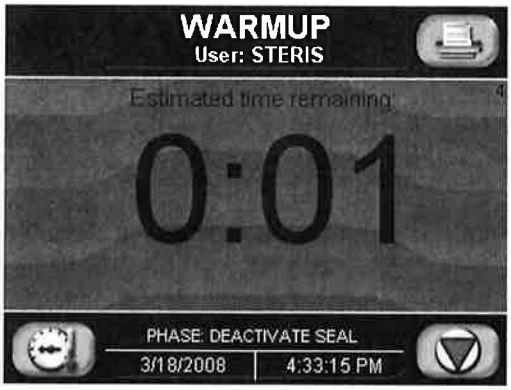
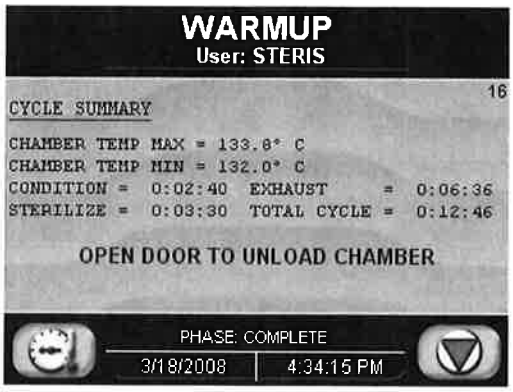
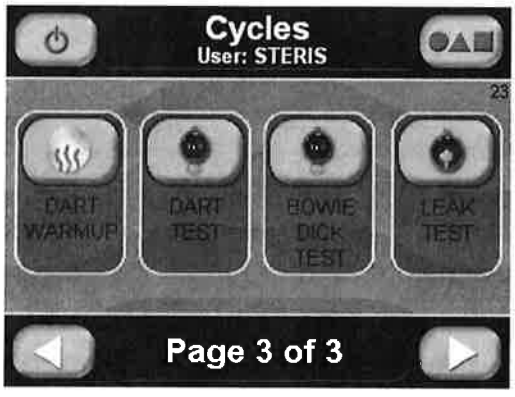
AIR BREAK PHASE: Chamber vacuum air breaks to 2.0 inHg (-0.17 bar). After chamber pressure is above 2.0 inHg (-0.17 bar), the following screen appears:



DEACTIVATE SEAL PHASE: Door unseals until seal pressure switch opens and 20 seconds has elapsed. After phase is complete, the following display appears:



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



6.7 DART Cycle (Only On Prevacuum Sterilizers)

Carefully review *Section 1, Safety Precautions*, and below before operating sterilizer.

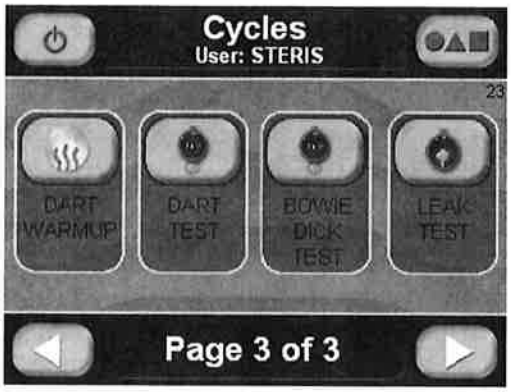
⚠ WARNING – BURN HAZARD:

- **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.**
- **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.

The cycle is designed to document the removal of residual air from a sample challenge load.

Run a DART CYCLE by pressing **DART CYCLE** button from the following screen:



This screen is obtained by pressing the button on screen #2 or screen #19. The following display appears (see *SECTION 5.3, STATUS BUTTONS*, for description of buttons):

JACKET CHARGE PHASE: Jacket charge phase continues until jacket temperature is greater than 132.0°C (270.0°F). After jacket charge phase, the following display appears:

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. After the activate seal phase, the following display appears:

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. After purge time, the following display appears:

PULSE EXHAUST PHASE: Chamber exhausts to 4.0 psig (0.28 bar). Waste temperature is controlled to maintain approximately 45.0°C (113.0°F). Jacket temperature is controlled to maintain approximately 133.5°C (273.0°F) in jacket. After phase is complete, the following screen appears:

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 45.0°C (113.0°F). Jacket temperature is controlled to maintain approximately 133.5°C (273.0°F) in jacket. After phase is complete, the following screen appears:

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. After last PULSE EVACUATE phase is complete, the following screen appears:

CHARGE PHASE: Chamber charges with steam until chamber temperature reaches sterilize temperature. Waste temperature is controlled to maintain approximately 45.0°C (113.0°F). After phase is complete, the following screen appears:

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). After sterilize time is complete, the following screen appears:

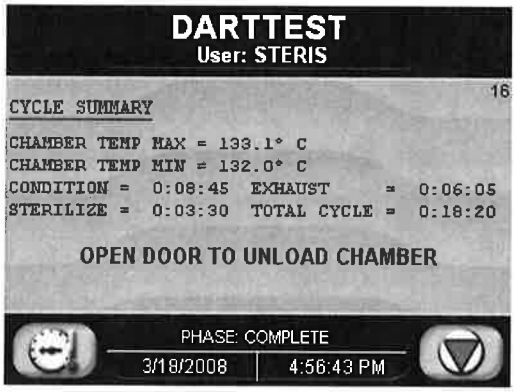
FAST EXHAUST PHASE: Steam fast exhausts from chamber to 4.0 psig (0.28 bar). After chamber pressure is less than 4.0 psig (0.28 bar), the following display appears:

VACUUM DRY PHASE: A vacuum is pulled in the chamber to 10.0 inHg (-0.34 bar) (VACUUM DRY setpoint). After chamber pressure is less than 10.0 inHg (-0.34 bar), the following display appears:

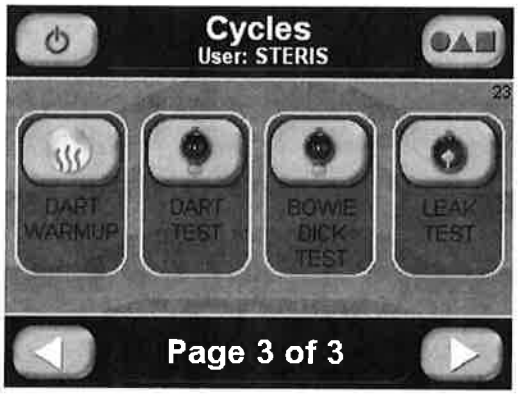
DRY PHASE: During dry phase, vacuum continues to be pulled to limit of system for dry time. After dry time, the following screen appears:

AIR BREAK PHASE: Chamber vacuum air breaks to 2.0 inHg (-0.17 bar). After chamber pressure is above 2.0 inHg (-0.17 bar), the following screen appears:

DEACTIVATE SEAL PHASE: Door unseals until seal pressure switch opens and 20 seconds has elapsed. After phase is complete, the following display appears:



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



6.8 Bowie-Dick Cycle (Only On Prevacuum Sterilizers)

Carefully review *Section 1, Safety Precautions*, and below before operating sterilizer.

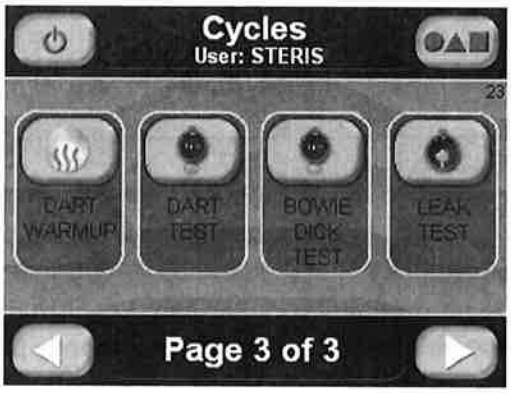
⚠ WARNING – BURN HAZARD:

- **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.**
- **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.**

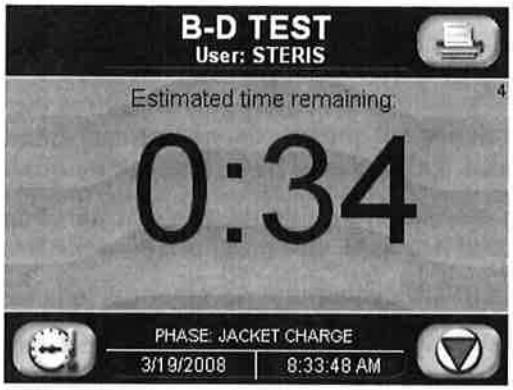
⚠ WARNING – EXPLOSION HAZARD: This sterilizer is not designed to process flammable compounds.

The cycle is designed to document the removal of residual air from a sample challenge load.

Run a BOWIE-DICK CYCLE by pressing **B-D CYCLE** button from the following screen:

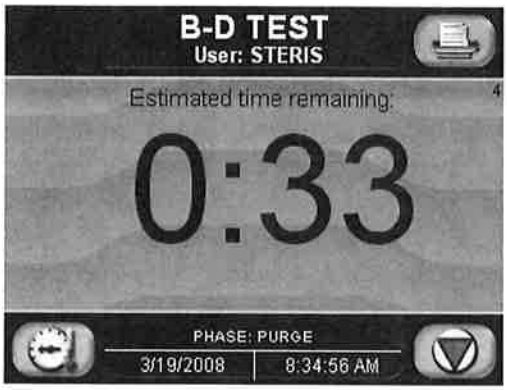


This screen is obtained by pressing the button on screen #2 or screen #19. The following display appears (see *SECTION 5.3, STATUS BUTTONS*, for description of buttons):

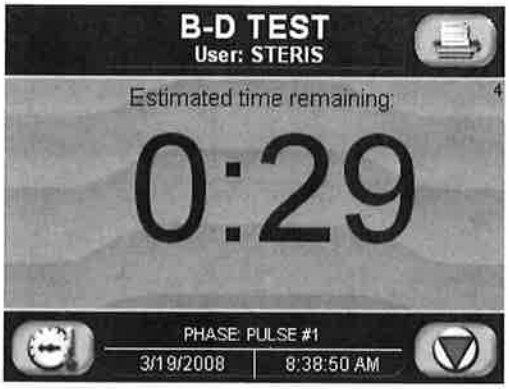


JACKET CHARGE PHASE: Jacket charge phase continues until jacket temperature is greater than 132.0°C (270.0°F). After jacket charge phase, the following display appears:

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. After the activate seal phase, the following display appears:



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. After purge time, the following display appears:



PULSE EXHAUST PHASE: Chamber exhausts to 4.0 psig (0.28 bar). Waste temperature is controlled to maintain approximately 45.0°C (113.0°F). Jacket temperature is controlled to maintain approximately 133.5°C (273.0°F) in jacket. After phase is complete, the following screen appears:

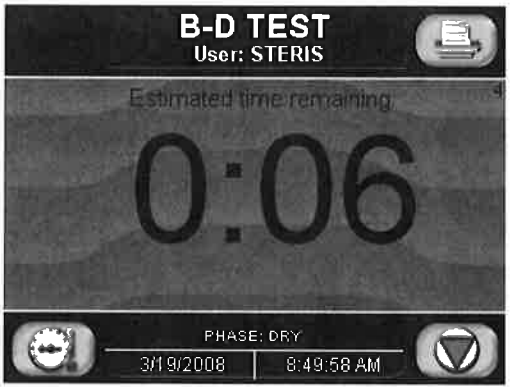
PULSE EVACUATE PHASE: Chamber evacuates to PULSE VACUUM setpoint (default 10.0 inHg (-0.34 bar) plus one minute. Waste temperature is controlled to maintain approximately 45.0°C (113.0°F). Jacket temperature is controlled to maintain approximately 133.5°C (273.0°F) in jacket. After phase is complete, the following screen appears:

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. After last PULSE EVACUATE phase is complete, the following screen appears:

CHARGE PHASE: Chamber charges with steam until chamber temperature reaches sterilize temperature. Waste temperature is controlled to maintain approximately 45.0°C (113.0°F). After phase is complete, the following screen appears:

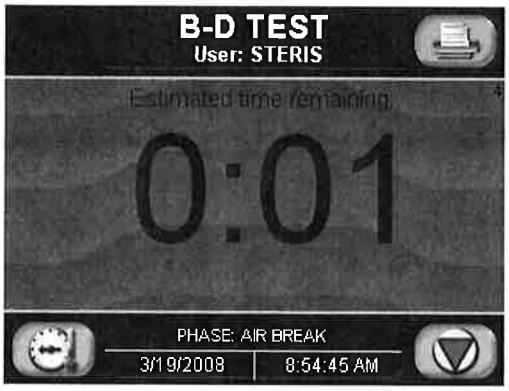
STERILIZE PHASE: Chamber temperature controls at sterilize temperature plus overdrive (control temperature). Waste temperature is controlled to maintain approximately 45.0°C (113.0°F). After sterilize time is complete, the following screen appears:

FAST EXHAUST PHASE: Steam fast exhausts from chamber to 4.0 psig (0.28 bar). After chamber pressure is less than 4.0 psig (0.28 bar), the following display appears:

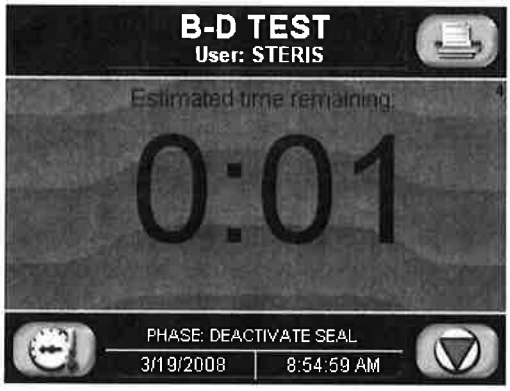


VACUUM DRY PHASE: A vacuum is pulled in the chamber to 10.0 inHg (-0.34 bar) (VACUUM DRY setpoint). After chamber pressure is less than 10.0 inHg (-0.34 bar), the following display appears:

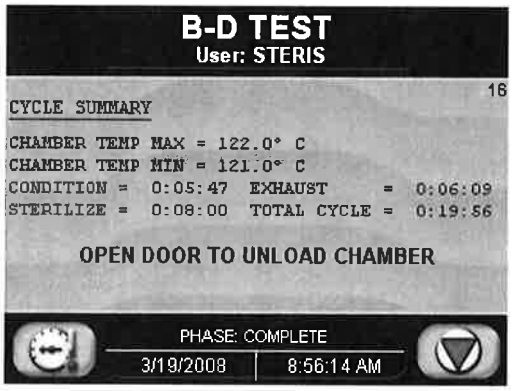
DRY PHASE: During dry phase, vacuum continues to be pulled to limit of system for dry time. After dry time, the following screen appears:



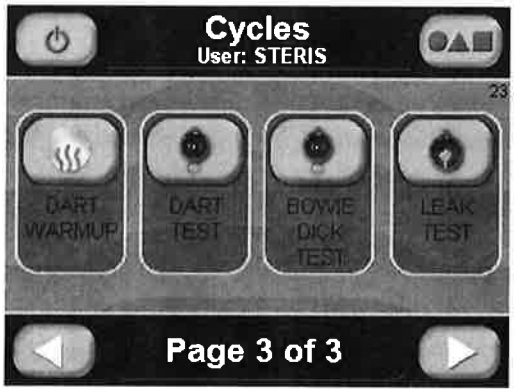
AIR BREAK PHASE: Chamber vacuum air breaks to 2.0 inHg (-0.17 bar). After chamber pressure is above 2.0 inHg (-0.17 bar), the following screen appears:



DEACTIVATE SEAL PHASE: Door unseals until seal pressure switch opens and 20 seconds has elapsed. After phase is complete, the following display appears:



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



6.9 Leak Test Cycle (Only On Prevacuum Sterilizers)

Carefully review *Section 1, Safety Precautions,* and below before operating 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.**
- **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.**

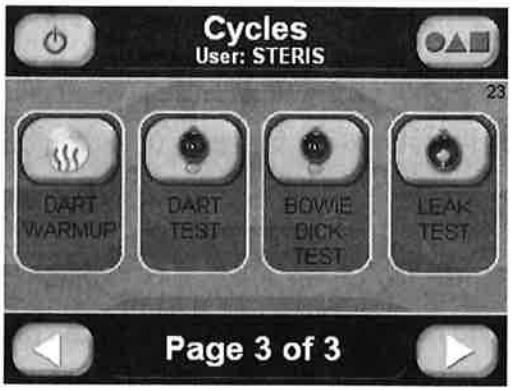
⚠ WARNING – EXPLOSION HAZARD: This sterilizer is not designed to process flammable compounds.

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: This test is not a substitute for a Dart test.

NOTE: 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 is considered acceptable.

Run a LEAK TEST CYCLE by pressing **LEAK TEST** button from the following screen.



This screen is obtained by pressing **TEST MODE** button on screen #2 or screen #19. The following display is shown:

JACKET CHARGE PHASE: Jacket charge phase continues until jacket temperature is greater than 132.0°C (270.0°F). After jacket charge phase, the following display appears:

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. After activate seal phase, the following display appears:

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. After purge time, the following display appears:

PULSE EXHAUST PHASE: Chamber exhausts to 4.0 psig (0.28 bar). Waste temperature is controlled to maintain approximately 45.0°C (113.0°F). Jacket temperature is controlled to maintain approximately 133.5°C (273.0°F) in jacket. After phase is complete, the following screen appears:

PULSE EVACUATE PHASE: Chamber evacuates to PULSE VACUUM setpoint (default 10.0 inHg (-0.34 bar). Waste temperature is controlled to maintain approximately 45.0°C (113.0°F). Jacket temperature is controlled to maintain approximately 133.5°C (273.0°F) in jacket. After phase is complete, the following screen appears:

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. After last PULSE EVACUATE phase is complete, the following screen appears:

EVACUATE PHASE: Chamber evacuates for 10 minutes. Waste temperature is controlled to maintain approximately 45.0°C (113.0°F). After phase is complete, the following screen appears:

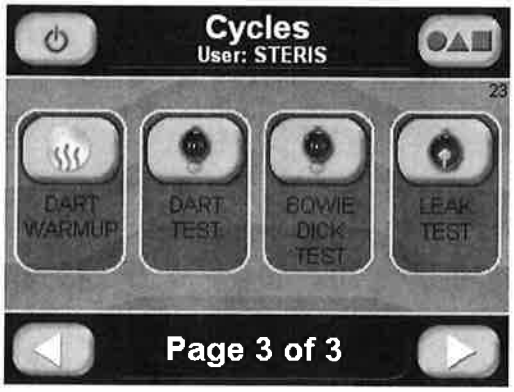
STABILIZE PHASE: Chamber remains in an idle state for two minutes (i.e., chamber holds at vacuum level). Waste temperature is controlled to maintain approximately 45.0°C (113.0°F). After stabilize time is complete, the following screen appears:

LEAK TEST PHASE: Chamber holds for 10 minutes. Initial and final pressure values are recorded. Leak rate is determined in mmHg. After leak test time is complete, the following display appears:

AIR BREAK PHASE: Chamber vacuum air breaks to 2.0 inHg (-0.17 bar). After chamber pressure is above 2.0 inHg (-0.17 bar), the following screen appears:

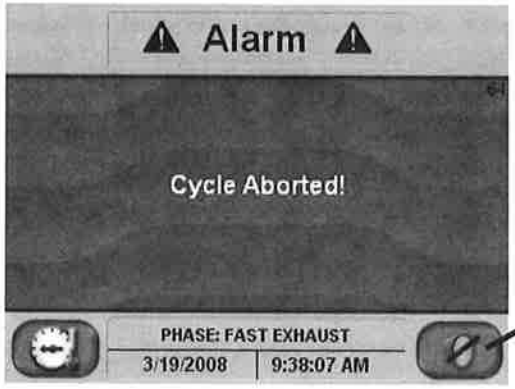
DEACTIVATE SEAL PHASE: Door unseals until seal pressure switch opens and 20 seconds has elapsed. After phase is complete, the following display appears:

COMPLETE PHASE: The cycle is complete. Open the door. Once door is open, display returns to main operating mode screen shown below:



6.10 Cycle Abort

The cycle may abort for two reasons. The operator pressed the abort button or the cycle got an alarm that aborted the cycle. The following display is an example screen when the cycle is aborted.



If the operator aborted the cycle, the printer prints:

* CYCLE ABORTED BY OPERATOR

The cycle aborts to the fast exhaust or slow exhaust phase. If the purge phase hasn't been run yet, cycle aborts to the deactivate seal phase.

If ABORT button is pressed on screen #64, the cycle ends and the screen shows operating mode screen #2 or #19. Cycle relieves any pressure in chamber.

6.11 Double Doors

If the sterilizer is equipped with double doors, a display will be on the non-operating end door panel. The non-operating end display will have the same functionality as the operating end display, including buttons to seal or unseal the door.

The operating end display incudes a printer. The non-operating end display has an optional printer.

See *Section 6.14.1, Supervisor Mode - Cycle Parameters*, on the description of the interlock types.

6.12 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.

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

The LOAD or **equivalent time at sterilization temperature** mode selection allows exposure time to start when load probe located in the product and the chamber drain line probe reach a preset sterilize temperature. The F_o value is calculated from the load probe located in the product load. Charge or exposure phase terminates when calculated F_o value is equal to the pre-selected value, or if the sterilize time counts down to 0, whichever occurs first. The F_o value and load temperature are printed along with standard status print values.

6.12.1 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

See *Section 6.12.1, Cycle Parameters*, on the description of changing F_o and STER CTRL values.

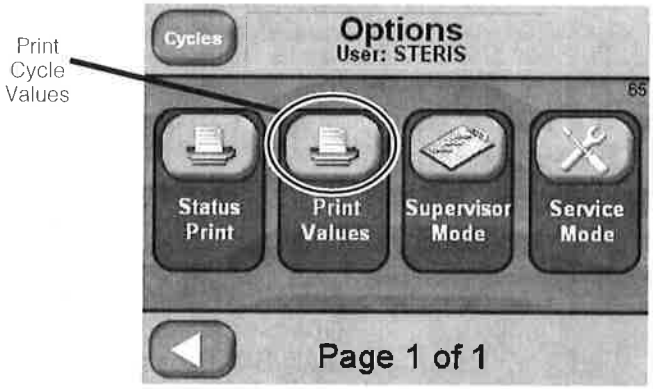
6.13 Separate Steam Feed Option

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 6.13.1, Cycle Parameters*).

6.14 Supervisor Mode

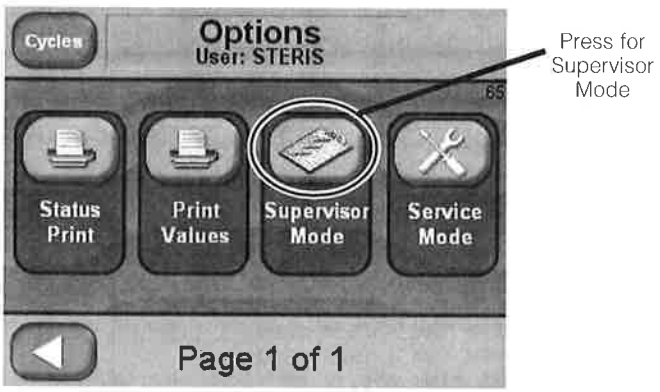
Refer to *Section 5, Control Interface*, for instructions on how to get to the options screen.



Press **PRINT CYCLE VALUES** button to print all of the cycle parameters. The following page shows an example printout with defaulted cycle values for a prevac sterilizer.

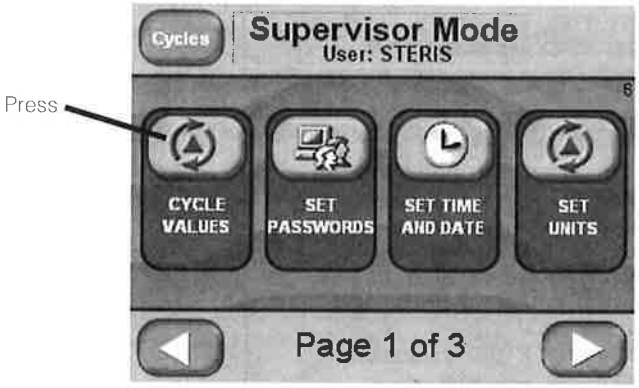
Example of Cycle Values Printout.

```
==============================
==== CYCLE VALUES PRINTOUT ===
==============================
XX:XX:XX XM            XX/XX/XX

LOGIN NAME:  STERIS

1.PREVAC1
PURGE TIME= 2:00
   PULSES = 4
 PRES VAC = 10.0 inHg
 PRES CHG = 15.0 PSIG
STER TIME = 0:30:00
STER TEMP = 121.0°C
 OVERTEMP = 6.0°C
OVERDRIVE = 1.5 C
UNDERTEMP = 1.0°C  RESUME
PRINT INT = 2 MIN
  VAC DRY = 10.0 inHg
 DRY TIME = 0:15:00
STRL CTRL = DRAIN
       Fo = 0
------------------------------
2.PREVAC2
PURGE TIME= 2:00
   PULSES = 4
 PRES VAC = 10.0 inHg
 PRES CHG = 15.0 PSIG
STER TIME = 0:30:00
STER TEMP = 121.0°C
 OVERTEMP = 6.0°C
OVERDRIVE = 1.5 C
UNDERTEMP = 1.0°C  RESUME
PRINT INT = 2 MIN
  VAC DRY = 10.0 inHg
 DRY TIME = 0:15:00
STRL CTRL = DRAIN
       Fo = 0
------------------------------
3.PREVAC3
PURGE TIME= 2:00
   PULSES = 4
 PRES VAC = 10.0 inHg
 PRES CHG = 15.0 PSIG
STER TIME = 0:30:00
STER TEMP = 121.0°C
 OVERTEMP = 6.0°C
OVERDRIVE = 1.5 C
UNDERTEMP = 1.0°C  RESUME
PRINT INT = 2 MIN
  VAC DRY = 10.0 inHg
 DRY TIME = 0:15:00
STRL CTRL = DRAIN
       Fo = 0
------------------------------
4.PREVAC4
PURGE TIME= 2:00
   PULSES = 4
 PRES VAC = 10.0 inHg
 PRES CHG = 15.0 PSIG
STER TIME = 0:30:00
STER TEMP = 121.0°C
 OVERTEMP = 6.0°C
OVERDRIVE = 1.5 C
UNDERTEMP = 1.0°C  RESUME
PRINT INT = 2 MIN
  VAC DRY = 10.0 inHg
 DRY TIME = 0:15:00
STRL CTRL = DRAIN
       Fo = 0
------------------------------
5.GRAVITY5
PURGE TIME= 2:00
STER TIME = 0:30:00
STER TEMP = 121.0°C
 OVERTEMP = 6.0°C
OVERDRIVE = 1.5 C
UNDERTEMP = 1.0°C  RESUME
PRINT INT = 2 MIN
  VAC DRY = 10.0 inHg
 DRY TIME = 0:15:00
STRL CTRL = DRAIN
       Fo = 0
------------------------------
6.GRAVITY6
PURGE TIME= 2:00
STER TIME = 0:30:00
STER TEMP = 121.0°C
 OVERTEMP = 6.0°C
OVERDRIVE = 1.5 C
UNDERTEMP = 1.0°C  RESUME
PRINT INT = 2 MIN
  VAC DRY = 10.0 inHg
 DRY TIME = 0:15:00
STRL CTRL = DRAIN
       Fo = 0
------------------------------
7.LIQUID7
PURGE TIME= 2:00
STER TIME = 0:45:00
STER TEMP = 121.0°C
 OVERTEMP = 6.0°C
OVERDRIVE = 1.5 C
UNDERTEMP = 1.0°C  RESUME
PRINT INT = 2 MIN
STRL CTRL = DRAIN
       Fo = 0
------------------------------
8.LIQUID8
PURGE TIME= 2:00
STER TIME = 0:45:00
STER TEMP = 121.0°C
 OVERTEMP = 6.0°C
OVERDRIVE = 1.5 C
UNDERTEMP = 1.0°C  RESUME
PRINT INT = 2 MIN
STRL CTRL = DRAIN
       Fo = 0
------------------------------

TOO LONG IN:
------------------------------
ACTIVATE SEAL =  1 m
     AIR BREAK =  5 m
        CHARGE = 60 m
DEACTIVATE SEAL=  1 m
      EVACUATE = 30 m
       EXHAUST = 10 m
 JACKET CHARGE = 60 m
```



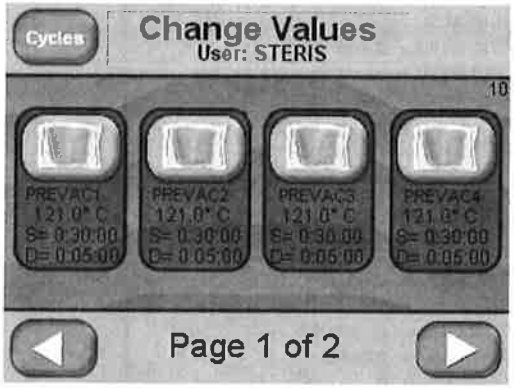
The supervisor mode may be entered by pressing **SUPERVISOR** button on the options screen.

The following display is shown:



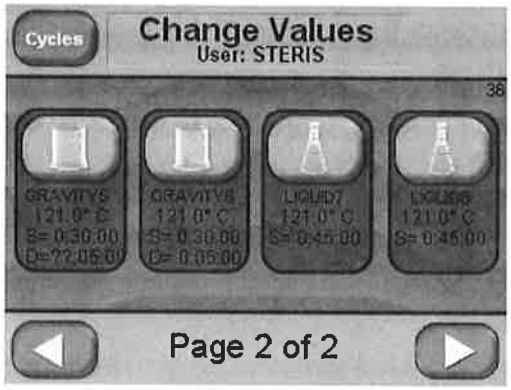
6.14.1 Cycle Parameters

Press **CYCLE VALUES button** (above) to change or view cycle parameters. The following display is shown (prevac sterilizer):

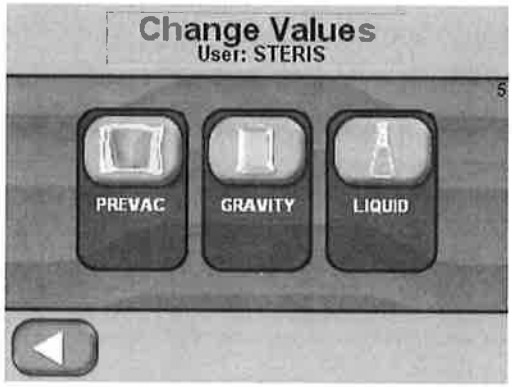


Screen shows cycles 1 through 4. These cycles may be any combination of PREVAC, GRAVITY or LIQUID cycle type.

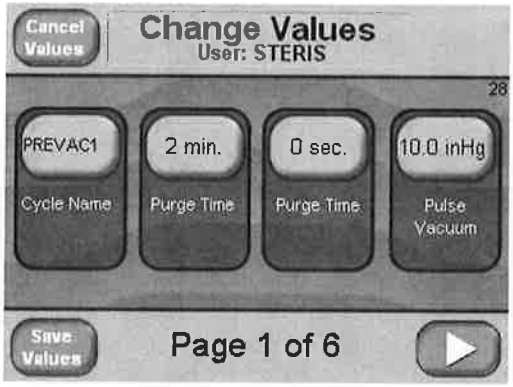
Press **RIGHT ARROW** button to change cycles 5 through 8.



Press **LEFT ARROW** button to go back . Press **PREVAC** button to change cycle values on cycle 1 (*NOTE: This procedure may be applied for any cycle – some cycles may have less or more parameters*). The display then shows:



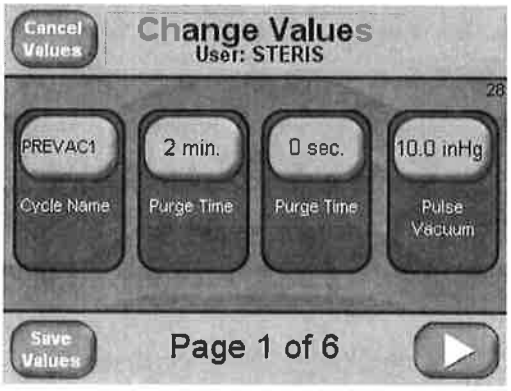
Press **LIQUID** button to set cycle to a liquid cycle type. Press **GRAVITY** button to set cycle to a gravity cycle type. On prevac sterilizers, press **PREVAC** button to set cycle to a prevac cycle type. The selected cycle type is shown.



The screen shows the prevac cycle type and the values changeable for the prevac cycle (*NOTE: When changing the prevac, isothermal, gravity and/or liquid cycles refer to this procedure*). Press **LEFT ARROW** and **RIGHT ARROW** buttons to scroll through the cycle values. Press **SAVE or CANCEL VALUES** button.

CYCLE NAME

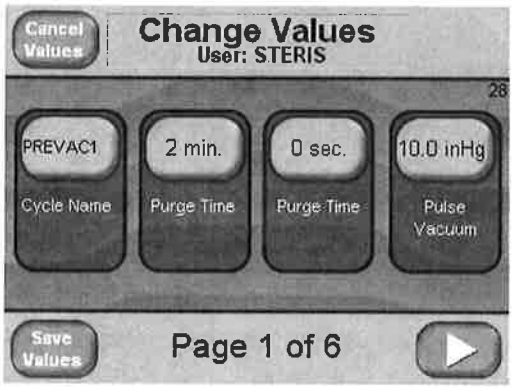
Press **CYCLE NAME=PREVAC1** to change cycle name. The following display is shown:



Press button with cycle name in it to change cycle name. An alphanumeric display is shown to enter cycle name. Enter any combination of numbers and letters and press **ENTER** button. The new cycle name is shown.

PURGE TIME

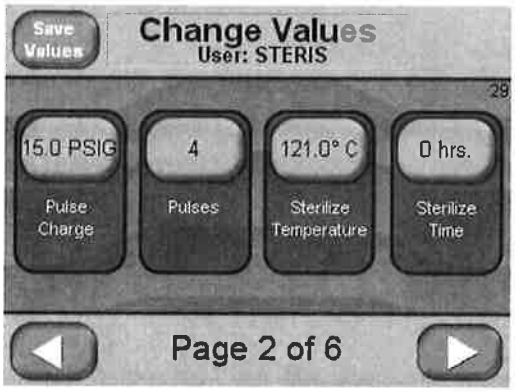
Press **PURGE TIME=2:00** to change the purge time. The following display is shown:



Press button next to minutes and seconds to change purge time. A numeric display is shown to enter purge time. The allowable range is 0 to 99 minutes and seconds. Enter numeric value and press **ENTER** button. New purge time is shown.

PULSES (only on Prevacuum sterilizers)

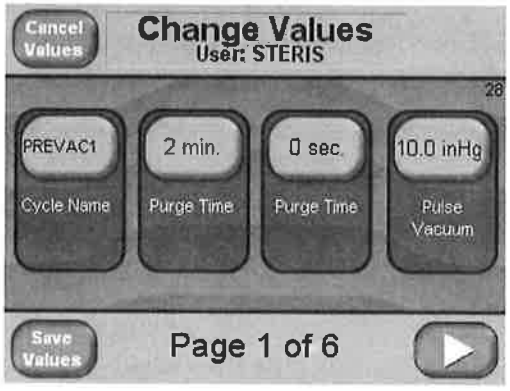
Press **PULSES=4** to change number of pulses. The following display is shown:



Press button to change number of pulses. A numeric display is shown to enter pulses. The allowable range is 0 to 99. Enter numeric value and press **ENTER** button. New pulses shown.

PULSE VACUUM (only on Prevacuum sterilizers)

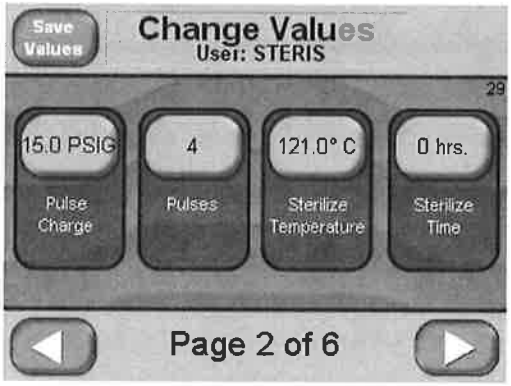
Press **PULSE VACUUM=10.0** to change pulse vacuum value. The following display is shown:



Press button to change the pulse vacuum. A numeric display is shown to enter pulse vacuum. The allowable range is 0 to 29.0 inHg. Enter numeric value and press **ENTER** button. New pulse vacuum is shown.

PULSE CHARGE (only on Prevacuum sterilizers)

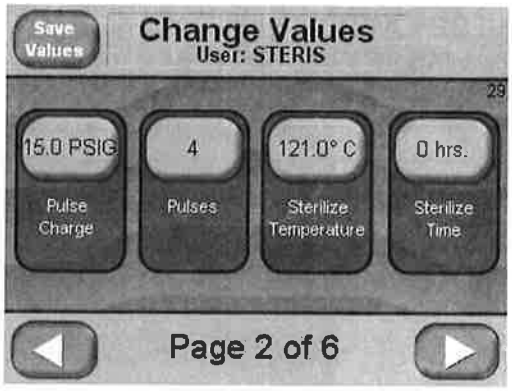
Press **PULSE CHARGE=15.0** to change pulse charge value. The following display is shown:

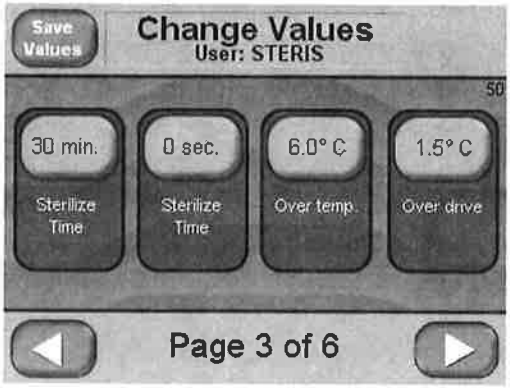


Press button to change pulse charge. A numeric display is shown to enter pulse charge. The allowable range is 0 to 35.0 psig. Enter numeric value and press **ENTER** button. New pulse charge is shown. Press **EXIT** button to return to screen #32.

STERILIZE TIME

Press **STERILIZE TIME=0:30:00** to change sterilize time. The following displays are shown:

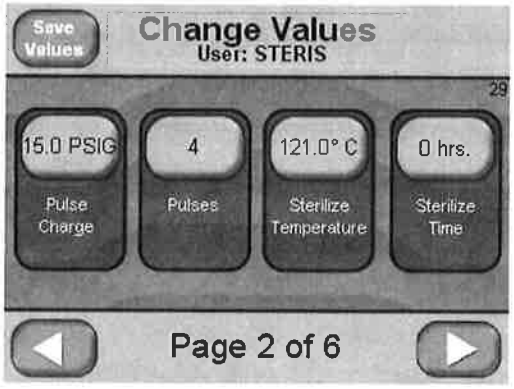




Press button next to the hours, minutes and seconds to change sterilize time. A numeric display is shown to enter sterilize time. The allowable range is 0 to 8 hours, 0 to 99 minutes, and seconds. Enter numeric value and press **ENTER** button. New sterilize time is shown.

STERILIZE TEMPERATURE

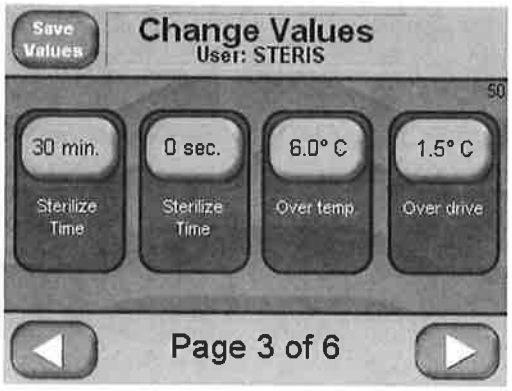
Press **STERILIZE TEMPERATURE=121.0°C** to change sterilize temperature. The following display is shown:



Press button to change sterilize temperature. A numeric display is shown to enter sterilize temperature. The allowable range is 100.0°C (212.0°F) to 141.0°C (285.0°F) for prevac, gravity, and liquid cycles. The allowable range is 78.0°C (172.0°F) to 110.0°C (230.0°F) for isothermal cycles. Enter numeric value and press **ENTER** button. New sterilize temperature is shown.

OVERTEMP

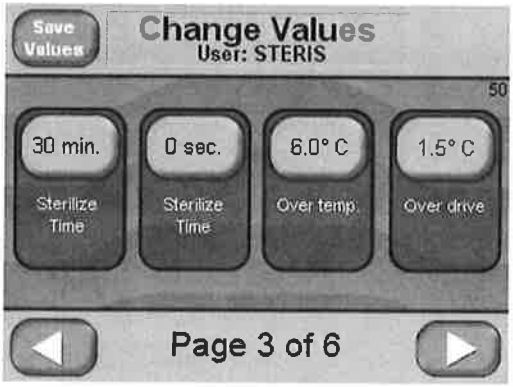
Press **OVERTEMP=6.0°C** to change over temperature alarm setpoint. See *SECTION 7, ALARMS*, for explanation of over temperature alarm. The following display is shown:



Press button to change overtemp. A numeric display is shown to enter overtemp. The allowable range is 0.0°C (32.0°F) to 40.0°C (104.0°F). Enter numeric value and press **ENTER** button. New sterilize temperature i s shown.

OVERDRIVE

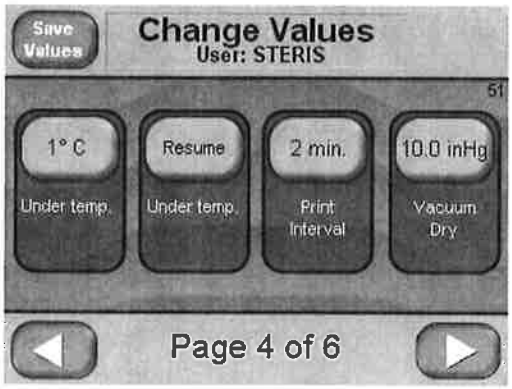
Press **OVERDRIVE=1.5°C** to change overdrive (sterilize temperature + overdrive = control temperature). See sterilize phase in cycle for an explanation of control temperature. The following display is shown:



Press button to change overdrive. A numeric display is shown to enter overdrive. The allowable range is 0.0°C (32.0°F) to 40.0°C (104.0°F). Enter numeric value and press **ENTER** button. The new sterilize temperature is shown.

UNDERTEMP

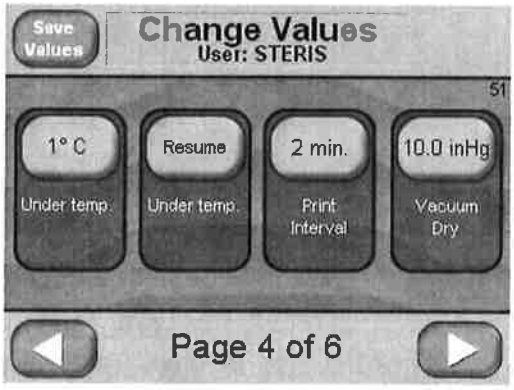
Press **UNDERTEMP=1.0°C** to change under temperature alarm setpoint. See ALARM SECTION for explanation of under temperature alarm. The following display is shown:



Press button to change undertemp. A numeric display is shown to enter undertemp. The allowable range is 0.0°C (32.0°F) to 40.0°C (104.0°F). Enter numeric value and press **ENTER** button. New sterilize temperature is shown.

PRINT INTERVAL

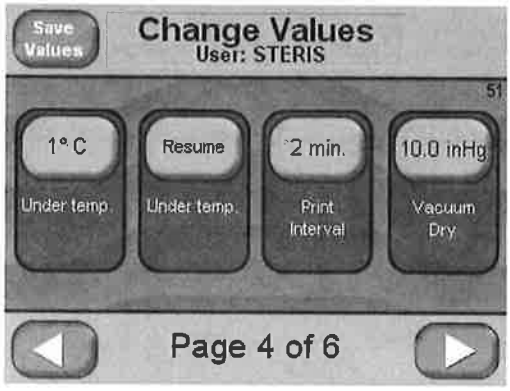
Press **PRINT INT=2 MIN** to change the print interval setpoint. Print interval is the time interval of the status prints during sterilize phase. The following display is shown:



Press button to change print interval. A numeric display is shown to enter print interval. The allowable range is 0 to 99 minutes. Enter numeric value and press **ENTER** button. New print interval is shown.

RESUME/RESTART

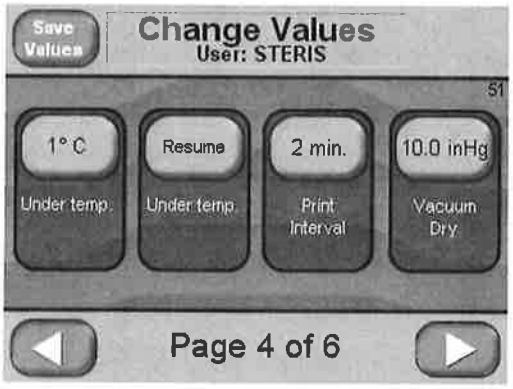
Press **RESUME/RESTART=RESUME** to set resume or restart setting. RESUME resumes sterilize timer after it has been stopped on an under temperature alarm. RESTART restarts sterilize timer after is has been stopped on an under temperature alarm. The following display is shown:



Press either **RESUME** or **RESTART** buttons to resume or restart. New resume or restart setting is shown.

VACUUM DRY

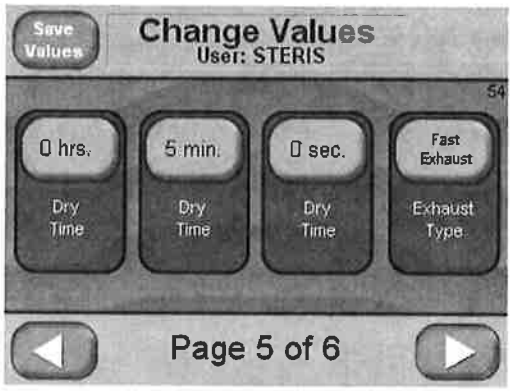
Press **VACUUM DRY=10.0 inHg (-0.34 bar)** to change vacuum dry setpoint. Vacuum dry setpoint is the vacuum level that dry timer starts. The following display is shown:



Press button to change vacuum dry setting. A numeric display is shown to enter vacuum dry setting. The allowable range is 0.0 to 29.9 inHg (1.0 -bar). Enter numeric value and press **ENTER** button. New vacuum dry setting is shown.

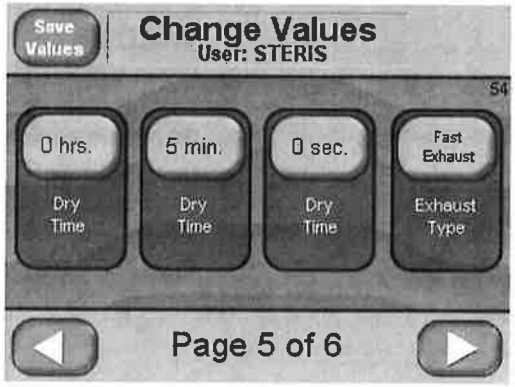
DRY TIME

Press **DRY TIME=0:15:00** to change the dry time. The following display is shown:

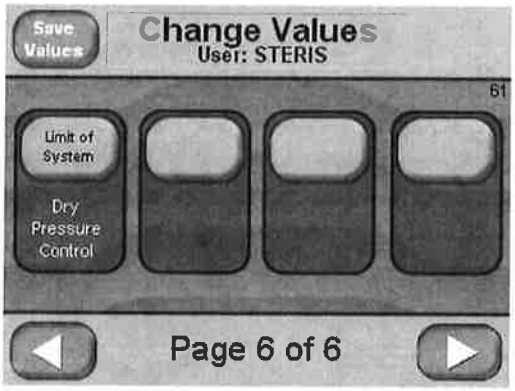


Press button next to the hours, minutes, and seconds to change the dry time. A numeric display is shown to enter dry time. The allowable range is 0 to 8 hours, 0 to 99 minutes, and seconds. Enter any numeric value and press **ENTER** button. New dry time is shown.

Exhaust Type (Prevac Cycle only). Press Exhaust type = Fast Exhaust to change the exhaust type to Slow Exhaust. The Prevac cycle has an option to run a fast or slow exhaust after the sterilize phase.

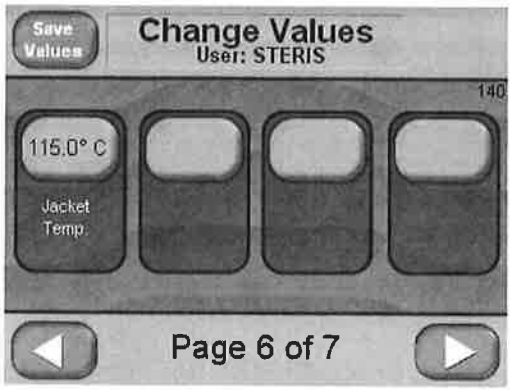


Dry Pressure Control (Prevac or Gravity Cycle only). Press Dry Pressure Control = Limit of System to change the Dry Pressure Control to Vacuum Dry Point. The vacuum system has the option to run to the limit of system or control at the vacuum dry point during the dry phase.



JACKET TEMPERATURE (SEPARATE STEAM OPTION, ONLY)

Press **JACKET TEMPERATURE = 115.0°C** to change the jacket temperature.

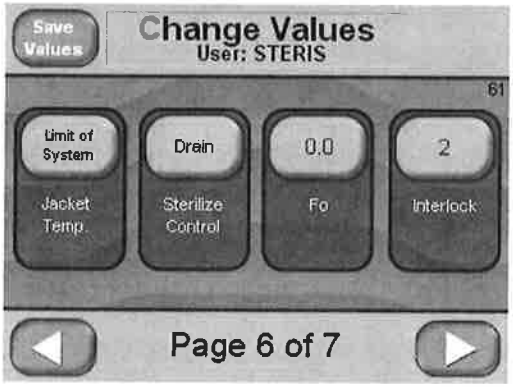


Press white buttonto change jacket temperature. A numeric display appears to enter jacket temperature. The allowable range is 100 to 141.0°C. The new jacket temperature is shown.

STER CTRL (LOAD PROBE OPTION)

Press **STER CTRL=DRAIN** to set which temperatures the control uses 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 reaches sterilize temperature. Selecting LOAD option also enables F_o (See F_o cycle value). The following display is shown:

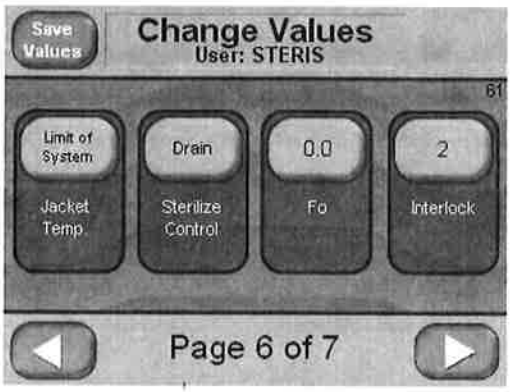
Press either **LOAD** or **DRAIN** buttons to resume or restart. New resume or restart setting is shown.



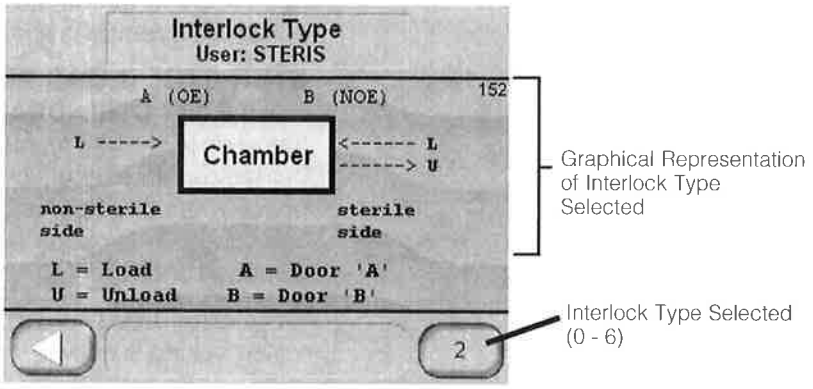
F_o (LOAD PROBE OPTION)

Press **F_o=0.0** to change the F_o value. Charge or sterilize phase ends when actual F_o value is equal to or greater than this setting. The following display is shown:

Press button to change F_o setting. A numeric display is shown to enter F_o setting. Enter numeric value and press **ENTER** button. New F_o setting is shown.



INTERLOCK DOORS (double door sterilizers only)
Press **INTERLOCK = DOOR B** button to change interlock type. The following display is shown:



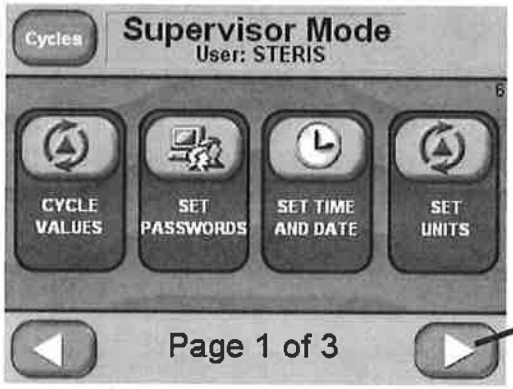
There are seven interlock types:

0. **NO INTERLOCKS –** Selected on screen below. Both doors are unsealed at the end of the cycle. Either door may be sealed or unsealed as many times as needed, out of cycle.
1. At the end of the cycle, both doors remain sealed. Press unseal door button on same side as door to be unsealed. Door B is designated as the **sterile side**. Once door A is unsealed, door B may not be unsealed until a cycle is run.
2. At the end of the cycle, door B is unsealed. Press unseal door button on door A. The door B is designated as the **sterile side**. Once door A is unsealed, door B may not be unsealed until a cycle is run.
3. At the end of the cycle, both doors remain sealed. Press unseal door button on same side as door to be unsealed. Door A is designated as the **sterile side**. Once door B is unsealed, door A may not be unsealed until a cycle is run.
4. At the end of the cycle, door A is unsealed. Press unseal door button on door A. Door B is designated as the **sterile side**. Once door A is unsealed, door B may not be unsealed until a cycle is run.
5. At the end of the cycle, door A is unsealed. Press unseal door button on door A. Door A is designated as the **sterile side**. Once door B is unsealed, door A may not be unsealed until a cycle is run.

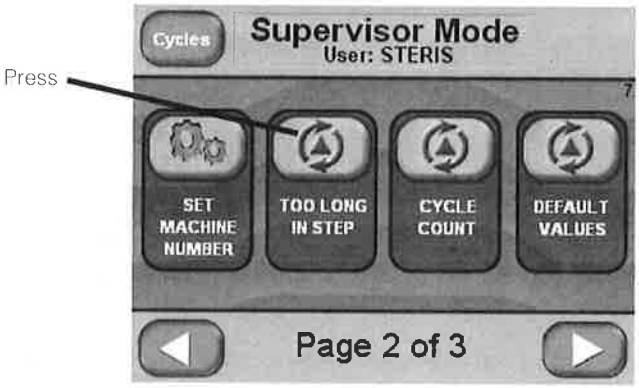
6. At the end of the cycle, door B is unsealed. Press unseal door button on door A. The door A is designated as the **sterile side**. Once door B is unsealed, door A may not be unsealed until a cycle is run.

6.14.2 Too Long In Step

To change or view the too long in step parameters, follow these steps:

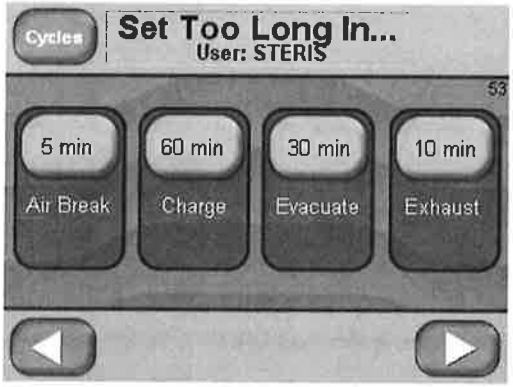


From SUPERVISOR MODE, press RIGHT ARROW button.



Then press TOO LONG IN STEP button.

The following display is shown:



Press **RIGHT ARROW** to scroll to other too long in step values not shown.
Press **LEFT ARROW** to return to (SUPERVISOR MODE).

Too Long in Step parameters follow on next page:

AIR BREAK

Press **AIR BREAK=5 MIN** on the screen shown above to change the too long in air break value.

Press button to change too long in air break time. A numeric display is shown to enter value. Enter numeric value and press **ENTER** button. New value is shown on screen.

CHARGE

Press **CHARGE=60 MIN** to change too long in charge value.

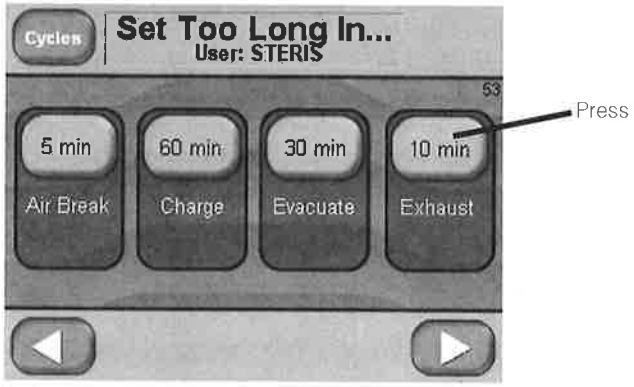
Press button to change the too long in charge time. A numeric display is shown to enter the value. Enter numeric value and press **ENTER** button. The new value is shown on screen.

EVACUATE

Press **EVACUATE=30 MIN** to change too long in evacuate value.

Press button to change too long in evacuate time. A numeric display is shown to enter value. Enter numeric value and press **ENTER** button. The new value is shown.

EXHAUST



Press **EXHAUST=10 MIN** to change too long in exhaust value.

Press button to change too long in exhaust time. A numeric display is shown to enter value. Enter numeric value and press **ENTER** button. New value is shown.

JACKET CHARGE (Press **RIGHT ARROW** to scroll to this screen).

Press **JACKET CHARGE=30 MIN** to change the too long in jacket charge value.

Press button to change too long in jacket charge time. A numeric display is shown to enter value. Enter numeric value and press **ENTER** button. The new value is shown.

SEAL (ACTIVATE SEAL)

Press **ACTIVATE SEAL=5 MIN** to change the too long in activate seal value.

Press button to change too long in activate seal time. A numeric display is shown to enter value. Enter numeric value and press **ENTER** button. New value be shown on screen.

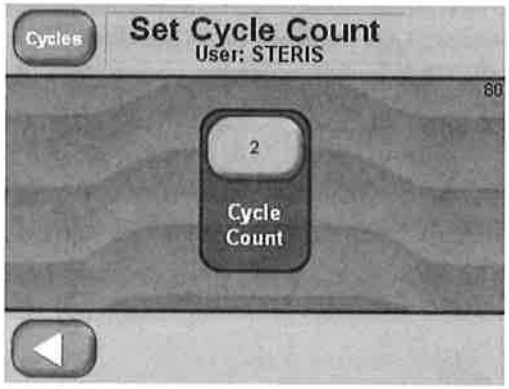
UNSEAL (DEACTIVATE SEAL)

Press **DEACTIVATE SEAL=5 MIN** to change too long in deactivate seal value.

Press button to change too long in deactivate seal time. A numeric display is shown to enter value. Enter numeric value and press **ENTER** button. New value is shown on screen.

6.14.3 Cycle Count

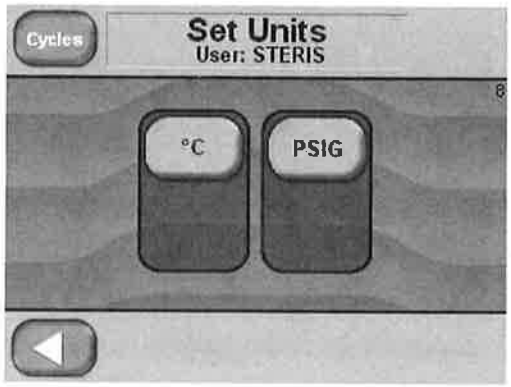
From SUPERVISOR MODE, press **CYCLE COUNT** button to change or view cycle count. The following display is shown:



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.

6.14.4 Units

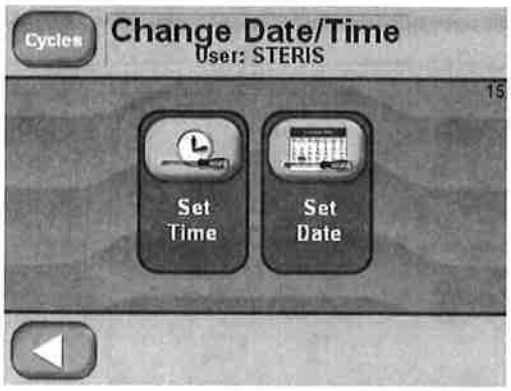
From SUPERVISOR MODE , press **UNITS** button to change or view the units. The following display is shown:



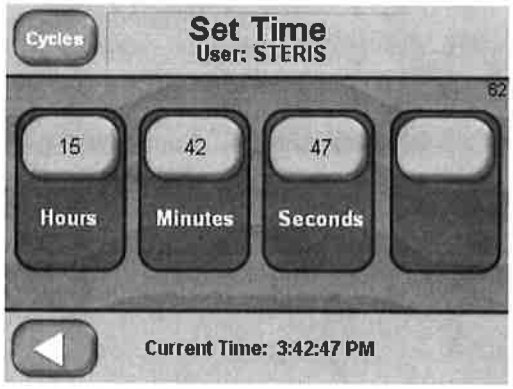
Press buttons to change units. The value will be shown on the button (i.e., CELSIUS and PSIG/INHG units are selected above). Press **LEFT ARROW** to return.

6.14.5 Set Time and Date

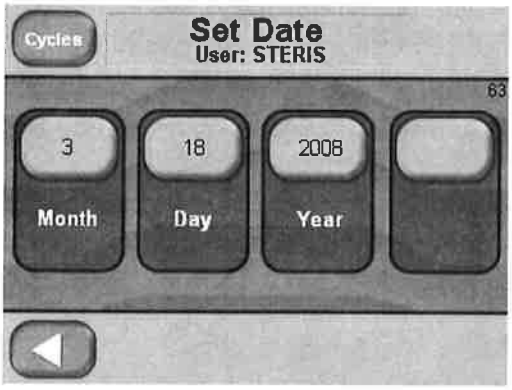
From SUPERVISOR MODE, press **SET TIME and DATE** button to change time and date. The following display is shown:



Press set time to enter time. The following display is shown:



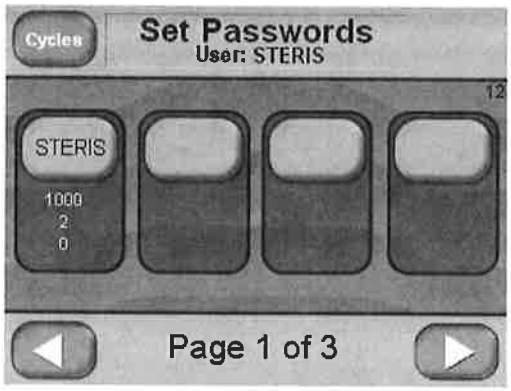
Press set Date to enter date. The following display is shown:



Press **LEFT ARROW** to return.

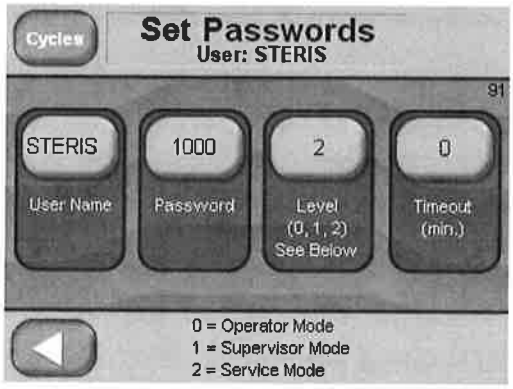
6.14.6 Set Passwords

From SUPERVISOR MODE screen #7, press **SET PASSWORDS** button to set passwords. The following display is shown:



1. Press **LEFT ARROW** and **RIGHT ARROW** buttons to show additional user names and passwords. LEFT ARROW shows previous six user names and passwords, until it shows initial screen, then it returns to the previous screen. RIGHT ARROW shows next six user names and pass words, until it shows last screen, then it shows first six user names and passwords.
2. Press **SPACE 1** to change user name and password for (1). Press **SPACE 2** to add a user name and password for (2 – 12). The display shows the following screen:

NOTE: If sterilizer is a double door, the display 'B' needs to have the password user names entered as they are on the display 'A' side.



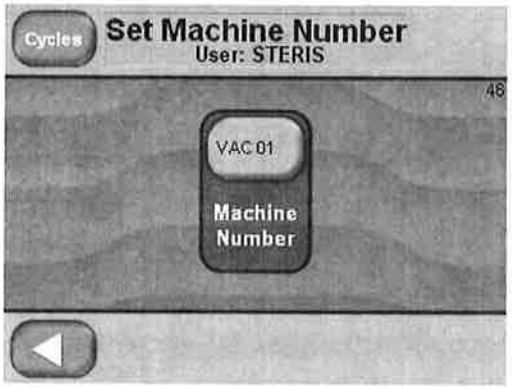
3. Press **button** next to USERNAME to add a user name. An alphanumeric screen appears to enter value. Press **ENTER** button to save value and return to screen #30. The added user name is shown on the screen.
4. Press **button** next to PASSWORD to add a password corresponding to entered username. An alphanumeric screen appears to enter value.
5. Press **ENTER** button to save value and return to screen #30. The password is shown on the screen.
6. Press **button** next to LEVEL. The text changes to OPERATOR MODE, SUPERVISOR MODE, and SERVICE MODE. Select access level for username. Operator has access to operator mode only. Supervisor has access to operator mode and supervisor mode. Service mode has access to operator mode, supervisor mode, and service mode.

7. Press **button** next to TIMEOUT to set time out period (in minutes). A numeric screen appears to enter value.

   Time out period is as follows: If user does not press a button in time out period, control logs out user and display shows screen #6. User then has to log back in. A value of 0 has no timeout.

6.14.7 Machine Number

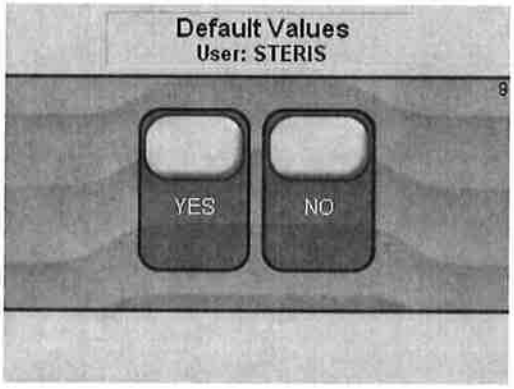
From SUPERVISOR MODE, press **MACHINE NUMBER** button to view or change machine number. The following display is shown:



Press **button** next to change machine number. A numeric display is shown to enter value. Enter numeric value and press **ENTER** button. New value is shown on screen.

6.14.8 Default Values

From SUPERVISOR MODE , press **DEFAULT VALUES** button to default values. The following display is shown:



Press **YES** button to default all values (cycle values, too long in step, units, machine number and cycle count). Calibration values are not defaulted. Press **NO** button to cancel default values. Display returns to previous screen.

6.14.9 Cycle Complete Buzzer

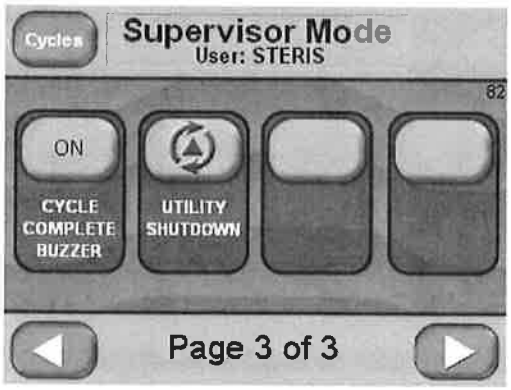
From SUPERVISOR MODE, press **Cycle Complete Buzzer** button to turn ON or OFF the buzzer for one minute at the start of the complete phase.

6.15 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.

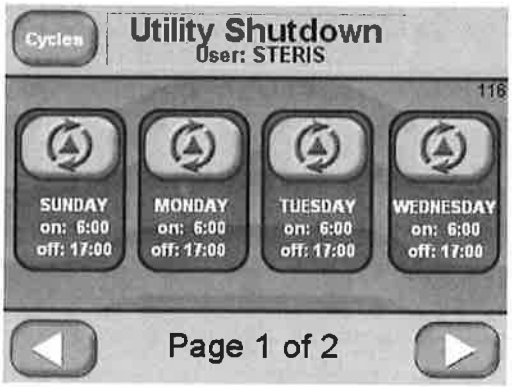
The Utility Shutdown feature may be accessed in the Supervisor Mode (see section 6.14 on how to access the Supervisor Mode).

NOTE: On double door sterilizers, the utility shutdown parameters can only be changed on display 'A'.



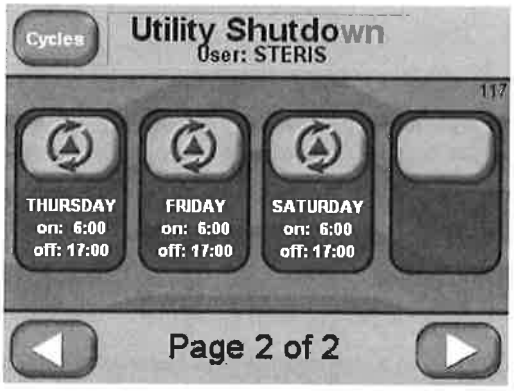
Press the UTILITY SHUTDOWN button.

The UTILITY SHUTDOWN modes may be selected individually for each day of the week. The following screen will be shown:



The display will show the days of the week and the restart (on) time and the shutdown (off) time. The buttons may also show OFF ALL DAY or ON ALL DAY.

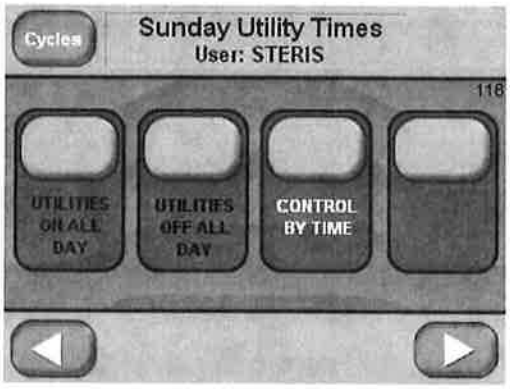
Press the right arrow button to show the rest of the days of the week.



The right or left arrow buttons will show the other days of the week. Press the day of the week to select the UTILITY SHUTDOWN mode and restart and shutdown times.

Three different modes may be selected for each day of the week:

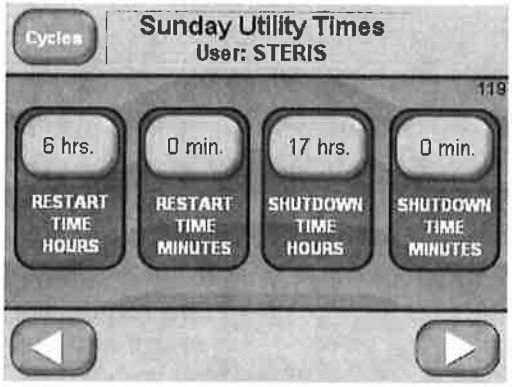
1. UTILITIES ON ALL DAY.
2. UTILITIES OFF ALL DAY.
3. CONTROL BY TIME.



UTILITIES ON ALL DAY – If this mode is selected, the UTILITY SHUTDOWN screen will not be shown for that day. The utilities will operate normally during the entire day.

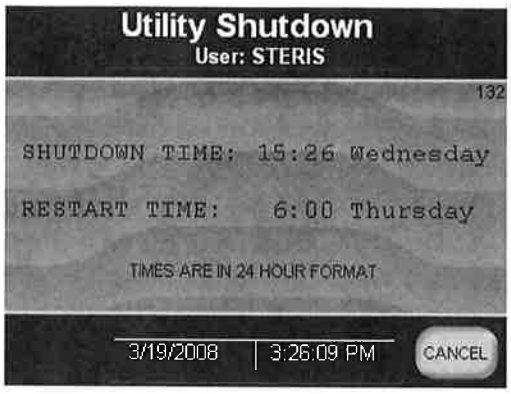
UTILITIES OFF ALL DAY – If this mode is selected, the UTILITIY SHUTDOWN screen will be shown and the utilities will be off the entire day.

CONTROL BY TIME – If this mode is selected, the following screen will be shown:



The restart time and shutdown time may be changed on this screen. The default setting is to restart the utilities on Sunday at 6 am (600 hours) and shutdown the utilities on Sunday at 5 pm (1700 hours). The default values are the same for every day of the week.

The UTILITY SHUTDOWN will occur on any screen except for the UTILITY SHUTDOWN setup screens shown above and during a cycle excluding the complete phase. If the shutdown time is reached for the day of the week, the following screen will be shown:

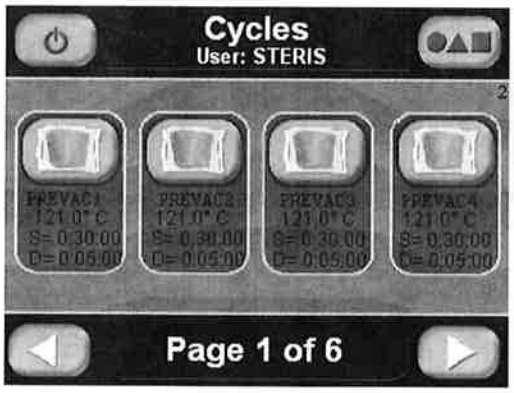


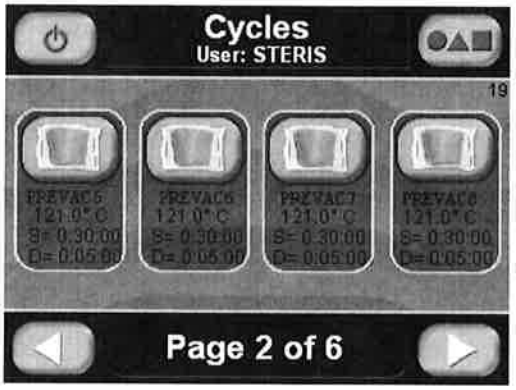
In the example above, the utilities will shutdown down on 1526 (3:26 pm) on Wednesday and they will turn back on at 600 (6 am) on Thursday.

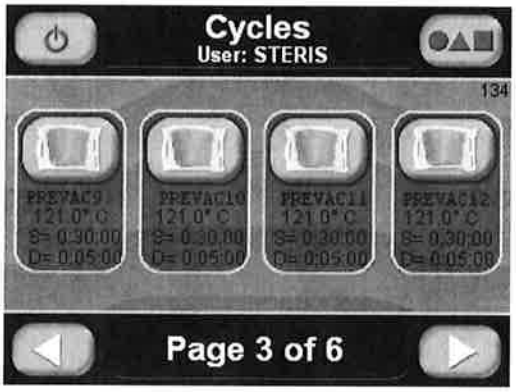
The CANCEL button will restart the utilities to run a cycle or another operation. After the cycle is complete the utilities will shut back down if the restart time hasn't been reached.

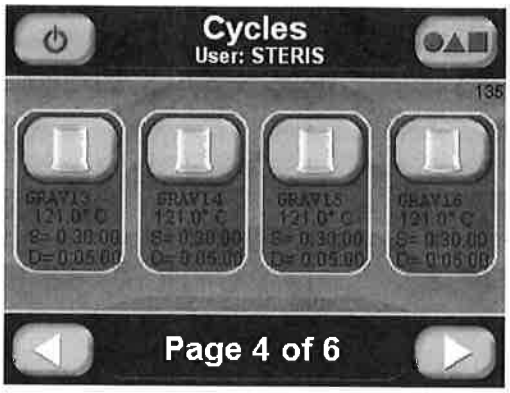
6.16 Additional Cycles (20 Cycle Option)

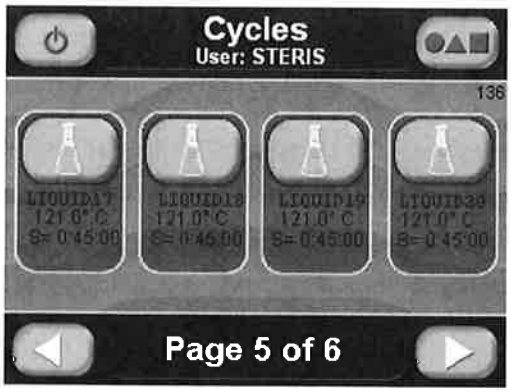
6.16.1 The following screens will be displayed for the Prevac Sterilizer configuration in the operating mode (the right or left arrow buttons will advance the screens):

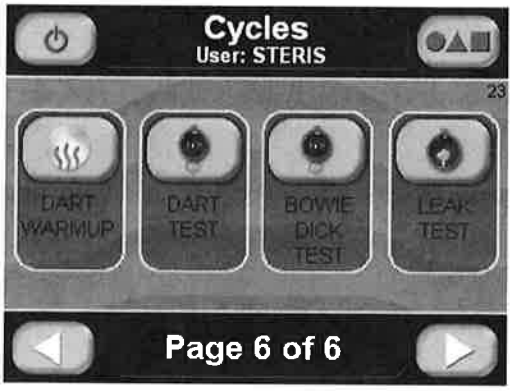




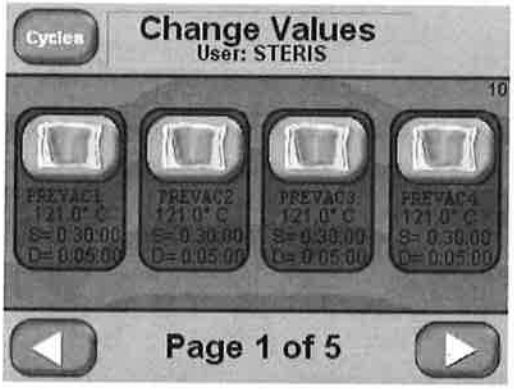


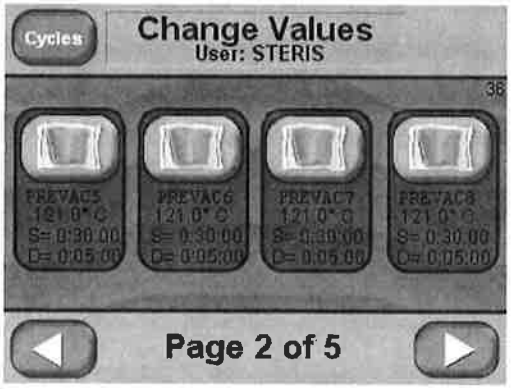


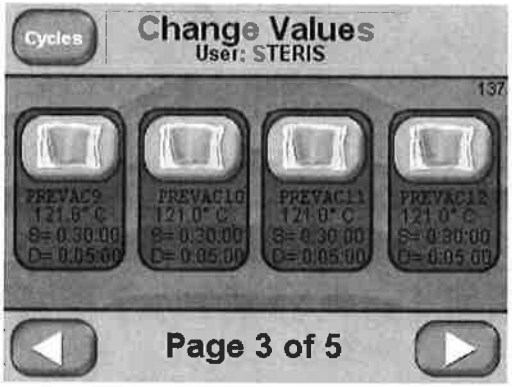


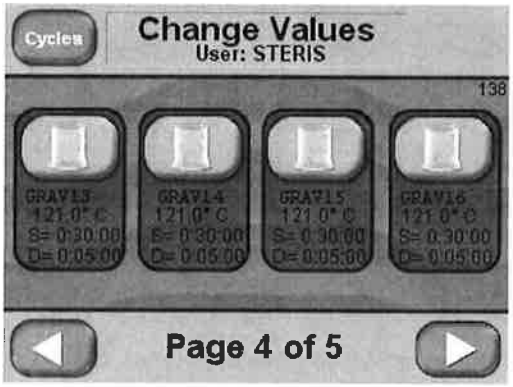


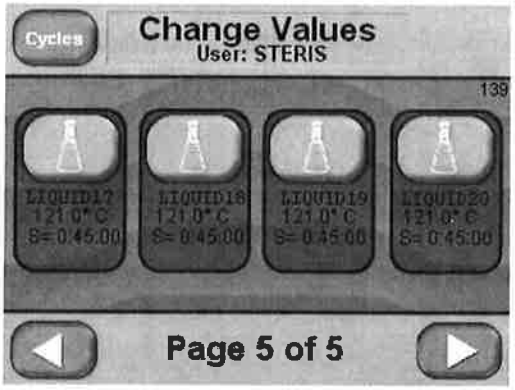
6.16.2 The following screens will be displayed for the Prevac Sterilizer configuration in the cycle values, supervisor mode (the right or left arrow buttons will advance the screens):



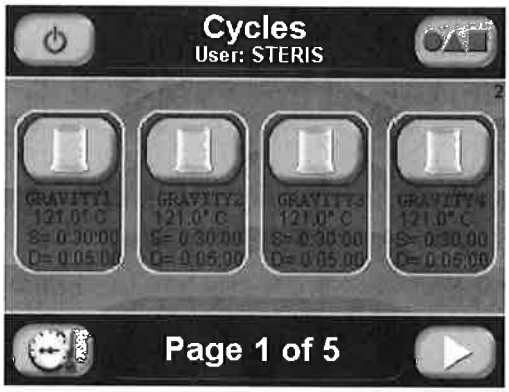

Cycles
Change Values
User: STERIS
36
PREVAC5
121.0° C
S= 0:30:00
D= 0:05:00
PREVAC6
121.0° C
S= 0:30:00
D= 0:05:00
PREVAC7
121.0° C
S= 0:30:00
D= 0:05:00
PREVAC8
121.0° C
S= 0:30:00
D= 0:05:00
Page 2 of 5

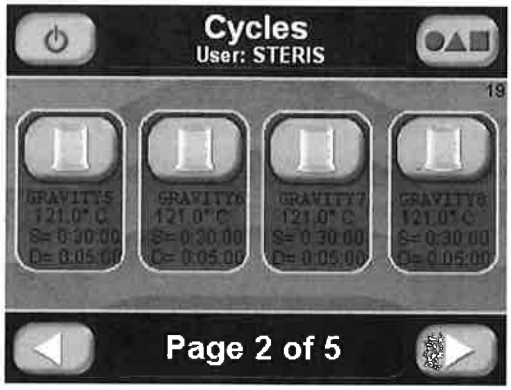

Cycles
Change Values
User: STERIS
137
PREVAC9
121.0° C
S= 0:30:00
D= 0:05:00
PREVAC10
121.0° C
S= 0:30:00
D= 0:05:00
PREVAC11
121.0° C
S= 0:30:00
D= 0:05:00
PREVAC12
121.0° C
S= 0:30:00
D= 0:05:00
Page 3 of 5

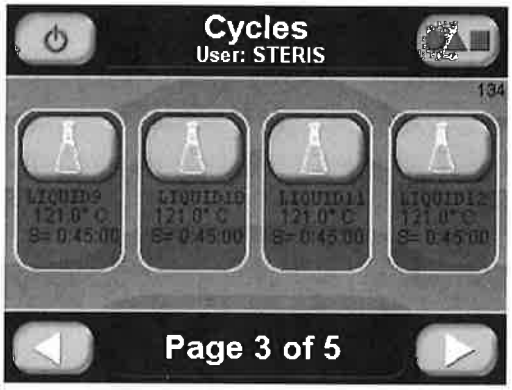

Cycles
Change Values
User: STERIS
138
GRAV13
121.0° C
S= 0:30:00
D= 0:05:00
GRAV14
121.0° C
S= 0:30:00
D= 0:05:00
GRAV15
121.0° C
S= 0:30:00
D= 0:05:00
GRAV16
121.0° C
S= 0:30:00
D= 0:05:00
Page 4 of 5

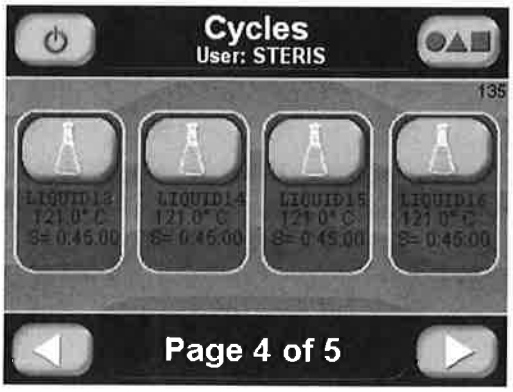

Cycles
Change Values
User: STERIS
139
LIQUID17
121.0° C
S= 0:45:00
LIQUID18
121.0° C
S= 0:45:00
LIQUID19
121.0° C
S= 0:45:00
LIQUID20
121.0° C
S= 0:45:00
Page 5 of 5

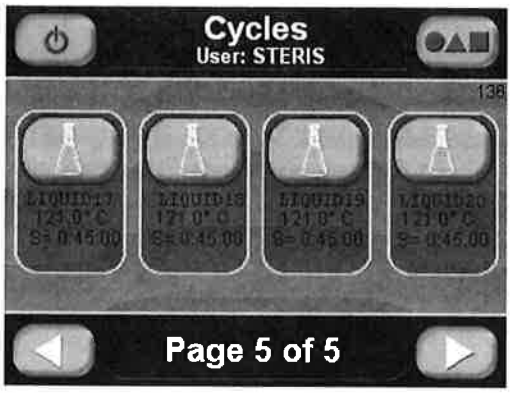
6.16.3 The following screens will be displayed for the Gravity Sterilizer configuration in the operating mode (the right or left arrow buttons will advande the screens):



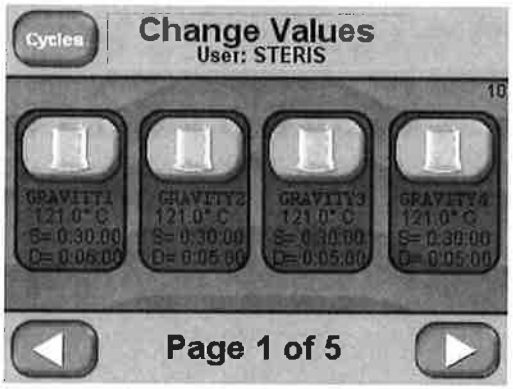


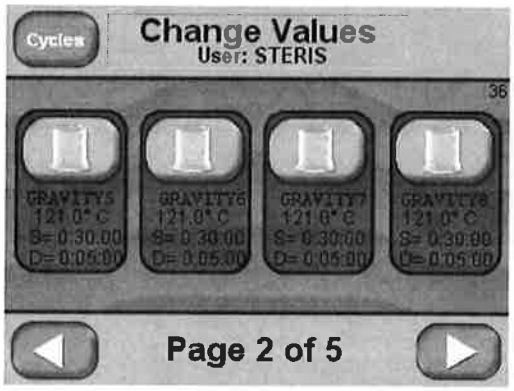


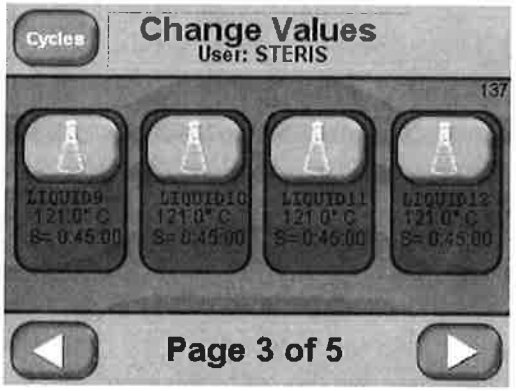


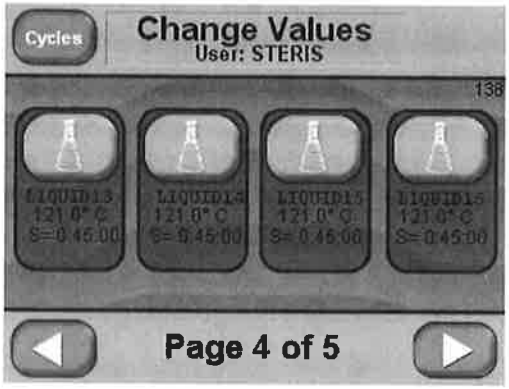


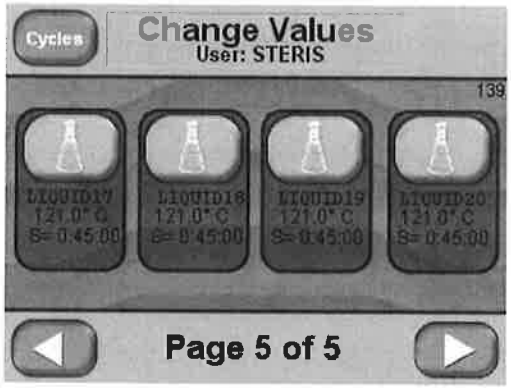
6.16.4 The following screens will be displayed for the Gravity Sterilizer configuration in the cycle values, supervisor mode (the right or left arrow buttons will advance the screens):



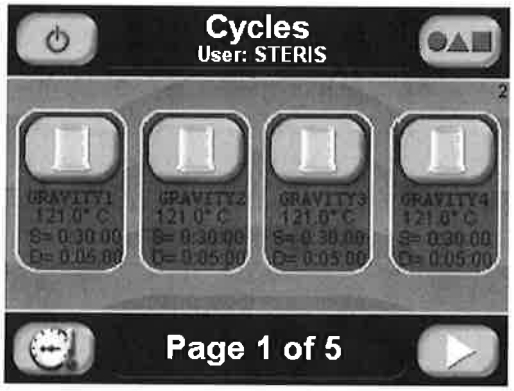


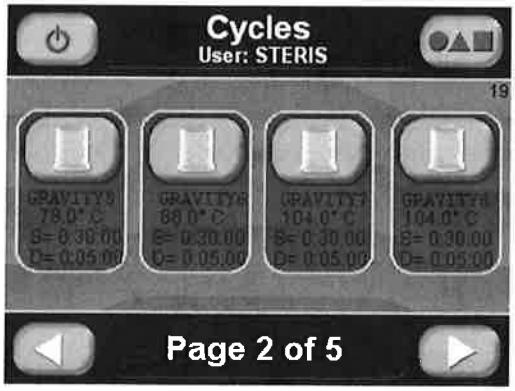


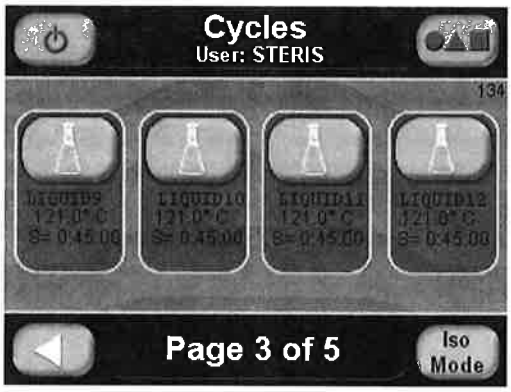


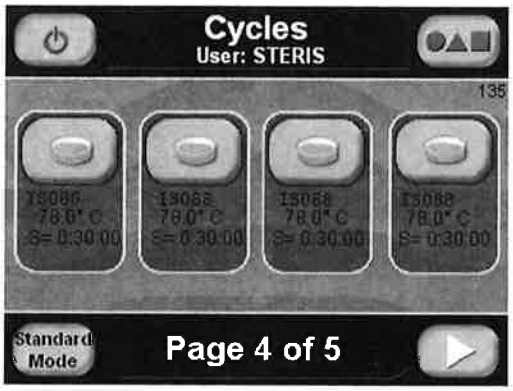


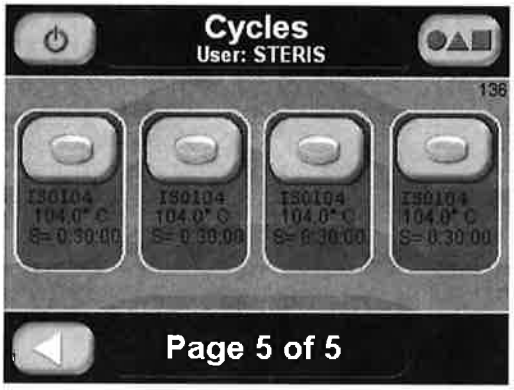
6.16.5 The following screens will be displayed for the Isothermal Sterilizer configuration in the operating mode. The right or left arrow buttons will advance the screens. The Iso Mode button will display the Isothermal cycles. The Standard Mode button will display the Gravity and Liquid cycles.



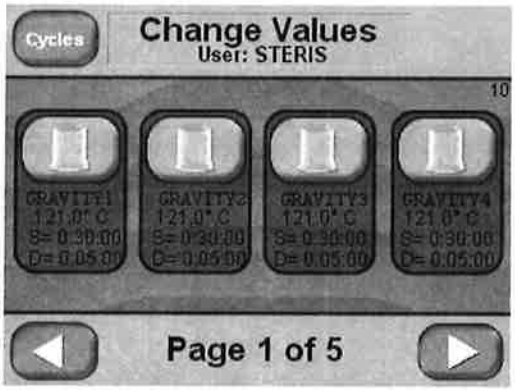


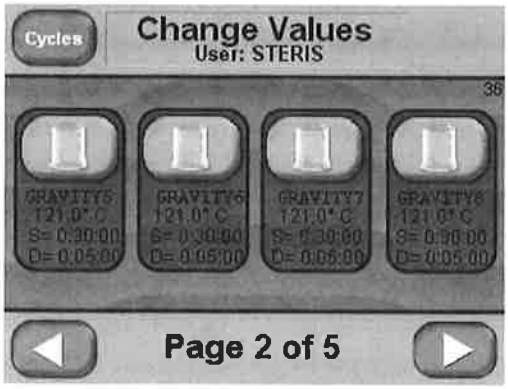


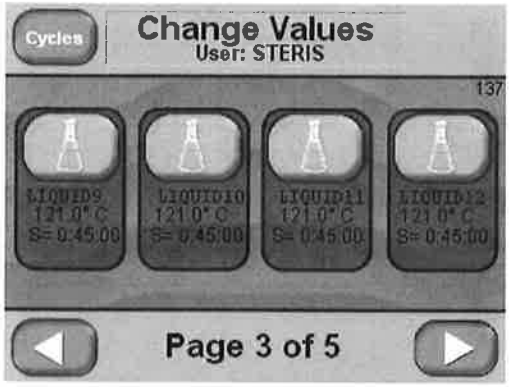


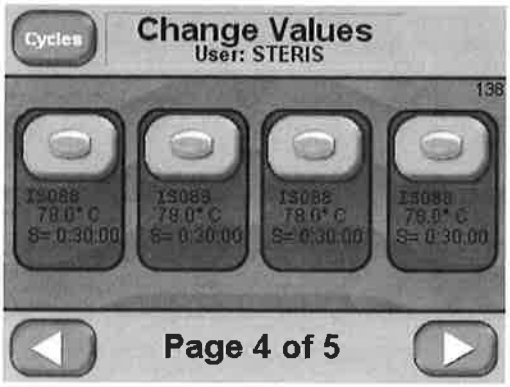


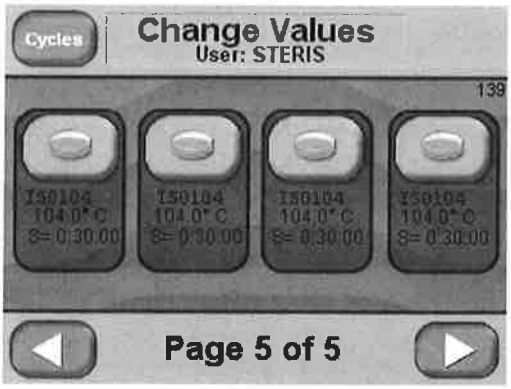
6.16.6 The following screens will be displayed for the Isothermal Sterilizer configuration in the cycle values, supervisor mode (the right or left arrows buttons will advance the screens):




Cycles
Change Values
User: STERIS
35
GRAVITY5
121.0°C
S= 0:30:00
D= 0:05:00
GRAVITY6
121.0°C
S= 0:30:00
D= 0:05:00
GRAVITY7
121.0°C
S= 0:30:00
D= 0:05:00
GRAVITY8
121.0°C
S= 0:30:00
D= 0:05:00
Page 2 of 5


Cycles
Change Values
User: STERIS
137
LIQUID9
121.0°C
S= 0:45:00
LIQUID10
121.0°C
S= 0:45:00
LIQUID11
121.0°C
S= 0:45:00
LIQUID12
121.0°C
S= 0:45:00
Page 3 of 5


Cycles
Change Values
User: STERIS
138
IS088
78.0°C
S= 0:30:00
IS088
78.0°C
S= 0:30:00
IS088
78.0°C
S= 0:30:00
IS088
78.0°C
S= 0:30:00
Page 4 of 5


Cycles
Change Values
User: STERIS
139
IS0104
104.0°C
S= 0:30:00
IS0104
104.0°C
S= 0:30:00
IS0104
104.0°C
S= 0:30:00
IS0104
104.0°C
S= 0:30:00
Page 5 of 5

ALARMS

7

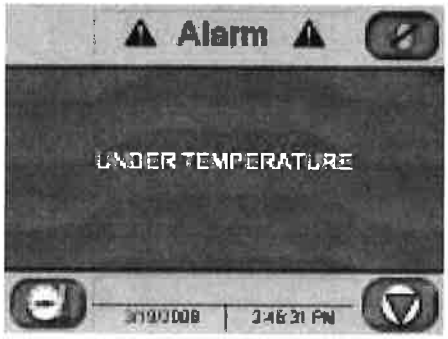
This section pictorially lists and describes all the possible alarm conditions which may occur when operating the Lab Series Life Sciences Small Sterilizers.

If a problem occurs that is not described in this section, please 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 any associated sensor temperatures.

On the display, the alarm blinks. The alarm buzzer sounds an alarm. Press **SILENCE ALARM** button to silence the alarm.

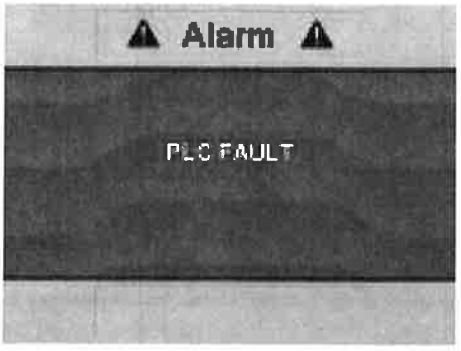
Alarm	Description	Screen with Alarm
PRESSURE IN CHAMBER	Occurs if 2 psig (0.14 bar) pressure is sensed in the chamber when a cycle is not running.	
CHAMBER FLOODED	Occurs if excess water is sensed in the chamber. ***WARNING! BURN HAZARD CHAMBER MAY BE FILLED WITH STEAM CONDENSATE.***	
DOOR SWITCH FAILURE	Occurs if door is sensed to be simultaneously sealed and opened.	

Alarm	Description	Screen with Alarm
DOOR UNSEALED	Occurs if door is sensed to be unsealed during cycle.	
OVER TEMPERATURE	Occurs if the chamber temperature is greater than the sterilize temperature + overdrive + overtemp settings.	
UNDER TEMPERATURE	Occurs if the chamber temperature is less than the sterilize temperature – undertemp settings.	
TOO LONG IN AIR BREAK	Occurs if the air break phase is longer than the too long in air break setting.	

Alarm	Description	Screen with Alarm
TOO LONG IN CHARGE	Occurs if the charge phase is longer than the too long in charge setting.	
TOO LONG IN DOOR SEAL	Occurs if the activate seal phase is longer than the too long in door seal setting.	
TOO LONG IN DOOR UNSEAL	Occurs if the deactivate seal phase is longer than the too long in door unseal setting.	
TOO LONG IN EVACUATE	Occurs if the evacuate phase is longer than the too long in evacuate setting.	

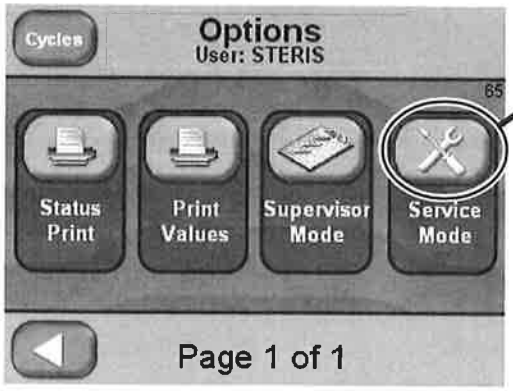
Alarm	Description	Screen with Alarm
TOO LONG IN EXHAUST	Occurs if the exhaust phase is longer than the too long in exhaust setting.	
TOO LONG IN JACKET CHARGE	Occurs if the jacket charge phase is longer than the too long in jacket charge setting.	
CHAMBER TEMPERATURE FAILURE	Occurs if the chamber temperature RTD failed.	
CHAMBER PRESS. FAILURE	Occurs if the pressure transducer failed.	

Alarm	Description	Screen with Alarm
JACKET TEMP. FAILURE	Occurs if the jacket temperature RTD failed.	
WASTE TEMP. FAILURE	Occurs if the waste temperature RTD failed.	
LOAD TEMP. FAILURE	Occurs if the load temperature RTD failed.	
Exhaust Rate Too Slow	Occurs if the slow exhaust rate is too slow.	

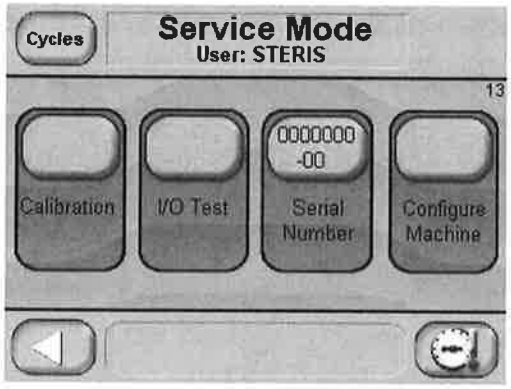
Alarm	Description	Screen with Alarm
Exhaust Rate Too Fast	Occurs if the slow exhaust rate is too Fast.	
Press/Temp FAILURE	Occurs if the Pressure is below 11 psig and the chamber temperature is above 121.0°C or if the pressure is below 20 psig and the chamber temperature is above 132.0°C.	
Emergency Stop Alarm (This alarm is only on units with power door.)	Occurs when the Emergency Stop is pressed. The door motor is turned off. After the problem has been corrected, pull the Emergency Stop back to enable the power door. The door motor remains off until the operator selects to Open/Close the door again.	
PLC Fault	Occurs if the PLC has a fault or hardware error.	

8.1 Service Mode

Refer to *Section 5, Control Interface*, for instructions on how to get to this screen.

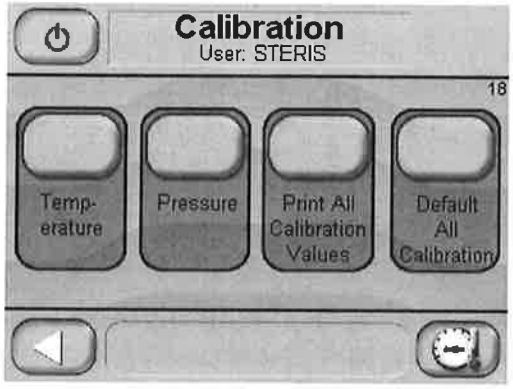


Press **SERVICE MODE** button to enter service mode. The following screen appears:



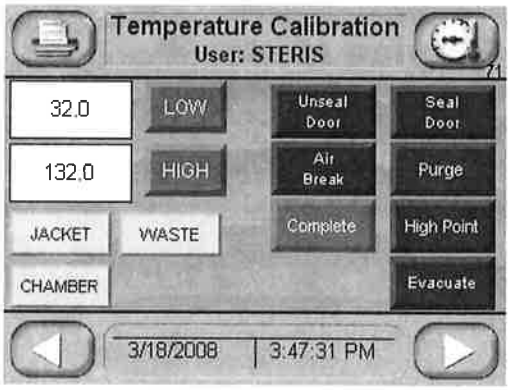
8.1.1 Calibration

Press **CALIBRATION** button (above) to enter the calibration mode. The following display appears:

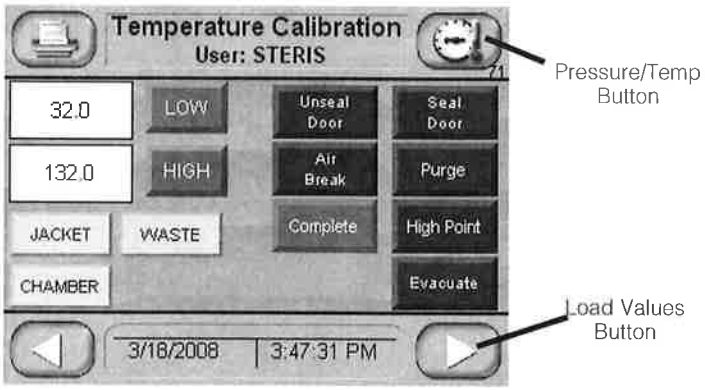


TEMPERATURE CALIBRATION

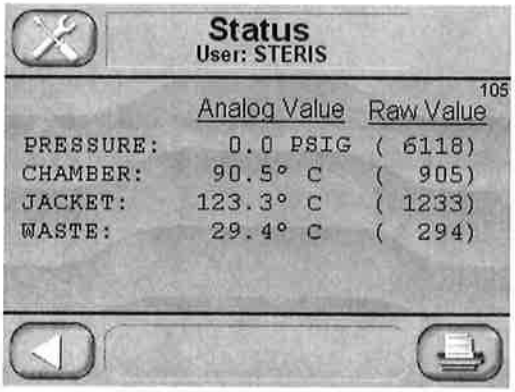
Press **TEMPERATURE** button on screen #18 to enter the temperature calibration. The following display appears:



Select the temperatures to calibrate by pressing on buttons showing CHAMBER, JACKET, and WASTE. If all RTDs are selected to be calibrated, the screen is displayed as follows:



Place selected RTDs in a low temperature bath. This bath may be water or any other solution that would be lower in temperature than a high temperature bath. Place the calibrated reference probe in the bath. All of the probes should be as close together as possible so that they read the same temperature. After the RTDs have stabilized, (that is the calibrated reference temperature reading hasn't changed more than 0.1° over a one minute period), press **NUMERIC** button to the left of **LOW** button. Enter the calibrated reference temperature in the display. Press **LOW** button when complete. Verify temperatures are reading properly by pressing **PRESSURE/TEMP** button and reviewing screen #105:

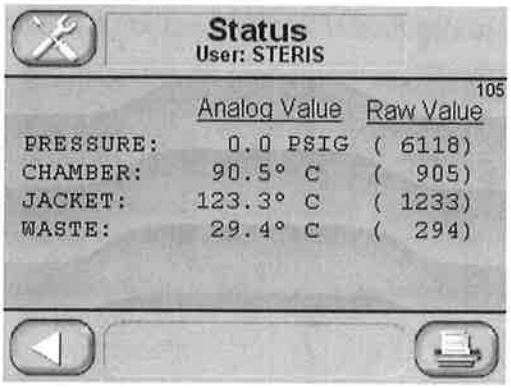


All selected temperatures should be exactly the same on the screen. If they are not, return to previous screen and press **LOW** button again. If they are bouncing:

- Check stability of bath
- Make sure RTDs are not touching bath container
- Check wiring connections on PLC
- Replace RTDs

After low temperature calibration point has been successfully completed, dry off RTDs and place them in high temperature oil bath (or equivalent). Place calibrated reference RTD with RTDs in oil bath.

After RTDs have stabilized, (that is the calibrated reference temperature reading hasn't changed more than 0.1° over a one minute period), press **NUMERIC** button to the left of **HIGH** button. Enter calibrated reference temperature in display. Press **HIGH** button when complete. Verify temperatures are all reading properly by pressing **PRESSURE/TEMP** button and reviewing the following screen:



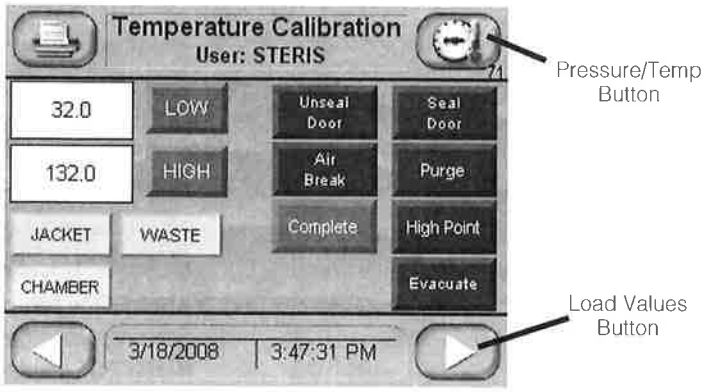
All selected temperatures should be exactly the same. If they are not, return to previous screen and press **HIGH** button again. If they are bouncing:

- Check stability of bath
- Make sure RTDs are not touching bath container
- Check wiring connections on PLC
- Replace RTDs

NOTE: Actual low or high temperatures for the calibration are unimportant as long as the low is lower than the high. Typically, low bath is room temperature and high bath is highest sterilize temperature.

TEMPERATURE CALIBRATION - Steam Method

Press **Temperature** button to enter temperature calibration. The following display appears:



Select the RTD to calibrate. Place this RTD in the chamber drain line. Place a thermocouple in the same position. Plug the pipe where the RTD was located, if necessary.

Open sterilizer door. Wait at least one minute. Press **WHITE** button next to the **LOW** button. Enter the calibrated reference temperature in the display. Press **LOW** button when complete (this saves low value). Press **PRESSURE/TEMP** button and verify temperature. Return to screen. Press **SEAL DOOR** button to make it red. Wait 30 seconds. Press **PURGE** button to make it red. Wait two minutes. Press **HIGH POINT** button to make it red. Wait until pressure stabilizes at high point.

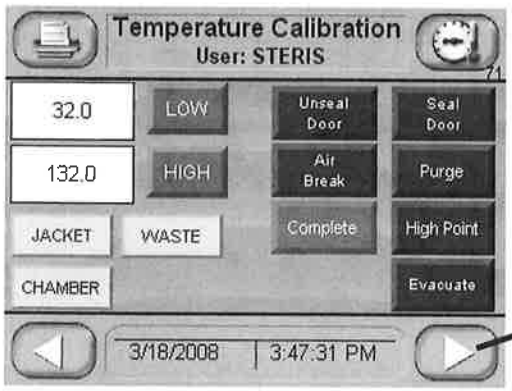
After temperature has stabilized for one minute (+/- 0.3 psi or better), press white button next to **HIGH** button. Enter calibrated temperature value in the display (example 132.0C). Press **HIGH** button when complete (this saves high value). Press **PRESSURE/TEMP** button and verify temperature is same as value just entered. Press **EVACUATE** button to remove the vapor from the chamber.

Press **AIR BREAK** button to break vacuum in the chamber and return to atmosphere. Press **UNSEAL DOOR** button to unseal the door. Press **COMPLETE** button after door is unsealed.

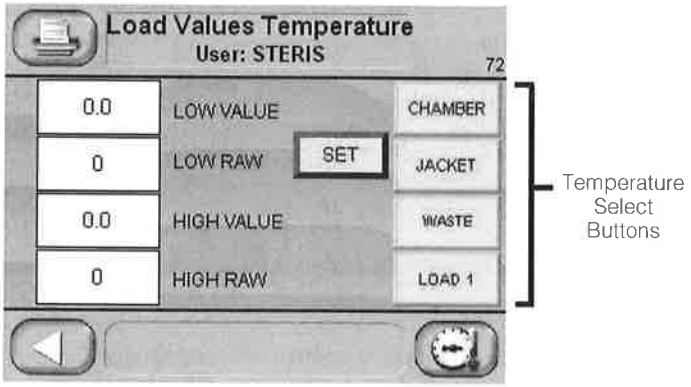
TEMPERATURE CALIBRATION - Load Values Method

Temperature load values calibration is the method of re-entering calibration values back into PLC's memory. This may be necessary if memory was altered because of a program download.

Press **RIGHT ARROW** button on the following screen:



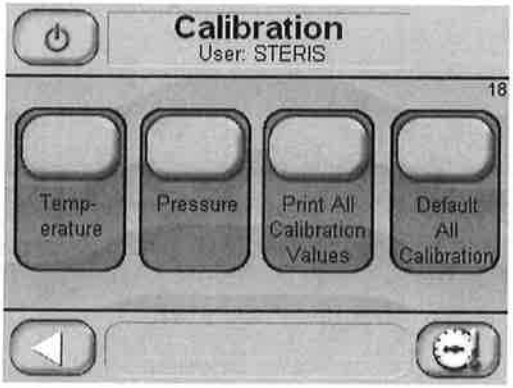
The following display appears:



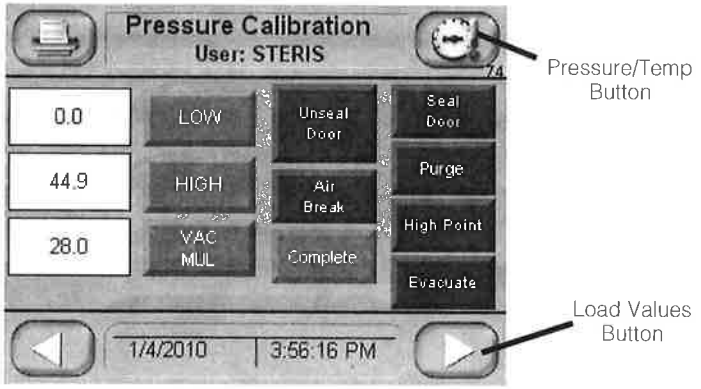
Press temperature select button that is being calibrated (button turns red). Enter low, low raw, high, and high raw values. Press **SET** button when complete. Press **LEFT ARROW** button when complete with calibration.

PRESSURE CALIBRATION

From Service Mode (See Section 8.1) Press **CALIBRATION** button to access the following screen:



Press **PRESSURE** button to enter pressure calibration. The following display appears:



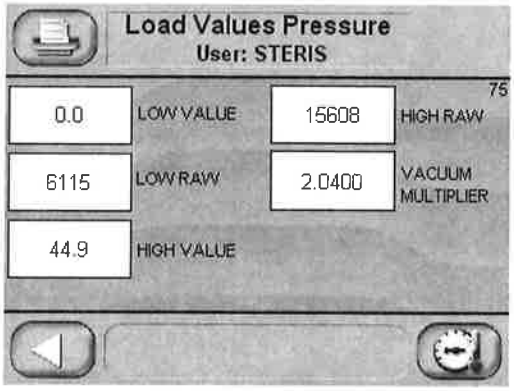
Open sterilizer door. Wait at least one minute. Press **WHITE** button next to the **LOW** button. Enter 0.0 in display. Press **LOW** button when complete (this saves low value). Press **PRESSURE/TEMP** button and verify pressure is 0.0. Return to screen. Press **SEAL DOOR** button to make it red. Wait 30 seconds. Press **PURGE** button to make it red. Wait two minutes. Press **HIGH POINT** button to make it red. Wait until pressure stabilizes at high point. After pressure has stabilized for one minute (+/- 0.3 psi or better), press white button next to **HIGH** button. Enter calibrated reference pressure value in the display (example 35.0 psig). Press **HIGH** button when complete (this saves high value). Press **PRESSURE/TEMP** button and verify pressure is same as value just entered. Return to screen. Press **EVACUATE** button. Wait until pressure has stabilized at low vacuum setting. After pressure has stabilized for one minute (+/- 0.3 psi or better), press **WHITE** button next to **VAC MUL** button. Enter calibrated reference pressure value in the display (example 28.9 inHg). Press **VAC MUL** when complete (this saves vacuum value). Press **PRESSURE/TEMP** button and verify vacuum is same as value just entered. Press **AIR BREAK** button to break vacuum in the chamber and return to atmosphere. Press **UNSEAL DOOR** button to unseal the door. Press **COMPLETE** button after door is unsealed.

PRESSURE LOAD VALUES CALIBRATION

Pressure load values calibration is the method of re-entering calibration values back into PLC's memory. This may be necessary if memory was altered because of a program download.

Press **LOAD VALUES** (right arrow button) on screen 74, above.

The display shows:



Enter low, low raw, high, high raw, and vacuum multiplier values. Press **LEFT ARROW** button when complete.

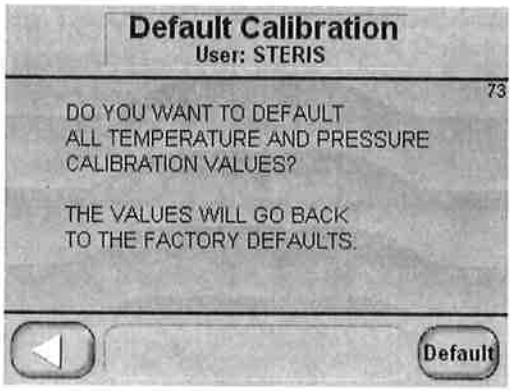
PRINT CALIBRATION VALUES

Press PRINT ALL CALIBRATION VALUES button to print calibrated temperature and pressure values. The following prints (default values printed):

```
================================
===== CALIBRATION VALUES =======
================================
9/30/2004 9:16:44 AM

LOGIN: STERIS

PRESSURE
--------------------------------
LOW = 0.0
LOW RAW = 12214
HIGH = 24.4
HIGH RAW = 28846
VAC MUL = 2.040000

CHAMBER
--------------------------------
LOW = 32.0
LOW RAW = 321
HIGH = 132.0
HIGH RAW = 1644

JACKET
--------------------------------
LOW = 32.0
LOW RAW = 321
HIGH = 132.0
HIGH RAW = 1567

WASTE
--------------------------------
LOW = 32.0
LOW RAW = 330
HIGH = 132.0
HIGH RAW = 1506
================================
```

DEFAULT CALIBRATION VALUES

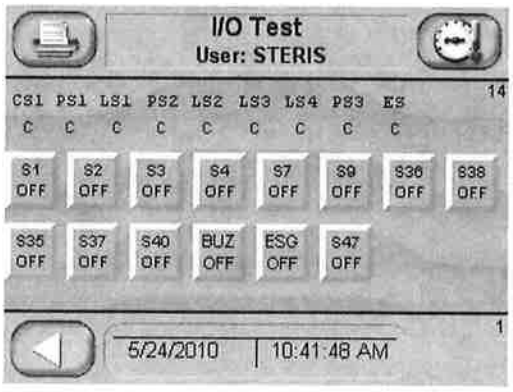
Press **DEFAULT ALL CALIBRATION** button to default calibration values back to factory settings. The following screen appears:



Press **DEFAULT** button to default calibration values to factory defaults. Press **LEFT ARROW** button to cancel defaulting calibration values and return to calibration menu.

8.1.2 I/O Test

Press **I/O TEST** button from the service mode screen to access input/output test. The following screen appears:



The display shows analog values, limit switches, and valves.

Limit switches:

CS1 – chamber flooded limit switch
PS1 – door **A** seal pressure switch
PS2 – door **B** seal pressure switch (not shown – double doors only)
LS1 – door **A** close switch
LS2 – door **B** close switch (not shown – double doors only)
PS3 – door **A** pressure lock (not shown – hinge doors only)
PS4 – door **B** pressure lock (not shown – hinge doors only)

AC outputs:
S1 – filtered air to chamber
S2 – steam to chamber*
S3 – fast exhaust
S4 – exhaust cooling
S7 – water ejector
S9 – steam to jacket
S35 – door **A** seal steam
S36 – door **B** seal (not shown – double doors only)**
S37 – door **A** seal exhaust
S38 – door **B** seal exhaust (not shown – double doors only)
S08 – Isothermal steam to chamber* (not shown – only on isothermal sterilizers)
S40 – constant bleed
BUZ- alarm and door open buzzer
ESG – electric steam to generator

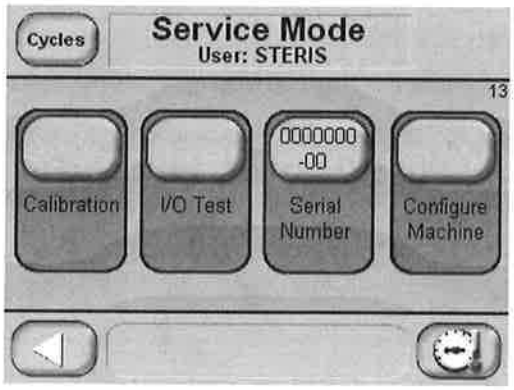
* if PS1 or PS2 open, then valve is off
** if LS1 or LS2 open, then valve is off

Press valve button **S1 OFF** to turn valve on (red). Gray indicates valve is off. Each valve may be actuated on and off in this way.

Press **RIGHT ARROW** button to show additional outputs not shown on the screen. Press **LEFT ARROW** button to exit I/O test screen and return to service mode screen. Any valve that shouldn't be on during normal operation is turned off automatically when exiting I/O test screen.

8.1.3 Serial Number

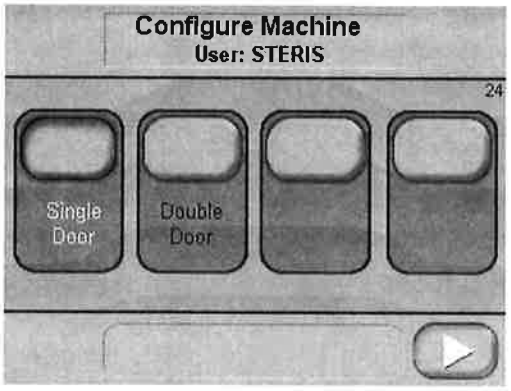
The service mode screen is shown below:



Press **SERIAL NUMBER** button to set serial number. Enter serial number in the screen. Serial number is alphanumeric, and can be up to 12 characters.

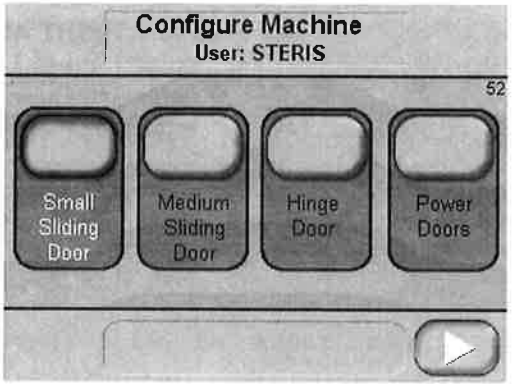
8.1.4 Configure Machine

Press **CONFIGURE MACHINE** button to enter configuration mode. The following screen appears:

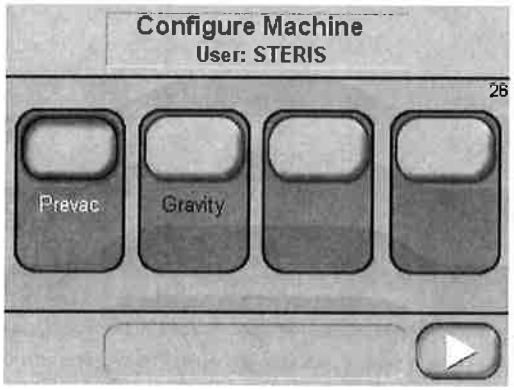


⚠ WARNING–PERSONAL INJURY AND/OR EQUIPMENT DAMAGE HAZARD: The configure machine section should only be done in the factory or by a qualified service technician.

Select either single door or double door by pressing appropriate button. Red indicates option is selected. Make sure selection is correct based on machine type. If unit is double door and it has dual displays, select the display (Door 'A" or Door 'B' display). Press **RIGHT ARROW** button when complete. The following screen appears:

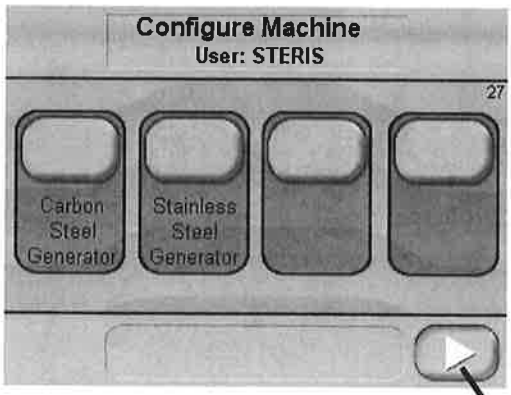


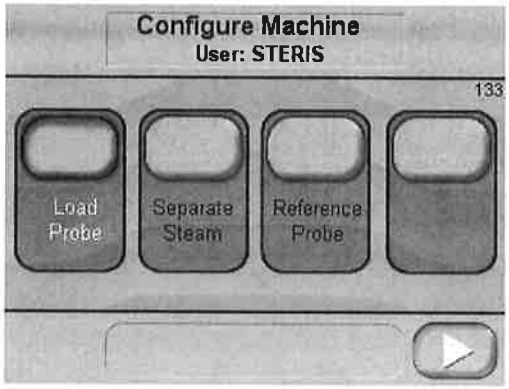
Select small sliding, medium sliding or hinge door. Press **RIGHT ARROW** button when complete. The following screen appears:



The display automatically shows correct sterilizer type. If sterilizer type is incorrect (i.e., GRAVITY is shown and it should be a PREVAC sterilizer), contact service. If sterilizer type is changed, values must be defaulted.

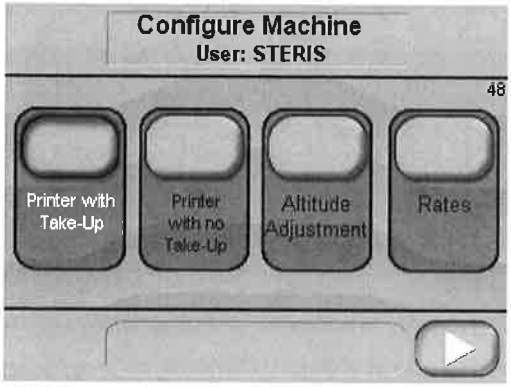
Press **RIGHT ARROW** button when complete. The following screens appear:



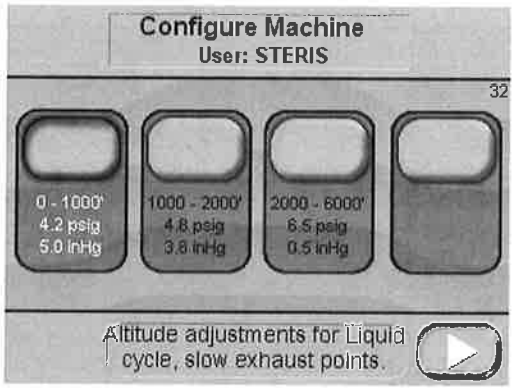


Next Screen

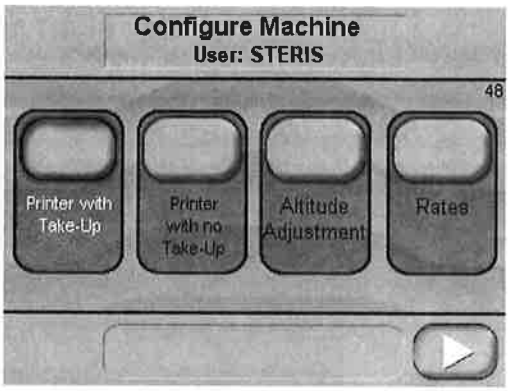
Select items that exist. Press **RIGHT ARROW** button when complete. The following screen appears:



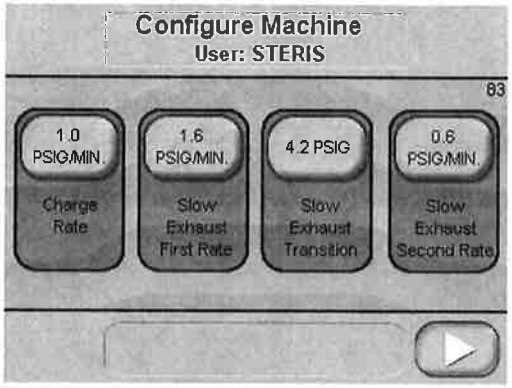
Press **ALTITUDE ADJUSTMENT** button to set altitude. The following is shown:



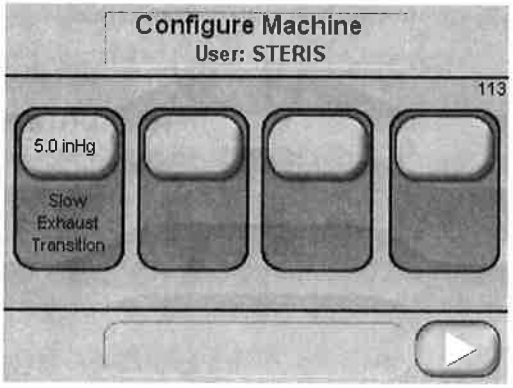
The Altitude Setting can be used to set the appropriate altitude of the unit location. Set the altitude and press the **RIGHT ARROW** button. The following is shown:



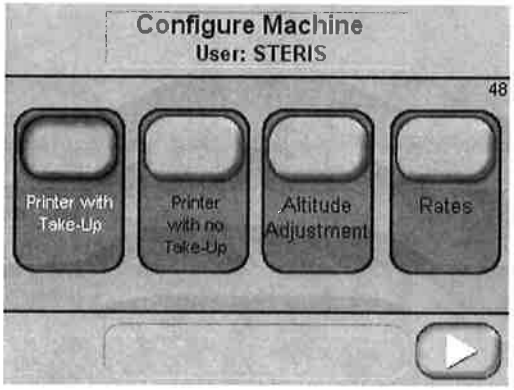
Press **RATES** button to set charge and show exhaust rates. The following display is shown:



Press **RIGHT ARROW** button to show the next screen:

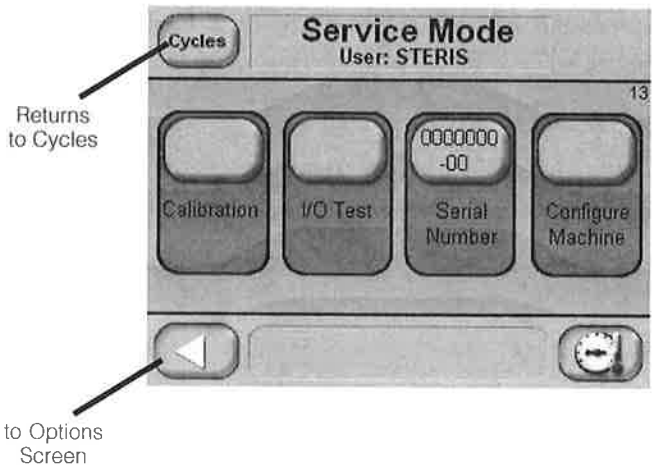


Press **RIGHT ARROW** button to show the following screen:



Set the printer model and press **RIGHT ARROW** button.

The screen returns to Service Mode display.



8.2 Change Printer Paper Roll/Ribbon (OmniPrint Printer)

To change the printer paper roll for the OmniPrint style printer, follow the steps given below:

1. Open the printer door by pressing the button and allowing the door to fall forward (as shown in Section 5, figure 5-1).
2. Refer to figure 8-1 and remove any existing paper, then open the swing door located in the center of the paper.
3. Remove the existing ink cartridge.
4. Insert the new paper roll in the compartment behind the swing door. Insert the end of the roll into slit of print mechanism.
5. Press PAPER FEED button so that 2 to 3 inches of paper feeds through the mechanism.
6. Insert the end of the paper through the new ink cartridge so that the paper feeds in between the ink ribbon and the plastic housing of the cartridge. Then install the cartridge into position.
7. Refer to figure 8-2. Close the swing door, then insert the end of paper into the (removable) paper take-up spool, and install the spool back into position.
8. Close printer door.

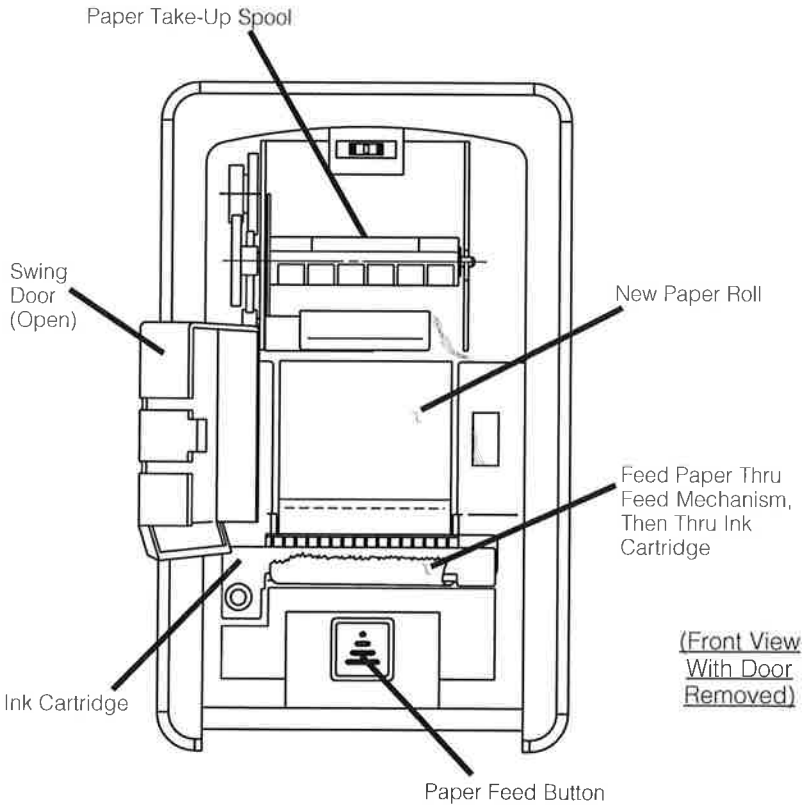


Figure 8-1.

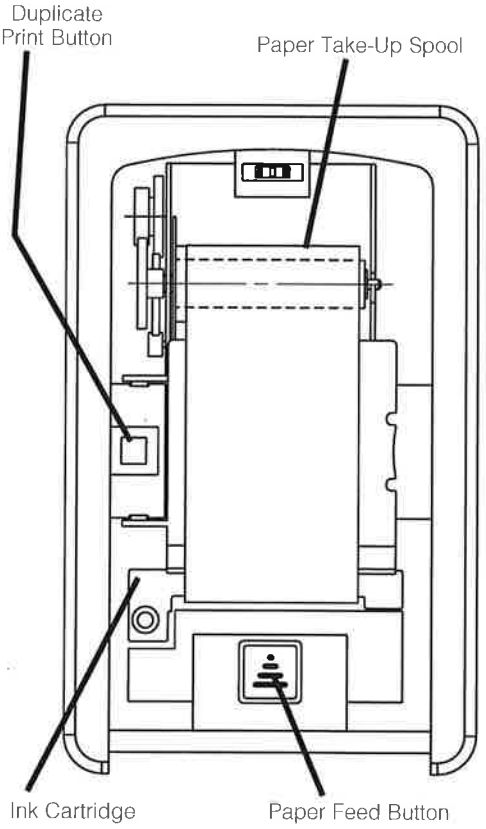


Figure 8-2.

8.3 Change Printer Paper Roll (Optional Cybertech Printer)

The printer paper roll should be changed whenever a colored strip is visible on one or both edges of the printout paper.

PAPER LOADING:

1. Open front cover of printer to access paper compartment.
2. Tilt printer mechanism forward to access paper holder. See Figure 8-3 for the following steps.
3. Remove old paper core.
4. Notice loading diagram on back of printer case. Refer to this when loading paper.
5. Insert new paper into paper holder with loose end of paper placed into slot at top of print mechanism. Front panel LED should be flashing.
6. While holding paper in print mechanism, push front panel switch to **Feed** position (Up). Paper should feed into print mechanism and out the front. Refer to Figure 8-4.
7. Continue feeding paper until there is about eight inches of paper exiting print mechanism.
8. Guide paper between paper guide rod #1 and plastic window until it exits at top paper guide rod #2. Make sure paper goes around this guide correctly. Refer to Figure 8-5.
9. Make a slight bend in paper edge and place bent paper edge into slot on the take-up spindle. Hold paper on to paper spindle.
10. Push the front panel switch to **Feed** position, paper should then wrap around spindle. If this doesn't, remove paper and start at step 9 again.
11. Once take-up is loaded, push front panel switch to **Reprint** (down) position. This procedure starts a print cycle (test print or reprint).
12. Close front cover while print is taking place. This step keeps paper tight around take-up.

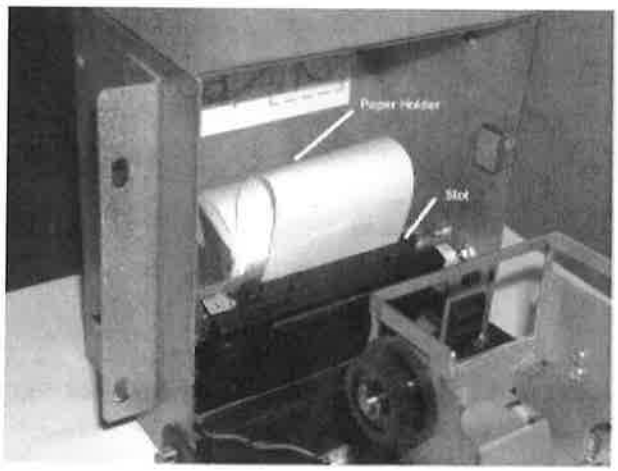


Figure 8-3. Paper Compartment

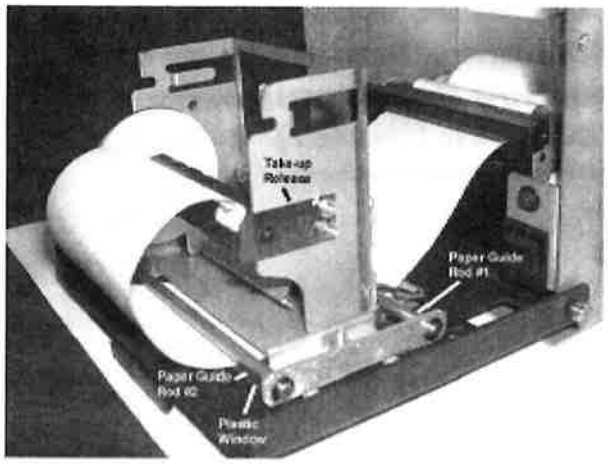


Figure 8-4. Paper Feed Position

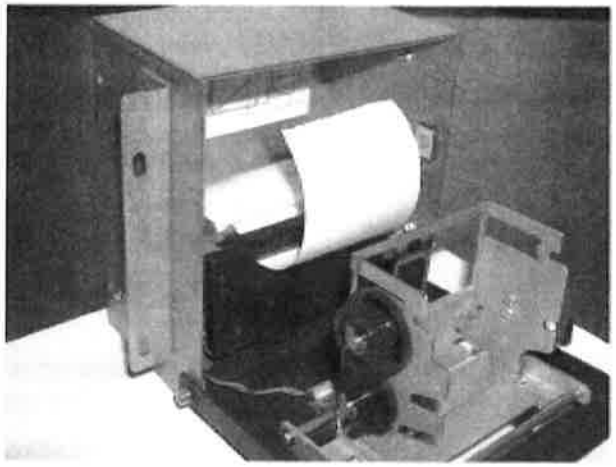


Figure 8-5. Paper Guide

- **TAKE-UP LOADING:**

1. When it is desired to remove stored paper from take-up, open front cover of printer.
2. While grasping take-up spindle and paper, push take-up release slightly to right until spindle is free. Refer to Figure 8-5 for take-up release position,
3. Simply slide paper off open end of take-up.
4. If paper does not release, rotate paper counterclockwise, while holding spindle end bell. Then slide roll of paper off.
5. Replace spindle on to take-up.

8.4 Change Printer Paper Roll (Optional Mylox Printer)

To change the printer paper roll for the Mylox style printer, follow the steps given below.

1. Open the top cover of the printer and place the paper roll in position, observing the direction of the arrow indicated in Figure 8-6.
2. Insert the end of the roll into slit of print mechanism (see Figure 8-6); paper auto-loads after a slight delay.
3. In cases where autoloading feature is not installed on the system, press FEED key (see Figure 8-6) so that a few centimeters of paper come out of the printer.
4. Insert the end into the slit on the top of the printer and close it.

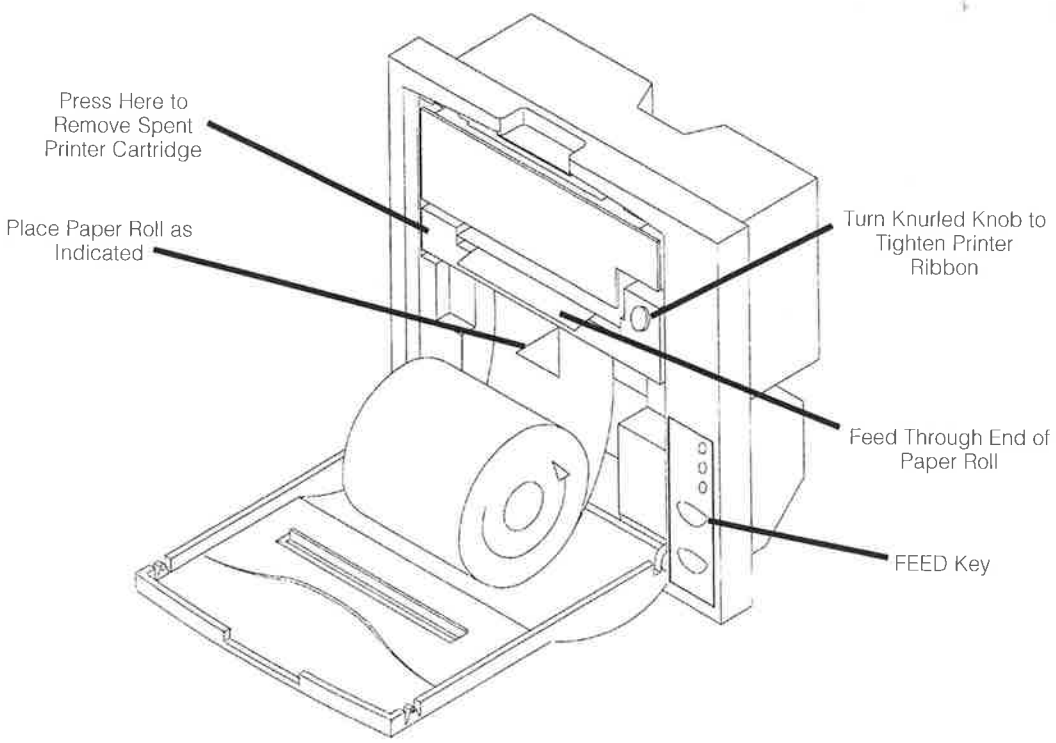


Figure 8-6. Change Paper for Mylox-style Printer

8.5 Change Printer Ribbon (Optional Mylox Printer)

1. Open the top of the printer and remove the old ribbon cartridge by pressing down at point indicated in Figure 8-6.
2. Insert the new ribbon, making sure that it is correctly positioned.
3. Pull the ribbon tight turning the knurled knob (see Figure 8-6), then close the printer's top again.

8.6 Clean Chamber Drain Strainer

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 bottom in chamber.
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.

8.7 Flush Chamber Drain

Flush chamber drain as follows whenever line becomes clogged:

See warnings for cleaning chamber drain strainer.

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 the drain. Solution may puddle in the bottom of the chamber.

... OR...

4. Should these detergents be unavailable, you may use a hot solution of 15 mL (~1 tablespoon) of trisodium phosphate to 500 mL (~1 pint) of hot water.
5. Open door and place strainer back in drain.

9.1 Maintenance Schedule

⚠ 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.

Maintenance procedures described in this section must be performed regularly at indicated intervals, using maintenance schedule in **Table 9-1** as a guide. Local conditions (water quality, usage, etc.) may require more frequent maintenance than indicated. Refer to maintenance manual (purchased separately) for replacement parts lists.

Customer should maintain a record of all maintenance procedures performed on sterilizer.

If a problem occurs, refer to alarm section.

NOTE: Never permit unqualified persons to service the sterilizer.

Table 9-1. Recommended Maintenance Schedule

Service required		Minimum Frequency
1.0	PREPARATION FOR PREVENTIVE MAINTENANCE	
1.1	Discuss equipment with operators and check printouts.	6x per year
1.2	Follow appropriate safety procedures; prepare unit for preventive maintenance.	6x per year
2.0	DOOR ASSEMBLY (EACH DOOR ON A DOUBLE DOOR UNIT)	
2.1	Verify proper door and door proximity switch operation. Adjust switch(s), if needed.	6x per year
2.2	Check condition of door gasket for wear and tear. Replace, as needed	6x per year
3.0	VALVES	
3.1	Verify each hand valve operates smoothly, check valve packing for leaks, rebuild or replace, as needed. * Steam supply valve. * Water supply valve.	6x per year 6x per year
3.2	Replace check valves.	1x per year
3.3	Rebuild steam supply manifold.	1x per year
3.4	Rebuild all solenoid valves.	1x per year

Service required		Minimum Frequency
3.0	VALVES (Cont.)	
3.5	Rebuild all check valves.	1x per year
3.6	Rebuild steam control valve (PRV).	1x per year
3.7	Verify proper setting/flow rate control valves. Replace, if needed.	2x per year
3.8	Verify that safety valve is not leaking.	6x per year
3.9	Replace safety valve.	1x per year
4.0	MISC. PIPING COMPONENTS	
4.1	Inspect steam strainer for debris. Clean, as needed.	2x per year
4.2	Inspect water strainer for debris. Clean, as needed.	2x per year
4.3	Inspect jacket strainer for debris. Clean, as needed.	2x per year
4.4	Inspect chamber drain strainer for debris. Clean, as needed.	6x per year
4.5	Replace air filter cartridge.	1x per year
4.6	Chamber and jacket gauge(s) – verify proper operation. Replace, if needed.	6x per year
4.7	Rebuild chamber and jacket traps.	1x per year
4.8	Verify that there are no leaks.	6x per year
4.9	Verify that door lock piston operates correctly.	6x per year
5.0	CONTROL	
5.1	Verify printer and paper take-up operate properly. Check printout for darkness, missing dots, etc.	6x per year
5.2	Verify all touch panels function properly (O.E. and N.O.E.).	6x per year
5.3	Verify date and time are correct. If not, correct.	6x per year
5.4	Verify operation of battery backed RAM. Replace, as needed.	6x per year
5.5	Verify buzzer is working.	6x per year
5.6	Verify water level sensor operates properly.	6x per year
5.7	Verify functional operation of each valve using the service mode I/O test.	6x per year
5.8	Verify temperature with pressure displays/printouts.	6x per year
5.9	Verify temperature and pressure settings.	6x per year
6.0	SAFETY TESTING	
6.1	Inspect ground bond.	1x per year
6.2	Inspect steam connection to sterilizer.	1x per year
6.3	Inspect water connection to sterilizer.	1x per year
6.4	Inspect drain connection to sterilizer.	1x per year
6.5	Test ground continuity to sterilizer per EN 61010-1.	1x per year
6.6	Inspect and repair any scratches, nicks, dents, and rusted components and frame; and inspect loose attachment hardware (nuts, bolts, screws, etc.).	1x per year

Service required		Minimum Frequency
7.0	FINAL CHECKOUT AND TEST	
7.1	Clean dirt and lint from components. Check all wiring, terminals and socket connections for damage and fraying.	6x per year
7.2	Verify unit has proper labels (caution, warnings).	6x per year
7.3	Run machine through each cycle to verify proper operation. Check all displays and printouts. Note on tape, **STERIS TEST**.	6x per year
7.4	Reinstall any panel or cover removed. Check area to insure removal of all materials used during inspection.	6x per year

9.2 Spare Parts

To order replacement parts and/or supply products, proceed as follows:

1. Include description and part/order number as listed in the following table.
2. Include model and serial numbers of your sterilizer on your order.
3. Send your order directly to the sales and service center serving your area.

Contact your sales representative for recommendations on cleaning products, biological indicators, or parts that are not listed below.

NOTE: Use only STERIS authorized parts on this equipment. Use of unauthorized parts void the warranty.

REPLACEMENT PARTS

Description	Part Number
Cybertech Printer	
Replacement paper (box of 5)	P387352-558
Replacement ribbons (package of 5)	P387352-559
Mylox or OmniPrint Printer	
Replacement paper (box of 5)	P387352-558
Replacement ribbons (box of 2)	P150828-440

10.1 PLC Specifications

PLC: MicroLogix® 1200 Controller*

Catalog number: 1762-L24BWA

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.

ANALOG MODULE: 4 CHANNEL INPUT MODULE

Catalog number: 1762-IF4

Resolution: 15 bits (bipolar)

Repeatability: +/-0.1%

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: 8 AC OUTPUTS (optional)

Catalog number: 1762-OW8

DISPLAY: PANELVIEW PLUS® 600

Catalog number: 2711P-T6C20D

COMMUNICATION MODE:

Catalog number: 2711P-RN22C

** MicroLogix® 1200 Controller is a registered trademark of Rockwell Automation.*