

**MAINTENANCE MANUAL**

**SYSTEM 1E™ Liquid Chemical Sterilant  
Processing System**

**(12/09/10)**

**P764333-674**

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STERIS Live Documents  
Updated: 01/27/2011

## **MAINTENANCE INSTRUCTIONS**

**SYSTEM 1E™ Liquid Chemical Sterilant  
Processing System**

**(12/09/10)      P764333-675**

# A Word From STERIS Corporation

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## ADVISORY

The operation and maintenance procedures recommended by STERIS are described in this manual. Only these recommended maintenance procedures should be followed.

A listing of the safety precautions to be observed when operating and servicing this equipment can be found in *SECTION 1* of this manual. Do not operate or service this equipment until you have become familiar with this information.

Any alteration of this equipment not authorized or performed by STERIS Engineering Service which could affect its operation will void the warranty, could adversely affect efficacy of the liquid chemical sterilization process, could violate federal, state, and

local regulations, and could jeopardize your insurance coverage.

## SYSTEM 1E™ LIQUID CHEMICAL STERILANT PROCESSING SYSTEM OVERVIEW

The SYSTEM 1E Processor is designed for liquid chemical sterilization of cleaned, immersible and reusable critical and semi-critical heat-sensitive medical devices in healthcare facilities, in less than 30 minutes. The system uses S40™ Sterilant Concentrate, which achieves its use-dilution within the processor. The processor is a tabletop, microprocessor-controlled device, in which the liquid chemical sterilization process is performed, controlled, and monitored, and maintains the process parameters necessary to assure standardized and effective liquid chemical sterilization.

***IMPORTANT: All personnel involved in the use and maintenance of this equipment must carefully review and comply with the warnings, cautions, and instructions contained in this manual. These instructions are important to protect the health and safety of personnel operating or servicing the equipment and should be retained in a conveniently accessible area for quick reference.***

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

**IMPORTANT: This Maintenance Manual is intended for use only by trained STERIS Service Technicians. Any unauthorized use is prohibited and is undertaken at the user's own risk. If this manual is found, it may be returned to:**

**STERIS Corporation,  
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# Section 1: Safety Precautions

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## 1.1 SAFETY PRECAUTIONS SUMMARY

The following *Safety Precautions* **must** be observed when operating or servicing this equipment. WARNING indicates the potential for personal injury and CAUTION indicates the potential for damage to equipment. For emphasis, certain *Safety Precautions* are repeated throughout the manual. **It is important to review all *Safety Precautions* before operating or servicing the unit.**

Strictly following these *Safety Precautions* enhances your ability to safely and effectively utilize the unit and helps the Customer avoid improper maintenance methods which may damage the unit or render it unsafe. It is important to understand that these *Safety Precautions* are not exhaustive; Customers are encouraged to develop their own safety policies and procedures to enhance and complement these *Safety Precautions*.

### **DANGER – HIGH VOLTAGE:**



Before attempting to dismantle, isolate power at control panel.

### **DANGER – ULTRA VIOLET LIGHT:**



UV Light is harmful to eyes and exposed skin. Do not run system with any covers or fittings removed.

### **WARNING – PERSONAL INJURY AND/OR EQUIPMENT DAMAGE HAZARD:**



Safe and reliable operation of this equipment requires regularly scheduled preventive maintenance, in addition to the faithful performance of routine maintenance. Contact STERIS Service to schedule preventive maintenance.



Repairs and adjustments to this equipment must be made only by fully qualified service personnel. Maintenance performed by inexperienced, unqualified personnel or installation of unauthorized parts could cause personal injury, invalidate the warranty or result in costly equipment damage. Contact STERIS regarding service options.



Do not use the SYSTEM 1E™ Liquid Chemical Sterilant Processing System until it has been properly installed and its electromechanical performance has been verified.



The SYSTEM 1E Liquid Chemical Sterilant Processing System may be used only in hospital-grade rooms when it is installed according to the applicable specification (VDE 0107, Class 1, Group C NFPA rating).



The SYSTEM 1E Liquid Chemical Sterilant Processing System is not intended for operation in explosion-endangered areas.



Danger: Risk of explosion if used in the presence of flammable anesthetics.



Risk of Fire: Replace power supply fuse with proper type as marked.

## **WARNING – PERSONAL INJURY AND/OR EQUIPMENT DAMAGE HAZARD: (CONTINUED)**



The SYSTEM 1E Liquid Chemical Sterilant Processing System is not protected against water spillage or spray. Take precautions in the use of liquid during cleaning or insertion of devices.



Connect the SYSTEM 1E Liquid Chemical Sterilant Processing System to a hospital-grade, GFI electrical receptacle only, to prevent electrical shock hazard.



SYSTEM 1E Processor performance has been validated and optimized with components defined by STERIS in the Operator Manual for the SYSTEM 1E Processor. Use of pre-filters that do not meet STERIS's specifications can lead to premature failure of the MaxPure Filter inside the processor. STERIS's warranty will not apply to damage or early life failure of the MaxPure Filter resulting from the use of pre-filters that do not meet STERIS's specifications. **DO NOT USE** components that do not meet STERIS's specifications.



The UV System unit may be hot to the touch!



The UV System is not user serviceable. All installation, maintenance work and service must be carried out by an authorized STERIS Service Representative only. Use only STERIS-approved replacement lamps, quartz sleeves and monitors.



UV chamber may be under pressure. Before attempting to remove end plates, monitor or quartz sleeve, depressurize and drain chamber.



Disconnect all utilities to SYSTEM 1E Liquid Chemical Sterilant Processing System before servicing. Do not service the SYSTEM 1E Liquid Chemical Sterilant Processing System unless all utilities have been properly locked out. Always follow OSHA Lockout-Tagout and electrical safety-related work practice standards.



Lid assembly is heavy. Always support lid assembly when gas spring cylinder is removed.

## **WARNING – SLIPPING HAZARD:**



To avoid slippery floor conditions, immediately wipe up any spilled liquids in the SYSTEM 1E Liquid Chemical Sterilant Processing System-loading and unloading areas.

## **WARNING – SHOCK AND BURN HAZARD:**



Disconnect all utilities to SYSTEM 1E Liquid Chemical Sterilant Processing System before servicing. Do not install processor unless all utilities have been properly locked out. Always follow all locally mandated Lockout-Tagout and electrical safety-related work practice standards.

## **WARNING – POTENTIAL BURN HAZARD:**



Possible high temperature. Before attempting to dismantle, make sure UV chamber is in a cool state.

## **WARNING – LIQUID CHEMICAL STERILANT VERIFICATION HAZARD:**



Failure to thoroughly clean devices prior to processing may result in an ineffective liquid chemical sterilization process.



Use the Quick Connect specifically designed for the device being processed.



Do not use S40™ Sterilant Concentrate after the expiration date indicated on the label.



Do not substitute any other product for S40 Sterilant Concentrate.



Use of a blocked or damaged aspirator may result in ineffective liquid chemical sterilization.



Always verify that the sterilant container is empty at the end of the cycle.



Devices are not liquid chemically sterilized and/or adequately rinsed when a liquid chemical sterilant processing cycle is cancelled.



Do not adjust inlet water pressure regulator from factory-set value of 50 psig.



Do not adjust Ultra Violet (UV) system hose lengths.

## **CAUTION – POSSIBLE EQUIPMENT DAMAGE HAZARD:**



Do not energize “h”, control screen designation for heater element (HTR1), unless chamber is full of water; element failure will occur.



Do not energize “s2”, control screen designation for seal release valve (SOL2), with water in the chamber; spill will occur.



Do not force lid to close.



After a cycle is cancelled, if fluid remains in the chamber, call STERIS.



When replacing the control board, use care when picking up the sheet metal/board assembly, because the display and printer cables are still connected under the board.



In the Service Mode, do not energize Heater unless chamber is full of water; element failure will occur.



In the Service Mode, do not energize Seal Relief Valve/Compressor with water in the chamber; spill will occur.



To avoid jamming paper in printer, do not force paper into printer mechanism and do not attempt to feed uneven, tattered, wrinkled paper.

## CAUTION – POSSIBLE EQUIPMENT DAMAGE HAZARD: (CONTINUED)



Water spills on the microcomputer housing and/or the printer or printer paper may result in damage to the SYSTEM 1E Processor or create a paper jam.



Do not remove MaxPure filter from plastic bag until fully installed.



To avoid damage to the SYSTEM 1E Liquid Chemical Sterilant Processing System prior to boxing for shipment. Follow procedure 1.6.3, *BOXING PROCEDURE* to aid in the process.



Do not place hard or rigid suctioning devices into the probes. Damage to thermocouples or concentration probes could occur.



Only use STERIS Corporation approved UV lamps and Quartz sleeves.







Always use cotton gloves when handling quartz sleeve. Do not touch quartz sleeve with bare hands. Skin oils from bare hands can cause possible damage to quartz sleeve.

## 1.2 SYMBOL DEFINITIONS

The following symbols appear on the SYSTEM 1E™ Liquid Chemical Sterilant Processing System.

**Table 1-1. Symbol Definitions**

Symbol	Definition
	Transfer of heat, hot surface
	Protective earth (i.e., ground)
	Electrostatic sensitive device
	Attention, consult manual for further instructions
SN	Serial number of unit
V	Voltage rating of unit
~	Alternating current
A	Amperage rating of unit
Hz	Frequency rating of unit
∅	Phase of the unit



### 1.3 GENERAL INFORMATION

This Maintenance Manual is applicable for SYSTEM 1E Liquid Chemical Sterilant Processing System.

### 1.4 TECHNICAL SPECIFICATIONS

#### 1.4.1 Overall Size SYSTEM 1E Liquid Chemical Sterilant Processing System

##### Processor

Width:	40" (102 cm)
Depth:	24" (61 cm)
Height:	
• Lid Closed:	13" (33 cm)
• Lid Open:	32" (82 cm) plus 6" (15 cm) service clearance

##### UV Chamber

Width:	32" (81.3 cm)
Depth:	6" (15.2 cm)
Height:	8" (20.32 cm)

##### UV Ballast

Width:	6.5" (16.5 cm)
Depth:	4" (10.2 cm)
Height:	13.5" (34.3 cm)

#### 1.4.2 Weight

##### Processor

Dry:	140 lb (64 kg)
Operating:	165 lb (75 kg)
Shipping:	178 lb (81 kg)

##### UV Chamber

Operational Weight:	22 lb (10 kg)
---------------------	---------------

##### UV Ballast

Operational Weight:	3 lb (1.4 kg)
---------------------	---------------

#### 1.4.3 Utility Requirements Electrical

Voltage:	115V ac (+5%/-10%)
Frequency:	60 Hz
Service Required:	SYSTEM 1E Processor: 15 Amp <sup>1</sup> UV System: 1 Amp <sup>1</sup>

#### 1.4.4 Water Requirements

- Pressure: Minimum, 40 psi (276 kPa); preferred 50 to 60 psi (345 to 414 kPa).
- Flow Rate: Minimum, 2.5 gpm (9.5 lpm).
- Temperature: 43 to 60°C (109 to 140°F).
- For optimum cycle time, water temperature should be between 46 to 48°C (115 to 118°F).
- Connection: 3/4" (1.9 cm) male hose connector.
- Quality: Potable/tap water. ≤ 140 ppm hardness as CaCO<sub>3</sub>, transmittance: ≥ 88% at 254 nm
- Drain: 1-1/4" (3.18 cm) I.D. (minimum) non-backpressuring drain.
- Supply Line: 1/2" (1.27 cm) I.D. (minimum) 3/4" (1.9 cm) I.D., optimum. Backflow prevention by others.
- Water Usage: Approximately 8.7 gal (33 L) per cycle.
- Peak Consumption: Minimum, 2.5 gpm (9.5 lpm)

#### 1.4.5 Pre-Filter Specifications:

- Pre-Filter A: Filter Rating - 2.5 micron Flow Rate – 14.5 gpm/psid
- Pre-Filter B: Filter Rating - 0.1 micron nominal Flow Rate - >1.0 gpm/psid
- Water Pressure Regulator: Pressure Setting - pre-set to 50 psig (minimum flow at 2.5 gpm or 9.5 lpm)

#### 1.4.6 Environmental Conditions

- Temperature: 16 to 32°C (60 to 90°F).
- Humidity: 10 to 90%, non-condensing.
- Classification: Protection against electric shock: Class 1

#### 1.4.7 General Installation Location Recommendation

The processor shall be installed and operated outside of patient environment exemplified in Figure 1-1.

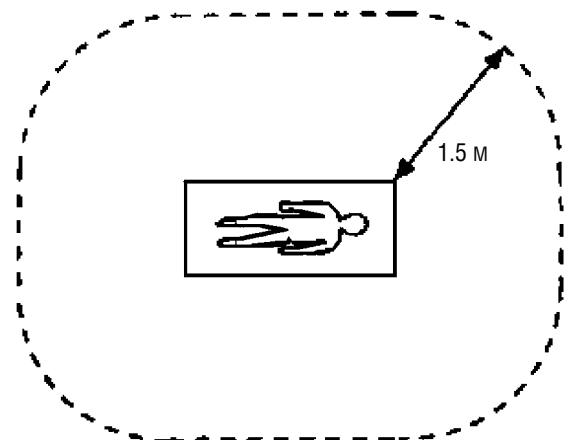


Figure 1-1. Processor Placement

1. Use hospital-grade GFCI receptacle.

## 1.5 INSTALLATION CHECKOUT PROCEDURE

### 1.5.1 Purpose

This installation checkout procedure, when closely adhered to, provides:

- Uniform procedures for all installations.
- Complete environmental data for future technical assistance.
- Means to request Customer assistance in environmental effects.
- Verification that SYSTEM 1E Processor is functioning at maximum level.
- Data to track start-up reliability.

### 1.5.2 General Guidelines

An installation report is to be completed every time an installation checkout is performed, a unit has been moved to a new location or major change has been made to the existing location.

*NOTE: When installation checkouts are being performed on more than one unit, a new installation report must be completed for each SYSTEM 1E Liquid Chemical Sterilant Processing System.*

Refer to the applicable sections for definitions and use of particular entries. If there is any confusion regarding these instructions or completion of the installation report, contact your supervisor for direction.

### 1.5.3 Distribution

There is only one copy to the installation report. The installation report should be attached to the corresponding field service report.

### 1.5.4 Procedure

The installation report form should be used to obtain all information about the Customer and the SYSTEM 1E Liquid Chemical Sterilant Processing System at every installation checkout visit.

Complete the form in the following manner:

- CUST. NO: Enter complete Customer number.
- CUST: Enter full name of Customer facility

- MODEL NO: Enter model number of SYSTEM 1E Liquid Chemical Sterilant Processing System (current model number is: P6500 [115V ac, 60Hz])
- ADDRESS: Enter address of facility where SYSTEM 1E Processor is located.
- SERIAL NO: Enter serial number of SYSTEM 1E Processor.

### 1.5.5 Electrical Utilities

- GFI OUTLET, GFI BREAKER OR ISOLATED POWER: Enter the type of electrical outlet: standard, GROUND FAULT INTERRUPTED outlet, GFI breaker or ISOLATED POWER.
- VERIFIED TRIP: Check if GFI or (LIM) had been observed to trip by using a test button or GFI tester.
- DUAL/SINGLE RECEPTACLE: Circle one that applies. **IMPORTANT: Dual receptacle required for UV light assembly.**
- NEMA 5-20R/OTHER: Circle if NEMA series 5, 20 Amp, receptacle is provided and is of hospital grade. Describe any other conditions.
- DEDICATED LINE/OTHER: Circle if the electrical outlet is on a dedicated electrical circuit and rated for 20 Amps (115V ac). Describe any other conditions.
- COMMENTS: Note any unusual conditions or additional useful information.

### 1.5.6 Water Inlet

- DUAL PREFILTER: Dual prefilter configuration is standard. No optional configurations available.

- **ADDITIONAL PREFILTERS:** Indicate the type (preferably in micron rating) and location of any additional prefilters installed.
- **TIME VS > TEMPERATURE:** Measure and chart the water temperature at a sampling of intervals to show at what rate the temperature rises and becomes stable. This should be done without the prefilter elements in place in service mode to open the dump (S5) solenoid valve. Monitor water flow for at least five minutes. This should be done before water has been permitted to run through the system.
- **AVAIL PRESS:** Enter the static available water pressure (in psi), with no water flowing, at the inlet to the SYSTEM 1E Processor.
- **INLET PRESS:** Enter the water pressure (in psi), while filling, at the inlet to the SYSTEM 1E Processor.

### 1.5.7 Fill Times

- **ENTER THE FILL TIME (IN SECONDS), AND THE NUMBER OF FILLS** By measuring the rinse fill times, and interpreting the FP readings, an indication of water pressure, supply line capacity, and (at least on a short term basis) water quality is obtained.

*NOTE: After a completed cycle, first fill time will always be slower due to the filter integrity test.*

### 1.5.8 Drain

- **DISTANCE TO STANDING WATER:** Record, in inches, the distance from end of drain hose (or drain fitting) to standing water.

- **DEDICATED/ SHARED:** Circle the appropriate choice. If drain is shared, describe how.
- **COMMENTS:** Note any unusual conditions, potential problems, or additional information.

### 1.5.9 Verification

In most installations, at least one Diagnostic Cycle and two consecutive Liquid Chemical Sterilant Processing Cycles should be run. If the Customer has already run cycles, verification should include at least one diagnostics and one liquid chemical sterilant processing cycle.

- **TRAYS TESTED:** Indicate trays tested.
- **DIAGNOSTICS CYC:** Indicate cycle count, start time, readings of stored variables and who ran the cycle. Enter F for DIAGNOSTICS run by the field service representative, or C for DIAGNOSTICS run by the Customer.
- **FZ VALUE:** Enter the value of the variable FZ.
- **FP VALUE:** Enter the value of the variable FP.
- **CP VALUE:** Enter the value of the variable CP.
- **CZ VALUE:** Enter the value of the variable CZ.
- **PS VALUE:** Enter the value of the variable PS.
- **LIQUID CHEMICAL STERILANT PROCESSING CYCLE** Enter the cycle count for the liquid chemical sterilant processing cycle being recorded.
- **TEMP** Enter the temperature range from the printout.
- **CONC** Enter the concentration reading from the printout.

## 1.6 RETURN MATERIALS AUTHORIZATION PROCEDURE

Before the shipment or the return of any SYSTEM 1E Liquid Chemical Sterilant Processing System, or other materials to STERIS Corporation, a return materials authorization (RMA) number must be obtained. The RMA number can be obtained by calling STERIS at 800-333-8828.

### 1.6.1 Shipping Precautions

Before shipping the SYSTEM 1E Liquid Chemical Sterilant Processing System, certain precautions should be followed to avoid:

1. Possibility of fluids freezing during transport.
2. Possibility of physical damage.
3. Loss of data.
4. Loss of components.

The precautions below are intended for use by all STERIS representatives, including those trained in the service of the SYSTEM 1E Liquid Chemical Sterilant Processing System.



#### **CAUTION – POSSIBLE EQUIPMENT**

**DAMAGE: To avoid damage to the SYSTEM 1E Liquid Chemical Sterilant Processing System prior to boxing for shipment. Follow procedure 1.6.3, BOXING PROCEDURE to aid in the process.**

### 1.6.2 Draining the SYSTEM 1E Liquid Chemical Sterilant Processing System Prior to Shipment

All possible water should be drained from the SYSTEM 1E Liquid Chemical Sterilant Processing System prior to boxing for shipment. The following procedure is meant to aid in the process.

1. Unplug SYSTEM 1E Processor.
2. Remove all hoses from inlet and drain to allow draining pressures to be equalized.
3. Remove any adapter trays and containers from inside chamber of SYSTEM 1E Liquid Chemical Sterilant Processing System.
4. Remove MaxPure™ Filter by unscrewing filter housing cap from filter housing body and lifting out filter.
5. Suction out all possible water from inside the MaxPure Filter housing body, including any water inside stand-pipe located in center of body opening.

6. Suction out all possible water from inside three connecting water probes located inside adapter chamber (drip pan) of SYSTEM 1E Liquid Chemical Sterilant Processing System.



#### **CAUTION – POSSIBLE EQUIPMENT**

**DAMAGE: Do not place hard or rigid suctioning devices into the probes. Damage to thermocouples or concentration probes could occur.**

7. Repeat Steps 5 and 6 until visible water is gone.

### 1.6.3 Boxing Procedure

After the SYSTEM 1E Liquid Chemical Sterilant Processing System has been drained of water, it can be boxed. The boxing procedure should be followed to avoid:

- Damage during shipment
- Improper handling by shippers
- Unsafe transit of any problematic conditions or data

*NOTE: If the original shipping container and parts have been discarded, contact STERIS for delivery of approved boxes and shipping hardware. STERIS will provide any packaging materials required to verify safe transport of the SYSTEM 1E Liquid Chemical Sterilant Processing System and accessories returning to STERIS.*

1. Insert SYSTEM 1E Liquid Chemical Sterilant Processing System into styrofoam end caps (two provided).
2. Lift SYSTEM 1E Liquid Chemical Sterilant Processing System with end caps into lower shipping box. The unit drops into box, feet first, with electrical line cord coiled up in center of back of unit. Two people should perform this task in order to reduce possibility of injury.
3. Insert any printed materials or data that accompanies unit in front of box between end caps.
4. Place top half of box over lower half of box and fasten together with shipping straps.

*NOTE: This shipping box does not need to be strapped to a shipping skid, unless required by a specific freight carrier.*

5. This completes boxing procedure.

# Section 2: Service Mode Procedures

## 2.1 GENERAL

### 2.1.1 Variable Names

**General:** During the DIAGNOSTIC Cycle operation of the SYSTEM 1E™ Liquid Chemical Sterilant Processing System, the unit measures and stores the following values into memory. These values can be accessed through Service Mode to assist in troubleshooting.

Except where noted, all variables apply to the DIAGNOSTIC Cycle only. The variables, names, and purposes are:

**Table 2-1. Variable Names**

Variable	Name	Purpose
FZ	Fill Zero	Zero pressure with the chamber full.
FP	Fill Pressure	Pressure across MaxPure™ Filter during fill.
CZ	Circulation Zero	Zero pressure with chamber full, circulation pump on, and circulation pinch valve closed.
CP	Circulation Pressure	Pressure with the chamber full and the circulation pump on.
BT	Begin Temperature	Starting temperature of heat rate test.
PS	Pressure Drop	Pressure drop across membrane of the MaxPure filter during filter integrity test.

### 2.1.2 How To Access Service Mode

To access Service Mode:

1. Turn Control Power switch OFF.
2. Turn ON Control Power while holding the 3 key on keypad.
3. Continue to hold 3 key until the unit beeps. Display shows the following:

---

**ENTER SERVICE  
ACCESS CODE 0000**

---

4. The access code is the current year. Enter access code using keypad, and press **SAVE VALUES** button.

---

**SERVICE OPERATE  
BURN IN**

---

From above menu, following choices are available:

- Select **SERVICE** to access test routines and parameter adjustments.
- Select **OPERATE** to return unit to a normal operating mode, but with ability to display cycle parameters while running.
- Select **BURN-IN** for RAM to be cleared and default parameters to be reloaded.

*NOTE: The information on the printout is related to the software version currently on the control board in the processor.*

*NOTE: If MaxPure Filter installed more than 90 days, a warning print out occurs:*

W A R N I N G  
MAXPURE FILTER  
IN USE 90 DAYS  
  
SEE OPERATOR MANUAL

**Figure 2-1. MaxPure Filter Alert Printout**

SERVICE MODE

---

PROGRAM: 93919091  
REV. X XX/XX/XX  
CRC = X X X X  
BOOT VERSION 6001  
  
XX/XX/XX X:XX:XX PM  
  
RUN TIME = X.X.X hr  
CYCLE CNT = XX  
serial no. = xxxxxxxxxxxx

**Figure 2-2. Service Mode Information Printout**

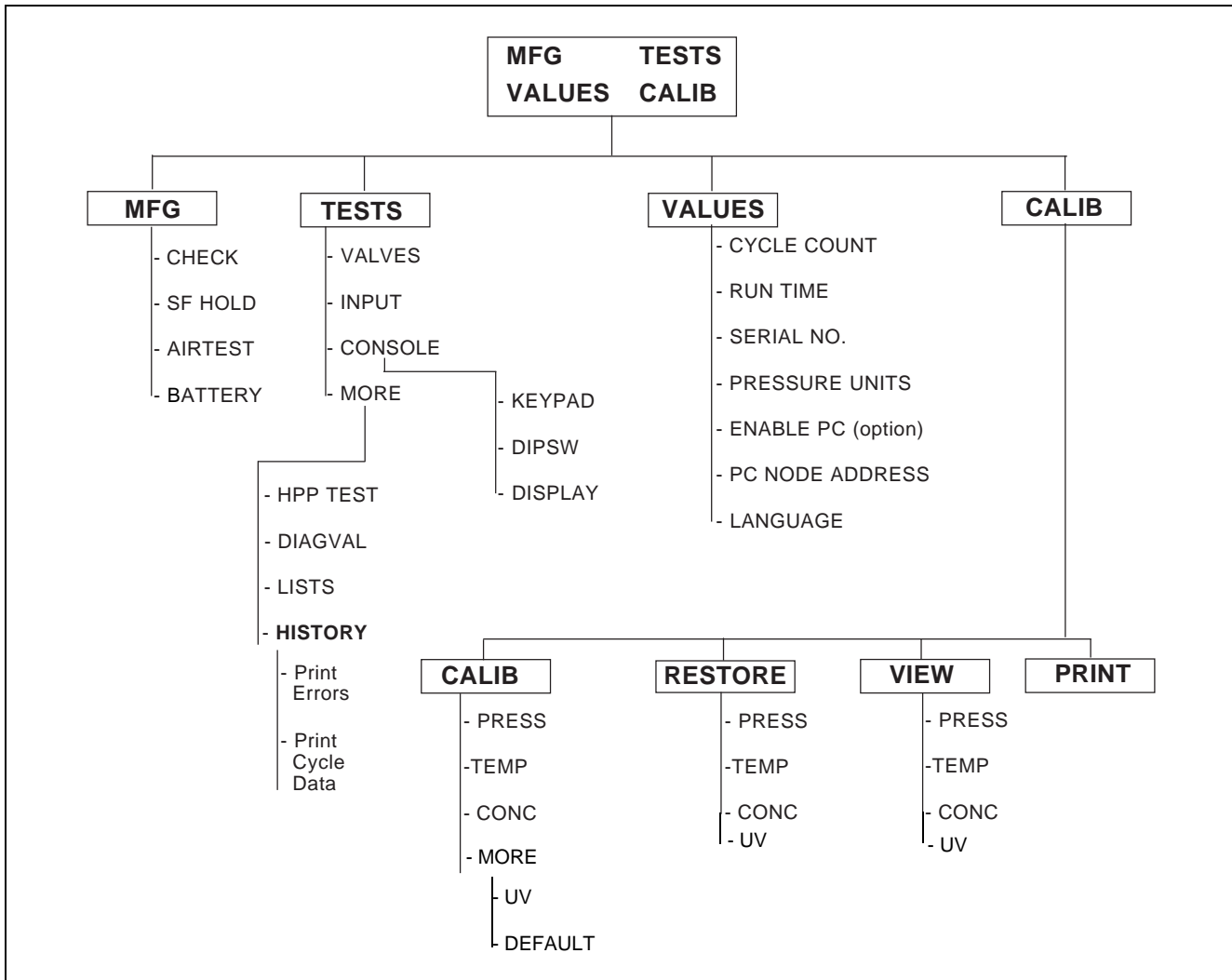


Figure 2-3. Service Mode Program Tree

• Service

SERVICE SELECT, then press SAVE VALUES touch pad. Display shows:

---

**CHECK      SF HOLD**  
**AIRTEST    BATTERY**

---



---

**MFG      TESTS**  
**VALUES   CALIB**

---

Printer also prints SERVICE MODE information. See Figure 2-2.

2.1.3 MFG (Manufacturing)

The manufacturing section is used by the factory prior to new unit shipment; however, several routines are useful in the field. Select MFG, then press SAVE VALUES touch pad. Display shows:

• Check

CHECK is a routine used by the factory that checks the components listed in this procedure. Select CHECK, then press SAVE VALUES touch pad. Display shows:

---

**AIR TEST TIME**  
**XX MINUTE**

---

This menu allows the setting time spent in AIR TEST. This is detailed later in this section. After setting the time, press **SAVE VALUES** touch pad. Display shows:

---

**FACTORY CHECK  
CHECKING ANALOG**

---

The control checks Thermocouples TC1, TC2, and TC3, the ambient temperature sensor on the CPU, and the concentration monitor probes CP1 and CP2. The unit must be at ambient temperature and the concentration probes dry to pass. If failure is detected, printout states failure and display returns to Main Menu:

---

**CHECK      SF HOLD  
AIRTEST    BATTERY**

---

Once analog checks pass, Select **CHECK**, then press **SAVE VALUES** touch pad. Display shows:

---

**FACTORY TEST  
OPEN & CLOSE LID**

---

This checks operation of lid switch. Open the lid, Display shows:

---

**FACTORY TEST  
LID OPEN**

---

Close lid. Display shows:

---

**FACTORY TEST  
VERIFY S2 ON & OFF**

---

Check audible indication that S2 (seal relief, SOL2) is energized and de-energized. The controls allow five seconds to verify. Then display shows:

---

**FACTORY TEST  
VERIFY P1 ON & OFF**

---

Check audible indication that P1 (circulation pump) is energized and de-energized. Control allows five seconds to verify. Display shows:

---

**FACTORY TEST  
COMP1 CONTROL ON**

---

Compressor runs to pressure switch setting and then control holds for two minutes. At the end of two minutes, counter (previously selected) counts down. Display shows:

---

**AIR TEST XX:XX**

---

At end of successful air test, display shows:

---

**PRESS SAVE VALUES  
TO CONTINUE**

---

Press **SAVE VALUES** touch pad. Display shows:

---

**VERIFY LATCH GAP  
PRESS SAVE VALUES TO CONT**

---

The latch gap can be checked. Press **SAVE VALUES** touch pad. Display shows:

---

**FACTORY TEST  
VERIFY S7 ON & OFF**

---

Check audible indication that S7 (inlet fill valve, SOL7) is energized and de-energized. Control allows five seconds to verify. Display shows:

---

**FACTORY TEST  
VERIFY S5 ON & OFF**

---

Check audible indication that S5 (dump valve, SOL5) is energized and de-energized. Control allows five seconds to verify. Display shows:

---

**FACTORY TEST  
VERIFY DRAIN OFF**

---

Check audible indication that drain pinch valve (V5) air pressure is relieved. Display shows:

**FACTORY TEST  
VERIFY CIRC OFF**

Check audible indication that circulation pinch valve (V6) air pressure is relieved. Display shows:

**INSERT TEST PLUG  
PRESS SAVE VALUES TO CONT**

Remove MaxPure™ Filter (FLT1). Place test plug in housing of MaxPure Filter. This test is to check integrity of housing. Press **SAVE VALUES** touch pad. Display shows:

**SFH TEST  
PRESSURE XX:XX**

Control pressurizes systems for a five-minute period. If pressure achieved is <51.73 psi or >58.75 psi, control prints **TRANSDUCER FAULT**. Otherwise at end of five minutes, display shows:

**SFH TEST  
HOLD XX:XX**

Control monitors pressure loss for a five-minute period. Start pressure in psi is printed at end of five minutes. Display shows:

**PRESS SAVE VALUES  
TO CONTINUE**

Final pressure is printed along with pressure differences; acceptable loss is 0.08 psi or less. S8 (SOL8) de-energizes and control measures CK8 (drain check valve), printer prints its value as SFH pressure, acceptable pressure is >3.9 psi and < 11.7 psi. Press **SAVE VALUES** touch pad. Display shows:

**FACTORY TEST  
INFLATING SEAL**

Display shows:

**PRESS SAVE VALUES  
TO CHECK HP PUMP**

Display shows:

**FACTORY TEST  
VERIFY HP PUMP**

HP pump runs for five seconds. Check audible indication for operation. At end of five seconds, seal deflates and control returns to Main Menu. Printer prints existing calibration data. Remove test plug and install MaxPure Filter.

- **SF Hold**

The SF Hold test is not used in the field.

- **Air Test**

This test is used to check for leaks in the compressed air system (lines, seals, etc.). The compressor runs to the compressor control switch (LS5) setting and holds for a selected time period. If the compressor does not turn back on during that time, the test is considered passed.

**CHECK SF HOLD  
AIR TEST BATTERY**

From Manufacturing Menu screen, select **AIR TEST**. Display shows:

**AIR TEST  
00 MINUTES**

Use keypad to select desired time for test, then press **SAVE VALUES** touch pad. Display shows:

Control remains for two minutes, then countdown automatically starts. Display shows:

**AIR TEST TIME  
COMP1 CONTROL ON**



*NOTE: If compressor does not shut off within two minutes, test does not continue to AIR TEST X:XX screen. At end of countdown, if compressor stayed off, display shows:*

---

**AIR TEST  
PASSED TEST**

---

Display shows:

---

**AIR TEST  
DEFLATING SEAL**

---

Display shows:

---

**MFG TESTS  
VALUES CALIB**

---

- **Battery**

This section allows factory to turn off battery for long-term storage. This is not used in the field.

### 2.1.4 Tests

Select **TESTS**, then press **SAVE VALUES** touch pad. Display shows: VALVES INPUT CONSOLE MORE

- **Valves**

Select **VALVES**, then press **SAVE VALUES** touch pad. Display shows:

---

tk s8 s5 s3 s4  
s7 s2 s1 h p1 p2

---

At this point, the following outputs can be checked:

- 
- tk - Paper Take-up
  - s8 - Air-water solenoid valve (SOL8)
  - s5 - Dump valve (SOL5)
  - s3 - Circulation pinch valve solenoid (SOL3)
  - s4 - Drain pinch valve solenoid (SOL4)
  - s7 - Inlet fill valve (SOL7)
  - s2 - Seal release valve (SOL2)
  - s1 - Compressor release solenoid (SOL1) and enable compressor (COMP1)
  - h - Heater element (HTR1)
  - p1 - Circulation pump (P1)
  - p2 - High pressure pump (P2)
- 



**CAUTION: Do not energize “h”, control screen designation for heater element (HTR1), unless chamber is full of water; element failure will occur.**



**CAUTION: Do not energize “s2”, control screen designation for seal release valve (SOL2), with water in the chamber; spill will occur.**

Test each output, one at a time, by using left or right arrow touch pad (< or >). The designator blinks when selected.

Check for proper ON and OFF operation shown on display (CAPITAL LETTERS = energized, lowercase = de-energized). Press **ENTER** to energize output, press **ENTER** again to de-energize.

*NOTE: While in VALVES, the STATUS touch pad can be used to cycle through the screens to view the analogs inputs. Pressing the PAPER FEED touch pad forces the unit to print the status of the LS6 and float block switch (LS3).*

Press **CANCEL** when done. Display shows:

---

**MFG TESTS  
VALUES CALIB**

---

Select **TESTS**, then press **SAVE VALUES** touch pad. Display shows:

---

**VALVES INPUT  
CONSOLE MORE**

---

- **Input**

Select **INPUT**, then press **SAVE VALUES** touch pad. Display shows:



Check for proper ON and OFF operation shown on display (CAPITAL LETTERS = switch closed, lowercase = switch open).

- LID = Lid switch (LS4)
- FLT = Float block switch (LS3)
- HPP = H.P. pump monitor pressure switch (LS6)
- CMP = Compressor control switch (LS5)

*NOTE: Float block switch (LS3) and compressor control switch (LS5) are normally closed. With lid down and latched switch is open and display is "lid" lowercase.*

Press **CANCEL** when done. Display shows:



Select **TESTS**, then press **SAVE VALUES** touch pad. Display shows:



- **Console**

**CONSOLE** allows checking of the keypad, dip switch settings, and display.

0	1	2		
3	4	5		
6	7	8		
9	15	10		
16	17	18	19	20

XXXXXXXXXX



Select **CONSOLE**, then press **SAVE VALUES** touch pad. Display shows:



- **Keypad**

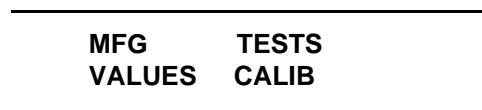
Select **KEYPAD**, then press **SAVE VALUES** touch pad. Display shows:



Refer to the keypad chart. Press a key on the keypad. If the communication link is functioning properly, the corresponding number on the keypad displays.

*NOTE: The **CANCEL** touch pad does not display a number. The test for the cancel touch pad is that it exits this routine when pressed.*

Select **CANCEL**. Display shows:



Select **TESTS**, then press **SAVE VALUES** touch pad. Display shows:



Select **CONSOLE**, then press **SAVE VALUES** touch pad.

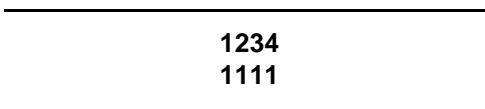
Display shows:



- **DIP SW (Dip Switch)**

*NOTE: Only NOSHOK used. Ametek - IPTG and Ametek - MPTG information shown for reference only.*

Select **DIP SW**, then press **SAVE VALUES** touch pad. Display shows:



The **1234** indicates the control board dip switch position and number directly below indicates status of the switch. 1 indicates OFF, and 0 indicates ON.

The dip switch definitions are as follows:

- **Position 1 and 2** – select model of pressure transducer. Check Transducer Model No.:

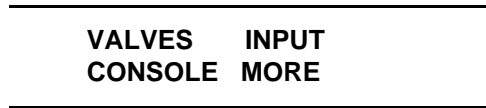
Position 1:	Position 2:	Trans. M/N:
1(off)	1(off)	NOSHOK
0(on)	1(off)	Ametek - IPTG
1(off)	0(on)	Ametek - MPTG

- **Position 3** – direction of the printer (0= print from bottom up; 1= print from top down; 1 is default setting.)
- **Position 4** – printer self test mode (0= test mode; 1= normal operation). Printer prints: **\*\*THIS IS A SELF TEST\*\***. Access dip switch through cover panel on backside of control panel. Locate plug button and remove. Use a small plastic screwdriver or pen to activate switch.

Select **CANCEL**. Display shows:



Select **TESTS**, then press **SAVE VALUES** touch pad. Display shows:

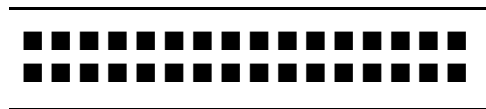


Select **CONSOLE**, then press **SAVE VALUES** touch pad. Display shows:

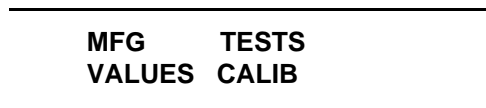


- **Display**

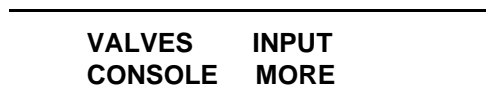
Select **DISPLAY**, then press **SAVE VALUES** touch pad. Display shows:



The display responds by lighting up all pixels in display. Inspect display for burned out pixels. Select **CANCEL**. Display shows:



Select **TESTS**, then press **SAVE VALUES** touch pad. Display shows:



- **More**

Select **MORE**, then press **SAVE VALUES** touch pad. Display shows:

---

<b>HPP TEST LISTS</b>	<b>DIAGVAL HISTORY</b>
---------------------------	----------------------------

---

- **HPP Test**

The HPP TEST is used to test operation of high-pressure pump. Select **HPP TEST**, then press **SAVE VALUES** touch pad. Display shows:

---

**HPP TEST  
INFLATING SEAL**

---

Printer prints: **HPP TEST**. Display shows:

---

**HPP TEST  
FILLING CHAMBER**

---

Display shows:

---

**HPP TEST  
HPP SWITCH CLSD/OPEN**

---

During this time, the HP pump is running and status of switch is shown in real time. If the switch is closed, the display shows **CLSD**. If the switch is open, the display shows **OPEN**.

Press **SAVE VALUES** to turn off pump and drain unit. Display shows:

---

**HPP TEST  
DRAINING CHAMBER**

---

Display shows:

---

**HPP TEST  
DEFLATING SEAL**

---

Display shows:

---

<b>MFG VALUES</b>	<b>TESTS CALIB</b>
-----------------------	------------------------

---

Select **TESTS**, then press **SAVE VALUES** touch pad. Display shows:

---

<b>VALVES CONSOLE</b>	<b>INPUT MORE</b>
---------------------------	-----------------------

---

Select **MORE**, then press **SAVE VALUES** touch pad. Display shows:

---

<b>HPP TEST LISTS</b>	<b>DIAGVAL HISTORY</b>
---------------------------	----------------------------

---

*NOTE: Refer to SECTION 2.1.1 VARIABLE NAMES for explanation of variables.*

DIAGNOSTIC CYCLE PARAMS

---

FP = X.XX  
 FZ = X.XX  
 CP = X.XX  
 CZ = X.XX  
 BT = X.XX  
 PS = X.XX

**Figure 2-4. Diagnostic Cycle Parameters**

- **DIAGVAL (Diagnostic Values)**

Select **DIAGVAL** to print out the diagnostic values from the last **DIAGNOSTIC** Cycle run. Select **DIAGVAL**, then press **SAVE VALUES** touch pad. Display shows:

---

<b>HPP TEST LISTS</b>	<b>DIAGVAL HISTORY</b>
---------------------------	----------------------------

---

The printer prints: **DIAGNOSTIC CYCLE PARAMS**. Refer to Figure 2-4. Press **CANCEL** touch pad to continue.

*NOTE: For diagnostic values, all pressure readings (except BT) are listed in psi.*

From Service Main Menu, select **TESTS**, then press **SAVE VALUES** touch pad. Display shows:

---

<b>VALVES</b>	<b>INPUT</b>
<b>CONSOLE</b>	<b>MORE</b>

---

Select **MORE**, then press **SAVE VALUES** touch pad. Display shows:

---

<b>HPP TEST</b>	<b>DIAGVAL</b>
<b>LISTS</b>	<b>HISTORY</b>

---

- **Lists**

Select **LISTS** to delete Operator ID and/or Physician ID list(s). When display shows: Select **LISTS**, then press **SAVE VALUES** touch pad. Display shows:

---

<b>PRINT LISTS</b>
<b>CLEAR LISTS</b>

---

To print a list, select **PRINT LISTS** option, then press **SAVE VALUES** touch pad. Display shows:

---

<b>PRINT OPER LIST</b>
<b>PRINT PHYS LIST</b>

---

Select the appropriate response, then press **SAVE VALUES** touch pad. The list is printed.

To clear a list, select the **CLEAR LISTS** option, then press the **SAVE VALUES** touch pad. Display shows:

---

<b>CLEAR OPER LIST</b>
<b>CLEAR PHYS LIST</b>

---

Select desired list to clear, then press **SAVE VALUES** touch pad.

- **History**

Display shows:

---

<b>PRINT ERRORS</b>
<b>PRINT CYCLE DATA</b>

---

Select **PRINT ERRORS** to print a listing of non-cycle related errors. These are non-critical errors that do not abort a cycle, and would only be displayed in the Service mode. Select **PRINT CYCLE DATA** to print last five cycle tapes in an Enhanced Operator Mode format. Press **CANCEL** touch pad to continue.

### 2.1.5 Values

Use cursor to select **VALUES**. Press **SAVE VALUES** touch pad to enter change values routine. These values are not found in operator Change Value Procedures. This section includes: Cycle Count, Run Time, Temperature Units, Pressure Units, Time Set. The Main Menu display shows:

---

<b>MFG</b>	<b>TESTS</b>
<b>VALUES</b>	<b>CALIB</b>

---

Select **VALUES**, then press **SAVE VALUES** touch pad. Display shows:

---

<b>CYCLE-COUNT=</b>
<b>XXXXXXXX</b>

---

When installing a new Control Board, cycle tapes should be checked and current cycle count entered into control. Press **SAVE VALUES**, touch pad to continue. Display shows:

---

<b>RUN-TIME=</b>
<b>XXXXXXXX hrs</b>

---

This is an elapsed time from control startup. If a new control board is being installed, start time at 0 hours. Press **SAVE VALUES** touch pad to continue. Display shows:

Enter Serial Number of unit, using keypad and right or left arrows (< or >). Press **SAVE VALUES** touch pad to continue. Display shows:

---

<b>PRESSURE UNITS</b>
<b>PSI</b> <b>BAR</b>

---

```

S E T U P

D-MM-YY          H:MM:SSP

ACCESS CODE: NO
OPERATOR ID: NO
PATIENT ID: NO
DEVICE ID: NO
PROCEDURE ID: NO
PHYSICIAN ID: NO
INFORMATIVE OPTION: NO
DUPLICATE PRINT: NO
COMPLETE TONE: YES
MAXPURE FILTER
FILTER START DATE: D-MM-YY

CYCLE COUNT      XXXX
-----

```

**Figure 2-5. Setup**

Use right or left arrows (< or >) to select pressure units. Press **SAVE VALUES** touch pad to continue. Display shows:

```

-----
      ENABLE PC?
      YES      NO
-----

```

(PC) selection is used for PC option. This requires a separate kit. If PC is to be enabled, select **YES**. If not enabled, select **NO**. If **NO** is selected, display advances to **LANGUAGES**. Select **YES** if connected to PC. Press **SAVE VALUES** touch pad to continue. Display shows:

```

-----
      PC NODE ADDRESS=
      XX
-----

```

This is used for PC applications. Follow PC kit instructions to identify node address. Enter correct address by using number keypad. Press **SAVE VALUES** touch pad to continue.

Display shows:

```

-----
      LANGUAGE
      ENGLISH
-----

```

Use left or right arrows (< or >) to select desired language. Press **SAVE VALUES** touch pad. Display shows:

```

-----
      * UPDATING *
      * MEMORY *
-----

```

The printer prints: \* Change Value X:XX:XXA or P. See Figure 2-5. The printer prints values selected in normal Operating Mode.

### 2.1.6 Calibration

The Calibration section of the Service Mode has four sub-sections:

- **CALIBRATION** routine – for adjusting pressure, temperature, concentration and UV system.
- **RESTORE** routine – to review or enter calibration data.
- **VIEW** routines – to review real time in each of the analog channels.
- **PRINT** routine – for printouts of current calibration data.

#### • Calibration

*NOTE: During the Calibration routine, when the control displays: STABILIZING, the control is waiting for the temperature or pressure to be at a stable point to allow for setting the correct value. If the control remains in STABILIZING and does not proceed, it would indicate that there is a fault that must be repaired before calibration can be accomplished successfully.*

When the display shows:

```

-----
      MFG      TESTS
      VALUES  CALIB
-----

```

Select **CALIB**, then press **SAVE VALUES** touch pad. Display shows:

```

-----
      CALIB    RESTORE
      VIEW     PRINT
-----

```

Select **CALIB**, then press **SAVE VALUES** touch pad. Display shows:

```

-----
      PRESS    TEMP
      CONC     MORE
-----

```

- **Pressure Calibration**

Select **PRESS**, then press **SAVE VALUES** touch pad.  
Display shows:

```

_____
          WARNING! CALIB
          WILL BE CHANGED
_____
  
```

Press **SAVE VALUES** to continue. Display shows:

```

_____
          INFLATING SEAL
_____
  
```

Display shows:

```

_____
          FILLING CHAMBER
_____
  
```

Display shows:

```

_____
          STABILIZING P=
          0.XX psi
_____
  
```

The control holds for a period of time, allowing pressure to stabilize, read the pressure on the transducer due to the head of water in the chamber, and set the calibration point automatically. No adjustments are necessary by the technician. Unit proceeds to drain. Display shows:

```

_____
          DRAINING CHAMBER
_____
  
```

Display shows:

```

_____
          * UPDATING *
          * MEMORY *
_____
  
```

Display shows:

```

_____
          DEFLATING SEAL
_____
  
```

Display shows:

```

_____
          * PRESSURE *
          * CALIBRATED *
_____
  
```

Printer prints pressure-calibrated values (see Figure 2-6, for example). Press **SAVE VALUES** touch pad to continue.

```

=====
=====PRESSURE=====
=====CALIBRATED=====
=====
AT X:XX:XX ON XX-XX-XX
PREVIOUS VALUES
PRESSURE TRANSDUCER
LOW RAW =XXXXX
CALIBRATED VALUES
PRESSURE TRANSDUCER
LOW RAW =XXXXX
=====
  
```

**Figure 2-6. Pressure Calibrated Values**

- **Temperature Calibration**

Temperature calibration is not normally necessary on SYSTEM 1E Liquid Chemical Sterilant Processing System.

*NOTE: A calibrated temperature measuring device is required for this procedure.*

A container with cold water (5 to 10°C [41 to 50°F]) and hot water (55 to 65°C [131 to 149°F]) is necessary. The thermocouple(s) is removed from the mounting location and is placed in the bath.

*NOTE: To make calibration easier, use a spare thermocouple in place of TC1, TC2 and TC3 thermocouples in the unit. Calibrate each thermocouple separately. Attach the spare thermocouple to the proper connection on CN1 while leaving the threaded end hang free. Free-hanging end is inserted into cold and hot water baths as directed during procedure.*

```

=====
=====INLET=====
=====OUTLET=====
===== DRAIN =====
===== TEMPERATURE =====
===== CALIBRATION =====
=====
AT X:XX:XX ON XX-XX-XX
PREVIOUS VALUES
INLET TEMPERATURE
-----
LOW PT = XXXX
LOW RAW = XXXX
HIGH PT = XXXX
HIGH RAW = XXXXX
OUTLET TEMPERATURE
-----
LOW PT = XXXX
LOW RAW = XXXX
HIGH PT = XXX X
HIGH RAW = XXXXX
DRAIN TEMPERATURE
-----
LOW PT = XXXX
LOW RAW = XXXX
HIGH PT = XXXX
HIGH RAW = XXXXX
CALIBRATED VALUES
INLET TEMPERATURE
-----
LOW PT = XXXX
LOW RAW = XXXX
HIGH PT = XXXX
HIGH RAW = XXXXX
DRAIN TEMPERATURE
-----
LOW PT = XXXX
LOW RAW = XXXX
HIGH PT = XXXX
HIGH RAW = XXXXX
OUTLET TEMPERATURE
-----
LOW PT = XXXX
LOW RAW = XXXX
HIGH PT = XXXX
HIGH RAW = XXXXX

```

**Figure 2-7. Temperature Calibrated Values**

When the display shows:

```

-----
MFG    TESTS
VALUES CALIB
-----

```

Select **CALIB**, then press **SAVE VALUES** touch pad.

Display shows:

```

-----
CALIB  RESTORE
VIEW   PRINT
-----

```

Select **CALIB**, then press **SAVE VALUES** touch pad.

Display shows:

```

-----
PRESS  TEMP
CONC   MORE
-----

```

Select **TEMP**, then press **SAVE VALUES** touch pad.

Display shows:

```

-----
INLET  OUTLET
DRAIN  ALL
-----

```

*NOTE: TC1 = Thermocouple #1 (drain transition block), TC2 = Thermocouple #2 (high pressure transition block) and TC3 = Thermocouple #3 (drain block assembly). Inlet and outlet as referenced to the heater.*

Select one: **INLET/OUTLET/DRAIN/ALL**, then press **SAVE VALUES** touch pad. Display shows:

```

-----
WARNING! CALIB
WILL BE CHANGED
-----

```

Printer prints Previous Values (see Figure 2-7). Press **SAVE VALUES** touch pad. Display shows:

```

-----
PLACE TC(S) IN
LO BATH PRESS SV
-----

```

Place thermocouple(s) and temperature measuring device in the cold water container and press **SAVE VALUES** touch pad. Display shows:



---

**STABILIZING LOW  
(THERMOCOUPLE LOCATION) = XX.XC**

---

Display shows:

---

**LO SET PT XX.X  
PRESS SV TO SET**

---

Using key pad, adjust displayed temperature to match temperature measured by calibrated device, then press **SAVE VALUES (SV)** touch pad. Display shows:

---

**PLACE TC(S) IN  
HI BATH PRESS SV**

---

Place thermocouple(s) and temperature measuring device in hot water container and press **SAVE VALUES** touch pad. Display shows:

---

**STABILIZING HIGH  
(THERMOCOUPLE LOCATION) = XX.XC**

---

Display shows:

---

**HI SET PT XX.X  
PRESS SV TO SET**

---

Using keypad, adjust displayed temperature to match temperature measured by calibrated device, then press **SAVE VALUES** touch pad. Display shows:

---

**\* UPDATING \*  
\* MEMORY \***

---

Display shows:

---

**\* (THERMOCOUPLE LOCATION) \*  
\* CALIBRATED \***

---

Printer then prints calibration data. See Figure 2-7, for example. Press **CANCEL** touch pad to exit calibration. Display shows: **MFG TESTS VALUES CALIB**

- **Concentration Probe Calibration (CONC)**

This routine is used to calibrate Control Board using established values. Technician is required to access test points on Connector Board adjacent to Power Supply. From Service Menu, Select **CALIB**, then press **SAVE VALUES** touch pad. Display shows:

---

**CALIB      RESTORE  
VIEW        PRINT**

---

Select **CALIB**, then press **SAVE VALUES** touch pad. Display shows:

---

**PRESS      TEMP  
CONC       MORE**

---

Select **CONC**, then press **SAVE VALUES** touch pad. Display shows:

---

**WARNING! CALIB  
WILL BE CHANGED**

---

At this point, CN9 must be disconnected for the remainder of this calibration procedure. Press **SAVE VALUES** touch pad. Display shows:

---

**PLACE JUMPER ON  
TP 1 & 2 PRESS SV**

---

Printer prints existing CONC calibration data.

Locate test points on connector board and jumper TP1 and TP2 (low points). Press **SAVE VALUES** touch pad. Display shows:

---

**STABILIZING LOW  
CONC = XX**

---

Display shows:

---

**PLACE JUMPER ON  
TP 1 & 3 PRESS SV**

---

Locate test points on connector board and jumper TP1 and TP3 (high points). Press **SAVE VALUES** touch pad. Display shows:

---

**STABILIZING HIGH  
CONC = XX**

---

Display shows:

---

**\* UPDATING \*  
\* MEMORY \***

---

```

=====
====CONCENTRATION====
====CALIBRATED====
=====
AT X:XX:XX
ON XX-XX-XX

PREVIOUS VALUES

CONCENTRATION MONITOR
-----
LOW RAW = XXXXX
HIGH RAW = XXXXX

CALIBRATED VALUES

CONCENTRATION MONITOR
-----
LOW RAW = XXXXX
HIGH RAW = XXXXX

```

**Figure 2-8. Concentration Probe Calibration**

Display shows:

---

**\* CONC MONITOR \*  
\* CALIBRATION \***

---

Printer then prints new calibration data. See Figure 2-8. Remove jumpers from board and press **SAVE VALUES**. Display Shows:

---

**MFG      TESTS  
VALUES   CALIB**

---

Reinstall CN9.

• **UV Sensor Calibration**

Connect 4-20 mA signal generator to UV connector on back panel.

Select **CALIB** and press the **SAVE VALUES** pushbutton.

The following displays with one of the options flashing:

---

**CALIB      RESTORE  
VIEW        PRINT**

---

Select **CALIB** and press the **SAVE VALUES** pushbutton.

The following displays with one of the options flashing:

---

**PRESS      TEMPS  
CONC        MORE**

---

Select **MORE** and press the **SAVE VALUES** pushbutton.

The following displays with UV flashing:

---

**UV  
DEFAULT**

---

Select **UV** and press the **SAVE VALUES** pushbutton.

The following displays:

---

**WARNING CALIB  
WILL BE CHANGED!**

---

Press the **SAVE VALUES** pushbutton.

The following displays and prints:

**SET UV TO LO CUR  
PRESS SV**

```

=====
===== UV INTENSITY =====
===== CALIBRATION =====
=====
AT 12:33:32P
ON 8-07-08

PREVIOUS VALUES

UV LAMP SENSOR
-----
LOW PT = X.X
LOW RAW = XXXXX
HIGH PT = XX.X
HIGH RAW = XXXXX

```

*NOTE: "Low and High Raw" values may be different.*

Set signal generator to 4.0 mA.

Press the **SAVE VALUES** pushbutton.

The following displays for 30 seconds:

**STABILIZING LOW  
UV = 4.0 mA**

The following displays with the first number of the UV intensity flashing:

**LO SET PT 04.3  
PRESS SV TO SET**

Set to 4.0 and press the **SAVE VALUES** pushbutton.

The following displays:

**SET UV TO HI CUR  
PRESS SV**

Press the **SAVE VALUES** pushbutton.

The following displays:

**STABILIZING HIGH  
UV = 20.0 mA**

While the **STABILIZING HIGH** screen is shown quickly raise signal generator to 20.0 mA. Wait 30 seconds from the time the value stopped changing.

The following displays with the first number of the UV intensity flashing:

**HI SET PT 20.0  
PRESS SV TO SET**

Set to 20.0 and press the **SAVE VALUES** pushbutton.

The following displays for a few seconds:

**\* UPDATING \*  
\* MEMORY \***

Then the follow displays and prints:

**\* UV SENSOR \*  
\* CALIBRATED \***

CALIBRATED VALUES

UV LAMP SENSOR

```

-----
LOW PT = X.X mA
LOW RAW = XXXXX
HIGH PT = XX.X mA
HIGH RAW = XXXXX

```

*NOTE: "Low and High Raw" values may be different.*

Press the **SAVE VALUES** pushbutton.

The following displays with CALIB flashing:

**MFG TESTS  
VALUES CALIB**

• **Default Calibration**

Select **CALIB** and press the **SAVE VALUES** pushbutton.

The following displays with CALIB flashing:

---

**CALIB RESTORE  
VIEW PRINT**

---

Select **CALIB** and press the **SAVE VALUES** pushbutton.

Select **MORE** and press the **SAVE VALUES** touch pad.

Select **DEFAULT** and press the **SAVE VALUES** touch pad to load default calibration values.

• **Restore Calibration Data**

Select **CALIB**, then press **SAVE VALUES** touch pad. Display shows:

---

**CALIB RESTORE  
VIEW PRINT**

---

Select **RESTORE**, then press **SAVE VALUES** touch pad. Display shows:

---

**PRES TEMP  
CONC UV**

---

The routines are similar for **PRESS**, **TEMP**, and **CONC**. When a selection is made, the following is displayed:

---

**WARNING! CALIB  
WILL BE CHANGED**

---

Press **SAVE VALUES** touch pad. Display shows data points that can be changed, such as **LOW RAW**, **HIGH RAW**, **LOW PT**, **HIGH PT**. Temperatures use all points, **CONC** uses only **LOW** and **HIGH RAW**, and **PRESSURE** uses **LOW RAW** only. Data can be entered using the keypad. If the previous calibration data needs to be re-entered due to calibration error, use the print function described later in this section (**PRINT**). Press **SAVE VALUES** touch pad. Display shows:

---

**\* UPDATING \*  
\* MEMORY \***

---

Display shows:

---

**PRES TEMP  
CONC MORE**

---

Select **CANCEL** to continue. Display shows:

---

**MFG TESTS  
VALUES CALIB**

---

• **View**

Current real time value of pressure, temperature, concentration and UV can be viewed in this routine.

Select **CALIB**, then press **SAVE VALUES** touch pad. Select **VIEW**, then press **SAVE VALUES** touch pad. Display shows:

---

**PRES TEMP  
CONC UV**

---

Selecting **PRESS/TEMP/CONC/UV** now displays the current, real-time reading. Press **CANCEL** after reading an item. Re-enter **VIEW** if other points need to be read.

• **Print**

Selection of this function allows all current calibration data to be printed. See Figure 2-9 for an example.

```

INLET TEMPERATURE
-----
LOW PT =XXXX
LOW RAW =XXXX
HIGH PT =XXXX
HIGH RAW =XXXXX

OUTLET TEMPERATURE
-----
LOW PT =XXXX
LOW RAW =XXXX
HIGH PT =XXXX
HIGH RAW =XXXXX

DRAIN TEMPERATURE
-----
LOW PT =XXXX LOW RAW =XXXX
HIGH PT =XXXX
HIGH RAW =XXXXX

CONCENTRATION MONITOR
-----
LOW RAW = XXXX
HIGH RAW = XXXX


PRESSURE TRANSDUCER
-----
LOW RAW = XXXX

UV LAMP SENSOR
-----
LOW PT = X.X mA
LOW RAW = XXXXX
HIGH PT = XX.X mA
HIGH RAW = XXXXX

```

**Figure 2-9. Calibration Data Printout**

```

STERIS®

SYSTEM 1E
-----
DATE: mm-dd-yy
CYCLE START: hh:mm:ssp
OPERATOR: _____
LOAD ID: _____
REMARKS: _____
_____
=====
TIME*   CONC**
WARM/MIX XX.X MIN XXX
EXPOSURE XX.X MIN XXX
RINSE: 1 XX.X SEC XXX
RINSE: 2 XX.X SEC XXX
DRAIN: XX.X SEC XXX
TOTAL: XX.X MIN XXX
=====
TEMP: XX.X - XX.X DEG. C
CONCENTRATION: XXX
EXPOSURE TIME: X.X
FILL TIME: X.X
INLET TEMP: XX DEG. C
OPERATOR: _____
SERIAL # XXXXXXXXXXXX
CYCLE COUNT: XXX
CYCLE COMPLETE:hh:mm:ssp
CHAMBER OPENED:hh:mm:ssp

```

**Figure 2-10. Cycle Data Printout**

## 2.2 ENHANCED OPERATOR MODE

When this mode is selected, display reverts to a standard operator mode screen; however, while cycle is progressing, pressing **STATUS** button allows display to show various parameters that are not seen in normal operation. These additional displays are as follows:

- Thermocouple temperatures TC1, TC2 and TC3 (read in degrees C)
- Concentration monitor
- Pressure (read by transducer, read in PSI)
- UV Intensity (read by UV monitor)
- Cycle phase

\* Time = length of time in phase

\*\* Conc = Concentration count at end of phase

Under normal conditions, display shows OPERATING, with a projected time to completion. Pressing the **STATUS** button shows the first alternate display. Pressing again shows second alternate display, and so on. Pressing **PAPER FEED** touch pad forces unit to print current status of LS6 and float switch.

*NOTE: The display reverts back to the OPERATING display after a few seconds, so it is necessary to continue pressing the STATUS button to continue showing the alternate displays.*

### **2.2.1 Enhanced Operator Mode Print-outs**

The printouts in the Enhanced Operator mode (see Figure 2-10) are expanded to give more cycle detail. This detail can be used to help troubleshoot a unit.

### **2.2.2 Burn-In SYSTEM 1E Liquid Chemical Sterilant Processing System**

Selecting Burn-In sets all parameters to default values, and printer prints the default values.

### **2.2.3 How To Exit Service Mode**

To exit Service Mode, turn power OFF, then turn power back ON.

# Section 3: Principles of Operation

## 3.1 SYSTEM 1E™ LIQUID CHEMICAL STERILANT PROCESSING SYSTEM DESCRIPTION

The SYSTEM 1E Liquid Chemical Sterilant Processing System is made up of the System 1E Processor, the Water Preparation unit and the UV Water Treatment unit. The three units function together as a system and cannot be altered. The Water Preparation unit includes the A and B pre-filters, housings and water pressure regulator. The water pressure regulator is factory set to 50 psig. The UV Water Treatment unit includes a stainless steel chamber with quartz sleeve, an ultra-violet lamp and a UV intensity monitor.

The SYSTEM 1E Liquid Chemical Sterilant Processing System runs only two cycles: a Liquid Chemical Sterilization Cycle and a Diagnostic Cycle. There are no user or service adjustments that can be made to alter either cycle sequence or parameter set points. The Liquid Chemical Sterilization Cycle is used for the processing of medical equipment, while the Diagnostic Cycle is a daily test cycle that verifies the operation of the unit components.

Accessories such as processing trays and Quick Connects are not addressed in this manual.

## 3.2 OVERVIEW OF THE SYSTEM

The SYSTEM 1E Liquid Chemical Sterilant Processing System is intended for the liquid chemical sterilization of manually cleaned immersible, reusable, critical and semi-critical heat-sensitive medical devices, including endoscopes and their accessories. Devices processed in the SYSTEM 1E Liquid Chemical Sterilant Processing System have been chemically sterilized using S40™ Sterilant Concentrate, a peracetic acid liquid chemical sterilant, and rinsed with extensively treated, potable water.

The SYSTEM 1E Processor treats potable water using a three stage process: pre-filtration, UV irradiation, and 0.1 micron filtration.

- The pre-filtration stage reduces particulates present in the potable water.
- The UV irradiation stage reduces waterborne pathogenic viruses in the unlikely event that they are present in potable water.
- The dual membrane, 0.1 micron pharmaceutical sterilizing-grade filter effectively removes bacteria, fungi and protozoa from the rinse water.

After completion of the cycle for the SYSTEM 1E Processor (which includes liquid chemical sterilization and rinse phases), the load is ready for immediate use. Once removed from the SYSTEM 1E Processor the devices are wet. Critical devices<sup>1</sup> and some semi-critical devices are processed within containers. The containers are closed with transparent lids; the containers are not designed for sterile storage and medical devices should not be stored after processing in SYSTEM 1E Processor. Processed medical devices should be used immediately to minimize the risk of environmental contamination.

SYSTEM 1E Processors are to be used only by trained personnel who are fully familiar with, and strictly comply with, the operating instructions and conditions detailed in the Operator Manual, as well as any applicable Quick Connect Processing Instructions. The warranty pertaining to equipment or products sold by STERIS is contained in STERIS's Terms and Conditions of Sale.

**Important:** Liquid chemical sterilization of a surgical or diagnostic device by the SYSTEM 1E Processor requires that the liquid sterilant make contact with all exterior and interior surfaces of the device. In the case of a device having internal channels or other interior surfaces, the device manufacturer's instructions should be reviewed to determine the manufacturer's recommendations for the preparation of the device for liquid chemical sterilization or disinfection. STERIS is not responsible for the adequacy of the device manufacturer's instructions or the design of the device which fails to permit liquid to contact the surfaces of all internal channels and components of the devices. The device will not be liquid chemically sterilized if the sterilant does not contact all interior and exterior surfaces of the device.

## 3.3 COMPONENT DESCRIPTION

Refer to Figure 3-1 for this section. This figure shows the general components used in the SYSTEM 1E Liquid Chemical Sterilant Processing System. The unit can be broken down into the following subsections:

1. Fluid Pathway
2. Housing of Water Filter
3. Air Manifold

### 3.3.1 Fluid Pathway Description of SYSTEM 1E Processor

1. Due to their size, a limited number of critical devices are processed in a processing tray. Go to [www.steris.com](http://www.steris.com) to determine how a specific device is processed.

**Table 3-1. Component List**

<b>Flow Chart Name</b>	<b>Common Name</b>	<b>Flow Chart Name</b>	<b>Common Name</b>	<b>Flow Chart Name</b>	<b>Common Name</b>
<b>Float Block Assembly</b>		<b>Drain Block Assembly</b>		<b>Dual Water Inlet Assembly</b>	
CK1 .....	Air inlet check valve	CK8 .....	Drain check valve	SOL5 .....	Dump valve
CK2 .....	Float block drain check valve	TC3 .....	Thermocouple #3 (drain block assembly)	SOL7 .....	Inlet fill valve
CK3 .....	Float block drain check valve	<b>High Pressure Pump Assembly</b>		<b>Miscellaneous Components</b>	
LS3 .....	Float block switch	CK9 .....	Pressure relief valve (internal to pump 2)	CK10 .....	Anti-siphon check valve
FLT2 .....	Sterile air filter	P2 .....	High pressure pump	COMP1 .....	Air compressor
<b>MaxPure™ Filter and Housing Assembly</b>		LS6 .....	H.P. pump monitor (pressure switch)	LS4 .....	Lid switch
FLT1 .....	Housing of MaxPure Filter	<b>Heater Housing</b>		P1 .....	Circulation pump
CK4 .....	Backflow preventer check valve	HTR1 .....	Heater element	S1 .....	Inflatable seal
PT1 .....	Pressure transducer	LS1 .....	Thermal Cutoff Switch	V5 .....	Drain pinch valve
SOL8 .....	Air-water solenoid valve	TC1 .....	Thermocouple #1 (drain transition block)	V6 .....	Circulation pinch valve
CK11 .....	Circulation Check Valve	<b>High Pressure Transition Block</b>		<b>UV System</b>	
<b>Air Manifold Assembly</b>		CP1, CP2 .....	Concentration probes	UV2 .....	UV Chamber
CK5 .....	Air manifold check valve	TC2 .....	Thermocouple #2 (high pressure transition block)	UVM1 .....	UV intensity Monitor
CK6 .....	Air-water check valve (in air manifold)	<b>Water Preparation System</b>		<b>Water Preparation System</b>	
CK7 .....	Air manifold check valve	PR1 .....	Water Pressure Regulator	FLTA1 .....	Pre-Filter A
LS2 .....	Seal pressure safety switch	FLTB1 .....	Per-Filter B	<b>Inflatable Seal</b>	
LS5 .....	Compressor control switch	<b>Inflatable Seal</b>		BH2 .....	Seal Emergency Relief
SOL1 .....	Compressor release solenoid	PR2 .....	Air Pressure Regulator		
SOL2 .....	Seal release solenoid				
SOL3 .....	Circulation pinch valve solenoid				
SOL4 .....	Drain pinch valve solenoid				



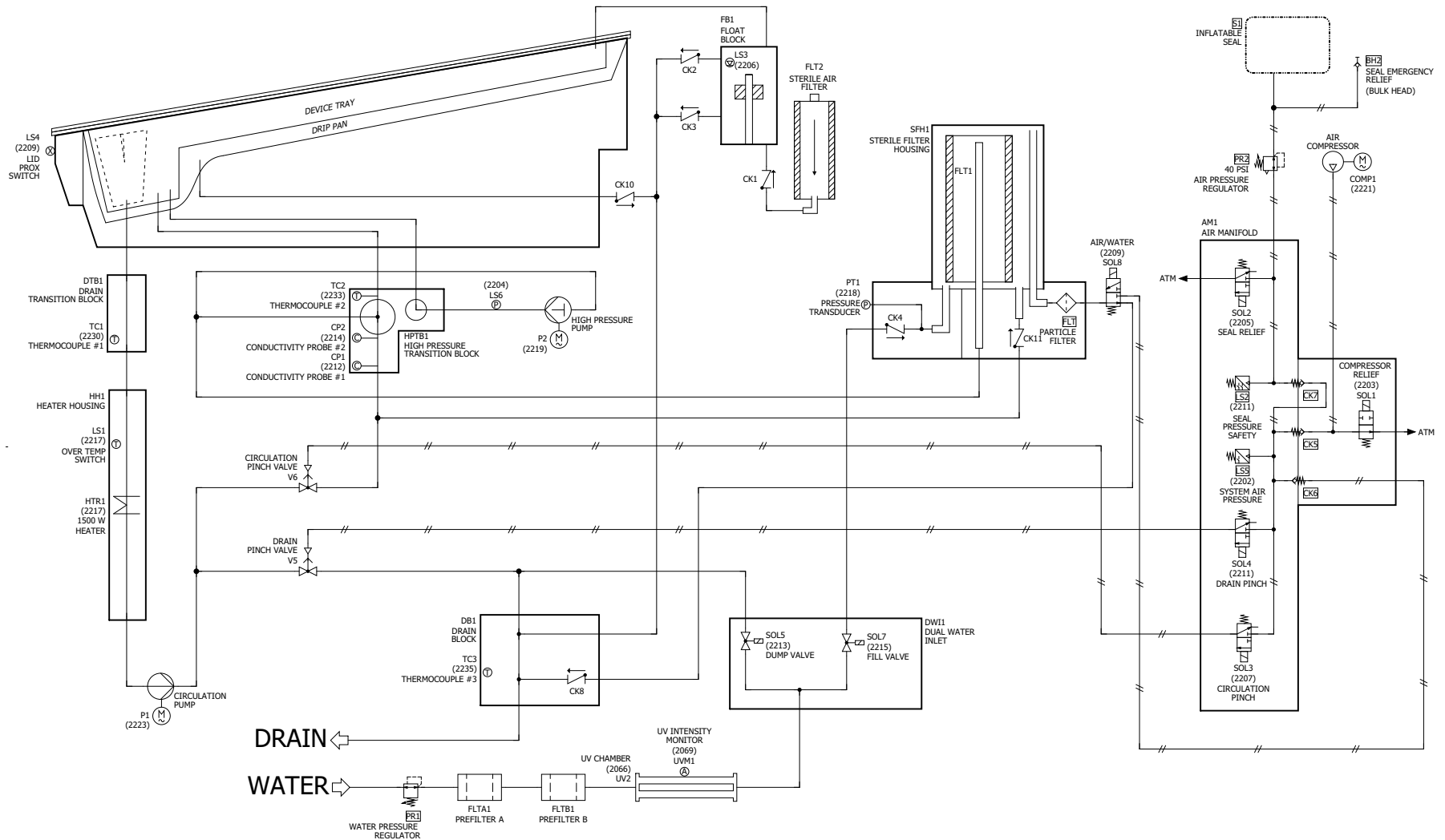


Figure 3-1. General Components

A water tight processing chamber is formed when the inflatable seal forces the processing adapter tray against the upper seal on the lid.

During the dump portion of the cycle, extensively treated water flows from the inlet, through dump valve (SOL5), past thermocouple #3 (drain block assembly; TC3), and out the drain. The chamber and main system plumbing are closed-off by the actuated drain pinch valve (V5).

During chamber filling, water flows through inlet fill valve (SOL7) and backflow preventer check valve (CK4), across the membrane in the MaxPure Filter, through the pressure transition block and into the chamber. Circulation pinch valve (V6) is open, filling circulation pump (P1), heater drain transition blocks and the chamber. During fill, air exhausts through the vent hole in the lid, into the float block, through CK2 and CK3, and out the drain. At completion of fill, water enters the float block and raises the float. SOL7 is then closed.

During circulation, fluid exits the chamber through the right drogue of the processing adapter tray (under the sterilant container), through the drain transition block, past thermocouple #1 (drain transition block; TC1), and into the heater housing. Fluid continues past the heater and is flowed by circulation pump (P1) through V6 to the high pressure transition block, past concentration probes (CP1/ CP2) and thermocouple #2 (high pressure transition block; TC2), and into the processing chamber through the processing tray container interface.

A portion of the fluid is flowed through the high pressure pump (P2) at  $16.5 \pm 3$  psi for 60 Hz units, through the smaller connector post/drogue to the processing tray container adapter to provide higher pressure directed flow for lumens. Also, a portion of the fluid is circulated through the membrane and housing of the MaxPure Filter.

The chamber is drained by P1 through V5 after V6 is closed.

The float block assembly has two basic functions. First, to maintain near-neutral chamber pressures. Second, the float block assembly provides indication of chamber-full condition and loss of fluid from the chamber.

During fills, float block drain check valves (CK2 and CK3) allow air to be purged from the chamber to drain, and at the end of fills, allow any excess fluid to drain. As fluid is pumped to drain, its volume in the chamber is replaced by air drawn through sterile air filter (FLT2) and air inlet check valve (CK1).

Chamber fills are terminated when air has been exhausted and water enters the float block assembly,

which raises LS3. System fluid loss is detected when the float switch drops. This drop occurs when a sufficient fluid volume loss from the system and float block assembly cracks open CK1, which lets air in, displacing fluid from the float block and causing LS3 to drop.

### 3.3.2 Water Filter Housing Description

The housing of the MaxPure Filter assembly houses a 0.1-micron pharmaceutical sterilizing-grade filter to provide filtered water to rinse processed instruments and also provides an air-tight chamber around the outside of the filter to accommodate pressure-hold tests for filter integrity.

Following replacement of the MaxPure Filter cartridge, through the removable housing cap, the filter is surrounded by air, both inside and outside. During a fill, water enters through CK4 and fills around the outside of the filter. Air trapped outside the filter is vented to drain through the normally de-energized air-water solenoid valve (SOL8), and is vented to drain through drain check valve (CK8). Water passes through the MaxPure Filter and out the housing's standpipe to the unit's system plumbing.

During liquid chemical sterilant processing cycles, sterilant circulates through CK11 and filter then into the top port and out the standpipe port to liquid chemically sterilize the inside and outside of the filter and to remove any trapped air. Also, during circulation, a positive pressure is generated by the circulation pump (P1) and held in the filter housing by the inlet and drain check valves (CK4 and CK8, respectively).

At the end of every cycle and during DIAGNOSTICS, the membrane test of the MaxPure Filter is conducted to verify integrity of the membrane in the MaxPure Filter. SOL8 is energized to close the path to drain and to open the filter housing chamber, outside the MaxPure Filter to the air manifold. Housing pressure is allowed to stabilize, and then its decay is monitored by the pressure transducer (PT1).

The MaxPure Water Filter Test has three phases.

- Pressurization

During pressurization phase, three way air water solenoid valve (SOL8) is energized allowing the filter housing to fill with compressed air. Two check valves (CK4 and CK11) seat sealing air in the filter housing. The compressor is enabled until the filter housing pressure is greater than 55 psig monitored by the pressure transducer PT1. The pressurization of the housing is timed for three minutes and aborts if the pressure is not reached in the allotted time.

- Stabilization

The stabilization phase starts immediately after pressure is reached in the filter housing. A 3-minute timer is started and the air compressor is controlled to maintain filter housing pressure between 51.73 and 58.75 psig. This phase pushes any water out of the filter and housing. If the air compressor cannot maintain air pressure between this range, the test is aborted.

- Monitoring

At the beginning of the monitoring phase, solenoid 8 is closed, sealing off the housing of the MaxPure Filter, and the air compressor is turned off. After 15 seconds, the pressure is recorded and a 2-minute timer is started. At the end of the 2 minutes, the pressure is recorded and matched against the starting pressure. If the pressure drop is greater than 4.4 psig, the filter flows more than the allowed rate and the test is aborted.

### 3.3.3 Air Manifold Description

Air from air compressor (COMP1) enters air manifold at fitting.

*NOTE: Air compressor (COMP1) maintains 31 to 43 psi in the air system.*

SOL1 is de-energized when the compressor is turned off to vent the compressor output line to atmosphere. This prevents the compressor from starting while under load. SOL1 is also energized when the compressor is turned on. Air manifold check valve (CK5) prevents loss of system air pressure.

Compressor control switch (LS5) controls air compressor operation. It opens at  $40 \pm 3$  psi, turning the compressor off; and closes when pressure drops by  $5 \pm 1$  psi, turning the compressor on.

Inflatable seal is inflated through air manifold check valve (CK7) and air pressure regulator, which limits air pressure in seal to 40 psig until SOL2 is energized open, venting the seal to atmosphere.

LS2 prevents water flow related components from energizing until seal pressure reaches  $30 \pm 3$  psi, at which pressure the switch closes. Should the seal pressure drop below  $24.5 \pm 4.5$  psi during operation, LS2 opens, and the cycle ends (aborts). The drain sequence is initiated following an abort.

Air-water solenoid valve (SOL8) is used only during the membrane test for the MaxPure Filter.

Air pressure to operate the drain and circulation pinch valves is supplied through fittings. These pinch valves are operated by the circulation pinch valve and the drain pinch valve solenoid (SOL3 and SOL4).

The pinch valves are used for holding water in the unit and diverting water to drain.

A list of the components used in the unit is shown in **Table 3-1**.

## 3.4 PRINCIPLES OF OPERATION – LIQUID CHEMICAL STERILIZATION PROCESSING CYCLE DESCRIPTION

**Event 0** – This is an out-of-cycle condition with power supplied to the unit. All solenoid valves are OFF at this point.

**Event 1** – Cycle Start: The operator must press START button. Control checks lid switch (LS4) for a latched lid. If lid is latched, control progresses to **Event 2**.

If at any time during the cycle LS4 is detected open, an alarm occurs and the cycle aborts. (Alarm: "CHAMBER OPEN".)

A. The control begins monitoring TC1 and TC2, if either exceeds  $60^{\circ}\text{C}$ , the cycle aborts. The control monitors the temperature for the duration of the cycle.

B. The control checks the UV intensity when the cycle start button is pressed. If the intensity is less than 6.0 mA, the control does not start the cycle. Once the UV intensity is above the 6.0 mA setpoint, the control starts the cycle.

C. The control verifies the MaxPure Filter life and will not start the cycle if the filters has been in use for more than 90 days.

D. When HTR1 is on, if TC1 and TC2 reach  $>7$  degrees difference an abort is called. (ALARM: "HEATER PROBLEM".)

**Event 2 – Compressor Operation:** The control enables output to air compressor (COMP1) and SOL1, inflating the seal. LS5 controls COMP1 output pressure. Note that LS2 is activated by compressed air and allows electrical power to be supplied to various components. Control also prints header on cycle tape. While header is printing, control progresses to **Event 3**.

**Event 3 – Seal Inflation:** Control allows 10 seconds for seal inflation. After 10 seconds, control progresses to **Event 4**.

**Event 4 – HP Pump OFF Test:** H.P. pump monitor (pressure switch)(LS6) checked for open condition. Since the P2 H.P. Pump is not running at this point, LS6 should not be activated. This step verifies the switch has not failed in the closed condition. If LS6 is open, control energizes drain pinch valve solenoid (SOL4) and SOL5. Control progresses to **Event 5**. If, however, LS6 is sensed closed, an alarm occurs and the cycle aborts. (Alarm: "HP PUMP FAILURE: PUMP OFF".)

**Event 5 – Water Temperature Test:** SOL4 is energized to close V5. SOL5 is energized. Water flows through SOL5, past TC3, which monitors for water temperature greater than 43°C (110°F). Water temperature is monitored for a minimum of 20 seconds. Temperature monitoring continues until the minimum temperature requirement has been met, or 240 seconds have passed. SOL5 is de-energized once either of these conditions has been met. If 240 seconds pass and water temperature does not reach 43°C, an alarm occurs and the cycle aborts. (Alarm: "**TEMPERATURE UNDER 43 DEG**".)

Once the water temperature reaches 43°C, the control checks the UV intensity. If the intensity is greater than 15.0 mA, the cycle progresses to **Event 6**. If the intensity is less than 15.0 mA, the control continues to monitor water for up to 10 minutes. If intensity remains below 15.0 mA following monitoring time, the control aborts the cycle. (Alarm: "**UV INTENSITY TIMEOUT**".)

Intensity is monitored for the duration of the cycle. If intensity drops below 14.5 mA, the control aborts the cycle (Alarm: "**UV LAMP PROBLEM**".)

If, at any time during the entire cycle, a temperature >60°C (140°F) is measured, an alarm occurs and the cycle aborts. (Alarm: "**TEMPERATURE OVER 60 DEG**".)

**Event 6 – Fill:** SOL4 remains energized from **Event 5**. V5 remains closed while SOL7 is energized, allowing water to flow into the SYSTEM 1E Processor, past CK4 and the MaxPure Filter. Note that V6 is open at this point, allowing water to fill piping on both sides of the pinch valve.

**Event 7 – Chamber Full:** Chamber fills with water until float switch in the float block rises, causing LS3 to open. Note that air from the chamber is vented through the float block through check valves CK2 and CK3. An alarm occurs if a full chamber has not been sensed within five minutes. If this time limit elapses, the cycle aborts. (Alarm: "**FILL PROBLEM**".) A notice is printed if fill takes longer than four and one half minutes. Control proceeds to **Event 8**.

**Event 8 – Stabilize:** SOL7 de-energizes and control waits 10 seconds before proceeding to **Event 9**.

**Event 9 – Circulation Pump Prime:** SOL4 de-energizes for one second, opening V5. This removes any air that may be trapped in P1. SOL7 is energized for 6 seconds to purge trapped air. SOL7 is then de-energized. Control proceeds to **Event 10**.

**Event 10 – Water Circulation Prior to Heating:** SOL4 is energized, and P1 energizes, pumping water through unit. This purges air from the remainder of the piping. Control proceeds to **Event 11**.

**Event 11 – Heating:** HTR1 energizes, TC1 and TC2 monitor water temperature in chamber. Control proceeds to **Event 12** when 60 seconds have elapsed.

**Event 12 – Stabilize:** HTR1 and P1 de-energize. This allows any air still in the system to rise and travel to the float block. After six seconds, control proceeds to **Event 13**.

**Event 13 – Refill:** SOL7 energizes for six seconds, further removing any air in the system. Control proceeds to **Event 14**.

**Event 14 – Check for Full Condition:** LS3 is checked. If open (chamber full condition), control proceeds to **Event 15**. If closed (chamber not full), SOL7 energizes for up to eight seconds, then proceeds to **Event 15**.

**Event 15 – P1/P2 Pump Operation:** P2 is energized and HTR1 energizes. After a five-second delay, LS6 is checked for a closed condition. This step verifies if the HP Pump is working. Control proceeds to **Event 16**. If LS6 is not sensed closed, an alarm occurs and the cycle aborts (Alarm: "**HP PUMP FAILURE: PUMP ON**".)

**Event 16 – Final Heat:** P1 is energized, TC1 and TC2 monitors water temperature after five seconds. Control proceeds to **Event 17** when TC1 and TC2 > 46°C. If seven minutes elapses without reaching temperature, the abort is called (Alarm: "**HEAT PROBLEM**".)

**Event 17 – Exposure Phase:** Control enters exposure phase and starts a six-minute timer. HTR1 cycles on/off to maintain TC1 between 53 and 55°C. HTR1 is energized if TC1 < 53°C and HTR1 is de-energized if TC2 > 55°C.

The chamber fluid temperature is monitored during the six-minute exposure. If temperature drops below 45.5°C at any time during exposure, an alarm occurs and the cycle aborts. (Alarm: "**TEMPERATURE UNDER 45.5 DEG**".)

The concentration monitor circuit is checked during the six-minute exposure. If a reading of <175 counts is measured, an alarm occurs and the cycle aborts. (Alarm: "**CONCENTRATION LOW**".)

The chamber fluid level circuit is checked during the six-minute exposure. If LS3 senses a not-full condition, an alarm occurs and the cycle aborts. (Alarm: "**CHAMBER LEVEL LOW**".)

Control proceeds to **Event 18** after six minutes.

**Event 18 – Drain:** HTR1 de-energizes, and SOL4 de-energizes, opening V5. P1 de-energizes and P2 de-energizes after a one-second delay. SOL4 energizes, closing V5. P1 and P2 are energized for 10 seconds. SOL4 is de-energized opening V5. SOL3 is

energized closing V6. P2 is de-energized and units drains. After 40 seconds control proceeds to **Event 19**.

**Event 19 – Rinse Fill:** P1 de-energizes and SOL3 de-energizes, opening V6. SOL4 energizes, closing V5 and SOL7 water fill valve energizes, filling chamber with water for rinse. After five seconds, control proceeds to **Event 20**.

**Event 20 – Rinse Fill Continue:** SOL3 energizes, closing V6. Chamber continues filling. Control proceeds to **Event 21** when LS3 opens, sensing a full chamber condition.

**Event 21 – P1 Circulation Pump Prime:** SOL3 de-energizes, opening V6, and SOL7 de-energizes. If fill time exceeds five minutes, an abort is called (Alarm: "FILL PROBLEM"). Control proceeds to **Event 22**.

**Event 22 – Rinse:** SOL4 de-energizes, opening V5 after one second. SOL4 energizes, closing V5, and P1 and P2 energize. Control proceeds to **Event 23** after 10 seconds.

**Event 23 – Rinse Drain:** SOL3 energizes, closing V6, SOL4 de-energizes, opening V5, P1 remains energized and P2 de-energizes. Unit drains for a fixed 40 seconds.

The control performs a total of two rinses, repeating **Events 19 to 23** for a total of two times. During the final drain, after the second rinse, the control checks the LS6 for an open condition. If not sensed open, an alarm occurs and the cycle aborts. (Alarm: "HP PUMP FAILURE: PUMP OFF".) At successful completion of the test, the control continues with **Event 24**.

**Event 24 – Air Purge:** P1 is de-energized, P2 remains energized, SOL4 is energized closing V5. After 60 seconds P2, SOL3 and SOL4 are de-energized, cycle continues to **Event 25**.

**Event 25 – Test # 12:** MaxPure™ Filter test. The control energizes SOL8 and controls COMP1 by PT1. If 55 psi is not reached within a three-minute time period, the first part of this test fails, an alarm occurs (Alarm: "MAXPURE FILTER MEMBRANE TEST FAILED"), and the cycle aborts.

If pressure is achieved within three minutes, the test enters a three-minute stabilization phase where COMP1 is energized and de-energized to maintain 55 psi for three minutes. After three minutes, the control measures PT1. If <52.83 psi, the test fails, an alarm occurs (Alarm: "MAXPURE FILTER MEMBRANE TEST FAILED"), and the cycle aborts.

If the pressure is >52.83 psi, then COMP1 is de-energized while SOL3 and SOL4 are energized. The control waits 15 seconds and reads PT1. If pressure is

<51.73 or >58.75 an alarm occurs (Alarm: "MAXPURE FILTER MEMBRANE TEST FAILED"). PT1 is monitored for two minutes, during which time if the pressure drop exceeds 4.4 psig, the test fails, an alarm occurs (Alarm: "MAXPURE FILTER MEMBRANE TEST FAILED"), and the cycle aborts. In the event of a failure, the printout indicates three values: the pressure level achieved, the pressure when the test failed, and the time (in seconds) to failure. Otherwise, cycle continues to **Event 26**.

**Event 26 – Cycle Complete:** SOL8, SOL3, and SOL4 de-energize. After 10 seconds PT1 is checked. If PT1 is <3.51 psi or >11.7 psi, an abort is called (Alarm: "DRAIN CHECK FAULT"). Exposure time is also checked: If <six minutes, an abort is called (Alarm: "EXPOSURE TIME FAILURE"). Printer prints cycle summary, audible end-of-cycle tone sounds, and complete is indicated. Control proceeds to **Event 27** after operator presses CANCEL button.

**Event 27 – Seal Deflate:** COMP1 de-energizes and SOL2 energizes. Seal deflates and chamber open time is printed on cycle tape. Control proceeds to **Event 28** when printer stops printing.

**Event 28 – Return to Ready:** SOL2 de-energizes after 15 seconds and enters a READY state.

Other alarm monitoring conditions:

1. Power Failure – anytime during a cycle where loss of power is sensed, an alarm occurs and the cycle aborts. (Alarm: "POWER FAILURE".)
2. Temperature Problem – anytime a temperature sensor on the control board senses an out-of-range condition, an alarm occurs and the cycle aborts. (Alarm: "TEMP. PROBLEM".)

### 3.5 PRINCIPLES OF OPERATION – DIAGNOSTIC CYCLE DESCRIPTION

The Diagnostic Cycle is a test cycle used to check the operation performance of the SYSTEM 1E Liquid Chemical Sterilant Processing System. Refer to the Diagnostic Cycle Graph when reviewing the following description. Note that the Events listed coincide with event number on the cycle graph.

**Event 1 – DIAGNOSTIC** button is pressed. If LS4 is closed, cycle continues to **Event 2**; if door switch is not closed, cycle will not start.

The control verifies the MaxPure Filter life and will not start the cycle if the filters has been in use for more than 90 days.

If UV intensity is <6.0 mA, display reads "WAIT FOR UV LAMP". If at any time during test intensity drops

below 14.5 mA, an abort is called (Alarm: "UV LAMP BELOW 14.5 mA").

**Event 2** – Printer starts to print header, COMP1 and SOL1 are energized.

**Event 3 – Test #1, A/D Converter Test:** If power supplied to control is within limits, cycle continues to **Event 4**. If test fails, an alarm occurs and cycle aborts (Alarm: "A/D CONVERTER FAULT").

**Event 4 – Test #2, Inlet Water Temperature Test:** Control energizes SOL4, closing V5 and SOL5, diverting incoming water past TC3 directly to drain. This test runs for a minimum of 20 seconds and up to a maximum of 240 seconds. If temperature exceeds 43°C, cycle progresses to **Test #3**. If temperature measured is <43°C, the test fails and an alarm occurs (Alarm: "INLET TEMP. <43 DEG") and cycle aborts. The printout indicates the water temperature in the event of a failure.

**Test #3, UV Intensity Test:** Once the water temperature reaches 43°C, the control checks the UV intensity. If the intensity is greater than 15.0 mA, the cycle progresses to **Event 5**. If the intensity is less the 15.0 mA, the control continues to monitor water for up to 10 minutes. If intensity remains below 15.0 mA following monitoring time, the control aborts the cycle. (Alarm: "UV INTENSITY TIMEOUT").

Intensity is monitored for the duration of the cycle. If intensity drops below 14.5 mA the control aborts the cycle (Alarm: "UV LAMP BELOW 14.5 mA").

**Event 5 – Test #4, Fill Time Test:** SOL4 remains energized, keeping V5 closed. SOL5 is de-energized while SOL7 is energized, thus allowing water to fill the chamber. During the first 20 seconds of fill, PT1 is monitored; the water pressure is stored as the FP (Fill Pressure) variable.

The chamber continues to fill until LS3 reads open or until 300 seconds has elapsed. SOL7 is then de-energized. If the fill time exceeds 300 seconds, the test fails, an alarm occurs (Alarm: "FILL TIME > 5 MIN.") and the cycle aborts. If the test passes, the cycle continues to **Event 6**.

**Event 6 – Test #5, Pressure Transducer Test:** SOL4 is de-energized for one second, then re-energized. P1 energized (turned ON) for four seconds, then de-energized (turned OFF). For 25 seconds, chamber pressure is allowed to stabilize. PT1 is then monitored for 60 seconds. The average value is stored as the FZ (Fill Zero) variable. Note that the pressure should be greater than 0 since the PT1 is reading the head pressure due to the water level in the unit.

After the 60 seconds has elapsed, the software looks at the FZ and FP values. If FP <5.85 psi or FZ > 1.95

psi, the test fails and an alarm occurs (Alarm: "PRESSURE XDUCER FAULT"), and the cycle aborts. The printout indicates the pressure transducer reading in psi in the event of a failure. If test passes, the cycle continues to **Event 7**.

**Event 7 – Test #6, Circulation Pressure Test:** The control energizes P1. After 30 seconds, the P1 pump continues to run and the control monitors the pressure transducer for a full 60 seconds. The values measured are averaged and stored as CP (Circulation Pressure).

The control makes a calculation using variables CP and FZ, such that,  $CP < FZ + 1.073$  psi, the test fails and an alarm occurs (Alarm: "CIRCULATION PRES. LOW") and the cycle aborts. The printout indicates the value for CP in the event of a failure. If test passes, cycle continues to **Event 8**.

**Event 8 – Test #7, Thermocouple Test:** The temperatures read by TC1 and TC2 are compared. If within 3°C of each other, cycle continues to **Event 9**; if >3° C, test fails, and an alarm occurs (Alarm: "THERMOCOUPLE FAILED") and the cycle aborts.

The printout indicates the values for TC1 and TC2 in the event of a failure.

**Event 9 – Test #8, Circulation Valve Test:** The control energizes SOL3, closing V6. If the pinch valve is working properly, the pressure transducer no longer sees pressure from the circulation pump.

The control waits 10 seconds, then monitors and averages the pressure transducer PT1 for 20 seconds and stored value CZ (Circulation Zero). The values for CZ and CP are compared. If the difference is >0.975 psi, cycle continues to **Event 10**. If the differences are less than values specified, an alarm occurs (Alarm: "CIRC. VALVE FAULT"), and the cycle aborts. The printout indicates the measured difference in the event of a failure.

**Event 10 – Test #9, Heat Rate Test:** The control de-energizes SOL3, opening the V6 and allows five seconds for chamber fluid to stabilize. LS3 is checked for a chamber full condition. If not full, P1 de-energizes and SOL7 energizes until LS3 senses a chamber condition.

Once full, the control energizes P1 and HTR1, and de-energizes SOL7. After, TC1 is read and the value stored in memory. After heating for 60 seconds more, TC1 is read. If temperature has increased by 1°C, cycle continues to **Event 11**. Otherwise, the control heats for up to 120 seconds more, measuring the temperature increase after 60 seconds and then after 120 seconds. If temperature increases by 1°C per minute, the cycle continues with **Event 11**; otherwise, the test fails and an alarm occurs (Alarm: "HEAT

RATE LOW"), and the cycle aborts. The printout indicates the temperature rate measured in the event of a failure.

**Event 11 – Test #10, Drain Valve Test:** HTR1 de-energizes and LS3 is checked. If a not-full condition is found, then fluid has leaked out of fluid block or chamber, and the test fails and an alarm occurs (Alarm: "DRAIN VALVE FAULT"), and the cycle aborts. Otherwise, cycle continues to **Event 12**.

**Event 12 – Test #11, Drain Time Test:** The control de-energizes SOL4, opening V5 and energizes SOL3, closing V6. P1 remains on and unit starts to drain. The control monitors the time required for LS3 to sense a not-full condition. If the time it takes LS3 to sense not-full is greater than five seconds, the test fails, an alarm occurs (Alarm: "DRAIN TIME FAULT"), and the cycle aborts. Otherwise, cycle continues to **Event 13**.

**Event 13 – Test #15, HP Pump Test:** During the beginning of the drain phase, the control monitors LS6 for open (no pressure) condition. If LS6 is not sensed open within 10 seconds, the test fails and an alarm occurs (Alarm: "HP PUMP FAULT: CLOSED") and the cycle aborts. Otherwise the control energizes SOL4, closing V5, and energizes P2. The control waits five seconds and then reads LS6 for 20 seconds. If the switch closes (senses pressure) in allotted time, the control de-energizes SOL4, opening the V5 and the drain continues for the remaining 40-second time period. Cycle continues to **Event 14**. If the test fails, an alarm occurs (Alarm: "HP PUMP FAULT: OPEN") and the cycle aborts.

**Event 14 – Test #12, Concentration Monitor Test:**

Units take a reading of the concentration monitor during the heat rate test. The highest reading is stored in memory. At the end of the drain phase, SOL3 and P1 de-energize; however, P2 remains energized for five additional seconds. During the drain phase a second concentration reading is taken. The difference between the two readings must be >3 counts. If <3 counts, the test fails and an alarm occurs (Alarm: "CONC. MONITOR FAILED") and the cycle aborts. Otherwise, the cycle continues to **Event 15**.

**Event 15 – Test # 13, MaxPure Filter Test:** The control energizes SOL8 and controls COMP1 by PT1. If 55 psi is not reached within a three-minute time period, the first part of this test fails, an alarm occurs (Alarm: "MAXPURE FILTER MEMBRANE TEST FAILED"), and the cycle aborts.

If pressure is achieved within three minutes, the test enters a three-minute stabilization phase where COMP1 is energized and de-energized to maintain 55 psi for three minutes. After three minutes, the

control measures PT1. If <52.83 psi, the test fails, an alarm occurs (Alarm: "MAXPURE FILTER MEMBRANE TEST FAILED"), and the cycle aborts.

If the pressure is >52.83 psi, then COMP1 is de-energized while SOL3 and SOL4 are energized. The control waits 15 seconds and reads PT1. If pressure is <51.73 or >58.75 psi, an alarm occurs (Alarm: "MAXPURE FILTER MEMBRANE TEST FAILED"). PT1 is monitored for two minutes, during which time if the pressure drop exceeds 4.4 psig, the test fails, an alarm occurs (Alarm: "MAXPURE FILTER MEMBRANE TEST FAILED"), and the cycle aborts. In the event of a failure, the printout indicates three values: the pressure level achieved, the pressure when the test failed, and the time (in seconds) to failure. Otherwise, cycle continues to **Event 16**.

**Event 16 – Test #14, Drain Check Test:** SOL8 is de-energized, venting the pressure from the housing of the MaxPure Filter through CK8. After 10 seconds, PT1 is read. If pressure is <3.51 psi or >11.7 psi, the test fails, an alarm occurs (Alarm: "DRAIN CHECK FAULT"), and the cycle aborts. Otherwise, cycle continues to **Event 17**.

**Event 17 – Seal deflates when SOL2 energizes and cycle is complete.**

## 3.6 CONTROL

### 3.6.1 Control Assembly

The SYSTEM 1E Processor control features a microcomputer control system. The control includes an ink-on-paper impact printer and a 2-line x 16-character display, to provide visual indications to the user.

### 3.6.2 Control Board

The control board has two flash chips: U5 and U22. RAM is backed up by a replaceable battery.

There are 10 low-current drivers, in sockets, on the board, U38 through U45, U59 and U60, that provide voltage to solenoids and solid-state relays. Each of these outputs is protected by a replaceable fuse.

Components protected by the fuses are as follows:

Fuse	Output	Component	Device Designation
F1	AC0	Take Up Paper	U38
F2	AC1	S8	U39
F3	AC2	S5	U40

Fuse	Output	Component	Device Designation
F4	AC3	S3	U41
F5	AC4	S4	U42
F5	AC5	S7	U43
F7	AC6	S2	U44
F8	AC7	Circulation Pump	U45
F9	AC8	(Spare)	U59
F10	AC9	(Spare)	U60

The outputs to the solid-state relays for S1, compressor, high-pressure pump, and heater are not protected by fuses.

### 3.6.3 Interface Box Assembly

This interface box has an interface board which is used as a termination point for the input/output unit cables. Cables run from the interface board to the control assembly.

The interface box also includes a line filter and a power supply.

### 3.6.4 Pressure Transducer

The PT1 transducer is a 0-100 psi range unit, with an output of 0-100 mV. At 0 psi, the output is 0 mV. The excitation voltage is 10V dc.

### 3.6.5 Electrical Description

Refer to machine schematic 10020568.

Incoming power is connected to the CB-1 circuit breaker. The CB-1 feeds the control transformer, interface box line filter, and solid-state relays for the appropriate 115V ac devices. The control transformer provides 24V ac power. The interface box line filter feeds the power supply, which provides +5, +15, -15 and +12 V dc to the control.

## 3.7 HIGH-PRESSURE PUMP TEST ROUTINE

### 3.7.1 General

The purpose of the HP pump test routine is to check the function of the HP pump by monitoring the pressure output of the pump. The control monitors the LS6 switch for this purpose. LS6 setting is 1.75 psi. When operating properly, the LS6 switch would be closed when the pump is ON and be open when the pump is OFF.

The control monitors the LS6 switch by reading voltages across the switch. A high reading (5V dc) is interpreted as switch OPEN, which should be the case with the HP pump OFF. A low reading (0 VDC) is interpreted as switch CLOSED, which indicates the switch is reading a pressure greater than the switch set-point of 1.75 psi.

The HP pump is checked for proper operation in both the Liquid Chemical Sterilant Processing Cycle and the Diagnostic Cycle.

In the liquid chemical sterilant processing cycle, the HP pump is checked at three points in the cycle. The first check is just after the seal is inflated. The control checks LS6, and since the HP pump is OFF at this point, the switch should be open. The second check takes place at the Warm/Mix phase. Since the HP pump has been running at this point, LS6 should be closed. The third check takes place at the beginning of the second Rinse drain phase. The HP pump is turned OFF briefly and the LS6 switch should open at that point.

In the Diagnostic Cycle, the HP pump is checked at one point in the cycle. At the beginning of the drain phase, the HP pump is turned OFF and the control checks LS6 for an open condition. If the test passes, the HP pump is turned ON and the control checks the LS6 for a closed condition.

### 3.7.2 Diagnostic HP Pump Test

The control looks at LS6 switch at the end-of-drain test time phase, the criteria is that LS6 must be continuously open for a two-second period during a HP pump OFF test, and must be continuously closed for a two-second period during a HP pump ON test. Total time allowed by the control to see a pass/fail condition is 10 seconds for the pump OFF test and 30 seconds for the pump ON test.



# Section 4: Inspection and Maintenance

## 4.1 General

Maintenance procedures described in this section should be performed at regular intervals, as indicated. The frequency indicated is the minimum, and should be increased if usage of the unit demands. Should a problem occur, refer to SECTION 5, TROUBLESHOOTING.

## 4.2 Daily Maintenance of SYSTEM 1E™ Liquid Chemical Sterilant Processing System

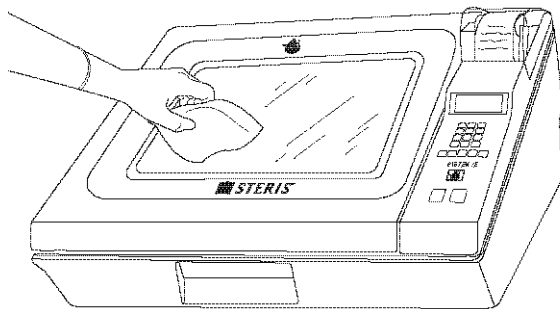


**WARNING – PERSONAL INJURY AND/OR EQUIPMENT DAMAGE HAZARD:**

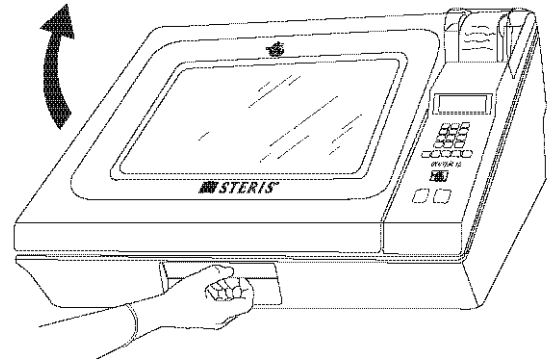
**Disconnect all utilities to SYSTEM 1E Liquid Chemical Sterilant Processing System before servicing. Do not service the SYSTEM 1E Liquid Chemical Sterilant Processing System unless all utilities have been properly locked out. Always follow OSHA Lockout-Tagout and electrical safety-related work practice standards.**

1. Clean external surfaces (Figure 4-1).

Wipe SYSTEM 1E Processor with a soft cloth dampened with 70% isopropyl alcohol.



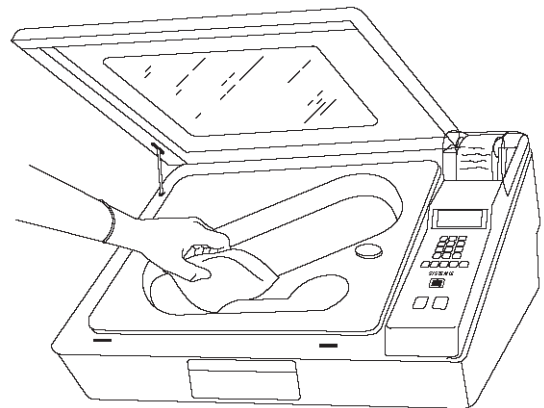
**Figure 4-1. Clean SYSTEM 1E Processor External Surfaces**



**Figure 4-2. Open Lid**

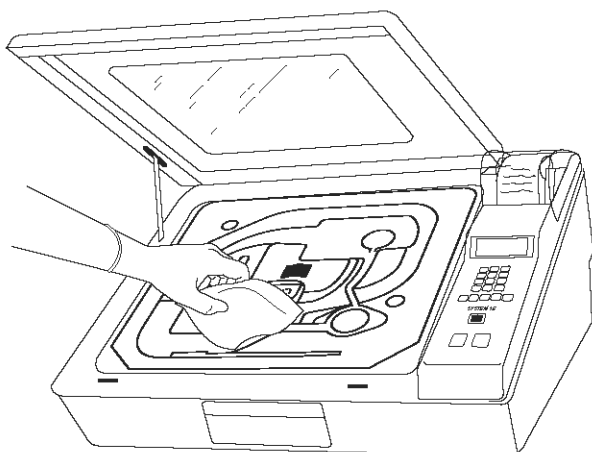
2. Open lid (Figure 4-2).
3. Clean Tray for Processing (Figure 4-3).

**Tray/container for Processing:** Wipe inner surface and seal, tray / container for processing, and accessory rack with a soft cloth dampened with 70% isopropyl alcohol.



**Figure 4-3. Clean Tray for Processing**

**Flexible Tray for Processing:** Wipe inner surface and seal, tray for processing, and accessory rack with a soft cloth dampened with 70% isopropyl alcohol (Figure 4-4).



**Figure 4-4. Clean Flexible Tray**

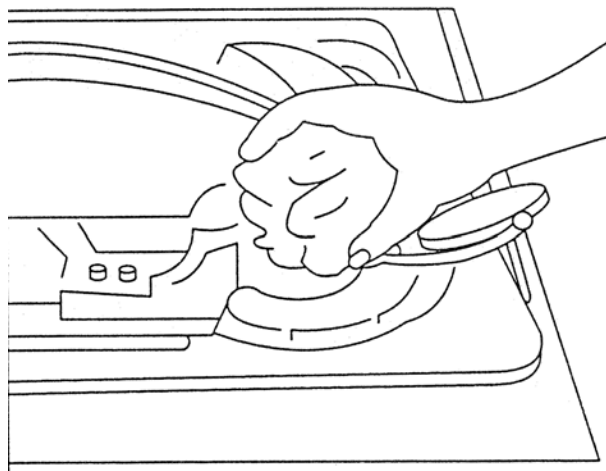
4. Wipe aspirator assembly and liquid chemical sterilant compartment with a soft cloth dampened with 70% isopropyl alcohol (Figure 4-5).
5. Check aspirator assembly. Verify probe lumen is clear. Inspect aspirator for cracks or chips. Verify hose connections are secure.

**Important:** If any damage is visible on the aspirator assembly, replace it immediately.



**WARNING – LIQUID CHEMICAL STERILANT VERIFICATION HAZARD:**

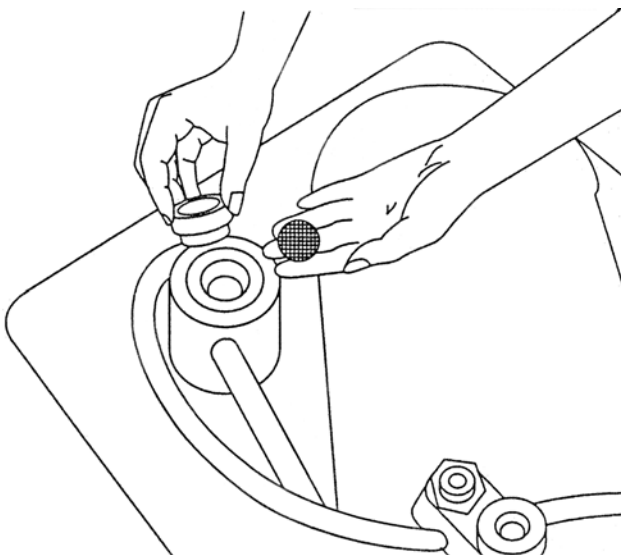
**Use of a blocked or damaged aspirator may result in ineffective liquid chemical sterilization.**



**Figure 4-5. Clean Flexible Tray**

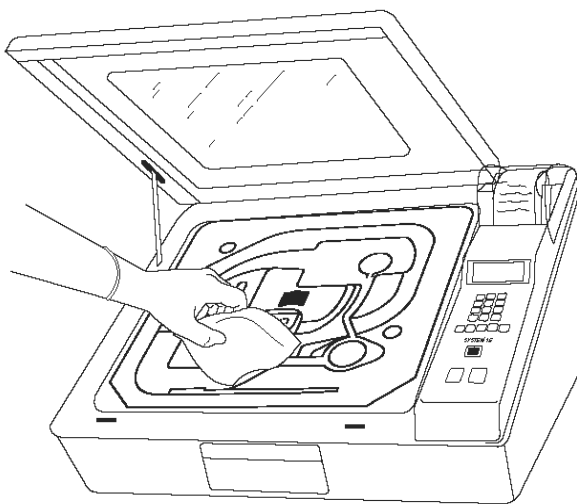
6. Check Drain Screen (Figure 4-6)

- a. Drain screen is located in the bottom of sterilant compartment.
- b. Verify screen is clean. Remove any debris or lint from screen. (A straight hemostat or smooth pickups helps.)
- c. Screen may be removed for thorough cleaning by lifting processing tray and unscrewing drogue. Replace screen after cleaning.



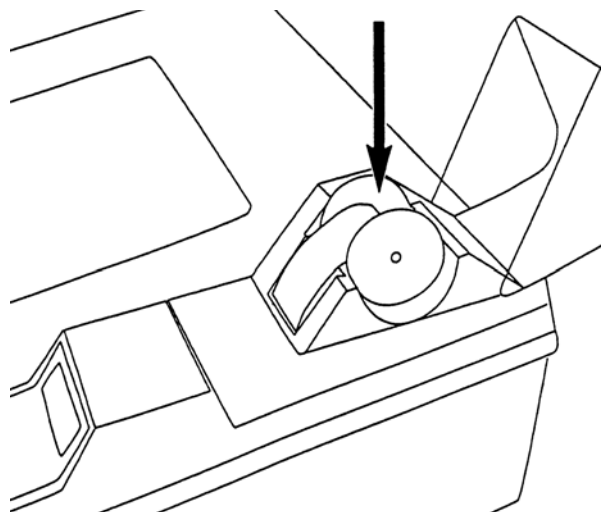
**Figure 4-6. Check Drain Screen**

7. Remove processing tray from drip pan.
8. Clean drip pan (see Figure 4-7).
  - Clean drip pan using a soft cloth dampened with 70% isopropyl alcohol.



**Figure 4-7. Clean Drip Pan**

9. Replace processing tray.
  - Replace processing tray in chamber. Place processing container and/or accessory rack on processing tray (if applicable).
10. Check printer paper (Figure 4-8).
  - Open printer paper access cover and check printer paper supply. Replace printer paper roll, if necessary.
11. Check printer ribbon.
  - Check print quality from previous day's printouts. Replace ribbon as needed. (Refer to *SECTION 7, COMPONENT REPAIR AND REPLACEMENT.*)
12. Review Printouts.
  - Check printouts for any indication of cycle faults or excessive fill times. Contact a service representative for repairs, when necessary. Refer to *SECTION 7, COMPONENT REPAIR AND REPLACEMENT* for filter check valves change procedures.



**Figure 4-8. Check Printer Paper Supply and Ribbon, Verify Print Quality**

### 4.3 Preventive Maintenance Schedule

Follow the schedule below to properly maintain this equipment. Frequency of inspections will depend on the usage of the unit. Recommended minimums are listed below. Where "Each" is indicated below, the step is to be performed at each inspection.

**Table 4-1. Preventive Maintenance Schedule**

Service Required	Frequency
<b>1.0 Preparation</b>	
1.1 Discuss operation with equipment operators and check printouts	Each
1.2 Follow lock-out/tag-out procedures	Each
<b>2.0 Filters</b>	
2.1 Replace sterile air filter	2x/year
2.2 Replace MaxPure™ Filter	Every 90 days
2.3 Verify pre-filters for proper performance	Each
<b>3.0 Valves</b>	
3.1 Replace CK1, CK2, CK3, CK11	3 year
3.2 Rebuild CK8	1x/year
3.3 Replace pinch valve sleeves	Every 2000 Cycles
3.4 Verify performance of CK1, CK2, CK3, CK4, CK5, CK6, CK7, CK8, CK10 and CK11	Each
3.5 Verify performance of SOL1, SOL2, SOL3, SOL4, SOL5, SOL7 and SOL8	Each

**Table 4-1. Preventive Maintenance Schedule**

<b>Service Required</b>	<b>Frequency</b>
<b>4.0 Miscellaneous Components</b>	
4.1 Check lid gas spring	Each
4.2 Check lid seal for damage	Each
4.3 Check inflatable seal for leaks	Each
4.4 Inspect drip pan for cracks	Each
4.5 Check entire unit for evidence of fluid leaks	Each
4.6 Check all hose clamps and air line fittings	1x/year
4.7 Inspect lid latch gap	Each
4.8 Inspect lid assembly (seal and header block)	Each
4.9 Inspect all trays and aspirators for damage	Each
<b>5.0 Component Tests</b>	
5.1 Verify output of air compressor	1x/year
5.2 Verify output of high pressure pump	1x/year
5.3 Perform LS6 switch test	Each
<b>6.0 Control</b>	
6.1 Verify proper operation of printer	Each
6.2 Verify all touch pads function properly	Each
6.3 Verify date and time are correct	Each
6.4 Verify operation of battery-backed RAM	Each
6.5 Verify proper operation of buzzer	Each
6.6 Check calibration of pressure transducer	1x/year
6.7 Verify operation of thermocouples	1x/year
<b>7.0 UV Lamp Assembly</b>	
7.1 Replace UV Monitor with a recalibrated monitor	1x/year
7.2 Replace UV Lamp	1 x/year
7.3 Clean quartz sleeve	1 x/year
7.4 Replace quartz sleeve	1x every 2 years
<b>8.0 Final Checkout and Test</b>	
8.1 Clean dirt and lint from control components	Each
8.2 Reinstall any panels removed	Each
8.3 Verify unit has proper labels	Each
8.4 Run Diagnostic Cycle	Each
8.5 Run Liquid Chemical Sterilant Processing Cycle	Each

# Section 5: Troubleshooting

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*NOTE: For additional troubleshooting reference:*

- *Use the SYSTEM 1E Liquid Sterilant Processing System service electrical schematic (P762650-985, located in the REFERENCE DRAWINGS section) for **system** pin and pin-out references.*
- ***Specific** cable and wire harness pin outs are illustrated in SECTION 5.5, CABLE/HARNESS PIN OUTS, ON PAGE 5-18 and are referenced in troubleshooting steps where applicable.*

<b>5.1 LIQUID CHEMICAL STERILIZATION CYCLE FAULTS</b>	
<p><b>5.1.1 Wait For UV</b></p> <p><b>Description</b> - UV intensity is below 6.0 mA.</p>	<p><b>Action:</b></p> <ol style="list-style-type: none"> <li>1. UV system unplugged – plug into receptacle.</li> <li>2. Fouled (dirty) quartz sleeve – clean.</li> <li>3. UV monitor harness not connected – plug into connector on rear of processor.</li> <li>4. Faulty UV monitor – replace.</li> <li>5. Faulty UV lamp – replace.</li> <li>6. Ballast circuit breaker tripped – reset.</li> <li>7. Faulty UV lamp ballast – replace.</li> </ol>
<p><b>5.1.2 Temperature Under 43°C</b></p> <p><b>Description</b> - SYSTEM 1E™ Processor senses incoming water temperature less than 43°C after four minutes of water purge.</p>	<p><b>Action:</b></p> <ol style="list-style-type: none"> <li>1. Check water supply is on.</li> <li>2. Check water temperature is within specifications.</li> <li>3. Check water filters are not clogged, replace.</li> <li>4. Faulty SOL 5 valve, replace. (Refer to Figure 5-5.)</li> <li>5. Faulty TC3, repair.</li> </ol>
<p><b>5.1.3 UV Intensity Timeout</b></p> <p><b>Description:</b> SYSTEM 1E Processor senses UV intensity signal is below 15.0 mA after 10 minutes.</p>	<p><b>Action:</b></p> <ol style="list-style-type: none"> <li>1. UV system unplugged – plug into receptacle.</li> <li>2. Fouled (dirty) quartz sleeve – clean.</li> <li>3. UV monitor harness not connected – plug into connector on rear of processor.</li> <li>4. Faulty UV monitor – replace.</li> <li>5. Faulty UV lamp – replace.</li> <li>6. Ballast circuit breaker tripped – reset.</li> <li>7. Faulty UV lamp ballast – replace.</li> </ol>

## 5.1 LIQUID CHEMICAL STERILIZATION CYCLE FAULTS (CONTINUED)

### 5.1.4 Fill Problem

**Description** – SYSTEM 1E Processor senses a full condition in less than 54 seconds or takes longer than five minutes to completely fill.

**Action:**

*If less than 54 seconds to fill:*

1. Check valves 2 and 3 failed open – replace.
2. Check LS3. (Refer to Figure 5-3.)
3. Check that A, B, and MaxPure™ Filters are in place.

*If more than five minutes to fill:*

1. Check that water supply is ON.
2. Check that water pressure supplied is within specification.
3. Check that strainer in pressure regulator is clear.
4. MaxPure Filter may be clogged – replace.
5. If MaxPure Filter replacement does not correct problem – replace A prefilter, then B prefilter if problem persists.
6. Drain hose may be restricted – repair.
7. Faulty CK4/inlet screen – clean or replace.
8. Faulty SOL7 solenoid valve – replace. (Refer to Figure 5-5.)
9. CK2 and CK3 may be stuck closed – replace.
10. Faulty LS3 – replace. (Refer to Figure 5-3.)
11. Low air pressure – check compressor.
12. Faulty LS5 – replace. (Refer to Figure 5-3.)
13. Faulty LS2 – replace.
14. Faulty SOL5 – replace. (Refer to Figure 5-5.)

### 5.1.5 Heat Problem

**Description** – SYSTEM 1E Processor takes longer than the allotted time to heat the fluid to 46°C. (The allotted time is determined by inlet water temperature.)

**Action:**

1. Faulty HTR1 (resistance should be between 10 - 12 Ohms) – replace. (Refer to Figure 5-5.)
2. Heater thermal overload tripped – reset.
3. Faulty SSR1 – replace. (Refer to Figure 5-5.)
4. Faulty LS2 – replace.
5. Faulty control board – replace.

### 5.1.6 Temperature Under 45.5°C

**Description** – SYSTEM 1E Processor detects fluid temperature of < 45.5°C during the exposure phase.

**Action:**

1. Faulty HTR1 – replace. (Refer to Figure 5-5.)
2. LS1 tripped – reset.
3. Faulty SSR1 – replace. (Refer to Figure 5-5.)
4. Faulty LS2 – replace.
5. Faulty control board – replace.



## 5.1 LIQUID CHEMICAL STERILIZATION CYCLE FAULTS (CONTINUED)

<p><b>5.1.7 Concentration Low</b></p> <p><b>Description</b> – Control measures less than 175 counts during exposure.</p>	<p><b>Action:</b></p> <ol style="list-style-type: none"> <li>1. No S40™ Sterilant Concentrate – run cycle again with S40 Sterilant Concentrate.</li> <li>2. Sterilant builders/buffers hardened – run cycle again with fresh S40 Sterilant Concentrate.</li> <li>3. Scale build-up on CP1 and CP2 – clean.</li> <li>4. Faulty CP1 and CP2 connection – repair.</li> <li>5. Out of calibration – recalibrate.</li> <li>6. Faulty control board – replace.</li> <li>7. Faulty interface board – replace.</li> </ol>
<p><b>5.1.8 Chamber Level Low</b></p> <p><b>Description</b> – SYSTEM 1E Processor senses a not-full condition during exposure.</p>	<p><b>Action:</b></p> <ol style="list-style-type: none"> <li>1. Leaking V5 – replace pinch valve sleeve.</li> <li>2. Faulty SOL4 – repair. (Refer to Figure 5-5.)</li> <li>3. Faulty LS3 – replace. (Refer to Figure 5-3.)</li> <li>4. Leaking tray – replace.</li> <li>5. CK2 or CK3 leaking – replace.</li> <li>6. Faulty CK8 – rebuild or replace.</li> <li>7. Leaking lid – replace.</li> <li>8. Plumbing leak – repair.</li> </ol>
<p><b>5.1.9 Heater Problem</b></p> <p><b>Description</b> – Control senses temperature difference of more than 7°C between TC1 and TC2.</p>	<p><b>Action:</b></p> <ol style="list-style-type: none"> <li>1. Clean tray drain strainer.</li> <li>2. Faulty P1 – replace. (Refer to Figure 5-5.)</li> <li>3. Faulty SSR4 – replace. (Refer to Figure 5-5.)</li> <li>4. Faulty TC1 or TC2 – repair or replace. (Refer to Figure 5-2.)</li> <li>5. TC1 or TC2 out of calibration – recalibrate.</li> <li>6. Faulty interface board – replace.</li> <li>7. Faulty control board – replace.</li> <li>8. Processor may have been too cold if first cycle of the day – run cycle again.</li> </ol>
<p><b>5.1.10 Chamber Open</b></p> <p><b>Description</b> – Control senses lid is open during cycle.</p>	<p><b>Action (If lid remains closed, but alarm occurs):</b></p> <ol style="list-style-type: none"> <li>1. Faulty LS4 – replace.</li> <li>2. Loose connection at LS4 – repair. (Refer to Figure 5-3.)</li> <li>3. Incorrect adjustment of latch flag assembly – readjust.</li> </ol> <p><b>Action (If lid physically opens during cycle):</b></p> <ol style="list-style-type: none"> <li>1. Incorrect latch bar adjustment.</li> <li>2. Chamber seal leaks – replace.</li> </ol>

<b>5.1 LIQUID CHEMICAL STERILIZATION CYCLE FAULTS (CONTINUED)</b>	
<p><b>5.1.11 Temperature Over 60°C</b></p> <p><b>Description</b> – Control senses temperature over 60°C anytime during cycle.</p>	<p><b>Action:</b></p> <ol style="list-style-type: none"> <li>1. If during fill phase (including rinse fills) – facility water supplied too hot, reduce temperature.</li> <li>2. If after fill phase, faulty HTR or SSR1 – replace. (Refer to Figure 5-5.)</li> <li>3. Defective control board – replace.</li> </ol>
<p><b>5.1.12 UV Lamp Problem</b></p> <p><b>Description</b> - SYSTEM 1E Processor detects a UV intensity of less than 14.5mA.</p>	<p><b>Action:</b></p> <ol style="list-style-type: none"> <li>1. Fouled (dirty) quartz sleeve – clean.</li> <li>2. UV monitor harness not connected – plug into connector on rear of processor.</li> <li>3. Faulty UV monitor – replace.</li> <li>4. Faulty UV lamp – replace.</li> <li>5. Ballast circuit breaker tripped – reset.</li> <li>6. Faulty UV lamp ballast – replace.</li> </ol>
<p><b>5.1.13 MaxPure™ Filter Test Failed (a. without and b. with numbers)</b></p> <p><b>Description</b> – a. (without numbers) The housing of the MaxPure Filter is pressurized. The pressure must reach &gt;55 psi in three minutes or the alarm occurs. If this portion passes, the housing pressure is maintained for three minutes. After this three-minute stabilization period, the pressure must be &gt;52.83 psi or the alarm occurs. If this portion passes the control waits 15 seconds and checks the housing of the MaxPure Filter pressure again. The pressure must be &gt;51.73 psi and &lt;58.75 psi or the alarm occurs.</p> <p><b>Description</b> – b. (with numbers) A two-minute hold test is performed. The pressure in the housing of the MaxPure Filter is monitored for two minutes. During this two-minute hold period, if the pressure drop exceeds 4.4 psi, an alarm occurs. Three numbers are printed; start pressure, finish pressure and the elapsed time of the failure (seconds). Pressure prints are in psi.</p>	<p><b>Action:</b></p> <ol style="list-style-type: none"> <li>1. Air leak – repair.</li> <li>2. Faulty COMP1 – replace. (Refer to Figure 5-5.)</li> <li>3. PT1 out of calibration – recalibrate.</li> <li>4. PT1 – replace. (Refer to Figures 5-1 and 5-2.)</li> <li>5. Faulty FLT1 – replace.</li> <li>6. Faulty CK4 – replace.</li> <li>7. Faulty CK6 – replace.</li> <li>8. Faulty housing of the MaxPure Filter – repair or replace.</li> <li>9. Faulty CK11 – replace.</li> </ol> <p><b>Action:</b></p> <ol style="list-style-type: none"> <li>1. Faulty FLT1– replace and rerun test.</li> <li>2. Air leak – repair.</li> <li>3. Faulty SOL8 – replace. (Refer to Figure 5-5.)</li> <li>4. Faulty housing of the MaxPure Filter – replace.</li> <li>5. PT1 out of calibration – recalibrate.</li> <li>6. Faulty PT1 – replace. (Refer to Figures 5-1 and 5-2.)</li> <li>7. Faulty CK11 – replace.</li> </ol>
<p><b>5.1.14 Temperature Problem</b></p> <p><b>Description</b> – Sensor on control board sees temperature &lt; 13°C or &gt; 65°C.</p>	<p><b>Action:</b></p> <ol style="list-style-type: none"> <li>1. Correct room temperature if out of specification.</li> <li>2. Replace control board if room temperature OK.</li> </ol>

## 5.1 LIQUID CHEMICAL STERILIZATION CYCLE FAULTS (CONTINUED)

### 5.1.15 Power Failure

**Description** – Loss of power during cycle.

**Action:**

1. Check Customer incoming power – report problem to Customer.
2. Faulty power supply – replace.
3. Check internal power connections as follows (refer to Figures 5-4 and 5-7.):
  - a. Check all connections. Pay particular attention to the 115V ac connections to the line filter, 115V ac wires out of the line filter to the connection on the power supply, cable from the power supply to the interface board, P1 and P2 on the interface board to P10 and P11 on the control board. Remove the connections, plug and unplug the connector a couple of times, apply anti-fretting compound (P/N 764329907) to the pins and sockets, then reconnect. If this does not fix the power failure problem, continue with the next step.
  - b. Check the 5V dc at the P10 connector between pins 1 and 3. The voltage should be 4.9-5.1V dc and steady. If the voltage is steady and the unit is still having power failures, go to Step d. If voltage is not correct, continue with next step.
  - c. If the voltage to the control falls below 4.8V dc, the unit resets. This drop in voltage can be caused by loose connections or a bad power supply. To isolate the problem, check the unit as follows:
    1. Check the 5V dc at the P2 connector between pins 1 and 4. If the voltage is 4.9 - 5.1V dc and steady at the P2 connector, the dc power cable is loose or defective. Check connections and replace, if necessary. If voltage is not correct, continue to next step.
    2. Check 5V dc at the P1 connector between pins 1 to 4, 2 to 5, and 3 to 6. All voltages should be 4.9 - 5.1 V dc and steady. If they are not correct, there is a loose or bad cable from the power supply, or the power supply is bad. Replace defective component.
  - d. If the 5V dc voltages are correct, the problem may be with the control board. To verify the problem, power down the unit, and disconnect cables P12, P5B and P8 from the control assembly. Leave P10 and P11 connected. Power up unit; if unit still goes into power failure, the control board is defective and should be replaced.

## 5.1 LIQUID CHEMICAL STERILIZATION CYCLE FAULTS (CONTINUED)

### 5.1.16 HP Pump Failure

**Description** – Pressure switch LS6 monitors the pump output under pump ON and OFF conditions. Should LS6 sense incorrect operation, an alarm occurs.

**Action:**

1. Quick Connects installed improperly – refer to operating instructions.
2. Wrong tray adapter used – refer to operating instructions (e.g., C1315 adapter to be used on C1220E and C1140E trays).
3. Faulty scope – test with known good scope.
4. Faulty LS6 – replace. (Refer to Figure 5-3.)
5. Faulty P2– test flow rate and output pressure, replace if out of specifications. (Refer to Figure 5-5.)
6. Incoming water pressure out of specifications – repair.
7. Tubing under tray obstructed – replace tray.

<b>5.2 DIAGNOSTIC CYCLE FAULTS</b>	
<p><b>5.2.1 A/D Converter Fault</b></p> <p><b>Description</b> – Control monitors a fixed resistor for known values.</p>	<p><b>Action:</b></p> <ol style="list-style-type: none"> <li>1. Check wiring connections at power supply and control board – repair. (Refer to Figures 5-4 and 5-7.)</li> <li>2. Faulty power supply – replace.</li> <li>3. Faulty control board – replace.</li> <li>4. Faulty transducer – replace.</li> </ol>
<p><b>5.2.2 Inlet H2O Temp &lt; 43°C</b></p> <p><b>Description</b> – Control monitors TC3 drain block during the water dump phase. Temperature must be &gt; 43°C or alarm occurs.</p>	<p><b>Action:</b></p> <ol style="list-style-type: none"> <li>1. Check that water supply is ON.</li> <li>2. Facility water temperature is &lt; 43°C – correct.</li> <li>3. Faulty control board – replace.</li> <li>4. Faulty TC3 – recalibrate. (Refer to Figure 5-2.)</li> <li>5. Faulty SOL5 – replace. (Refer to Figure 5-5.)</li> <li>6. Low air pressure – check compressor/LS5 air piping components.</li> <li>7. Faulty LS2 – replace.</li> </ol>
<p><b>5.2.3 UV Intensity Timeout</b></p> <p><b>Description:</b> SYSTEM 1E Processor senses UV intensity signal is below 15.0 mA after 10 minutes.</p>	<p><b>Action:</b></p> <ol style="list-style-type: none"> <li>1. UV system unplugged – plug into receptacle.</li> <li>2. Fouled (dirty) quartz sleeve – clean.</li> <li>3. UV monitor harness not connected – plug into connector on rear of processor.</li> <li>4. Faulty UV monitor – replace.</li> <li>5. Faulty UV lamp – replace.</li> <li>6. Ballast circuit breaker tripped – reset.</li> <li>7. Faulty UV lamp ballast – replace.</li> </ol>
<p><b>5.2.4 UV Lamp Below 14.5 mA</b></p> <p><b>Description</b> - SYSTEM 1E Processor detects a UV intensity of less than 14.5 mA.</p>	<p><b>Action:</b></p> <ol style="list-style-type: none"> <li>1. Fouled (dirty) Quartz sleeve – clean.</li> <li>2. UV monitor harness not connected – plug into connector on rear panel of processor.</li> <li>3. Faulty UV monitor – replace.</li> <li>4. Faulty UV lamp – replace.</li> <li>5. Ballast circuit breaker tripped – reset.</li> <li>6. Faulty UV lamp ballast – replace.</li> </ol>

## 5.2 DIAGNOSTIC CYCLE FAULTS (CONTINUED)

### 5.2.5 Fill time > 5 Minutes

**Description** – Control monitors LS3 from start of fill. If full condition is not sensed within five minutes, alarm occurs.

**Action:**

1. Water pressure too low – correct (refer to *SECTION 1* for specifications).
2. MaxPure Filter may be clogged – replace.
3. If MaxPure Filter replacement does not correct problem – replace A prefilter, then B prefilter if problem persists.
4. Restriction in drain hose – correct.
5. Faulty SOL7 fill valve – replace. (Refer to Figure 5-5.)
6. Faulty CK4/strainer – repair or replace.
7. Faulty CK2 and or CK3 – replace.
8. Faulty V5 – repair.
9. Faulty SOL4 – replace. (Refer to Figure 5-5.)
10. Faulty SOL5 – replace. (Refer to Figure 5-5.)
11. Faulty LS3 – replace. (Refer to Figure 5-3.)
12. Faulty LS2 – replace.

### 5.2.6 Pressure Transducer Fault

**Description** – Control monitors fill pressure (FP) and fill zero (FZ). If FP < 5.85 psi or if FZ is > 1.95 psi, alarm occurs.

**Action:**

*If printout shows inlet < 5.85*

1. Water pressure too low – correct.
2. Filters plugged – replace.
3. Faulty SOL7 fill valve – replace.
4. Faulty CK4/strainer – repair or replace.
5. Faulty PT1 – recalibrate or replace. (Refer to Figure 5-1 and 5-2.)
6. Float block not drained from previous cycle – drain and re-test.
7. Faulty LS3 – replace. (Refer to Figure 5-3.)

*If printout shows zero > 1.95*

1. Faulty PT1 – recalibrate or replace. (Refer to Figure 5-1 and 5-2.)
2. Faulty CK2 and or CK3 – replace.
3. Faulty MaxPure™ Filter – replace.

### 5.2.7 Circulation Pressure Low

**Description** – Control monitors circulation pressure (CP) and fill zero (FZ) and performs a calculation. If CP < (1.073 psi + FZ), alarm occurs.

**Action:**

1. Incomplete tray being run (no container or lid) – retest with complete tray.
2. S40 being run – run without S40.
3. Drain screen plugged – clean.
4. Faulty CK2 and/or CK3 – replace.
5. Faulty P1 – replace.
6. Faulty SSR4 – replace. (Refer to Figure 5-5.)
7. PT1 fault – repair. (Refer to Figure 5-1 and 5-2.)
8. V6 – repair.
9. Faulty CK11 – replace.

## 5.2 DIAGNOSTIC CYCLE FAULTS (CONTINUED)

<p><b>5.2.8 Thermocouple Failed</b></p> <p><b>Description</b> – Control monitors TC1 and TC2 and alarm will occur if readings are more than 3°C apart.</p>	<p><b>Action:</b></p> <ol style="list-style-type: none"> <li>1. Loose connection to TC1 or TC2 – repair connection. (Refer to Figure 5-2.)</li> <li>2. Faulty TC1 or TC2 – replace.</li> <li>3. Out of Calibration – recalibrate.</li> <li>4. Faulty interface board – replace.</li> <li>5. Faulty control board – replace.</li> <li>6. Tray drain strainer obstructed – clean or replace.</li> <li>7. Faulty P1 – replace.</li> <li>8. Faulty SSR4 – replace. (Refer to Figure 5-5.)</li> </ol>
<p><b>5.2.9 Circulation Valve Fault</b></p> <p><b>Description</b> – Control monitors circulation pressure (CP) and pressure with circulation pump (P1) on and circulation valve closed (CZ). Alarm occurs if CP–CZ &lt; 0.975 psi (2.5 counts).</p>	<p><b>Action:</b></p> <ol style="list-style-type: none"> <li>1. V5 leaking – replace.</li> <li>2. Faulty SOL3 – replace. (Refer to Figure 5-5.)</li> <li>3. Incomplete tray being run (no container or lid) – retest with complete tray.</li> <li>4. PT1 fault – repair. (Refer to Figure 5-1 and 5-2.)</li> <li>5. Faulty CK11 – replace.</li> </ol>
<p><b>5.2.10 Heat Rate Low</b></p> <p><b>Description</b> – Control monitors temperature rise of fluid during heating phase. Alarm occurs if temperature does not rise an average of 1.0°C per minute.</p>	<p><b>Action:</b></p> <ol style="list-style-type: none"> <li>1. Faulty HTR1 – replace.</li> <li>2. LS1 tripped – reset.</li> <li>3. Faulty SSR1 – replace. (Refer to Figure 5-5.)</li> <li>4. Faulty control board – replace.</li> </ol>
<p><b>5.2.11 Drain Valve Fault</b></p> <p><b>Description</b> – Control monitors LS3 just prior to draining the chamber. If LS3 switch does not sense a full condition, alarm occurs.</p>	<p><b>Action:</b></p> <ol style="list-style-type: none"> <li>1. Chamber leak through cracked tray – replace tray.</li> <li>2. Faulty V5 – replace.</li> <li>3. Faulty LS3 – replace.</li> <li>4. Faulty CK8 – rebuild.</li> <li>5. CK2 or CK3 leaking – replace.</li> <li>6. Plumbing component leak – repair.</li> </ol>
<p><b>5.2.12 Drain Time Fault</b></p> <p><b>Description</b> – Control monitors the LS3 after the unit starts draining. If LS3 does not sense a not-full condition within five seconds, alarm occurs.</p>	<p><b>Action:</b></p> <ol style="list-style-type: none"> <li>1. Clogged FLT2 – replace.</li> <li>2. Faulty CK1 – replace.</li> <li>3. Drain hose restricted – repair.</li> <li>4. Faulty V5 – replace.</li> <li>5. Faulty LS3 – replace.</li> </ol>

## 5.2 DIAGNOSTIC CYCLE FAULTS (CONTINUED)

### 5.2.13 Concentration Monitor Failed

**Description** – Control checks concentration monitor circuit and compares to calculated values, alarm occurs if below set value.

**Action:**

1. Faulty CK1 – replace.
2. Scale buildup on CP1 and CP2 – clean.
3. Faulty control board – replace. (Refer to Figure 5-5.)
4. Other:

The concentration reading is monitored while the unit is full and water is warm from the Heat Rate Test. The control records the high reading at this time. While the unit is draining during the drain and HP pump tests, the control watches the concentration and records the low reading. (The HP pump is left on while draining to help blow out the high pressure transition block.) If the difference between the high and low reading is not at least three counts, the test fails.

A failure of this test can be caused by low conductivity water, failure of the unit to drain properly, or defective component. Use the following troubleshooting guide to determine cause.

Look at the printout for the following:

```
CONC
MONITOR FAILED
MINIMUM X
SHOULD READ X
```

The MINIMUM is the lowest reading that the unit recorded during the test. Reading must be three counts less than the high reading. The SHOULD READ is the minimum reading control expected to see HIGH READING – 3 COUNTS.

Example:

```
CONC. MONITOR FAILED
MINIMUM 56
SHOULD READ 55
```

This means that the high reading was 58 counts (SHOULD READ +3 counts) and the lowest reading that the unit saw was 56 counts. The test failed since the low reading was not three counts less than the high reading. To troubleshoot the problem, first verify that the control is functioning properly as follows:

Unplug CN9 from the interface board and enter the service mode. Go to CALIB menu and select the VIEW option. Under the VIEW menu, select CONC to view the concentration counts. First, place a jumper between TP1 and TP2 on the interface board. The counts displayed should be approximately 170. Next, place the jumper between TP1 and TP3 on the interface board. The counts displayed should be approximately 117.



## 5.2 DIAGNOSTIC CYCLE FAULTS (CONTINUED)

<p><b>5.2.13 Concentration Monitor Failed (cont.)</b></p>	<p>If the readings are more than five counts off on either reading, re-calibrate as per maintenance manual and re-verify readings. If the above readings are correct, then the fault is mostly a failure of the unit to drain completely. Troubleshoot a drain problem remembering that the H. P. pump is running during the drain portion of the diagnostic to help remove water from the high pressure transition block.</p> <p>If the Concentration Monitor Test fails with the following printout (MINIMUM value prints 0):</p> <pre> CONC. MONITOR FAILED MINIMUM 0 SHOULD READ -3 </pre> <p>It could be due to low conductivity water being supplied to the unit such that the conductivity differential requirements is not being satisfied.</p> <p>5. H. P. Pump output low – check H. P. pump operation.</p>
<p><b>5.2.14 MaxPure Filter Membrane Fault (a. without numbers and b. with numbers)</b></p> <p><b>Description – a.</b> (without numbers) The housing of the MaxPure Filter is pressurized. The pressure must reach &gt;55 psi in three minutes or the alarm occurs. If this portion passes, the housing pressure is maintained for three minutes. After this three-minute stabilization period, the pressure must be &gt;52.83 psi or the alarm occurs. If this portion passes the control waits 15 seconds and checks the housing of the MaxPure Filter pressure again. The pressure must be &gt;51.73 psi and &lt;58.75 psi or the alarm occurs.</p> <p><b>Description – b.</b> (with numbers) A two-minute hold test is performed. The pressure in the housing of the MaxPure Filter is monitored for two minutes. During this two-minute hold period, if the pressure drop exceeds 4.4 psi, an alarm occurs. Three numbers are printed; start pressure, finish pressure and the elapsed time of the failure (seconds). Pressure prints are in psi.</p>	<p><b>Action:</b></p> <ol style="list-style-type: none"> <li>1. Air leak – repair.</li> <li>2. Faulty COMP1 – replace.</li> <li>3. PT1 out of calibration – recalibrate.</li> <li>4. PT1 – replace. (Refer to Figure 5-1 and 5-2.)</li> <li>5. Faulty FLT1 – replace.</li> <li>6. Faulty CK4 – replace.</li> <li>7. Faulty CK6 – replace.</li> <li>8. Faulty housing of the MaxPure Filter – repair/replace.</li> <li>9. Faulty CK11 – replace.</li> </ol> <p><b>Action:</b></p> <ol style="list-style-type: none"> <li>1. Faulty FLT1– replace and rerun test.</li> <li>2. Air leak – repair.</li> <li>3. Faulty SOL8 – replace. (Refer to Figure 5-5.)</li> <li>4. Faulty housing of the MaxPure Filter – replace.</li> <li>5. PT1 out of calibration – recalibrate.</li> <li>6. Faulty PT1 – replace. (Refer to Figure 5-1 and 5-2.)</li> <li>7. Faulty CK11 – replace.</li> </ol>

## 5.2 DIAGNOSTIC CYCLE FAULTS (CONTINUED)

### 5.2.15 Drain Check Fault

**Description** – At end of Diagnostic Cycle, pressure in housing of the MaxPure Filter is vented through CK8 to check cracking pressure. Pressure must be as follows or alarm occurs:

$$3.51\text{psi} < \text{pressure} < 11.7\text{psi}$$

**Action:**

1. Faulty CK8 – replace.
2. Drain line restriction – repair.
3. Faulty PT1 – repair. (Refer to Figure 5-1 and 5-2.)

### 5.2.16 Ambient Temperature Fault

**Description** – A sensor on the control board monitors ambient room temperature and alarm occurs if temperature measured is  $> 65^{\circ}\text{C}$  or  $< 13^{\circ}\text{C}$ .

**Action:**

1. Room temperature out of specification – resolve.
2. Faulty control board – replace.

### 5.2.17 Lid Open Fault

**Description** – Control monitors lid switch for open condition during cycle. If open is sensed, alarm occurs.

**Action:**

1. Faulty LS4 – replace. (Refer to Figure 5-3.)
2. Loose connection at LS4 – repair.
3. Incorrect adjustment of latch flag assembly – re-adjust.

### 5.2.18 HP Pump Fault

**Description** – Pressure switch LS6 monitors the pump output under pump ON and OFF conditions. Should the switch sense incorrect operation, an alarm occurs.

**Action:**

1. Wrong tray adapter used – refer to operating instructions (e.g., C1315 adapter to be used on C1220E and C1140E trays).
2. Faulty LS6 switch – replace.
3. Faulty P2 – test flow rate and output pressure, replace if out of specifications.
4. Tubing under tray obstructed – replace tray.
5. Incoming water pressure out of specification – check utility pressure values and discuss with Customer.

## 5.3 OTHER FAULTS

### 5.3.1 Ground Fault Interrupt (GFI) Trip

**Description** – A GFI measures the difference in current flow between the hot and neutral lines of a circuit. Normally both are identical; however, if there is current leakage to ground from the hot line, the GFI senses the imbalance and **trips**.

The typical trip point of a GFI is 4 to 6 mA, and since this is a very small level of imbalance, it will require component isolation to locate the cause.

Establish if the GFI trips as soon as the unit turns on, or if it occurs in cycle. If trip occurs when turned on, it may be necessary to isolate components one at a time. When doing so, turn the unit ON to see if the GFI trips. If trip occurs in cycle, the trip may be occurring when a specific component is energized; if so, use the service mode/hand terminal to manually activate individual components until the source of trip is located.

#### Action:

1. Verify proper operation of GFI using ground fault tester – if OK, continue with component isolation, otherwise, replace GFI.
2. If trip occurs in cycle – use service mode/hand terminal to operate components individually until trip source is located.
3. If trip occurs when powered up – isolate individual components manually until fault is located.

### 5.3.2 Water Spills from SYSTEM 1E Processor

#### Action:

Check the following items.

1. Drip pan full of water?
2. Is chamber filling?
  - a. Faulty LS3 – repair.
  - b. SOL5 or SOL7 leaking – repair.
  - c. Are instruments loaded incorrectly – reload.
  - d. Is water pressure >60 psi – reduce.
  - e. Back pressure in the drain – repair.
  - f. Faulty CK2, CK3 – repair.
  - g. Header block – replace lid.

<b>5.4 CONTROL FAULTS</b>		
<b>Fault</b>	<b>Description</b>	<b>Service Instructions</b>
<b>5.4.1 Printer Prints: ROM FAILURE</b>	Read Only Memory (ROM) Failure. Occurs if memory fails Cyclic Redundancy Check (CRC) test. Prints only in DIAGNOSTIC Cycle.	<ol style="list-style-type: none"> <li>1. Program chips defective. Replace chips.</li> <li>2. Main control board failure. Replace board.</li> </ol>
<b>5.4.2 Printer Prints: RAM FAILURE</b>	Random Access Memory (RAM) Failure. Occurs if memory fails memory tests. Prints only in DIAGNOSTIC Cycle.	<ol style="list-style-type: none"> <li>1. Main control board failure. Replace board.</li> </ol>
<b>5.4.3 Printer Prints: RTC FAILURE</b>	Real Time Clock (RTC) Failure. Occurs if microprocessor clock does not agree with RTC within allotted time (five minutes).	<ol style="list-style-type: none"> <li>1. Re-enter date and time.</li> <li>2. Defective smart battery. Replace.</li> <li>3. Main Control board failure. Replace board.</li> </ol>
<b>5.4.4 Printer Prints: TC1 FAILURE</b>	Occurs if the inlet thermocouple reading is greater than 75°C or less than 0°C in DIAGNOSTIC Cycle.	<ol style="list-style-type: none"> <li>1. Check TC1 for loose connections or broken wires.</li> <li>2. Check analog cable connections. (Refer to Figure 5-5.)</li> <li>3. Re-enter known good calibration values.</li> <li>4. Defective TC1. Replace.</li> <li>5. Defective interface board. Replace board.</li> </ol>
<b>5.4.5 Printer Prints: TC2 FAILURE</b>	Occurs if the outlet thermocouple reading is greater than 75°C or less than 0°C in DIAGNOSTIC Cycle.	<ol style="list-style-type: none"> <li>1. Check TC2 for loose connections or broken wires.</li> <li>2. Check analog cable connections. (Refer to Figure 5-5.)</li> <li>3. Re-enter known good calibration values.</li> <li>4. Defective TC2. Replace.</li> <li>5. Defective interface board. Replace board.</li> </ol>

<b>5.4 CONTROL FAULTS (CONTINUED)</b>		
<b>Fault</b>	<b>Description</b>	<b>Service Instructions</b>
<b>5.4.6 Printer Prints: TC3 FAILURE</b>	Occurs if the drain block thermocouple reading is greater than 75°C or less than 0°C in DIAGNOSTIC Cycle.	<ol style="list-style-type: none"> <li>1. Check TC3 for loose connections or broken wires.</li> <li>2. Check analog cable connections. (Refer to Figure 5-5.)</li> <li>3. Re-enter known good calibration values.</li> <li>4. Defective TC3. Replace.</li> <li>5. Defective interface board. Replace board.</li> </ol>
<b>5.4.7 Printer Prints: CHM-PRES NOT CALIBRATED</b>	Indicates PT1 has not been calibrated or calibration data lost and default values are being used.	<ol style="list-style-type: none"> <li>1. Calibrate the PT1.</li> <li>2. Re-enter known good calibration values.</li> <li>3. Defective battery-backed RAM. Replace RAM.</li> </ol>
<b>5.4.8 Printer Prints: INLET NOT CALIBRATED</b>	Indicates TC1 (inlet thermocouple) has not been calibrated or calibration data lost and default values are being used.	<ol style="list-style-type: none"> <li>1. Re-enter known good calibration values</li> <li>2. Calibrate TC1.</li> <li>3. Defective battery-backed RAM. Replace RAM.</li> </ol>
<b>5.4.9 Printer Prints: OUTLET NOT CALIBRATED</b>	Indicates TC2 (outlet thermocouple) has not been calibrated or calibration data lost and default values are being used.	<ol style="list-style-type: none"> <li>1. Re-enter known good calibration values.</li> <li>2. Calibrate TC2.</li> <li>3. Defective battery-backed RAM. Replace RAM.</li> </ol>
<b>5.4.10 Printer Prints: DRN-BLK NOT CALIBRATED</b>	Indicates TC3 (drain block thermocouple) has not been calibrated or calibration data lost and default values are being used.	<ol style="list-style-type: none"> <li>1. Re-enter known good calibration values.</li> <li>2. Calibrate TC3.</li> <li>3. Defective battery-backed RAM. Replace RAM.</li> </ol>
<b>5.4.11 Printer Prints: CONC. NOT CALIBRATED</b>	Indicates concentration monitor has not been calibrated or calibration data lost and default values are being used.	<ol style="list-style-type: none"> <li>1. Calibrate the concentration monitor.</li> <li>2. Re-enter known good calibration values.</li> <li>3. Defective battery-backed RAM. Replace RAM.</li> </ol>
<b>5.4.12 Printer Prints: FLASH VALUES RESTORED</b>	Flash Memory Parameters Restored. Occurs on power-up if battery-backed RAM values are lost. RAM is initialized. Flash ROM values are restored.	<ol style="list-style-type: none"> <li>1. Battery Backed RAM failure. Replace RAM.</li> <li>2. Main control board failure. Replace board.</li> </ol>

5.4 CONTROL FAULTS (CONTINUED)		
Fault	Description	Service Instructions
5.4.13 <b>Printer Prints: FLASH VALUES SAVED</b>	Flash Memory Parameters Saved. Occurs on power-up if ROM values are lost. RAM values are saved to Flash ROM.	<ol style="list-style-type: none"> <li>1. Program chips defective. Replace chips.</li> <li>2. Main control board failure. Replace board.</li> </ol>
5.4.14 <b>Printer Prints: FLASH VALUES LOST. PLEASE REPROGRAM</b>	Flash Memory Parameters Lost. Occurs on power-up if both ROM values and the battery-backed RAM values are lost. Factory defaults are loaded. RAM values are saved to Flash ROM.	<ol style="list-style-type: none"> <li>1. Battery-backed RAM defective. Replace RAM.</li> <li>2. Program chips defective. Replace chips.</li> </ol>
5.4.15 <b>Printer Prints: **LOW BATTERY** PLEASE REPLACE</b>	Occurs if battery voltage is below minimum range.	<ol style="list-style-type: none"> <li>1. Battery-backed RAM defective. Replace RAM.</li> <li>2. Main control board failure. Replace board.</li> </ol>
5.4.16 <b>Printer Prints: KEY X ERROR</b>  Where X is the defective keypad pushbutton. See page 2-6 or page 6-3 for map of keypad.	Occurs if keypad pushbutton is closed on power-up.	<ol style="list-style-type: none"> <li>1. Touch pad defective. Replace.</li> <li>2. Key pressed during power up. Do not press any keypad pushbuttons during power-up.</li> </ol>

5.5 CABLE/HARNESS PIN OUTS

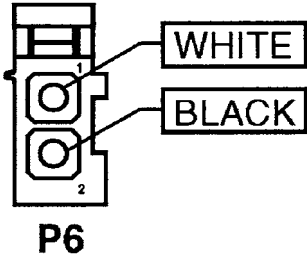
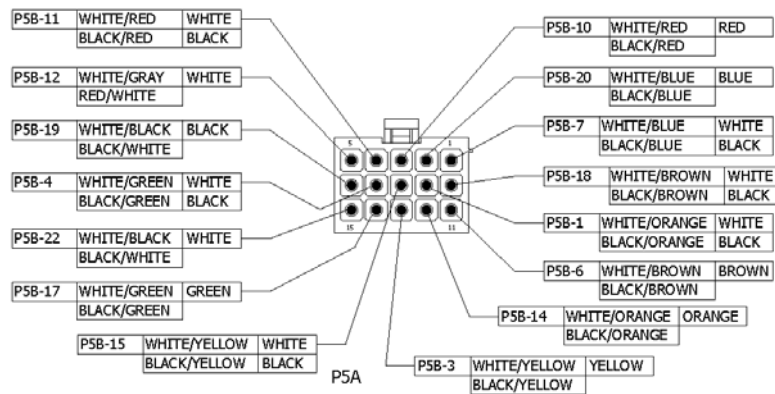
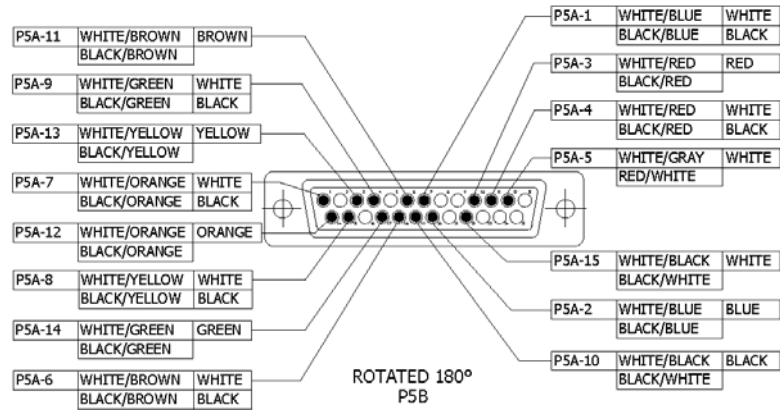
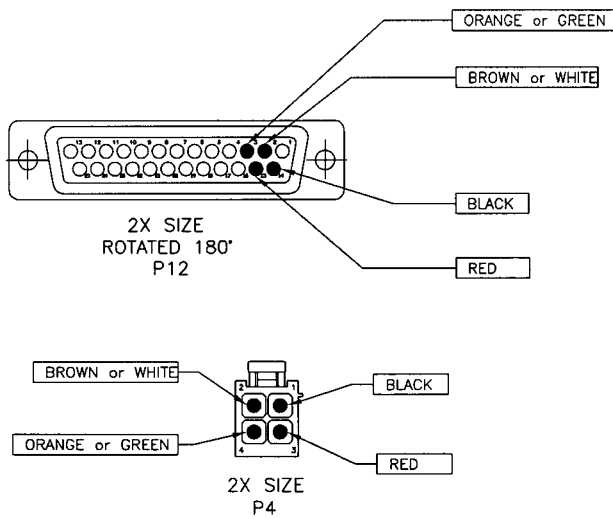


Figure 5-1. Transducer Harness Assembly (P6) Pin Out Locations



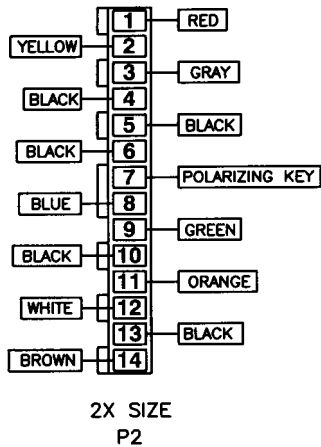
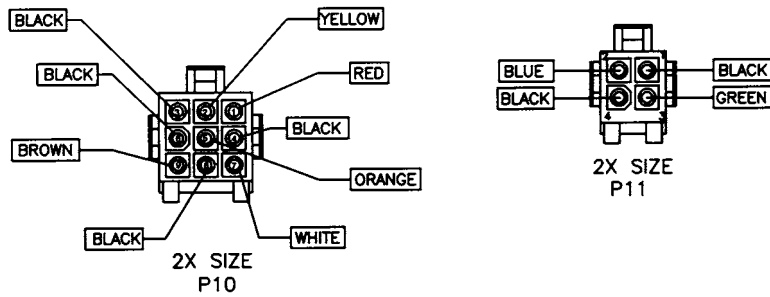
WIRE CHART					
TWISTED PAIR	COLOR (5479C)	TWISTED PAIR	COLOR (5499C)	FROM	TO
BLACK/BLUE	BLACK	WHITE/BLUE	WHITE	P5A-1	P5B-7
BLACK/BLUE	BLUE	WHITE/BLUE	BLUE	P5A-2	P5B-20
BLACK/RED	RED	WHITE/RED	RED	P5A-3	P5B-10
BLACK/RED	BLACK	WHITE/RED	WHITE	P5A-4	P5B-11
RED/WHITE	WHITE	WHITE/GRAY	WHITE	P5A-5	P5B-12
BLACK/BROWN	BLACK	WHITE/BROWN	WHITE	P5A-6	P5B-18
BLACK/ORANGE	BLACK	WHITE/ORANGE	WHITE	P5A-7	P5B-1
BLACK/YELLOW	BLACK	WHITE/YELLOW	WHITE	P5A-8	P5B-15
BLACK/GREEN	BLACK	WHITE/GREEN	WHITE	P5A-9	P5B-4
BLACK/WHITE	BLACK	WHITE/BLACK	BLACK	P5A-10	P5B-19
BLACK/BROWN	BROWN	WHITE/BROWN	BROWN	P5A-11	P5B-6
BLACK/ORANGE	ORANGE	WHITE/ORANGE	ORANGE	P5A-12	P5B-14
BLACK/YELLOW	YELLOW	WHITE/YELLOW	YELLOW	P5A-13	P5B-3
BLACK/GREEN	GREEN	WHITE/GREEN	GREEN	P5A-14	P5B-17
BLACK/WHITE	WHITE	WHITE/BLACK	WHITE	P5A-15	P5B-22
RED/GREEN	RED	WHITE/VIOLET	WHITE	-----	-----
-----	DRAIN	-----	DRAIN	-----	-----
RED/WHITE	RED	WHITE/GRAY	GRAY	-----	-----
-----	BLACK	-----	BLACK	DRAIN WIRE	RING TERM.
-----	BLACK	-----	BLACK	P5B-16	P5B-9
-----	-----	-----	-----	R1	P5B-16
-----	-----	-----	-----	R1	P5B-21
RED/GREEN	GREEN	WHITE/VIOLET	VIOLET	R1 (P5B-21)	MALE DISCONNECT

Figure 5-2. Analog Cable Assembly – Pin Out Locations



WIRE CHART		
COLOR (WIRE COLOR MAY VARY, AS NOTED, DUE TO MANUF. MATERIAL USED.)	FROM	TO
BLACK	P4-1	P12-14
WHITE or BROWN	P4-2	P12-2
RED	P4-3	P12-15
GREEN or ORANGE	P4-4	P12-3
BLACK	DRAIN WIRE	RING TERM.

Figure 5-3. DC Input Harness – Pin Out Locations



WIRE CHART		
COLOR	FROM	TO
RED	P2-1	P10-1
YELLOW	P2-2	P10-2
GRAY	P2-3	-----
BLACK	P2-4	P10-3
BLACK	P2-5	P10-4
BLACK	P2-6	P11-1
BLUE	P2-8	P11-2
GREEN	P2-9	P11-3
BLACK	P2-10	P10-6
ORANGE	P2-11	P10-5
WHITE	P2-12	P10-7
BLACK	P2-13	P10-8
BROWN	P2-14	P10-9
BLACK		P11-4

Figure 5-4. DC Power Harness – Pin Out Locations



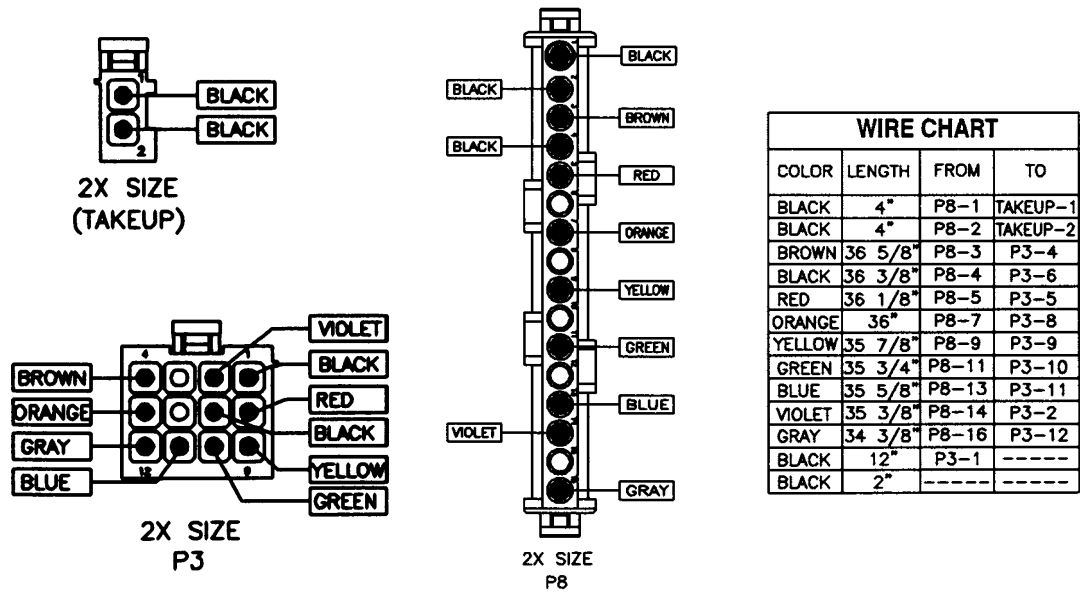
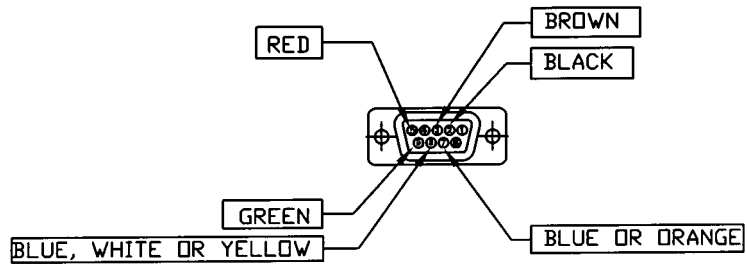
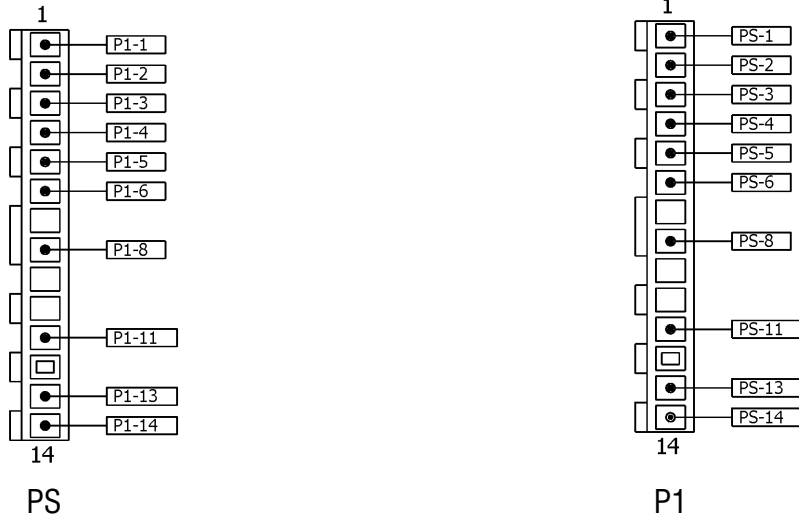


Figure 5-5. AC Output Harness – Pin Out Locations



WIRE CHART		
COLOR	FROM	TO
(WIRE COLOR MAY VARY, AS NOTED, DUE TO MANUF. MATERIAL USED)		
BLACK	P3-2	PANEL-2
BROWN	P3-3	PANEL-3
RED	P3-5	PANEL-5
ORANGE or BLUE	P3-7	PANEL-7
BLUE, WHITE or YELLOW	P3-8	PANEL-8
GREEN	P3-9	PANEL-9

Figure 5-6. Serial Port Harness – Pin Out Locations



WIRE CHART			
ITEM NO.	COLOR	FROM	TO
5	GRAY	PS-1	P1-1
		PS-2	P1-2
		PS-3	P1-3
		PS-4	P1-4
		PS-5	P1-5
		PS-6	P1-6
		PS-8	SPLICE
		PS-11	P1-11
		PS-13	P1-13
		PS-14	P1-14
		SPLICE	P1-8
5	GRAY	SPLICE	SPLICE

Figure 5-7. DC Power Supply Harness – Pin Out Locations

# Section 6: Field Test Procedure

## 6.1 GENERAL

This section is to be used to verify that the SYSTEM 1E™ Liquid Chemical Sterilant Processing System is operating within manufacturer's specification. Field test procedures are used in addition to the DIAGNOSTIC Cycle for the SYSTEM 1E Liquid Chemical Sterilant Processing System to evaluate various components. Field test procedures are to be performed by qualified trained service personnel with appropriate test instrumentation.

## 6.2 TEST INSTRUMENTATION

The following instrumentation is utilized in this section:

1. Calibrated potentiometer and thermocouple leads.
2. Calibrated pressure gauge.
3. Digital VOM.

## 6.3 INSTALLATION VERIFICATION

Refer to the Site Prep Guide for the SYSTEM 1E Processor. It is necessary to verify the following utilities:

1. Water pressure: Minimum 40 psi; preferred, 50 to 60 psi.
2. Water temperature: 43 to 60°C (110 to 140°F); 46 to 48°C (115 to 118°F) **recommended** for optimum cycle times.
3. Water flow rate: Minimum, 2.5 gpm.
4. Electrical Voltage: 115Vac (+5% / -10%).
5. GFI circuit: Trips when test button depressed.
6. Drain piping diameter: 1-¼" I.D. diameter minimum.
7. Drain piping slope: Hoses must slope downward and not have any dips/bows.
8. Water supply piping: ½" diameter minimum.
9. Level of mounting surface: Level with use of a spirit level or equivalent.
10. Room temperature: 60 to 90°F (16 to 32°C).

## 6.4 TEST PROCEDURES

### 6.4.1 Pressure Transducer Calibration

For calibration procedures, refer to *SECTION 2, SERVICE MODE*.

### 6.4.2 Temperature Calibration

For Temperature Calibration procedure, refer to *SECTION 2, SERVICE MODE*.

### 6.4.3 Concentration Monitor Calibration

For concentration monitor calibration procedure, refer to *SECTION 2, SERVICE MODE*.

### 6.4.4 UV Monitor Calibration

For UV monitor calibration procedure, refer to *SECTION 2, SERVICE MODE*.

### 6.4.5 HP Pump Flow Rate And Pressure Test

The check for HP pump flow rate and pressure utilizes the same measurement equipment. The tray is removed for this test. The manipulation of the SYSTEM 1E Liquid Chemical Sterilant Processing System valves and pump differs and are discussed separately.

Equipment – Use kit (P/N 764329-097), consisting of plumbing fittings needed to adapt to STERIS Heise pressure gauge. A flask or similar container capable of measuring 2 L (0.53 gal) is also required. Substitution of an accurate pressure gauge is acceptable. The tubing supplied in the kit is attached to the high-pressure quick disconnect post with a hose clamp. For the flow test, the hose is directed to the 2 L (0.53 gal) container. For the pressure test, the hose is connected to the gauge.

For the flow rate test an acceptable range is 2 L (0.53 gal) in 37 to 57 seconds (3.2 to 2.1 lpm). For the pressure test, an acceptable range is 13.5 to 19.5 psi for 60Hz.

#### • Procedure

1. Leaving lid open, enter service mode. Select TESTS, and then select VALVES.
2. Inflate seal by turning ON s1 (SOL1).
3. Close drain pinch valve by turning ON s4 (SOL4).
4. Fill drain pan with water by turning ON s7 (SOL7). Allow water to fill drip pan until water is about 1-¾"

- (45 mm) above the drogues. Stop fill process by turning OFF s7 (SOL7).
5. Aim hose into drip pan and turn ON P2. Allow water to flow until all air has been expelled from HP pump and tubing.
  6. Using a 2 L (0.53 gal) flask, record time to fill.
  7. Turn OFF P2.
  8. Connect tubing to gauge.
  9. Turn ON P2. Record pressure indicated on gauge.
  10. Turn OFF P2.
  11. Drain SYSTEM 1E Liquid Chemical Sterilant Processing System by turning OFF s4 (SOL4) drain pinch valve solenoid, and turning ON P1, circulation pump. Turn OFF P1 once water level reaches top of drogues. It is necessary to manually drain remaining water using a cup.
  12. Turn OFF s1 (SOL1).
  13. Deflate seal by turning ON s2 (SOL2). Once deflated, tray can be re-installed and SYSTEM 1E Processor removed from service mode.

#### 6.4.6 LS6 Switch Test Procedure

This test procedure checks the operation of the LS6 H.P. pump monitor (pressure switch) under dynamic conditions.

The HP pump test is found in Service Mode by selecting TESTS, then MORE, then HPP TEST. Selecting HPP TEST with lid closed starts an automated sequence where the SYSTEM 1E Processor is filled with water and the HP pump runs. The display shows CLSD if the switch is activated or OPEN if the switch is not activated. When the pump is running, the switch should be CLOSED. At the conclusion of testing, press **SAVE VALUES** and the unit automatically drains and returns to the main Service Mode menu.

#### 6.4.7 Seal Leak Test and Compressor Output Test

1. Connect pressure gauge to seal relief port at rear of the SYSTEM 1E Processor.
2. In Service Mode select TESTS, then VALVES, then turn ON s1 (SOL1), which turns on the air compressor.
  - Wait until the compressor stops running.
3. Check for leaks at fittings. No leaks should be detected before this test is performed.
4. Turn OFF s1 (SOL1).

5. Record pressure reading on gauge.
6. Wait five minutes and record pressure on gauge. A pressure difference of 1.0 psi or less is acceptable.
7. Turn ON s2 (SOL2) to deflate seal and remove test equipment.
8. Turn off s2 (SOL2) when the seal has been fully deflated and the lid latch releases.
9. If leaking, replace seal (see SECTION 7).
  - Inspect retaining bars and corner retainers (part of drip pan).
  - Inspection should ensure there are no sharp edges that could potentially puncture or damage the seal during installation and or operation.
  - Any rough or sharp edges should be smoothed out using sand paper or a file without altering profile of retaining bars.

#### 6.4.8 Pressure Hold Test for Housing of MaxPure™ Filter

This test utilizes the MaxPure Filter test plug to test the integrity of the filter housing and associated piping.

*NOTE: Verify proper operation of compressor and pressure transducer prior to performing this test.*

1. Remove cap of MaxPure Filter, remove filter, insert test plug, and reinstall cap.
2. In Service Mode select TESTS, then VALVES. Turn ON s1 (SOL1) and s8 (SOL8) to enable compressor. Wait until compressor stops running.
3. Press **STATUS** button several times until pressure is displayed. Pressure should be between 37 and 43 psi.
4. Turn OFF s1 (SOL1).
5. Wait five minutes for pressure to stabilize, then record start pressure.
6. Every minute for five minutes press **STATUS** button until pressure is displayed and record pressure.
7. Maximum allowable pressure difference between start and finish pressure is 0.120 psi.
8. Turn OFF SOL8 to deflate housing.
9. Turn ON s2 (SOL2) to deflate seal and remove test equipment.
10. Turn OFF s2 (SOL2) when the seal has been fully deflated and the lid latch releases.

### 6.4.9 CK8 Test

- This test can be used to determine the setpoint of CK8.
  - This test requires manipulation of components in the VALVES section of the Service Mode.
1. Turn ON s8 (SOL8).
  2. Turn ON s1 (SOL1). Compressor runs to compressor control switch(LS5) setting.
  3. When compressor has stabilized, turn OFF s1 (SOL1).
  4. Turn OFF s8 (SOL8).
  5. Press STATUS touch pad, and monitor system pressure. The reading that it stabilizes at is the CK8 setting. Acceptable range is greater than 3.5 psi or less than 11.7 psi.

### 6.4.10 Output Test

This test is used to operate the board outputs.

Enter the Service Mode, select TESTS, then select VALVES and the following outputs can be operated:

- tk – Paper take up
- s8 – Air-water solenoid valve (SOL8)
- s5 – Dump valve (SOL5)
- s3 – Circulation pinch valve solenoid (SOL3)
- s4 – Drain pinch valve solenoid (SOL4)
- s7 – Inlet fill valve (SOL7)
- s2 – Seal release solenoid (SOL2)
- s1 – Compressor release solenoid (SOL1) and enable compressor (COMP1)
- h – Heater element (HTR1)
- p1 – Circulation pump
- p2 – High pressure pump (HP Pump)

### 6.4.11 Touch Pad Test

In Service Mode, select TESTS, then CONSOLE, then KEYPAD. This brings up keypad test which indicates a number on display when corresponding pad is pressed. If display does not change when pad is pressed, it indicates a faulty touch pad.

#### • Console

CONSOLE allows checking of Keypad, Dip Switch settings, and Display.

Select CONSOLE, then press SAVE VALUES touch pad. Display shows:

KEYPAD DISPLAY	DIPSW
-------------------	-------

#### • Keypad

Select KEYPAD, then press SAVE VALUES touch pad. Display shows:

* KEYPAD TEST *
KEY =

Refer to the illustration below. Press a key on the keypad. If the communication link is OK, the corresponding number on the keypad displays.

*NOTE: The CANCEL touch pad does not display a number. The test for the CANCEL touch pad is that it exits this routine when pressed.*

**Keypad Test Chart**

0	1	2		
3	4	5		
6	7	8		
9	15	10		
16	17	18	19	20



# Section 7: Component Repair and Replacement

## 7.1 LID REPLACEMENT/SHIMMING PROCEDURE

Equipment, Fixtures, Special Tools:

1. P/N 450100 Roll Pins (as required, up to three).
2. LOCTITE<sup>®1</sup> Thread Lock (as required).
3. 5/32" Cobalt Drill Bit.
4. Lid Spacer Kit (P/N 200273).  
Includes: Four Spacers (P/N 100707)  
Four Shims (P/N 100706)
5. Feeler gauge.

### Procedure:

1. Disconnect line cord from outlet; depressurize inlet water line and disconnect water lines (inlet and drain).
2. Remove tray and remove remaining water in drip pan.
3. Siphon water from both quick-disconnect (QD) posts and install caps on all three posts.
4. Remove shroud.
5. Disconnect #6 clamp holding black hose to float block.
6. Pull black hose off float block and let it hang.
7. Remove retaining ring on bottom of gas spring cylinder and remove 8-32 setscrew in lid locking clevis pin.
8. Thread an 8-32 screw into threaded hole of clevis pin. With lid open and held with right hand, pull clevis pin out by screw head (8-32) with left hand.
9. Remove gas spring cylinder and close lid.
10. Remove four 10-32 x 1/2" socket head screws from hinges. Using a screwdriver, pry hinges away from frame. (Sometimes spacer and roll pin stay with hinge and sometimes spacer and roll pin stay on frame.)
11. Once hinges are free from frame, move latch handle to open and remove lid from unit.
12. Place four 0.250" thick spacers (P/N 100707) and four 0.060" shims (P/N 100706) equally spaced around four sides of seal. These spacers slip over seal and seal retainers.
13. Set new lid on unit and install four bolts into hinges; use LOCTITE on bolt threads. If holes for roll pins are aligned, then reinstall roll pins through hinges, shims and into frame and tighten. If holes for roll pins are not aligned, then new holes for roll pins have to be drilled into frame through second set of holes in hinges.
14. Check latch bar adjustment. There should be no gap between latch hooks and latch pawls. There also should be no gap between front of pawls and back of latch hook on both sides. Refer to Figure 7-1.
15. Remove lid spacer kit and install tray. Inflate and deflate seal. Check gap and readjust as needed.

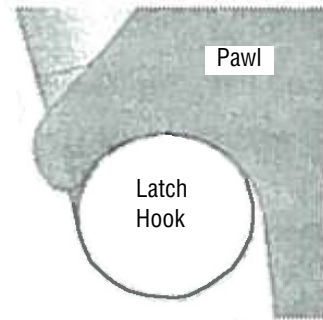
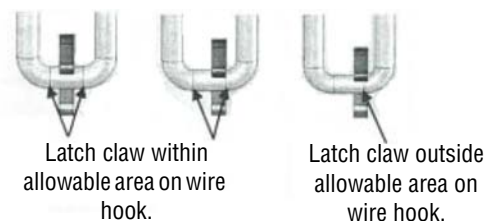


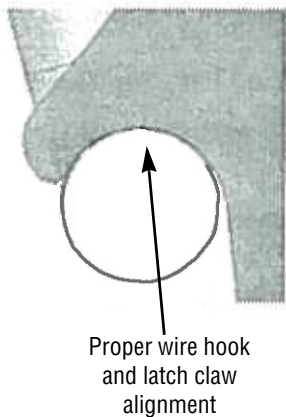
Figure 7-1. Adjust Lid Latch

16. To adjust/readjust latch:
  - a. Loosen screw on the latch assembly so it is lightly secured to the processor (no shims are needed) with latch adjusted to very top of travel in slots. Lower latch slightly so that it doesn't hit the drip pan. Center the latch assembly left to right making sure that both latch claws are as close to the center of the lid wire hooks as possible. See the examples below as reference, first two examples are acceptable alignments the third is not and adjustments should be made. *NOTE: The lines indicated on the wire hook are imaginary lines where the radius starts.*



1. LOCTITE<sup>®</sup> is a registered trademark of Henkel A.G. & Co.

- b. Use the four lid spacers (PIN 100707) and four shims (PIN 100706) (included in the SYSTEM 1E tool kit) and equally space them around the four sides of the seal to establish the correct lid height. These spacers and shims fit over the seal and seal retainers.
- c. Close the lid and loosen the screws on the latch brackets and let the latch claws hang from the lid wire hooks.
- d. If the latch claws and the wire hooks do not align properly (see diagram below) tap the hooks with a soft blow hammer so that the cylinder part of the lid wire hook and the curved part of the latch claw are aligned. Both sides should make contact as shown in the picture. Use the handle travel adjustment setscrew to make any necessary adjustment.



- e. After all adjustments have been made tighten the screws. Reinsert the roll pins drilling new holes if necessary.
  - f. Verify the lid opens and closes easily and make sure the lid wire hooks clear the latch properly and do not contact the drip pan when closed. Also verify that wire hooks seat with latch claws properly.
  - g. It may be necessary to push down slightly on lid to allow the latch claws to clear the wire hooks when opening the lid.
17. Once lid is adjusted and all screws are tightened, install gas cylinder from bracket on frame to lid and insert clevis pin into gas cylinder. Adjust lid opening speed with clevis pin.
  18. Install retaining ring on bottom of gas cylinder; tighten set screw into lid to lock clevis pin in place.

19. Install black hose on float block assembly and tighten hose clamp.
20. Close lid and ensure latch flag is still in adjustment.
21. Reinstall shroud.
22. Once shroud is installed, install water lines (drain and inlet), plug unit back into power source. Run test cycles and check for leaks.

## 7.2 LID SWITCH AND LATCH FLAG ADJUSTMENT PROCEDURE

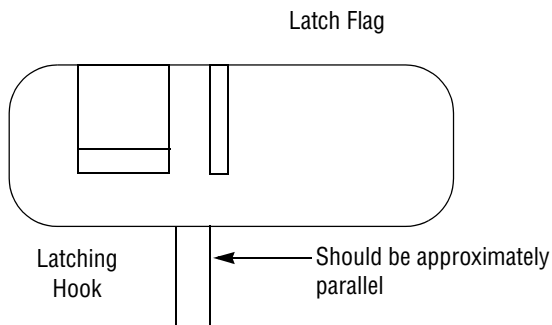
### Equipment, Fixtures, Special Tools:

1. Voltmeter (VOM) with micro clip leads.
2. One 0.020" shim.
3. One 0.060" shim.
4. Feeler gauge if 0.020 and 0.060 shim not available.

### Procedure:

1. Remove power cord from wall receptacle.
2. Turn OFF water supply to SYSTEM 1E Liquid Chemical Sterilant Processing System, depress red button to relieve pressure at housing of pre-filter.
3. Disconnect drain hose from back side of SYSTEM 1E Processor and install cap.
4. Disconnect inlet water hose from back side of SYSTEM 1E Processor and install cap.
5. Remove adapter tray from inside cavity of SYSTEM 1E Processor and set aside.
6. Siphon water from both QD posts and install caps on all three posts.
7. Remove shroud from SYSTEM 1E Liquid Chemical Sterilant Processing System and set aside.
8. Plug power cord into wall receptacle.
9. Remove cover from control interface box and set aside.
10. Connect VOM to Pin 10 (Ground) and Pin 6 on CN9 Connector. (Open reads 5V.)
11. Visually examine that the connector is connected to limit switch.
12. Visually examine latch flag assembly for damage. Latch flag should be approximately parallel to the latching hook (see Figure 7-3).  
*NOTE: Top view looking down through slot left side.*
13. With lid assembly closed, connect VOM to Pin 10 and Pin 6 on CN9 connector.

14. Insert 0.020" thick shim between latch pawl and latch hook. Voltage reading should be zero.

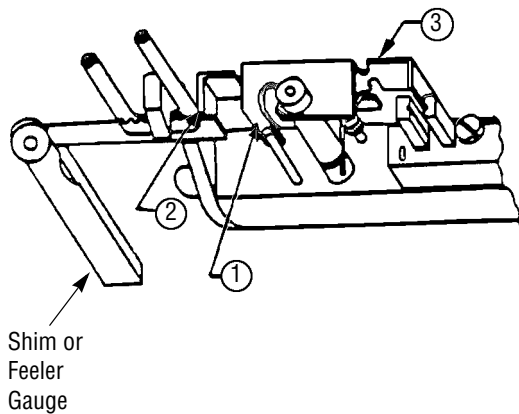


**Figure 7-2. Lid Latch Hook Adjustment**

15. Without removing 0.020" thick shim, insert an additional 0.060" (total 0.080") thick shim. Voltage reading should read 5 V.

*NOTE: If specifications in **Steps 14 and 15** are not met, the latch flag must be re-adjusted.*

16. See Figure 7-3. Bend leg (1) until flag edge (2) touches 0.020" shim installed and leg (1) touches pin.



**Figure 7-3. Lid Latch Flag Adjustment**

17. See Figure 7-3. Insert 0.060" shim (Total 0.080") between latch pawl, latch hook, and flag edge (2). Voltage should read 5 V. If not, bend leg (3) away from sensor, flag edge (2) is touching shims, and leg (1) is touching pin.

18. Remove shims from assembly.
19. Remove VOM from CN9 connector.
20. Reinstall shroud.

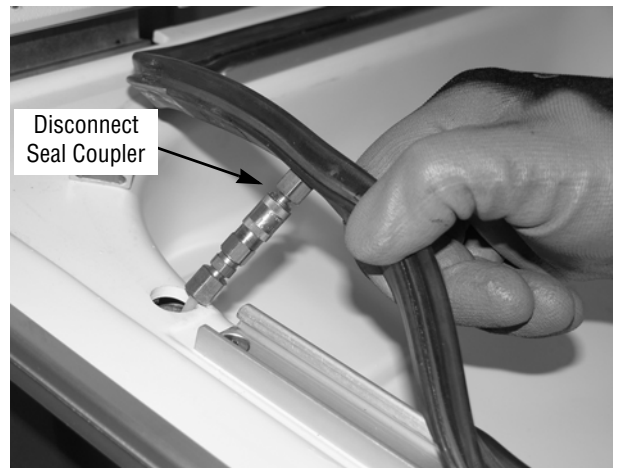
21. Remove caps previously installed, and re-connect inlet water hose to plastic valve fitting and drain hose to brass male fitting on opposite side.
22. Reinstall lid on electronics control box.
23. Plug unit into wall receptacle and run test cycles.

### 7.3 DRIP PAN ASSEMBLY REPLACEMENT

*NOTE: Replaceable components should be serviced by removing the drip pan assembly without turning the unit over. The lower shroud only needs to be removed when servicing the lower gas spring cylinder mount, the lid latch assembly, removal of air manifold assembly and circulation pump. Follow the lower shroud removal procedure for safe lifting and removal when required.*

**Important:** This procedure should only be performed by STERIS-trained technicians.

1. Unplug the processor from GFCI receptacle.
2. Open lid assembly and remove tray.
3. Remove any residue water in drip pan assembly. Using a syringe with a piece of tubing suction water from the large and small drogues until empty.
4. On the left side on the inflatable seal lift up to gain access to the quick connect air line. Disconnect air line.



**Figure 7-4. Disconnect Quick Disconnect Seal Coupler**

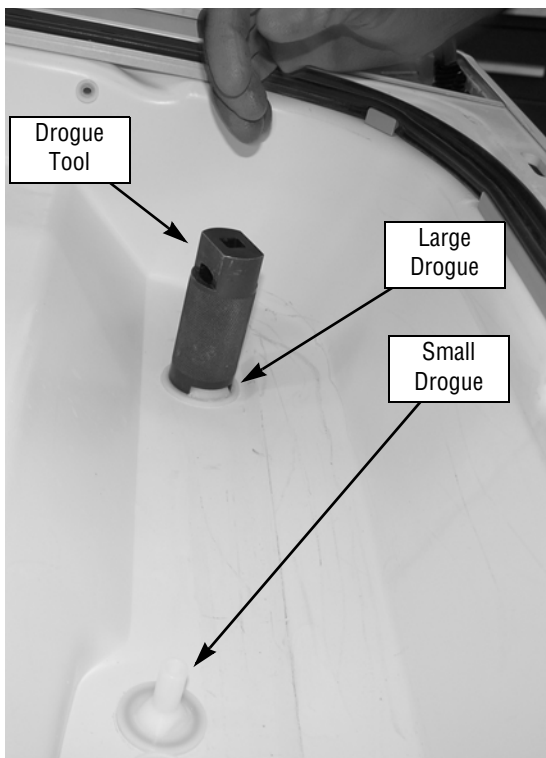
5. Remove inflatable seal from retaining bars and clips and set aside.
6. Remove two screws from each of the four retaining bars.





**Figure 7-5. Remove Seal Retaining Bars**

7. Use the large and small drogue tools, remove the drogues from the drip pan assembly. Inspect o-rings for damage and replace as needed.



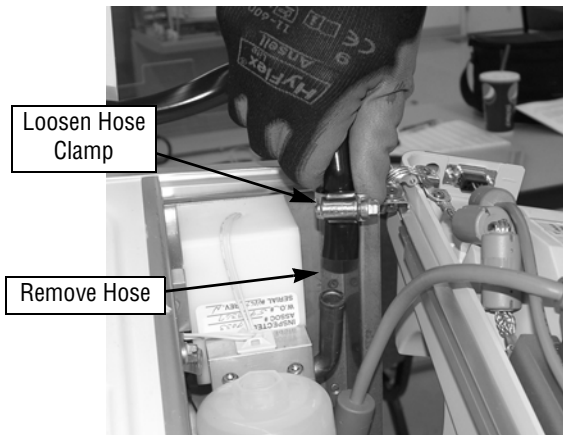
**Figure 7-6. Use Drogue Tools to Remove Drogues from Drip Pan**

8. Remove the printer cover from the control assembly by removing two screws on the printer cover bracket. Unplug take motor electrical connector and cut cable tie.



**Figure 7-7. Remove Printer Cover**

9. Loosen hose clamp on lid assembly black hose at the float block and remove hose.



**Figure 7-8. Remove Hose**

10. Remove the two screws on each the two control hinges from the frame side of the hinge and loosen other two screws.



**Figure 7-9. Loosen Control Hinge Screws**

11. Loosen the 8-32 setscrew from gas spring cylinder locking clevis pin.



**Figure 7-10. Loosen Gas Spring Setscrew**

**⚠ WARNING – PERSONAL INJURY OR EQUIPMENT DAMAGE HAZARD: Lid assembly is heavy. Always support lid assembly when gas spring cylinder is removed.**

12. Thread an 8-32 screw into threaded hole of locking clevis pin. Hold lid open with right hand and pull clevis pin out using 8-32 screw with left hand. Lean lid assembly back past 90° position and support in place.



**Figure 7-11. Remove Gas Spring Clevis Pin**

13. Support the control assembly with right hand and remove two remaining screws from control hinges. Lift drip pan assembly from front edge so trim band is removed from lower shroud and slide control assembly through drip pan band opening and set on electronics enclosure.
14. Secure control assembly back to the frame using one screw into each hinge.
15. Secure lid assembly by reinstalling clevis pin into gas spring cylinder.
16. Replaceable components are now accessible and available for servicing.

#### **7.4 ASPIRATOR ASSEMBLY LEAK TEST PROCEDURE**

##### **Equipment, Fixtures, Special Tools:**

1. Container with approximately 6" (152mm) of water.
2. Length of 1/8" tubing (approximately 12" [305 mm]).
3. 50 cc syringe.

##### **Procedure:**

1. Remove aspirator to be tested from tubing on adapter tray.
2. Install 1/8" tubing onto aspirator's 90° elbow and attach other end of tubing to syringe.
3. Plug orifice on end of aspirator probe with finger.
4. Submerge top of aspirator in water.
5. Using syringe, force air into aspirator and check for leaks, air bubbles. If leaks occur, aspirator should be replaced.

## 7.5 ADAPTER TRAY LEAK CHECK PROCEDURE

### Procedure:

1. Determine if leak is actually from adapter tray:
  - a. Check header block for leaks.
    - 1) Place a dry paper towel between drip pan and lid directly under header block.
    - 2) Run liquid chemical sterilant processing cycle.
    - 3) Remove towel before releasing seal. Towel should be dry.
    - 4) If not dry, locate leak in header block area and, if leaking, replace lid assembly.
  - b. Check anti-siphon check valve (CK10) for leaks:
    - 1) Disconnect outlet of CK10 and place end of tubing into small container to catch water.
    - 2) Run liquid chemical sterilization cycle (this must be a complete cycle with two rinses).
    - 3) Check for water leaking from tubing.
    - 4) If there is a leak, then replace CK10.
  - c. Check for leaks around lid seal:
    - 1) Dry off edges of adapter tray and drip pan.
    - 2) Close lid.
    - 3) Slip paper towels between lid and drip pan until they touch inflatable seal. Do this all the way around lid.
    - 4) Run complete liquid chemical sterilization cycle.
    - 5) Remove towels and check for moisture. Do this before releasing inflatable seal. If moisture is present, lid seal is leaking.
  - d. Verify adapter tray leak:
    - 1) Remove water from drip pan and dry with towel.
    - 2) Run complete liquid chemical sterilant processing cycle.
    - 3) After cycle, remove tray and measure quantity of water; allowable is 50-100 cc.
    - 4) Repeat using other container trays.
2. Locate leaks in adapter tray:
  - a. All types of adapter tray leaks.
    - 1) Check for loose hoses.
      - 2) Check for loose drogue fittings.
      - 3) Check for adapter tray binding when installing or removing.
      - 4) Check QD post.
    - b. Check for leaks caused by bad glue joints or cracks:
      - 1) Visually inspect bottom of tray for cracks in casting and cup cutter base. Pay special attention to the area around the cup cutter base.
      - 2) To locate bad glue joints or cracks that are not visible:
        - a) Run liquid chemical sterilant processing cycle.
        - b) When SYSTEM 1E Liquid Chemical Sterilant Processing System is draining, cover air inlet hole on air filter.
        - c) Watch for air bubbles entering chamber. This indicates source of leak.
        - d) Once leak source has been found, uncover air inlet hole and allow SYSTEM 1E Processor to drain.
    - c. Check H. P. tubing on adapter tray. The tubing may have a small tear at the 90 degree tubing connector on H. P. drogue.

## 7.6 LID SEAL SANDING PROCEDURE

### General

If upper seal sticks to the adapter tray after completion of an operating cycle for SYSTEM 1E Liquid Chemical Sterilant Processing System (Diagnostic or liquid chemical sterilant processing), check for sticking CK1 or clogged sterile air filter. Otherwise, implement this procedure.

### Equipment, Fixtures, Special Tools:

Medium (100 - 150 grit) or similar grade sandpaper.

### Procedure:

1. If upper seal is sticking to adapter tray, sand top face at rear splice area lightly to roughen finish.
2. If sticking persists, lightly sand entire face surface.
3. During retest, check for water leaks between upper seal and adapter tray.
4. If after sanding entire face surface sticking persists, troubleshoot unit for another possible problem. This may include the replacement of the sticking upper seal.

## 7.7 SEAL REPLACEMENT PROCEDURE

Replace inflatable seal as follows.

### Procedure:

1. Turn power OFF to unit.
2. Open Lid assembly and remove device tray.
3. Pull inflatable seal out of retaining bars and corner clips.
4. Pull air line from hole in drip pan assembly and disconnect quick disconnect coupler.
5. Check retaining bars and clips for any sharp edges. Remove any sharp edges with sand paper or file.
6. Install new inflatable seal by connecting quick disconnect coupler. Pull on line and coupler to ensure it is connected properly.



**Figure 7-12. Connect Quick Disconnect Coupler**

7. Place inflatable seal in forward retaining bar at an angle pushing under retaining bar lip.
8. Using a 1/8" Allen wrench elbow (rounded edge), push the other side under opposite lip of retaining bar. Repeat for each retaining bar and clip.



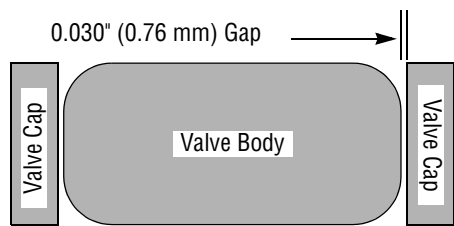
**Figure 7-13. Press Seal in Place Using Allen Wrench Elbow**

9. Use SECTION 6.4.7 SEAL LEAK TEST AND COMPRESSOR OUTPUT TEST to check new seal for any leaks prior to running a liquid chemical sterilant processing cycle.

## 7.8 PINCH VALVE SLEEVE REPLACEMENT PROCEDURE

### Procedure:

1. Turn OFF power and water supply to SYSTEM 1E Liquid Chemical Sterilant Processing System.
2. Remove shroud.
3. Using a strap wrench or similar tool, loosen caps on both ends of pinch valve. Remove body from SYSTEM 1E Liquid Chemical Sterilant Processing System.
4. Remove old pinch valve sleeve.
5. Clean body and caps of any foreign matter.
6. Install new sleeve into valve body.
7. Apply Vacuum Grease P/N 400033 to both faces of the sleeve.
8. Install body and hand-tighten both caps. Caps are fully tight when a 0.030" ( $\pm 0.005$ ") gap (use a feeler gauge) is present between the cap and the body. See Figure 7-14.



**Figure 7-14. Pinch Valve Gap Adjustment**

9. Exercise pinch sleeves.
  - a. Enter service mode (see SECTION 2) and manually activate and deactivate the pinch sleeve.
  - b. Enter valve test. Turn on S1 to inflate the drain pinch sleeve.
  - c. Turn on S4 to activate the drain pinch sleeve.
  - d. Turn on S3 to activate the circulation pinch sleeve.
  - e. Leave activated for 5 - 10 seconds.
  - f. Turn off S4 and S3.
  - g. Leave activated for 10 - 15 seconds.
  - h. Repeat steps c through g as necessary.

The exercising routine is a temporary measure designed to optimize pinch sleeve performance. Pinch sleeve materials may be changed in the future to improve durability and performance.

10. Re-install shroud, and run a test cycle. If no leaks are observed, place unit back into service.

## 7.9 CONCENTRATION PROBE CLEANING

### Equipment, Fixtures, Special Tools:

1. Vinegar
2. Scotch Brite™<sup>1</sup> Pad

### Procedure:

Scale on concentration probes may be corrected in one of three ways:

1. Pour vinegar into port and allow to sit for 15 minutes.
2. Probe depth is factory set and is critical to proper operation. Mark probe depth before removing to clean. Remove probes and clean with Scotch Brite pad. Reinstall probe at marked position.
3. If scale is too heavy, replace probe and block.

<sup>1</sup> Scotch Brite™ is a trademark of 3M.

## 7.10 SEAL PRESSURE REGULATOR/COMPRESSOR OUTPUT TEST

### Procedure:

1. Connect pressure gauge to bulkhead fitting at back of SYSTEM 1E Liquid Chemical Sterilant Processing System.
2. Energize compressor.
3. Measure output pressure of compressor. Maximum acceptable pressure is 44 psi (303.4 kPa).

**WARNING – PERSONAL INJURY HAZARD:** Disconnect all utilities to SYSTEM 1E Liquid Chemical Sterilant Processing System before servicing. Do not service the SYSTEM 1E Liquid Chemical Sterilant Processing System unless all utilities have been properly locked out. Always follow OSHA Lockout-Tagout and electrical safety-related work practice standards.

**WARNING – PERSONAL INJURY and/or EQUIPMENT DAMAGE HAZARD:** Repairs and adjustments to this equipment must be made only by fully qualified service personnel. Maintenance performed by inexperienced, unqualified personnel or installation of unauthorized parts could cause personal injury, invalidate the warranty, or result in costly equipment damage. Contact STERIS regarding service options.

## 7.11 POWER SUPPLY

### Procedure:

1. Turn OFF power and shut off water supply. Follow lock-out/tag-out procedures.
2. Remove lower shroud.
3. Remove control box cover.
4. Remove four mounting screws.
5. Slide power supply upward, and remove two connectors.

*NOTE: The larger connector requires use of a small flat-blade screwdriver to disengage the snap lock in order to remove it.*

6. Remove insulating pad from old power supply and attach to new power supply.
7. Install new power supply by following the steps outlined above in reverse order.

## 7.12 CONNECTOR BOARD

### Procedure:

1. Turn OFF power, and shut off water supply. Follow lock-out/tag-out procedures.
2. Remove lower shroud.
3. Remove control box cover.
4. Remove connectors from board.
5. Remove thermocouple wires.
6. Remove board.
7. Install new board by following the steps outlined above in reverse order.

*NOTE: When installing thermocouple wires, white goes to + and red goes to -.*

*NOTE: The new connector board is supplied with thermocouple calibration data. This data must be entered via the Service Mode. Select Calibration, and menu selection RESTORE. Refer to SECTION 2, SERVICE MODE, for complete procedure.*

*NOTE: The concentration monitor must be calibrated after board replacement.*

## 7.13 CONTROL BOARD

### Procedure:

1. Turn OFF power, and shut off water supply. Follow lock-out/tag-out procedures.
2. Remove connectors from rear of control.
3. Remove standoffs at each jack using a 3/16" nut driver.
4. Remove plastic cover.
5. Remove J6 and J7 ribbon connector (from Touch Pad).
6. Remove four screws holding sheet metal/board assembly to plastic panel.
7. Gently pick up sheet metal/board assembly and slide ribbon cables free.



**CAUTION – POSSIBLE EQUIPMENT DAMAGE HAZARD: Use care when picking up the sheet metal/board assembly, because the display and printer cables are still connected under the board.**

8. Tilt sheet metal/board assembly up and disconnect display cable first; then disconnect printer cable.
9. Remove sheet metal/board assembly from unit.
10. Remove board from sheet metal housing.

11. Prepare replacement board as follows:

- a. New boards are unprogrammed. Either a new-programmed chip set must be installed, or chip set from original board must be installed. New chip sets are marked U5 and U22; however, original board chip sets may not be so marked. U5 must be installed in U5 socket and U22 must be installed in U22 socket.

*NOTE: The dot on the chip must line up with the arrow in the socket.*

Use a PLC chip puller (STERIS P 764326-559) to remove chips. If this tool is not available, a 0.050" Allen wrench or similar device can be used to gently pry up chip from socket.

- b. Remove resistors R55 and R56 from the new board. These are located next to the J9 connector. DO NOT REMOVE THE R54 RESISTOR. R55 and R56 resistors must be removed in order to clear housing re-installed later.
- c. Check dip switch settings on new board and adjust so they match old board.

12. Install new board onto sheet metal housing.
13. Slide sheet metal/board assembly in place, connecting printer connector first, then display connector.

*NOTE: The display cable is not keyed. If not sure as to the proper positioning of the connector, look at both connectors on the cable. Pin 1 of the connector is indicated by an arrow. The Pin 1 designation on the display board can be seen easily so that the display end of the cable can be matched up easily. On the control board, Pin 1 designation is not seen easily; however, the back side of the pins can be seen. Pin 1 has a square cross-section, and therefore the Pin 1 of the connector must be aligned with the pin with the square cross-section.*

14. Complete installation by following steps outlined above in reverse order.
15. Perform a burn-in and calibration of transducer, thermocouples, concentration monitor and UV system before placing unit back into service.

## 7.14 PROGRAM CHIP CHANGE

### Equipment, Fixtures, Special Tools:

1. Wrist strap.
2. PLC puller (P-764326-559 or equivalent).

**Procedure:**

1. Print calibration values from Service Mode.
2. Turn OFF power to unit. Follow lock-out/tag-out procedures.
3. Open control panel and remove cables and back cover.
4. Using a PLC puller or equivalent, remove the flash memory chips from U5 and U22 sockets.
5. Install new program chips.  
*NOTE: Replacement chips are marked U5 and U22 and must be installed in the correct socket.*  
*NOTE: The dot on the chip must line up with the arrow in the socket.*
6. Re-install back cover and cables.
7. Turn power ON, while holding down "3" touch pad.
8. Select Burn-In from selections, to burn-in the software from new program chips.
9. Reload calibration values.
10. Turn OFF power then turn power ON.
11. Run a Diagnostic Cycle to check unit operation before returning unit to service.

**7.15 DISPLAY****Procedure:**

1. Turn OFF power and shut OFF water supply. Follow lockout/tagout procedures.
2. Remove control board.
3. Remove two screws holding display bracket to plastic housing.
4. Gently remove display.

*NOTE: Some adhesive from the touch panel causes the display to stick. Pull gently to prevent damage to the display or the touch panel.*

5. Remove bracket from display.
6. Complete installation by following steps outlined above in reverse order.

**7.16 PRINTER****Procedure:**

1. Turn OFF power, and shut off water supply. Follow lockout/tagout procedures.
2. Flip up cover exposing printer.
3. Loosen two screws holding printer in place and slide printer out.

*NOTE: The connector on the printer cable should slide out with the printer so the connector can be grasped when removing the printer. On earlier units, the printer cable was shorter, preventing access to the connector. On these earlier units, it is necessary to remove the control board for proper access to the connector for the printer.*

4. Complete installation by following the steps outlined above in reverse order.

**7.17 PRESSURE TRANSDUCER****Procedure:**

1. Turn OFF power, and shut OFF water supply. Follow lockout/tagout procedures.
2. Disconnect connectors to transducer, then remove transducer.
3. Inspect transducer and note model number.
4. Install a new transducer and reconnect wiring.

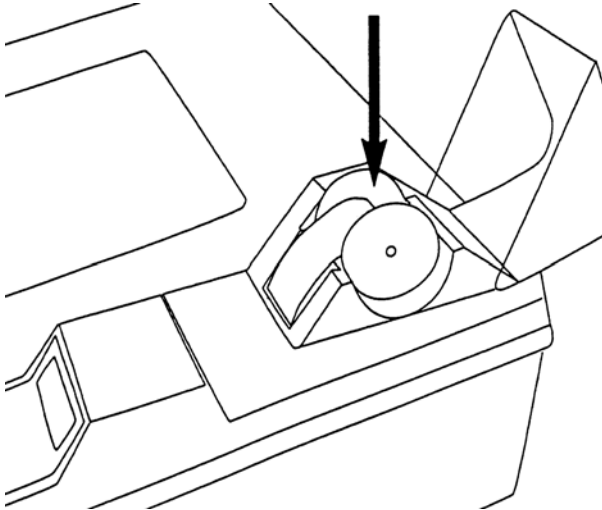
Dip Switch Settings:

NOSHOK - Position 1 OFF, Position 2 OFF.

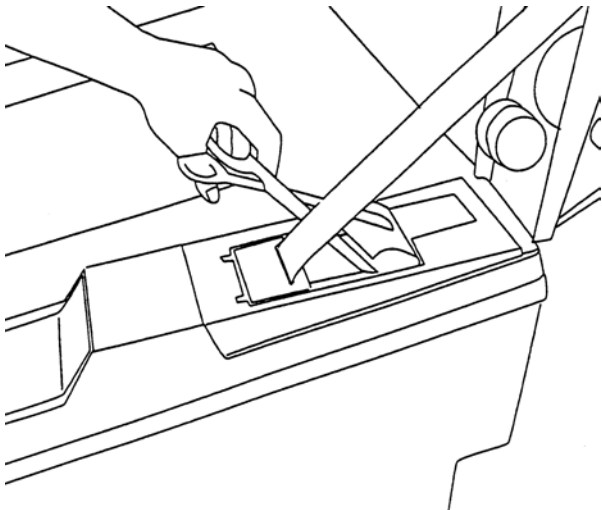
## 7.18 PAPERROLL AND INK CARTRIDGE REPLACEMENT PROCEDURE

### Paper Roll Replacement Procedure:

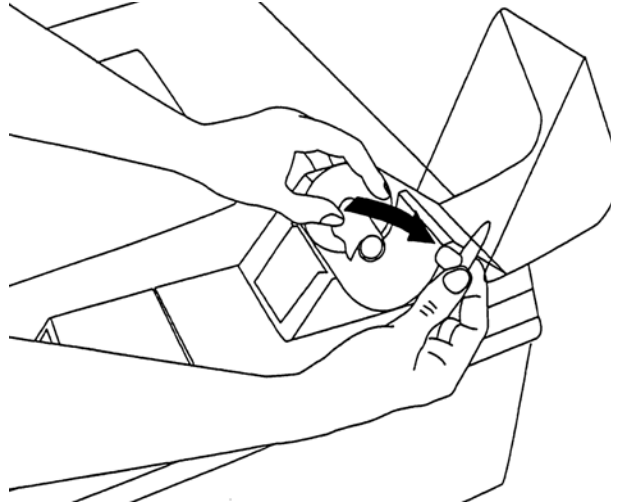
1. Lift up paper cover to remove old paper roll.



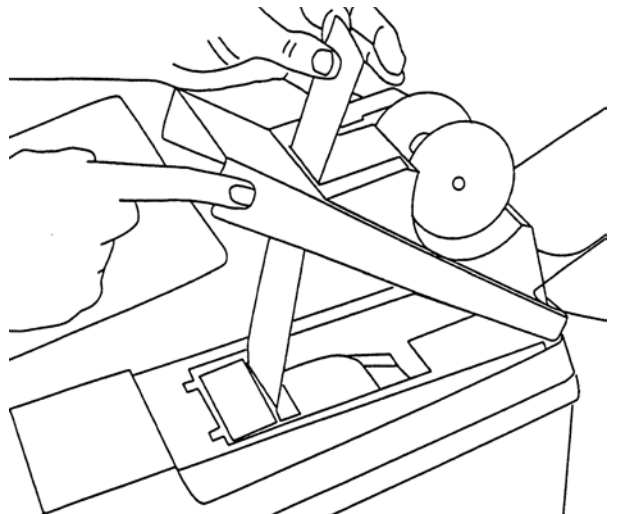
2. Discard old paper roll, then gently pull out and discard any remaining paper from ink cartridge area.



3. Place new paper roll on paper spool.

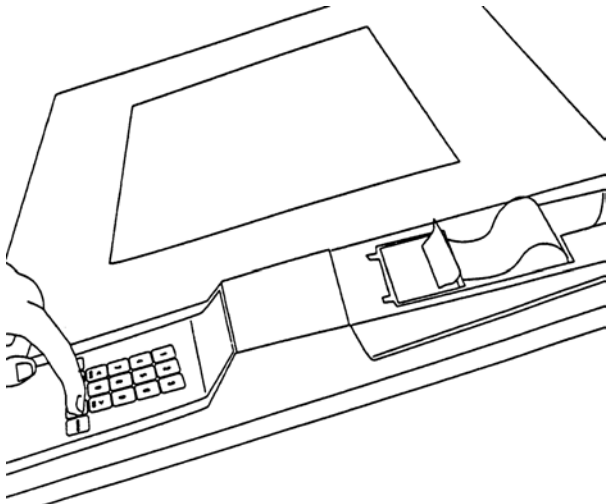


4. Manually feed end of paper roll into printer slot, just behind ink cartridge. Paper should fit through the space between ink cartridge body and ink ribbon.

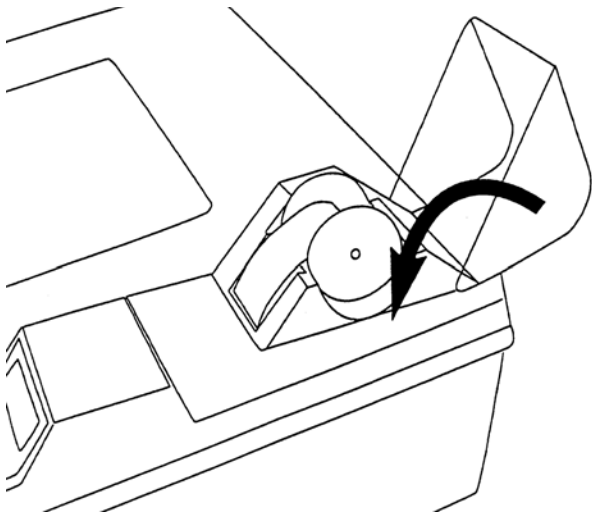




5. Press **PAPER FEED** touch pad until paper advances through printer and ink cartridge, exiting through front.



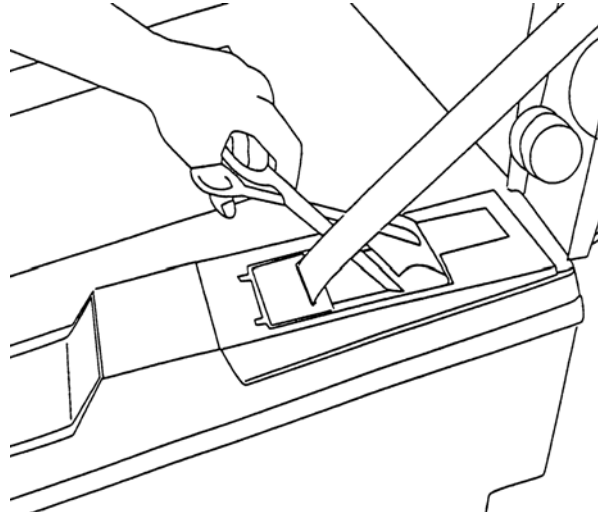
6. Close printer cover, slipping end of paper roll through upper housing cover (as shown).



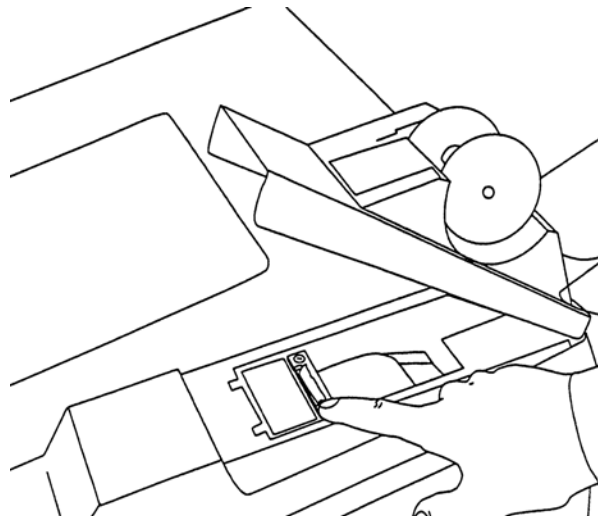
### Ink Cartridge Replacement Procedure

Change printer ink cartridge (P150828-440) whenever type on printouts is light and faded and before printouts become difficult to read. (Frequency of changing depends upon frequency of use.)

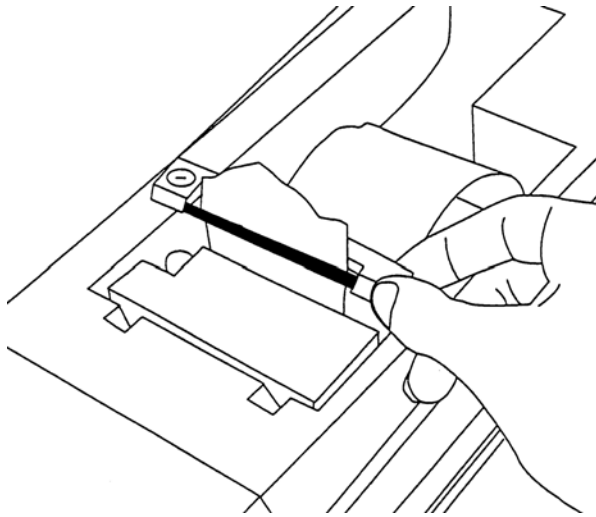
1. With printer take up housing cover closed, tear off excess paper at edge of the cover.



2. Lift up paper take up housing cover to access printer.



3. Press on right side of used ink cartridge (area marked **PUSH**) until cartridge pops out.



4. Slip used ink cartridge off end of paper and discard.
5. Slip new ink cartridge over paper, in same position as one removed, making sure paper feeds through printer and through space between ink cartridge ribbon and cartridge housing.
6. Press both left and right sides of cartridge simultaneously until cartridge snaps into place.
7. Tighten any slack in ink ribbon by turning adjustment wheel counterclockwise approximately 1/4-turn.
8. Close housing of printer take up.

## 7.19 CHANGING MAXPURE™ FILTER

**⚠️ WARNING – PERSONAL INJURY AND/OR EQUIPMENT DAMAGE HAZARD: SYSTEM 1E Processor performance has been validated and optimized with components defined by STERIS in the Operator Manual for the SYSTEM 1E Processor. Use of pre-filters that do not meet STERIS's specifications can lead to premature failure of the MaxPure Filter inside the processor. STERIS's warranty will not apply to damage or early life failure of the MaxPure Filter resulting from the use of pre-filters that do not meet STERIS's specifications. DO NOT USE components that do not meet STERIS's specifications.**

### Procedure:

**MaxPure Filter** - The MaxPure Filter is replaced, at a minimum, once every 90 days. The filter is also changed if the processor indicates a MaxPure Filter Membrane Test failure (see SECTION 5, TROUBLESHOOTING) or a Fill Time problem.

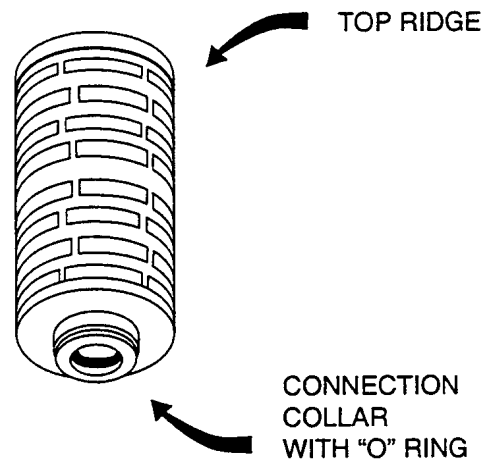
If the MaxPure Filter has not been changed within 90 days, the processor will printout the following message:

WARNING  
MAXPURE FILTER  
IN USE 90 DAYS  
SEE OPERATOR MANUAL

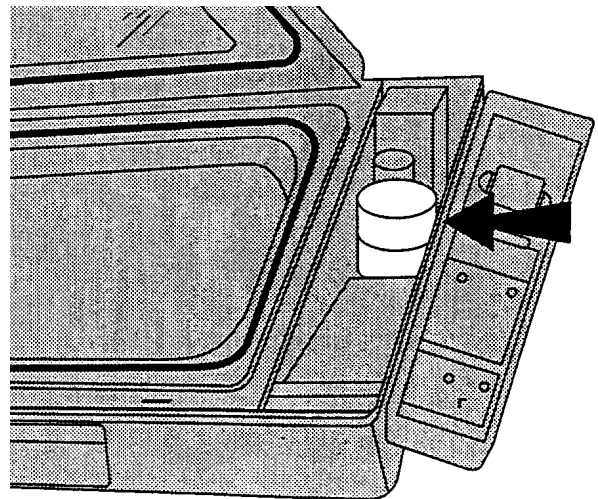
A Liquid Chemical Sterilant Processing Cycle or a Diagnostic Cycle cannot be started until the MaxPure filter is changed. If a cycle is attempted, the display for the System 1E processor will show:

Change MaxPure  
Filter

1. Unplug SYSTEM 1E Processor.

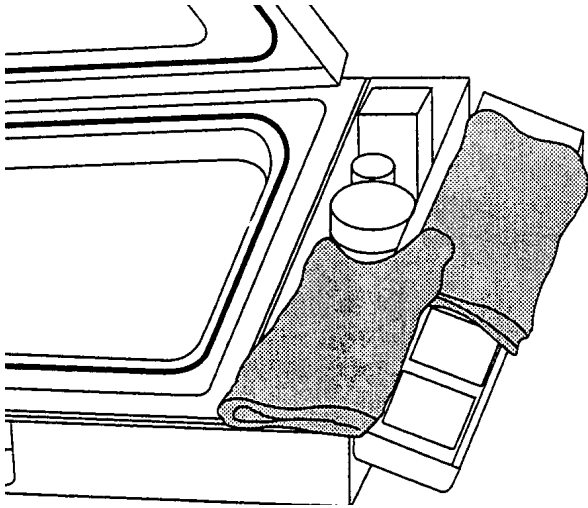


2. Locate housing of MaxPure Filter.  
Open control panel.  
Locate housing of MaxPure Filter.



3. Protect electronics.

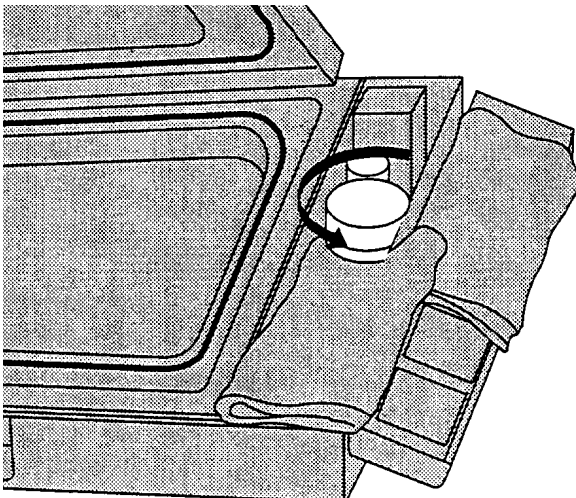
- Place an absorbent towel over electronic enclosures and printer paper to protect from water drops.



**CAUTION – POSSIBLE EQUIPMENT DAMAGE HAZARD:** Water spills on the microcomputer housing and/or the printer or printer paper may result in damage to the SYSTEM 1E Processor or create a paper jam.

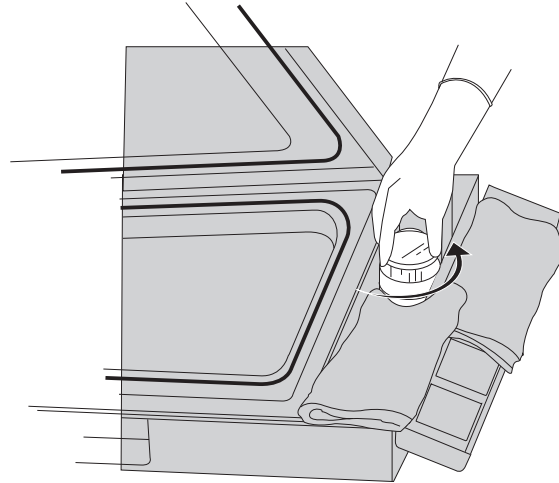
4. Remove housing cap of filter.

- Unscrew housing cap of filter by turning it counterclockwise.



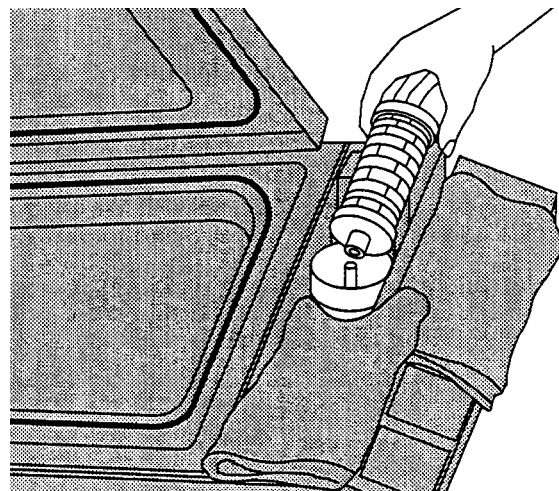
5. Remove filter.

- Pull up on metal ring on top of the filter while twisting to remove filter.



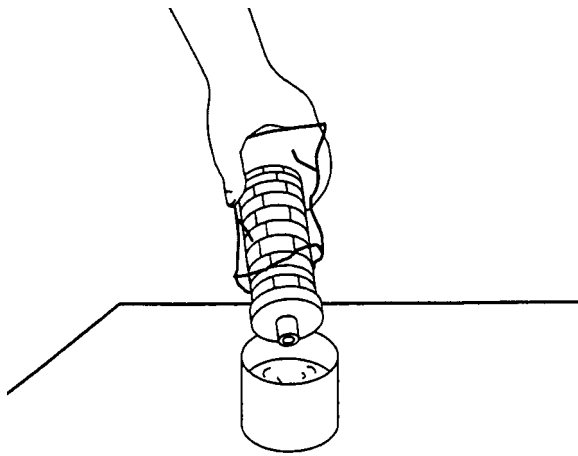
6. Drain water from filter.

- While holding filter over filter housing, permit water to drain from filter for 20-30 seconds.



7. Check replacement filter type.

- Examine replacement filter to verify it is exactly the same as the one being replaced (looks alike, same catalog number).
- If it is the same filter, proceed to **Step 8**.

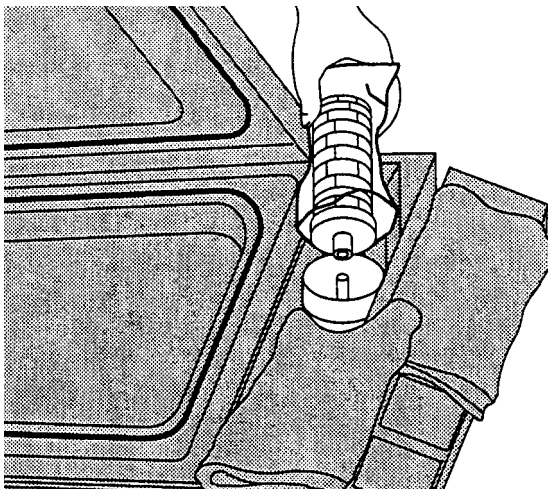


8. Replace with new MaxPure filter.

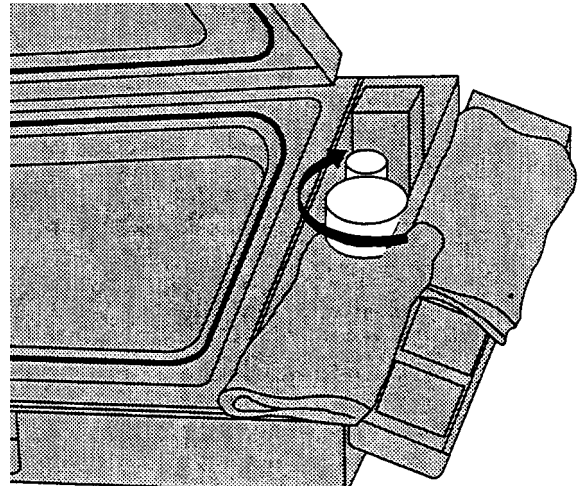
- Cut plastic wrap on seam near filter connection collar with O-ring.

**CAUTION – POSSIBLE EQUIPMENT DAMAGE HAZARD: Do not remove MaxPure filter from plastic bag until fully installed.**

- Dip end of filter in water to wet O-ring.



9. Insert filter. Align water filter core with copper tube in central housing of the MaxPure Filter. Slide filter out of plastic bag with O-ring down. Once MaxPure filter is in housing, press on top of filter to verify it is sealed (top edge of MaxPure Filter housing). Remove plastic bag.



10. Replace housing cap of filter. Line up threads and turn clockwise until snug.

11. Remove absorbent towels.

12. Close control panel.

13. Plug in SYSTEM 1E Liquid Chemical Sterilant Processing System.

14. Press "Change Values" button until message: "MAXPURE FILTER REPLACED?" appears.

Use arrow button to select "YES" and press "Save Values" button.

15. Initiate a Diagnostic Cycle.

A successful Diagnostic Cycle must be completed.

## 7.20 CHANGING STERILE AIR FILTER

**WARNING – PERSONAL INJURY HAZARD:** Disconnect all utilities to SYSTEM 1E Liquid Chemical Sterilant Processing System before servicing. Do not service the SYSTEM 1E Liquid Chemical Sterilant Processing System unless all utilities have been properly locked out. Always follow OSHA Lockout-Tagout and electrical safety-related work practice standards.

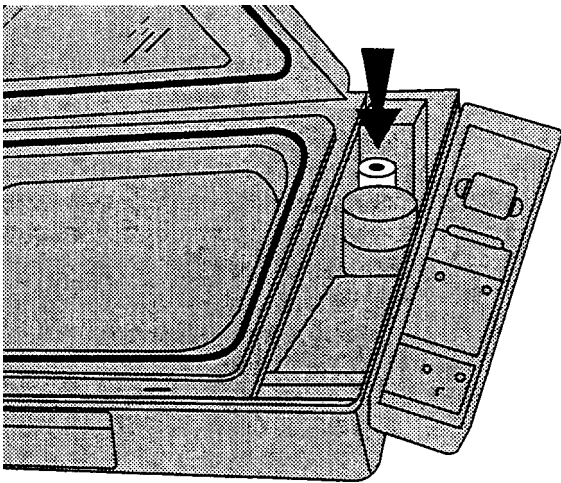
**WARNING – PERSONAL INJURY and/or EQUIPMENT DAMAGE HAZARD:** Repairs and adjustments to this equipment must be made only by fully qualified service personnel. Maintenance performed by inexperienced, unqualified personnel or installation of unauthorized parts could cause personal injury, invalidate the warranty, or result in costly equipment damage. Contact STERIS regarding service options.

### Procedure:

The sterile air filter should be changed every six months.

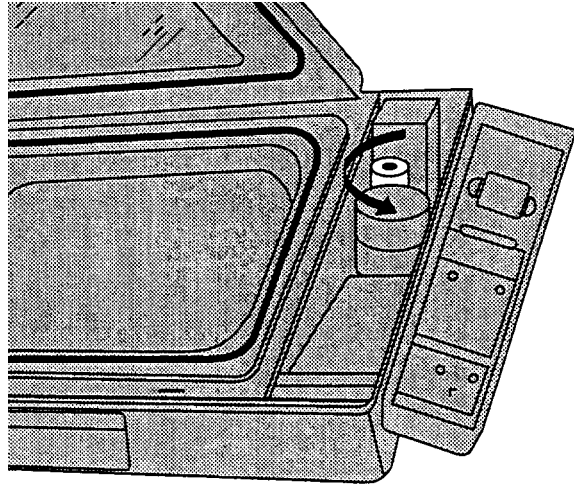
The sterile air filter must be installed in the SYSTEM 1E Processor prior to operation.

1. Open control panel and locate sterile air filter.



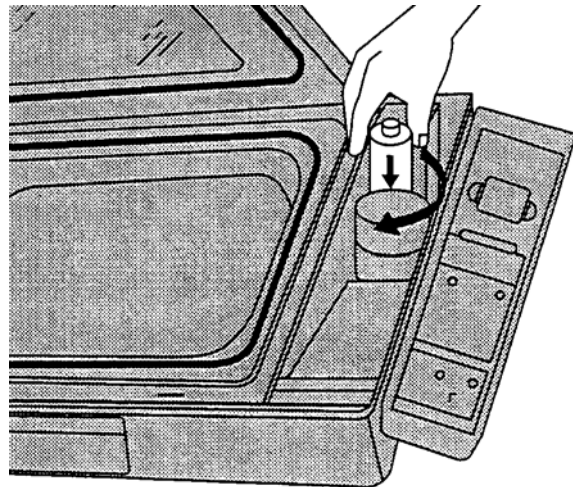
2. Remove air filter.

Pull up on metal ring on top of the filter while twisting to remove filter.



3. Replace with new air filter.

With flow arrow pointing down, turn filter clockwise.



4. Close control panel.

## 7.21 CHANGING PRE-FILTERS PROCEDURE

1. Turn OFF the water supply to the SYSTEM 1E Liquid Chemical Sterilant Processing System.
2. Press red button located on top of pre-filter to exhaust air.
3. Unscrew housing bowl from housing body (counterclockwise).
4. Remove and discard old filter, rinse housing bowl with clear water.
5. Install new filter:
  - a. For filter housing of the A filters or single filter assemblies: Place the filter cartridge into the housing bowl with black O-ring facing up.
  - b. For B filters: Install filter with black O-ring up, placing filter cartridge onto housing body.
6. Screw filter bowl onto filter housing (clockwise).
7. Restore water to filter assembly and SYSTEM 1E Liquid Chemical Sterilant Processing System.
8. Exhaust air.
  - Press red button located on top of housing of pre-filter to exhaust air.
  - Exhaust air from both pre-filters.

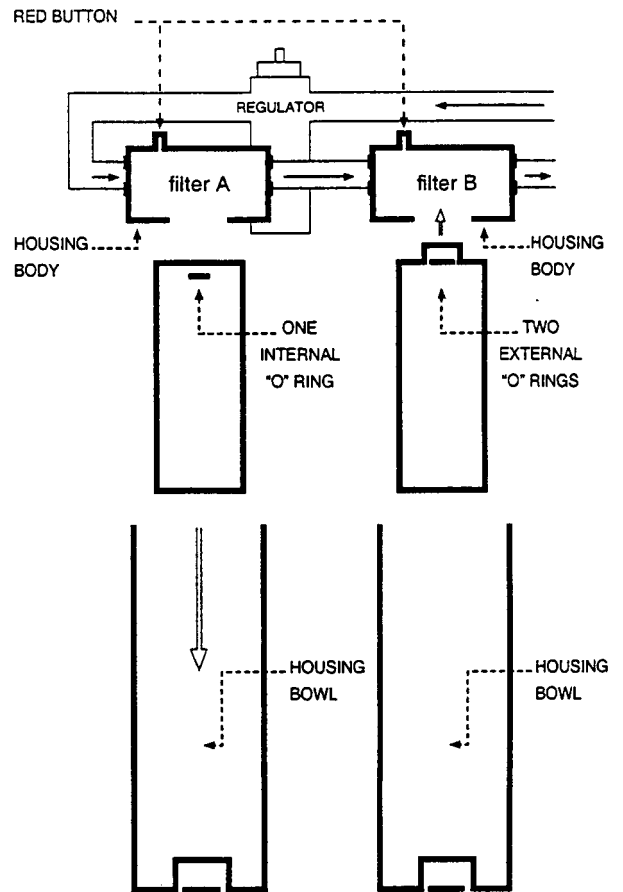
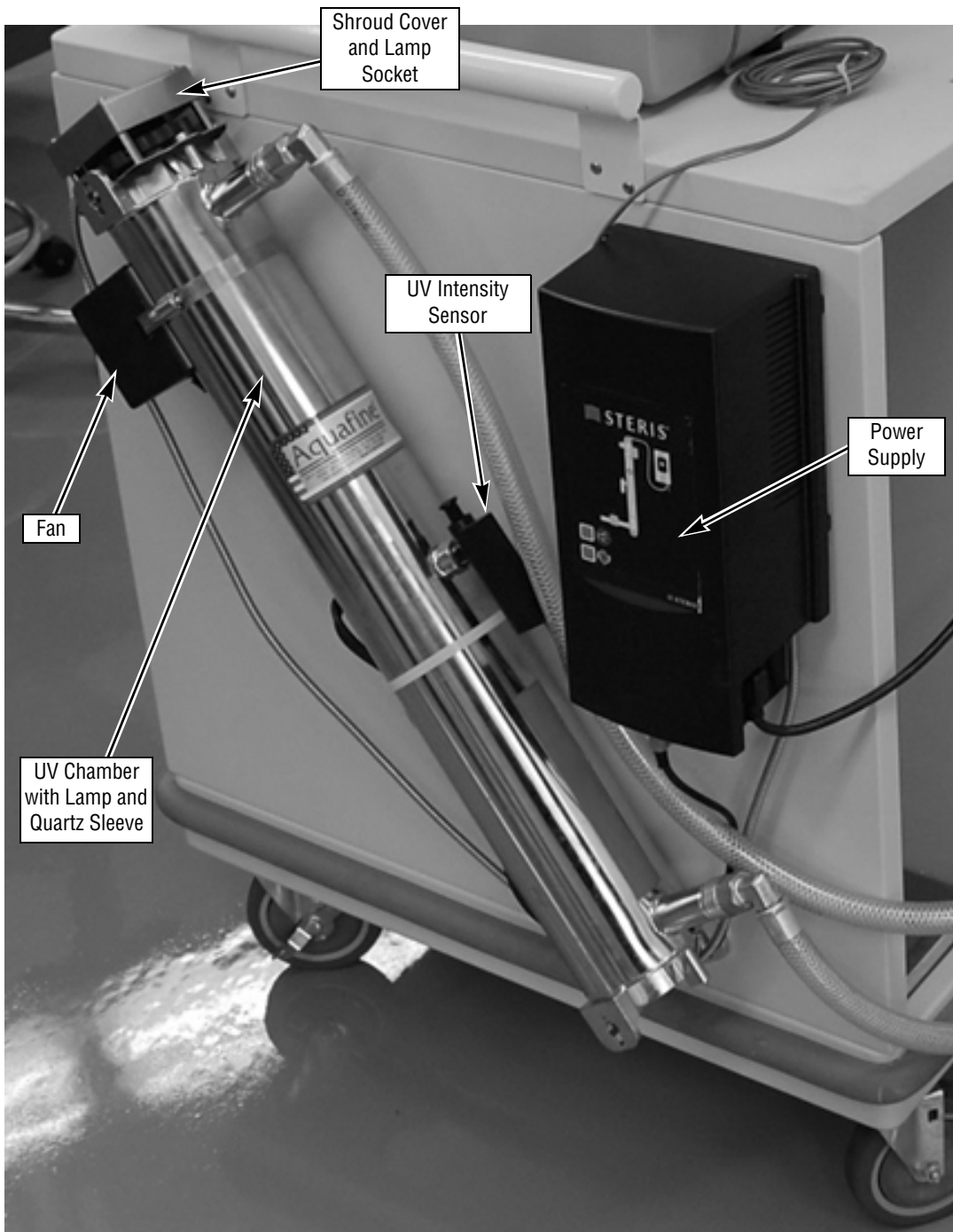


Figure 7-15. Pre-Filter Arrangement



**Figure 7-16. Ultra Violet Water Treatment System**

## 7.22 ULTRA VIOLET (UV) WATER TREATMENT SYSTEM

The UV water treatment system is made up of a power supply with control panel, UV chamber that houses a quartz sleeve and UV lamp, fan assembly and a UV sensor. The power supply provides power and control of the UV lamp inside the UV chamber. It gives a status of lamp operation and life. The fan removes excess heat

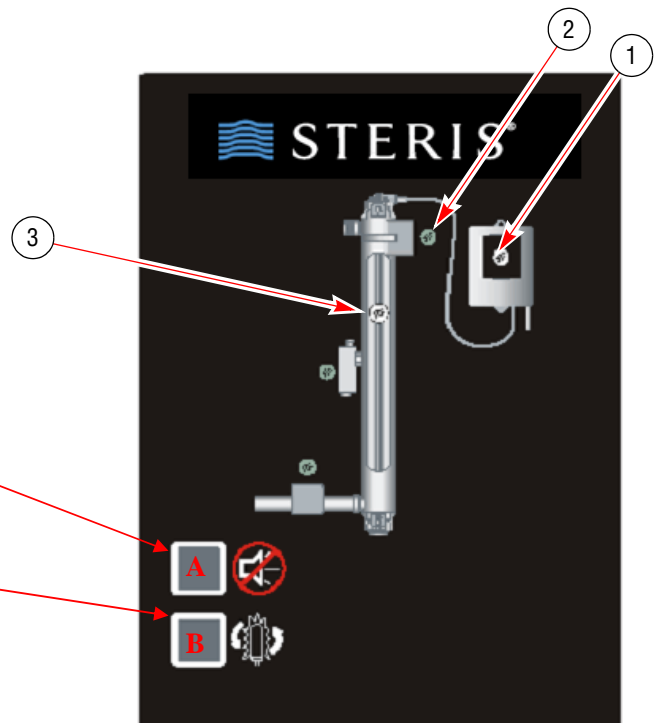
from UV chamber when water in the chamber is not flowing. The UV sensor measures the amount of UV light or intensity at the external sensor. The sensor is factory calibrated and is not field adjustable. This sensor ensures the UV light intensity is above the minimum for proper water treatment.

The power supply control panel pushbutton description and LED status are shown in Figure 7-17.

## The Control Panel

### Buttons

Button	Meaning
(A) Mute	Press this button in order to turn off the audible alarm. When the alarm is due to the lamp's age, the mute button will deactivate the audible alarm for 7 days; this may be repeated up to a maximum of 4 times.
(B) New Lamp	After installing a new lamp, press and hold this button until you hear a beep (about five seconds). This will reset the internal clock.



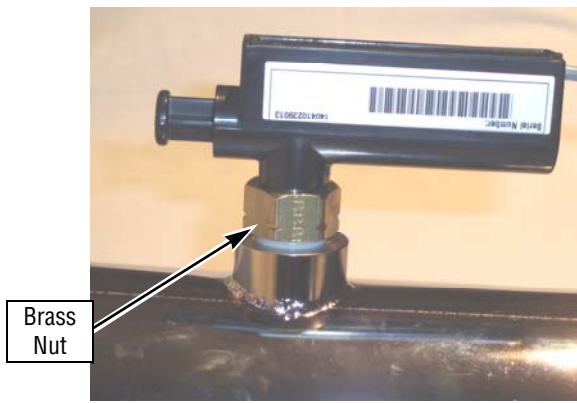
### Indicator lights

Indicator lights only indicate a problem with the component when flashing red.

	Green	Yellow	Flashing red	Solid red
(1)	Operating normally	Not applicable	Power supply failure; replace power supply	Ballast inactive due to lamp failure
(2)	Operating normally	Not applicable	Fan disconnected; reconnect  Fan turning slower than required; unplug system, clean blades using a Q-tip  Fan damaged; replace fan	Not applicable
(3)	Operating normally	Warning; lamp will require replacement shortly	Lamp disconnected; unplug system, reconnect lamp and plug-in system again  Lamp failure; replace lamp	Lamp inactive due to ballast failure

Figure 7-17. Aquafine STERIUUV5 Control Panel





**Figure 7-18. Loosen Brass Nut**

### 7.23 UV MONITOR REPLACEMENT



**DANGER – HIGH VOLTAGE:** Before attempting to dismantle, isolate power at control panel.



**DANGER – ULTRA VIOLET LIGHT:** UV Light is harmful to eyes and exposed skin. Do not run system with any covers or fittings removed.



**WARNING–PERSONAL INJURY and /or EQUIPMENT DAMAGE HAZARD:**

- The UV System is not user serviceable. All installation, maintenance work and service must be carried out by an authorized STERIS Service Representative only. Use only STERIS-approved replacement lamps, quartz sleeves and monitors.
- UV chamber may be under pressure. Before attempting to remove end plates, monitor or

quartz sleeve, depressurize and drain chamber.



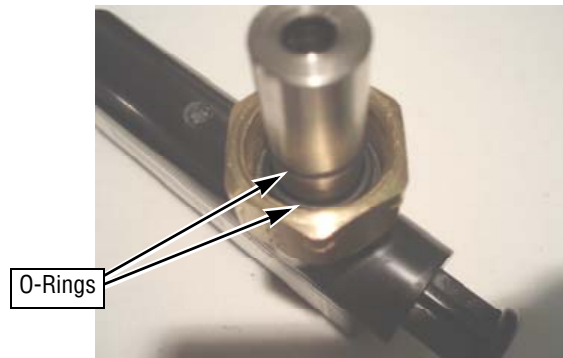
**WARNING – POTENTIAL BURN HAZARD:** Possible high temperature. Before attempting to dismantle, make sure UV chamber is in a cool state.



**CAUTION – POSSIBLE EQUIPMENT DAMAGE HAZARD:** Only use STERIS Corporation approved UV lamps and Quartz sleeves.

#### UV Monitor:

1. Unplug UV System from facility GFCI receptacle.
2. Turn off incoming water supply to ultra violet system.
3. Disconnect UV monitor cable from back of processor. Allow system to cool for 10 minutes.
4. Loosen and unthread the brass nut from sensor Quartz Hi-Hat assembly and remove sensor assembly as shown in Figures 7-18 and 7-19.



**Figure 7-19. Install O-Rings**

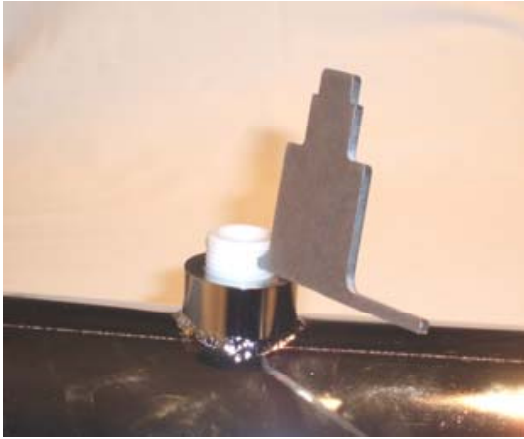
5. Install both new O-rings onto the replacements sensor assembly as shown in Figure 7-19.

## Quartz Hi-Hat Assembly:

Special Tools:

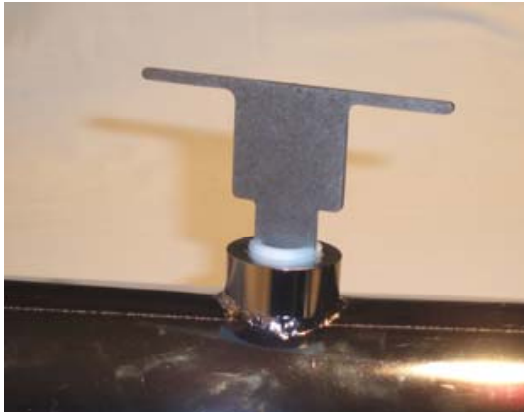
Sensor Tool – STERIS part number, 10006361.

1. Use sensor tool to unthread white sensor nipple from UV chamber (see Figure 7-27).



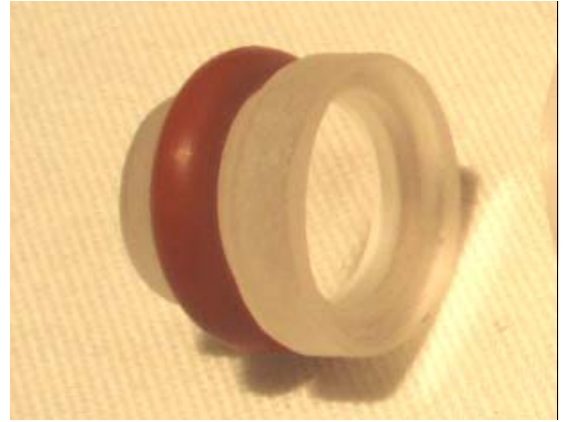
**Figure 7-20. Unthread Sensor Nipple**

2. Reverse tool and remove the sensor sleeve (see Figure 7-28).



**Figure 7-21. Remove Sensor Sleeve**

3. Remove Quartz Hi-Hat and O-ring from chamber by tilting chamber to one side and allowing the quartz Hi-Hat to drop out (see Figure 7-29).



**Figure 7-22. O-Ring and Quartz Hi-Hat**

4. Reinstall components in reverse order. Avoid over tightening the sensor sleeve. The sleeve should be tightened enough to compress the O-ring on the Quartz Hi-Hat. Thread the sensor nipple with the tool hole exposed (see Figure 7-20).
5. Install new UV sensor with O-rings installed. Hand tighten brass nut. Do not use a wrench to tighten brass nut.

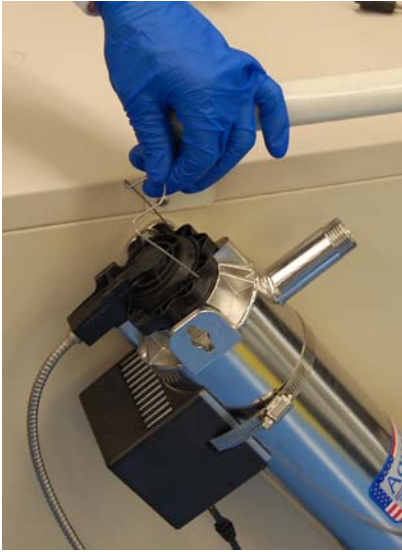
## 7.24 UV LAMP REPLACEMENT

1. Unplug UV System from facility GFCI receptacle.
2. Turn off incoming water supply valve to UV System and allow unit to cool for 10 minutes.
3. Remove four pan-head screws from the shroud cover as shown below (see Figure 7-23).



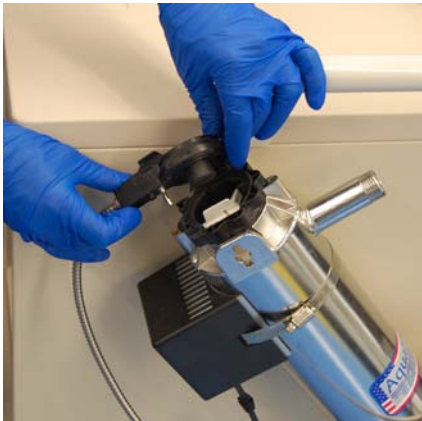
**Figure 7-23. Remove Screws from Shroud Cover**

4. Unlock lamp socket assembly by pinching wire and rotating wire form over the lamp socket as shown in Figure 7-24.



**Figure 7-24. Remove Wire Form**

5. Remove lamp socket by lifting up on socket evenly (see Figure 7-25). Set lamp socket aside carefully.



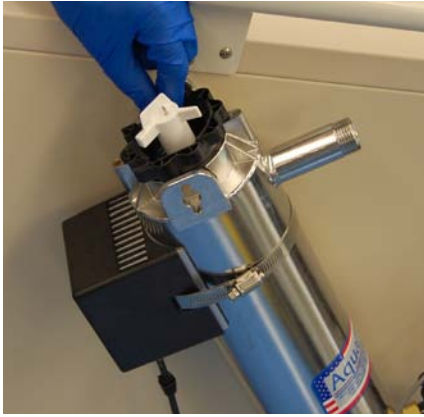
**Figure 7-25. Remove UV Lamp Shroud**

6. Remove UV lamp by rotating lamp counter-clockwise and slowly lifting the lamp straight out of chamber (see Figure 7-26).



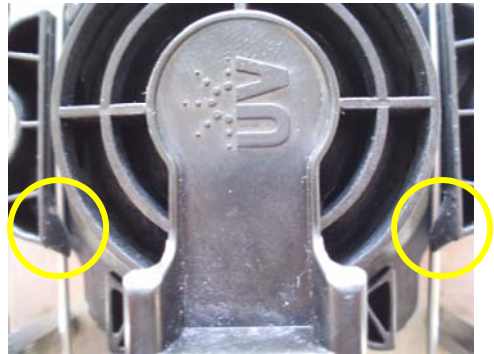
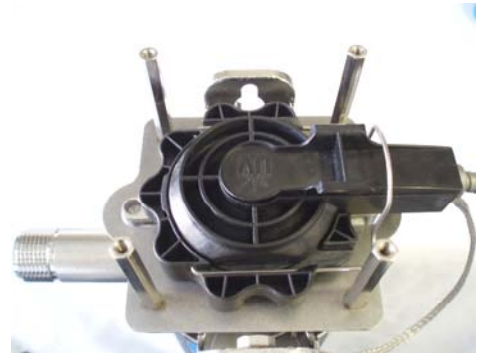
**Figure 7-26. Remove UV Lamp Slowly**

7. Install new UV lamp by sliding into the UV chamber slowly and rotating clockwise into the locked position, as shown in Figure 7-27.



**Figure 7-27. Install New UV Lamp**

8. Install UV chamber lamp socket.
  - Press socket firmly and evenly onto the lamp pins
  - Align banana jack on lamp socket with slot on the sleeve bolt
9. Lock the lamp socket using wire form. Pinch to lock wire under locking tabs as shown in Figure 7-28.



**Figure 7-28. Lock Lamp Socket with Wire Form**

10. Install shroud cover onto the standoffs on the shroud plate using the pan head screws as shown in Figure 7-29. After installation of a new lamp, reset the elapse-time meter on the lamp power supply. See Figure 7-29 and *SECTION 7.27, RESET UV LAMP ELAPSE-TIME METER.*



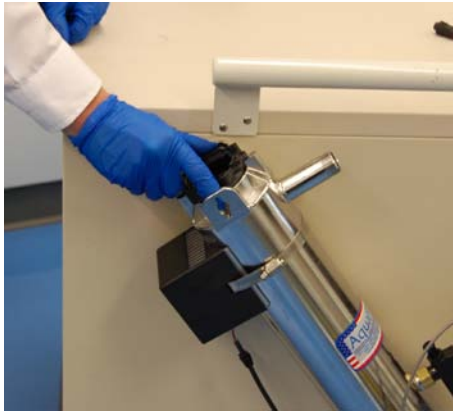
**Figure 7-29. Install Shroud Cover**

## 7.25 UV QUARTZ SLEEVE REPLACEMENT

Special Tools:

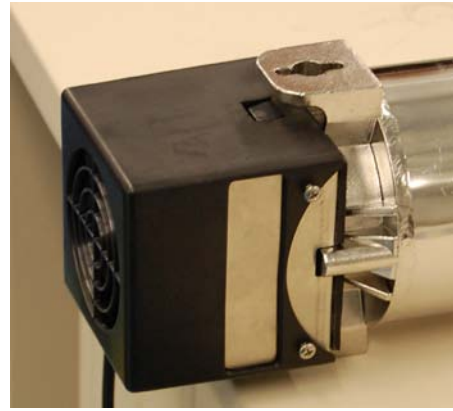
Quartz Sleeve Removal Tool – STERIS part number 10006364.

1. Unplug UV System from facility GFCI receptacle.
2. Turn off incoming water supply valve to UV System and allow unit to cool for 10 minutes.
3. Disconnect water outlet hose from UV chamber and drain water from UV chamber into a five-gallon bucket.
4. Follow **Steps 1 - 6** in *SECTION 7.24, UV LAMP REPLACEMENT* to remove UV lamp from chamber.
5. Remove quartz sleeve bolt by turning sleeve bolt 90° counter-clockwise and lift from shroud plate as shown in Figure 7-30.



**Figure 7-30. Remove Quartz Sleeve Bolt**

6. For UV chambers mounted horizontally, remove fan assembly from opposite chamber end by removing the four pan head screws securing fan to the support bracket as shown in Figure 7-31.



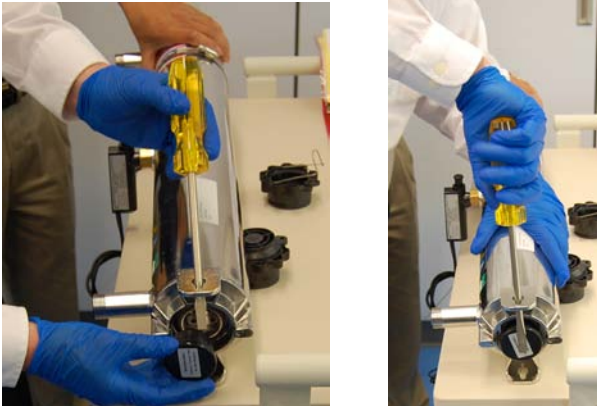
**Figure 7-31. Remove Fan Assembly**

7. Once the fan is removed (or for a vertically mounted UV chamber), remove one 10-24 x 3/4" pan head screw from opposite-end sleeve bolt. Turn the sleeve bolt 90° counter-clockwise and remove from chamber end, as shown in Figure 7-32.



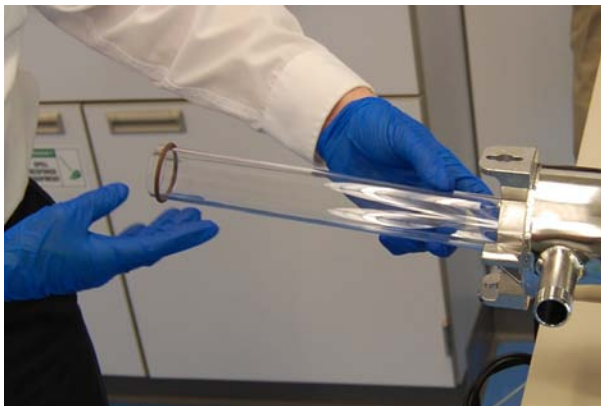
**Figure 7-32. Remove Quartz Sleeve Bolt (Opposite End)**

8. Insert Quartz Sleeve Removal Plug/Tool and carefully pry sleeve tool inward (using a large screwdriver) until quartz sleeve is free as shown in Figure 7-33.



**Figure 7-33. Free Quartz Sleeve**

9. Remove sleeve from chamber opposite end.
  - Support the sleeve so it does not drop when it passing internal chamber baffle.
  - Collect both O-rings from sleeve.
10. Inspect O-rings for damage and quartz sleeve for scratches, cracks and cleanliness. See Section 7.24 for quartz sleeve cleaning procedures. If quartz sleeve is cracked or scratched, a replacement quartz sleeve is required.



**Figure 7-34. Inspect O-Rings and Quartz Sleeve**

11. Install quartz sleeve by inserting sleeve bolt opposite end of lamp connector into UV chamber.
  - The locking screw is not required at this time.
  - The sleeve bolt is removed again in a **Step 16**.

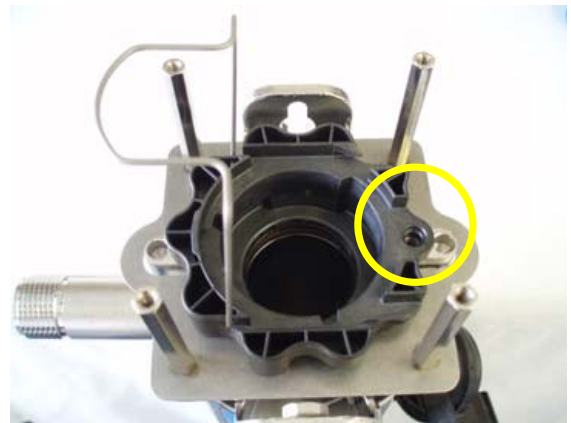
**CAUTION – POSSIBLE EQUIPMENT DAMAGE HAZARD:** Always use cotton gloves when handling quartz sleeve. Do not touch quartz sleeve with bare hands. Skin oils from bare hands can cause possible damage to quartz sleeve.

12. From the opposite end of chamber, insert quartz sleeve.
13. Insert beveled end of the sleeve first and pass it through the baffle on opposite end of UV chamber until it reaches the sleeve bolt. To prevent scratching, do not rotate the sleeve once positioned in chamber.
14. Wet one O-ring with water and place over top end of quartz sleeve as shown in Figure 7-35.



**Figure 7-35. Place Wet O-Ring on Quartz Tube**

15. Install shroud plate and sleeve bolt. Rotate sleeve bolt clockwise 90° until bolt reaches its stop, expect resistance seating the O-ring (the hole in the sleeve bolt aligns with the hole in the chamber housing) as shown in Figure 7-36.



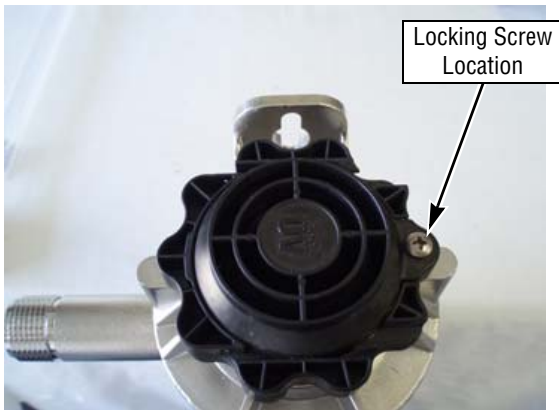
**Figure 7-36. Install Shroud Plate and Quartz Sleeve Bolt**

16. Remove the opposite end sleeve bolt, wet the second O-ring with water and place over the beveled end of quartz sleeve as shown in Figure 7-37.



**Figure 7-37. Install Opposite-End Quartz Sleeve O-Ring**

17. For horizontal mounted chambers, install fan bracket. Once fan bracket is installed or for vertically mounted chambers install sleeve bolt and turn it 90° clockwise, expect resistance when seating the o-ring. Lock with 10-24 x 3/4" pan head screw as shown in Figure 7-38.



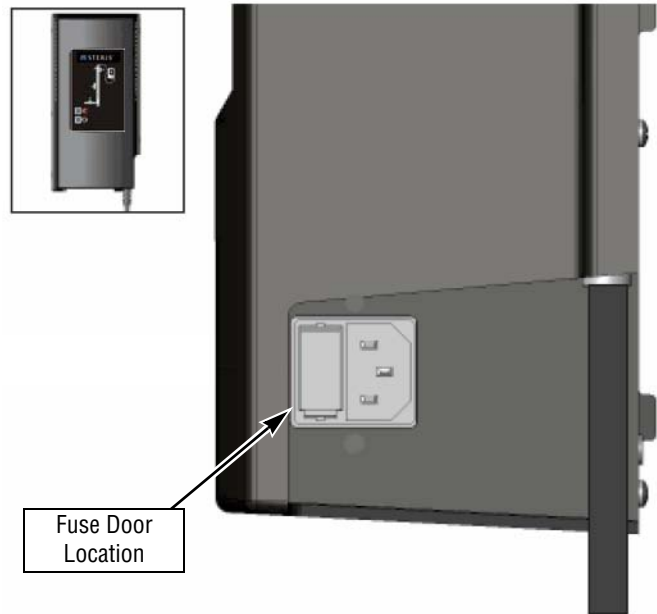
**Figure 7-38. Lock Shroud with Pan-Head Screw**

18. For horizontally mounted chambers, install fan on fan bracket using the four pan head screws to secure fan in place.
19. Quartz sleeve is now installed and sealed.
20. See SECTION 7.24, UV LAMP REPLACEMENT Steps 7 through 10 for lamp installation. Reinstall lamp, lamp socket and shroud cover.

## 7.26 UV POWER SUPPLY FUSE REPLACEMENT

The UV water treatment system is equipped with one functioning and one spare 250V, 2 Amp fuse. To replace fuse follow the steps below.

1. Unplug the power cord from the wall receptacle then disconnect power cord from the right side of the power supply.
2. Remove fuse door by pushing in the tap on one side using a small flat blade screw driver and gently prying outwards. Repeat on the other side of door and pull fuse holder out of unit. See Figure 7-39 for fuse door location.



**Figure 7-39. Fuse Door Location**

3. Replace blown fuse with spare and replace spare with a new 250V, 2 Amp fuse.
4. Reinstall fuse holder into power supply noting the location of the functioning fuse versus spare fuse.
5. Plug power cord back into power supply.
6. Plug power cord back into wall receptacle.

## 7.27 RESET UV LAMP ELAPSE-TIME METER

The elapsed-time meter measures the number of months that the lamp has been operating. The lamp must be replaced after it has been operating for 12 months. After 11 months of operation, the time meter indicator turns yellow. At 12 months of operation the meter sounds an audible alarm and the indicator turns red.

To reset the elapsed-time meter follow these steps.

1. Disconnect the power supply power cord from the wall receptacle and leave it unplugged for 10 seconds.
2. Press and hold the lamp reset pushbutton.
3. Plug the power cord into the wall receptacle while continuing to press and hold the lamp reset pushbutton. The indicator light flashes green for three seconds then indicator light flashes red. As soon as indicator light flashes red, immediately release the lamp reset pushbutton.

## 7.28 CONVERT FAN FROM VERTICAL TO HORIZONTAL MOUNTING CONFIGURATION

The UV System can be mounted either in a vertical or horizontal orientation. The UV water treatment system is shipped as a vertically configured system and the fan is mounted to the S/S chamber as shown in Figure 7-40. If the UV system will be mounted horizontally, the fan assembly needs relocated as described in the following steps.



**Vertical Mounted Fan Position**



**Horizontal Mounted Fan Position**

### Figure 7-40. Convert Fan from Vertical to Horizontal Mounting

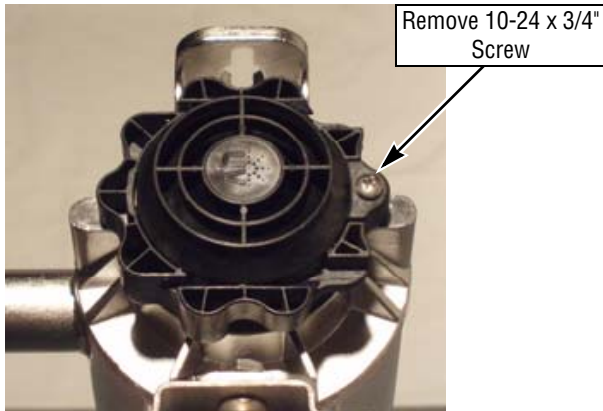
1. Remove fan assembly from the UV chamber by unthreading the 4" hose clamp and discard.
2. With a small flat blade screwdriver, lift the tabs on both sides of the housing and slide the heat sink from the fan cover as shown in Figure 7-41. Discard heat sink.





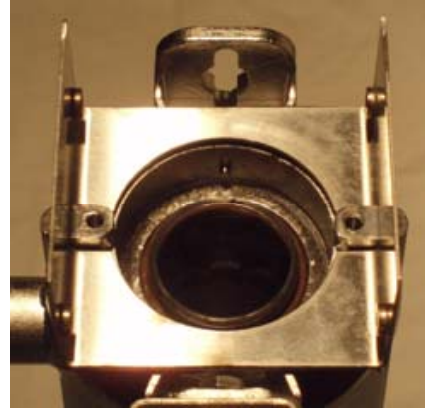
**Figure 7-41. Remove and Discard Heat Sink**

3. Remove 10-24 x 3/4" pan screw from sleeve bolt opposite of the lamp socket. Turn sleeve bolt 90° counter-clockwise and remove from chamber end as shown below.



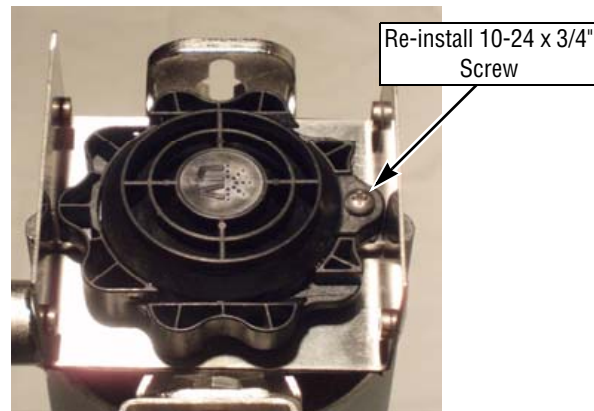
**Figure 7-42. Remove 10-24 x 3/4" Pan Head Screw**

4. Install the horizontal fan mounting bracket (shipped with the UV Water Treatment System) over the chamber ears as shown in Figure 7-43.



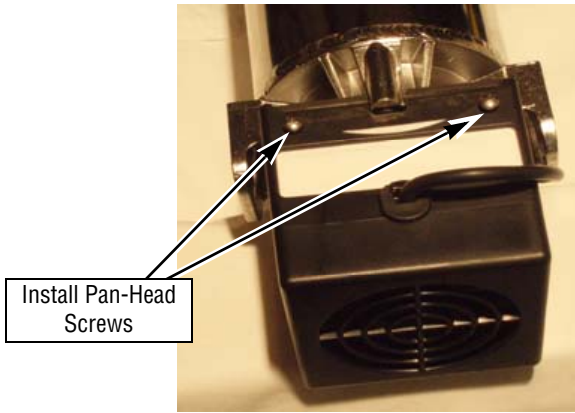
**Figure 7-43. Install Fan Mounting Bracket**

5. Re-install sleeve bolt and secure with locking pan-head screw as shown in Figure 7-44.



**Figure 7-44. Re-install Sleeve Locking Screw**

6. Slip fan cover on and secure with four pan-head screws as shown below.



**Figure 7-45. Install Fan Cover and Secure with Screws**

7. This completes the relocation of the fan assembly from a vertically mounted to a horizontally mounted UV chamber configuration.

### **7.29 UV LAMP SOCKET GROUNDING**

The lamp socket is grounded to the UV chamber using a 8-32 x 1/2" screw, #8 external-tooth lock washer and 8-32 nut as shown below. If power supply or lamp socket wire harness is replaced, ensure ground connection is made and it is tight. See Figure 7-46.



**Figure 7-46. Ensure Lamp Socket is Grounded**

### Live Document, Historical Table

Live Document Page Number	Figure Number/ Name	Manual Development Historical Record
(Front Cover)	Front Cover	<b>P:</b> Stamp "01/27/11 LIVE DOCUMENT" <b>C:</b> Document Manufacturing changes/manual errors and clarifications <b>A:</b> Stamped to show Live Document Date
4-3	Table 4-1 Preventive Maintenance Schedule	<b>P:</b> Frequency of 3.1, Replacement of Check Valves CK1, CK2, CK3 and CK11 is incorrect. <b>C:</b> Frequency changed. <b>A:</b> Step 3.1, Check Valves CK1, CK2, CK3 and CK11 need to be replaced 2x/year.



STERIS Live Documents

Updated: 12/21/2010

## **MAINTENANCE MANUAL**

### **Illustrated Parts Breakdown**

**System 1E<sup>®</sup> Liquid Chemical  
Sterilant Processing System**

**(10/21/10) P764333-676**

# A Word From STERIS Corporation



**IMPORTANT:** A listing of the *SAFETY PRECAUTIONS* to be observed when operating and servicing this equipment can be found in *SECTION 1* of the *Maintenance Instructions (P764333-674)*. Do not operate or service the equipment until you have been trained on this information.

Thank you for choosing this fine STERIS product. STERIS is committed to ensuring your continued satisfaction. This manual illustrates and identifies assemblies and components of the System 1E™ Liquid Chemical Sterilant Processing System. **All personnel involved in the use and maintenance of this equipment must carefully review and comply with the SAFETY PRECAUTIONS and instructions contained in the Maintenance Instructions (P764333-675). Do not begin service of this equipment until you have become familiar with this information.**

## GENERAL

Assemblies and components of the System 1E Liquid Chemical Sterilant Processing System are illustrated and identified on the following pages. The part number, the description and the quantity required for each usage are given. Each indentation in the description represents the assembly level. The **UNITS PER ASSEMBLY** column is specific for the given assembly or subassembly level.



**WARNING – PERSONAL INJURY AND/OR EQUIPMENT DAMAGE HAZARD:** Repairs and adjustments to this equipment must be made only by STERIS or STERIS-trained service personnel. Maintenance performed by unqualified personnel or installation of unauthorized parts could cause personal injury, result in improper equipment performance, invalidate the warranty, or result in costly damage. Contact STERIS regarding service options.



**CAUTION – POSSIBLE EQUIPMENT DAMAGE:** To prevent voiding the warranty or damaging the equipment, use only STERIS replacement parts.

## HOW TO USE THE ILLUSTRATED PARTS BREAKDOWN

1. Determine the function and application of the part required. Examine the list of illustrations and select the most appropriate title. Note the illustration page number.
2. Turn to the page indicated and locate the desired part on the illustration (see Example 1).
3. From the illustration, obtain the item number assigned to the part desired. Refer to the accompanying description for specific information regarding the part (see Example 1).
4. The abbreviation A/R means “As Required” or “Amount Required.”
5. The abbreviation SS means “Stainless Steel.”

## SPECIAL INSTRUCTIONS

**Table 1** provides part numbers and figure references for the most commonly replaced items on a System 1E® Liquid Chemical Sterilant Processing System. This table is for quick reference only. For a complete listing of parts, refer to the appropriate Figure and associated Illustrated Parts Breakdown (IPB) in this Section of the maintenance manual.

FIG. & ITEM NO.	PART NUMBER	S V C	DESCRIPTION	UNITS PER ASSEMBLY			
10-1	P 146667	035	Harmony LA Wall Control Assembly, Domestic.....	X			
	P 146667	327	Harmony LA Wall Control Assembly, Global.....		X		
	P 146667	358	Harmony LA Wall Control Assembly, LA2 .....			X	
	1 P	146667	278 ASSEMBLY, Cover/Membrane Replacement .....	1	-	-	1
	2 P	042631	045 SCREW, Socket Button Head, 1/4-20.....	4	-	-	4
	3 P	076230	091 WASHER, Lock, 1/4 External Tooth.....	4	-	-	4
	4 P	146667	087 COVER.....	1	X	1	-
	P	129382	215 • SCREW, Hex Head, 1/4-20 x 1/2.....	-	1	-	-
	P	129382	219 • WASHER, 1/4 .....	-	1	-	-
	5 P	143356	211 REFLECTOR.....	1	-	1	-

No indentation-part of top assembly

One indentation-first subassembly, part of assembly under which it is indented.

No indentation-part of top assembly

One indentation-first subassembly, part of assembly under which it is identified with an "X" in the column.

Example 1. How To Use IPB Page (Typical)

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---

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**Table 1. System 1E Parts – Quick Reference Guide**

<b>Part Number</b>	<b>Description</b>	<b>Quantity</b>
10004454	Air Compressor Assembly	1
10004458	Air Pressure Regulator	1
A1600	Aspirator	A/R
200160	Air Manifold Assembly	1
P093915-047	Battery Backed Ram Chip	1
400047	Bearing, Flanged Brass (Latch Assembly) (Pins 450002)	2
200173	Bulkhead Connector Assembly	1
400208	Bumper, Processor Feet (452007 Screw, 450211 Washer)	4
100209	Bushing, Drain Orange Silicon In General Proc. Tray C1200E	A/R
27B04300	Bushing, Drain Orange Silicon In Directed Flow Tray C1220E	A/R
400069	Caps, Shipping Inlet And Drain (Ea.)	2
400144	Caps Shipping Q.D. Post (Small) (Ea.)	1
400145	Caps Shipping Q.D. Post (Large) (Ea.)	2
400345	CK-1 Check Valve	1
400510	CK-2 , 3, 11 Check Valve	3
400368	CK-4 Kepner Valve	1
200226	Kepner Kit (Kepner, 2 O-Rings, Plastic Elbow, Plastic Nut)	A/R
P755718-203	Chip Set	1
400774	CK-5 ,6, 7 Check Valve, Air Manifold	3
400696	CK-8 Drain Check Valve	1
200696	CK-8 Rebuild Kit (2 O-Rings And Spring)	A/R
400219	CK-10 Check Valve, Anti-Siphon (Barb Fitting 100459)	1
200740	Circulation Pump Assembly Magnetic Drive	1
500078	Circuit Breaker - 0.5A CB2	1
500081	Circuit Breaker - 20A CB1	1
200656	Cross Block Assembly	1
400811	Drain Tube Assembly	1
10004547	Drip Pan Assembly (452004 Screw)	1
100614	Drain, Transition Block	1
200655	Drain Block Assembly	1



**Table 1. System 1E Parts – Quick Reference Guide**

<b>Part Number</b>	<b>Description</b>	<b>Quantity</b>
200148	Drogue, Large (Including O-Ring And Glyde Ring)	A/R
200149	Drogue, Small (Including O-Ring And Glyde Ring)	A/R
200732	Drogue, HP, For C1160E Tray	A/R
A1503	Filter, Sterile Air	A/R
200118	Filter Housing Cap, MaxPure™ Assembly	1
10004459	Filter Housing, MaxPure Assembly	1
A1564	Filter, MaxPure, Water	A/R
10005226	Filter, MaxPure, Water Filter A1564 Label	A/R
200387	Fluid Port Adapter (C1315E From Customer Service)	A/R
400059	Foam Tape	A/R
400245	Foam Plugs (Tubing Padding)	A/R
100596	Gasket, Drain Block To Heater Assy 1	
100359	Gasket, Hp Transition Block To Circ Pinch Sleeve Assembly	1
200056	Gas Spring Cylinder	1
500025	GFCI Hospital Grade Plug, 20A (Tech Only)	A/R
400033	Grease, High Vacuum (For Pinch Sleeves)	A/R
450400	Grommets (For Circulation Pump And Compressor)	8
100681	Heater Element Gasket	1
200137	Heater Housing Assembly, Stainless Steel	1
452202	Heater Housing Bolts	6
500106	Heater Element (120V Domestic)	1
100601	Hinge , Butt (Lid) 450100 Roll Pin	2
200176	High Pressure Pump (Flowjet)	1
100356	Hinge Shim	2
100345	Hold Down Blocks	2
613004	Hose 5/8 Blue (Drain And Inlet)	A/R
400806	Hose 5/8 Clear PVC (Drain And Inlet)	A/R
201013	Hose Adaper 90 Degree Elbow Kit	A/R
200960	Hose Assy Inlet And Drain, Clear Hose	1
400427	Hose Barb 45 Degree From CK10 To Hose From Drip Pan	1
450510	Hose Clamp (Black Hose To Brass Tube Float Block)	5
200257	Hose Coupling Kit (Includes Fitting and Clamp)	A/R
400241	Hose Nipple (Brass Conn. SOL 5, 7 To Hose Conn.)	A/R
200697	HP Pump Poppets	2

**Table 1. System 1E Parts – Quick Reference Guide**

<b>Part Number</b>	<b>Description</b>	<b>Quantity</b>
613006	HP Pump Tubing 3/16 Under Trays	A/R
200181	HP Trans. Block w/Concentration Probes (100359 Gasket)	1
P755716-468	Kit, Install (2 Pres. Gauges, Ball Valves And Hardware)	A/R
10004448	Kit, Installation Assembly	A/R
P764329-736	Kit, Shim For Lid Hinge	A/R
101012	Labels, Service	1
201178	Latch Shaft Flag Assembly	1
450100	Latch Shaft Flag Roll Pins	4
400047	Latch Shaft Flag Bronze Bushing	2
500019	LS-1 Thermo Switch, Manual Reset	1
300136	LS-2 Pressure Switch Assembly, 30 Psi	1
200042	LS-3 Float Valve Assembly	1
500173	LS-4 Switch Opto Photo	1
300137	LS-5 Pressure Switch Assembly, 40 Psi	1
500121	LS-6 High Pressure Switch - HP Pump	1
10009606	Lid Assembly	1
500088	Line Filter	1
400034	Loctite Thread Adhesive	A/R
100375	Logo Steris Prefilter Cover	1
10004613	Logo Steris Front of Lid (Large Label)	1
400426	Male Tee Branch (Nylon)	1
400141	Male Connector (For 613009, 3/16" Tubing 1/4" NPT HP Transition Block)	6
400143	Male Connector (For 613009, 3/16" Tubing Straight Conn. 3/8" Pinch Sleeves)	3
400375	Male Connector (For 5/16" Tubing 613027 Straight Conn.)	1
400376	Male Connector 90 Deg Elbow W/ Comp. Fitting On HP Pump	2
10004470	Male Connector 11/16" (Filter Housing Assembly)	1
10004620	Membrane Panel	1
400080	Metal Water Filter (Between SOL 8 and Sterile Water Filter)	1
400035	O-Ring Lube	A/R
450600	O-Ring (Large QD Post Under Drip Pan)	2
450601	O-Ring (Large O-Ring in drogue)	A/R
450605	O-Ring (Large QD Post In Drip Pan)	2
450606	O-Ring (Air Manifold Check Valve)	6

**Table 1. System 1E Parts – Quick Reference Guide**

<b>Part Number</b>	<b>Description</b>	<b>Quantity</b>
450608	O-Ring (Kepner Check Valve Outer)	1
450609	O-Ring (Small Q.D. Post In Drip Pan)	1
450610	O-Ring (HP Small Drogue Inside)	A/R
450611	O-Ring (Air/Water Valve)	1
450612	O-Ring (Small Q.D. Post Under Drip Pan)	1
450614	O-Ring (Kepner Check Valve, CK4, Inner)	1
450616	O-Ring (Between Large Drogue And Cup Cutter Assembly)	A/R
450617	O-Ring (Small In Air Manifold)	1
450620	O-Ring (Sterile Filter Housing Cap For 200119 New)	1
450621	O-Ring (CK 1, 2, 3 and 11)	6
450622	O-Ring (Prefilter Housing)	2
764334-066	PM Pack	A/R
P146665-002	PC Board Controller	1
P093915-200	PC Board Interface	1
400420	Pinch Valve Sleeves, Silicon	2
200654	Pinch Valve Branch Assembly	1
500068	Power supply 5 VDC	A/R
P136812-438	Power Supply Gold Connector	1
300071	Power Cord Assembly (International Models, Cord Not Shipped With Units)	1
100430	Prefilter Assembly Plastic Cover (100375 Logo)	1
A1501	Prefilter A 0.25 Micron Nominal	A/R
A1562	Prefilter B 0.10 Micron Nominal	A/R
A1567	Prefilter A (A1501) and B (A1562) Together In One Pack	A/R
A1563	Prefilter Dual Assembly	A/R
10004236	Prefilter A Housing	1
10004237	Prefilter B Housing	1
400356	SUMP, Pre-Filter with O-Ring	2
400507	Prefilter Wrench	A/R
400357	Prefilter Relief Button (Pressure)	1
P136817-134	Pressure Transducer Assembly	1
10004456	Pressure Regulator on the Prefilter Assembly	1
10004604	Printer Spool Assembly	1
10004604	Printer Spool Stud	1
P129367-593	Printer Take-Up Spool Tape (Teflon Disc)	A/R
P093922-486	Printer Take-Up Motor	1
P129362-819	Printer Paper (Box of 3 Rolls)	A/R
P150828-440	Printer Ribbon (Box of 2)	A/R

**Table 1. System 1E Parts – Quick Reference Guide**

<b>Part Number</b>	<b>Description</b>	<b>Quantity</b>
P093914-003	Printer Header Assembly	1
200180	Q.D. Air Line (From Bulkhead To Seal)	1
100038	Q.D. Post, Large (in Drip Pan )	2
100503	Q.D. Post, Small (in Drip Pan)	1
400451	Q.D. Post Tool, Large	A/R
400452	Q.D. Post Tool, Small	A/R
450100	Roll Pin (All Hinges)	4
100168	Screen, Tray	A/R
201153	Seal, Inflatable	1
100135	Seal Retainer Short, Inflatable Seal (452004 Screws)	2
100136	Seal Retainer Long, Inflatable Seal (452004 Screws)	2
10004538	Shroud (4 Screws Back Of Unit 452112)	1
10004631	Shroud Cover, Rear Access	1
200188	SOL 1 Compressor Relief	1
200189	SOL 2, 3, 4 Solenoid Valves	3
200154	SOL 5, 7 Dual Water Inlet Valve Assembly	1
200534	SOL 8 Air/Water Valve Assembly	1
500059	SSR 1, 2, 3, 4 Solid State Relay	4
500040	SSR 5 Solid State Relay	1
452800	Spring, Latch Bar Assembly	1
452802	Spring, Metal Filter	1
452803	Spring, High Force, Latch Flag	1
400036	Teflon Thread Sealant	A/R
400367	Teflon Tape 1/4 Wide	A/R
400150	Teflon Tape 3/8 Wide	A/R
100520	Thermocouple	3
A1003	Temperature Booster - 240 VAC Single Phase	A/R
A1004	Temperature Booster - 208 VAC Single Phase	A/R
A1017	Temperature Booster - 240 VAC Three Phase	A/R
A1018	Temperature Booster - 208 VAC Three Phase	A/R
A1005	Temperature Gauge	A/R
400001	Tie Wrap	A/R
400037	Tie Wrap Adhesive Mount	A/R
500066	Transformer (Isolation)	1

**Table 1. System 1E Parts – Quick Reference Guide**

<b>Part Number</b>	<b>Description</b>	<b>Quantity</b>
100459	Tubing Connector (Plastic Conn. In Drip Pan From CK 10)	1
613000	Tubing 3/8 ID Green For Tray, Also In Unit	A/R
613001	Tubing 1/2 ID Green Hose In Unit	A/R
613006	Tubing Under Tray 3/16 ID Clear	A/R
613007	Tubing 1/4 ID (CK10 to Tubing Conn. In Drip Pan, 100459)	A/R
613009	Tubing 3/16 ID for HP Pump (LS6 to Gray HP Block)	A/R
613027	Tubing Polyethylene From HP Pump to Copper Tee	A/R
613049	Tubing For Under New C1160E Trays, Clear	A/R
400140	Union Elbow w/Swage Lock In Drain Block (400139 Adapter)	5
400071	Washer, Blue Hose	A/R
400022	Water Tight Seal (Power Line Incoming To Unit)	1
	***** Harnesses & Cables *****	
P146665-364	AC Output Harness (P8 to P3)	1
P146665-365	DC Power Harness (P2 to P10 and P11)	1
P146665-363	DC Input Cable (P4 to P12)	1
10004506	Analog Cable (P5A to P5B)	1
P136817-135	Transducer Wire Harness (P6 To Pressure Transducer)	1
P136817-129	Serial Port Harness (P3 to Panel)	1
P093922-498	Display Harness (P1 to Display)	1
P093922-499	Printer Harness Assembly (P2 to Printer)	1
10004499	DC Power Supply Harness (Power Supply to J1)	1
10004501	UV Monitor Cable	1
	***** Service Items *****	
200314	Ball Valve Assembly	A/R
100381	Filter Plug	A/R
101012	Labels (Variables And History)	A/R
200273	FS Lid Adjustment Kit (4 Spacers and Covers For Seal Retainers)	A/R
P764328-474	SYSTEM 1 Tool Kit (Must Be STERIS Trained)	A/R
	***** PROCESSING TRAYS AND CONTAINERS *****	
C1140E	Flexible Endoscope - Container and Tray	A/R
C1602	Flexible Endoscope - Container Lid Only	A/R
C1142E	Flexible Endoscope - Tray Only	A/R
C1141	Flexible Endoscope - Container Only	A/R
C1200E	General Processing - Container and Tray	A/R
C1201	General Processing - Container Only	A/R
C1601	General Processing - Container Lid Only	A/R
C1202E	General Processing - Tray Only	A/R
C1220E	Directed Flow - Container and Tray	A/R
C1221	Directed Flow - Container Only	A/R
C1600	Directed Flow - Container Lid Only	A/R

**Table 1. System 1E Parts – Quick Reference Guide**

<b>Part Number</b>	<b>Description</b>	<b>Quantity</b>
C1222E	Directed Flow - Tray Only	A/R
C1160E	Universal Flexible Processing Tray	A/R
C1392	Incubator (Adjustable 30 - 60 Degrees C)	A/R
S3033	Thermometer Replacement Kit For Incubator	A/R
C1390	Vaccustat Clips (Orange Clips for Test Strips) 2/PK	A/R

Figure 1. SYSTEM 1E Piping Schematic

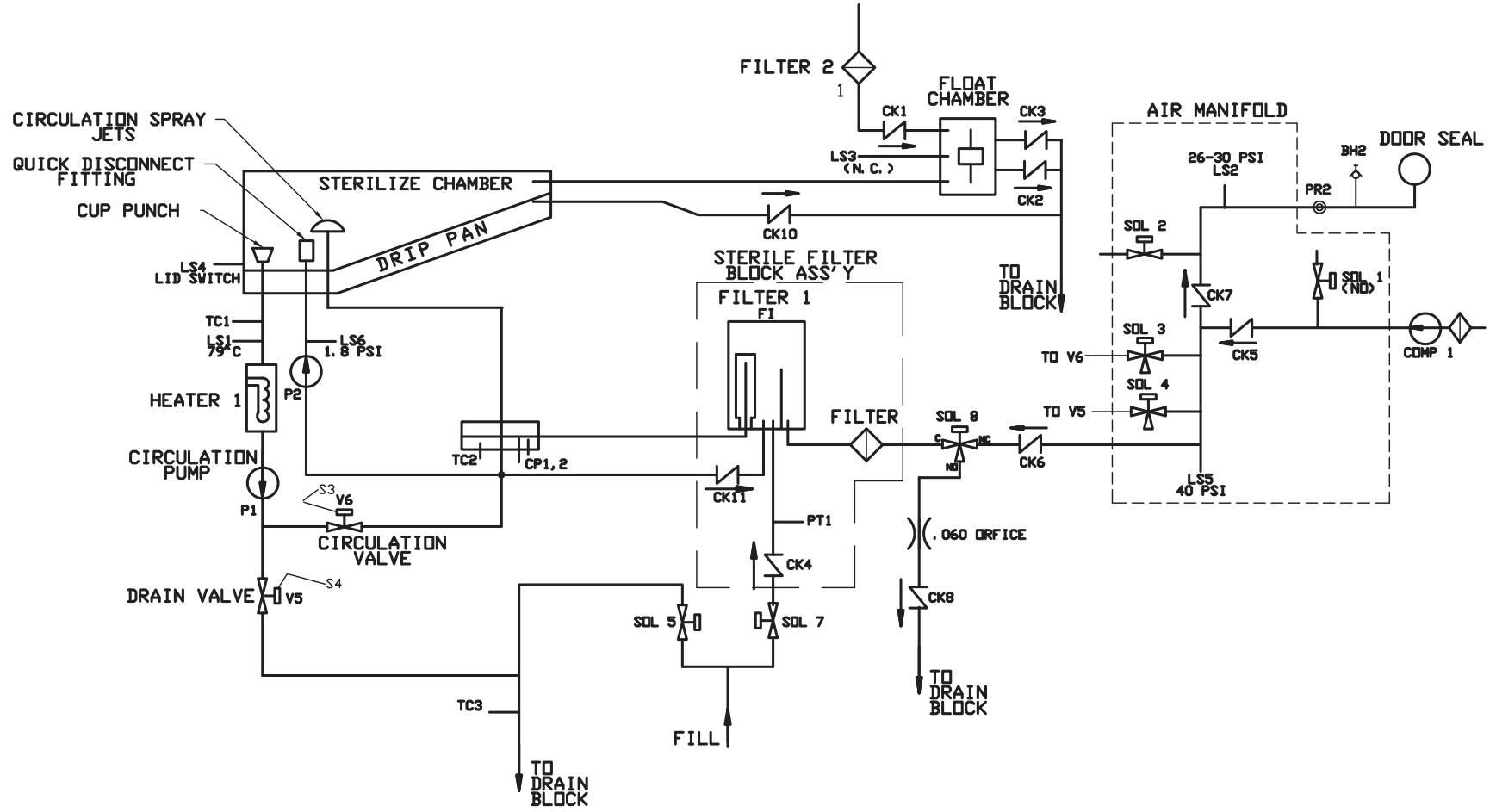
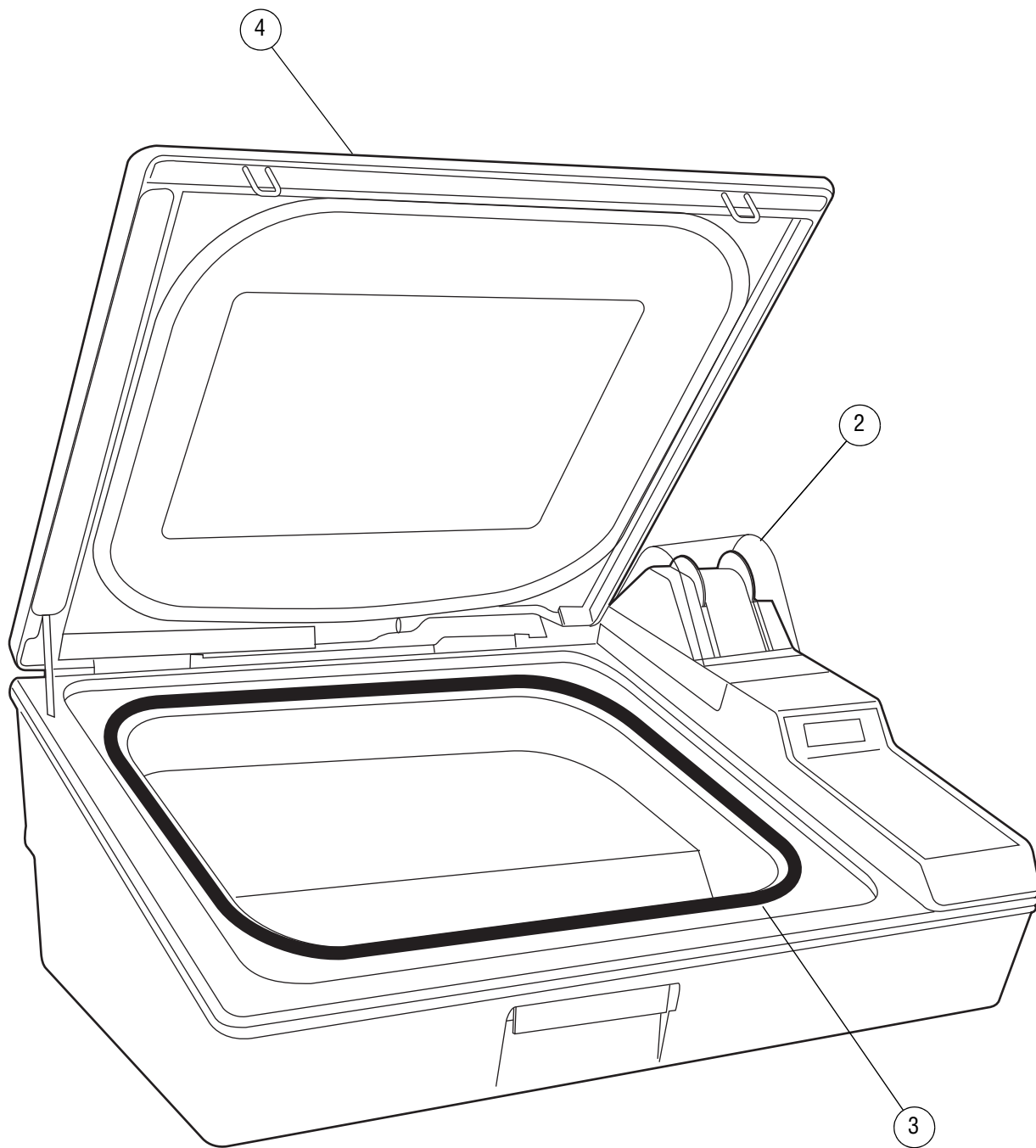


Figure 1. SYSTEM 1E Piping Schematic

**FIGURE 1. SYSTEM 1E PIPING SCHEMATIC**

<b>Chart Name</b>	<b>Part No.</b>	<b>Description</b>
BH2	200173	Bulkhead, Seal
CK1	400345	Air Inlet Check Valve
CK2	400510	Float Block Drain Check
CK3	400510	Float Block Drain Check
CK4	400368	Backflow Preventer Check Valve For Incoming Water
CK5	400774	Air Manifold Check Valve
CK6	400774	Air-Water Check Valve (In Air Manifold)
CK7	400774	Air Manifold Check Valve
CK8	400696	Drain Check Valve
CK9	N/A	Pressure Relief Valve (Internal To Pump 2)
CK10	400219	Anti-Siphon Check Valve
CK11	400510	Backflow Prevention for Circulation Check Valve
COMP	10004454	Air Compressor Assembly 115V
CP1, CP2	200181	HP Transition Block (Includes Conductivity Probes)
FLT1	10004459	Sterile Filter Housing
FLT2	A1503	Sterile Air Filter
HTR1	500106	Heater Element (1500 Watt) 120 V ac Only
LS1	500019	Thermal Cutoff Switch
LS2	300136	Seal Pressure Safety Switch
LS3	200042	Float Block Assembly
LS4	500173	Lid Switch
LS5	300137	Compressor Control Switch
LS6	500121	H.P. Pump Monitor (Pressure Switch)
P1	200740	Circulation Pump 120 V ac Only
P2	200176	High Pressure Pump 120 V ac Only
PR2	10004458	Air Pressure Regulator, Seal
PT1	P-136817-134	Pressure Transducer
SSR1, 2, 3, 4	500059	Solid State Relay
SSR5	500040	Solid State Relay
SOL1	200188	Compressor Release Valve Solenoid
SOL2, 3, 4	200189	Seal Release, Circulation and Drain Pinch Valves
SOL5, 7	200154	Dual Water Inlet Valve Assembly
SOL8	500122	Air-Water Solenoid Valves
TC1	100520	Thermocouple #1 (Drain Transition Block)
TC2	100520	Thermocouple #2 (High Pressure Transition Block)
TC3	100520	Thermocouple #3 (Drain Block Assembly)
V5	400420	Drain Pinch Valve
V6	400420	Circulation Pinch Valve

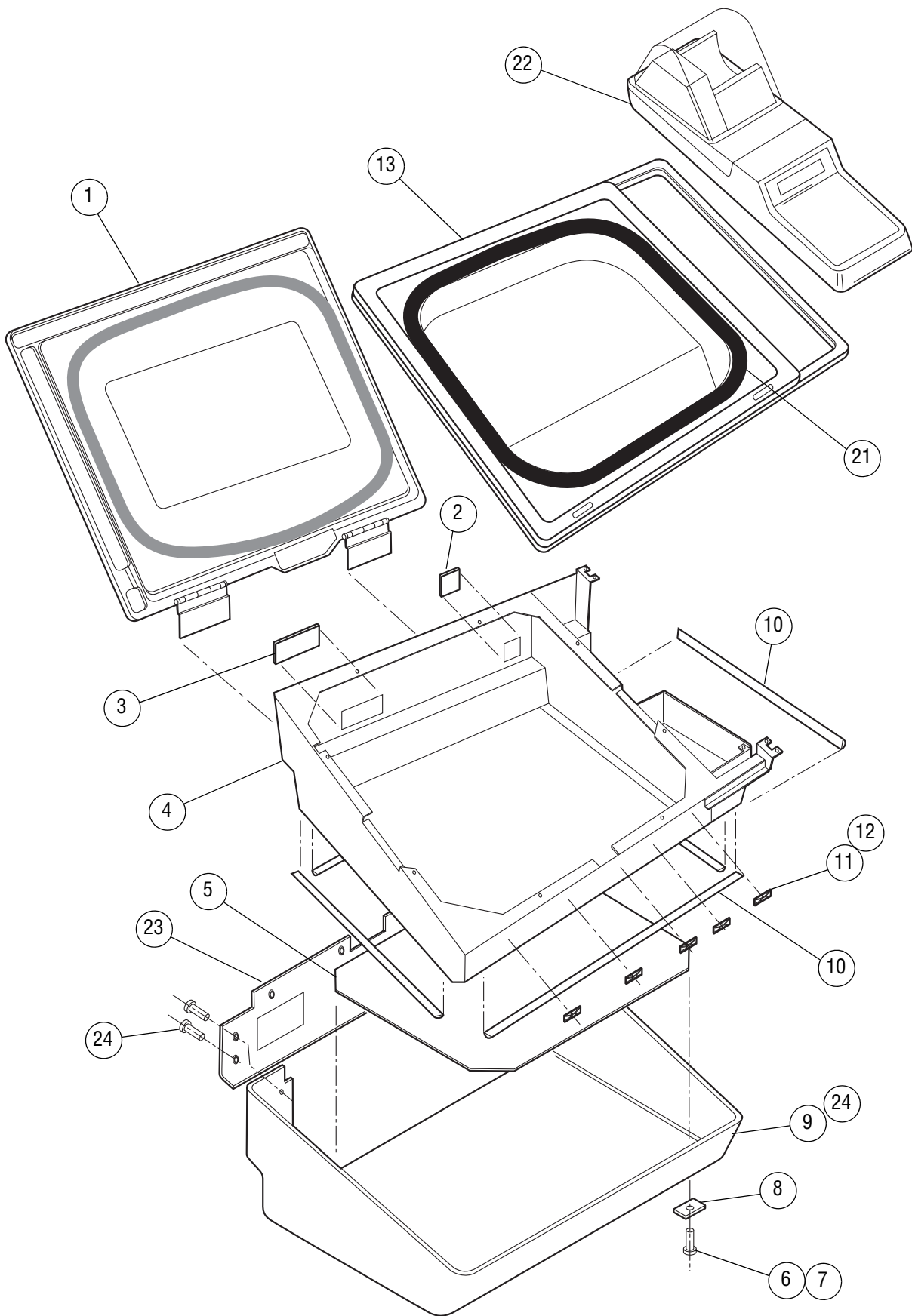




**Figure 2. SYSTEM 1E Complete**

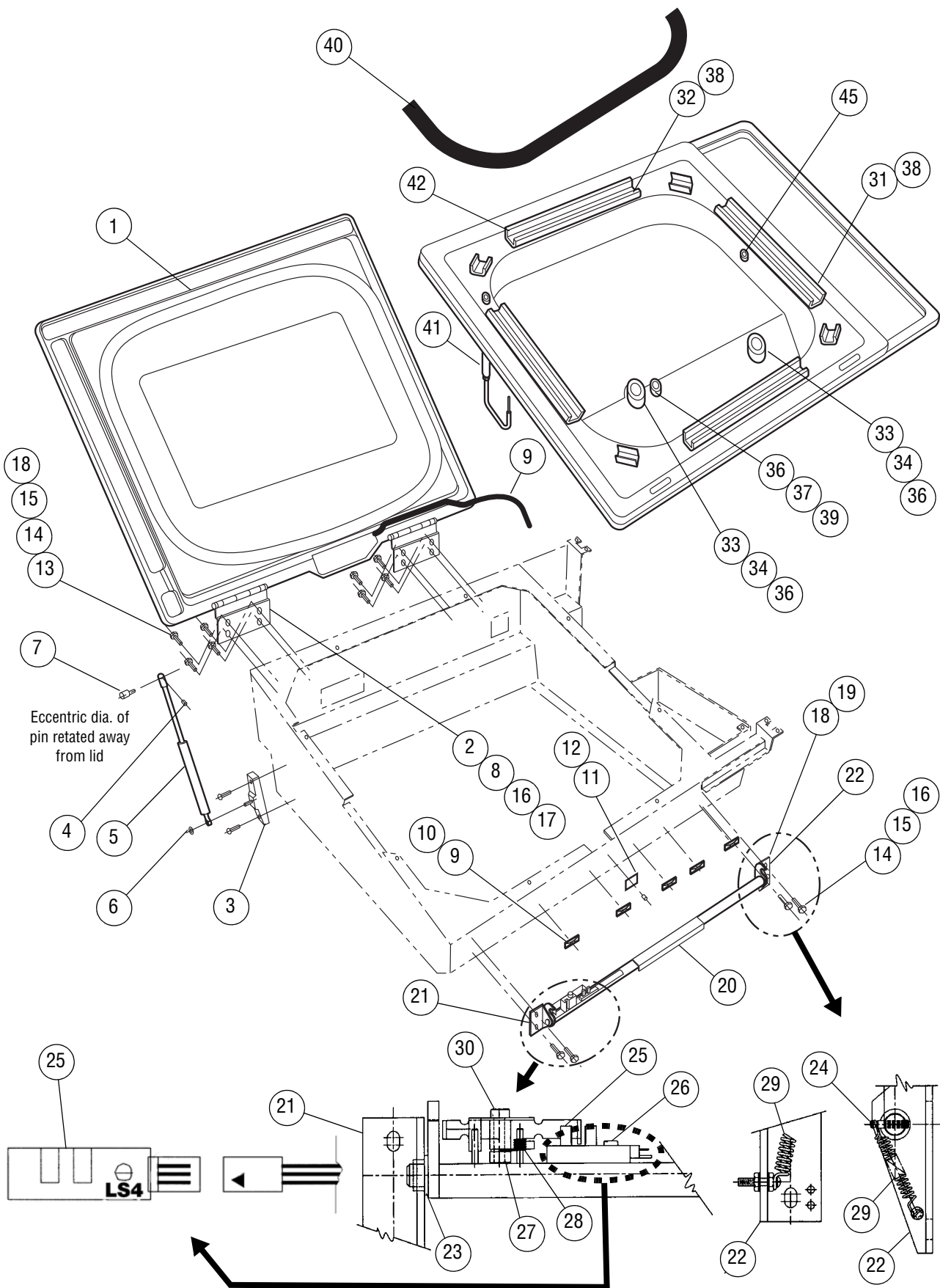
FIG. & ITEM NO.	PART NUMBER	SVC	DESCRIPTION	UNITS PER ASSEMBLY
2-			<b>SYSTEM 1E – COMPLETE</b> .....	<b>X</b>
1	C1140E		CONTAINER and TRAY, Flexible Endoscope Processing (Not Shown) .....	A/R
	C1142E		• TRAY, Flexible Endoscope (Tray Only, Not Shown) .....	A/R
	C1141		• CONTAINER, Flexible Endoscope (Container Only, Not Shown) ....	A/R
	C1602		• CONTAINER, Flexible Endoscope (Container Lid Only, Not Shown)	A/R
	200387		• ADAPTER, Fluid Port (Not Shown) .....	1
	C1200E		CONTAINER and TRAY, General Processing (Not Shown).....	A/R
	C1202E		• TRAY, General Processing (Tray Only, Not Shown) .....	A/R
	100209		• BUSHING, Drain, General Processing Tray (Not Shown) .....	A/R
	C1201		• CONTAINER, General Processing (Container Only, Not Shown) ....	A/R
	C1602		• CONTAINER LID, General Processing (Lid Only, Not Shown) .....	A/R
	C1220E		CONTAINER and TRAY, Directed Flow Processing (Not Shown) .....	A/R
	C1222E		• TRAY, Directed Flow (Tray Only, Not Shown).....	A/R
	27B04300		• BUSHING, Drain, Directed Flow Tray (Not Shown).....	A/R
	C1221		• CONTAINER, Directed Flow (Container Only, Not Shown).....	A/R
	C1600		• CONTAINER, Directed Flow (Container Lid Only, Not Shown).....	A/R
	200387		• ADAPTER, Fluid Port (Not Shown) .....	A/R
	C1160E		TRAY, Universal Flexible Processor (Not Shown).....	A/R
2			ASSEMBLY, Control (See Figure 14) .....	1
3			ASSEMBLY, Drip Pan, and Components (See Figure 4) .....	1
4			ASSEMBLY, Lid, and Components (See Figure 4) .....	1
5	A1600		ASPIRATOR (Not Shown) .....	1
6	100618		SCREEN, Drain (Under Cup Punch, Not Shown).....	A/R
7	613006		TUBING, 3/16" (Tubing Under Tray, Not Shown) .....	A/R
8	10004448		PACKAGE, SYSTEM 1E Installation (Not Shown) .....	X
	A1503		• FILTER, Sterile Air.....	1
	A1564		• FILTER, MaxPure Water .....	1
	P 091007	091	• HINGE, Washer .....	2
	P 129362	819	• PAPER, Printer (3 Rolls).....	1
	P 146665	368	• COVER, Paper Take-Up.....	1
	P 150828	440	• PRINTER RIBBON, Epson <sup>1</sup> (2 per Box) .....	1
	T6540		• GUIDE, Site Preparation, SYSTEM 1E .....	1
	10004449		• HOSE ASSEMBLY, NSF (See Figure 10).....	1
9	A1569		RETROFIT, Cupcutter (Not Shown) .....	A/R

1.Epson® is a registered trademark of Epson America, Inc.



**Figure 3. Frame Components – Panels**

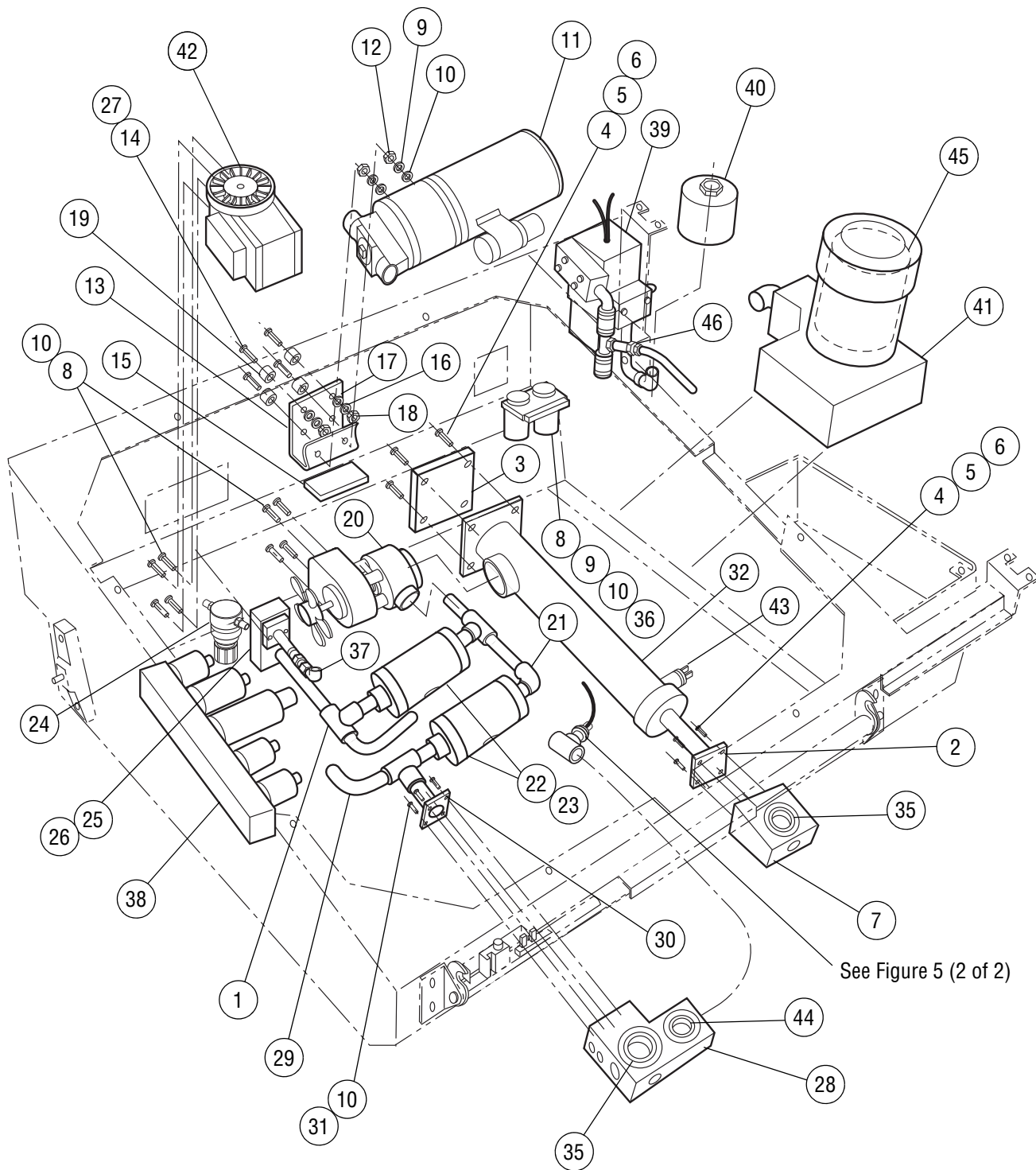
FIG. & ITEM NO.	PART NUMBER		SVC	DESCRIPTION	UNITS PER ASSEMBLY			
3-				<b>FRAME COMPONENTS – PANELS.....</b>				X
1				ASSEMBLY, Lid (See Figure 4).....				1
2		100717		PANEL, Access (1-Relay).....				1
3		101740		PANEL, Access (3-Relay).....				1
4				WELDMENT, Frame.....				1
5	P	136817	139	SHIELD, Cover.....				1
6		450211		WASHER #10.....				4
7		452007		SCREW, Button Head, #10-32 x 1".....				4
8		400208		BUMPER, Feet.....				4
9		10004538	*	SHROUD, Lower, with Screws.....				1
10		613046		GASKET, EMI.....				A/R
11				TIE, Cable.....				
12		400037		ADHESIVE, Mount.....				A/R
13				ASSEMBLY, Drip Pan (See Figure 4).....				1
14		450402		GROMMET, Flex, 2-9/16" Lg. (Not Shown).....				1
15		450403		GROMMET, Flex, 4-7/8" Lg. (Not Shown).....				1
16		450404		GROMMET, Flex, 2-15/16" Lg. (Not Shown).....				1
17		450405		GROMMET, Flex, 4-7/16" Lg. (Not Shown).....				1
18		450406		GROMMET, Flex, 4-15/16" Lg. (Not Shown).....				1
19		450407		GROMMET, Flex, 6-1/4" Lg. (Not Shown).....				1
20		450408		GROMMET, Flex, 2-1/4" Lg. (Not Shown).....				1
21		201153		SEAL, Inflatable.....				1
22				ASSEMBLY, Control (See Figure 14).....				1
23		10004631		COVER, Shroud Rear Access.....				1
24		452112	*	SCREWS, Button Head, 1/4-20 x 5/8" Lg.....				4
				* Item 9, Lower Shroud includes Qty. of 2 of Item 24.				



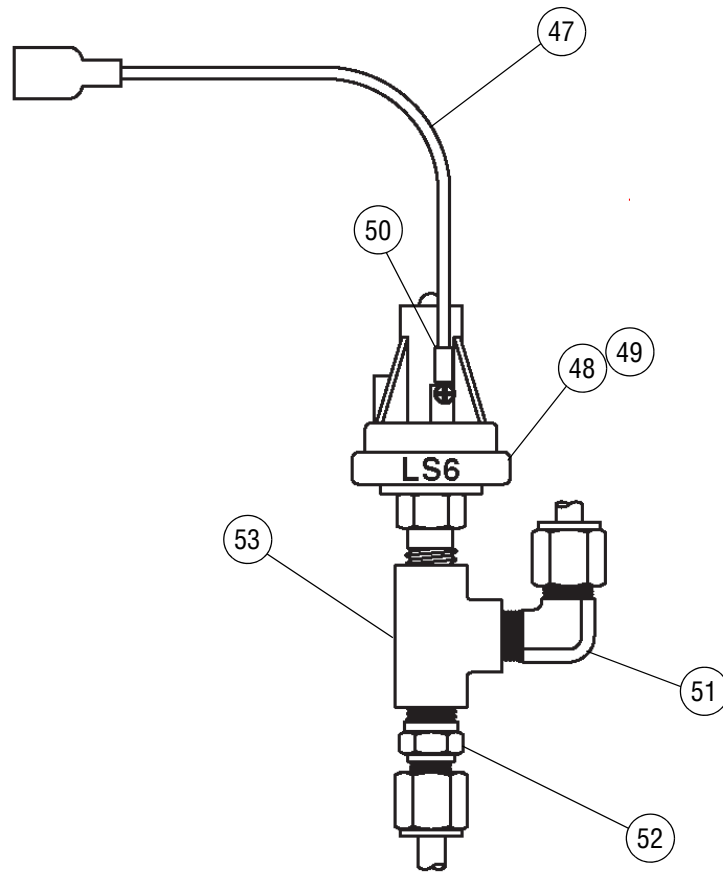
**Figure 4. Lid Assembly and Related Components**

FIG. & ITEM NO.	PART NUMBER	SVC	DESCRIPTION	UNITS PER ASSEMBLY
4-			<b>LID ASSEMBLY AND RELATED COMPONENTS.....</b>	<b>X</b>
1	10004606	*	ASSEMBLY, Lid.....	1
2	100601		HINGE.....	2
3	200055		BRACKET, Gas Cylinder .....	1
4	451907		SETSCREW, #8-32 x 1/2" Lg. ....	1
5	200056		GAS SPRING CYLINDER .....	1
6	451000		RING, Retaining.....	1
7	100063		PIN, Clevis .....	1
8	100356		SHIM, Hinge.....	2
9	400811	*	ASSEMBLY, Drain Tube.....	1
10	400037		ADHESIVE, Tie Wrap Mount .....	A/R
11	451907		SETSCREW, #8-32 x 1/2" Lg. ....	1
12	400197		STRIKE, Steel.....	1
13	452004		SCREW, Flat Head, #10-32 x 1/2" Lg.....	12
14	450201		LOCKWASHER, #10 .....	8
15	450211		WASHER, Flat, #10 .....	8
16	452000	**	SCREW, Socket Cap, #10-32 x 1/2" Lg.....	4
17	P 764329	736	KIT, Lid Shim .....	A/R
18	450100		PIN, Roll.....	4
19	100362		SHIM, Latch, 0.030 Thk. ....	2
	100633		SHIM, Latch, 0.016 Thk. ....	2
	100770		SHIM, Latch, 0.008 Thk. ....	A/R
20	201178		ASSEMBLY, Latch Shaft and Flag .....	1
21	100234		• BRACKET, Latch, L.H. ....	1
22	100233		• BRACKET, Latch, R.H.....	1
23	400047		• BEARING, Flanged.....	2
24	450002		• PIN, Knurled, 1/8" Dia.....	1
25	500173		• SWITCH, Lid Limit (LS4) .....	1
26	451820		• SCREW, Pan Head, #6-32 x .38" Lg. ....	1
27	450248		• WASHER, Wave, SS .....	1
28	452803		• SPRING, Torsion.....	1
29	452800	**	• SPRING, Extension (Latch Bar) .....	1
30	451910		• BOLT, Shoulder .....	1
31	100135		RETAINER, Short Seal.....	2
32	100136		RETAINER, Long Seal.....	2
33	450600		O-RING (Drain Block) .....	2
34	450605		O-RING (Quick Disconnect Post) .....	2
35	100038		POST, Quick Disconnect (Not Shown) .....	2
36	450609		O-RING (Quick Disconnect Post) .....	1
37	450612		O-RING (Transition Block) .....	1
38	452004		SCREW.....	8
39	100503		POST, Quick Disconnect, High Pressure .....	1
40	201153		SEAL, Chamber .....	1
41			DISCONNECT, Quick, Air Line (See Figure 12).....	1
42	10004547		PAN, Drip.....	1
43	400451		TOOL, Quick Disconnect Post, Large (Tech. Tool) (Not Shown) .....	A/R
44	400452		TOOL, Quick Disconnect Post, Small (Tech. Tool) (Not Shown).....	A/R
45	100459		CONNECTOR, Tubing.....	1
			* Item 1, Lid Assembly includes Item 9, Drain Tube.	
			** Use Loctite® <sup>1</sup> 242, P/N 400034.	

1. LOCTITE® is a registered trademark of Henkel A. G. & Co.



**Figure 5. Fluid and Air Components (1 of 2)**



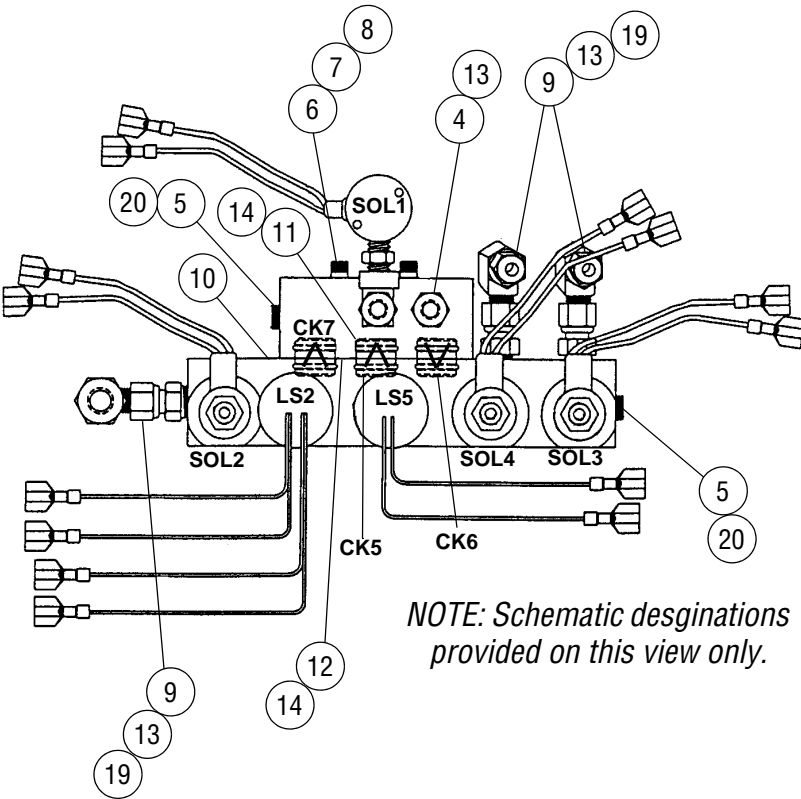
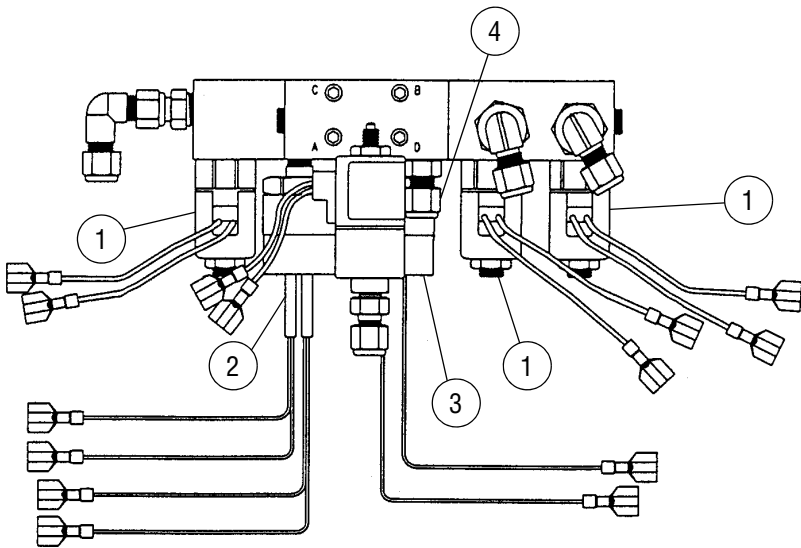
**Figure 5. Fluid and Air Components (2 of 2)**



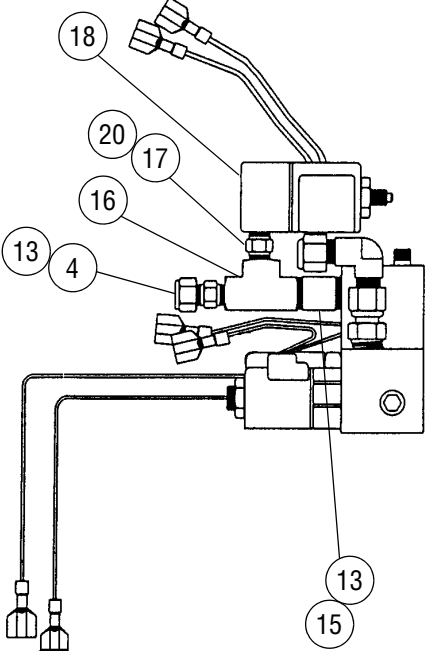
FIG. & ITEM NO.	PART NUMBER	S V C	PART	UNITS PER ASSEMBLY			
5-			<b>FLUID AND AIR COMPONENTS .....</b>	<b>X</b>			
1			ASSEMBLY, Drain Block (See Figure 9).....	1			
2	100596		GASKET, Drain Block To Heater .....	1			
3	100681		GASKET, Heater Element.....	1			
4	452202		BOLTS, Heater Housing, 5/16-18 x 7/8" .....	8			
5	450209		LOCKWASHER, 5/16.....	8			
6	450210		WASHER, Flat, 5/16.....	8			
7	100614		DRAIN, Transition Block.....	1			
8	452001		SCREW, Button Head, #10-32 x 3/8" .....	6			
9	450201		LOCKWASHER, #10 .....	8			
10	450211		WASHER, Flat, #10.....	12			
11	200176		PUMP, High Pressure .....	1			
	200697		• POPPETS, High Pressure Pump (Not Shown) .....	2			
12	453005		NUT, Hex. #10-32 .....	2			
13	100523		BRACKET, Pump .....	1			
14	452105		SCREW, Button Head, 1/4-20 x 3/8" .....	4			
15	100590		CUSHION, Pump Bracket .....	1			
16	450207		LOCKWASHER, 1/4-20.....	4			
17	450208		WASHER, Flat, 1/4-20 .....	4			
18	453006		WASHER, Nut, 1/4-20 .....	4			
19	400277		STUD, Mounting Plate.....	4			
20	200740		ASSEMBLY, Circulation Pump, Magnetic Drive.....	1			
	200966		• IMPELLER KIT (for Circulation Pumps manufactured by Gormann-Rupp only) (Not Shown)				
	450400		GROMMET, 1/2" OD x 3/16" ID .....	8			
21	200654		ASSEMBLY, Pinch Valve Branch.....	1			
22	400726		BODY, Valve .....	2			
23	400420		SLEEVE, Valve .....	2			
	400033		• GREASE, High Vacuum (Not Shown).....	A/R			
	400032		• COMPOUND, Anti-Sieze (Not Shown) .....	A/R			
24	10004458		REGULATOR, Air (PR2) .....	1			
25	400037		MOUNT, Adhesive Backed .....	A/R			
26	100329		SHIM, Drain Block.....	3			
27	400235		ADHESIVE, Loctite 222 (Not shown) .....	A/R			
28	200181		BLOCK, HP Trans. with Concentration Probes .....	1			
29	200656		ASSEMBLY, Cross Block.....	1			
30	100359		GASKET, HP (Transition Block to Circ Pinch Sleeve Assembly).....	1			
31	452010		SCREW, Button Head, #10-32 x 5/8" .....	4			
32	200137		ASSEMBLY, Heater Housing, Stainless Steel .....	1			
33	500106		Heater Element (Not Shown) .....	1			
34			Item # Not Used				
35	450600		O-Ring, Large.....	2			
36	200154		VALVE, Dual Inlet Water (SOL5 & SOL7).....	1			
37	400696		VALVE, Drain Check (CK8).....	1			
	200696		• KIT, Rebuild, CK8 .....	A/R			
38			ASSEMBLY, Air Manifold (See Figure 6) .....	1			
39			ASSEMBLY, Float Block (See Figure 7) .....	1			
45	2004		SCREW, 10-32 x 1/2" SS .....	4			
40	A1503		FILTER, Sterile (AIR) .....	1			



FIG. & ITEM NO.	PART NUMBER	S V C	DESCRIPTION	UNITS PER ASSEMBLY			
5-			<b>FLUID AND AIR COMPONENTS.....</b>	X			
41			HOUSING, MaxPure Filter (See Figure 8).....	1			
42	10004454		ASSEMBLY, Air Compressor (COMP) .....	1			
43	500019		SWITCH, Thermal Cutoff (LS1) .....	1			
44	450612		O-RING, Small .....	1			
45	A1564		FILTER, MaxPure Water.....	1			
46	400219		VALVE, Anti-siphon Check (CK10).....	1			
47	200777		ASSEMBLY, Pressure Switch .....	1			
48	500121		• SWITCH, Pressure (H.P. Pump Monitor)(LS6).....	1			
49	400367		• TAPE, Teflon .....	A/R			
50	300090		• ASSEMBLY, Cable .....	2			
51	400142		• MALE ELBOW .....	1			
52	400141		• MALE CONNECTOR.....	1			
53	400088		• UNION TEE .....	1			

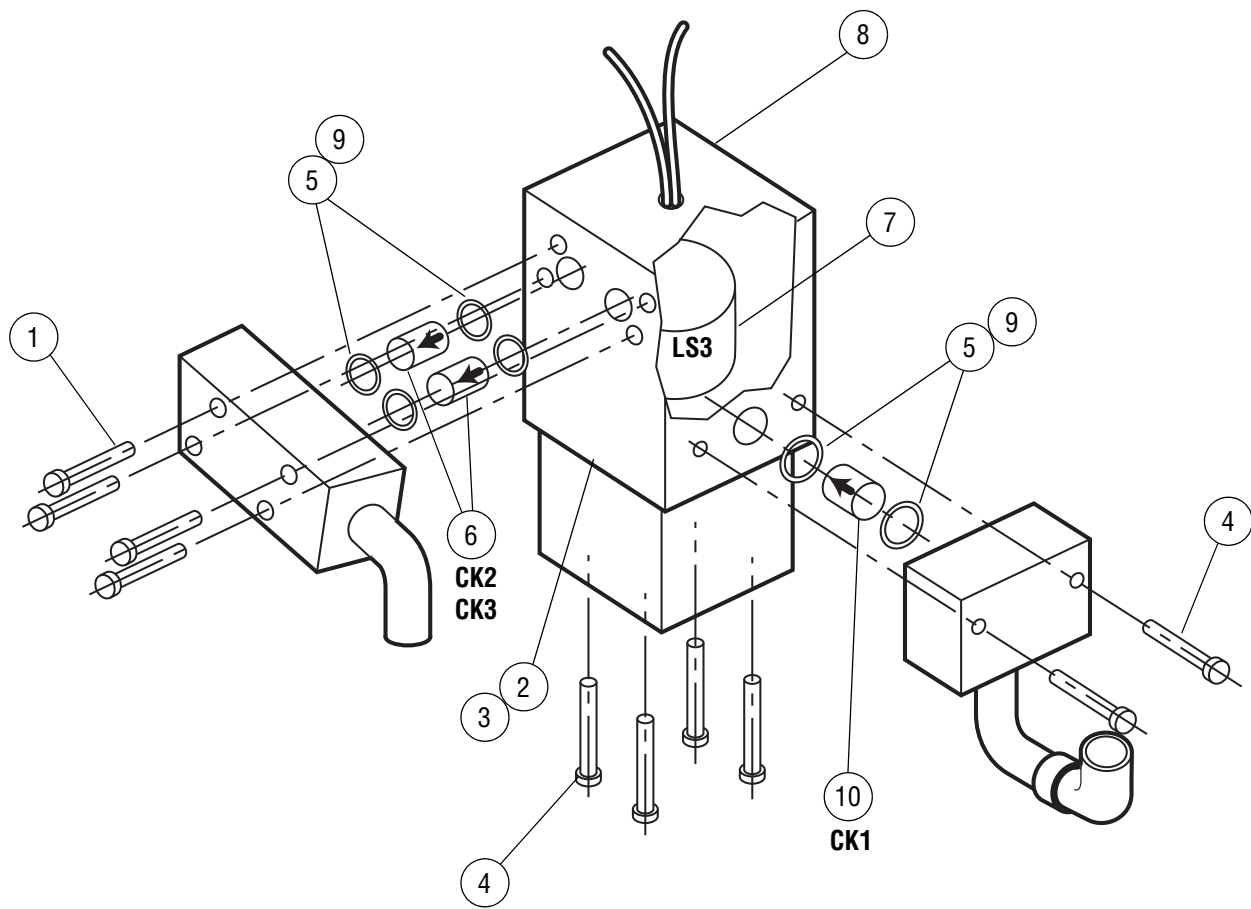


*NOTE: Schematic designations provided on this view only.*



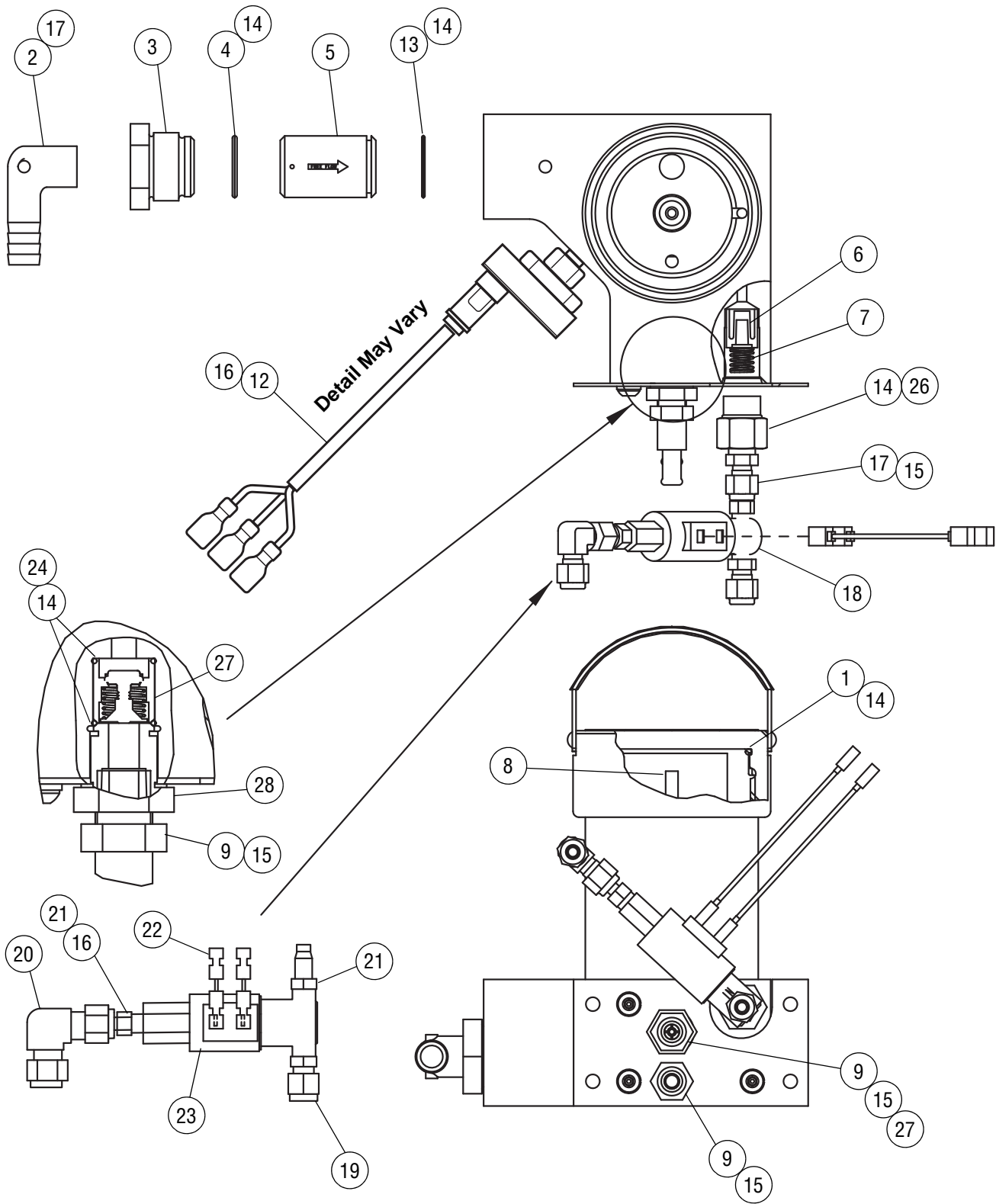
**Figure 6. Air Manifold Assembly**

FIG. & ITEM NO.	PART NUMBER	S V C	DESCRIPTION	UNITS PER ASSEMBLY
6-	200160		<b>AIR MANIFOLD ASSEMBLY .....</b>	<b>X</b>
1	200189	*	VALVE, Solenoid (SOL2, SOL3, SOL4) .....	3
2	300136	**	ASSEMBLY, Seal Pressure Safety Switch (LS2) .....	1
3	300137	**	ASSEMBLY, Compressor Control Switch (LS5) .....	1
4	400141		CONNECTOR, Male .....	2
5	400055		PLUG, Hex Head .....	2
6	451913		SCREW, #8-32 x 1-1/2" Lg. ....	4
7	450215		LOCKWASHER, #8 .....	4
8	400034		LOCTITE, 242 .....	A/R
9	400140		ELBOW .....	3
10	400774	***	VALVE, Air Manifold Check (CK5, CK6, CK7) .....	3
11	450606		O-Ring .....	6
12	450617	+	O-Ring .....	1
13	400036		SEALANT, Thread .....	A/R
14	400035		LUBRICANT, O-Ring .....	A/R
15	400087		NIPPLE, Long .....	1
16	400088		TEE, 1/8" NPT .....	1
17	400089		NIPPLE, Hex .....	1
18	200188	++	VALVE, Compressor Release Solenoid (SOL1) .....	1
19	400139		ADAPTER, Tube, Male .....	3
20	400367	**+	TAPE, Teflon <sup>1</sup> , 1/4" Wide .....	A/R
			<i>* Do not apply Loctite or O-Ring lubricant to the Solenoid Valves (Item #1) threaded stems.</i>	
			<i>** Apply 2-1/2 wraps of Teflon Tape (Item #20) and torque pressure Switches (Items #2 &amp; #3) to 55 in/lbs.</i>	
			<i>*** Apply a thin film of O-Ring lubricant to exposed surface of both O-Rings.</i>	
			<i>+ Apply a thin film of O-Ring lubricant to all surfaces of O-Ring. Install carefully, minimizing stretch.</i>	
			<i>++ Apply 2 wraps of Teflon Tape (Item #20) before installing Solenoid (Item #18), start 1 to 2 threads from end.</i>	
			<i>1. Teflon<sup>®</sup> is a registered trademark of E. I. du Pont de Nemours and Company or its affiliates.</i>	



**Figure 7. Float Block Switch Assembly**

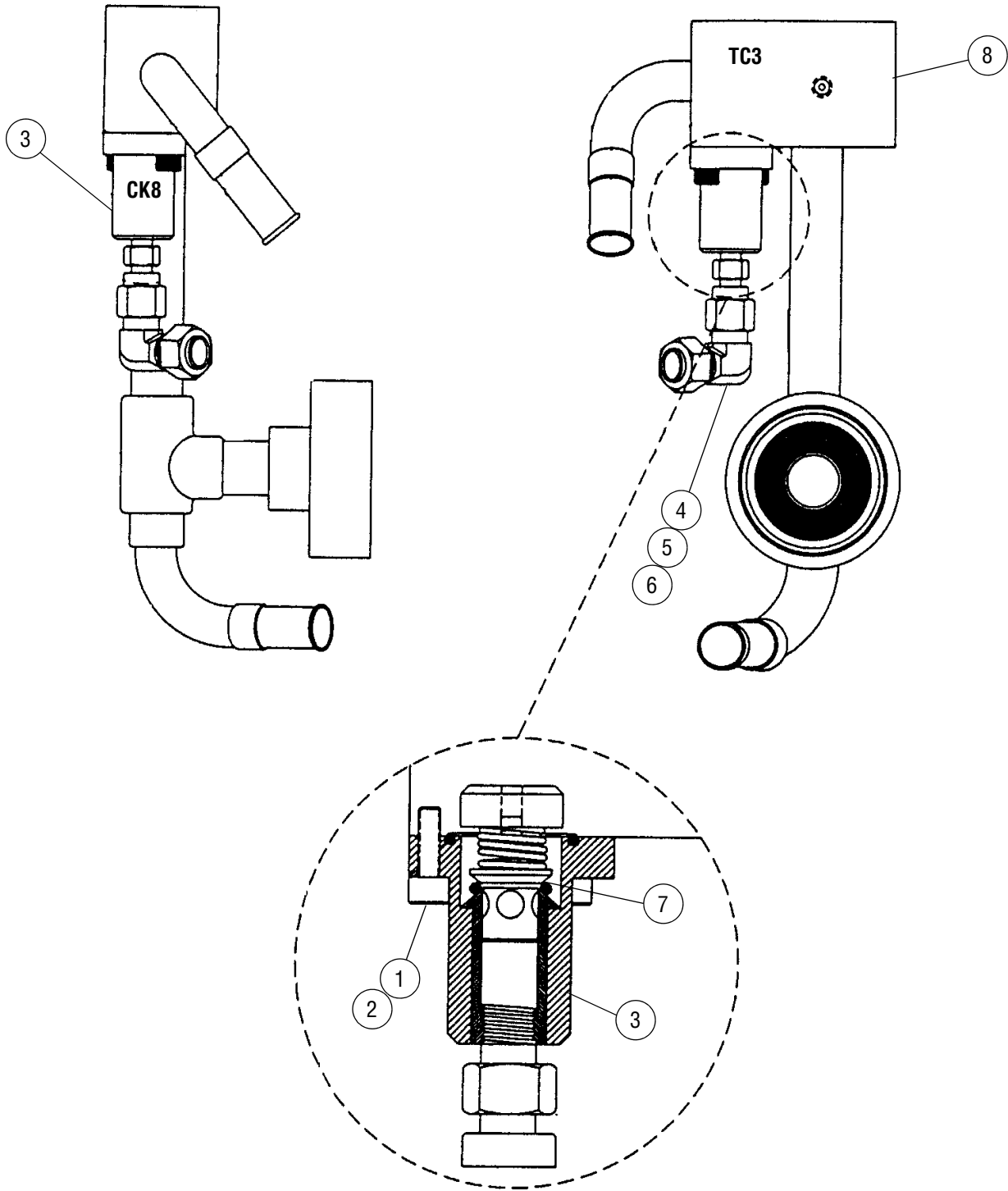
FIG. & ITEM NO.	PART NUMBER	S V C	DESCRIPTION	UNITS PER ASSEMBLY
7-	200042		<b>FLOAT BLOCK SWITCH ASSEMBLY (LS3)</b> .....	X
1	451913		SCREW, Socket Head Cap, #8-32 x 1.5" .....	4
2	100222		GASKET, Float .....	1
3	100146		SCREEN, Filter .....	1
4	451908		SCREW, Socket Head Cap, #8-32 x 1.00" .....	6
5	450621	*	SILICONE, O-Ring .....	A/R
6	400510		VALVE, Float Block Drain Check (CK2, CK3) .....	2
7	500005		SWITCH, Float Block (LS3) .....	1
8	550021		DISCONNECT, Insulated Male .....	2
9	400035		LUBRICANT, O-Ring .....	A/R
10	400345		VALVE, Air Inlet Check, SS (CK1) .....	1
11	A1503		FILTER, Sterile Air (FLT2) (Not Shown) .....	1
12	550024		CONNECTOR, Female (Spade) (Not Shown) .....	2
<p>* Apply a thin film of O-Ring lubricant to entire outside diameter of O-Ring. Install carefully; minimize stretching.</p>				



**Figure 8. Sterile Filter Housing Assembly**

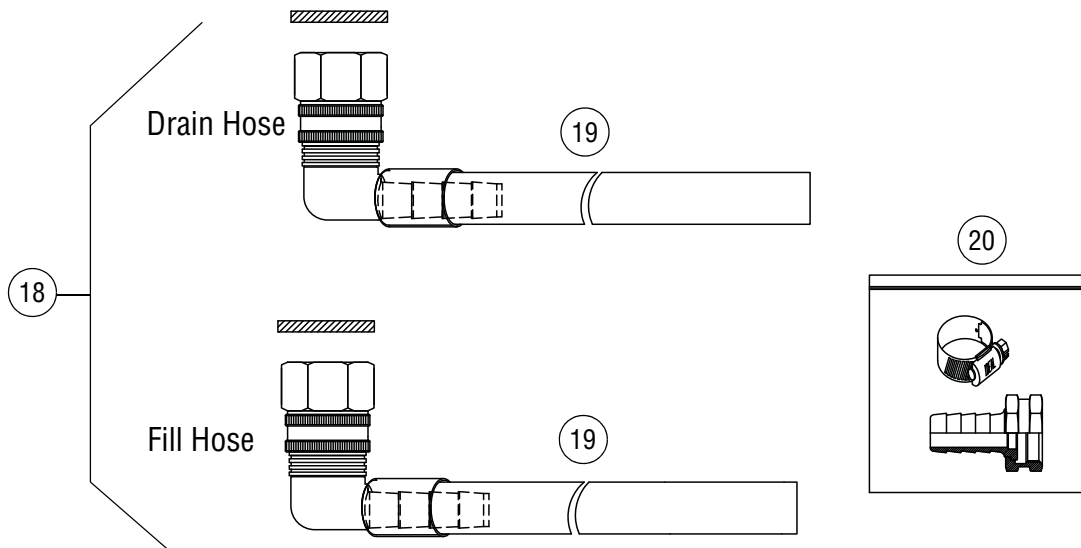
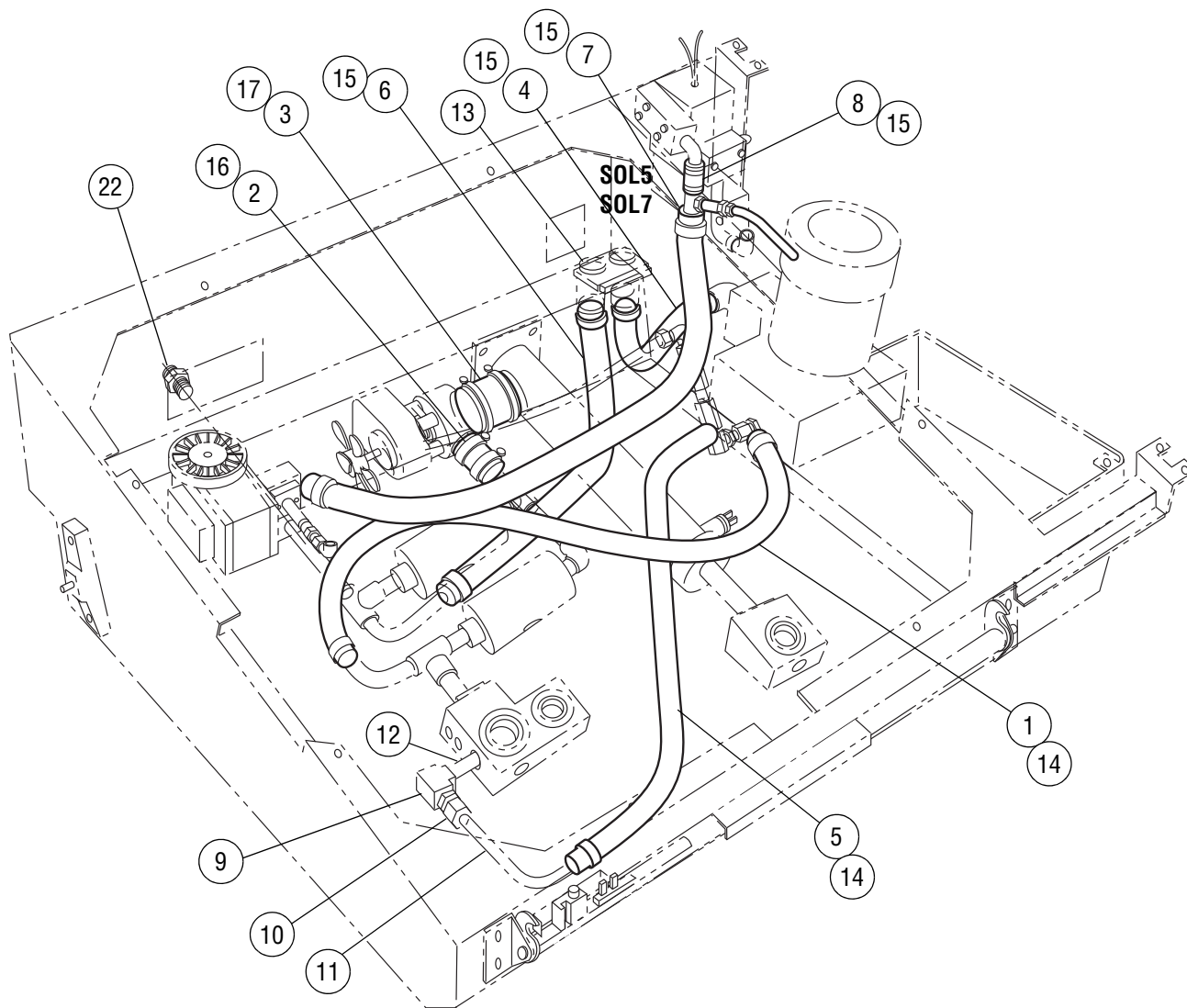
FIG. & ITEM NO.	PART NUMBER	SVC	DESCRIPTION	UNITS PER ASSEMBLY
8-	10004459		<b>STERILE FILTER HOUSING ASSEMBLY .....</b>	<b>X</b>
1	200118	*	ASSEMBLY, Filter Housing Cap.....	1
2	400358		ELBOW, 90°.....	1
3	100612		CONNECTOR, Male.....	1
4	450608		SILICONE, O-Ring.....	1
5	400368		VALVE, Backflow Preventer Check (CK4).....	1
	200226		KIT, Kepner Rebuild (CK4) .....	A/R
6	400080		FILTER.....	1
7	452802		SPRING, Compression.....	1
8	A1564		FILTER, Sterile Water.....	1
9	200029	**	SUBASSEMBLY, Adapter, 3/8" .....	2
10	452100		SCREW, Hex Socket Button Head Cap (Not Shown).....	3
11	450207		LOCKWASHER, 1/4" (Not Shown) .....	3
12	P 136817	134 ***	ASSEMBLY, Pressure Transducer (PT1).....	1
13	450614		SILICONE, O-Ring.....	1
14	400035	*	LUBRICANT, O-Ring .....	A/R
15	400036	**	SEALANT, Thread .....	A/R
16	400367	***	TAPE, Thread Seal, 1/4" Wide.....	A/R
17	400150		TAPE, Thread Seal, 1/2" Wide (Not Shown).....	A/R
18	200510		ASSEMBLY, Air-Water Valve Solenoid (SOL8).....	1
19	400141		• CONNECTOR, Male.....	1
20	400140		• ELBOW, Union .....	1
21	400139		• ADAPTER, Tube.....	1
22	300125		• CABLE, Electrical Jumper .....	1
23	500122		• SOLENOID, Air-Water VALVE (24V) (SOL8) .....	1
24	450621		O-RING .....	2
25	400143		CONNECTOR, Male (Not Shown) .....	1
26	100342		ADAPTER, Modified Female Pipe .....	1
27	400510		VALVE, Check (CK11).....	1
28	10004470		CONNECTOR, Male, 11/16".....	1
			<i>* Apply a light film of O-Ring lubricant (Item #14) to the O-Ring in the Filter Housing Cap (Item #1) before fitting the Cap to the Filter Housing.</i>	
			<i>** Do not apply Thread Sealant (Item #15) to the first two threads on this fitting.</i>	
			<i>***Apply 2 turns of Thread Seal Tape (Item #16) to threads on the Pressure Transducer (Item #12). Do not apply tape to the first two threads.</i>	





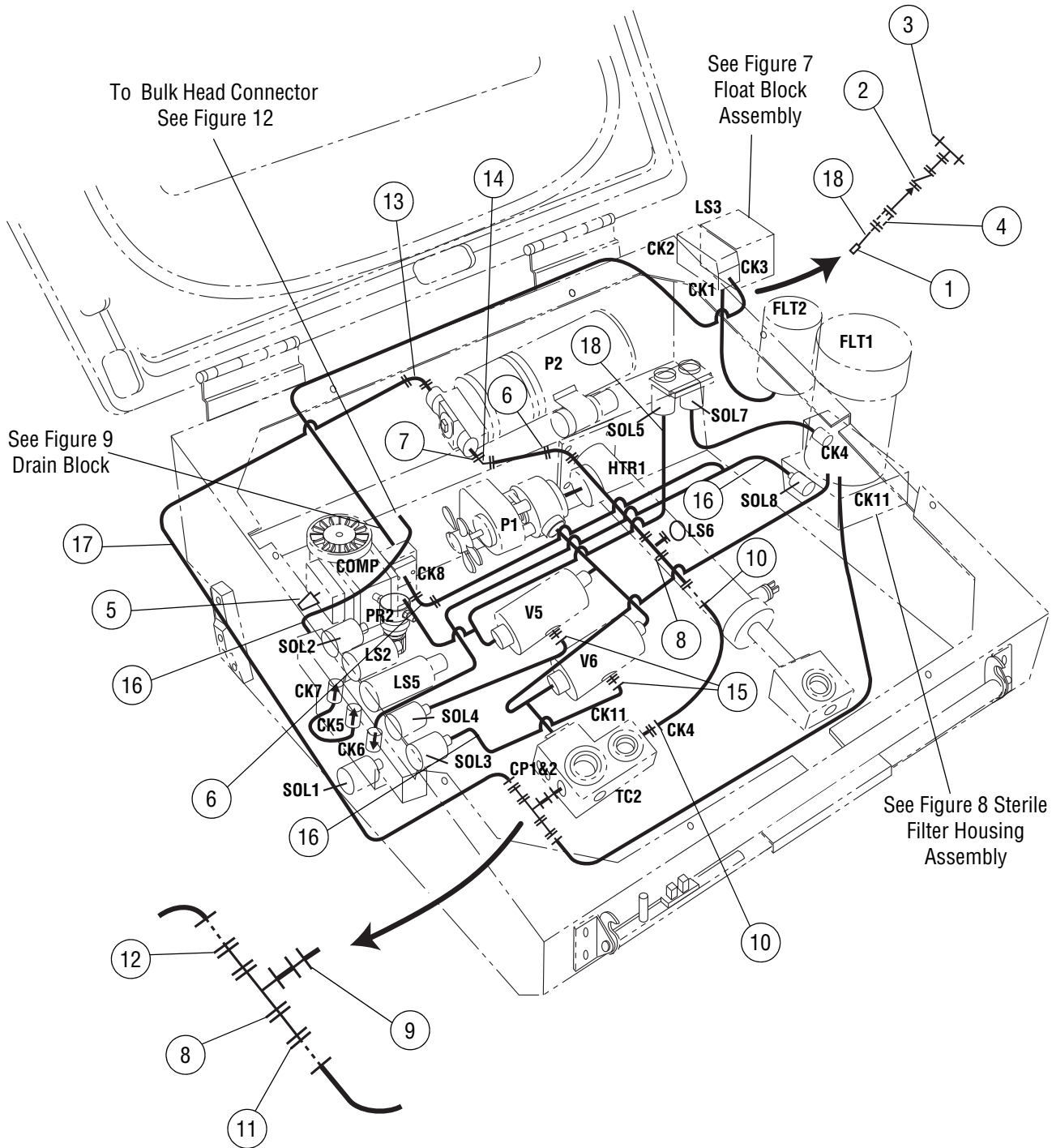
**Figure 9. Drain Block Assembly**

FIG. & ITEM NO.	PART NUMBER	S V C	DESCRIPTION	UNITS PER ASSEMBLY
9-	200655		<b>DRAIN BLOCK ASSEMBLY .....</b>	<b>X</b>
1	452000		SCREW, Hex Head.....	2
2	450201		LOCKWASHER, Split, #10 .....	2
3	400696		ASSEMBLY, Drain Check Valve, 6 PSI (CK8).....	1
4	400140		ELBOW, Male 1/4 Tube Swage Lock, #8-400-9 .....	1
5	400036	*	SEALANT, Thread Locking, Loctite #59231 .....	A/R
6	400139		ADAPTER, Male Tube, 1/8 NPT Cajon #8-4-TA-1-2 .....	1
7	200696		KIT, Rebuild, CK8, (includes O-Ring and Springs) .....	A/R
8	100520		THERMOCOUPLE #3 (TC3) (Not Included in Drain Block Assembly)	1
* <i>Limit use of thread sealant to a minimum. Do not contaminate internal orifice.</i>				



**Figure 10. Water Hoses**


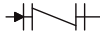
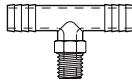











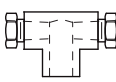

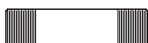



FIG. & ITEM NO.	PART NUMBER	S V C	DESCRIPTION	UNITS PER ASSEMBLY
10-			<b>WATER HOSES .....</b>	<b>X</b>
1	613000		HOSE, 3/8" I.D. x 25" .....	1
2	613002		HOSE, 7/8" I.D. x 1-1/4" .....	1
3	613003		HOSE, 1-1/4" I.D. x 1-7/8" .....	1
4	613001		HOSE, 1/2" I.D. x 6-1/2" .....	1
5	613000		HOSE, 3/8" I.D. x 22-1/2" .....	1
6	613001		HOSE, 1/2" I.D. x 20-1/2" .....	1
7	613001		HOSE, 1/2" I.D. x 21-1/2" .....	1
8	613001		HOSE, 1/2" I.D. x 2-1/2" .....	1
9	400088		TEE, Union.....	1
10	400366		CONNECTOR, Male .....	1
11	100373		TUBE, Filter Return.....	1
12	400087		NIPPLE, Pipe .....	1
13	200154		VALVE, Dual Water Inlet (SOL5 and SOL7) .....	1
14	450510		CLAMP, For 3/8" ID Hose .....	A/R
15	450507		CLAMP, For 1/2" ID Hose .....	A/R
16	450508		CLAMP, For 7/8" ID Hose .....	A/R
17	450509		CLAMP, For 1-1/4" ID Hose.....	A/R
18	10004449		ASSEMBLY, Hose .....	1
19	400806		TUBING .....	1
20	200257		FITTING AND CLAMP .....	1
21	201013		90° FITTING AND CLAMP (Not Shown).....	1
22	450807		ADAPTOR, Brass, 1/2" MPT x 3/4" MPT .....	1

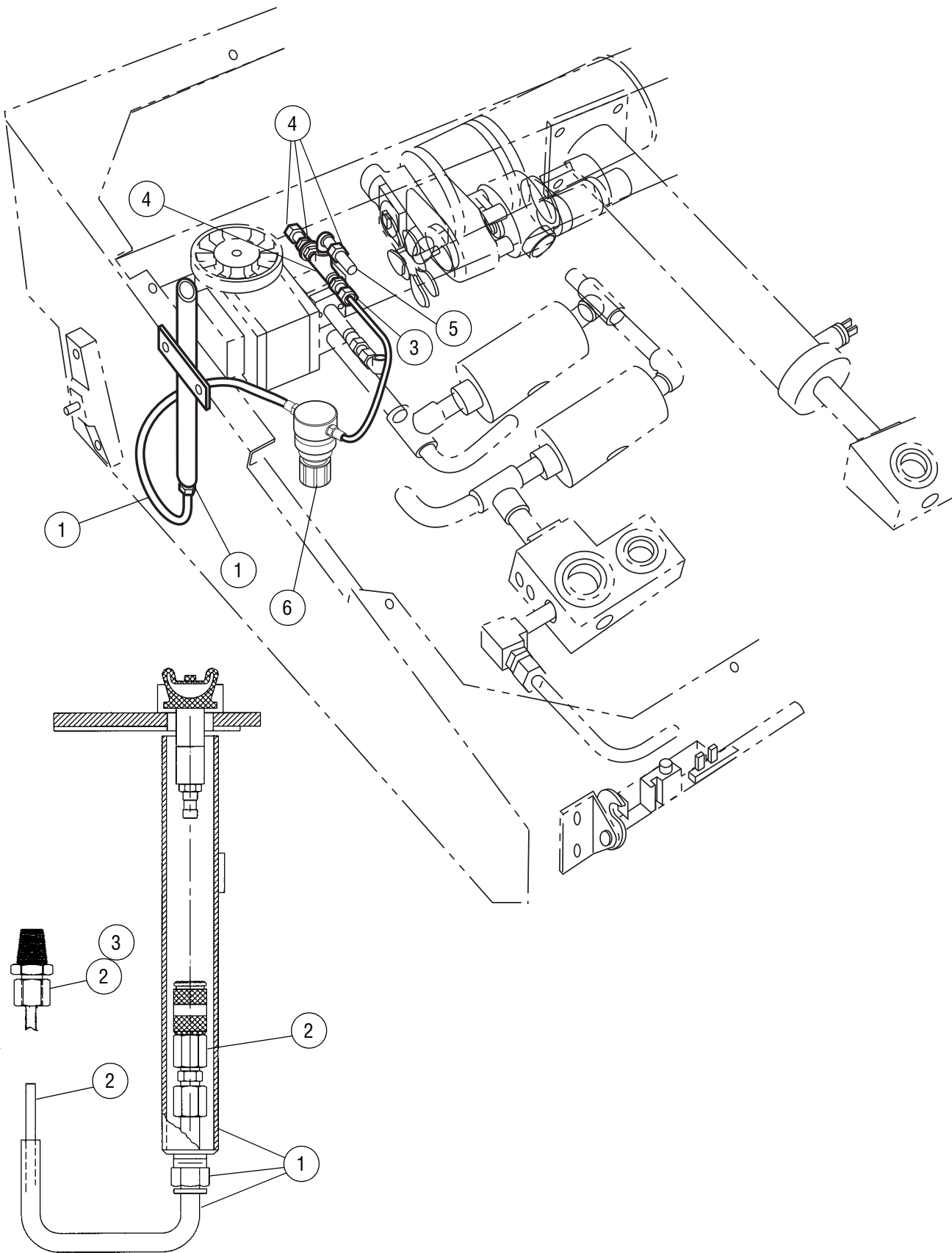


**Figure 11. Piping and Components**

FIG. & ITEM NO.	PART NUMBER	SVC	DESCRIPTION	UNITS PER ASSEMBLY
11-			<b>PIPING AND COMPONENTS .....</b>	<b>X</b>
			(Locations represented by schematic designations)	
1	100459		CONNECTOR, Tubing, Modified, (CK10).....	1
2	400219		VALVE, Anti-siphon Check (CK10) (Type A).....	1
3	400426		TEE, Male Branch (CK10) (Type B).....	1
4	400427		HOSE, Barb (CK10) (Type G).....	1
5	400267		SILENCER, Air (COMP) (Type D).....	1
6	400142		ELBOW, Male (COMP) (Type E).....	1
7	400272		BUSHING (P2) (Type F).....	1
8	400088		TEE, Union, 1/8" NPT (LS6) (Type H).....	1
9	400087		NIPPLE, Pipe (TC2) (Type J).....	1
10	400141		CONNECTOR, Male (CP1 and 2) (Type C).....	1
11	400366		CONNECTOR, Male (CP1 and 2) (Type C).....	1
12	400375		CONNECTOR, Male (CP1 and 2) (Type C).....	1
13	400376		ELBOW, Male, 90° (P2) (Type E).....	2
14	450836		ELBOW, Male, 45° (P2) (Type K).....	2
15	400143		CONNECTOR, Male (Pinch Valve) (Type C).....	2
16	613009		TUBING, Polyethylene, 3/16" ID x .25 OD.....	A/R
17	613027		TUBING, Polyethylene, 1/4" ID x .25 OD.....	A/R
18	613007		TUBING, Polyethylene, 1/4" ID x .375 OD.....	A/R
19	400245		PADDING, Foam, Black (Not Shown).....	A/R



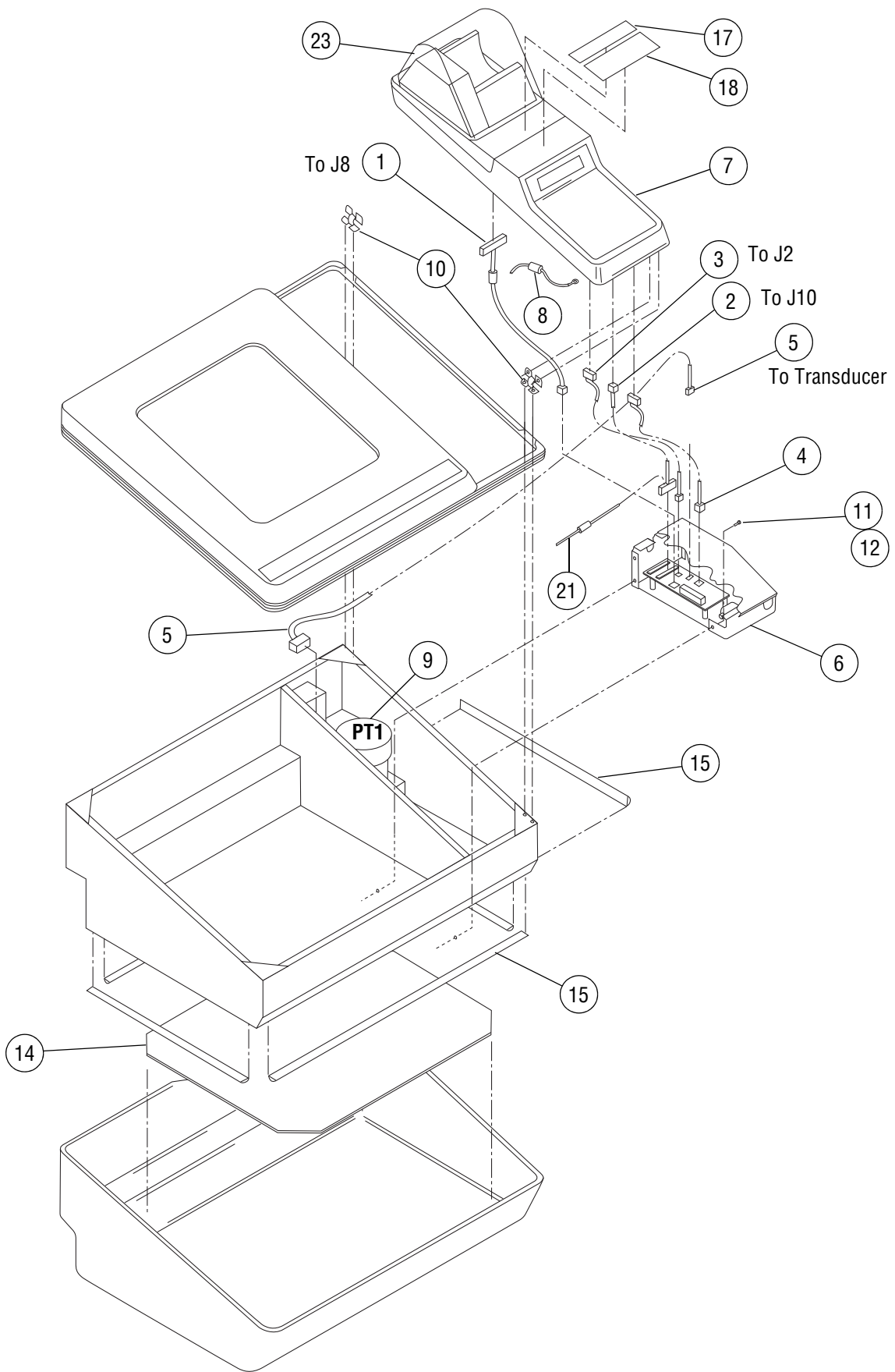
<b>A</b>		Valve-Check Flanged	
<b>B</b>		Tee - Male Branched/NPT	
<b>C</b>		Connector - Male	
<b>D</b>		Silencer	
<b>E</b>		Elbow - 90°	
<b>F</b>		Bushing	
<b>G</b>		Hose Barb - Compression	
<b>H</b>		Tee - Male Compression	
<b>J</b>		Nipple - Pipe	
<b>K</b>		Elbow - 45°	



**Figure 12. Bulkhead Connector Assembly**

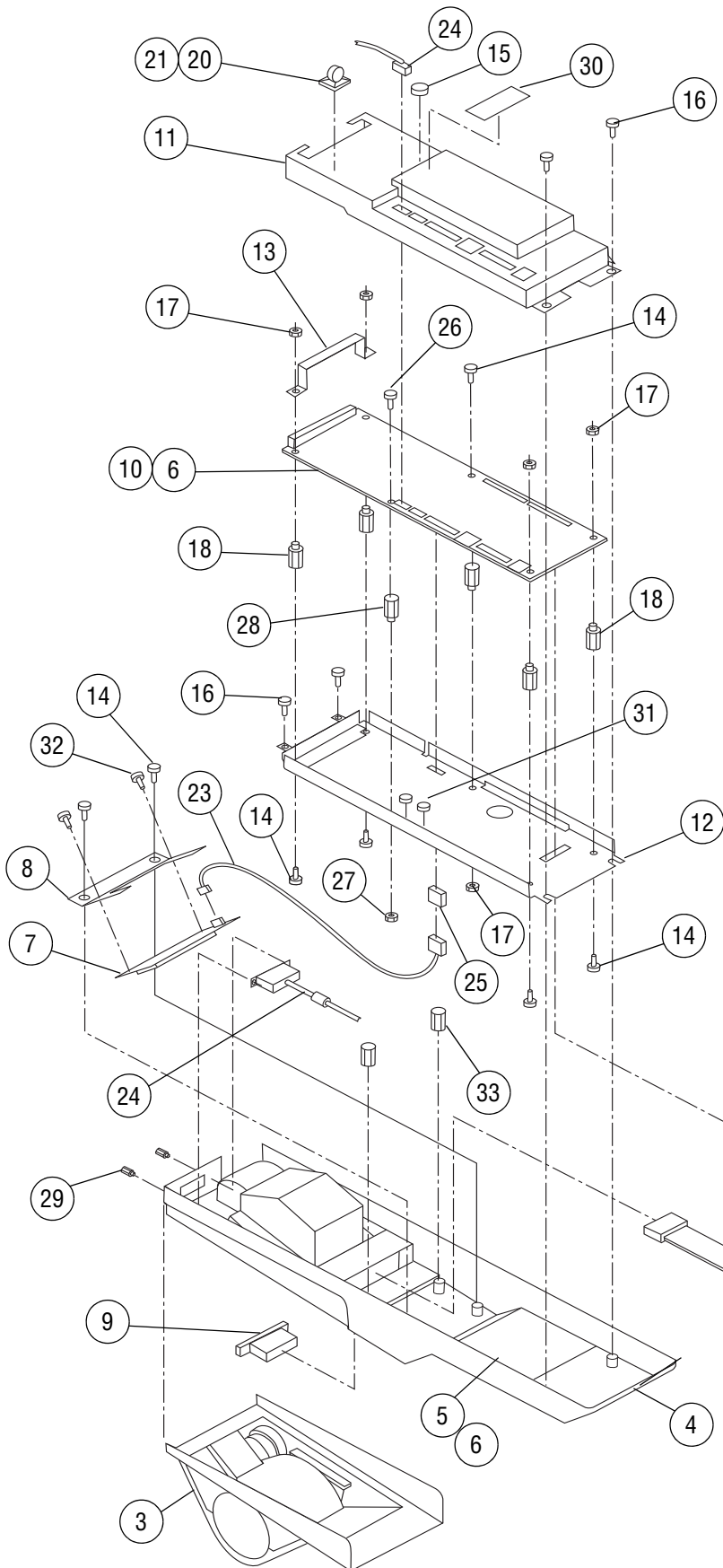
FIG. & ITEM NO.	PART NUMBER	S V C	DESCRIPTION	UNITS PER ASSEMBLY			
12-			<b>BULKHEAD CONNECTOR ASSEMBLY.....</b>	X			
1	200179		ASSEMBLY, Guide Tube.....	1			
2	200180		LINE, Air, Quick Disconnect.....	1			
3	400268		• CONNECTOR, Tube.....	1			
	400268		• FERRULE, Spark.....	1			
4	200173		ASSEMBLY, Bulkhead Connector.....	1			
5	613009		TUBE, 3/16" ID x .250" OD.....	A/R			
6	10004458		REGULATOR, Air Pressure.....	1			



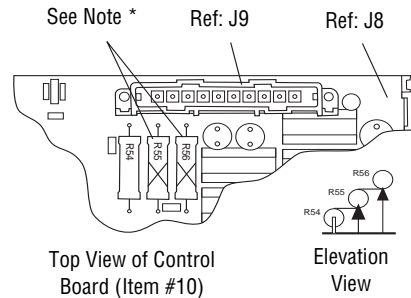


**Figure 13. Control Assembly**

FIG. & ITEM NO.	PART NUMBER		S V C	DESCRIPTION	UNITS PER ASSEMBLY			
13-				<b>CONTROL ASSEMBLY .....</b>	<b>X</b>			
1				AC OUTPUT HARNESS (See Figure 18).....	1			
2				DC POWER HARNESS (See Figure 18).....	1			
3				DC INPUT HARNESS (See Figure 18).....	1			
4				ANALOG HARNESS (See Figure 18).....	1			
5				TRANSDUCER WIRE HARNESS (See Figure 18) .....	1			
6				INTERFACE BOX ASSEMBLY (See Figure 16).....	1			
7				CONTROL ASSEMBLY (See Figure 14) .....	1			
8	P	093922	489	GROUND STRAP ASSEMBLY.....	2			
9	P	136817	134	TRANSDUCER, PRESSURE (PT1) .....	1			
10		451800		HINGE MOUNTING HARDWARE .....	4			
11		451904		SCREWS, Button Head, #8-32 x 1/2 .....	3			
12		450215		LOCKWASHER, #8 .....	3			
13		500173		LID SWITCH (LS4) (Not Shown) .....	1			
14	P	136817	139	COVER, Shield .....	1			
15		613046		EMI GASKET, (Unit of Measure 96" Long).....	A/R			
16	P	129362	819	PRINTER PAPER (3 Rolls) (Not Shown).....	A/R			
17	P	093922	487	LABEL, Warning ("Flammable" - English).....	1			
	P	093922	490	LABEL, Warning (French).....	1			
	P	093922	491	LABEL, Warning (Spanish).....	1			
	P	093922	492	LABEL, Warning (German).....	1			
	P	093922	493	LABEL, Warning (Italian) .....	1			
18	R	093922	488	LABEL, Important (English) .....	1			
	P	093922	494	LABEL, Important (French).....	1			
	P	093922	495	LABEL, Important (Spanish) .....	1			
	P	093922	496	LABEL, Important (German) .....	1			
	P	093922	497	LABEL, Important (Italian).....	1			
19	P	150828	440	RIBBON CARTRIDGE (Epson Printer, Box of 2, Not Shown).....	A/R			
20		400037		WIRE TIE (Not Shown).....	A/R			
21		550024		QUICK DISCONNECT WIRE TERMINAL .....	1			
22	P	129352	049	WIRE CRIMP NUT (Not Shown).....	2			
23				TAKE-UP HOUSING COVER KIT (See Figure 15) .....	1			
24		613045		TUBING, Corrugated Split Wall (Not Shown) .....	1			




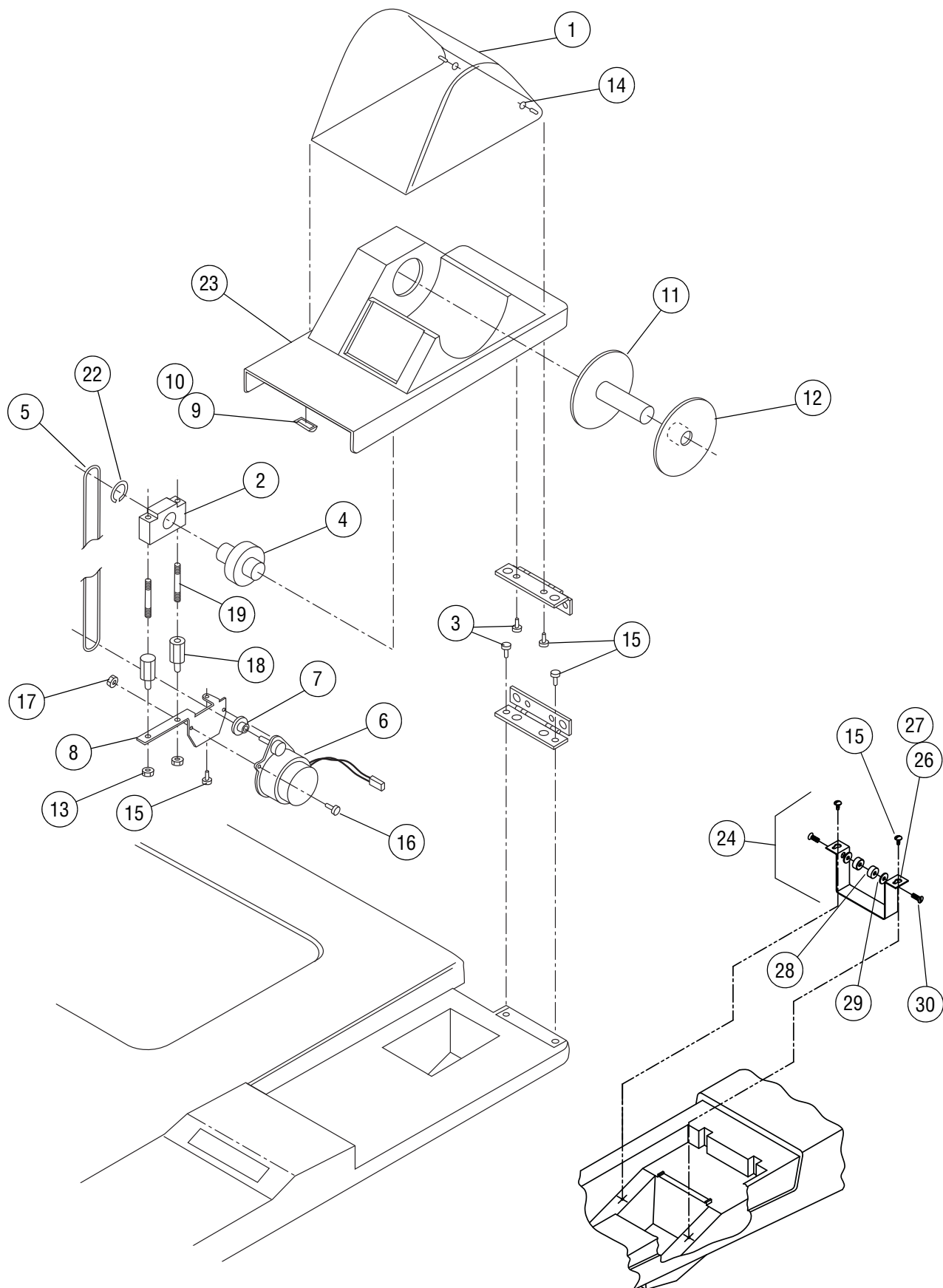
**CONTROL BOARD MODIFICATION  
REQUIRED FOR REPLACEMENT**



*\* MODIFICATION NOTE: Before installing CONTROL BOARD (Item #10) to shield WELDMENT (Item #12), remove R55 and R56 Resistors. These Resistors are not used in this application, and create an interference.*

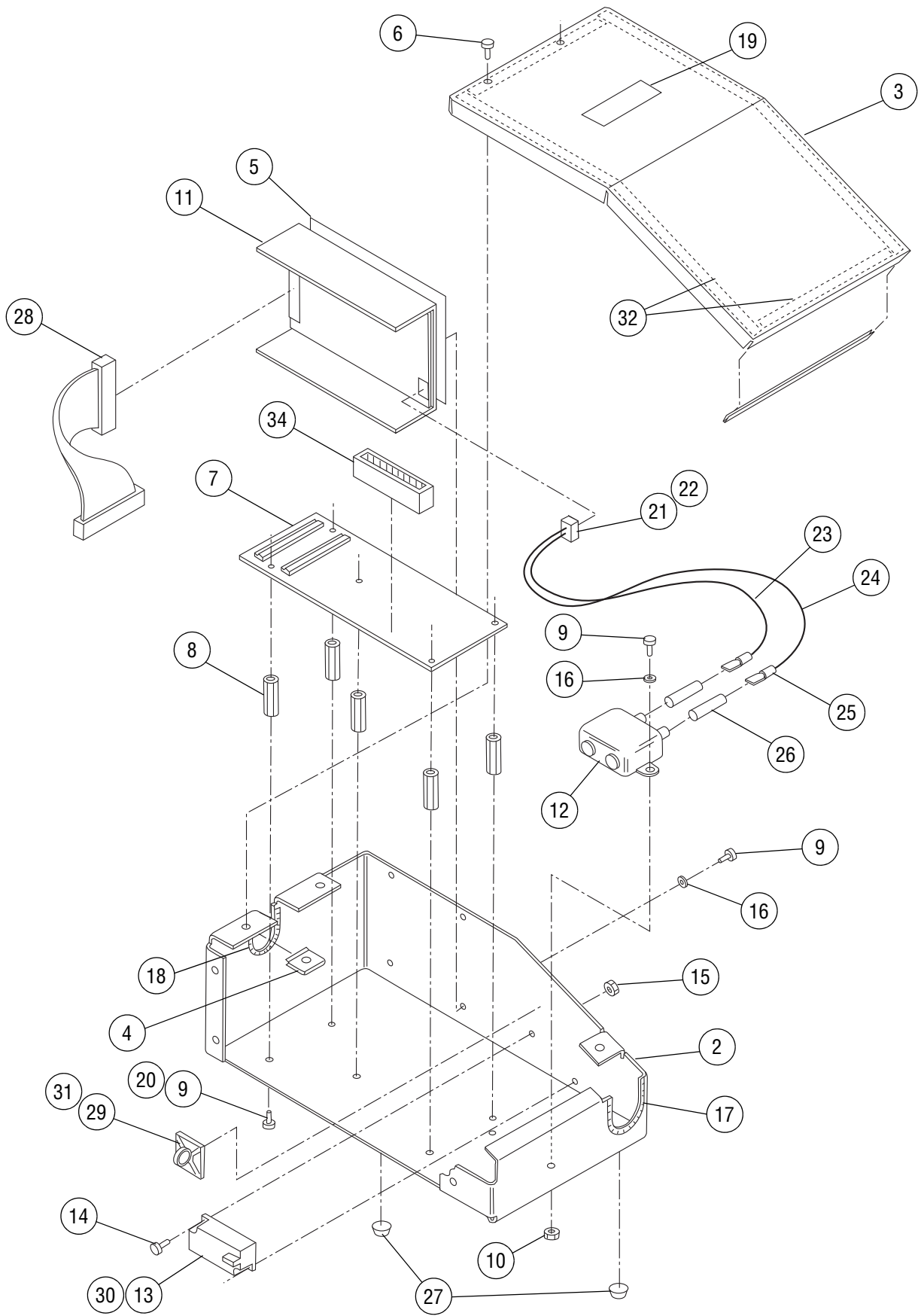
**Figure 14. Control Assembly**

FIG. & ITEM NO.	PART NUMBER	S V C	DESCRIPTION	UNITS PER ASSEMBLY
14- 	10004600		<b>CONTROL ASSEMBLY, DOMESTIC .....</b>	<b>X</b>
1			(Not Used)	
2			(Not Used)	
3			HOUSING, Take-up Motor (See Figure 15).....	1
4	10004601		HOUSING, Control.....	1
5	10004620		TOUCH PANEL, Domestic .....	1
6	P 755718	203	PROGRAM CHIP SET .....	1
7	P 093915	177	DISPLAY .....	1
8	P 093922	504	BRACKET, Display Mounting. ....	1
9	P 093914	003	PRINTER HEADER ASSEMBLY .....	1
10	P 146665	002 *	CONTROL BOARD (See Modification Note) .....	1
	P 129376	188	• FUSE, 630 MA, VDA	
	P 093915	047	• BATTERY, Smart	
	P 129361	870	• DRIVER, Chip	
11	P 146665	359 *	COVER, BTM Board .....	1
12	P 136817	136	WELDMENT, Shield .....	1
13	P 093922	484	BRACKET, Support .....	1
14	P 093912	226	SCREW, Flange Lock, #6-32 x 1/4" .....	9
15	P 129376	349	PLUG BUTTON .....	1
16	P 129376	340	SCREW, Flange Lock, #6-32 x 3/8" .....	9
17	P 084121	002	NUT, Keps, #6-32 .....	5
18	P 129376	331	STANDOFF, (Male x Female), #6-32 x 3/8" (Nylon).....	6
19	P 129376	337	HEADER, Right Angle (15 Pin).....	1
20	P 129326	001	MOUNT, Cable Tie .....	1
21	P 084104	001	WIRE, Tie.....	1
22			PRINTER HARNESS ASSEMBLY (See Figure 18) .....	1
23			DISPLAY HARNESS ASSEMBLY (See Figure 18) .....	1
24	P 136817	129	SERIAL PORT HARNESS.....	1
25	P 129376	338	HEADER, Straight (5 Pin) .....	1
26	P 129376	332	SCREW, Pan Head, #6-32 x 1/4" (Nylon).....	4
27	P 129376	333	NUT, Hex, #6-32 (Nylon) .....	8
28	P 093912	152	STANDOFF, (Male x Female), #6-32 x 3/8" .....	1
29	P 093912	380	SCREWLOCK KIT .....	1
30	P 093922	077	LABEL (ESD and Shock Hazard) .....	1
31	P 129376	341	BUMPER, Adhesive-Backed.....	2
32	P 129376	347	SCREW, Pan Head, #6-32 x 1/2" (Nylon).....	2
33	P 093912	157	STANDOFF, (Male x Female), #6-32 x 1" .....	2
<p>* MODIFICATION NOTE: Before installing CONTROL BOARD (Item #10) to shield weldment (Item #12), remove R55 and R56 Resistors. These Resistors are not used in this application, and create an interference.</p>				



**Figure 15. Take-Up Motor Components**

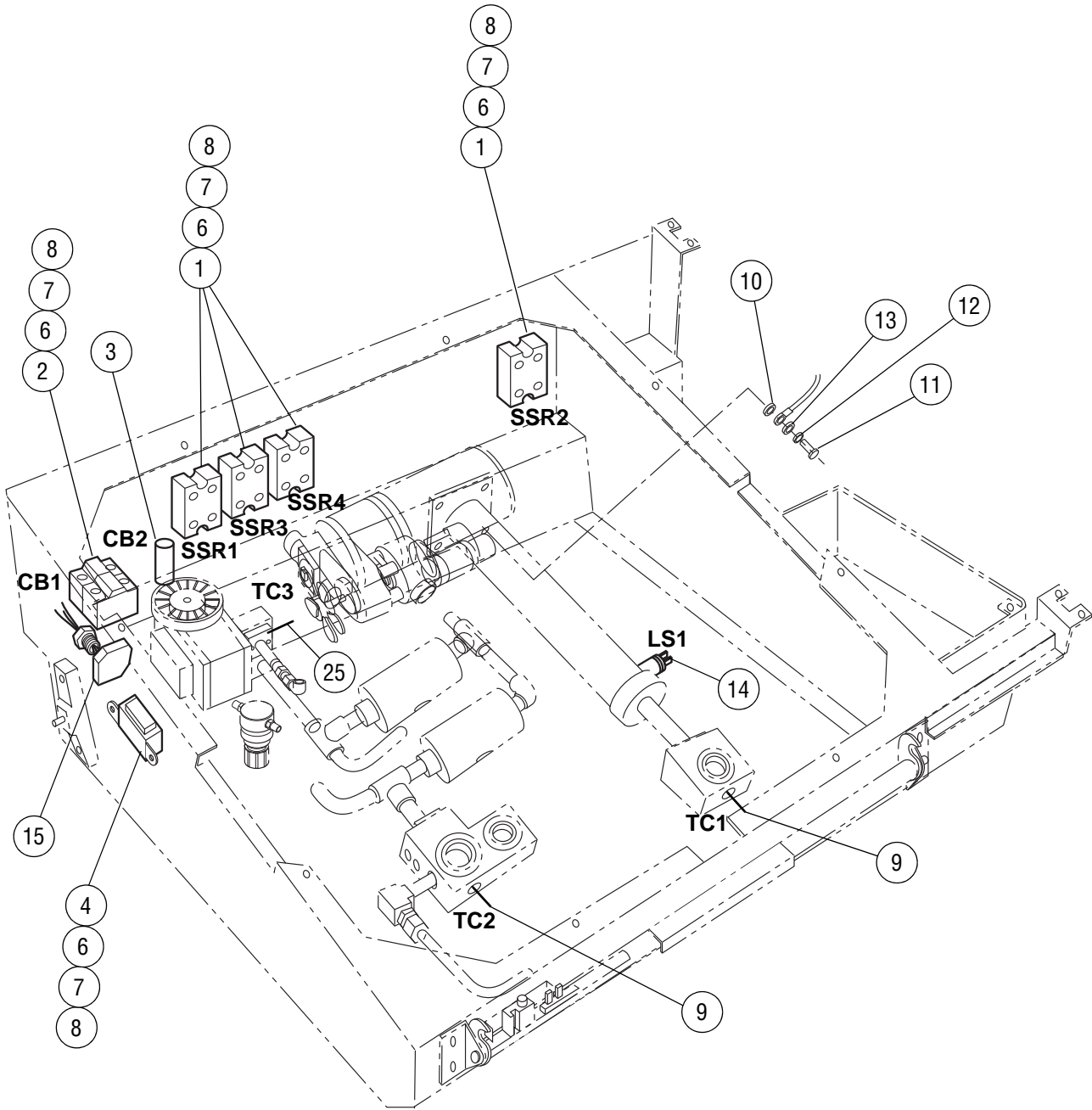
FIG. & ITEM NO.	PART NUMBER		S V C	DESCRIPTION	UNITS PER ASSEMBLY			
15-				<b>TAKE-UP MOTOR COMPONENTS.....</b>				X
1		10004601		COVER, Take-Up Motor .....				1
2	P	093922	505	ASSEMBLY, Pillow Block .....				1
3	P	093922	485	HINGE, Rear.....				1
4	P	093922	478	ASSEMBLY, Magnet Spindle.....				1
5	P	129376	326	BELT, O-Ring.....				1
6	P	093922	486	MOTOR, Gear CCW.....				1
7	P	129376	327	PULLEY, Gear Motor .....				1
8	P	136817	131	BRACKET, Motor Mounting.....				1
9	P	150475	014	MAGNET, Catch .....				1
10	P	129376	329	STRIKE, Steel.....				1
11		10004604		ASSEMBLY, Spool .....				1
12		10004603		STUD, Spool.....				1
13	P	150828	316	NUT, Flange Lock #8-32.....				2
14	P	091007	091	WASHER, NYLON.....				2
15	P	129376	340	SCREW, Flange Lock #6-32 x 3/8" .....				7
16	P	093908	032	SCREW, Sems #4-40 x 1/2" .....				2
17	P	084121	003	NUT, Keps, #4-40 .....				2
18	P	129376	339	STANDOFF (Male x Female), #8-32 x 3/4" .....				2
19	P	129376	342	STUD, Threaded, #8-32 x 1-7/16" .....				2
20		400034		LOCTITE #242 (Not Shown).....				A/R
21	P	129362	819	ROLL, Paper (3 Rolls) (Not Shown).....				A/R
22	P	129376	348	RING, Retaining.....				1
23		10004602		HOUSING, Take-Up Motor .....				1
24	P	129373	950	KIT, Spindle Mounting.....				X
25				Not Used				
26	P	093921	177	MOUNTING ASSEMBLY, Spindle .....				X
27	P	093921	219	• BRACKET, Spindle Mount.....				1
28	P	129373	947	• SPINDLE .....				2
29	P	081673	004	• WASHER, Flat, #6.....				2
30	P	084119	002	• SCREW, Flat Head, #6 x 3/8".....				2



**Figure 16. Interface Box Assembly**

FIG. & ITEM NO.	PART NUMBER		SVC	DESCRIPTION	UNITS PER ASSEMBLY
16-	10004500			<b>INTERFACE BOX ASSEMBLY.....</b>	<b>X</b>
1				(Not Used)	
2	P	146665 352		WELDMENT, Interface Box .....	1
3	P	146665 353		COVER, Interface Box .....	1
4	P	129376 354		NUT, Retaining, #10-32 .....	3
5			*	PAD, Insulating .....	A/R
6		452001		SCREW, Truss Head, Machine, #10-32 UNF x 1/2" .....	3
7	P	093922 904		ASSEMBLY, Interface Board .....	1
8	P	129376 328		STANDOFF, #6-32 x 1" (Female x Female) .....	5
9	P	129353 823		SCREW, Button Head Cap, #6-32 UNC x 1/4" .....	11
10	P	084121 004		NUT, Keps, #6-32 UNC .....	2
11	P	136812 438		SUPPLY, Power.....	1
12		500088		FILTER, Line .....	1
13		500040		RELAY, Solid State (SSR5) .....	1
14	P	045455 061		SCREW, Button Head Cap, #4-40 UNC x 1/4" .....	2
15	P	084121 003		NUT, Keps, #4-40 UNC .....	2
16	P	084114 002		WASHER, Flat, #6 .....	4
17		450403		GROMMET, Flex, 3 5/32" .....	1
18		450404		GROMMET, Flex, 2 5/8" .....	1
19	P	093922 077		LABEL (ESD and Shock Hazard) .....	1
20	P	081683 001		LOCKWASHER, #6 .....	5
21	P	129376 120		HOUSING, 5 Position .....	1
22	P	129376 122		TERMINAL, Crimp .....	2
23	R	004018 187		WIRE, White .....	A/R
24	R	004018 191		WIRE, Black.....	A/R
25		550024		TERMINAL, Female, Fully Insulated, 18-22 AWG.....	2
26		400286		TUBING, Shrink .....	A/R
27	P	129376 220		BUMPER, Stick-on.....	2
28		10004499		HARNESS, DC Power Supply .....	1
29	P	084104 001		WIRE, Tie.....	A/R
30	P	764327 601		COMPOUND, Thermo (5 oz., Tube).....	A/R
31	P	129326 001		MOUNT, Cable Tie .....	1
32		613046		GASKET, EMI, 36".....	A/R
33	P	093908 039		SCREW, Sems, #6-32 UNC x 3/8" (PCB Board Hold Down) (Not Shown) .....	5
34	P	129393 148		BLOCK, Terminal, 12-Circuit .....	1
				* Cat #5300AC, Thermasil III – cut material to 2.875" wide x 4.75" long. (Not by STERIS.)	





**Figure 17. Electrical Components**

FIG. & ITEM NO.	PART NUMBER	S V C	DESCRIPTION	UNITS PER ASSEMBLY
17-			<b>ELECTRICAL COMPONENTS .....</b>	<b>X</b>
1	500059		RELAY, Solid State (SSR1, 2, 3, 4) .....	4
2	500206		BREAKER, Circuit, 20A (CB1) .....	1
3	500078		BREAKER, Circuit, 0.5A (CB2) .....	1
4	500066		TRANSFORMER, Isolation .....	1
5	451802		SCREW, Button Head, #6-32 x 3/8" (Not Shown) .....	10
6	453001		NUT, KEPS, #6-32 .....	10
7	450205		WASHER, Flat #6 .....	22
8	450213		LOCKWASHER, #6 .....	6
9	100520		THERMOCOUPLE (TC1, 2, 3) .....	3
10	450221		LOCKWASHER, Internal/External, #10 .....	2
11	450003		SCREW, Button Head, #10-32 x 3/8" .....	2
12	450201		LOCKWASHER, #10 .....	2
13	450211		WASHER, Flat, #10 .....	2
14	500019		SWITCH, Thermal Cutoff (LS1) .....	1
15	400022		FITTING, Electric Cord Seal .....	1

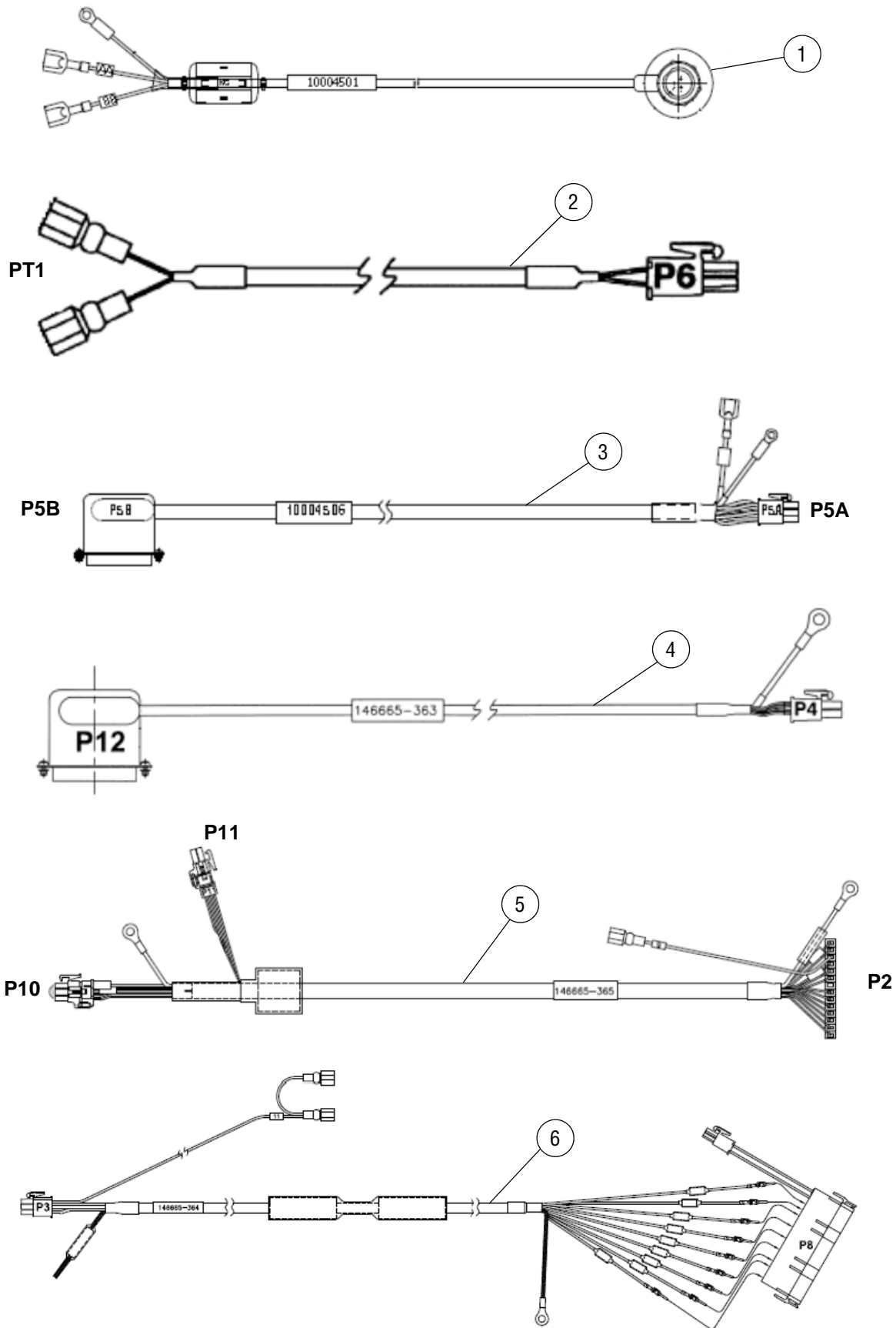


Figure 18. Harness/Cable Assemblies (1 of 2)

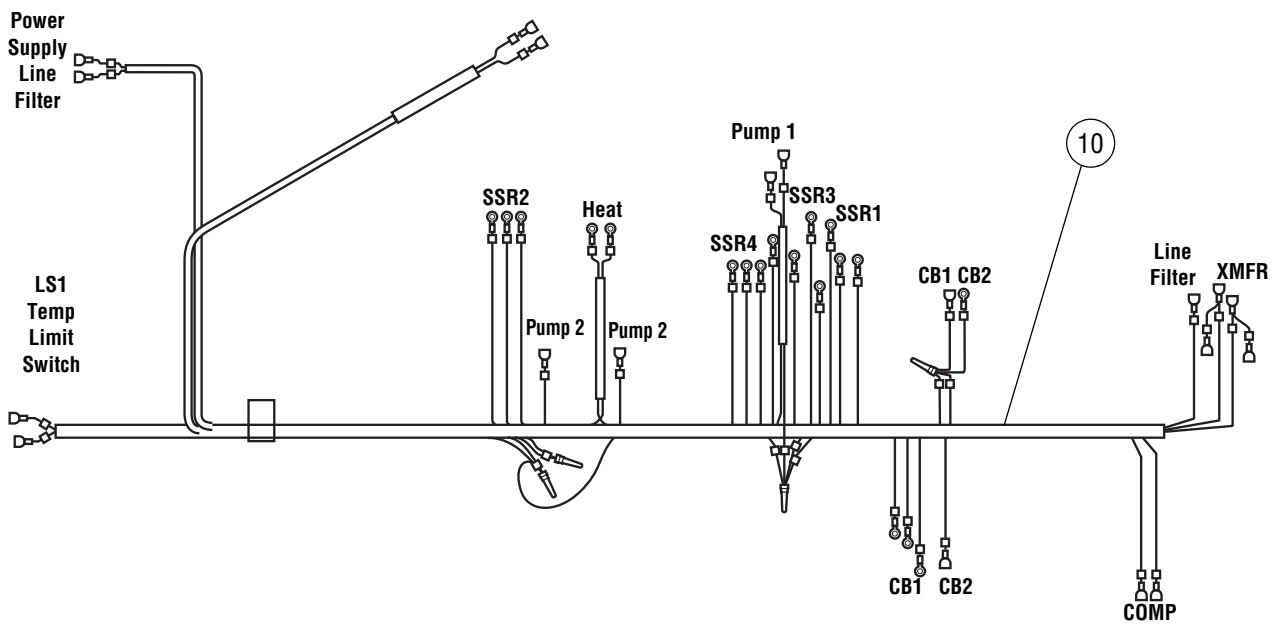
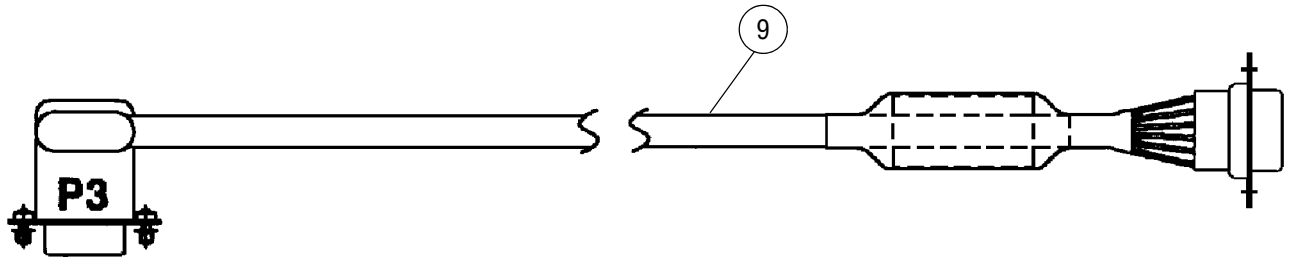
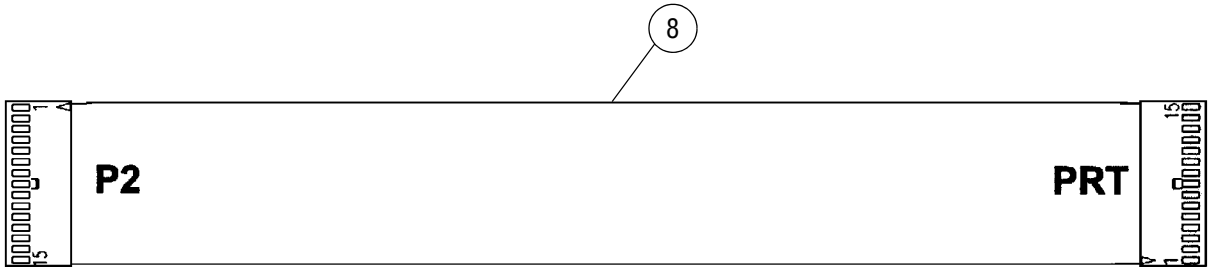
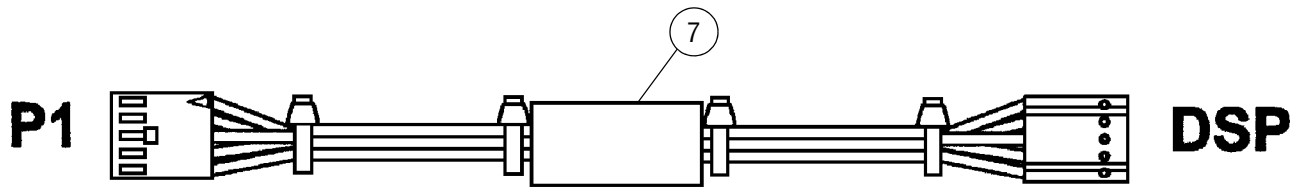
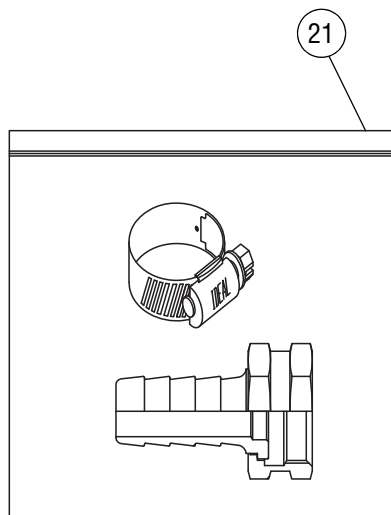
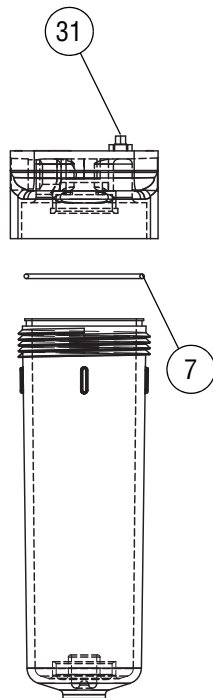
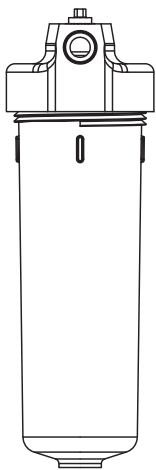
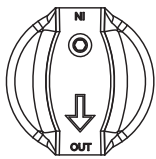
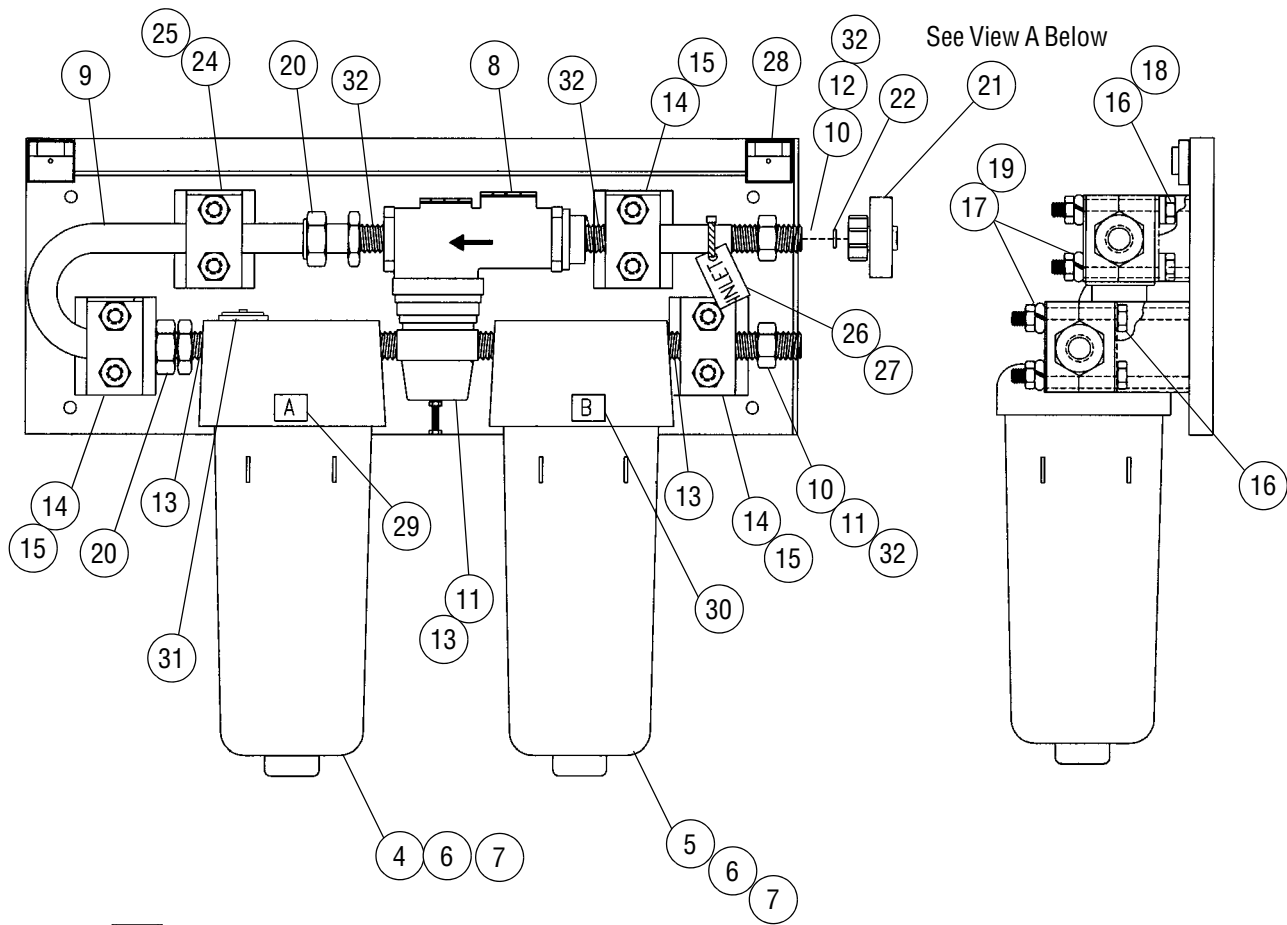


Figure 18. Harness/Cable Assemblies (2 of 2)

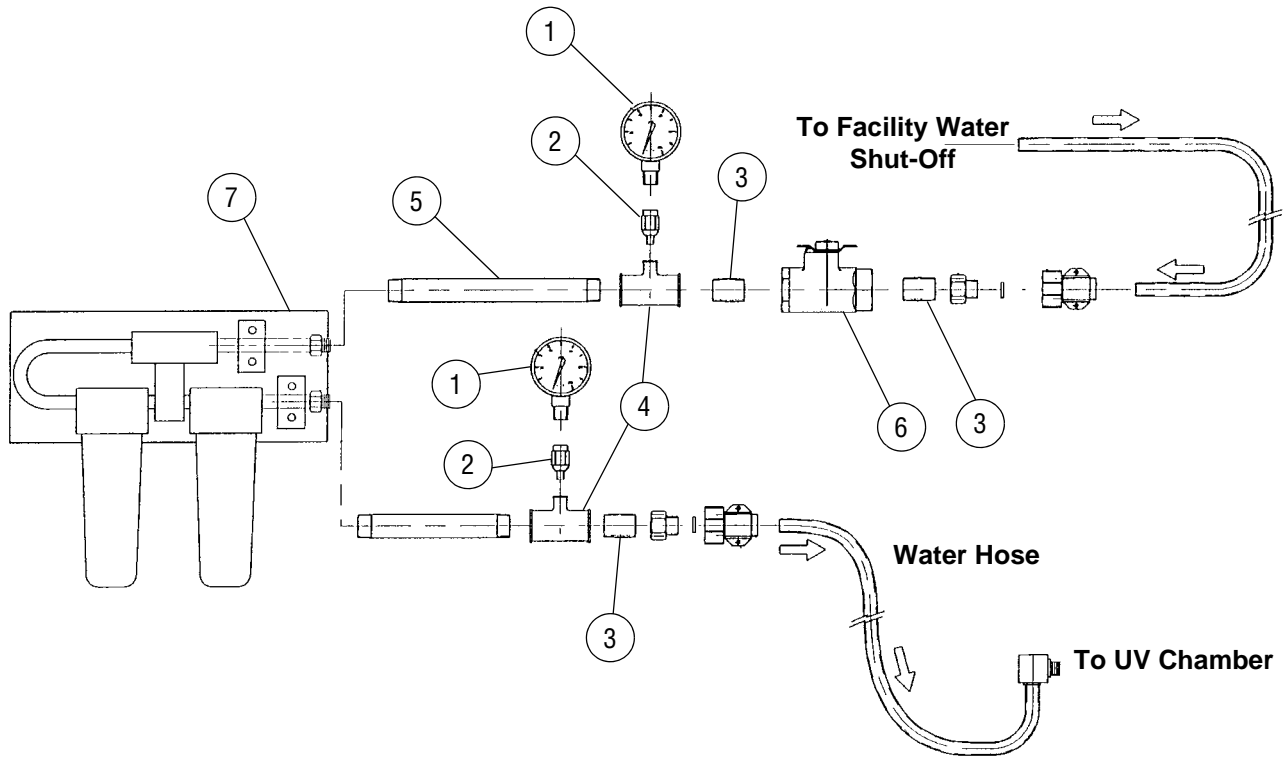
FIG. & ITEM NO.	PART NUMBER		S V C	PART	UNITS PER ASSEMBLY			
18-				<b>HARNESS/CABLE ASSEMBLIES .....</b>				X
1		10004501		CABLE, Internal Monitor Cable .....				1
2	P	136817	135	HARNESS, Transducer Wire (P6 to PT1) .....				1
3		10004506		CABLE, Analog (P5A to P5B) .....				1
4	P	146665	363	CABLE, DC Input (P4 to P12) .....				1
5	P	146665	365	HARNESS, DC Power (P2 to P10 and P11) .....				1
6	P	146665	364	HARNESS, AC Output (P8 to P3) .....				1
7	P	093922	498	HARNESS, Display (P1 to Display).....				1
8	P	093922	499	ASSEMBLY, Printer Harness (P2 to Printer).....				1
9	P	136817	129	HARNESS, Serial Port (P3 to Panel) .....				1
10		300064		HARNESS, High Voltage Wire (LS1; Power Supply Line Filter; Fan; SSR1/2/3 and 4 P1; HTR1; P2; CB1; CB2; COMP) .....				1
11		10004499		HARNESS, DC Power Supply (Not Shown) (Power Supply to J1) ....				1
12		300068		ASSEMBLY, Cable (Not Shown) (Pump to Ground) .....				1
13		300069		ASSEMBLY, Cable (Not Shown) (Compressor to Ground).....				1
14		300065		ASSEMBLY, Cable (Not Shown) (Heater to Filter) .....				1
15		500025		ASSEMBLY, Cable (Not Shown).....			A/R	
16		400022		FITTING, Electric Cord, Seal (Not Shown).....				1
17		300071		ASSEMBLY, Power Cord (Not Shown) (AC Power) .....				1



**View A**

**Figure 19. Dual Pre-Filter Assembly**

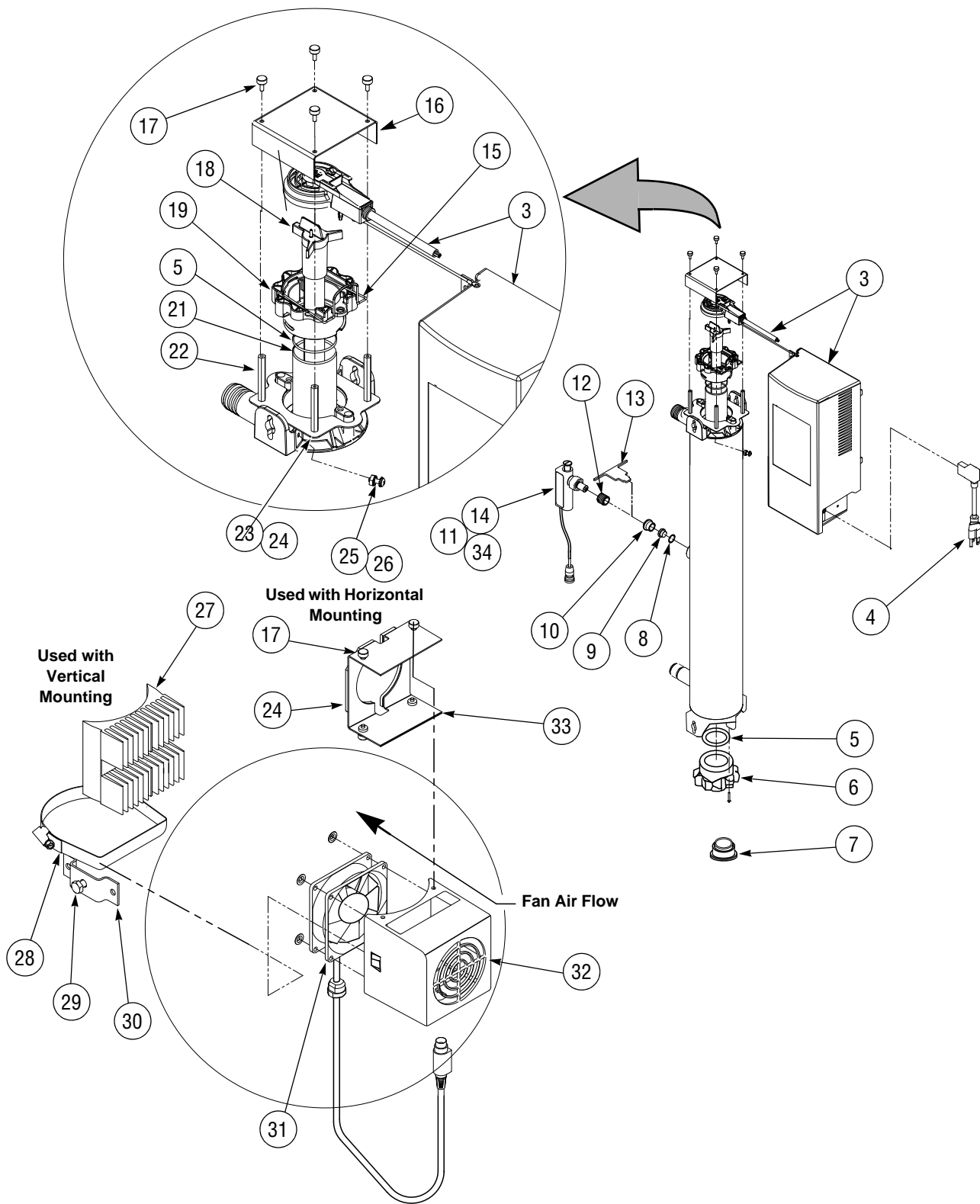
FIG. & ITEM NO.	PART NUMBER	SVC	DESCRIPTION	UNITS PER ASSEMBLY
19-	A1563		DUAL PRE-FILTER ASSEMBLY (English) .....	X
1	100430		COVER (Not Shown) .....	1
	10004428		• LABEL, Reversing (English) .....	1
	100375		• LOGO, Prefilter System .....	1
	10004427		• LABEL, Shock Hazard (English) .....	1
2			(Item # Not Used)	
3	A1567		PRE-FILTER, A & B Replacement (Not Shown).....	A/R
4	A1501		• CARTRIDGE, A, Pre-filter.....	1
5	A1562		• CARTRIDGE, B, Pre-filter.....	1
6	10004237		ASSEMBLY, Filter, B With Lexan Sump .....	1
	400356		• BOWL, Plastic (Sump).....	1
	10004236		ASSEMBLY, Filter, A With Lexan Sump .....	1
	400356		• BOWL, Plastic (Sump).....	1
7	450622		O-Ring, Sump Filter Assembly .....	2
8	10004456		REGULATOR, Pressure (Max., Inlet Pressure, 300 psi) .....	1
9	100541		ELBOW, Return .....	1
10	400192		ADAPTER .....	2
11	100425		PIPE, Brass, Threaded .....	2
12	100426		PIPE, Brass, Threaded .....	1
13	400150		TAPE, Pipe Thread Seal.....	A/R
14	400187		CLAMP, Standard, Half.....	6
15	400188		PLATE, Cover, Standard .....	3
16	452104		SCREW, Hex Head 1/4-20 x 2-1/4" Lg. ....	8
17	450207		WASHER, Split lock, 1/4".....	8
18	450208		WASHER, Flat, Stainless Steel, 1/4" .....	4
19	453006		NUT, Hex, 1/4-20 .....	8
20	400290		CONNECTOR, Male .....	2
21	200257		KIT, Hose Coupler .....	2
22	400071		WASHER, Rubber .....	2
23	400507		WRENCH, Pre-filter (Tool, Not Shown) .....	A/R
24	400189		CLAMP, Standard, Half.....	2
25	400190		PLATE, Cover, Standard, Stainless Steel.....	2
26	100431		LABEL, Inlet .....	1
27	400166		TWIST-TIE .....	1
28	400196		CATCH, Magnetic .....	2
29	100436		LABEL, Filter Indent "A" .....	2
30	100437		LABEL, Filter Indent "B" .....	2
31	400357		BUTTON, Pressure Relief .....	1
32	400036		SEALANT.....	A/R



**Figure 20. Gauge Installation Package**



FIG. & ITEM NO.	PART NUMBER		S V C	DESCRIPTION	UNITS PER ASSEMBLY		
20-	P	755716	468	<b>GAUGE INSTALLATION PACKAGE .....</b>	<b>X</b>		
1	P	764328	468	GAUGE, Pressure 0-100 psi.....	2		
2	P	764328	700	SNUBBER, 1/4" NPT .....	2		
3	P	029290	091	NIPPLE, 3/4" NPT x 1" Lg.....	3		
4	P	084323	001	TEE, Reducing, 3/4" x 3/4" 1/4" NPT .....	2		
5	P	029314	091	NIPPLE, 3/4" NPT x 7" Lg.....	1		
6	P	047601	091	VALVE, Ball, 3/4" NPT .....	1		
7				ASSEMBLY, Dual Pre-Filter (See Figure 19) .....	1		



**Figure 21. Ultra Violet Light System**

FIG. & ITEM NO.	PART NUMBER	S V C	DESCRIPTION	UNITS PER ASSEMBLY			
21-	A1579		ULTRA VIOLET LIGHT SYSTEM .....	X			
1	A1591		STERIUUV YEARLY REPLACEMENT PARTS KIT (Not Shown).....		X		
2	A1592		STERIUUV 2 YR. REPLACEMENT PARTS KIT (Not Shown).....			X	
3	10006395		POWER SUPPLY .....	1	-	-	
4	10006394		CORD, Power .....	1	-	-	
5	10006363		O-RING, Quartz Sleeve .....	2	-	2	
6	10006396		BOLT, Sleeve.....	1	-	-	
7	10006364		TOOL, Sleeve Removal .....	A/R	-	1	
8	10006355		O-RING, Quartz Hi-Hat (Red) .....	1	1	-	
9	10006354		SENSOR, Quartz Hi-Hat.....	1	1	-	
10	10006356		SLEEVE, Sensor.....	1	1	-	
11	10006358		ASSEMBLY, Sensor .....	1	1	-	
12	10006357		SENSOR, Nipple .....	1	1	-	
13	10006361		SENSOR, Tool .....	A/R	1	-	
14	10006359		SENSOR, O-Ring .....	1	1	-	
15	10006398		FORM, Wire .....	1	-	-	
16	10006406		COVER, Shroud.....	1	-	-	
17		*	SCREW, Thumb #6-32 X 3/8" LONG .....	8	-	-	
18	10006353		LAMP, Replacement .....	1	1	-	
19	10006397		BOLT, Sleeve.....	1	-	-	
20	10006408		FUSE, 250V, 2A (Not Shown).....	1	-	-	
21	10006362		SLEEVE, Quartz .....	1	-	1	
22	10006405		STAND-OFF, Shroud.....	4	-	-	
23	10006404		PLATE, Shroud.....	1	-	-	
24	10006407		GASKET, Bracket .....	2	-	-	
25		*	WASHER, #8 External Lock .....	2	-	-	
26		*	SCREW, #8-32 XZ 1/2".....	1	-	-	
27	10006401		HEAT SINK.....	1	-	-	
28	10006402		CLAMP, 4" Screw .....	1	-	-	
29		*	BOLT, Hex, 1/4-20 X 1/2" .....	2	-	-	
30	10006393		BRACKETS, Mounting, Set, with Screws .....	2	-	-	
31	10006400		FAN, Cooling .....	1	-	-	
32	10006399		SHROUD, Fan .....	1	-	-	
33	10006403		BRACKET, Fan Mount .....	1	-	-	
34	10006360		SENSOR, O-Ring .....	1	1	-	
* Note: These parts not supplied by STERIS, purchase locally.							

### Live Document, Historical Table

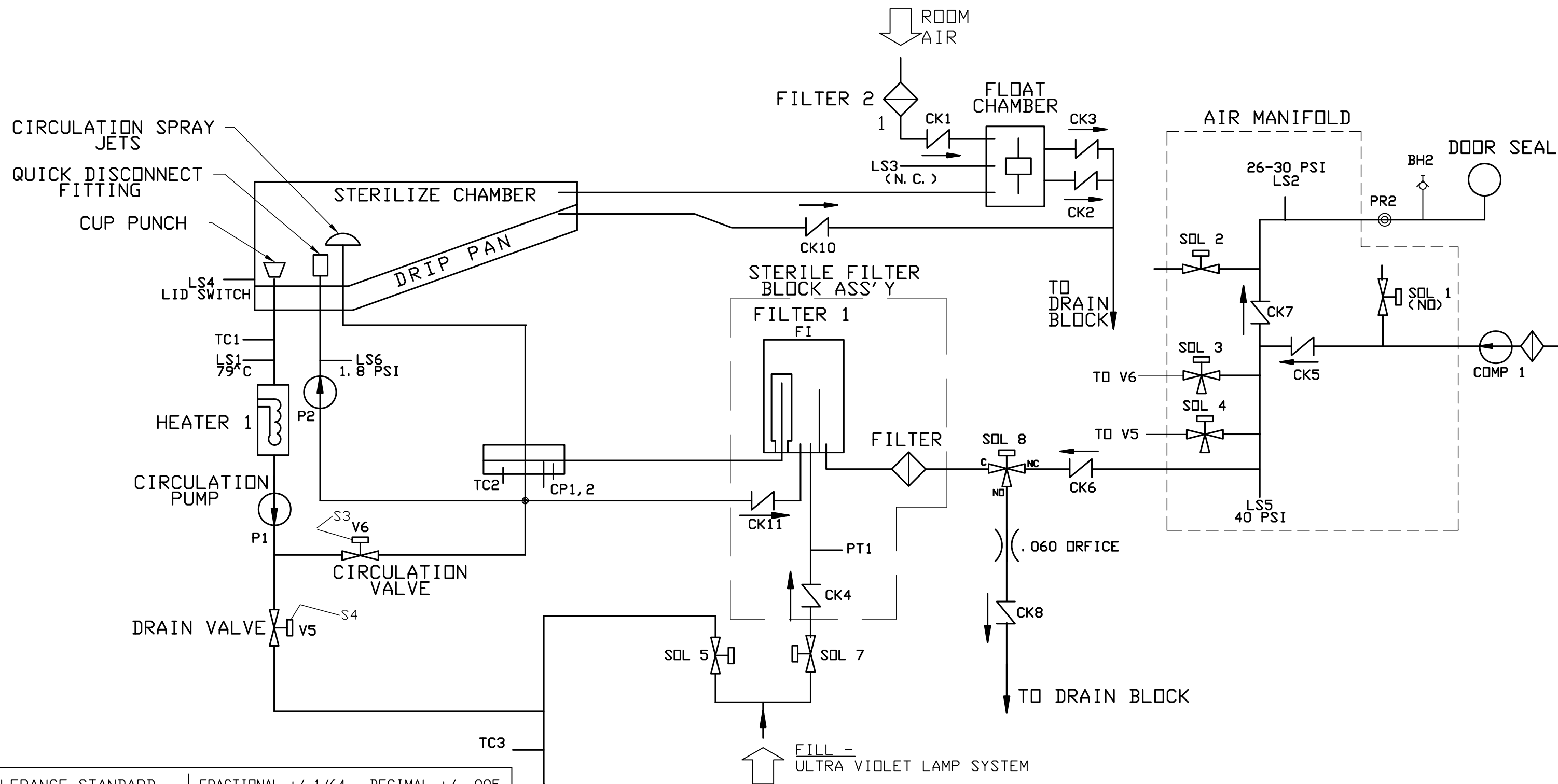
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(Front Cover)	Front Cover	<b>P:</b> Stamp "12/17/10 LIVE DOCUMENT" <b>C:</b> Document Manufacturing changes/manual errors and clarifications <b>A:</b> Stamped to show Live Document Date
33	11 Piping and Components	<b>P:</b> Description on item 17, p/n 613027, is not correct. <b>C:</b> Error <b>A:</b> The correct description is: Tubing Polyethylene, 1/4"ID x 5/32"OD.
(Front Cover)	Front Cover	<b>P:</b> Stamp "12/21/10 LIVE DOCUMENT" <b>C:</b> Document Manufacturing changes/manual errors and clarifications <b>A:</b> Stamped to show Live Document Date
20	5 Fluid and Air Components	<b>P:</b> Item #45 part number incomplete <b>C:</b> Error <b>A:</b> 452004 Screw, 10-32 x 1/2" SS
39	14 Control Assembly, Domestic	<b>P:</b> Control Assembly part number does not have a "P" in the beginning <b>C:</b> Error <b>A:</b> 10004600 Control Assembly, Domestic

# Reference Drawings

Located at the end of this manual (behind the tab **Reference Drawings**) are the SYSTEM 1E™ Liquid Chemical Sterilant Processing System reference drawings. These drawings are supplied as an aid in understanding unit operation and troubleshooting. See **Table 1** for listing and order of drawings.

**Table 1. SYSTEM 1E Liquid Chemical Sterilant Processing System Reference Drawings**

Title	Sheet	Drawing Reference Number
Piping Schematic (Processor Only)	1 of 1	755718-179
Electrical Schematic (Processor Only)	1 of 1	762650-985
Cycle Graph	1 of 1	755718-204
Diagnostic Cycle Graph	1 of 1	755718-205
Interface Board Schematic	4 of 4	093922-904
Control Diagram	1 of 22	10020568
	2 of 22	
	5 of 22	
	6 of 22	
	7 of 22	
	10 of 22	
	20 of 22	
	21 of 22	
	22 of 22	



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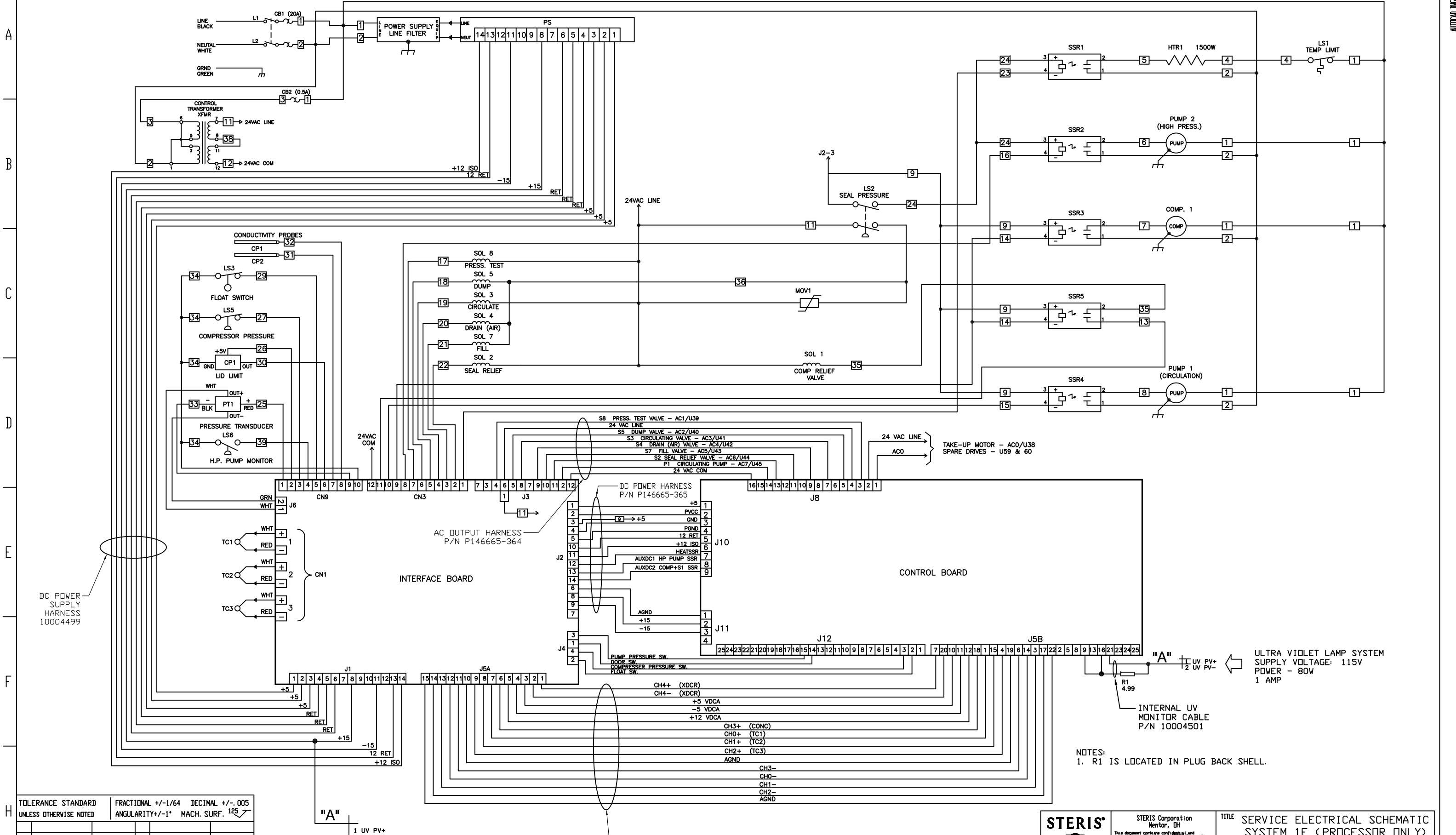
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ANGULARITY +/-1° MACH. SURF. 125

NO.	DATE	E.C.A. NUMBER	NO.	DATE	E.C.A. NUMBER
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DATE	DATE	DATE	DATE	DATE		
					1 SHEET OF 1	

QUANTITY	PART NUMBER	ITEM NO.	PART NAME	DESCRIPTION, MATERIAL	REV. NO.	REVISION DATE
	762650-985		SERVICE, SCHEMATIC	ELECTRICAL	0	09/15/10



NOTES:  
 1. R1 IS LOCATED IN PLUG BACK SHELL.

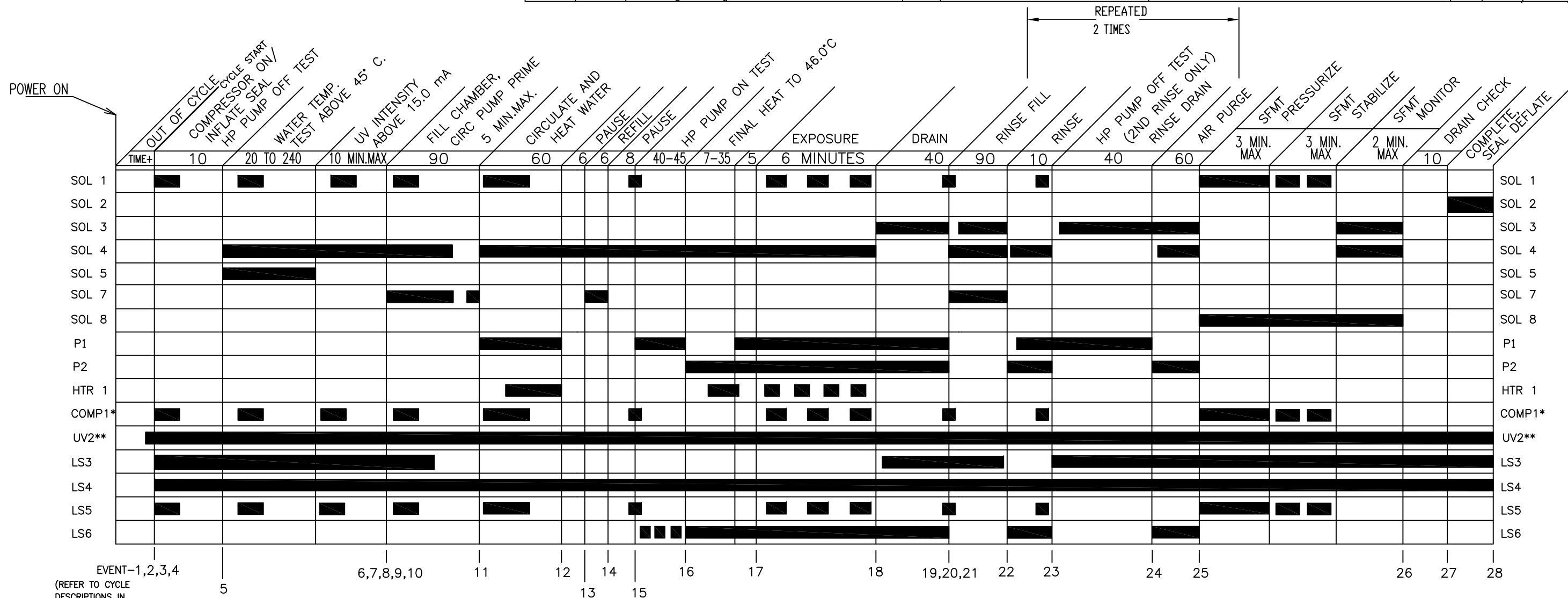
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AUTOCAD INC.

DWG. NO. 755718-204 1 SHEET OF 1

QUANTITY	PART NUMBER	ITEM NO.	PART NAME	DESCRIPTION, MATERIAL	REV NO	REVISION DATE
X	755718-204	1	STERIS SYSTEM 1E	CYCLE GRAPH	0	10/29/10



EVENT-1,2,3,4  
(REFER TO CYCLE DESCRIPTIONS IN THE MAINTENANCE MANUAL)

KEY- ■ INDICATES VALVE STATUS ON AND SWITCH CLOSURE

SOL 1	SOLENOID 1
SOL 2	SOLENOID 2
SOL 3	SOLENOID 3 / V6
SOL 4	SOLENOID 4 / V5
SOL 5	SOLENOID 5
SOL 7	SOLENOID 7
SOL 8	SOLENOID 8
P1	CIRC. PUMP
P2	H.P. PUMP
HTR 1	HEATER 1
COMP 1	COMPRESSOR *
UV2	UV LIGHT **
LS3	CHAMBER FLOAT SWITCH
LS4	CHAMBER LID SWITCH
LS5	AIR COMPRESSOR SWITCH
LS6	HP PUMP TEST SWITCH

- NOTES:
- \* ACTIVATION OF COMP 1 AND LS 5 SHOWN TYPICAL. COMP 1 WILL OPERATE WHENEVER PRESSURE DROPS BELOW LS5 SETTING.
  - \*\* UV LIGHT PLUGGED IN PRIOR TO STARTING CYCLE.
  - + SECONDS UNLESS OTHERWISE NOTED.

TOLERANCE STANDARD UNLESS OTHERWISE NOTED  
 FRACTIONAL +/-1/64 DECIMAL +/-0.005  
 ANGULARITY +/-1° MACH.SURF. 125

0	10/29/10	SVC10-088			
NO.	DATE	E.C.A. NUMBER	NO.	DATE	E.C.A. NUMBER
REVISIONS			REVISIONS		

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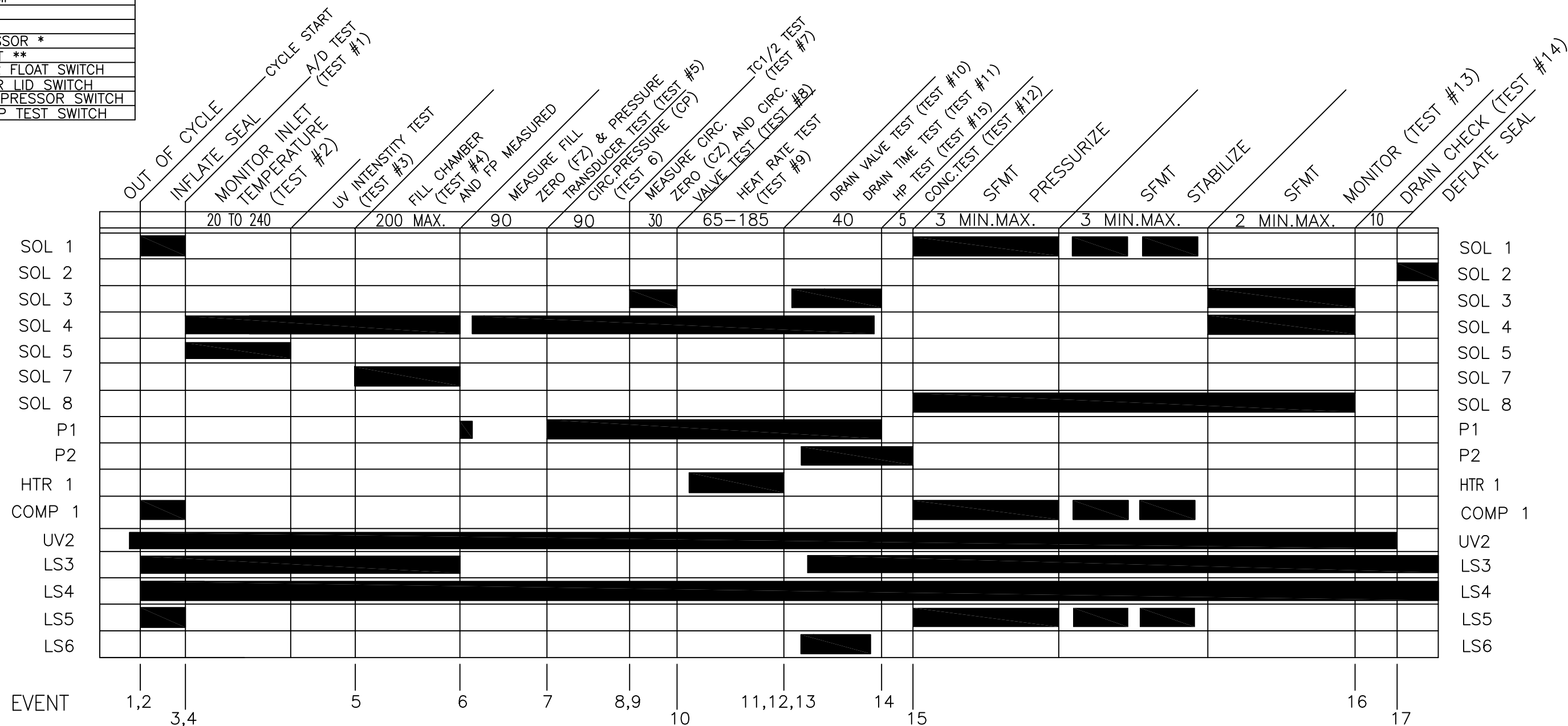
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X	755718-205	1	STERIS SYSTEM 1E	DIAGNOSTIC CYCLE GRAPH	0	09/15/10

KEY- ■■■■■ INDICATES VALVE STATUS ON AND SWITCH CLOSURE

SOL 1	SOLENOID 1
SOL 2	SOLENOID 2
SOL 3	SOLENOID 3 / V6
SOL 4	SOLENOID 4 / V5
SOL 5	SOLENOID 5
SOL 7	SOLENOID 7
SOL 8	SOLENOID 8
P1	CIRC. PUMP
P2	H.P. PUMP
HTR 1	HEATER 1
COMP 1	COMPRESSOR *
UV2	UV LIGHT **
LS3	CHAMBER FLOAT SWITCH
LS4	CHAMBER LID SWITCH
LS5	AIR COMPRESSOR SWITCH
LS6	HP PUMP TEST SWITCH

NOTES:

- \* ACTIVATION OF COMP 1 AND LS 5 SHOWN TYPICAL. COMP 1 WILL OPERATE WHENEVER PRESSURE DROPS BELOW LS5 SETTING.
- \*\* UV LIGHT PLUGGED IN PRIOR TO STARTING CYCLE.
- + SECONDS UNLESS OTHERWISE NOTED.

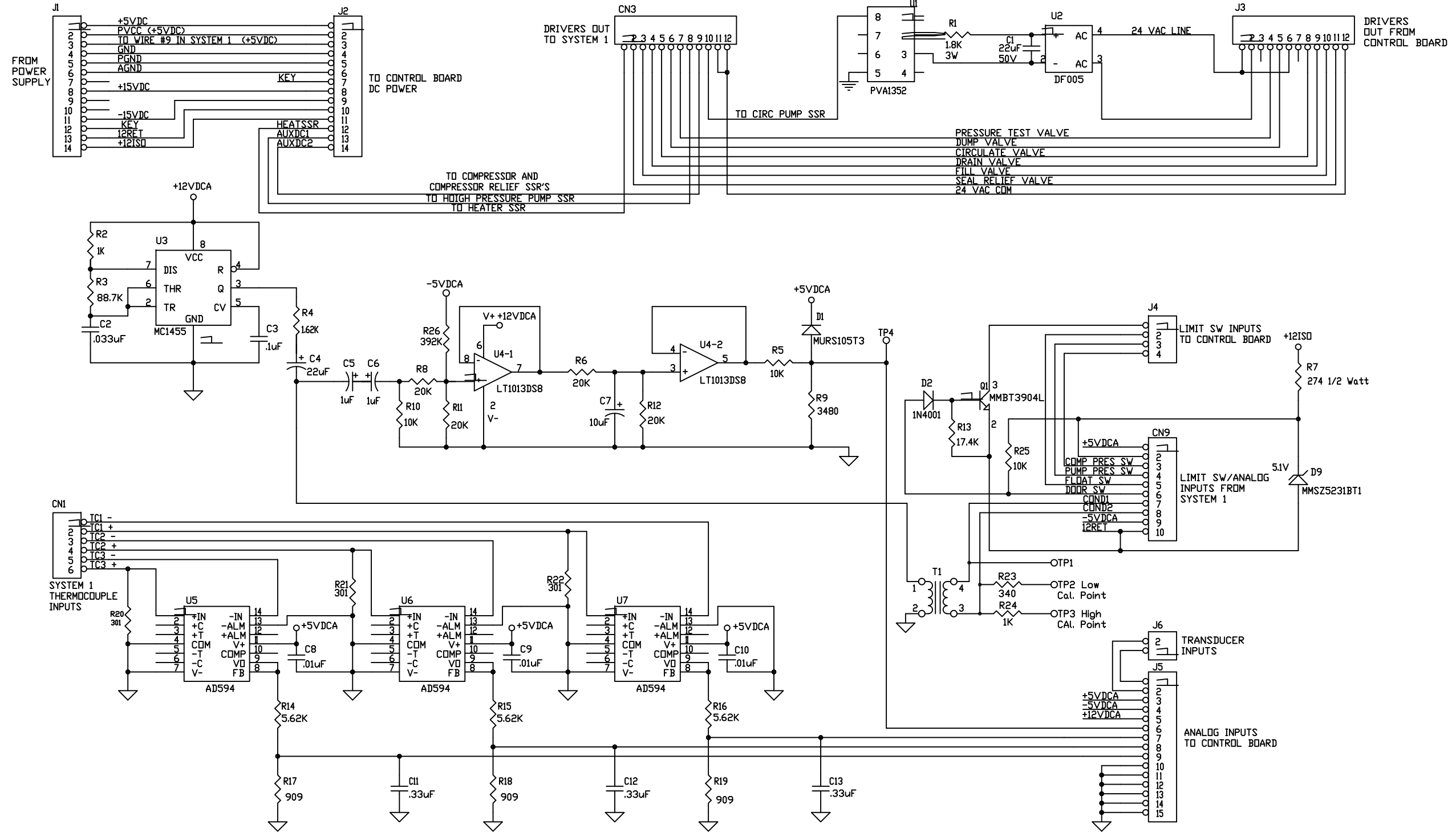


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XXX	93922-904	1	ASSEMBLY,	INTERFACE BOARD	2	09-12-05



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Mentor, OH 44060 USA  
Telephone : (800) 548-4873

Project Name : 10020568

Project Description : SYSTEM 1E/1EX Control Diagrams

Machine Type : LIQUID CHEMICAL STERILIZATION SYSTEM, LCSS

Drawing Number : 10020568

Source File Name : 10020568.zw1

Visualization Files : 10020568.pdf

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Native Language : ENGLISH


Design Location : MENTOR, OH USA

Build Location : MENTOR, OH USA

Total sheets : 9

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DRAWN BY	<i>TBuck</i>	03/16/2009

TITLE SYSTEM 1E/1EX Control Diagrams

LOCATION	SCALE	SIZE	DRAWING NUMBER	VERSION	SHEET
	1	D	10020568	C	1 OF 22

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SHEET	TYPE	LOCATION	DESCRIPTION	NOTES	
1	Title page / cover sheet		TITLE PAGE / COVER SHEET		
2	Table of contents		TABLE OF CONTENTS		
5	Graphic		REVISION HISTORY		
6	Graphic		NOTE SHEET		
7	Schematic single-line		SINGLE LINE DIAGRAM		
10	P&I diagram		MECHANICAL SCHEMATIC	PROCESS AND INSTRUMENTATION DIAGRAM	FLUID POWER SCHEMATIC
20	Schematic multi-line		ELECTRICAL SCHEMATIC	AC INCOMING AND AC/DC DISTRIBUTION	1E/1EX CONFIGURATION TABLE
21	Schematic multi-line		ELECTRICAL SCHEMATIC	POWER BOX ASSEMBLY	MAIN CONTROL ASSEMBLY
22	Schematic multi-line		ELECTRICAL SCHEMATIC	DIGITAL AND ANALOG I/O INTERFACE	HEATER AND PUMPS

A

B

C

D

E

A

B

C

D

E

1

5

1

2

3

4

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# REVISION HISTORY

REVISION	ECN NUMBER	DATE	DESCRIPTION	REVISED BY	APPROVED BY
A	N/A	06/18/2009	INITIAL RELEASE	N/A	FPMokris
B	SEE PLM	11/12/2009	SHEET 7 ADDED, SHEET 21 REVISED WITH NEW "CBL" NUMBERS AND OPERATOR INTERFACE LAYOUT REARRANGED. UPDATED MISCELLANEOUS CROSS-REFERENCES.	FPMokris	FPMokris
C	SEE PLM	03/09/2010	INCORPORATED 1E/1EX (i.e. DOMESTIC/INTERNATIONAL) DESIGNS IN THIS DRAWING SET. UPDATED AND DETAILED CBL1, CBL2, CBL3, CBL4, AND CBL5 AND APPROPRIATE CROSS CONNECTIONS. REMOVED UV LIGHT ELECTRICAL CIRCUITS FROM THIS DRAWING SET AND REFERENCE INDIVIDUAL SCHEMATICS BY MODELS A1565 AND A1579.	FPMokris	FPMokris

# DRAWING STANDARDS:

## STANDARD NOTES:

- 13) SEPARATELY MOUNTED - SUPPLIED BY OTHERS
- 14) SEPARATELY MOUNTED - SUPPLIED BY STERIS
- 15) SEPARATELY MOUNTED
- 101) MOUNTED ON CONTROL PANEL
- 102) MOUNTED ON LOGIC ASSEMBLY
- D) MOUNTED ON DOOR
- OPT) OPTION, NOT SUPPLIED
- R) RESERVED FOR FUTURE USE
- SJ) SADDLE JUMPER (TERMINAL BOARD)

## CUSTOM NOTES, (PRODUCT SPECIFIC):

- 1E ONLY) SUPPLIED WITH MODEL 1E ONLY
- 1EX ONLY) SUPPLIED WITH MODEL 1EX ONLY
- SEE 1E/1EX TABLE) SEE 1E/1EX CONFIGURATION TABLE

## STANDARD SYMBOLS:

- 1) ITEM NUMBER BALLOON FOR MECHANICAL DETAIL

## GUIDELINES FOR DRAWING GROUPINGS BY TYPE:

A PROJECT METHODOLOGY FOR A DOCUMENTATION PACKAGE IS OPTIMIZED WHEN DRAWINGS ARE GROUPED BY TYPE, FUNCTION AND FORM. FOR THE SAKE OF CONSISTENCY AND TOWARDS THIS END THE FOLLOWING GUIDELINES HAVE BEEN ESTABLISHED.

DEPENDING ON SPECIFIC PROJECT REQUIREMENTS, DRAWING GROUPS MAY BE ADDED TO THE STRUCTURE, AND PATTERNED AS APPROPRIATE. WHEN A PARTICULAR GROUP IS NOT NECESSARY, IT MAY BE ELIMNATED; HOWEVER, THE DRAWING NUMBERS ASSIGNED TO THAT GROUP SHOULD BE HELD IN RESERVE.

SHEET	DRAWING GROUPING / TYPE	DESIGN NOTES
1	TITLE PAGE / COVER SHEET	REQUIRED, CUSTOM FORM
2-4	TABLE OF CONTENTS	REQUIRED, E-CAE GENERATED FORM
5-9	GRAPHICS	REVISION HISTORY, REQUIRED; NOTE SHEET, REQUIRED; SINGLE-LINE DIAGRAMS, AS NEEDED
10-99	SCHEMATICS	ELECTRICAL AND MECHANICAL, AS REQUIRED











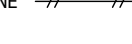





## SCHEMATIC COORDINATES AND CROSS REFERENCE SCHEMES:

THE FOLLOWING SCHEME HAS BEEN ADOPTED AND APPLIED TO THE SINGLE AND DOUBLE "LADDER" SCHEMATICS. THIS CONVENTION IS THE BASIS FOR LOCATING ANY COMPONENT AND IS DEFINED IN THE SELECTED STANDARD SHEET. A DEFINED SCHEME IS REQUIRED WHEN CROSS-REFERENCE INFORMATION IS DESIRED BETWEEN ANY SCHEMATIC SHEETS AND GENERATED REPORTS.

WHEN ACTIVE, THE CORDINATE NUMBERING SYSTEM IS RECOGNIZED BY ONE OR TWO COLUMNS OF "LINE NUMBERS" ON THE LEFT AND CENTER OF THE SCHEMATIC SHEET. THE LEFT COLUMN CONTAINS LINES 01 THROUGH 39, WHILE THE CENTER COLUMN CONTAINS LINES 40 THROUGH 78. BETWEEN THESE COLUMN END POINTS, LINE NUMBERS RUN CONSECUTIVELY.


THE ENTIRE COORDIANTE REFERENCE IS COMPLETED WITH THE RESPECTIVE SHEET NUMBER, ACCORDING TO THE FORMAT:

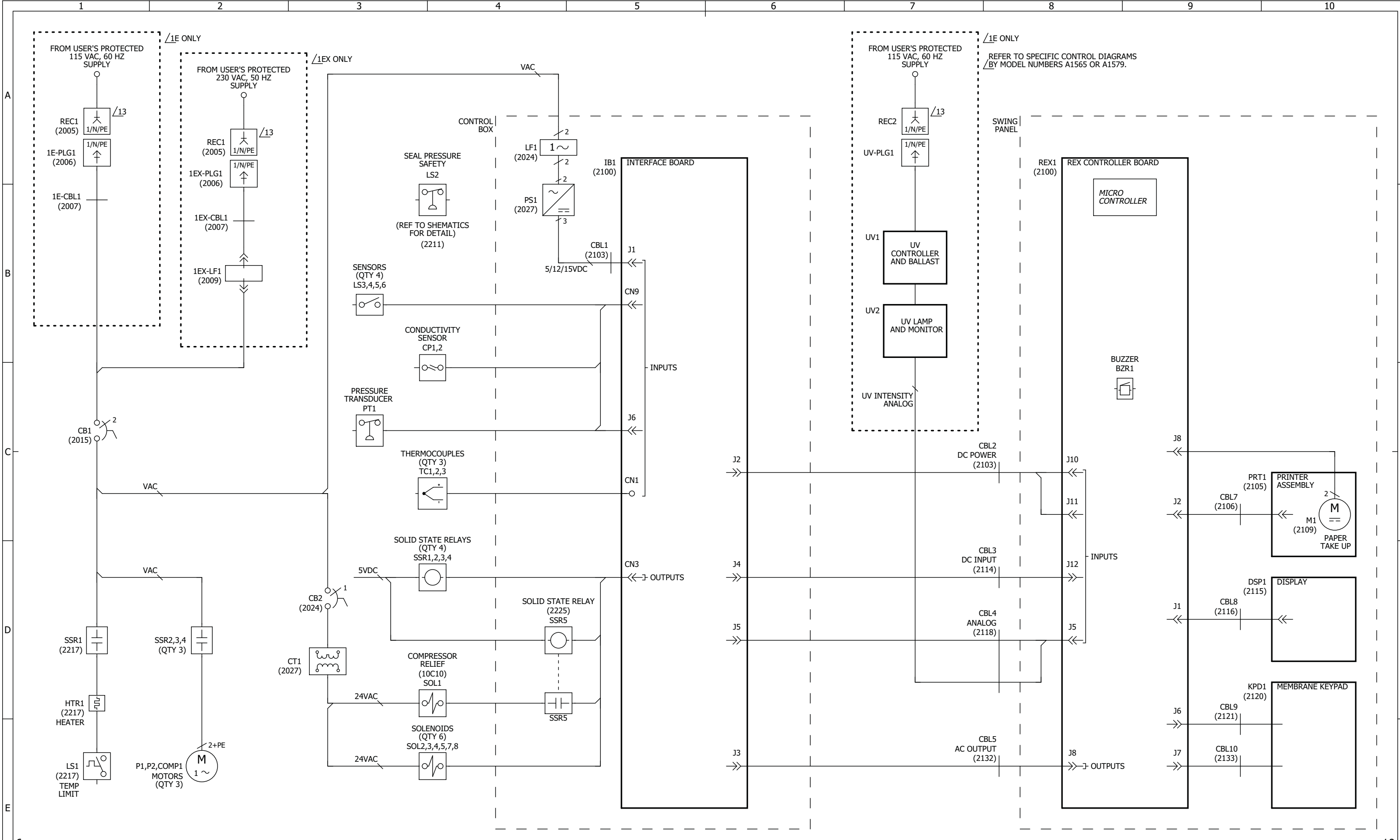
"SSLL" - WHERE  
 "SSS" IS THE SHEET NUMBER. MINIMUM OF 2 DIGITS.  
 "LL" IS THE LINE NUMBER THAT LOCATES A COMPONENT. 2 DIGITS, 01 THROUGH 78.

MECHANICAL CONTROL LEGEND	
FLUID POWER	PROCESS, P&ID
PRESSURE REGULATOR 	LIQUID FILTER 
NON-RETURN VALVE WITH SPRING (CHECK VALVE) 	PARTICLE FILTER 
NON-RETURN VALVE WITHOUT SPRING 	BACKFLOW PREVENTER (CHECK VALVE) 
VALVE - OPERATING ELEMENT SOLENOID 	VALVE WITH PNEUMATIC PRESSURE ACTUATOR 
VALVE - OPERATING ELEMENT SPRING 	VALVE WITH SOLENOID ACTUATOR 
AIR SUPPLY LINE 	HEATING ELEMENT 
ATMOSPHERE 'ATM' 	GENERAL SENSOR 
	RECIPROCATING PISTON PUMP 
	CENTRIFUGAL PUMP 

← PREVIOUS SHEET NUMBER / NAME

NEXT SHEET NUMBER / NAME →

DESCRIPTION <b>NOTE SHEET</b>		 This document contains confidential and proprietary information of STERIS Corporation. Neither this document nor the information therein are to be reproduced, distributed, used or disclosed either in part or in whole except as specifically authorized by STERIS Corporation.		NAME APPROVER: <i>FPMokris</i> REVIEWER: <i>JFWyar</i> DRAWN BY: <i>TBuck</i>	DATE 03/09/2010 03/09/2010 03/16/2009	TITLE <b>SYSTEM 1E/1EX Control Diagrams</b>	LOCATION SCALE: 1 SIZE: D	DRAWING NUMBER 10020568	VERSION C	SHEET 6 OF 22
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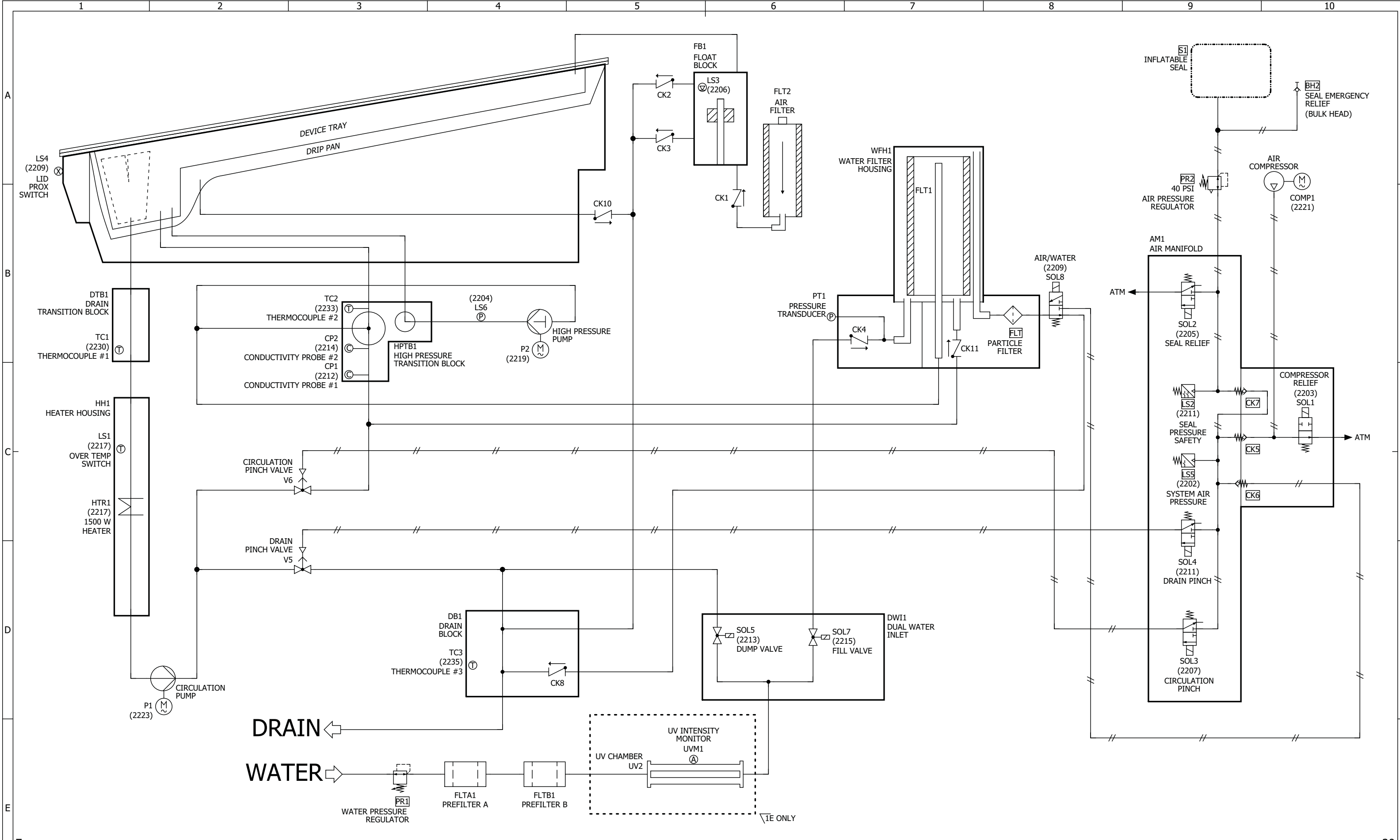


DESCRIPTION  
**SINGLE LINE DIAGRAM**

**STERIS**  
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APPROVER	NAME	DATE
REVIEWER	FPMokris	03/09/2010
DRAWN BY	TBuck	03/09/2010
	FPMokris	08/15/2009

TITLE	LOCATION	SCALE	SIZE	DRAWING NUMBER	VERSION	SHEET
<b>SYSTEM 1E/1EX Control Diagrams</b>		1	D	10020568	C	7 OF 22



DRAIN ←

WATER →

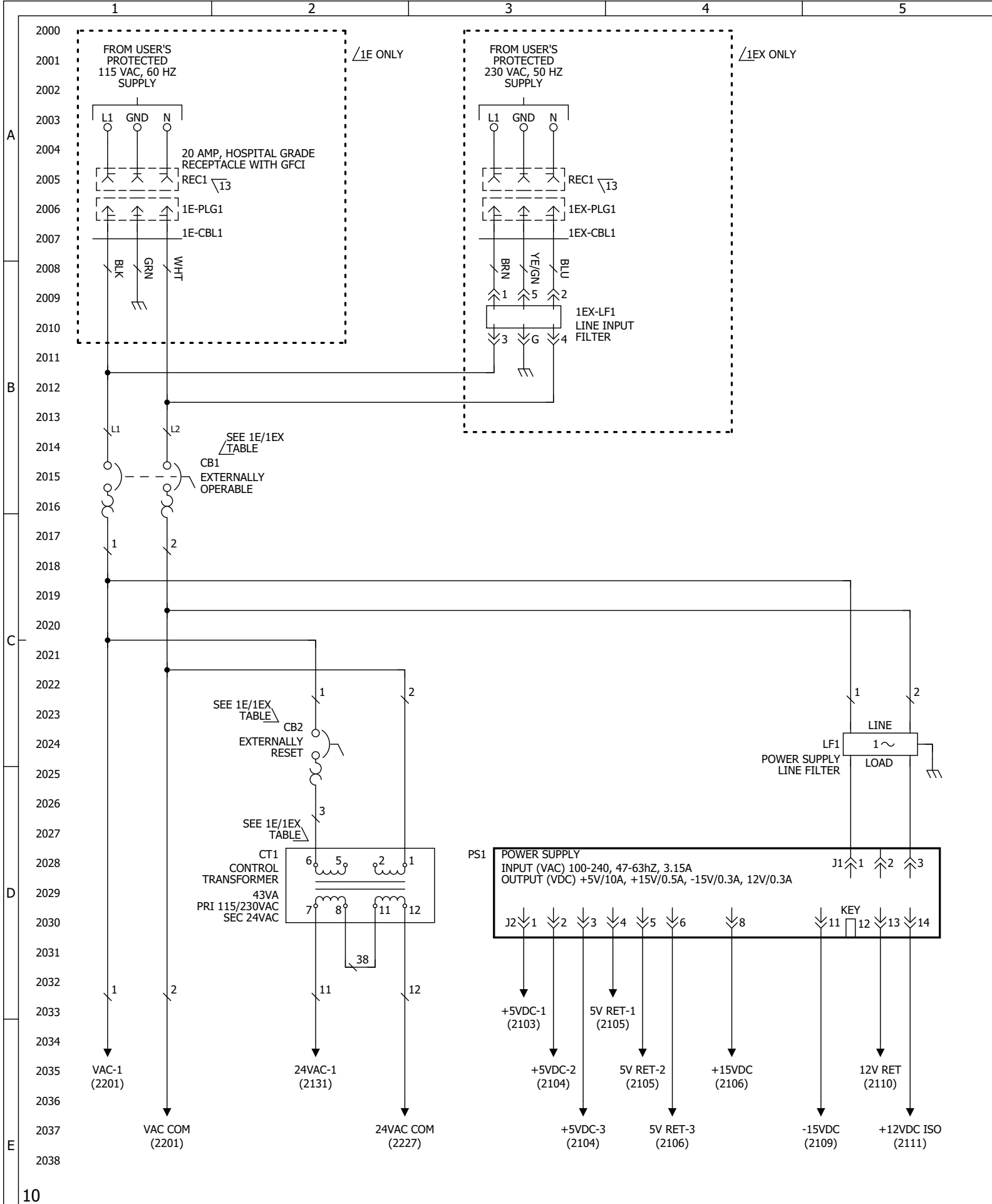
DESCRIPTION  
**MECHANICAL SCHEMATIC**  
 PROCESS AND INSTRUMENTATION DIAGRAM  
 FLUID POWER SCHEMATIC

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APPROVER	NAME	DATE
REVIEWER		
DRAWN BY		

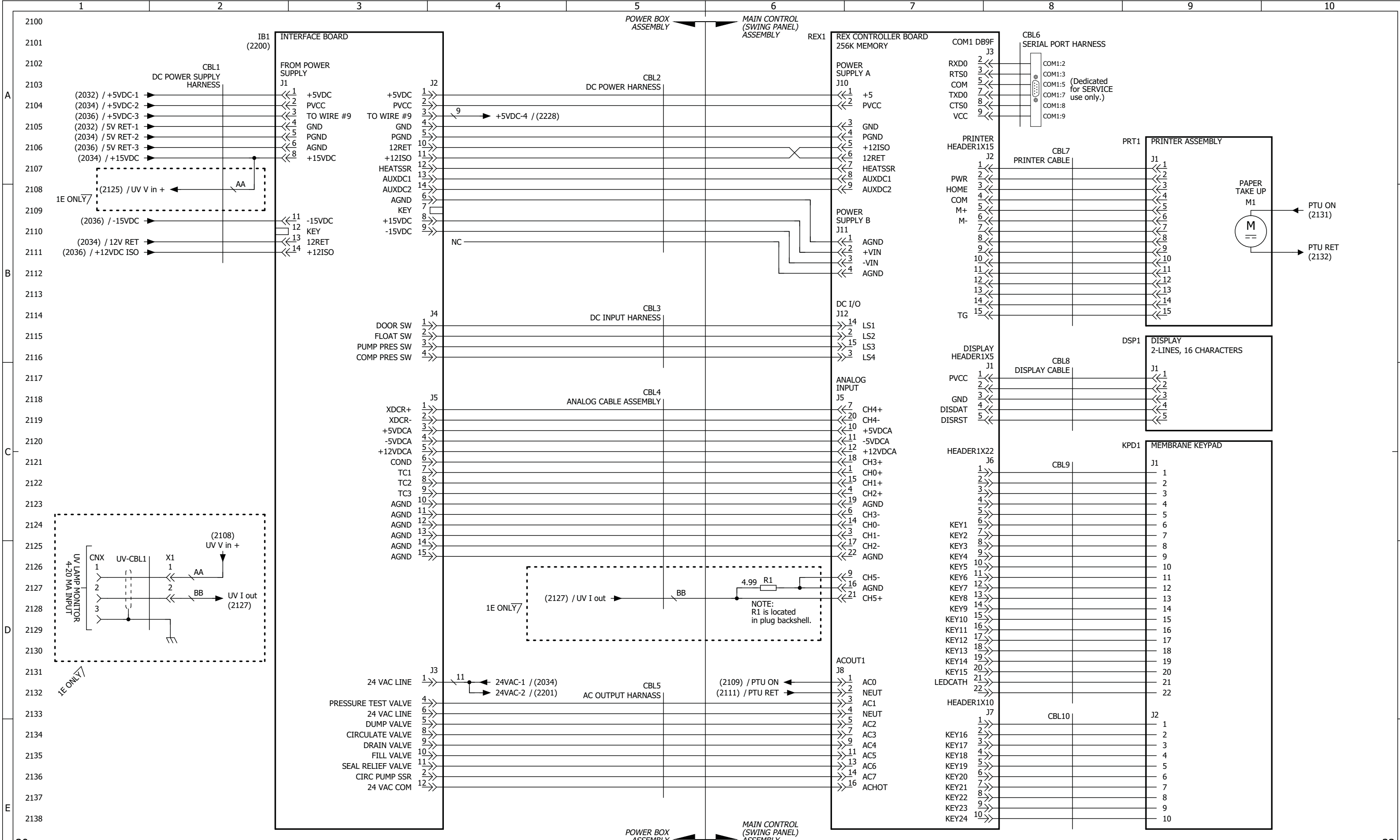
TITLE	DATE	VERSION
LOCATION	SCALE	SIZE
DRAWING NUMBER	VERSION	SHEET





1E/1EX TABLE

MODEL 1E AND 1EX CONFIGURATION AND VARIANT TABLE			
DEVICE TAG	LINE REF	MODEL 1E	MODEL 1EX
CB1	2015	20 AMP	10 AMP
CB2	2024	0.50 AMP	0.25 AMP
CT1	2028	PRIMARY CONNECTIONS: JUMPER TERMINALS	
		1 TO 5 AND 2 TO 6	2 TO 5



20

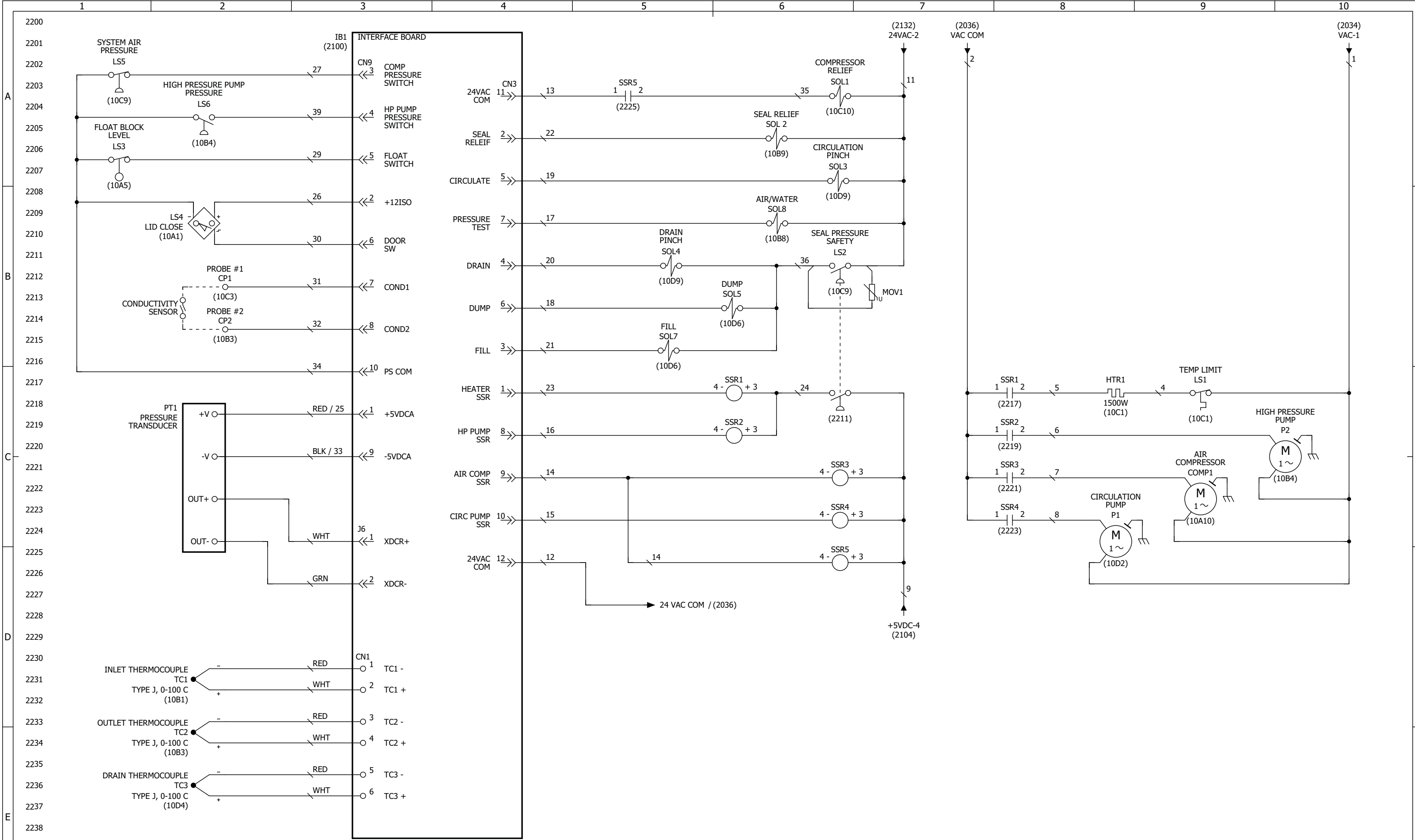
22

DESCRIPTION  
**ELECTRICAL SCHEMATIC**  
 POWER BOX ASSEMBLY  
 MAIN CONTROL ASSEMBLY

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APPROVER	NAME	DATE
REVIEWER		
DRAWN BY		

TITLE	SCALE	SIZE	DRAWING NUMBER	VERSION	SHEET
<b>SYSTEM 1E/1EX Control Diagrams</b>	1	D	10020568	C	21 OF 22



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DESCRIPTION  
**ELECTRICAL SCHEMATIC**  
 DIGITAL AND ANALOG I/O INTERFACE  
 HEATER AND PUMPS

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APPROVER	NAME	DATE
REVIEWER		
DRAWN BY		

TITLE	<b>SYSTEM 1E/1EX Control Diagrams</b>			
LOCATION	SCALE	SIZE	DRAWING NUMBER	VERSION
	1	D	10020568	C
SHEET				22 OF 22