.1.2.1 Basic position

The brewing unit can only be inserted in basic position.

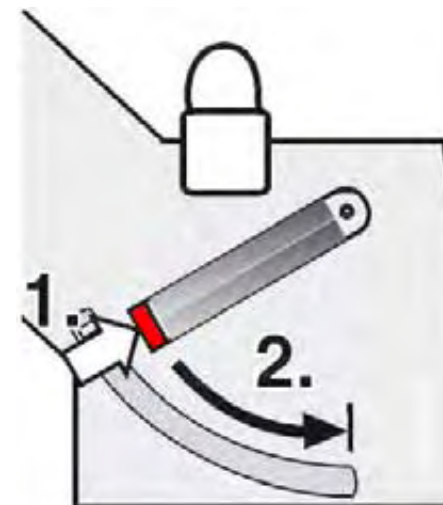
- ▶ The brewing chamber is totally located underneath the filling duct.
- ▶ Handle is engaged in position „Lock open“ (1).
- ▶ Mark on the drive shaft is opposite the peak of the marking arrow (2).



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.



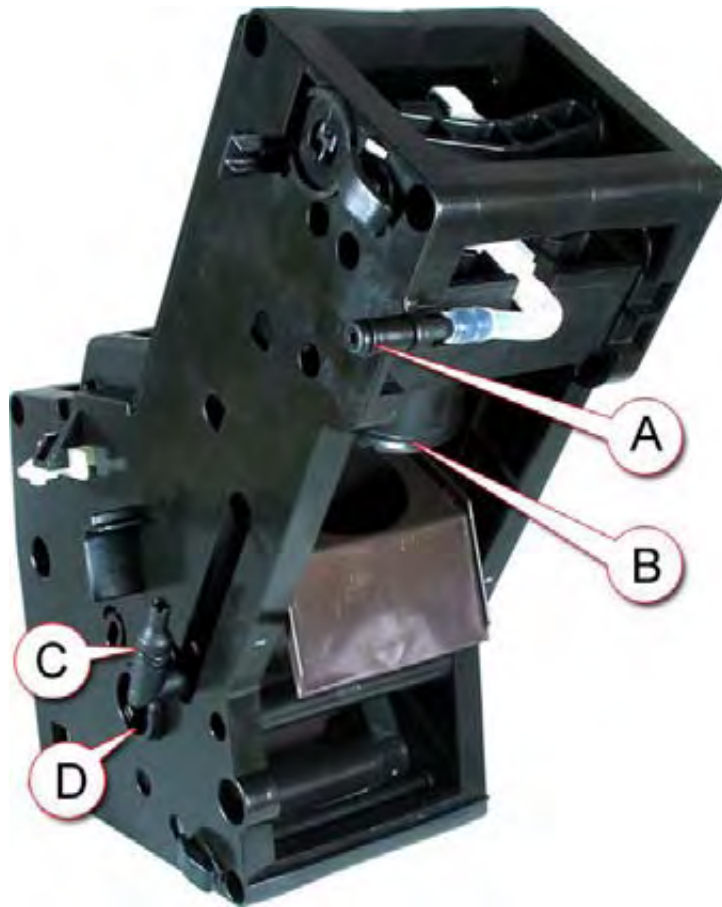
Lock closed



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

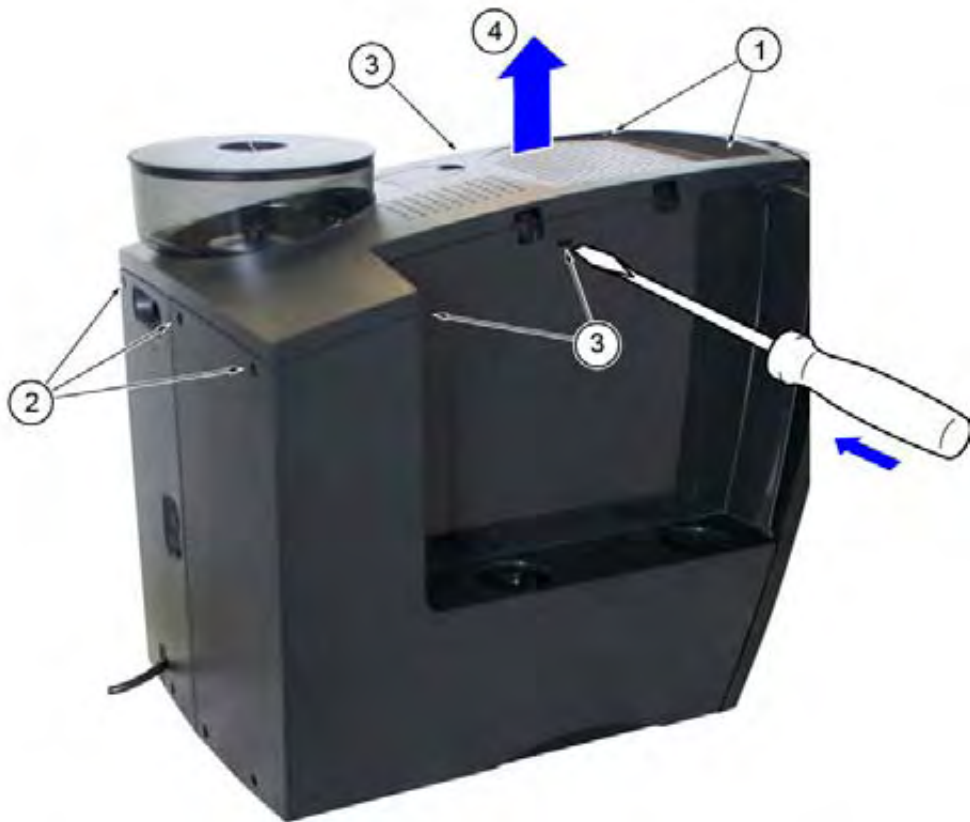
6.2.1 Preparation

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 module.



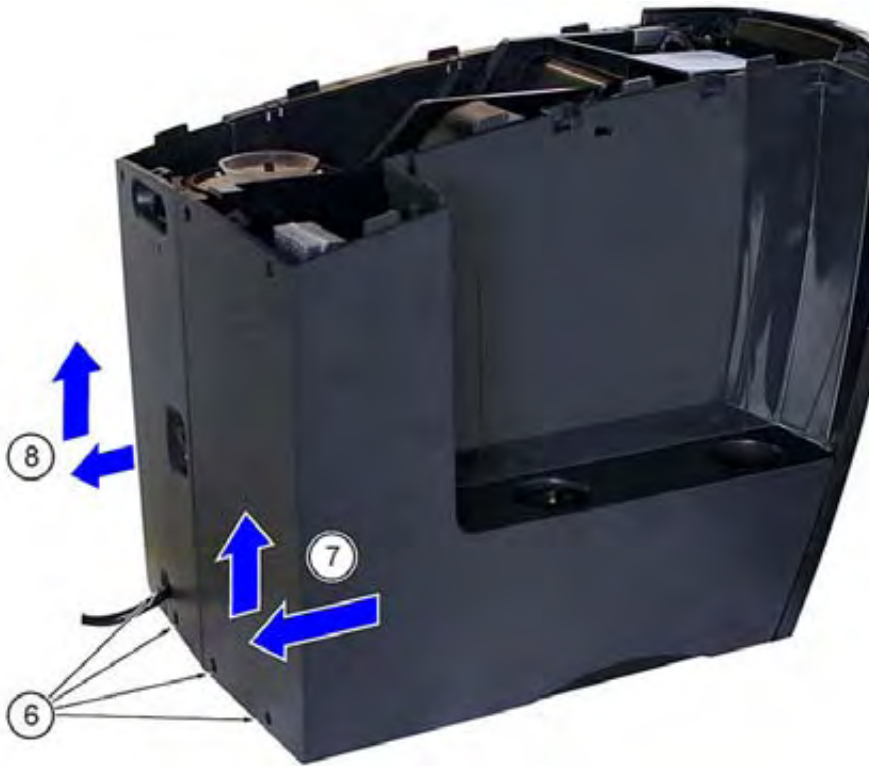
6.2.2 Opening the housing – step 1

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.

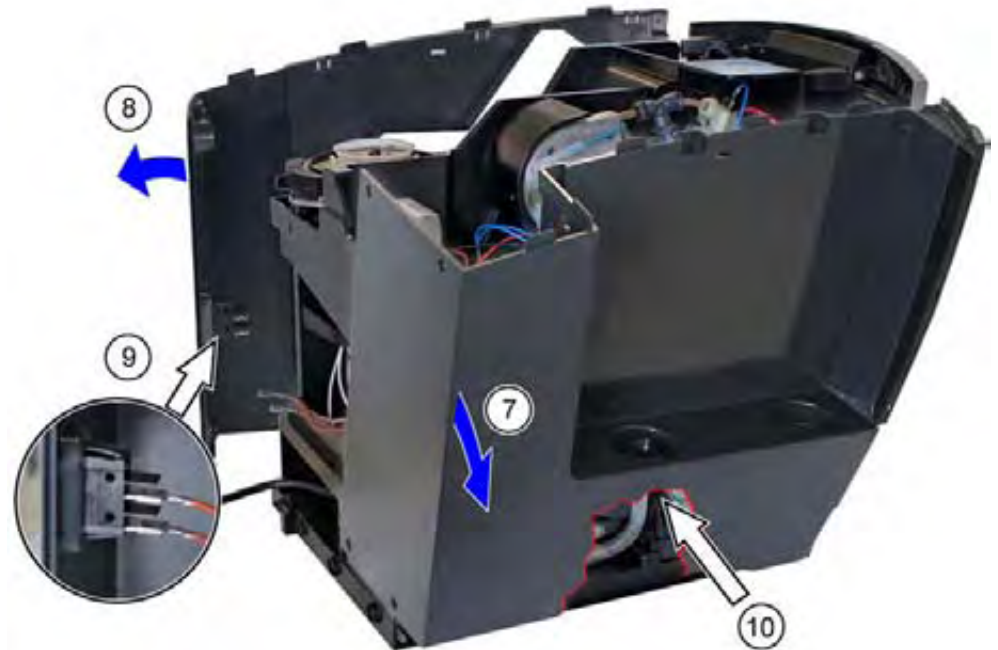


6.2.3 Opening the housing – step 2

1. Loosen two (6) Torx T10 screws on the left (7) and right (8) sides of the housing.
2. Pull the left (7) and right (8) sides of the housing to the rear, disengage from the guides of the base group and remove. If required, disengage mains switch (9) or remove supply hose (10) from the flow meter.



3. Assemble in reverse sequence



6.3 Replacing the pump

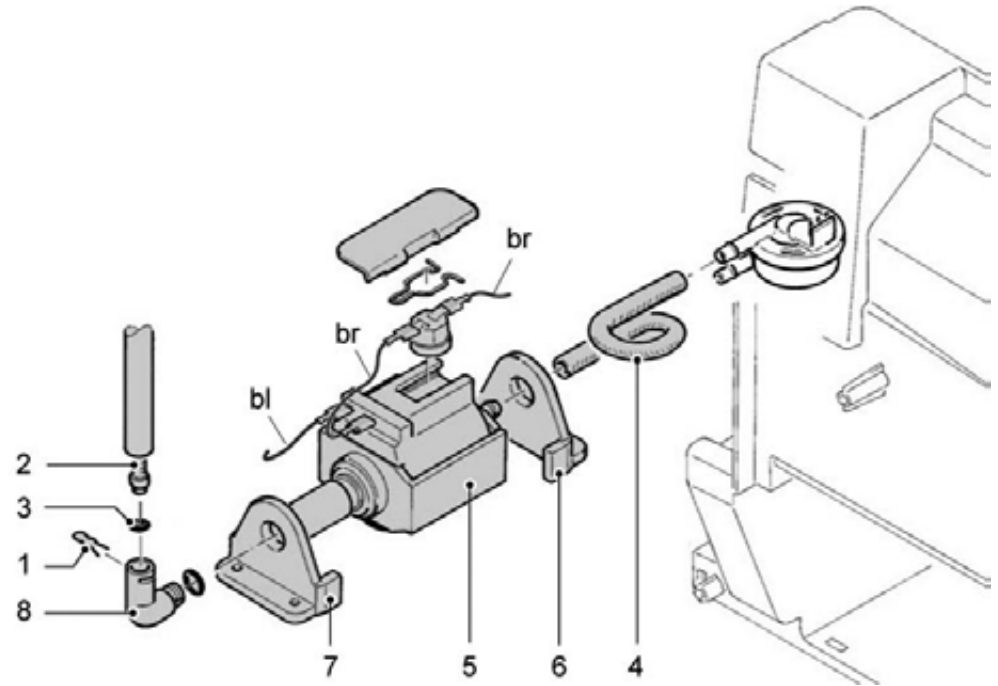
Tools:

- ▶ 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 (centred under installation bracket)
- ▶ Quality of the cable connections
- ▶ Bend correct
- ▶ Installation bracket is firmly attached

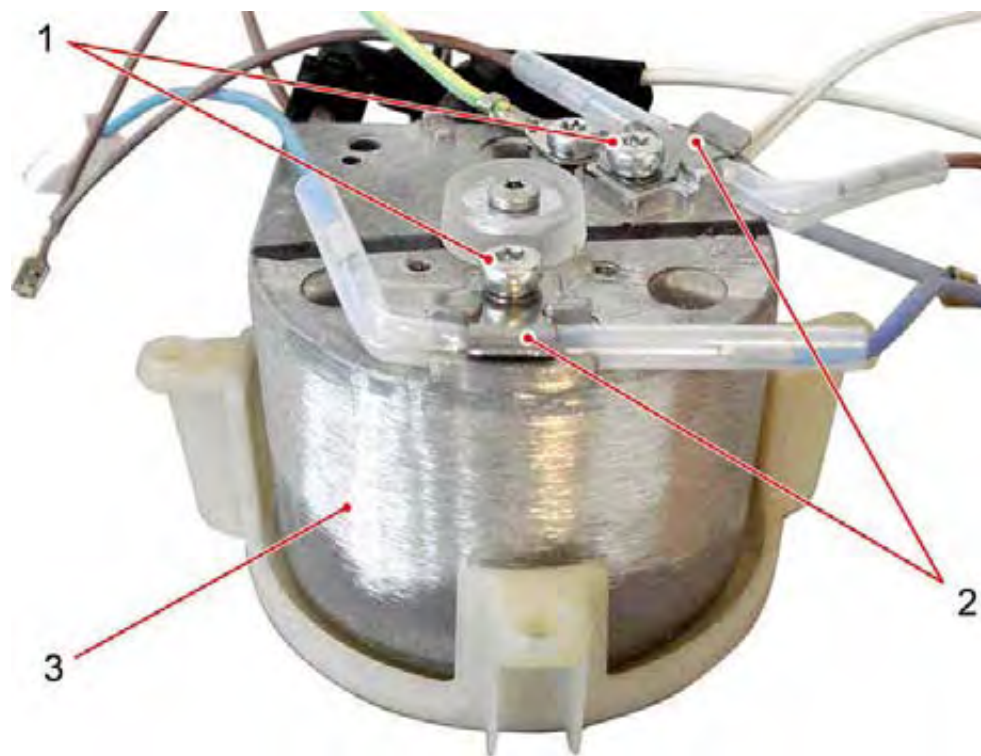
6.4.2 Component

The thermo cut off element is supplied as a pre-assembled component. (Wire colour 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:

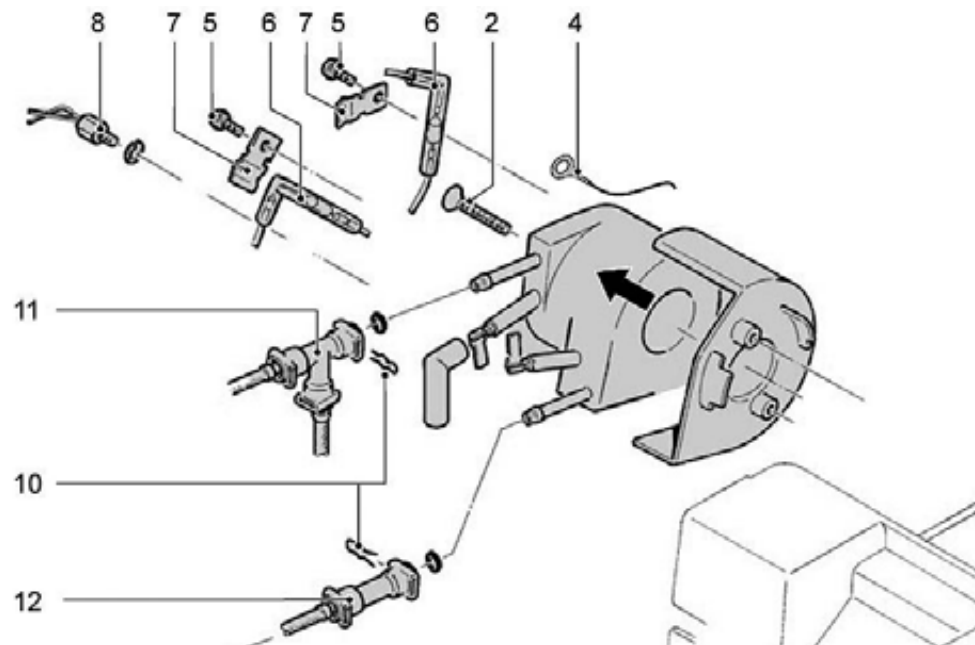
- ▶ Open-ended wrench WAF 8 mm
- ▶ Torx screwdriver T20
- ▶ Allen key WAF 4 mm

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!

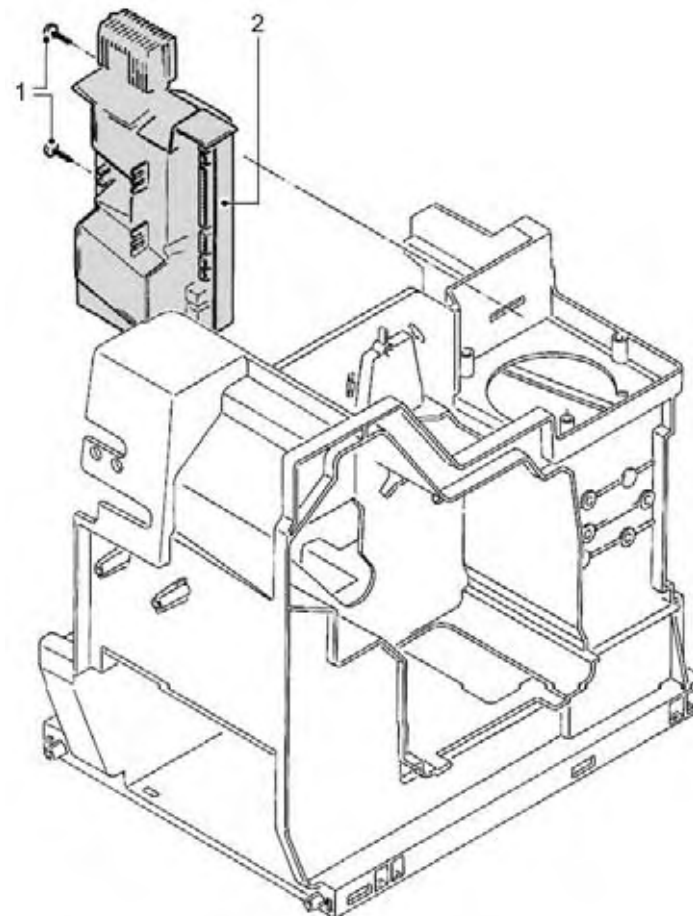
Static voltage may destroy components on the electronics module!

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

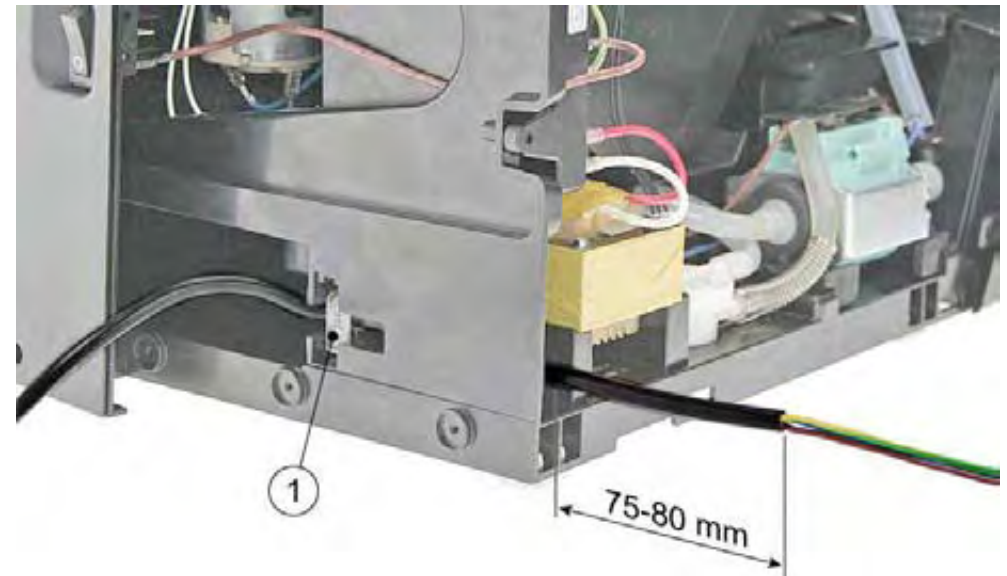
Procedure:



**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.



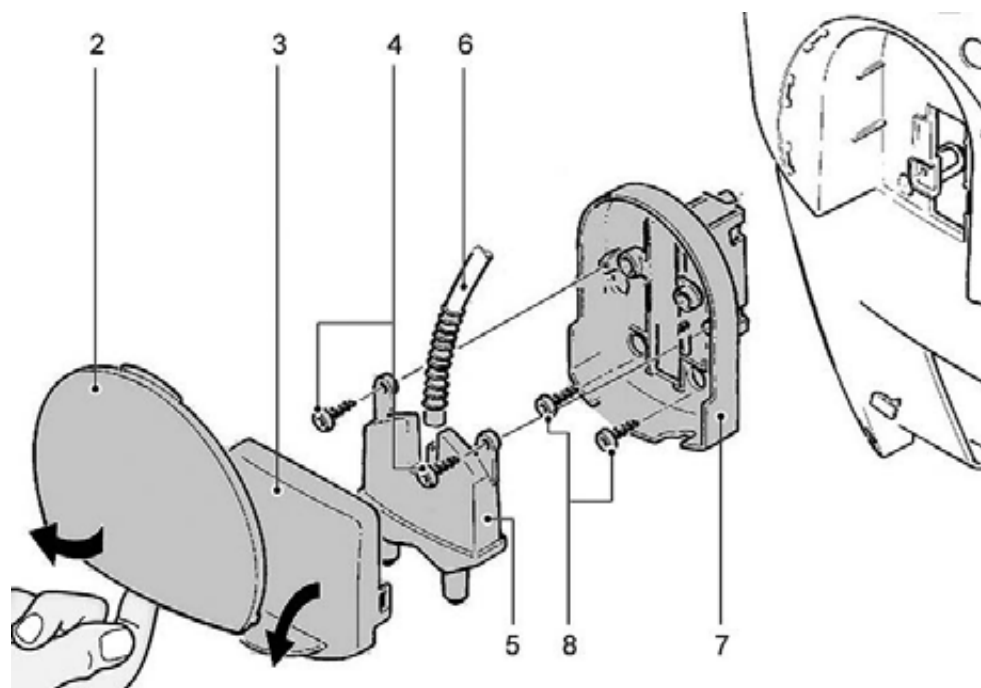
6.8 Replacing the coffee outlet

Tools:

- ▶ Torx-screwdriver T10

6.8.1 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.

6.9 Replacing the front panel

Tools:

- ▶ Torx screwdriver T10
- ▶ Long-nosed pliers

6.9.1 Procedure:

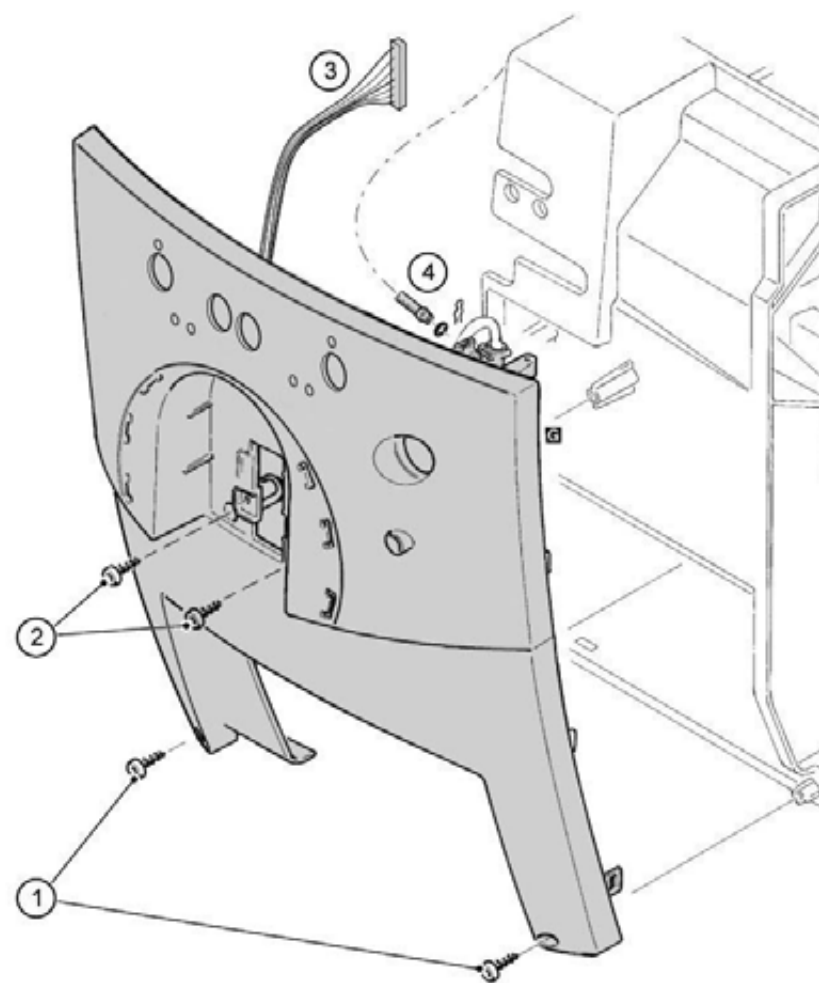
1. Disassemble appliance as described in the chapter entitled "General disassembly".
2. Remove coffee outlet as described in the chapter entitled "Replacing the coffee distributor", Points 1.–4.
3. Loosen two Torx T10 screws **(1)** on the front panel.
4. Pull outlet slide all the way down and loosen 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.



6.10 Replacing steam valve and operating panel

Tools:

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

6.10.1 Procedure for steam valve:



Note:

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

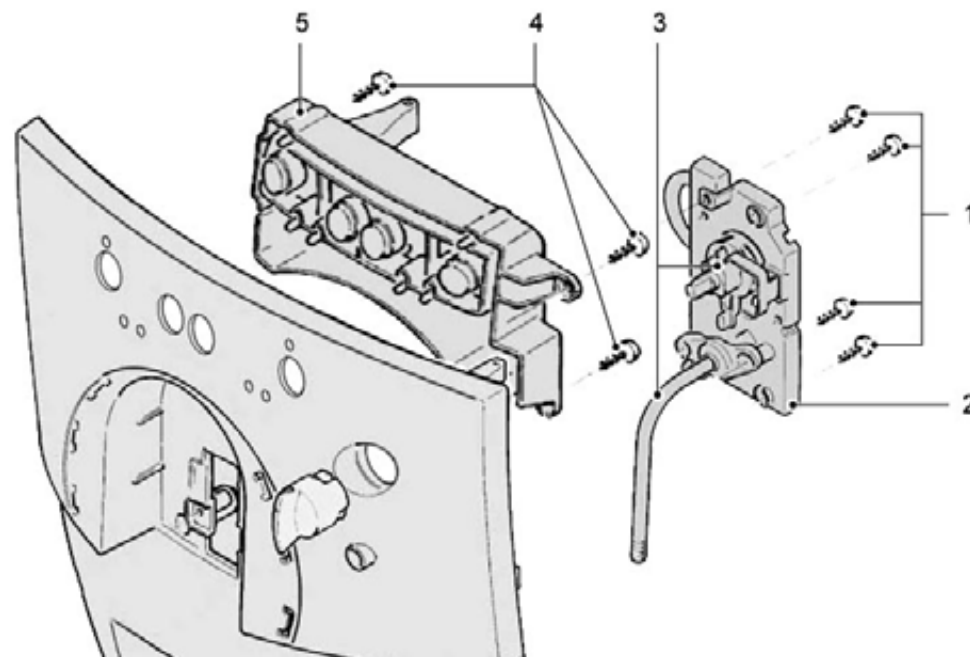
Note tightening torque of the screws (1) and (4)! (1.0–1.2 Nm)

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.

6.10.2 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!

6.11 Appliance test



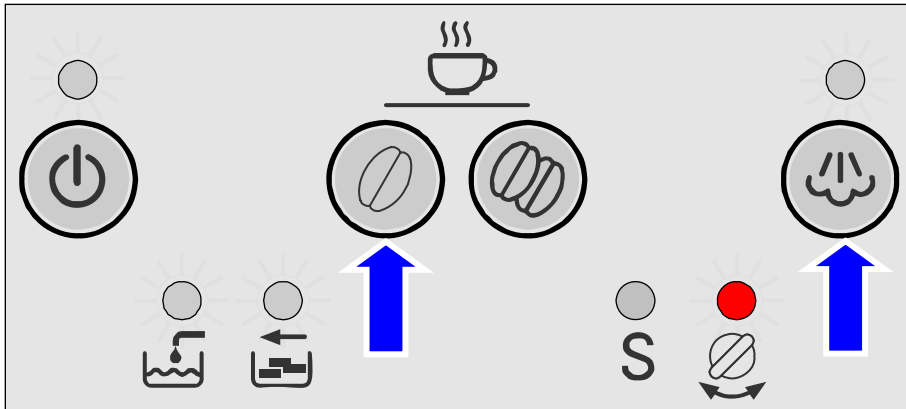
When a repair is complete, conduct an appliance test according to the following instructions!

6.11.1 Procedure

1. Insert mains plug and set mains switch to "I"

Appliance is in standby

2. Open steam tap

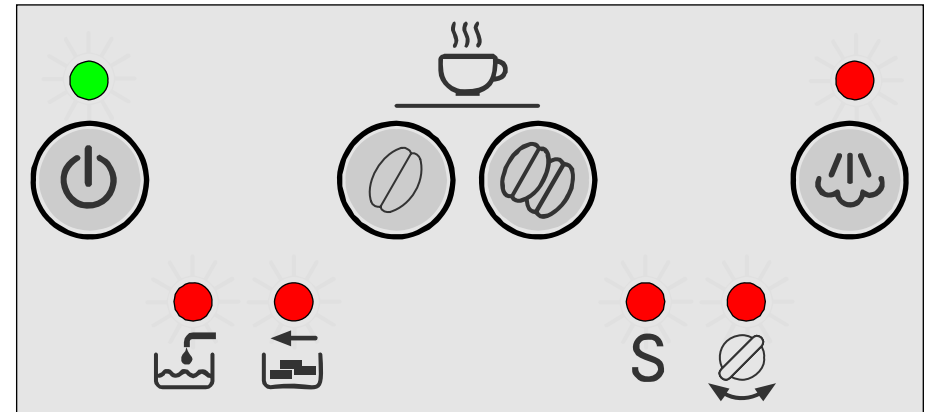


3. Simultaneously press coffee on MILD ☉ and steam ☁ buttons for **5 seconds**

Start appliance test, Close steam tap LED ☁ is lit.

4. Close steam tap

All LEDs are lit. Brewing unit is initialised, limit switches are tested.



5. Press Standby button

Brewing unit moves to brewing position. Pump starts, water is conveyed through the coffee outlet until the flow is interrupted. On account of the pressure in the brewing chamber, the switch for grinding unit compensation is actuated and tested.

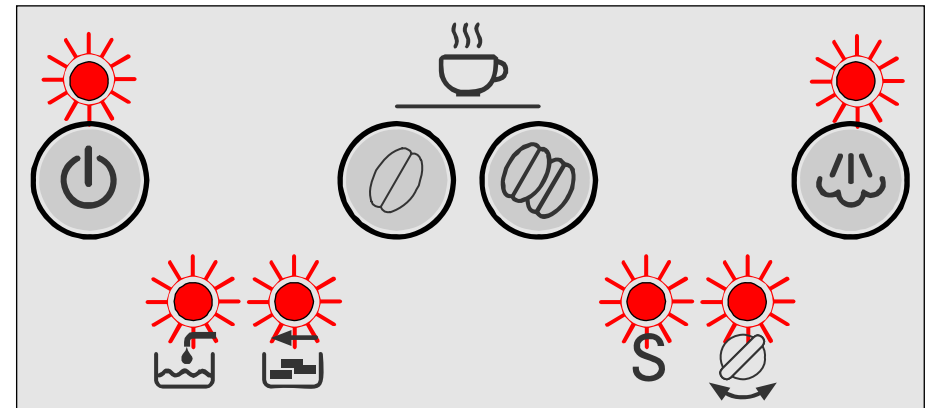
6. Mains switch set to "O"

7. Carry out points 1–4 again

8. Press Coffee strong ☉ button

Grinding unit runs for 5 seconds. Check clockwise rotation. Pause 2 seconds.

Appliance heats up to standby temperature, all LEDs flash red




Appliance test procedure

When the temperature has been reached, the Standby button LED is lit green.

9. Press Standby button


Empty trays LED is lit

10. Press Coffee strong  button

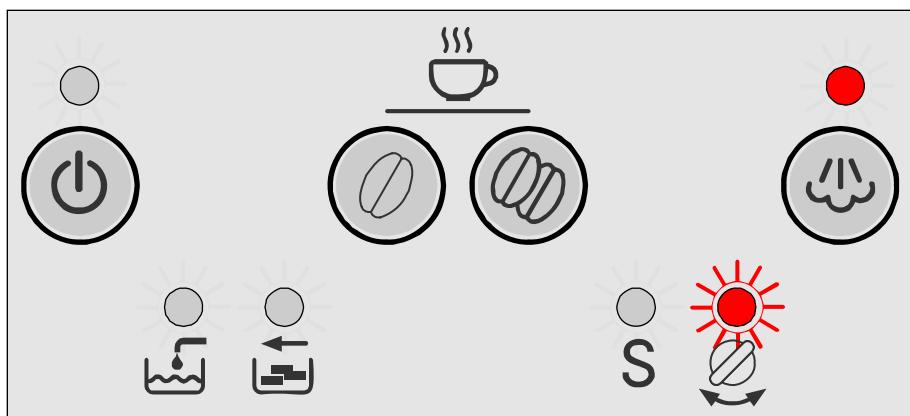
Add water LED is lit

11. Remove and re-insert drip tray.

S LED is lit

12. Press Coffee mild  button


Brewing unit moves to brewing position. Pump starts, water is conveyed through the coffee outlet.

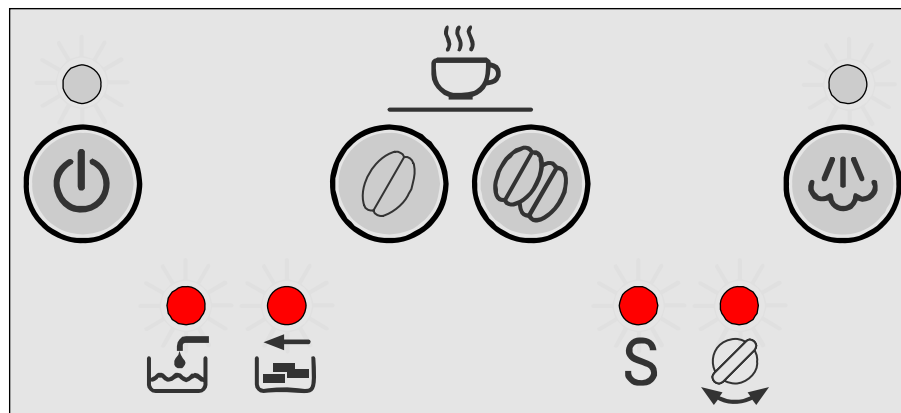


13. Open steam tap.

Appliance heats up to steam temperature and is evaporated without water supply. Steam tap can be opened and closed several times.

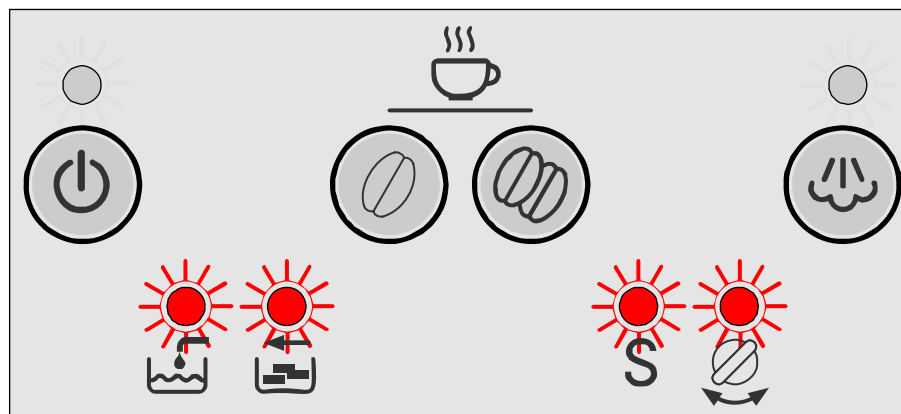
14. Close steam tap

15. Press the steam  button.



16. Press Coffee mild , strong  and steam  buttons for 5 seconds

Software bit for filling system and for extended grinding unit running time (+6 seconds) is set.



All 4 LEDs flash, the appliance test has ended.

Appliance then switches back to standby.

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 machine 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 drawer clean, inserted.
- ▶ Buttons and rotary knob move easily?

3. Switching on the appliance

- ▶ Switch on the appliance with the mains switch.
- ▶ Is the **Standby** button LED lit dimly red?
- ▶ Switch on with the **Standby** button, appliance is initialised or indicates Fill system (LED above **Standby** button and “Turn steam/hot water valve” flash)?
- ▶ Conduct drawer test with original tray.
- ▶ Insert test drawer, appliance rinses independently. Is the **Standby** button LED lit green?
- ▶ How long does the machine require to heat up, rinse? (Standard time approx. 70 seconds)

4. Fill water tank

- ▶ Water tank leaking?

5. Coffee preparation without beans

- ▶ Press On button.
- ▶ Check clockwise rotation of the grinding unit.
- ▶ Brewing stops, is “Add beans” message indicated?

6. Hot water preparation

- ▶ Open hot water/steam valve.
- ▶ Is the pump functioning?
- ▶ Is hot water running out of the steam pipe?

7. Steam generation

- ▶ Press Draw steam button. How long does the machine 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?

7.2 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 machine 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 drawer clean, inserted.
- ▶ Buttons and rotary knob move easily?

3. Switching on the appliance

- ▶ Switch on the appliance with the mains switch.
- ▶ Is the **Standby** button LED lit dimly red?
- ▶ Switch on with the **Standby** button, appliance is initialised or indicates Fill system (LED above **Standby** button and “Turn steam/hot water valve” flash)?
- ▶ Conduct drawer test with original tray.
- ▶ Insert test drawer, appliance rinses independently. Is the **Standby** button LED lit green?
- ▶ How long does the machine require to heat up, rinse? (Standard time approx. 70 seconds)

4. Fill water tank

- ▶ Water tank leaking?

5. Coffee preparation without beans

- ▶ Press On button.
- ▶ Check clockwise rotation of the grinding unit.
- ▶ Brewing stops, is “Add beans” message indicated?

6. Hot water preparation

- ▶ Open hot water/steam valve.
- ▶ Is the pump functioning?
- ▶ Is hot water running out of the steam pipe?

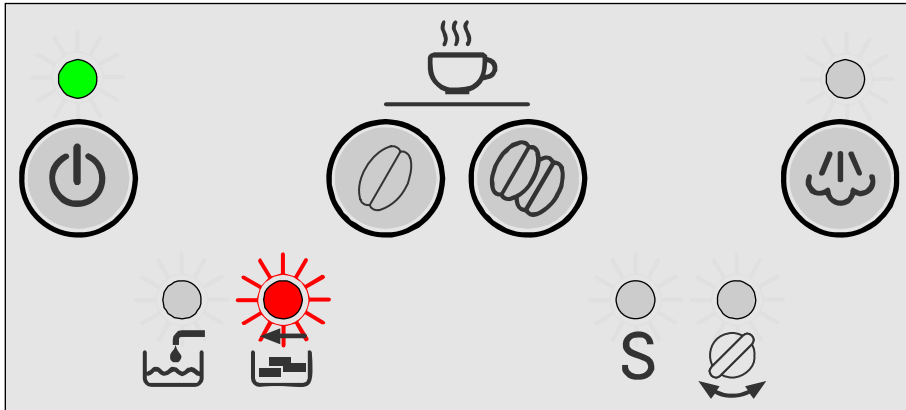
7. Steam generation

- ▶ Press Draw steam button. How long does the machine 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?

7.3 System and error messages

7.3.1 System messages

7.3.1.1 Trays missing



LED display: Trays missing flashes

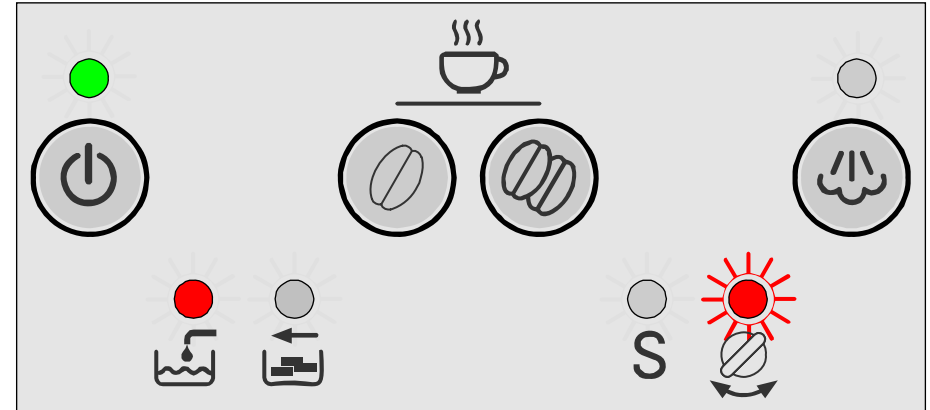
LED button: Standby is lit green

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 microswitch for tray detection.

7.3.1.2 Add water



LED display: Add water is lit, Open tap flashes

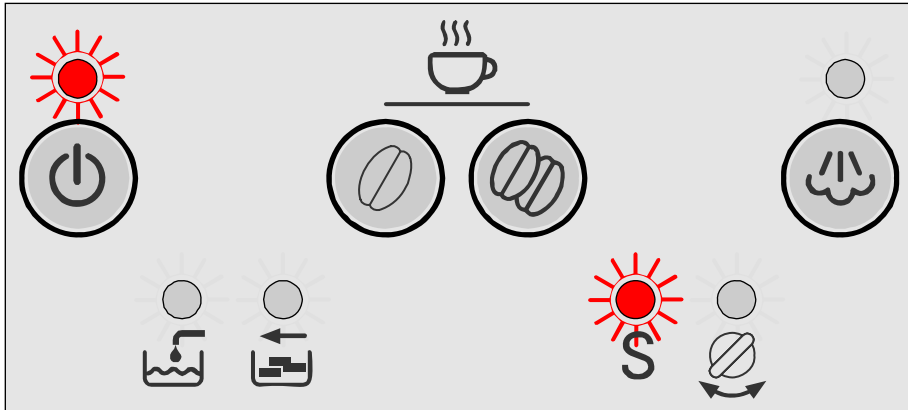
LED button: Standby is lit green

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 flowmeter only.

7.3.1.3 Brewing unit missing



LED display: Service flashes alternating with

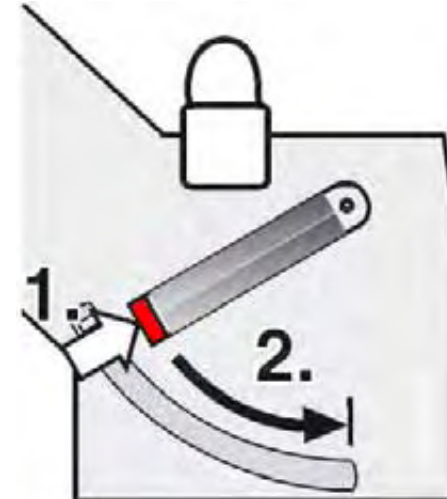
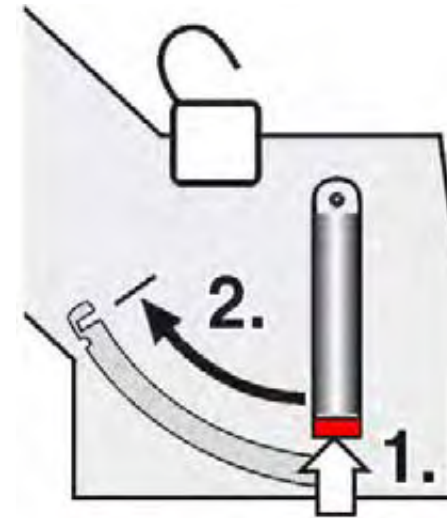
LED button: Standby (dim red)

Brewing unit is not or is incorrectly inserted.

Brewing unit handle is not locked.

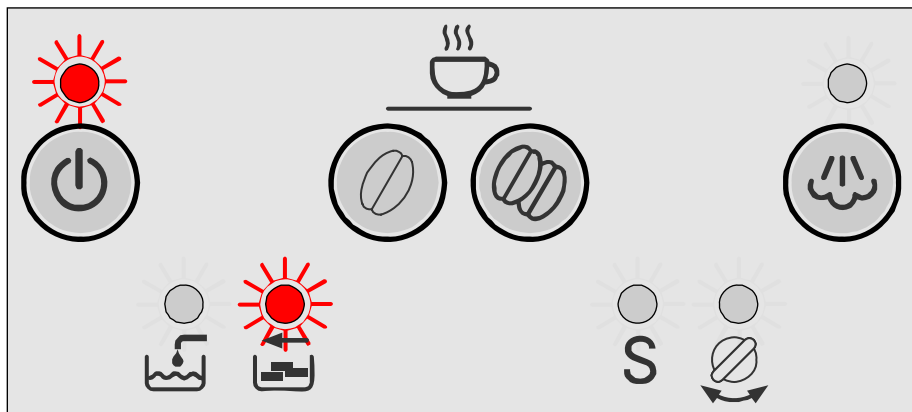
Switch for detecting the lock is defective.

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



7.3.2 Error messages

7.3.2.1 Fault 1, NTC fault



LED display: Trays missing flashes

LED button: Standby flashes

NTC temperature sensor outside the measurement range.

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

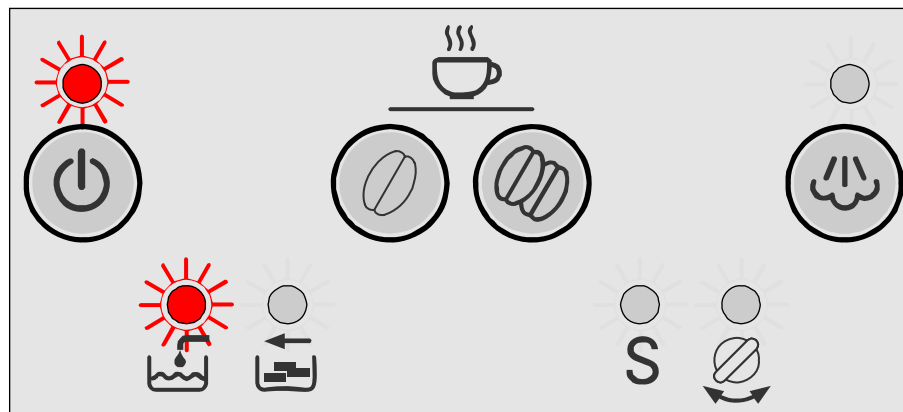
The message is indicated when the appliance is switched following initialisation.

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 be unlocked again by resetting the mains only.

7.3.2.2 Fault 5, heater fault



LED display: Add water flashes

LED button: Standby flashes

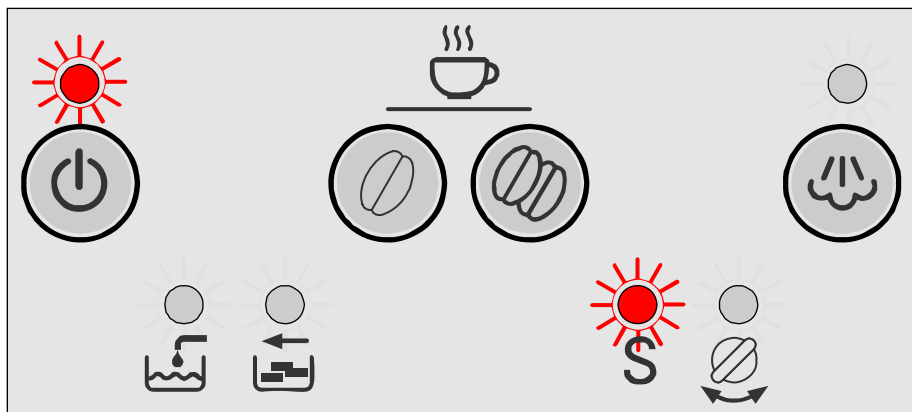
Heater or thermal links defective (interrupted).

Appliance is locked

- ▶ Check heater and thermal links
- ▶ Check wiring

Appliance can be unlocked again by resetting the mains only.

7.3.2.3 Fault 8, initialisation fault



LED display: Service flashes

LED button: Standby flashes

Initialisation of the brewing unit has failed.

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

Appliance is locked.

Faults during initialisation 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.
- ▶ Re-adjust the grinding unit setting.

7.4 Measuring the coffee temperature

Test voltage: 230 V +/- 3 V

Procedure:

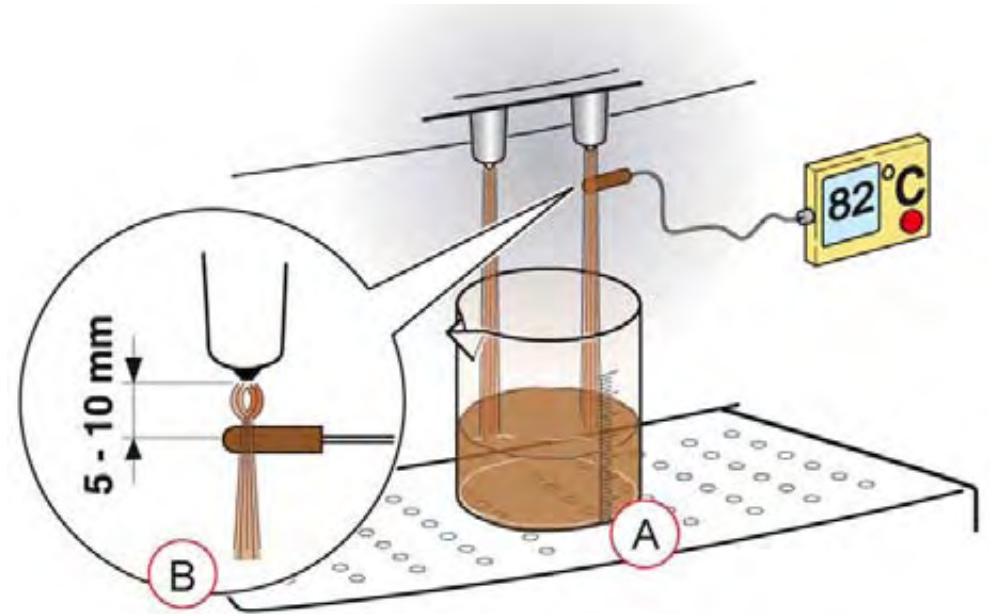
1. Switch on the machine with the mains switch, press the Standby button.
2. Wait until heating up and rinsing phases have ended (standby).
3. Set filling quantity: coffee approx. 125 ml, espresso approx. 40 ml
4. Place a measuring cup (A) under the coffee outlet.
5. Press the On button to start brewing 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 +/- 3°
3 rd cup (40 ml espresso)	83 °C +/- 3°
1 st cup (125 ml coffee)	82 °C +/- 4°
3 rd cup (125 ml coffee)	84 °C +/- 4°



8 TECHNICAL SPECIFICATIONS

8.1 Rating plate

The rating plate is situated on the inner support 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: FD8609 86 = year minus 20 (= **2006**)

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 input

Heater 1400 W

Pump 65 W

8.2.4 Pump pressure

Extraction pressure 5–7 bar

Static 15–17 bar

max. permitted 22 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:

1 coffee 82°C+/-5°

2 coffees 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

Setpoint temperature UHT milk 1.5% (measure in 10°C +/-5° Tetrapack)

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 the heater > 37 °C after 20 min

8.4 Consumption values (230 V/50 Hz models)

Operating status	Active functions	Remark		Duration [hh:mm:ss]	Consumption [kWh]
Standby	---		---	1 day	0.0032
Heating up to standby		(including rinsing)			0.0200
"Standby" low power mode	Heater, electronics ready	Appliance heats periodically		1 hour	0.0260
				1 day	0.6240
				1 week	4.3680
				1 month	18.7200
				1 year	227.7600
Brewing coffee	1 coffee (approx. 125 ml)	From standby state			0.0150
Brewing espresso	1 espresso (approx. 40 ml)	From standby state			0.0080
Draw hot water	30 sec. hot water			00:00:30	0.0080
	60 sec. hot water			00:01:00	0.0190
	90 sec. hot water			00:01:30	0.0300
Draw steam	30 sec. steam			00:00:30	0.0100
	60 sec. steam			00:01:00	0.0190
	90 sec. steam			00:01:30	0.0260
Coffee from cold state	1 cup of coffee (approx. 125 ml)	From cold state			0.0340

8.5 Dimensions and weight

8.5.1 Appliance dimensions

Height	340 mm
Width	260 mm
Depth	460 mm
Height between coffee outlet and drip tray	Approx. 85 mm–120 mm



8.5.2 Cable length

Approx. 1.1 m

8.5.3 Weight

8.1 kg

9.5 kg including packaging

8.6 Filling amounts

8.6.1 Capacity

Water tank	1.8 l
Bean container	approx. 250 g
Drip tray	Approx. 400 ml (up to float notify limit) 800 ml maximum

8.6.2 Cup filling amounts

Filling amounts can be adjusted steplessly	30 ml–220 ml
Factory setting	approx. 125 ml
Reset to factory setting	<ul style="list-style-type: none">▶ Remove drip tray▶ Simultaneously press Mild + Strong “on” buttons and hold down for 5 second
LEDs flash	
	<ul style="list-style-type: none">▶ Re-insert drip tray▶ Switch on appliance with standby button

8.7 Components

Logic module (control unit)	Supply voltage	11.5 V DC
	Operating voltage	5.0 V DC
Drive – brewing module	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	1250 W
Pump	Supply voltage	230 V AC / 50 Hz
	Pumping capacity	65 W / 15 – 17 bar (static)
Pump thermostat	Switching limit	115 °C
Outlet valve	Opening pressure	4.5 bar
Grinding unit	Supply voltage	230 V AC / 50 Hz
	Speed – motor	19,250 r.p.m. (no load)
	Transmission ratio - gears	36 : 1 (~ 490 r.p.m.)