SERVICE MANUAL

SP9 System – Twin & Single

(#1000830, #1000831, #1000832, #1000833)

Marco Beverage Systems Ltd.
63d Heather Road,
Sandyford Industrial Estate,
Dublin 18,
Republic of Ireland

Ireland Tel: (01) 295 2674
Ireland Fax: (01) 295 3715

UK Tel: (0207) 274 4577
UK Fax: (0207) 978 8141
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1. **INTRODUCTION:**

The information provided in this manual is intended to assist in the installation and maintenance of the Marco SP9 System, consisting SP9 Boiler and either one or two SP9 Head Units (Single/Twin). Please read the instructions carefully to prevent accidents and ensure an efficient installation.

This manual is not a substitute for any safety instructions or technical data affixed to the machine or its packaging. All information in this manual is current at the time of publication and is subject to change without notice.

*Only technicians or service providers authorised by Marco Beverage Systems should carry out installation and maintenance of these machines.*

Marco accepts no responsibility for any damage or injury caused by incorrect or unreasonable installation or operation.

2. **SAFETY INSTRUCTIONS:**

When using electrical appliances, basic safety precautions should always be followed to prevent the risk of fire, electric shock, burns or other injuries or damages.

- **Read all operating and safety instructions carefully.**

- **This machine must be earthed. If the moulded plug supplied is not used then ensure that the green/yellow cable is connected to a suitable earth.**

- **Risk of flooding: The hose supplied with the boiler is non-toxic food quality tested to 190psi. However, a hose is not a permanent connection. It is, therefore, advisable to switch off boiler and close the stopcock valve when boiler is not in use. e.g. overnight, etc.**

- **The utmost care has been taken in the manufacture and testing of this machine.**

- **Failure to install, maintain and / or operate this machine according to the manufacturer's instructions may result in conditions that can cause injury or damage to property. If in any doubt about the serviceability of the machine always contact the manufacturer or your own supplier for advice.**

- **This machine is not intended for use by persons (including children) with reduced physical, sensory, or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction concerning use of the appliance by a person responsible for their safety.**
• Children should be supervised to ensure that they do not play with the machine.

• In the event any wires are damaged, such wires can only be replaced by experts or professional service staff from the manufacturer service department or similar functional departments.

### 3. SPECIFICATIONS:

<table>
<thead>
<tr>
<th>Dimensions</th>
<th>SP9 Boiler - 4L / 2.4kW</th>
</tr>
</thead>
<tbody>
<tr>
<td>Height (mm)</td>
<td>565</td>
</tr>
<tr>
<td>Width (mm)</td>
<td>155</td>
</tr>
<tr>
<td>Depth (mm)</td>
<td>395</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Performance</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Immediate Draw-Off (litres)</td>
<td>4L</td>
</tr>
<tr>
<td>Max. Hourly Output (L/hr)</td>
<td>24L</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Plumbing</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Fittings</td>
<td>3/4&quot; BSP5-50 psi (35-345 kPa)</td>
</tr>
<tr>
<td></td>
<td>US Machines – 3/8&quot; NPT</td>
</tr>
<tr>
<td></td>
<td>Food grade inlet hose - supplied</td>
</tr>
<tr>
<td>Pressure</td>
<td>0.5 – 5.0 bar</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Electrical</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Mains Plug</td>
<td>Earthed Mains Plug to IEC 230vac</td>
</tr>
<tr>
<td></td>
<td>(UK – 3-Pin Plug, BS1363)</td>
</tr>
<tr>
<td></td>
<td>(EU – CEE7 Schuko)</td>
</tr>
<tr>
<td></td>
<td>(US - NEMA L6-20P)</td>
</tr>
<tr>
<td>Current Rating</td>
<td>11.5 amp</td>
</tr>
<tr>
<td>Power Rating</td>
<td>2.4kW</td>
</tr>
</tbody>
</table>

Table 1.
4. INSTALLATION:

**Electrical Installation:**
- Electrical specification: 2.4kW-230VAC-50/60Hz
- A moulded 13A IEC power cord is provided. This should be plugged into the IEC connection on the base of the boiler and plugged into a suitable 13A power outlet.
- When installing the machine, always observe the local regulations and standards.

**Plumbing Installation:**
- Mains water pressure required (limits): 5-50psi (35-345kPa) 0.5 – 5.0 bar
- Fit a stop Valve on a cold water line and attach a 3/4" BSP male fitting, (e.g. 3/4" x 1/2" 311 or washing machine type stop valve).
- For US versions use 3/8" NPT male fitting.
- **Connect straight tailpiece of the hose to the stop valve fitting. Make sure that the pre-attached sealing washer is fitted.**
- Turn on the water to flush any impurities, dust etc. from the inlet hose and water pipe. Allow several litres through.
- Connect right-angled tailpiece of the hose to the inlet valve of the boiler (3/4" BSP). Make sure the sealing washer is fitted here also.
- Turn on water and check for leaks.

**Installation of SP9 Head Unit:**
A full A4 sheet sized version of the counter cut-out template, seen opposite in Figure 1, can be found on the last page of this manual.

The cut-out is simply two 80mm holes centred 83mm apart. Alternatively, the area outlined in red, bounded by the two circles and the parallel lines (obround shape) can be cut out using a jig-saw or similar.

Once the cut-out is complete, mount the SP9 Head Unit using the brackets supplied. See Figure 3, below. Use the appropriate rubber spacers on the brackets to match the thickness of the counter.

Attach the electrical connector and the two hoses to the appropriate ports on the under counter unit.
A goes to A, B goes to B and DIN goes to DIN.
For a Single Head System, use A1, B1 and DIN1.
For a Twin Head System, connect Head Unit 1 as in a Single Head System. Connect Head Unit 2 to A2, B2 and DIN2.
The hoses should be secured with the supplied hose clips.
The Undercounter Unit should ideally be positioned directly below the Head unit installed position. When mounting Twin Head Units, ensure a minimum of 100mm between units, not just between cut-outs, as indicated in Figure 2, below.

The distance between the SP9 Head Unit and the Under Counter unit should be NO MORE than 400mm.

Max distance between head and boiler refers to the length of the tubing. Since the tubing is never a straight line, actual distance between head and boiler can be substantially less than 400mm, depending on alignment of units.

Drainage – Connect drip tray, boiler vent and head vent to a drain via a tundish or some other method of open connection to drain. Do not connect these three outlets together in a closed configuration using T-piece or double T-piece. Always allow these to “breath”.

![Diagram 1](image1)

![Diagram 2](image2)

![Diagram 3](image3)

![Diagram 4](image4)
Figure 2.

Figure 3.
Operating SP9 Undercounter Unit for the First Time:

- Check that all installation procedures have been carried out.
- Ensure water is connected to unit, valve is turned on and power cord is connected and plugged in to wall socket.
- The “power on” light will glow green and the machine will fill to a safe level, above the elements, before heating. The display will show the current water temperature and the status “Filling…”
- The “Ready/Status” light will cycle two red flashes while the machine is filling to the safe level.
- After this amount of water has heated to about 94°C, the boiler will draw more water in until the temperature drops by 1 or 2 degrees. The boiler will then heat again. This heat fill cycle continues until the boiler is full.
- Ensure the Undercounter unit is set to SP9 mode for use with the SP9 brewer. See Menu Navigation section in this manual
- While filling, the “Ready/Status” light will remain blank.
- The “Ready/Status” light will glow green when the machine is both full and up to normal operating temperature. Allow approximately 15 minutes.
- The boiler is now ready for use – the display will show the Water Temperature and the status “READY”.

5. SETUP AND CALIBRATION:

Operating the Head Unit for the first time:
To help prevent heat loss between the Undercounter unit and the Head unit the silicone hose can be insulated with hose insulation. Simply cut the insulation to the correct length required.
Once the Head Unit installation procedure has been carried out, place a 1 litre jug under the dispense head. Set the dispense volume to 750ml and press the start switch twice. This will dispense 750ml in one delivery, without pausing. Measure the dispensed volume to confirm factory calibration (750ml ± 10ml). If the volume is not satisfactory, proceed to the calibration procedure below to calibrate the Head Unit. The calibration should only be conducted by a trained service engineer. See guidelines below.

Dispense Volume Calibration
1. Once all installation procedures are carried out the Head Unit is ready to be calibrated.
2. Turn volume dial to Max. Set Brew Time to 2 minutes.
3. Place large container (>1 litre) of known weight under spray head.
4. Initiate brew.
5. Weigh & record brew output.
6. The output should be 750g, plus or minus 10g.
7. If output is within 10g of 750g calibration is complete.
8. If not, enter calibration mode by holding down toggle switch for approximately 3 sec.
9. A long beep will sound to confirm the unit is in calibration mode.
10. Enter the volume recorded via the brew switch using the following example:
   - If 724g was measured
   - The toggle switch is used to input each digit successively
   - To enter ‘7’ the toggle switch is toggled 7 times
   - A long beep will sound
   - To enter the ‘2’ toggle the toggle switch 2 times
   - A long beep will sound
   - To enter the ‘4’ toggle the toggle switch 4 times
   - To enter a ‘0’ value simply do not toggle the toggle switch.
   - If calibration is successful a long beep will sound at the end of the process. If not, multiple short beeps will sound
11. Verify calibration by repeating steps 2 – 5.

**NOTE:** SP9 head should allow you to enter a value between 375 and 999 in calibration. If your volume is above 1000 you should do it in 2 stages – first enter 999, then do the full brew and enter measured value in calibration.

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**CALIBRATION**

1. Turn quantity to maximum value & time to between 2-3 minutes.
2. Dispense, note not using continuous dispense mode.
3. Weigh output
4. Feedback weight (see text on page 5)

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Figure 5.

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SP9 Revision 1.6 has additional calibration steps as outlined below.

If the dispensed volume from the SP9 is not linear, the following additional calibration can be completed to more closely match the printed scale to the dispense volume.

**To calibrate SP9 scale (Revision 1.6 and later ONLY):**
Set dial to 200ml, hold toggle switch down until second beep is heard.
Set dial to 700ml, hold toggle switch down until third beep is heard.
Scale is now calibrated.

**Additional functionality of SP9 Revision 1.6:**
If a brew is cancelled after any water has been dispensed, the pump I the boiler will stop and the dump/dispense valve will operate for 5 seconds to purge water from the SP9 head.
6. OVERVIEW & OPERATION:

SP9 – EFFORTLESS EXCEPTIONAL COFFEE BY THE CUP

SP9 is a single-portion brewer designed to deliver volumes from 150ml to 750ml. It is designed to work with several different existing brewing devices from Kalita right through to Chemex.

SP9 also has a Continuous Dispense Mode for filling tea pots or other hot beverage vessels.

SP9 can be configured as a Twin System, with two head units operating independently from a single under counter unit.

SP9 can also be configured as a Single System, with a single head unit operating with a single under counter unit.

In brew mode, once the brew switch is toggled, SP9 will recirculate hot water for 15 seconds to preheat the system. It will then start to dispense water in 9 pulses. The first pulse is 12% of the total volume selected, designed as a pre-infusion stage. The remaining 8 pulses are all of equal volume of 11% of total volume selected.

Water Volume can be varied from 150ml to 750ml. Brew Time can be varied from 1 to 5 minutes.

The under-counter unit can deliver 100 to 120 cups of water per hour at a flow rate of 1.3 litres/min.

Before brewing you should become familiar with the SP9 system controls.

Brew Cycle Calculation

JET6 / SP9 - PULSE BREW CYCLE

FLOW RATE = 2.1 LTR/MIN

6.0 @ 2.1 = 2.86 mins = 172 seconds

BREW TIME = 9 mins (540 secs)
Brew Time = (Water Delivery) + (Pause Time)

Brew Time = (172 seconds) + (368 seconds)

540 Secs = (9 x Water Pulse) + (8 x Pause)

540 Secs = (20.6 + (8 x 18.9)) + (8 x 46 secs)
CONTROLS

DIAGRAM OF PARTS

Head
Spray Head
Basket Holder
Drip Tray
Display Screen
Boiler
Service Hatch

Head Box Contains
• SP9 Head & mounting brackets
• Hosing
• Spray Head 4 hole (factory fitted)*
• Spray Head 7 hole
• Instruction Manual

Boiler Box Contains
• SP9 Boiler
• Power Cord
• Vent Hosing
• Instruction Manual
• Water Inlet Hose

* Note: Alternate spray head not suitable for cup-by-cup swapping. Preferred sprayhead should be selected at install prior to calibration.
BREWING

Select the required volume of water to be dispensed, using the upper control knob.

Select the brew time, also referred to as the dispense or contact time, using the lower control knob.

Start the brew by pressing the toggle switch once. Three beeps will be heard when the brew cycle has completed.

For continuous dispense mode, select the volume of water to be dispensed and press the toggle switch twice.
Brewing

1. Select quantity

2. Select time

3. Place device with coffee under the spray head

4. Press toggle once

Figure 7.
7. MENU NAVIGATION:

Display Panel

Undercounter Unit Modes of Operation

Ensure the Undercounter unit is set to SP9 Mode for use with the SP9 head unit.

The SP9 Undercounter Unit has many settable features which gives the operator greater flexibility in choosing how the unit will operate.

There are two Menus in the SP9 Undercounter Unit:
- **USER SETUP**.
- **SERVICE SETUP**
Entering Setup Mode
• To enter setup mode press power and eco buttons on the front panel at the same time.
• The display will show “USER SETUP” message:
• Release the buttons now to enter the USER SETUP mode.
• To enter advanced settings (Service Setup) keep the buttons pressed until the display shows “SERVICE SETUP” message and release them.
• In both setup modes use front panel buttons to navigate the settings:
  • Power button to scroll through the functions,
  • Eco button to increase set value (press and hold for auto-repeat).

8. USER SETUP OPTIONS:

The default temperature setting is 95°C
The user can set the temperature of the tank. Use the navigation instructions above to change the temperature.
NOTE: Temperature should never be set for more than 96°C as it may cause steam to be generated during low pressure days.

<table>
<thead>
<tr>
<th>Screen view</th>
<th>Description</th>
<th>Default value</th>
</tr>
</thead>
<tbody>
<tr>
<td>SET TEMP: 95.0</td>
<td>Sets new tank temperature. Range: 60 – 98.5 °C (Default 95°C) Resolution: 0.5 °C</td>
<td>93.0</td>
</tr>
<tr>
<td>TIME DISP: 00.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PAUSES: 00.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PAUSE TIME: 00.0</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Screen view</th>
<th>Description</th>
<th>Default value</th>
</tr>
</thead>
<tbody>
<tr>
<td>SET TEMP: 95.0</td>
<td>Sets dispense time. Range: 0 – 99.9 seconds Resolution: 0.1 second For PUSH &amp; HOLD mode set to 0 (Default).</td>
<td>00.0</td>
</tr>
<tr>
<td>TIME DISP: 00.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PAUSES: 00.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PAUSE TIME: 00.0</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Sets number of pauses during time dispense.
Range: 0 – 20
If machine set as PUSH & HOLD then number of pauses has no impact on dispense.

Sets pause time (same for each of the pauses).
Range: 0 – 20.0 seconds
Resolution: 0.1 second
If machine set as PUSH & HOLD then time of pause has no impact on dispense.

Press the **eco** button to save all the values and reboot the machine.

### 9. SERVICE SETUP OPTIONS:

<table>
<thead>
<tr>
<th>Screen view</th>
<th>Description</th>
<th>Default value</th>
</tr>
</thead>
</table>
| **DESCALE**: OFF  
**FILTER**: OFF  
**INLET TIME**: 03.0  
**DEAD TIME**: 12.0 | **No. 1** Sets and shows remaining weeks before de-scaling is needed (“DESCALE TANK” message on the screen). Setting it to OFF will disable the function. Range: 1 – 60 weeks | **OFF** |
| **DESCALE**: OFF  
**FILTER**: OFF  
**INLET TIME**: 03.0  
**DEAD TIME**: 12.0 | **No. 2** Sets and shows remaining litres of water before filter change is needed (“CHANGE FILTER” message on the screen). Setting it to OFF will disable the function. Range: 100 – 9900 litres | **OFF** |
| **DESCALE**: OFF  
**FILTER**: OFF  
**INLET TIME**: 03.0  
**DEAD TIME**: 12.0 | **No. 3** Sets the time for which the inlet opens every time the machine needs water. It minimises temperature fluctuations. The value should be picked to allow 0.5 - 1°C cooling after water intake and depends on the tank size and element power. **This is a factory setting and should only be changed by trained personnel.** Range: 0 – 20.0 seconds Resolution: 0.1 second | **3.0** |
No. 4 Sets the time at which machine waits for the water too cool down after water intake. Measured from the beginning of the water intake. The value depends on tank size and element power. This is a factory setting and should only be changed by trained personnel. Range: 0 – 60.0 seconds Resolution: 0.5 second

No. 5 “SERV PIN” limits access to SERVICE SETUP, setting it to 0000 disables the pin (default) Back-Door PIN is 1793

No. 6 PIN entry screen - once PIN is set and user wants to access SERVICE SETUP, this screen will pop up. Use top button to move through positions and bottom to scroll through the values (0 to 9 and again 0). If PIN is accepted you will gain access to the SERVICE SETUP, if PIN is rejected machine will reboot itself.

No. 7 Sets the mode the machine works in:
• SP 9 - Default
• HEAT FILL (minimises temperature fluctuations),
• CONT FILL (continuous fill – makes sure the tank is always full but temperature may vary),
• COOL FILL (allows cooling but reduces tank size by using ECO mode),
• MANUAL (manual filling).

No. 8 Sets temperature units on screen. Celsius or Fahrenheit

No. 9 This sets max limit of the temperature that user can set in USER SETUP; max value is 98.5 degrees Celsius
No.10 Press the *eco* button to save all the values and reboot the machine.

Table 3.

10. DIAGNOSTICS:

The SP9 under counter unit is controlled by a processor-based embedded system which monitors different aspects of the equipment. If a fault is detected, the ready light will flash red a number of times, pause, and then repeat the flashes, as long as the fault is detected. A list of faults, corresponding to the number of flashes between each pause, can be seen below.

<table>
<thead>
<tr>
<th>No. of Flashes</th>
<th>Symptom</th>
<th>Action Required</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Boiler full but not heating - low-level probe not seeing water</td>
<td>Clean Probes</td>
</tr>
<tr>
<td>2</td>
<td>Water below low-level probe (normal at installation) Level probes not seeing water</td>
<td>Check Water Feed/Pressure Clean Water-Level Probes</td>
</tr>
<tr>
<td>3</td>
<td>Temperature Sensor Failure (o/c)</td>
<td>Replace Thermistor</td>
</tr>
<tr>
<td>4</td>
<td>Water Not Heating</td>
<td>Heating Element/Clean Probes</td>
</tr>
<tr>
<td>5</td>
<td>Temperature Sensor Failure (s/c)</td>
<td>Replace Thermistor</td>
</tr>
<tr>
<td>6</td>
<td>Machine not Filling</td>
<td>Check Water Feed Inlet Solenoid/Clean Probes</td>
</tr>
</tbody>
</table>

Table 4.

Note: If there are variations in dispense volumes, ensure that the silicon spray head is installed properly. Failure to do so may lead to incorrect/varying dispense volumes.
### 12. DISPLAY STATUS MESSAGES:

<table>
<thead>
<tr>
<th>Status</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>BOILER OFF</td>
<td>Machine off. Display backlight off but temperature read-out still working.</td>
</tr>
<tr>
<td>FILLING ...</td>
<td>Water level below low level probe. Machine is filling automatically. Status LED – 2 red blinks.</td>
</tr>
<tr>
<td>FILL THE TANK</td>
<td>Water level below low level probe. Machine has to be refilled manually (shown only in MANUAL mode). Status LED – 2 red blinks.</td>
</tr>
<tr>
<td>WAIT ...</td>
<td>Water is being heated. Dispense valve disabled.</td>
</tr>
<tr>
<td>BOILER READY</td>
<td>Water is up to the temperature and can be used. Note that this only means that the tank is heated and not that it is full. Status LED – green.</td>
</tr>
<tr>
<td>DISPENSE</td>
<td>Water is being dispensed. If machine is set to time dispenses – there will also be a progress bar drawn underneath. Dispense can always be cancelled by clicking the dispense button again.</td>
</tr>
<tr>
<td>COOLING ...</td>
<td>Machine was set by the user to a lower temperature than the current tank temperature and is trying to cool down by taking in more cold water. This process may take between 20 seconds to a few minutes depending on tank size and temperature difference. Works only in COOL FILL mode.</td>
</tr>
<tr>
<td>DISPENSE WATER TO COOL THE TANK</td>
<td>Machine cannot take more cold water to cool the tank because it is full. Water needs to be dispensed to allow room for more cold water to come in and finish cooling process.</td>
</tr>
<tr>
<td>DESCALE TANK</td>
<td>Descale timer elapsed. Time to descale the tank.</td>
</tr>
<tr>
<td>CHANGE FILTER</td>
<td>Litres output exceeds set value. Time to change the water filter.</td>
</tr>
<tr>
<td>CHECK LOW PROBE</td>
<td>Low water level probe broken (disconnected). Machine detects high level probe signal but cannot detect low level one. Filling is disabled. Status LED – 1 red flash.</td>
</tr>
<tr>
<td>THERMISTOR S/C</td>
<td>Temperature sensor (thermistor) is short circuited. Dispense and heater disabled. Status LED – 3 red flashes.</td>
</tr>
<tr>
<td>ELEMENT FAILURE</td>
<td>Heating element is broken. Error is triggered when after 20 minutes of heating and not taking in water temperature in the tank fails to increase. Dispense is disabled. Status LED – 4 flashes.</td>
</tr>
<tr>
<td>THERMISTOR O/C</td>
<td>Temperature sensor (thermistor) is disconnected. Dispense and heater disabled. Status LED – 5 red flashes.</td>
</tr>
<tr>
<td>LOW PRESSURE</td>
<td>Incoming water pressure too low. The error will be reset after water supply restores. All boiler functions are active. Status LED – 6 flashes.</td>
</tr>
<tr>
<td>COMM ERROR</td>
<td>Display board lost communication with boiler PCB (cannot receive serial data about temperature and probes). All actions cancelled.</td>
</tr>
</tbody>
</table>

Table 5.
13. ROUTINE MAINTENANCE:

It is a common occurrence for limescale to build up in the tank of a water boiler. The amount of limescale build up is relative to the water hardness in a particular area. The most common error indication on a boiler is the Ready light giving two red flashes between pauses, indicating that water can’t be seen in the tank. This can be caused by a number of issues, most commonly, limescale or film build up on the water level probes.

**Descaling Procedure:**

- Isolate machine from power supply.
- Isolate machine from water supply.
- ALLOW TO COOL COMPLETELY!
- Drain water from machine.
- Remove all lids.
- Remove as much scale as possible by hand, paying particular attention to level probes (White plastic with steel tab). Be very careful not to damage any attachments.
- Use ScaleKleen, Marco part No. 8000270 or similar. Follow instructions carefully.
- Thoroughly clean and flush the machine before re-use.
- Clean water level probes with ScotchBrite
- Follow installation and first time operation instructions

NB: Always clean the water level probes after descaling and rinsing the tank.

**To Clean Water Level Probes:**

- Turn off water feed to unit
- Dispense as much water from unit as possible using two clicks at the head unit
- Turn off unit at wall socket or unplug from wall socket
- Remove top cover from boiler
- Remove tank lid from tank
- Identify water level probes – flat metal tabs inside water tank - 3 probes
- Thoroughly clean probes with ScotchBrite (or scouring pad)
- Replace tank lid and top cover
- Reconnect power and water to boiler and operate as normal
14. COMPONENT ACCESS – UNDER COUNTER UNIT:

Access to the IEC socket (230vac/13A) and the water connection point is at the base of the unit.

![INLET SOLENOID CONNECTION](image1)
![IEC LEAD CONNECTION](image2)

**Figure 8 - Base of SP9 Undercounter Unit**

**SP9 Connections**

When connecting a single SP9 Head to the under counter unit, the electrical connection should be connected to DIN1, the water feed to the Head Unit should be connected to A1 and the water return from the Head Unit should be connected to B1.

Similarly, when connecting a Twin SP9 system, the first Head Unit should be connected as described above. The second Head Unit should be connected in the same manner but to A2, B2 and DIN2.

The Vent should be plumbed to a waste outlet via a tundish.
Water Tank Access

In order to descale the tank or clean the water level probes, it is necessary to access the tank. This can be done by removing the two screws retaining the rear top cover, as shown opposite.

Remove the rear top lid and the top tank insulation inside.

Water Tank Lid Removal

Remove the four 10mm hex nuts retaining the tank lid to gain access to the interior of the water tank.

There’s no need to remove the silicon hose attached to the tank lid. Simply fold it back out of the way while still attached.

Internal Components Access

To access the internal components and wiring, remove the side panel by first removing the four cross-head retaining screws.
Figure 12.

Internal Component Map
1. Dispense Solenoid Tab
2. Inlet Solenoid Tab
3. Neutral Tabs
4. Transformer
5. Mains Live In Tab
6. Relays - Heater
7. Heater Tab
8. On/Off 2-way Connector (Link Inserted
9. LED 5-way Connector
10. Earth Tab
11. Daughter PCB Connector (low voltage)
12. External Connector
13. Thermistor Connector
14. DIP Switch – 3 way
15. Tactile Switch
16. Water Level – 5-way connector (low voltage)
17. Button Connector – 4-way
18. Data I/O Connector – 4-way
19. Relays – Inlet Solenoid

Figure 14.
Replacing the Main Control Board

If the main control board needs to be replaced, note the position of all connections and the DIP-switch settings.

Remove power to the under counter unit and remove all connections from the main control board. Using a pillar release tool (or a BIC biro with the refill removed) release each pillar in turn while applying slight pressure to the back of the control board. Once all pillars have been released, remove the board completely.

![Figure 15.](image)

Before fitting the replacement main control board, ensure the DIP-switch settings correspond to those of the original control board, as noted earlier.

Ensure all connections have been replaced in the correct positions before applying power to the machine. The diagram on the previous page details all connection points on the main control board.

Pump Replacement

To remove a pump, cut the retaining cable ties, unplug the electrical connections and remove the silicon hose from the outlet port on the pump.

The pump is push-fit and is held in place by the seal and the siphoning action of the pump.

Pull or pry the pump from the seal to remove.

Follow the instructions above in reverse to replace the pump.
Display Board Replacement
Remove the ribbon cable from the display board. Remove the four retaining nuts.

When removing the display board, be careful not to lose any spacers, as the distance between the display board and front panel is critical to the operation of the switches on the board.

Fit the replacement board and replace the four retaining nuts.
Do not over-tighten, as this will affect the distance between the front panel and the display board.

24vdc Power Supply Replacement
Disconnect power to the under counter unit. The cable connections can be removed before removal of the 24vdc power supply or after the retaining screws have been removed, depending on access and preference.
The 24vdc power supply is retained on its mounting bracket by two screws, accessible from the bottom of the bracket. Remove the two screws (and the cable connections, if applicable) and remove the 24vdc power supply. Replace the 24vdc power supply and the cable connections.
Ensure the connections are replaced back in to the correct terminals.

Water Level Probes Replacement
To replace the water level probes, empty the tank and gain access through the tank lid opening.
Disconnect the wiring harness from the outer threading part of the probe. While holding the probe on the inside of the tank, remove the retaining nut on the outside. The probe can now be removed and replaced. See diagram on next page.

Note: Probes should only be replaced if leaking or physically damaged. Usually, any probe issues can be resolved by cleaning them with ScotchBrite.
**Heating Element Replacement**

To replace the heating element, empty the tank and gain access through the tank lid opening. Disconnect the spade connectors from the outer connectors of the heating element. While holding the heating element on the inside of the tank, remove the retaining nuts and seals on the outside. The heating element can now be removed and replaced. See diagram on next page.

*Note: Do not over-tighten the retaining nuts, as this could deform the seals and cause leakage.*

**Over-Temperature Cut-Out Replacement**

To replace the over-temperature cut-out switch, remove the spade connectors from the switch. Remove the two retaining nuts and remove the switch. When replacing, use a little thermal conductive paste to ensure good thermal conductivity. See diagram on next page.
15. COMPONENT ACCESS – HEAD UNIT:

All internal components can be accessed by removing the three main panels, as indicated in the diagram below.

**Top Flat Panel** – Remove 3 screws
Before removing top flat panel, remove the reservoir gasket (No.9 on Spare Parts Schematic).

**Front Flat Panel** – Remove 4 screws

**Front Curved Panel** – Remove 2 screws
Be careful when removing front curved panel, as the reservoir is mounted inside this panel.
To Remove Knobs:
- Remove centre cover from knob using a small screw driver or knife
- Loosen the knob from the spindle by turning the brass collar anti-clockwise, as indicated in photo opposite

To Replace Knobs:
- Turn spindle to either end point
- Place knob on to spindle and align to appropriate end point dot, as indicated in photo opposite
- Tighten the brass collar by turning it clockwise
- Replace the centre cover on the knob

Head Unit Control Board Replacement
Remove the front curved panel, as described previously. It should be possible to achieve sufficient clearance for removal of the control board without having to disconnect the tubing from the reservoir.
Disconnect the cable connection from the control board. Remove the adjustment knobs and retaining nuts from the adjustment pots. Remove the head unit control board from inside the head unit.
Replace the control board by following the preceding instructions in reverse.
Reservoir and Solenoid Replacement
Remove the front curved panel, as described previously. Disconnect the wires from the solenoid. Remove the tubing from the bottom of the solenoid and the three tubes from the bottom of the reservoir. Remove the retaining nuts and silicone spacers from the reservoir. The solenoid is attached by pushing it in to the silicone mounting seal in the reservoir. Remove the solenoid from the reservoir by pulling the two apart while twisting them. When replacing the reservoir or solenoid, follow the instructions above in reverse.

Figure 20.
16. ELECTRICAL SCHEMATICS:
17. SPARE PARTS SCHEMATICS:
### SP9 Under-Counter Unit – Spare Parts Part 1

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# SP9 Head Unit – Spare Parts

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### 18. RECOMMENDED SPARE PARTS:

#### SP9 Head Unit (P/N: 1000830) - Spare Parts

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#### SP9 Under-Counter Unit (P/N: 1000831) - Spare Parts

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19. DIMENSIONED DRAWINGS:
Installation Cut-Out Template

192.8mm

83 ±1

∅80

131mm

100

131

∅80
SP9 Overfill Error / Baffle Plate Removal

Overview

The SP9 Twin System is predominantly used where high volume portion brewing is required. It has been found, in certain circumstances, that an over-fill error can occur when both head units are used simultaneously.

This issue does not occur with the SP9 Single System.

If this issue occurs, an Overfill Error message will be shown on the boiler LCD screen and brewing will be halted immediately.

Changes/Updates

If the over-fill error is occurring during simultaneous twin brew cycles, the baffle plate in the water tank can be removed to prevent this issue from occurring, without affecting the operation of the system.

The baffle was originally inserted to reduce the impact and aid in dispersing the recirculated water when entering the water tank. The design has been updated to remove the baffle plate in future models.

Baffle Removal

Ensure under counter unit has been isolated from the water and electricity. Allow boiler to cool.
Remove the top black lid from the under counter unit by removing the two retaining screws. Figure 1.
Remove the insulation foam from on top of the water tank.
Remove the water tank lid by removing the four retaining nuts. Figure 2.
Gently lever off the tank lid and remove the baffle by inserting finger in to hole in baffle plate pulling it away from the tank. Figure 3.
Be careful of potentially sharp edges on baffle plate.

Replace the tank lid and four retaining nuts.
Insert the insulation foam back on top of the water tank.
Replace the top black lid and two retaining screws.

Reconnect water and electricity, and operate according to user manual.
How to Descale Water Tank and Clean Water Level Probes

It is a common occurrence for limescale to build up in the tank of a water boiler. The amount of limescale build up is relative to the water hardness in a particular area.

The most common error indication on a boiler is the Ready light giving two red flashes between pauses, indicating that water can’t be seen in the tank. This can be caused by a number of issues, most commonly, limescale or film build up on the water level probes.

**Descaling Procedure:**
- Isolate machine from power supply.
- Isolate machine from water supply.
- ALLOW TO COOL COMPLETELY!
- Drain water from machine.
- Remove all lids.
- Remove as much scale as possible by hand, paying particular attention to level probes (White plastic with steel tab). Be very careful not to damage any attachments.
- Use ScaleKleen, Marco part No. 8000270 or similar. Follow instructions carefully.
- Thoroughly clean and flush the machine before re-use.
- Follow installation and first time operation instructions

NB: Always clean the water level probes after descaling and rinsing the tank.

**To Clean Water Level Probes:**
- Turn off unit at wall socket or unplug from wall socket
- Remove top cover from boiler
- Remove tank lid from tank
- Identify water level probes – flat metal tabs inside water tank, normally 2 or 3 probes
- Dispense as much water from unit as possible using tap
- Thoroughly clean probes with ScotchBrite or scouring pad
- Replace tank lid and top cover
- Reconnect power to boiler and operate as normal
How to Clean Water Level Probes

It is a common occurrence for limescale to build up in the tank of a water boiler. The amount of limescale build up is relative to the water hardness in a particular area. All Marco boilers are controlled by an embedded system which monitors the various aspects of the machine. If there is a flashing red light displayed at any time, this is an indication that the embedded system has identified a fault. The number of flashes between each pause indicates a specific fault. The most common indication is two flashes between pauses, indicating that the embedded system cannot see water in the tank. This can be caused by a number of issues, including water feed being turned off, low water pressure or, most commonly, limescale or film build up on the water level probes.

To Clean Water Level Probes:

- Turn off unit at wall socket or unplug from wall socket
- Remove top cover from boiler
- Remove tank lid from tank
- Identify water level probes – flat metal tabs inside water tank, normally 2 or 3 probes
- Dispense as much water from unit as possible using tap
- Thoroughly clean probes with ScotchBrite or scouring pad
- Replace tank lid and top cover
- Reconnect power to boiler and operate as normal