Normal Sterilizer Operation

Audible	Sterilizer Phase	Action / Notes
Beeps (3s)	POWER UP	Note: Navigate to Settings Menu on the display to adjust items like: Managing Users, Units of Measure, Date, Time, Language, Preheat Options, and etc. • Fill Valve - Closed • Vent Valve - Open • Air Valve - Closed • Heater - Off • Fans will run if temperature in the enclosure exceeds 45° C (113° F) and/or after Heating phase of a cycle starts. Fans will be off if below 41° C (105.8° F) and not running a cycle.
Audible	**Start a Cycle**	**Action / Notes**
None	FILLING	• Fill Valve - Energized [Open] • Vent Valve - Energized [Closed] • Air Valve - Energized [Open] • Heating Element - Off • Water Level Sensor - When the water level in the chamber reaches the sensor, the resistance from the sensor to ground drops and the control board stops the current flow to the fill valve.
	HEATING	• Fill Valve - De-energized [Closed] • Vent Valve - Energized [Closed] • Air Valve - Energized (*) [Open] • Heating Element - On • Temperature Sensor and Pressure Sensor - Monitors the conditions inside the chamber throughout heating. • Fans - Turn on at the start of heating - or when the enclosure temperature is at 45°C (113°F) or greater. • Door Interlock - Engages when pressure is 13.8 kPa (2 psi) or less. * Air Valve - Periodically during the Heat-Up Mode, voltage is supplied to the (normally closed) air valve. When energized, the air valve opens. ..... • Wrapped 1 and Wrapped 2: Air Valve will initially be energized open until the chamber temperature reaches 87.8°C (190°F), once closed the air valve will be opened | four times to expel air from the chamber. ..... • Unwrapped and Delicate: Air Valve will initially be closed, opening occurs three times to expel air from the chamber.
	STERILIZING	• Fill Valve - De-energized [Closed] • Vent Valve - Energized [Closed] • Air Valve - De-energized [Closed] • Heating Element - Cycles On & Off • Temperature Sensor & Pressure Sensor - Monitors the conditions inside the chamber throughout Sterilization.
	VENTING	• Fill Valve - De-energized [Closed] • Vent Valve - De-energized [Open] • Air Valve - Energized [open] • Heating Element - Off • Condensing Coil - Steam and water released from the chamber through vent and air valves, is circulated through the condensing coil in the reservoir. This cools the steam and water before returning it to the reservoir. • Door Interlock - Disengages when pressure is 3.4 kPa (.5 psi) or less. • Pressure Sensor - When the pressure reaches 5 kPa (0.7 psi), a 35 second timer is started. After the 35 second timer expires, the door open .. beep pattern starts indicating 5 seconds from door activation.
Beeps (Occurs 5 seconds before Door opens.)	DOOR OPENING	• Fill Valve - De-energized [Closed] • Vent Valve - De-energized [Open] • Air Valve - Energized [Open] • Heating Element - Off • Door Opening Motor -12 VDC is supplied to the door motor. This causes the motor to run, rotating the cam and linkage lifting the door latch mechanism and opening the door to the dry position. When the cam reaches its original position,the hall effect sensor stops the motor. • Hall Effect Sensor and Door Magnet - Door motor will travel up to 1 full revolution until the hall effect sensor detects the door magnet. This signals that the door latch bar is in the correct position and stops the door motor.
	DRYING	• Fill Valve - De-energized [Closed] • Vent Valve - De-energized [Open] • Air Valve - De-energized [Closed] • Heating Element - Cycles On & Off • Fans - Turn off at end of cycle (If no drying then at end of Venting) unless the enclosure temperature is at 45°C (113°F) or greater. • Sterilizer Door - The sterilizer door must remain open to dry position throughout the Drying Mode. If the door is closed, pressure may build up in the chamber resulting in an error code. Opening the door beyond the dry position will result in an error. • Door Dry Position Switch - The dry position switch monitors when door is in the dry position. The switch is open when door is closed. The switch is closed when door is in the dry position. The switch opens back up when door is opened past the dry position.
Beeps (7.5 s)	DRYING CYCLE COMPLETE	• Fill Valve - De-energized [Closed] /• Vent Valve - De-energized [Open] • Air Valve - De-energized [Closed] / • Heater - Off

Location Specifications

Support Surface:

• Surface should be water-resistant material (e.g. laminate, stainless steel, solid surface materials, stone).

• Surface must be level to ensure chamber fills with correct water level. Improper water level in the chamber could cause a sterilizer malfunction.

Clearance Requirements:

To ensure proper air circulation and to allow access to the reservoir fill port and drain coupling, adhere to the minimum clearance requirements listed below. If the sterilizer will frequently be operated without pauses between cycles, position unit where steam will not damage materials or equipment in the surrounding area. If the sterilizer will be used in an enclosed area and will frequently be operated without pauses between cycles, a direct to drain solution is recommended.

Back of Unit to Back Wall	5.1 cm (2 in)
Front Support Surface to Front Sterilizer	2.5 cm (1 in)
Sides of Unit to Side Wall	5.1 cm (2 in)
Distance above Unit	12.7 cm (5 in)
Maximum Upper Overhang (from back of sterilizer)	38.1 cm (15 in)
Minimum Height Under Cabinet or Shelf	54.9 cm (21.6 in)

Fuse Ratings

115 VAC	F1	15 Amp, 250 V, Fast Acting, 6.35 mm x 31.7 5 mm (0.250 in Dia x 1.250 in L)
	F2	15 Amp, 250 V, Fast Acting, 6.35 mm x 31.75 mm (0.250 in Dia x 1.250 in L)
	F3	2.5 Amp, 250 V, Time Delay/Slow-Blow, 5.20 mm x 20.00 mm (0.205 in Dia x 0.787 in L)
230 VAC	F1	8 Amp, 250 V, Fast Acting, 5.20 mm x 20.00 mm (0.205 in Dia x 0.787 in L)
	F2	8 Amp, 250 V, Fast Acting, 5.20 mm x 20.00 mm (0.205 in Dia x 0.787 in L)
	F3	2.5 Amp, 250 V, Time Delay/Slow-Blow, 6.35 mm x 31.75 mm (0.250 in Dia x 1.250 in L)

Electrical Rating

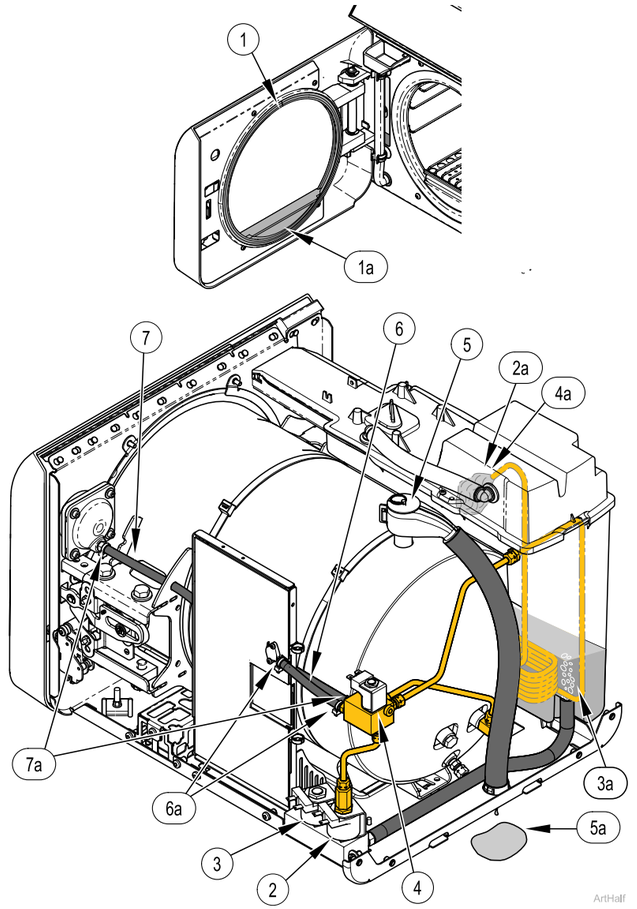
Note: A separate (dedicated) circuit is recommended for this sterilizer. Sterilizer should not be connected into an electrical circuit with other appliances or equipment unless circuit is rated for the additional load.

115 VAC Unit	115 VAC, 12 Amp, 50/60 Hz
230 VAC Unit *	230 VAC, 6.4 Amp, 50/60 Hz

** The sterilizer is to be connected to a single-phase (split-phase) three-wire supply with 115 V nominal line to ground and 230 V nominal line to line.*

Note: 115 VAC models may be operated in a voltage range of 103-127 VAC. 230 VAC models may be operated in a voltage range of 207-253 VAC. Overall cycle time will vary based on conditions such as voltage, starting temperature, and altitude. At the lower end of the voltage range, heat-up times will increase, and it may be necessary to run a Pre-Heat cycle prior to the sterilization cycle.

Leak Check Chart



Component	Check	Correction
Door / Dam Gaskets (1)	Check for water leaking around door. (1a)	Inspect / clean gaskets. Replace gasket(s) if necessary.
Vent Valve (2)	Check for water leaking from condensing coil spout. (2a)	Clean / replace vent valve.
Fill Valve (3)	Check for water leaking back into reservoir thru the fill line. (3a) Look for bubbles coming from bottom of reservoir.	Clean / replace fill valve.
Air Valve (4)	Check for excessive steam coming thru condensing coil spout. (4a) NOTE: During the HEAT & VENT modes, it is normal for steam to be exhausted thru the spout.	Clean / replace air valve.
Pressure Relief Valve (5)	Check for water / steam leakage from beneath the rear of the sterilizer. (5a)	Refer to: Pressure Relief Valve Test. Replace valve if necessary.
Pressure Sensor Hose (6)	Check for steam leakage at pressure sensor hose connections. (6a)	Secure pressure sensor hose connection with high temperature cable ties.
Door Interlock Hose (7)	Check for steam leakage at door interlock hose connections. (7a)	Secure pressure sensor hose connection with high temperature cable ties.

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Sterilizer Service Quick Reference

For Models:
M9® (-050/-053)
M11® (-050/-051/-053)

This document is intended for use by qualified service technicians only!

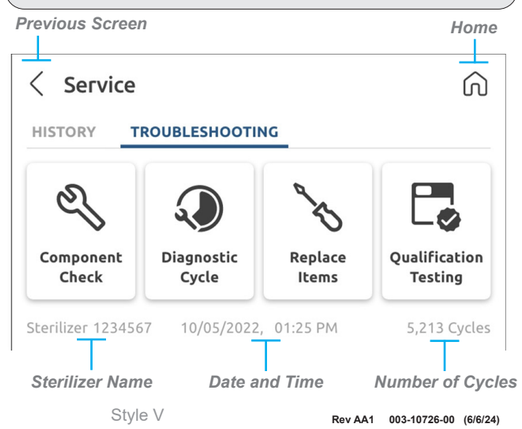
WARNING
To prevent risk of shock always disconnect power before removing covers or performing any service procedure.

WARNING
Sterilizer or components may be hot or become hot. Wait until the sterilizer or components are cool to the touch before continuing service.

Note
Refer to the service manual for complete instructions.

Troubleshooting Menus

Step 1: Access Troubleshooting
A) From the home menu press settings.
B) Select the Service icon.
C) Choose the Troubleshooting Tab.



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WARNING
Some procedures require power to be connected with covers removed. Line voltage is present. Use extreme caution to prevent electric shock.

WARNING
Disconnect power to sterilizer when testing resistance (Ω).

Approximate Ohm Ω Readings	
115 VAC MODELS	**230 VAC MODELS**
• Door Motor 450 Ω • Fill Solenoid k Ω • Air Solenoid k Ω • Vent Solenoid k Ω • Auto Fill Solenoid k Ω • Heating Element 9 - 11 Ω	• Door Motor 450 Ω • Fill Solenoid k Ω • Air Solenoid k Ω • Vent Solenoid k Ω • Auto Fill Solenoid k Ω • Heating Element 39 - 43 Ω

Note:
- *Disconnect connector(s) at component when checking Ohms (Ω).*

Note
For proper test point readings meter leads need to penetrate PC board conformal coating.

LED Description	LED	Color	System State When ON
Isolated 12V Power	D27	Green	Isolated 12V power is functional.
12V Power	D24	Green	12V power is functional.
5V Power	D23	Green	5V power is functional.
3.3V Power	D22	Green	3.3V power is functional.
Sterilization MCU Status (flashing)	D34	Green	Sterilization MCU Firmware is running.
Sterilization MCU Error	D5	Red	Sterilization MCU is in an error condition.
3.0V Precision Reference	D13	Green	3.0V Precision Reference is functional.
Sensor MCU Status (flashing)	D35	Green	Sensor MCU Firmware is running.
Sensor MCU Error	D7	Red	Sensor MCU is in an error condition.
Door Dry Position	D53	Green	Door is in Dry Position.
Chamber Water Level	D52	Green	Chamber is full.
Door Motor Output	D2	Green	Door motor output is active.
Door Motor Hall Effect Switch	D55	Green	Door motor is in the Home position.
Fan output 0 (lower fan)	D19	Green	Fan 0 output is on.
Fan output 1 (lower fan)	D20	Green	Fan 1 output is on.
Fan output 2 (upper fan)	D17	Green	Fan 2 output is on.
Air Valve output	D11	Green	Air valve output is activated.
Autofill Valve output	D12	Green	Autofill valve output is activated.
Autofill overflow probes	D54	Red	Water is contacting the overflow probes.
Fill valve output	D6	Green	Fill valve output is on.
Vent Valve	D8	Green	Vent valve output is on.
Door Switch Status	D47	Green	Door is closed.
High Limit Thermostat	D48	Red	Thermostat is tripped.
Heater Status	D51	Green	Power is applied to heater output.

Test Point Description	Input / Output / Voltage	Test Point Pos +	Test Point Neg -	Expected Reading 115 V model	Expected Reading 230 V model
AC Line Voltage In - Not Fused	Voltage	TP269	TP272	115 VAC	230 VAC
AC Line Voltage - Fused	Voltage	TP270	TP273	115 VAC	230 VAC
AC Voltage Output to Power Supply	Voltage	TP266	TP273	115 VAC	230 VAC
Isolated 12V	Voltage	TP271	TP299	12 VDC	12 VDC
12V Net	Voltage	TP291	TP292	12 VDC	12 VDC
5V Net	Voltage	TP294	TP292	5 VDC	5 VDC
3.3V Net	Voltage	TP293	TP292	3.3 VDC	3.3 VDC
12V Motor Output	Voltage	TP304	TP69	12 VDC	12 VDC
Door Dry Position Switch Input	Input	TP227	TP292	Door Closed 3.3 VDC / Door In Dry Position 0 VDC / Door Open Past Dry Position 3.3 VDC	Door Closed 3.3 VDC / Door In Dry Position 0 VDC / Door Open Past Dry Position 3.3 VDC
Chamber Water Level Input	Input	TP177	TP292	Contacted 0 VDC / Not Contacted 3.3VDC	Contacted 0 VDC / Not Contacted 3.3 VDC
Door Motor Output	Output	TP367	TP292	Activated 0 VDC / Not Activated 12 VDC	Activated 0 VDC / Not Activated 12 VDC
Hall Effect Switch Input	Input	TP392	TP292	Home Position 0 VDC / Not in Home Position 12 VDC	Home Position 0 VDC / Not Home Position 12 VDC
Fan Output 0 (lower fan)	Output	Black Wire	TP292	Activated 0 VDC / Not Activated 12 VDC	Activated 0 VDC / Not Activated 12 VDC
Fan Output 1 (lower fan)	Output	Black Wire	TP292	Activated 0 VDC / Not Activated 12 VDC	Activated 0 VDC / Not Activated 12 VDC
Fan Output 2 (upper fan)	Output	Black Wire	TP292	Activated 0 VDC / Not Activated 12 VDC	Activated 0 VDC / Not Activated 12 VDC
Air Valve Output	Output	TP108	TP127	Activated 108 VDC / Not Activated 0 VDC	Activated 216 VDC / Not Activated 0 VDC
Autofill Valve Output	Output	TP105	TP155	Activated 115 VAC / Not Activated 0 VAC	Activated 230 VAC / Not Activated 0 VAC
Autofill Overflow Detection Circuit	Input	TP465	TP292	Contacted 0 VDC / Not Contacted 1.65 VDC	Contacted 0 VDC / Not Contacted 1.65 VDC
Fill Valve Output	Output	TP75	TP74	Activated 108 VDC / Not Activated 0 VDC	Activated 216 VDC / Not Activated 0 VDC
Vent Valve Output	Output	TP73	TP72	Activated 108 VDC / Not Activated 0 VDC	Activated 216 VDC / Not Activated 0 VDC
Heater Output	Output	TP89	TP88	Activated 115 VAC / Not Activated 0 VAC	Activated 230 VAC / Not Activated 0 VAC
Thermostat Voltage	Input	TP86	TP88	Thermostat Not Tripped 115 VAC / Tripped 0 VAC	Thermostat Not Tripped 230 VAC / Tripped 0 VAC
Door Switch Input	Input	TP57	TP273	Door Closed and Thermostat Not Tripped 115 VAC Door Open or Thermostat Tripped 0 VAC	Door Closed and Thermostat Not Tripped 230 VAC Door Open or Thermostat Tripped 0 VAC
Door Switch Monitoring Circuit	Input	TP402	TP292	Door Open or Thermostat Tripped 3.3VDC Door Closed and Thermostat Not Tripped 0 VDC	Door Open or Thermostat Tripped 3.3VDC Door Closed and Thermostat Not Tripped 0 VDC
Thermostat Detect Circuit	Input	TP415	TP292	Thermostat Tripped 3.3VDC / Not Tripped 0 VDC	Thermostat Tripped 3.3VDC / Not Tripped 0 VDC
Heater Status Detection	Input	TP498	TP292	Activated 0 VDC / Not Activated 3.3 VDC	Activated 0 VDC / Not Activated 3.3 VDC