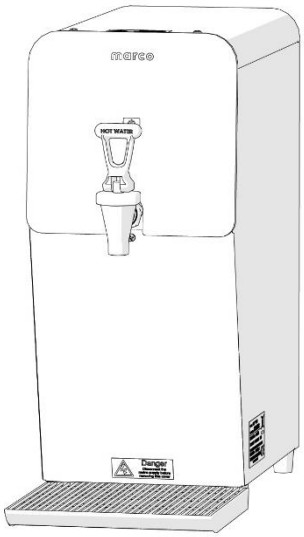
MT Boiler Range – Service Manual



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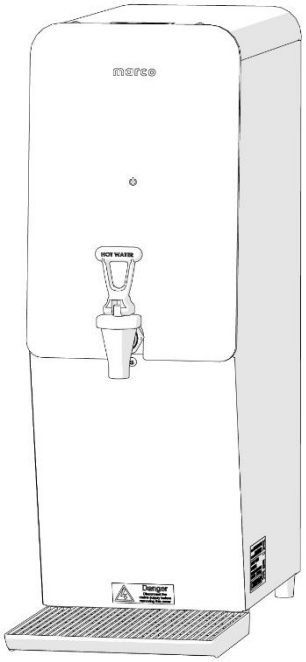

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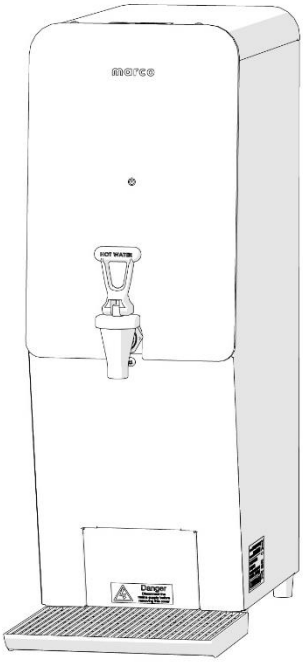

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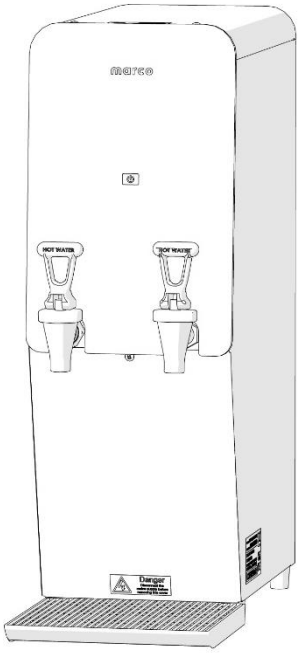

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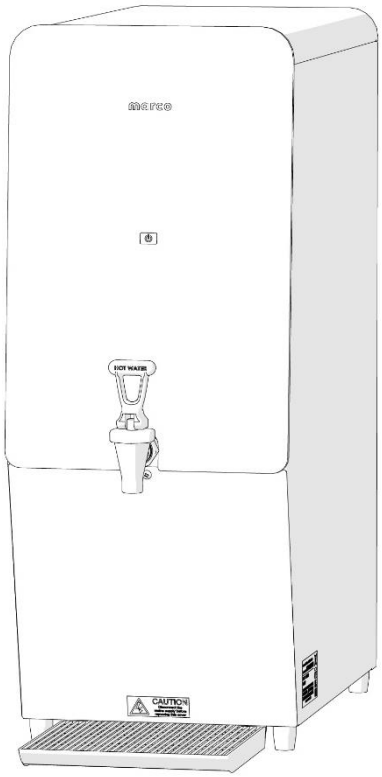

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ww.marcobeveragesystems.com	Ireland Tel: +353 (1) 295 2674
	UK Tel: +44 (0207) 2744577

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1. INTRODUCTION

The information provided in this manual is intended to assist in the installation and maintenance of the Marco Mix Boiler range. 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 should carry out installation and maintenance of these machines.

Marco accepts no responsibility for any damage or injury caused by incorrect or unreasonable installation and 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 appliance must be placed/installed on a horizontal flat stable surface.**
- **The ambient temperatures this appliance should operate within 5°C - 35°C (41°F – 95°F).**
- **This appliance may be placed in self-service areas if attended to by trained personnel.**
- **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 machine 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 after service staff from the manufacturer after service department or similar function departments.**
- **CAUTION - Risk of fire and electric shock. Only to be used with manufacturer's specified power cord set. Marco p/n 1501506, 1501487 (USA), 1501488 (EU), 1501489 (UK/Ire).**
- **This appliance should not be installed in an area where a water jet could be used to clean it.**
- **Access to the service area of the appliance is restricted to persons having knowledge and practical experience of the appliance and the relevant safety and hygiene requirements.**

3. SPECIFICATIONS

BOILERS:

		MT4 – 1000762# 1001762#	MT8 – 1000763# 1001763#	MT8DT – 1000764#	MT25 – 1000765#	MT30 – 1000766#
Performance	**Immediate Draw Off (L)**	4L	8L	8L	25L	30L
	Total Hourly output (L/hr)	28	28	28	28	56
Electrical	**Mains Connection**	Earthed Mains Plug to IEC 230V (UK – BS1363) (EU – CEE7) (US 230V – NEMA L6-20P) (US 120V – NEMA 5-15)				
	Rating	@230V 2.8kW 13A @120v 1.5kW 13A				@230V 5.6kW 30A
Plumbing	**Fittings**	0.75” BSP (or 9/16”-24 UNEF for US versions) food grade inlet hose supplied.				
	Required Pressure	14.5 – 145 psi (100-1000 kPa) 14.5 – 87psi (100-600kPa) machines with built-in filter				
Dimensions	**Height (mm)**	464	589		690	
	Width (mm)	202	202		272	
	Depth (mm)	436	436		570	

4. INSTALLATION

4.1 MT Boiler Installation

Electrical Installation:

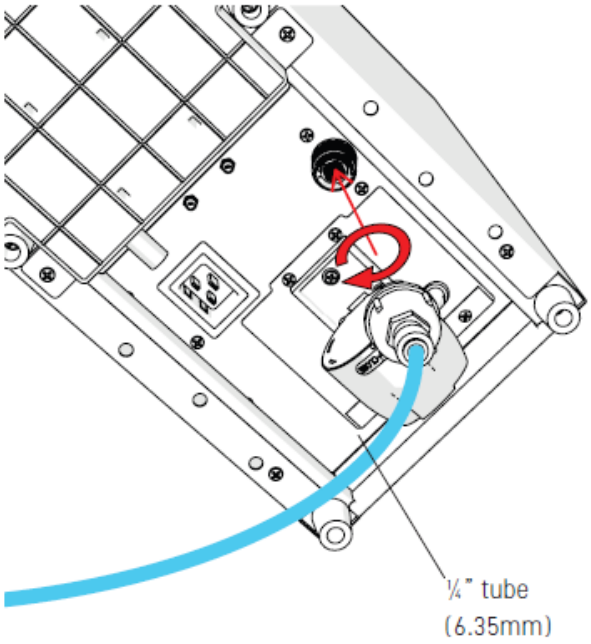
When installing the machine, always observe the local regulations and standards. The appliance is supplied with a moulded power cord. A suitable mains power supply socket should be available within easy access of the appliance so that it can be disconnected easily after install.

Plumbing Installation:

- Mains water pressure required (limits): 14.5 – 145psi (100 – 1000kPa) 1.0 – 10.0 bar except machines with built-in water filter: 14.5 – 87psi (100-600kPa) 1.0 – 6.0 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 9/16”-24 UNEF – 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 the hose to the inlet valve of the boiler (3/4" BSP). Make sure the sealing washer is fitted.
- Turn on water and check for leaks.

4.1 MT Boiler Installation (cont.)

1.



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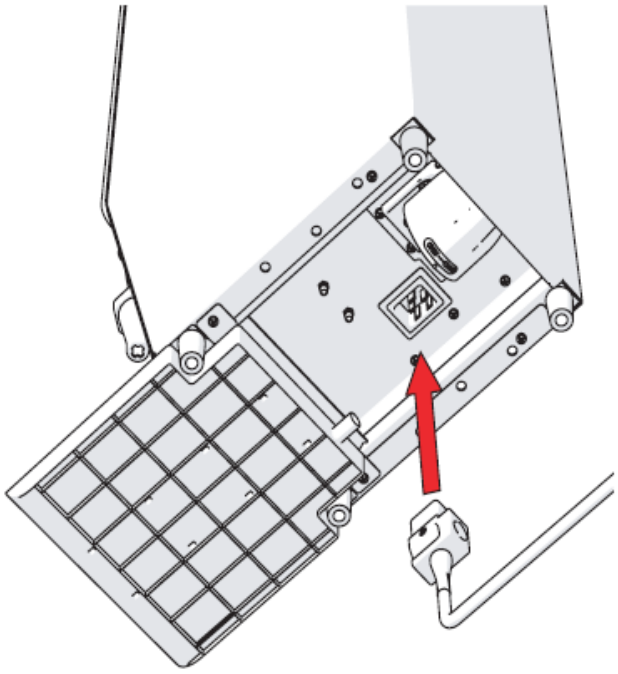

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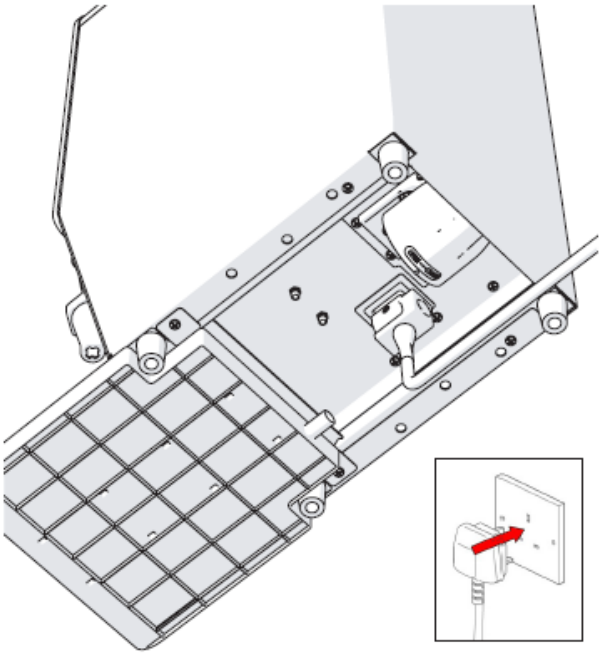
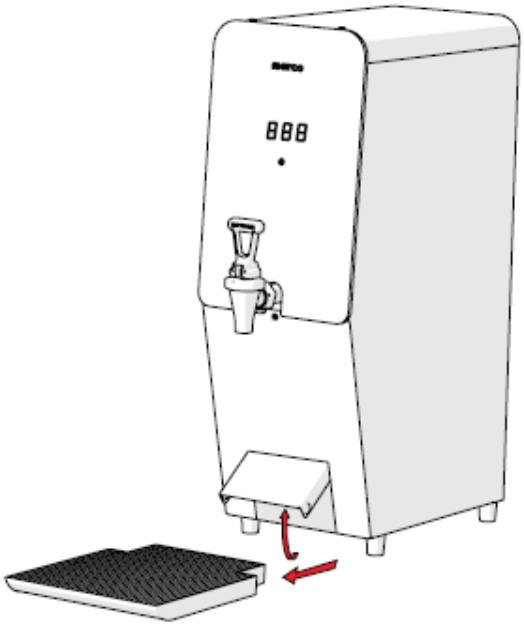


50mm (1.9") ventilation clearance required at each side and back of the machine

4.2 Filter Installation

Machine P/N: (1000763F#)

1.



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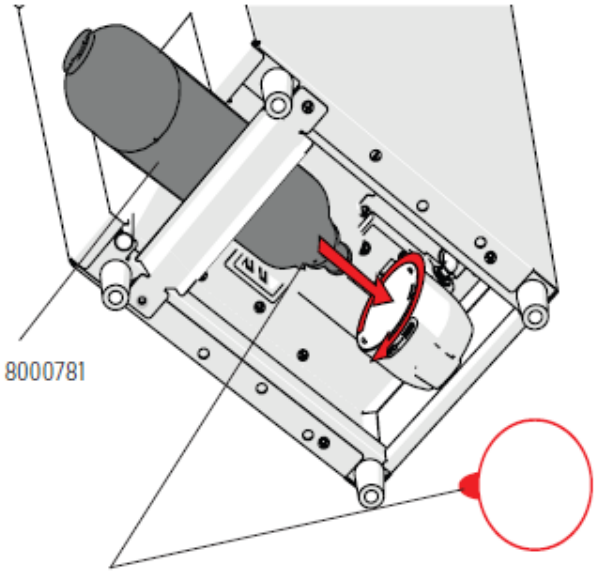
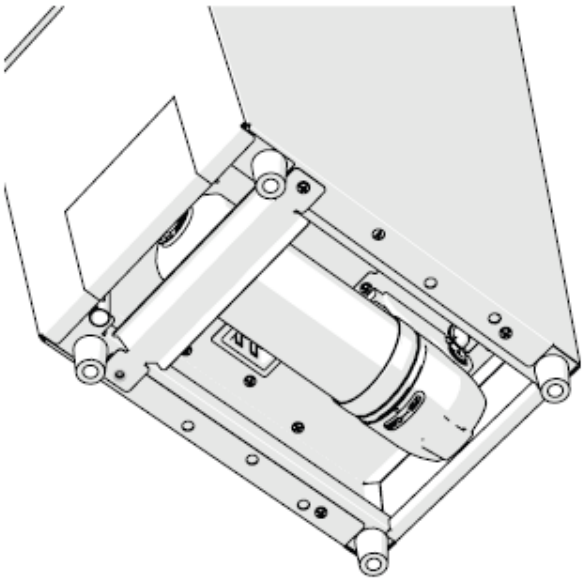


The orientation indicator on the filter should point left before rotating

3.



5. BOILER SETUP

5.1 Operating Boiler for the First Time

- Check that all installation procedures have been carried out.
- Ensure water valve is connected and turned on.
- Plug in the IEC connector to the boiler.
- On models with a filter, connect the filter.
- Plug boiler into suitable socket.
- The boiler will power up.
- The screen will show the software revision.
- The machine will then fill with water and the display will flash between E-2 & the current temperature of the tank, until the water has reached the low-level probe, then it will show the current water temperature.
- The default temperature is 95°C (203°F).
- Once the machine is up to temperature the boiler is now ready for use.

NOTE:
Because the boiler is electronically controlled no priming is necessary.
The element cannot switch on until a safe level of water is reached.

6.1 MT Boiler Operation

1.

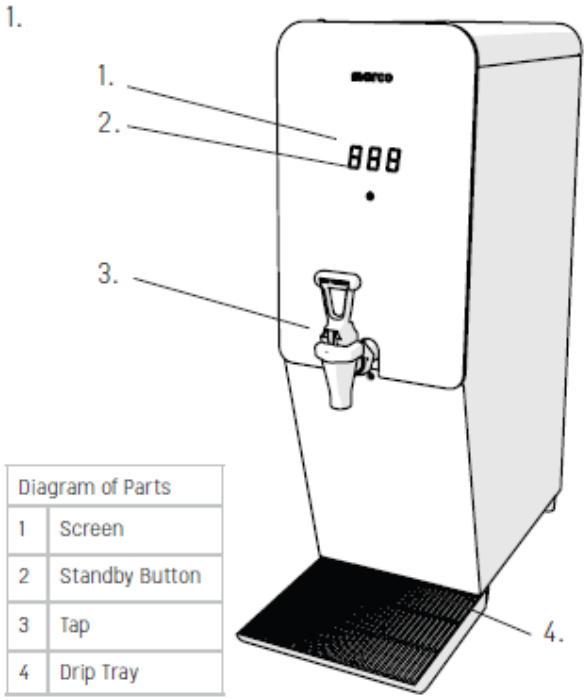
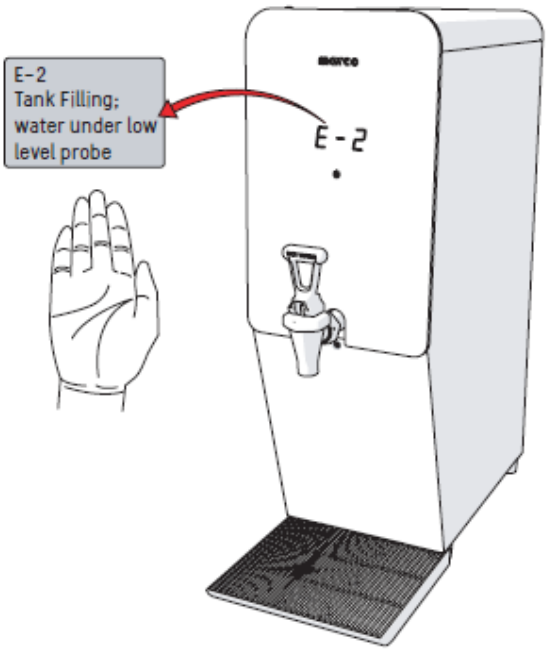


Diagram of Parts	
1	Screen
2	Standby Button
3	Tap
4	Drip Tray

2.



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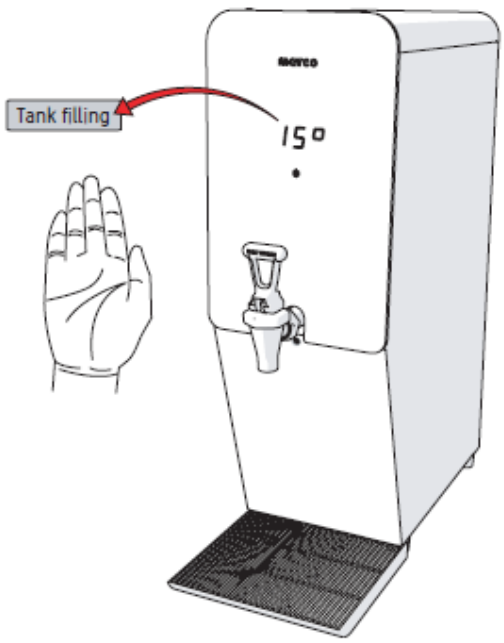

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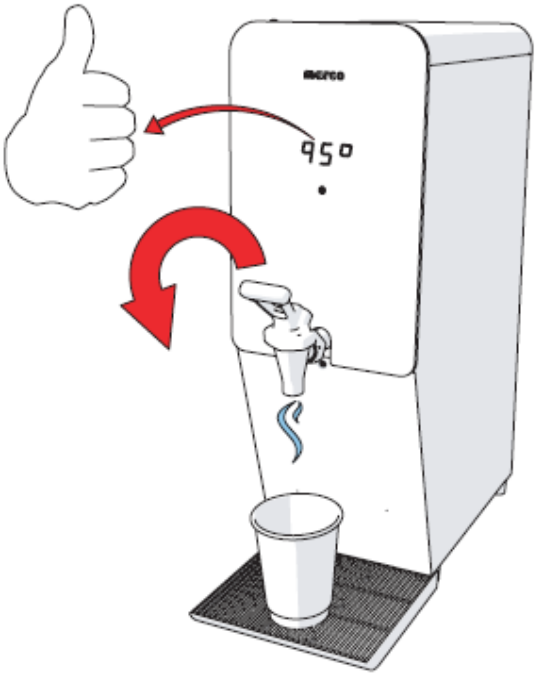


6.2 MT Dual Tap Boiler Operation

Machine P/N: (1000764#)

1.

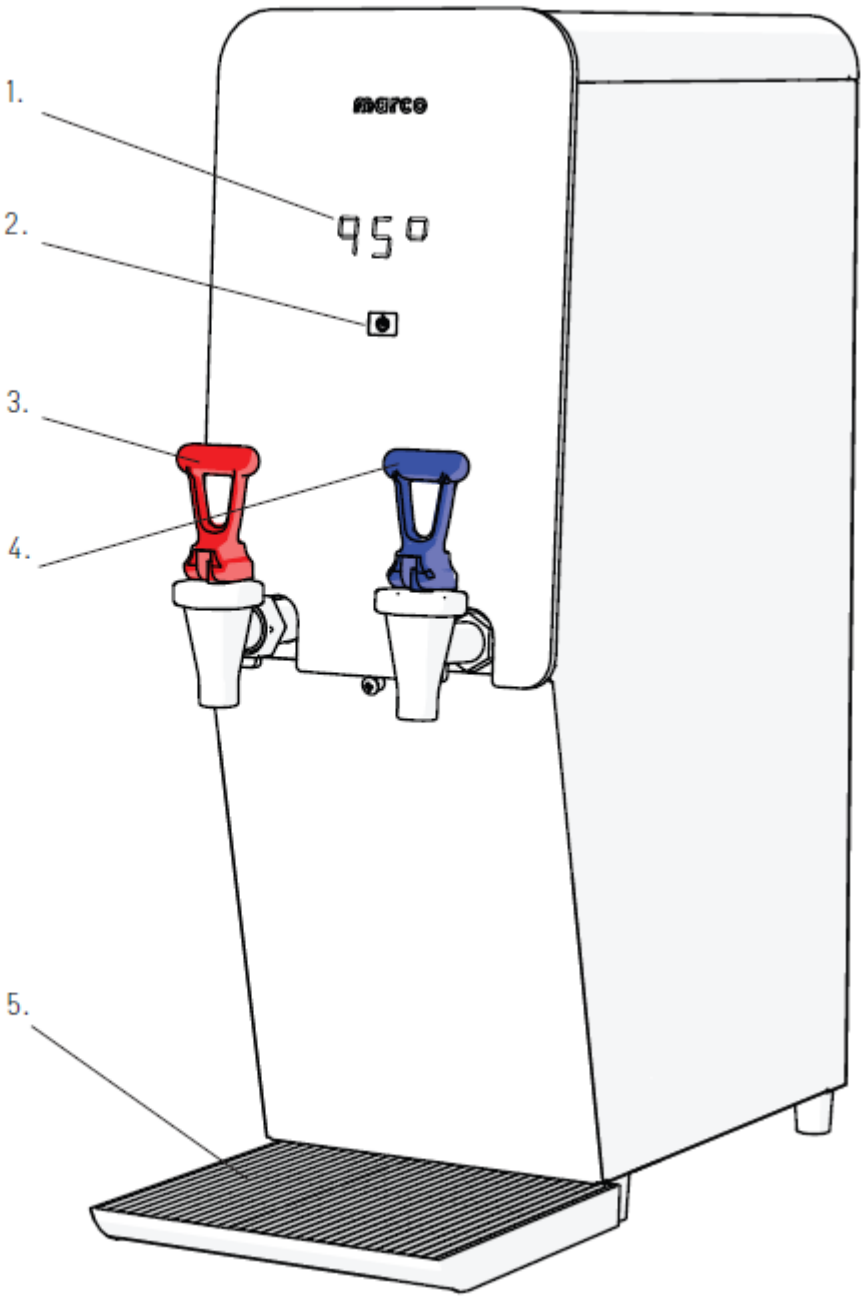
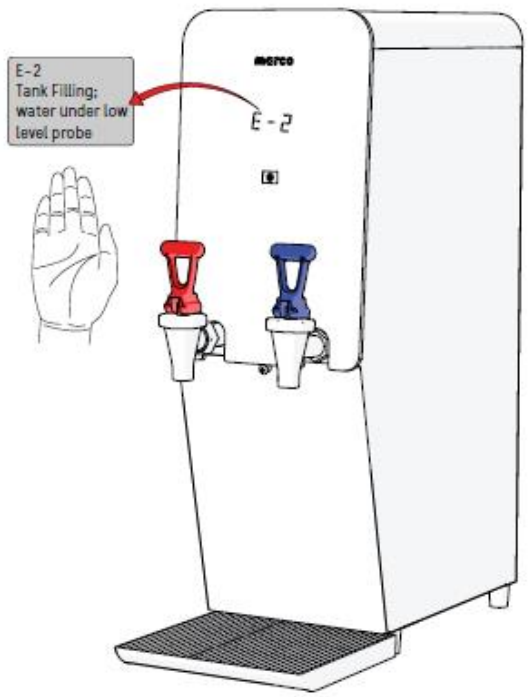


Diagram of Parts	
1	Screen
2	Standby Button
3	Hot Tap
4	Ambient Tap
5	Drip Tray

6.2 MT Dual Tap Boiler Operation (cont.)

2.



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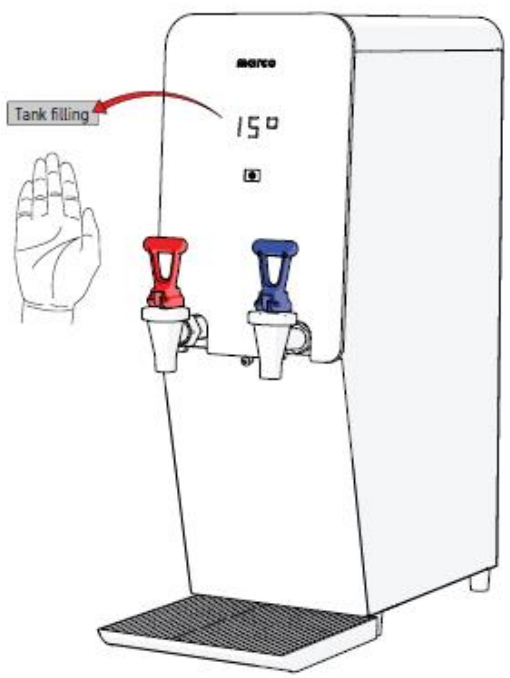

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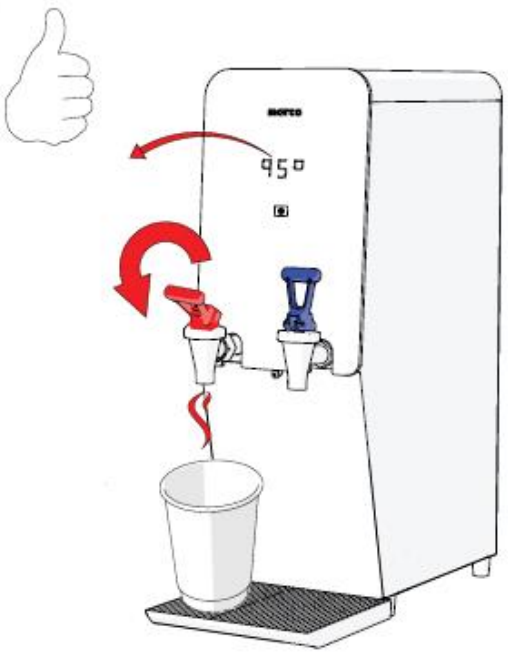


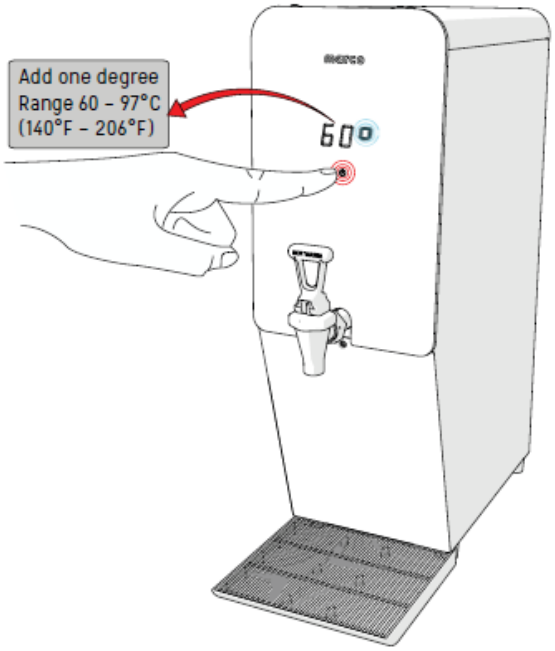
5.

7. SERVICE SET UP

7.1 Changing Temperature

1.

2.

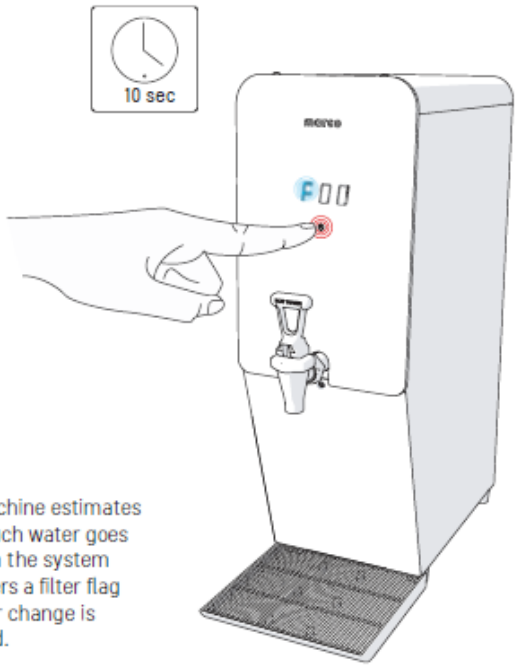


3.

7.2 Filter Mode

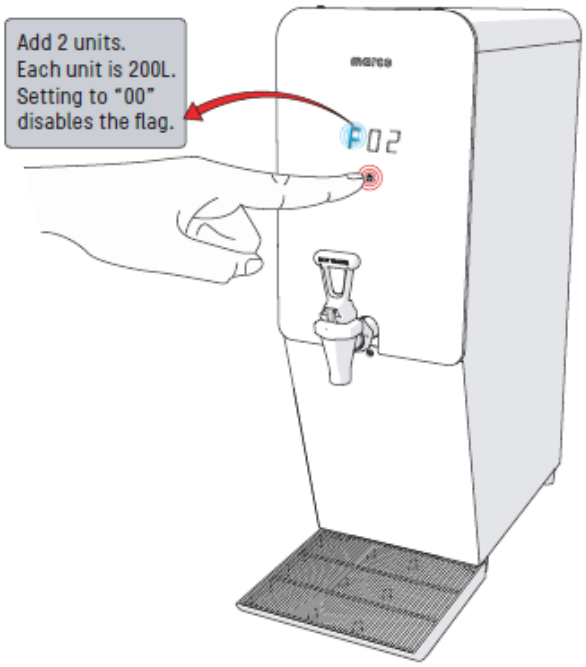
Machine P/N: (1000763F#)

1.



The machine estimates how much water goes through the system & triggers a filter flag if a filter change is required.

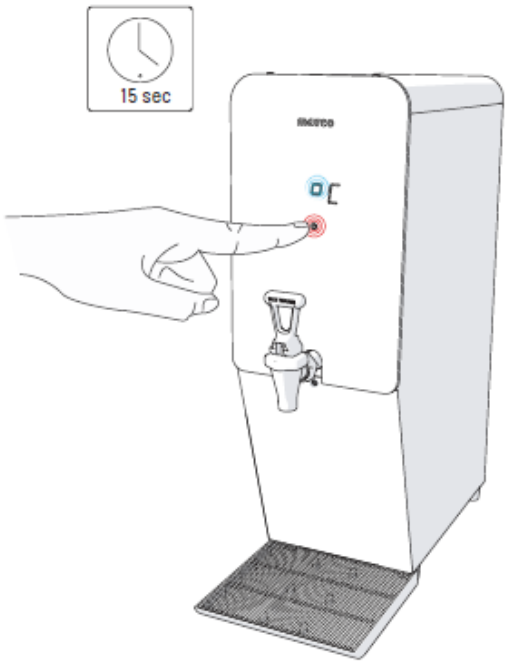
2.



3.

7.3 Changing from Celsius to Fahrenheit

1.



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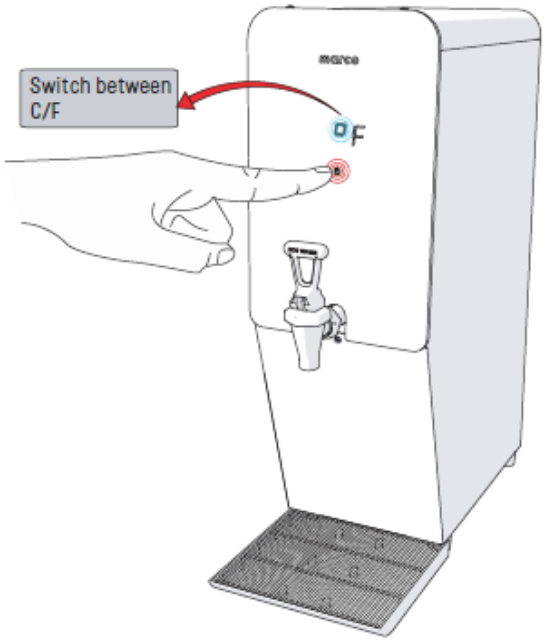

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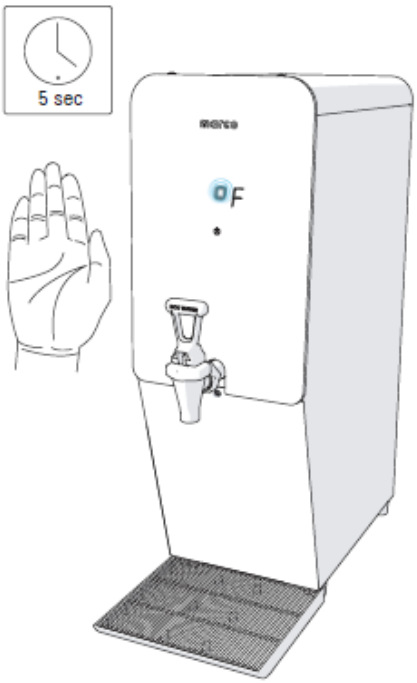

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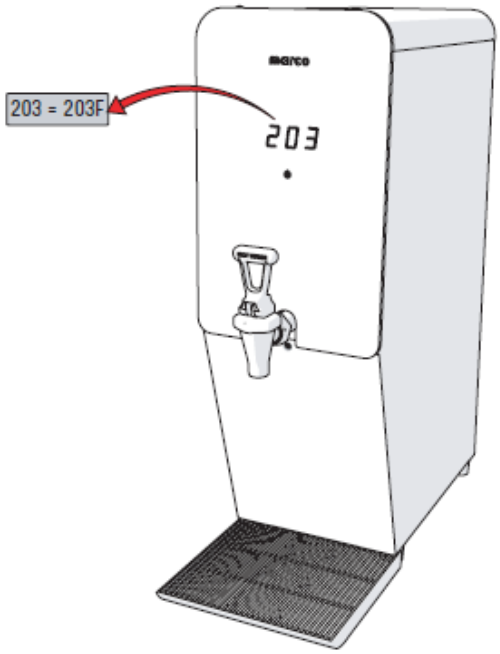
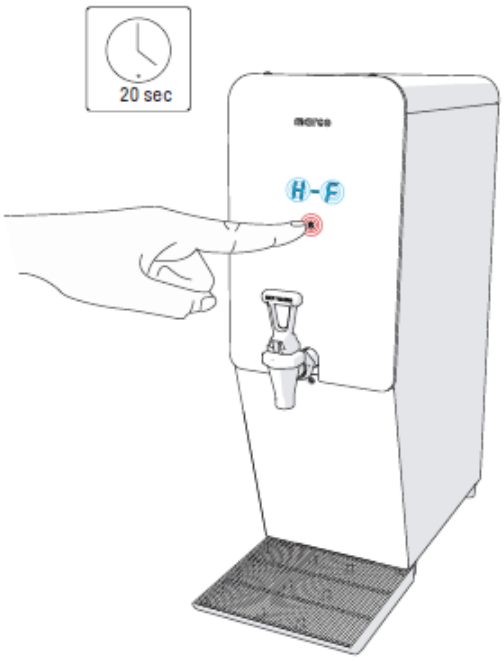


7.4 Heat Fill Selection

1.



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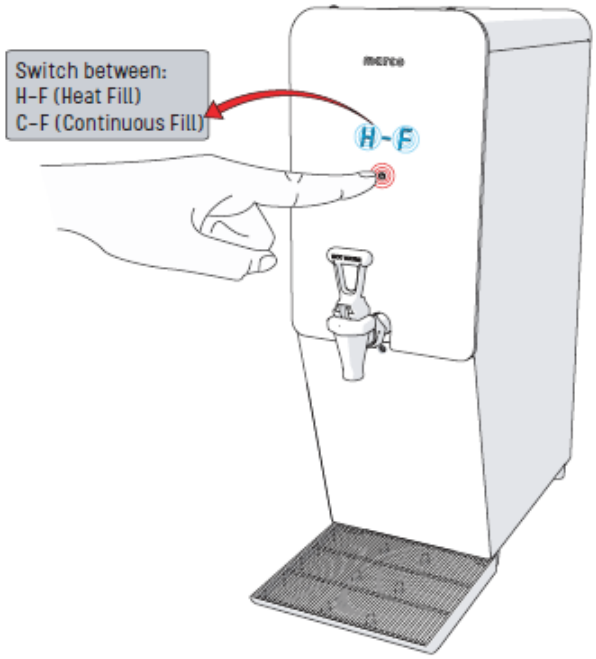

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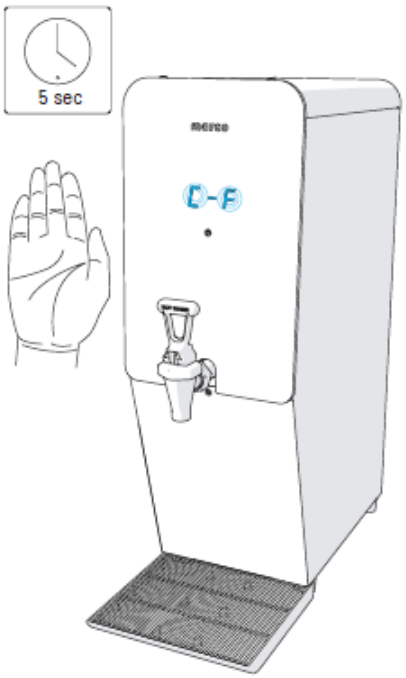


Heat Fill (default & recommended setting)

The inlet valve lets in a small fixed volume of water and the element turns on heating the water to the set temperature. This process is repeated until the water has reached the high level probe and the machine is up to temperature.

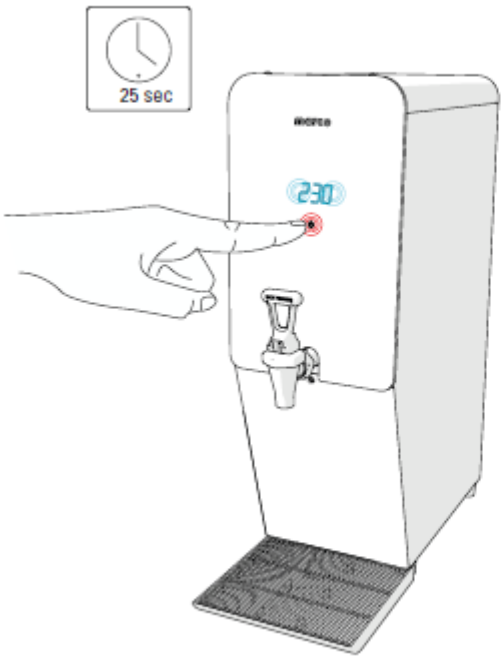
Continuous Fill

The inlet solenoid stays open until the water has reached the high level probe. Simultaneously the element stays on until the machine is up to the programmed set temperature.

7.5 Power Selection.

Power (Voltage) Selection

1.



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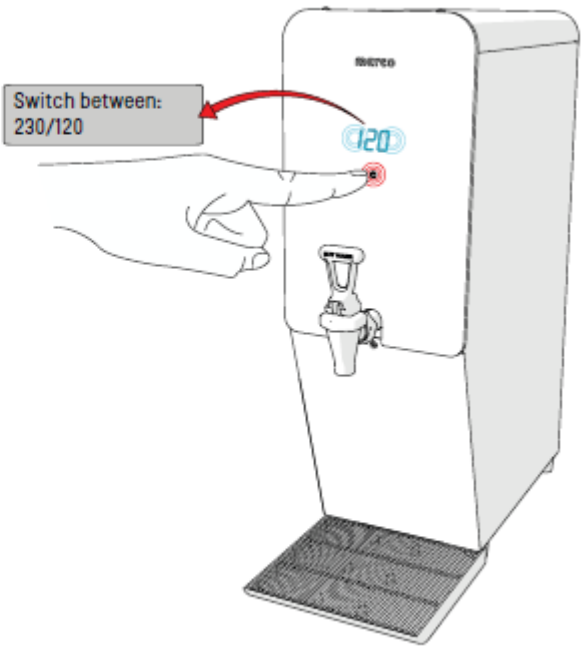

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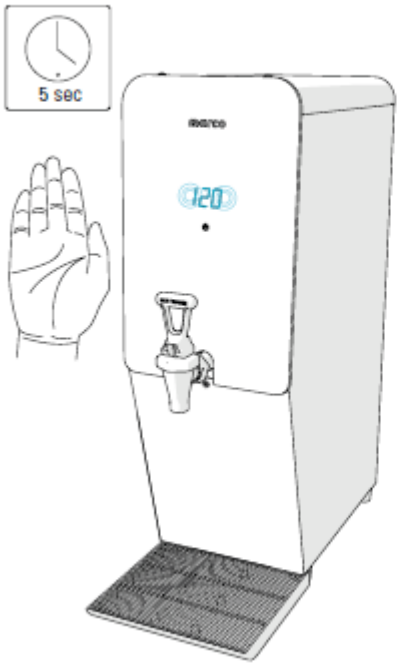


230

For 230V machines the 230 mode is set for optimal performance.

120

For 120V machines the 120 mode is set for optimal performance.

NOTE:

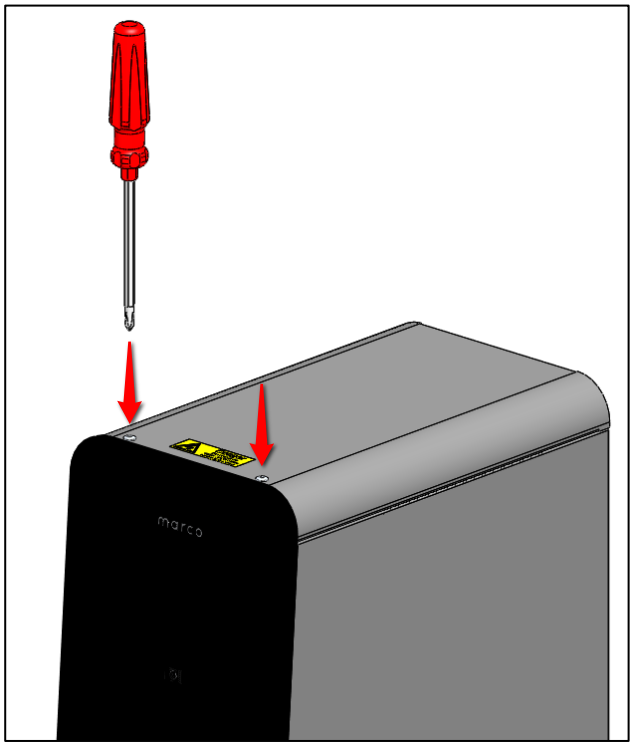
The correct mode is set in the factory accordingly to the rating plate info.

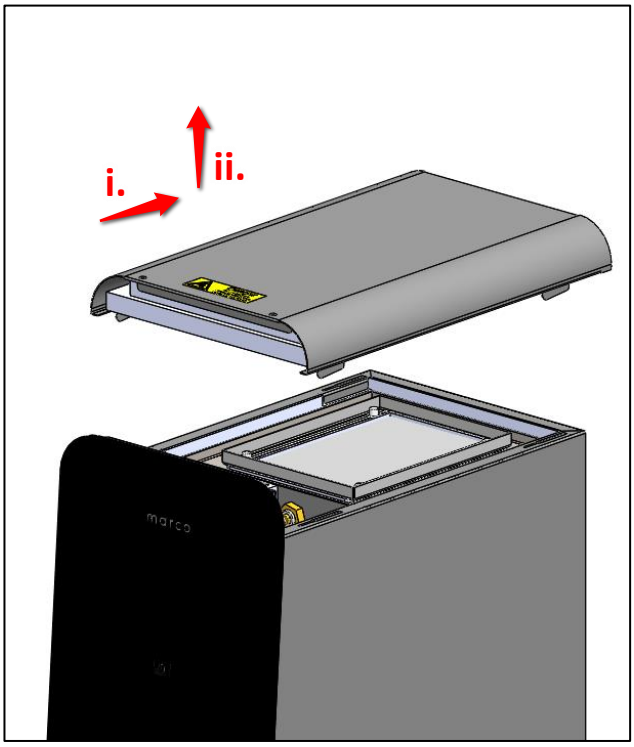
8. ROUTINE MAINTAINENCE/INTERNAL ACCESS

Maintenance should be carried out by Marco approved technicians only.

8.1 Top Lid Removal

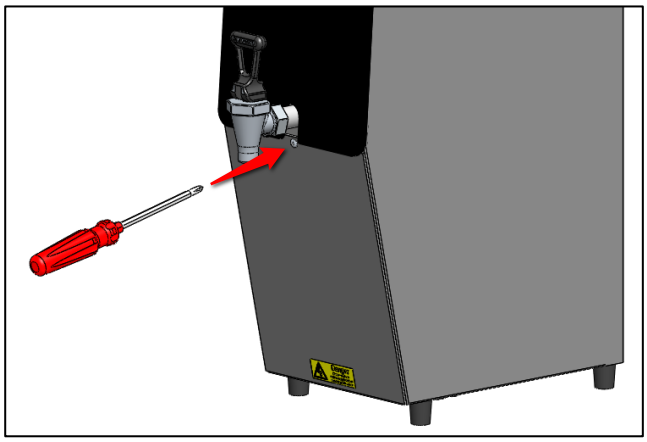
1. Remove the screws in the top lid with a suitable cross headed screwdriver.
2. Push Top Lid backwards and lift it up.

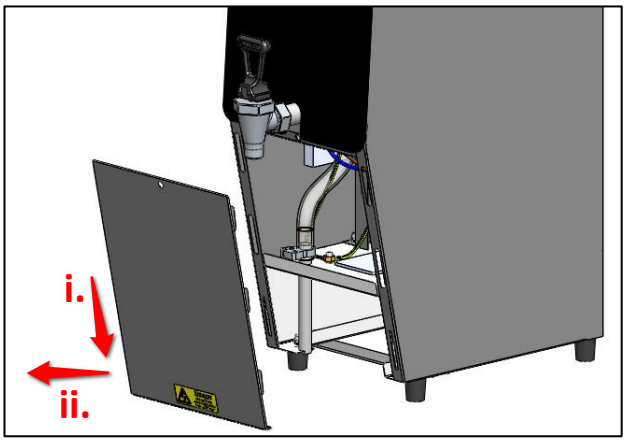




8.2 Lower Front Panel Removal

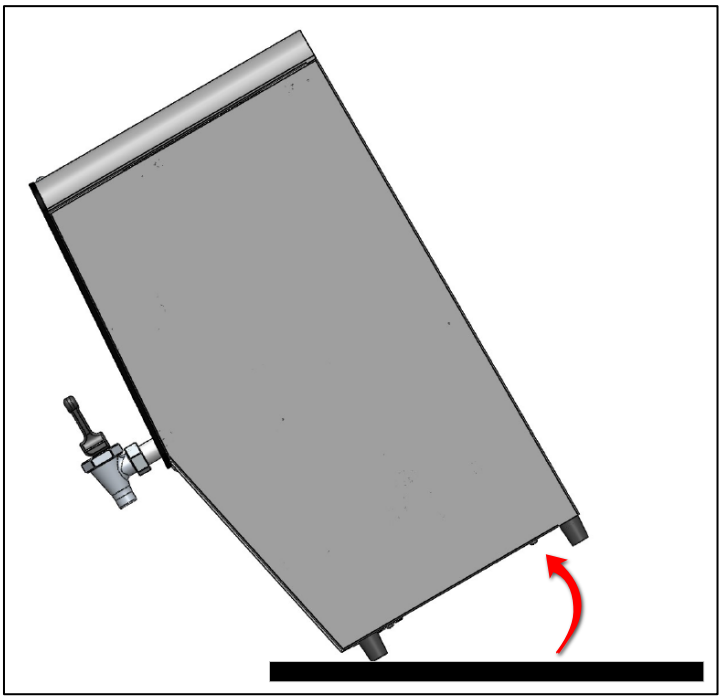
1. Put the Drip Tray aside.
2. Remove the screw in the lower front panel with a suitable cross headed screwdriver.
3. Push lower front panel downwards and pull it out from the machine.





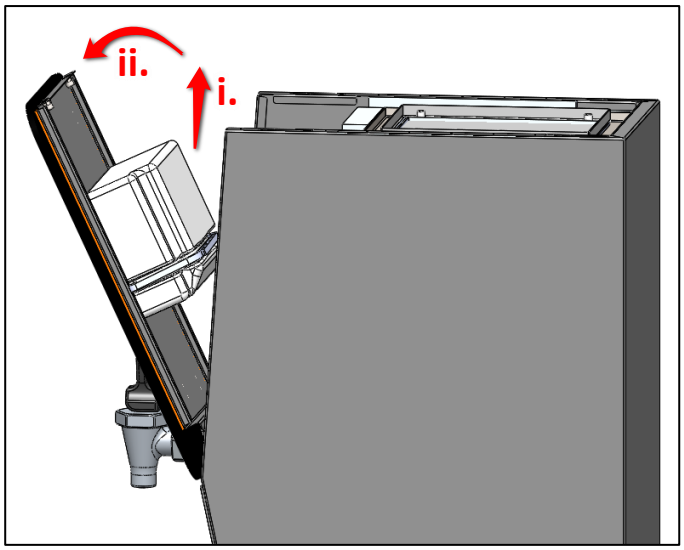
8.3 Draining the tank

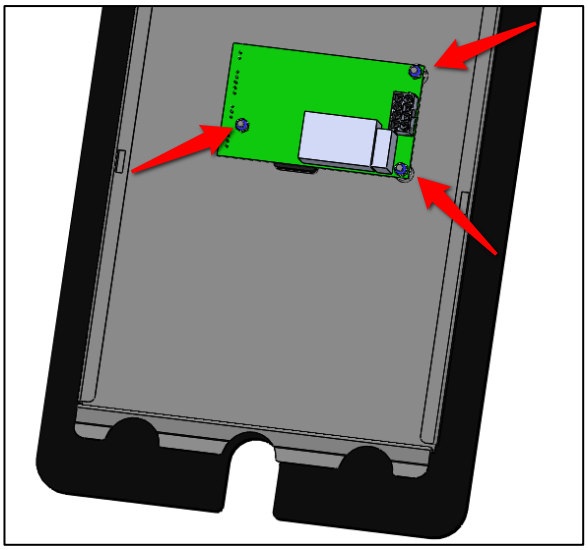
1. Turn off machine and disconnect from mains power.
2. Allow to cool sufficiently to avoid burn risk.
3. Place machine so that the tap of the machine is located next to a sink or a bucket large enough to hold the full contents of the tank.
4. Open the tap and drain the machine up to the spigot level.
5. Tilt the machine forward and drain the remain water.



8.4 PCB replacement

1. Turn off machine and disconnect from mains power.
2. Remove Top Lid as per sections 8.1.
3. Pull Plastic Front Panel upwards and tilt it forward.
4. Remove the PCB insulation block by cutting the cable tie.
5. Disconnect all wiring connected to the PCB and remove Plastic Front Panel from the machine.
6. Remove 3 nuts to release PCB from Plastic Front Panel.

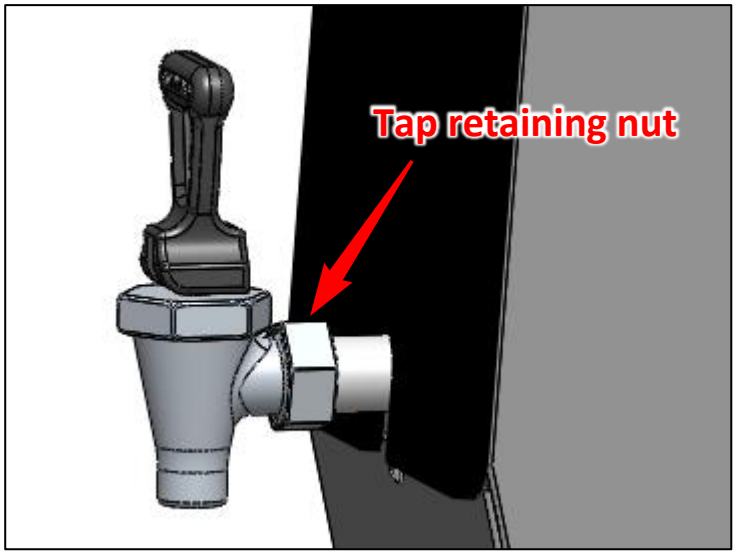




8.5 Dispense Tap removal

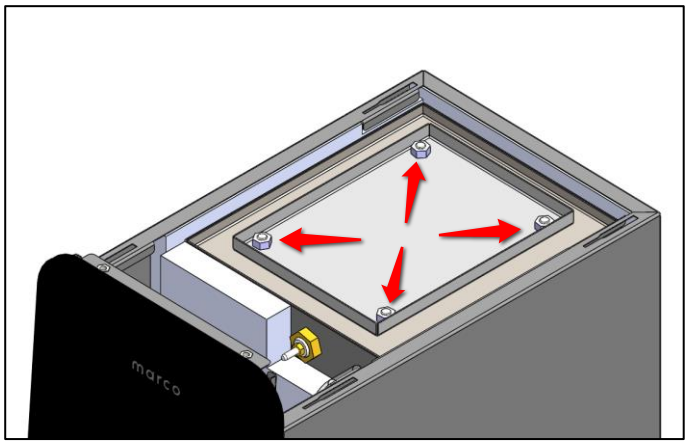
To remove the dispense tap in any Tap version boiler: **(CAUTION - make sure tank is drained fully first as per section 8.3!)**

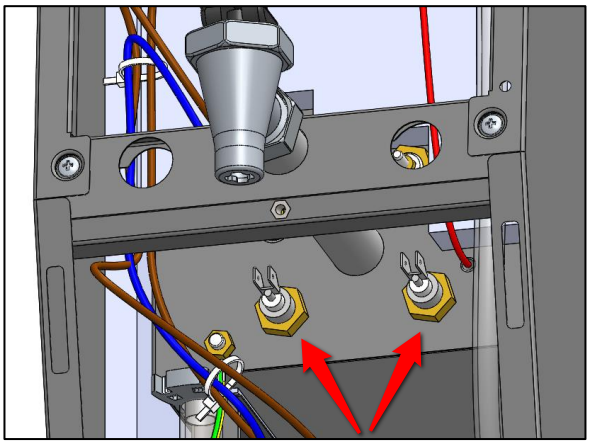
1. Loosen Tap retaining nut by turning clockwise.
2. When tightening the nut, the tap should be gripped and held in place.



8.6 Heater Element Removal

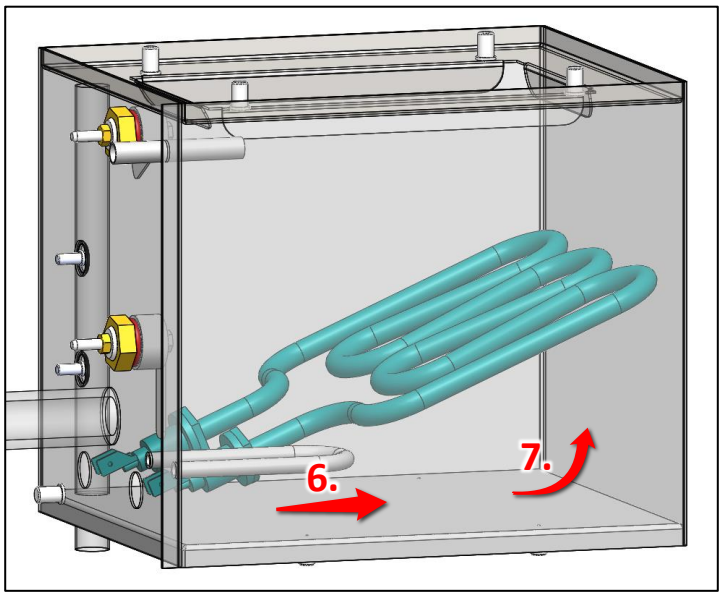
1. Turn off machine and disconnect from mains power.
2. Drain the tank as per section 8.3.
3. Remove Top Lid, Plastic Front Panel & Lower Front Panel as per sections 8.1, 8.2 and 8.4.
4. Undo the four 6mm lock nuts and remove Inner Lid.
5. Disconnect all wiring connected to the Heater Element.
6. Undo the two 18mm lock nuts and slide the heater element tabs through the holes in the Tank Body.
   Please note the orientation of the heater element tabs which should face upwards.

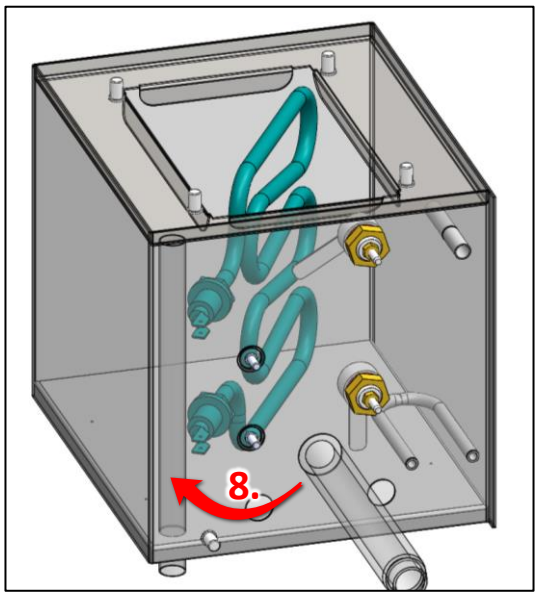




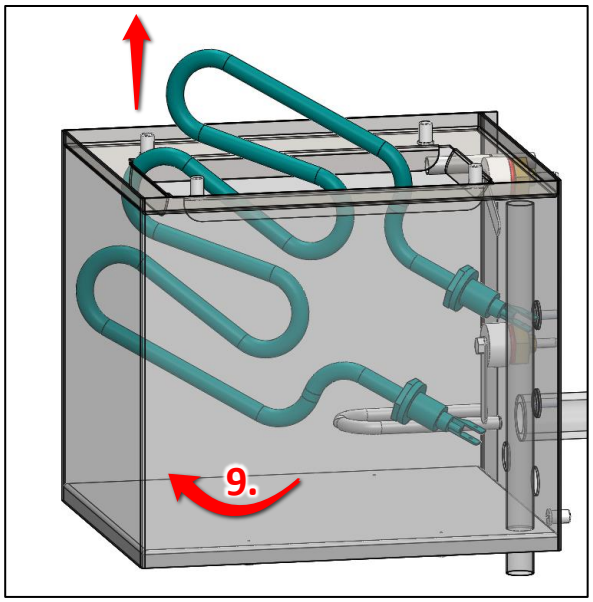
CAUTION - the next steps applies to the 1000762# and 1001762# models only.

8.6 Heater Element Removal (cont.)





7. Rotate the heater element upwards up to the stage when it will go above the Thermistor Pocket.
8. Rotate it to the vertical position.

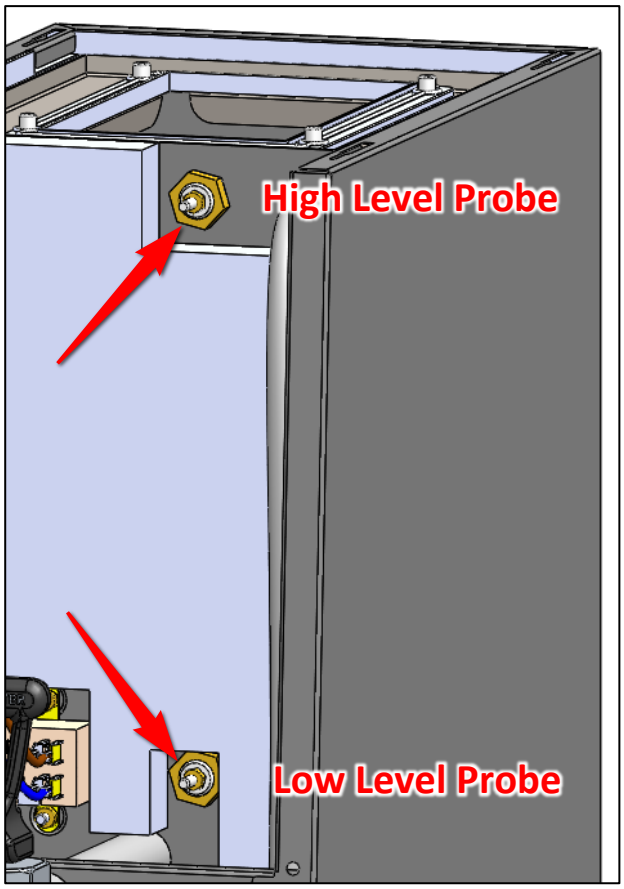


9. Rotate it to the stage when it will be possible to pull it out from the tank.

8.7 Level Probes - Cleaning & replacement

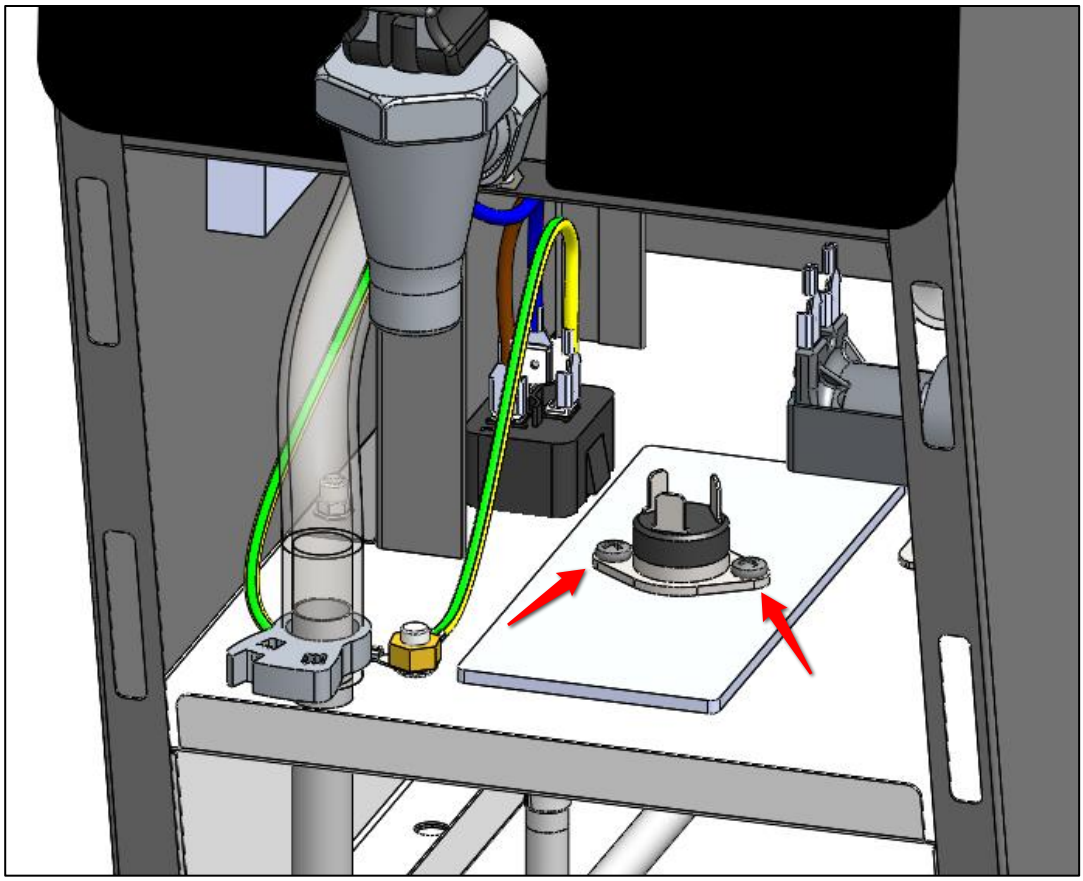
There are 2 probes (low level, high level) on the MT Boiler range.

1. Turn off machine and disconnect from mains power.
2. Drain the tank as per section 8.3.
3. Remove Top Lid, Inner Lid & Plastic Front Panel as per sections 8.1, 8.6 and 8.6.
4. Undo the two ¼" lock nuts and remove low / high Level Probe.

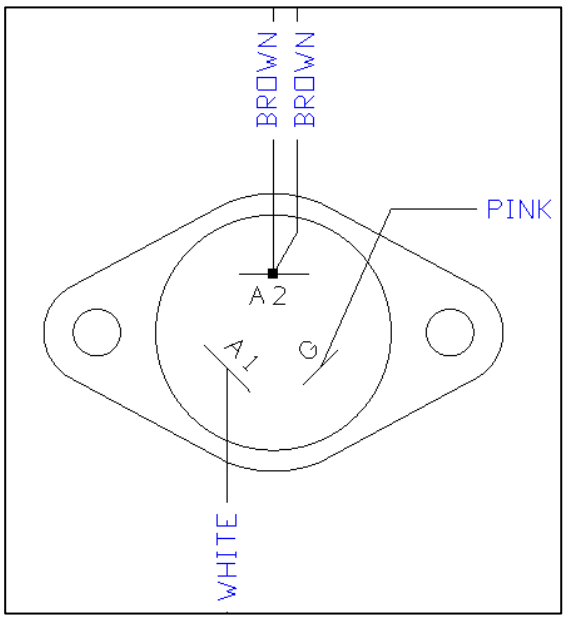


8.8 Triac Replacement

1. Turn off machine and disconnect from mains power.
2. Remove Lower Front Panel as per sections 8.2.
3. Disconnect all wires to the Triac – **making note of the correct wiring terminal connections.**
4. Undo two retaining screws as located in the picture below.

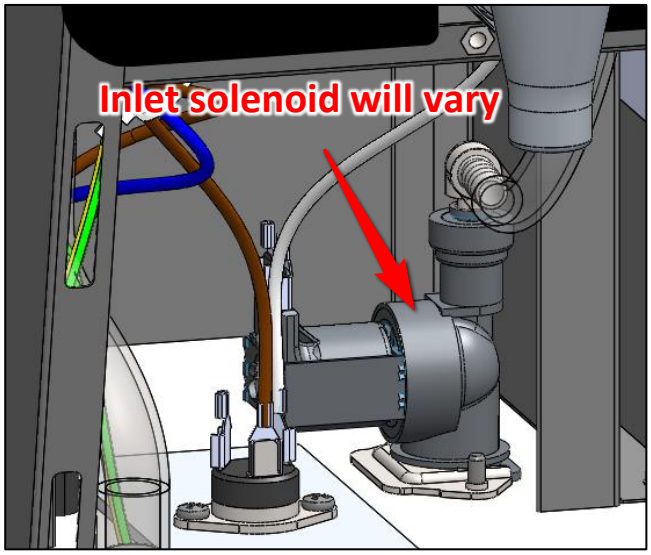


Correct triac wiring (as per wiring diagrams):

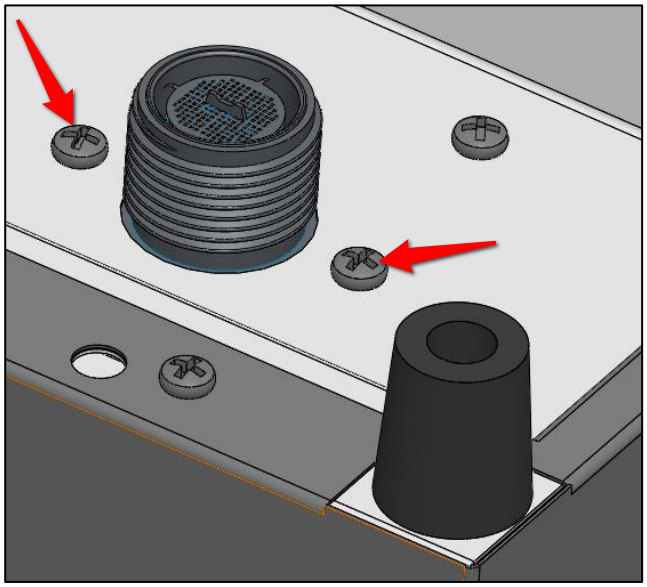


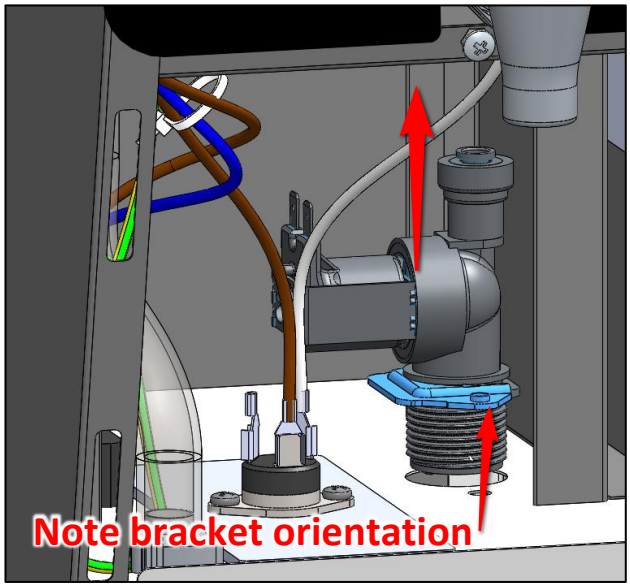
8.9 Inlet solenoid Replacement

1. Turn off machine and disconnect from mains power.
2. Drain the tank as per section 8.3.
3. Remove Lower Front Panel as per sections 8.2.



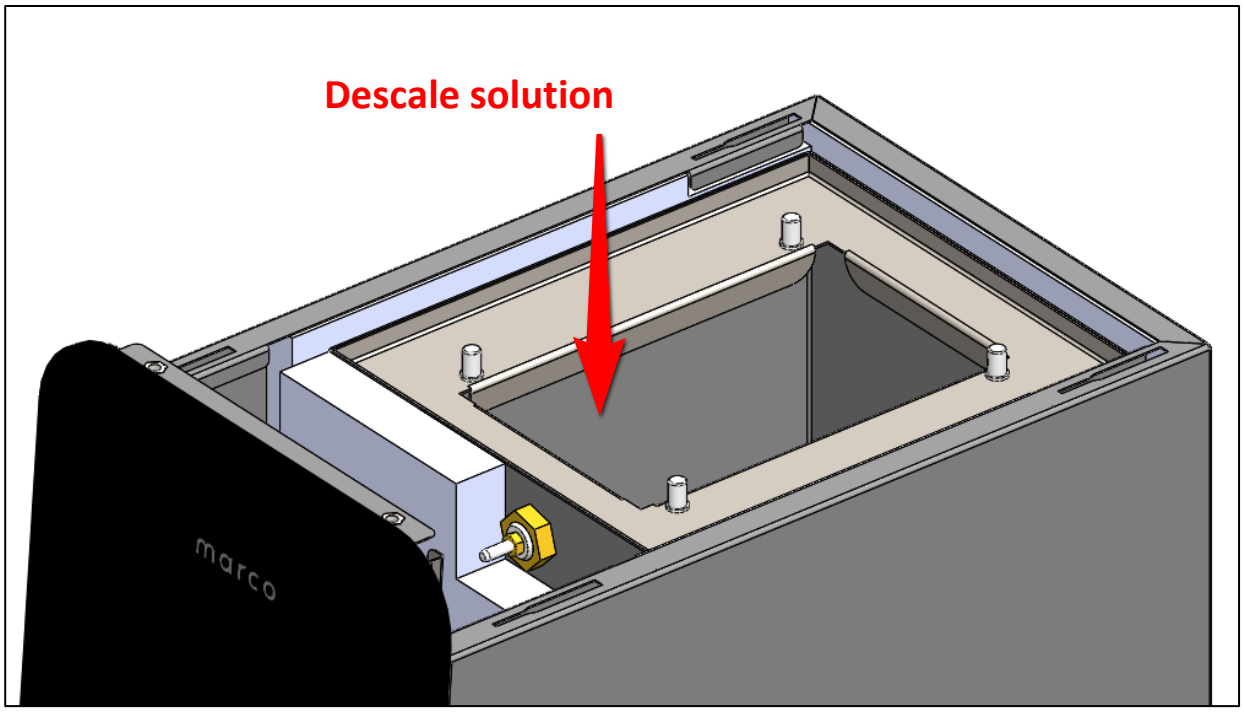
4. Disconnect all wires and hoses to the inlet solenoid.
5. Remove two solenoid retaining screws located on the base of the machine.
6. Remove solenoid by pulling upwards (**NOTE**: if replacing solenoid, observe the orientation of the mounting bracket of the solenoid being removed. If orientation is NOT correct the solenoid will not fit).





8.10 De-scaling the tank

1. Disconnect machine from mains power and water supply.
2. Allow to cool sufficiently to avoid burn risk.
3. Remove Top Lid & Inner Lid as per sections 8.1 and 8.4
4. Dispense enough water from the boiler that will be replaced by the descale solution, through the dispense tap.
5. Pour in descale solution slowly into tank.
6. Allow descale solution to work for required time to dissolve scale – as per descale product instructions.
7. Flush tank thoroughly to flush out limescale and descale solution before re-use at least 4 times.
8. If limescale build up is severe, the large deposits of scale removed by hand.



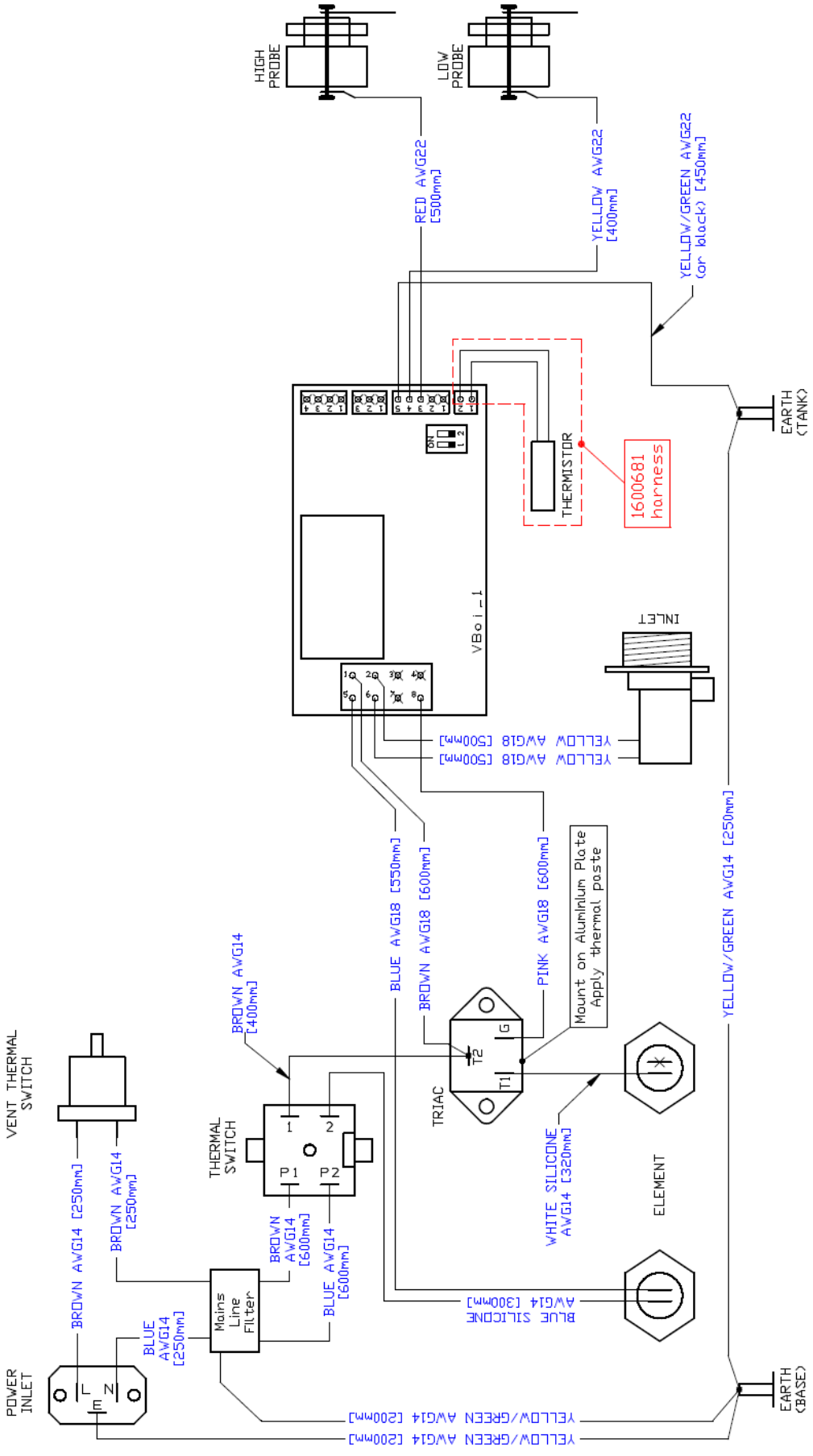
9. DIAGNOSTICS

The screen of the boiler indicates various errors or problems with the machine. See diagnostic table below for further details.

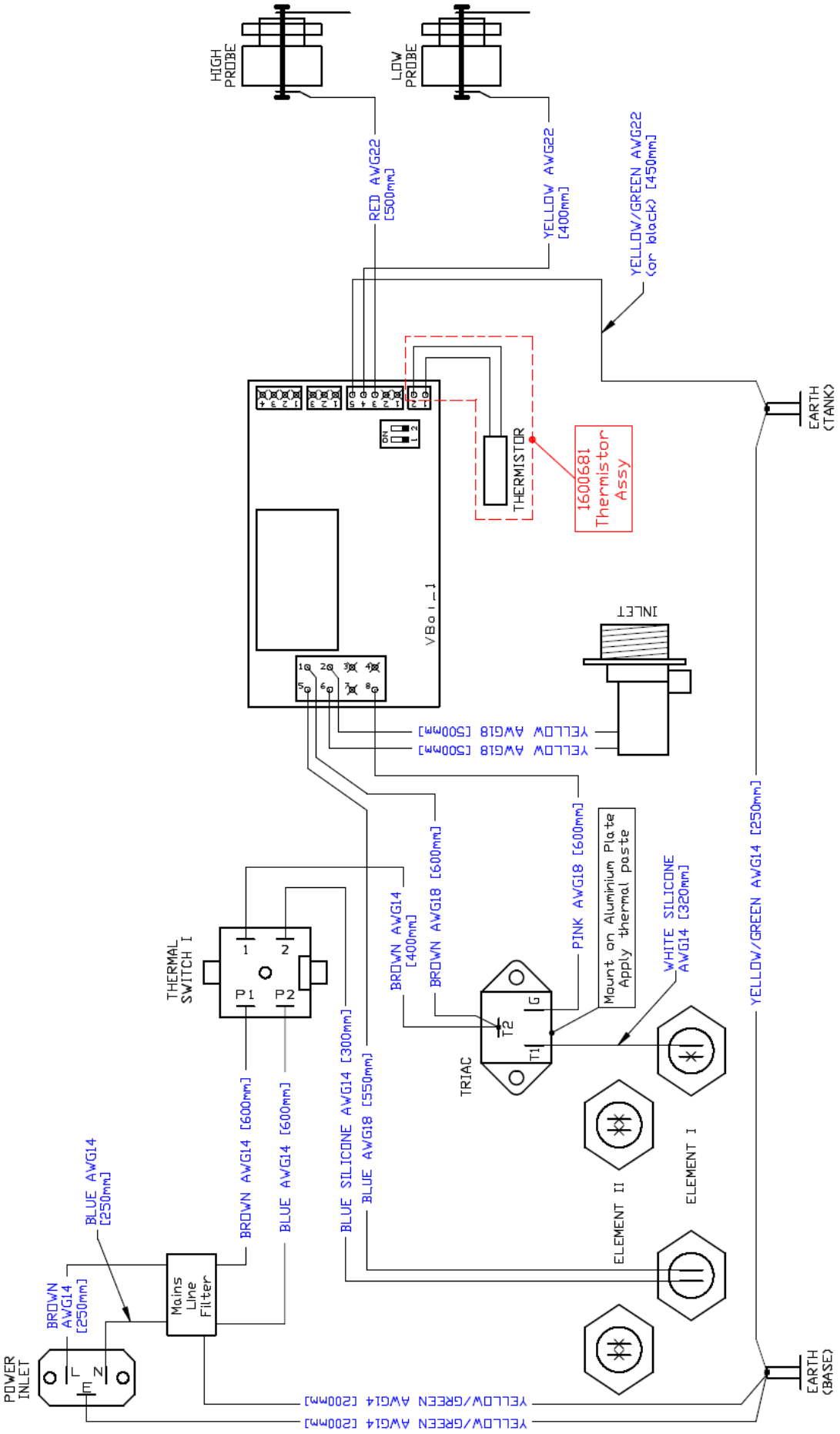
Error	Description	Action
E-1	High level probe is detected but low level probe is not detected.	Descale machine & low-level probe. If it persists, call service agent. Check low level probe is wired. Check high & low level are not switched.
E-2	Low level probe not detected.	Wait for machine to fill. If water can be dispensed then the probe may be covered in limescale, -descale machine. If descaled and error persists then call service agent. Check low level probe is wired.
E-3	Temperature sensor (thermistor) is faulty, missing or not plugged in.	Call service agent. Thermistor has an open circuit.
E-4	Water is not heating	Element has failed, Call service agent. Check element for resistance which should be approx 19 Ohms
E-5	Temperature sensor (thermistor) is faulty	Call service agent. Thermistor has a short circuit.
E-6	No incoming water	Check water supply is turned on and mains pressure is above 1bar (14.5psi) If water supply is OK call service agent as the inlet valve has likely failed.

10. ELECTRICAL SCHEMATICS

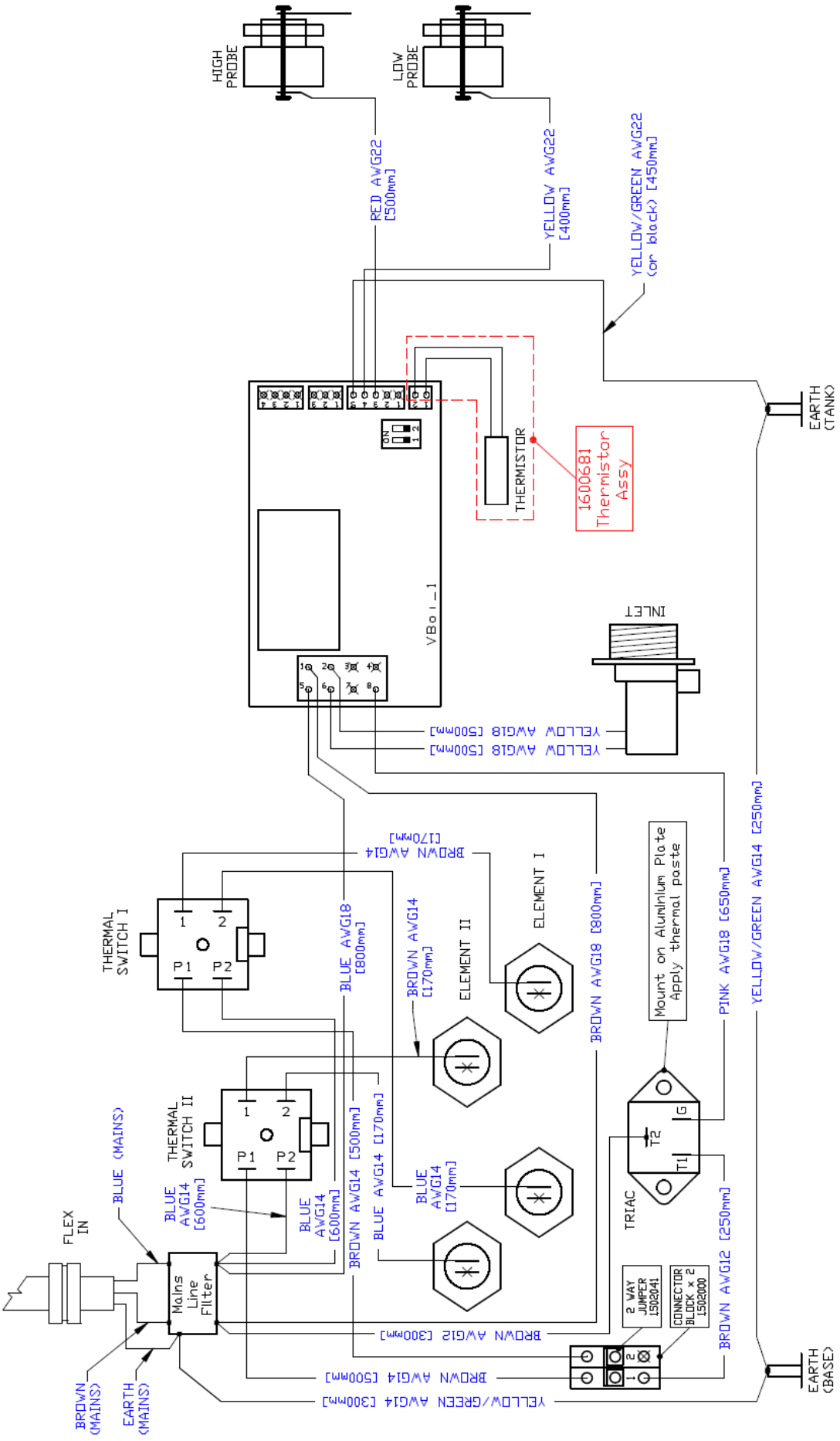
10.1 Wiring Diagram - 1000762#, 763#, 764#, 1001762#, 1001763#.



10.1 Wiring Diagram (cont.) – 1000765#

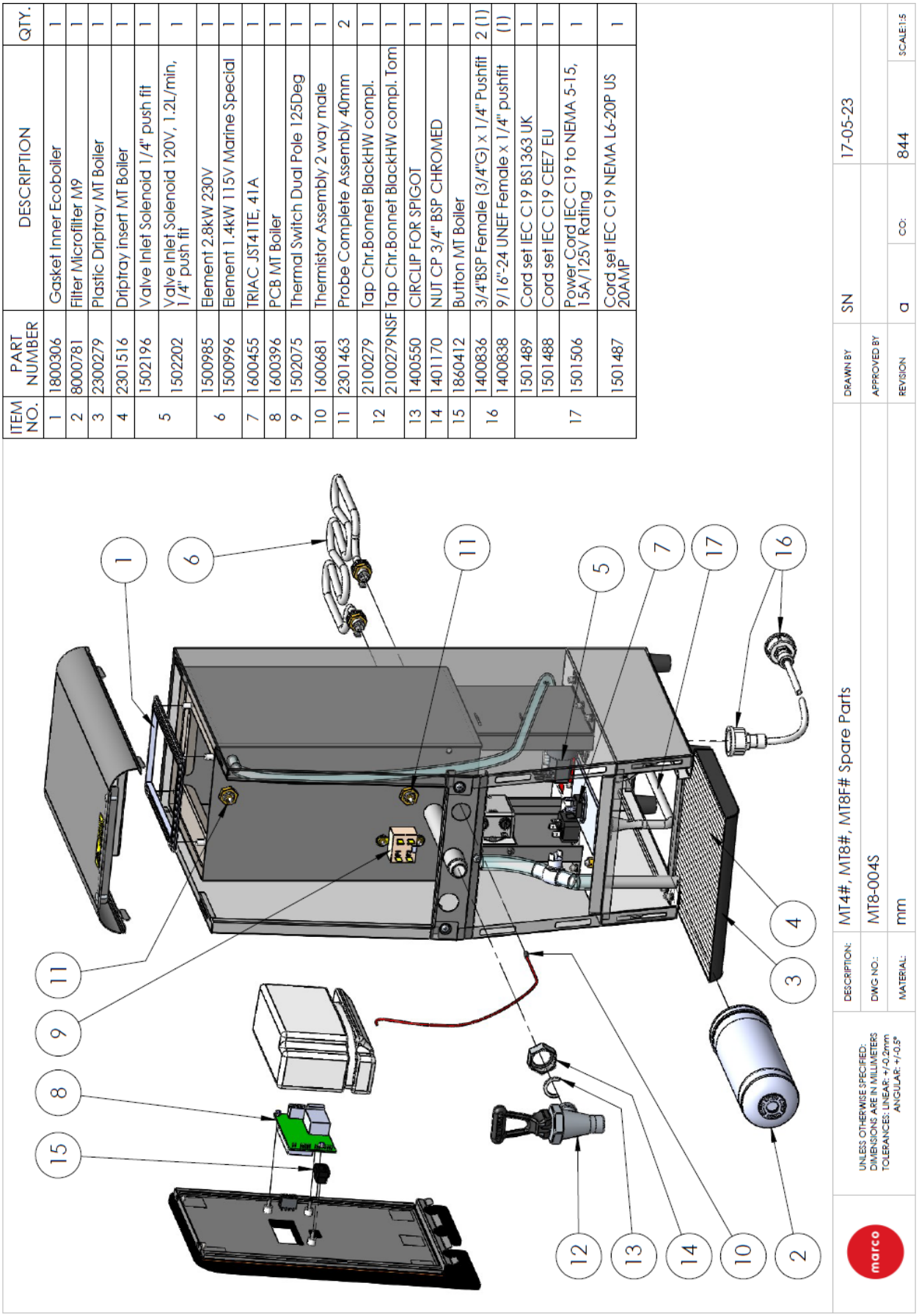


10.1 Wiring Diagram (cont.) – 1000766#



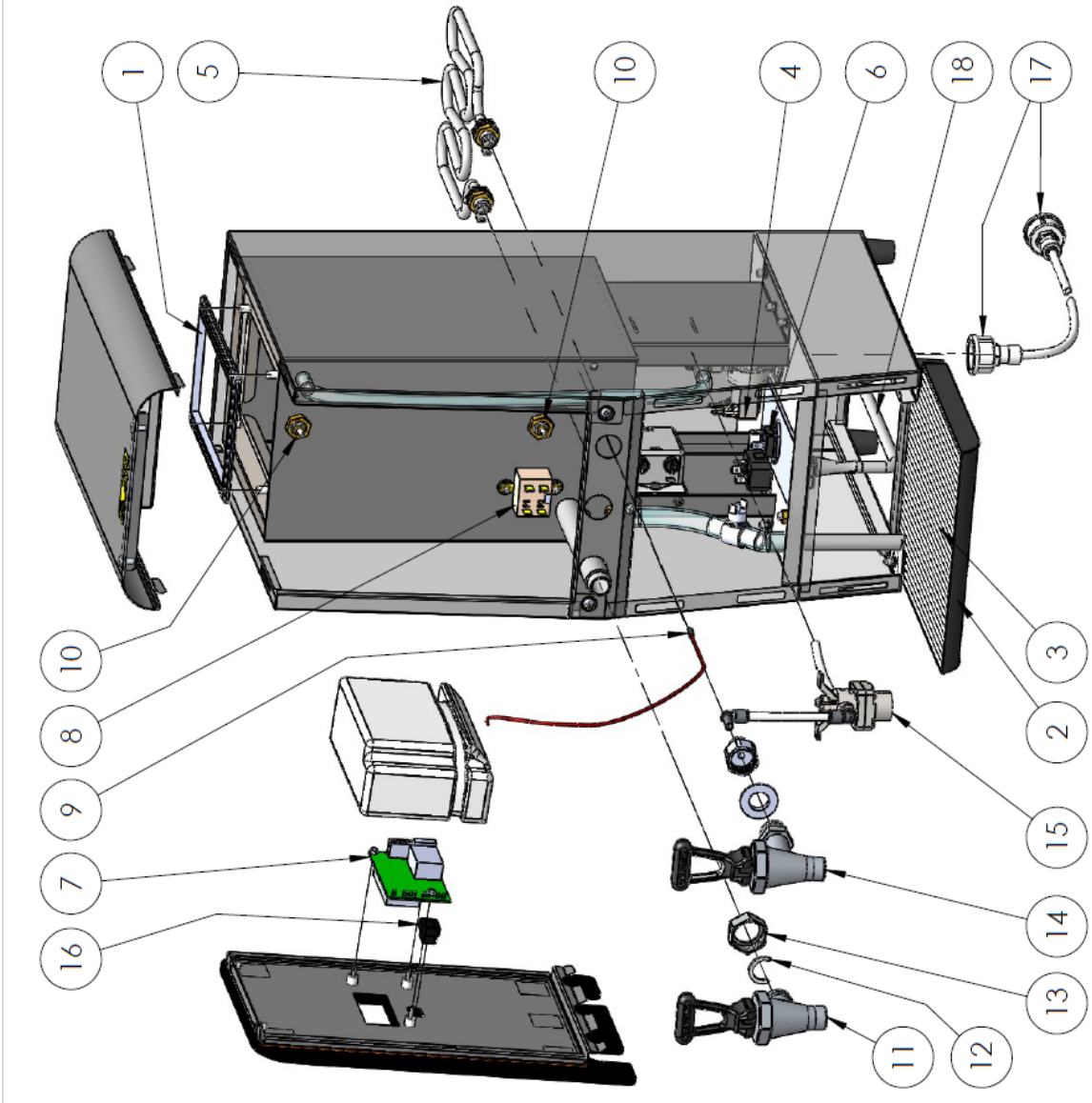
11.1 MT4, MT8, MT8F parts - 1000762#, 1762#, 763#, 1763#, 763F#.

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	1800306	Gasket Inner Ecoboiler	1
2	8000781	Filter Microfilter M9	1
3	2300279	Plastic Driptray MT Boiler	1
4	2301516	Driptray insert MT Boiler	1
5	1502196	Valve Inlet Solenoid 1/4" push fit	1
	1502202	Valve Inlet Solenoid 120V, 1.2L/min, 1/4" push fit	1
6	1500985	Element 2.8kW 230V	1
	1500996	Element 1.4kW 115V Marine Special	1
7	1600455	TRIAC JST41TE, 41A	1
8	1600396	PCB MT Boiler	1
9	1502075	Thermal Switch Dual Pole 125Deg	1
10	1600681	Thermistor Assembly 2 way male	1
11	2301463	Probe Complete Assembly 40mm	2
12	2100279	Tap Chr.Bonnet BlackHW compl.	1
	2100279NSF	Tap Chr.Bonnet BlackHW compl. Tom	1
13	1400550	CIRCLIP FOR SPIGOT	1
14	1401170	NUT CP 3/4" BSP CHROMED	1
15	1860412	Button MT Boiler	1
16	1400836	3/4"BSP Female (3/4"G) x 1/4" Pushfit	2 (1)
	1400838	9/16"-24 UNEF Female x 1/4" pushfit	(1)
17	1501489	Cord set IEC C19 BS1363 UK	1
	1501488	Cord set IEC C19 CEE7 EU	1
	1501506	Power Cord IEC C19 to NEMA 5-15, 15A/125V Rating	1
	1501487	Cord set IEC C19 NEMA L6-20P US 20AMP	1



11.2 MT8DT parts - 1000764#.

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	1800306	Gasket Inner Ecoboiler	1
2	2300279	Plastic Driptray MT Boiler	1
3	2301516	Driptray insert MT Boiler	1
4	1502201	Valve Inlet Dual 230V (1.2L/min / unrestricted) 3/8" push fit	1
5	1500985	Element 2.8kW 230V	1
6	1600455	TRIAC JST41TE, 41A	1
7	1600396	PCB MT Boiler	1
8	1502075	Thermal Switch Dual Pole 125Deg	1
9	1600681	Thermistor Assembly 2 way male	1
10	2301463	Probe Complete Assembly 40mm	2
11	2100329	Tap (S type) Red	1
12	1400550	CIRCLIP FOR SPIGOT	1
13	1401170	NUT CP 3/4" BSP CHROMED	1
14	2100272	Tap 1/2"BSP (1/2"G) male 3/8"BSP (3/8"G) female Blue with nut	1
15	1402309	Pressure reducer 0.14MPa 1/4" push fit	1
16	1860412	Button MT Boiler	1
17	1400836	3/4"BSP Female (3/4"G) x 1/4" Pushfit	2
18	1501489	Cord set IEC C19 BS1363 UK	1
	1501488	Cord set IEC C19 CEE7 EU	1



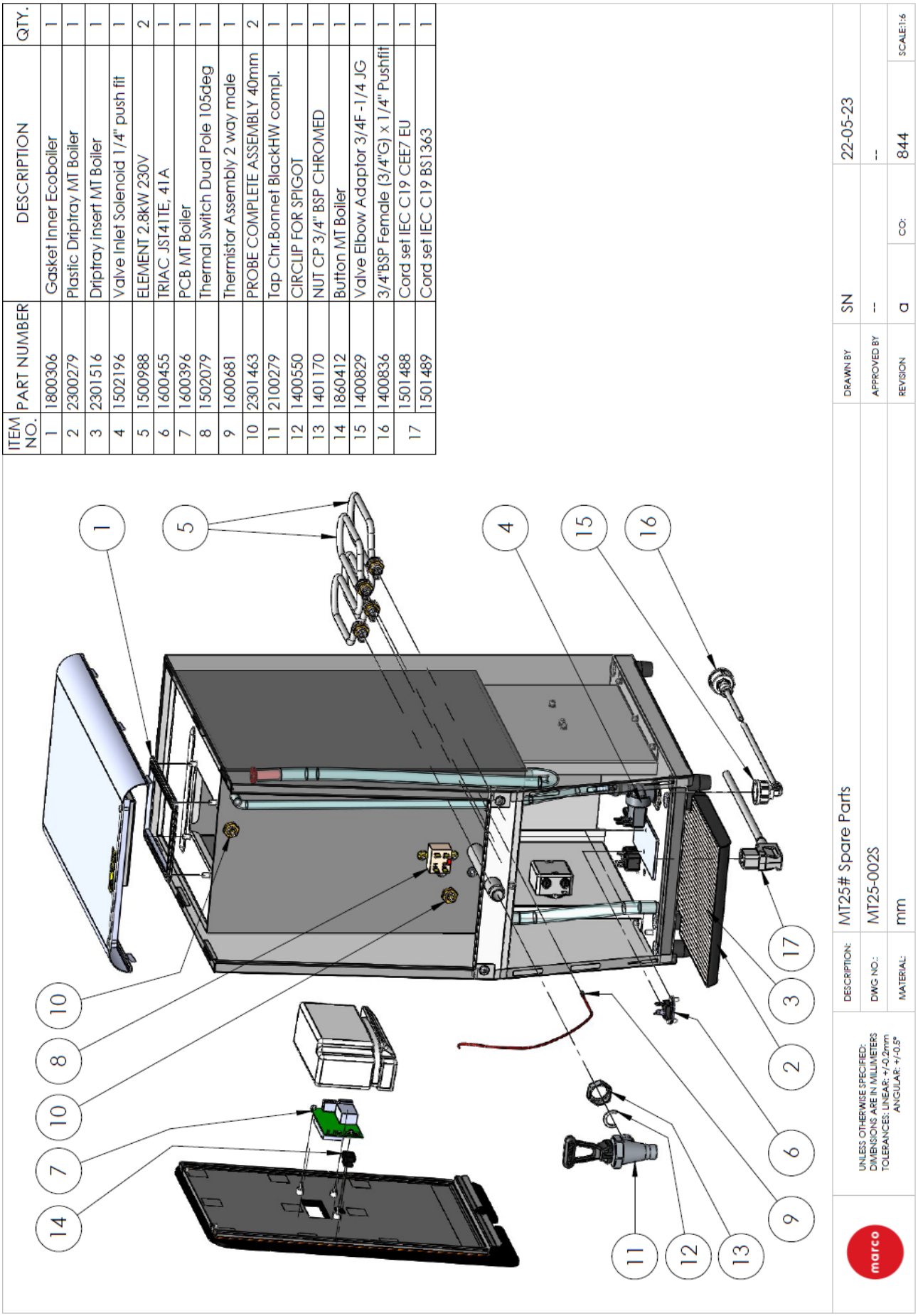
DESCRIPTION:	MT8DT# Spare Parts	DRAWN BY	SN	18-05-23	
DWG NO.:	MT8-005S	APPROVED BY			
MATERIAL:	mm	REVISION	a	CO:	844

UNLESS OTHERWISE SPECIFIED:
DIMENSIONS ARE IN MILLIMETERS
TOLERANCES: LINEAR: +/-0.2mm
ANGULAR: +/-0.5°

SCALE:1:5

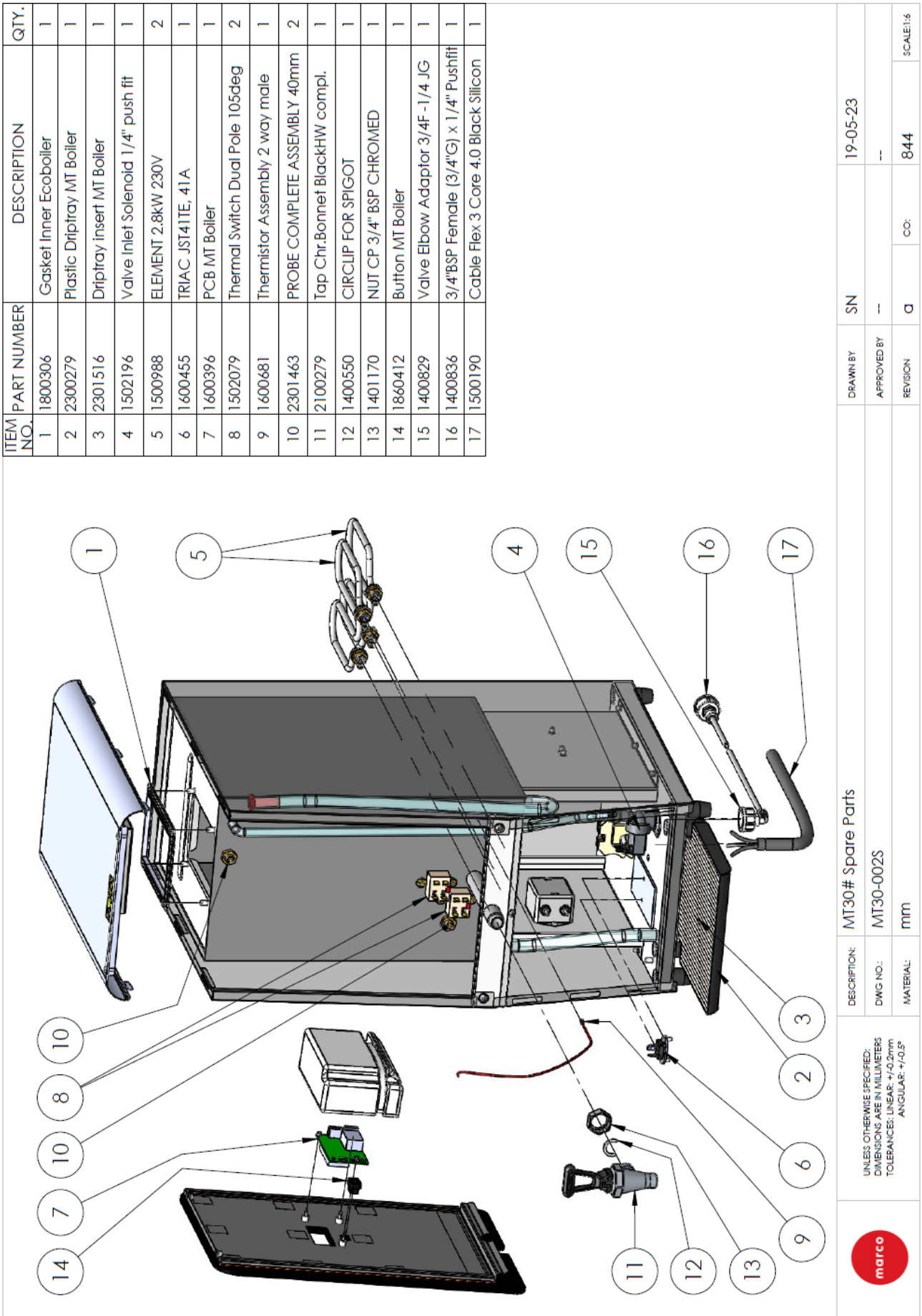
11.3 MT25 parts - 1000765#.

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	1800306	Gasket Inner Ecoboiler	1
2	2300279	Plastic Driptray MT Boiler	1
3	2301516	Driptray Insert MT Boiler	1
4	1502196	Valve Inlet Solenoid 1/4" push fit	1
5	1500988	ELEMENT 2.8kW 230V	2
6	1600455	TRIAC JST41TE, 41A	1
7	1600396	PCB MT Boiler	1
8	1502079	Thermal Switch Dual Pole 105deg	1
9	1600681	Thermistor Assembly 2 way male	1
10	2301463	PROBE COMPLETE ASSEMBLY 40mm	2
11	2100279	Tap Chr.Bonnet BlackHW compl.	1
12	1400550	CIRCLIP FOR SPIGOT	1
13	1401170	NUT CP 3/4" BSP CHROMED	1
14	1860412	Button MT Boiler	1
15	1400829	Valve Elbow Adaptor 3/4F -1/4 JG	1
16	1400836	3/4"BSP Female (3/4"G) x 1/4" Pushfit	1
17	1501488	Cord set IEC C19 CEE7 EU	1
	1501489	Cord set IEC C19 BS1363	1



11.4 MT30 parts - 1000766#.

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	1800306	Gasket Inner Ecoboiler	1
2	2300279	Plastic Driptray MT Boiler	1
3	2301516	Driptray insert MT Boiler	1
4	1502196	Valve Inlet Solenoid 1/4" push fit	1
5	1500988	ELEMENT 2.8kW 230V	2
6	1600455	TRIAC JST41TE, 41A	1
7	1600396	PCB MT Boiler	1
8	1502079	Thermal Switch Dual Pole 105deg	2
9	1600681	Thermistor Assembly 2 way male	1
10	2301463	PROBE COMPLETE ASSEMBLY 40mm	2
11	2100279	Tap Chr.Bonnet BlackHW compl.	1
12	1400550	CIRCLIP FOR SPIGOT	1
13	1401170	NUT CP 3/4" BSP CHROMED	1
14	1860412	Button MT Boiler	1
15	1400829	Valve Elbow Adaptor 3/4F -1/4 JG	1
16	1400836	3/4"BSP Female (3/4"G) x 1/4" Pushfit	1
17	1500190	Cable Flex 3 Core 4.0 Black Silicon	1



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