Harvey®

Chemiclave
EC Series Sterilizers

SERVICE MANUAL

LT1121X2 • 11/13/00

Table of Contents

Introduction

Note

To save space, most figures in this manual show only one of the models. This is usually the EC5500. Both models contain similar or identical components and operate in a similar way.

The Harvey® Chemiclave sterilizer is a safe, fast and effective sterilizer for use in medical and dental offices, hospitals, clinics and other health care facilities.

To sterilize goods, Chemiclave sterilizers use an unsaturated chemical vapor process. The active ingredient in Vapo-Steril, the liquid sterilant, is formaldehyde.

Two models of the EC Series are available: the EC5500 (8” chamber diameter) and the EC6000 (10” chamber diameter).

The model with a larger chamber (EC6000) can process a larger load. Features of each model are summarized in Figures 1 and 12 and in “General Specifications.”

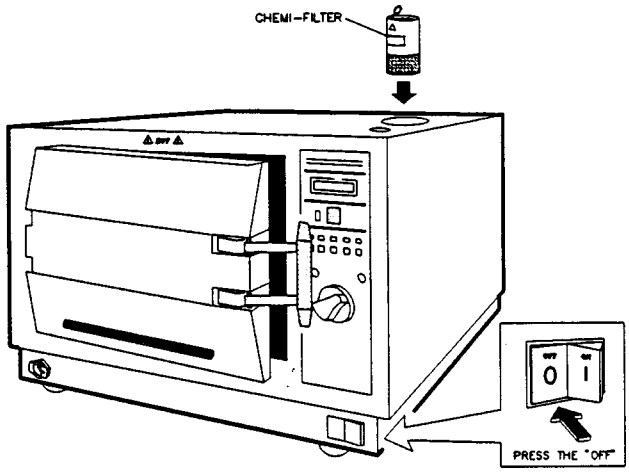


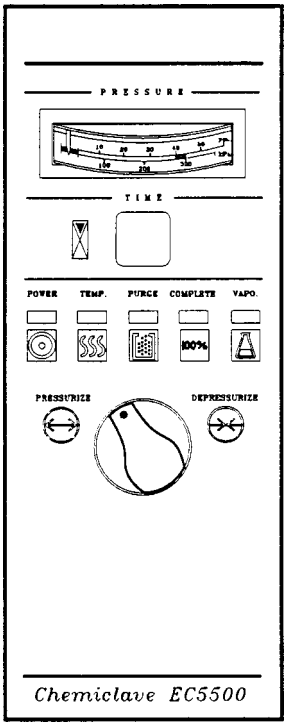
Figure 1: EC Series Chemiclave Sterilizers

General Specifications

Model EC5500	
Cabinet Size	16.75" W x 13" H x 18.5" D (425mm x 330mm x 470mm)
Chamber Size	8" diameter x 13.25" deep (203mm x 337mm)
Weight	59 lbs. (26.8 kg)
Heater Wattage	800 W
Electrical Rating	100 VAC, 50 Hz, 10 Amps 100 VAC, 60 Hz, 10 Amps 115 VAC, 60 Hz, 8 Amps 230 VAC, 50 Hz, 4 Amps
Operating Pressure	20 - 40 psig (138 - 276 kPa)
Operation Temperature	132°C (270°F)
Pressure Relief Valve	45 psig (310 kPa)
Fluid Capacities	
Solution Reservoir	1.1 liters (37 fl. oz.)
Condensate Tank	1.1 liters (37 fl. oz.)
Shot Chamber	30ml (1.01 fl. oz.)

Model EC6000	
Cabinet Size	19.25" W x 16.5" H x 20.5" D (489mm x 419mm x 521mm)
Chamber Size	10" diameter x 16" deep (254mm x 406mm)
Weight	120 lbs. (54.4 kg)
Heater Wattage	1200 W
Electrical Rating	100 VAC, 60 Hz, 13 Amps 115 VAC, 60 Hz, 12 Amps 230 VAC, 50 Hz, 6 Amps
Operating Pressure	20 - 40 psig (138 - 276 kPa)
Operation Temperature	132°C (270°F)
Pressure Relief Valve	45 psig (310 kPa)
Fluid Capacities	
Solution Reservoir	1.1 liters (37 fl. oz.)
Condensate Tank	1.1 liters (37 fl. oz.)
Shot Chamber	60ml (2.03 fl. oz.)

General Description



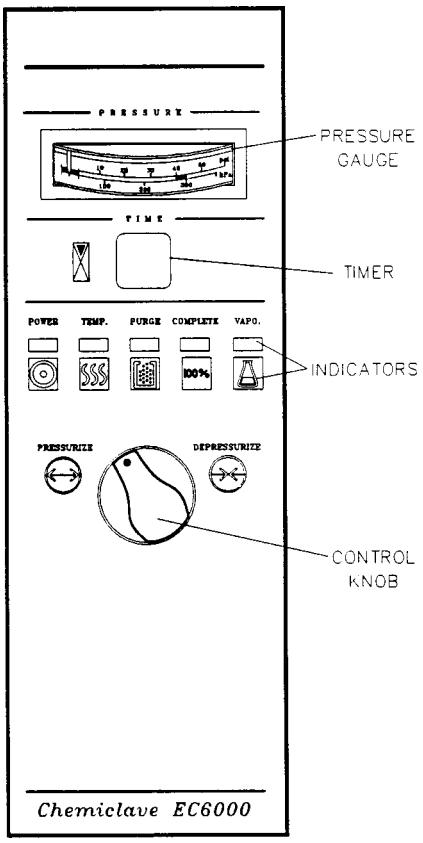


Figure 2: Control Panels—EC Series

Controls and Features

Power Switch

The power switch on the front of the sterilizer turns power to the sterilizer ON (I) or OFF (O). See Figure 1.

Control Panel

Pressure Gauge

Displays the chamber pressure. See Figure 2.

Timer

Times the 20 minute exposure phase and the purge phase for models EC5500 and EC6000.

Indicators

POWER: Lights when power to the unit is ON.

TEMP: Turns on and off as the chamber heaters cycle on and off.

COMPLETE: Lights when the exposure phase is complete.

PURGE: Lights when the chamber is being emptied of vapors.

VAPO: Signals when the reservoir must be filled with Vapo-Steril solution. The indicator will remain lit until solution is added.

CONTROL KNOB: Attached to the valve shaft, this knob controls the metering valve. Turning the control knob to PRESSURIZE introduces VAPO-Steril into the chamber and enables a cycle to begin. Turning the knob to DE-PRESSURIZE permits vapors to exhaust from the chamber.

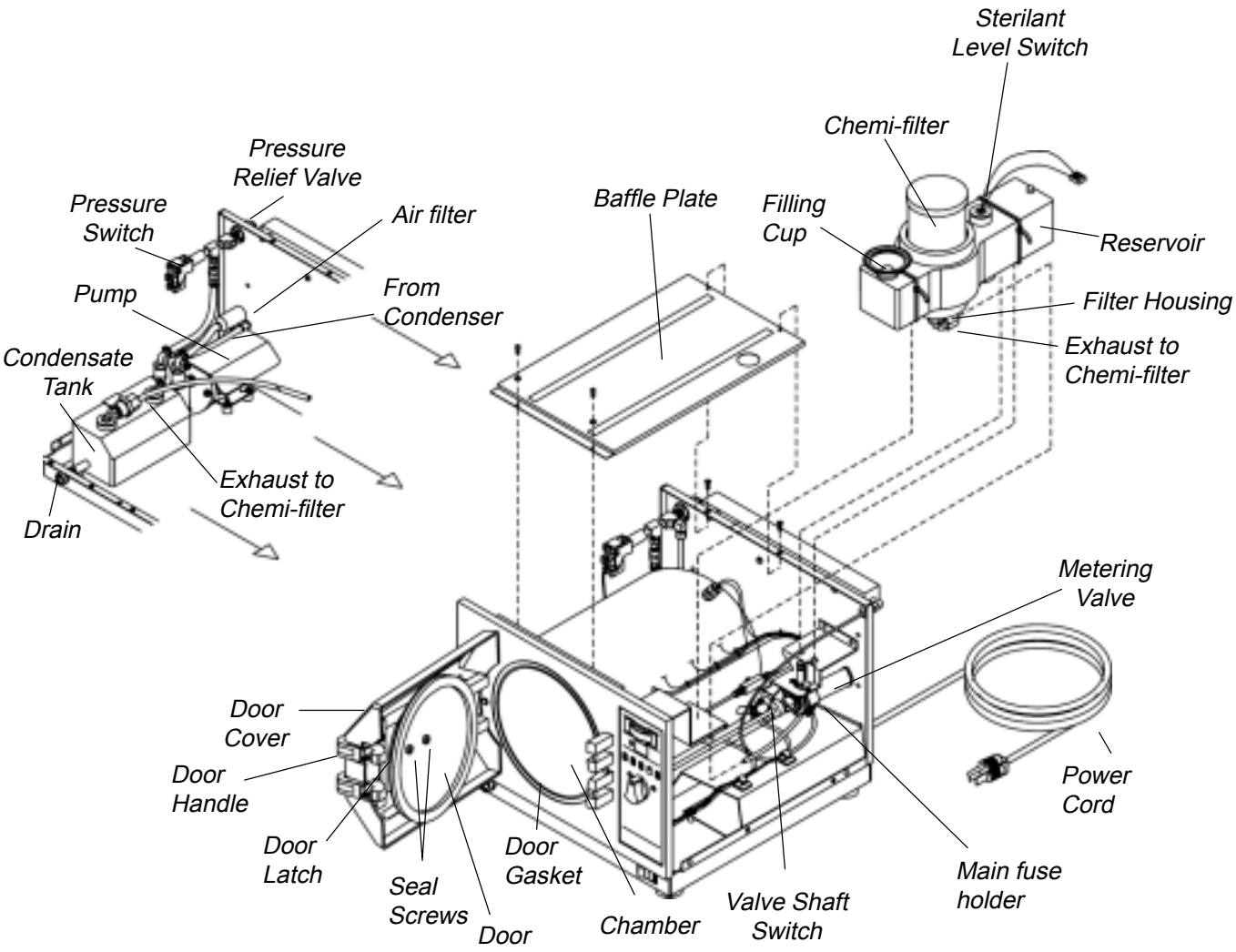


Figure 3: Major Components

Chemi-Filter

The Chemi-Filter is placed in the top of the sterilizer. It removes chemicals from the exhaust.

Door

The door latch secures the door. It is opened by the door handle. The handle mechanism prevents the door from being opened while there is pressure in the chamber.

Drain

A drain valve below the sterilizer door is provided to drain used Vapo-Steril from the condensate tank.

Pressure Relief Valve

A safety valve on the rear of the sterilizer relieves excess chamber pressure (see Figure 3).

Piping Components

See Figure 3 for major components and Figure 12 for detailed component locations.

Caution
Be sure you are using only Harvey Vapo-Steril solution. Other solutions will cause damage to the Chemiclave and will void all warranties.

Reservoir

The reservoir holds about 1 liter of Vapo-Steril solution (see “Technical Specifications” for exact amounts). The filling cup has a spring-loaded valve. When the reservoir is full, the valve stops the flow of solution from the filling bottle.

The reservoir contains a STERILANT LEVEL SWITCH. This switch lights the VAPO indicator on the control panel when the level of solution is low.

Metering Valve

Operated by the control knob, the valve has four ports (including the shot chamber) and two settings, DEPRESSURIZE and PRESSURIZE.

With the control knob at DEPRESSURIZE, Vapo-Steril can enter through the fill port and fill the shot chamber, while the chamber itself connects through the exhaust port to the exhaust line.

With the control knob at PRESSURIZE, the fill port and exhaust port are closed. The valve connects the shot chamber to chamber. The measured amount of Vapo-Steril from the shot chamber can enter the chamber. The chamber can build pressure to run a sterilizing cycle.

Chamber

Pressure vessel where loads of instruments are sterilized. The pressure for a typical sterilizing cycle is 20 - 40 psig (138 - 276 kPa).

Pressure Gauge

Displays the chamber pressure.

Pressure Relief Valve

The pressure relief valve will open to relieve the chamber pressure if it exceeds the pressure rating of the valve. This valve is on the rear of the sterilizer.

Condenser

The condensing coils on the back of the sterilizer liquefy the vapors that exit from the chamber.

Condensate Tank

The condensate tank collects the liquefied vapors from the condenser. Any remaining vapors proceed through the exhaust line to the Chemi-Filter.

Drain

The drain includes a valve in the chassis and a separate fitting with plastic tubing. The operator inserts the fitting into the valve to empty liquid waste from the condensate tank.

Exhaust

Vapors from the chamber that do not liquefy in the condenser proceed to the exhaust connection on the filter housing. They exit through the Chemi-Filter into the atmosphere.

Chemi-Filter

The Chemi-Filter traps the formaldehyde from the exhaust vapors before releasing them to the atmosphere. The Chemi-Filter should be installed before the sterilizer is operated. It must be replaced regularly.

Pump

Propels air into the chamber during the purge phase, which forces vapors out of the chamber through the vent port.

Air Filter

Removes contaminants from intake air before the pump propels it into the chamber.

Check Valve

Prevents chamber back pressure from contacting the pump and the air filter.

Electrical Components

Printed Circuit Boards (PCBs)

Power Supply Board

Transforms line power into working voltages. Acts as “input/output” board for heater and pump.

Display Control Board

Contains logic circuits and display components, including the timer and the buzzer.

- Timer: On Display/Control Board. Counts to time the exposure and purge phases. For the exposure phase, the timer operates only if the valve shaft switch is closed and the pressure switch is closed. For the purge phase, the timer is actuated when the control knob is turned to DEPRESSURIZE and valve shaft switch changes from closed to open. After a 1-minute delay, the timer begins to count down the preset purge valve.

- Buzzer: On Display/Control Board. Signals the end of the exposure and purge phases.

Power Cord

The power cord connects the unit to the voltage supply.

Power Switch

The POWER switch turns ON and OFF the electrical power for the unit.

Control Panel

The control panel contains the indicators, pressure gauge and the control knob.

Heater

The chamber is heated by a band-type heater that wraps completely around the outside of the chamber. Wattage for the heater is listed in “Technical Specifications.”

Caution

Refer to “Thermostat Adjustment” in the “Maintenance and Servicing” section of this manual before adjusting the thermostat.

Thermostat

Turns heater on and off to maintain chamber temperature.

Overtemp Switch

Opens to cut power to the heaters if chamber temperature reaches (163°C ± 4) 325°F. Overtemp switch has to be **manually reset.**

Valve Shaft Switch

Engaged by the cam on the valve shaft, this switch is closed only when the control knob is set to PRESSURIZE. For the exposure phase, the timer will not operate if either this switch or pressure switch is open. For the purge phase, this switch must change from the closed state to the open state. After a 1-minute delay, the timer begins to count down the preset purge value.

Pressure Switch

Closes when chamber pressure reaches the minimum exposure pressure of (138 kPa) 20 psi. Opens whenever chamber pressure is less than that value. For the exposure phase, the timer will not operate if either this switch or value switch is open.

Sterilant Level Switch

The sterilant level switch in the reservoir lights the VAPO indicator when the sterilant level is low. This switch is preset to actuate when one liter of Vapo-Steril can be poured into the reservoir. The float level is not adjustable.

Principles of Operation

Chemiclave Cycle (EC5500 & EC6000)

Warning

Do not reuse Vapo-Steril solution removed from the waste tank. This liquid may be contaminated or chemically altered and may damage the sterilizer.

Caution

Use only harvey Vapo-Steril solution in the Chemiclave. Do not dilute, alter or otherwise change Vapo-Steril in any way. Use of other solutions may cause mechanical damage to components of the sterilizer and may result in non-sterile loads.

Filling the Reservoir

This is a manual function. When the sterilant reservoir is filled, Vapo-Steril can flow through the metering valve to fill the shot chamber. The metering valve is open to the shot chamber when the control knob is set to DEPRESSURIZE (see Figure 4).

Power On

Control knob is set to DEPRESSURIZE before turning the power ON. This vents any sterilant vapors into the condensate tank. Electrical power is applied to the unit when POWER switch is turned ON. When the power is turned ON all the indicator (LED's) should light for approximately two seconds then extinguish, except for the POWER and TEMP indicators which should remain ON.

Warm Up

The heater that surrounds the chamber is turned on when the power is turned ON. It stays active until the setpoint temperature is reached. As long as the heater is active, the TEMP indicator lights (see Figure 5).

Ready/Load

When the setpoint temperature is reached, the heater cycles off and the TEMP indicator goes out. The chamber is ready to be loaded (see Figure 6). The heater is controlled to maintain chamber temperature. TEMP light cycles on and off with heater.

Pressurization

When the operator sets control knob to PRESSURIZE, sterilant flows by gravity into the chamber from the shot chamber of the metering valve (see Figure 7, PRESSURIZE mode). Chamber pressure begins to increase. The timer displays "20" minutes.

Exposure

This timed function begins when chamber pressure reaches 20 psig (138 kPa). Pressure switch is then energized. The timer counts down the exposure time of 20 minutes. The decimal point flashes when the timer is active. Chamber pressure is displayed continually on the pressure gauge. If pressure goes below 20 psig (138 kPa), the pressure switch is de-energized. This stops the timer countdown and the flashing decimal point until pressure returns to 20 psig (138 kPa) or above.

Note
Exposure conditions are maintained until the control knob is set to depressurize.

Exposure Complete

When the exposure is complete, the timer displays “00” and a tone sounds. The COMPLETE indicator lights. The PURGE indicator flashes briefly (see Figure 9).

Depressurization

Begins when the operator sets the control knob to DEPRESSURIZE (see Figure 4). This vents the chamber through the metering valve to the condensate tank (see Figure 8, DEPRESSURIZE mode). Pressure switch is de-energized. The COMPLETE indicator stays on. The PURGE indicator continues to flash as the chamber depressurizes for one minute.

Purge

Begins automatically after Depressurization (approximately 1 minute delay before pump starts). See Figure 10. Timer displays “07” (EC5500) or “09” (EC6000). The COMPLETE indicator goes out. The PURGE indicator lights. Purge pump forces sterilant vapor from the chamber until the timer counts down to “00.”

Complete

After Purge, the pump stops and the PURGE indicator goes out. A tone sounds. The pressure gauge reads less than 2 psig (14 kPa). The cycle is complete. The COMPLETE light stays lit for one minute, then goes out. Heater remains controlled as long as the POWER switch remains ON. The POWER indicator is lit and he TEMP indicator cycles on and off with the heater. To unload, the operator opens the door (see Figure 11).

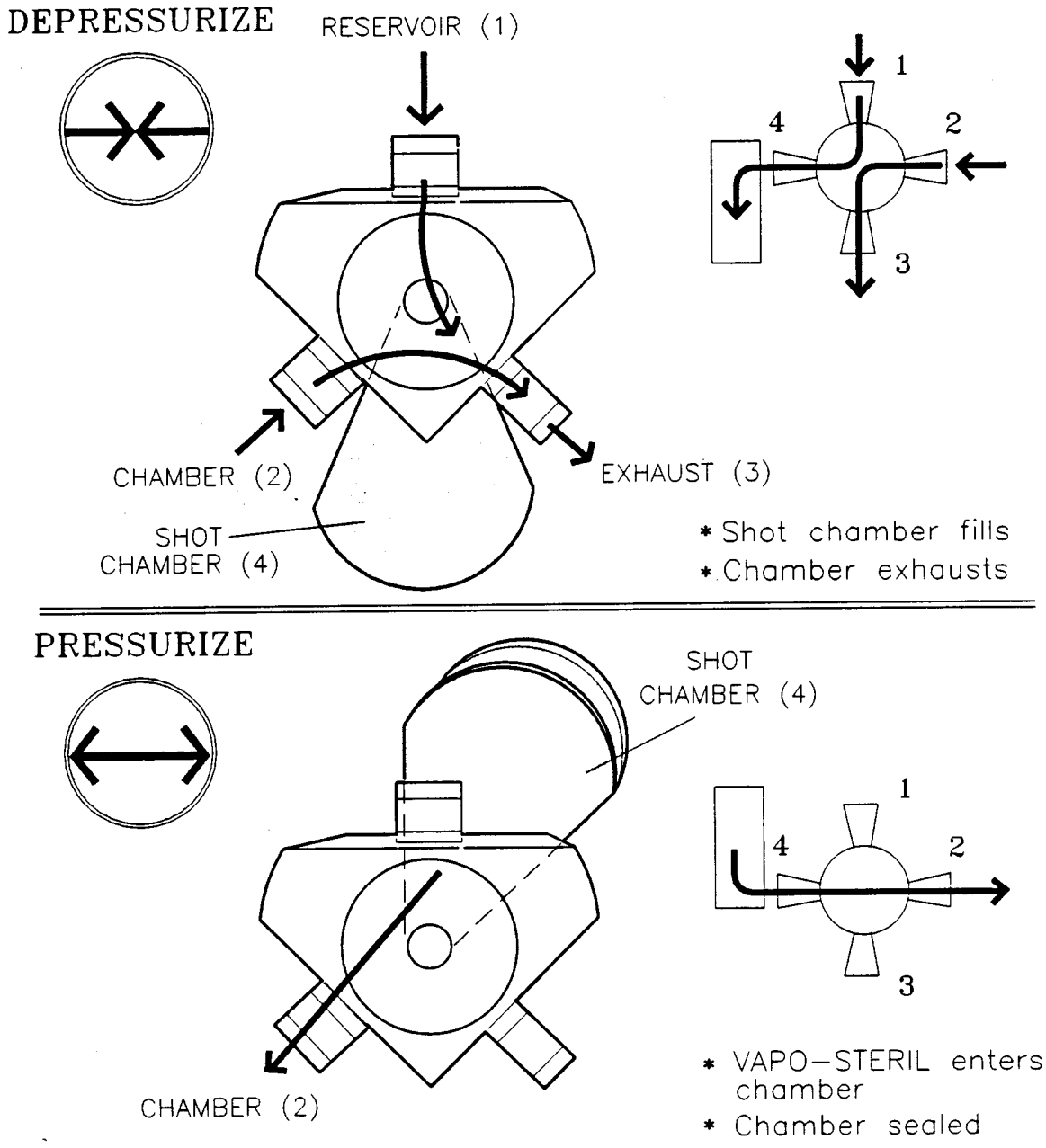


Figure 4: Metering Valve Function

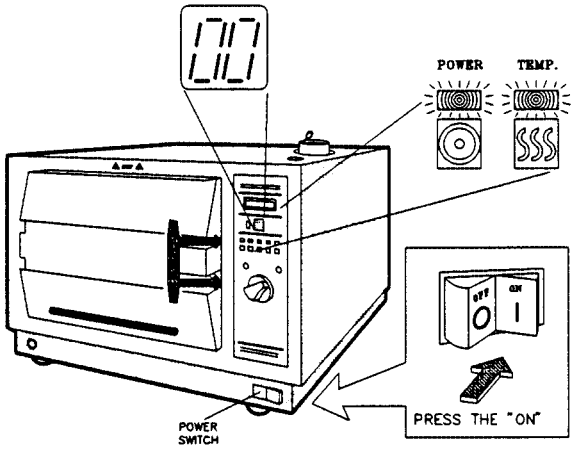


Figure 5: Warm-Up

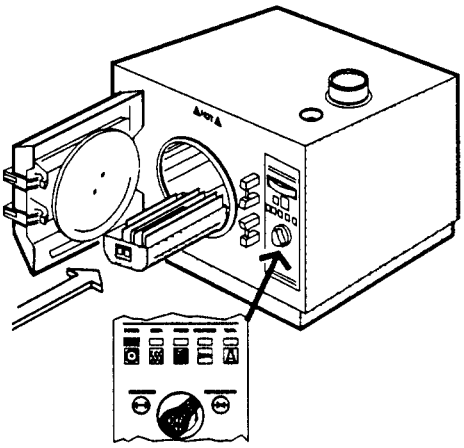


Figure 6: Ready/Load

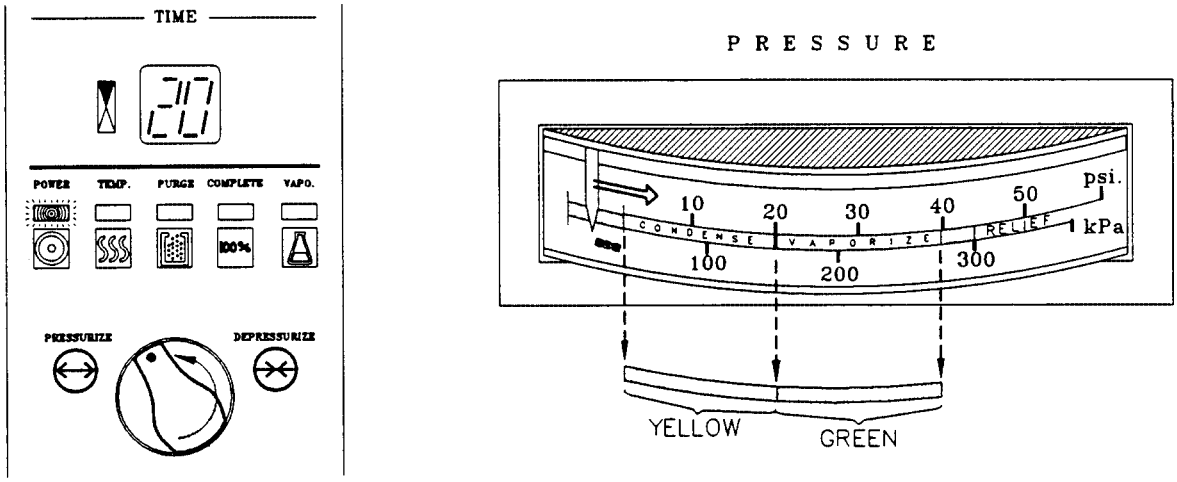


Figure 7: Pressurization

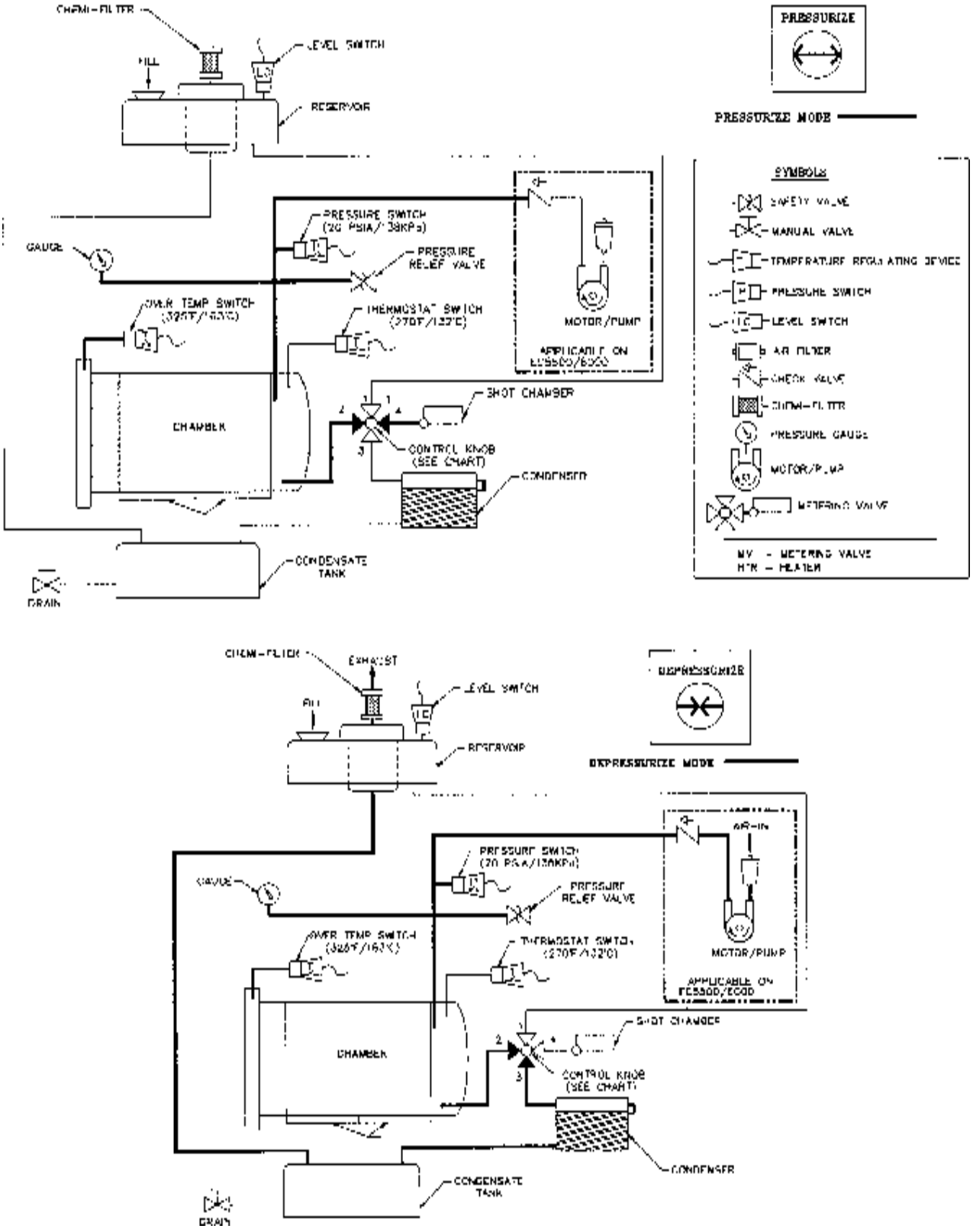


Figure 8: EC5500/EC6000 Operation

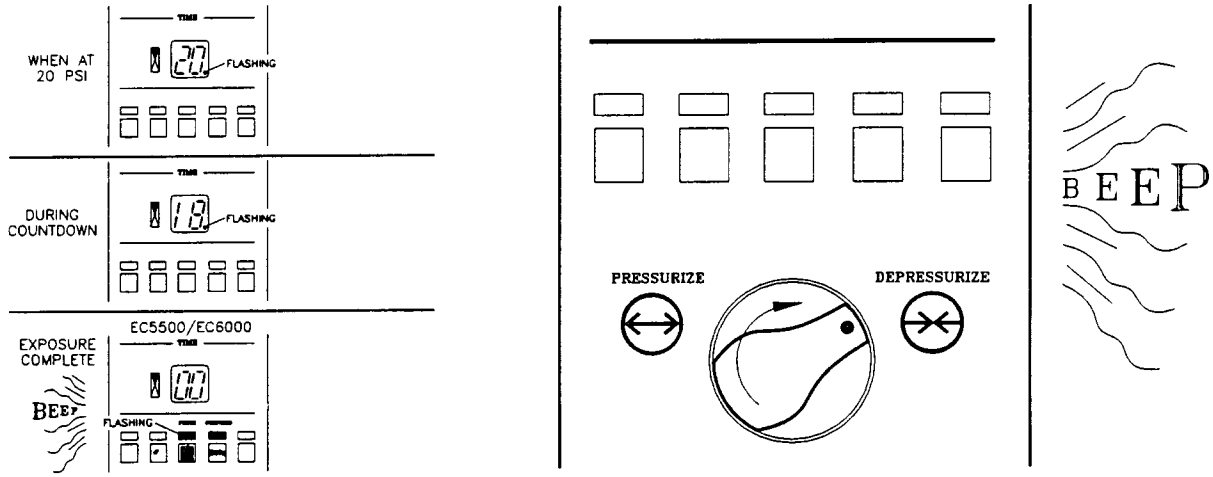


Figure 9: Exposure

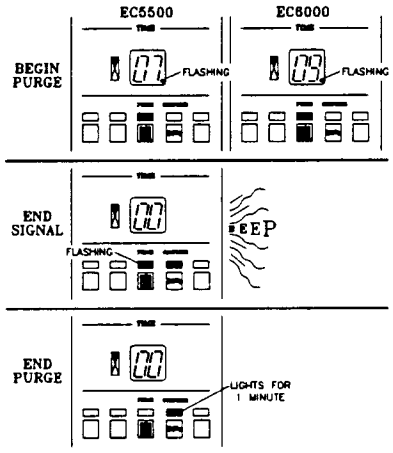


Figure 10: Purge

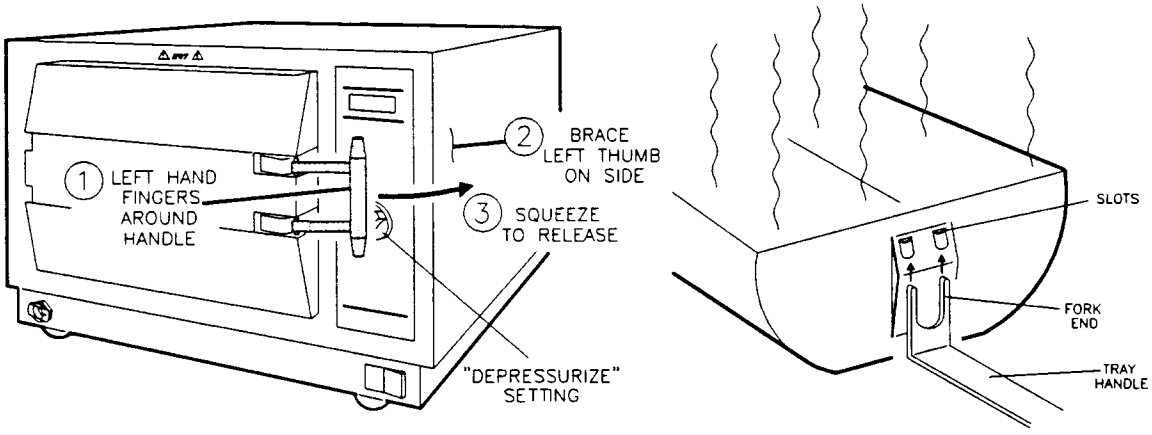
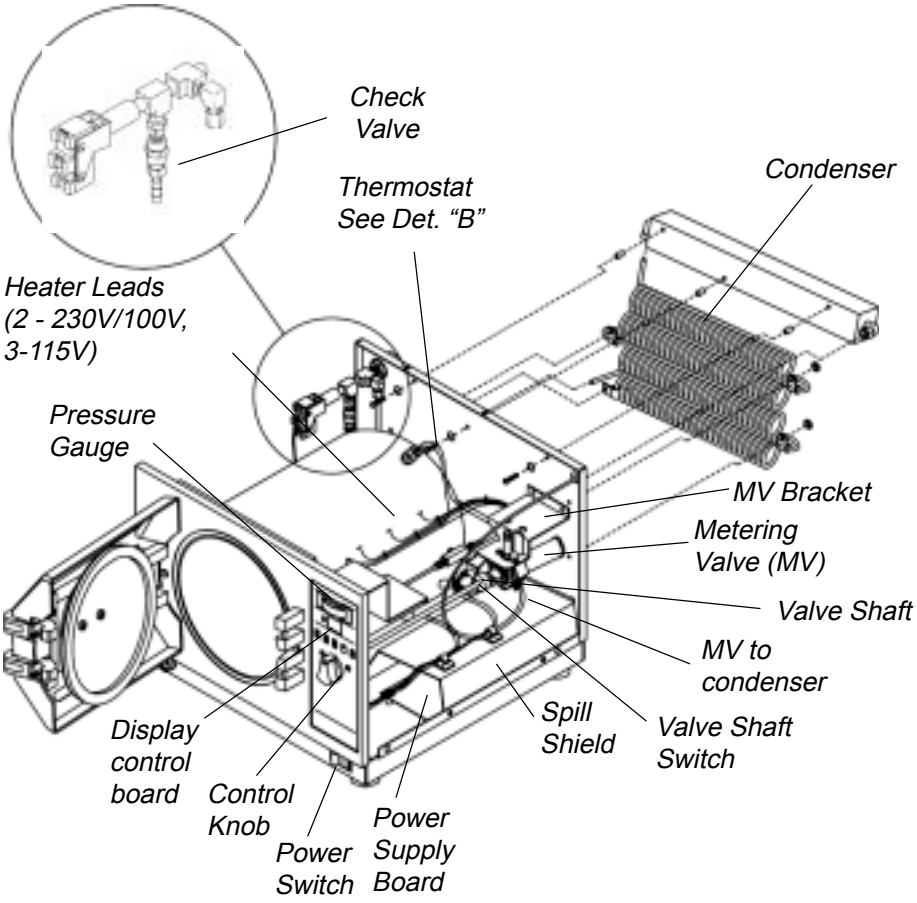
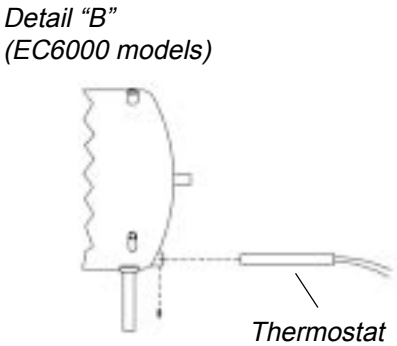


Figure 11: End/Unload





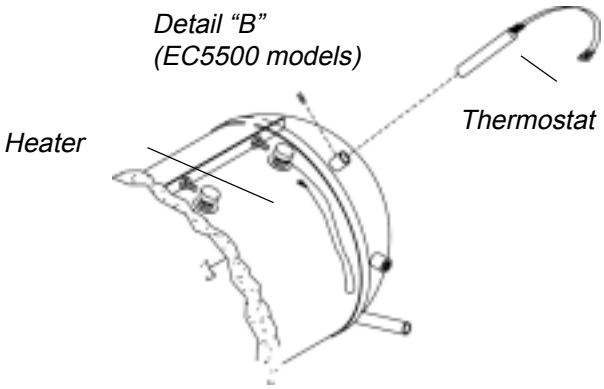


Figure 12: Component Locations

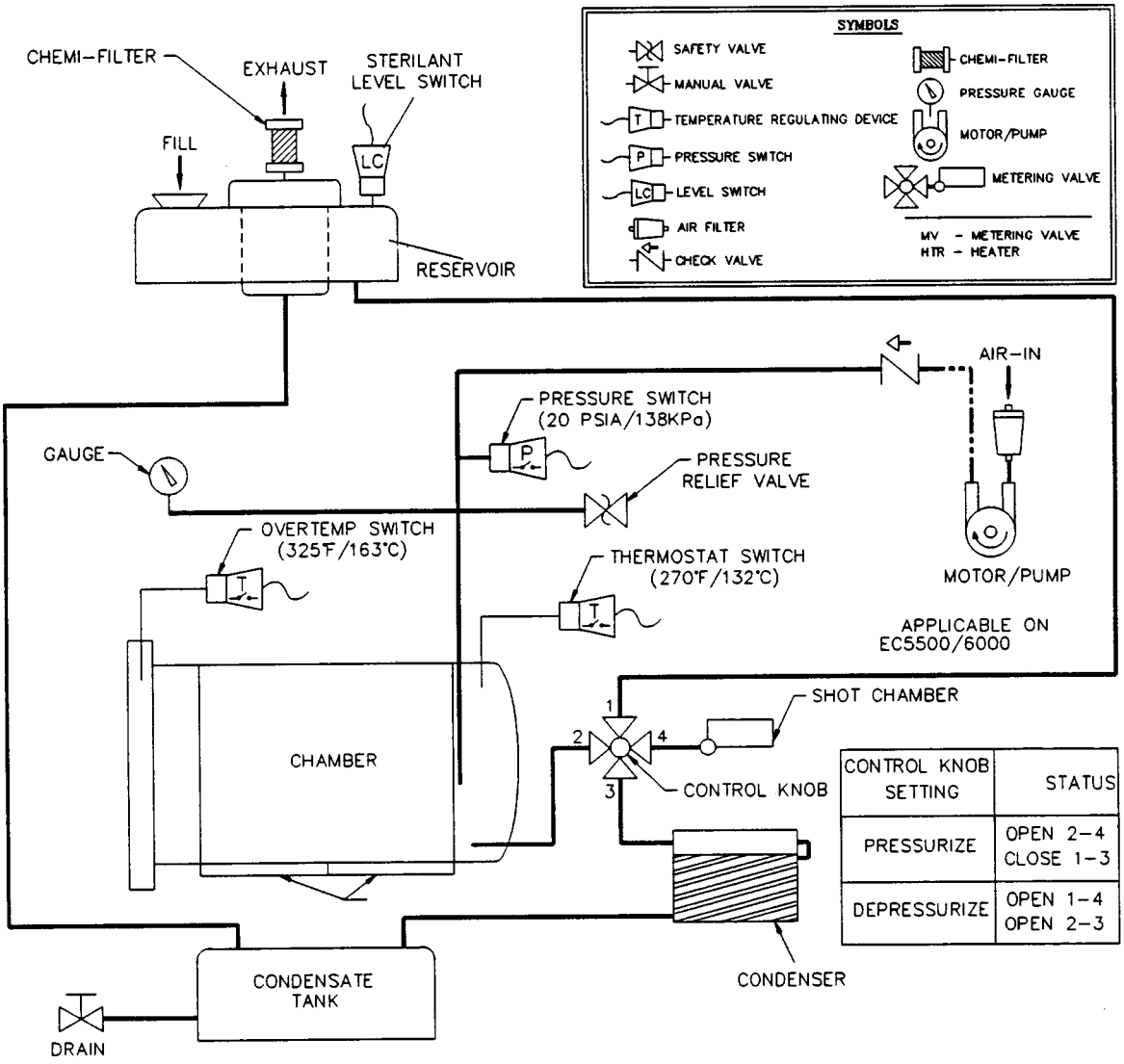


Figure 13: Piping Schematic

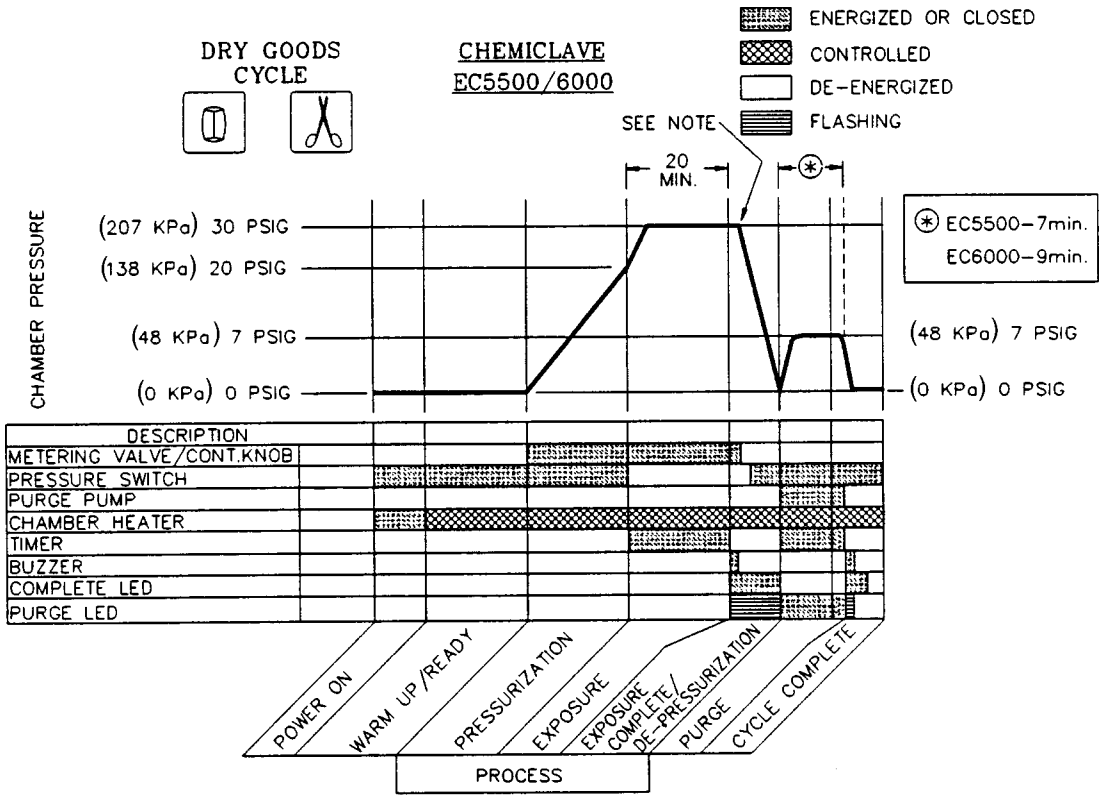


Figure 14: Cycle Phase Diagram

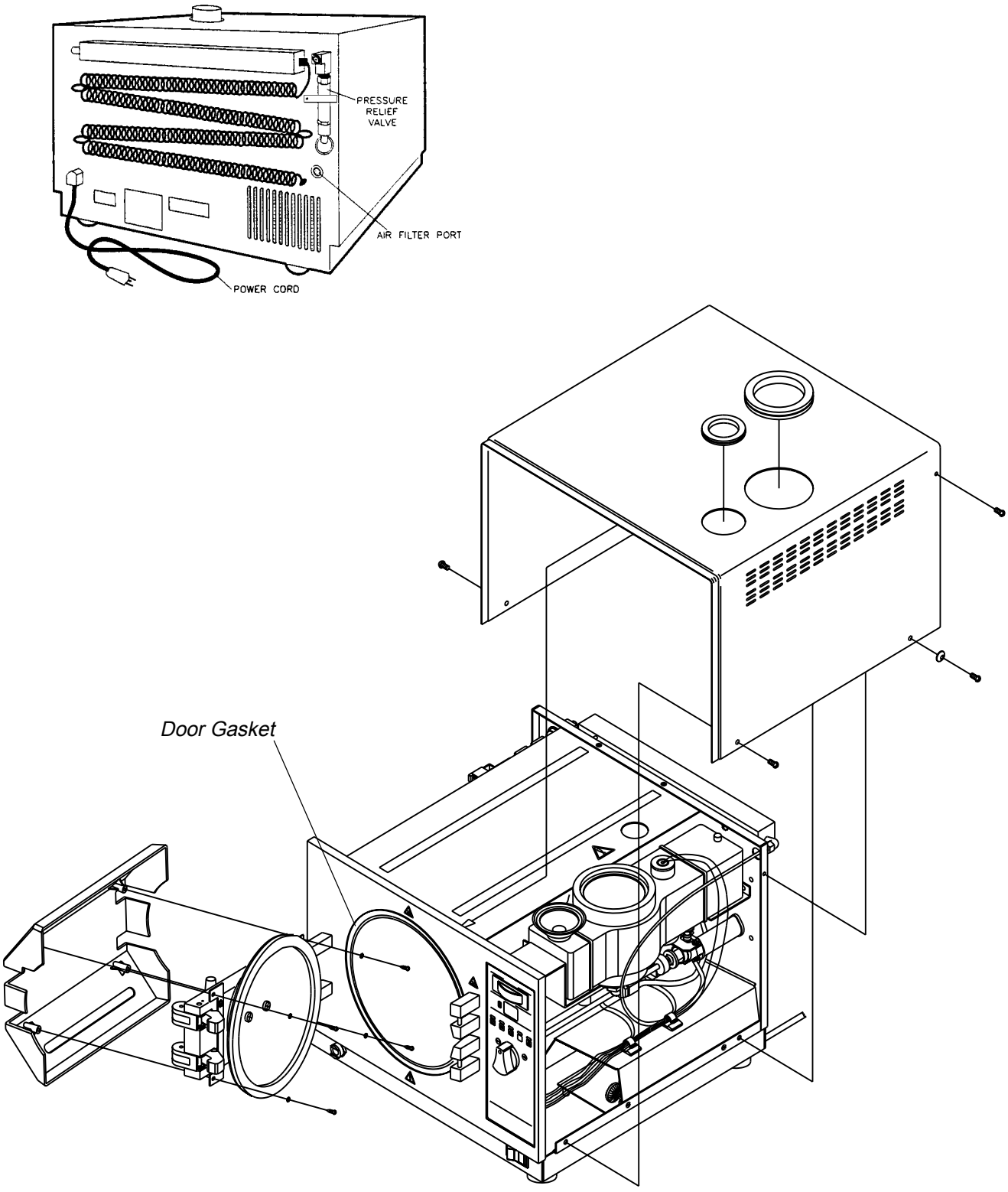


Figure 15: Exploded View - Top Cover and Door

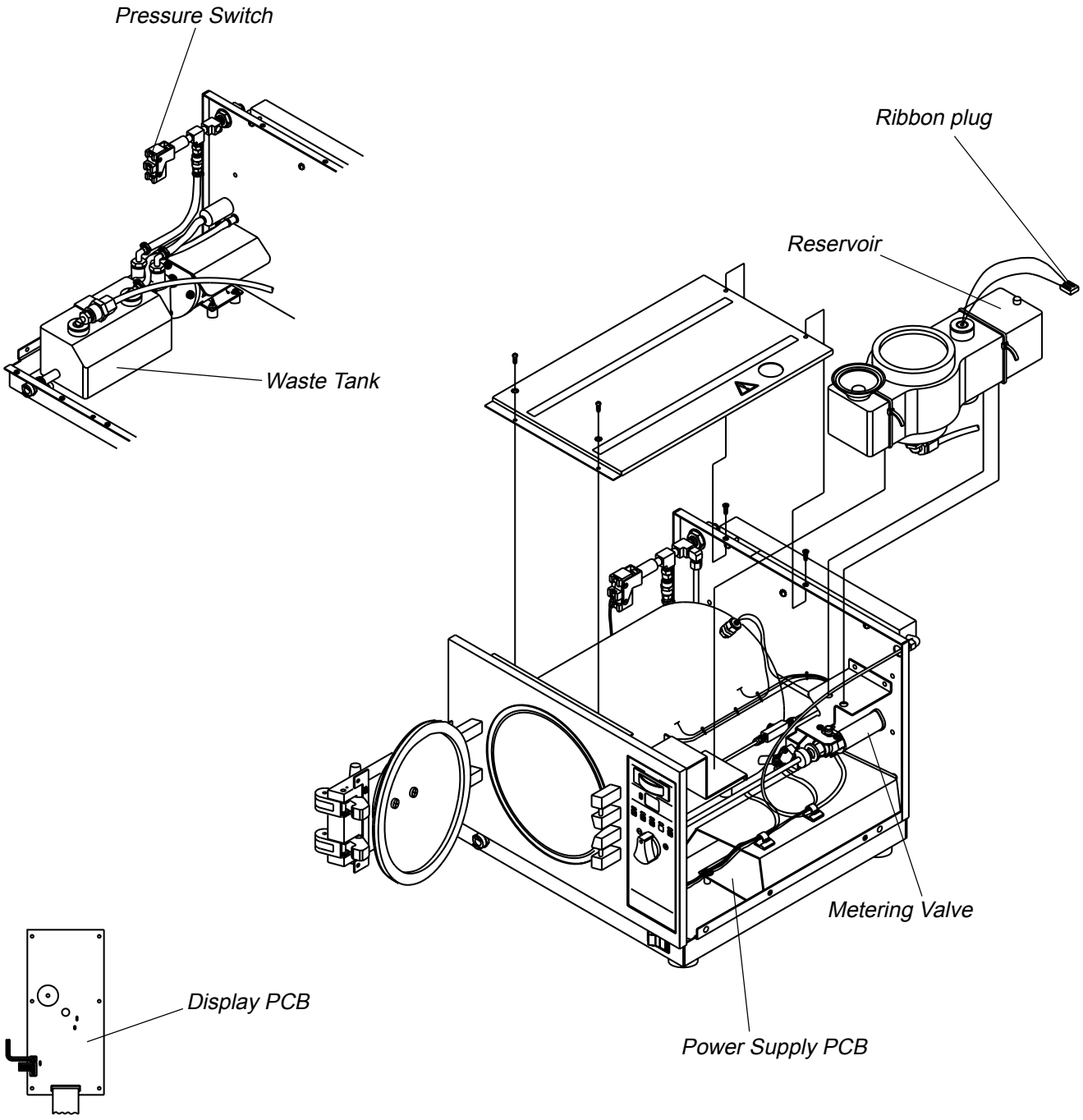
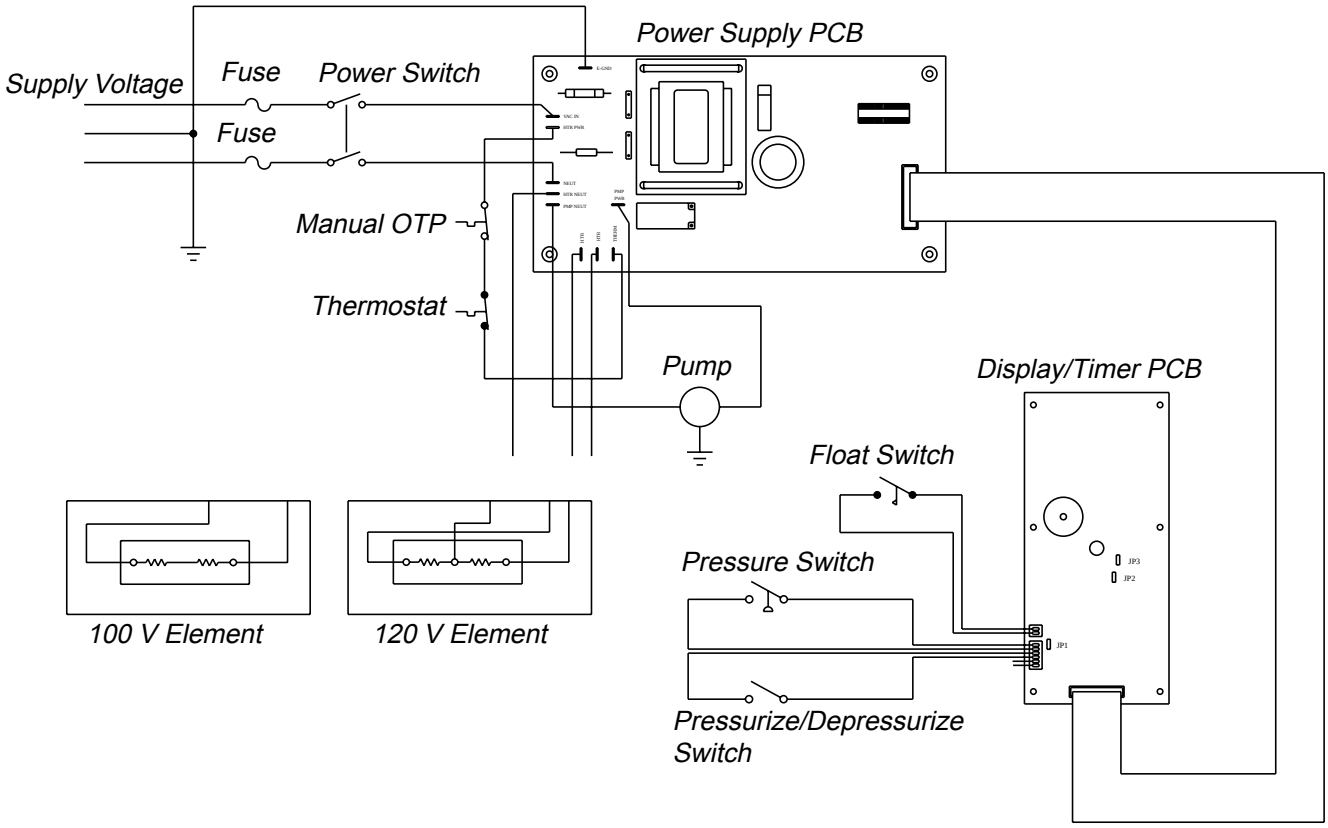
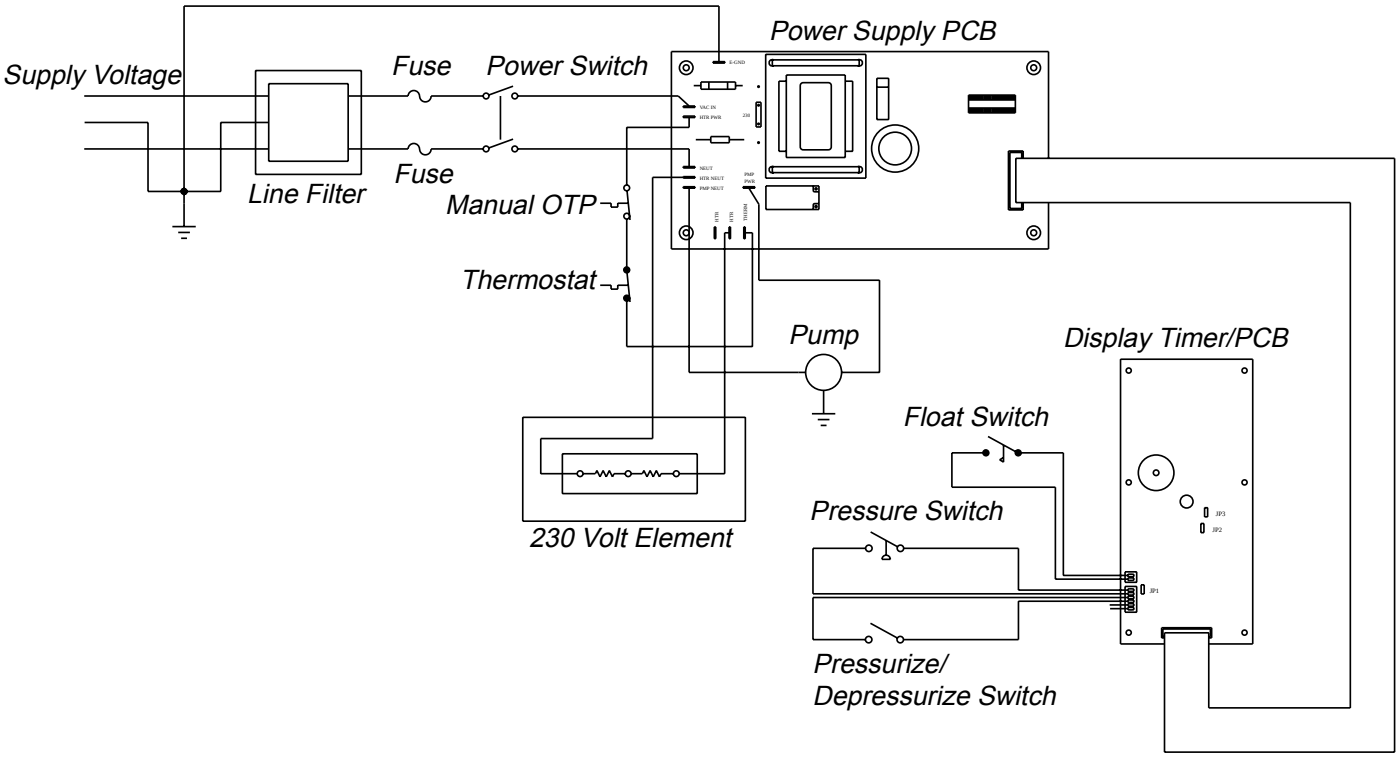


Figure 16: Exploded View

Wiring Diagrams



Wiring Diagram 100/120 V



Wiring Diagram 230 Volt

Troubleshooting

Problem	Cause	Remedy
Unit will not turn on.	Faulty power cord.	Check and replace.
	Mains fuse blown.	Check mains fuses. Replace if necessary.
	Power switch faulty.	Test and replace.
Low chamber pressure (18-24 psi)	Low Vapo-Steril level.	Fill Vapo-Steril reservoir.
	Dirty door gasket.	Wipe gasket and door face.
	Door loose.	Adjust door tension.
	Load too heavy.	Reduce load size.
	Using cloth wraps or gauze.	Not recommended in Chemiclave. Use wraps as specified in Owner/Operator manaual.
	Loose seal screws (door).	Tighten or replace.
	Leaky check valve.	Soap the air filter on rear of unit. If it bubbles under pressure, replace the check valve.
	Metering valve.	Check for leaks. Replace if necessary.
	Low temp.	Calibrate to 270° F ± 5 (132°C)
	Leaks.	Check for leaks at fittings, gasket and door, and pressure relief valve.
High pressure (occasional).	Wet instruments.	Rinse instruments in isopropyl alcohol to remove water. Let instruments sit in unit with door cracked for 1 minute before running a cycle.
	Pressurize cycle started before previous depressurize cycle is complete.	Tell the user to wait at least 15 seconds before turning the control knob.
High pressure (constant).	High temperature.	Calibrate to 270°F ± 5 (132°C).
Pressure rises but drops.	Door seal leaks.	Check for leaks. Repair.
	Leak at check valve.	Check for leaks. Replace.
	Leaks at fittings.	Check for leaks. Replace.
	Leak at pressure relief valve.	Check for leaks. Repair.
	Leak at metering valve.	Check for leaks. Replace.
Chamber full of Vapo-Steril in the morning.	Unit was shut off the night before with the door closed.	Always crack the door before turning off the unit.

Problem	Cause	Remedy
Timer won't start. (Pressure O.K.)	Pressure < 20 psi (138 kPa).	See "Low Chamber Pressure."
	Valve shaft switch not engaged.	Check that cam is engaging switch, if not, adjust cam position on valve shaft.
	Pressure switch not closing at 20 psi (138 kPa).	Check pressure switch. Adjust.
	Check for power.	Restore power.
	Faulty Display/Control Board	Test PCB. Replace if necessary.
Purge time will not display.	Wrong jumpers on Display Control Board.	Check jumpers. Reinstall as needed.
No buzzer.	Faulty buzzer.	Replace Display/Control Board.
Unit failed spore test. (Pressure O.K.)	Low pressure in chamber.	See "Low Chamber Pressure."
	Overloaded	Reduce load.
	User is using Nyclave (plastic) bags.	Not recommended for Chemiclave.
	User is using see-thru bags improperly.	Do not stack or layer bags. One layer, paper side down, or align in a row placed on edge.
	Faulty test.	Retest.
Hard to open the door.	Door tension too tight.	Adjust door to relieve excess tension. Note: Tension on the door is preset at the factory. After unit has been in use, door adjustment may be needed. Release the tension in small amounts. Pressure must not bypass the gasket at less than 40 psi (276 kPa).
VAPO. indicator won't light.	Level switch in reservoir is faulty.	Check and replace.
	Indicator light is burned out.	Check. Replace Display/Control Board if required.
TEMP. indicator won't light.	Over temp switch is open.	Reset Over temp switch.
	Heating element is open.	Check element resistance.

Maintenance and Servicing

Warning

When troubleshooting the system, be sure that Vapo-Steril does not drip onto power supply board. If the Vapo-Steril drips or is spilled on the power supply board, turn off the power switch and allow time for the Vapo-Steril to evaporate completely. Otherwise, the Vapo-Steril could ignite, causing burns and damage.

Note

If following those procedures fails to repair the sterilizer, contact Barnstead/ Thermolyne Technical Support.

Piping Components

Leaks

If the sterilizer cannot reach or maintain chamber pressure, first inspect the door gasket and replace it if worn or damaged. Then check for leaks in components (see following procedures). As each leak is identified and corrected, be sure the process does not disturb nearby connections.

Leaks at Fittings

1. Allow the unit to cool to room temperature.
2. Use compressed air, soapy water and a brush.
3. Remove the outside cover.
4. Pressurize the piping system with compressed air.

- Remove the reservoir. (Bands are removable. Do not cut.) Then disconnect the tubing from the exhaust inlet to the metering valve. Lift the reservoir straight up. Quickly cover the outlet under the reservoir to prevent spillage. Set the reservoir aside.
- Open the chamber door. Turn the control knob to Pressurize. This will drain any Vapo-Steril from the metering valve. Wipe any Vapo-Steril from the bottom of the chamber.
- Turn the control knob to DEPRESSURIZE. Close and latch the door.
- Remove the tubing from the exhaust port of the metering valve (see Figure).
- Hold the compressed air nozzle tightly against the exhaust port stub on the metering valve. Blow air into the unit until the pressure gauge needle moves into the VAPORIZATION range (green). Then turn the control knob to PRES-SURIZE.

5. Check for leaks around tube fittings and pipe threads at the pressure gauge, metering valve, and chamber. Do this by brushing the areas with soapy water. Leaks will appear as bubbles or foam that form and grow larger.

6. If there is a leak, tighten the leaking part. Repeat the pressure test. If there is still a leak, check for damage to fittings or threads. Replace as necessary.

7. If there is extensive damage, contact Barnstead/Thermolyne Technical Support.

Leaks at Gasket and Door

1. IF UNIT IS AT ROOM TEMPERATURE:

- Pressurize the unit. To do this, perform steps 2-4 of “Leaks at Fittings.”

- Brush around the edge of the door with soapy water. Leaks will appear as bubbles or foam that form and grow larger.

- Brush with soapy water around the seal screws at the center of the door. Watch for bubbles or foam that forms and grows larger.

2. IF UNIT IS HEATED TO READY TEMPERATURE:

- Place a few drops of lightweight oil at the top edge of the door.

- Allow the oil to flow completely around the door.

- Place a few drops of oil at the top of the seal screws (see Figure 5-4). Let the oil flow around the screws.

- Foaming or bubbling indicate leakage.

3. If the door leaks around the edge, increase the door tension (see “Door Adjustment”).

4. If the door tension is tight and there are still leaks, inspect the gasket. Replace if necessary (see “Gasket Replacement”).

5. If there are leaks around the seal screws, check the door collar. Replace the seal screws, and the door collar if required.

Leaks at Pressure Relief Valve

See “Pressure Relief Valve.”

Leaks at Metering Valve

See “Metering Valve.”

Metering Valve

Checking for Leaks

1. Turn power switch to OFF. Remove top cover. Turn power switch ON and allow unit to heat up to operating temperature.
2. Turn control knob to PRESSURIZE.
3. Check the metering valve for any external leaks. If so, replace the metering valve.
4. The metering valve may allow a small amount of air to leak by the supply side, which will show up as champagne bubbles in the fill tube. The metering valve may also allow a small amount of air to leak by the exhaust side, which will cause fluid movement in the exhaust tube. One or the other is OK as long as the unit maintains maximum pressure during a cycle, but if both conditions occur; replace the metering valve.

Removing Old Metering Valve

1. Set control knob to depressurize. Be sure the pressure gauge reads, “0.” Turn OFF power switch and allow unit to cool to room temperature.
2. Remove top cover.
3. Unplug the float switch from the timer/display PC board.
4. Remove air line tubing connector from filter holder and remove filter holder.
5. Loosen the clamp next to the reservoir on tubing leading to metering valve.

Note
If the VAPO light is not ON prior to turning the unit OFF, Vapo Steril will run out of the reservoir when it is removed. To prevent this, plug the reservoir opening or empty the Vapo into a container.

6. Loosen and remove bands holding reservoir (do not cut band).
7. Remove reservoir. (Lift up and set on top of unit.)
8. Remove “C” clip next to PC board and pull knob and shaft away from metering valve.
9. Loosen the clamp next to the metering valve on tubing leading to the chamber.
10. Disconnect vent tube from metering valve.
11. Remove the two screws holding metering valve in place and remove metering valve.

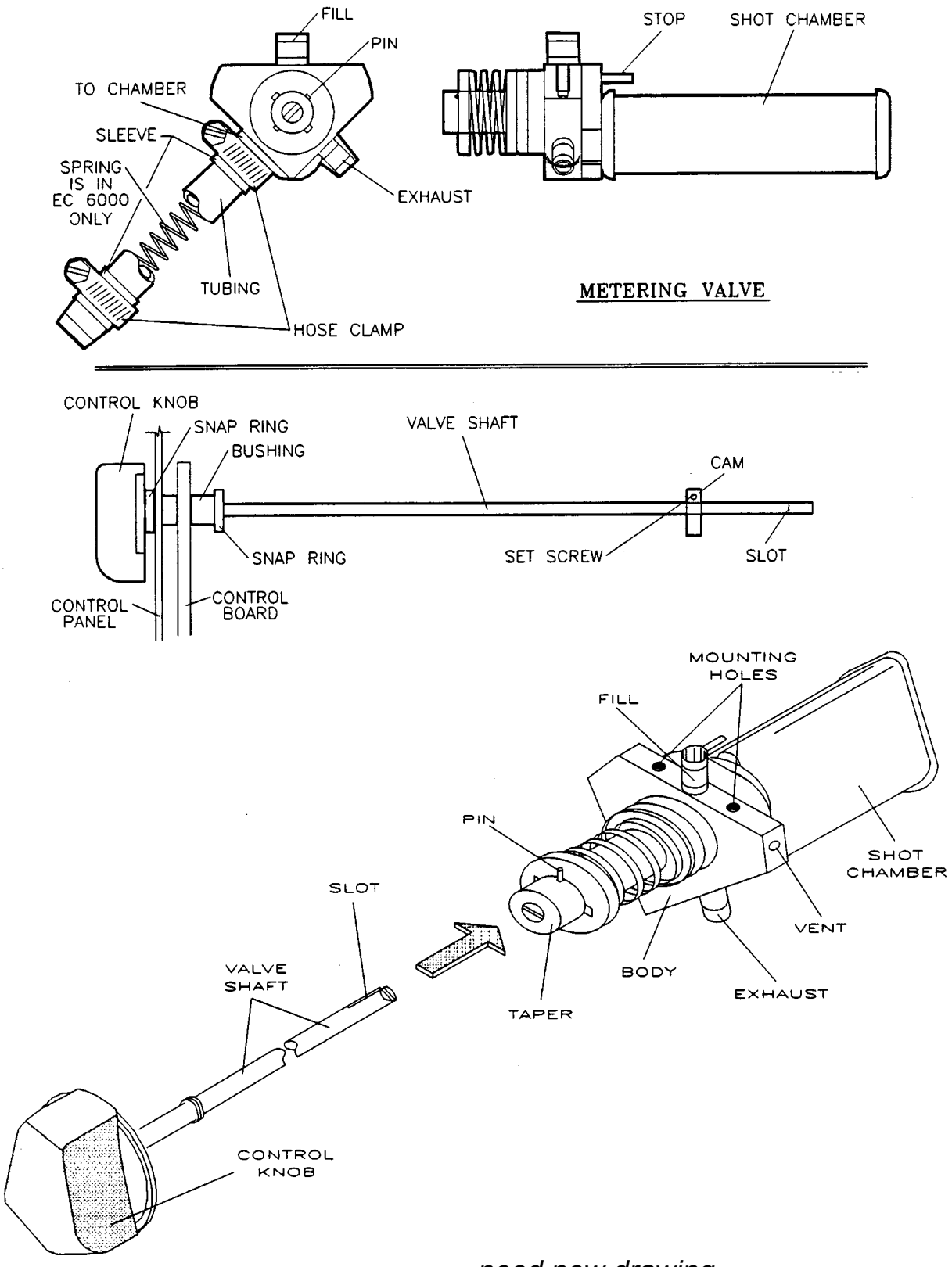
Installing New Metering Valve

1. Hold new metering valve in place and determine the correct length for the chamber tubing. (Approximately 2.75” for EC5500 or 3.75” for EC6000 from tip of metal chamber tube to the end of the plastic tube.) Cut off excess.
2. Install new metering valve, making sure to align chamber tube on nipple #2 of the metering valve. Tighten screws and clamp. Turn metering valve so that the shot chamber is down.
3. Push knob and shaft back into unit. Turn knob to depressurize and install “C” clip. Align the flat of the cam to the arm of the microswitch. The distance should be less than 1/32” between cam and switch arm. Rotate knob from depressurize to pressurize a few times. The microswitch should click and not bind. Knob should turn metering valve without binding.
4. Install tubing on nipple #1.
5. Attach vent line to open vent port #3 (small nipple) of new metering valve.
6. Reinstall reservoir and filter holder. Tighten clamp next to reservoir.
7. Reattach bands and filter holder air line. Reconnect the float switch connector to display/timer PC board.
8. Install chemifilter, turn power switch ON and fill reservoir with Vapo Steril until VAPO light goes out.
9. Run at least 3 cycles and check unit for leaks. (You may notice a slight “bubbling” until the seal seats itself.
10. Reinstall cover.

Note
Open door between test cycles.

Note
When running a cycle, make sure that Vapo travels from the metering valve to the chamber. Vapo should start flowing within 10 seconds after turning knob to pressurize.

Note
If you notice bubbles but the pressure is holding between 22-40 psi, the metering valve is fine to use.



need new drawing

Figure 17: Metering Valve

Pressure Gauge

The pressure gauge only indicates pressure. It has no effect on temperature. Failure of the gauge is highly unusual. Before replacing the gauge, check other causes for pressure changes.

Pressure Relief Valve

The pressure relief valve releases pressure at the rating marked on the valve. After prolonged use, the pressure relief valve may leak at lower pressures. If it leaks, first try to reseat the valve. If unsuccessful, replace the valve.

Checking for leaks

UNIT AT ROOM TEMPERATURE

1. Pressurize the unit. To do this, perform steps 2-4 of “leaks at Fittings.”

2. Brush the opening ports with soapy water. Leaks will appear as bubbles or foam that grow larger.

UNIT HEATED TO OPERATING TEMPERATURE

1. Turn control knob to PRESSURIZE. If liquid collects around the ports of the pressure relief valve, the relief valve is leaking.

2. Pull the ring to clear debris and reseat the valve. Check again for leaks.

3. If the valve still leaks, replace it.

Pressure Relief Valve Replacement

1. Depressurize the unit.

2. Remove the cover.

3. Remove the pressure relief valve (see Figure 18).

4. Install the new pressure relief valve.

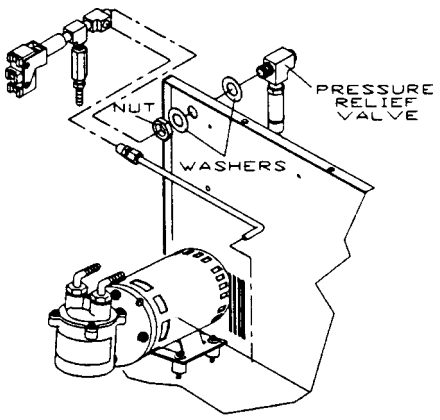


Figure 18: Pressure Relief Valve Replacement

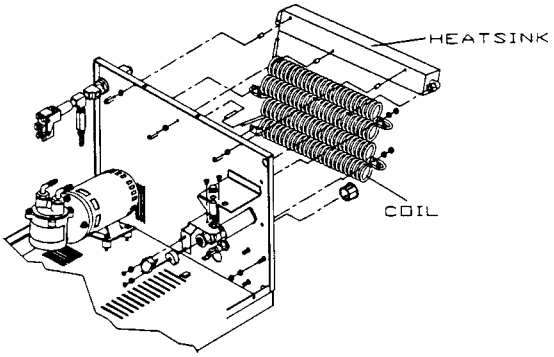


Figure 19: Removing the Condenser Coil

Warning
Burn Hazard: Allow the unit to cool to room temperature before performing this repair; burns could result.

Condenser

In models EC5500 and EC6000 the condenser has a heatsink and a coil.

Removing the Coil

1. Remove the cover from the unit.
2. Disconnect the fitting at the heatsink (see Figure 19). Disconnect the tubing from the other end of the coil.
3. Remove the hardware that secures the coil to the rear of the cabinet.

Condensate Tank

If the condensate tank leaks, replace it.

Door

Door Adjustment

See “Door Adjustment.”

Gasket Replacement

The door gasket seals the chamber at sterilization pressure to a minimum of 40 psig (276 kPa).
To replace the door gasket, see “Gasket Replacement.”

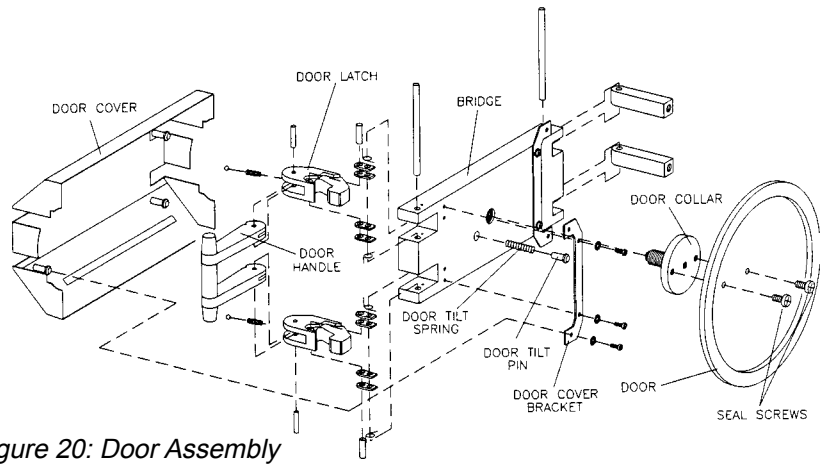


Figure 20: Door Assembly

Door Replacement
If replacement is necessary (see Figure 20).

Door Collar
If you can change the door adjustment by spinning the door, the door collar must be replaced. Replace the seal screws also (see Figure 20).

Seal Screws
Replace if the unit leaks from the door collar, or if the door collar is replaced (see Figure 20).

Purge Pump (EC5500/6000)

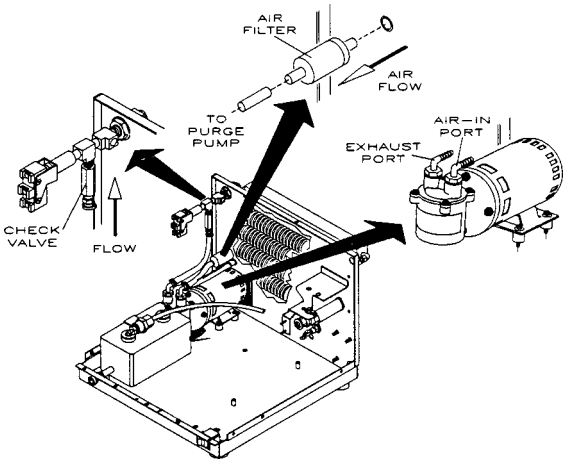


Figure 21: Chemipurge Components

Warning

Shock Hazard: Disconnect power cord before repairing or replacing the pump.

Functional Check
- If the pump is running, but is not producing enough pressure: Check piping for leaks before replacing the pump.
- If the pump makes a constant loud knocking sound:

  Check that the pump mountings are snug (see Figure 21). Tighten if needed.

  If the sound continues inside the pump, replace the pump.

Replacement
1. Turn OFF power switch.
2. Unplug purge pump electrical connections to the power supply. See Power Supply PCB.
3. Disconnect hoses from air-in and exhaust ports.
4. Remove the hardware that secures the pump to the base of the cabinet.
5. Remove the pump.
6. Install replacement pump in reverse order. Make sure tubing lines are connected to the correct ports.

Air Filter

Replace the air filter once a year. Mark the replacement date on the air filter for reference.
To replace the air filter, disconnect tubing (from Purge Pump), install replacement air filter in the correct direction, and reconnect tubing (see Figure 21).

Check Valve

If the unit does not maintain pressure during operation, the check valve may not be seated properly. To reseat the check valve:

1. Run the unit in Purge for one minute to loosen the check valve ball.

2. Run a test cycle. It should reseat the check valve ball.

3. If the check valve continues to leak under pressure, replace it (see Figure 21).

Electrical Components

Fuses

Warning
Disconnect power cord before replacing a fuse.

If the control panel does not activate when Power Switch is ON, check the fuse cartridges. If a fuse is blown, replace it with another of the same rating. (See Wiring Diagrams.)

Model	Fuse	Code	Part No.
EC5500	100V, 12 A, Time Lag	T	5120-0036
	115V, 10 A, Time Lag	T	261575
	230V, 7 A, Time Lag	T	440-0020
EC6000	115V, 15 A, Time Lag	T	264305
	110V, 15 A, Time Lag	T	264305
	230V, 8 A, Time Lag	T	FZX67

Fuse Replacement

1. Disconnect unit from power supply.
2. Remove unit cover.
3. Remove the fuse.
4. Check the fuse with an ohmmeter. Replace fuse if necessary.
5. Reinstall fuse.
6. Replace the unit cover.
7. Reconnect unit to power supply.

Printed Circuit Boards (PCBs)

There are printed circuit boards:

- Power Supply Board
- Display/Control Board

Power Supply Board

(See Figure 22)

- Can be configured for 115V or 230V.
- Hard-wired fuse F102:

  100 mA, 5 x 29 mm, with leads, UL 198 G, UL Listed, CSA certified.

  SANO part no. SD5—100mA, 250V or Wickman part no. 19898-027-LO.

Display/Control Board

(See Figure 23)

JUMPERS

Jumper	**Frequency Rating**	
	60 Hz	50 Hz
JP1	IN	OUT

Jumper	**Model**	
	EC5500 7-min purge	EC6000 9-min purge
JP2	IN	OUT
JP3	OUT	IN

Testing the Printed Circuit Boards (PCBs)

1. Check for voltage to Power Supply Board.

- Set the probes of a DC voltmeter across test points TP1 and TP2 (see Figure 22).
- Check for 5 VDC ± 0.25V.
- If voltage does not check out, check for F102 fuse blown. Also check that the jumpers are properly configured.
- If voltage still does not check out, replace the board.

2. Check for power to the Display/Control Board.

- Set the probes of a DC voltmeter across test points TP1 and TP2 (see Figure 23).
- Check for 5 VDC ± 0.25V.
- If voltage does not check out, replace the cable.
- If voltage does check out, but board does not function, replace the board.

Troubleshooting PCBs

Problem	Cause	Remedy
F102 fuse blown on Power Supply Board.	Power Supply Board configured for 115V, connected to 230V line.	Check power configuration on Power Supply Board. Change if required.
Unit will not power up or shows erratic display.	Power Supply Board configured for 230V, connected to 115V line.	Check power configuration on Power Supply Board. Change if required.
Display/Control Board does not show 5 VDC across test points.	Power Supply Board not configured.	Check power configuration on Power Supply Board. Change if required.
	Fuse F102 blown on Power Supply Board.	Check power configuration on Power Supply Board. Change if required.
Display/Control Board does not show 5 VDC across test points.	Power Supply Board not configured.	Check power configuration on Power Supply Board. Change if required.
	Fuse F102 blown on Power Supply Board.	Replace Power Suppply Board 2A.
	If Power Supply Board shows 5 VDC but Display/Control Board does not: bad connecting cable.	Replace cable.
	If both boards show 5 VDC but Display/Control board does not function, bad Display/Control Board.	Replace Display/Control Board.
Problems with heatup or cycle phase timing.	Display/Control Board jumpers incorrect.	Check and correct jumper configuration.

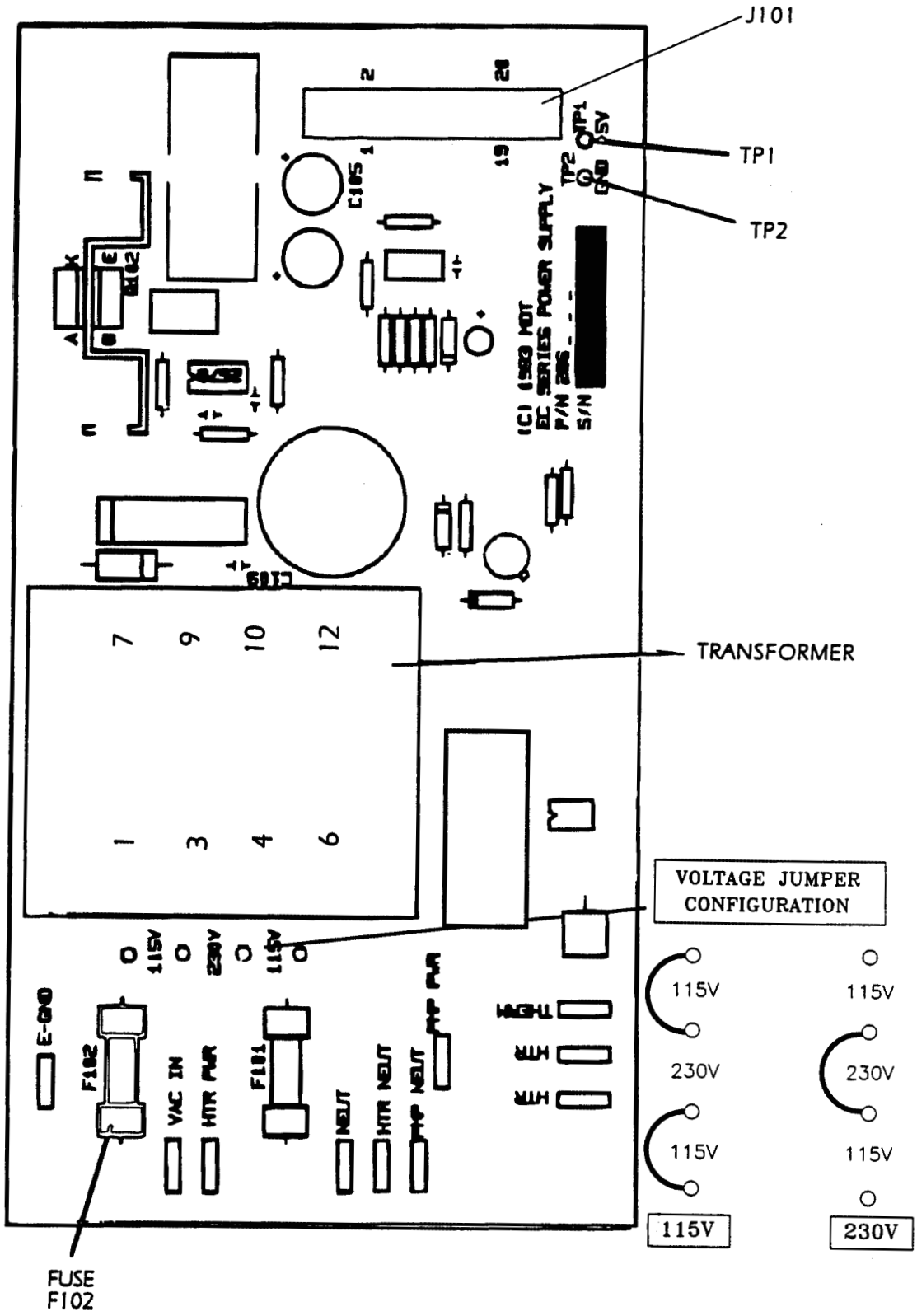
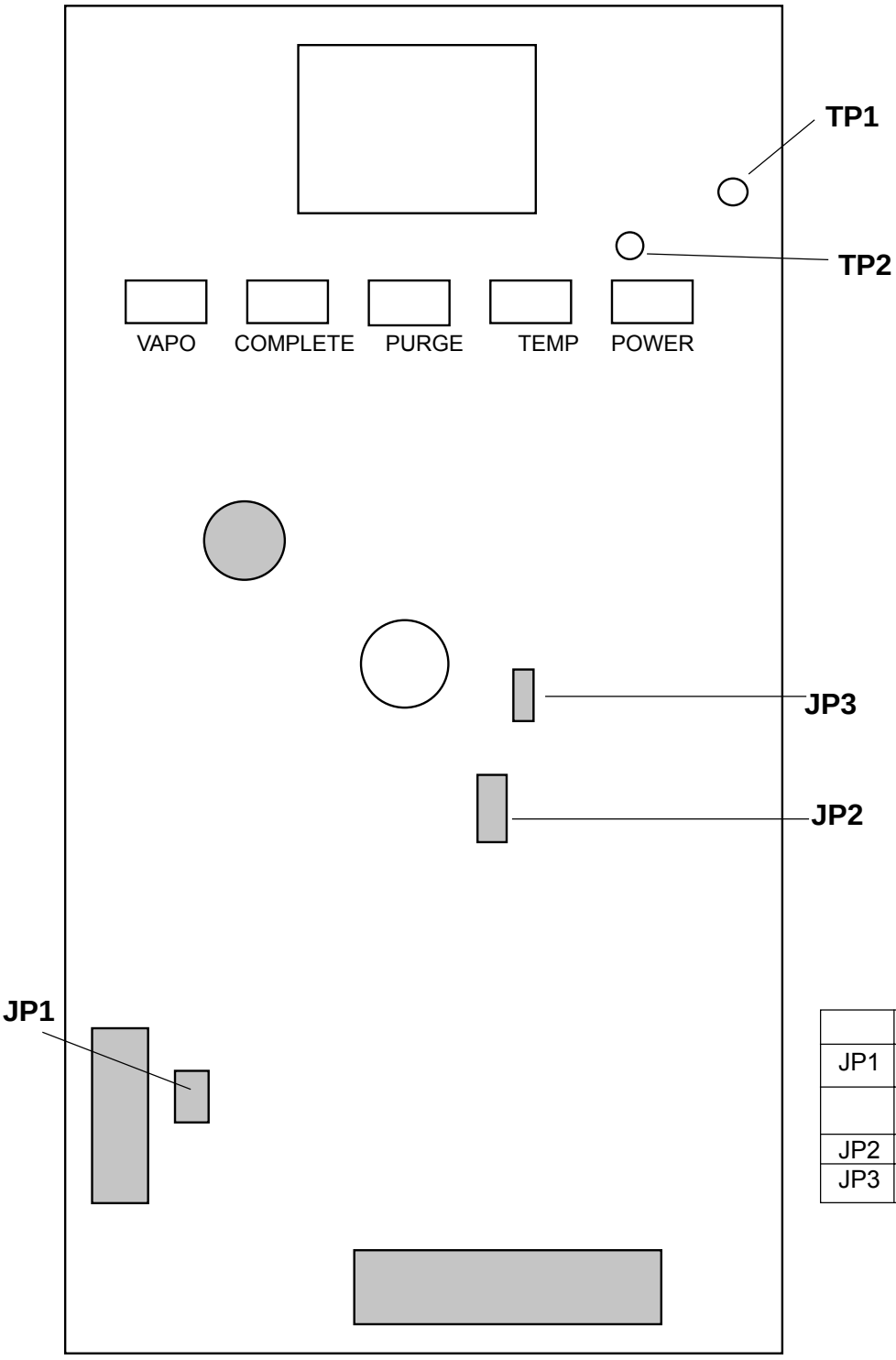


Figure 22: Power Supply Printed Circuit Board



Jumper Conditions

	60 Hz	50 Hz	
JP1	IN	OUT	
		EC5500	EC6000
JP2		IN	OUT
JP3		OUT	IN

Figure 23: Display/Control Printed Circuit Board

Timer

The timer is part of the Display/Control Board. It indicates the time only. It cannot interfere with the sterilization cycle.

When chamber pressure increases to about 20 psig (138 kPa), Pressure Switch closes. This enables the timer to count down. Valve Shaft Switch must also be closed by setting the control knob to PRESSURIZE.

Timer Check

If the timer does not function correctly, test Display/Control Board.

- Be sure the jumpers on the board are correct.
- Replace Display/Control Board if required.

Power Switch

Warning

Shock Hazard: Unplug power cord before removing main power switch.

1. Unplug the unit from the power source.
2. Remove the top cover.
3. Unplug connectors from switch terminals.
4. Compress and hold spring clips at both sides of switch (see Figure 24).
5. Remove the switch from outside.
6. Install replacement switch in reverse order. See the Wiring Diagrams.
7. If resistance values differ, the heater must be replaced.

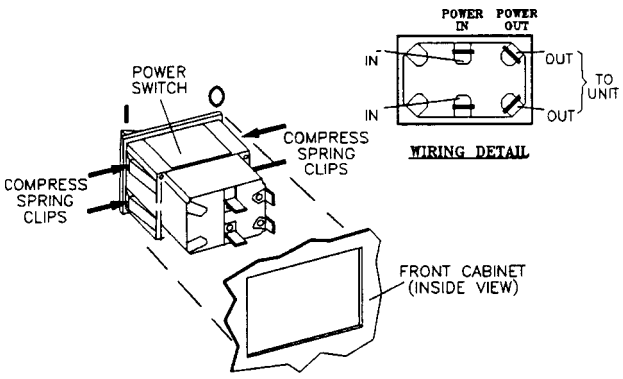


Figure 24: Power Switch Removal

Warning

Shock Hazard: Unplug power cord before testing or replacing the heater.

Heater

Functional Check

Test the continuity of the heater.

100V/230V Units

1. Unplug unit from the power supply.
2. Remove the top cover.
3. Remove the Power Supply Shield over Power Supply Board.
4. Disconnect the two heater leads (HTR and HTR Neutr.) on Power Supply PCB.
5. Measure the resistance between the heater leads or between the corresponding heater terminals (see chart below for correct range):

Heater Resistance		
Model	EC5500	EC6000
230 V	60-70Ω	38-44Ω
100V	11-14Ω	7-10Ω

6. If resistance values differ from the range in the chart may need to be replaced.

115V Units

1. Unplug unit from the power supply.
2. Remove the top cover.
3. Remove the Power Supply Shield over Power Supply Board.
4. Disconnect the two heater leads (HTR & HTR) (see Figure) on the Power Supply Board.
5. Disconnect the heater lead from the HTR NEUT.
6. Measure the resistance separately from each heater lead (HTR) to the NEUTRAL lead (HTR NEUT) between the corresponding heater terminals (see chart below for correct range):

Heater Resistance		
Model	EC5500	EC6000
115 V	30-35Ω	19-22Ω

7. If resistance values differ from the range in the chart, the heater may not need to be replaced.

Replacement

Heater is not field replaceable. Return the unit to the factory for repair.

Chamber Temperature

To verify the temperature, a thermometer assembly (Part #267569) is required.

1. Remove the tray from the unit.
2. Turn unit “ON” and allow to heat foe a minimum of 90 minutes.
3. Be sure the reservoir contains VAPO-STERIL solution.
4. Verify the thermometer reads less than 100°F. If not, shake the thermometer down. Place the thermometer assembly (Part #267569) in the middle of the chamber with the bulb facing the back of the unit.
5. Close the door. Set control knob to pressurize and run a complete cycle.
6. After the buzzer sounds, turn the control knob to depressurize. Allow unit to complete purge phase. When buzzer sounds, open the door. Using the tray handle or protective clothing, remove the thermometer assembly from the chamber.
7. Allow the thermometer to cool to room temperature (10-15 min.).
8. Thermometer should read a temperature between 265°F - 275°F. If it doesn’t, adjust the thermostat.
9. Reinstall top cover on unit.

Warning

Burn Hazard: Chamber and thermometer assembly will be hot. Use proper protection when removing assembly from chamber.

Thermostat

See “Chamber Temperature.”

Functional Check

A continuity check of thermostat with the chamber at room temperature should indicate full continuity (o ohms).

Thermostat Adjustment

1. Perform steps 1-8 of the “Chamber Temperature” procedure before adjusting the temperature.
2. Adjust thermostat if temperature on the thermometer is out of the range of 265°F to 275F.

Note

Never adjust the thermostat only because the pressure in the chamber is low. Troubleshoot most likely causes first.

Adjust the chamber temperature to 250°F ± 5°F.

Do not adjust per pressure readings.

Check temperature with thermometer assembly #267569.

Note
Turn clockwise to decrease temperature.

Turn counterclockwise to increase temperature.

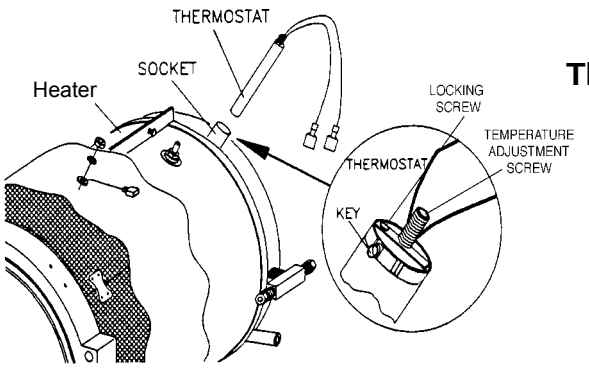


Figure 25: Thermostat (EC5500)

Warning
Shock Hazard: Unplug power cord before performing these procedures.

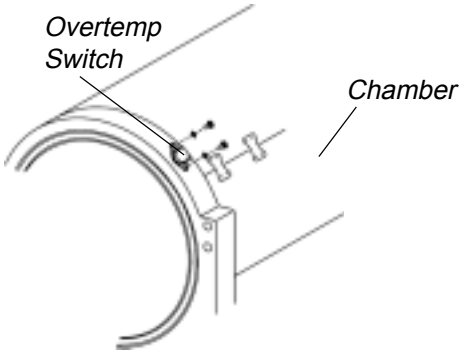


Figure 26: Overtemp Switch

3. Locate thermostat: EC5500 — Remove top cover (see Figure 25). EC6000 — On the back of the unit, remove the 1-1/4” cover located in the bottom center of the back.
4. Loosen the locking screw on the thermostat (see Figure 25).
5. Turn the temperature adjustment screw to either increase or decrease temperature.
6. Tighten the locking screw on the thermostat.
7. Repeat steps 1/8 under “Chamber Temperature.”
8. Repeat procedure until the temperature falls within the 265°F - 275°F range.
9. Replace covers.

Thermostat Replacement

1. Verify the chamber pressure is 0 PSI and the unit is at room temperature.
2. Disconnect from power source and remove top cover.
3. Disconnect wire leads (see Figure 25).
4. Remove the thermostat from its socket. To do this, loosen set screw holding the thermostat in place.
5. Install the replacement thermostat. Align the key in the slot of the socket and tighten set screw.
6. Reconnect the wires.
7. Test and adjust thermostat according to “Chamber Temperature” procedure and “Thermostat Adjustment.”

Overtemp Switch

Functional Check and Replacement

1. Unplug unit from the power source.
2. Remove the top cover.
3. Disconnect wires from the over temp switch.
4. Test continuity of the over temp switch. If the switch is open, reset by pushing center button. If the switch will not reset, replace it.
5. Remove the hardware that secures the switch to the chamber.
6. Install the replacement switch.
7. Reconnect the wire leads and replace cover.

Note
Be sure unit is cool and at room temperature.

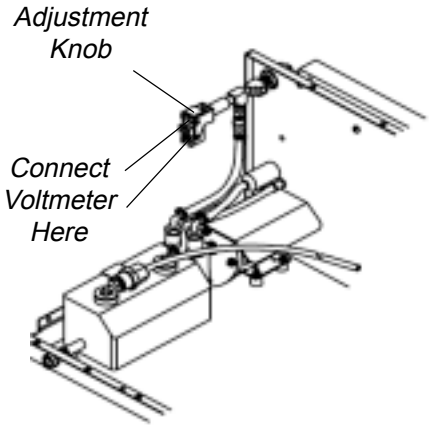


Figure 27: Pressure Switch

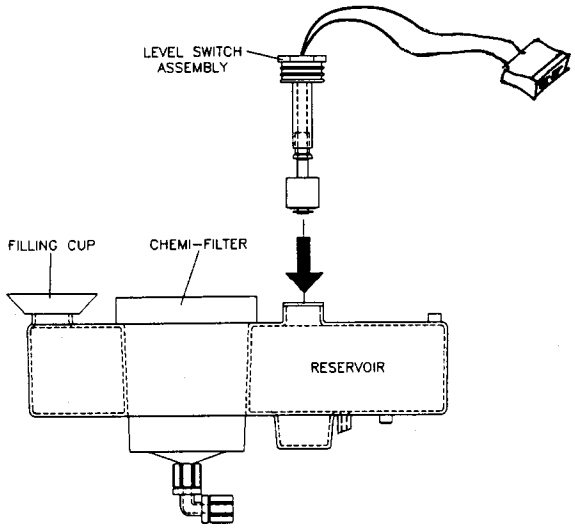


Figure 28: Sterilant Level Switch

Pressure Switch

The pressure switch is set to close at 20 psi (138 kPa). If it does not, adjust it.

1. Unplug unit from power switch and remove top cover.
2. Follow steps 1-4 under “Piping Component.”
3. Open pressure relief valve to obtain a pressure of 20 psi (138 kPa).
4. Connect an ohmmeter to the pressure switch terminals (see Figure 27).
5. Turn adjusting knob of the pressure switch until its microswitch closes. (The ohmmeter will read, “O.”) NOTE: Clockwise increases pressure, counterclockwise decreases pressure.
6. Depressurize the chamber.
7. Reconnect exhaust tube and reinstall reservoir.
8. Replace top cover.

Sterilant Level Switch

The float on the sterilant level switch can stick, interfering with the function of the VAPO indicator.

Testing Sterilant Level & Switch Replacement

1. Unplug unit from power source.
2. Remove top cover.
3. Remove the level switch from the reservoir,
4. Disconnect the wire leads from Display/ Control PCB.
5. Check the float for free movement and correct function. When the float is down (Against “C” cup) there should be continuity. If not, replace.
6. Reinstall level switch and connect wire leads to display/timer PC board.
7. Replace top cover.

Check Valve

If the unit does not maintain pressure during operation, the check valve may not be seated properly. To reseat the check Valve:

1. Run the unit in Purge for one minute to loosen the check valve ball.
2. Run a test cycle. It should reseat the check valve ball.
3. If the check valve continues to leak under pressure, replace it (see Figure 12).

Electrical Components

Fuses

If the control panel does not activate when Power Switch is ON, check the fuse cartridges. If a fuse is blown, replace it with another of the same rating.

Model	Fuse	Code	Part No.
EC5500	100V, 12A, Time Lag	T	5120-0036
	115V, 10A, Time Lag	T	261575
	230V, 7A, Time Lag	T	440-0020
EC6000	115V, 15A, Time Lag	T	264305
	110V, 15A, Time Lag	T	264305
	230V, 8A, Time Lag	T	FZX67

Warning
Shock Hazard. Make sure unit is disconnected from power source.

Fuse Replacement

1. Disconnect unit from power supply.
2. Remove unit cover.
3. Remove the fuse.
4. Check the fuse with an ohmmeter. Replace fuse if necessary.
5. Reinstall fuse.
6. Replace the unit cover.
7. Reconnect unit to power supply.

Recommended Spare Parts		
Qty.	**Part No.**	**Description**
General Components		
2	261569	Chemi-Filter
2	260560	Filter, Air (EC5500 & EC6000)
2	GSX60	Gasket, Door (EC5500)
2	260006701	Gasket, Door (EC6000)
2	231550301	Handle, Tray Removal (EC5500)
2	231600301	Handle, Tray Removal (EC6000)
1	266212	Knob, Control, Pressurize/Depressurize Valve
Electrical Components		
1	266216	Board, Power Supply Printed Circuit
1	266206	Board, Display/Control Printed Circuit
4	440-0020	Fuse, 7A Time Delay (EC5500, 230V Units)
4	5120-0036	Fuse, 12A Time Delay (EC5500, 100V Units)
4	FZX67	Fuse, 8A Time Delay (EC6000, 230V Units)
4	261575	Fuse, 10A Time Delay (EC5500,115V Units)
4	264305	Fuse, 15A Time Delay (EC6000, 115V Units)
2	266002	Switch,On/Off Rocker (100V Units)
1	SW1121X2	Switch, Reservoir Level Switch Assembly
1	266812	Switch, Limit (Microswitch)
1	FZX66	Switch, Overtemp Cut-Out
1	CN1121X1	Thermostat Assembly
Plumbing Components		
1	261824	Cup Assembly, Reservoir Filling
1	266820	Gauge, Pressure
1	PU1122X1	Pump, Purge Pump Assembly (115V Units)
1	PU1122X2	Pump, Purge Assembly (230V Units)
1	260061101	Switch, Pressure
1	264901	Valve, Check
1	280002702	Valve, Metering (EC5500)
1	250052411	Valve, Pressure Relief [310 kPa (45 psi)]
1	260998	Valve, Metering (EC6000)
1	AYX22	Purge pump replacement diaphram

General Maintenance

Warning
Failure to follow the routine cleaning instructions may cause equipment malfunction and/or void warranty.

Note
Never turn OFF the power switch with the door latched. As the unit cools, it could create a slight vacuum and pull waste Vapo-Steril solution back into the chamber from the waste tank.

Warning
Avoid burns. Be sure the sterilizer is cool when maintaining areas around the chamber and door.

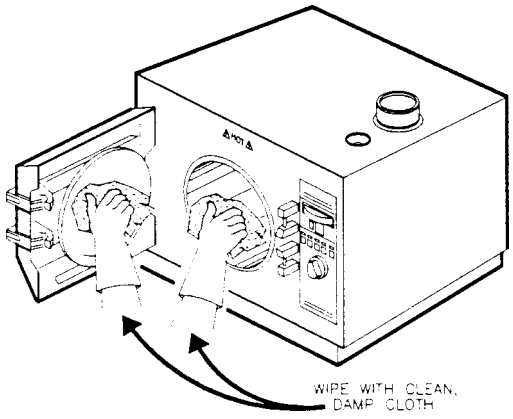


Figure 29: Cleaning the Door Gasket

Proper maintenance can prevent both downtime and repair bills. Operators should maintain their units carefully.

Suggest these to the owner/operator to help them avoid needless service calls/repairs:

- Use only Vapo-Steril solution. Store Vapo-Steril solution separately from other liquids to prevent mistakenly filling the reservoir with a different liquid. Use of any other liquid could prevent sterilization and may severely damage the unit.
- Do not reuse Vapo-Steril solution. This liquid may be contaminated or chemically altered. It may damage the sterilizer.
- Always line the instrument tray with chemically pure Harvey Tray Liners. Certain papers (such as paper towels) contain paper-processing impurities. If used as liners, they may stain or cause deposits in the tray and chamber.
- Check the door gasket periodically for cuts or wear. This will prevent leaks and loss of Vapo-Steril solution.
- Leave the door unlatched when not in use. Otherwise, the pressure of the latched door will shorten the life of the door gasket.
- Never turn OFF the power switch with the door latched. As the unit cools, it could create a slight vacuum and pull waste Vapo-Steril solution back into the chamber from the waste tank.

The rest of this section includes the General “Maintenance” section from the Owner/Operator Manual (LT1121X1). Notes have been added for service personnel.

Daily

Cleaning the Door Gasket

- Wipe the door gasket and mating surface daily with a clean damp cloth (see Figure 29). Do not use abrasive cleaners.
- Examine the door gasket for cracks or damage, which could result in a poor pressure seal. If replacement is required, refer to “Replace the Door Gasket.”

Warning

Vapo-Steril solution causes eye damage and may cause skin irritation. Do not get in eyes or on skin or clothing. Wear goggles or face shield when handling. Harmful or fatal if swallowed. Avoid contamination of food.

Do not drain the waste tank while a cycle is in progress. This could depressurize the chamber and interfere with sterilization.

Do not reuse Vapo-Steril solution removed from the waste tank. This liquid may be contaminated or chemically altered and may damage the sterilizer.

Flammable liquid. Treat Vapo-Steril as a hazardous waste. Dispose of used Vapo-Steril in accordance with all prevailing local jurisdictional requirements.

Caution

Always drain the waste tank before filling the reservoir. If this is not done, excess waste could overflow, damage the Chemi-Filter and require substantial clean-up.

Draining the Waste Tank

- Drain the waste tank when the VAPO indicator lights on the control panel (see Figure 30).
- If preferred, drain the waste tank daily—but also whenever the VAPO indicator lights.
- Dispose of waste according to local, state and federal regulations.
- Store the tubing with the drain fitting attached.

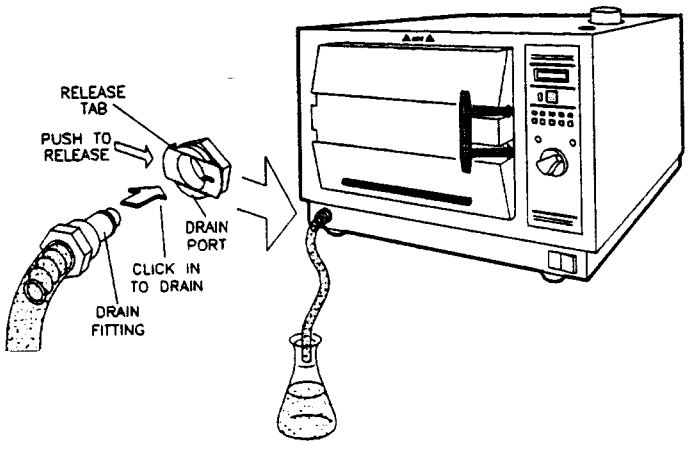


Figure 30: Draining the Waste Tank

Note

Harvey chamber cleaner works best in a warm, dry chamber.

Hot Surface

Wear protective gloves and safety glasses. Chamber and trays may cause burns if touched.

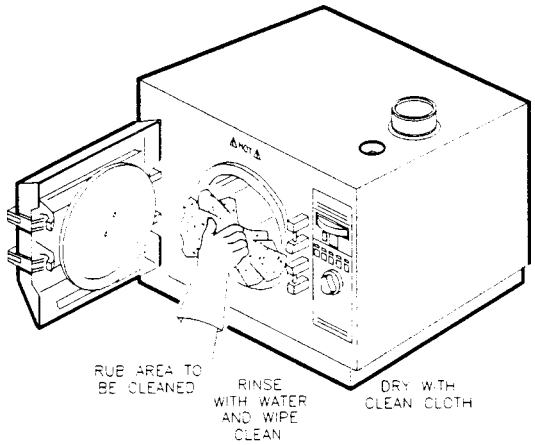


Figure 31: Cleaning the Sterilizer Chamber and Trays

Warning

Exposure Hazard: Do not operate the valve plunger while the sterilizer is in a cycle or under pressure. Exposure to chemical vapor could result.

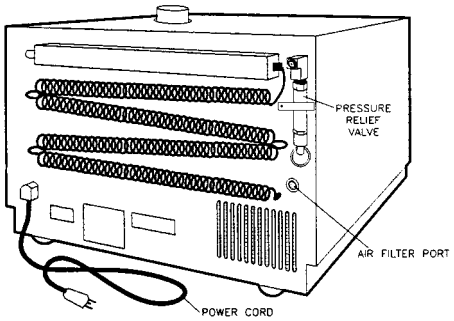


Figure 32: Checking the Pressure Relief Valve

Weekly

Cleaning Chamber and Trays

At least once a week, clean the chamber and trays with Harvey Chamber Cleaner. Clean whenever slight staining appears.

1. Close the door.
2. Turn ON the POWER switch. Wait two minutes.
3. Turn OFF the POWER switch.
4. Open the door. The chamber should be warm, not hot.
5. Clean the chamber and trays with Harvey Chamber Cleaner. Follow the instructions on the container.

Monthly

Check Pressure Relief Valve

Manually operate the valve plunger of the pressure relief valve on the back of the sterilizer (see Figure 32). This is to be sure the plunger will move should the chamber become over-pressurized.

To check the plunger:

1. Pull on the ring several tomes to ensure free movement.
2. If the plunger does not move freely, contact service personnel to replace the pressure relief valve.

Warning

If the Chemi-Filter cartridge is broken, avoid contact with skin and eyes and avoid breathing dust. For additional information, see the Material Safety Data Sheet.

Do not attempt to remove the cartridge while the sterilizer is processing.

Replace only with a Harvey Chemi-Filter.

To dispose of the used cartridge consult the Material Safety Data Sheet.

Frequently check the Chemi-Filter for expiration. Replace per filter chart as required.

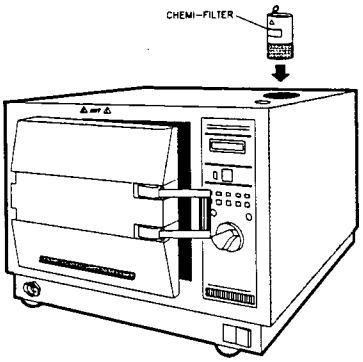


Figure 33: Replacing the Chemi-Filter

When Required

Replacing the Chemi-Filter

1. Be sure the power switch is OFF (see Figure 33).
2. Grasp the pull strap at the top of the used Chemi-Filter. Remove the filter from the filter.
3. Remove the new Chemi-Filter from its package.
4. Mark the replacement date in the “Replace By” box on the Chemi-Filter label. To calculate the date , read the chemi-filter label or refer to “Finding the Replacement Date” (following).
5. Grasp the pull strap at the top of the Chemi-Filter. Insert the filter opening. Push the filter down as far as possible.
6. Dispose of used Chemi-Filter according to local, state and federal regulations.

Finding the Replacement Date

- Calculate the replacement date by adding the number of months until replacement to the current month.
- Use the chart on the Chemi-Filter label to find the number of months until replacement.
- The chart on the Chemi-Filter label is based on a 5-day workweek and an average number of cycles/workday of 2, 4, 6, 8, 10 or 12.
- If your usage differs from these values, calculate the months of replacement as shown in “Months Until Replacement Calculation.”

Months Until Replacement Calculation

Values Needed:

1. Assign proper values to c, D and T.

   c = no. of cycles/workday (operator defined)

   D = no. of workdays/week (operator defined)

   T = Total no. of cycles before filter needs replacement (see chart below).

Total Cycles Before Replacement (T)		
Model	EC5500	EC6000
Total Cycles (T)	500	250

Calculation:

2. Insert the values for c, D and T into the formula:

   no. of months until replacement = 0.231 x (T/[c x D])

Example:

A. An operator has an EC5500 sterilizer. She intends to run it 7 cycles each day, 4 days/ week.

   How soon must she replace the Chemi-Filter?

Solution:

   c = 7, D = 4 and T = 500. Substituting into the formula, we get:

   0.230 x (500/[7 x 4]) = 4.125

Replace the Chemi-Filter after 4 months.

Warning

Burn Hazard: Door may be hot. Be sure that unit has cooled before performing this procedure.

Replacing the Door Gasket

Replace the door gasket at least once a year.

1. Open the door. Use a blunt instrument to lift it from the gasket groove.
2. Remove the gasket from the gasket groove in the rim of the chamber.
3. Clean the gasket groove and sealing surface so that it is free of dirt or of deposits.

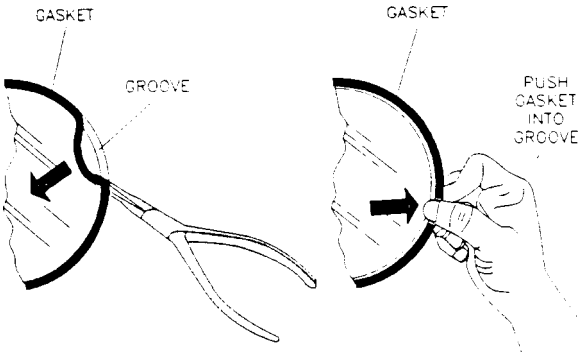


Figure 34: Door Gasket Replacement

Note
Adjust until the latch can just be opened without the safety handle breaking the hinge.

Warning
Do not overtighten the door.

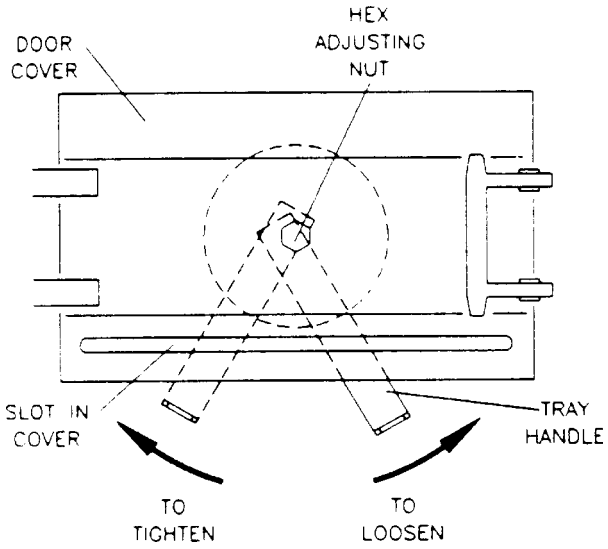


Figure 35: Door Adjustment

4. Wipe the replacement gasket with a clean, damp cloth. Then insert the gasket into the gasket groove.

- Seat the gasket in the groove at 12 o'clock, 6 o'clock, 3 o'clock and 9 o'clock.
- Work the gasket into the groove in each of the four quadrants. Use finger pressure only.
- To seat the gasket completely, slowly close and latch the door.

Door Adjustment

If chamber pressure is not retained during a cycle, a door adjustment may be necessary.

1. Clean or replace the door gasket if necessary.
2. Turn ON the sterilizer. Run a "no load" cycle to heat it to t operating temperature. When the cycle is complete and chamber pressure is below 2 psi, open the door.

- If chamber pressure is retained during the cycle, do not adjust the door.
- If chamber pressure is not retained, go to step 3.

3. Hold the tray handle at the fork end so that the fork points toward you. Insert the hex end of the tray handle through the slot in bottom of the door cover (see Figure 35).
4. To tighten: Move the fork end of the tray toward the right of the slot. Fix the hex end onto the adjusting nut. Move the tray handle to the left side of the slot, turning the adjusting nut clock-wise.
5. Moving the tray handle from one side of the slot to the other should be enough to achieve a seal. If the door is difficult to close, loosen the door slightly.
6. To Loosen: Position the fork end of the tray handle to the left of the slot. Then fit the hex end onto the adjusting nut. Move the tray handle toward the right side of the slot, turning the adjusting nut counterclockwise.

Recommended Spare Parts

Spare Parts		
Qty.	**Part No.**	**Description**
1	260560	Air filter (EC5500,6000)
1	261569	Chemi-Filter
1	GSX60	Door Gasket, 8" (EC5500)
1	260006701	Door Gasket 10" (EC6000)
2-4	440-0020	Fuse, 7A (EC5500, 230V)
2-4	51200036	Fuse,12A (EC5500,100V)
2-4	FZX67	Fuse, 8A (EC6000, 230V)
1	261575	Fuse, 10A (EC5500, 115V)
1	264305	Fuse, 15A (EC6000, 115V & 100V)
1	232010301	Harvey Cleaning Kit

Two Year Limited Warranty

Barnstead|Thermolyne Corporation warrants that if a product manufactured by **Barnstead|Thermolyne** and sold by it within the continental United States or Canada proves to be defective in material or construction, it will provide you, without charge, for a period of ninety (90) days, the labor, and a period of two (2) years, the parts, necessary to remedy any such defect. Outside the continental United States and Canada, the warranty provides, for two (2) years, the parts necessary to remedy any such defect. The warranty period shall commence either six (6) months following the date the product is sold by **Barnstead|Thermolyne** or on the date it is purchased by the original retail consumer, whichever date occurs first.

Use only HARVEY VAPO-STERIL solution in this sterilizer. DO NOT dilute, alter or otherwise change VAPO-STERIL solution in any way. Do not use water in the CHEMICLAVE sterilizer. Only VAPO-STERIL solution is proven an effective sterilant with this sterilizer. Use of other solutions may cause mechanical damage to components of your CHEMICLAVE sterilizer and may result in unsterile loads. Use of such solutions will void the warranty.

All warranty inspections and repairs must be performed by and parts obtained from an authorized **Barnstead|Thermolyne** dealer or **Barnstead|Thermolyne** (at its own discretion). Heating elements, however, because of their susceptibility to overheating and contamination, must be returned to our factory, and if, upon inspection, it is concluded that failure is not due to excessive high temperature or contamination, warranty replacement will be provided by **Barnstead|Thermolyne**. The name of the authorized **Barnstead|Thermolyne** dealer nearest you may be obtained by calling or writing to:

Alfa Medical

265 Post Ave Westbury, NY 11590

1-800-801-9934 Fax 516-977-7434

email@sterilizers.com

Barnstead|Thermolyne's sole obligation with respect to its product shall be to repair or (at its own discretion) replace the product. Under no circumstances shall it be liable for incidental or consequential damage.

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