OPERATOR MANUAL

AMSCO® 110LS and AMSCO® 250LS
Life Sciences Small Sterilizers

(Rev A) **P387366-389**

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SAFETY PRECAUTIONS

1

The following is a list of the safety precautions which must be observed when operating this equipment. WARNINGS indicate the potential for danger to personnel, and CAUTIONS indicate the potential for damage to equipment. These precautions are repeated (in whole or in part), where applicable, throughout the manual. This is a listing of all safety precautions appearing in the manual. Carefully read them before proceeding to use or service the unit.

WARNING–ELECTRIC SHOCK AND BURN HAZARD:

⚠ Disconnect all utilities to sterilizer before servicing. Do not service the sterilizer unless all utilities have been properly locked out. Always follow appropriate Lockout-Tagout and electrical safety-related work practice standards.

WARNING–PERSONAL INJURY HAZARD:

⚠ When closing the chamber door, keep hands and arms out of the door opening and make sure opening is clear of obstructions.

WARNING–BURN HAZARD:

⚠ Sterilizer, rack/shelves, and loading car will be hot after cycle is run. Always wear protective gloves and apron when removing a processed load. Protective gloves and apron must be worn when reloading sterilizer following the previous cycle.

⚠ Steam may be released from the chamber when door is opened. Step back from the sterilizer each time the door is opened to minimize contact with steam vapor.

⚠ Do not attempt to open the sterilizer door if a WATER IN CHAMBER ALARM condition exists. Call a qualified service technician before attempting to use sterilizer further.

⚠ After manual exhaust, steam may remain inside the chamber. Always wear protective gloves, apron, and a face shield when following emergency procedure to unload sterilizer. Stay as far back from the chamber opening as possible when opening the door.

⚠ Allow sterilizer to cool to room temperature before performing any cleaning or maintenance procedures.

⚠ Failure to shut off the steam supply when cleaning or replacing strainers can result in serious injury.

⚠ Jacket pressure must be 0 psig (0 bar) before beginning work on the steam trap.

⚠ Proper testing of the safety valve requires the valve to be operated under pressure. Exhaust from the safety valve is hot and can cause burns. Proper safety attire (gloves, eye protection, insulated overall) is required. Testing is to be performed by qualified service personnel only.

⚠ Sterilizer operator may be severely burned by scalding water if the water level control malfunctions. The steam generator level control may malfunction if the supply water exceeds 26,000 ohms/cm (38.5 microohms) conductivity minimum. Do not connect treated water (e.g., distilled, reverse osmosis, deionized) unless water resistivity is determined to be acceptable. If water exceeds 26,00 ohms/cm, contact STERIS for information concerning modifications required to the generator control system

WARNING–BURN HAZARD (CONT'D):

⚠ When sterilizing liquids, to prevent personal injury or property damage resulting from bursting bottles and hot fluid, the following procedures must be observed:

- Use LIQUID cycle only; no other cycle is safe for processing liquids.
- Use only vented closures; do not use screw caps or rubber stoppers with crimped seal.
- Use only Type 1 borosilicate glass bottles; do not use ordinary glass bottles or any container not designed for sterilization.
- Do not allow hot bottles to be jolted; this can cause hot-bottle explosions. Do not move bottles if any boiling or bubbling is present.

WARNING–EXPLOSION HAZARD:

⚠ This sterilizer is not designed to process flammable compounds.

WARNING–SLIPPING HAZARD:

⚠ To prevent falls, keep floors dry by immediately wiping up any spilled liquids or condensation in sterilizer loading or unloading area.

WARNING–PERSONAL INJURY AND/OR EQUIPMENT DAMAGE HAZARD:

⚠ Regularly scheduled preventive maintenance is required for safe and reliable operation of this equipment. Contact STERIS to schedule preventive maintenance.

⚠ Repairs and adjustments to this equipment must be made only by fully qualified service personnel. Maintenance performed by inexperienced, unqualified persons or installation of unauthorized parts could cause personal injury or result in costly equipment damage.

⚠ The configure machine section should only be done in the factory or by a qualified service technician.

WARNING–STERILITY ASSURANCE HAZARD:

⚠ Load sterility may be compromised if the biological indicator or air leak test indicates a potential problem. If these indicators show a potential problem, refer the situation to a qualified service technician before using the sterilizer further.

CAUTION–POSSIBLE EQUIPMENT DAMAGE:

- Gasket must be fully retracted prior to operating sterilizer door.
- Do not try to raise or lower door rapidly as fast operation may damage the manual door mechanism.
- If 0 dry time is selected, sterilizer automatically initiates a vapor removal phase in place of drying. This phase can still draw a vacuum to 5 inHg. Consult device manufacturer's recommendations to verify devices being processed can withstand this depth of vacuum.
- Lifting the chamber float switch when cleaning the chamber may cause the sterilizer control to initiate a **Chamber Flooded** alarm. If this alarm condition occurs, the operator must turn the control power OFF then ON to clear the alarm. The control power switch is located in the mechanical area at the side of the sterilizer. Placing the sterilizer in standby does not clear this alarm.
- Allow thermostatic traps to cool down to room temperature before removing cover. Since there is nothing to limit expansion, the bellows may rupture or fatigue if trap is opened while hot.
- Actuation at less than 75% of rated pressure can allow debris to contaminate the seat and cause the safety valve to leak. A leaking safety valve must be replaced.
- Insufficient service clearance will make repairs more difficult and time-consuming.
- Piping sized too small may cause water hammer, resulting in damage to the sterilizer.
- After installation, it is mandatory to brace piping at the drain funnel so that it will not move vertically.
- Ensure door opening is clear of any obstruction before closing the door(s).
- Do not attempt to open sterilizer door during manual operation unless chamber is at 0 psig (0 bar).
- Never use a wire brush, abrasives, or steel wool on door and chamber assembly. Do not use cleaners containing chloride on stainless-steel surfaces. Chloride-based cleaners will deteriorate stainless steel, eventually leading to failure of the vessel.
- Immediately wipe up saline solution spills on loading car, to prevent damage to stainless steel.
- Do not use cleaners containing chlorides on loading cars. Chloride-based cleaners will deteriorate the loading car metal.
- Sterilization of chloride-containing solutions (e.g., saline) can cause chamber corrosion and is not recommended by the manufacturer. If, however, chloride-containing solutions must be processed, clean the chamber after each use.
- Avoid damage to the integral steam generator daily. Flush the generator daily. Failure to flush generator daily will void the manufacturer's warranty.

Definition of Symbols

Symbol	Definition
	Transfer of Heat, Hot Surface
	Protective Earth (Ground)
	Electrostatic Sensitive Device
	Attention, Consult Manual for Further Instructions
A	Amperage Rating of the unit
V	Voltage Rating of the unit
~	Alternating Current
Hz	Frequency of the unit
ϕ	Phase of the unit
SN	Serial Number of Unit
	Pinch Point

A WORD FROM STERIS

This manual contains important information on proper use of the AMSCO® 110LS and AMSCO® 250LS Life Sciences Small Steam Sterilizers. **All personnel involved in the use of this equipment must carefully review and comply with the Warnings, Cautions and instructions contained in this manual.** These instructions are important to protect the health and safety of personnel operating the sterilizer and should be retained in a conveniently accessible area for quick reference.

This sterilizer is specifically designed to process goods using only the cycles as specified in this manual. If there is any doubt about a specific material or product, contact the manufacturer of the product for the recommended sterilization technique.

STERIS carries a complete line of accessories for use with this sterilizer to simplify, organize, and verify sterility of the sterilization process. Instrument trays and biological/chemical monitoring systems are all available to fulfill a typical life-science facility's processing needs. Contact a STERIS representative to review these possibilities.

Service Information

A thorough preventive maintenance program is essential for safe and proper sterilizer operation. Comprehensive instructions for routine preventive maintenance can be found in *SECTION 8, ROUTINE MAINTENANCE*. Customers are encouraged to contact STERIS concerning our Preventive Maintenance Agreement. Under the terms of this agreement, preventive maintenance, adjustments, and replacement of worn parts are done on a scheduled basis to help ensure equipment performance at peak capability and to help avoid untimely or costly interruptions. STERIS maintains a staff of well equipped, factory-trained technicians to provide this service, as well as expert repair services. Please call STERIS to learn about additional details.

Indications for Use

Two sterilizer configurations are available, Prevacuum and Isothermal. Each configuration includes choice of a single or double door, for open or recessed mounting.

Prevacuum (Standard) – for use in laboratory and industrial applications and designed for sterilization of nonporous heat- and moisture-stable goods, sterilization of liquids and media in borosilicate glass containers with vented closures, and decontamination of supplies after laboratory procedures. The prevacuum sterilizer is equipped with prevacuum, gravity, liquid, leak test and daily air removal test cycles.

Isothermal (Optional) – for use in laboratory and industrial applications and designed for low temperature sterilization of heat-sensitive and heat-coagulable materials. This configuration is equipped with isothermal, prevacuum, gravity, liquid, leak test and daily air removal test cycles.

Printed in U.S.A.

AMSCO 110LS and AMSCO 250LS Comparison

AMSCO Model	Chamber Dimensions	Chamber Volume	Door Configuration
AMSCO 110LS	16 x 16 x 26" (406 x 406 x 660 mm)	109 L	Single or Double
AMSCO 250LS	20 x 20 x 38" (508 x 508 x 965 mm)	249 L	Single or Double

Advisory

This sterilizer is specifically designed to only process goods using the cycles as specified in this manual. If there is any doubt about a specific material or product, contact the manufacturer of that product for the recommended sterilization technique.

A summary of the safety precautions to be observed when operating and servicing this equipment can be found in *SECTION* 1 of this manual. Do not operate or service the equipment until becoming familiar with this information. Do not attempt to operate this equipment in a manner not specified by the manufacturer.

Any alteration of the sterilizer not authorized or performed by STERIS which could affect its operation will void the warranty, could adversely affect sterilization efficacy, could violate national, state, and local regulations and jeopardize insurance coverage.

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The base language of this document is ENGLISH. Any translations must be made from the base language document.

INSTALLATION VERIFICATION

2

2.1 Installation Checklist

CAUTION – POSSIBLE EQUIPMENT DAMAGE HAZARD: Insufficient service clearance will make repairs more difficult and time-consuming.

An equipment drawing showing all utility and space requirements was supplied with the sterilizer. Clearance space shown on the drawing is necessary for ease of installation and to help ensure proper operation and maintenance of equipment. Uncrating and Installation Instructions were also furnished with the sterilizer. If any of these documents are missing or misplaced, contact STERIS giving the serial and model numbers of the equipment. Replacement copies will be sent out promptly.

After installing this unit according to the instructions provided, complete the following checklist to help ensure installation is complete and correct. Or, if desired, call STERIS to schedule a technician to test the installation and demonstrate proper equipment operation.

2.1.1 Service Clearance

Clearance as specified on the equipment drawing must be available.

2.1.2 Plumbing Services

Feed Water:

- All supply line shutoffs must be provided with lockout capability.
- Backflow prevention is not provided by STERIS.
- Water Pressure–supplied must be within specifications as shown on the equipment drawing. If pressure is too high, a regulator must be installed. If water pressure is too low, equipment performance is affected.
- Water Quality–supplied must be within specifications. Improper water quality adversely affects equipment operation. Damage to the equipment due to improper water quality is not covered under warranty.

Steam Supply:

- **Shutoffs** (with provisions for lockout and tagout) located nearby.
- **Supply piping** adequately sized.
- **Supply pressure** measured (specification is 3.5 to 5.2 bar [50 to 80 psig], dynamic).
- **Drain piping** must be sloped properly, and sized to handle the maximum waste flow from the sterilizer.

2.2 Technical Specifications

2.2.1 Electrical Service

- Electric single-phase service to the unit must be as specified on the Equipment Drawing and on the Machine Data Plate.
- Electric single-phase service requires a clearly marked disconnect with lockout/tagout capability located near the sterilizer.
- Electric single-phase service should be on a separate circuit, and not tied into circuits containing large reactive loads (e.g., motors).
- Sterilizer protective ground must be connected to terminal block TB-1 in the sterilizer power box. Use green/yellow wire for European installations.
- 3-phase service requires a clearly marked disconnect with lockout/tagout capability located near the sterilizer.

2.2.2 Sterilizer Final Check

- Chamber must be leveled properly.
- Door must open and close smoothly.
- Door locked switches must be adjusted correctly.
- Chamber strainer must be in place.
- Rack and shelves and/or loading car operates correctly.
- Warranty labels properly applied.

2.2.3 Cycle Operation

- Unit powers up correctly.
- Run Leak Test cycle–leak rate is to be less than 1.0 mm Hg/minute (1.3 mbar/minute). Only on prevac sterilizers.
- Verify operation of a typical cycle (121° C [250°F] gravity).

2.2.4 Overall Size and Weight (W x H x D)

- **16 x 16 x 26" Sterilizer:** 660 x 1892 x 902 mm (26 x 74.5 x 35.5")
- **20 x 20 x 38" Sterilizer:** 762 x 1892 x 1152 mm (30 x 74.5 x 45.375")

2.2.5 Environmental Conditions

Temperature: 10° to 32°C (50° to 90°F)
Humidity: 10 to 90% noncondensing
Pollution Degree: 2
Altitude Range: 0 - 1829 m (0 - 6,000 ft)
Installation Category (Overvoltage Category): II
A-Weighted Sound Power Level: 85 dBA (maximum)

2.2.6 Utility Requirements
For Units Using Facility Steam

- **Electric:**

Control Box Power (Units using Facility Steam)				
Voltage (Vac)	**# Phases**	**Frequency**	**Nominal Current**	**Circuit Protection***
120	1	50/60 Hz	2.0 A	20 A

Vacuum Pump Power (Units using Facility Steam)				
Voltage (Vac)	**# Phases**	**Frequency**	**Nominal Current**	**Circuit Protection***
208/240	3	50/60 Hz	6.0 A	20 A
380/415			4.0 A	
440/480			3.0 A	
575/600			3.0 A	

- **Steam:**

  Pressure: 50 to 80 psig (344.7 to 551.6 Kpa)

  Consumption:
  - 16 x 16 x 26" (406 x 406 x 660 mm) 83 lb/hr (38 kg/hr) peak
  - 20 x 20 x 38" (508 x 508 x 965 mm) 116 lb/hr (53 kg/hr) peak

- **Cold Water:**

  Pressure: 206.8 to 344.7 Kpa (30 to 50 psig)

  Temperature: 70°F (21°C, maximum)

  Consumption: Peak 6 gpm

** Circuit should be protected from exceeding the amp value shown, which is the maximum current rating.*

2.2.7 Utility Requirements

For Units Equipped With Optional Electric Steam Generators

- **Electric:**

Control Box Power (Units with Steam Generator)				
Voltage (Vac)	**# Phases**	**Frequency**	**Nominal Current**	**Circuit Protection***
120	1	50/60 Hz	9.0 A	20 A

Vacuum Pump Power (Units with Steam Generator)				
Voltage (Vac)	**# Phases**	**Frequency**	**Nominal Current**	**Circuit Protection***
208	3	50/60 Hz	89.0 A	120 A
240			78.0 A	105 A
380			42.0 A	55 A
415			46.0 A	60 A
440			34.0 A	45 A
480			40.0 A	55 A
575			31.0 A	45 A
600			32.0 A	45 A

Water Ejector Power (Units with Steam Generator)				
Voltage (Vac)	**# Phases**	**Frequency**	**Nominal Current**	**Circuit Protection***
208	3	50/60 Hz	83.2 A	110 A
240			72.2 A	95 A
380			38.0 A	50 A
415			42.0 A	55 A
440			31.0 A	40 A
480			37.0 A	50 A
575			28.0 A	40 A
600			29.0 A	40 A

- **Hot Water:**
  - Pressure: 137.9 to 344.7 Kpa (20 to 50 psig)
  - Temperature: 60°C (140°F), maximum
  - Consumption: Peak 1gpm, per cycle 4 gal, Idle 1 gph
- **Stainless-Steel Option Only:**
  Distilled, Reverse-Osmosis (RO), or Deionized Water with a minimum specific resistivity of 1 mΩ/cm.
- **Cold Water:**
  - Pressure: 206.8 to 344.7 Kpa (30 to 50 psig)
  - Temperature: 21°C (70°F), maximum
  - Consumption: Peak 6 gpm, per cycle 140 gal, Idle 10 gph

* *Circuit should be protected from exceeding the amp value shown, which is the maximum current rating.*

TECHNIQUES OF STERILIZATION

3

3.1 Recommended Sterilization Variables

3.1.1 Prevacuum Cycle

The Prevacuum cycle is recommended to process heat- and moisture-stable goods [except liquids] which are capable of being sterilized with steam. This cycle can also be used to decontaminate wastes, including wastes containing liquids, provided the materials are properly contained.

Refer to **Table 3-1** for recommended Prevacuum cycle parameters.

Table 3-1. Prevacuum Cycle Parameters

Temperature	Pressure Point Psig (psia)	Minimum Recommended Sterilize Time* Minutes at Temperature
121°C (250°F)	12-14 (27-29)	15
132°C (270°F)	26-28 (40-42)	4

* Minimum sterilize times are based on obtaining a 10^6 Sterility Assurance Level (SAL) with standard test loads. Specific loads may require different sterilize times to achieve this level of sterility, or may require a different SAL.

3.1.2 Gravity Cycle

Refer to **Table 3-2** for the type of items which can be processed in a Gravity cycle and the recommended parameters.

Table 3-2. Gravity Cycle Parameters

Items	Minimum Recommended Sterilize Time at 121°C (250°F) (minutes)	Minimum Recommended Sterilize Time at 132°C (270°F) (minutes)	Dry Time (minutes)
Glassware Empty, inverted, vented*	15 Min.	3 Min.	0 Min.†
Instruments metal combined with suture, tubing or other porous materials (unwrapped)	20 Min.	10 Min.	0 Min.†

Table 3-2. Gravity Cycle Parameters (Continued)

Items	Minimum Recommended Sterilize Time at 121°C (250°F) (minutes)	Minimum Recommended Sterilize Time at 132°C (270°F) (minutes)	Dry Time (minutes)
Hard Goods Unwrapped	15 Min.	3 Min.	0 Min.†
Hard Goods Wrapped in muslin or equivalent	30 Min.	15 Min.	30 Min.‡

* If items which can trap air must be sterilized upright, they should be sterilized in a prevacuum cycle.

† Goods will be wet when removed from sterilizer.

‡ Dry time can vary for wrapped goods depending on pack density, weight of goods, pack preparation techniques including type of wrapping material used, and sterilizer loading procedures.

3.1.3 Liquid Cycle

Refer to **Table 3-3** for recommended Liquid cycle parameters. The recommended times indicated in **Table 3-3** assume the use of vented bottles or Erlenmeyer flasks. The minimum sterilization time includes the time required to bring the solution up to the sterilization temperature plus the time required to achieve sterilization.

NOTE: *Use load probes and F_o option to optimize cycle times.*

Table 3-3. Liquid Cycle Parameters – No Load Probes

Volume of Liquid in One Container (mL)	Minimum Recommended Sterilize Time at 121°C (250°F) (minutes)*
75	25
250	30
500	40
1000	45
1500	50
2000	55
>2000	55+10 min/L

* Minimum sterilize times are based on obtaining a 10^6 Sterility Assurance Level (SAL) with standard test loads. Specific labs may require different sterilize times to achieve this level of sterility, or may require a different SAL.

3.2 Control Measures for Verifying Sterilization Process

There are three general control measures used to verify sterilization:

- Biological Measure, using live spores (see *SECTION 3.2.1, BIOLOGICAL MONITORS*)
- Chemical Measure, using an indicator to verify air removal (see *SECTION 3.2.2, CHEMICAL MEASURE (BOWIE-DICK TESTS)*
- Testing for Prevacuum Efficiency (see *SECTION 3.2.3, VACUUM LEAK TEST*)

These are discussed in the sub-sections below.

3.2.1 Biological Monitors

WARNING – STERILITY ASSURANCE HAZARD: Load sterility may be compromised if the biological or chemical indicator, or vacuum leak test indicates a potential problem. If these indicators show a potential problem, refer the situation to a qualified service technician before using the sterilizer further.

A live spore test utilizing *G. stearothermophilus* is the most reliable form of biological monitoring. This type of product utilizes controlled populations of a controlled resistance, so that survival time and kill time can be demonstrated.

To verify the process, insert the biological indicator in a test pack and place pack on the bottom shelf. Run test pack through a typical cycle. On completion, forward test pack and monitor to appropriate personnel for evaluation. Refer to current guidelines to conduct routine biological monitoring.

3.2.2 Chemical Measure (Bowie-Dick Tests)

The STERIS Dart® Testing Apparatus to Determine the Effectiveness of Removing Air from a Chamber and the Bowie-Dick Test Pack both use chemical indicators to document the removal of residual air from a sample challenge load in a prevacuum sterilizer. These tests do not apply to gravity or liquid cycles.

After exposure in a prevacuum test cycle, the test pack is opened, chemical indicator examined, and conclusions drawn as to the pattern of residual air, if any, that remained in the pack during the sterilizing cycle. Any indication of a malfunction must be reported to the supervisor. The sterilizer must not be used to run prevacuum cycles until approved by supervisor.

Dart Testing Apparatus is designed to be used at a 132-134°C (270-273°F) with an exposure time of 3.5 to 4 minutes. The Steraffirm Bowie-Dick Test Packs are available for two cycles:

- 121°C (250°F) with 8 minute exposure time
- 132°C (270°F) with 3.5 minute exposure time

Refer to instructions for running the Bowie-Dick in *SECTION 6.7, DART AND BOWIE-DICK CYCLES*.

A Bowie-Dick Test cycle is not a test for adequate exposure to heat in terms of time-at-temperature.

3.2.3 Vacuum Leak Test

WARNING – STERILITY ASSURANCE HAZARD: Load sterility may be compromised if the biological or chemical indicator, or vacuum leak test indicates a potential problem. If these indicators show a potential problem, refer the situation to a qualified service technician before using the sterilizer further.

After running a Leak Test cycle, a value or leak rate is printed on tape. The value helps in establishing a trend over a period of time and can indicate when the integrity of the system is beginning to deteriorate (i.e., allowing air to enter the system).

Operators and maintenance personnel run a leak test daily or weekly to monitor the system air-tight integrity and make repairs as needed.

A leak rate of greater than 1 mmHg per minute indicates a problem with the sterilizer that must be addressed.

3.3 Recommendations for the Sterilization Process

Saturated steam is a well controlled, reliable method for processing items which can withstand the temperatures and pressures associated with steam sterilization. The requirements for achieving reproducible results are well known by many users, but are not always understood by all users.

The condition most likely to result in sterilization problems is a failure to remove all of the air from the items being processed. For example, placing an empty beaker or bowl in an upright position in a gravity displacement sterilizer may result in the object not being sterilized, or may require exceptionally long sterilization times. This problem is caused by air trapped in the object; air has almost twice the density as does saturated steam under the same conditions. Thus, the air remains in the bottom of the container while steam forms a stable layer above it. (Similar to oil forming a stable layer over water.) As long as there is no mechanism for actively mixing air and steam, the bottom of the container is only exposed to dry heat, which is not an effective sterilization method at the time and temperatures typically used in steam processes.

The best method for enhancing sterilization of solid-bottom containers in gravity displacement cycles is to orient all objects in a position which would allow water to flow out. When steam enters the chamber, it tends to layer over trapped air. If, however, an object is oriented so air is not trapped, but can flow out; air flows out to be replaced by steam. Steam can now reach all surfaces and effect sterilization.

3.4 Sterilization Techniques and Recommendations for Liquids

WARNING – EXPLOSION HAZARD: This sterilizer is not designed to process flammable compounds.

WARNING – PERSONAL INJURY HAZARD: Avoid personal injury from bursting bottles. Liquid sterilization cycle must only be used for liquids in borosilicate (Pyrex) flasks with vented closures.

WARNING – BURN HAZARD:

- **Steam may be released from the chamber when door is opened. Step back from the sterilizer each time the door is opened to minimize contact with steam vapor.**
- **When sterilizing liquids, to prevent personal injury or property damage resulting from bursting bottles and hot fluid, you must observe the following procedures:**
  - **Use LIQUID cycle only; no other cycle is safe for processing liquids.**
  - **Use only vented closures; do not use screw caps or rubber stoppers with crimped seal.**
  - **Use only Type 1 borosilicate glass bottles; do not use ordinary glass bottles or any container not designed for sterilization.**
  - **Do not allow hot bottles to be jolted; this can cause hot-bottle explosions. Do not move bottles if any boiling or bubbling is present.**

CAUTION – POSSIBLE EQUIPMENT DAMAGE: Sterilization of chloride-containing solutions (e.g., saline) can cause chamber corrosion and is not recommended by the manufacturer. If, however, chloride-containing solutions must be processed, clean the chamber after each use.

Important: Read this section before using the sterilizer to sterilize liquids.

Recommended minimum exposure time for a 1 liter liquid flask is 45 minutes at 121°C (250°F). *Volumes greater or less than 1 liter must be determined.*

The minimum exposure (sterilization) assumes the use of vented bottles or Erlenmeyer flasks and includes the time required to bring the solution up to the sterilization temperature plus the time required to achieve sterilization. Variables that might effect this time include flask/bottle material and viscosity of the liquid to be processed.

***NOTE:** Use load probes and F_o option to optimize cycle times.*

The use of borosilicate glass is required because it is a superior glass capable of resisting thermal shock. If glass less thermally resistant is used, a greater potential for bursting exists.

Vented closures are required because, by design, they release internal pressure build-up by automatically venting the containers, whereas pressure in unvented containers remains until the contents have cooled. Examples of vented closures are shown in *FIGURE 3-1.*

When loading the sterilizer, place small bottles in a separate basket to minimize sliding.

Always use side rails on the loading car to prevent containers or baskets from falling off.

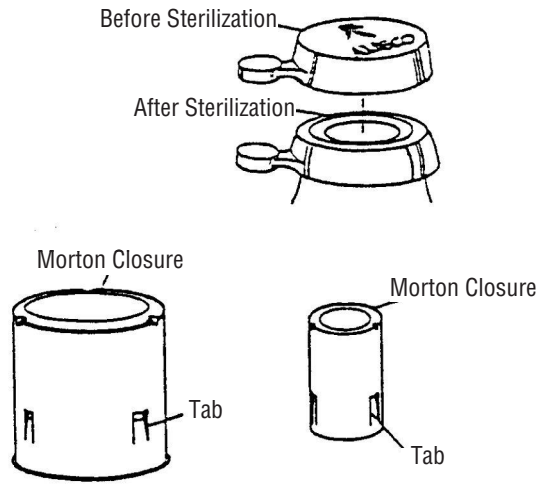


Figure 3-1. Vented Closures

4.1 Component Identification

The AMSCO® 110LS and AMSCO® 250LS are steam-jacketed sterilizers designed to process a variety of loads using saturated steam under pressure and gravity air removal principals.

The sterilizers are equipped with a fully-programmable microcomputer control system capable of storing process cycles for sterilizing hard goods, lightly wrapped porous loads and liquid loads in vented containers. The control system monitors and automatically controls all cycle operations and functions.

Before operating the sterilizer, it is important to become familiar with the location and function of all major components and controls (see *FIGURE 4-1*).

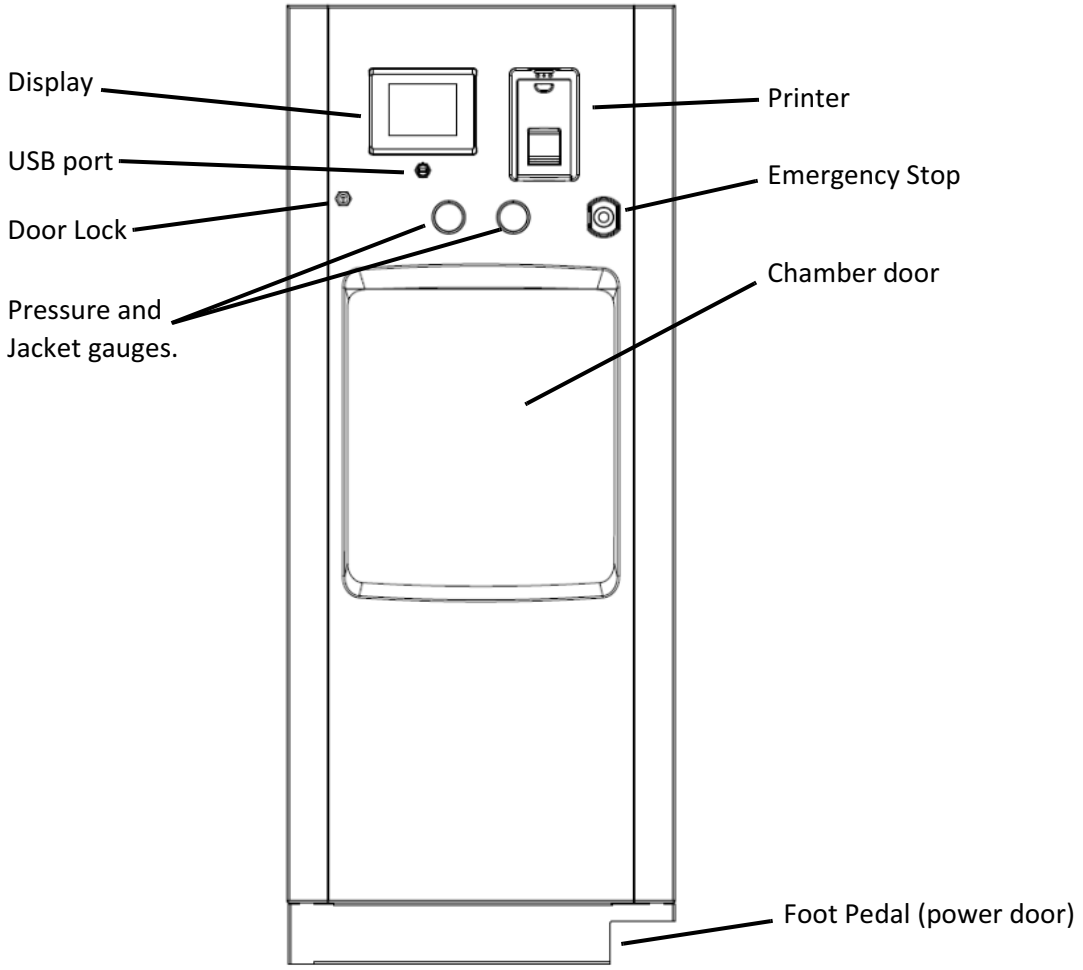


Figure 4-1. AMSCO 250LS Sterilizer

4.1.1 Main Power Disconnect Switch

The main power disconnect switch, located behind the front cabinet panel, controls power supply to the sterilizer and control system (see *FIGURE 4-2*).

Important: *This switch should remain in the ON position at all times for normal unit operation.*

⚠ WARNING – ELECTRIC SHOCK AND BURN HAZARD: Disconnect all utilities to sterilizer before servicing. Do not service the sterilizer unless all utilities have been properly locked out. Always follow appropriate Lockout-Tagout and electrical safety-related work practice standards.

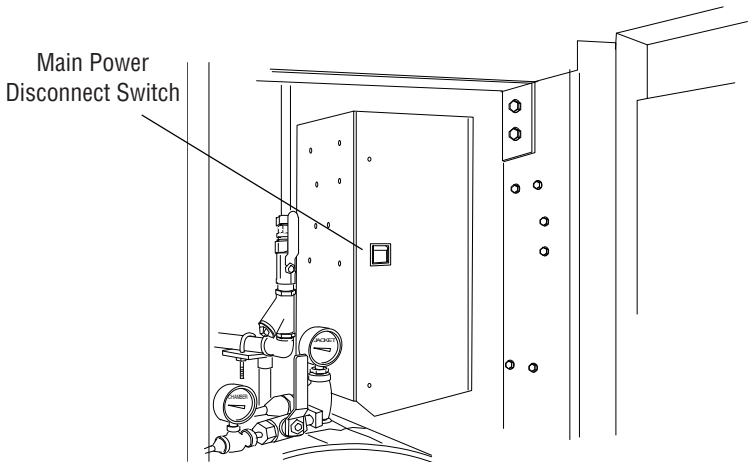


Figure 4-2. Main Power Disconnect Switch Location

4.1.2 Supply Valves

Supply valves (see *FIGURE 4-3*) to the sterilizer are located behind the front cabinet panel. Steam supply valve is located above the chamber door; water supply valve is located below the chamber door).

NOTE: *If unit is equipped with electric steam generator, see SECTION 4.6, OPTIONAL ELECTRIC STEAM GENERATOR, for location of the generator supply valve.*

Important: Both supply valves to the sterilizer should remain in the ON position at all times for normal unit operation.

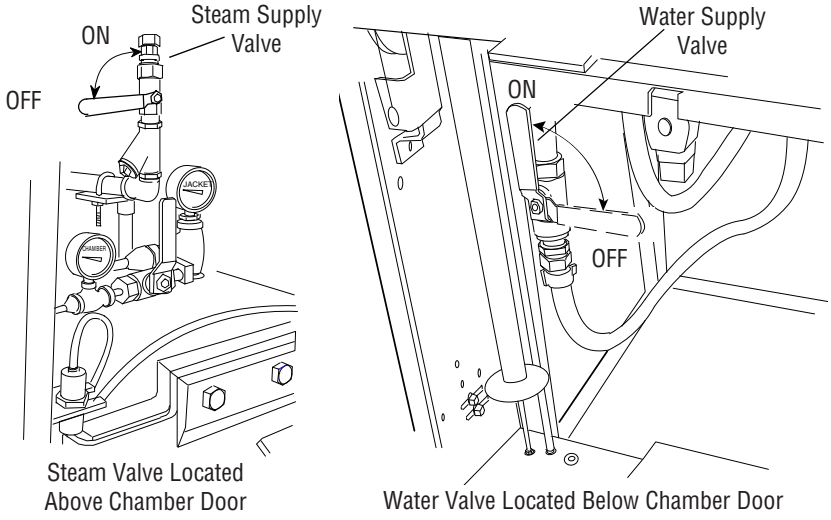


Figure 4-3. Steam and Water Supply Valves

4.2 Control Panel

The control panel, located on load end of the sterilizer, is used to direct all sterilizer functions. The operator may control cycle operation, program cycles and sterilizer operating parameters and monitor cycle performance from the control panel.

4.2.1 Touch Screen

The touch screen allows the user to operate and program the sterilizer control by touching (pressing) the appropriate touch-sensitive areas on the display. On each screen, all rectangular-outlined boxes are touch-sensitive areas, referred to as **buttons** (see *FIGURE 4-4*).

Refer to *SECTION 5, CONTROL INTERFACE,* for further details on interfacing with the control system's touch screen.

Figure 4-4. Example of In-Cycle Touch Screen

4.2.2 Printer

Printer records all cycle data on 2-1/4" (57 mm) wide paper.

The following is an example of a typical in-cycle printout in the condensed print format (see *FIGURE 4-5*).

```
==============================
========== GRAVITY ===========
==============================
CYCLE START AT      XX:XX:XX A/P
            ON          XX/XX/XX

CYCLE COUNT               0
LOGIN NAME:          XXXXXX
STERILIZER           XXXXXX

CYCLE TYPE         GRAVITY
CYCLE NO.          2

   STER TEMP = 121.0 C
CONTROL TEMP = 122.5 C
   STER TIME = 0:30:00
    DRY TIME = 0:01:00

                           V=inHg
- TIME           T=C      P=psig
-----------------------------
C 11:48:24A      66.7       0.3V
C 11:49:24A     112.7      10.0P
S 11:49:43A     121.2      16.6P
S 11:51:43A     122.6      17.7P
S 11:53:43A     123.3      17.8P
S 11:55:43A     123.6      16.8P
S 11:57:43A     122.6      17.0P
S 11:59:43A     122.6      17.2P
S 12:01:43P     122.5      17.0P
S 12:03:43P     122.4      17.2P
S 12:05:43P     122.5      16.8P
S 12:07:43P     122.4      16.9P
S 12:11:43P     122.4      17.0P
S 12:13:43P     122.5      17.1P
S 12:15:43P     122.6      17.0P
S 12:17:43P     122.7      17.0P
S 12:19:43P     122.6      16.8P
E 12:19:44P     122.6      16.9P
E 12:19:54P     113.7       3.2P
E 12:20:03P      99.9      11.1V
E 12:21:03P      40.5      28.1V
Z 12:21:46P      68.4       0.5V

LOAD                      020903

CHAMBER TEMP MAX=124.8 C
CHAMBER TEMP MIN=121.2 C

CONDITON      = 1:19
STERILIZE     = 30:01
EXHAUST       = 1:42
TOTAL CYCLE   = 33:02

==============================
======= READY TO UNLOAD ======
==============================
```

Figure 4-5. Printout

All printer functions are controlled using the touch screen. For details on each function, refer to *SECTION 5, CONTROL INTERFACE*.

4.2.3 Operating Mode

When sterilizer is placed in the Operating mode, the generated printout lists the sterilizer type and manufacturer.

```
CONTROL ON
Day, Month XX, XXXX
XX:XX:XX AM
*****************************
*                           *
*      STERIS SCIENTIFIC    *
*      AMSCO® LAB SERIES    *
*      PREVAC STERILIZER    *
*                           *
*****************************
```

Figure 4-6. Printout: Sterilizer Type

4.2.4 Cycle Start

When a cycle is started, the generated printout lists name of cycle started, time and date the cycle was started, the current cycle count (number of cycles run since original start up of unit), operator name, sterilizer ID number, default cycle number/type and the programmed parameters for the cycle started.

NOTE: *Cycle count value may be changed in the Supervisor Mode.*

4.2.5 End-of-Cycle Performance Summary

At the end of a cycle, the generated printout lists number of cycles run that day, the maximum and minimum chamber temperatures reached during the sterilize phase, processing times for key phases and the total cycle time.

4.2.6 Alarm Condition

When an alarm condition occurs, the generated printout (*FIGURE 4-7*) lists the type of alarm and time, chamber temperature and chamber pressure when it occurred.

NOTE: *Refer to SECTION 7, ALARMS, for listing of possible alarm conditions.*

```
* ALARM
PRESSURE IN CHAMBER
F 10:07:23A    61.7C    34.0P
```

Figure 4-7. Printout: Alarm Condition

4.3 Languages

AMSCO 110LS and AMSCO 250LS sterilizers have multiple language capability. Displays and printouts may be shown in English, French, Spanish or another available language by selecting it on Standby Screen.

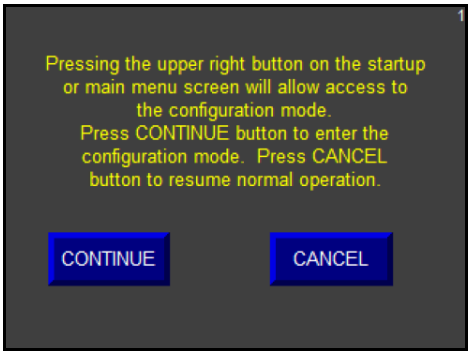
The above screen shows selectable languages, e.g., English, French and Spanish. English is currently selected.

If **FRENCH** or **SPANISH** is selected, display changes accordingly after a 5-second delay; and displays and printouts are displayed in newly selected language.

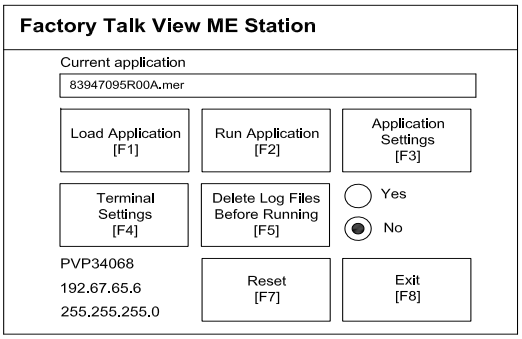
Control has the ability to power up in default language (English) or selected language. Complete following steps to select this option:

***NOTE:** For double door units, in regard to language changes, display "B" also needs to be setup as described in this procedure.*

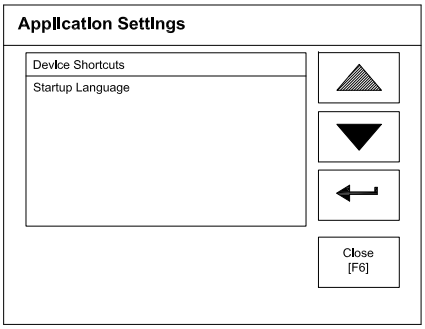
1. Press upper right button on Startup or Main Menu Screen (*Screen 1*) to access following display:



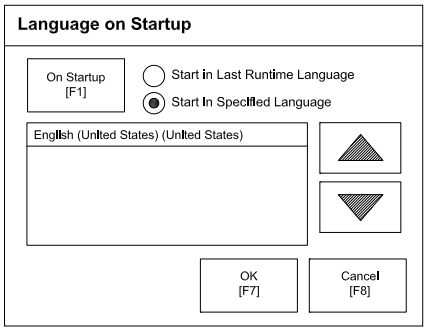
2. Press **CONTINUE** button. After about 30 seconds the following screen displays:



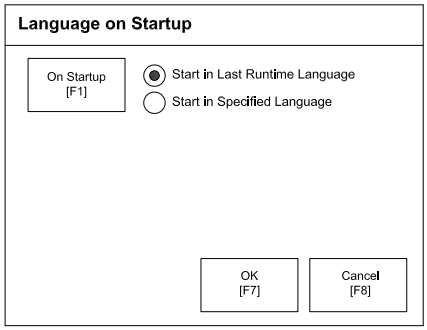
3. Press **Application Settings** button. The following screen appears:



4. Select **Startup Language**. The following display appears:



5. Startup Language Screen is set to start control in English. Note that even if another language was selected, if power is turned OFF and back ON, English would remain as used language.
6. If selected language is to be displayed (when unit is powered up) Press **Start in Last Runtime Language**. For example, if French is selected and is always to be displayed (even when power is cycled), select this option. The following screen shows this option selected:



7. Press **OK** and return back to configuration screen. Setting is now saved.
8. Cycle power (turn OFF and ON).

4.4 Manual Operation of Door

Carefully review *SECTION 1, SAFETY PRECAUTIONS,* and the following warnings and cautions before manually operating door(s).

⚠ WARNING - PERSONAL INJURY HAZARD: When closing the chamber door, keep hands and arms out of the door opening and make sure opening is clear of obstructions.

⚠ WARNING - BURN HAZARD:

- **Steam may be released from the chamber when door is opened. Step back from the sterilizer each time the door is opened to minimize contact with steam vapor.**
- **Do not attempt to open the sterilizer door if a WATER IN CHAMBER ALARM condition exists. Call a qualified service technician before attempting to use sterilizer further.**
- **After manual exhaust, steam may remain inside the chamber. Always wear protective gloves, apron, and a face shield when following emergency procedure to unload sterilizer. Stay as far back from the chamber opening as possible when opening the door.**

⚠ CAUTION - POSSIBLE EQUIPMENT DAMAGE HAZARD:

- **Gasket must be fully retracted prior to operating sterilizer door.**
- **Make sure door opening is clear of any obstruction before closing the door(s).**
- **Do not attempt to open sterilizer door during manual operation unless chamber is at 0 psig (0 bar).**
- **Do not try to raise or lower door rapidly as fast operation may damage the manual door mechanism.**

Using hand pressure, pull up or push down on the door handle to operate the door.

NOTE: *Do not try to raise or lower door rapidly as fast operation may damage the door drive mechanism.*

4.5 Emergency Door Operation

Carefully review *SECTION 1, SAFETY PRECAUTIONS* and the following warnings and cautions before performing emergency door operation.

⚠ WARNING - BURN HAZARD:

- **Do not attempt to open the sterilizer door if a WATER IN CHAMBER ALARM condition exists. Call a qualified service technician before attempting to use sterilizer further.**
- **After manual exhaust, steam may remain inside the chamber. Always wear protective gloves, apron, and a face shield when following emergency procedure to unload sterilizer. Stay as far back from the chamber opening as possible when opening the door.**
- **Allow sterilizer to cool to room temperature before performing any cleaning or maintenance procedures.**
- **Do not attempt to open the sterilizer door if a WATER IN CHAMBER ALARM condition exists. Call a qualified service technician before attempting to use sterilizer further.**
- **Failure to shut off the steam supply when cleaning or replacing strainers can result in serious injury.**
- **Jacket pressure must be 0 psig (0 bar) before beginning work on the steam trap.**
- **Proper testing of the safety valve requires the valve to be operated under pressure. Exhaust from the safety valve is hot and can cause burns. Proper safety attire (gloves, eye protection, insulated overall) is required. Testing is to be performed by qualified service personnel only.**
- **When sterilizing liquids, to prevent personal injury or property damage resulting from bursting bottles and hot fluid, you must observe the following procedures:**
  - **Use LIQUID cycle only; no other cycle is safe for processing liquids.**
  - **Use only vented closures; do not use screw caps or rubber stoppers with crimped seal.**
  - **Use only Type 1 borosilicate glass bottles; do not use ordinary glass bottles or any container not designed for sterilization.**
  - **Do not allow hot bottles to be jolted; this can cause hot-bottle explosions. Do not move bottles if any boiling or bubbling is present.**

⚠ WARNING - EXPLOSION HAZARD: This sterilizer is not designed to process flammable compounds.

⚠ WARNING - PERSONAL INJURY AND/OR EQUIPMENT DAMAGE HAZARD: Repairs and adjustments to this equipment must be made only by fully qualified service personnel. Maintenance performed by inexperienced, unqualified persons or installation of unauthorized parts could cause personal injury or result in costly equipment damage.

⚠ CAUTION - POSSIBLE EQUIPMENT DAMAGE HAZARD:

- **Gasket must be fully retracted prior to operating sterilizer door.**
- **Do not attempt to open sterilizer door during manual operation unless chamber is at 0 psig (0 bar).**

The following emergency procedure should only be used in instances where the sterilizer has lost either electrical or water utilities, and a load is sealed in the chamber. This procedure requires manually releasing the door seal by pressing on the door and pushing the seal back into the groove.

1. Open front cabinet panel. Open manual exhaust valve to exhaust remaining steam from the chamber (see *FIGURE 4-8*). Leave valve open during emergency procedure.
2. Using pressure tool provided, press on upper left hand and right hand corners of chamber door as shown in *FIGURE 4-8*. Door should give inward slightly, indicating seal has been compressed into groove.
3. Close front cabinet panel and pull down on door handle.
4. Once door is open, do not use sterilizer until unit has been examined by a qualified service technician. Further use without proper attention may damage sterilizer.
5. Close manual exhaust valve.

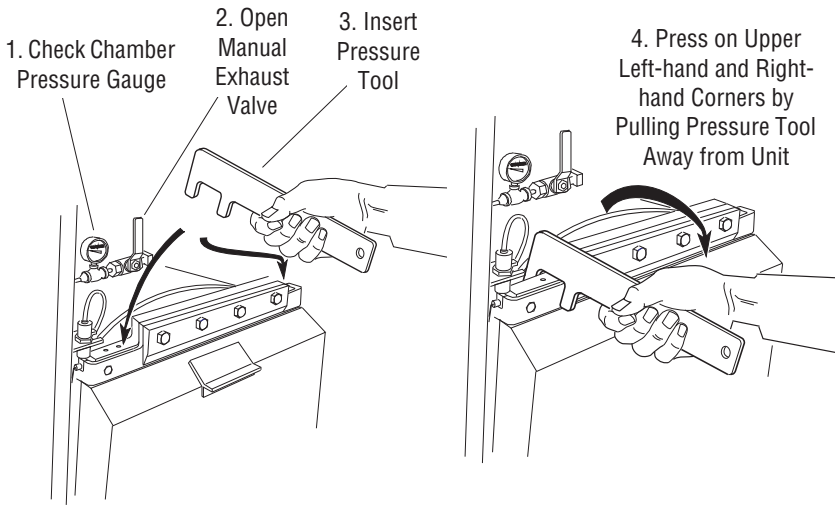


Figure 4-8. Emergency Door Operation

4.6 Optional Electric Steam Generator

Carefully review *SECTION 1, SAFETY PRECAUTIONS* and below before operating steam generator. If a building steam source is not available, the sterilizer may be equipped with an electric steam generator. The generator automatically converts water to steam using electric heat. The steam created is then used to power the sterilizer.

⚠ WARNING – BURN HAZARD:

- **Do not attempt to open the sterilizer door if a WATER IN CHAMBER ALARM condition exists. Call a qualified service technician before attempting to use sterilizer further.**
- **After manual exhaust, steam may remain inside the chamber. Always wear protective gloves, apron, and a face shield when following emergency procedure to unload sterilizer. Stay as far back from the chamber opening as possible when opening the door.**
- **Allow sterilizer to cool to room temperature before performing any cleaning or maintenance procedures.**
- **Do not attempt to open the sterilizer door if a WATER IN CHAMBER ALARM condition exists. Call a qualified service technician before attempting to use sterilizer further.**
- **Failure to shut off the steam supply when cleaning or replacing strainers can result in serious injury.**
- **Jacket pressure must be 0 psig (0 bar) before beginning work on the steam trap.**
- **Proper testing of the safety valve requires the valve to be operated under pressure. Exhaust from the safety valve is hot and can cause burns. Proper safety attire (gloves, eye protection, insulated overall) is required. Testing is to be performed by qualified service personnel only.**
- **When sterilizing liquids, to prevent personal injury or property damage resulting from bursting bottles and hot fluid, you must observe the following procedures:**
  - **Use LIQUID cycle only; no other cycle is safe for processing liquids.**
  - **Use only vented closures; do not use screw caps or rubber stoppers with crimped seal.**
  - **Use only Type 1 borosilicate glass bottles; do not use ordinary glass bottles or any container not designed for sterilization.**
  - **Do not allow hot bottles to be jolted; this can cause hot-bottle explosions. Do not move bottles if any boiling or bubbling is present.**

⚠ WARNING – EXPLOSION HAZARD: This sterilizer is not designed to process flammable compounds.

⚠ WARNING – PERSONAL INJURY AND/OR EQUIPMENT DAMAGE HAZARD: Repairs and adjustments to this equipment must be made only by fully qualified service personnel. Maintenance performed by inexperienced, unqualified persons or installation of unauthorized parts could cause personal injury or result in costly equipment damage.

⚠ CAUTION – POSSIBLE EQUIPMENT DAMAGE HAZARD:

- **Gasket must be fully retracted prior to operating sterilizer door.**
- **Do not attempt to open sterilizer door during manual operation unless chamber is at 0 psig (0 bar).**

Carbon steam generators are highly susceptible to mineral scaling if the supplied water has any level of hardness. Refer to **Table 4-1** for water quality requirements.

Important: *Regardless of the hardness level of supplied water, the generator must be flushed every day before use to prevent mineral scaling or carryover of debris into the chamber.*

The control system will automatically flush the steam generator if power is on; for this reason it is recommended that power remain on continuously.

See Water Utility Requirements for Stainless Steel generators.

Table 4-1. Required Feed Water Quality for Carbon Steel Steam Generators

Condition	Nominal Recommended	Maximum Recommended
Temperature	As Supplied	140° F (60° C)
Total Hardness as CaCO3*	0-17 mg/L	130 mg/L
Total Dissolved Solids	50-150 mg/L	250 mg/L
Total Alkalinity as CaCO3	50-100 mg/L	180 mg/L
pH	6.8 - 7.5	6.5 - 8.5
Total Silica	0.1 - 1.0 mg/L	2.5 mg/L
Resistivity - ohms/cm	2000-6000	26,000

*17.1 mg/L = 1 grain hardness

4.7 Generator Flush Operation

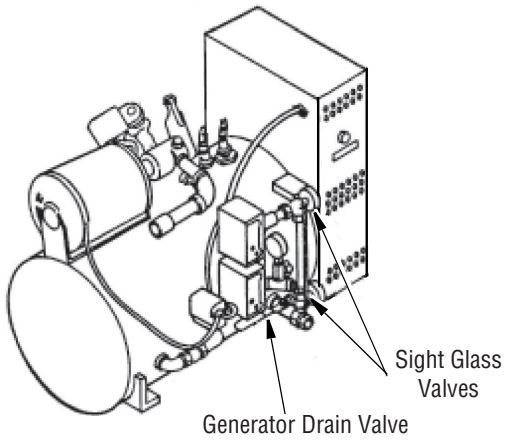


Figure 4-9. Optional Electric Steam Generator

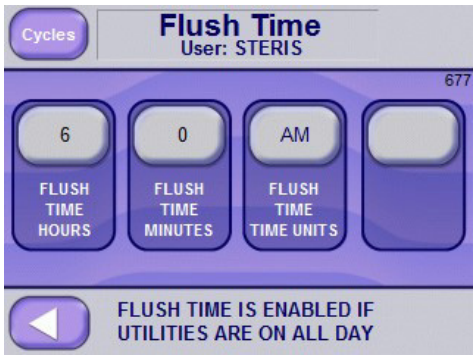
For sterilizers with electric steam generator option, Supervisor Mode can be used to setup a Generator Flush, as follows. Stainless Steel Generators do not have a Generator flush.

4.7.1 Set Generator Flush Time (Time to Start)

To set the start time for steam generator flush:

1. Access Supervisor Mode.
2. Advance to Screen Page 6 of 6.

3. Select GENERATOR FLUSH TIME button to access Flush Time screen.



4. Set FLUSH TIME HOURS, FLUSH TIME MINUTES, and AM or PM.

NOTE: *Flush Time is only active if utilities are set to be on all day. If Utility Shutdown is active (either by time or off all day, then the steam generator flush occurs during a 15 minute period after the start of the utility shutdown.*

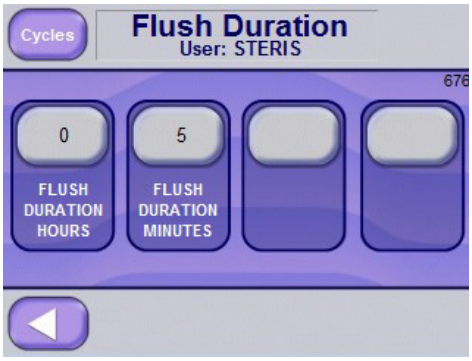
4.7.2 Set Flush Duration

Flush Duration is the amount of time for the flush phase. Generator water is set to turn on while the generator drain is open. During a flush, water flows through the generator to remove water impurities.

To set the flush duration:

1. Access Supervisor Mode.
2. Advance to Screen Page 6 of 6.

3. Select the GENERATOR FLUSH DURATION button to access the Flush Duration screen.
4. Set the Flush Duration time in Hours and Minutes.

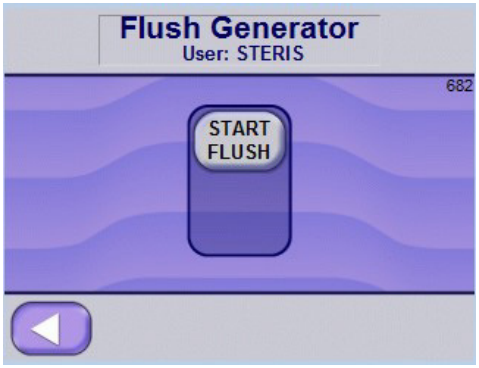


4.7.3 Run Generator Flush

To run the Generator Flush Cycle:

1. Access Supervisor Mode.
2. Advance to Screen Page 6 of 6.

3. Select the RUN GENERATOR FLUSH button to access the Flush Generator screen.



4. Press the START FLUSH button to start the generator flush cycle. The phases are described in *SECTION 4.7.4, GENERATOR FLUSH CYCLE (DESCRIPTION OF PHASES), PAGE 4-16*.

4.7.4 Generator Flush Cycle (Description of Phases)

The Generator Flush Cycle progresses through the following phases:

a. **DEPRESSURIZE**

A printout, similar to the following, occurs when the cycle starts:

*** GENERATOR 9:25:51 AM**
FLUSH START

NOTE: *If there is no pressure in the steam generator when the flush cycle starts, the generator partially heats up to remove the vacuum from the generator.*

The depressurize phase removes pressure from the generator by flowing it through the jacket and/or door seal(s). If doors are closed, door seal(s) can be used, which subtracts approximately 20 minutes from the depressurize phase. The generator pressure switch must be closed and the jacket temperature must be less than 100°C to end the phase.

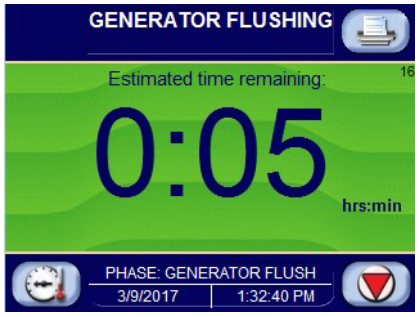
b. **OPEN VALVE**

Generator drain ball valve opens.

c. **DRAIN**

Cycle waits an additional 10 seconds after the generator drain valve opens.

d. **FLUSH**



Generator flush lasts for the set flush duration time (default is 5 minutes). Generator water turns on while water in generator drains, allowing generator to flush.

e. **CLOSE VALVE**

Generator drain valve closes.

A printout, similar to the following, occurs when the cycle starts:

*** GENERATOR 9:25:51 AM**
FLUSH COMPLETE

If the operator aborts the cycle an associated printout results:.

*** GENERATOR 9:25:51 AM**
FLUSH ABORT

If an alarm occurs during cycle, the alarm prints and the cycle aborts.

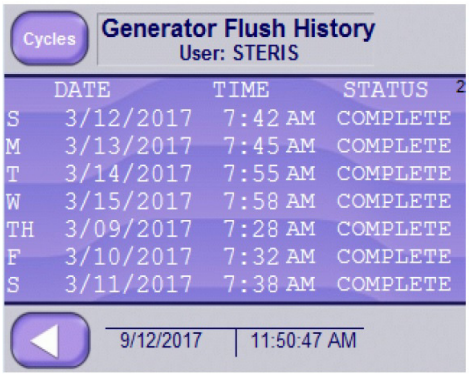
4.7.5 Generator Flush History

Generator Flush History shows a flush status of COMPLETE or ABORT for a one week period.

To view Generator Flush History:

1. Access Supervisor Mode.
2. Advance to Screen Page 6 of 6.

3. Select GENERATOR FLUSH HISTORY button.



Days of week, first column in preceding screen image, are designated as follows:

S - Sunday/Saturday	W - Wednesday
M - Monday	Th - Thursday
T - Tuesday	F - Friday

The screen displays date, time and status of the flush. Date and time are saved when the flush is either completed or aborted. If the flush was aborted, but later successfully completed, only the complete status is shown. If the flush was done multiple times, only the first

completed flush is saved as history, even if a later flush was aborted.

Points to note:

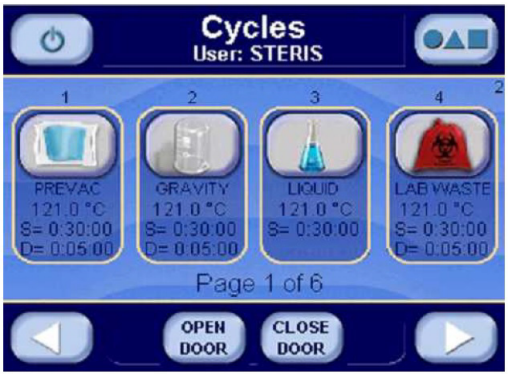
- Flush values are stored in internal memory.
- The display shows the status for a week.
- Internal memory shows a complete history of the flush values.
- Multiple flushes or aborts, even if they occur on the same day, are saved.

4.8 Automatic Generator Flush

When automatic utility shutdown is set, generator flush time determines when the generator flushes.

Important: A generator flush will not occur during a cycle. If Flush Time occurs during a cycle, then the flush initializes after the cycle completes.

When within 60 minutes of flush time, the screen shows how many minutes until start of generator flush.

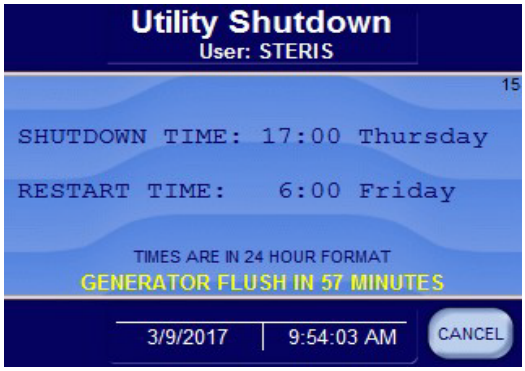


When the time expires, the generator flush cycle automatically starts. For a description of the cycle see *Section 4.7.4, Generator Flush Cycle (Description of Phases), Page 4-16*.

Upon completion of the flush, the screen returns to either the standby screen, screen 2 or screen 5 if in the Isothermal mode.

When the time is within 60 minutes of the set flush time, the screen displays a countdown of remaining minutes until the generator flush begins.

If utilities are set to be OFF all day or controlled by time, the generator flush cycle automatically starts after 15 minutes into the utility shutdown.



4.9 Generator Flush Alarms

4.9.1 List of Flush Alarms

Generator Flush Alarms automatically abort the Generator Flush Cycle. The alarms and their causes are listed in Table 7.1, ALARMS.

4.9.2 Setting "Too Long . . ." Alarms

The following four "Too Long . . ." alarms can be set from the Supervisor Mode screen by pressing the TOO LONG IN STEP button. The allowable time range for each alarm is included below.

- TOO LONG TO PRESSURIZE GENERATOR
  (1 minute to 120 minutes)v
- TOO LONG TO DEPRESSURIZE GENERATOR
  (1 minute to 120 minutes)
- TOO LONG TO CLOSE GENERATOR DRAIN
  (1 to 60 seconds)
- TOO LONG TO OPEN GENERATOR DRAIN
  (1 to 60 seconds)

Refer to Table 6.1 for additional information.

5.1 General Description

Touch screens allow the user to operate and program the sterilizer by lightly touching (pressing) the appropriate touch-sensitive areas on the display. On each screen, all buttons are touch sensitive areas. When a button is pressed, the display area within the button changes state.

After the sterilizer has been powered up, the display shows the following screen:

Touch any portion of screen to proceed.

NOTE: Pressing the upper right on the screen enables the control panel.

The In Standby Screen displays a "**. . . Please Wait**" message, then displays the Log In Screen.

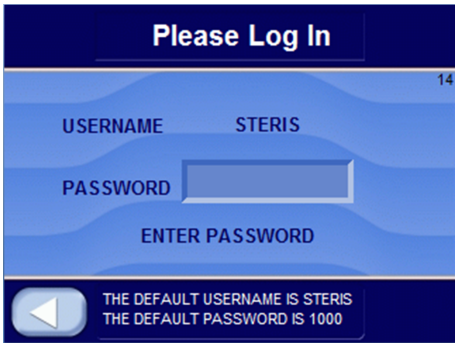
5.1.1 Log In

After touching the In Standby Screen, the display shows the following screen:

Enter the Username.

5.1.2 Password Entry

After entering the Username, touch the white area next to Password. An alpha-numeric touch screen is displayed. Enter password and press **ENTER**.



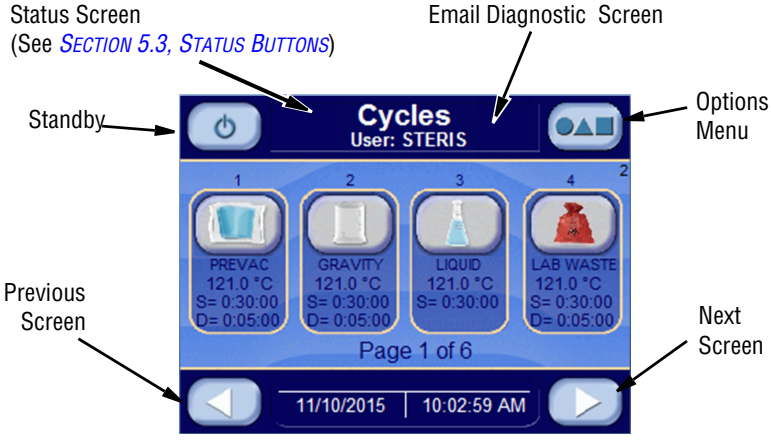
NOTE: When using Password Screen, the following apply:

*1) If username and/or password are invalid, **INVALID USERNAME** or **INVALID PASSWORD** is shown on Screen 14. Re-enter username and/or password or press **left arrow** button to return to Standby Screen.*

2) After username and password have been successfully entered, every screen during Operating Mode displays username (login name).

3) Default username is STERIS and password is 1000. This username and password gains entry to the operating, supervisor and service modes. Once logged in, this username and password may be changed by supervisor.

The Operating Mode Screen appears.



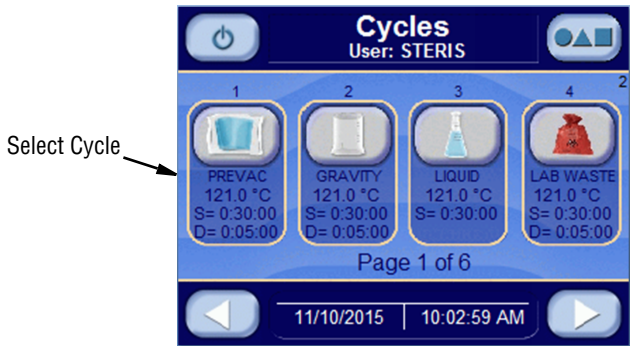
5.1.3 Options Menu

Press the Options Menu button (preceding figure) to access the Options Screen (# 65). Refer to *SECTION 6.19, OPTIONS SCREEN* for details pertaining to the Options screen.

5.2 Operating Modes

5.2.1 Prevac Sterilizer Only

Press **OPERATING MODE** button to enter operating mode. The operating mode display is shown below:



Press the button associated with the desired cycle. Note that pressing **RIGHT ARROW** button advances to screen showing additional cycles.

NOTE:

- *Jacket temperature is selectable and can be turned off with the Green Mode. In standard mode, by default, jacket charges with steam to maintain 115°C (239°F).*
- *If display shows **CLOSE DOOR(S)** message, close the door.*
- *A cycle cannot be run with door open.*
- *A cycle may be run while the jacket is still charging.*

Press the **START CYCLE** button to start the cycle.

Press **PRINT CYCLE VALUES** button to print all cycle values. The following is a print example of all cycles values.

NOTE: STRL, CTRL and Fo only appear if load probes are selected.

```
================================
=     CYCLE VALUES PRINTOUT    =
================================
8/2/2016 11:27:34 AM

LOGIN NAME: STERIS
STERILIZER: VAC01

1.PREVAC
PURGE TIME= 2:00
PULSE VAC = 10.0 inHg
PULSE CHG = 15.0 PSIG
   PULSES =  4
STER TEMP = 121.0 °C
STER TIME =  0:30:00
 OVERTEMP =   6.0 °C
OVERDRIVE =   1.5 °C
UNDERTEMP =   1.0 °C
UNDERTEMP = RESUME
PRINT INT =  2 MIN
  VAC DRY = 10.0 inHg
 DRY TIME = 0:05:00
  EXHAUST = FAST
 DRY CONT = LIMIT
SLOW EXH. =  1.6 PSI/MIN
SLOW EXH. =  4.2 PSIG
SLOW EXH. =  0.6 PSI/MIN
SLOW EXH. =  5.0 inHg
   CHARGE = 1.0 PSI/MIN
  EXHAUST = 10.0 PSI/MIN
 EVACUATE = 10.0 PSI/MIN
VAPOR REM =  10 MIN
--------------------------------
2.GRAVITY
PURGE TIME= 2:00
STER TEMP = 121.0 °C
STER TIME =  0:30:00
 OVERTEMP =   6.0 °C
OVERDRIVE =   1.5 °C
UNDERTEMP =   1.0 °C
PRINT INT =  2 MIN
  VAC DRY = 10.0 inHg
 DRY TIME = 0:05:00
 DRY CONT = LIMIT
   CHARGE = 1.0 PSI/MIN
  EXHAUST = 10.0 PSI/MIN
 EVACUATE = 10.0 PSI/MIN
--------------------------------
3. LIQUID
PURGE TIME= 2:00
STER TEMP = 121.0 °C
STER TIME =  0:30:00
 OVERTEMP =   6.0 °C
OVERDRIVE =   1.5 °C
UNDERTEMP =   1.0 °C
UNDERTEMP = RESUME
PRINT INT =  2 MIN
SLOW EXH. =  1.6 PSI/MIN
SLOW EXH. =  4.2 PSIG
SLOW EXH. =  0.6 PSI/MIN
SLOW EXH. =  5.0 inHg
   CHARGE = 1.0 PSI/MIN
  EXHAUST = 10.0 PSI/MIN
 EVACUATE = 10.0 PSI/MIN
VAPOR REM =  10 MIN
--------------------------------
4.LAB WASTE
PURGE TIME= 2:00
PUL VAC 1 = 20.0 inHg
PUL HLD 1 = 10 SEC
PUL CHG 1 = 15.0 PSIG
PUL VAC 2 = 10.0 inHg
PUL HLD 2 = 10 SEC
PUL CHG 2 = 15.0 PSIG
PUL VAC 3 =  5.0 inHg
PUL HLD 3 = 10 SEC
PUL CHG 3 = 10.0 PSIG
   PULSES =  3
STER TEMP = 121.0 °C
STER TIME =  0:30:00
 OVERTEMP =   6.0 °C
7.PREVAC
PURGE TIME= 2:00
PULSE VAC = 10.0 inHg
PULSE CHG = 15.0 PSIG
   PULSES =  4
STER TEMP = 121.0 °C
STER TIME =  0:30:00
 OVERTEMP =   6.0 °C
OVERDRIVE =   1.5 °C
UNDERTEMP =   1.0 °C
UNDERTEMP = RESUME
PRINT INT =  2 MIN
  VAC DRY = 10.0 inHg
 DRY TIME = 0:05:00
  EXHAUST = FAST
 DRY CONT = LIMIT
SLOW EXH. =  1.6 PSI/MIN
SLOW EXH. =  4.2 PSIG
SLOW EXH. =  0.6 PSI/MIN
SLOW EXH. =  5.0 inHg
   CHARGE = 1.0 PSI/MIN
  EXHAUST = 10.0 PSI/MIN
 EVACUATE = 10.0 PSI/MIN
VAPOR REM =  10 MIN
--------------------------------
8.PREVAC
PURGE TIME= 2:00
PULSE VAC = 10.0 inHg
PULSE CHG = 15.0 PSIG
   PULSES =  4
STER TEMP = 121.0 °C
STER TIME =  0:30:00
 OVERTEMP =   6.0 °C
OVERDRIVE =   1.5 °C
UNDERTEMP =   1.0 °C
UNDERTEMP = RESUME
PRINT INT =  2 MIN
  VAC DRY = 10.0 inHg
 DRY TIME = 0:05:00
  EXHAUST = FAST
 DRY CONT = LIMIT
SLOW EXH. =  1.6 PSI/MIN
SLOW EXH. =  4.2 PSIG
SLOW EXH. =  0.6 PSI/MIN
SLOW EXH. =  5.0 inHg
   CHARGE = 1.0 PSI/MIN
  EXHAUST = 10.0 PSI/MIN
 EVACUATE = 10.0 PSI/MIN
VAPOR REM =  10 MIN
--------------------------------
9.PREVAC
PURGE TIME= 2:00
PULSE VAC = 10.0 inHg
PULSE CHG = 15.0 PSIG
   PULSES =  4
STER TEMP = 121.0 °C
STER TIME =  0:30:00
 OVERTEMP =   6.0 °C
OVERDRIVE =   1.5 °C
UNDERTEMP =   1.0 °C
UNDERTEMP = RESUME
PRINT INT =  2 MIN
  VAC DRY = 10.0 inHg
 DRY TIME = 0:05:00
  EXHAUST = FAST
 DRY CONT = LIMIT
SLOW EXH. =  1.6 PSI/MIN
SLOW EXH. =  4.2 PSIG
SLOW EXH. =  0.6 PSI/MIN
SLOW EXH. =  5.0 inHg
   CHARGE = 1.0 PSI/MIN
  EXHAUST = 10.0 PSI/MIN
 EVACUATE = 10.0 PSI/MIN
VAPOR REM =  10 MIN
--------------------------------
10.PREVAC
PURGE TIME= 2:00
PULSE VAC = 10.0 inHg
PULSE CHG = 15.0 PSIG
   PULSES =  4
STER TEMP = 121.0 °C
13.GRAVITY
PURGE TIME= 2:00
STER TEMP = 121.0 °C
STER TIME =  0:30:00
 OVERTEMP =   6.0 °C
OVERDRIVE =   1.5 °C
UNDERTEMP =   1.0 °C
PRINT INT =  2 MIN
  VAC DRY = 10.0 inHg
 DRY TIME = 0:05:00
 DRY CONT = LIMIT
   CHARGE = 1.0 PSI/MIN
  EXHAUST = 10.0 PSI/MIN
 EVACUATE = 10.0 PSI/MIN
--------------------------------
14.GRAVITY
PURGE TIME= 2:00
STER TEMP = 121.0 °C
STER TIME =  0:30:00
 OVERTEMP =   6.0 °C
OVERDRIVE =   1.5 °C
UNDERTEMP =   1.0 °C
PRINT INT =  2 MIN
  VAC DRY = 10.0 inHg
 DRY TIME = 0:05:00
 DRY CONT = LIMIT
   CHARGE = 1.0 PSI/MIN
  EXHAUST = 10.0 PSI/MIN
 EVACUATE = 10.0 PSI/MIN
--------------------------------
15.GRAVITY
PURGE TIME= 2:00
STER TEMP = 121.0 °C
STER TIME =  0:30:00
 OVERTEMP =   6.0 °C
OVERDRIVE =   1.5 °C
UNDERTEMP =   1.0 °C
PRINT INT =  2 MIN
  VAC DRY = 10.0 inHg
 DRY TIME = 0:05:00
 DRY CONT = LIMIT
   CHARGE = 1.0 PSI/MIN
  EXHAUST = 10.0 PSI/MIN
 EVACUATE = 10.0 PSI/MIN
--------------------------------
16.GRAVITY
PURGE TIME= 2:00
STER TEMP = 121.0 °C
STER TIME =  0:30:00
 OVERTEMP =   6.0 °C
OVERDRIVE =   1.5 °C
UNDERTEMP =   1.0 °C
PRINT INT =  2 MIN
  VAC DRY = 10.0 inHg
 DRY TIME = 0:05:00
 DRY CONT = LIMIT
   CHARGE = 1.0 PSI/MIN
  EXHAUST = 10.0 PSI/MIN
 EVACUATE = 10.0 PSI/MIN
--------------------------------
17. LIQUID
PURGE TIME= 2:00
STER TEMP = 121.0 °C
STER TIME =  0:30:00
 OVERTEMP =   6.0 °C
OVERDRIVE =   1.5 °C
UNDERTEMP =   1.0 °C
UNDERTEMP = RESUME
PRINT INT =  2 MIN
SLOW EXH. =  1.6 PSI/MIN
SLOW EXH. =  4.2 PSIG
SLOW EXH. =  0.6 PSI/MIN
SLOW EXH. =  5.0 inHg
   CHARGE = 1.0 PSI/MIN
  EXHAUST = 10.0 PSI/MIN
 EVACUATE = 10.0 PSI/MIN
VAPOR REM =  10 MIN
--------------------------------
18. LIQUID
PURGE TIME= 2:00
STER TEMP = 121.0 °C
```

Continued on Next Page ...

NOTE: LAB WASTE cycle values (not shown) will look like a PREVAC cycle values printout.

```
OVERDRIVE =   1.5 °C
UNDERTEMP =   1.0 °C
UNDERTEMP = RESUME
PRINT INT =  2 MIN
  VAC DRY = 10.0 inHg
 DRY TIME = 0:05:00
  EXHAUST = FAST
 DRY CONT = LIMIT
SLOW EXH. =  1.6 PSI/MIN
SLOW EXH. =  4.2 PSIG
SLOW EXH. =  0.6 PSI/MIN
SLOW EXH. =  5.0 inHg
   CHARGE = 1.0 PSI/MIN
  EXHAUST = 10.0 PSI/MIN
 EVACUATE = 10.0 PSI/MIN
VAPOR REM =  10 MIN
--------------------------------
5.PREVAC
PURGE TIME= 2:00
PULSE VAC = 10.0 inHg
PULSE CHG = 15.0 PSIG
   PULSES =  4
STER TEMP = 121.0 °C
STER TIME =  0:30:00
 OVERTEMP =   6.0 °C
OVERDRIVE =   1.5 °C
UNDERTEMP =   1.0 °C
UNDERTEMP = RESUME
PRINT INT =  2 MIN
  VAC DRY = 10.0 inHg
 DRY TIME = 0:05:00
  EXHAUST = FAST
 DRY CONT = LIMIT
SLOW EXH. =  1.6 PSI/MIN
SLOW EXH. =  4.2 PSIG
SLOW EXH. =  0.6 PSI/MIN
SLOW EXH. =  5.0 inHg
   CHARGE = 1.0 PSI/MIN
  EXHAUST = 10.0 PSI/MIN
 EVACUATE = 10.0 PSI/MIN
VAPOR REM =  10 MIN
--------------------------------
6.PREVAC
PURGE TIME= 2:00
PULSE VAC = 10.0 inHg
PULSE CHG = 15.0 PSIG
   PULSES =  4
STER TEMP = 121.0 °C
STER TIME =  0:30:00
 OVERTEMP =   6.0 °C
OVERDRIVE =   1.5 °C
UNDERTEMP =   1.0 °C
UNDERTEMP = RESUME
PRINT INT =  2 MIN
  VAC DRY = 10.0 inHg
 DRY TIME = 0:05:00
  EXHAUST = FAST
 DRY CONT = LIMIT
SLOW EXH. =  1.6 PSI/MIN
SLOW EXH. =  4.2 PSIG
SLOW EXH. =  0.6 PSI/MIN
SLOW EXH. =  5.0 inHg
   CHARGE = 1.0 PSI/MIN
  EXHAUST = 10.0 PSI/MIN
 EVACUATE = 10.0 PSI/MIN
VAPOR REM =  10 MIN
--------------------------------
```

```
STER TIME =  0:30:00
 OVERTEMP =   6.0 °C
OVERDRIVE =   1.5 °C
UNDERTEMP =   1.0 °C
UNDERTEMP = RESUME
PRINT INT =  2 MIN
  VAC DRY = 10.0 inHg
 DRY TIME = 0:05:00
  EXHAUST = FAST
 DRY CONT = LIMIT
SLOW EXH. =  1.6 PSI/MIN
SLOW EXH. =  4.2 PSIG
SLOW EXH. =  0.6 PSI/MIN
SLOW EXH. =  5.0 inHg
   CHARGE = 1.0 PSI/MIN
  EXHAUST = 10.0 PSI/MIN
 EVACUATE = 10.0 PSI/MIN
VAPOR REM =  10 MIN
--------------------------------
11.PREVAC
PURGE TIME= 2:00
PULSE VAC = 10.0 inHg
PULSE CHG = 15.0 PSIG
   PULSES =  4
STER TEMP = 121.0 °C
STER TIME =  0:30:00
 OVERTEMP =   6.0 °C
OVERDRIVE =   1.5 °C
UNDERTEMP =   1.0 °C
UNDERTEMP = RESUME
PRINT INT =  2 MIN
  VAC DRY = 10.0 inHg
 DRY TIME = 0:05:00
  EXHAUST = FAST
 DRY CONT = LIMIT
SLOW EXH. =  1.6 PSI/MIN
SLOW EXH. =  4.2 PSIG
SLOW EXH. =  0.6 PSI/MIN
SLOW EXH. =  5.0 inHg
   CHARGE = 1.0 PSI/MIN
  EXHAUST = 10.0 PSI/MIN
 EVACUATE = 10.0 PSI/MIN
VAPOR REM =  10 MIN
--------------------------------
12.PREVAC
PURGE TIME= 2:00
PULSE VAC = 10.0 inHg
PULSE CHG = 15.0 PSIG
   PULSES =  4
STER TEMP = 121.0 °C
STER TIME =  0:30:00
 OVERTEMP =   6.0 °C
OVERDRIVE =   1.5 °C
UNDERTEMP =   1.0 °C
UNDERTEMP = RESUME
PRINT INT =  2 MIN
  VAC DRY = 10.0 inHg
 DRY TIME = 0:05:00
  EXHAUST = FAST
 DRY CONT = LIMIT
SLOW EXH. =  1.6 PSI/MIN
SLOW EXH. =  4.2 PSIG
SLOW EXH. =  0.6 PSI/MIN
SLOW EXH. =  5.0 inHg
   CHARGE = 1.0 PSI/MIN
  EXHAUST = 10.0 PSI/MIN
 EVACUATE = 10.0 PSI/MIN
VAPOR REM =  10 MIN
--------------------------------
```

```
STER TIME =  0:30:00
 OVERTEMP =   6.0 °C
OVERDRIVE =   1.5 °C
UNDERTEMP =   1.0 °C
UNDERTEMP = RESUME
PRINT INT =  2 MIN
SLOW EXH. =  1.6 PSI/MIN
SLOW EXH. =  4.2 PSIG
SLOW EXH. =  0.6 PSI/MIN
SLOW EXH. =  5.0 inHg
   CHARGE = 1.0 PSI/MIN
  EXHAUST = 10.0 PSI/MIN
 EVACUATE = 10.0 PSI/MIN
VAPOR REM =  10 MIN
--------------------------------
19. LIQUID
PURGE TIME= 2:00
STER TEMP = 121.0 °C
STER TIME =  0:30:00
 OVERTEMP =   6.0 °C
OVERDRIVE =   1.5 °C
UNDERTEMP =   1.0 °C
UNDERTEMP = RESUME
PRINT INT =  2 MIN
SLOW EXH. =  1.6 PSI/MIN
SLOW EXH. =  4.2 PSIG
SLOW EXH. =  0.6 PSI/MIN
SLOW EXH. =  5.0 inHg
   CHARGE = 1.0 PSI/MIN
  EXHAUST = 10.0 PSI/MIN
 EVACUATE = 10.0 PSI/MIN
VAPOR REM =  10 MIN
--------------------------------
20. LIQUID
PURGE TIME= 2:00
STER TEMP = 121.0 °C
STER TIME =  0:30:00
 OVERTEMP =   6.0 °C
OVERDRIVE =   1.5 °C
UNDERTEMP =   1.0 °C
UNDERTEMP = RESUME
PRINT INT =  2 MIN
SLOW EXH. =  1.6 PSI/MIN
SLOW EXH. =  4.2 PSIG
SLOW EXH. =  0.6 PSI/MIN
SLOW EXH. =  5.0 inHg
   CHARGE = 1.0 PSI/MIN
  EXHAUST = 10.0 PSI/MIN
 EVACUATE = 10.0 PSI/MIN
VAPOR REM =  10 MIN
--------------------------------

TOO LONG IN:
------------------
ACTIVATE SEAL =  5 MIN
AIR BREAK = 5 MIN
CHARGE = 60 MIN
DEACTIVATE SEAL = 5 MIN
EVACUATE = 30 MIN
EXHAUST = 10 MIN
JACKET CHARGE = 30 MIN
================================
```

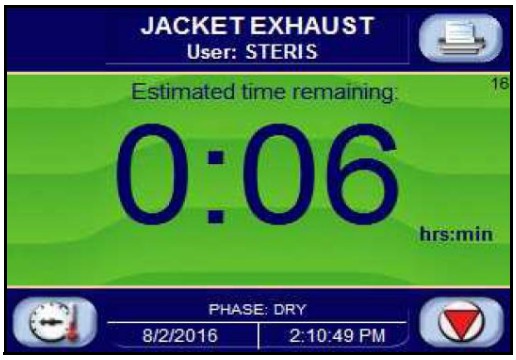
5.2.2 Isothermal Sterilizer Only (Optional Cycle)

Press **ISO MODE** to enter Isothermal mode.

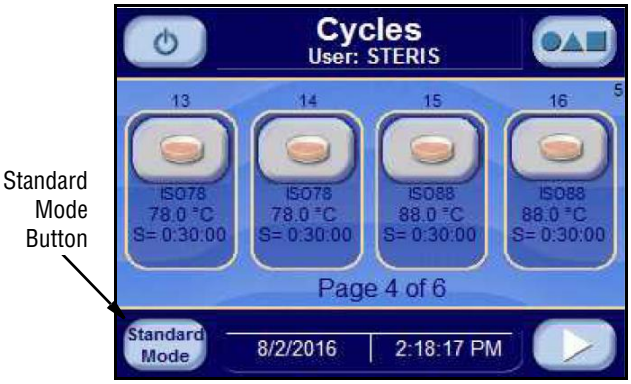
Ensure sterilizer door(s) is closed.

NOTE: Doors must be closed for ISO MODE button to shown.

NOTE: If the jacket temperature is greater than 100.0°C (212.0°F), jacket drains for five minutes.



After the jacket drain cycle is complete, the following screen is shown:



Jacket steam is OFF. Press **STANDARD MODE** button to return to standard mode (gravity and liquid cycles).

NOTE: A cycle cannot be run with door open. The cycle may be run with the jacket still charging.

Press **CYCLE** button to select a cycle. Corresponding cycle values appear on display for cycles 1 through 20 (cycles 13-20 are reserved for isothermal cycles).

*NOTE: If display shows **CLOSE DOOR(S)** message, close door(s). The cycle does not start until doors are closed.*

Press **PRINT CYCLE VALUES** button to print all cycle values. The following is a print example of all cycles values:

```
================================
=     CYCLE VALUES PRINTOUT    =
================================
8/2/2016 11:27:34 AM

LOGIN NAME: STERIS
STERILIZER: VAC01

1.PREVAC
PURGE TIME= 2:00
PULSE VAC = 10.0 inHg
PULSE CHG = 15.0 PSIG
   PULSES =  4
STER TEMP = 121.0 °C
STER TIME =  0:30:00
 OVERTEMP =   6.0 °C
OVERDRIVE =   1.5 °C
UNDERTEMP =   1.0 °C
UNDERTEMP = RESUME
PRINT INT =  2 MIN
  VAC DRY = 10.0 inHg
 DRY TIME = 0:05:00
  EXHAUST = FAST
 DRY CONT = LIMIT
SLOW EXH. =  1.6 PSI/MIN
SLOW EXH. =  4.2 PSIG
SLOW EXH. =  0.6 PSI/MIN
SLOW EXH. =  5.0 inHg
   CHARGE = 1.0 PSI/MIN
  EXHAUST = 10.0 PSI/MIN
 EVACUATE = 10.0 PSI/MIN
VAPOR REM =  10 MIN
--------------------------------
2.GRAVITY
PURGE TIME= 2:00
STER TEMP = 121.0 °C
STER TIME =  0:30:00
 OVERTEMP =   6.0 °C
OVERDRIVE =   1.5 °C
UNDERTEMP =   1.0 °C
PRINT INT =  2 MIN
  VAC DRY = 10.0 inHg
 DRY TIME = 0:05:00
 DRY CONT = LIMIT
   CHARGE = 1.0 PSI/MIN
  EXHAUST = 10.0 PSI/MIN
 EVACUATE = 10.0 PSI/MIN
--------------------------------
3. LIQUID
PURGE TIME= 2:00
STER TEMP = 121.0 °C
STER TIME =  0:30:00
 OVERTEMP =   6.0 °C
OVERDRIVE =   1.5 °C
UNDERTEMP =   1.0 °C
UNDERTEMP = RESUME
PRINT INT =  2 MIN
SLOW EXH. =  1.6 PSI/MIN
SLOW EXH. =  4.2 PSIG
SLOW EXH. =  0.6 PSI/MIN
SLOW EXH. =  5.0 inHg
   CHARGE = 1.0 PSI/MIN
  EXHAUST = 10.0 PSI/MIN
 EVACUATE = 10.0 PSI/MIN
VAPOR REM =  10 MIN
--------------------------------
4.LAB WASTE
PURGE TIME= 2:00
PUL VAC 1 = 20.0 inHg
PUL HLD 1 = 10 SEC
PUL CHG 1 = 15.0 PSIG
PUL VAC 2 = 10.0 inHg
PUL HLD 2 = 10 SEC
PUL CHG 2 = 15.0 PSIG
PUL VAC 3 =  5.0 inHg
PUL HLD 3 = 10 SEC
PUL CHG 3 = 10.0 PSIG
   PULSES =  3
STER TEMP = 121.0 °C
STER TIME =  0:30:00
 OVERTEMP =   6.0 °C
7.PREVAC
PURGE TIME= 2:00
PULSE VAC = 10.0 inHg
PULSE CHG = 15.0 PSIG
   PULSES =  4
STER TEMP = 121.0 °C
STER TIME =  0:30:00
 OVERTEMP =   6.0 °C
OVERDRIVE =   1.5 °C
UNDERTEMP =   1.0 °C
UNDERTEMP = RESUME
PRINT INT =  2 MIN
  VAC DRY = 10.0 inHg
 DRY TIME = 0:05:00
  EXHAUST = FAST
 DRY CONT = LIMIT
SLOW EXH. =  1.6 PSI/MIN
SLOW EXH. =  4.2 PSIG
SLOW EXH. =  0.6 PSI/MIN
SLOW EXH. =  5.0 inHg
   CHARGE = 1.0 PSI/MIN
  EXHAUST = 10.0 PSI/MIN
 EVACUATE = 10.0 PSI/MIN
VAPOR REM =  10 MIN
--------------------------------
8.PREVAC
PURGE TIME= 2:00
PULSE VAC = 10.0 inHg
PULSE CHG = 15.0 PSIG
   PULSES =  4
STER TEMP = 121.0 °C
STER TIME =  0:30:00
 OVERTEMP =   6.0 °C
OVERDRIVE =   1.5 °C
UNDERTEMP =   1.0 °C
UNDERTEMP = RESUME
PRINT INT =  2 MIN
  VAC DRY = 10.0 inHg
 DRY TIME = 0:05:00
  EXHAUST = FAST
 DRY CONT = LIMIT
SLOW EXH. =  1.6 PSI/MIN
SLOW EXH. =  4.2 PSIG
SLOW EXH. =  0.6 PSI/MIN
SLOW EXH. =  5.0 inHg
   CHARGE = 1.0 PSI/MIN
  EXHAUST = 10.0 PSI/MIN
 EVACUATE = 10.0 PSI/MIN
VAPOR REM =  10 MIN
--------------------------------
9.PREVAC
PURGE TIME= 2:00
PULSE VAC = 10.0 inHg
PULSE CHG = 15.0 PSIG
   PULSES =  4
STER TEMP = 121.0 °C
STER TIME =  0:30:00
 OVERTEMP =   6.0 °C
OVERDRIVE =   1.5 °C
UNDERTEMP =   1.0 °C
UNDERTEMP = RESUME
PRINT INT =  2 MIN
  VAC DRY = 10.0 inHg
 DRY TIME = 0:05:00
  EXHAUST = FAST
 DRY CONT = LIMIT
SLOW EXH. =  1.6 PSI/MIN
SLOW EXH. =  4.2 PSIG
SLOW EXH. =  0.6 PSI/MIN
SLOW EXH. =  5.0 inHg
   CHARGE = 1.0 PSI/MIN
  EXHAUST = 10.0 PSI/MIN
 EVACUATE = 10.0 PSI/MIN
VAPOR REM =  10 MIN
--------------------------------
10.PREVAC
PURGE TIME= 2:00
PULSE VAC = 10.0 inHg
PULSE CHG = 15.0 PSIG
   PULSES =  4
STER TEMP = 121.0 °C
13.ISO78
STER TEMP = 78.0 °C
STER TIME =  0:30:00
 OVERTEMP =   6.0 °C
OVERDRIVE =   0.0 °C
UNDERTEMP =   6.0 °C
UNDERTEMP = RESUME
PRINT INT =  2 MIN
SLOW EXH. =  1.6 PSI/MIN
SLOW EXH. =  4.2 PSIG
SLOW EXH. =  0.6 PSI/MIN
SLOW EXH. =  5.0 inHg
VAPOR REM =  10 MIN
--------------------------------
14.ISO78
STER TEMP = 78.0 °C
STER TIME =  0:30:00
 OVERTEMP =   6.0 °C
OVERDRIVE =   0.0 °C
UNDERTEMP =   6.0 °C
UNDERTEMP = RESUME
PRINT INT =  2 MIN
SLOW EXH. =  1.6 PSI/MIN
SLOW EXH. =  4.2 PSIG
SLOW EXH. =  0.6 PSI/MIN
SLOW EXH. =  5.0 inHg
VAPOR REM =  10 MIN
--------------------------------
15.ISO88
STER TEMP = 88.0 °C
STER TIME =  0:30:00
 OVERTEMP =   6.0 °C
OVERDRIVE =   0.0 °C
UNDERTEMP =   6.0 °C
UNDERTEMP = RESUME
PRINT INT =  2 MIN
SLOW EXH. =  1.6 PSI/MIN
SLOW EXH. =  4.2 PSIG
SLOW EXH. =  0.6 PSI/MIN
SLOW EXH. =  5.0 inHg
VAPOR REM =  10 MIN
--------------------------------
16.ISO88
STER TEMP = 88.0 °C
STER TIME =  0:30:00
 OVERTEMP =   6.0 °C
OVERDRIVE =   0.0 °C
UNDERTEMP =   6.0 °C
UNDERTEMP = RESUME
PRINT INT =  2 MIN
SLOW EXH. =  1.6 PSI/MIN
SLOW EXH. =  4.2 PSIG
SLOW EXH. =  0.6 PSI/MIN
SLOW EXH. =  5.0 inHg
VAPOR REM =  10 MIN
--------------------------------
17.ISO104
STER TEMP = 104.0 °C
STER TIME =  0:30:00
 OVERTEMP =   6.0 °C
OVERDRIVE =   0.0 °C
UNDERTEMP =   6.0 °C
UNDERTEMP = RESUME
PRINT INT =  2 MIN
SLOW EXH. =  1.6 PSI/MIN
SLOW EXH. =  4.2 PSIG
SLOW EXH. =  0.6 PSI/MIN
SLOW EXH. =  5.0 inHg
VAPOR REM =  10 MIN
--------------------------------
18.ISO04
STER TEMP = 104.0 °C
STER TIME =  0:30:00
 OVERTEMP =   6.0 °C
OVERDRIVE =   0.0 °C
UNDERTEMP =   6.0 °C
UNDERTEMP = RESUME
PRINT INT =  2 MIN
SLOW EXH. =  1.6 PSI/MIN
SLOW EXH. =  4.2 PSIG
SLOW EXH. =  0.6 PSI/MIN
```

Continued on Next Page ...

```
OVERDRIVE =   1.5 °C
UNDERTEMP =   1.0 °C
UNDERTEMP = RESUME
PRINT INT =  2 MIN
  VAC DRY = 10.0 inHg
 DRY TIME = 0:05:00
  EXHAUST = FAST
 DRY CONT = LIMIT
SLOW EXH. =  1.6 PSI/MIN
SLOW EXH. =  4.2 PSIG
SLOW EXH. =  0.6 PSI/MIN
SLOW EXH. =  5.0 inHg
   CHARGE = 1.0 PSI/MIN
  EXHAUST = 10.0 PSI/MIN
 EVACUATE = 10.0 PSI/MIN
VAPOR REM =  10 MIN
--------------------------------
5.PREVAC
PURGE TIME= 2:00
PULSE VAC = 10.0 inHg
PULSE CHG = 15.0 PSIG
   PULSES =  4
STER TEMP = 121.0 °C
STER TIME =  0:30:00
 OVERTEMP =   6.0 °C
OVERDRIVE =   1.5 °C
UNDERTEMP =   1.0 °C
UNDERTEMP = RESUME
PRINT INT =  2 MIN
  VAC DRY = 10.0 inHg
 DRY TIME = 0:05:00
  EXHAUST = FAST
 DRY CONT = LIMIT
SLOW EXH. =  1.6 PSI/MIN
SLOW EXH. =  4.2 PSIG
SLOW EXH. =  0.6 PSI/MIN
SLOW EXH. =  5.0 inHg
   CHARGE = 1.0 PSI/MIN
  EXHAUST = 10.0 PSI/MIN
 EVACUATE = 10.0 PSI/MIN
VAPOR REM =  10 MIN
--------------------------------
6.PREVAC
PURGE TIME= 2:00
PULSE VAC = 10.0 inHg
PULSE CHG = 15.0 PSIG
   PULSES =  4
STER TEMP = 121.0 °C
STER TIME =  0:30:00
 OVERTEMP =   6.0 °C
OVERDRIVE =   1.5 °C
UNDERTEMP =   1.0 °C
UNDERTEMP = RESUME
PRINT INT =  2 MIN
  VAC DRY = 10.0 inHg
 DRY TIME = 0:05:00
  EXHAUST = FAST
 DRY CONT = LIMIT
SLOW EXH. =  1.6 PSI/MIN
SLOW EXH. =  4.2 PSIG
SLOW EXH. =  0.6 PSI/MIN
SLOW EXH. =  5.0 inHg
   CHARGE = 1.0 PSI/MIN
  EXHAUST = 10.0 PSI/MIN
 EVACUATE = 10.0 PSI/MIN
VAPOR REM =  10 MIN
--------------------------------
```

```
STER TIME =  0:30:00
 OVERTEMP =   6.0 °C
OVERDRIVE =   1.5 °C
UNDERTEMP =   1.0 °C
UNDERTEMP = RESUME
PRINT INT =  2 MIN
  VAC DRY = 10.0 inHg
 DRY TIME = 0:05:00
  EXHAUST = FAST
 DRY CONT = LIMIT
SLOW EXH. =  1.6 PSI/MIN
SLOW EXH. =  4.2 PSIG
SLOW EXH. =  0.6 PSI/MIN
SLOW EXH. =  5.0 inHg
   CHARGE = 1.0 PSI/MIN
  EXHAUST = 10.0 PSI/MIN
 EVACUATE = 10.0 PSI/MIN
VAPOR REM =  10 MIN
--------------------------------
11.PREVAC
PURGE TIME= 2:00
PULSE VAC = 10.0 inHg
PULSE CHG = 15.0 PSIG
   PULSES =  4
STER TEMP = 121.0 °C
STER TIME =  0:30:00
 OVERTEMP =   6.0 °C
OVERDRIVE =   1.5 °C
UNDERTEMP =   1.0 °C
UNDERTEMP = RESUME
PRINT INT =  2 MIN
  VAC DRY = 10.0 inHg
 DRY TIME = 0:05:00
  EXHAUST = FAST
 DRY CONT = LIMIT
SLOW EXH. =  1.6 PSI/MIN
SLOW EXH. =  4.2 PSIG
SLOW EXH. =  0.6 PSI/MIN
SLOW EXH. =  5.0 inHg
   CHARGE = 1.0 PSI/MIN
  EXHAUST = 10.0 PSI/MIN
 EVACUATE = 10.0 PSI/MIN
VAPOR REM =  10 MIN
--------------------------------
12.PREVAC
PURGE TIME= 2:00
PULSE VAC = 10.0 inHg
PULSE CHG = 15.0 PSIG
   PULSES =  4
STER TEMP = 121.0 °C
STER TIME =  0:30:00
 OVERTEMP =   6.0 °C
OVERDRIVE =   1.5 °C
UNDERTEMP =   1.0 °C
UNDERTEMP = RESUME
PRINT INT =  2 MIN
  VAC DRY = 10.0 inHg
 DRY TIME = 0:05:00
  EXHAUST = FAST
 DRY CONT = LIMIT
SLOW EXH. =  1.6 PSI/MIN
SLOW EXH. =  4.2 PSIG
SLOW EXH. =  0.6 PSI/MIN
SLOW EXH. =  5.0 inHg
   CHARGE = 1.0 PSI/MIN
  EXHAUST = 10.0 PSI/MIN
 EVACUATE = 10.0 PSI/MIN
VAPOR REM =  10 MIN
--------------------------------
```

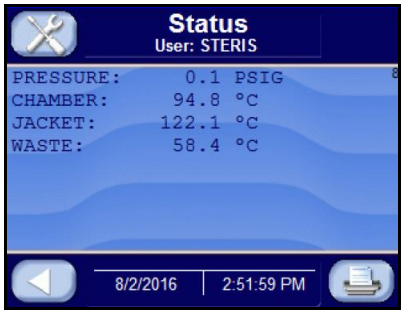
```
SLOW EXH. =  5.0 inHg
VAPOR REM =  10 MIN
--------------------------------
19.ISO104
STER TEMP = 104.0 °C
STER TIME =  0:30:00
 OVERTEMP =   6.0 °C
OVERDRIVE =   0.0 °C
UNDERTEMP =   6.0 °C
UNDERTEMP = RESUME
PRINT INT =  2 MIN
SLOW EXH. =  1.6 PSI/MIN
SLOW EXH. =  4.2 PSIG
SLOW EXH. =  0.6 PSI/MIN
SLOW EXH. =  5.0 inHg
VAPOR REM =  10 MIN
--------------------------------
20.ISO104
STER TEMP = 104.0 °C
STER TIME =  0:30:00
 OVERTEMP =   6.0 °C
OVERDRIVE =   0.0 °C
UNDERTEMP =   6.0 °C
UNDERTEMP = RESUME
PRINT INT =  2 MIN
SLOW EXH. =  1.6 PSI/MIN
SLOW EXH. =  4.2 PSIG
SLOW EXH. =  0.6 PSI/MIN
SLOW EXH. =  5.0 inHg
VAPOR REM =  10 MIN
--------------------------------

TOO LONG IN:
------------------
 ACTIVATE SEAL =  5 MIN
     AIR BREAK =  5 MIN
        CHARGE = 60 MIN
DEACTIVATE SEAL=  5 MIN
      EVACUATE = 30 MIN
       EXHAUST = 10 MIN
 JACKET CHARGE = 30 MIN
================================
```

5.3 Status Buttons

Status screens are accessed by pressing the following buttons:

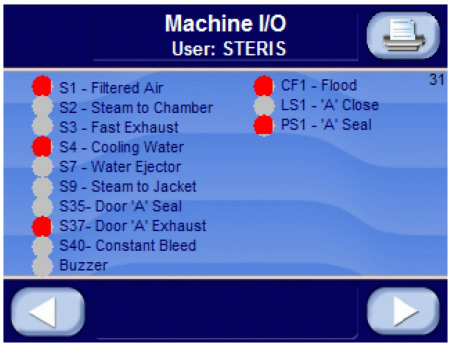
- **PRES/TEMP** ,
- **MACHINE I/O**
- **GRAPH**

1. Press **PRES/TEMP** button to show pressure/temperature Status Screen.



The status screen shows the current pressure and temperatures. Press **EXIT** button to return to the previous screen.

2. Press **MACHINE I/O** button to display Machine I/O Status Screen.



Gray circle next to device indicates that device is OFF or OPEN. When circle turns red the device is ON or CLOSED.

Press **LEFT ARROW** button to return to previous screen. Press **LEFT ARROW** button again to return to Operating Mode Main Menu Screen.

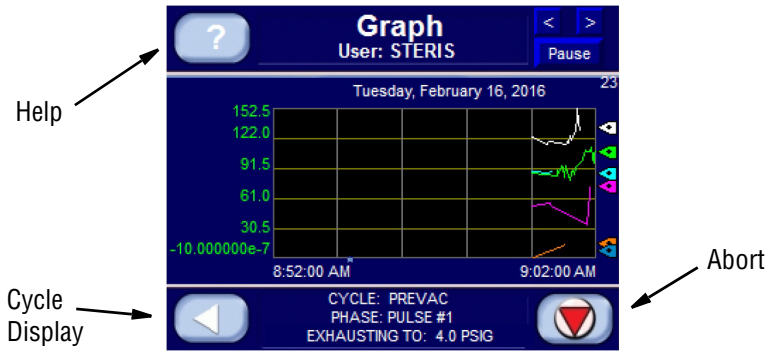
3. Press middle of **CYCLES** on any cycle select screens (following image) to display Pressure / Temperature status screen.

Press **STATUS PRINT** button to print current status; an example is:

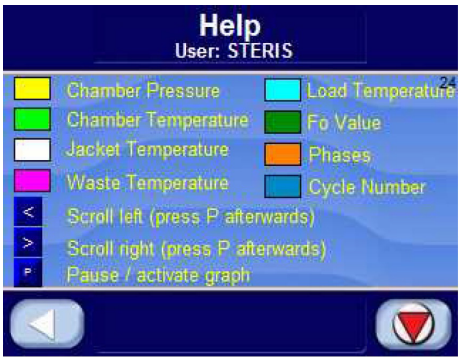
```
STATUS PRINT
----------------------------
2/16/2016 8:50:16 AM
CHAMBER:            80.0 °C
JACKET:            115.0 °C
WASTE:              45.0 °C
```

Press **PRINT VALUES** button to print all cycle values.

Pressing **GRAPH** button during cycle displays Graph Screen (Screen 23) showing cycle graphs of chamber, jacket, waste and pressure analog values. An example follows:



The graph displays analog values over a 10-minute period of time. Each analog value is represented by a different color. Press**?** button to access Help Screen (*Screen 24*) shown below:



See *SECTION 5.5, USB STORAGE*, for a description of saving and retrieving data from a compact flash card.

During a cycle, the screen changes color as follows:

- condition phase - green
- sterilize phase - blue
- exhaust phase - purple
- complete phase - blue

5.4 Printer Operation

Printer records all cycle data on 2.25” (57 mm) wide single-ply paper. See Section 8.2.1. Replace Printer Paper Roll, page 8-2 for paper changing procedure.

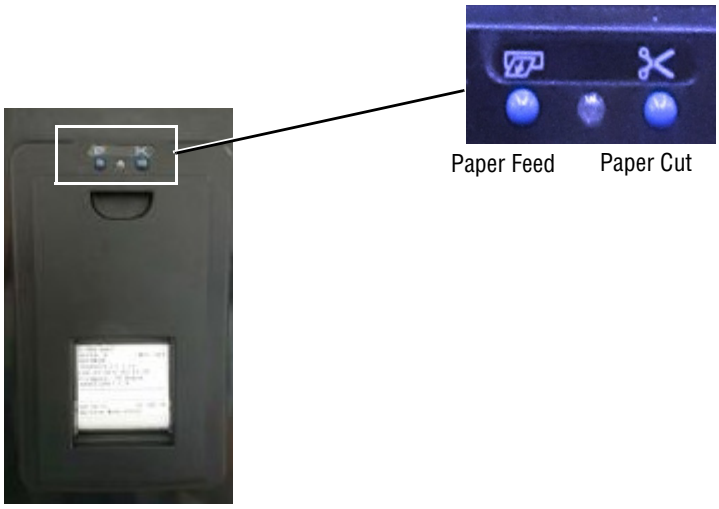


Figure 5-1. Thermal Printer

- **Paper Feed** – Located on the upper front of printer door, just left of center. Press to feed out paper from the roll stored inside the control. This control is accessible during all phases of operation, including alarm conditions. Press and hold for continuous feed.
- **Paper Cut**– Located on the upper front of printer door, just right of center. Press to cut paper to allow removal for record storage.
- **Duplicate Print** – Press Options button to access the duplicate print function. Press duplicate print button to obtain a duplicate printout of the previous cycle run.

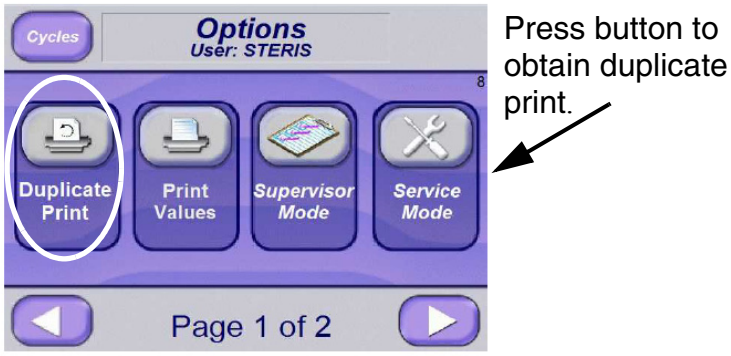
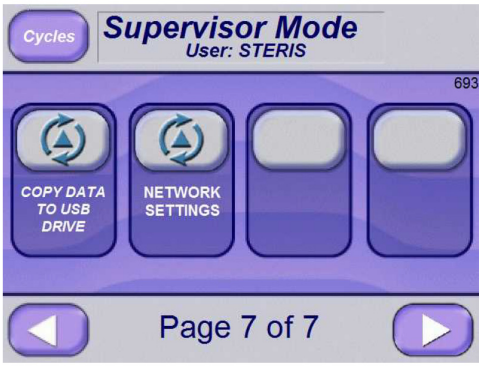


Figure 5-2. Accessing Duplicate Print

5.5 USB Storage

Cycle tapes, calibration data and generator flush history are stored in the display internal memory. The files can be copied to a USB storage device by pressing the COPY TO USB DRIVE button on the following screen.

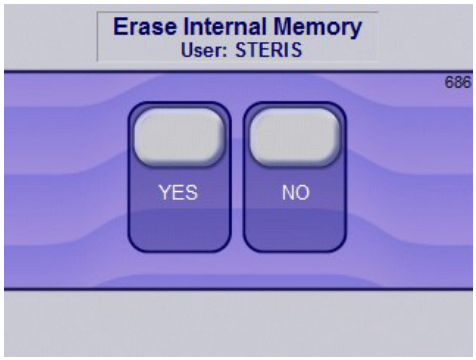


To copy files to USB device:

1. Insert a USB drive into the USB port.
2. Press the USB button (upper right corner of Options screen (#8) page 1 of 1.

   A message screen displays.

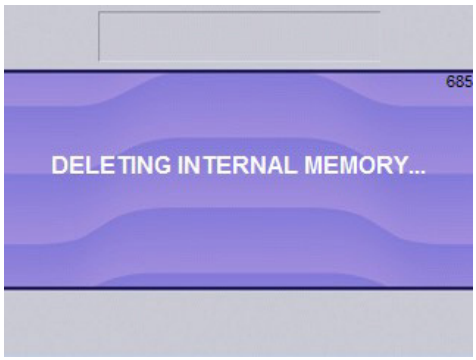
After the files are saved to the USB drive, the following Erase Internal Memory (#686) screen appears:



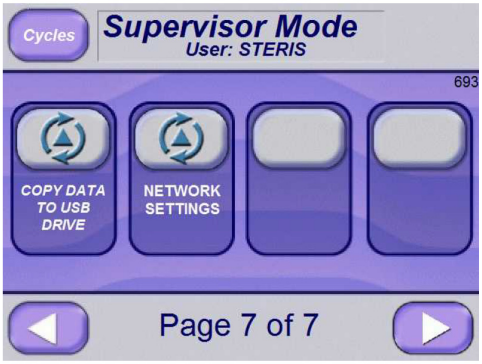
3. Press YES or NO, as applicable:

Press NO to avoid erasing files from internal memory.
Press YES to erase all files in internal memory.

If YES is selected, the following screen appears with the message, “DELETING INTERNAL MEMORY...”



After all files are erased from internal memory, the following screen is shown.



5.6 Display Cycle Graph Data

To read Display Cycle Graph Data from a PC, unzip the file "FTViewFileViewer_2002.zip" or later version to the PC and proceed as follows:

1. Put RSTXViewCmn.ocx file under:

   C:\Program Files (x86)\Common Files\Rockwell

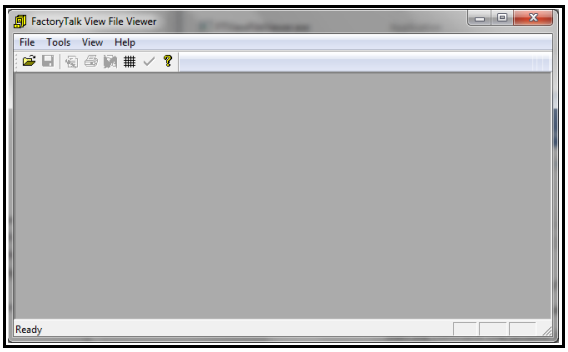
2. Start Command Line window (*Note: Run as Administrator*) and enter this command:

   Regsvr32 "C:\Program Files (x86)\Common Files\Rockwell\ RSTXViewCmn.ocx"

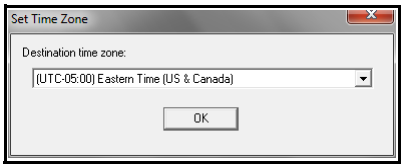
   A confirmation pop-up window should display.

3. Run FTViewFileViewer.exe.

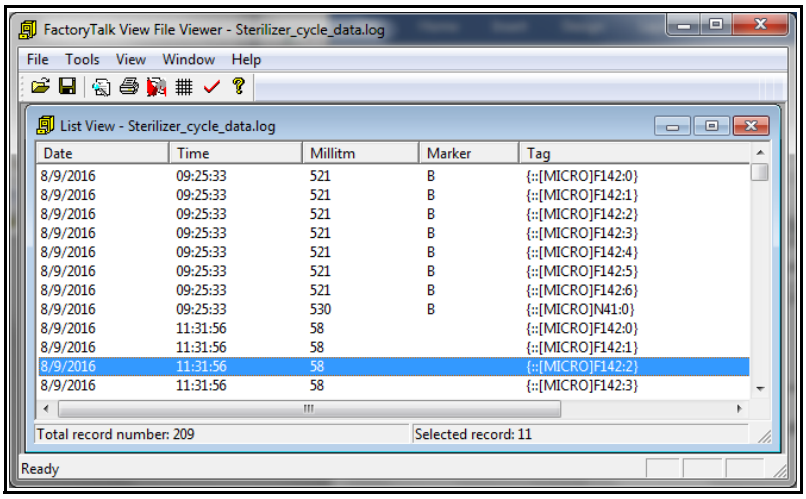
4. The following screen appears:



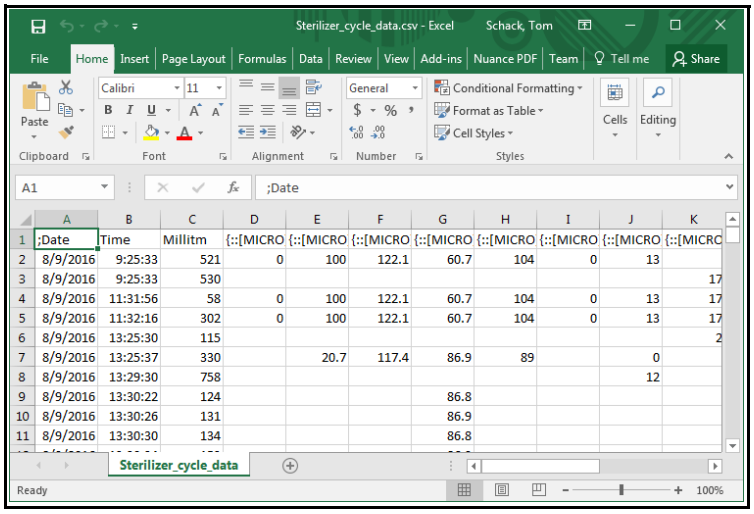
5. Press File and open Sterilizer_cycle_data.log file from the following directory path: Cycle data\Sterilizer_cycle_data.



6. Set Time Zone and press **OK**.
7. Display should show something similar to this screen:



8. Press File, Save As, and CSV Files (Table).
9. Open Sterilizer_cycle_data.csv file using Microsoft Excel and display should show something similar to this screen:



	A	B	C	D	E	F	G	H	I	J	K
1	;Date	Time	Millitm	{::[MICRO	{::[MICRO	{::[MICRO	{::[MICRO	{::[MICRO	{::[MICRO	{::[MICRO	{::[MICRC
2	8/9/2016	9:25:33	521	0	100	122.1	60.7	104	0	13	
3	8/9/2016	9:25:33	530								17
4	8/9/2016	11:31:56	58	0	100	122.1	60.7	104	0	13	17
5	8/9/2016	11:32:16	302	0	100	122.1	60.7	104	0	13	17
6	8/9/2016	13:25:30	115								2
7	8/9/2016	13:25:37	330		20.7	117.4	86.9	89		0	
8	8/9/2016	13:29:30	758							12	
9	8/9/2016	13:30:22	124				86.8				
10	8/9/2016	13:30:26	131				86.9				
11	8/9/2016	13:30:30	134				86.8				

10. Data can now be graphed or saved.

STERILIZER OPERATION

6

6.1 Before Operating Sterilizer

Carefully review *SECTION 1, SAFETY PRECAUTIONS*, and the Warnings and Cautions below before operating the sterilizer.

WARNING – BURN HAZARD:

- **Sterilizer, rack/shelves, and loading car will be hot after cycle is run. Always wear protective gloves and apron when removing a processed load. Protective gloves and apron must be worn when reloading sterilizer following the previous cycle.**
- **Steam may be released from the chamber when door is opened. Step back from the sterilizer each time the door is opened to minimize contact with steam vapor.**
- **When sterilizing liquids, to prevent personal injury or property damage resulting from bursting bottles and hot fluid, you must observe the following procedures:**

  >>Use LIQUID cycle only; no other cycle is safe for processing liquids.

  >>Use only vented closures; do not use screw caps or rubber stoppers with crimped seal.

  >>Use only Type 1 borosilicate glass bottles; do not use ordinary glass bottles or any container not designed for sterilization.

  >>Do not allow hot bottles to be jolted; this can cause hot-bottle explosions. Do not move bottles if any boiling or bubbling is present.

CAUTION – POSSIBLE EQUIPMENT DAMAGE:

- **Gasket must be fully retracted prior to operating sterilizer door.**
- **Ensure door opening is clear of any obstruction before closing the door(s).**
- **Do not attempt to open sterilizer door during manual operation unless chamber is at 0 psig (0 bar).**
- **Immediately wipe up saline solution spills on loading car, to prevent damage to stainless steel.**
- **Sterilization of chloride-containing solutions (e.g., saline) can cause chamber corrosion and is not recommended by the manufacturer. If, however, chloride-containing solutions must be processed, clean the chamber after each use.**
- **Failure to flush the integral steam generator (daily for carbon steel / every two weeks for stainless steel) voids the manufacturer's warranty and can lead to possible generator damage.**

The following steps must be performed prior to daily sterilizer usage.

1. Open chamber door and check drain strainer is clean and in place (see *FIGURE 6-1*).
2. Verify chamber interior is clean and close chamber door. Refer to *SECTION 8, ROUTINE MAINTENANCE*, if cleaning is necessary.
3. Open front cabinet panel on load end of sterilizer. Verify steam and water supply valves to sterilizer are ON (*FIGURE 6-2*). Close cabinet panel.
4. *For Manual Flush option only*, if sterilizer is equipped with an integral electric steam generator, flush and start up generator as outlined in *SECTION 4.7, GENERATOR FLUSH OPERATION*, in this manual.
5. Open printer access door and verify amount of printer paper is sufficient. A colored warning stripe is visible when paper roll is near end. Refer to *SECTION 8, ROUTINE MAINTENANCE*, if paper roll needs replaced.

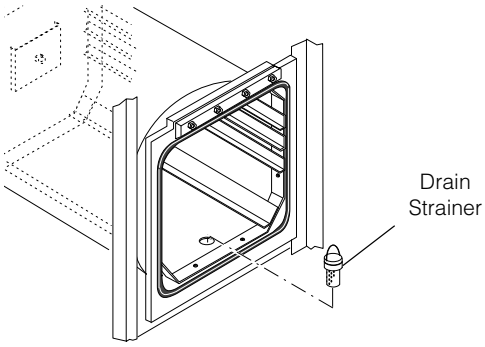


Figure 6-1. Check Chamber Drain Strainer

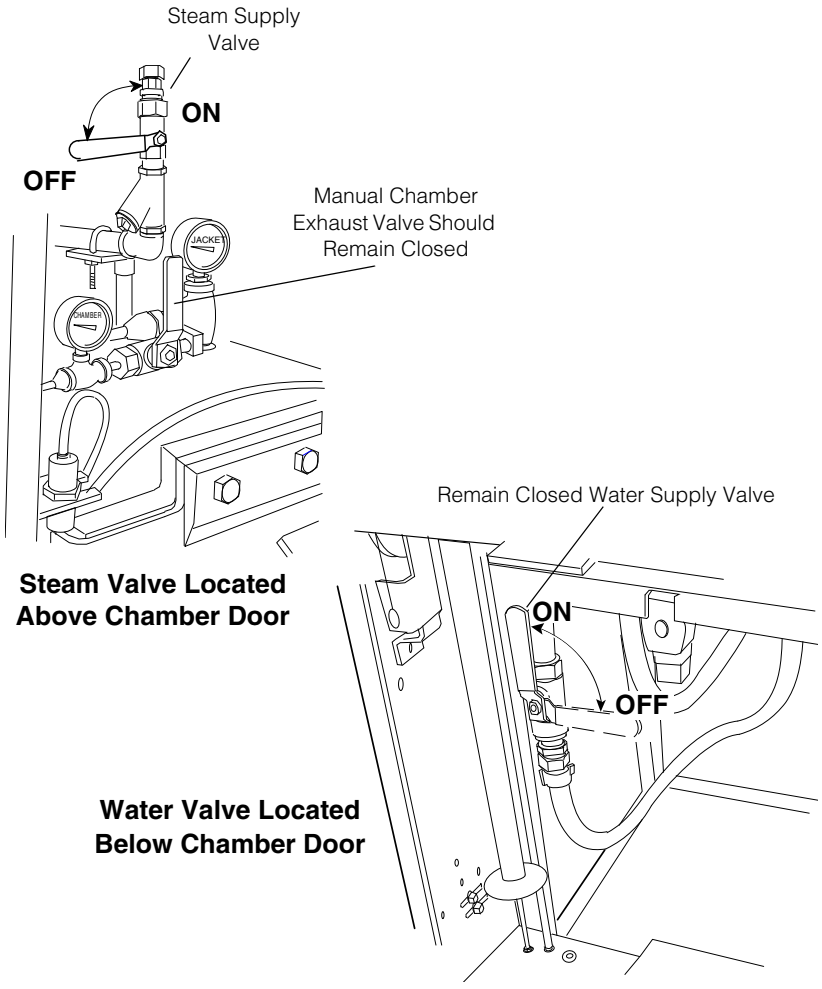


Figure 6-2. Steam and Water Supply Valves

6. Close printer access door. Printer records sterilizer type.
7. Enter Operator Mode (refer to Section 5.1, General description for Log In and Password Entry).

   NOTE: Once operating mode is entered, steam enters sterilizer jacket and heats jacket to 115°C (239°F). Also, the isothermal mode does not turn jacket on.
8. Load chamber as outlined in *SECTION 6.1.1, LOAD STERILIZER.*

6.1.1 Load Sterilizer

1. Open chamber door.
2. Slide shelf half way out of sterilizer chamber (*FIGURE 6-3*).
3. Place load on shelf and slide shelf back into chamber. Ensure shelves are completely inside chamber before closing door.
4. Close chamber door. Sterilizer is now ready to run a processing cycle. Refer to appropriate Cycle Operation Instructions included in this section, for instructions on running the cycle.

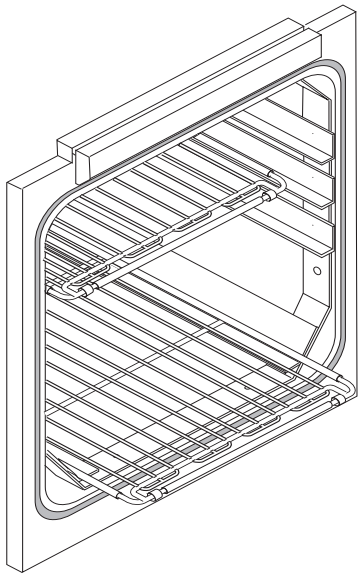


Figure 6-3. Slide Shelf Half Way Out of Chamber

6.1.2 Sterilizer Equipped with Loading Car

1. Open chamber door.
2. Verify loading car is securely fastened to transfer carriage.
3. Move transfer carriage forward until carriage latches with chamber end frame (see *FIGURE 6-4*).

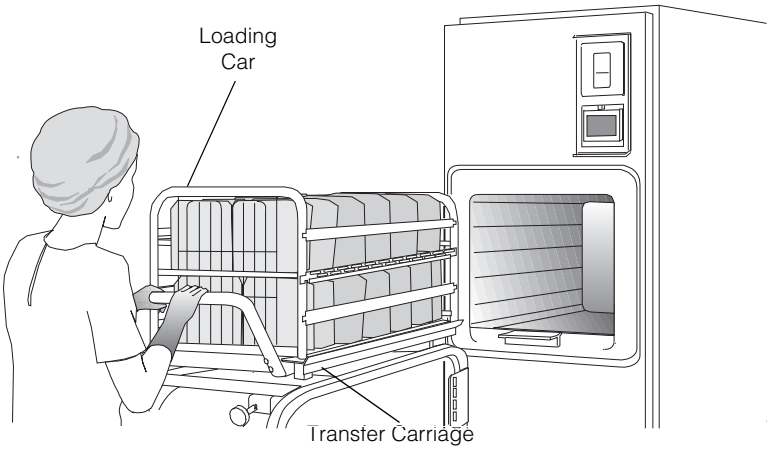


Figure 6-4. Positioning Loaded Transfer Carriage (Typical)

4. Ensure transfer carriage is latched to chamber end frame by pulling carriage backward. If properly latched, carriage should remain stationary.
5. Once carriage is latched in place, release loading car from transfer carriage by lifting up carriage lock.
6. Carefully push loading car into sterilizer chamber. Ensure loading car is positioned in back detent inside chamber.
7. Pull carriage latch knob to disengage transfer carriage from chamber end frame. Move transfer carriage away from chamber.
8. Close chamber door. Sterilizer is now ready to run a processing cycle. Refer to appropriate Cycle Operation Instructions included in this section, for instructions on running the cycle.

6.2 Gravity Cycle

Carefully review *SECTION 1, SAFETY PRECAUTIONS*, and the Warnings and Cautions below before operating the sterilizer.

WARNING – BURN HAZARD:

- **Do not attempt to open the sterilizer door if a WATER IN CHAMBER ALARM condition exists. Call a qualified service technician before attempting to use sterilizer further.**
- **Sterilizer, rack/shelves, and loading car will be hot after cycle is run. Always wear protective gloves and apron when removing a processed load. Protective gloves and apron must be worn when reloading sterilizer following the previous cycle.**
- **Steam may be released from the chamber when door is opened. Step back from the sterilizer each time the door is opened to minimize contact with steam vapor.**
- **After exhaust, steam may remain inside the chamber. Always wear protective gloves, apron, and a face shield when following emergency procedure to unload sterilizer. Stay as far back from the chamber opening as possible when opening the door.**
- **When sterilizing liquids, to prevent personal injury or property damage resulting from bursting bottles and hot fluid, you must observe the following procedures:**

  >>Use LIQUID cycle only; no other cycle is safe for processing liquids.

  >>Use only vented closures; do not use screw caps or rubber stoppers with crimped seal.

  >>Use only Type 1 borosilicate glass bottles; do not use ordinary glass bottles or any container not designed for sterilization.

  >>Do not allow hot bottles to be jolted; this can cause hot-bottle explosions. Do not move bottles if any boiling or bubbling is present.

WARNING – EXPLOSION HAZARD: This sterilizer is not designed to process flammable compounds.

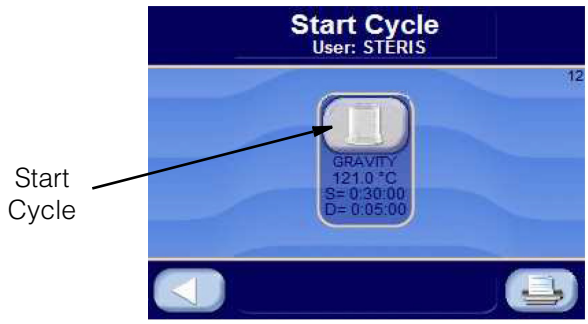
WARNING – PERSONAL INJURY HAZARD: When closing the chamber door, keep hands and arms out of the door opening and make sure opening is clear of obstructions.

CAUTION – POSSIBLE EQUIPMENT DAMAGE:

- **Gasket must be fully retracted prior to operating sterilizer door.**
- **Ensure door opening is clear of any obstruction before closing the door(s).**
- **Do not attempt to open sterilizer door during manual operation unless chamber is at 0 psig (0 bar).**
- **Immediately wipe up saline solution spills on loading car, to prevent damage to stainless steel.**
- **Sterilization of chloride-containing solutions (e.g., saline) can cause chamber corrosion and is not recommended by the manufacturer. If, however, chloride-containing solutions must be processed, clean the chamber after each use.**
- **Failure to flush the integral steam generator (daily for carbon steel / every two weeks for stainless steel) voids the manufacturer's warranty and can lead to possible generator damage.**

NOTE: This cycle is for sterilizing hard goods (e.g., empty glasses, non-porous loads).

Run a GRAVITY CYCLE by pressing **GRAVITY** button from one of the Operating Mode Screens (refer to *SECTION 5.2, OPERATING MODES*).



Press **LEFT ARROW** button to cancel selected cycle and return user to Operating Mode screen.

Press **START CYCLE**.

*NOTE: If **CLOSE DOOR(S)** button is shown, close door(s).*

Refer to *SECTION 5.3, STATUS BUTTONS*, for description of buttons.

JACKET CHARGE PHASE: Jacket charge phase continues until jacket temperature is greater than set sterilizer temperature (example 121°C [250°F]). If separate steam selected, jacket charge phase continues until jacket temperature is greater than set jacket temperature (example 115°C [239°F]).

ACTIVATE SEAL PHASE: Door gasket seals with steam until door seal switch is closed. An additional 20 seconds elapses, after seal switch is closed, before phase is complete.

PURGE PHASE: Steam enters chamber from jacket to control pressure at 6 psig (0.41 bar). Fast exhaust aids in removing air from chamber.

CHARGE PHASE: Chamber charges with steam until chamber temperature reaches sterilize temperature setpoint. If load option is selected, phase holds until load temperature is greater than or equal to sterilize temperature. Waste temperature is controlled to maintain approximately 60°C (140°F).

STERILIZE PHASE: Chamber temperature controls at sterilize temperature, plus overdrive (control temperature). Waste temperature is controlled to maintain approximately 60°C (140°F).

FAST EXHAUST PHASE: Steam fast exhausts from chamber to 4.0 psig (0.28 bar).

VACUUM DRY PHASE: A vacuum is pulled in the chamber to 10.0 inHg (-0.34 bar; VACUUM DRY setpoint).

DRY PHASE: During dry phase, vacuum continues to be pulled to system limit for dry time. If Dry Pressure Control is set to Vacuum Dry, vacuum controls at vacuum dry setpoint of10.0 inHg (-0.34 bar).

AIR BREAK PHASE: Chamber vacuum air breaks to 2.0 inHg (-0.07 bar) and is followed by a 10 second delay.

DEACTIVATE SEAL PHASE: Door unseals until seal pressure switch opens, and 20 seconds has elapsed.

COMPLETE PHASE: Cycle is complete. Open door and unload chamber. Once door is open, display returns to main operating mode screen.

Example of Gravity Cycle tape.

```
============================
========== GRAVITY1 ==========
============================
CYCLE START AT XX:XX:XXX
            ON  XX/XX/XX

CYCLE COUNT              0
LOGIN NAME:         TOM

CYCLE NO.         2

   STER TEMP = 121.0 C
CONTROL TEMP = 122.5 C
   STER TIME = 0:30:00
    DRY TIME = 0:01:00

                         V=inHg
- TIME           T=C     P=psig
------------------------------
C 11:48:24A      66.7      0.3V
C 11:49:24A     112.7     10.0P
S 11:49:43A     121.2     16.6P
S 11:51:43A     122.6     17.7P
S 11:53:43A     123.3     17.8P
S 11:55:43A     123.6     16.8P
S 11:57:43A     122.6     17.0P
S 11:59:43A     122.6     17.2P
S 12:01:43P     122.5     17.0P
S 12:03:43P     122.4     17.2P
S 12:05:43P     122.5     16.8P
S 12:07:43P     122.4     16.9P
S 12:11:43P     122.4     17.0P
S 12:13:43P     122.5     17.1P
S 12:15:43P     122.6     17.0P
S 12:17:43P     122.7     17.0P
S 12:19:43P     122.6     16.8P
E 12:19:44P     122.6     16.9P
E 12:19:54P     113.7      3.2P
E 12:20:03P      99.9     11.1V
E 12:21:03P      40.5     28.1V
Z 12:21:46P      68.4      0.5V

LOAD                    020903

CHAMBER TEMP MAX=124.8 C
CHAMBER TEMP MIN=121.2 C

CONDITION     =  1:19
STERILIZE     = 30:01
EXHAUST       =  1:42
TOTAL CYCLE   = 33:02

============================
====== READY TO UNLOAD =======
============================
```

6.3 Prevac Cycle

Carefully review *SECTION 1, SAFETY PRECAUTIONS*, and the Warnings and Cautions below before operating the sterilizer.

WARNING – BURN HAZARD:

- **Do not attempt to open the sterilizer door if a WATER IN CHAMBER ALARM condition exists. Call a qualified service technician before attempting to use sterilizer further.**
- **Sterilizer, rack/shelves, and loading car will be hot after cycle is run. Always wear protective gloves and apron when removing a processed load. Protective gloves and apron must be worn when reloading sterilizer following the previous cycle.**
- **Steam may be released from the chamber when door is opened. Step back from the sterilizer each time the door is opened to minimize contact with steam vapor.**
- **After exhaust, steam may remain inside the chamber. Always wear protective gloves, apron, and a face shield when following emergency procedure to unload sterilizer. Stay as far back from the chamber opening as possible when opening the door.**
- **When sterilizing liquids, to prevent personal injury or property damage resulting from bursting bottles and hot fluid, you must observe the following procedures:**

  >>Use LIQUID cycle only; no other cycle is safe for processing liquids.

  >>Use only vented closures; do not use screw caps or rubber stoppers with crimped seal.

  >>Use only Type 1 borosilicate glass bottles; do not use ordinary glass bottles or any container not designed for sterilization.

  >>Do not allow hot bottles to be jolted; this can cause hot-bottle explosions. Do not move bottles if any boiling or bubbling is present.

WARNING – EXPLOSION HAZARD: This sterilizer is not designed to process flammable compounds.

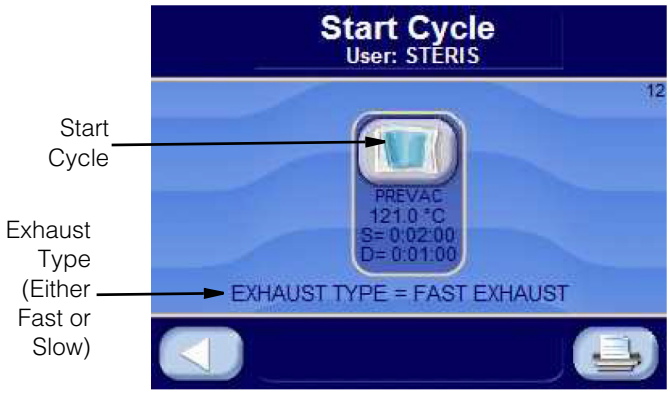
WARNING – PERSONAL INJURY HAZARD: When closing the chamber door, keep hands and arms out of the door opening and make sure opening is clear of obstructions.

CAUTION – POSSIBLE EQUIPMENT DAMAGE:

- **Gasket must be fully retracted prior to operating sterilizer door.**
- **Ensure door opening is clear of any obstruction before closing the door(s).**
- **Do not attempt to open sterilizer door during manual operation unless chamber is at 0 psig (0 bar).**
- **Immediately wipe up saline solution spills on loading car, to prevent damage to stainless steel.**
- **Sterilization of chloride-containing solutions (e.g., saline) can cause chamber corrosion and is not recommended by the manufacturer. If, however, chloride-containing solutions must be processed, clean the chamber after each use.**
- **Failure to flush the integral steam generator (daily for carbon steel / every two weeks for stainless steel) voids the manufacturer's warranty and can lead to possible generator damage.**

NOTE: The Prevac Cycle is for sterilizing wrapped goods (e.g., instrument trays, textile packs and instrument containers) and for sterilizing liquids in heat-resistant containers with vented closure with slow exhaust option.

Run a PREVAC CYCLE by pressing **PREVAC** button from one of the operating mode screens (refer to *SECTION 5.2, OPERATING MODES*). The following screen appears (values are examples only):



Press **LEFT ARROW** button to cancel selected cycle and return user to Operating Mode Screen.

Press **START CYCLE** to start Prevac Cycle.

NOTE: If CLOSE DOOR(S) button is shown, close door(s).

Refer to *SECTION 5.3, STATUS BUTTONS*, for description of buttons.

JACKET CHARGE PHASE: Jacket charge phase continues until jacket temperature is greater than set sterilizer temperature (example 121.0°C (250.0°F). If separate steam selected, jacket charge phase continues until jacket temperature is greater than set jacket temperature, for example: 115°C (239°F).

ACTIVATE SEAL PHASE: Door gasket seals with steam until door seal switch is closed. An additional 20 seconds elapses, after seal switch is closed, before the phase is complete.

PURGE PHASE: Steam enters chamber from jacket to control pressure at 6 psig (0.41 bar). Fast exhaust aids in removing air from chamber.

PULSE EXHAUST PHASE: Chamber exhausts to 4.0 psig (0.28 bar). Waste temperature is controlled to maintain approximately 60°C (140°F). Jacket temperature is controlled to maintain approximately 122.5°C (253.0°F) in jacket.

PULSE EVACUATE PHASE: Chamber evacuates to PULSE VACUUM setpoint (default 10.0 inHg [-0.34 bar]). Waste temperature is controlled to maintain approximately 60°C (140°F). Jacket temperature is controlled to maintain approximately 122.5°C (253.0°F) in jacket.

PULSE CHARGE PHASE: Chamber charges with steam to PULSE CHARGE setpoint (default 26.0 psig [0.34 bar]). PULSE EXHAUST, PULSE EVACUATE and PULSE CHARGE repeats for number of pulses selected.

CHARGE PHASE: Chamber charges with steam until chamber temperature reaches sterilize temperature setpoint. If load option is selected, phase holds until load temperature is greater than or equal to sterilize temperature. Waste temperature is controlled to maintain approximately 60°C (140°F).

STERILIZE PHASE: Chamber temperature controls at sterilize temperature, plus overdrive (control temperature). Waste temperature is controlled to maintain approximately 60°C (140°F).

NOTE: At this point, either the Fast Exhaust Phase or Slow Exhaust Phase selection applies. The phase sequences for both follow.

==========

FAST EXHAUST PHASE (ALTETRNATIVE TO SLOW EXHAUST PHASE)

FAST EXHAUST PHASE: Steam fast exhausts from chamber to 4.0 psig (0.28 bar).

VACUUM DRY PHASE: A vacuum is pulled in the chamber to 10.0 inHg (-0.34 bar; VACUUM DRY setpoint).

DRY PHASE: During dry phase, vacuum continues to be pulled to the limit of the system for dry time. If Dry Pressure Control is set to Vacuum Dry, vacuum controls at the vacuum dry setpoint of 10.0 inHg (0.34 bar).

AIR BREAK PHASE: Chamber vacuum air breaks to 2.0 inHg (-0.07 bar) and waits an additional 10 seconds.

DEACTIVATE SEAL PHASE: Door unseals until seal pressure switch opens, and 20 seconds has elapsed.

COMPLETE PHASE: Cycle is complete. Open door and unload chamber. Once door is open, display returns to Main Operating Mode Screen.

==========

SLOW EXHAUST PHASE (ALTETRNATIVE TO FAST EXHAUST PHASE)

SLOW EXHAUST PHASE: The slow exhaust rates and transition points are adjustable to optimize time and to reduce boil over. Steam slowly exhausts from chamber to 5.0 inHg (0.17 bar). Pressure rate controls at 1.6 psi/minute (0.11 bar) to 4.2 psig (0.29 bar) and at 0.6 psi/minute (0.04 bar) to
5.0 inHg (0.17 bar).

VAPOR REMOVAL PHASE: Vapors in chamber vents for 10 minutes. Note that vent time is adjustable to optimize cycle time and vapor removal.

PHASE: Door unseals until seal pressure switch opens and 20 seconds has elapsed.

COMPLETE PHASE: Cycle is complete. Open door and unload chamber.

==========

Example of Prevac Cycle Tape with Fast Exhaust Selected.

```
==============================
========== PREVAC1 ===========
==============================
CYCLE START AT XX:XX:XXX
            ON XX/XX/XX

CYCLE COUNT              0
LOGIN NAME:         TOM

CYCLE NO.         2

   STER TEMP = 121.0 C
CONTROL TEMP = 122.5 C
   STER TIME = 0:15:00
    DRY TIME = 0:05:00

                         V=inHg
- TIME           T=C     P=psig
------------------------------
C 11:48:24A      66.7      0.3V
C 11:50:24A     112.7      6.0P
C 11:51:22A     100.0     10.0V
C 11:51:50A      90.0     15.0P
C 11:52:15A     112.7      4.0P
C 11:52:55A     100.0     10.0V
C 11:53:17A      90.0     15.0P
C 11:53:45A     112.7      4.0P
C 11:54:08A     100.0     10.0V
C 11:54:47A      90.0     15.0P
C 11:55:00A     112.7      4.0P
C 11:55:43A     100.0     10.0V
S 11:57:43A     121.2     16.6P
S 11:59:43A     122.6     17.7P
S 12:01:43A     123.3     17.8P
S 12:03:43A     123.6     16.8P
S 12:05:43A     122.6     17.0P
S 12:07:43A     122.6     17.2P
S 12:09:43P     122.5     17.0P
S 12:11:43P     122.5     17.0P
E 12:12:44P     122.6     16.9P
E 12:13:14P     113.7      3.2P
E 12:15:03P      99.9     11.1V
E 12:20:03P      40.5     28.1V
Z 12:21:46P      68.4      0.5V

LOAD                     020903

CHAMBER TEMP MAX=124.8 C
CHAMBER TEMP MIN=121.2 C

CONDITON      =  9:20
STERILIZE     = 15:00
EXHAUST       =  9:03
TOTAL CYCLE   = 23:23

==============================
======  READY TO UNLOAD ======
==============================
```

6.4 Liquid Cycle

Carefully review *SECTION 1, SAFETY PRECAUTIONS*, and the Warnings and Cautions below before operating the sterilizer.

WARNING – BURN HAZARD:

- **Do not attempt to open the sterilizer door if a WATER IN CHAMBER ALARM condition exists. Call a qualified service technician before attempting to use sterilizer further.**
- **Sterilizer, rack/shelves, and loading car will be hot after cycle is run. Always wear protective gloves and apron when removing a processed load. Protective gloves and apron must be worn when reloading sterilizer following the previous cycle.**
- **Steam may be released from the chamber when door is opened. Step back from the sterilizer each time the door is opened to minimize contact with steam vapor.**
- **After exhaust, steam may remain inside the chamber. Always wear protective gloves, apron, and a face shield when following emergency procedure to unload sterilizer. Stay as far back from the chamber opening as possible when opening the door.**
- **When sterilizing liquids, to prevent personal injury or property damage resulting from bursting bottles and hot fluid, you must observe the following procedures:**

  >>Use LIQUID cycle only; no other cycle is safe for processing liquids.

  >>Use only vented closures; do not use screw caps or rubber stoppers with crimped seal.

  >>Use only Type 1 borosilicate glass bottles; do not use ordinary glass bottles or any container not designed for sterilization.

  >>Do not allow hot bottles to be jolted; this can cause hot-bottle explosions. Do not move bottles if any boiling or bubbling is present.

WARNING – EXPLOSION HAZARD: This sterilizer is not designed to process flammable compounds.

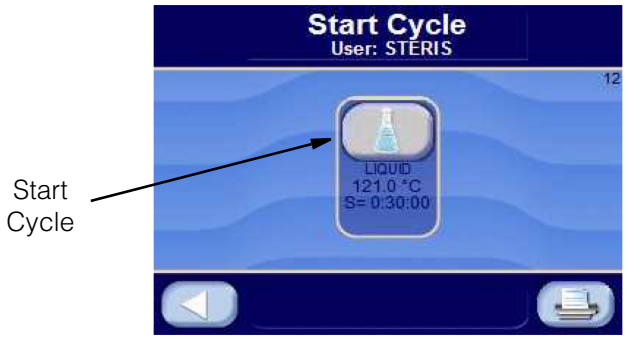
WARNING – PERSONAL INJURY HAZARD: When closing the chamber door, keep hands and arms out of the door opening and make sure opening is clear of obstructions.

CAUTION – POSSIBLE EQUIPMENT DAMAGE:

- **Gasket must be fully retracted prior to operating sterilizer door.**
- **Ensure door opening is clear of any obstruction before closing the door(s).**
- **Do not attempt to open sterilizer door during manual operation unless chamber is at 0 psig (0 bar).**
- **Immediately wipe up saline solution spills on loading car, to prevent damage to stainless steel.**
- **Sterilization of chloride-containing solutions (e.g., saline) can cause chamber corrosion and is not recommended by the manufacturer. If, however, chloride-containing solutions must be processed, clean the chamber after each use.**
- **Failure to flush the integral steam generator (daily for carbon steel / every two weeks for stainless steel) voids the manufacturer's warranty and can lead to possible generator damage.**

NOTE: The Liquid Cycle is used for sterilizing liquids in heat-resistant containers with vented closures.

Run a LIQUID CYCLE by pressing **LIQUID** button from one of the operating mode screens (refer to *SECTION 5.2, OPERATING MODES*). The following screen appears (values are examples only):



Press **LEFT ARROW** button to cancel selected cycle and return user to Operating Mode Screen.

Press **START CYCLE** to start the liquid cycle.

NOTE: If CLOSE DOOR(S) button is shown, close door(s).

Refer to *SECTION 5.3, STATUS BUTTONS*, for description of buttons.

JACKET CHARGE PHASE: Jacket charge phase continues until jacket temperature is greater than set sterilizer temperature (example 121°C [250°F]). If separate steam selected, jacket charge phase continues until jacket temperature is greater than set jacket temperature, for example: 115.0°C (239°F).

ACTIVATE SEAL PHASE: Door gasket seals with steam until door seal switch is closed. An additional 20 seconds elapses, after seal switch is closed, before phase is complete.

PURGE PHASE: Steam enters chamber from jacket to control pressure at 6 psig (0.41 bar). Fast exhaust aids in removing air from chamber.

CHARGE PHASE: Chamber charges with steam until chamber temperature reaches sterilize temperature setpoint. If load option is selected, phase holds until load temperature is greater than or equal to sterilize temperature. Waste temperature is controlled to maintain approximately 60°C (140°F).

STERILIZE PHASE: Chamber temperature controls at sterilize temperature, plus overdrive (control temperature). Waste temperature is controlled to maintain approximately 60°C (140°F).

SLOW EXHAUST PHASE: Steam slowly exhausts from chamber to 5.0 inHg (0.17 bar). Pressure rate controls at 1.6 psi/minute (0.11 bar) to 4.2 psig (0.29 bar) and at 0.6 psi/minute (0.04 bar) to 5.0 inHg (0.17 bar). The slow exhaust rates and transition points are adjustable to optimize time and to reduce boil over.

VAPOR REMOVAL PHASE: Vapors in chamber vent for 10 minutes. Note the vent time is adjustable to optimize cycle time and vapor removal.

DEACTIVATE SEAL PHASE: Door unseals until seal pressure switch opens and 20 seconds has elapsed.

COMPLETE PHASE: Cycle is complete. Open door and unload chamber. Once door is open, display returns to Main Operating Mode Screen.

Example of Liquid Cycle tape.

```
==============================
========== LIQUID3 ===========
==============================
CYCLE START AT XX:XX:XXX
           ON  XX/XX/XX


CYCLE COUNT             0
LOGIN NAME:        TOM


CYCLE NO.        2


   STER TEMP = 121.0 C
CONTROL TEMP = 122.5 C
   STER TIME = 0:45:00

                        V=inHg
- TIME          T=C    P=psig
------------------------------
C 11:48:24A     66.7     0.3V
C 11:49:24A    112.7    10.0P
S 11:49:43A    121.2    16.6P
S 11:51:43A    122.6    17.7P
S 11:53:43A    123.3    17.8P
S 11:55:43A    123.6    16.8P
S 11:57:43A    122.6    17.0P
S 11:59:43A    122.6    17.2P
S 12:01:43P    122.5    17.0P
S 12:03:43P    122.4    17.2P
S 12:05:43P    122.5    16.8P
S 12:07:43P    122.4    16.9P
S 12:11:43P    122.4    17.0P
S 12:13:43P    122.5    17.1P
S 12:15:43P    122.6    17.0P
S 12:17:43P    122.7    17.0P
S 12:19:43P    122.6    16.8P
E 12:19:44P    122.6    16.9P
Z 12:39:03P     89.9     5.1V


LOAD                   080804


CHAMBER TEMP MAX=124.8 C
CHAMBER TEMP MIN=121.2 C


CONDITON      =  1:19
STERILIZE     = 30:01
EXHAUST       = 21:42
TOTAL CYCLE   = 42:01


==============================
======= READY TO UNLOAD ======
==============================
```

6.5 Isothermal Cycle (Optional)

Carefully review *SECTION 1, SAFETY PRECAUTIONS*, and the Warnings and Cautions below before operating the sterilizer.

WARNING – BURN HAZARD:

- **Do not attempt to open the sterilizer door if a WATER IN CHAMBER ALARM condition exists. Call a qualified service technician before attempting to use sterilizer further.**
- **Sterilizer, rack/shelves, and loading car will be hot after cycle is run. Always wear protective gloves and apron when removing a processed load. Protective gloves and apron must be worn when reloading sterilizer following the previous cycle.**
- **Steam may be released from the chamber when door is opened. Step back from the sterilizer each time the door is opened to minimize contact with steam vapor.**
- **After exhaust, steam may remain inside the chamber. Always wear protective gloves, apron, and a face shield when following emergency procedure to unload sterilizer. Stay as far back from the chamber opening as possible when opening the door.**
- **When sterilizing liquids, to prevent personal injury or property damage resulting from bursting bottles and hot fluid, you must observe the following procedures:**

  >>Use LIQUID cycle only; no other cycle is safe for processing liquids.

  >>Use only vented closures; do not use screw caps or rubber stoppers with crimped seal.

  >>Use only Type 1 borosilicate glass bottles; do not use ordinary glass bottles or any container not designed for sterilization.

  >>Do not allow hot bottles to be jolted; this can cause hot-bottle explosions. Do not move bottles if any boiling or bubbling is present.

WARNING – EXPLOSION HAZARD: This sterilizer is not designed to process flammable compounds.

WARNING – PERSONAL INJURY HAZARD: When closing the chamber door, keep hands and arms out of the door opening and make sure opening is clear of obstructions.

CAUTION – POSSIBLE EQUIPMENT DAMAGE:

- **Gasket must be fully retracted prior to operating sterilizer door.**
- **Ensure door opening is clear of any obstruction before closing the door(s).**
- **Do not attempt to open sterilizer door during manual operation unless chamber is at 0 psig (0 bar).**
- **Immediately wipe up saline solution spills on loading car, to prevent damage to stainless steel.**
- **Sterilization of chloride-containing solutions (e.g., saline) can cause chamber corrosion and is not recommended by the manufacturer. If, however, chloride-containing solutions must be processed, clean the chamber after each use.**
- **Failure to flush the integral steam generator (daily for carbon steel / every two weeks for stainless steel) voids the manufacturer's warranty and can lead to possible generator damage.**

NOTE: For the Isothermal Cycle, the following apply:

1) The Isothermal Cycle is designed for low temperature processing (e.g., fractional sterilization, pasteurization) at 78 to 110°C (172 to 230°F).

2) The jacket is off during the Iso Mode.

3) Because the jacket is drained into the chamber, the sterilizer door(s) must be closed before the Iso Mode button appears (following figure, lower right), allowing unit to switch to Iso Mode.

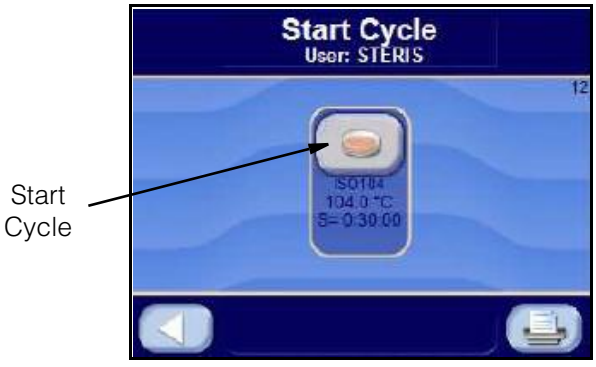
4) If the jacket is less than 100°C (250°F), the jacket drain phase is bypassed and Screen 4 is shown.

Run ISOTHERMAL CYCLE by pressing **ISO MODE** button on Cycles screen.

Press wanted **ISOTHERMAL** button (values are for example only).

*NOTE: Press **LEFT ARROW** button to cancel selected cycle and return to Operating Mode Screen.*

Press **START CYCLE** button to start the Isothermal Cycle.



*NOTE: If **CLOSE DOOR(S)** button is shown, close door(s).*

ACTIVATE SEAL PHASE: Door gasket seals with steam until door seal switch is closed. An additional 20 seconds elapses, after seal switch is closed, before phase is complete.

CHARGE PHASE: Chamber charges with steam until chamber temperature reaches sterilize temperature. Waste temperature is controlled to maintain approximately 60°C (140°F).

STERILIZE PHASE: Chamber temperature controls at sterilize temperature plus overdrive. Waste temperature is controlled to maintain approximately 60°C (140°F).

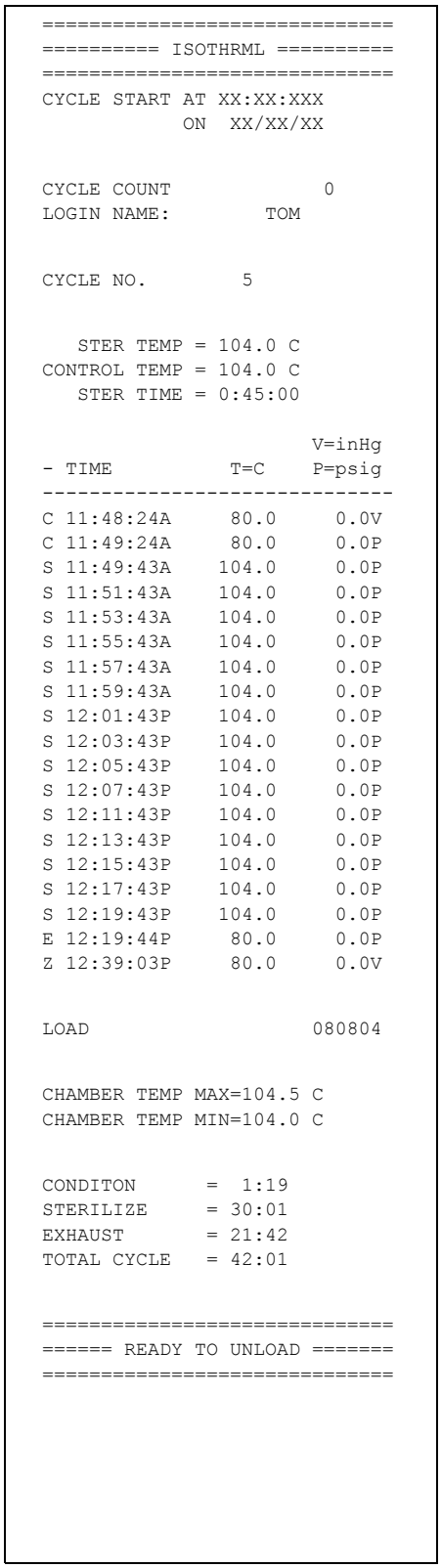
SLOW EXHAUST PHASE: Steam slowly exhausts from chamber to 5.0 inHg (0.17 bar). Pressure rate controls at 1.6 psi/minute (0.11 bar) to 4.2 psig (0.29 bar) and at 0.6 psi/minute (0.04 bar) to 5.0 inHg (0.17 bar). Note that the slow exhaust rates and transition points are adjustable to optimize time and to reduce boil over.

VAPOR REMOVAL PHASE: Vapors in chamber vents for 10 minutes. Note that the vent time is adjustable to optimize cycle time and vapor removal.

DEACTIVATE SEAL PHASE: Door unseals until seal pressure switch opens and 20 seconds has elapsed.

COMPLETE PHASE: Cycle is complete. Open door and unload chamber. Once door is open, display returns to main operating mode screen.

Example of cycle tape.



```
==============================
========== ISOTHRML ==========
==============================
CYCLE START AT XX:XX:XXX
           ON  XX/XX/XX


CYCLE COUNT             0
LOGIN NAME:        TOM


CYCLE NO.        5


   STER TEMP = 104.0 C
CONTROL TEMP = 104.0 C
   STER TIME = 0:45:00

                       V=inHg
- TIME          T=C    P=psig
------------------------------
C 11:48:24A     80.0     0.0V
C 11:49:24A     80.0     0.0P
S 11:49:43A    104.0     0.0P
S 11:51:43A    104.0     0.0P
S 11:53:43A    104.0     0.0P
S 11:55:43A    104.0     0.0P
S 11:57:43A    104.0     0.0P
S 11:59:43A    104.0     0.0P
S 12:01:43P    104.0     0.0P
S 12:03:43P    104.0     0.0P
S 12:05:43P    104.0     0.0P
S 12:07:43P    104.0     0.0P
S 12:11:43P    104.0     0.0P
S 12:13:43P    104.0     0.0P
S 12:15:43P    104.0     0.0P
S 12:17:43P    104.0     0.0P
S 12:19:43P    104.0     0.0P
E 12:19:44P     80.0     0.0P
Z 12:39:03P     80.0     0.0V


LOAD                   080804


CHAMBER TEMP MAX=104.5 C
CHAMBER TEMP MIN=104.0 C


CONDITON      =  1:19
STERILIZE     = 30:01
EXHAUST       = 21:42
TOTAL CYCLE   = 42:01


==============================
====== READY TO UNLOAD =======
==============================
```

6.6 Warmup Cycle

Carefully review *SECTION 1, SAFETY PRECAUTIONS*, and the Warnings and Cautions below before operating the sterilizer.

WARNING – BURN HAZARD:

- **Do not attempt to open the sterilizer door if a WATER IN CHAMBER ALARM condition exists. Call a qualified service technician before attempting to use sterilizer further.**
- **Sterilizer, rack/shelves, and loading car will be hot after cycle is run. Always wear protective gloves and apron when removing a processed load. Protective gloves and apron must be worn when reloading sterilizer following the previous cycle.**
- **Steam may be released from the chamber when door is opened. Step back from the sterilizer each time the door is opened to minimize contact with steam vapor.**
- **After exhaust, steam may remain inside the chamber. Always wear protective gloves, apron, and a face shield when following emergency procedure to unload sterilizer. Stay as far back from the chamber opening as possible when opening the door.**
- **When sterilizing liquids, to prevent personal injury or property damage resulting from bursting bottles and hot fluid, you must observe the following procedures:**

  >>Use LIQUID cycle only; no other cycle is safe for processing liquids.

  >>Use only vented closures; do not use screw caps or rubber stoppers with crimped seal.

  >>Use only Type 1 borosilicate glass bottles; do not use ordinary glass bottles or any container not designed for sterilization.

  >>Do not allow hot bottles to be jolted; this can cause hot-bottle explosions. Do not move bottles if any boiling or bubbling is present.

WARNING – EXPLOSION HAZARD: This sterilizer is not designed to process flammable compounds.

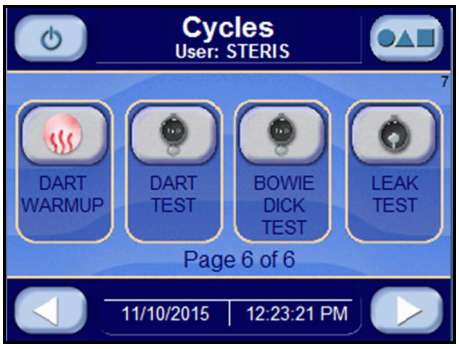
WARNING – PERSONAL INJURY HAZARD: When closing the chamber door, keep hands and arms out of the door opening and make sure opening is clear of obstructions.

CAUTION – POSSIBLE EQUIPMENT DAMAGE:

- **Gasket must be fully retracted prior to operating sterilizer door.**
- **Ensure door opening is clear of any obstruction before closing the door(s).**
- **Do not attempt to open sterilizer door during manual operation unless chamber is at 0 psig (0 bar).**
- **Immediately wipe up saline solution spills on loading car, to prevent damage to stainless steel.**
- **Sterilization of chloride-containing solutions (e.g., saline) can cause chamber corrosion and is not recommended by the manufacturer. If, however, chloride-containing solutions must be processed, clean the chamber after each use.**
- **Failure to flush the integral steam generator (daily for carbon steel / every two weeks for stainless steel) voids the manufacturer's warranty and can lead to possible generator damage.**

The Warmup Cycle is used to warm sterilizer shelves, door and jacket before a Daily Air Removal Test (DART)[1] or Bowie-Dick cycle is run.

Press **RIGHT ARROW** button on the second of three Operating Mode screens to display Cycles Page 6 of 6 (*Screen 7*). Run a DART WARMUP CYCLE by pressing **DART WARMUP**.



Press **DART WARMUP** button again and Cycle proceeds as follows:

JACKET CHARGE PHASE: Continues until jacket temperature is greater than 132°C (270°F); or 121°C (250°F) for Bowie-Dick Test cycle.

ACTIVATE SEAL PHASE: Door gasket seals with steam until door seal switch is closed. An additional 20 seconds elapses, after seal switch is closed, before phase is complete.

PURGE PHASE: Steam enters chamber from jacket to control pressure at 6 psig. Fast exhaust and water ejector is on to aid in removing air from chamber.

CHARGE PHASE: Chamber charges with steam until chamber temperature reaches sterilize temperature. Waste temperature is controlled to maintain approximately 60°C (140°F).

STERILIZE PHASE: Chamber temperature controls at sterilize temperature plus overdrive (control temperature). Waste temperature is controlled to maintain approximately 45.0° C (113.0° F).

FAST EXHAUST PHASE: Steam fast exhausts from chamber to 4.0 psig (0.28 bar).

VACUUM DRY PHASE: A vacuum is pulled in chamber to 10.0 inHg (-0.34 bar) – VACUUM DRY setpoint.

DRY PHASE: Vacuum continues to be pulled to limit of system for set dry time.

AIR BREAK PHASE: Chamber vacuum air breaks to 2.0 inHg (-0.07 bar); a 10 second delay follows.

DEACTIVATE SEAL PHASE: Door unseals until seal pressure switch opens and 20 seconds has elapsed.

COMPLETE PHASE: Cycle is complete. Open door and unload chamber.

[1] In this context and elsewhere, where implied (such as on screen buttons), DART is an acronym for Daily Air Removal Test. However, note that the term is registered as a testing apparatus, i.e., Dart® Testing Apparatus to Determine the Effectiveness of Removing Air from a Chamber.

6.7 DART and Bowie-Dick Cycles

Carefully review *SECTION 1, SAFETY PRECAUTIONS*, and the Warnings and Cautions below before operating the sterilizer.

WARNING – BURN HAZARD:

- **Do not attempt to open the sterilizer door if a WATER IN CHAMBER ALARM condition exists. Call a qualified service technician before attempting to use sterilizer further.**
- **Sterilizer, rack/shelves, and loading car will be hot after cycle is run. Always wear protective gloves and apron when removing a processed load. Protective gloves and apron must be worn when reloading sterilizer following the previous cycle.**
- **Steam may be released from the chamber when door is opened. Step back from the sterilizer each time the door is opened to minimize contact with steam vapor.**
- **After exhaust, steam may remain inside the chamber. Always wear protective gloves, apron, and a face shield when following emergency procedure to unload sterilizer. Stay as far back from the chamber opening as possible when opening the door.**
- **When sterilizing liquids, to prevent personal injury or property damage resulting from bursting bottles and hot fluid, you must observe the following procedures:**

  >>Use LIQUID cycle only; no other cycle is safe for processing liquids.

  >>Use only vented closures; do not use screw caps or rubber stoppers with crimped seal.

  >>Use only Type 1 borosilicate glass bottles; do not use ordinary glass bottles or any container not designed for sterilization.

  >>Do not allow hot bottles to be jolted; this can cause hot-bottle explosions. Do not move bottles if any boiling or bubbling is present.

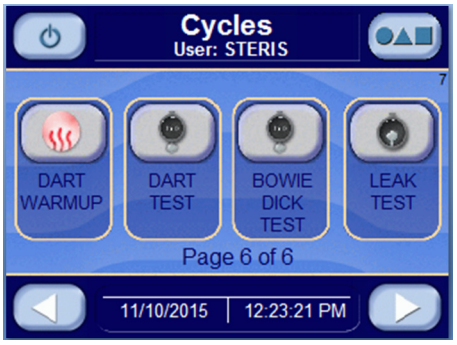
WARNING – EXPLOSION HAZARD: This sterilizer is not designed to process flammable compounds.

WARNING – PERSONAL INJURY HAZARD: When closing the chamber door, keep hands and arms out of the door opening and make sure opening is clear of obstructions.

CAUTION – POSSIBLE EQUIPMENT DAMAGE:

- **Gasket must be fully retracted prior to operating sterilizer door.**
- **Ensure door opening is clear of any obstruction before closing the door(s).**
- **Do not attempt to open sterilizer door during manual operation unless chamber is at 0 psig (0 bar).**
- **Immediately wipe up saline solution spills on loading car, to prevent damage to stainless steel.**
- **Sterilization of chloride-containing solutions (e.g., saline) can cause chamber corrosion and is not recommended by the manufacturer. If, however, chloride-containing solutions must be processed, clean the chamber after each use.**
- **Failure to flush the integral steam generator (daily for carbon steel / every two weeks for stainless steel) voids the manufacturer's warranty and can lead to possible generator damage.**

The DART[1] and Bowie-Dick cycles are designed to document the removal of residual air from a sample challenge load.



Run a DART Cycle or Bowie-Dick Cycle by pressing **DART TEST** or **BOWIE DICK TEST** from Cycles Page 6 of 6 Screen (*Screen 7*). The cycle phases and parameters are identical except for the following:

DART:

pulse charge: 26.0 psig (1.79 bar)

sterilize temperature: 132.0 °C (270 °F)

sterilize time: 3:30

BOWIE DICK:

pulse charge: 15.0 psig (1.03 bar)

sterilize temperature: 121.0 °C (250 °F)

sterilize time: 8:00

JACKET CHARGE PHASE: Continues until jacket temperature is greater than 132.0°C (270.0°F).

ACTIVATE SEAL PHASE: Door gasket seals with steam until door seal switch is closed. An additional 20 seconds elapses, after seal switch is closed, before phase is complete.

PURGE PHASE: Steam enters chamber from jacket to control pressure at 6 psig. Fast exhaust and water ejector is on to aid in removing air from chamber.

PULSE EXHAUST PHASE: Chamber exhausts to 4.0 psig (0.28 bar). Waste temperature is controlled to maintain approximately 60°C (140°F). Jacket temperature is controlled to maintain approximately 133.5°C (273.0°F) in jacket.

PULSE EVACUATE PHASE: Chamber evacuates to PULSE VACUUM setpoint (default 10.0 inHg (-0.34 bar) plus one minute. Waste temperature is controlled to maintain approximately 60°C (140°F). Jacket temperature is controlled to maintain approximately 133.5°C (273.0°F) in jacket.

PULSE CHARGE PHASE: Chamber charges with steam to PULSE CHARGE setpoint (default 26.0 psig (0.34 bar). PULSE EXHAUST, PULSE EVACUATE, and PULSE CHARGE repeat for the number of pulses selected.

[1] In this context and elsewhere, where implied (such as on screen buttons), DART is an acronym for Daily Air Removal Test. However, note that the term is registered as a testing apparatus, i.e., Dart® Testing Apparatus to Determine the Effectiveness of Removing Air from a Chamber.

CHARGE PHASE: Chamber charges with steam until chamber temperature reaches sterilize temperature. Waste temperature is controlled to maintain approximately 60°C (140°F).

STERILIZE PHASE: Chamber temperature controls at sterilize temperature plus overdrive (control temperature). Waste temperature is controlled to maintain approximately 60°C (140°F).

FAST EXHAUST PHASE: Steam fast exhausts from chamber to 4.0 psig (0.28 bar).

VACUUM DRY PHASE: A vacuum is pulled in the chamber to 10.0 inHg (- 0.34 bar) (VACUUM DRY setpoint).

DRY PHASE: During dry phase, vacuum continues to be pulled to limit of system for dry time.

AIR BREAK PHASE: Chamber vacuum air breaks to 2.0 inHg (-0.07 bar).

DEACTIVATE SEAL PHASE: Door unseals until seal pressure switch opens and 20 seconds has elapsed.

COMPLETE PHASE: Cycle is complete. Open door and unload chamber. Once door is open, display returns to main operating mode screen.

6.8 Leak Test Cycle

Carefully review *SECTION 1, SAFETY PRECAUTIONS*, and the Warnings and Cautions below before operating the sterilizer.

WARNING – BURN HAZARD:

- **Do not attempt to open the sterilizer door if a WATER IN CHAMBER ALARM condition exists. Call a qualified service technician before attempting to use sterilizer further.**
- **Sterilizer, rack/shelves, and loading car will be hot after cycle is run. Always wear protective gloves and apron when removing a processed load. Protective gloves and apron must be worn when reloading sterilizer following the previous cycle.**
- **Steam may be released from the chamber when door is opened. Step back from the sterilizer each time the door is opened to minimize contact with steam vapor.**
- **After exhaust, steam may remain inside the chamber. Always wear protective gloves, apron, and a face shield when following emergency procedure to unload sterilizer. Stay as far back from the chamber opening as possible when opening the door.**
- **When sterilizing liquids, to prevent personal injury or property damage resulting from bursting bottles and hot fluid, you must observe the following procedures:**

  >>Use LIQUID cycle only; no other cycle is safe for processing liquids.

  >>Use only vented closures; do not use screw caps or rubber stoppers with crimped seal.

  >>Use only Type 1 borosilicate glass bottles; do not use ordinary glass bottles or any container not designed for sterilization.

  >>Do not allow hot bottles to be jolted; this can cause hot-bottle explosions. Do not move bottles if any boiling or bubbling is present.

WARNING – EXPLOSION HAZARD: This sterilizer is not designed to process flammable compounds.

WARNING – PERSONAL INJURY HAZARD: When closing the chamber door, keep hands and arms out of the door opening and make sure opening is clear of obstructions.

CAUTION – POSSIBLE EQUIPMENT DAMAGE:

- **Gasket must be fully retracted prior to operating sterilizer door.**
- **Ensure door opening is clear of any obstruction before closing the door(s).**
- **Do not attempt to open sterilizer door during manual operation unless chamber is at 0 psig (0 bar).**
- **Immediately wipe up saline solution spills on loading car, to prevent damage to stainless steel.**
- **Sterilization of chloride-containing solutions (e.g., saline) can cause chamber corrosion and is not recommended by the manufacturer. If, however, chloride-containing solutions must be processed, clean the chamber after each use.**
- **Failure to flush the integral steam generator (daily for carbon steel / every two weeks for stainless steel) voids the manufacturer's warranty and can lead to possible generator damage.**

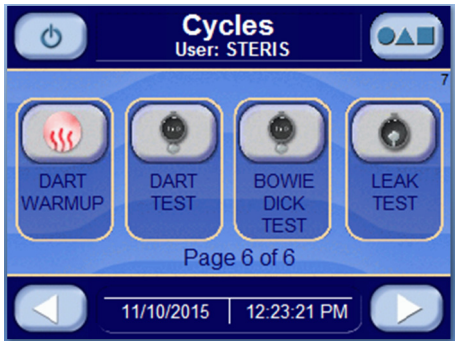
Important: *Before running a Leak Test Cycle, the chamber temperature should be stabilized by running a Normal Cycle. A Leak Test Cycle should be run on the sterilizer at least once each week. It should be one of the first cycles run for the day, but not the first cycle. In this cycle, the sterilizer automatically checks for vacuum leaks in the piping and door seal. If the sterilizer fails the leak test, it must be inspected by a service technician before using the sterilizer further. The leak test can be used to confirm that the sterilizer piping is intact after performing repairs.*

NOTE: Before running a Leak Test, note the following:

1) Leak Tests are not substitutes for DART[1] and Bowie-Dick tests.

2) The measured leak rate (mmHg/minute) is calculated by the control over a timed 10 minute period and is included in the cycle printout. A leak rate of 1 mmHg/minute or less is considered acceptable.

[1] In this context and elsewhere, where implied (such as on screen buttons), DART is an acronym for Daily Air Removal Test. However, note that the term is registered as a testing apparatus, i.e., Dart® Testing Apparatus to Determine the Effectiveness of Removing Air from a Chamber.



Run a Leak Test Cycle by pressing **LEAK TEST** button from Cycles Page 6 of 6 Screen (*Screen 7*). Cycle passes through following phases:

JACKET CHARGE PHASE: Jacket charge phase continues until jacket temperature is greater than 132.0°C (270.0°F).

ACTIVATE SEAL PHASE: Door gasket seals with steam until door seal switch is closed. An additional 20 seconds elapses, after seal switch is closed, before phase is complete.

PURGE PHASE: Steam enters chamber from jacket to control pressure at 6 psig. Fast exhaust and water ejector is on to aid in removing air from chamber.

PULSE EXHAUST PHASE: Chamber exhausts to 4.0 psig (0.28 bar). Waste temperature is controlled to maintain approximately 60°C (140°F). Jacket temperature is controlled to maintain approximately 133.5°C (273.0°F) in jacket.

PULSE EVACUATE PHASE: Chamber evacuates to PULSE VACUUM setpoint (default 10.0 inHg (-0.34 bar). Waste temperature is controlled to maintain approximately 60°C (140°F). Jacket temperature is controlled to maintain approximately 133.5°C (273.0°F) in jacket.

PULSE CHARGE PHASE: Chamber charges with steam to PULSE CHARGE setpoint (default 26.0 psig [0.34 bar]). PULSE EXHAUST, PULSE EVACUATE and PULSE CHARGE repeat for number of pulses selected.

EVACUATE PHASE: Chamber evacuates for 10 minutes. Waste temperature is controlled to maintain approximately 60°C (140°F).

STABILIZE PHASE: Chamber remains in an idle state for two minutes (i.e., chamber holds at vacuum level). Waste temperature is controlled to maintain approximately 60°C (140°F).

LEAK TEST PHASE: Chamber holds for 10 minutes. Initial and final pressure values are recorded. Leak rate is determined in mmHg.

AIR BREAK PHASE: Chamber vacuum air breaks to 2.0 inHg (-0.07 bar).

DEACTIVATE SEAL PHASE: Door unseals until seal pressure switch opens and 20 seconds has elapsed.

COMPLETE PHASE: Cycle is complete. Open door. Once door is open, display returns to main operating mode screen.

6.9 Lab Waste Cycle

Carefully review *SECTION 1, SAFETY PRECAUTIONS*, and the Warnings and Cautions below before operating the sterilizer.

WARNING – BURN HAZARD:

- **Do not attempt to open the sterilizer door if a WATER IN CHAMBER ALARM condition exists. Call a qualified service technician before attempting to use sterilizer further.**
- **Sterilizer, rack/shelves, and loading car will be hot after cycle is run. Always wear protective gloves and apron when removing a processed load. Protective gloves and apron must be worn when reloading sterilizer following the previous cycle.**
- **Steam may be released from the chamber when door is opened. Step back from the sterilizer each time the door is opened to minimize contact with steam vapor.**
- **After exhaust, steam may remain inside the chamber. Always wear protective gloves, apron, and a face shield when following emergency procedure to unload sterilizer. Stay as far back from the chamber opening as possible when opening the door.**
- **When sterilizing liquids, to prevent personal injury or property damage resulting from bursting bottles and hot fluid, you must observe the following procedures:**

  >>Use LIQUID cycle only; no other cycle is safe for processing liquids.

  >>Use only vented closures; do not use screw caps or rubber stoppers with crimped seal.

  >>Use only Type 1 borosilicate glass bottles; do not use ordinary glass bottles or any container not designed for sterilization.

  >>Do not allow hot bottles to be jolted; this can cause hot-bottle explosions. Do not move bottles if any boiling or bubbling is present.

WARNING – EXPLOSION HAZARD: This sterilizer is not designed to process flammable compounds.

WARNING – PERSONAL INJURY HAZARD: When closing the chamber door, keep hands and arms out of the door opening and make sure opening is clear of obstructions.

CAUTION – POSSIBLE EQUIPMENT DAMAGE:

- **Gasket must be fully retracted prior to operating sterilizer door.**
- **Ensure door opening is clear of any obstruction before closing the door(s).**
- **Do not attempt to open sterilizer door during manual operation unless chamber is at 0 psig (0 bar).**
- **Immediately wipe up saline solution spills on loading car, to prevent damage to stainless steel.**
- **Sterilization of chloride-containing solutions (e.g., saline) can cause chamber corrosion and is not recommended by the manufacturer. If, however, chloride-containing solutions must be processed, clean the chamber after each use.**
- **Failure to flush the integral steam generator (daily for carbon steel / every two weeks for stainless steel) voids the manufacturer's warranty and can lead to possible generator damage.**

The Lab Waste Cycle (Waste Bag Cycle) is designed for the sterilization of laboratory waste in autoclavable bags. Because these loads are mixed loads that are enclosed in a bag or container, both air removal and steam penetration are difficult.

NOTE: Because most waste loads have a liquid presence, use of typical Gravity or Pre-vacuum cycles would allow for possible boil over.

The Lab Waste cycle employs modified vacuum pulses and a controlled exhaust for better air removal and better steam contact, while allowing for shorter cycle times. Like all default Sterilization cycles, parameters may need adjusting based on specific load.

Run a Lab Waste cycle by pressing **LAB WASTE** button from one of the operating mode screens (refer to *SECTION 5.2, OPERATING MODES*). The following screen appears (values are examples only):

Press **LEFT ARROW** button to cancel cycle selected and return to Operating Mode screen.

Press **LAB WASTE** button to start the Lab Waste Cycle. Cycle phases are as follows:

*NOTE: If **CLOSE DOOR(S)** button is shown, close door(s). Refer to SECTION 5.3, STATUS BUTTONS, for description of buttons.*

JACKET CHARGE PHASE: Jacket charge phase continues until jacket temperature is greater than set sterilizer temperature (example: 121.0°C [250.0°F]). If separate steam selected, jacket charge phase continues until jacket temperature is greater than set jacket temperature, for example: 115°C (239°F).

ACTIVATE SEAL PHASE: Door gasket seals with steam until door seal switch closes. An additional 20 seconds elapses, after seal switch closes, before phase is complete.

PURGE PHASE: Steam enters chamber from jacket to control pressure at 6 psig (0.41 bar). Fast exhaust aids air removal from chamber.

PULSE EXHAUST PHASE*: Chamber exhausts to 4.0 psig (0.28 bar). Waste temperature is controlled to maintain approximately 60°C (140°F). Jacket temperature is controlled to maintain approximately 122.5°C (253.0°F) in jacket.

PULSE EVACUATE PHASE*: Chamber evacuates to PULSE VACUUM setpoint (default 10.0 inHg [-0.34 bar] [0.34 bar]. Waste temperature is controlled to maintain approximately 60°C (140°F). Jacket temperature is controlled to maintain approximately 122.5°C (253.0°F) in the jacket.

*The indicated phases (Pulse Exhaust, Pulse Evacuate, Pulse Hold and Pulse Charge) have different parameters for the first three pulses.

PULSE HOLD PHASE*: Chamber pressure controls at PULSE VACUUM setpoint for PULSE #n HOLD time (10 seconds).

PULSE CHARGE PHASE*: Chamber charges with steam to Pulse Charge setpoint (default 26.0 psig (0.34 bar). Pulse Exhaust, Pulse Evacuate, Pulse Hold and Pulse Charge repeats for the number of pulses selected.

CHARGE PHASE: Chamber charges with steam until chamber temperature reaches sterilize temperature setpoint. If load option is selected, phase holds until load temperature is greater than or equal to sterilize temperature. Waste temperature is controlled to maintain approximately 60°C (140°F).

STERILIZE PHASE: Chamber temperature controls at sterilize temperature, plus overdrive (control temperature). Waste temperature is controlled to maintain approximately 60°C (140°F).

NOTE: At this point, either the Fast Exhaust Phase or Slow Exhaust Phase selection applies. The phase sequences of the two options follow below.

==========

FAST EXHAUST PHASE (ALTETRNATIVE TO SLOW EXHAUST PHASE)

FAST EXHAUST PHASE: Steam fast exhausts from chamber to 4.0 psig (0.28 bar).

VACUUM DRY PHASE: A vacuum is pulled in the chamber to 10.0 inHg (-0.34 bar) (VACUUM DRY setpoint).

DRY PHASE: During dry phase, vacuum continues to be pulled to the limit of the system for dry time. If Dry Pressure Control is set to Vacuum Dry, vacuum controls at the vacuum dry setpoint of 10.0 inHg (0.34 bar).

AIR BREAK PHASE: Chamber vacuum air breaks to 2.0 inHg (-0.07 bar), and waits an additional 10 seconds.

DEACTIVATE SEAL PHASE: Door unseals until seal pressure switch opens, and 20 seconds has elapsed.

COMPLETE PHASE: Cycle is complete. Open door and unload chamber. Once door is open, display returns to main operating mode screen.

==========

SLOW EXHAUST PHASE (ALTETRNATIVE TO FAST EXHAUST PHASE)

SLOW EXHAUST PHASE: The slow exhaust rates and transition points are adjustable to optimize time and to reduce boil over. Steam slowly exhausts from chamber to 5.0 inHg (0.17 bar). Pressure rate controls at 1.6 psi/minute (0.11 bar) to 4.2 psig (0.29 bar) and at 0.6 psi/minute (0.04 bar) to
5.0 inHg (0.17 bar).

VAPOR REMOVAL PHASE: Vapors in chamber vents for 10 minutes. Note that vent time is adjustable to optimize cycle time and vapor removal.

PHASE: Door unseals until seal pressure switch opens and 20 seconds has elapsed.

COMPLETE PHASE: Cycle is complete. Open door and unload chamber.

6.10 USP 660 Cycle

Carefully review *SECTION 1, SAFETY PRECAUTIONS*, and the Warnings and Cautions below before operating the sterilizer.

WARNING – BURN HAZARD:

- **Do not attempt to open the sterilizer door if a WATER IN CHAMBER ALARM condition exists. Call a qualified service technician before attempting to use sterilizer further.**
- **Sterilizer, rack/shelves, and loading car will be hot after cycle is run. Always wear protective gloves and apron when removing a processed load. Protective gloves and apron must be worn when reloading sterilizer following the previous cycle.**
- **Steam may be released from the chamber when door is opened. Step back from the sterilizer each time the door is opened to minimize contact with steam vapor.**
- **After exhaust, steam may remain inside the chamber. Always wear protective gloves, apron, and a face shield when following emergency procedure to unload sterilizer. Stay as far back from the chamber opening as possible when opening the door.**
- **When sterilizing liquids, to prevent personal injury or property damage resulting from bursting bottles and hot fluid, you must observe the following procedures:**

  >>Use LIQUID cycle only; no other cycle is safe for processing liquids.

  >>Use only vented closures; do not use screw caps or rubber stoppers with crimped seal.

  >>Use only Type 1 borosilicate glass bottles; do not use ordinary glass bottles or any container not designed for sterilization.

  >>Do not allow hot bottles to be jolted; this can cause hot-bottle explosions. Do not move bottles if any boiling or bubbling is present.

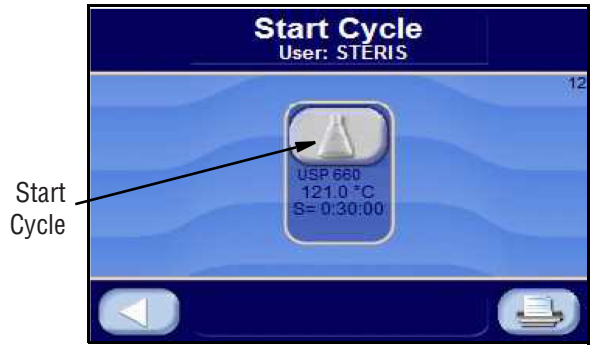
WARNING – EXPLOSION HAZARD: This sterilizer is not designed to process flammable compounds.

WARNING – PERSONAL INJURY HAZARD: When closing the chamber door, keep hands and arms out of the door opening and make sure opening is clear of obstructions.

CAUTION – POSSIBLE EQUIPMENT DAMAGE:

- **Gasket must be fully retracted prior to operating sterilizer door.**
- **Ensure door opening is clear of any obstruction before closing the door(s).**
- **Do not attempt to open sterilizer door during manual operation unless chamber is at 0 psig (0 bar).**
- **Immediately wipe up saline solution spills on loading car, to prevent damage to stainless steel.**
- **Sterilization of chloride-containing solutions (e.g., saline) can cause chamber corrosion and is not recommended by the manufacturer. If, however, chloride-containing solutions must be processed, clean the chamber after each use.**
- **Failure to flush the integral steam generator (daily for carbon steel / every two weeks for stainless steel) voids the manufacturer's warranty and can lead to possible generator damage.**

The USP 660 cycle is a test cycle for glass delamination designed to meet the criteria as defined by United States Pharmacopia (USP). Run a USP 660 cycle by pressing **USP 660** button from one of the operating mode screens (refer to *SECTION 5.2, OPERATING MODES*). The following screen appears:



Press **LEFT ARROW** button to cancel cycle selected and return to the operating mode screen.

Press **USP 660** button to start the USP 660 Cycle. Cycle phases are as follows:

*NOTE: If **CLOSE DOOR(S)** button is shown, close door(s). Refer to SECTION 5.3, STATUS BUTTONS, for description of buttons.*

JACKET CHARGE PHASE: Jacket charge phase continues until jacket temperature is greater than set sterilizer temperature (example 121°C [250°F]). If separate steam selected, jacket charge phase continues until jacket temperature is greater than set jacket temperature (example: 115°C [239°F]).

ACTIVATE SEAL PHASE: Door gasket seals with steam until door seal switch is closed. An additional 20 seconds elapses, after seal switch is closed, before phase is complete.

CHARGE PHASE: Chamber rates with steam based on chamber temperature until chamber temperature reaches sterilize temperature setpoint. Waste temperature is controlled to maintain approximately 60°C (140°F).

FAST EXHAUST PHASE: Chamber rates with steam and exhaust based on chamber temperature until chamber pressure reaches 5 inHg.

DEACTIVATE SEAL PHASE: Door unseals until seal pressure switch opens, and 20 seconds has elapsed.

COMPLETE PHASE: Cycle is complete. Open door and unload chamber. Once door is open, display returns to Main Operating Mode Screen.

6.11 ATF 1 Cycle (Alternating Tangential Flow)

Carefully review *SECTION 1, SAFETY PRECAUTIONS*, and the Warnings and Cautions below before operating the sterilizer.

WARNING – BURN HAZARD:

- **Do not attempt to open the sterilizer door if a WATER IN CHAMBER ALARM condition exists. Call a qualified service technician before attempting to use sterilizer further.**
- **Sterilizer, rack/shelves, and loading car will be hot after cycle is run. Always wear protective gloves and apron when removing a processed load. Protective gloves and apron must be worn when reloading sterilizer following the previous cycle.**
- **Steam may be released from the chamber when door is opened. Step back from the sterilizer each time the door is opened to minimize contact with steam vapor.**
- **After exhaust, steam may remain inside the chamber. Always wear protective gloves, apron, and a face shield when following emergency procedure to unload sterilizer. Stay as far back from the chamber opening as possible when opening the door.**
- **When sterilizing liquids, to prevent personal injury or property damage resulting from bursting bottles and hot fluid, you must observe the following procedures:**

  >>Use LIQUID cycle only; no other cycle is safe for processing liquids.

  >>Use only vented closures; do not use screw caps or rubber stoppers with crimped seal.

  >>Use only Type 1 borosilicate glass bottles; do not use ordinary glass bottles or any container not designed for sterilization.

  >>Do not allow hot bottles to be jolted; this can cause hot-bottle explosions. Do not move bottles if any boiling or bubbling is present.

WARNING – EXPLOSION HAZARD: This sterilizer is not designed to process flammable compounds.

WARNING – PERSONAL INJURY HAZARD: When closing the chamber door, keep hands and arms out of the door opening and make sure opening is clear of obstructions.

CAUTION – POSSIBLE EQUIPMENT DAMAGE:

- **Gasket must be fully retracted prior to operating sterilizer door.**
- **Ensure door opening is clear of any obstruction before closing the door(s).**
- **Do not attempt to open sterilizer door during manual operation unless chamber is at 0 psig (0 bar).**
- **Immediately wipe up saline solution spills on loading car, to prevent damage to stainless steel.**
- **Sterilization of chloride-containing solutions (e.g., saline) can cause chamber corrosion and is not recommended by the manufacturer. If, however, chloride-containing solutions must be processed, clean the chamber after each use.**
- **Failure to flush the integral steam generator (daily for carbon steel / every two weeks for stainless steel) voids the manufacturer's warranty and can lead to possible generator damage.**

The ATF 1 (Alternating Tangential Flow 1) cycle is a method that can be used to sterilize XCell™ ATF System.[1] The ATF 1 cycle can also be used for other purposes requiring sterilization features of this cycle.

Run a ATF 1 CYCLE by pressing ATF 1 button from one of operating mode screens (*SECTION 5.2, OPERATING MODES*). The following screen appears (values are examples only):

Press **LEFT ARROW** button to cancel selected cycle and return user to operating mode screen.

Press **START CYCLE** to start ATF 1 Cycle.

NOTE: If CLOSE DOOR(S) button is shown, close door(s).
Refer to SECTION 5.3, STATUS BUTTONS, for description of buttons.

JACKET CHARGE PHASE: Jacket charge phase continues until jacket temperature is greater than set sterilize temperature (example 121.0°C (250.0°F)). If separate steam selected, jacket charge phase continues until jacket temperature is greater than set jacket temperature, for example: 15°C (239°F).

ACTIVATE SEAL PHASE: Door gasket seals with steam until door seal switch is closed. An additional 20 seconds elapses after seal switch is closed before phase is complete.

PREHEAT: The product in chamber is heated to 60°C (140°F) for 90 minutes using jacket heat only (no direct steam). The chamber temperature is used to determine 60°C (140°F) temperature.

PURGE PHASE: Steam enters chamber from jacket (or direct with separate steam) to control pressure at 6 psig (0.41 bar). Fast exhaust aids in removing air from chamber. The duration is 5 minutes.

PULSE EXHAUST PHASE: Chamber exhaust to 4.0 psig (0.28 bar) with an exhaust rate of 1 psi per minute. Jacket temperature is controlled to maintain approximately 122.5°C (253.0°F) in jacket. Units with separate steam control jacket at 115°C (239.0°F).

1. XCell™ is a registered trademark of Repligen Corporation.

PULSE EVACUATE PHASE: Chamber evacuates to 25.0 inHg (-0.84 bar) with an evacuate rate of 1 psi per minute. Jacket temperature is controlled to maintain approximately 122.5°C (253.0°F) in jacket. Units with separate steam control jacket at 115°C (239.0°F).

PULSE VACUUM HOLD: Chamber holds at 25.0 inHg for one minute. Jacket temperature is controlled to maintain approximately 122.5°C (253.0°F) in jacket. Units with separate steam control jacket at 115°C (239.0°F).

PULSE CHARGE PHASE: Chamber charges with steam to 0.1 psig. Jacket temperature is controlled to maintain approximately 122.5°C (253.0°F) in jacket. Units with separate steam will control jacket at 115°C (239.0°F).

PULSE PRESSURE HOLD: Chamber holds at 0.1 psig for twenty minutes. Jacket temperature is controlled to maintain approximately 122.5°C (253.0°F) in jacket. Units with separate steam will control jacket at 115°C (239.0°F).

Repeat PULSE EVACUATE, PULSE VACUUM HOLD, PULSE CHARGE phases for number of pulses selected. Typically, one or two more times.

CHARGE PHASE: Chamber charges with steam, with a 1°C per minute temperature rate, until chamber temperature reaches sterilize temperature set point. If load option is selected, phase holds until load temperature is greater than or equal to sterilize temperature. Jacket temperature will control to maintain 1°C per minute temperature rate. Units with separate steam will control jacket at 115°C (239.0°F).

STERILIZE PHASE: Chamber temperature controls at sterilize temperature, plus overdrive (control temperature). Jacket temperature is controlled to maintain approximately 122.5°C (253.0°F) in jacket. Units with separate steam will control jacket at 115°C (239.0°F). A typical sterilize time is 60 minutes.

EXHAUST: Chamber exhausts, with a 1°C per minute temperature rate, until pressure reaches 0.1 psig. Jacket temperature will control to maintain 1°C per minute temperature rate. Units with separate steam will control jacket at 115°C (239.0°F).

DEACTIVATE SEAL PHASE:
Door unseals until seal pressure switch opens, and 20 seconds has elapsed. See interlock control section.

COMPLETE PHASE: Cycle is complete. The door may be opened at this time to allow XCell ATF system to cool down to ambient temperature. Once door is open, display returns to Main Operating Mode Screen.

6.12 ATF 2 Cycle (Alternating Tangential Flow)

Carefully review *SECTION 1, SAFETY PRECAUTIONS*, and the Warnings and Cautions below before operating the sterilizer.

WARNING – BURN HAZARD:

- **Do not attempt to open the sterilizer door if a WATER IN CHAMBER ALARM condition exists. Call a qualified service technician before attempting to use sterilizer further.**
- **Sterilizer, rack/shelves, and loading car will be hot after cycle is run. Always wear protective gloves and apron when removing a processed load. Protective gloves and apron must be worn when reloading sterilizer following the previous cycle.**
- **Steam may be released from the chamber when door is opened. Step back from the sterilizer each time the door is opened to minimize contact with steam vapor.**
- **After exhaust, steam may remain inside the chamber. Always wear protective gloves, apron, and a face shield when following emergency procedure to unload sterilizer. Stay as far back from the chamber opening as possible when opening the door.**
- **When sterilizing liquids, to prevent personal injury or property damage resulting from bursting bottles and hot fluid, you must observe the following procedures:**

  >>Use LIQUID cycle only; no other cycle is safe for processing liquids.

  >>Use only vented closures; do not use screw caps or rubber stoppers with crimped seal.

  >>Use only Type 1 borosilicate glass bottles; do not use ordinary glass bottles or any container not designed for sterilization.

  >>Do not allow hot bottles to be jolted; this can cause hot-bottle explosions. Do not move bottles if any boiling or bubbling is present.

WARNING – EXPLOSION HAZARD: This sterilizer is not designed to process flammable compounds.

WARNING – PERSONAL INJURY HAZARD: When closing the chamber door, keep hands and arms out of the door opening and make sure opening is clear of obstructions.

CAUTION – POSSIBLE EQUIPMENT DAMAGE:

- **Gasket must be fully retracted prior to operating sterilizer door.**
- **Ensure door opening is clear of any obstruction before closing the door(s).**
- **Do not attempt to open sterilizer door during manual operation unless chamber is at 0 psig (0 bar).**
- **Immediately wipe up saline solution spills on loading car, to prevent damage to stainless steel.**
- **Sterilization of chloride-containing solutions (e.g., saline) can cause chamber corrosion and is not recommended by the manufacturer. If, however, chloride-containing solutions must be processed, clean the chamber after each use.**
- **Failure to flush the integral steam generator (daily for carbon steel / every two weeks for stainless steel) voids the manufacturer's warranty and can lead to possible generator damage.**

The ATF 2 (Alternating Tangential Flow 2) cycle is one method that can be used to sterilize XCell™ ATF System.[1] This cycle can also be used for other purposes that require sterilize features of this cycle.

Run a ATF 2 CYCLE by pressing ATF 2 button from one of operating mode screens (*SECTION 5.2, OPERATING MODES*). The following screen appears (values are examples only):

Press **LEFT ARROW** button to cancel selected cycle and return user to operating mode screen.

Press **START CYCLE** to start ATF 2 Cycle.

NOTE: If CLOSE DOOR(S) button is shown, close door(s).Refer to SECTION 5.3, STATUS BUTTONS, for description of buttons.

JACKET CHARGE PHASE: Jacket charge phase continues until jacket temperature is greater than set sterilize temperature (example 121.0°C (250.0°F)). If separate steam selected, jacket charge phase continues until jacket temperature is greater than set jacket temperature, for example: 115°C (239°F).

ACTIVATE SEAL PHASE: Door gasket seals with steam until door seal switch is closed. An additional 20 seconds elapses, after seal switch is closed, before phase is complete.

PULSE EVACUATE PHASE: Chamber evacuates to 25.0 inHg (-0.84 bar) with an exhaust rate of 1 psi per minute. Jacket temperature is controlled to maintain approximately 122.5°C (253.0°F) in jacket. Units with separate steam will control jacket at 115°C (239.0°F).

PULSE VACUUM HOLD: Chamber holds at 25.0 inHg for five minutes. Jacket temperature is controlled to maintain approximately 122.5°C (253.0°F) in jacket. Units with separate steam will control jacket at 115°C (239.0°F).

1. XCell™ is a registered trademark of Repligen Corporation.

PULSE CHARGE PHASE: Chamber charges with steam to 0.1 psig with a charge rate of 2.5°C per minute. Jacket temperature is controlled to maintain approximately 122.5°C (253.0°F) in jacket. Units with separate steam will control jacket at 115°C (239.0°F).

CHARGE PHASE: Chamber charges with steam, with a 1°C per minute temperature rate, until chamber temperature reaches sterilize temperature set point. If load option is selected, phase holds until load temperature is greater than or equal to sterilize temperature. Jacket temperature will control to maintain 1°C per minute temperature rate. Units with separate steam will control jacket at 115°C (239.0°F).

STERILIZE PHASE: Chamber temperature controls at sterilize temperature, plus overdrive (control temperature). Jacket temperature is controlled to maintain approximately 122.5°C (253.0°F) in jacket. Units with separate steam will control jacket at 115°C (239.0°F). A typical sterilize time is 60 minutes.

EXHAUST: Chamber exhausts, with a 1°C per minute temperature rate, until pressure reaches 0.1 psig. Jacket temperature will control to maintain 1°C per minute temperature rate. Units with separate steam will control jacket at 115°C (239.0°F).

DEACTIVATE SEAL PHASE: Door unseals until seal pressure switch opens, and 20 seconds has elapsed. See interlock control section.

COMPLETE PHASE: Cycle is complete. The door may be opened at this time to allow XCell ATF system to cool down to ambient temperature. Once door is open, display returns to Main Operating Mode Screen.

6.13 Decontamination (DECON) Cycle (Optional)

Carefully review *SECTION 1, SAFETY PRECAUTIONS*, and the Warnings and Cautions below before operating the sterilizer.

WARNING – BURN HAZARD:

- **Do not attempt to open the sterilizer door if a WATER IN CHAMBER ALARM condition exists. Call a qualified service technician before attempting to use sterilizer further.**
- **Sterilizer, rack/shelves, and loading car will be hot after cycle is run. Always wear protective gloves and apron when removing a processed load. Protective gloves and apron must be worn when reloading sterilizer following the previous cycle.**
- **Steam may be released from the chamber when door is opened. Step back from the sterilizer each time the door is opened to minimize contact with steam vapor.**
- **After exhaust, steam may remain inside the chamber. Always wear protective gloves, apron, and a face shield when following emergency procedure to unload sterilizer. Stay as far back from the chamber opening as possible when opening the door.**
- **When sterilizing liquids, to prevent personal injury or property damage resulting from bursting bottles and hot fluid, you must observe the following procedures:**

  >>Use LIQUID cycle only; no other cycle is safe for processing liquids.

  >>Use only vented closures; do not use screw caps or rubber stoppers with crimped seal.

  >>Use only Type 1 borosilicate glass bottles; do not use ordinary glass bottles or any container not designed for sterilization.

  >>Do not allow hot bottles to be jolted; this can cause hot-bottle explosions. Do not move bottles if any boiling or bubbling is present.

WARNING – EXPLOSION HAZARD: This sterilizer is not designed to process flammable compounds.

WARNING – PERSONAL INJURY HAZARD: When closing the chamber door, keep hands and arms out of the door opening and make sure opening is clear of obstructions.

CAUTION – POSSIBLE EQUIPMENT DAMAGE:

- **Gasket must be fully retracted prior to operating sterilizer door.**
- **Ensure door opening is clear of any obstruction before closing the door(s).**
- **Do not attempt to open sterilizer door during manual operation unless chamber is at 0 psig (0 bar).**
- **Immediately wipe up saline solution spills on loading car, to prevent damage to stainless steel.**
- **Sterilization of chloride-containing solutions (e.g., saline) can cause chamber corrosion and is not recommended by the manufacturer. If, however, chloride-containing solutions must be processed, clean the chamber after each use.**
- **Failure to flush the integral steam generator (daily for carbon steel / every two weeks for stainless steel) voids the manufacturer's warranty and can lead to possible generator damage.**

The optional Decontamination Cycle, also referred to as a Decon Cycle, is a specialized cycle designed for processing loads in BSL-3 and BSL-4 applications. The Decontamination Cycle removes the risk of dangerous organisms becoming aerosolized in the drain or escaping the autoclave in the initial phases of a Sterilization Cycle. This is accomplished through removing air through a 0.2 micron filter and trapping effluent and sterilizing it in the process of the cycle and makes use of a fast or slow exhaust phase.

Start a Decon Cycle by pressing **DECON** button from one of the operating mode screens (refer to *SECTION 5.2, OPERATING MODES*). The following screen appears (values are examples only):

The Filter Life (if shown) starts at 0 and increments each minute during the Decon Cycle Sterilize phase. 545 would represent 545 minutes in the Decon Sterilize phase. After a pre-determined value, filter needs to be replaced. Only a qualified Service Technician should replace the filter. See Maintenance Manual for filter replacement.

Press **LEFT ARROW** button to cancel cycle selected and return to Operating Mode screen.

Press **DECON** button to start the Decon Cycle. Cycle phases are as follows:

*NOTE: If **CLOSE DOOR(S)** button is shown, close door(s). Refer to SECTION 5.3, STATUS BUTTONS, for description of buttons.*

JACKET CHARGE PHASE: Phase continues until jacket temperature is greater than set sterilizer temperature (example: 121.0°C [250.0°F]).

ACTIVATE SEAL PHASE: Door gasket seals with steam until door seal switch is closed. An additional 20 seconds elapses, after seal switch is closed, before phase is complete.

PURGE PHASE: Steam enters chamber from jacket to control pressure at 6 psig (0.41 bar). Fast exhaust and water ejector aid in removing air from chamber.

PULSE EXHAUST PHASE: Chamber exhausts to 4.0 psig (0.28 bar) (0.27 bar). Waste temperature is controlled to maintain approximately 60°C (140°F). Jacket temperature is controlled to maintain approximately 122.5°C (253.0°F) in jacket.

PULSE EVACUATE PHASE: Chamber evacuates to PULSE VACUUM setpoint (default 10.0 inHg [-0.34 bar] [0.34 bar]). Waste temperature is controlled to maintain approximately 60°C (140°F). Jacket temperature is controlled to maintain approximately 122.5°C (253.0°F) in jacket.

FILTER LIFE value can be modified in Supervisor Mode (**SPECIAL CYCLES** button).

PULSE CHARGE PHASE: Chamber charges with steam to Pulse Charge setpoint (default: 26.0 psig [0.34 bar]). Pulse Exhaust, Pulse Evacuate and Pulse Charge repeats for number of pulses selected.

CHARGE PHASE: Chamber charges with steam until chamber temperature reaches sterilize temperature setpoint. If load option is selected, phase holds until load temperature is greater than or equal to sterilize temperature. Waste temperature is controlled to maintain approximately 60°C (140°F).

STERILIZE PHASE: Chamber temperature controls at sterilize temperature, plus overdrive (control temperature). Waste temperature is controlled to maintain approximately 60°C (140°F).

NOTE: At this point, either the Fast Exhaust Phase or Slow Exhaust Phase selection applies. The phase sequences of the two options follow below.

==========

FAST EXHAUST PHASE (ALTETRNATIVE TO SLOW EXHAUST PHASE)

FAST EXHAUST PHASE: Steam fast exhausts from chamber to 4.0 psig (0.28 bar).

VACUUM DRY PHASE: A vacuum is pulled in the chamber to 10.0 inHg (-0.34 bar) (VACUUM DRY setpoint).

DRY PHASE: During dry phase, vacuum continues to be pulled to the limit of the system for dry time.

AIR BREAK PHASE: Chamber vacuum air breaks to 2.0 inHg (-0.07 bar).

DEACTIVATE SEAL PHASE: Door unseals until seal pressure switch opens, and 20 seconds has elapsed.

COMPLETE PHASE: Cycle is complete. Open door and unload chamber. Once door is open, display returns to main operating mode screen.

==========

SLOW EXHAUST PHASE (ALTETRNATIVE TO FAST EXHAUST PHASE)

SLOW EXHAUST PHASE: Steam slowly exhausts from chamber to 5.0 inHg (0.17 bar). Pressure rate controls at 1.6 psi/minute (0.11 bar) to 4.2 psig (0.29 bar) and at 0.6 psi/minute (0.04 bar) to 5.0 inHg (0.17 bar).

VAPOR REMOVAL PHASE: Vapors in chamber vents for 10 minutes.

PHASE: Door unseals until seal pressure switch opens and 20 seconds has elapsed.

COMPLETE PHASE: Cycle is complete. Open door and unload chamber.

NOTE: Aside form the tape header, Decon Cycle print tapes look like Prevac Cycle tapes; and for that reason have not been duplicated here.

6.14 Liquid Air Cool Cycle (Optional)

Carefully review *SECTION 1, SAFETY PRECAUTIONS*, and the Warnings and Cautions below before operating the sterilizer.

WARNING – BURN HAZARD:

- **Do not attempt to open the sterilizer door if a WATER IN CHAMBER ALARM condition exists. Call a qualified service technician before attempting to use sterilizer further.**
- **Sterilizer, rack/shelves, and loading car will be hot after cycle is run. Always wear protective gloves and apron when removing a processed load. Protective gloves and apron must be worn when reloading sterilizer following the previous cycle.**
- **Steam may be released from the chamber when door is opened. Step back from the sterilizer each time the door is opened to minimize contact with steam vapor.**
- **After exhaust, steam may remain inside the chamber. Always wear protective gloves, apron, and a face shield when following emergency procedure to unload sterilizer. Stay as far back from the chamber opening as possible when opening the door.**
- **When sterilizing liquids, to prevent personal injury or property damage resulting from bursting bottles and hot fluid, you must observe the following procedures:**

  >>Use LIQUID cycle only; no other cycle is safe for processing liquids.

  >>Use only vented closures; do not use screw caps or rubber stoppers with crimped seal.

  >>Use only Type 1 borosilicate glass bottles; do not use ordinary glass bottles or any container not designed for sterilization.

  >>Do not allow hot bottles to be jolted; this can cause hot-bottle explosions. Do not move bottles if any boiling or bubbling is present.

WARNING – EXPLOSION HAZARD: This sterilizer is not designed to process flammable compounds.

WARNING – PERSONAL INJURY HAZARD: When closing the chamber door, keep hands and arms out of the door opening and make sure opening is clear of obstructions.

CAUTION – POSSIBLE EQUIPMENT DAMAGE:

- **Gasket must be fully retracted prior to operating sterilizer door.**
- **Ensure door opening is clear of any obstruction before closing the door(s).**
- **Do not attempt to open sterilizer door during manual operation unless chamber is at 0 psig (0 bar).**
- **Immediately wipe up saline solution spills on loading car, to prevent damage to stainless steel.**
- **Sterilization of chloride-containing solutions (e.g., saline) can cause chamber corrosion and is not recommended by the manufacturer. If, however, chloride-containing solutions must be processed, clean the chamber after each use.**
- **Failure to flush the integral steam generator (daily for carbon steel / every two weeks for stainless steel) voids the manufacturer's warranty and can lead to possible generator damage.**

The Liquid Air Cool cycle is designed to reduce the amount of time required to cool liquid loads to safe temperatures at the end of a cycle. The process utilizes air-over-pressure to allow for steam pressure to be reduced faster, without the risk of boil-over. To further assist with cooling, water is used in the jacket (in place of steam) to cool the chamber walls and increase cooling in the chamber.

Run a Liquid Air Cool Cycle by pressing **LIQUID** button from one of the Operating Mode Screens (refer to *SECTION 5.2, OPERATING MODES*). The following screen appears:

Press **LEFT ARROW** button to cancel cycle selected and return to the operating mode screen.

Press **AIRCOOL** button to start the Liquid Air Cool Cycle. Cycle phases are as follows:

*NOTE: If **CLOSE DOOR(S)** button is shown, close door(s). Refer to SECTION 5.3, STATUS BUTTONS, for description of buttons.*

JACKET CHARGE PHASE: Jacket charge phase continues until jacket temperature is greater than set sterilizer temperature (example: 121°C [250°F]). If separate steam selected, jacket charge phase continues until jacket temperature is greater than set jacket temperature (example: 115°C [239°F]).

ACTIVATE SEAL PHASE: Door gasket seals with steam until door seal switch is closed. An additional 20 seconds elapses, after seal switch is closed, before phase is complete.

PURGE PHASE: Steam enters chamber from jacket to control pressure at 6 psig (0.41 bar). Fast exhaust aids in removing air from chamber.

CHARGE PHASE: Chamber charges with steam until chamber temperature reaches sterilize temperature setpoint. If load option is selected, phase holds until load temperature is greater than or equal to sterilize temperature. Waste temperature is controlled to maintain approximately 60°C (140°F).

STERILIZE PHASE: Chamber temperature controls at sterilize temperature, plus overdrive (control temperature). Waste temperature is controlled to maintain approximately 60°C (140°F).

AIR COOL PHASE: Chamber controls with compressed air at 18 psig (1.24 bar) until load temperature is less than 80°C (176°F).

JACKET DRAIN PHASE: Jacket drains after chamber exhausts to 4.0 psig (0.28 bar). Phase ends after 5 minutes and when chamber pressure is less than 1 psig (0.07 bar).

DEACTIVATE SEAL PHASE: Door unseals until seal pressure switch opens, and 20 seconds has elapsed.

COMPLETE PHASE: Cycle is complete. Open door and unload chamber. Once door is open, display returns to main operating mode screen.

6.15 Cycle Abort

A cycle may abort for one of two reasons; (1) the operator pressed the **ABORT** button or (2) an alarm caused the cycle to abort. An example of a Cycle Abort screen is as follows:

When an operator presses the **ABORT** button, the cycle aborts to the fast or slow exhaust phase [see note] to relieve the chamber of pressure and the printer prints:

*CYCLE ABORTED BY OPERATOR

NOTE: If the purge phase has not yet run, the cycle aborts to the Deactivate Seal phase.

When the cycle ends the operating mode screen is displayed.

6.16 Double Doors

Sterilizers equipped with double doors include an additional display on the non-operating end door panel. The non-operating end display includes the same functionality as the operating-end display, including buttons to seal and unseal the door.

The operating-end includes a printer. The non-operating end can include a printer, as an option.

See *SECTION 6.20.2, INTERLOCKS* for additional information on door interlocks.

6.17 Load Probe and F_o Sterilization

(Sterilizers With Load Probe Only)

The load probe and F_o option equips the sterilizer with a load temperature probe (RTD) sealed through the chamber vessel. The probe is manually located by the operator in the product container within the chamber. In conjunction with this load probe option, the microcomputer control allows operator selection of two sterilization time measurement control modes. These modes are labeled: STER CTRL=DRAIN and STER CTRL=LOAD/DRAIN.

6.17.1 Drain Mode

DRAIN or **standard time at temperature** mode selection allows exposure time to be started from temperature probe (RTD) located in chamber drain line. Exposure time starts when drain line temperature is equal to or greater than chamber temperature setpoint, regardless of load temperature.

6.17.2 Load/Drain Mode

LOAD/DRAIN or **equivalent time at sterilization temperature** mode selection allows exposure time to start when load (located in product) and chamber drain line probes reach a preset sterilize temperature. F_o value is calculated from load probe located in product load. Charge or exposure phase terminates if calculated F_o value is equal to preselected value, or if sterilize time counts down to 0 (whichever occurs first).

The F_o value and load temperature are printed along with standard status prints.

6.17.3 F_o Sterilization

The F_o is the measure of equivalent time at which a specific load would have been exposed at the base sterilization temperature of 121.0°C (250.0° F). Units of F_o are minutes. The sterilizer control is programmed to calculate F_o once all load probes have reached 110.0°C (230.0°F), although significant F_o accumulation does not occur until all load probes are above 121.0°C (250.0°F), F_o accumulates faster than real (clock) minutes.

The formula for F_o is $F_o = \Sigma(10^{[(t1-t2)/Z]}) * \Delta t$

Where: t1 = Load temperature

t2 = 121.0°C (250.0°F)

Z = 10.0°C (18.0°F)

Δt = 1/60 minute (the time duration between F_o accumulations per 1 minute).

6.18 Separate Steam Feed Option

The separate steam feed option directs steam to jacket, while directing steam to chamber separately. The default method is to allow chamber steam to be fed from the jacket.

The separate steam feed option allows jacket temperature to be controlled independently from chamber temperature. Jacket temperature can be set for each individual cycle; see *SECTION 6.20.1, Cycle Values*.

6.19 Options Screen

The Options screen provides a way to:

- Duplicate Print
- Print Values
- Obtain Ethernet IP Address
- Access Supervisor Mode
- Access Service Mode

Use Options Menu button on upper right corner of a Cycles screen to access Options screen.

Options Menu Button

6.19.1 Duplicate Print

To obtain a reprint of last cycle run, press Duplicate Print button (on the Options Menu). Reprint prints before current cycle tape and includes text, “DUPLICATE PRINT.” An exception is when physical duplicate print button is pressed on printer.

An automatic duplicate print can be obtained after cycle is run and original printout is complete. To accomplish this, in Change Values screen, set Automatic Duplicate Print to ON.

A duplicate print can also be obtained from PHASE: COMPLETE screen; simply Press Duplicate Print button located at upper right of the screen. Note that original printout must complete before pressing this button.

6.19.2 Print Values

To print sterilizer status:

1. Press Options Menu button to access Options screen (#65).
2. Press Print Values button.

All cycle parameters print.

6.19.3 Supervisor Mode (Accessing)

To access Supervisor Mode:

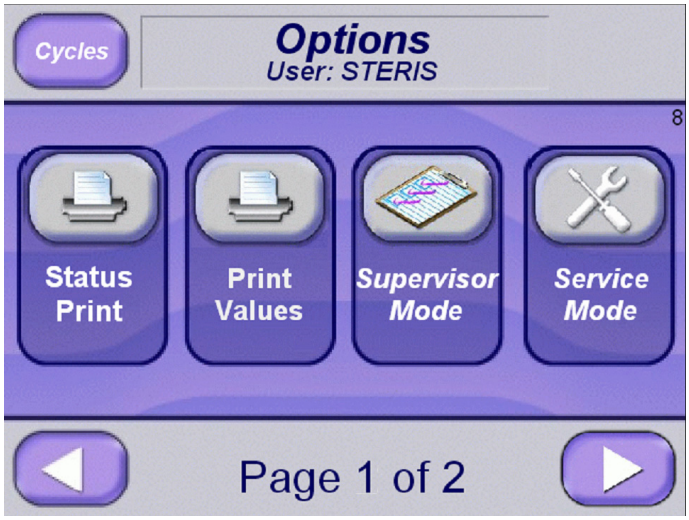
1. Press Options Menu button to access Options screen (#65)
2. Press Supervisor Mode button.

6.19.4 Service Mode

Important: Service Mode is only to be used by qualified service technicians. The mode is not to be used by operators or supervisors unless they have been properly trained and qualified to service sterilizer. Contact STERIS for additional information.

Press right arrow to show second page of Options screen.

Press right arrow on Options screen below.



6.19.5 Cycle Tapes

CYCLE TAPES

File name is shown in white box.

File name consists of following information: Cycle name, Date and Time

Files are shown in order. Last cycle occurs first, and rest of cycles occur from most recent to oldest.

Press right arrow button to show cycles 6 through 10.

Cycle Tapes button will be shown on Page 2 of 2. Pressing button will show following screen.

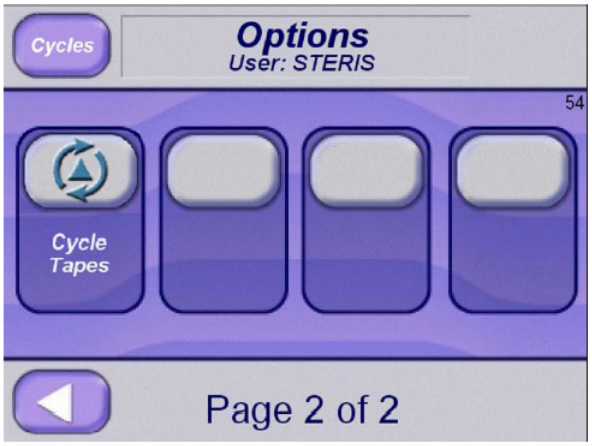
For detailed information pertaining to mode, see *SECTION 6.20, SUPERVISOR MODE, PAGE 6-48*.

Press white box to show that cycle's cycle tape.

```
================================
========== GRAVITY   ==========
================================
CYCLE START AT 8:35:25 AM
           ON 6/27/2019

CYCLE COUNT            4
LOGIN NAME:  STERIS
STERILIZER:  VAC01
CYCLE NO.    2

   STER TEMP = 121.0 °C
CONTROL TEMP = 122.5 °C

   STER TIME =  0:01:00
    DRY TIME =  0:01:00

                          V=inHg
- Time         T=C        P=PSIG
--------------------------------
C  8:36:08 AM    95.3      0.3V
E  8:39:08 AM   122.8     15.2P
E  8:40:21 AM   103.5      3.9P
E  8:40:31 AM   103.5     10.0V
E  8:41:30 AM   103.5     12.1V
Z  8:41:40 AM   103.5      0.5V

CHAMBER TEMP MAX=122.8 °C
CHAMBER TEMP MIN=121.0 °C

CONDITION    =  0:02:00
STERILIZE    =  0:01:00
EXHAUST      =  0:02:31
TOTAL CYCLE  =  0:05:31

================================
======= READY TO UNLOAD ========
================================
```

Press X to exit cycle tape view screen.

Cycle tapes can be printed by coping files to a USB drive and transferring files to a PC.



Press white box to show that cycle's cycle tape.

```
================================
========== GRAVITY   ==========
================================
CYCLE START AT 8:35:25 AM
           ON 6/27/2019

CYCLE COUNT            4
LOGIN NAME:  STERIS
STERILIZER:  VAC01
CYCLE NO.    2

   STER TEMP = 121.0 °C
CONTROL TEMP = 122.5 °C

   STER TIME =  0:01:00
    DRY TIME =  0:01:00

                        V=inHg
- Time        T=C       P=PSIG
--------------------------------
C  8:36:08 AM    95.3     0.3V
E  8:39:08 AM   122.8    15.2P
E  8:40:21 AM   103.5     3.9P
E  8:40:31 AM   103.5    10.0V
E  8:41:30 AM   103.5    12.1V
Z  8:41:40 AM   103.5     0.5V

CHAMBER TEMP MAX=122.8 °C
CHAMBER TEMP MIN=121.0 °C

CONDITION    =  0:02:00
STERILIZE    =  0:01:00
EXHAUST      =  0:02:31
TOTAL CYCLE  =  0:05:31

================================
======= READY TO UNLOAD ========
================================
```

Press X to exit cycle tape view screen.

Cycle tapes can be printed by coping files to a USB drive and transferring files to a PC.

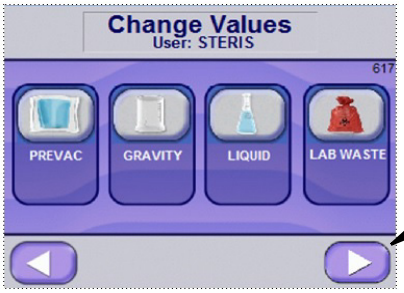
6.20 Supervisor Mode

Access Supervisor Mode may be entered by pressing **SUPERVISOR MODE** button on the Options Screen (*Screen 65*). Supervisor Mode Screen Page 1 of 5 (*Screen 600*) appears as follows:

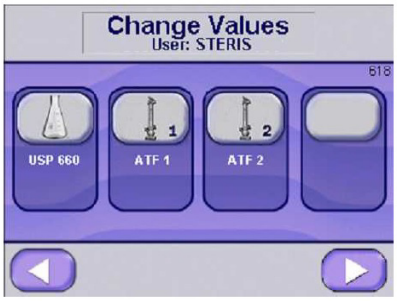
6.20.1 Cycle Values

Press **CYCLE VALUES** button on Supervisor Mode Screen Page 1 of

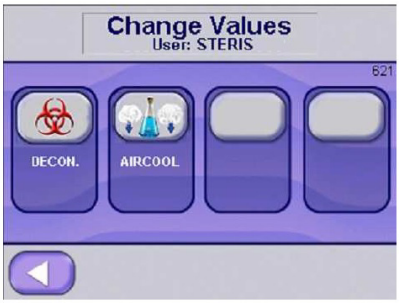
5 (*Screen 600*) to view or change cycle parameters.



Advance Screen button is present only if applicable, based on settings and options.



Changed Values screen for USP 660, ATF 1 and ATF 2 is available, depending on settings.



Changed Values Screen for Decontamination Cycle and Liquid Aircool Cycle is available if these options were chosen.

Press Cycle Type for which changes are to be made. Cycle types are selected from initial Change Values Screens (*617, 618 and 621*).

Initial Change Values Screens:

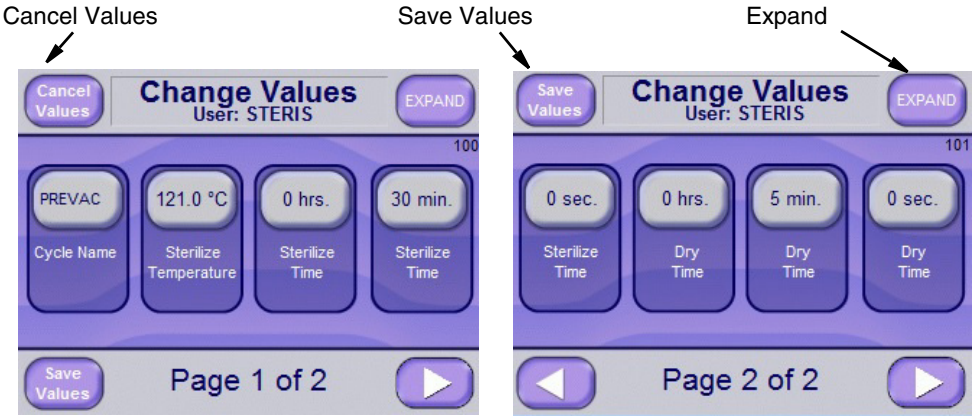
First Screen (#617): PREVAC, GRAVITY, LIQUID, LAB WASTE

Second Screen(#618): USP 660, ATF 1, ATF 2

Third Screen (#621): DECON (optional), AIR COOL (optional)

Use Right and Left Arrow buttons to navigate between three screens as needed.

Values for selected cycle type, e.g., PREVAC, are shown on initial basic screens (examples below)**.**



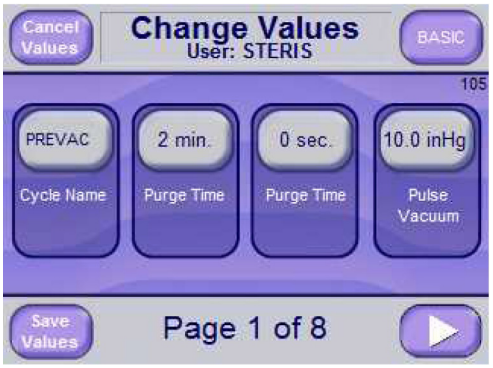
The previous two *basic* screens apply to the PREVAC cycle type and include values that can be changed for the PREVAC cycle.

NOTE: When changing the PREVAC, ISOTHERMAL, GRAVITY, LIQUID, USP660, AFT 1, AFT 2, AIR COOL and/or DECON cycles refer to this procedure.

Press **LEFT ARROW** and **RIGHT ARROW** buttons to scroll through cycle values.

Press **SAVE VALUES** button to save changes or press the **CANCEL VALUES** button if the intention is no longer to change the values.

Press **EXPAND** button, located on upper right of each basic screen (see above images) to show additional cycle values used in more advanced cycles. An example of an *Extend* screen follows:



From the Extend screen, press BASIC button to return to basic screen.

Press the **BASIC** button, located on upper right of each extend screen (see previous image) to return to the basic cycle parameters.

Table 6-1. Parameters with Changeable Value

Press applicable Parameter button and use keyboard display to enter new values.

	Parameter	Comments
1	**Cycle Name**	Enter combination of letters and numbers to create new name, then press ENTER. The new cycle name appears on the Cycle Name button
2	**Purge Time** (Excluding Isothermal, USP660 and ATF 2)	Allowable range is 0 to 99 minutes and seconds. Enter numeric value and press ENTER button. New purge time is shown.
3	**Pulses** (Prevac, Lab Waste, ATF 1 and Decon Only)	Allowable range is 0 to 99. Enter numeric value and press ENTER button. New pulse value is shown.
4	**Pulses** (Prevac, Lab Waste, ATF 1 and Decon Only)	Allowable range is 0 to 29.9 inHg. Enter numeric value and press ENTER button. New pulse vacuum is shown.
5	**Pulse Charge** (Prevac, ATF1, ATF 2, Lab Waste and Decon Only)	Allowable range is 0 to 35.0 psig. Enter numeric value and press ENTER button. New pulse charge is shown.
6	**Pulse Vac 1, 2 and 3** (Lab Waste and ATF 1 Only)	The vacuum levels can be varied from pulse 1, 2 and 3. Allowable range is 0 to 29.9 inHg. Enter numeric value and press ENTER button. New pulse vacuum value is shown.
7	**Pulse Hold 1, 2 and 3** (Lab Waste, ATF 1 and ATF 2 Only)	The vacuum hold time can be varied from pulse 1, 2 and 3. After vacuum level is reached, cycle controls at the pressure for the time set. Allowable range is 0 to 59 seconds. Enter numeric value and press ENTER button. New pulse hold value is shown.
8	**Pulse Charge 1, 2 and 3** (Lab Waste, ATF 1 and ATF 2 Only)	The pressure levels can be varied from pulse 1, 2 and 3. Allowable range is 0 to 35 psig. Enter numeric value and press ENTER button. New pulse charge value is shown.
9	**Sterilize Time**	As applicable, press buttons for hours, minutes and seconds to change sterilize time. Allowable range: • Hours: 0 to 99 • Minutes: 0 to 59 • Seconds: 0 to 59 Enter numeric value and press ENTER button. New sterilize time is shown.
10	**Sterilize Temperature**	Allowable ranges: • All Cycles except Isothermal: 100.0 to 141.0°C (212.0 to 285.0°F) • Isothermal Cycles: 78.0 to 110°C (172.0 to 230.0°F) Enter numeric value and press ENTER button. New sterilize temperature is shown.

Table 6-1. Parameters with Changeable Value (Cont'd)

Press applicable Parameter button and use keyboard display to enter new values.

	Parameter	Comments
11	**Over temp**	Allowable range is 0.0 to 40°C (32.0 to 104.0°F). Enter numeric value and press ENTER button. New sterilize temperature i s shown. See *SECTION 7, ALARMS*, for explanation of over temperature alarm.
12	**Over drive**	Allowable range is 0.0 to 40°C (32.0 to 104.0°F). Enter numeric value and press ENTER button. The new sterilize temperature is shown. See sterilize phase in cycle for an explanation of control temperature.
13	**Under temp.**	Allowable range is 0.0 to 40°C (32.0 to 104.0°F). Enter numeric value and press ENTER button. The new sterilize temperature is shown. See *SECTION 7, ALARMS*, for an explanation of under temperature alarm.
14	**Print Interval**	Print interval is the time interval of status prints during sterilize phase. Allowable range is 0 to 99 minutes. Enter numeric value and press ENTER button. New print interval is shown.
15	**Resume/Restart**	RESUME resumes sterilize timer after it has been stopped on an under temperature alarm. RESTART restarts sterilize timer after is has been stopped on an under temperature alarm. Press either RESUME or RESTART button to resume or restart. New resume or restart setting is shown.
16	**Vacuum Dry** (Gravity, Prevac and Lab Waste Only)	Vacuum dry setpoint is the vacuum level that dry timer starts. Allowable range is 0.0 to 29.9 inHg (1.0 - bar). Enter desired numeric value and press ENTER button. New vacuum dry setting is shown.
17	**Dry Time** (Gravity, Prevac and Lab Waste Only)	As applicable, press buttons for hours, minutes and seconds to change dry time. Allowable range: • Hours: 0 to 99 • Minutes: 0 to 59 • Seconds: 0 to 59 Enter numeric value and press ENTER button. New dry time is shown.
18	**Exhaust Type** (Prevac, Lab Waste and Decon Only)	The cycles have an option to run a fast or slow exhaust after the sterilize phase. Press "Fast Exhaust" section on Exhaust Type button to change from Fast Exhaust to Slow Exhaust. Press "Slow Exhaust" section on Exhaust Type button to change from Slow Exhaust to Fast Exhaust.
19	**Slow Exhaust First Rate** (Liquid, Prevac, Lab Waste, Isothermal and Decon Only)	The slow exhaust rate is controlled at this value from the end of sterilization to the slow exhaust first transition point.

Table 6-1. Parameters with Changeable Value (Cont'd)

Press applicable Parameter button and use keyboard display to enter new values.

	Parameter	Comments
20	**Slow Exhaust First Transition** (Liquid, Prevac, Lab Waste, Isothermal and Decon Only)	Allowable range is 0 to 99.9 psig. Enter numeric value and press ENTER button. New value is shown.
21	**Slow Exhaust Second Rate** (Liquid, Prevac, Lab Waste, Isothermal and Decon Only)	The slow exhaust rate is controlled at this value from the start of the slow exhaust first transition to the slow exhaust second transition point. Allowable range is 0 to 99.9 psig. Enter numeric value and press ENTER button. New value is shown.
22	**Slow Exhaust Second Transition** (Liquid, Prevac, Lab Waste, Isothermal and Decon Only)	Allowable range is 0 to 99.9 psig. Enter numeric value and press ENTER button. New value is shown.
23	**Vapor Removal** (Liquid Cycle Only)	Allowable range is 0 to 59. Enter numeric value and press ENTER button. New value is shown.
24	**Dry Pressure Contro**l (Prevac, Lab Waste, Gravity and Decon Only)	Press Dry Pressure Control = Limit of System to change the Dry Pressure Control to Vacuum Dry Point. The vacuum system has the option to run to the limit of system or control at the vacuum dry point during the dry phase.
25	**Charge Rate**	The charge rate is controlled at this value from the start of the charge rate to the exhaust rate. Allowable range is 0 to 99.9 psig. Enter numeric value and press ENTER button. New value is shown.
26	**Exhaust Rate**	The exhaust rate is controlled at this value from the start of the exhaust rate to the evacuate rate. Allowable range is 0 to 99.9 psig. Enter numeric value and press ENTER button. New value is shown.
27	**Evacuate Rate**	The evacuate rate is controlled at this value from the start of the evacuate rate to the sterilize phase. Allowable range is 0 to 99.9 psig. Enter numeric value and press ENTER button. New value is shown.
28	**Jacket** Temperature (Steam Option Only)	Allowable range is 100 to 141.0°C. The new jacket temperature is displayed.
29	**Sterilize Control** (Load Probe Option)	Sets control to use drain or load probe temperature to transition to sterilize phase. DRAIN option enters sterilize phase when chamber temperature reaches sterilize temperature. LOAD option enters sterilize phase when chamber and load temperature reach sterilize temperature. Selecting LOAD option also enables Fo (See Fo cycle value).
30	**F_0** (Load Probe Option)	Press Fo=0.0 to change the Fo value. The Charge Phase or Sterilize Phase ends when the actual Fo value is ≥ the Fo setting.
31	**Interlock**	*See SECTION 6.20.2, INTERLOCKS, for details.*

Table 6-1. Parameters with Changeable Value (Cont'd)

Press applicable Parameter button and use keyboard display to enter new values.

	Parameter	Comments
32	**Air Detector** (Air Detector Option Only)	The air detector value is the difference between the chamber and air detector probes at the transition between the vacuum to pressure pulses during the Prevac cycle. Allowable range is between 0 to 99.9. Enter numeric value and press ENTER button. New value is shown.
33	**Air Detector Pulses** (Air Detector Option Only)	The air detector pulses is the number of vacuum pulses during the Prevac cycle. Allowable range is between 0 to 99. Enter numeric value and press ENTER button. New value is shown.
34	**Air Detector Active** (Air Detector Option Only)	Turns on/off air detector feature during the Prevac cycle. The air detector feature starts with a series of vacuum pulses and then transitions to a series of pressure pulses after it checks the air detector alarm at the transition point (0 psig). Allowable range is ON or OFF. Make selection and press ENTER button. New value is shown.
35	**Hold Time**	Allowable range is 0 to 999. Enter numeric value and press ENTER button. New value is shown. (See *SECTION , CONTINUOUS CYCLES*.)
36	**Number of Continuous Cycles**	Allowable range is 0 to 9999. Enter numeric value and press ENTER button. New value is shown. (See *SECTION , CONTINUOUS CYCLES*.)
37	**Charge Temperature Rate** (USP 660, ATF 1 and ATF 2 Only)	The rate controls the chamber temperature from the end of active seal phase to the beginning of sterilize phase. Allowable range is 0 to 99.9. Enter numeric value and press ENTER button. New value is shown.
38	**Exhaust Temperature Rate** (USP 660, ATF 1 and ATF 2 Only)	The rate controls the chamber temperature from the end of sterilize phase to the beginning of deactivate seal phase. Allowable range is 0 to 99.9. Enter numeric value and press ENTER button. New value is shown.
39	**Preheat Temperature** (ATF 1 Only)	Allowable Range: 0 to 140°C Enter numeric value and press ENTER button. New Preheat Temperature displays.
40	**Preheat Time** (ATF 1 Only)	Allowable Range: 0 to 120 minutes. Enter numeric value and press ENTER button. New Preheat Time displays.
41	**Pulse Vacuum Hold** (ATF 1, ATF 2 and Lab Waste Only)	Allowable Range: 0 to 99 minutes and 0 to 59 seconds. Enter numeric value and press ENTER button. New Pulse Vacuum Hold time displays.
42	**Pulse Charge Hold** (ATF 1 and ATF 2 Only)	Pulse Charge Hold time can be varied from pulse 1, 2 and 3. After pressure level is reached, cycle controls at pressure for time set. Allowable range: 0 to 59 minutes and 0 to 59 seconds. Enter numeric value and press ENTER button. New Pulse Charge Hold Time displays.

Table 6-1. Parameters with Changeable Value (Cont'd)

Press applicable Parameter button and use keyboard display to enter new values.

	Parameter	Comments
43	**Automatic Duplicate Print**	Refer to *SECTION 6.19.1, DUPLICATE PRINT*.
	Too Long In _____. *Applies to remaining line items, for example, Too Long In Air Brake, Too Long In Charge, etc.* See *SECTION 6.20.8, TOO LONG IN STEP*.	
44	**Air Break**	To change time of a "Too Long In/To . . . " type parameter (listed in left column), perform following steps: a) Press time section of associated button, for example, the Air Break button. b) On resulting numeric keypad display, enter new time value and press ENTER. The new value is shown on screen.
44	**Alarm**	
45	**Charge**	
46	**Evacuate**	
47	**Exhaust**	
48	**Jacket Charge***	
49	**Seal*** (Activate Seal)	
50	**Unseal*** (Deactivate Seal)	
51	**Pressurize Generator** (1 to 120 min.)	These three Too Long To alarms pertain to Steam Generator. To set parameters from Supervisor Mode: a) Advance to Screen Page 2 of 6. b) Select TOO LONG IN STEP button. c) Set value for each "Too Long In..." parameter Allowable parameter settings for three steam generator alarms are provided beneath alarm.
52	**Depressurize Generator** (1 to 120 min.)	
53	**Close Generator Drain** (1 to 60 secs.)	
54	**Open Generator Drain** (1 to 60 secs.)	

**Exhaust, Jacket Charge, Seal and Unseal appear on the second "Set Too Long In..." screen.*

6.20.2 Interlocks

When sterilizer is equipped with double-doors, pressing INTERLOCK from Change Values screen advances screen to allow operator to select interlock type by means of numeric keypad. The interlock type is displayed as numeric code is entered. Default interlock type is "2," which designates Door A as Non-Sterile end of unit and Door B as Sterile end.

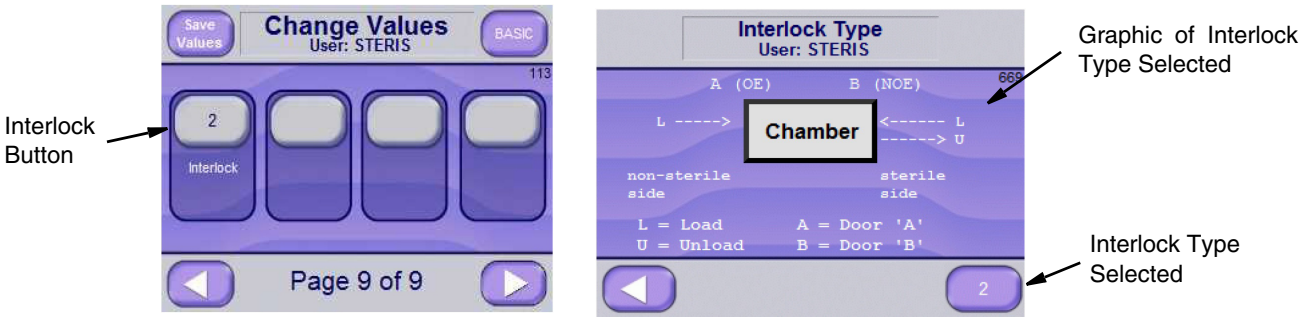


Table 6-2. Interlock Codes and Functionality

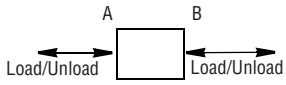
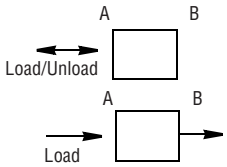
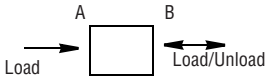
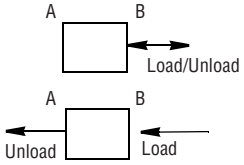
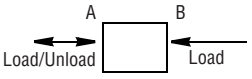
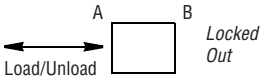
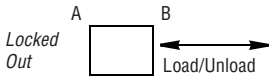
Code	Non-Sterile Door	Sterile Door	Comments	Concept Image
0	A	B	• No Interlocks. • Either door can be used to load/unload. • Both doors can be opened at same time. • At end of cycle, both doors automatically unseal.	
1	A	B	• Door A is designated as Non-Sterile end. • Sterilizer must be loaded from Door A. • Either door can be used to unload. • At end of cycle operator must manually unseal unload door by pressing **UNSEAL DOOR** button on touch screen.*,†	2 Options 
2 *Default*	A	B	• Door A is designated as Non-Sterile end. • Either door can be used to load sterilizer. • Sterilizer must be unloaded from Door B. • At end of cycle Door B is automatically unsealed.*,†	
3	B	A	• Door B is designated as Non-Sterile. • Sterilizer must be loaded from Door B. • Either door can be used to unload. • At end of cycle operator must manually unseal unload door by pressing **UNSEAL DOOR** button on touch screen.‡	2 Options 
4	B	A	• Door B is designated as Non-Sterile. • Either door can be used to load sterilizer. • Sterilizer must be unloaded from Door A. • At end of cycle Door A automatically unseals.‡	
5**	A	*Locked Out*	• Door A is designated as Non-Sterile end. • NOE Door is locked out. • Sterilizer must be loaded/unloaded from Door A. • At end of cycle Door A automatically unseals.	

Table 6-2. Interlock Codes and Functionality

Code	Non-Sterile Door	Sterile Door	Comments	Concept Image
6	B	*Locked Out*	• Door B is designated as Non-Sterile end. • Door A is locked out. • Sterilizer must be loaded/unloaded from Door B. • At end of cycle Door B automatically unseals.	

* Once Non-Sterile end door is opened, Sterile end door cannot be opened until a complete cycle has been run. If Sterile door is opened, Non-Sterile end door cannot be opened until Sterile end door is closed, sealed and another complete Sterilization cycle run to transfer interlock to Non-Sterile end door.

† Door Interlock Settings (Codes "1" and "3") require **UNSEAL DOOR** button to be pressed.

‡ Once Sterile end door is opened, Non-Sterile end door cannot be opened until a complete cycle has been run. If Non-Sterile end door is opened, Sterile end door cannot be opened until Non-Sterile end door is closed, sealed and another complete Sterilization cycle run to transfer interlock to Sterile end door.

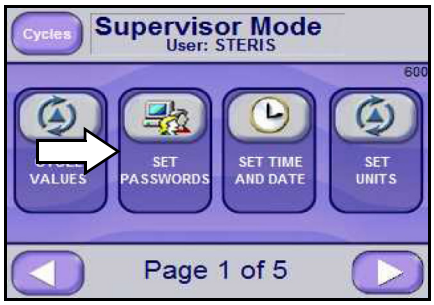
**Option Setting (Code "5") is used for Test Cycles, for example, Leak Tests.

***NOTE:** If interlock setting other than default ("2") is desired, a separate interlock type must be set for each cycle.*

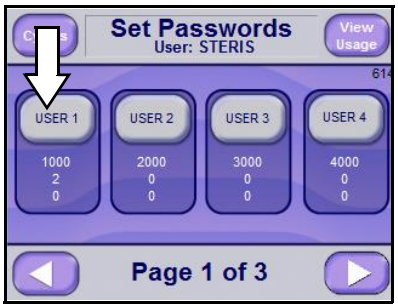
6.20.3 Set Passwords/ User Names

Set Passwords and/or User Name as follows:

1. From Supervisor Mode Screen (*Screen 600*), press **SET PASSWORDS** button to enable Set Passwords and change User Name functions. The Set Passwords Page 1 of 3 Screen (*Screen 614*) is displayed.



Selecting "Set Passwords"



Press this button to edit password parameters (next screen)

Password Parameters

2. Press desired button (User 1 through User 12) on screen to display Set Passwords Screen (*Screen 626*).

   *NOTE: Press **RIGHT ARROW** button on Screen 614 to see additional usernames and passwords (up to 12; Pages 2 of 3 and 3 of 3). Press **LEFT ARROW** button to return to Supervisor Mode screen (Screen 600).*

3. Press User Name button to add/change a user name using the resulting alphanumeric keyboard display. Press **ENTER** button to save value and return to previous screen. Added or changed User Name is visible on the User Name button.

4. Press Password button to add/change password using the resulting alphanumeric keyboard display. Press **ENTER** button to save value and return to previous screen. Added or changed password is visible on the Password button.

5. Press Level button. The text changes to OPERATOR MODE, SUPERVISOR MODE, and SERVICE MODE. Select access level for username.

   NOTE: Modes have the following access:

   0 = Operator Mode – operator mode only

   1 = Supervisor Mode – operator and supervisor modes

   2 = Service Mode – operator, supervisor and service modes

   3 = Disable Passwords – no username or password required

   NOTE:
   • First username is limited to access Mode 2 or Mode 3.
   • Only first username can access Mode 3.

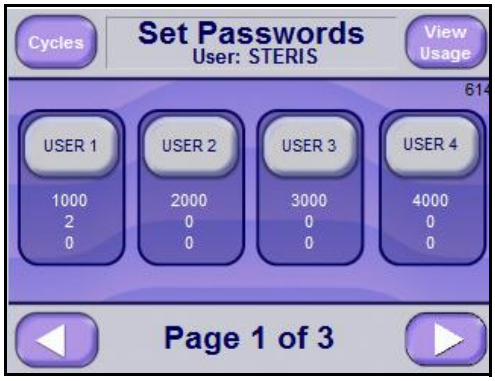
   NOTE:

6. Press top/lighter region of TIMEOUT to set password time out period (in minutes). A numeric screen appears to enter value.

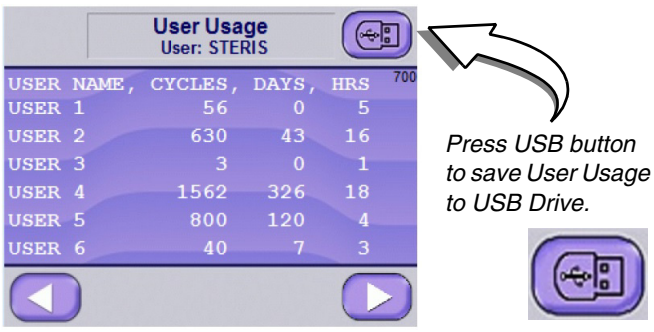
   NOTE: Time out period is as follows: If user does not press a button within the time out period, control logs-out user and display; user must log back in. A value of 0 is no timeout.

7. **User Usage** may also be set/determined as follows:

   NOTE: The Sterilizer control is setup to record the number of cycles and cycle time of the users. There are twelve possible users that can be programmed on the control and the control keeps track of each user's cycle operation. The number of cycles and total time are recorded for each user. The cycle time is an accumulation of cycle time in days and hours.

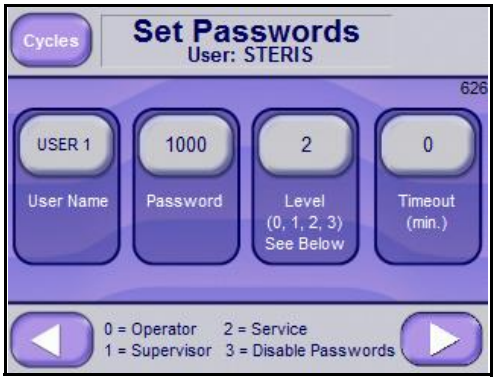


   a. On Set Passwords Screen (*Screen 614*), press **VIEW USAGE** to display User Usage Screen (*Screen 700*) as follows:



b. Press **RIGHT ARROW** button to see up to six additional User's cycle information (*Screen 701*). Press **LEFT ARROW** button to return to Set Passwords Screen (*Screen 614*).

c. User's Usage for Cycles, Cycles Days and Cycles Hours can be modified from Set Passwords Screen (*Screen 614*). Press desired **USER#** button to display Individual User data screen (*Screen 626*) as follows:

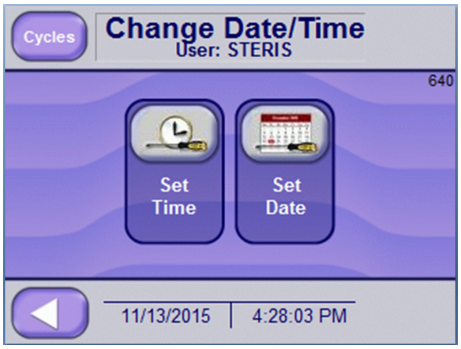


d. Press **RIGHT ARROW** button to display individual User Stats Screen (*Screen 702*). Press **LEFT ARROW** button to return to Set Passwords Screen (*Screen 614)*.

e. User's Usage stats for Cycles, Cycles Days and Cycles Hours can be modified by pressing desired button and changing value using numeric screen that appears. A similar screen is shown for all twelve Users. **LEFT ARROW** button to return user to display individual User Usage Individual Stats Screen (*Screen 626*).

6.20.4 Set Date and Time

From Supervisors Mode Screen (*Screen 600*), press **SET TIME AND DATE** button. Change Date/Time Screen (*Screen 640*) is displayed.



From *Screen 640*, press **Set Time** to enter time. A new screen appears allowing Hours, Minutes and Seconds to be set. Pressing **LEFT ARROW** returns user to Supervisors Mode Screen (*Screen 600*).

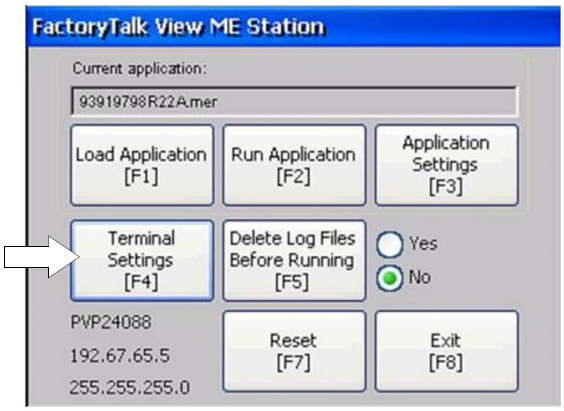
From *Screen 640*, press **Set Date** to enter a new date. A screen appears allowing the Month, Day and Year to be set.

Press **LEFT ARROW** to leave Date/Time Screen (*Screen 640*).

6.20.5 Set Date and Time (Formats)

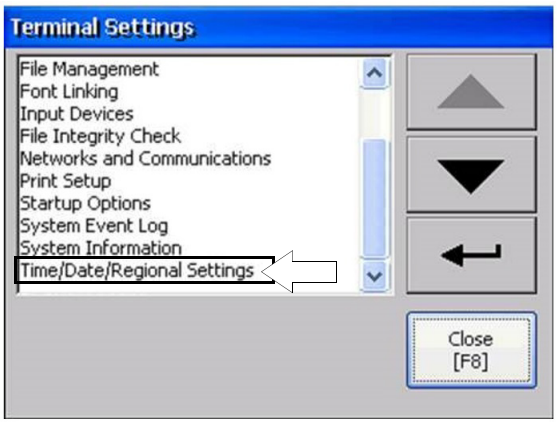
To set hour and date formats on the display and printouts, follow these steps.

1. Access **FactoryTalk View ME Station** (see following image). To access initial screen, press on the upper right section of the Standby screen (screen 1).
2. Press Terminal Settings [F4] button.



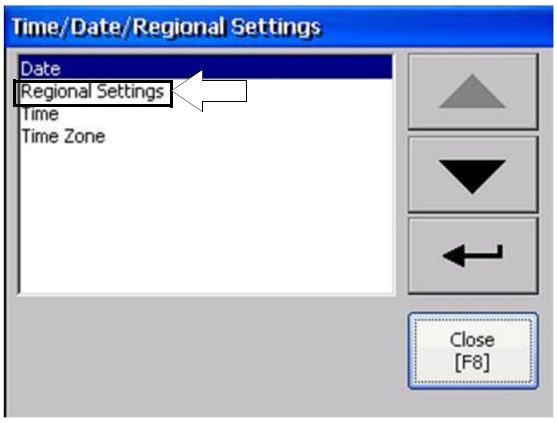
Terminal Settings screen displays (following image).

3. Scroll down to, and click on Time/Date/Regional Settings selection.

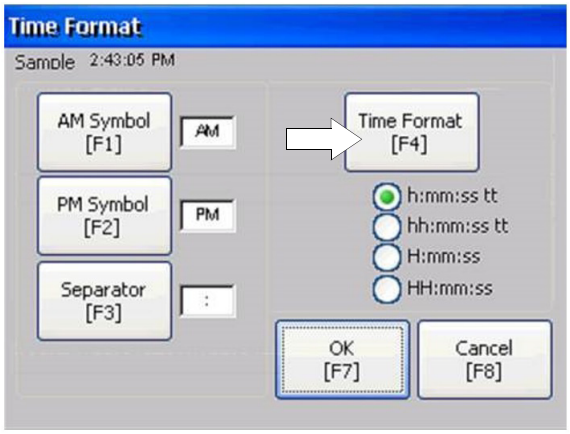


The associate Time/Date/Regional Settings screen displays (following image).

4. Select and click on Regional Settings.

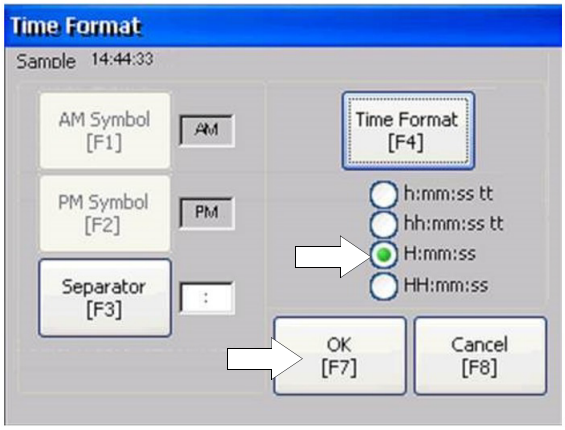


5. From resulting Regional Settings screen, select and click on From resulting screen, press Time Format [F4] button.



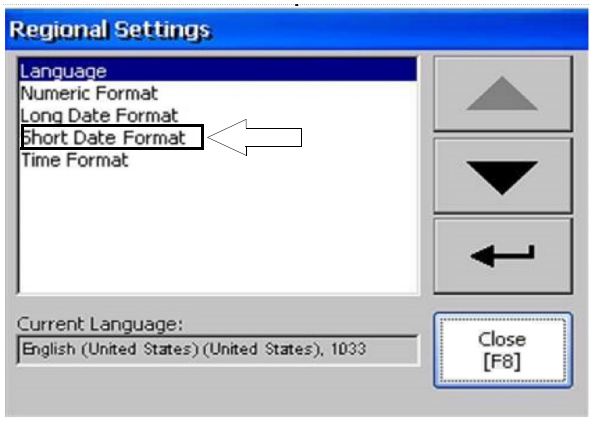
6. Select desired time format. And then press OK [F7].

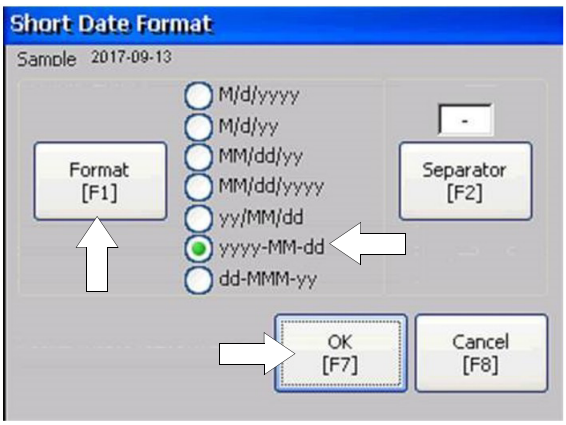
In following example, H:mm:ss (24 hour military time) is selected.



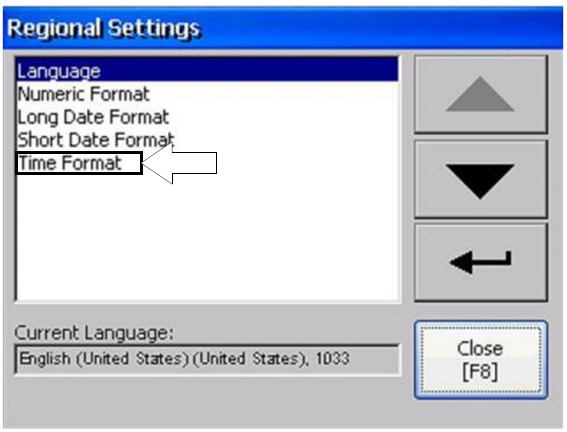
After pressing OK, Regional Settings screen displays (below, left).

7. Select Short Date Format to access Short Date Format screen.





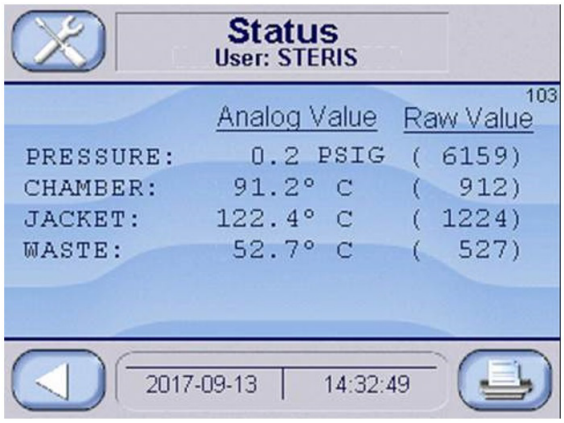
8. Time Format.



9. On Short Date Format screen, select desired date format; then press OK [F7].

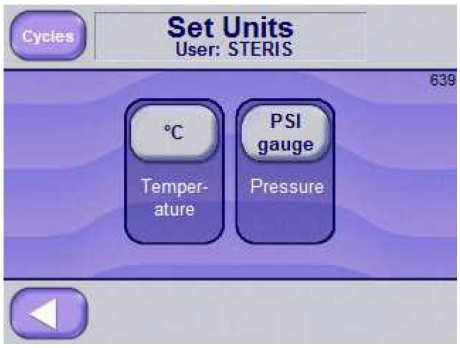
10. Press Format [F1] to select format that you want.
11. Press OK, Close, Close, Close and then Run Application (not shown).

New time and date formats now display on screens and subsequent printouts.



6.20.6 Set Units

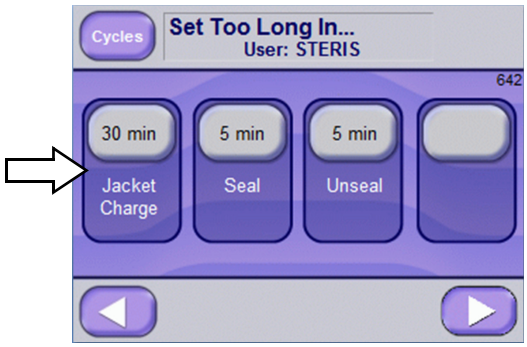
From Supervisors Mode Screen (*Screen 600*), press **SET UNITS** button to change or view set units. Set Units Screen (*Screen 639*)is displayed.



Press buttons to change units. Value is shown on button: Temperature units are °C and °F; Pressure units are psig/inHg and bar. Press **LEFT ARROW** to return to Supervisors Mode Screen (*Screen 600*).

6.20.7 Machine Number

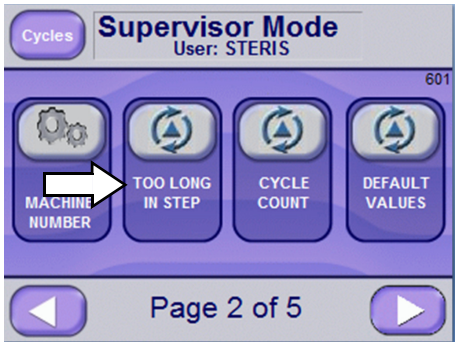
From Supervisors Mode Screen (*Screen 600*), press **SET MACHINE NUMBER** button. Set Machine Number Screen (*Screen 46*) is displayed.



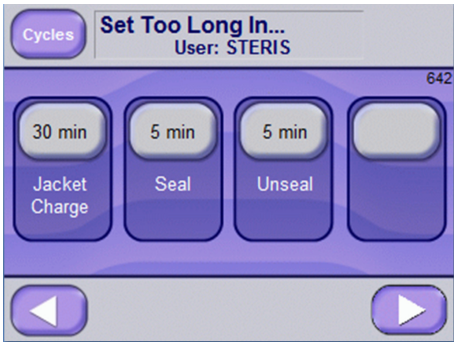
Press top/lighter region of Machine Number button. Enter numeric value and press ENTER. New value is shown.

6.20.8 Too Long In Step

From Supervisors Mode Screen (*Screen 600*), press **TOO LONG IN STEP** to view Set Too Long In ... Screen (*Screen 641*).



2. If applicable, press **RIGHT ARROW** button to access additional parameters. Following screen appears:



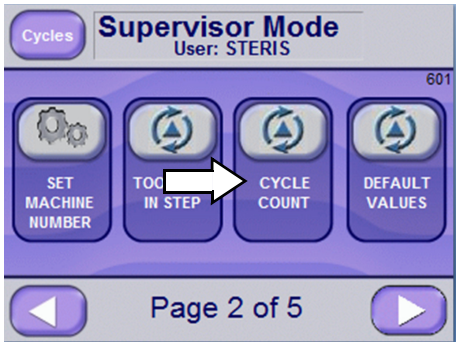
3. For applicable parameter, press time section of associated button, for example, **Air Break** button.

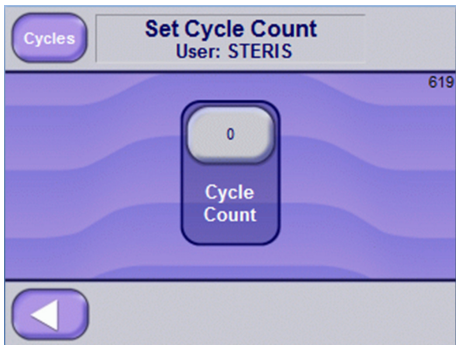
4. On resulting numeric keypad display, enter new time value and press **ENTER**.

The new value is shown on screen, in place of previous value.

6.20.9 Cycle Count

From Supervisors Mode Screen (*Screen 600*), press **CYCLE COUNT** button to change or view cycle count. Set Cycle Count screen is displayed.

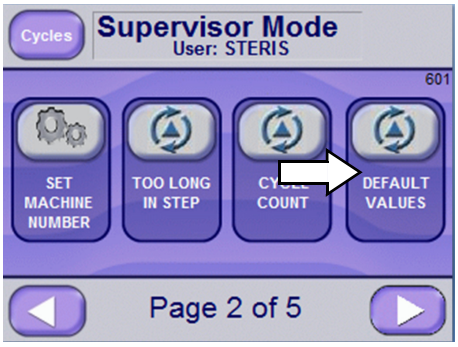


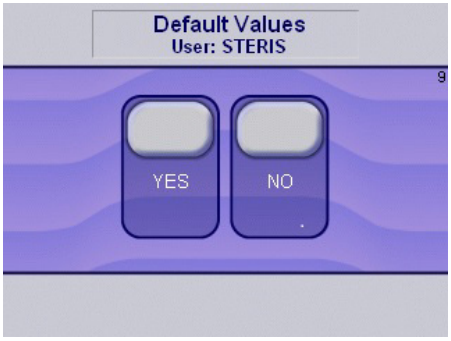


On Cycle Count screen, press button to change cycle count. A numeric display is shown to enter value. Enter numeric value and press **ENTER** button. The new value is shown. Range is 0 - 32767.

6.20.10 Default Values

From Supervisors Mode Screen (*Screen 600*), press **DEFAULT VALUES** button to default values. The Default Values screen is displayed.





Press **YES** to default all values:

- Cycle Values
- Too Long In Step
- Units
- Machine Number
- Cycle Count

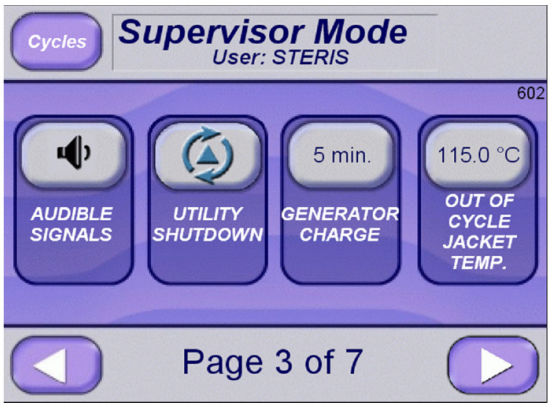
NOTE: Calibration values are not defaulted.

Press **NO** to cancel default values. Display returns to previous screen.

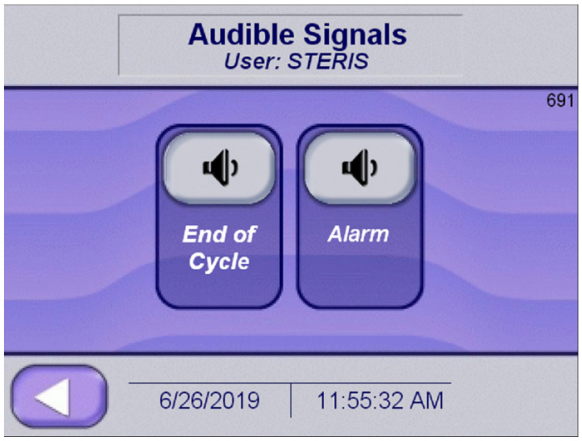
6.20.11 Audible Signals

The control has a speaker that will sound when a button is pressed, when cycle completes, or when an alarm occurs.

In Supervisor mode, AUDIBLE SIGNALS button will be shown.



Press this button to make changes to sound levels.



The optional sound levels for End of Cycle and Alarm are shown below. When buttons are pressed sound level will be played. Alarm does not have a selection to turn sound off.

Sound off

Low level sound

Medium, sound

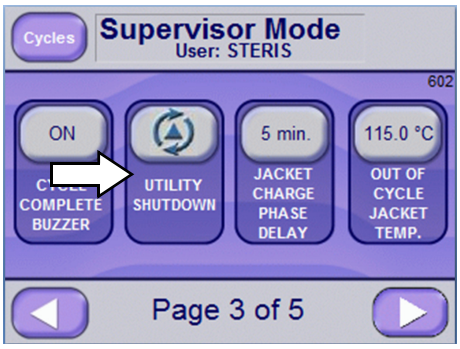
High sound level

6.20.12 Utility Shutdown

The Utility Shutdown feature allows the jacket steam and the generator (if present) to be automatically turned off during programmed time intervals. This allows the steam utility to be conserved when the sterilizer is not in operation for a period of time.

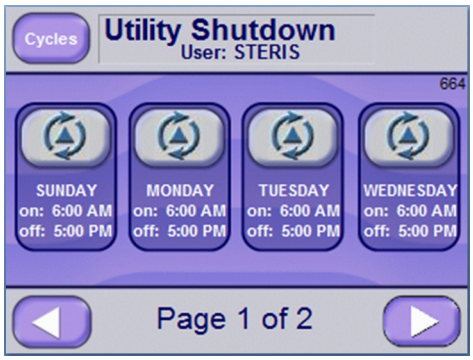
The Utility Shutdown feature may be accessed in the Supervisor Mode (see *SECTION 6.19, OPTIONS SCREEN*, on how to access the Supervisor Mode).

NOTE: On double door sterilizers, the utility shutdown parameters can only be changed on display "A".



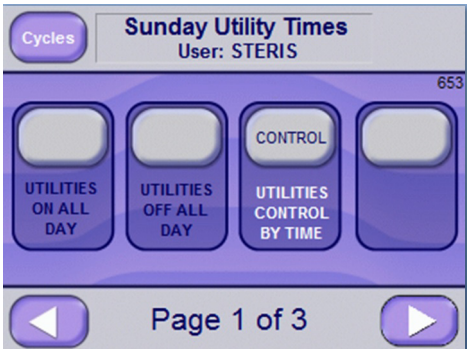
1. From Supervisors Mode Screen (*Screen 602*), press **UTILITY SHUTDOWN** button

   UTILITY SHUTDOWN modes can be selected individually for each day of the week. The Utility Shutdown Screen Page 1 of 2 (*Screen 664*) appears and shows the first four weekdays. Utility Shutdown Screen Page 2 of 2 shows the remaining days.



Each day button shows on and off times (restart and shutdown times). Buttons may also show **OFF ALL DAY** or **ON ALL DAY**.

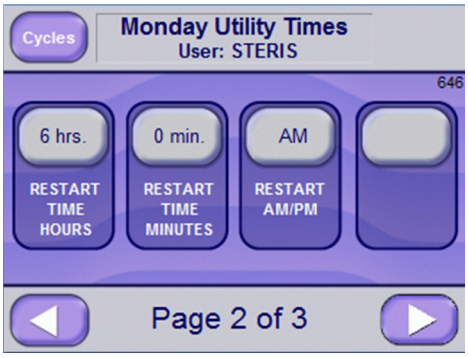
2. Press desired day button. Three different modes can be selected for each day of the week:
   - UTILITIES ON ALL DAY
   - UTILITIES OFF ALL DAY
   - CONTROL BY TIME



UTILITIES ON ALL DAY – When selected, Utility Shutdown Screen does not show for associated day. Utilities operate normally during entire day.

UTILITIES OFF ALL DAY – When selected, Utility Shutdown Screen shows and utilities are off entire day.

CONTROL BY TIME – When selected, following screen appears:



Restart times are set on Page 2 of 3 screen (above).

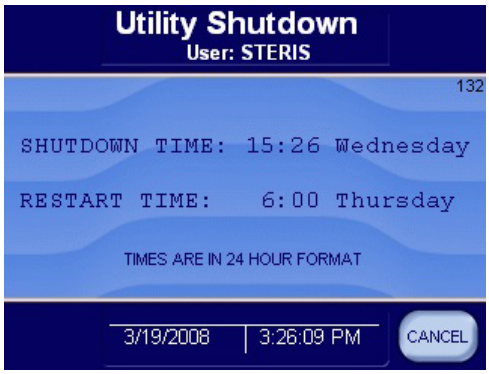
Shutdown times are set on Page 3 of 3.

Default settings are for restart at **6 am** and shutdown at **5 pm**.

UTILITY SHUTDOWN occurs on any screen except for:

- UTILITY SHUTDOWN setup screens
- Cycle, excluding the complete phase.

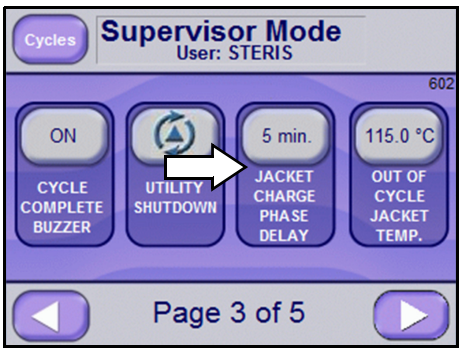
When shutdown time is reached, a screen similar to shown Utility Shutdown Screen (Screen 132) appears, showing Shutdown and Restart times.



*NOTE: Pressing the **CANCEL** button restarts utilities to run a cycle or another operation. After the cycle is complete, utilities shutdown, as long as the restart time has not been reached.*

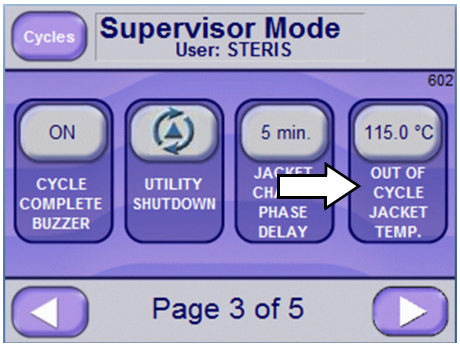
6.20.13 Jacket or Generator Charge Phase Delay

Jacket or Generator Charge Phase Delay is used to set a delay time such that after a cycle is started, if the jacket is not up to temperature for the time set, the jacket charge phase will continue for set delay time.



6.20.14 Out of Cycle Jacket Temperature

Out of Cycle Jacket Temperature is maintained jacket temperature when out of cycle, unless Green Mode (see *SECTION 6.20.16, GREEN MODE*) is in effect. After a liquid cycle, the jacket remains off until the door is closed.

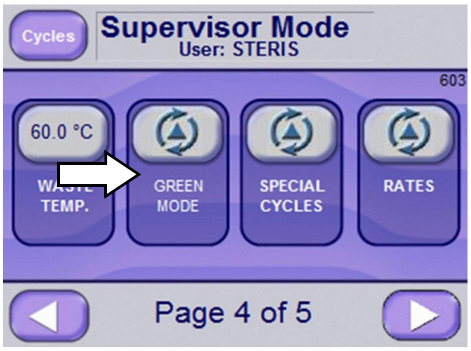


6.20.15 Waste Temperature

The **WASTE TEMP.** button is used to adjust Waste Temperature setpoint to a value within range of 40-60°C (104-140°F).

6.20.16 Green Mode

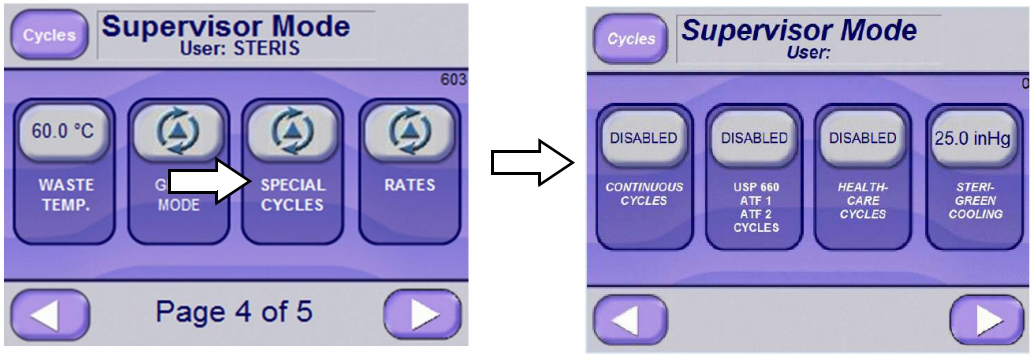
When sterilizer is out of cycle, Green Mode turns jacket off after a programmed time. Setting a value of 0 for both hours and minutes disables Green Mode.



6.20.17 Special Cycles

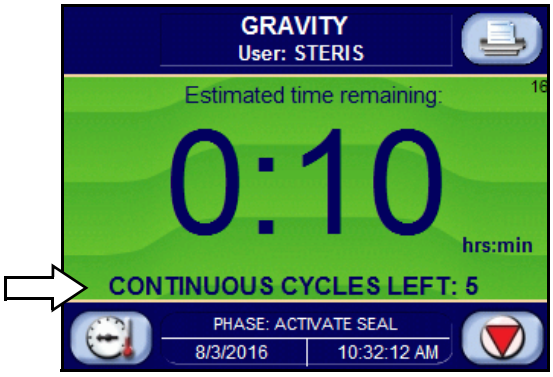
Continuous Cycles

Cycles can be setup to run continuous. The number of continuous cycles and the hold time can be set. The continuous can be **ENABLED** or **DISABLED**.

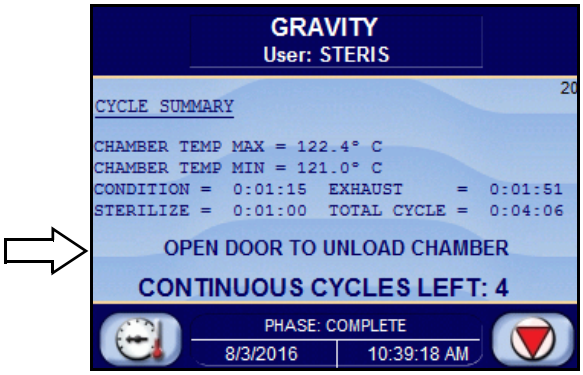


Continuous Cycles can be set when associated cycle is ready to run. Continuous Cycles can also be set from Change Values.

Number of Continuous Cycles remaining is shown on operation screen when cycle is run with Continuous Cycles selected (as shown on *Screen 16* below).



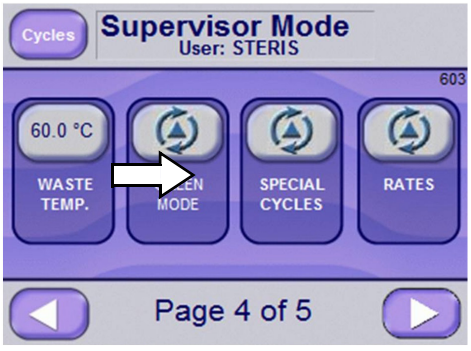
During Complete phase, if any Continuous Cycles remain, **do not manually open the door** (door opens automatically at completion of Continuous Cycle for Hold Phase, see sample *Screen 20*). Control orders cycle completed if user opens door.

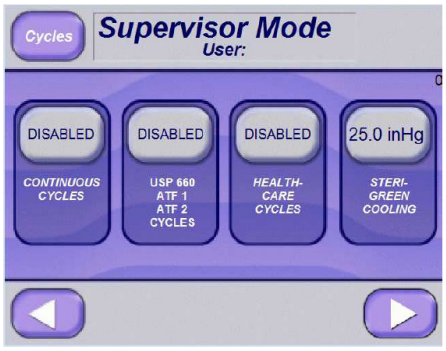


Door opens and chamber remains open for selected hold time (Hold Phase; see sample *Screen 16*). Hold Phase allows product and chamber to cool down for next cycle. After hold time, door automatically closes and same cycle repeats from beginning.

USP 660, ATF 1 and ATF 2 Cycles

USP 660, ATF 1 and ATF 2 cycles can be ENABLED or DISABLED. When ENABLED, cycle type can be set in Change Values.

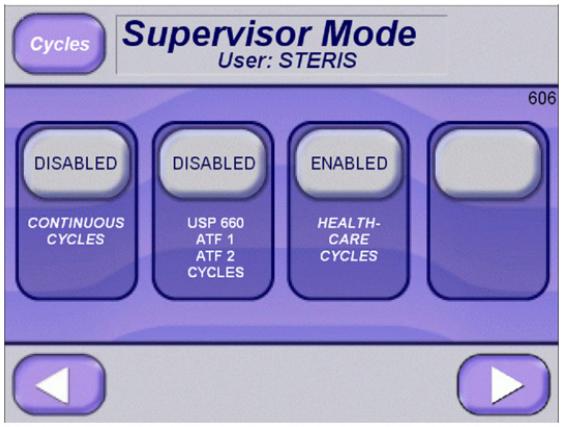




6.20.18 Healthcare Cycles

Healthcare cycles can be run on Life Science Sterilizer by selecting SPECIAL CYCLES in Supervisor mode.

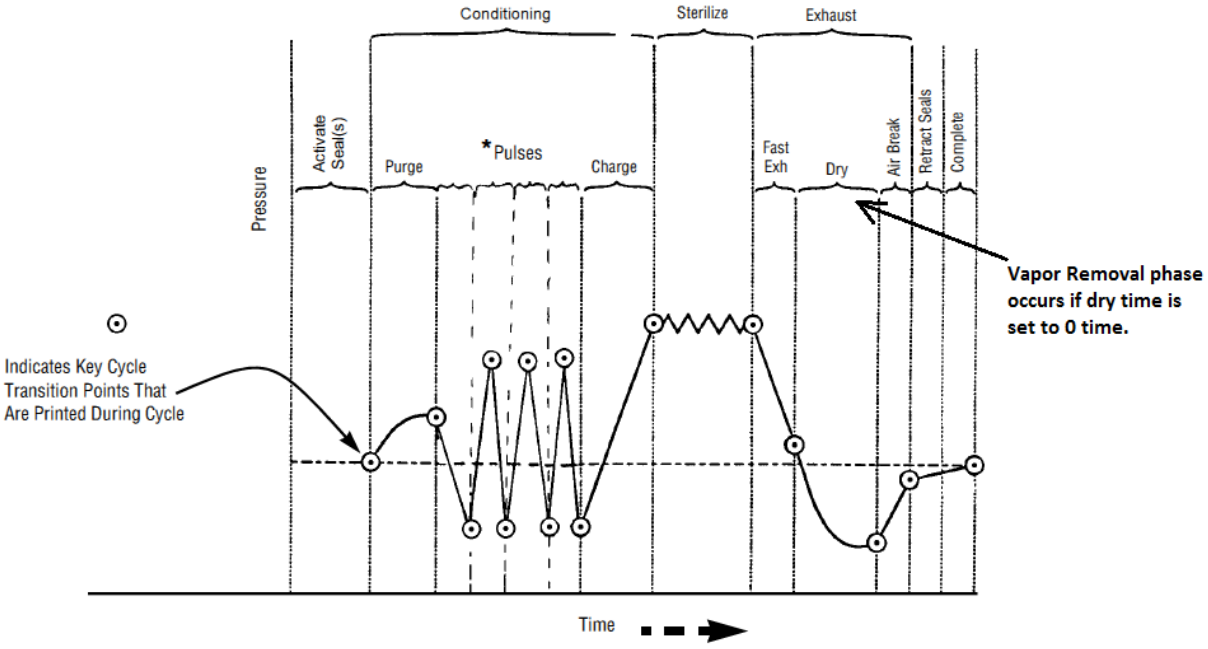
The following screen is shown.



Select ENABLED in HEALTHCARE CYCLES option button to run Prevac and Gravity Healthcare cycles.

Healthcare Prevac Cycle

The Healthcare Prevac cycle graph is shown below.



* The pulses will pull for one minute before cycle transitions when Pulse Vacuum value is reached.

The following parameters are not included in Healthcare Prevac cycle but are included in Life Science Prevac cycle.

Exhaust Type (set to Fast Exhaust)

Vacuum Dry

Slow Exhaust First Rate

Slow Exhaust First Transition

Slow Exhaust Second Rate

Slow Exhaust Second Transition

Vapor Removal

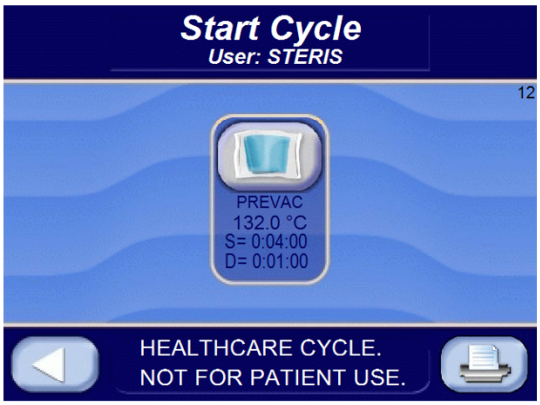
Jacket Temperature

Sterilize Control (set to Drain)

Air Detector (no Air detector option on Healthcare cycle)

Cycle Operation

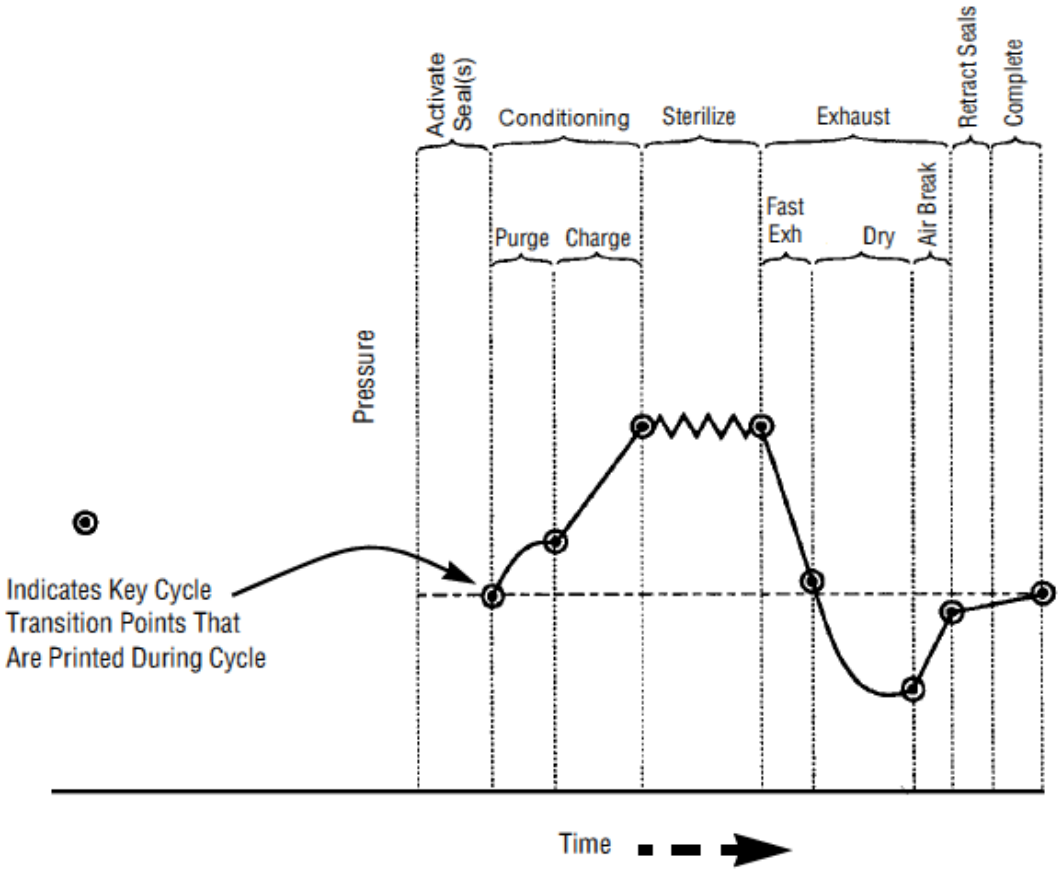
When Healthcare Prevac cycle is started, the following will be shown.



Screen will indicate that it is a Healthcare cycle. It will also indicate that it is Not for Patient Use. Press Prevac icon to run Healthcare Prevac cycle.

Healthcare Gravity Cycle

Healthcare Gravity cycle graph is shown below.



The following parameters are not included in Healthcare Gravity cycle but are included in Life Science Gravity cycle.

Vacuum Dry

Jacket Temperature

Sterilize Control (set to Drain)

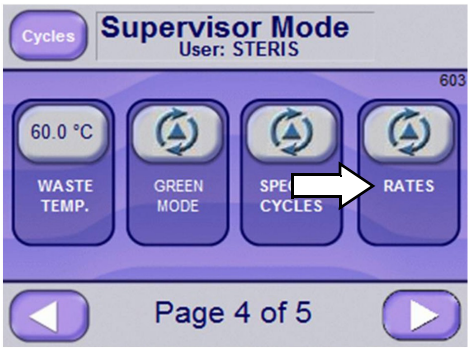
Cycle Operation

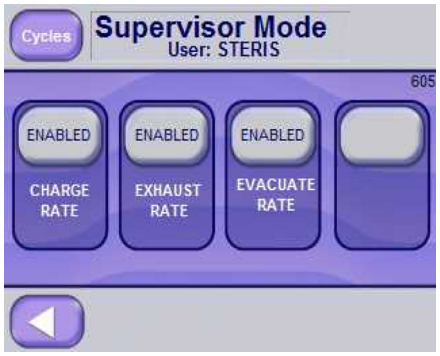
When Healthcare Gravity cycle is started, the following will be shown.

Screen will indicate that it is a Healthcare cycle. It will also indicate that it is Not for Patient Use. Press Gravity icon to run Health Care Gravity cycle.

6.20.19 Rates

Used to enable or disable rates for Charge, Exhaust and Evacuate. The enabling (disabling) of the rates are independent; for example, Charge Rate can be enabled while Exhaust and Evacuate rates are disabled.





When a rate is enabled, it can be adjusted through use of the associated Change Values screen. The Charge Rate allows pressure rate to control from end of purge or end of last pulse to Sterilize phase. Exhaust Rate allows pressure rate to control from end of Sterilize to beginning of Vacuum Dry phase. Evacuate Rate allows pressure rate to control from start of Vacuum Dry phase to end of Dry.

6.20.20 E-mail Alert System

AMSCO® 110LS and AMSCO® 250LS Small Sterilizers include an email alert system which can notify users, by email, of certain sterilizer conditions and when preventive maintenance is due. Notification topics are discussed later in this section of the manual.

To use the e-mail system, it must first be configured for use.

NOTE: E-mail setup is only required for first-time use and when network and/or system-user changes must be made.

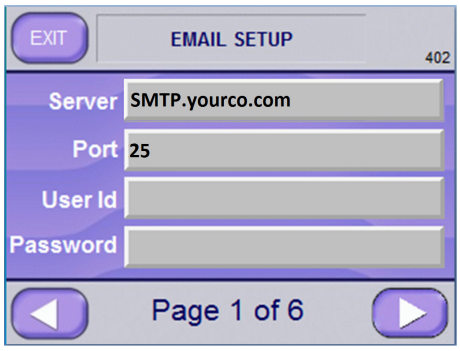
E-mail Setup

1. From Supervisor Mode Screen Page 5 of 5 (*Screen 603*), select **E-MAIL OPTIONS** button.

   NOTE: Discuss e-mail setup with your company's IT Department and/or Network Administrator before beginning setup procedure.

   NOTE: First time the unit is powered up, it automatically tries connecting to network.

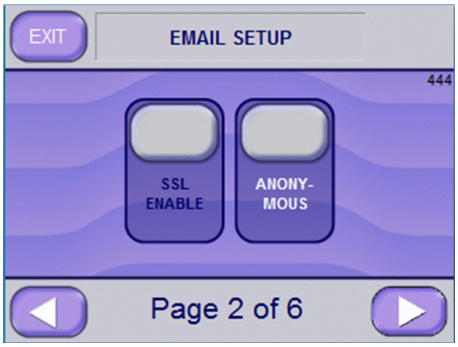
2. *[Optional]* Enter Server, Port, User Id and Password on Email Setup Screen Page 1 of 6 (*Screen 402*).



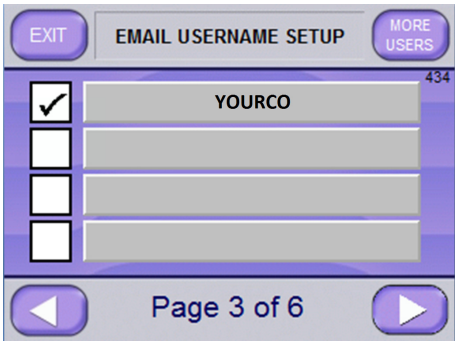
In regard to email setup:

- **Server** is usually setup in the format: SMTP.xxxx.com, where xxxx is the company associated with the email.
- **Port** is usually set to 25.
- **User Id** and **Password** may be necessary to connect to network. This information should be available from network administrator or IT department.

3. Press **RIGHT ARROW** button to advance to next screen.



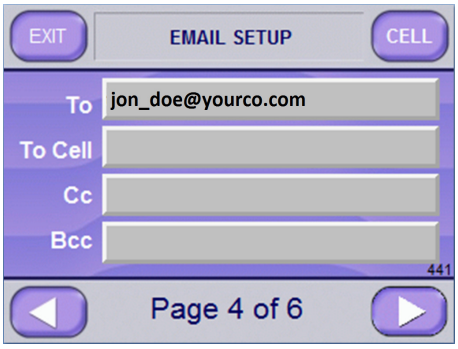
4. *[Optional]* Select **SSL ENABLE** or **ANONYMOUS,** if suggested to do so by your Network Administrator or IT Department. Both settings are part of Network Setup; both are optional. In Email Setup Screen Page 2 of 6 (*Screen 444*), note that ANONYMOUS is selected.
5. Press RIGHT ARROW button to advance to next screen (*Screen 434*).



Email Setup Screen Page 3 of 6 (*Screen 434*) lists all users currently set to use sterilizer e-mail system. Each user can independently set e-mail system preferences.

Note that pressing **MORE USERS** button, upper right of screen, displays additional users, if applicable.

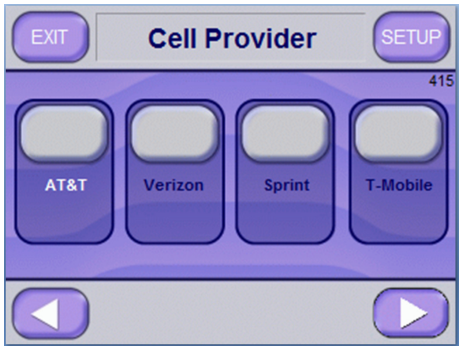
6. Press the **RIGHT ARROW** button to advance to next screen, i.e., Email Setup Screen Page 4 of 6 (*Screen 441*).



7. Enter intended email recipient addresses in appropriate lines (*Screen 441*). Each line can contain multiple addresses, if separated by a comma and does not exceed 82 characters.

   NOTE: The "To Cell" text box is for the purpose of sending Cell Phone text messages.

8. Enter cell number into "To Cell" box, then press **CELL** button (upper right of screen); this accesses CELL PROVIDER screen (*Screen 415*).



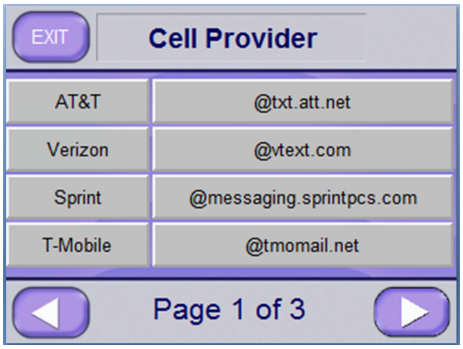
9. To setup Cell Provider, push appropriate button and then press **SETUP** button (upper right of screen).

   To access additional providers, push **RIGHT ARROW** button to advance screen.

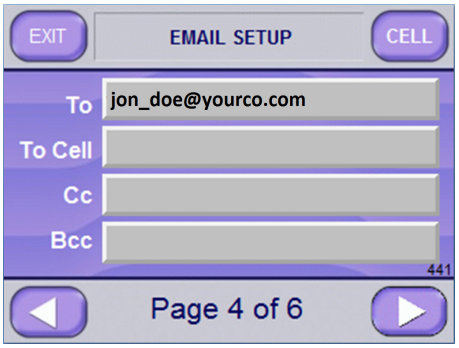
   Providers available at time of this publication are:

   - AT&T
   - Verizon
   - Sprint
   - T-Mobile
   - Virgin
   - Boost
   - US Cellular
   - EMEA1
   - EMEA2

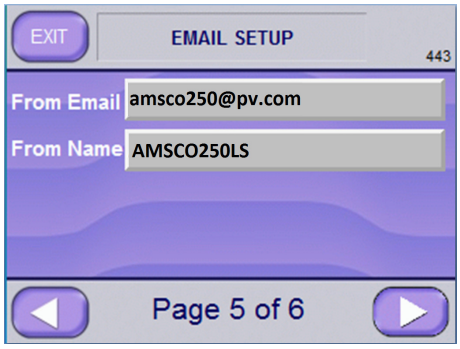
An example of a Cell Provider setup screen follows:



10. From Cell Provider screen, press **EXIT** button (upper left of screen) to return to higher level provider screen; then press **EXIT** on that screen.
    The Email Setup Screen Page 4 of 6 (*Screen 441*) displays.



11. Press **RIGHT ARROW** button to advance screen. Email Setup Screen Page 5 of 6 (*Screen 443*) appears.



12. Enter supervisor's email address in **From Email** text box; and enter his or her name in **From Name** text box.

    NOTE: A different email address and name can be entered, but as the sterilizer can receive emails, use of the supervisor's contact information is recommended.

13. Press the **RIGHT ARROW** button to advance to the Test Email Setup Screen Page 6 of 6 (*Screen 446*).

14. Press **TEST** button (upper right). If setup is correct, STATUS displays:

    "EMAIL SENT SUCCESSFULLY"

15. Verify the "To" address receives the email.

    NOTE: If the STATUS indicates an error, use the **LEFT ARROW** *button to view earlier setup screens and correct the error. Involve IT Department and Network Administrator if needed.*

16. After test completes successfully, press **EXIT** button to reach Supervisor Mode Page 5 of 7 Screen (*Screen 603*).

Setting E-Mail Options

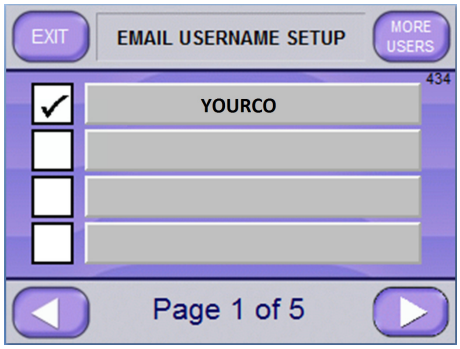
The email alert system which can notify users, by email, of certain sterilizer conditions and when preventive maintenance is due.

After the system has been configured for the network, as described in the preceding section, e-mail options can be set on an individual basis, in other words, multiple recipients can receive different types of information from the sterilizer.

NOTE: Before setting e-mail options, system must be set as previously described.

To configure email options, proceed as follows:

1. From Supervisor Mode Page 5 of 5 Screen (*Screen 603*), press **E-MAIL OPTIONS** button. The Email Username Setup Screen (*Screen 434*) appears.

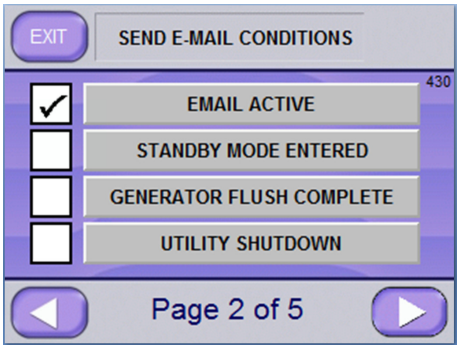


   NOTE: Screen 434 lists users currently setup to use sterilizer email system.

2. The following options can be set for One user, multiple users or all users:

   NOTE: Pressing **MORE USERS** *button (upper right) lists additional users, if applicable.*

   a. Press **RIGHT ARROW** button to advance to Send Email Conditions Screen Page 2 of 5 (*Screen 430*).



NOTE: E-mails are only sent if EMAIL ACTIVE is selected.

b. Select all desired conditions for which emails are to be sent. Each recipient can have a different set of conditions. To access additional conditions, push **RIGHT ARROW** button

Conditions available for selection, from the "Send E-mail Condtions" screens are as follows:

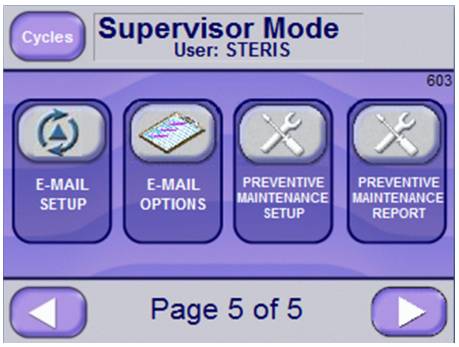
E-MAIL CONDITION	SCREEN PAGE
❑ EMAIL ACTIVE	
❑ STANDBY MODE ENTERED	Page 2 of 5
❑ GENERATOR FLUSH COMPLETE	
❑ UTILITY SHUTDOWN	
❑ START OR UTILITY RESTART	
❑ CYCLE STARTED	Page 3 of 5
❑ CYCLE ABORTED	
❑ CYCLE COMPLETED	
❑ ABORTING ALARMS	
❑ NON-ABORTING ALARMS	Page 4 of 5
❑ SUPERVISOR MODE ENTERED	
❑ CYCLE VALUES CHANGED	
❑ USERNAME, PASSWORD CHANGED	
❑ SERVICE MODE ENTERED	Page 5 of 5
❑ CALIBRATION CHANGED	
❑ CONFIGURATION CHANGED	

*NOTE: If **EMAIL ACTIVE** is selected, other selected conditions, when the condition is triggered, result in email notifications of the condition(s) being sent to associated recipients. If **TO CELL** was set (during address setup), associated recipients receive a text message regarding the triggered condition(s).*

c. Press **RIGHT ARROW** button to advance to remaining screen pages and select desired conditions.

Preceding list shows all conditions currently available for selection, as well as screen page on which they are located.

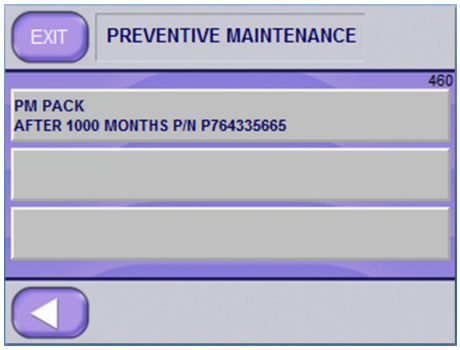
d. After making all selections, press **EXIT** button (upper left corner of screen) to access Supervisor Mode Page 5 of 5 Screen (*Screen 603*).



Setup for Preventive Maintenance Notification

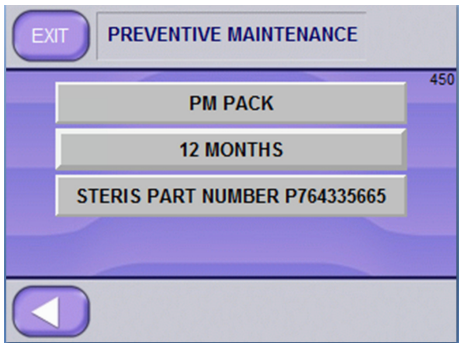
Setup the email alert system to notifying recipients when preventive maintenance is due.

1. From Supervisor Mode Page 5 of 5 Screen (*Screen 603*), press **PREVENTIVE MAINTENANCE REPORT** button. A similar screen displays:



NOTE: The system sends notice (by email and/or phone text) when a PM Pack is due. Two additional notifications can be added by pressing on the blank buttons and editing the resulting screen parameters (see Screen 450).

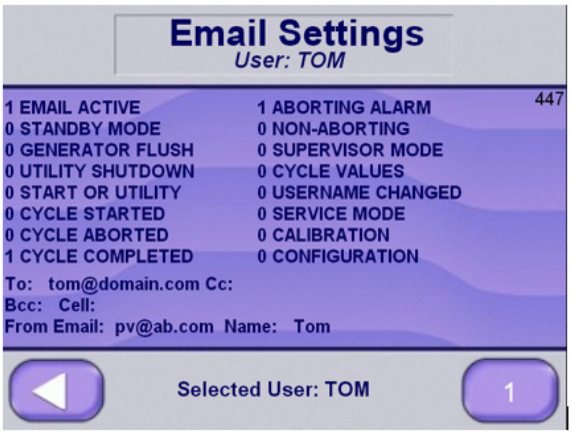
2. Press **PM Pack** button (first line in above example) to modify existing information or press on blank button to create a new notification. When a **PM Pack** button is pressed, a similar screen appears:



3. Press on applicable text button to edit information. In above example 1000 MONTHS has been changed to **12 MONTHS**.
4. If needed, press **LEFT ARROW** button to return to initial Preventive Maintenance screen.
5. Press EXIT (upper left of screen) to return to Supervisor Mode Screen Page 5 of 7 (*Screen 604*).

Supervisor Mode Email Setup

Press Email View button to view Email Setup and Option Values.



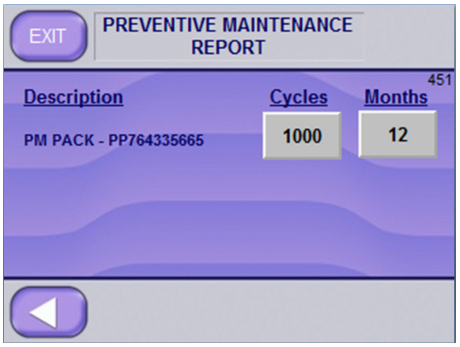
The "1" indicates that option is selected, "0" indicates that it is deselected.

The lower right button will indicate which user is selected. The email to and from email settings are shown for that user as well as email options.

Editing the Preventive Maintenance Report

The Preventive Maintenance Report screen can hold three text lines pertaining to PM packs. To view and/or edit the report:

1. Go to Supervisor Mode Screen Page 5 of 5 (*Screen 603*).
2. Press **PREVENTIVE MAINTENANCE REPORT** button. Preventive Maintenance Report Screen (*Screen 451*) appears:



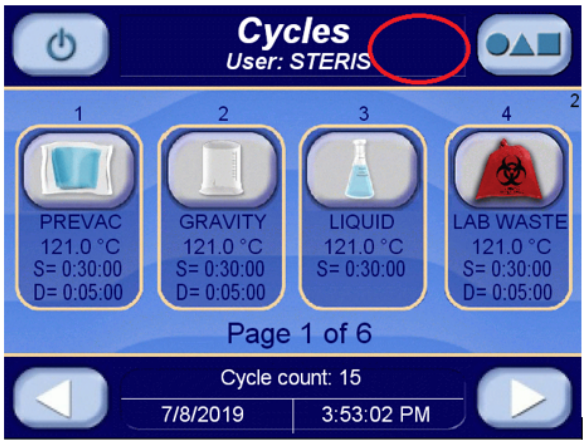
NOTE: PM Report screen lists up to three PM pack descriptions (our example shows only one PM Pack). Each descriptive line, in addition to PM description, indicates number of cycles run and number of months passed since last PM notification was sent.

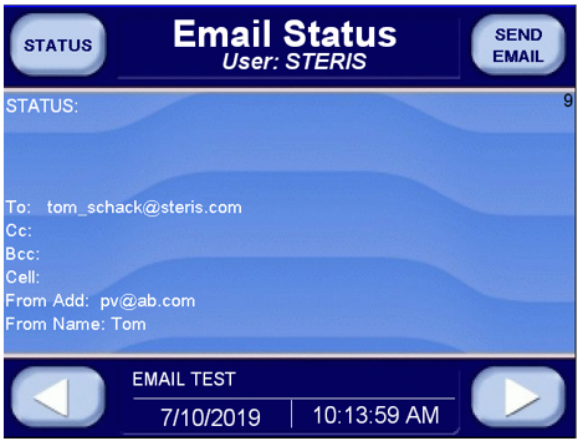
3. Press **Cycles** button to edit the cycles value, if applicable.
4. Press **Months** button to edit the months value, if applicable.
5. Press **LEFT ARROW** or **EXIT** button to return to Supervisor Mode Screen Page 5 of 5 (*Screen 603*).

Email Alert System

Press upper part of the Cycles screen (screen 2 through 7) to show email settings screen.

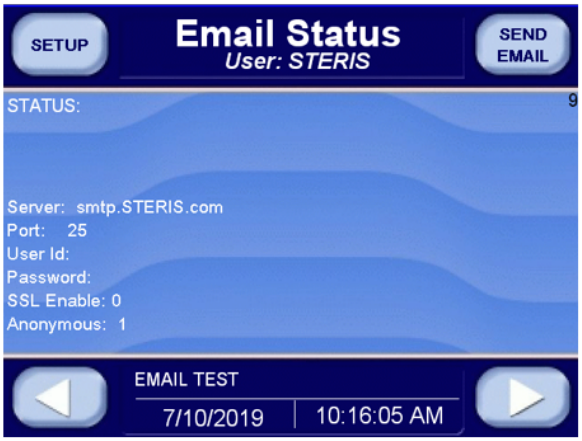
The following screen is shown.





The screen shows who is going to receive the email and who it is from. This is Email Status.

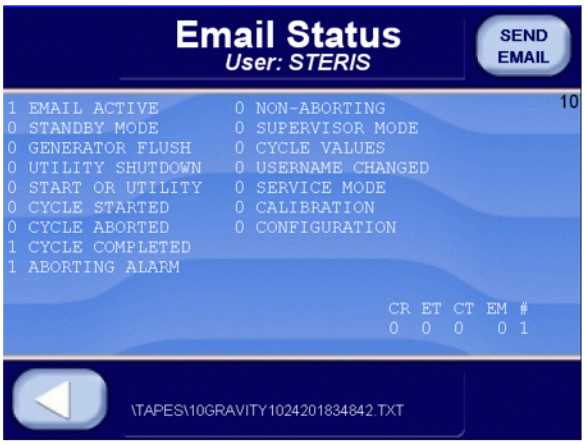
Press STATUS button to show the following information.



Screen shows network setup information. This is Email Setup.

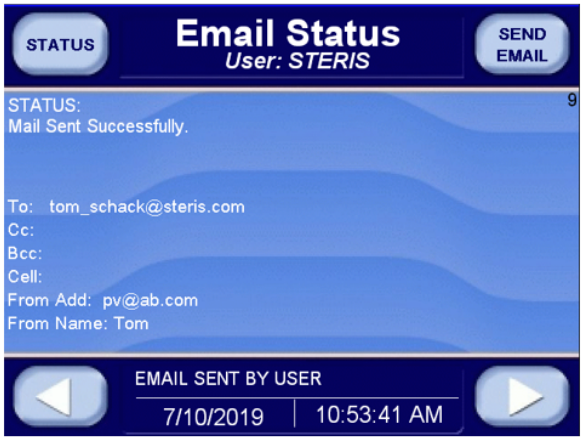
Press SETUP button to go back to showing email status.

Press right arrow button to show following screen.

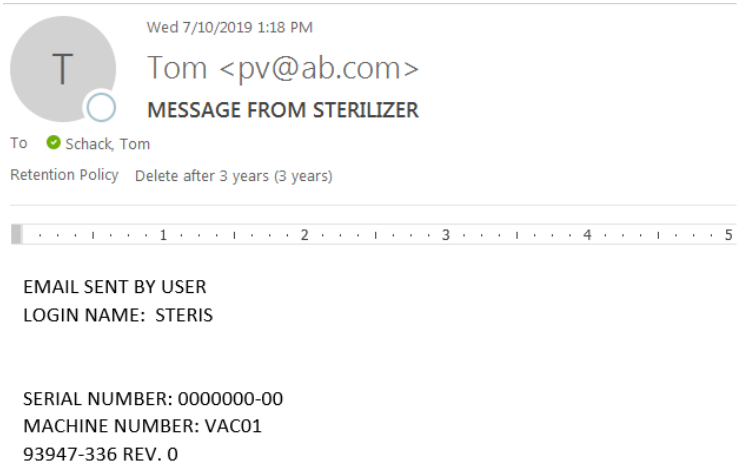


The "1" in front of description indicates the option is selected. "0" indicates the option is not selected. The "CR ET CT EM and #" are used for diagnostics.

Press SEND EMAIL button to send an Email Test to user(s) shown in Email Status with Email Setup information.



The following email will be sent.



Wireless Ethernet

For the Sterilizer to utilize the email alert system, the Sterilizer needs to be connected to the facility's Ethernet. There are two ways to connect to the Ethernet: an Ethernet cable from the display to the building's Ethernet port, or it can be connected wireless if the building has an active wireless network.

This section explains how to connect to an active wireless network. In both methods, the Sterilizer needs to access an available email server. This needs to be verified and the settings made on the Sterilizer display. Setup the Ethernet Adapter as follows:

1. Customer must supply an Ethernet adapter. Other Ethernet adapters may work, but the Ethernet adapter chosen for this description is a Universal Wi-Fi N Adapter from IOGEAR (model number GWU627).
2. Verify Ethernet adapter encryption method is same as facility's encryption method. WEP, TKIP, AES, WPA and WPA2 are provided with this model number.
3. Connect adapter to a computer (see *FIGURE 6-5*). USB port on adapter is plugged into a USB port on computer and Ethernet port on adapter is plugged into Ethernet port on computer.

Figure 6-5. Ethernet Adapter Setup

Configure the computer's Local Area Connection for the following IP address and Subnet mask (see *FIGURE 6-6*):

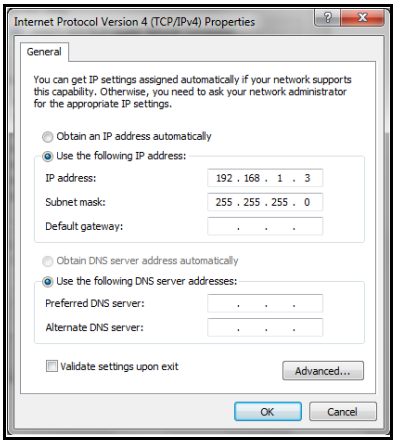
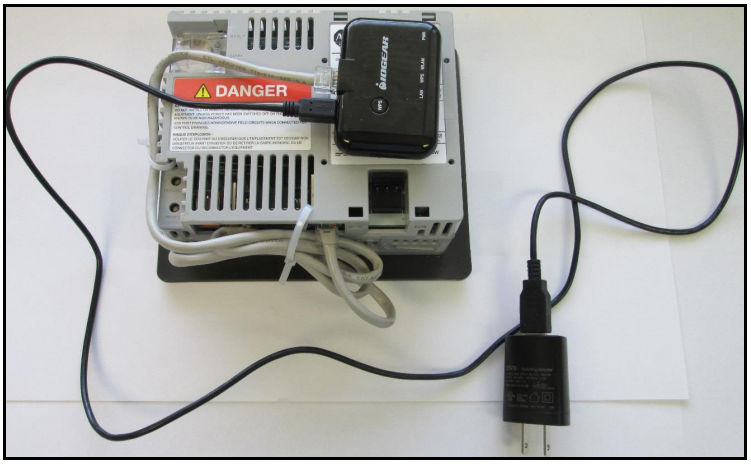


Figure 6-6. Set IP and Subnet Mask

1. Open web browser and enter **192.168.1.252**.
2. The following screen appears. A network connection is shown if adapter successfully connects to facility's wireless network. Press **Connect** button to establish connection. Press **OK** when complete.

3. Close web browser.
4. Change your computer network settings Local Area Connection back to original configuration.
5. Disconnect Ethernet cable and USB cables from your computer.

6. Install device on back of OE display (Display A) as shown below:



a. Using Velcro supplied with adapter, put one strip on display back and other on adapter back. Connect as shown in picture.

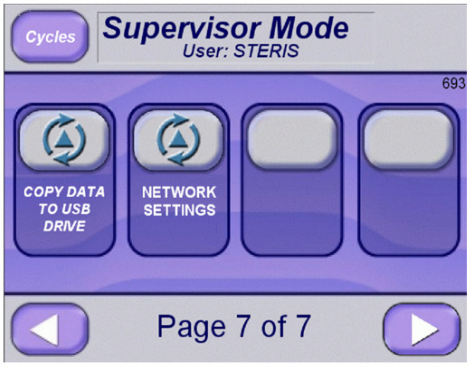
b. Connect Ethernet cable from display to adapter as shown in picture.

c. Using USB cable and power plug, connect to buildings 120 VAC power.

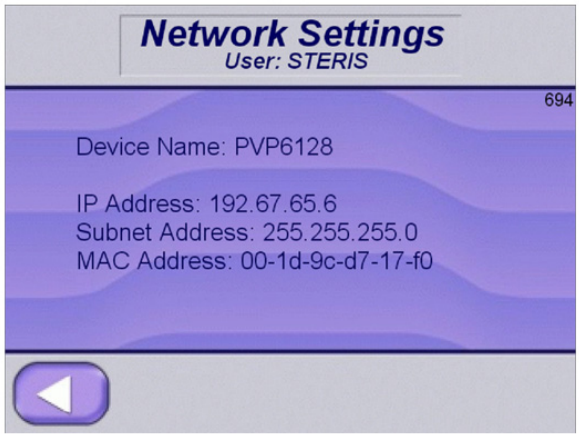
d. Device is ready to start sending data to wireless network.

6.20.21 Network Settings

Network settings can be viewed in Supervisor Mode.

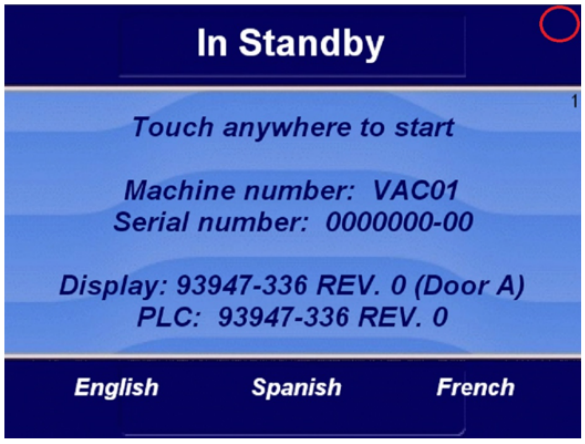


Press NETWORK SETTINGS button.

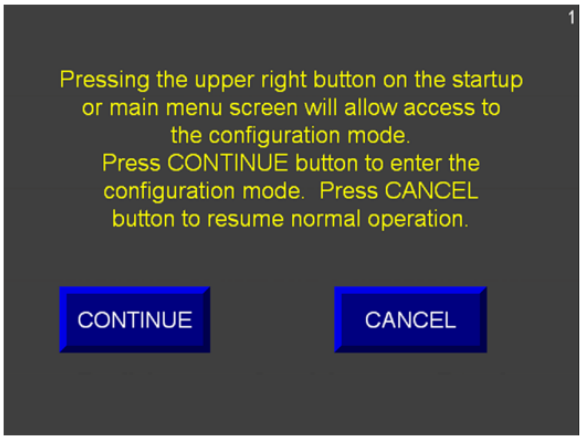


NOTE: An ethernet cable or a wireless device (optional) needs to be connected to buildings network.

The IP Address can be set to static or DHCP. These settings are done in configuration mode.

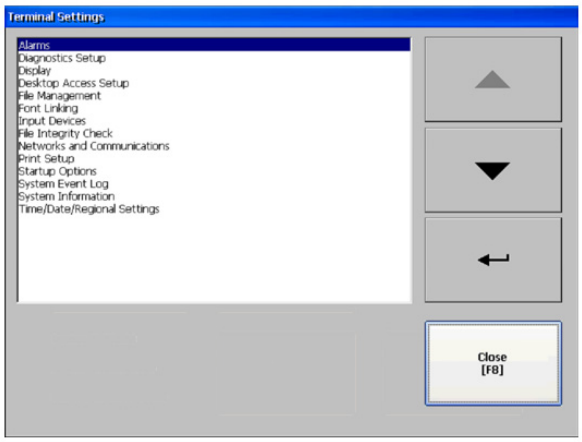


Press where red circle is shown.

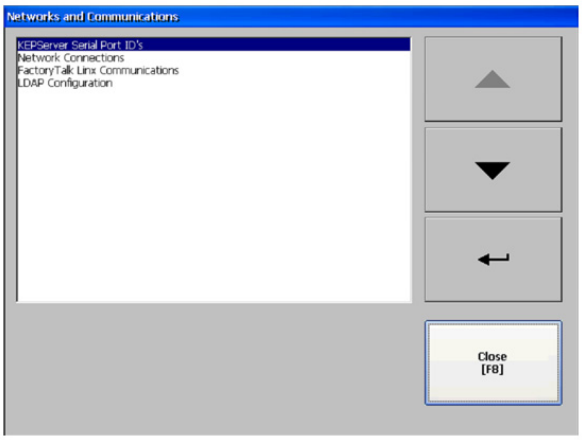


Press CONTINUE button to enter configuration mode.

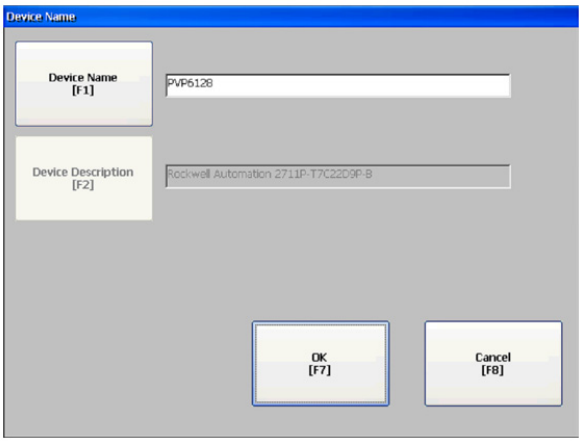
Press Terminal Settings button.



Press Networks and Communications.

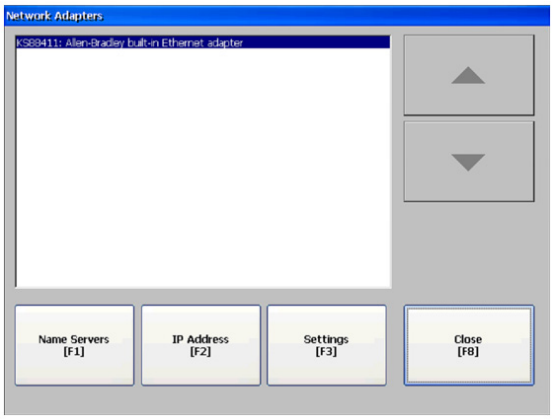


Press Device Name.

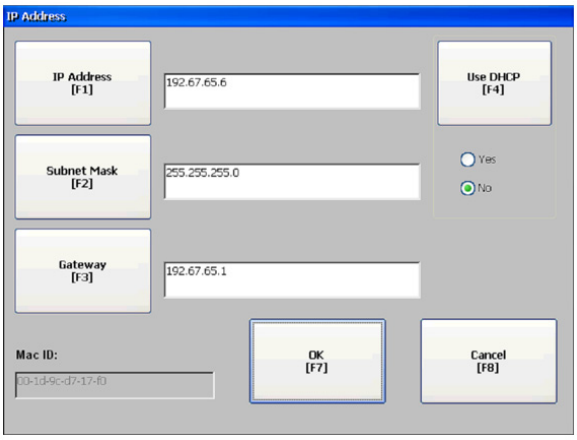


Device Name can be modified on this screen. Press OK or Cancel button.

Press Network Adapters.



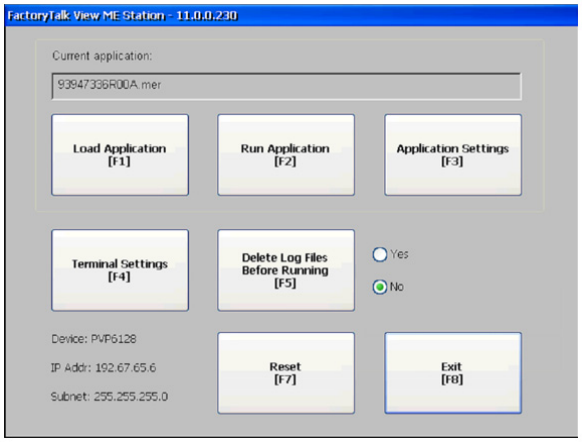
Press IP Address.



Enter IP Address, Subnet Mask and Gateway or press Use DHCP

button to have network automatically assign IP address. Press OK when complete.

Press Close until first screen is shown.



Device name, IP Address and Subnet will be shown on this screen. If any changes were made, new values will be shown on Reset or a power cycle.

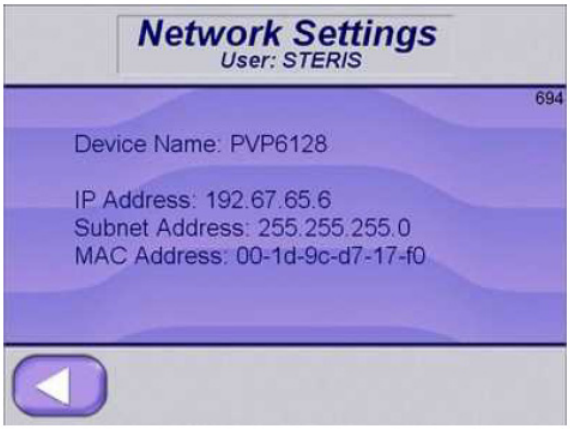
6.20.22 Remote Viewing

Sterilizer control is preset at factory to allow Remote Viewing of display. Control can also be set for Remote Control, but this setup requires a Supervisor.

To use Remote Viewing, follow these steps:

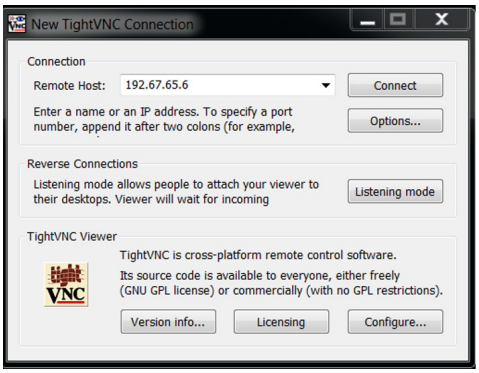
NOTE: An Ethernet connection is required.

1. Connect Ethernet cable to Email Alert port on back of control box.
2. Cycle power off and on. Control acquires a DHCP address from building's server.
3. Note IP address, displayed on screen (following figure).



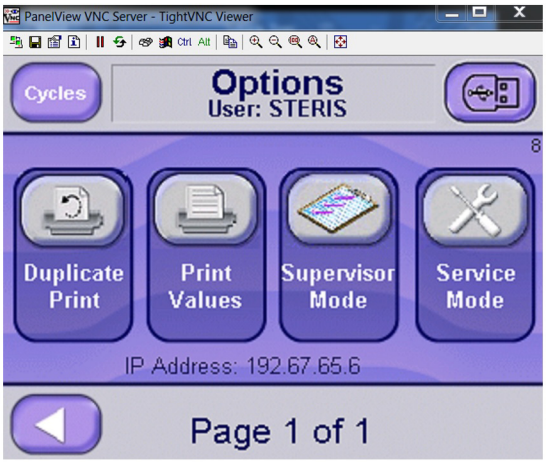
4. Go to following website: http://www.tightvnc.com/

5. Download free remote control software package, **TightVNC**.
6. Run TightVNC on a PC (or other device). A screen displays, see following figure.



7. In Remote Host box, enter IP address shown on OPTIONS screen (screen 8)
8. Press Connect.

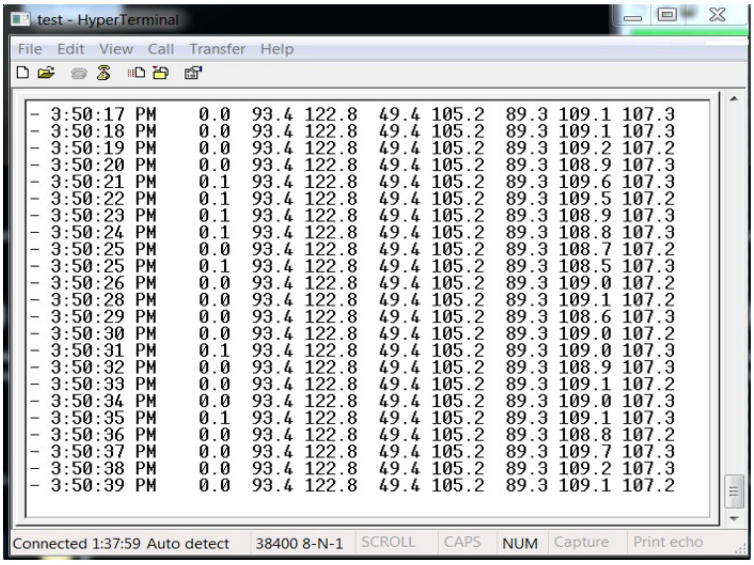
Remote Viewing is now active and sterilizer control screen shows on PC monitor.



6.20.23 Serial Output

Pressure and temperature data is outputted serially during a cycle but not during complete phase. Serial output feature is disabled if sterilizer is configured for a double door since serial port is reserved for second display.

Data can be viewed using communication/terminal emulation software capable of receiving serial data, for example, HyperTerminal, represented in following figure.



Serial Output Data String As Seen In HyperTerminal Software

The baud rate is 38,400, 8 bit, no parity, one stop bit, no hardware control. Data output is once per second.

Data string, see figure, consists of following:

First column: "S" or '–' (Dash)
- S = sterilize phase
- – (Dash) = cycle not in sterilize phase

Second column: time of day

Third column: AM, PM or spaces for MIL time

Fourth column: Pressure or shown as negative for vacuum

Remaining columns show temperature in following order: Chamber, Jacket, Waste, Load 1, Air Detector (Load 2), Filter, Reference.

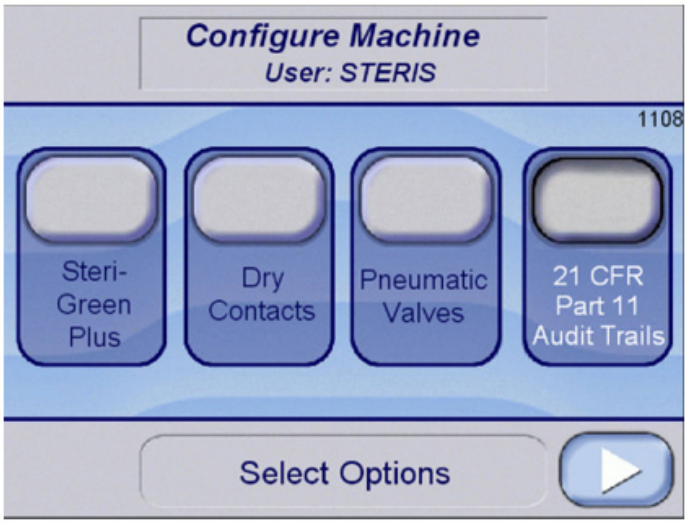
6.21 21 CFR Part 11 with Audit trails and Electronic Signatures

INTRODUCTION AND SETUP

The 21 CFR Part 11 feature will allow for record retention and traceability on LS Series Sterilizer. This is accomplished by using User Management system, Audit Trails and option Electronic Signatures on Sterilizer control.

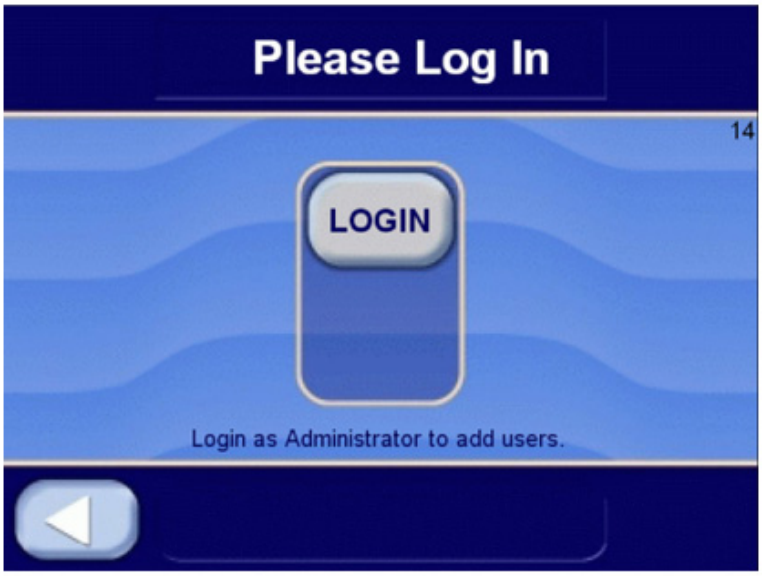
The 21 CFR Part 11 feature can be selected in configuration mode of

Sterilizer. Select 21 CFR Part 11 Audit trails button on following screen.



White text and button depressed indicate that feature is enabled.

After feature is selected, logging out and logging in from standby screen will show following screen.



USER MANAGEMENT

Press LOGIN button to show Login screen.

Enter User Name as Steris1 and Password as Steris1. These are default Administration user names and passwords. They can be changed in User Management system.

User Management mode is entered.

The following screen is shown.

ADD USER

User can be added on following screen.

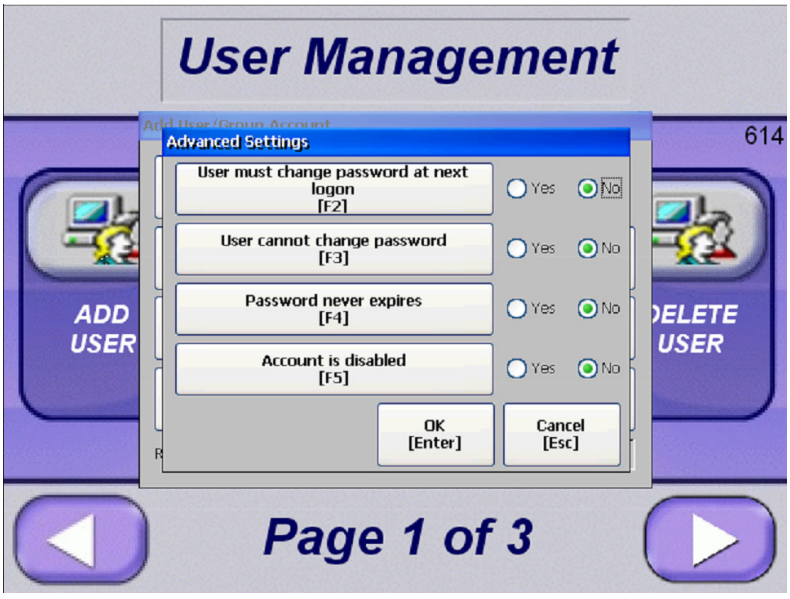
Type: Select FactoryTalk Security User only.

Name: Enter User's name.

Password: Enter User's password.

Confirm Password: Confirm User's password.

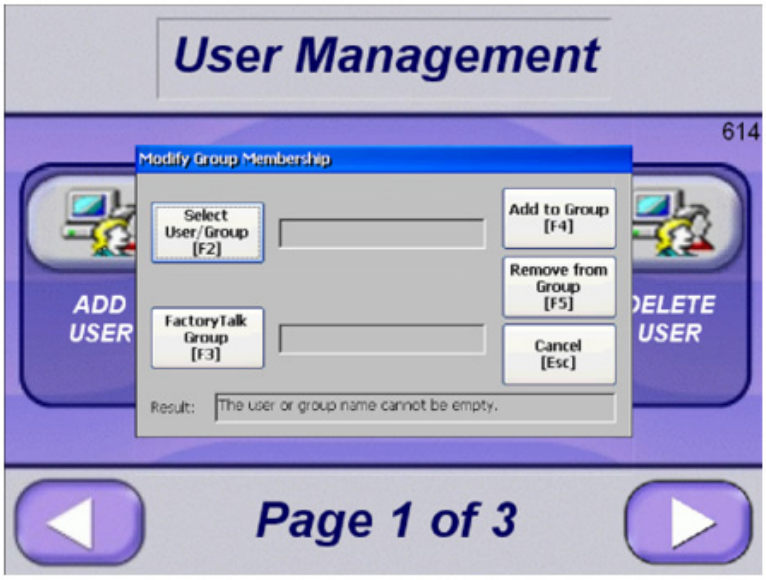
Advanced: Additional password settings. See screen below.



Add: Adds entered User.

MODIFY USER

User can be assigned to a group (access level) on following screen.



Select User / Group: Select one of users that were added in Add User section. Defaults are STERIS (Operator, Supervisor, Service access) and Steris1 (Admin access).

Factory Talk Group: Select one of groups (access levels). Available access levels are ADMIN (Administrators), Operator, Service, or Supervisor.

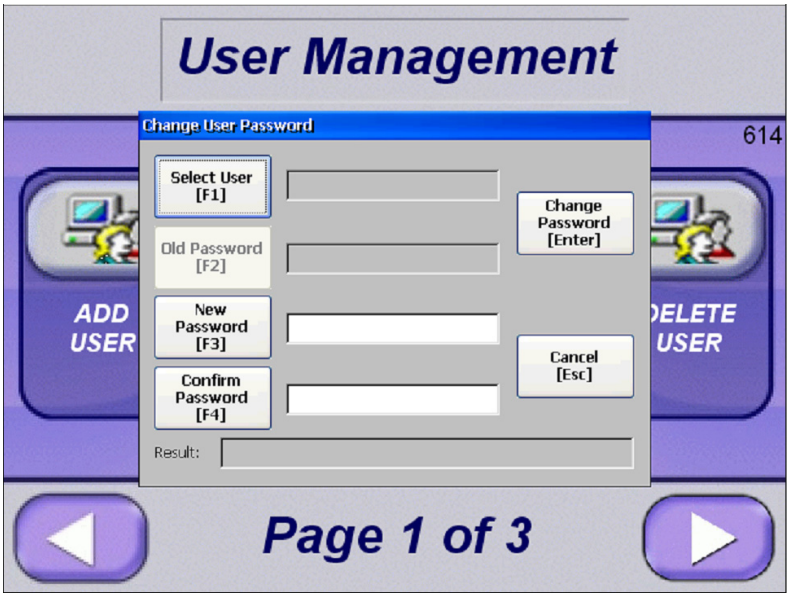
Add to Group: Add user to group selected.

Remove from Group: Remove user from group selected.

Cancel: Cancel selection.

SET PASSWORD

A new password can be added or changed for selected user.



Select User: Select User from list of Users.

Old Password: Not applicable for Administrator.

New Password: Enter password for User.

Passwords are required to meet following criteria:

1.)Cannot contain all of user name. For example, a user named John12 cannot have password John1234. However, password 12john is permitted. This check is case sensitive so john12 could have password jOHN12.

2.)Must contain at least six characters.

3.)Must contain characters from three of these four categories.

a.Unaccented uppercase characters (A to Z).

b.Unaccented lowercase characters (a to z).

c.Numerals (0 to 9).

d.Non-alphanumeric characters (!, @, #, %).

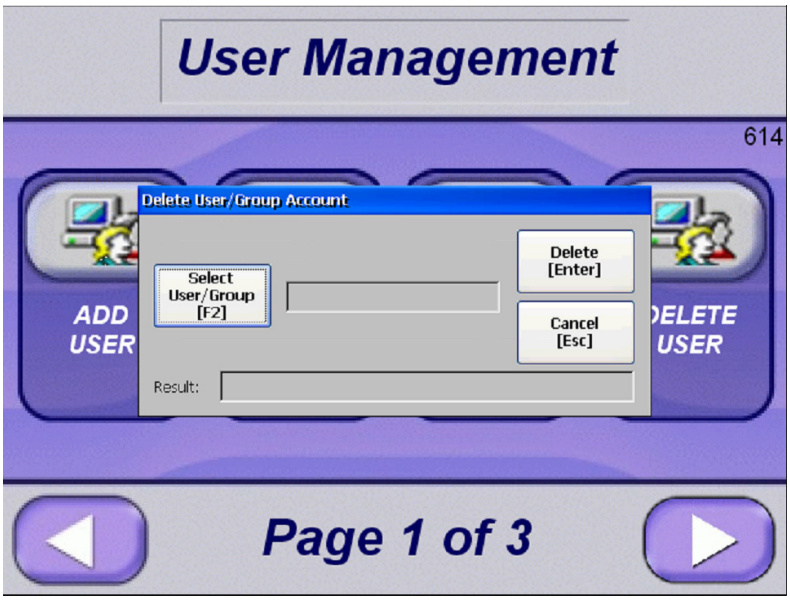
Confirm Password: Re-enter password for User.

Change Password: Set password for User.

Cancel: Cancel selection.

DELETE USER

User can be deleted with this selection.



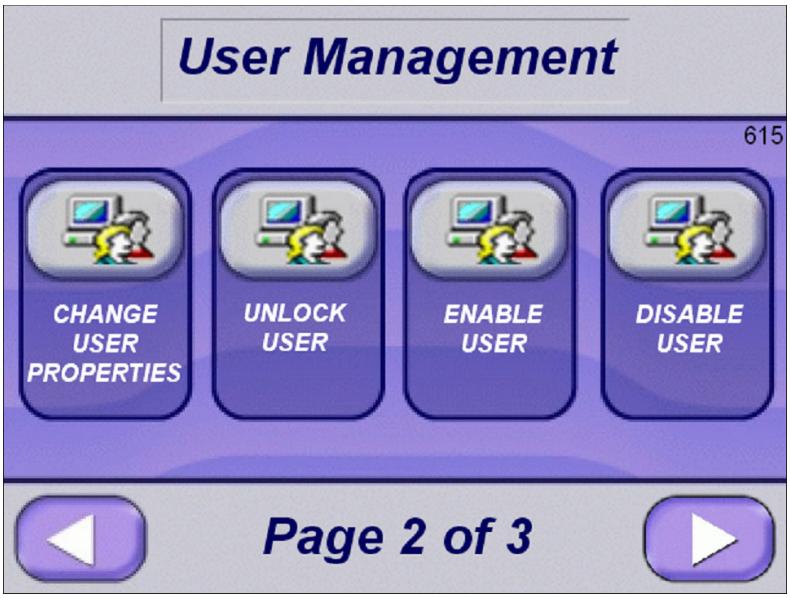
Select User/Group: User or Group Selection

Type: Select User or Group.

Select: Select User to delete.

Cancel: Cancel selection

Press right arrow button on User Management screen to show Page 2 of 3.

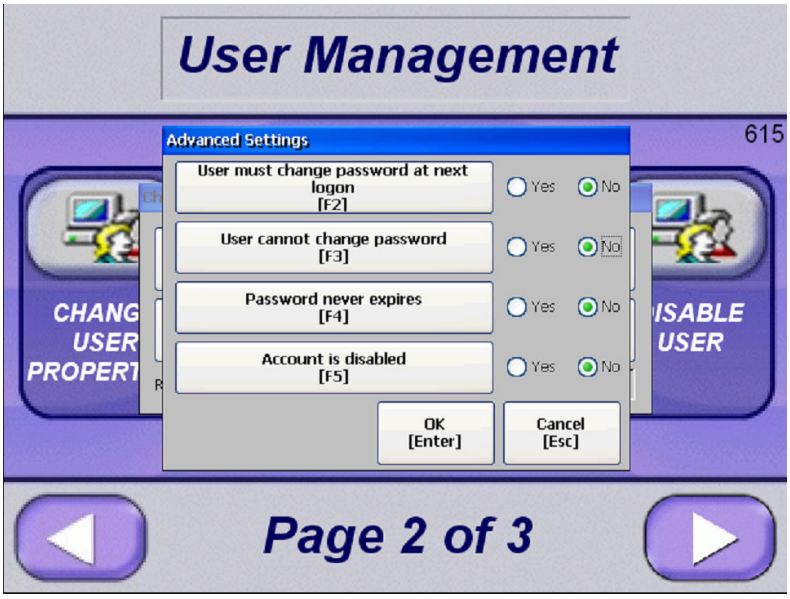


CHANGE USER PROPERTIES

User properties can be modified.

Select User: Select a user from list.

Properties: Select options from list.



Press OK or Cancel when selections are complete.

Change: Press change to update selected user with selected options.

Cancel: Cancel selections.

UNLOCK USER

Unlocks any user that was locked out because of multiple login attempts.

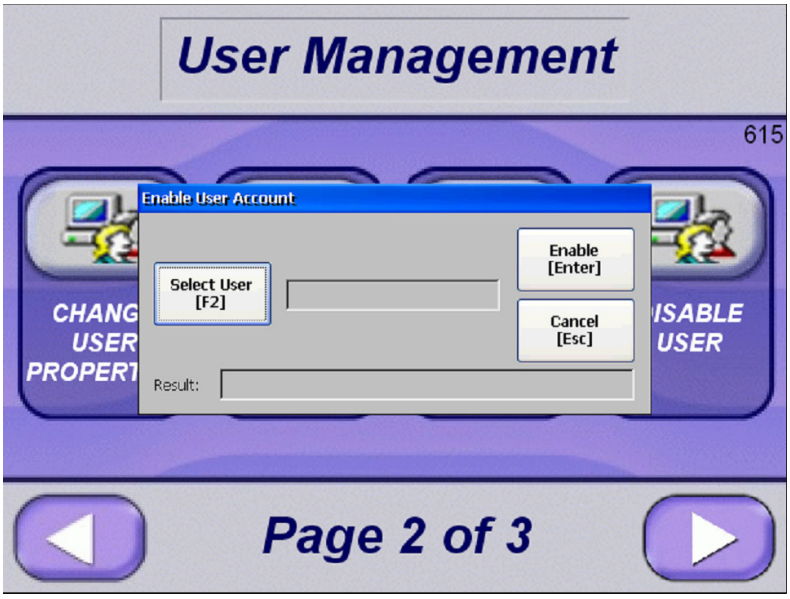
Select User: Select locked out user. If no user is locked out, selection will be empty.

Unlock: After locked out user is selected, press Unlock to unlock user.

Cancel: Cancel selection.

ENABLE USER

Disabled user can be enabled.



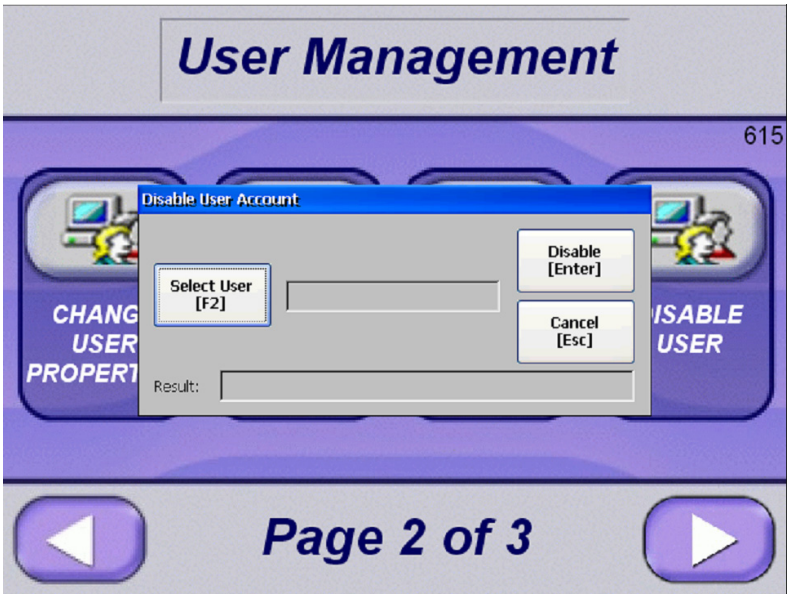
Select User: Select disabled user. If no user is disabled, selection will be empty.

Enable: After disabled user is selected, press Enable to enable user.

Cancel: Cancel selection.

DISABLE USER

Enabled user can be disabled.



Select User: Select enabled user.

Enable: After enabled user is selected, press Disable to disable user.

Cancel: Cancel selection.

Press right arrow button on User Management screen to show Page 3 of 3.

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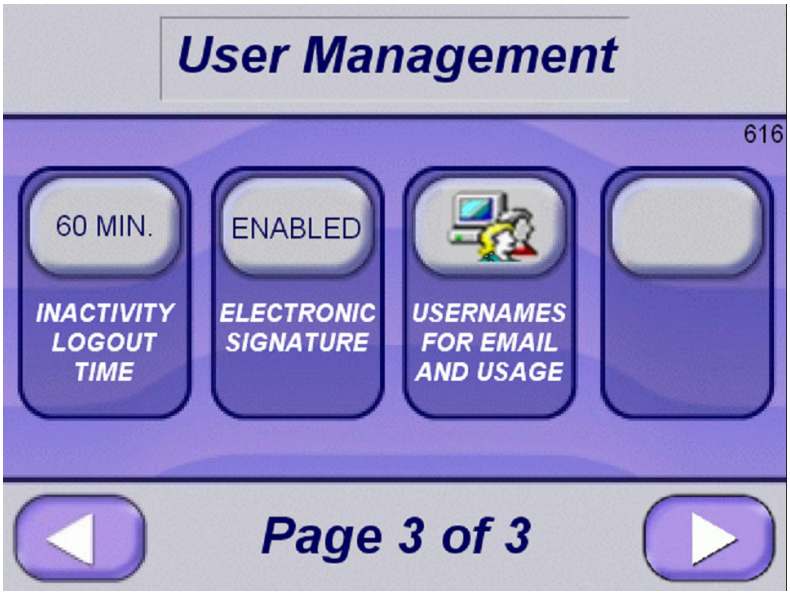


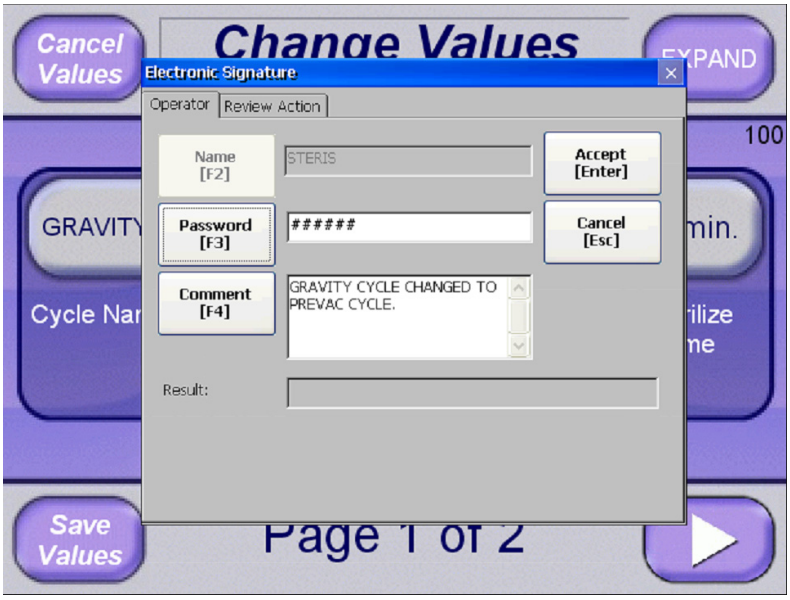
INACTIVITY LOGOUT

If user doesn't press a button for time selected, user will automatically be logged out. The range is 0 to 9999 minutes. The default is 60 minutes.

ELECTRONIC SIGNATURE

If electronic signature option is selected, user will be required to enter a reason for any value change in text box. Information entered in text box will be recorded in audit trail. Electronic signature enable/disable selection is for all users.

An example of Electronic signature is shown below.



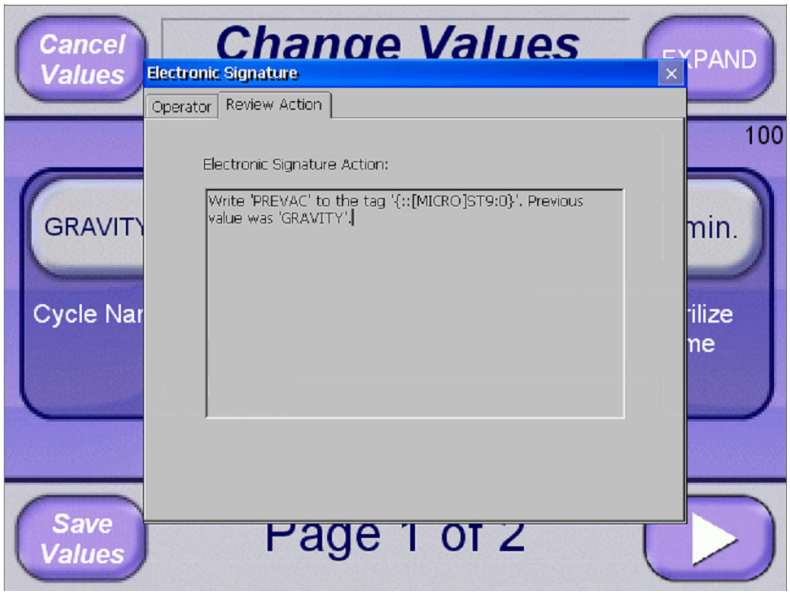
Password: Enter user password.

Comment: Enter reason value is being changed.

Accept: Press Accept to continue with entered information.

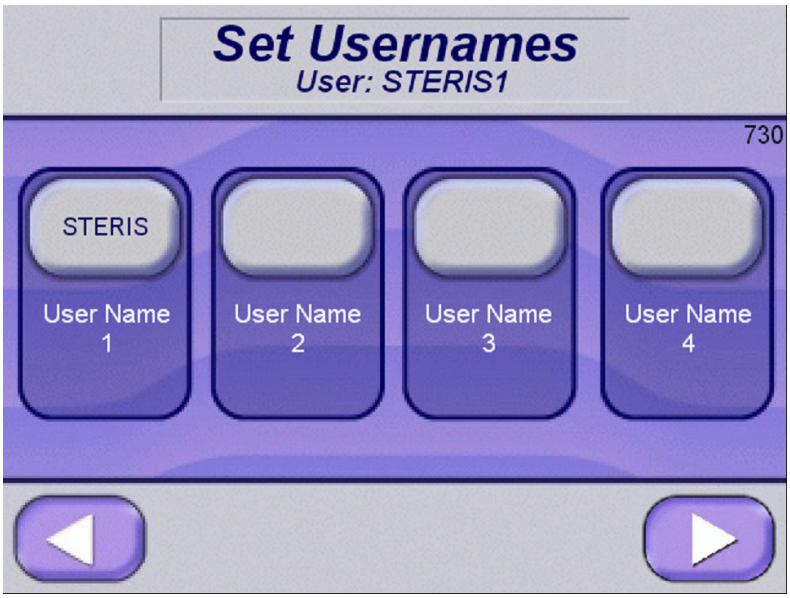
Cancel: Cancel Selection

Review Action: Shows change being made.

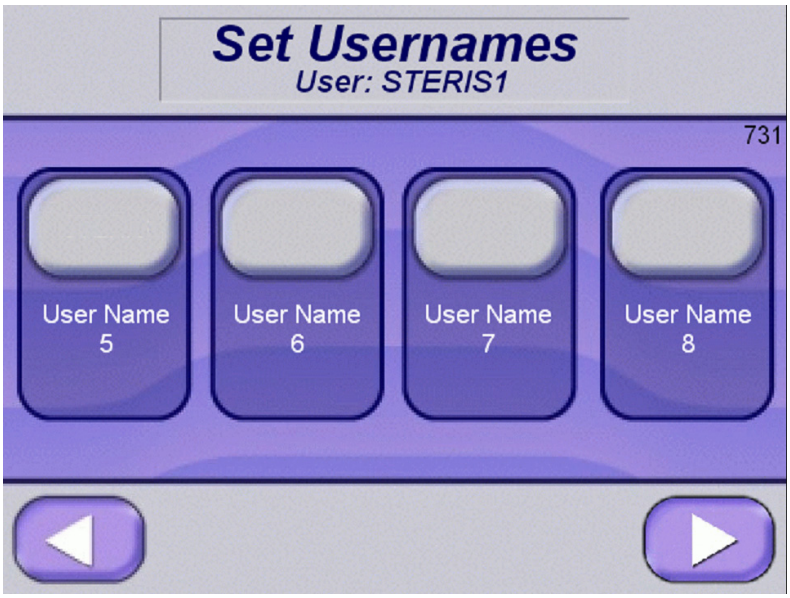


USERNAMES FOR EMAIL AND USAGE

Email and user usage allow up to 12 usernames to be entered. Username and user username need to match to load values for that username.



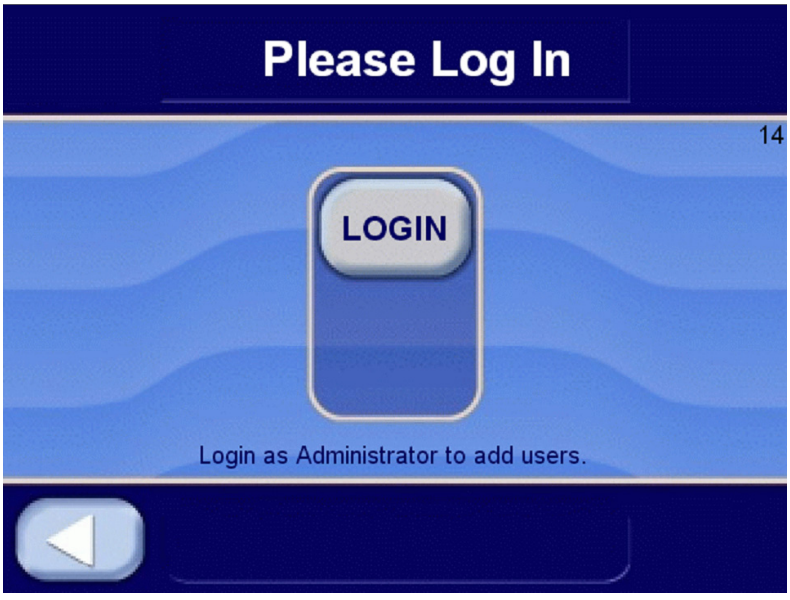
Pressing right arrow shows second screen.



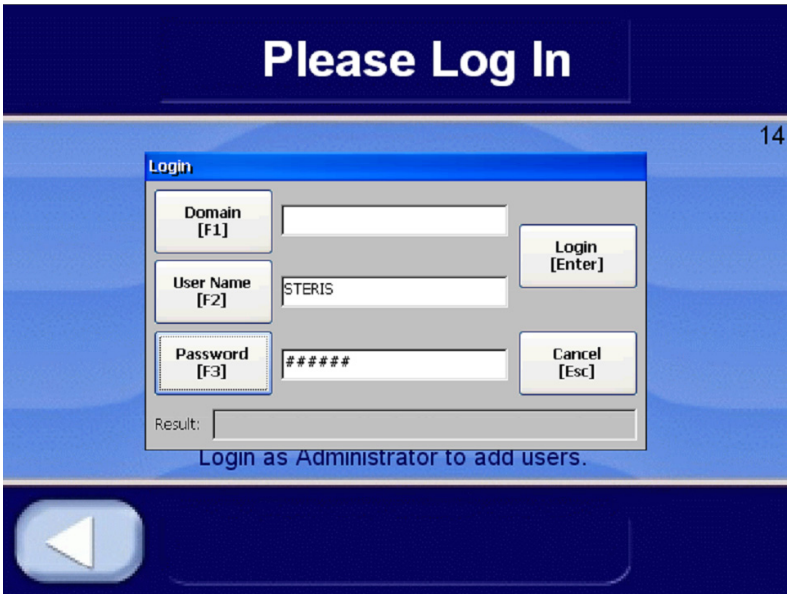
USER LOGIN

After Users are setup, press left arrow button until Administrator is logged out.

Press screen to show login screen.

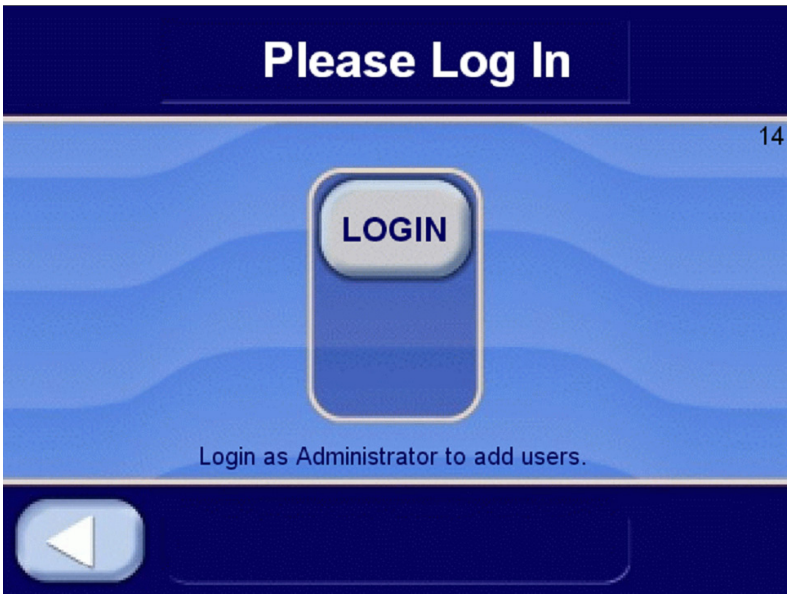


Press Login button to login with one of entered user's names.



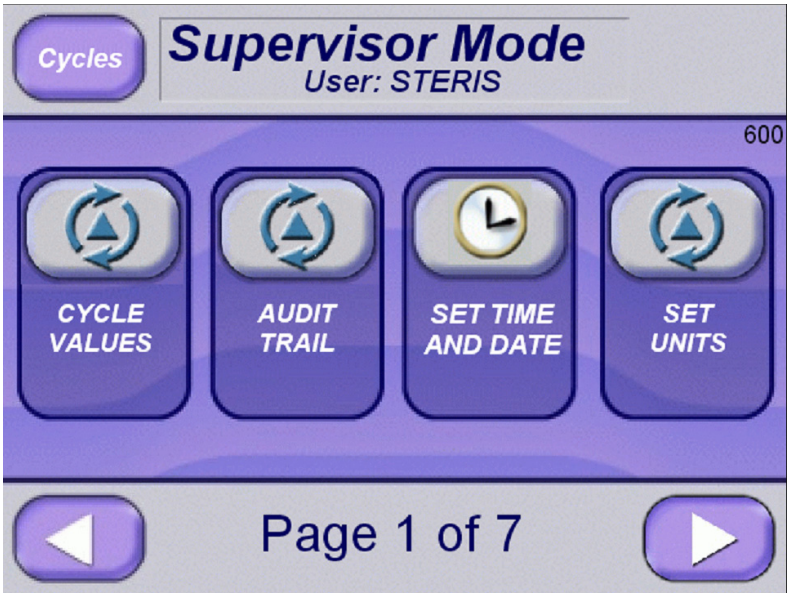
Press Login button after Username and Password are entered.

Press right arrow button to complete login process.



AUDIT TRAIL

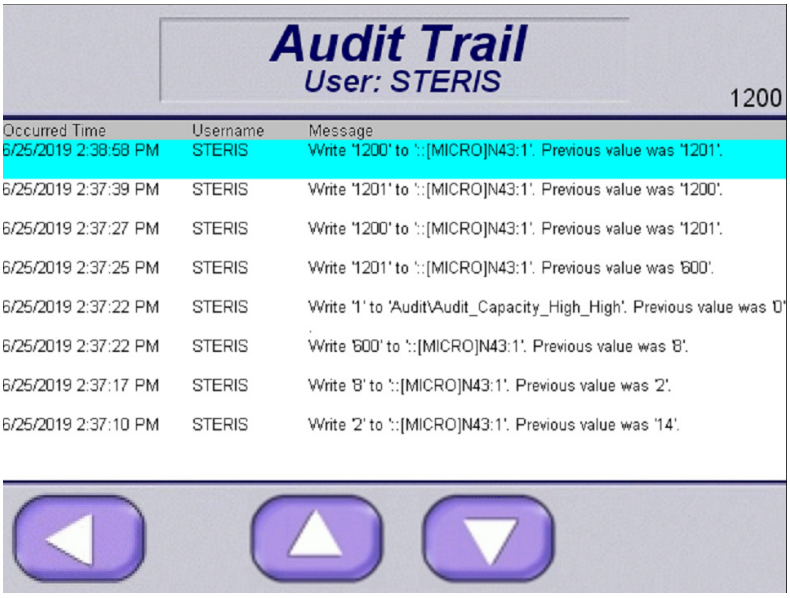
Press AUDIT TRAIL button to show audit trail selections.



Press AUDIT TRAIL button to show Audit Trail options screen.

VIEW AUDIT TRAIL

Press VIEW AUDIT TRAIL button to show Audit Trail information.



Occurred Time, Username, and Message of Audit Trail will be shown on screen. Up and down arrows will allow user to scroll through audit trail (most recent first).

NOTE: Press white area of screen before pressing up and down arrows to activate scrolling feature.

Press left arrow to return.

COPY AUDIT TRAIL TO USB

Press Copy Audit Trail To USB button to allow audit trail information to be copied to USB drive.

Wait 5 seconds and then following screen will be shown.

Insert USB drive into USB port and press button.

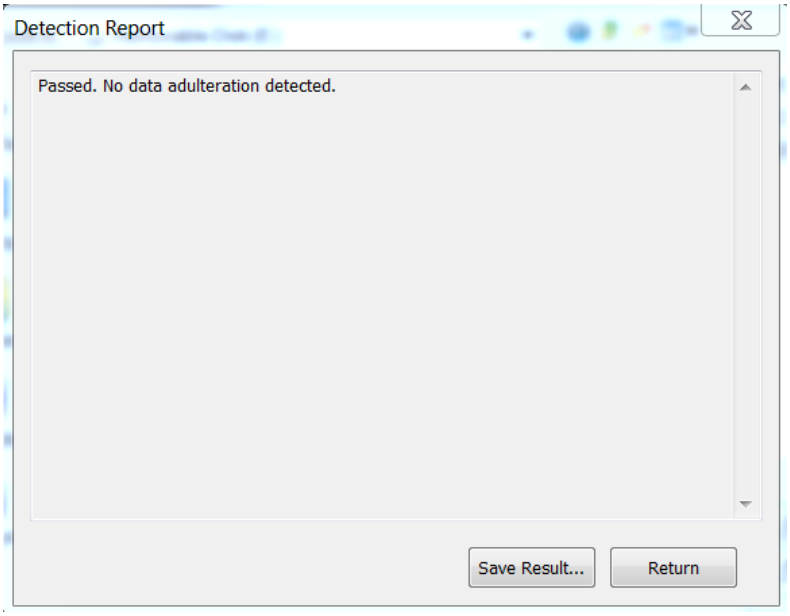
A message will be shown to indicate status of CSV file.

Wait 5 seconds. File will be copied to USB drive.

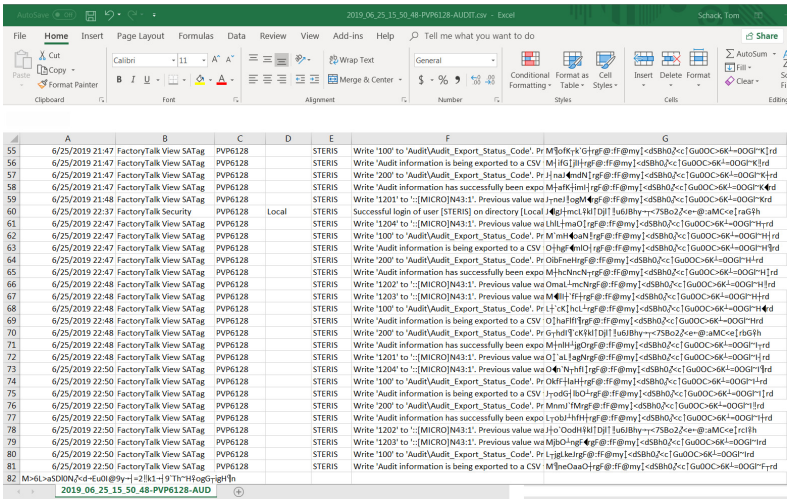
Inserting USB drive into a PC will show a similar file as shown below.

File will be labeled as year, month, day, hours, minutes, seconds, display name and AUDIT.

Run RA_CHECKCSVINTEGRITY.EXE file, located on SD memory card, to verify file integrity. This ensures data has not been changed in file.



Opening file will show following.



Column F shows message and column G shows encryption code.

The display will show following screen.

CLEAR AUDIT TRAIL

Press Clear Audit Trail button to clear Audit trail on display.

Press Clear Audit Trail button to clear display's audit trail information.

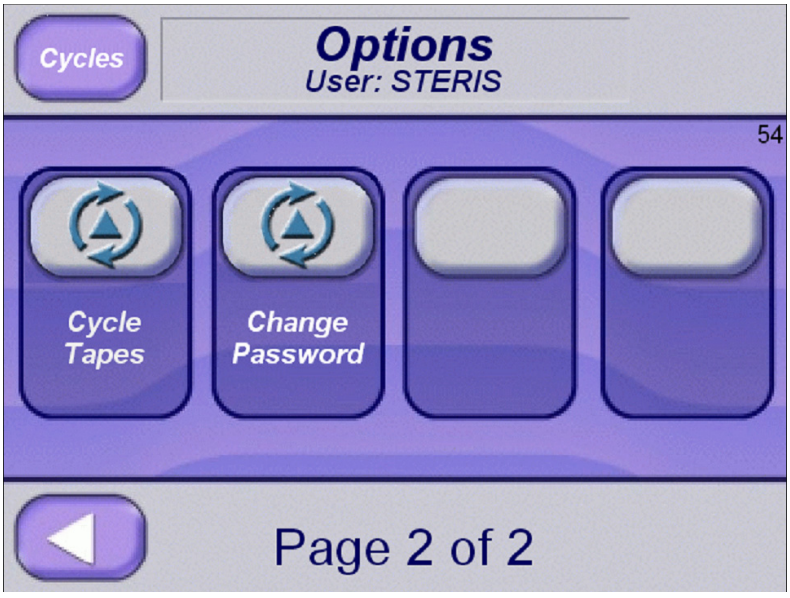
Press Cancel button to cancel selection.

Pressing Clear Audit Trail will show following screen for 5 seconds.

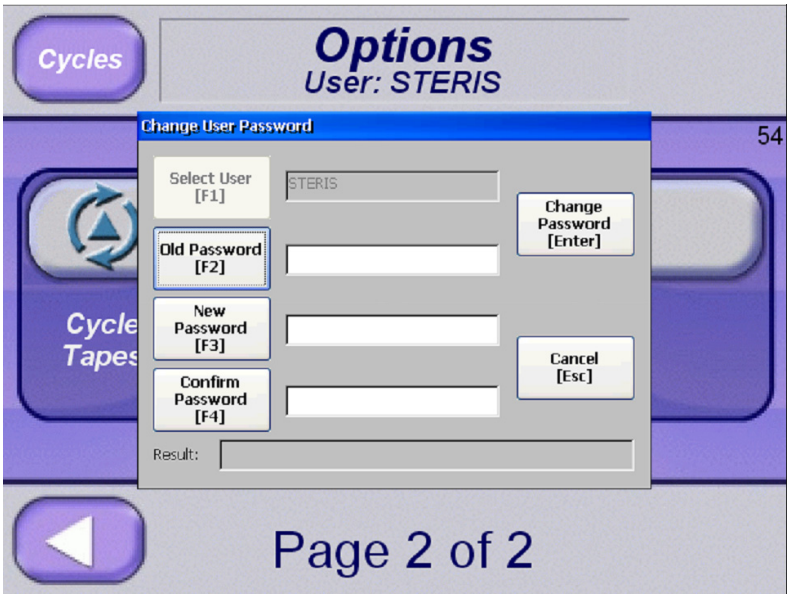
Display will show following screen.

CHANGE PASSWORD

User can change their password on following Options (Page 2 of 2) screen. This screen is shown by pressing right arrow on Options (Page 1 of 2) screen.



Press Change Password button. The following screen will be shown.



Old Password: User needs to enter their existing password.

New Password: User needs to enter new password.

Confirm Password: User needs to confirm new password by re-entering it.

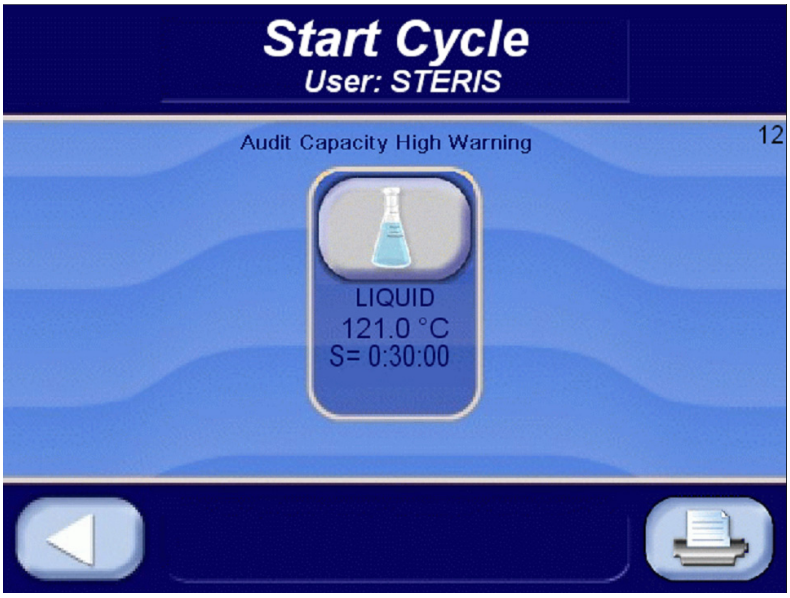
Change Password: Press button to save new password.

Cancel: Press button to cancel selection.

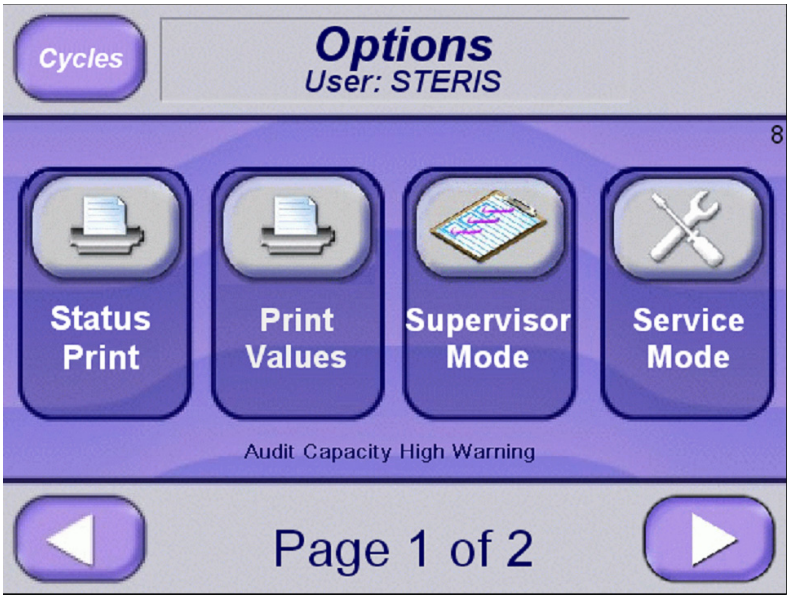
OPERATION

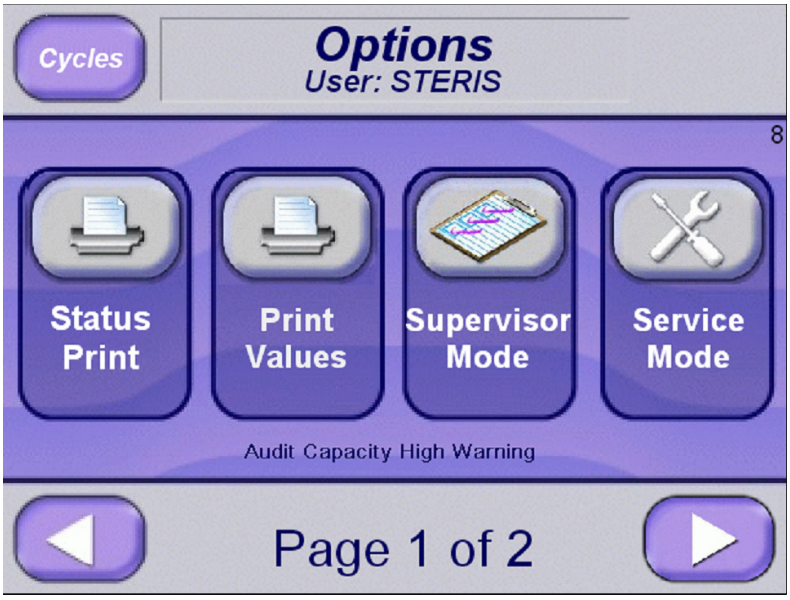
Display will indicate when Audit Trail capacity is too high or close to its storage limit. Limit is 10,000 Audit Trail entries.

If Audit Trail isn't copied to USB drive, Audit Trail data will be overwritten. Oldest data will be overwritten first. The following message will appear on screen if Audit Trail capacity is too high.

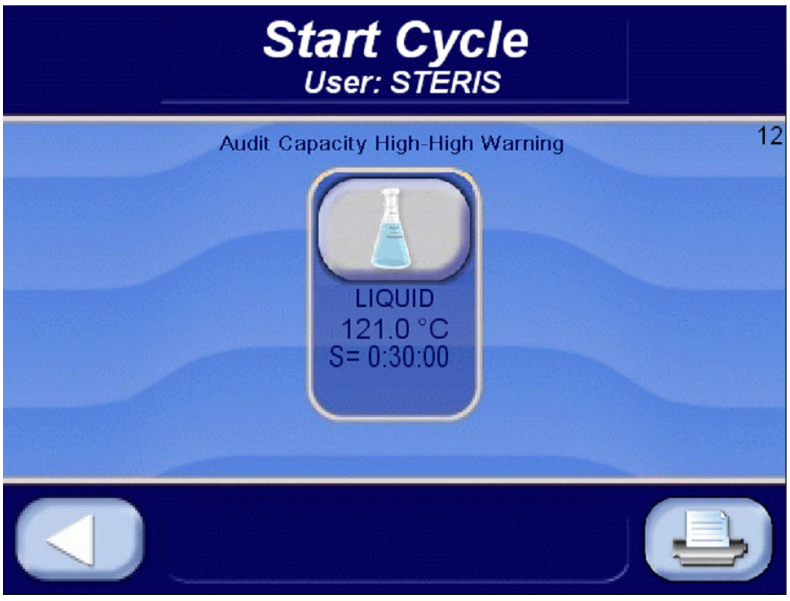

Start Cycle
User: STERIS
Audit Capacity High Warning
12
LIQUID
121.0 °C
S= 0:30:00

Or

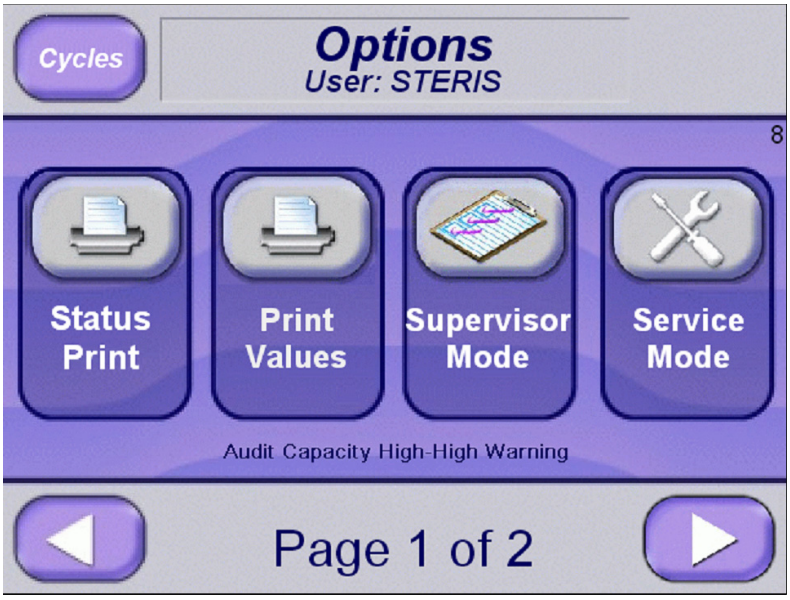

Cycles
Options
User: STERIS
8
Status Print
Print Values
Supervisor Mode
Service Mode
Audit Capacity High Warning
Page 1 of 2



If Audit Trail storage is 99% full, the following message will appear on screen.



Or



If these messages are displayed, go to Audit Trail Options screen and copy data to a USB drive. After copy is complete, clear Audit Trail.

ALARMS

7

Table 7-1lists alarm conditions which may occur when operating an The AMSCO® 110LS and AMSCO® 250LS Life Sciences Small Sterilizer.

If a problem occurs that is not described in this section, call your STERIS Service Representative. A trained service technician will promptly place your sterilizer in proper working condition.

When an alarm occurs the printer automatically generates a printout, typically listing alarm name, time alarm occurred, current chamber status and associated sensor temperatures.

On the display, the alarm blinks and a buzzer sounds the alarm. Press **SILENCE ALARM** button to silence the alarm

Table 7-1. ALARMS

IN CYCLE ALARMS – Non-Aborting		
1	OVER TEMPERATURE	Occurs if the chamber temperature is greater than the sterilize temperature + overdrive + overtemp settings.
2	UNDER TEMPERATURE	Occurs if the chamber temperature is less than the sterilize temperature – undertemp settings.
3	TOO LONG IN AIR BREAK	Occurs if the air break phase is longer than the too long in air break setting.
4	TOO LONG IN CHARGE	Occurs if the charge phase is longer than the too long in charge setting.
5	TOO LONG IN SEAL A/B	Occurs if the activate seal phase is longer than the too long in door seal setting.
6	TOO LONG IN UNSEAL A/B	Occurs if the deactivate seal phase is longer than the too long in door unseal setting.
7	TOO LONG IN EVACUATE	Occurs if the evacuate phase is longer than the too long in evacuate setting.
8	TOO LONG IN EXHAUST	Occurs if the exhaust phase is longer than the too long in exhaust setting.
9	TOO LONG IN JACKET CHARGE	Occurs if the jacket charge phase is longer than the too long in jacket charge setting.
10	EXHAUST RATE TOO FAST	Occurs if the pressure is less than 4 psi from the expected rate during the slow exhaust phase.
11	EXHAUST RATE TOO SLOW	Occurs if the pressure is more than 4 psi from the expected rate during the fast exhaust phase.

Table 7-1. ALARMS

IN CYCLE ALARMS – Non-Aborting (continued)		
12	CHAMBER / REFERENCE DEVIATION (Reference Probe Only)	Occurs if the chamber and reference comparison is more than 2°C during the end of the sterilize phase.
13	EMERGENCY STOP	Occurs if the emergency stop button is pressed. All outputs turn off.

IN CYCLE ALARMS – Aborting		
1	CHAMBER FLOODED	Occurs if excess water is sensed in chamber. ***WARNING! BURN HAZARD CHAMBER MAY BE FILLED WITH STEAM CONDENSATE***
2	DOOR A/B SWITCH FAILURE - OUT OF CYCLE	Occurs if door is sensed to be open and door is sensed to be sealed.
3	DOOR A/B UNSEALED	Occurs if door is sensed to be unsealed during cycle.
4	CHAMBER TEMP. FAILURE	Occurs if chamber temperature RTD failed.
5	CHAMBER PRESSURE FAILURE	Occurs if pressure transducer failed.
6	JACKET TEMP. FAILURE	Occurs if jacket temperature RTD failed
7	PRESS / TEMP. FAILURE	Occurs if chamber temperature is > 121°C (250°F) and pressure is < 10 psig (0.76 bar) or if chamber is > 132°C (270°) and pressure is < 20 psig (1.38 bar).
8	LOAD TEMP. FAILURE	Occurs if load temperature failed.
9	REFERENCE TEMP. FAILURE	Occurs if reference RTD failed.
10	AIR DETECTOR TEMP. FAILURE (Air Detector Probe Only)	Occurs if air detector RTD failed.
11	AIR DETECTOR FAILURE (Air Detector Probe Only)	Occurs during Prevac cycle when air detector is selected if air is sensed in chamber.
12	FAILURE FAILURE (Decon Cycle Only)	Occurs if decontamination RTD failed.
13	AIR COOL PRESSURE LOW (Air Cool Cycle Only)	Occurs if pressure is less than air cool pressure alarm during Air Cool phase.
	ALARMS 14 through 19 Pertain to Optional Electric Steam Generator	
14	TOO LONG TO DEPRESSURIZE GENERATOR	Generator takes too long to depressurize. Either generator pressure switch remained open or jacket temperature remained above 100°C after one hour.
15	TOO LONG TO CLOSE GENERATOR DRAIN	Generator drain ball valve failed to open. Either drain valve did not open or generator drain ball valve close switch malfunctioned.

Table 7-1. ALARMS

16	TOO LONG TO OPEN GENERATOR DRAIN	Generator drain ball valve failed to close. Either drain valve did not close or generator drain ball valve open switch malfunctioned.
17	GENERATOR DRAIN OPEN FAILURE	Generator drain ball valve open switch reads closed when close switch is also closed, while valve is trying to open.
18	GENERATOR DRAIN CLOSE FAILURE	Generator drain ball valve close switch is reading closed when open switch is also closed, while valve is trying to close.
19	GENERATOR PRESSURE SWITCH FAILURE	Generator pressure switch is reading closed when the jacket temperature is above 115°C.

OUT OF CYCLE ALARMS		
1	PRESSURE IN CHAMBER	Occurs if 2 psig (0.14 bar) pressure is sensed in the chamber when a cycle is not running.
2	CHAMBER FLOODED	Occurs if excess water is sensed in chamber. ***WARNING! BURN HAZARD CHAMBER MAY BE FILLED WITH STEAM CONDENSATE.***
3	CHAMBER TEMP. FAILURE	Occurs if chamber temperature RTD failed.
OUT OF CYCLE ALARMS (continued)		
4	CHAMBER PRESSURE FAILURE	Occurs i pressure transducer failed.
5	JACKET TEMP. FAILURE	Occurs if jacket temperature RTD failed
6	WASTE TEMP. FAILURE	Occurs if waste temperature RTD failed.
7	LOAD TEMP. FAILURE	Occurs if load temperature RTD failed.
8	AIR DETECTOR TEMP. FAILURE (Air Detector Only)	Occurs if air detector RTD failed.
9	FILTER TEMP. FAILURE (Decon Cycle Only)	Occurs if filter RTD failed.
10	EMERGENCY STOP	Occurs if emergency stop button is pressed. All outputs turn off.
11	TOO LONG IN JACKET CHARGE	Occurs if jacket charge phase is longer than the too long in jacket charge setting.
12	TOO LONG TO CLOSE DOOR A/B	Occurs if door takes too long to close.
13	TOO LONG TO OPEN DOOR A/B	Occurs if door takes too long to open.
14	DOOR A/B SWITCH FAILURE	Occurs if door is sensed to be simultaneously sealed and opened.

ROUTINE MAINTENANCE

8

8.1 Preventive Maintenance

⚠ WARNING – SHOCK AND BURN HAZARD: Regularly scheduled preventive maintenance is required for safe and reliable operation of this equipment. Contact your STERIS Service Representative to schedule preventive maintenance.

⚠ WARNING – PERSONAL INJURY OR EQUIPMENT DAMAGE HAZARD: Repairs and adjustments to this equipment must be made only by fully qualified service personnel. Maintenance performed by inexperienced, unqualified persons or installation of unauthorized parts could cause personal injury or result in costly equipment damage.

Observe all preventive maintenance procedures in the following pages to properly maintain AMSCO® 110LS and AMSCO® 250LS are sterilizers. Local conditions (water quality, usage, etc.) may require more frequent maintenance.

The following preventive maintenance advisories must be observed:

1. Regular service and maintenance MUST be performed only by STERIS or a STERIS-trained technician. Any work performed by inexperienced or unqualified persons or the installation of unauthorized parts could cause personal injury, invalidate the warranty or result in costly damage.
2. Under no circumstances should this equipment be serviced without the Maintenance Manual. The Maintenance Manual can be purchased by contacting STERIS Customer Service.
3. A detailed Interval Based Checklist (IBCL) is essentially a preventive maintenance schedule. The IBCL and replacement parts list can be found in the Maintenance Manual. The Maintenance Manual can be purchased by contacting STERIS Customer Service.
4. Preventive Maintenance is essential in keeping this equipment in optimal working condition. STERIS recommends establishing an annual maintenance agreement with STERIS service.

NOTE: Preventive Maintenance is not covered under warranty.

***Important:** Follow all safety procedures including Lockout/Tagout.*

Inspection Frequency: The sterilizer must be inspected by a qualified STERIS service technician at least twice each year. Actual frequency of equipment use may increase the number of required inspections.

8.2 Replace Printer Paper Roll

The printer paper roll should be checked every day. Replace the paper roll whenever a colored stripe is visible on one or both edges of the printout paper.

1. Open thermal printer front cover. Note cover is magnetically held closed. (See Figure 8-1.)

Figure 8-1. Thermal Printer

2. Lift Inner Cover as shown in Figure 8-2.
3. Position paper roll as follows:
   a. Position paper roll in bottom of printer compartment, paper coming from bottom of roll.
   b. Ensure at least 8” (203 mm) of paper extends from printer compartment.
4. Close Inner Cover.

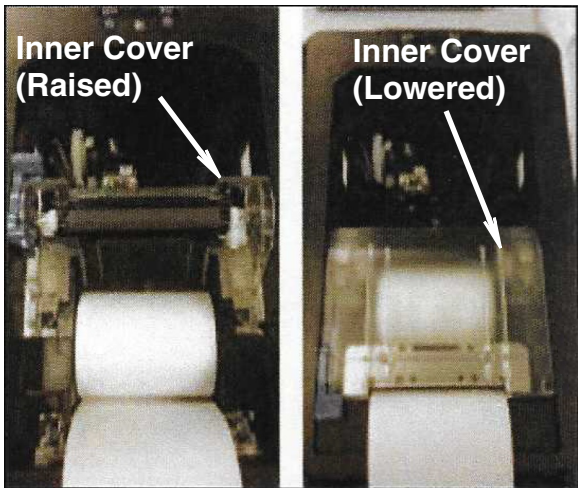
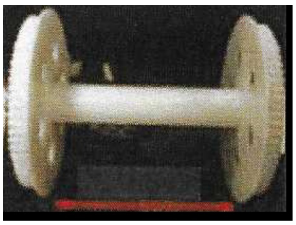
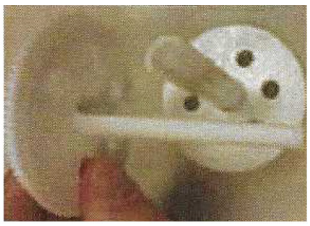


Figure 8-2. Positioning Paper Roll

5. Remove take-up spool from printer and carefully pull apart as shown in Figure 8-3.





Spool (Assembled) Spool (Disassembled)

Figure 8-3. Take-Up Spool

6. Place paper between take-up spool; then push spool halves together.
7. Tightly wind paper around spool two to three times; then place spool back in original position (at top of printer compartment.
8. Close printer cover.

8.3 Clean Chamber Drain Strainer

WARNING – BURN HAZARD:

- **Allow sterilizer to cool to room temperature before performing any cleaning or maintenance procedures.**
- **Failure to shut off the steam supply when cleaning or replacing strainers can result in serious injury.**

Important: *The chamber drain strainer must be cleaned at least once a day, preferably in the morning before running the first cycle.*

1. Remove drain strainer from drain in chamber bottom.
2. Remove any obvious debris from strainer. If necessary, clear screen in strainer using a brush, wire or similar tool.
3. Once strainer has been cleared of obvious debris, reverse strainer under running water.
4. Replace strainer in chamber drain.

8.4 Flush Chamber Drain

WARNING – BURN HAZARD:

- **Allow sterilizer to cool to room temperature before performing any cleaning or maintenance procedures.**
- **Failure to shut off the steam supply when cleaning or replacing strainers can result in serious injury.**

Flush chamber drain as follows whenever line becomes clogged:

1. Turn OFF steam supply valve. Wait until jacket pressure is zero. Wait until chamber has cooled to room temperature.
2. Remove chamber drain strainer. Clean strainer using procedures given above, if necessary.
3. Pour solution of 60 mL (~1/4 cup) of STERIS sonic detergent or Liqui-Jet 2 Instrument Detergent and 500 mL (~1 pint) of hot water into drain. Solution may puddle in bottom of chamber.

… OR…

4. Should these detergents be unavailable, use hot solution of 15 mL (~1 tablespoon) of tri-sodium phosphate to 500 mL (~1 pint) of hot water.
5. Open door and return strainer to drain.

8.5 Spare Parts

To order replacement parts and/or supply products, proceed as follows:

1. Include description and part/order number as listed in following table.
2. Include model and serial numbers of sterilizer.
3. Send order directly to sales and service center serving your area.

NOTE: *Contact STERIS sales representative for recommendations on cleaning products, biological indicators or parts that are not listed below. Use only STERIS authorized parts on this equipment. Use of unauthorized parts void the warranty.*

Replacement Parts Description	Part Number
Printer	
Replacement paper (box of 3)	10092606

APPENDIX A — SUPPLEMENTAL INFORMATION

PLC SPECIFICATIONS

PLC: MicroLogix® 1400 Controller*

** MicroLogix 1400 Controller and Panel View Plus are registered trademarks of Rockwell Automation.*

Catalog number: 1766-L32AWAA

Agency Certification: UL 508, C-UL under CSA C222.2 no. 142, Class I, Div. 2, Groups A, B, C, D (UL 1604, C-UL under CSA C222.2 no. 213) and CE

Operating temperature: 0°C to 55°C (32°F to 131°F) ambient.

Storage temperature: -40° C to 85°C (-40° F to 185°F) ambient.

Operating humidity: 5% to 95% relative humidity (non-condensing)

Variables stored in flash memory for permanent storage.

Optional Memory module for program backup. 1766-MM1

RTD MODULE: 4 CHANNEL INPUT MODULE

Catalog number: 1762-IR4

Resolution: 0.1°C (0.1°F)

Repeatability: +/-0.2°C (+/- 0.4°F)

Accuracy: +/-0.9°C (+/- 1.62°F)

Maximum drift: +/-0.026°C/°C (+/- 0.026° F/°F)

RELAY OUTPUT MODULE: AC OUTPUTS

16 AC Outputs, Catalog number: 1762-O16

DISPLAY: PANELVIEW PLUS® 7 700*

Catalog number: 2711P-T7C22D9P-B

SCADA TABLE

The following table shows the PLC tag locations for the value descriptions.

Value Description	Tag Value
Purge Minutes	F94:0
Purge Seconds	F94:1
Pulse Vacuum	F94:2
Pulse Charge	F94:3
Pulses	F94:4
Sterilize Temperature	F94:5
Sterilize Hours	F94:6
Sterilize Minutes	F94:7
Sterilize Seconds	F94:8

Over Temperature	F94:9
Overdrive	F94:10
Under Temperature	F94:11
Under Temperature Restart/Resume	F94:12
Print Interval	F94:13
Vacuum Dry	F94:14
Dry Hours	F94:15
Dry Minutes	F94:16
Dry Seconds	F94:17
Fast or Slow Exhaust	F94:18
Dry Control (Vacuum Dry Setpoint or Limit of System)	F94:19
Slow Exhaust Rate 1	F94:20
Slow Exhaust Pressure 1	F94:21
Slow Exhaust Rate 2	F94:22
Slow Exhaust Pressure 2	F94:23
Charge Rate	F94:24
Exhaust Rate	F94:25
Evacuate Rate	F94:26
Vapor Removal	F94:27
Load or Drain	F94:28
Fo	F94:29
Cycle Type	F94:30
Pulse Vacuum 2	F94:31
Pulse Vacuum 3	F94:32
Pulse Charge 2	F94:33
Pulse Charge 3	F94:34
Pulse Hold 1	F94:35
Pulse Hold 2	F94:36
Pulse Hold 3	F94:37
Continuous Cycles	F94:38
Continuous Cycles Hold	F94:39
Temperature Charge Rate	F94:40
Temperature Exhaust Rate	F94:41
Aircool Pressure	F94:42
Aircool Alarm	F94:43
Aircool Final Load Temperature	F94:44
Air Detector Pulses	F94:45
Air Detector Alarm	F94:46
Air Detector On	F94:47
Analog Pressure	F94:48
Analog Chamber	F94:49
Analog Jacket	F94:50
Analog Waste	F94:51
Analog Load	F94:52
Analog Reference	F94:53
Analog Filter	F94:54
Analog Air Detector	F94:55