User manual Slim Jim – in progress

Document ID: Sup-Tum-Eng | Date of issue: December 20, 2018 | Revision date: - - -

CONTENTS

Water Quality

Have a water treatment system installed and its function checked regularly. The treatment system should at least have a carbon block that not only traps drug-remnants, Chlorine and organic compounds but also prevents rigid particles >30 µm to enter the pump. Optimally, the water fed into the espresso machine would fall in the SCA "core zone", see Figure 1, and have a pH of 7.0-7.5 (at 25°C).

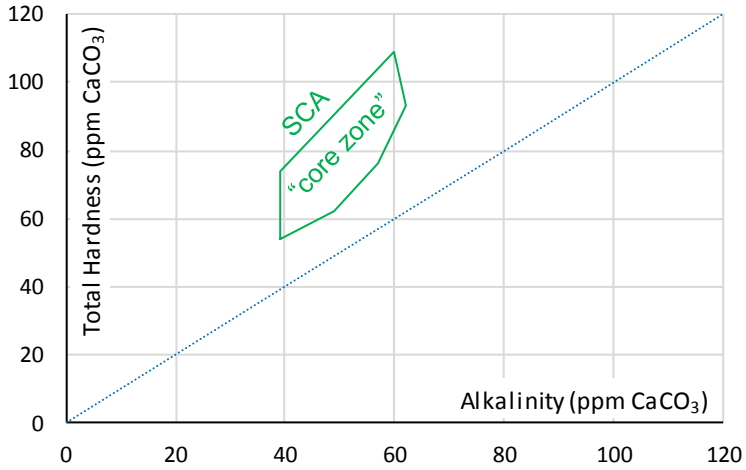


Figure 1. Alkalinity vs-Total Hardness graph showing the SCA "core zone" in green outline.

Besides the Alkalinity and Total Hardness requirements, the water should have the following properties:

Parameter	Target	Acceptable range	unit
Total Hardness	72	50-175#	ppm
Total Alkalinity	40*#	40-75#	ppm
pH	7.0*	6.5-7.5*, 6.5-8.0#	--
Electrical conductivity		< 3 times Alkalinity (in ppm)#	µS/cm[1]
Total Dissolved Solids	150*	75-250*	ppm[1]
Calcium Hardness	51-68*	17-85*	ppm
Sodium	10*	at or near 10*	ppm
Sulfate	30	0-50	ppm
Chloride	0	0-30	ppm
Silica	0	0-5	ppm
Odor and colour	clean*, fresh*, odor free*, clear*		
Taste influencing organic compounds*#	not present		
Chlorine#, Hypochlorite#, Chloramines#			
Iron#, Lead#, Manganese			

* SCAA Technical Standards Committee, 2009: water properties for optimum taste.
# Values from "The SCAE water Chart" (2015?).

Table 1. Showing parameter values for water meant to brew coffee with.

Water with properties that lie within the SCA "core zone" and correct pH combines technical aspects enabling a safe operation and sensory aspects yielding a high quality brew, provided the other parameters are met as well. Low brew-ratio's, as for espresso, shift the optimum of total hardness and alkalinity towards higher values.

[1] The conversion from electrical conductivity to TDS depends heavily on the water composition and temperature, yielding results that can vary significantly. Additionally, even if the estimated TDS value is accurate, it does not contain any information about what the TDS is actually made up of.

Parts identification

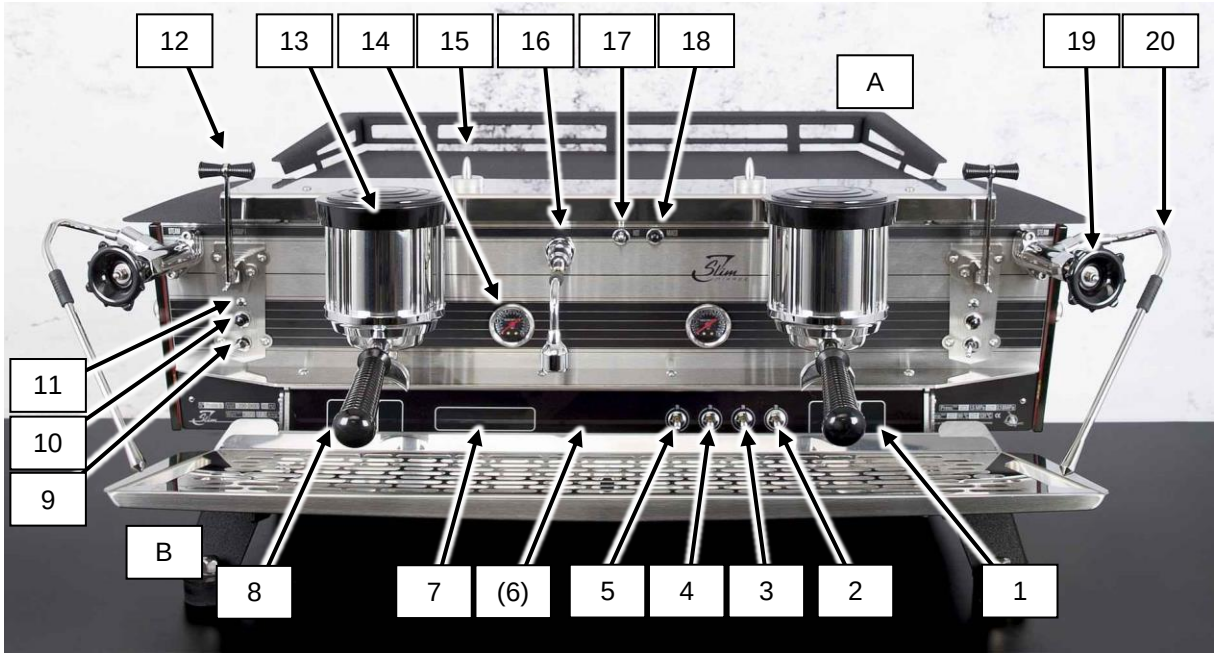


Figure 2. Showing the main operational parts of the Slim Jim Duette Bastone version. The Slim Jim Triplette has three groups but its functions are identical to the Duette. On the Touchpad version, the group brewing lever units are replaced with touchpads (see Figure 5).

1. Right hand group 3-digit display (shot-timer and/or temperature)
2. Main switch (switches power to everything but the heating circuits)
3. Switch circuit 3 (switches power to right group heating (Triplette only) and upper spiral in steam boiler)
4. Switch circuit 2 (switches power to right (Duette) or center (Triplette) group heating and middle spiral in steam boiler)
5. Switch circuit 1 (switches power to left group heating and lower spiral in steam boiler)
6. (Center group 3-digit display; only on Triplette: shot-timer and/or temperature)
7. Capacitive interface and display of controller
8. Left hand group 3-digit display (shot-timer and/or temperature)
9. Volume switch (left group)
10. Program & continuous button (left group)
11. Group indicator light (left group)
12. Group brewing lever (left group)
13. Group (left)
14. Coffee brew pressure gauge (left group)
15. Two-stage pre-infusion cylinder
16. Hot water spout
17. Hot water toggle switch (hot water only)
18. Hot water button switch (mix-water)
19. Steam valve (right)
20. Steam wand (right)

A. Cup-rack
B. Drip-tray

Not visible on this photo:

- Green indicator lights for heating spirals (one for each spiral; see page 25)
- Connection for external temperature probe (see page 26).

Operational features

MAIN switch

The main switch (see Figure 3) is located at the right hand side of the machine and has 2 positions:

DOWN=OFF Power to the controller is disconnected. When the machine is functioning correctly, all heating is also off, whatever the position of the heat switches. With a malfunction it is however possible that one (or more) heating elements/sections are still active. Depending on latent heat in the machine the brew will not be warm enough, hot water will be at lower flow-rate and temperature and steam power is reduced or absent.

UP=ON The machine is connected to the electric mains, but power to the heating elements will remain disconnected as long as the heat switches are still off. The machine functions but the boilers will not heat. The optional cup-heater may function if it is turned on.

Figure 3. Showing the three HEAT switches, the MAIN switch and a blank TEMP/TIMER (3-digit) display.

HEAT switches

Heating power to the machine is split in three different circuits. Each circuit can be (dis-)connected individually. The heating element of the steam boiler consists of a lower middle and upper section.

Notes!
The boilers will not heat up when the HEAT switches are in the OFF position.

With the main switch in OFF position, the boilers will not heat up, irrespective of the position of the HEAT switches.

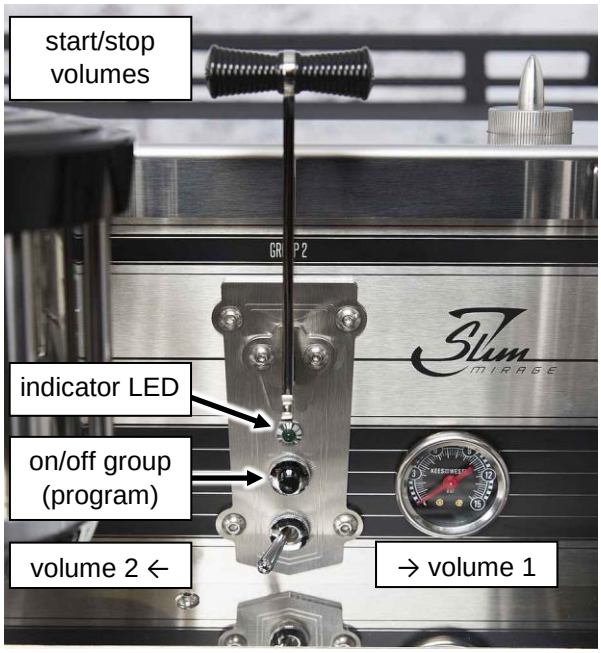
1. HEAT 1 powers the left group heating element and the lower section of the steam boiler heating element.
2. HEAT 2 powers the central (Triplette) or right (Duette) group heating element and the middle section of the steam boiler heating element.
3. HEAT 3 powers the right group heating element (Triplette only) and the upper section of the steam boiler heating element.

Circuit breakers

The machine has an individual breaker for each of the four electrical circuits in the machine (main-circuit plus 3 heat-circuits). When one of the circuits has a malfunction (electric short), the corresponding breaker will cut power to that circuit only. If the main-circuit breaker is activated the machine will be completely inoperable but if a single heat-circuit breaker is activated the rest of the machine will remain functional.

The circuit breakers are located within the electrics tray and cannot be accessed by the barista. If a circuit breaker is activated, have a technician check and repair the machine as soon as possible.

Bastone unit



A bastone unit includes a brew lever, an indicator light, a momentary push button and a two-position toggle switch.

Shortly pressing the brew lever will start the pre-set volume determined by the toggle-switch. A pre-set volume can be stopped before the volume is reached by shortly pressing the brew lever again.

When the group is active, the indicator LED is lit.

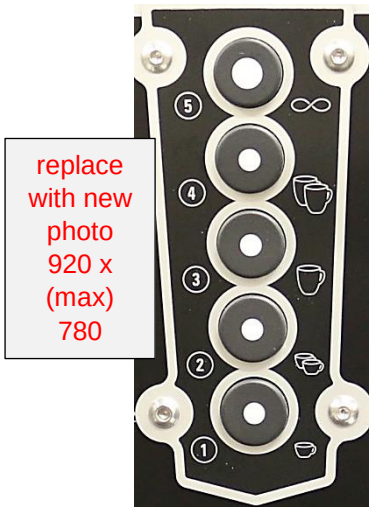
The push button is the continuous (“on/off”) switch with programming function.

The toggle switch determines which of the two possible pre-set volumes is active.

Figure 4. Bastone unit.

The push button underneath each brew lever is the continuous (“on/off”) switch equivalent to button #5 on a touchpad (see below). The indicator light will light up continuously when the controller is in programming mode. A continuous dispense can also be stopped by shortly pressing the brew lever.

Touchpad



A touchpad has 5 momentary push buttons with internal indicator LED.

The upper button (#5, larger circle) is an on/off group switch with programming function.

Buttons #1-4 are used to start a pre-set volume. A pre-set volume can be stopped before the volume is reached by shortly pressing any button.

When the group is active, the indicator LED of corresponding button is lit.

Figure 5. Touchpad.

Press the upper button briefly to open the group valve and activate the pump, the LED in the button will light up. Press it briefly again to deactivate the pump and group valve, the LED will go off.
Press the upper button and keep pressed to get the controller in programming mode such that shot-volumes (and hot water timer) can be programmed. The indicator LED of the upper button will flash and the other 4 will be lit continuously. Press and keep pressed again to leave programming mode.

For shot-volume programming with bastone units or touchpads see page 14: Program volumes with touchpad or bastone.

Temperature display

Each boiler is equipped with its own temperature controlling system. Measured temperature values can be displayed 2-ways: on the control panel and/or on the large 3-digit displays underneath each group (see Figure 6). In the barista menu, the temperature unit can be switched from °C to °F.

On control panel

At “normal” operation, the control panel will show the temperatures of all coffee boilers and the steam boiler and and will continue to do so during a shot such that information about temperature is always real-time available during a shot.
An orange line above a temperature value on the interface indicates that the corresponding heating element is active.

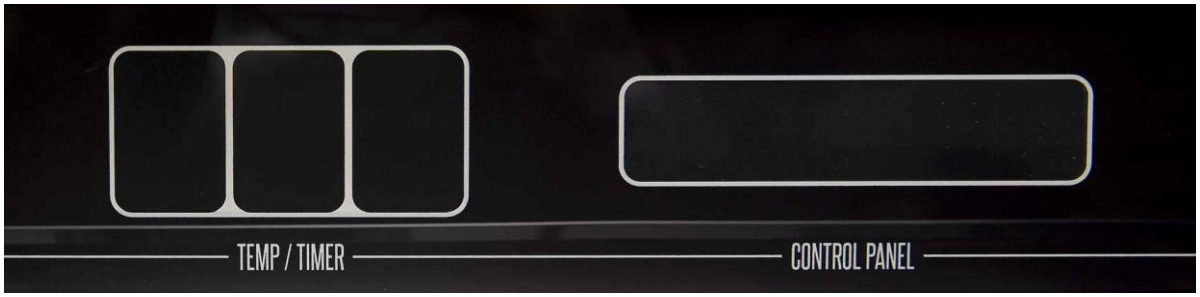


Figure 6. Showing a 3-digit temperature/timer display (left) and the control panel (right).

On 3-digit displays

Factory setting is that a 3-digit display will display the temperature of the corresponding group during idle. It changes to a shot-timer when the group is activated. The shot-time will be replaced by the boiler temperature after a user-adjustable amount of seconds.

Shot time

The shot time gives an excellent indication of the brew process and can assist the trained barista to refine that process.

The large 3-digit displays underneath each group (see Figure 7) function as shot timers and/or temperature display. In factory setting the displays show at idle the temperature of the corresponding coffee boiler. As soon as the group valve opens the function changes to shot timer, starting at zero, and counting starts. The timer stops counting when the group valve is closed and the measured time between opening and closing of the group valve remains displayed for an adjustable amount of seconds after the group valve was closed upon which the display changes back to showing the temperature.

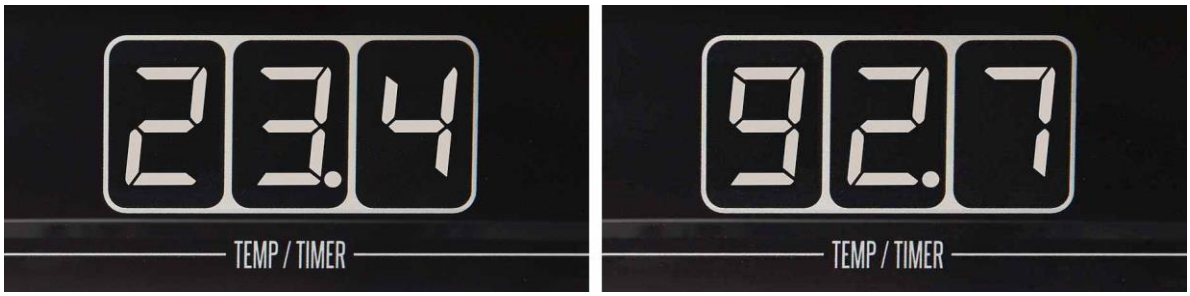


Figure 7. A 3-digit display showing shot time (left) and the same display showing temperature (right).

Pressure gauge

While brewing a real shot the coffee-bed becomes less permeable during wetting (pre-infusion stage) and pressure will rise until pump-pressure is reached (ideally 9 bar). The pressure gauges display the pressure in the line that runs from group-valve to group-screen. This means that when a group is inactive or when no portafilter is locked in, the pressure gauge will display 0 bar.

The pressure gauge shows the actual pressure on the coffee bed.
When the group is inactive, the pressure displayed is thus (very close to) 0.

Figure 8. The brew pressure gauge of group 2.

If 9 bar pressure is not reached during a normal brew, either the pump pressure is set too low or the coffee bed was not able to produce enough counter pressure. Insufficient counter-pressure can be caused by too few and/or too coarse coffee grinds, channelling in coffee bed during extraction, etc.

Dispensing hot water

Momentary toggle switch for dispense of water directly from steam boiler.

Push-button switch for timed dispense of non-sputtering mix-water.

Figure 9. The hot-water toggle switch and mix-water push button switch.

Mixed water
Press the mixed-water push button switch down briefly. The flow will stop when the pre-set time has elapsed, or when the switch is pressed down briefly again, whichever comes first.
A technician can manipulate the cold inflow with a set-screw on the manifold inside the machine to optimise the mix-water temperature.

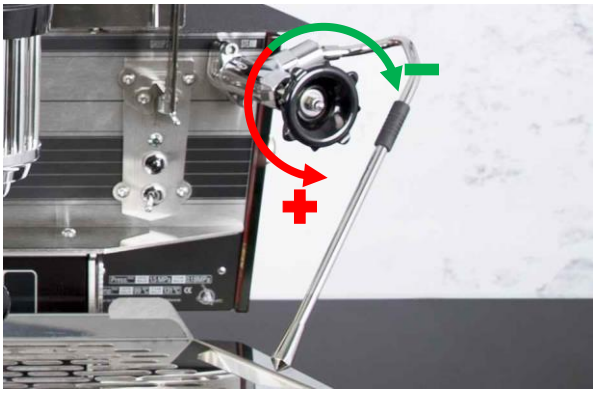
Hot water
Press-hold the toggle switch down to start water flowing directly from the steam boiler to the spout. It will take a moment before the water starts to sputter indicating that boiling water is being dispensed. The duration of that moment depends on the temperature of the intermediate parts just prior to pressing the switch. The flow will stop when the switch is released.

Note!
Hot water can only be dispensed when the steam boiler is above 100°C as steam pressure is the means to push the water out of the boiler. When the steam boiler is not at operational temperature yet, the mix-water temperature will be lower than the set temperature.

Steaming

The Slim Jim has two identical mechanical steam valves that can optionally be equipped with foot operated solenoid valves.

Before steaming milk it is necessary to open the valve for a short while to purge water from the steam wand and heat up the wand and valve. The purged water is condensate from steam coming in contact with the cold tubing, valve and wand. Position the tip of the steam wand over the drip tray when purging the condensate.
Directly after steaming milk, flush the steam wand with a little steam and clean the tip of the steam wand with a damp cloth. For hygienic reasons, do not use this cloth for anything other than cleaning the steam tip.



Twist the valve-knob to open/close and adjust the steam flow. From fully open to fully closed is about ¾ turn, there is no need to close the valve firmly.

If the optional foot-operated steam valve is mounted, do not fully close the mechanical valve.

Figure 10. The right hand steam valve.

When the optional foot operated solenoid valve is mounted, the knob is used to adjust the flow of the steam only. The solenoid valve will be opened and closed by an air-switch that is activated by a bellow on the floor. Of course, when the mechanical valve is turned close, no steam will flow from the wand.

Note! It is advised not to decrease the steam power by lowering the steam boiler temperature. A lower boiler temperature will reduce the amount of steam that can be produced and the temperature of the mix-water dispensing.

Pre-infusion cylinder

The piston rod will rise up during the initial stage of a brew. A double spring assembly inside the pre-infusion cylinder assures a slow-starting and gradual pressure build-up to about 3 bar when the maximum displacement of the piston is reached.

Figure 11. Piston-rod ends of the pre-infusion cylinders.

At the start of a brew water leaving the group-valve can go into the coffee-bed and into the pre-infusion cylinder. The water will flow in the direction of the least back-pressure. At start the coffee-bed will have no back-pressure but once the grinds are wetted, dominant water-flow changes towards the pre-infusion cylinder. Pressure gradually increases until the cylinder is completely filled and all water has to flow through the coffee-bed. From that moment brew-pressure quickly increases to pump-pressure.

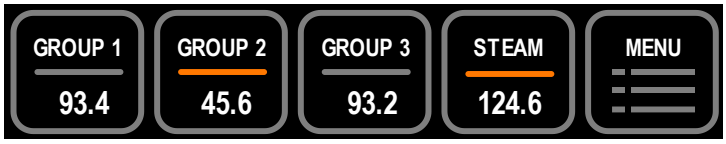
⚠ **Caution!** The piston-rod of the pre-infusion cylinder can become very warm.

The advantage of the pre-infusion cylinder over a reduced flow-rate at start is that the entire coffee-bed will be soaked relatively quick and then has time to swell and settle at reduced pressure before high pressure is established. With reduced flow-rate during pre-infusion it will take a longer time to wet all grinds and swelling and setting of the coffee-grinds starts where water reaches the grinds first such that the upper part of the coffee-bed becomes more impermeable to the later inflow.

Control panel

The control panels of the Triplette and Duette are very similar and has a 5-“button” capacitive touch screen. When at operation, the display will show the temperatures in °C or °F without the temperature unit. The reason for this is that not showing the unit allows the use of a bigger font for the temperature values. The user will be aware of the local unit-setting and realise that normal brewing is at 90-95°C or 187-203°F.

operational window Triplette with temperature in °C



the orange center-line indicates that the heating of that boiler is active.

operational window Duette with temperature in °F

the Duette does not have a 3rd group.

Change individual boiler to ECO and back

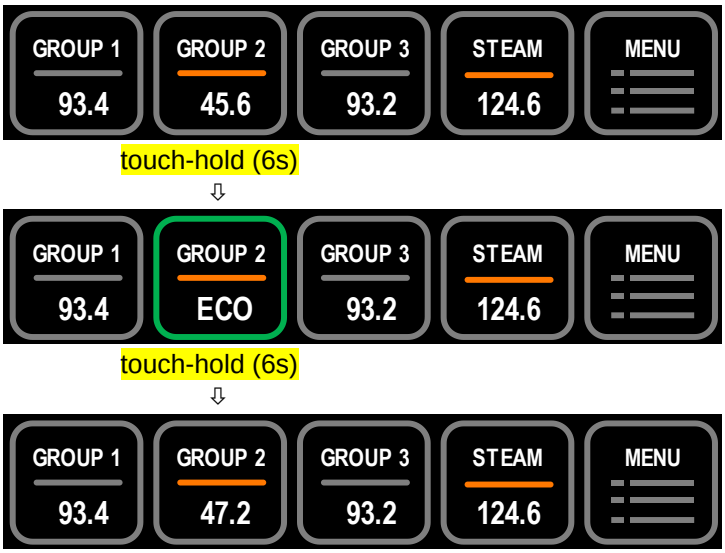
The factory set operational temperatures of the boilers are 93.0°C (coffee) and 125.0°C (steam) (199°F and 257°F) respectively. 125°C is equivalent to approximately 1.35 Bar steam overpressure.

Each boiler can be individually set to a lower ECO temperature (50°C, 122°F for the coffee boilers, 70°C, 158°F for the steam boiler). At the lower temperature setting up to 80% power is saved while the boiler will still have a short heat-up time. In the “operational window” of the interface, touch-hold the button of the boiler that you want to change until the colour of the button-frame changes to green (about 6 seconds). Touch-hold again and the corresponding boiler will heat up to operational temperature again.

An individual group set at ECO will also turn to normal operation when the corresponding bastone unit or touchpad is operated.

When the steam boiler is set to ECO, using any of the groups to make a brew or pressing the mix-water switch will turn the steam boiler back to normal operation.

operational window



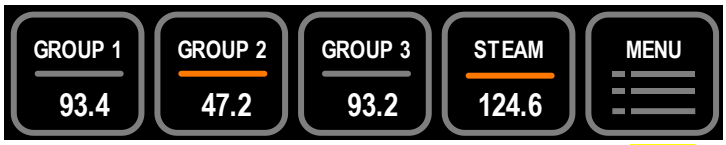
the green frame and word ECO indicate that setpoint is ECO
or operate the bastone/touchpad

Note that in the example above group 2 is at 45.6°C at moment of switching to ECO. As the ECO temperature of the coffee-boilers is 50°C, the boiler will continue to heat until 50°C is reached and the center line will thus remain orange.

Go to stand-by

You have to leave the operational window to go to stand-by. In stand-by the controller is in sleeping mode and the machine does not operate. There are two stand-by modes: “NO HEAT” and “ECO-MODE”. At “NO HEAT” there is no power to the heating elements and the boilers will (eventually) cool down to room-temperature. At “ECO-MODE” the boilers will cool down to a lower set temperature and are then kept at that temperature.

operational window

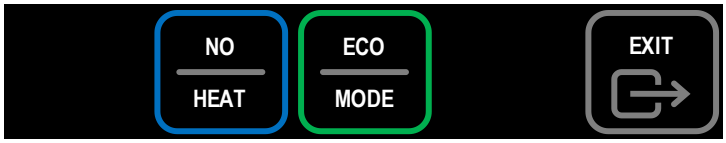


touch ⇩

menu window

touch ⇩

stand-by window



choose “NO HEAT” or “ECO MODE”

touch ⇩ touch ⇩ ⇩

no-heat window

“NO HEAT”: the machine will cool down

eco window

“ECO”: the machine will settle at lower set temperature

touch

touching the central button at “NO HEAT” or “ECO”will return the machine to operation (first window)

or operate a bastone/touchpad

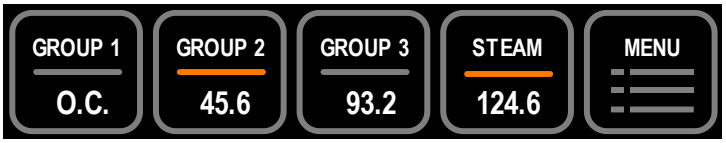
A machine set at ECO will also turn to normal operation when any of bastone units or touchpads or mix-water switch is manipulated. This “first manipulation” will not result in starting a dispense.

Sensor malfunction

For each boiler sensor, the corresponding area in the display, as well as the 3-digit display, will show O.C. (open circuit, infinite resistance) or C.C. (closed circuit, electric short) if there is a sensor malfunction. When a sensor malfunction is shown for a boiler, the heating of that boiler is dis-engaged. The machine will remain functional on the other boilers. When there is a steam boiler sensor malfunction the indicator LED(s) on the bastone units or touchpads will flash continuously.

Even though the coffee boilers will remain operational when there is a steam boiler sensor malfunction, overall functionality of the machine will be low. Have the machine checked as soon as possible (probably you need to have the sensor replaced).

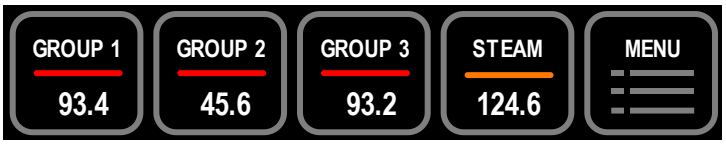
oprational window



a closed circuit is detected at group 1 temperature sensor.

As the sensor in the heat exchanger manifold has no designated area on the control panel, a sensor error is indicated by a red center line in all groups. There is no distinction between open or closed circuit. With a malfunctioning sensor, the cool-valve will not open but the machine will remain functional. A non-functional cool valve may lead to overheating of the groups and rapid decay of the flow-meters in the machine. Have the machine repaired as soon as possible.

operational window



a heat exchanger manifold sensor malfunction is detected.

Technical assistence

In the no-heat or eco window (shown below) touch the left of the controll panel. The next window will show the telephone number to call for technical assitence, provided that the technician has entered the information. The back button will return to “NO HEAT” or “ECO MODE”, whatever the earlier setting was.

no-heat window

“NO HEAT”: the machine will cool down

eco window

“ECO”: the machine will settle at lower set temperature

touch ⇩

assistence window

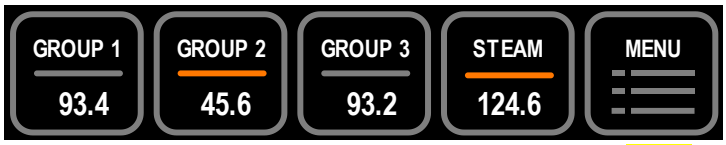
touch ⇩

BACK will return to previously active window

Use external temperature sensor (option)

An external NTC-sensor can be plugged into the bottom of the electrics tray. The temperature of the external sensor can be shown on the control panel instead of the steam boiler temperature.

operational window

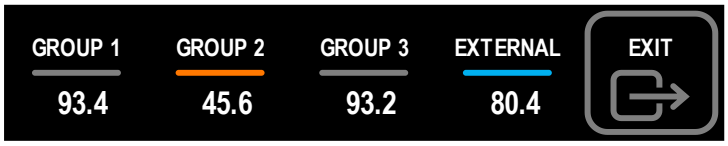


touch ⇩

menu window

touch ⇩

external sensor window Triplette



external sensor attached (°C).

external sensor window Duette

external sensor attached (°F).

touch ⇩

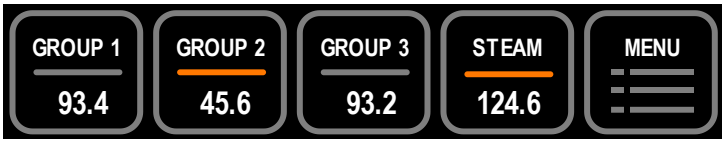
return to operational window

Start automatic back-flush program

See paragraph “Back flush group” on page 21 for complete back-flush procedure.

When the machine is in “normal” operational mode touch the MENU icon on the interface.
In the next screen touch the button “CLEAN PROGRAM”.

operational window



touch ⇩

menu window

touch ⇩

This will start the cleaning program. The display will immediately return to the upper (operational) window.

The groups will pressurise (duration: 16 seconds) and de-pressurise (duration: 10 seconds) 8 times successively and then the machine will return to normal operation. Indicator LED(s) on the corresponding bastone unit or touchpad will flash during the cleaning program.

Note! If a group is activated during the back-flush program, the cleaning program will stop for that group but will continue on the other group(s).

Program volumes with touchpad or bastone

The bastone version of the Slim Jim has 2 pre-set volumes per group, the touchpad version has 4 pre-set volumes per group. When water flows through a coffee group, the flow meter of that group sends pulses to the controller. The controller counts the pulses after activation of the group and will de-activate the group when the pre-set number of pulses has been received (that is: when the pre-set volume of water has passed the flow meter).

The pre-set volumes can be programmed 2-ways: with the bastone units or touchpads, or using the interface (in the Barista-menu; submenu “volumes”).

When using the bastone or touchpad to program volumes, the left group is the dominant group meaning that when a volume is programmed on the left group, the other group(s) will take over that volume. After getting the machine to programming mode a shot is started and ended with the bastone (or touchpad). Upon leaving the programming mode, the last programmed dispense for each shot volume is stored in memory.

Make sure to mimic an actual brew while programming volumes: check that the machine is at operational temperature for some time and prepare the coffee-bed as you normally would.

procedure

1. get the controller in programming mode:
   - touchpad: press-hold the upper button of the left touchpad
   - bastone: press-hold the push button of the left bastone

   the LED(s) on all units will start flashing

2. start the brew/dispense as normal
   - touchpad: shortly press the button to be programmed
   - bastone: note the position of the toggle-switch, shortly pres the bastone lever down
   - hot water: start the dispense by shortly pressing the dispense push button

   the corresponding LED will light up

3. stop the brew/dispense when the correct volume is reached
   - touchpad: shortly press the button again
   - bastone: shortly press the bastone lever down
   - hot water: stop the dispense by shortly pressing the dispense push button

   the LED(s) on all units will start flashing again

you may now program another volume (on another or the same button/switch position if needed) or:

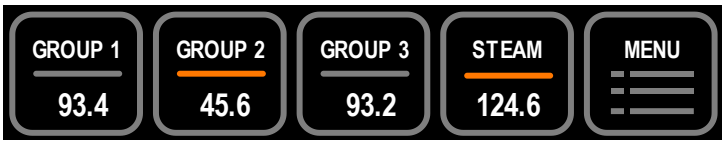
4. get the controller out of programming mode
   - touchpad: press-hold the upper button of the left touchpad
   - bastone: press-hold the push button of the left bastone

   until the LED(s) stop flashing.

Change settings in the Barista menu

You have to leave the operational window of the controller and choose the correct parameter-set to change individual settings.

operational window



touch ⇩

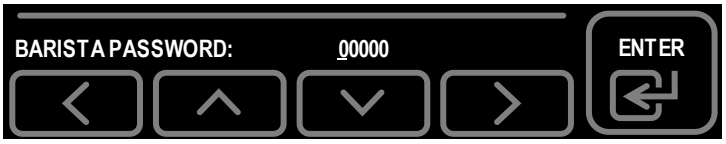
menu window

touch ⇩

settings window

touch ⇩

enter barista password window



use arrows to construct the password (33333)

touch ⇩

use up and down to change the value of the underlined digit, use previous and next to change digit

barista menu window

choose a sub-menu or exit to the operational window

Sub-menu TEMPERATURE SETTING

In the sub-menu temperature setting you can consecutively adjust the following:

parameter	range	factory	increment	unit	remark
display	°C, °F	°C			
setpoint group 1	80.0 .. 99.9°C 176 .. 212°F	93.0°C 199.4°F	0.1	°C or °F	
setpoint group 2					
setpoint group 3					In a Duette there is no group 3.
setpoint steam	110 .. 130°C 230 .. 266°F	125°C 257°F	1		
cup heater	0 .. 100	0	1	%	OFF at “NO HEAT” and “ECO-all”
show temp. at ECO	no, yes	no*			When “yes” the digit displays will show a temperature at ECO.

When installed and in use, the cup-heater will be active the set percentage of each consecutive period of 100 seconds.

* The 3-digit displays will show “ECO” instead of a temperature when the corresponding boiler is at ECO. This can be changed to keep showing the actual temperature.

Note! Do not adjust the temperature of the hot water dispense by changing the temperature of the steam-boiler. Have a technician adjust the mix-water dispense temperature by turning a set screw on the inlet manifold (inside the machine).

Sub-menu VOLUME SETTING

In the sub-menu volume setting you can consecutively adjust the following:

parameter		range	factory	increment	unit	remark
water timer		0.5 .. 15	2.0	0.1	s	mixed-water is timed.
touchpad	bastone					
V1Gr1		15 .. 300	70*	1	ml	With bastone units there are only 2 programmable volumes per group. The positions with* are not used.
V2Gr1	V1Gr1		110			
V3Gr1			130*			
V4Gr1	V2Gr1		170			
V1Gr2			70*			
V2Gr2	V1Gr2		110			
V3Gr2			130*			
V4Gr2	V2Gr2		170			
V1Gr3			70*			In a Duette there is no group 3.
V2Gr3	V1Gr3		110			
V3Gr3			130*			
V4Gr3	V2Gr3		170			

Note that the volumes can also be set with the aid of the touchpads/bastone units. Only when volumes are programmed with touchpad or bastone, the left group is dominant.

You can roughly program a shot-volume with the touchpad/bastone and then fine-tune that volume on the control panel (increase or decrease) instead of brewing a new shot. Note that the volume shown on the interface is the total volume that passes the flow-meter, it thus also includes the water that remains in the coffee puck after the brew (appr. half the weight of the coffee-grinds) and the water that flows into the pre-infusion cylinder (appr. 28 ml).

Sub-menus TIMED ON/OFF and TIME/DAY

In the sub-menu timed on/off you can consecutively adjust the following:

parameter	range	factory	remark
auto off	NO, to ECO-all, to NO HEAT	NO	turn automatically to stand-by
off time	hh:mm		time to turn to stand-by
auto on	NO, YES	NO	turn automatically ON
on time	hh:mm		time to turn ON
day off	none, Monday .. Sunday	none	skip a weekday to turn ON

This sub-menu continues into the sub-menu TIME/DAY.

In the sub-menu timed on/off you can consecutively adjust the following:

parameter	range	factory	increment	unit	remark
shot time	-1 .. 99	20	1	s	-1 never show shottime 0 show shot time during brew only
present time	hh:mm				
present day	Mon..Sun				

Timer function to switch the machine

The machine can automatically change state:

- Using the “auto off” function will turn the machine to stand-by (ECO or NO HEAT) at a pre-set time (e.g. at the end of the day). It is especially meant to facilitate the use of the ECO function.
- Using the “auto on” function will turn the machine to operational temperature at a pre-set time (e.g. in the morning). When set correctly, the machine will be fully operational the minute the store opens.
- The “day off” function will make the pre-programmed ON time skip a weekday.

An automatically set switch can be overridden manually on the machine at any time. After such interference the timer function will continue to run in the backgroud and will perform the next pre-set action when it turns up.

Notes!
To have the machine react properly to the timer function instructions the main and circuit switches must remain in the ON position.
The time and weekday of the controller must also be set correctly. It is advised to check these regularly (present time and weekday are shown on the ECO-all and NO HEAT windows).

Why switch to ECO …

1. A machine kept at ECO consumes about 20% of the energy of a machine kept at operational temperature.

Heat loss of the machine is related to the square of the temperature difference between the machine and its environment. Of course some extra energy is needed to heat up from ECO to operational temperature. Switching to ECO will therefore lead to 70-75% energy reduction, depending on how long the machine will be at ECO.

… and not to OFF?

2. A lot of parts in the machine suffer from temperature variations, the more so when these variations are large.
3. Heating up from ECO (just over 8 minutes) is faster than heating up from room temperature (about 15 minutes).

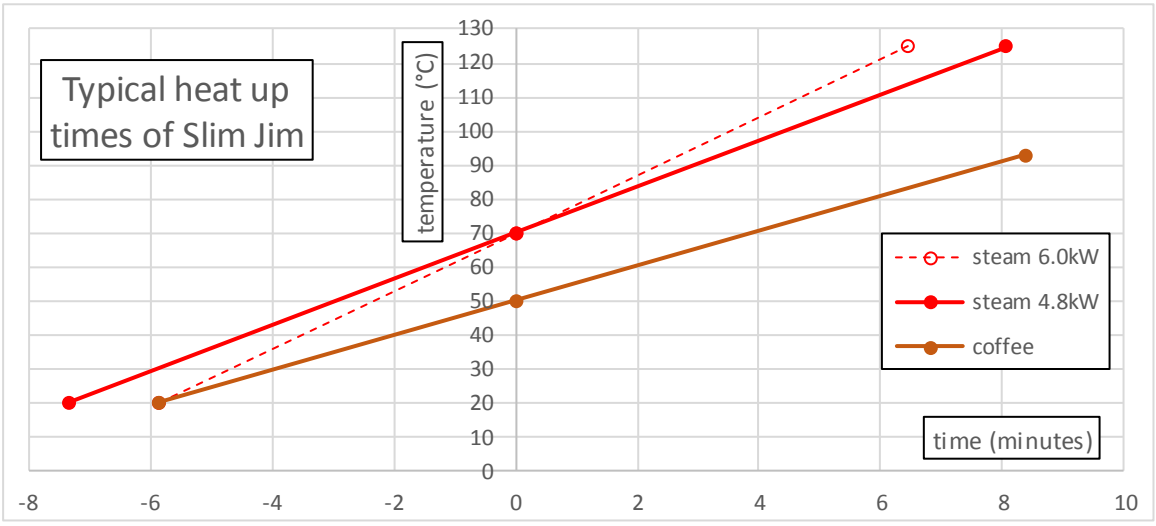


Figure 12. Graph showing typical heat-up duration normalised at ECO-temperatures. From ECO to operational temperatures takes just over 8 minutes for both coffee and steam. From 20°C to operational takes 14 (coffee) and 16 (steam) minutes resp.. Also shown is heat-up with high power heating element for steam boiler.

Note! The temperature sensor of the steam-boiler is placed above the water-level for quick response to steam withdrawal. At temperatures below 110 °C (230 °F) the sensor will not register a change in (water) temperature quickly. For that reason, the steam-boiler temperature may be up to 6 °C higher than the ECO-setpoint at the moment you switch from ECO to operational mode.

Pump-pressure

Check

Check the pump-pressure when an actual brew is at the infusion stage; i.e. the highest pressure reached during a brew. Make sure that only a single group is active during this check as multiple “users” will result in a somewhat lower pump-pressure.

Do not use the mix-water during this check as that will also result in some pressure loss.

Check all groups available and compare the results. The pump-pressure at the different groups should be identical as there is only one pump used for the entire machine.

Notes!
A small divergency (<0.2 bar) between the groups can be the result of deviations between pressure gauges and is no cause for alarm.
A large divergency may indicate a malfunction but can also be the result of different coffee-bed preparation. Redo the check and have a technician solve the problem when the divergency persists.

Adjust

Pump pressure is adjusted on the pump by regulating the amount of by-pass of the pump-outflow. Adjust the pressure when an actual brew is at the infusion stage (the more or less stable high pressure during a brew).

See Figure 13: First loosen the plastic locking nut, then twist the set-screw until the desired pressure is reached and fasten the locking nut again. Check the pump pressure again after the adjustment.

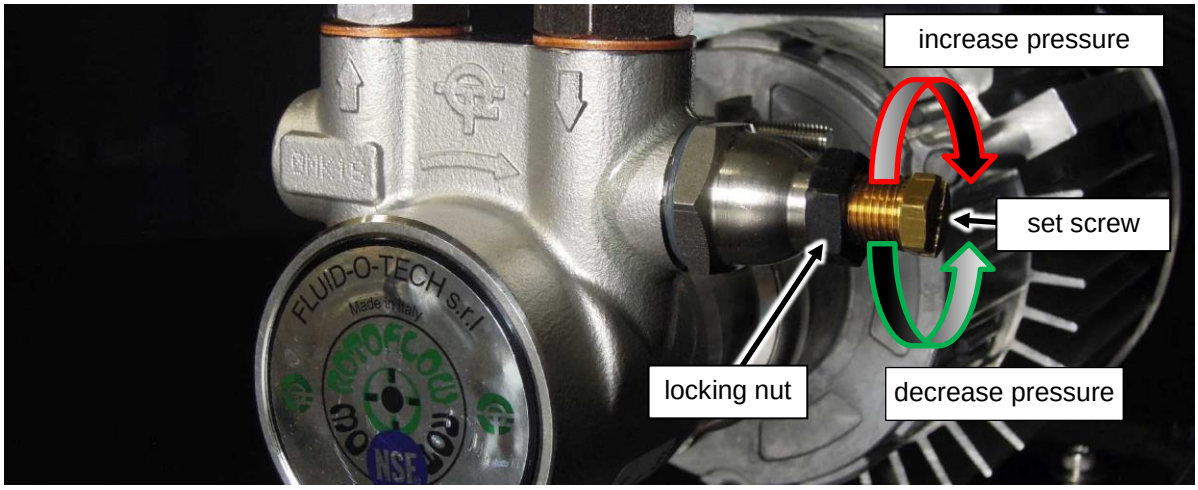


Figure 13. Showing the pump with set screw to adjust the pump-pressure.

Cool down the machine

(re-locate to technical manual?)

As the steam boiler is isolated, the temperature in the steam boiler will drop very slowly when heating is turned off and the machine is otherwise untouched. It will take about 5 hrs to cool down to its ECO temperature of 70°C. The coffee boiler, which is not isolated, will cool down faster and will reach ECO temperature (50°C) after 1.5-2 hrs.

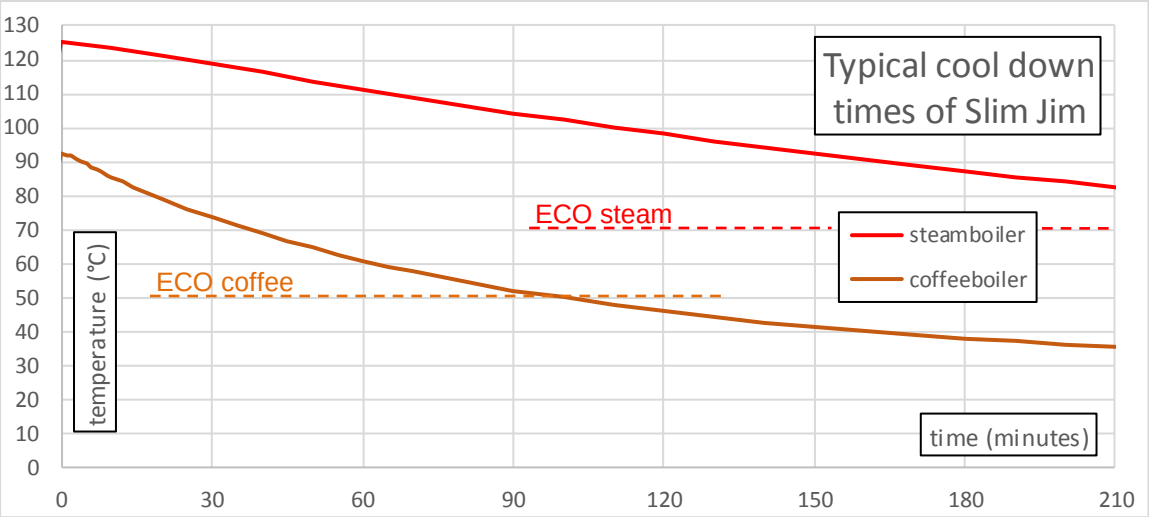


Figure 14. Graph showing typical cool-down of the boilers when the machine is turned to "NO HEAT" when it is at operational temperature.

If it is needed to cool down the machine quickly, turn the heating circuits to OFF and open both steam taps until no more steam escapes from the tip. That will cool down water in the steam boiler to 100°C but be aware that there will be some latent heat within the stainless steel of the boiler and heat exchanger. Activate all groups continuously for a few minutes to have cold water running towards the groups.

Daily to weekly routine

Use hot water from the machine

Even the best treated water will lead to scale deposition in the steam boiler if the steam boiler is predominantly used to steam milk. If the hot water-tap on the espresso machine is hardly ever used get into the habit of doing your daily clean-up up with mix-water drawn from the espresso-machine instead of from the buildings hot-water supply.

Clean body

Resistant smudges on high gloss metal panels may be removed with silver polish and a soft cloth (these surfaces scratch easily, even copper polish may leave marks). Other materials can be cleaned with window cleaner in a hand spray flask in combination with a soft, clean, cotton cloth. When the material is warm you have to work swiftly to prevent stripes: spray and immediately rub.

Lift the drip tray grill from the machine and clean it with washing up liquid and a sponge.

Activate the groups (without filter holder locked in) or let the hot water run for a moment and use a brush to push remains into the drain.

Remove filter basket

Materials needed

- Group screen extractor (or back end of teaspoon)

Procedure

1. Remove the filter holder from the group and pry the filter basket out (see Figure 15).
2. When remounting the filter basket, make sure the spring remains in the indentation of the filter holder and grabs the basket.

Figure 15. Pry filter basket from filter holder with the group screen extractor.

Clean filter holder

Remove the filter basket from the filter holder and clean the filter basket with a little washing up liquid and plastic scouring pad or firm brush. Soak the metal part of the filter holder for 10 minutes in a solution of 1 tablespoon of coffee dissolving powder in 0.5 litre hot water. The plastic handle will eventually disintegrate in this solution and should thus be kept out of the solution.

⚠ **Caution!** Never clean the filter holder in a dish washer as dish washer detergent will ruin it.

Clean steam wand

Milk easily bakes to the hot inner and outer surfaces of the steam wand and tip. Therefore, the steam wand and tip should be cleaned with a damp cloth directly after each use. Do not use this cloth for anything else than the steam wand.

Note! Immediately after steaming milk you should purge the steam wand with a little steam. This will prohibit milk creeping into the pipe, and even into the valve house, through so-called capillary rise. Purging also prevents clogging of the 4 holes in the tip. In the event that clogging occurs, place the end of the steam wand and tip for several minutes in a glass of hot water. The remains will soften and can be wiped off easily. NEVER scrape, grind or cut the steam wand or tip since it leads to damage.

The optional foot-operated 3-way solenoid valve largely reduces the possibility that milk is sucked into the steam wand after it has been used. The plastic steam tip of the optional cool-touch version of the steam wand will largely reduce the possibility that milk will bake onto it and thus facilitates cleaning.

Back flush group

Back flushing cleans the group and conduits from coffee residue which influences the taste of the extraction since fresh (hot) water is transported to the coffee bed through these parts. It is advised to back flush the groups at least once a day and when the machine is intensively used more often.

Note! The automatic cleaning program is best performed at the end of the day and is very useful as there is no need to repeatedly engage-disengage each group individually. You should run the program twice: first with cleaning powder, then rinse the blind filter baskets and run the program again without cleaning powder. In this second run you quickly empty a blind filter in between pressurising of the groups, when the groups have depressurised you do the same with the next group, etc.

Described next is the back flush procedure for an individual group.

Materials needed

- Plastic group brush (included in shipment)
- Blind filter (looks like a filter basket but has no holes, included in shipment)
- Coffee dissolving powder (included in shipment)
- Group screen extractor (included in shipment, or back end of teaspoon)

Procedure

1. Remove the filter holder, activate the group: shortly press the upper button (***Touchpad***) or group lever (***Bastone***) and flush the group for approximately 5 seconds. Then shortly press again to de-activate the group and stop the flow.
2. Clean the group screen and group seal with the plastic group brush.
3. Pry the filter basket (e.g. with the group screen extractor) from the filter holder (see Figure 15) and replace it with the blind filter.
4. Scoop 1 teaspoon of coffee dissolving powder in the blind filter and lock the filter holder in the group.
5. Activate the group, keep activated until full 9 Bar pressure is reached.
6. Then de-activate the group and wait until all pressure has dropped.
7. Repeat steps 5 and 6 eight times (pressurise, then de-pressurise), or use the automatic back-flush program (see page 13).
8. Remove the filter holder from the group, clean the blind filter by flushing it under the tap, activate the group for approximately 5 seconds to remove possible powder from the group screen.
9. Lock filter holder in group, activate the group to pressurise, de-activate the group to de-pressurise, remove filter holder and pour out remaining liquids.
10. Repeat step 9 four times (or use the automatic back-flush program).
11. Pry the blind filter from the filter holder and replace the filter basket.

Δ Warning! Finishing the back flush routine without cleaning powder is essential to prevent remnants of cleaning powder settling between the plunger and housing of the 3-way group valve.

Clean group screen, check and replace group seal

The group screen helps to disperse the incoming hot water onto the coffee bed and also prevents coffee grinds entering the group.
The black group seal will remain flexible for a long time but will harden eventually. We advise to check the group seal regularly and replace when needed.

Materials needed

- Group screen extractor (included in shipment, or back end of a fork or spoon)
- Plastic brush (included in shipment)
- Coffee dissolving powder (included in shipment)
- Replacement group seal (when necessary)

Procedure

1. Pry the group screen gently from the group using the screen extractor levered under the bayonet-ring. Place the pointed edge of the tool **in the rim of** the group screen (see Figure 16 a), do not puncture the group screen. Pry left and right, the screen will fall out together with the group seal.
2. Remove the group seal from the group screen.
3. Soak the metal group screen in a solution of coffee dissolving powder and warm water for about 5 minutes. Rinse under streaming water.
4. Check the group seal for cracks and/or hardening, replace if necessary.
5. One side of the group seal has a somewhat more rounded surface. When replacing the group seal on the group screen, make sure the rounded side of the ring is inserted into the group (facing upwards, see Figure 16 b).
6. Place group screen with group seal on the filter holder and insert into group, pushing upwards.
7. Turn filter holder in bayonet to press group seal into the group.

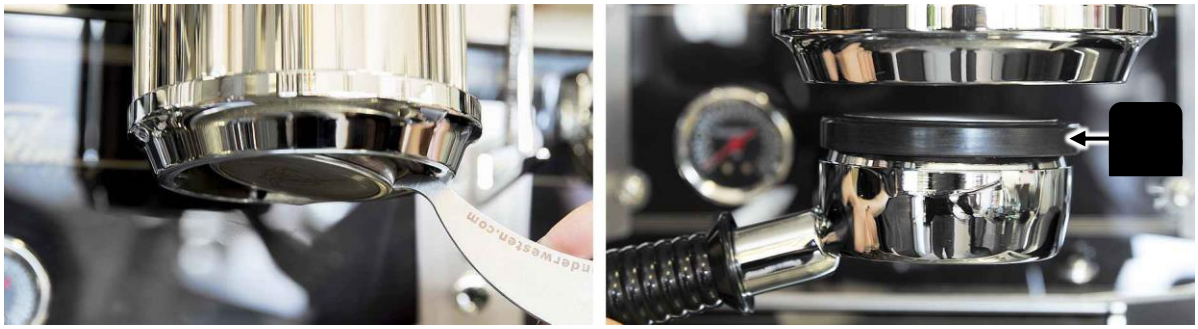


Figure 16 a (left). Pry left and right with screen extractor to remove group screen and group seal.
Figure 16 b (right). Mount group screen with filter holder and group ring. Inset shows schematic cross section of group ring with rounded surface upwards.

Clean group dispersion plate

The group (lower) dispersion plate ensures uniform wetting of the coffee bed. When dirty, the wetting will become less uniform. As the dispersion plate and base are made of plastic material, which is heat neutral, no oils and fats will bake on easily and plate and base will remain clean for quite long. Although the dispersion set is made of high quality plastic material (PEEK), it is slowly affected by the aggressive cleaning powder such that it will need replacement eventually.

Materials needed

- Short screw driver no.2
- Group screen extractor (included in shipment, or back end of a fork or spoon)
- Plastic brush (included in shipment)
- Coffee dissolving powder (included in shipment)

Procedure

1. Remove group screen with group seal (see previous item).
2. Remove the two bolts from plastic dispersion plate with short screwdriver (see Figure 17), the dispersion plate will fall out. Be careful with these screws, they have specific length to match the thickness of the dispersion plate.

> ⚠ **Caution!** The dispersion base remains in the group bottom. With the bolts removed, the connection between the dispersion base and group bottom is fragile.

3. Clean dispersion plate with plastic brush. When necessary, put dispersion plate in a solution of coffee dissolving powder and warm water for about 5 minutes. Rinse under streaming water.

> ⚠ **Caution!** Do not scrub the dispersion plate with a metal brush or Scotch-pad as it will scratch easily and dirt adheres more easily on a scratched surface.

4. When re-installing, tighten the bolts that hold the group dispersion plate with little torque.
5. Remount group screen and group seal (see previous section).

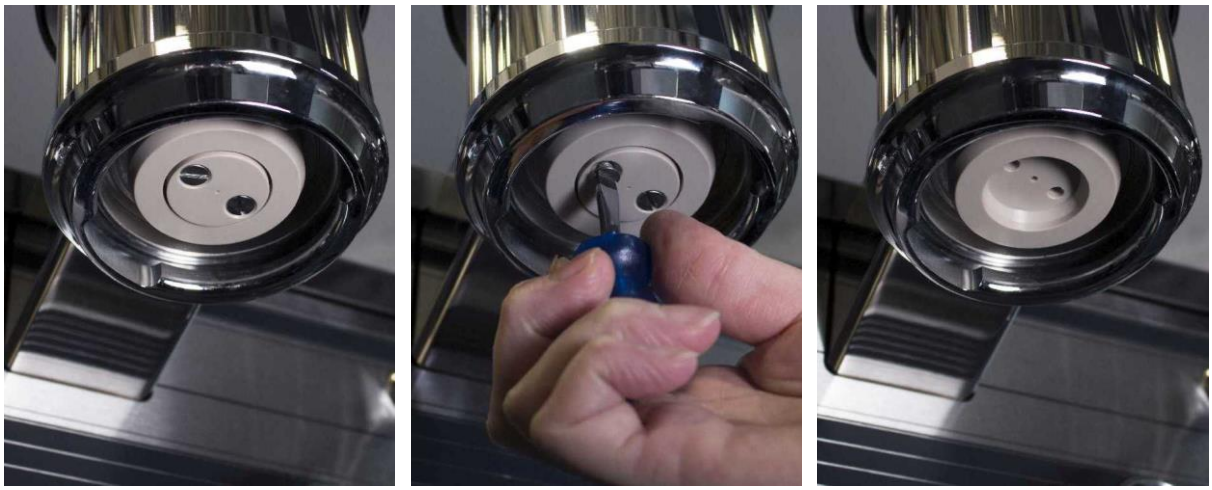


Figure 17. Dispersion set mounted in group head. Remove the 2 screws. The dispersion plate will fall out. The dispersion base remains in the group.

Replace dispersion base and plate

The dispersion base and plate are sold as a set only (with new screws) as both parts deteriorate simultaneously. The protrusion on the dispersion base easily breaks off when the plastic material is affected (by cleaning powder).

Materials needed

- Short screw driver no.2
- Group screen extractor (included in shipment, or back end of a fork or spoon)
- Plastic brush (included in shipment)
- Coffee dissolving powder (included in shipment)
- Replacement for dispersion set.

Procedure

1. Remove the group dispersion plate (see previous item).
2. Gently pull the dispersion base from the group bottom, pull as perpendicular as possible. Do not twist the dispersion base.
   If the dispersion base does not come off from the group bottom easily, use two longer M5 bolts to get a grip on the base (see Figure 18a,b).
   If the protrusion breaks from the base and remains in the group head, pull out with needle nose pliers or twist in a (wood) screw and pull the screw with protrusion from the group bottom.
3. Mount the new base and plate with the new screws, discard the old screws.
4. Remount the group screen and seal (see previous item).

Figure 18. How to remove the dispersion base if it does not come out easily. Use 2 bolts M5x60 or similar to get grip onto the dispersion base.

Check machine condition, report malfunctions

It will help the maintenance technician solving problems if some information about the machine is known before he makes a house-call. This information should include:

1. serial number of the machine
2. free flow rate of each individual group
3. a well-defined description of the malfunction

Free-flowrate

During “free-flow” (no filter holder locked in the group) the flowrate gives an indication of the smallest orifice in the coffee system of the machine. This would normally be the the flat-jet underneath the group-valve which, depending on individual set-up, has a diameter of 0.6 – 1.0 mm. With such small openings, even a minor divergence can cause quite a large difference in flowrate. Production variances of the flat-jets are known to cause a difference in free-flow flowrate and thus “free-flow shot time” between groups of up to 10%.
The table below gives an indication of free-flowrates at brew temperature with different flat-jet sizes. If one or more groups have a free-flowrate that falls outside the range given for that flat-jet it is advised to have a technician check the machine.

diameter of flat-jet (mm)	minimum (ml/minute)	goal (ml/minute)	maximum (ml/minute)
0.6	400	480	500
0.8	630	750	780
1.0	800	960	1000

Table 2. Showing range of free-flowrates for water of 90-95°C at 9 bar brew pressure for different size flat-jets.

Heating element indicator lights

A set of indicator lights is found on the bottom of the electronics box, see Figure 19.

If the machine is warmed up and functioning correctly, the 3 lights on the left (steam boiler) will light up simultaneously at longer intervals and “in sync” [2] with the corresponding orange indicator line shown on the interface. The 2 or 3 lights on the right (coffee boiler heating) will light up shortly at somewhat erratic intervals but in sync with the corresponding orange indicator line on the interface.

If there is a problem with the machine, the indicator lights help to determine possible causes.

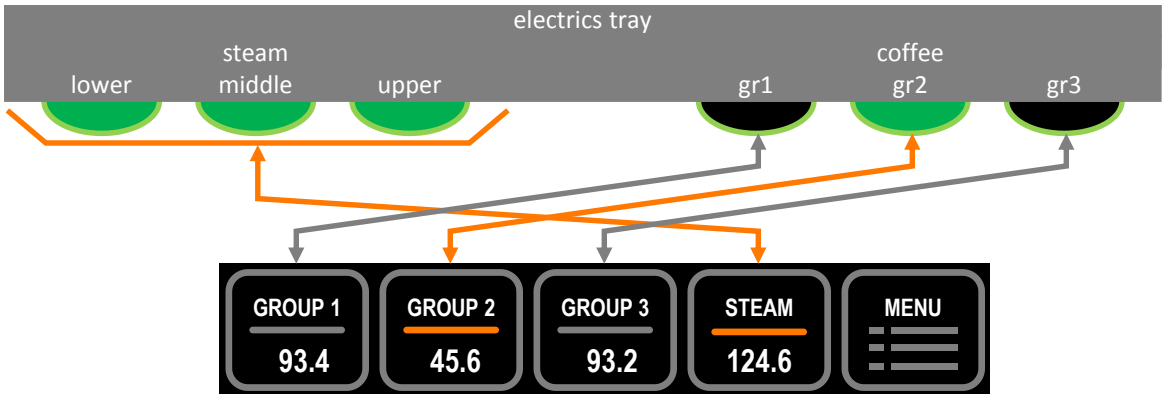


Figure 19. The heating element indicator lights on a Slim Jim Triplette, left indicator lights for the steam boiler, right for the coffee boilers.

[2] The interface is lagging by about 0.5 seconds.

Check pressure gauges

1. No pressure: when not brewing, the needles on all gauges should be in “resting position” (indicating close to 0 bar).
2. Identical pressure: with a blind filter in all groups, all groups active and all pre-infusion cylinders completely full, all gauges should display identical pressures. A small deviation between the different gauges (0.2 bar) is within specifications.

Note! There is no need to replace a faulty gauge immediately. The gauges give feed-back on, but have no active part in, the brew-process. A machine remains fully operational with faulty gauges as long as they do not leak. Have a faulty gauge replaced during the next scheduled maintenance.

Opening pressure of expansion valve

You can check the opening pressure of the expansion valve by first having a long flush (about 20 seconds) then quickly locking in a blind filter and activating the group again. After filling of the pre-infusion cylinder, pressure will quickly rise to pump pressure and then the expansion of heating up the cold inflow of water will increase the pressure inside the coffee system above pump-pressure. The gauge should reach a maximum value between 10.5 bar and 13.5 bar and then remain constant.

Notes!

- If the pressure rises above 13.5 bar, the expansion valve opens at too high pressure.
- If the pressure does not rise over 10.5 bar it is possible that (1) the expansion valve opens at too low pressure or (2) the one-way valve in the system is malfunctioning or (3) a group-valve from another group starts leaking at too low pressure.

When the above is encountered, have a technician solve the problem as soon as possible.

External temperature probe (option)

If you have this option, connect the external probe to the machine and set the interface to show its temperature (see page 13) to check individual temperatures of brews and/or hot water.

Consistency in programmed volumes

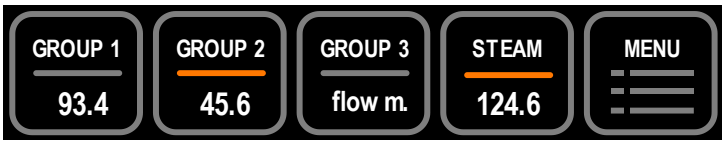
Programmed volumes mutate during a few days after installation as during first fill there will be an inflow of about 0.8 litres in the heat exchanger plus another 0.8 litres of fresh water to each group. After a few days the excess air, which is always present in tap water, has segregated and will be expelled from each group and air content in the coffee-water is stabilised.

Before programming volumes with the bastones or touchpads the machine must be completely warmed up and used to make coffee a few times per group. Using the machine ensures that the drain trap contains some water (which may evaporate overnight when the machine is not used but still warm).

Variance in coffee bed characteristics (ground coffee particle size and distribution and packing/ tamping) should be as small as possible. For that reason you have to make sure that the coffee-bed during volume-programming is the same as during normal coffee preparation. Do not use grinds that have been in a storage container if you normally use grinding-on-demand; level and tamp the grinds as if to make an actual brew; etc..

Flow rate during the entire brew may not fall outside the range of the flow meter: the maximum flow-rate cannot be exceeded due to machine set-up but the flow-rate during a shot should not fall below a certain minimum. When the flow at any time during the brew becomes slower than 25 ml/minute (0.7mm flow meter) or 35 ml/minute (1.15mm flow meter) the impeller in the flow meter will come to a (near) stand-still. When an LED on a bastone or touchpad starts flashing during the brew (and the corresponding area on the interface shows “flow m.” (see Figure 20) it is certain that the flow is too slow but the blinking may hold off even when flow was too slow for accurate counting. The error message will disappear the next time the group is activated.

operational window



group 3 shows a flow-meter error

Figure 20. Error report if the flow-rate during a brew falls outside the flow-meter range.

When you prefer to brew real slowly, we advise to use scales under the cup in combination with manually (de-) activating the group for best weight consistency in the cup.

Recommended maintenance scheme

Daily (see user manual)
- Clean steam wand
- Back flush groups
- Clean filter holder

Weekly (see user manual)
- Clean group screen
- Clean group dispersion plate

Monthly (see user manual)
- Check pump pressure; adjust when necessary
- Check and replace if necessary:
  - group seal
  - group screen
  - filter basket
  - filter holder clip
- Check the functioning of your water treatment system

Every 3 months
monthly maintenance PLUS:

- Grease steam wand ball with food-safe grease and check play between nut and ball of steam wand; replace O-ring and/or nut when necessary
- Check anti-vacuum valve for leakage
- Check safety-valve on steam boiler for leakage
- Check opening pressure of expansion valve
- Check free flow rate per group; clean flat-jets when necessary

Every 6 months
quarterly maintenance PLUS:

- Check dispersion plate and base; replace when necessary
- Check tube from mix-block to hot water outlet for scale build-up; replace when necessary

Every 12 months
bi-annual maintenance PLUS:

- Check injection line for scale buildup; replace when necessary
- Clean level probe and safety probe
- Replace:
  - group screen
  - filter basket
  - filter holder clip
- Replace anti-vacuum valve
- Renew water treatment filter cartridge

Every 5 years
yearly maintenance PLUS:

- Replace all solenoid valves
- Replace pump

For maintenance procedures, we refer to the technical manual.

Maintenance Record

(machine number: _____ , installation date:_____)

Date	Technician	Task	Comments

△ Warning!

Maintenance on the machine should be done by a qualified technician. Parts of the machine can reach a temperature close to 130 °C (266 °F). The steam/hot water boiler contains water and pressurised steam of 125 °C at 1.35 Bar overpressure (257 °F at 20 PSI), temperature and pressure in the coffee system may reach up to 96 °C at 12 Bar overpressure (205 °F at 175 PSI).

When servicing the machine it is sometimes necessary to keep the machine connected to the AC power outlet and the machine switched “ON”. In both cases there is a possibility that you touch a live wire.

☠ Danger

We cannot be held responsible for damage and/or injuries resulting from actions performed on our machines by non-qualified personnel.

Any qualified technician working on the machine is urged to thoroughly read the latest edition of the “Technical manual” which can be obtained via:

support@keesvanderwesten.com

When seeking contact with the e-mail address above, please forward the model and serial number of the machine in question.

Contact information

Kees van der Westen Espressonistic Works B.V.
Van Elderenlaan 6
5581WJ WAALRE
The Netherlands

Telephone *+31 40 2223433*
Email *support@keesvanderwesten.com*
Website *www.keesvanderwesten.com*

Ordering replacement parts
Order spare parts via:
spareparts@keesvanderwesten.com

Please supply machine details (model and serial number) and full contact information when ordering.