

MAINTENANCE MANUAL

RELIANCE® SYNERGY™ WASHER/DISINFECTOR

06/27/03

P764330-664

A Word From STERIS Corporation

This manual contains important information on the proper use of this washer. Refer to Section 6, *Inspection and Maintenance*, for instructions in routine care of this unit. All personnel and department heads are urged to carefully review and become familiar with the *Safety Precautions* and instructions contained herein. These instructions should be retained in a conveniently accessible area for quick reference.

IMPORTANT: A listing of the *Safety Precautions* to be observed when operating this unit can be found in Section 1. Do not operate the unit until you have become familiar with this information.

INDICATIONS FOR USE

The Reliance® Synergy™ Washer/Disinfector is intended for use in the cleaning and disinfection of reusable utensils, trays, glassware, bedpans, urinals, rubber and plastic goods, simple hard-surfaced rigid surgical instruments (such as forceps and clamps), and other similar and related articles found in healthcare facilities.

This unit is specifically designed to only process goods as outlined in the *Operator Manual* (P920013-971) provided with unit. If there is any doubt about a specific material or product, contact the manufacturer of the product for the recommended washing technique.

ADVISORY

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

STERIS does not intend, recommend, nor represent in any way that this Reliance Synergy Washer/Disinfector be used for the terminal disinfection or sterilization of any regulated medical device. Reliance Synergy Washer/Disinfectors are intended only to perform an initial step in the processing of soiled, reusable medical devices. If medical devices will be contacting blood or compromised tissues, such devices must be terminally processed in accordance with device manufacturer's instructions and/or good hospital practices before each use in human patients.

STERIS does not recommend the use of the Suction Tip and Instrument Rack for processing endoscopes, laparoscopes, or other instruments used for minimally-invasive surgery. Processing these types of instruments may result in equipment damage as well as improperly cleaned items.

To ensure operators are adequately trained in the safe use of the equipment, STERIS recommends that:

- all personnel who operate or maintain the equipment are trained in its operation and in its safe use;
- personnel working with toxic chemicals and vapors (if applicable) have comprehensive instructions in the washer/disinfector process, relevant health hazards, and methods to detect the escape of toxic materials;
- there is regular training of all personnel concerned with the operation and maintenance of the equipment; attendance records are maintained; and that evidence of understanding is demonstrated.

SERVICE INFORMATION

A thorough preventive maintenance program is essential to safe and proper equipment operation. You are encouraged to contact STERIS concerning extended service maintenance agreements to give your washer/disinfector planned maintenance, assuring equipment performance according to factory specifications.

A global network of skilled service specialists can provide periodic inspections and adjustments to assure low-cost peak performance. STERIS can provide information regarding the Annual Maintenance Agreements.

STERIS carries a complete line of accessories for use in this equipment. A STERIS representative will gladly review these with you.

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

See inside back cover for contact information.

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Section 1: Listing of Safety Precautions and Symbols




The following is a listing of *Safety Precautions* which must be observed when operating or servicing this equipment. WARNINGS indicate the potential for danger to personnel, and CAUTIONS indicate the potential for damage to equipment. These *Safety Precautions* are repeated, where applicable, throughout the manual.

Observance of these *Safety Precautions* will minimize the risk of personal injury and/or the possible use of improper maintenance methods which may damage the unit or render it unsafe. It is important to understand that these precautions are not exhaustive. STERIS could not possibly know, evaluate, and advise maintenance departments of all conceivable ways in which maintenance might be done or the possible hazardous consequences of each way.

WARNING – PERSONAL INJURY AND/OR EQUIPMENT DAMAGE HAZARD:



-  Regularly scheduled preventive maintenance, in addition to the faithful performance of the minor maintenance described within this manual, is required for safe and reliable operation of this equipment. Contact STERIS to schedule preventive maintenance.
-  Only fully qualified service personnel should make repairs or adjustments to this equipment. Maintenance done by inexperienced, unqualified personnel, or installation of unauthorized parts could cause personal injury, invalidate the warranty, or result in costly equipment damage.
-  Do not disconnect door electrical cables if electric supply has not been cut off. Door may lift at high speed and cause personal injury.
-  Use an 18 x 2 x 4" piece of wood to support pump while sliding it back into the unit. Pump is very heavy and will fall if not supported properly, causing personal injury and/or equipment damage.
-  If an obstruction is present in the wash chamber door, Door Safety Bar will detect obstruction and door will automatically stop from closing. Wait until door is fully open and water flow has stopped before removing obstruction.
-  When placing a basket onto conveyor modules, ensure the basket support hook is in closed position; i.e., flush with side of basket.
-  Always load empty baskets on appropriate loading cart or surface.
-  Do not place empty basket on the conveyor modules to load soiled articles. Proximity switch will detect basket and indexing will automatically start.
-  Risk of explosion: Do not remove from pressurized lines. Do not exceed maximum temperature/pressure specifications. Do not install/service without following installation instructions (see sensor manual). Wear safety goggles and face shield during installation/service. Do not alter product construction. Failure to follow safety instructions could result in severe personal injury.

WARNING – ELECTRIC SHOCK AND/OR BURN HAZARD:








-  Disconnect all utilities to washer before servicing. Do not service the washer unless all utilities have been properly locked out. Always follow local electrical codes and safety-related work practices.
-  Fasteners and star washers are used to ensure protective bonding continuity. Always reinstall any star washer which may have been removed during installation or servicing.
-  Risk of electrical shock.

(See next page for additional Safety Precautions)





WARNING – ELECTRIC SHOCK AND/OR BURN HAZARD (Cont'd):

-  Lock building electric supply to OFF and close unit supply valves before performing any service on the unit. If unit is started during maintenance procedures, hot water/steam may be sprayed into wash chamber.
-  Avoid contact with nearby metal heat sink radiator and transformer. Use a non conductive tool to make voltage adjustment on power supply.



WARNING – PERSONAL INJURY HAZARD:

-  When baskets are present on conveyor modules keep fingers and hands away from wash chamber doors and moving baskets.
-  In case of an emergency situation involving the conveyor modules, always press the EMERGENCY STOP Button to stop all washer/disinfector and conveyor operations.
-  Do not aim spray head at any part of body. High-pressurized fluid can cause severe injury.
-  In case of an emergency situation involving conveyor modules, always press EMERGENCY STOP Button to stop all washer/disinfector and conveyor operations.
-  Always press EMERGENCY STOP Button prior to removing conveyor and/or chamber obstruction.
-  In case of power loss, automatic doors lower slowly by gravity. Keep hands out of the door area to avoid personal injury.
-  The chamber door is heavy. Lifting door manually may require two people.

WARNING – BURN HAZARD:

-  Allow piping to cool down before inspecting and/or cleaning supply-line strainers.
-  Allow unit to cool down before performing any service on the pump. Piping and valves become very hot during unit operation.
-  Except for emergency, do not open door when cycle is in progress. In an emergency, first stop cycle by pressing the EMERGENCY STOP Button and wait for water flow to stop. Wear appropriate Personal Protective Equipment (PPE) whenever reaching into the chamber.
-  Before removing an obstruction from the wash chamber door, always wear appropriate Personal Protective Equipment (PPE) and wait until water flow stops. Hot water/steam may be sprayed through door opening.

WARNING – CHEMICAL BURN AND/OR EYE INJURY HAZARD:

-  Wear gloves and eye protection when using a descaling product. Avoid contact with eyes or skin. If spilled or splashed, flush with water for 15 minutes. If swallowed, DO NOT induce vomiting. Administer an alkali with plenty of water. Seek medical attention immediately.
-  Wear gloves and eye protection when removing clamps and replacing squeeze tube. Residual detergent might remain in used squeeze tube. If detergent contacts skin or eyes, immediately flush with running water for at least 10 minutes. If contact was with the eyes, seek medical attention.

(See next page for additional Safety Precautions)

WARNING – CHEMICAL BURN AND/OR EYE INJURY HAZARD (Cont'd):

- ⚠ Detergents are caustic and can cause adverse effects to exposed tissues. Do not get in eyes, on skin, or attempt to swallow.
- Read and follow the precautions and instructions on the detergent label and in the Material Safety Data Sheet (MSDS) prior to handling the detergent, refilling the detergent container, or servicing the detergent injection pump.
- Wear appropriate Personal Protective Equipment (PPE) whenever handling the detergent or servicing the detergent injection pumps and lines.

WARNING – HEALTH HAZARD:

- ⚠ Vapors from solvents can be harmful. Use with adequate ventilation. Follow directions on the container.

WARNING – SLIPPING HAZARD:





- ⚠ To avoid slippery floor conditions, immediately wipe up any spilled liquids or condensation.

CAUTION – POSSIBLE EQUIPMENT DAMAGE HAZARD:







- ⚠ When choosing a detergent, select one with a low chloride content. Detergents with a high chloride content can be harmful to stainless steel.
- ⚠ Always position each manifold and/or bottom rotary spray over a manifold connector before operating unit. If manifolds and/or bottom rotary sprays are not positioned correctly, damage may result and unit will be unable to effectively wash load.
- ⚠ Avoid product damage. Always select a cycle appropriate for the items being processed.
- ⚠ Suction tips (as well as other items) must be fully enclosed within the accessory (curved suction tips facing inward) to prevent obstruction in conveyor modules.
- ⚠ Observe the Electrostatic Precautions outlined in Section 8.1. Always wear a grounding wrist strap when removing or replacing PC boards or ICs.
- ⚠ Carefully tighten setscrew. The metal setscrew can easily strip the plastic threads in the roller block assembly.
- ⚠ Ensure a cooling fan is attached to rear motor shaft. Check that fan blades are positioned to send airflow to motor. Motor will overheat without a cooling fan.
- ⚠ Solenoid valves are equipped with a special material which can be attacked by oils and grease. When replacing entire valve, wipe threads clean of cutting oils and use Teflon tape to seal pipe joints.
- ⚠ Do not use carbon tetrachloride, trichloethylene, thinner, acetone or similar solvents in cleaning any part of airline regulator or filter. Water and a mild soap is recommended.
- ⚠ Always use a silicone lubricant (P117950-599) to lubricate squeeze tubes. Petroleum-based lubricants, such as Vaseline or grease, cause squeeze tubes to melt.
- ⚠ Use non-abrasive cleaners when cleaning unit. Follow directions on containers and rub in a back-and-forth motion (in same direction as surface grain). Abrasive cleaners will damage stainless steel. Cleaners rubbed in a circular motion or applied with a wire brush or steel wool on door and chamber assemblies can be harmful to stainless steel. Do not use these cleaners on painted surfaces.

(See next page for additional Safety Precautions)

CAUTION – POSSIBLE EQUIPMENT DAMAGE HAZARD (Cont'd):






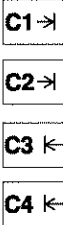


-  Wipe all plastic surfaces or painted surfaces with 70% isopropyl alcohol cleaner or any non-abrasive household cleaner (such as glass or countertop cleaners).
-  DO NOT attempt to perform calibration unless fully prepared to do so. Incorrect procedures can destroy Factory calibration. Read the entire procedure before attempting to calibrate the unit.
-  Allow the Independent Monitor to warm up and stabilize before attempting calibration. Warm up time of 15 minutes at room temperature is recommended.
-  Solenoid valves are equipped with a special material which can be attacked by oils and grease. When replacing entire valve, wipe threads clean of cutting oils and use Teflon tape to seal pipe joints.

1.1 Symbols on the Unit

| Symbol | Definition |
|---|---|
|  | Warning. Refer to Manual for Further Information. |
|  | Transfer of Heat, Hot Surface. |
|  | Protective Earth (Ground). |
|  | Warning! Risk of Electrical Shock. |
|  | ON (For Part of Equipment). |
|  | OFF (For Part of Equipment). |
| Information on the Nameplate: | |
| Symbol | Definition |
| MOD. | Model of the Unit. |
| S/N | Serial Number of the Unit. |
| kVA | Power Rating of the Unit. |
| V_~ | Volt, Number of the Phase (Three or One [blank]) Alternating Current. |
| A | Amperage Rating of the Unit. |
| YEAR | Year of Manufacture of the Unit. |
| Hz | Hertz – Frequency of the Unit. |





1.2

Symbols on the
Amsco® Reliance®
444 Load/Unload
Modules (Option)

| Symbol | Definition |
|---|--|
|  | Protective Earth (Ground). |
|  | Warning! Risk of Electrical Shock. |
|  | Fuse Identification. |
|  | Risk of Crushing Fingers or Hands. |
|  | Burn Hazard. Wear Safety Gloves. |
|  | Basket Position on Conveyor. |
|  | ON (For Part of Equipment). |
|  | OFF (For Part of Equipment). |
| Information on the Nameplate: | |
| Symbol | Definition |
| MODEL | Model Number of the Unit. |
| S/N | Serial Number of the Unit. |
| kVA | Power Rating of the Unit. |
| V_~ | Volt, Number of the Phase (Three or One [blank]) Alternating Current. |
| A | Amperage Rating of the Unit. |
| YEAR | Year of Manufacture of the Unit. |
| Hz | Hertz - Frequency of the Unit. |

1.3

Symbols on the
Amsco® Reliance®
ATS Automated
Transport System
(Option)

| Symbol | Definition |
|--|---|
|  | ON - Main Power Supply. |
|  | OFF - Main Power Supply. |
|   | START - Unit Is Activated When Pushbutton Is Pushed In. |
|   | STOP - Unit Is Deactivated When Pushbutton Is Pushed out. |
|  | Protective Earth (Ground). |
|  | Fuse Identification. |
|  | Warning! Risk of Electrical Shock. |
|  | Attention, Refer to Manual for Further Instructions. |
|  | Risk of Crushing Fingers or Hands. |
|  | Burn Hazard. Wear Safety Gloves. |
|  | Entanglement Hazard. |

* Refer to Amsco ATS Reliance Automated Transport System Maintenance Manual (P764329-141) for detailed information.

Section 2: General Information

2.1 GENERAL INFORMATION

The product literature included in this section contains factual data relating to the principal characteristics of the Reliance® Synergy™ Washer/Disinfector.

The literature is informative rather than instructional. It provides and conveys, through text and illustrations, a general concept of the equipment, its purpose, limitations, and technical applications.

2.2 TECHNICAL SPECIFICATIONS

These specifications are intended to describe the technical information given on the nameplate of your washer/disinfector and to state other relevant information. Check Equipment Drawing or Identification Nameplate, located in bottom of side panel on the load side, for proper voltage and amperage.

2.2.1 Amperage and Power Consumption

The Reliance Synergy Washer/Disinfector operates either on:

- 208 V, 3~, 60 Hz, 4-wire;
- 480 V, 3~, 60 Hz, 3-wire;
- 380/400/415 V, 3~, 50 Hz, 3-wire.

A protective ground conductor is required (Class 1 Equipment).

The maximum currents and power consumptions are indicated on nameplate.

- Main supply voltage fluctuation not exceeding $\pm 10\%$ of nominal voltage;
- Installation Category: Overvoltage Category II*

**NOTE: Overvoltage attenuation must be provided. The equipment must be connected in a way to reduce transient voltage at the electrical main supply. Overvoltage attenuation can be achieved by:*

- Connecting the equipment main supply to a distribution system with multiple branch circuits;*
- Connecting the equipment main supply through an isolating transformer (380/400/415 V [input, output], 3-phases, 30 kVA; 208 V [input, output], 3-phases, 15 kVA; or 480 V [input, output], 3-phases, 30 kVA).*

Always follow local electrical installation codes.

Refer to *Uncrating/Installation Instructions* (P920013-970) for proper connection.

2.2.2 Noise Level

Equivalent Sound Pressure Level at work station (measured 1.0 m [3 ft.] away from equipment and at 1.6 m [5 ft.] from ground): **68 dB (A)**. (Results determined according to *ISO-3746: 1979 Standard: Acoustics Determination of Sound Power Levels of Noise Sources Survey Method*.)

2.2.3 Permissible Environmental Conditions

This washer/disinfector is designed to give optimal results under the following conditions:

- Indoor use only;
- Altitude of operation up to 2,000 m (6,560 ft.);
- Temperature 5°C (41°F) to 40°C (104°F);
- Maximum relative humidity is 80% for temperatures up to 31°C (88°F) decreasing linearly to 50% relative humidity at 40°C (104°F);
- Pollution Degree 2.

2.2.4 Certification

This Reliance Synergy Washer/Disinfector complies with the following regulations:

- Underwriters Laboratories Standard (UL) 61010A-1;
- Canadian Standards Association (CSA) CAN/CSA 22.2 No. 1010.1;
- Compliant with the requirements of the HTM 2030 guidance document if the Independent Monitoring option is present.

Governing Directive for the affixing of the CE mark:

Medical Device Directive 93/42/EEC.

CE 0123

Standards applied to demonstrate conformity to the directives:

IEC-61010-1; IEC-61326-1; IEC-61010-2-045.

2.3 DETERGENT AND CHEMICAL ADDITIVE SPECIFICATIONS

2.3.1 General

When selecting detergents and chemical additives, to achieve optimal performance, the selected chemical additives must meet as a minimum, the specifications listed in Table 2-1.

Table 2-1. Chemical Specifications

| Product Description | Use-Dilution Range (mL/L) | pH Range Use-dilution | Other Applicable Requirements |
|----------------------------|---------------------------|-----------------------|--|
| Strong Alkaline Detergents | 2 - 16 | 12.0 - 14.0 | Liquid, non-foaming, high-chelating ability, protein and blood compatible. |
| Alkaline Detergents | 2 - 16 | 9.0 - 12.0 | Liquid, non-foaming, high-chelating ability, protein and blood compatible. |
| Acidic Detergents | 2 - 8 | 3.6 - 6.0 | Liquid, non-foaming, high-chelating ability, protein and blood compatible. |
| Neutral Detergents | 2 - 16 | 6.0 - 8.0 | Liquid, non-foaming, high chelating ability, protein and blood compatible. |
| Enzymatic Cleaners | 2 - 16 | 6.0 - 8.0 | Liquid, low-foaming, fast-acting, compatible with a broad range of proteins, non-staining. |
| Instrument Lubricants | 2 - 4 | 6.0 - 8.0 | Liquid, non-foaming, neutral, with antimicrobial preservatives, high lubricity. |
| Descalers | 4 - 16 | < 2.5 | Liquid, non-foaming, phosphoric acid-based, free-rinsing. |

NOTE: For detergents, note the following:

- 1) Always use a non-foaming detergent for effective cleaning and proper pump and water level control operation.
- 2) Follow detergent manufacturer's recommendations to determine the temperature of the WASH treatment. See **Table 5-6, Cycle Description Chart**, for available temperature ranges.
- 3) Follow detergent manufacturer's recommendations for the amount of detergent used according to water hardness.

2.3.2 Recommended Chemical Additives

To achieve maximum efficiency, select chemicals appropriate to soil type being processed. STERIS recommends the following chemicals:

- **Criti-Klenz II® Instrument Detergent** – (alkaline) a concentrated liquid detergent for processing organic soils (blood, oil, fat, grease, protein, glucose).
- **Renu-Klenz® Neutral pH Detergent** – (neutral) a unique neutral pH instrument cleaner with Instrument Protection System, exceptional hard water tolerance, and extensive materials compatibility.
- **H-Klenz II® Instrument Detergent** – (strong alkaline) a highly concentrated non-foaming instrument cleaner. A rinse treatment of C-A Klenz™ is needed to neutralize alkaline residues.
- **C-A Klenz® Neutralizer** – (mild acid) a concentrated non-foaming mild acid neutralizer.
- **EnzyCare® 2 (Dual Enzyme) Instrument Detergent** – (Dual enzymatic detergent) for pre-rinse procedure.
- **Hinge-Free® Instrument Lubricant** – for instrument lubrication.
- **Dri 'N Shine® Drying Agent** – for final rinse phase.
- **Liquid Descale Liquid Scale Remover** – for descaling washers used in healthcare facilities.

NOTE: Certain products may not be available in your area. Contact STERIS for product availability and ordering information.

| Treatment Additive | Chemical | pH | Recommended for: |
|--------------------|--------------|--------------------|----------------------------------|
| WASH | Criti-Klenz | 10.9 alkaline | Instruments, Utensils, Glassware |
| | Renu-Klenz | 7.5 neutral | MIS, Anesthesia / Respiratory |
| | H-Klenz II* | 14 strong alkaline | Instruments, Utensils, Glassware |
| NEUTRALIZER | C-A Klenz | 1 acid | Instruments, Utensils Glassware |
| ENZYME | EnzyCare 2 | 7.0-7.8 concentr. | Instruments, Utensils Glassware |
| FINAL RINSE | Dri 'N Shine | 9.5 | Final Rinse |
| | Hinge-Free | 7.8 | Lubrication |

*H-Klenz II Instrument Detergent must be followed by a Rinse treatment of C-A Klenz Neutralizer to neutralize alkaline residues.

IMPORTANT: STERIS does not promote, recommend, or endorse the use of any other type of chemical additives in the processing of articles in the Reliance Synergy Washer/Disinfector, such as alcohol rinses, or liquid germicides including hypochloric acid (bleach).

Section 3: Operating Instructions

3.1 COMPONENT IDENTIFICATION

The Reliance® Synergy™ Washer/Disinfector is equipped with a fully programmable microprocessor control system capable of storing up to 11 cycles for processing a wide variety of loads. The control system monitors and automatically controls all cycle operations and functions.

Become familiar with all control locations and functions before operating the washer/disinfector (see Figure 3-1).

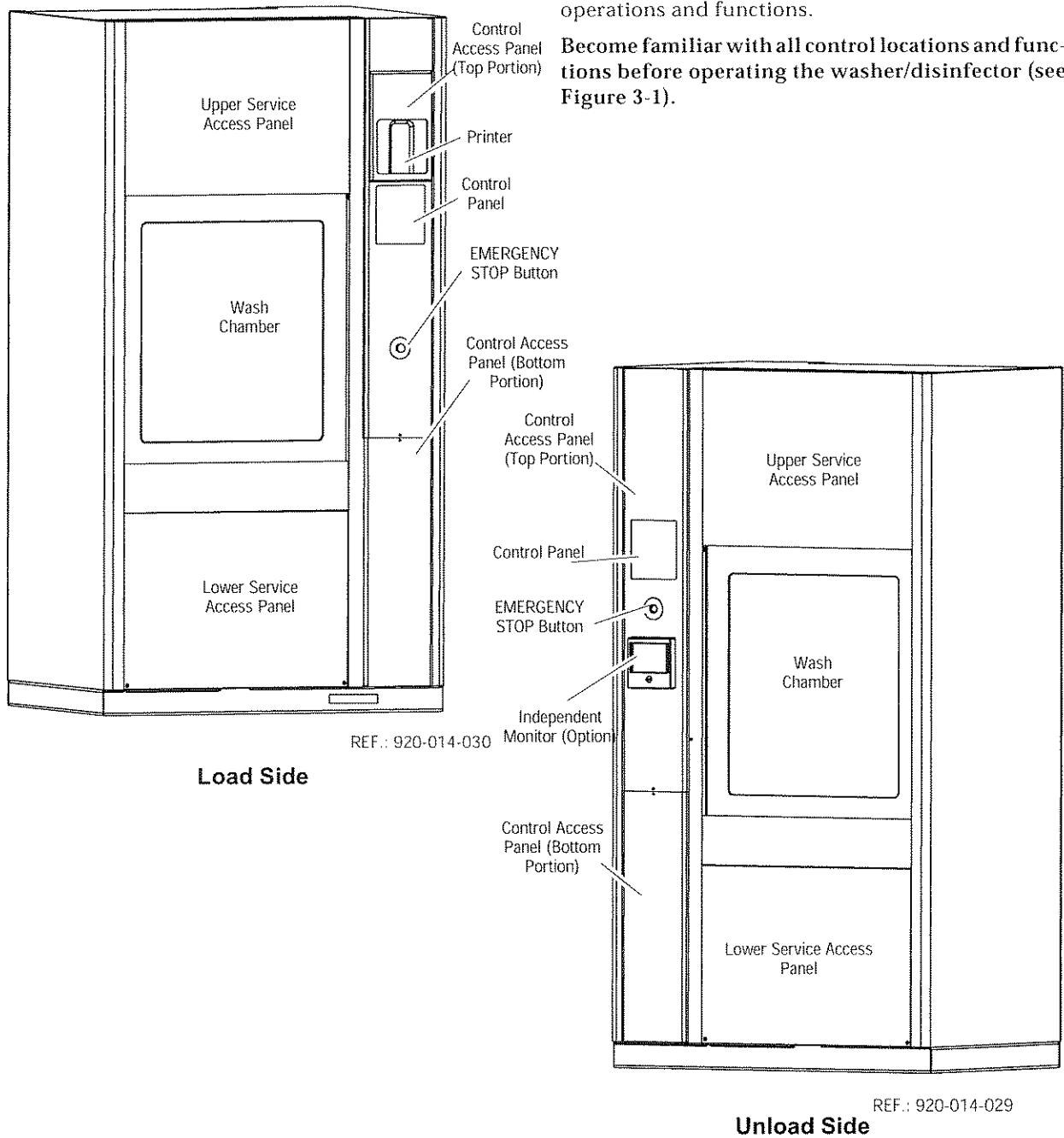


Figure 3-1. Reliance Synergy Washer/Disinfector

3.2 CONTROL LOCATIONS

3.2.1 Main Power Switch

The **Main Power Switch**, (located behind load end control console access panel) is used to shut off power to the unit control board and I/O board for maintenance purposes.

IMPORTANT: Main Power Switch should remain in ON position at all times, except for maintenance purposes.

3.2.2 POWER-OFF/STANDBY Switch

The **POWER-OFF/STANDBY** rocker switch, located behind the printer door, includes two settings which direct operation of the control (see Figure 3-2).

- **POWER** – press top portion of rocker switch to initialize the controls and place control in Ready Mode.
- **OFF/STANDBY** – press bottom portion of rocker switch to initiate SHUTDOWN cycle and turn off all AC power to the control (Standby Mode).

NOTE: Control should be placed in Standby Mode after the last cycle of the day and when washer is not in use for an extended period of time.

IMPORTANT: Placing the **POWER-OFF/STANDBY** switch to **OFF/STANDBY** position does not turn OFF electrical power to the unit.

3.2.3 Printer

The printer, located on the right side of the load end (see Figure 3-2), records all cycle data on 57 mm (2-1/4 inch) wide single-ply thermal paper. See Section 6.6, *Changing Printer Paper Roll*, for paper changing and paper ordering information.

Printer Function Switch — Controls two printer functions, PRINT and PRINT VALUES:

- **PRINT** — Pressing the top portion of the rocker switch generates a complete printout of the actual water temperature of sump, and air temperature in drying chamber.
- **PRINT VALUES** — Pressing the bottom portion of the rocker switch generates a complete printout of all cycle values.

NOTE: Printer is located on load side only.

3.3 LOAD SIDE CONTROL PANEL

See Figure 3-2.

The Load Side Control panel is used to select cycles and treatments, start/stop cycles, and display status and control messages.

Load side includes a printer.

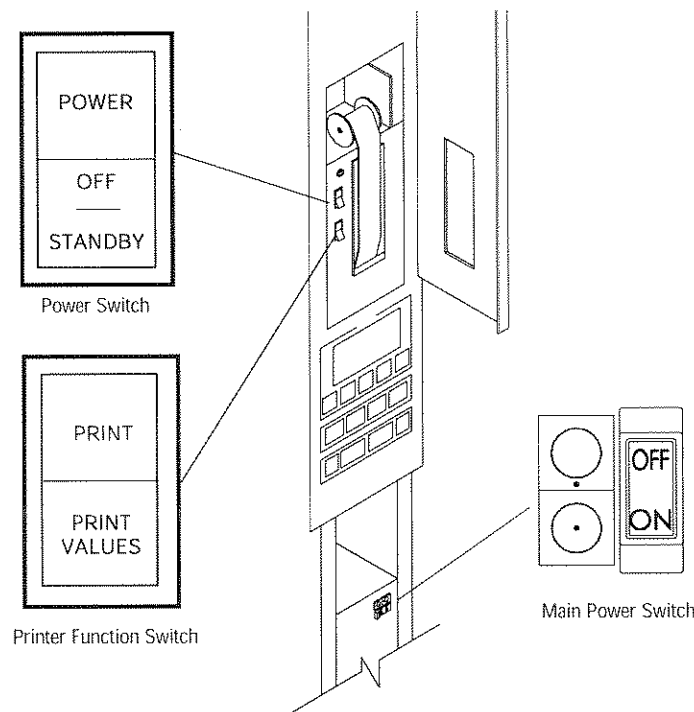


Figure 3-2. Load-Side Control and Printer

3.3.1 Display Screen

The two-line, alphanumeric screen displays cycle program data on demand, in-cycle performance data, and operator instructions. Display screen also indicates certain abnormal conditions that may occur during a cycle.

3.3.2 Touch Pads (see Figure 3-3)

Cycle Status Touch Pads:

- **CYCLE MENU touch pad** is used to view all three menus available, one after the other.
- **SELECT CYCLE touch pad** is used to select one of the four cycles available from each menu.
- **REVIEW CYCLE touch pad** is used to review all different treatments (and values) programmed for a specific cycle. Only the values that can be modified by the operator are displayed. Cycle reviewing can be stopped at any time by pressing STOP/RESET touch pad. Display will go back to main Cycle Menu.
- **CYCLE START touch pad** is used to start cycles.
- **STOP/RESET touch pad** is used to stop cycles, and to exit menus after ending selections (pressing the STOP/RESET touch pad will always cause display to go back to previous menu).

Manual Operation Touch Pads:

- **EXTEND CYCLE touch pad** is used to multiply treatment time by two, while reviewing cycle, using REVIEW CYCLE touch pad.

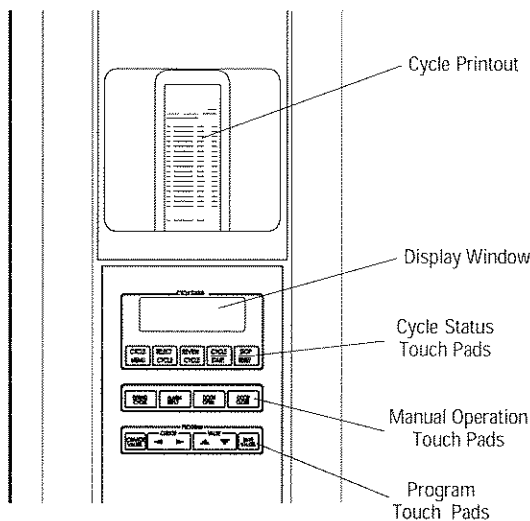


Figure 3-3. Load Side Control Panel Touch Pads

- **ALARM REPLY touch pad** is used to acknowledge and stop intermittent buzzer alarm signal.
- **DOOR OPEN touch pad** is used to lift door to open position.
- **DOOR CLOSE touch pad** is used to lower door to closed position.

Program Touch Pads:

- **CHANGE VALUES touch pad (CVTP)** is used to modify, add, and delete treatments in preprogrammed cycles and to create custom cycles.
- **CURSOR arrows touch pad** is used to move left or right on the display.
- **VALUE arrows touch pad** is used to raise or lower the value of a treatment time, temperature, or date. VALUE arrows touch pad can also be used to create the name of new cycles by scrolling through the alphabet.
- **SAVE VALUES touch pad (SVTP)** is used to permanently store all changes to the washer/disinfecter cycle values in the control memory.

3.4 UNLOAD SIDE CONTROL PANEL

The Unload-Side Control Panel features the same touch pad and display as the load-side control panel. The display window concurrently shows the same message as shown in display window on the load side of the unit.

There is no printer on the unload side.

3.5 EMERGENCY SAFETY FEATURES

3.5.1 EMERGENCY STOP Buttons

⚠ WARNING – BURN HAZARD: Except for emergency, do not open door when cycle is in progress. In an emergency, first stop cycle by pressing the EMERGENCY STOP Button and wait for water flow to stop. Wear appropriate Personal Protective Equipment (PPE) whenever reaching into the chamber.

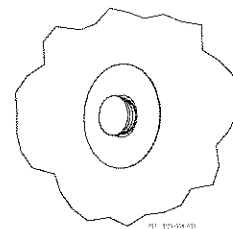


Figure 3-4. Emergency Stop Button

Each EMERGENCY STOP Button located under the control panel on both sides of the unit instantly stops washer operation when pressed (see Figures 3-1 and 3-4).

IMPORTANT: Use the EMERGENCY STOP Buttons for emergency situations only. DO NOT USE AS A START/STOP Button.

3.5.2 Door Interlock

A door interlock feature allows only one door to be opened at a time to avoid cross-contamination.

3.5.3 Supervisor Access Code

A safety feature prevents opening of doors if a cycle has not been successfully completed.

When a cycle has been interrupted (operator has pressed EMERGENCY STOP Button), a Supervisor Access Code must be entered by an authorized person to unlock and **open load side door only**. This prevents cross-contamination. Refer to Section 3.21, *Access Code*, for procedures on how to enter Supervisor Access Code.

3.6 AMSCO RELIANCE 444 LOAD/ UNLOAD MODULES (OPTION)

⚠ WARNING - PERSONAL INJURY HAZARD: When baskets are present on conveyor modules keep fingers and hands away from wash chamber doors and moving baskets.

The Amsco® Reliance® 444 Load/Unload modules are designed to be used in processing departments of healthcare facilities, to provide automated loading and unloading of single-level and multilevel racks to the Reliance Synergy Washer/Disinfector. The Amsco Reliance 444 Load/Unload Modules are available in four configurations: one-rack load module, two-rack load module, one-rack unload module, and two-rack unload module.

3.6.1 Power Switch

Power to conveyor modules is controlled by a switch located on the controller. The controller is located under the unload-end conveyor module (see Figure 3-5).

IMPORTANT: The conveyor power switch should remain ON at all times following installation and system start up.

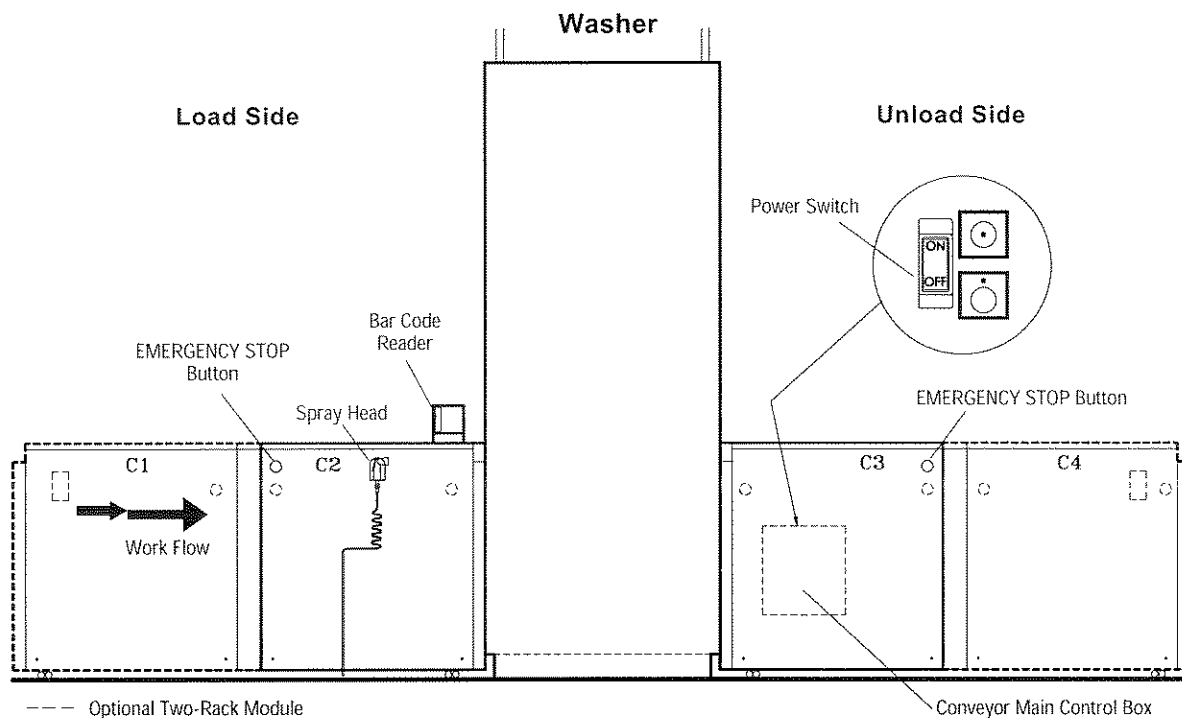


Figure 3-5. Amsco Reliance 444 Load/Unload Modules (Option)

3.6.2 Bar Code Reader

The load-end conveyor module is equipped with a bar code reader, located next to the wash chamber door.

- When a basket is automatically loaded into the washer, the bar code reader scans the attached bar coded tag. The coded tag informs the washer control of the correct cycle type for processing the load.
- If the bar code reader is unable to read the tag on a basket, or if the basket does not have a bar code tag, the appropriate cycle can be manually started by the operator (refer to Section 3.12.2, *Manual Entry of Bar Code Identification Number*, for manually starting a cycle).

3.6.3 EMERGENCY STOP Buttons

⚠ WARNING – PERSONAL INJURY HAZARD: In case of an emergency situation involving the conveyor modules, always press the **EMERGENCY STOP Button** to stop all washer/disinfector and conveyor operations.

Each automatic load/unload conveyor is equipped with an EMERGENCY STOP Button located on conveyor service-side. EMERGENCY STOP Buttons are provided to stop the conveyor in an emergency situation.

3.6.4 Spray Heads

⚠ WARNING – PERSONAL INJURY HAZARD: Do not aim spray head at any part of body. High-pressurized fluid can cause severe injury.

Conveyor modules are equipped with a hand-operated spray head. Each spray head is equipped with a flexible, retractable hose.

Spray heads are used for rinsing off conveyor gutters if they become soiled during operation.

NOTE: Gutters should be rinsed immediately if they become soiled.

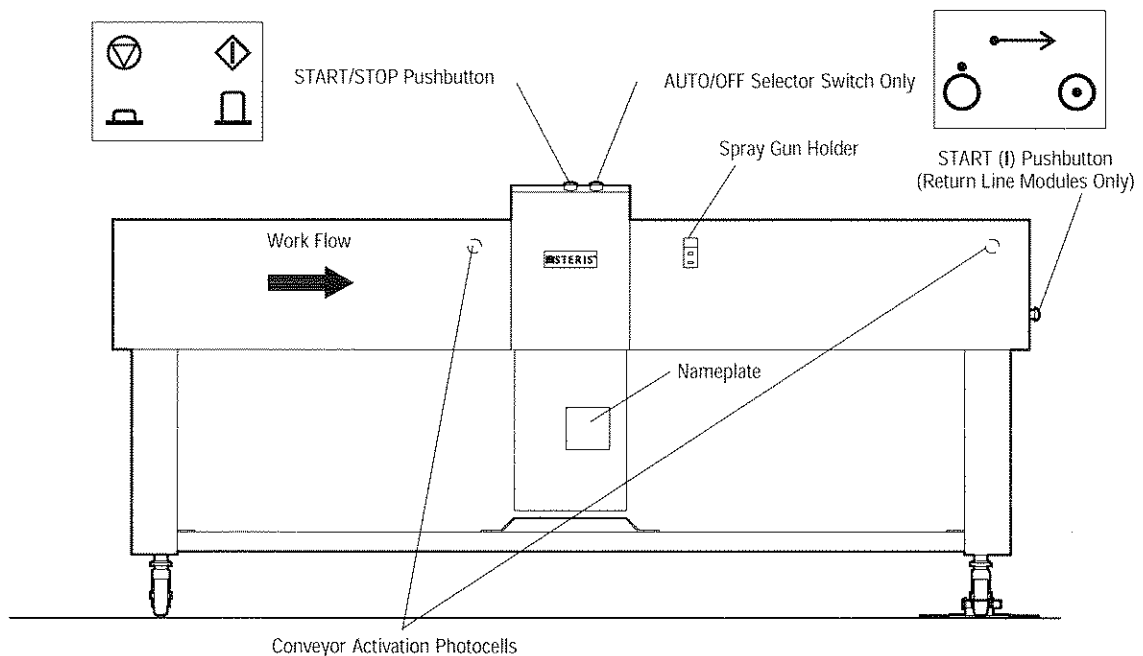
Always return spray heads to storage location when not in use.

3.7 AMSCO RELIANCE ATS AUTOMATED TRANSPORT SYSTEM (OPTION)

Each Amasco® Reliance® ATS Automated Transport System module is equipped with a pushbutton to allow operator to control workflow at any point on the conveyor line (see Figure 3-6).

3.7.1 START/STOP Pushbutton (Red)

Allows operator to start or stop operation of conveyor modules. START/STOP Pushbutton is present



REF: 920-014-248

Figure 3-6. Amasco Reliance ATS Automated Transport System Module (Side View – Typical)

on each Powered Module with gates. Also present on loading module of Return-line modules.

- Used to Start/Stop the conveyor modules, stop the modules in case of emergency, and reset module operation when an alarm occurs.
- Normal operation of conveyor modules is stopped by pushing the START/STOP Pushbutton, and started by pulling Pushbutton up.

3.7.2 AUTO/OFF (I-O) Selector Switch

Present on each Powered Module with gates with pusher mechanism.

- When AUTO/OFF Selector Switch is in I position, pusher mechanism is activated.

3.8 INDEPENDENT MONITOR (OPTION)

Independent Monitor (option) is located on unload side, under the washer/disinfector EMERGENCY STOP Button (see Figures 3-1 and 3-7).

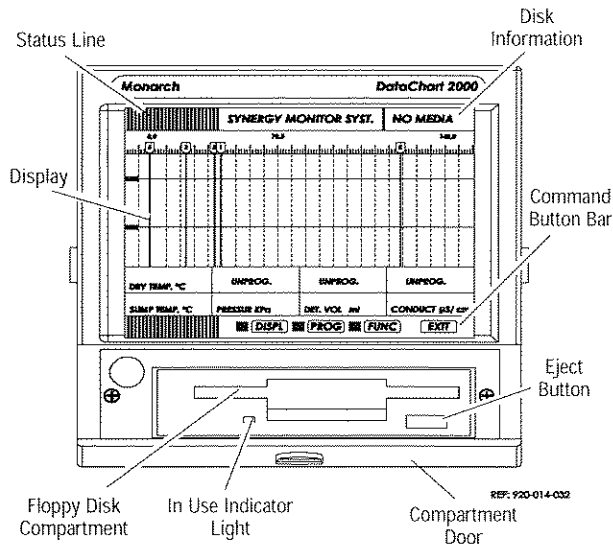


Figure 3-7. Independent Monitor (Option)

Cycle parameters are monitored independently from the control at each phase. The parameters captured by the independent monitor are interpreted by the control and an alarm signal is emitted if parameters do not meet cycle specifications.

Touchscreen touch pads allow displaying information in different formats: Trend Charts, Bar Graphics, Digital Windows, Alarm/Event data, or combinations of these.

Cycle parameters are stored in recordable PC compatible 89-mm (3-1/2") floppy disks with capacity to record up to five workdays (on a typical cycle basis). Disk recording capacity is displayed in percent on upper right corner of monitor display. When disk is full or if there is not enough room to store new information, an alarm will warn operator to change the disk before starting a new cycle. Refer to Section 3.22, *Using Independent Monitor*, for changing floppy disk procedure.

Access to monitor software and/or data recordings is protected by a password. Only authorized persons may have access to software and data recordings. Refer to Section 3.22.7, *Getting Recorded Data*, for procedures to access and read recorded data.

3.9 OPERATING INSTRUCTIONS

3.9.1 Before Operating the Equipment

⚠ WARNING – BURN HAZARD: Except for emergency, do not open door when cycle is in progress. In an emergency, first stop cycle by pressing the EMERGENCY STOP Button and wait for water flow to stop. Wear appropriate Personal Protective Equipment (PPE) whenever reaching into the chamber.

⚠ WARNING – SLIPPING HAZARD: To avoid slippery floor conditions, immediately wipe up any spilled liquids or condensation.

Refer to Section 3.20, *Cycle and Control Values Programming*, to change cycles, cycle values, or control values.

1. Verify building electrical supply disconnect switch (circuit breaker) is positioned to ON.
2. Verify unit supply valves are open.
3. Position Main Power Switch, located behind upper service access panel, to ON.
4. Position POWER-OFF/STANDBY rocker switch located behind the printer door to POWER.
5. Open chamber door.
6. Verify wash chamber is empty and all material has been removed.
7. Verify bottom filter is clean and in place.
8. Open printer door and verify that sufficient amount of printer paper is available.

A colored warning stripe is visible when paper roll is near the end. Refer to Section 6.6, *Changing Printer Paper Roll*, if paper roll needs to be replaced.

NOTE: Do not operate printer without paper.

⚠ CAUTION – POSSIBLE EQUIPMENT DAMAGE:

- When choosing a detergent, select one with a low chloride content. Detergents with a high chloride content can be harmful to stainless steel.

- Always position each manifold and/or bottom rotary spray over a manifold connector before operating unit. If manifolds and/or bottom rotary sprays are not positioned correctly, damage may result and unit will be unable to effectively wash load.

- Avoid product damage. Always select a cycle appropriate for the items being processed.

9. Verify detergent supply (at a remote location). Ensure pickup tubes are in good condition and placed in containers (see Figure 3-8). If supplies are low or have run out, install new containers (see Section 6.4, *Replacing Chemical Container*).

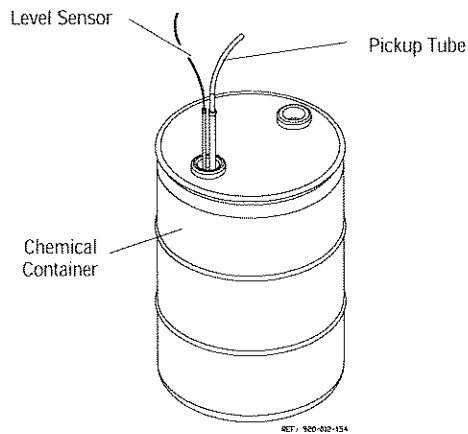


Figure 3-8. Chemical Container

10. To achieve maximum cleaning efficiency, select detergents appropriate to soil type being processed. Refer to the list of STERIS-recommended detergents and chemicals in Section 2.3, *Detergent and Chemical Additive Specifications*.

NOTE: When selecting detergents, note the following:

1) Always use a non-foaming detergent for effective cleaning and proper pump and water-level operation.

2) Refer to Detergent Specifications and follow detergent manufacturer's recommendations to determine the temperature of the WASH treatment. See Table 5-6, Cycle Description Chart for available temperature ranges.

3) Follow detergent manufacturer's recommendations for amount of detergent to use depending on water hardness.

4) Contact STERIS for information on specific cleaning and descaling products recommended for use with this equipment.

3.9.2 Priming Procedure

⚠ WARNING – CHEMICAL BURN AND/OR EYE INJURY HAZARD: Detergents are caustic and can cause adverse effects to exposed tissues. Do not get in eyes, on skin, or attempt to swallow. Read and follow the precautions and instructions on the detergent label and in the Material Safety Data Sheet (MSDS) prior to handling the detergent, refilling the detergent container, or servicing the detergent injection pump. Wear appropriate Personal Protective Equipment (PPE) whenever handling the detergent or servicing the detergent injection pumps and lines.

1. Open load chamber access door.
2. Use **CYCLE MENU** touch pad to scroll to third cycle menu.
3. Use **SELECT CYCLE** touch pad to select **PRIME**.
4. Press **CYCLE START** touch pad to start priming. Display shows:

PUMP TO PRIME?
Pump Name
__ indicates blinking position

5. Scroll through pump names, using **VALUE arrows** (up or down) touch pad until pump to be primed is displayed.
6. Press **CYCLE START** touch pad to confirm pump selection and start priming. Display shows:

PRIMING IN PROGRESS
TIME = XX:XX

7. Inside the wash chamber, look at the injectors located on the lower part of the chamber wall. When a few drops of chemical come out of the injectors, press **STOP/RESET** touch pad.
8. For lubricant injection, check pickup tube in container to ensure that pump is priming.

NOTE: Priming time may take five minutes or more for pumps 1 to 4. Priming time may be 20 minutes or more for pump 5.

3.10 ACCESSORIES

STERIS carries a complete line of accessories for use in this equipment. Contact STERIS for more information on these products.

To properly clean items and to avoid personal injuries, always follow these general loading guidelines:

- Ensure that no items protrude or hang out of the rack. Always use a rack designed to handle the appropriate type of items to be processed.
- All hinged surgical instruments with handles, such as scissors, hemostats, and forceps must be strung before being placed in a rack, to optimize cleaning of the hinges. A maximum of 50 items, open at a 90° angle, must be placed in each instrument tray.
- Instruments must always be placed in an instrument tray for processing, never alone on a manifold rack.
- Specific accessories have been designed to handle trays, basins, bowls, and bedpans.
- Miscellaneous articles can be placed in a general purpose rack, with or without hold-down screen.

ADVISORY: Microsurgery instrument containers must be placed in a general-purpose rack, with cover opened or removed before processing. Always use the GENTLE Cycle with microsurgery instruments.

- **Two-Level Manifold Rack** (see Figure 3-9) is designed to hold a 25-cm (10") high rack (maximum) on the bottom level, and one or two Amsco® Instrument Trays, or two mesh Instrument Trays, on the upper level.
- **Three-Level Manifold Rack** (see Figure 3-10) is designed to hold a general purpose rack or one or two mesh instrument trays on the bottom level, a general purpose rack or one or two Amsco Instrument Trays or two mesh Instrument Trays on the middle level, and one or two Amsco Instrument Trays or two mesh Instrument Trays on the upper level.
- **Four-Level Manifold Rack** (see Figure 3-11) is designed to hold one or two Amsco Instrument Trays, or two mesh Instrument Trays, on each level.
- **Five-Level Manifold Rack** (see Figure 3-12) is designed to hold two mesh Instrument Trays on each level.
- **Multi-Purpose Basin Rack** (see Figure 3-13) is designed to hold up to 26 basins of various shapes (round, square, rectangle) and sizes, as well as kidney bowls.
- **Kidney Bowl Rack** (see Figure 3-14) is designed to hold up to 20 kidney bowls of various sizes.
- **Anaesthesia/Respiratory Rack** (see Figures 3-15 to 3-17) is designed to hold different types of tubing and medical devices during processing.

- **Hold-Down Screen** (see Figure 3-18) is designed to retain small miscellaneous objects in place. Use in combination with instrument trays, Two-Level Manifold Rack, and Three-Level Manifold Rack.
- **Suction Tips and Instrument Rack** (see Figure 3-19) is designed to hold one or two Amsco Instrument Trays, or two mesh Instrument Trays, on the bottom level (including up to eight suction tips with Luer Lock on mesh basket Luer Lock holder, and miscellaneous items inside of mesh basket), and one or two Amsco Instrument Trays on the middle and upper levels, as well as up to ten large suction tips on special connectors located on side of rack. Ensure connecting mesh basket water supply hose to its dedicated port on bottom level of the Suction Tips and Instrument Rack.

ADVISORY: STERIS does not recommend the use of the Suction Tips and Instrument Rack for processing endoscopes, laparoscopes, or other instruments used for minimally invasive surgery. Processing these types of instruments may result in equipment damage as well as improperly cleaned items.

- **The Rigid MIS Instrument Rack** (see Figure 3-20) is designed for the efficient cleaning, drying, and low-level thermal disinfection of rigid minimally invasive surgery instruments such as end caps and compression springs, as well as non-cannulated items on the lower-level compartments, cannulated instruments, trocars, sleeves, reducer sleeves, bridges, and automatic flap valves on Upper Level Rack. Refer to the Rigid MIS Instrument Rack *Equipment Manual* (P920003-690) for more information on loading and routine maintenance.

IMPORTANT: The Rigid MIS Instrument Rack is designed to be used in conjunction with the Enzyme Treatment option.

ADVISORY: STERIS does not intend, recommend, nor represent in any way that the Rigid MIS Instrument Rack be used for the terminal disinfection or sterilization of any regulated medical device. If medical devices will be contacting blood or compromised tissues, such devices must be terminally processed in accordance with good hospital practices before each use in human patients.

The Rigid MIS Instrument Rack is specifically designed to only process goods as outlined in its *Equipment Manual* (P920003-690). If there is any doubt about a specific material or product, contact the instrument manufacturer for recommended washing techniques.

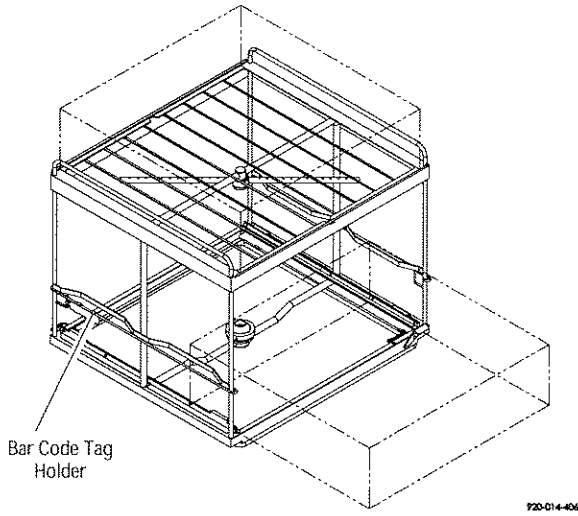


Figure 3-9. Two-Level Manifold Rack

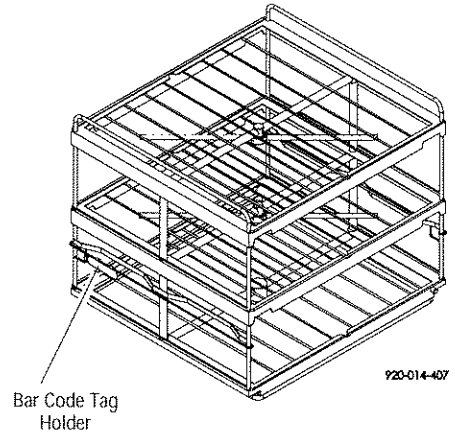


Figure 3-10. Three-Level Manifold Rack

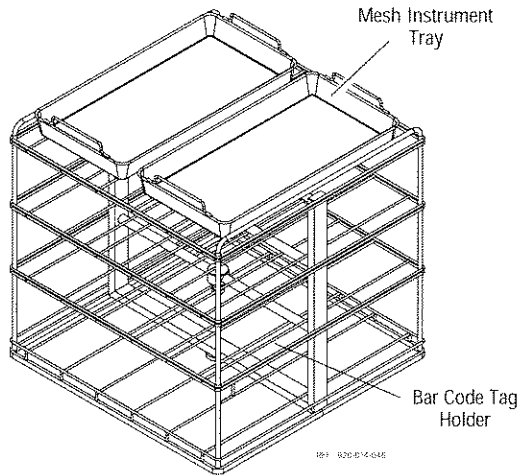


Figure 3-11. Four-Level Manifold Rack

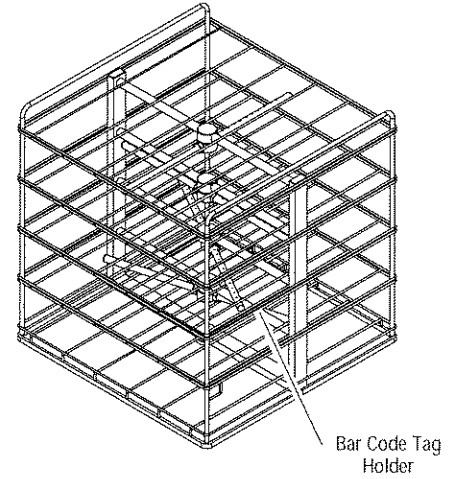


Figure 3-12. Five-Level Manifold Rack

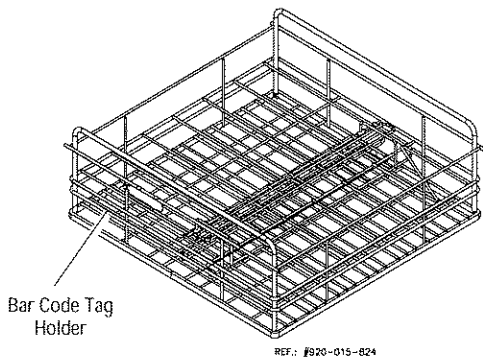


Figure 3-13. Multi-Purpose Basin Rack

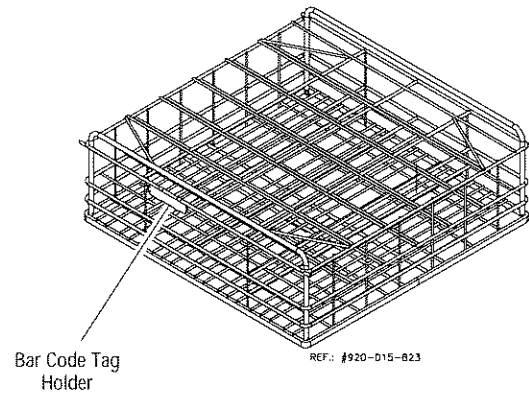
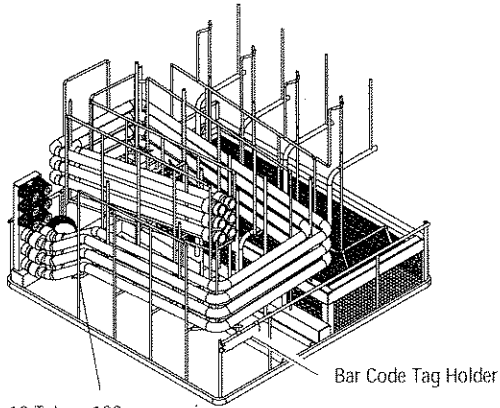


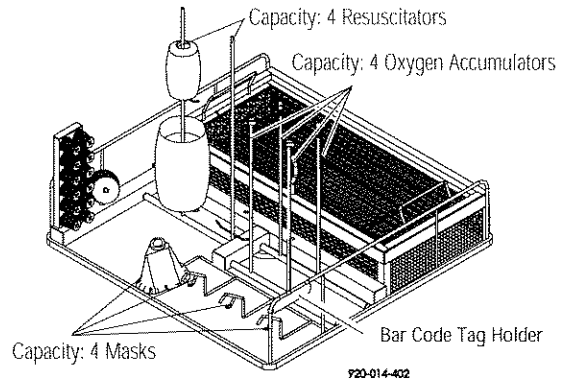
Figure 3-14. Kidney Bowl Rack



Capacity: 12 Tubes, 182 cm, maximum
(8 Tubes combined with 1 Lung Treatment Tube)

920-014-400

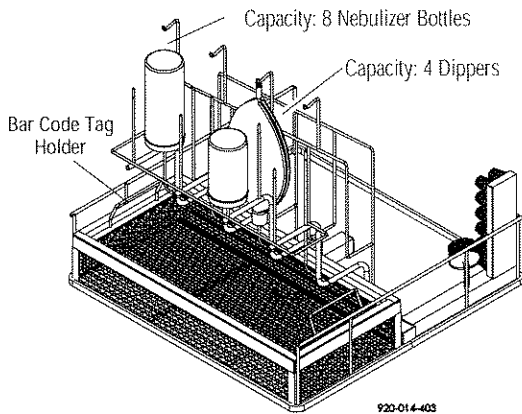
Figure 3-15. Anesthesia Tubing Manifold – Respiratory Tubing Arrangement



Capacity: 4 Masks

920-014-402

Figure 3-16. Anesthesia Tubing Manifold – Resuscitators, Oxygen Accumulators, and Masks Arrangement



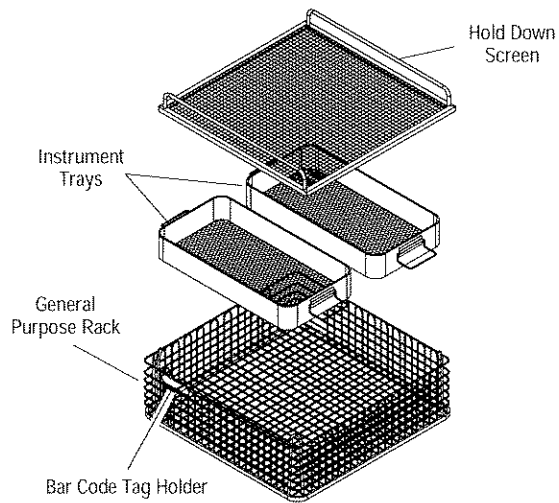
Capacity: 8 Nebulizer Bottles

Capacity: 4 Dippers

Bar Code Tag Holder

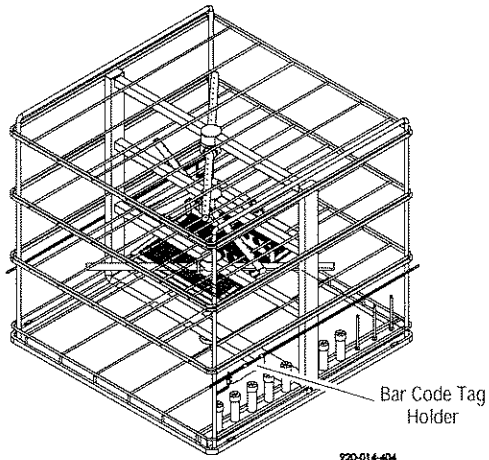
920-014-403

Figure 3-17. Anesthesia Tubing Manifold – Nebulizer Bottles, Dippers Arrangement



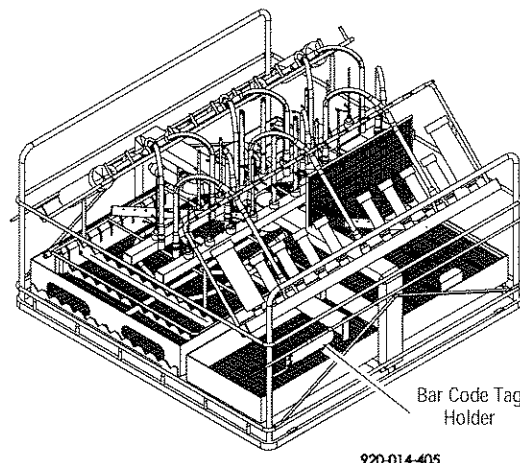
REF122-993-554

Figure 3-18. Hold Down Screen



920-014-404

Figure 3-19. Suction Tips and Instrument Rack



920-014-405

Figure 3-20. Rigid MIS Instrument Rack

3.11 LOADING UNIT WITHOUT CONVEYOR MODULES

⚠ WARNING – PERSONAL INJURY AND/OR EQUIPMENT DAMAGE HAZARD: Always load empty baskets on appropriate loading cart or surface.

⚠ CAUTION – POSSIBLE EQUIPMENT DAMAGE:

- Always position each manifold and/or bottom rotary spray over a manifold connector before operating unit. If manifolds and/or bottom rotary sprays are not positioned correctly, damage may result and unit will be unable to effectively wash load.

- Suction Tips (as well as other items) must be fully enclosed within the accessory (curved suction tips facing inward) to prevent obstruction in conveyor system.

- Avoid product damage. Always select a cycle appropriate for items being processed.

NOTE: Review Section 6.11, Troubleshooting, to identify the cause of any abnormal condition during a cycle or if unit fails to complete a cycle.

This procedure is used if facility is not equipped with Amsco Reliance 444 Load/Unload Modules or an Amsco Reliance ATS Automated Transport System, or if the conveyor module system is not in function.

1. Use a transfer cart to bring fully loaded basket or accessory next to the unit.
2. Ensure plasticware and/or metalware is positioned correctly on manifolds and/or in baskets.
 - When loading a basket, bowls must be placed open end down in basket.
 - If lightweight plasticware or metalware is being washed, use a cover to prevent items from turning.
 - Ensure that no items stick out or hang out of the rack. Always use a rack designed to handle the appropriate type of items to be processed.
3. Open door and slide loaded manifolds and/or baskets into wash chamber. Verify each manifold and/or basket is positioned over a manifold connector.
4. Press **DOOR CLOSE** touch pad.

5. When door is closed, Cycle Menu appears on the display:

INSTR UTENSILS
GLASSWARE PLASTIC
 __ indicates flashing position.

6. Use **SELECT CYCLE** touch pad to select desired cycle (see Table 3-1).
7. Press **CYCLE START** touch pad twice to initiate cycle.
8. Cycle proceeds through selected cycle treatment. See Section 3.13, *Typical Cycle Operation*.

Table 3-1. Cycle Names and Bar Code Tag Numbers

| CODE | CYCLE NAME | USE |
|------|----------------------------|--|
| 00 | INSTRUMENTS | To process surgical instruments |
| 01 | UTENSILS | To process bedpans, trays, basins, and bowls |
| 03 | GLASSWARE | To process beakers, bottles, and jugs |
| 04 | PLASTIC | To process plasticware |
| 05 | ANESTHESIA/ RESPIRATORY | To process anesthesia tubing, bags, and masks |
| 06 | GENTLE CYCLE | To process delicate surgical instruments |
| 07 | RIGID MIS | To process rigid minimally invasive surgical instruments |
| 08 | CYCLE 8 | For custom-programmed processing |
| 09 | CYCLE 9 | For custom-programmed processing |
| 10* | CYCLE 10 | For custom-programmed processing |
| ** | DECONTAM | Decontamination Cycle |

* This cycle does not guarantee complete washing/disinfection unless verified by the operator because the high level of flexibility allowed in the cycle selections.

** There is no Bar Code Tag for the DECONTAM cycle.

3.12 LOADING UNIT WITH CONVEYOR MODULES

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

- If an obstruction is present in the wash chamber door, Door Safety Bar will detect obstruction and door will automatically stop from closing. Wait until door is fully open and water flow has stopped before removing obstruction.

- Always load empty baskets on appropriate loading cart or surface.

- Do not place empty basket on the conveyor modules to load soiled articles. Proximity switch will detect basket and indexing will automatically start.

⚠ CAUTION – POSSIBLE EQUIPMENT DAMAGE:

When placing a basket onto conveyor modules, ensure the basket support hook is in closed position; i.e., flush with side of basket.

⚠ WARNING – PERSONAL INJURY HAZARD:

- When baskets are present on conveyor modules keep fingers and hands away from wash chamber doors and moving baskets.

- In case of an emergency situation involving the conveyor modules, always press the EMERGENCY STOP Button to stop all washer/disinfector and conveyor operations.

- When choosing a detergent, select one with a low chloride content. Detergents with a high chloride content can be harmful to stainless steel.

⚠ CAUTION – POSSIBLE EQUIPMENT DAMAGE:

- Suction tips (as well as other items) must be fully enclosed within the accessory (curved suction tips facing inward) to prevent obstruction in conveyor modules.

- Avoid product damage. Always select a cycle appropriate for the items being processed.

3.12.1 General

This procedure is used if facility is equipped with Amsco Reliance 444 Load/Unload Modules or an Amsco Reliance ATS Automated Transport System.

Ensure appropriate cycle parameters are set in the control before beginning operation of the unit.

NOTE: When using the automatic indexing, note the following:

1) For Automatic Indexing, proper Bar Code Tag (according to items being processed) must be attached to basket. See Figure 3-22 on how to insert Bar Code Tag inside Bar Code Tag holder easily. See Figures 3-10 to 3-21 for Bar Code installation on each accessory.

2) Review Section 6.11, Troubleshooting, to identify the cause of any abnormal condition during a cycle or if unit fails to complete a cycle.

3) For more information on Amsco Reliance ATS Automated Transport System, refer to Operator Manual (P122995-004).

1. Use a transfer cart to bring fully loaded basket or accessory next to the loading conveyor module.

- Ensure plasticware and/or metalware is positioned correctly on manifolds and/or in baskets.

- When loading a basket, bowls must be placed open end down in basket.

- If lightweight plasticware or metalware is being washed, use a cover to prevent items from turning.

- Ensure that no items stick out or hang out of the rack. Always use a rack designed to handle the appropriate type of items to be processed.

2. Select desired Bar Code Tag depending on load to be processed (see Table 3-1).

3. Place desired Bar Code Tag in Bar Code Tag Holder (see Figure 3-21).

4. Bar Code Tag must face the side of the conveyor where the bar code tag reader is located. Ensure the bar code tag is positioned correctly and is in legible condition (see Figure 3-21).

NOTE: If a bar code tag is not available, or if the available tag is not legible, the operator can select and start a cycle manually. See instruction further in this section.

5. Push basket forward until the back edge of basket is aligned with the arrows marked on the conveyor.

6. Ensure front edge of the basket is aligned with the conveyor activation photocell (See Figure 3-22). The conveyor activates as the basket crosses the i/0.1 photocell beam (double load module), or the i/0.2 and the i/0.3 photocell beams (single load module), for at least 3 seconds.

NOTE: Spray head can be used to rinse off gross soil from load and to wash load module pan.

7. The basket is automatically indexed into the wash chamber.
8. As the basket is indexed into the wash chamber, the bar code reader detects the cycle to be processed from the bar code tag.
 - If the bar code tag is read without error, the basket will be indexed into the wash chamber, door will close, and cycle will automatically start.
 - If the bar code reader cannot detect the bar code tag, refer to Section 3.12.2, *Manual Entry of a Bar Code Identification Number*.
9. Cycle proceeds through selected cycle treatments. See Section 3.13, *Typical Cycle Operation*.

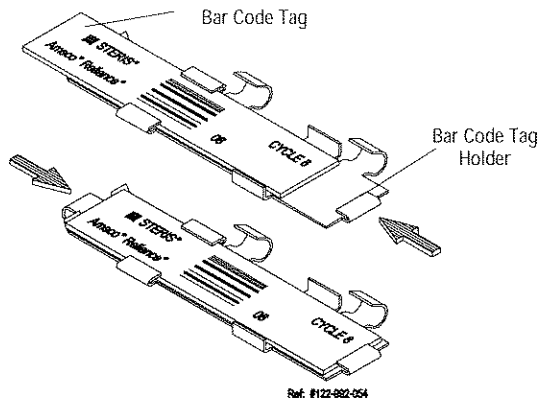


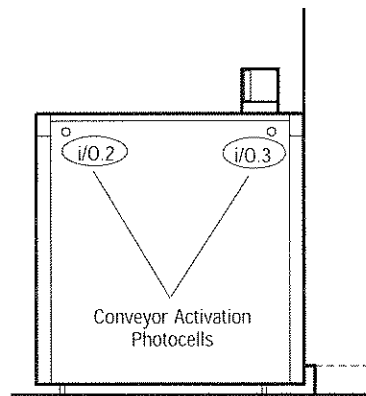
Figure 3-21. Bar Code Tag Insertion

3.12.2 Manual Entry of a Bar Code Identification Number

⚠ CAUTION – POSSIBLE EQUIPMENT DAMAGE: Avoid product damage. Always select a cycle appropriate for items being processed.

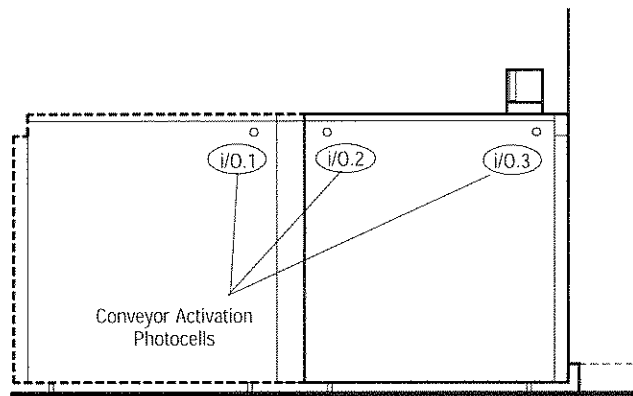
If the bar code reader is unable to detect the bar code tag on a basket, it may be for one of the following reasons:

- The bar code tag may be positioned on the side of the basket opposite the bar code reader. Reposition basket.
- The basket may not have a bar code tag. Install bar code Tag in bar code tag holder (see Figure 3-21).
- The basket's bar code tag may be damaged or otherwise illegible to the bar code reader.



REF.: #920-012-778

Single Load Module



REF.: #920-012-777

Double Load Module

Figure 3-22. Conveyor Photocells

1. Place basket on the load conveyor module.
2. Door opens. Basket is automatically loaded into the wash chamber.

If an error occurs during the reading of the bar code tag or if there is not a bar code tag on the basket, the chamber door will close but the cycle WILL NOT START. An alarm sounds and display shows:

**NO BAR CODE DETECTED
PRESS START TO RESUM**

3. Press CYCLE START touch pad. Alarm tone stops and display shows:

**PRESS START TO
SELECT CYCLE**

4. Press CYCLE START touch pad. Cycle menu appears. Display shows:

**INSTR. UTENSILS
GLASSWARE PLASTIC**
— indicates flashing position.

5. Press CYCLE MENU touch pad to access other cycle menus if necessary, then press SELECT CYCLE touch pad to select desired cycle.
6. Press CYCLE START touch pad twice to initiate cycle.

3.13 TYPICAL CYCLE OPERATION

▲ WARNING—PERSONAL INJURY HAZARD AND/OR EQUIPMENT DAMAGE:

- Always load empty baskets on appropriate loading cart or surface.
- Do not place empty basket on the conveyor modules to load soiled articles. Proximity switch will detect basket and indexing will automatically start.
- If an obstruction is present in the wash chamber door, Door Safety Bar will detect obstruction and door will automatically stop from closing. Wait until door is fully open and water flow has stopped before removing obstruction.

▲ WARNING – PERSONAL INJURY HAZARD: When baskets are present on conveyor modules keep fingers and hands away from wash chamber doors and moving baskets.

▲ WARNING – BURN HAZARD: Except for emergency, do not open door when cycle is in progress. In an emergency, first stop cycle by

pressing the EMERGENCY STOP Button and wait for water flow to stop. Wear appropriate Personal Protective Equipment (PPE) whenever reaching into the chamber.

▲ CAUTION—POSSIBLE EQUIPMENT DAMAGE:

- Always position each manifold and/or bottom rotary spray over a manifold connector before operating unit. If manifolds and/or bottom rotary sprays are not positioned correctly, damage may result and unit will be unable to effectively wash load.
- Suction tips (as well as other items) must be fully enclosed within the accessory (curved suction tips facing inward) to prevent obstruction in conveyor modules.
- Avoid product damage. Always select a cycle appropriate for the items being processed.

Washer operation can be halted at any time by pressing the STOP/RESET touch pad. Pressing the STOP/RESET touch pad once will halt cycle operation and printout message will indicate: STOP PRESSED! Pressing the STOP/RESET touch pad twice will abort the cycle and printout message will be: CYCLE ABORTED! To resume cycle operation, press CYCLE START touch pad. In an emergency, if it is necessary to open unload door after pressing STOP/RESET touch pad, a Supervisor Access Code must be entered by an authorized person; wait for water flow to stop and then open load door. To resume cycle, close door and press CYCLE START touch pad.

NOTE: If unit is equipped with conveyor modules, note the following:

- 1) If a cycle is aborted, the conveyors will stop. To restart conveyor operation, a normal cycle must be started manually (press CYCLE START touch pad twice). Conveyors resume normal operation once the cycle is started.
- 2) To stop automatic loading and unloading of basket(s), press EMERGENCY STOP button located on the conveyor module.

The cycle description which follows applies to the pre-programmed INSTRUMENTS cycle, which is the most extensive combination of pre-programmed treatments.

1. Position the POWER-OFF/STANDBY switch to POWER position and ensure that Main Power switch is in ON position. Display shows:

**RELIANCE
SYNERGY**

then:

INSTR UTENSILS
GLASSWARE PLASTIC
__ indicates flashing position.

... and printer records:

CONTROL ON HH:MM:SS (Current Time)
 YY/MM/DD (Current Date)

RELIANCE
SYNERGY
S/N 36XXXXXXXX (Unit Serial Number)

2. Press **CYCLE START** touch pad to select desired cycle. Display shows:

**PRESS START TO
PROCESS - INSTR**

3. Press **CYCLE START** touch pad. Cycle proceeds through selected treatments as follows:

NOTE: Note the following regarding the typical cycle:

1) To extend the time of a particular treatment, press the **EXTEND CYCLE** touch pad while reviewing cycle selection using **REVIEW CYCLE** touch pad. This suspends the initial time setting and causes the treatment in progress time to be multiplied by two.

2) Always use a non-foaming detergent for effective cleaning and proper pump and water-level control operation.

3) Follow detergent manufacturer's recommendations for the amount of detergent used according to water hardness.

4) See Table 5-6, *Cycle Description Chart*, for available settings.

- **PRE-WASH:** Load is pre-washed with cold water (maximum 16°C [60°F]) from building supply line for 2 minutes (factory-setting). Three additional pre-wash treatment can be programmed in Automatic mode.
- **PULSED ENZYME:**

Wash: Load is sprayed with enzyme detergent-injected hot tap water and pulsed (sequence of soaking and recirculation) for 4 minutes (factory-setting).

Rinse: Load is rinsed with hot tap water for 15 seconds (factory-setting). A second rinse can be added in Service mode.

- **WASH:**

Wash: Load is washed with detergent-injected water heated at 65°C (150°F) (factory-setting) for 2 minutes (factory setting).

Neutralizer: If selected, load is washed with detergent-injected hot tap water (factory-setting) for 1 minute (factory setting).

- **RINSE:** Load is rinsed with hot tap water for 15 seconds (factory-setting). Three additional rinses can be added in Automatic mode.
- **THERMAL RINSE:** Load is rinsed with heated pure water at 82°C (180°F) (factory-setting) and recirculated for 1 minute (factory-setting).
- **DRYING:** Load is dried at 116°C (240°F) (factory-setting) for 6 minutes (factory-setting).

4. When cycle is complete, buzzer sounds and display shows:

**PLEASE OPEN DOOR
AND REMOVE THE LOAD**

5. Open door. Leave door open to permit load to cool before removing manifolds and/or baskets. Main Cycle Menu returns.

NOTE: When cycle is complete, door must be opened and then closed before another cycle may be started.

3.14 VISUAL INSPECTION

IMPORTANT: Good Hospital Practice dictates that all instruments be inspected for visible debris after processing in the Reliance Synergy Washer/Disinfecter. Any instrument with visible debris must be rewashed until clean and free of visible debris prior to terminal processing. Failure to reprocess until all visible debris have been removed may impede the terminal processing.

1. Once items are cool, check for any residue or soil.
2. Any item that has not been cleaned properly must be reprocessed.

3.15 RESPONDING TO AN ALARM

Buzzer can be silenced by pressing the **ALARM REPLY** touch pad. After silencing buzzer, printer records:

ALARM ACKNOWLEDGED
AT HH:MM:SS (time)

... to record time at which operator acknowledged the alarm buzzing signal. See Section 6.11, *Troubleshooting*, for a full list of alarm conditions and operator actions.

3.16 STOP CYCLE OPERATION

▲ WARNING – BURN HAZARD: Except for emergency, do not open door when cycle is in progress. In an emergency, first stop cycle by pressing the EMERGENCY STOP Button and wait for water flow to stop. Wear appropriate Personal Protective Equipment (PPE) whenever reaching into the chamber.

Washer/disinfector operation can be halted at any time by pressing the STOP/RESET touch pad.

1. Press **STOP/RESET** touch pad to immediately halt operation of the cycle in progress. Display screen indicates that **STOP/RESET** touch pad was pressed:

**STOP WAS PRESSED
PRESS START TO RESUM**

alternating with...

**INSTR. HOT
ENZYME WATER**

and printer records:

STOP PRESSED 2:55:00p

2. Press **CYCLE/START** touch pad to resume cycle operation. Treatment resumes at the point where it was interrupted.

IMPORTANT: When a cycle has been interrupted (operator has pressed EMERGENCY STOP Button or STOP/RESET touch pad) and it is necessary to open chamber door, Supervisor Access Code must be entered by an authorized person to **unlock and open load side door only**. Refer to Section 3.21, *Access Code*.

3.17 ABORT CYCLE OPERATION

▲ WARNING – BURN HAZARD: Except for emergency, do not open door when cycle is in progress. In an emergency, first stop cycle by pressing the EMERGENCY STOP Button and wait for water flow to stop. Wear appropriate Personal Protective Equipment (PPE) whenever reaching into the chamber.

1. Press **STOP/RESET** touch pad to halt cycle in progress. Display shows:

**STOP WAS PRESSED
PRESS START TO RESUM**

alternating with...

**INSTR. HOT
DRAINING TIME: MM:SS**

2. Press **STOP/RESET** touch pad a second time to abort the cycle. Display screen indicates that cycle was aborted:

CYCLE ABORTED

... and printer records:

CYCLE ABORTED 2:42:P

Control automatically aborts cycle operation and returns to selected Cycle Menu.

IMPORTANT: When a cycle has been interrupted (operator has pressed EMERGENCY STOP Button or STOP/RESET touch pad) and it is necessary to open chamber door, Supervisor Access Code must be entered by an authorized person to **unlock and open load side door only**. Refer to Section 3.21, *Access Code*.

3.18 SHUTDOWN

NOTE: Control should be placed in Standby Mode after last cycle of the day and when washer is not in use for an extended period of time.

At the end of a work session, the washer should be shut down and cleaned thoroughly. Refer to Section 6, *Inspection and Maintenance*, for complete cleaning instructions and scheduled minor maintenance.

1. Position **POWER-OFF/STANDBY** switch to **OFF/STANDBY**. Display shows:

**STANDBY CYCLE WILL
START IN 01:00**

2. There is a 1 minute countdown before **STANDBY** cycle starts.

This delay allows operator to cancel **STANDBY** cycle and come back to Automatic Mode by positioning **POWER-OFF/STANDBY** back to **POWER**. After 1 minute delay, if **POWER-OFF/STANDBY** is left in **OFF/STANDBY** position, sump is drained for 5 minutes. Printer records:

STANDBY CYCLE START
2:51:32P

... and display shows:

**STANDBY CYCLE
TIME LEFT= 05:00**

- When Shutdown Cycle is completed and control goes in Standby Mode. Interior light stays on. Printer records:

STANDBY CYCLE END
2:53:32P

... and display shows:

00:00:00 P

- To perform maintenance on the washer/disinfector, position Main Power switch, located behind load end control console access panel, to OFF.
- Position building electrical disconnect switch (circuit breaker) to OFF and close building supply lines.
- Clean unit as described in Section 6, *Inspection and Maintenance*.
- Ensure building electrical disconnect switch and Main Power switch are positioned to ON after completion of cleaning and minor maintenance procedures.

NOTE: Leaving Main Power switch to OFF position overnight will shorten life span of battery backed-up control memory.

3.19 POWER DOOR OPERATION

WARNING – BURN HAZARD:

- Except for emergency, do not open door when cycle is in progress. In an emergency, first stop cycle by pressing the EMERGENCY STOP Button and wait for water flow to stop. Wear appropriate Personal Protective Equipment (PPE) whenever reaching into the chamber.

- Before removing an obstruction from the wash chamber door, always wear appropriate Personal Protective Equipment (PPE) and wait until water flow stops. Hot water/steam may be sprayed through door opening.

Door movement is controlled by DOOR OPEN and DOOR CLOSE touch pads located on control panel.

- DOOR OPEN: Press to automatically lift door up to open position.
- DOOR CLOSE: Press to automatically lower door to closed position.

A door-interlock safety feature allows only one door to be opened at a time to avoid cross-contamination.

Load door can be operated only from load-side control panel, and unload door can be operated only from unload-side control panel.

Unload-side door can be opened **ONLY AFTER COMPLETION OF A CYCLE**.

If a cycle has not been successfully completed, unload door will NOT open. If door must be opened before cycle is completed, a Supervisor Access Code must be entered by an authorized person and only the load door can be opened. Refer to Section 3.21, *Access Code*, for procedures on how to enter Supervisor Access Code.

3.19.1 Door Obstruction

If an obstruction is present in the wash chamber door, do not attempt to remove the object. A door safety sensor on the door button detects the obstruction. Door automatically stops from closing then opens completely. An alarm sounds and display shows:

**ALARM :
DOOR OBSTRUCTION**

- Press ALARM REPLY touch pad to silence buzzer.
- Once door is completely open, remove obstruction from wash chamber door. Display shows:

**INSTR. UTENSILS
GLASSWARE PLASTIC**
— indicates flashing position.


- Press DOOR CLOSE touch pad to close the door.
- Press CYCLE START touch pad. Door closes and cycle operation resumes.

3.19.2 Power Door Operation During a Power Failure

WARNING – PERSONAL INJURY HAZARD:

- In case of power loss, automatic doors lower slowly by gravity. Keep hands out of the door area to avoid personal injury.

- The chamber door is heavy. Lifting door manually may require two people.

 **WARNING – ELECTRIC SHOCK AND/OR BURN HAZARD: Fasteners and star washers are used to ensure protective bonding continuity. Always reinstall any star washer which may have been removed during installation or servicing.**

Power doors should not be open unless a cycle has been successfully completed. In the cases where a

power failure occurs and it is necessary to open load door proceed as follows:

TO OPEN DOOR

1. Loosen screws from the bottom right and left corners of the upper service access panel (see Figure 3-23).
2. Remove the upper service access panel.
3. Use a flat screw driver to pry into door frame holes and lift side blocks (see Figure 3-24).
4. Close air supply. On the bottom of the washer/disinfector, in the service compartment, unplug the red hoses from both cylinders.
5. Climb on a step ladder to lift door using the door handle (see Figure 3-23). A second person must help lifting the door from the bottom. Pull out door when lifting until completely open. Door must lift without any resistance.
6. Remove the two quick-release safety pins on top of the washer frame (see Figure 3-25). Insert into the door and frame, on both sides of the door to secure in open position (see Figure 3-26).

TO CLOSE DOOR

1. To manually close door, one person must hold the door and lift slightly from the bottom, while the other person removes both quick-release safety pins from the frame.
2. Store quick-release safety pins on the door frame (see Figure 3-25).
2. Lower door by pulling it out slightly, until door rests on the sill.
3. On the bottom of the washer/disinfector, connect red hoses to cylinders. Door will close completely when power is restored.

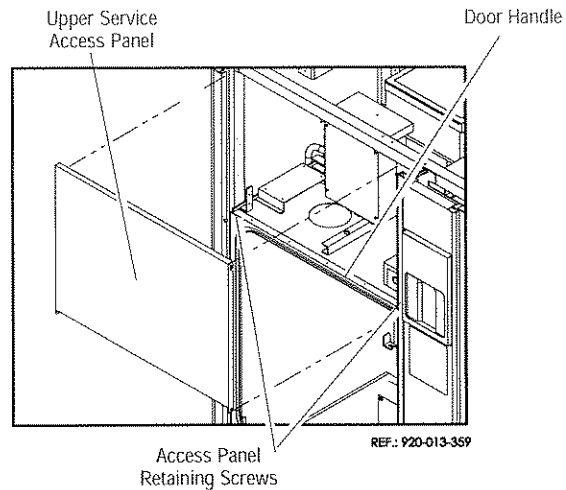


Figure 3-23. Remove Upper Service Access Panel



Figure 3-24. Pry into Door Frame

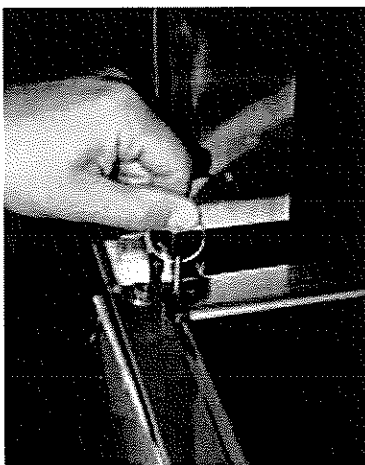


Figure 3-25. Remove Quick-Release Safety Pin

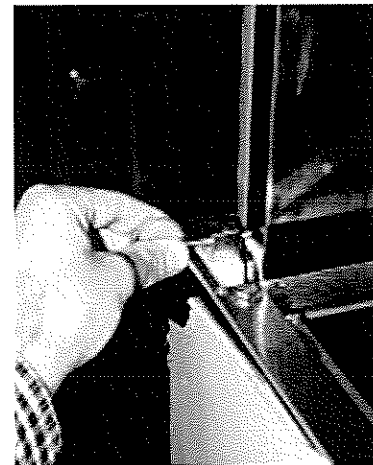


Figure 3-26. Insert Quick-Release Safety Pin

3.20 CYCLE AND CONTROL VALUES PROGRAMMING

⚠ CAUTION—POSSIBLE EQUIPMENT DAMAGE: Avoid product damage. Always select a cycle appropriate for the items being processed.

3.20.1 General

The Reliance Synergy Washer/Disinfector is programmed at the factory for the following operating CYCLES:

- INSTRUMENTS (00) – To process surgical instruments.
- UTENSILS (01) – To process bedpans, trays, basins, and bowls.
- GLASSWARE (03) – For processing beakers, bottles, and jugs.
- PLASTIC GOODS (04) – To process plasticware.
- ANESTHESIA/RESPIRATORY GOODS (05) – For processing anesthesia tubes, bags, and masks.
- GENTLE CYCLE (06) – To process delicate surgical instruments.
- RIGID MIS (07) – To process rigid minimally invasive surgical instruments.

NOTE: Each factory-preset cycle has been tested to ensure effective washing and disinfection.

In addition, a DECONTAM cycle is programmed at the factory to help with routine maintenance. See Section 6.2.2, *DECONTAM Cycle*, for information.

Cycles include various sequences of TREATMENTS:

NOTE: Refer to Table 5-6, Cycle Description Chart, for treatment specifications.

- PRE-WASH
- ENZYME (Pulsed Recirculated, One Rinse [Max. two rinses if selected in the Service mode])
- WASH/NEUTRALIZER
- RINSE
- THERMAL RINSE (with pure water or hot tap water)
- DRYING

Each treatment has time and/or temperature values, some of which can be modified within a range. To ensure safe and effective operation, some preset values cannot be modified.

Treatments include various combinations of PHASES:

- FILLING
- HEATING
- CHEMICAL/ENZYME INJECTION
- RECIRCULATION
- DRAINING
- COOLING

3.20.2 Customizing Cycles

Three paths are available to customize cycles to suit specific needs: **modify** factory preset cycles, **add** treatments to cycles, or **create** a new cycle configuration (see Table 3-2).

Table 3-2. Change Cycle Program Tree

| PROGRAM TREE - CHANGE CYCLES | | | |
|---|---|---|--|
| MODIFY | (CREATE) ADD | REMOVE | EXIT |
| Cycle Treatment: - Name - Temperature - Time - Detergent Name - Water Type | To create or add a treatment to an existing cycle | To remove a previously added treatment from a cycle | To Modify or Set Miscellaneous Values: - Recir. Pump Motor Speed - Cycle Values Printout - Printer On/Off - Date and Time - Access Code |

3.20.3 Modifying Factory-Set Cycles

1. Press **CYCLE MENU** touch pad until the desired cycle name appears on the cycle status screen. Four cycles are shown on each menu screen, e.g.,

INSTR. **UTENSILS**
GLASSWARE **PLASTIC**
 ___ indicates flashing position.

2. Press **SELECT CYCLE** touch pad to select another cycle within that menu.
3. Press **CHANGE VALUES** touch pad to confirm cycle selection. Display shows:

MODIFY **ADD**
REMOVE **EXIT**
 ___ indicates flashing position.

4. Press **CHANGE VALUES** touch pad to confirm **MODIFY** selection.
5. Press **VALUE arrows (up or down)** touch pad to scroll through treatment names. When the name of the treatment to be modified appears, press **CHANGE VALUES** touch pad to select that treatment.

NOTE: Not all treatments can be modified. See Table 5-6, Cycle Description Chart.

6. If the treatment has values that can be modified, press **CURSOR arrows (left or right)** and **VALUE arrows (up or down)** touch pad to select the desired values. Press **CHANGE VALUES** touch pad to confirm selection and continue with the next treatment.

7. **TO EXIT:** When all treatments and their values have been selected, there are two ways to save them and exit:

- To change the date or time, enable the printer, print out all programmed cycle values, select the recirculating pump motor speed, or establish an access code . . .

Press the **CHANGE VALUES** touch pad

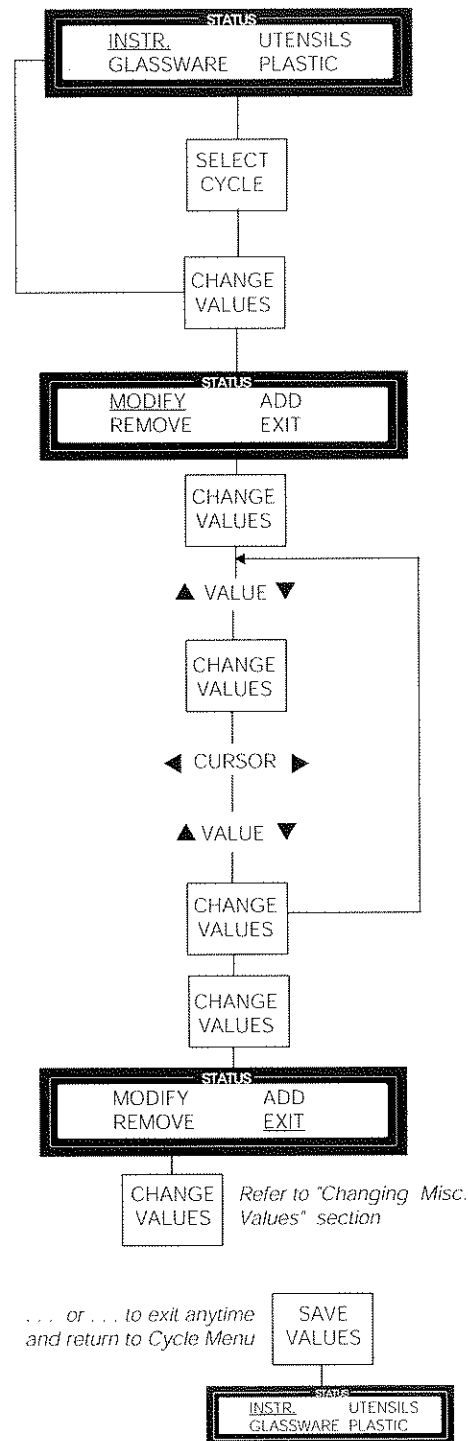
Select **EXIT**

Press **CHANGE VALUES** touch pad again

. . . and the control leads the operator through an exit routine that accesses those functions. For more information, see Section 3.20.7, *Changing Miscellaneous Values*.

. . . or . . .

- Exit Change Values routine at any time, by pressing the **SAVE VALUES** touch pad. This stores changes made up to that point, and returns the operator to the main Cycle Menu.



— Designates cursor position when display appears on control.

Figure 3-27. Modifying Factory-Set Cycles

3.20.4 Adding Treatments To Cycle

To add treatments to a cycle:

1. Press **CYCLE MENU** touch pad until the desired cycle name appears on the status screen, e.g.,

INSTR. **UTENSILS**
GLASSWARE **PLASTIC**
 ___ indicates flashing position.

2. Press **SELECT CYCLE** touch pad to select another cycle within that menu.

3. Press **CHANGE VALUES** touch pad to confirm cycle selection. Display shows:

MODIFY **ADD**
REMOVE **EXIT**
 ___ indicates flashing position.

4. Press **CURSOR arrow (right)** touch pad to highlight **ADD**, then press **CHANGE VALUES** touch pad to confirm **ADD** selection and continue sequence. Display shows:

CREATE TREAT. AFTER
(TREATMENT NAME)
 ___ indicates flashing position.

5. Press **VALUE arrow (up or down)** touch pad to scroll treatment names. When the name of the treatment to be added appears, press **CHANGE VALUES** touch pad to select. Display shows:

INITIALIZING
TREATMENT ...

... followed by choice of temperature, time, and detergent.

NOTE: TREATMENT LIMITS – As many as 13 treatments can be included in a cycle. If operator tries to enter a 14th treatment, the display will read "NO ROOM IN THIS CYCLE." Some treatments are limited as to the number of times they can be used in a cycle. If operator tries to enter more, the display will read "NO ROOM IN THIS TREATMENT TYPE". Treatment limits are:

| Treatment Name | Max # Per Cycle |
|-----------------------|-----------------|
| • PRE-WASH | 4 |
| • PULSED ENZYME WASH | 1 |
| • PULSED ENZYME RINSE | 2* |
| • WASH/NEUTRALIZER | 1** |
| • RINSE | 4 |
| • THERMAL RINSE | 1 |
| • DRYING | 1 |

*(The second rinse can be added in Service Mode only)

** (except for ANES/RESP and MIS Cycles)

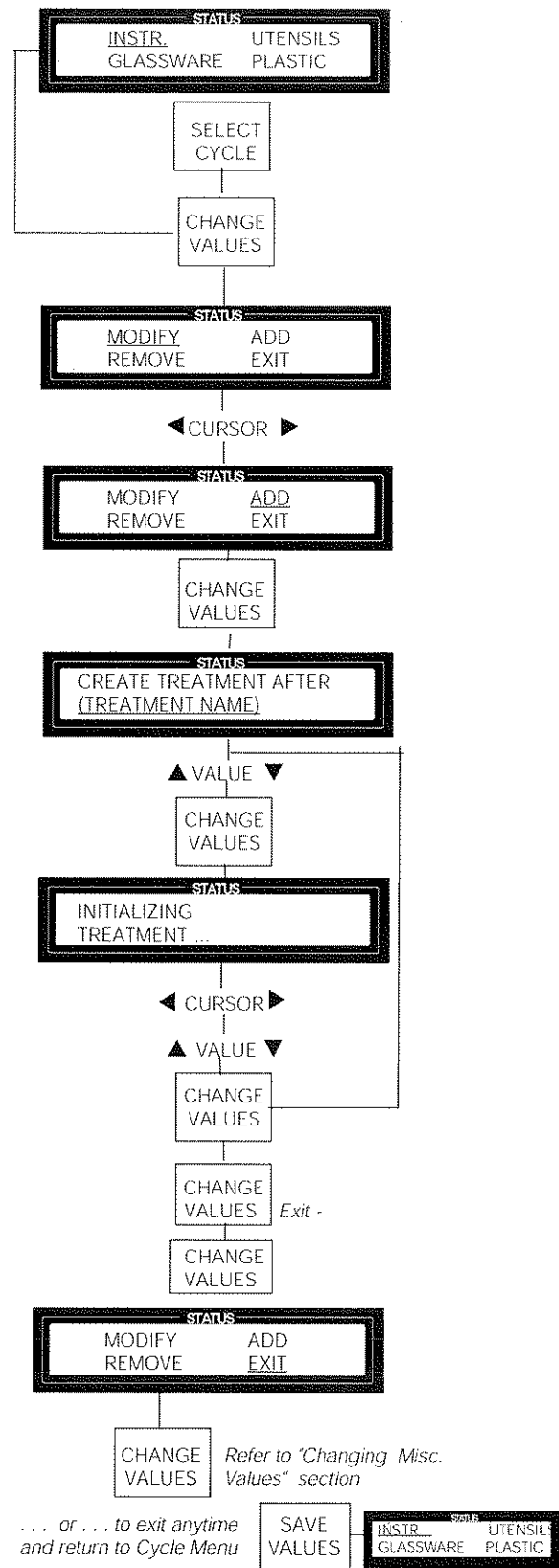


Figure 3-28. Adding Treatments to Cycles

6. If the treatment has values that can be modified (see Cycle Values and Factory Preset Cycle tables at the beginning of this section for time and temperature ranges), press **CURSOR** arrows (left or right) and **VALUE** arrows (up or down) touch pad to select desired values. Press **CHANGE VALUES** touch pad to confirm selection and continue with the next treatment.

7. **TO EXIT:** When all treatments and their values have been selected, there are two ways to save them and exit:

- To change the date or time, enable the printer, print out all programmed cycle values, select the recirculating pump motor speed, or establish an access code . . .

Press the **CHANGE VALUES** touch pad

Select **EXIT**

Press **CHANGE VALUES** touch pad again

. . . and the control leads the operator through an exit routine that accesses those functions. For more information, see Section 3.20.7, *Changing Miscellaneous Values*.

. . . or . . .

- Exit Change Values routine at any time, by pressing the **SAVE VALUES** touch pad. This stores changes made up to that point, and returns the operator to the main Cycle Menu.

3.20.5 Removing Treatments From Cycle

Added treatments can be deleted at a later time, but **core treatments which are part of factory-set cycles cannot be removed.**

To remove treatments that have been added, follow the same procedure described in Section 3.20.4, *Adding Treatments To Cycles*, except select **REMOVE** instead of **ADD**.

3.20.6 Creating Custom Cycles

Creating custom cycles allows the operator to store treatments and values tailored to make processing more efficient, while retaining immediate access to factory preset cycles. Three custom cycles can be created as follows:

NOTE: See Table 5-6, Cycle Description Chart, for treatments and values available.

1. Press **CYCLE MENU** touch pad until available cycle appears. Press **SELECT CYCLE** touch pad if you want another cycle within that menu.

2. Press **CHANGE VALUES** touch pad to confirm cycle selection. Display shows:

CHANGE CYCLE NAME
CYCLE NAME

— indicates flashing position.

3. Enter new cycle name (nine characters or less), using **CURSOR** arrows (left or right) touch pad to move from one position to the next, and **VALUE** arrows (up or down) touch pad to scroll letters, numbers, underscore, or a space (represented by a square). When display shows the desired value, simply move cursor to next position.

4. Press **CHANGE VALUES** touch pad to confirm new name and continue sequence. Display shows:

MODIFY ADD
REMOVE EXIT

— indicates flashing position.

5. Press **CHANGE VALUES** touch pad to confirm **ADD** selection and continue sequence.

NOTE: CREATE appears only when selecting the FIRST treatment of CYCLE 10. After the first treatment, the display shows ADD instead of CREATE.

6. Press **VALUE** arrows (up or down) touch pad to scroll treatment names. When the name of the first treatment in the new cycle appears, press **CHANGE VALUES** touch pad to select that treatment.

NOTE: See Table 5-6, Cycle Description Chart, for treatments and values available.

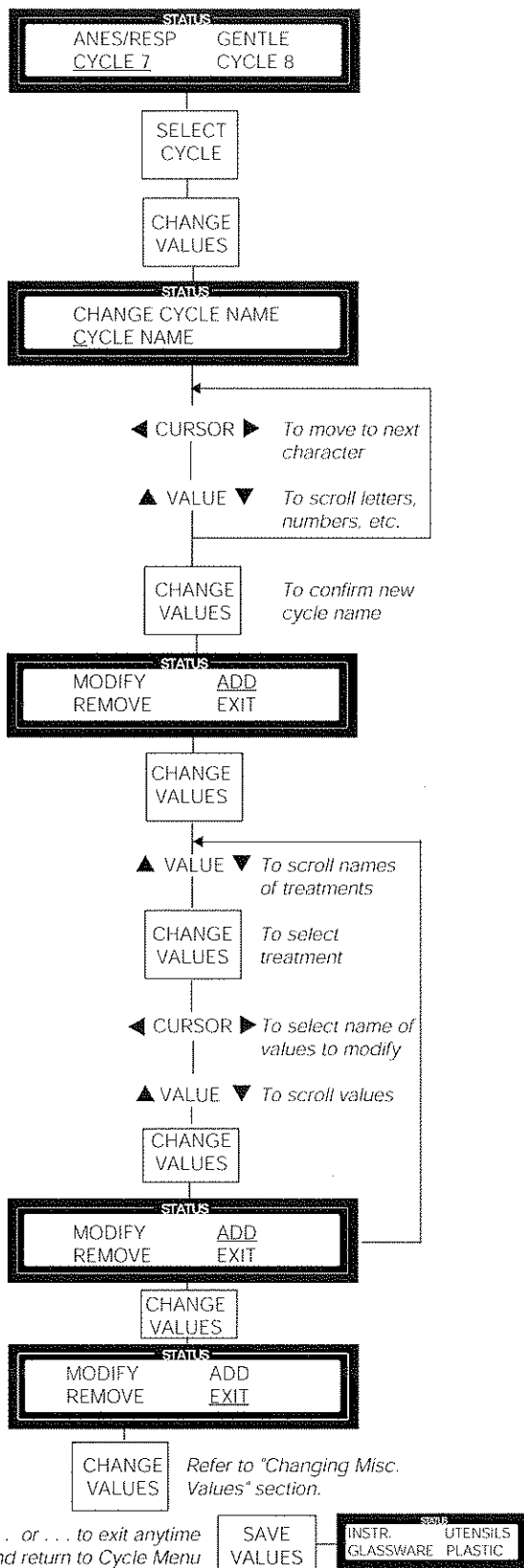
7. If the treatment has values that can be modified, press **CURSOR** arrows (left or right) and **VALUE** arrows (up or down) touch pad to select the desired values. Press **CHANGE VALUES** touch pad to confirm selection and **ADD** the next treatments.

TREATMENT LIMITS – As many as 13 treatments can be included in a cycle. If the operator tries to enter a 14th treatment, the display shows "NO ROOM IN THIS CYCLE." Some treatments are limited as to the number of times they can be used in a cycle. If the operator tries to enter more, the display shows "NO ROOM IN THIS TREATMENT TYPE." Treatment limits are:

| Treatment Name | Max # Per Cycle |
|-----------------------|-----------------|
| • PRE-WASH | 4 |
| • PULSED ENZYME WASH | 1 |
| • PULSED ENZYME RINSE | 2* |
| • WASH/NEUTRALIZER | 1** |
| • RINSE | 4 |
| • THERMAL RINSE | 1 |
| • DRYING | 1 |

**(The second rinse can be added in Service Mode only)*

*** (except for ANES/RESP and MIS Cycles)*



— Designates cursor position when display appears on control.

Figure 3-29. Creating Custom Cycles

8. TO EXIT: Ending the Creating Custom Cycles process is the same as Modifying Factory-Set Cycles. When all treatments and their values have been selected, there are two ways to save them and exit:

- To change the date or time, enable the printer, print out all programmed cycle values, select the recirculating pump motor speed, or establish an access code . . .

Press the CHANGE VALUES touch pad
Select EXIT

Press CHANGE VALUES touch pad again
... and the control leads the operator through an exit routine that accesses those functions. For more information, see Section 3.20.7, Changing Miscellaneous Values.

... or ...

- Exit Change Values routine at any time, by pressing the SAVE VALUES touch pad. This stores changes made up to that point, and returns the operator to the main Cycle Menu.

Using Custom Cycles

IMPORTANT: After a custom cycle has been created and stored, each time that cycle is selected the display shows:

CVTP = MODIFY CYCLE
SVTP = ERASE CYCLE

- Press CHANGE VALUES (CVTP) touch pad to modify cycle values
or
- Press SAVE VALUES (SVTP) touch pad to reset selected cycle values to factory-set values. Cycle reverts to original default preprogrammed values.
- To continue operating the cycle as it had been created, press CHANGE VALUES touch pad and select EXIT.

3.20.7 Changing Miscellaneous Values

The Exit routine on the control allows the operator to change the recirculating pump motor speed, print the programmed cycle values, and change miscellaneous values (turn the printer on/off, change date/time, establish access code). The procedure is similar to modifying, adding, or creating cycles.

- **Selecting Recirculating Pump Motor Speed**

1. Press CHANGE VALUES touch pad. Display shows:

MODIFY ADD
REMOVE EXIT
 ___ indicates flashing position.

2. Press CURSOR arrows (left or right) touch pad to move the cursor from MODIFY to EXIT.
3. Press CHANGE VALUES touch pad to confirm EXIT selection. Press again until the following message is displayed:

SELECT MOTOR SPEED
LOW HIGH
 ___ indicates flashing position.

4. Press CURSOR arrows (left or right) to select motor speed. Press CHANGE VALUES touch pad to confirm motor speed setting and continue with other selections (or press CHANGE VALUES then SAVE VALUES to confirm setting and return to main Cycle Menu).

- **Printing Cycle Values**

1. Press CHANGE VALUES touch pad. Display shows:

MODIFY ADD
REMOVE EXIT
 ___ indicates flashing position.

2. Press CURSOR arrows (left or right) touch pad to move the cursor from MODIFY to EXIT.
3. Press CHANGE VALUES touch pad to confirm EXIT selection. Press again until the following message is displayed:

PRINT CYCLE VALUES?
NO
 ___ indicates flashing position.

4. Press VALUE arrows (up or down) touch pad to change NO to YES. Press CHANGE VALUES touch pad to print values for the cycle that has been changed or selected. Display automatically returns to main Cycle Menu.

NOTE: The PRINT CYCLE VALUES feature is used to print values of a specified cycle. If a printout of all cycle values is desired, use the PRINT VALUES switch inside the printer access door.

- **Turning Printer ON/OFF**

1. Press CHANGE VALUES touch pad. Display shows:

MODIFY ADD
REMOVE EXIT
 ___ indicates flashing position.

2. Press CURSOR arrows (left or right) touch pad to move the cursor from MODIFY to EXIT.
3. Press CHANGE VALUES touch pad to confirm EXIT selection. Press again until the following message is displayed:

CHANGE MISC. VALUES?
NO
 ___ indicates flashing position.

4. Press VALUE arrows (up or down) touch pad to change NO to YES, then press CHANGE VALUES touch pad to confirm selection and continue sequence of displays. Display shows:

PRINTER ENABLED?
YES
 ___ indicates flashing position.

5. Press VALUE arrows (up or down) touch pad to enable or disable printer. Press CHANGE VALUES touch pad to confirm setting and continue with selections (or press CHANGE VALUES touch pad then SAVE VALUES touch pad to save printer setting and return to main Cycle Menu.

- **Setting Date and Time**

1. Press CHANGE VALUES touch pad. Display shows:

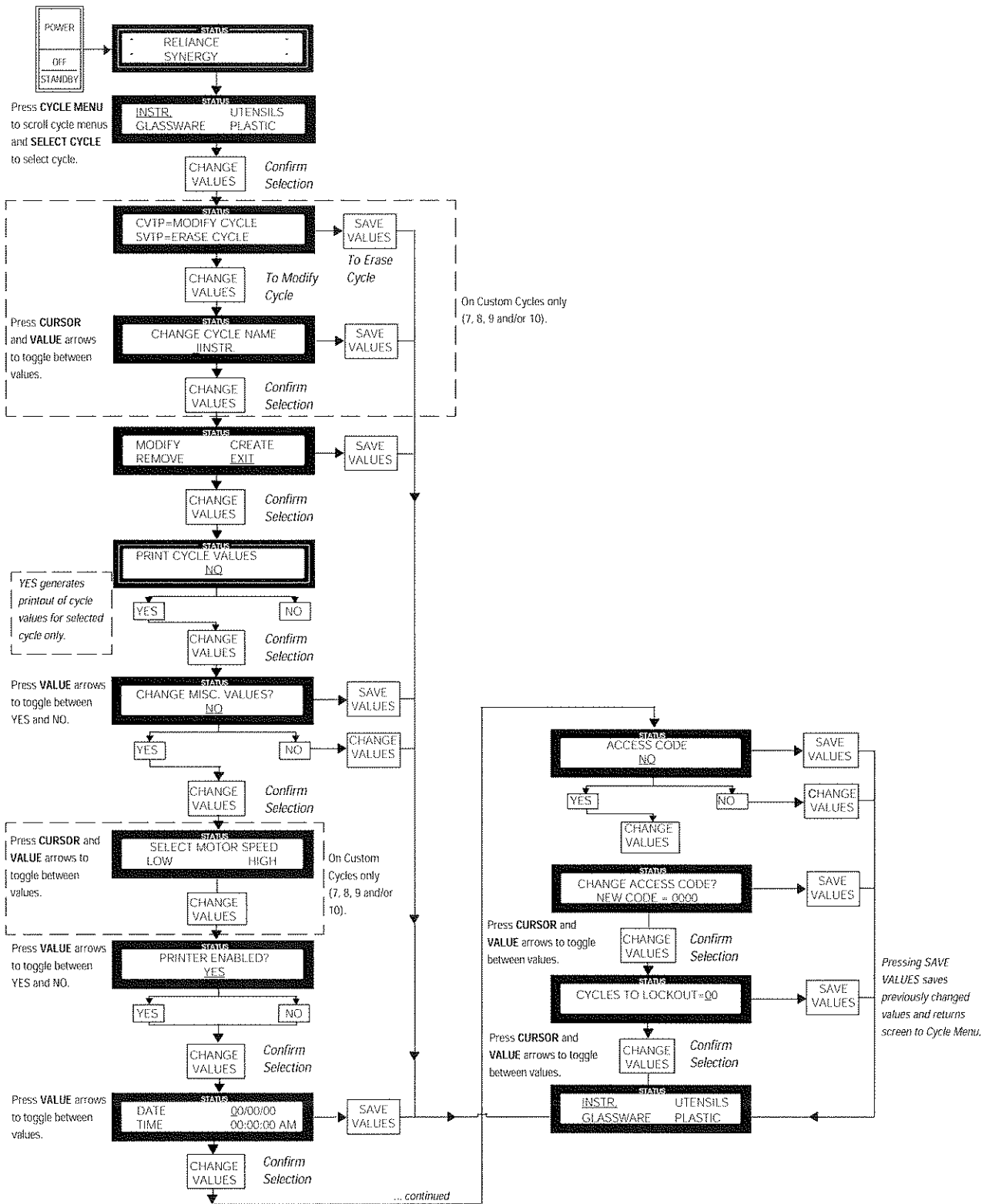
MODIFY ADD
REMOVE EXIT
 ___ indicates flashing position.

2. Press CURSOR arrows (left or right) touch pad to move the cursor from MODIFY to EXIT.
3. Press CHANGE VALUES touch pad to confirm EXIT selection. Press again until the following message is displayed:

CHANGE MISC. VALUES?
NO
 ___ indicates flashing position.

4. Press VALUE arrows (up or down) touch pad to change NO to YES, then press CHANGE VALUES touch pad until the following message is displayed:

DATE YY/MM/DD
TIME HH:MM:SS AM
 ___ indicates flashing position.



___ Designates cursor position when display appears on control.

Figure 3-30. Change Values Mode – Changing Miscellaneous Values

5. Press **CURSOR** arrows (left or right) to move from one digit on the display to another, and **VALUE** arrows (up or down) touch pad to scroll numbers to set date and time. When all settings are entered, press **CHANGE VALUES** to confirm setting and continue with Access Code sequence (or press **CHANGE VALUES** touch pad then **SAVE VALUES** touch pad to confirm setting and return to main Cycle Menu).

3.21 ACCESS CODE

The access code allows the supervisor to lock cycle parameters by preventing unauthorized personnel from entering that part of the program. If the supervisor sets the access code ON, the supervisor or an authorized operator must enter a four-digit code to change cycles or values.

The Access Code also allows supervisor or authorized personnel to unlock load side door in case of a cycle interruption. If the Access Code is not entered, load door will not open even if EMERGENCY STOP Button is pressed.

NOTE: Unload door can only be opened if cycle has been successfully completed.

When the access code is ON, if the operator tries to change a cycle that has been locked, the display shows:

ACCESS CODE KNOWN?
NO
__ indicates flashing position.

1. If the access code is known, press the **VALUE** arrows (up or down) touch pad to change NO to YES, enter the access code (preset access code is 0000) and then press the **CHANGE VALUES** touch pad. Display shows:

MODIFY **ADD**
REMOVE **EXIT**
__ indicates flashing position.

2. Proceed as described under Modifying Factory-Set Cycles.

If the operator does not know the access code, the control returns to the main Cycle Menu.

When the access code is OFF, there is no indication during normal operations that the feature exists.

NOTE: The unit is shipped from the factory with the Access Code at OFF position. If the backup battery on the control circuit board fails, access code selection is lost and the access code itself is lost.

• Advantages of Enabling or Disabling Access Code

Enabling or disabling the access code can impact the efficiency of washing operations.

For that reason, the supervisor should carefully consider which path to take. If the access code is ON, the supervisor can ensure operators use the washer/disinfector within predetermined parameters. If the access code is OFF, the supervisor can allow operators more flexibility in determining which cycles to use and how to use them. The deciding factor should be what works best for the facility's operation.

• Enabling/Changing Access Code

1. Press **CHANGE VALUES** touch pad. Display shows:

MODIFY **ADD**
REMOVE **EXIT**
__ indicates flashing position.

2. Press **CURSOR** arrows (left or right) touch pad to select EXIT. Press **CHANGE VALUES** touch pad until display shows:

CHANGE MISC. VALUES?
NO
__ indicates flashing position.

3. Press **VALUE** arrows (up or down) touch pad to change NO to YES. Press **CHANGE VALUES** touch pad until display shows:

ACCESS CODE
NO
__ indicates flashing position.

4. Press **VALUE** arrows (up or down) touch pad to change NO to YES in order to enable access code. Press **CHANGE VALUES** touch pad to confirm selection. Display shows:

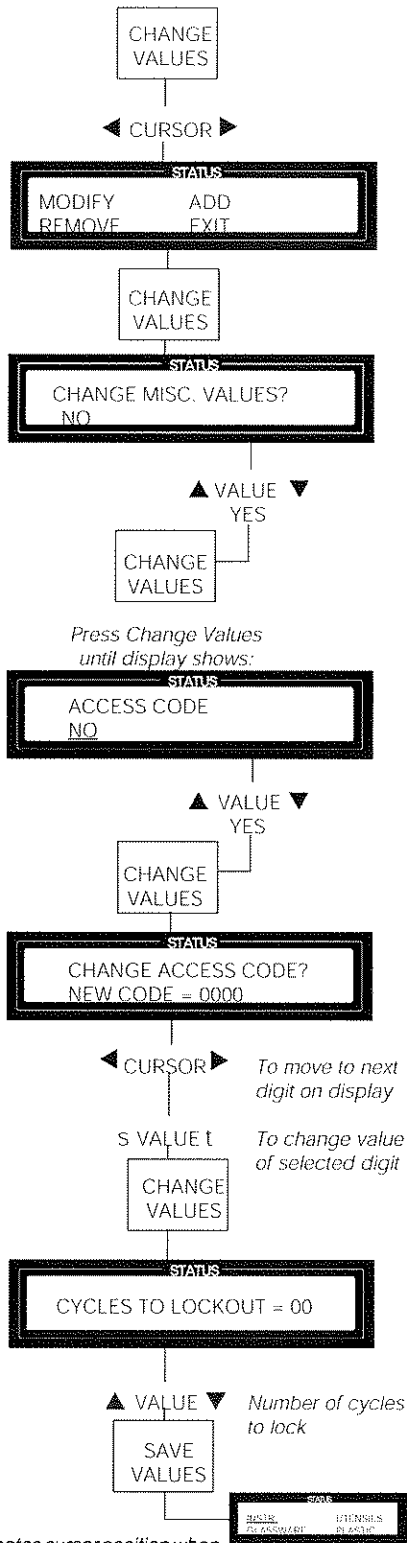
CHANGE ACCESS CODE?
NEW CODE = XXXX

5. Default access code is 0000. To customize your access code, input four new digits, using **CURSOR** arrows (left or right) touch pad to go from one digit to another, and **VALUE** arrows (up or down) touch pad to increase the value of each digit. Press **CHANGE VALUES** touch pad to confirm new code. Display shows:

CYCLES TO LOCKOUT = 00

NOTE: Lockout is sequential (INSTRUMENTS cycle first, then UTENSILS, GLASSWARE, PLASTIC, ANES/RESP, GENTLE), followed by custom cycles. For example, if one

See "Changing Miscellaneous Values - Flowchart"



___ Designates cursor position when display appears on control.

Figure 3-31. Enabling/Changing Access Code

cycle is locked out, it will be INSTRUMENTS; if two, INSTRUMENTS and UTENSILS, etc.

6. Press VALUE arrows (up or down) touch pad to enter number of cycles to lock out, then press CHANGE VALUES touch pad then SAVE VALUES touch pad to confirm selection and return to main Cycle Menu. Display shows:

INSTR. UTENSILS
GLASSWARE PLASTIC
___ indicates flashing position.

7. Access code is now enabled.

• **Disabling Access Code**

Disable the access code in a sequence similar to enabling:

1. Press CHANGE VALUES touch pad. Display shows:

MODIFY ADD
REMOVE EXIT
___ indicates flashing position.

2. Press CURSOR arrows (left or right) touch pad to select EXIT.

3. Press CHANGE VALUES touch pad until display shows:

CHANGE MISC. VALUES?
NO
___ indicates flashing position.

4. Press VALUE arrows (up or down) touch pad to change NO to YES. Press CHANGE VALUES touch pad to confirm selection.

5. Press CHANGE VALUES touch pad until display shows:

ACCESS CODE KNOWN?
NO
___ indicates flashing position.

6. Press VALUE arrows (up or down) touch pad to change NO to YES. Press CHANGE VALUES touch pad. Display shows:

ENTER OPERATOR
ACCESS CODE = XXXX

7. Enter proper access code, then press CHANGE VALUES touch pad. Display shows:

ACCESS CODE
YES
___ indicates flashing position.

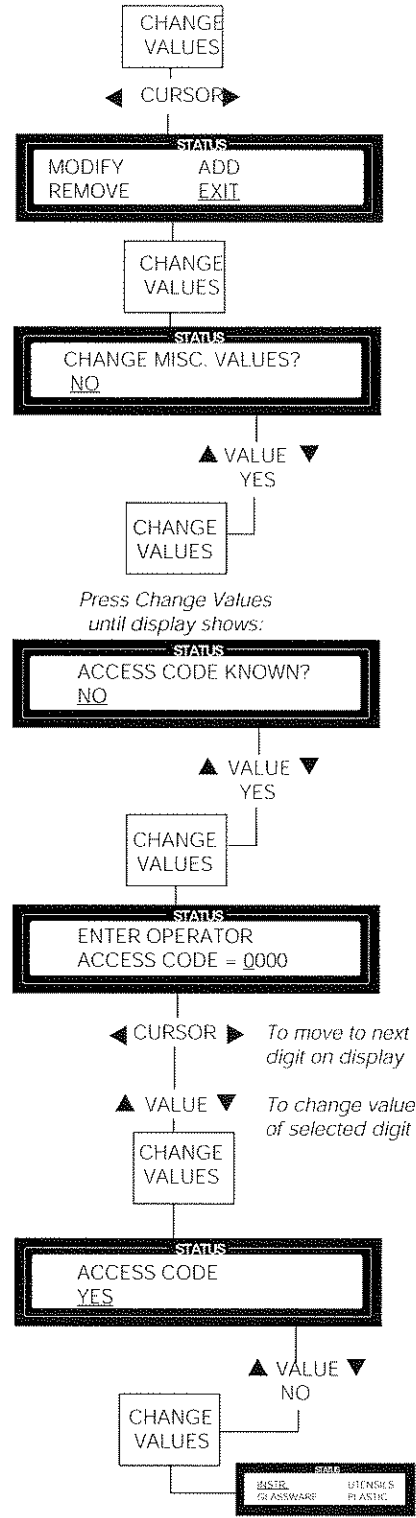
8. Press VALUE arrows (up or down) touch pad to change YES to NO to disable access code. Press

CHANGE VALUES touch pad then SAVE VALUES touch pad to confirm and return to main Cycle Menu. Display shows:

INSTR. UTENSILS
 GLASSWARE PLASTIC
 ___ indicates flashing position.

9. Access code is now disabled, and anyone can modify cycles.

See "Changing Miscellaneous Values - Flowchart"



___ Designates cursor position when display appears on control.

Figure 3-32. Disabling Access Code

3.22 USING INDEPENDENT MONITOR (OPTION)

If the Independent Monitor option is present, cycle parameters are monitored independently from the control at each phase. The data captured by the independent monitoring is interpreted by the control and an alarm signal is emitted if parameters do not meet cycle specifications.

Refer to Table 3-4, for parameters monitored during the different phases of a cycle.

Depending on unit voltage, parameters are displayed in imperial units or metric units, as follows:

| | 208 V and 480 V 60 Hz | 380/400/415 V 50 Hz |
|------------------------------|--------------------------|------------------------|
| Sump and drying temperature: | °F | °C |
| Pressure: | psi | kPa |
| Chemical injection volume: | oz | ml |
| Conductivity: | µS/cm | µS/cm |

Touchscreen touch pads allow displaying information in different formats: Trend Charts, Bar Graphs, Digital Windows, Alarm/Events Data Window, or combination of these.

Cycle parameters are stored in a recordable floppy disk with capacity to record up to five work days (on a typical cycle basis).

A companion software disk containing software needed to view and print recorded data from Independent Monitor is provided.

STERIS recommends making a back up copy from monitor configuration, for more security. See Section 3.22.4, *Programming and Safety Backup Copy*.

3.22.1 Formatting a Floppy Disk

NOTE: For formatting a floppy disk, note the following:

1) Access to monitor PROG or FUNC menus is protected by a pass code. Only authorized persons or a qualified technician may have access to them. Refer to the Section 3.22.10, *Setting Passcodes*.

2) Before a disk can be used for recording, it must be FORMATTED. For best results, only format the disk inside the Independent Monitor.

1. Open pull-down panel from Cycle Monitor.
2. Ensure the disk is not write protected. The plastic slide in one corner of the floppy disk must be in


such a position that it exposes the hole in the plastic cover.

3. Insert the disk into the drive, label side up and metal slide first.
4. Press MENU at the bottom right corner of the LCD screen. The command button bar appears.
5. Press PROG. The Passcode Menu appears.
6. Use numeric keyboard to enter passcode.
7. Use the UP and DOWN Arrow Keys to scroll the highlight bar to RECORD SETUP. Then, press ENTER.
8. In the RECORD SETUP Program Menu, use UP or DOWN Arrow Keys to scroll the highlight bar to FORMAT. Then, press ENTER
9. A window displays:
FORMAT = NO*
10. Press YES then ENTER to begin formatting. The light on the drive will be ON until the format is complete. Display shows: **Format Done**
11. Press OK to end format. The disk is now formatted and ready for use.

NOTE: Never remove a disk from the drive while the drive light is on.

Table 3-4. Monitored Parameters

| Parameters | Phases | | | |
|-----------------|----------|------|---------------|-----|
| | Pre-wash | Wash | Thermal Rinse | Dry |
| Time | | | | |
| Sump Temp. | | | | |
| Pressure | | | | |
| Chemical Vol. | | | | |
| Conductivity | | | | |
| Dry Temperature | | | | |

Monitored Parameters 

3.22.2 Loading Companion Software

1. Insert the Companion software disk (provided with the equipment) in the floppy drive of an IBM-compatible PC that runs Microsoft Windows 3.1, Windows 95/98, or Windows NT Operating Systems.
2. Use the Windows Program Manager to select the File/Run menu item; or in Windows 95/98 or Windows NT, select: Start/Run.
4. Type in A:\SETUP or B:\SETUP depending on which drive the disk was inserted.
5. Press the OK button. This will run the setup program which will automatically install the software. The operator be asked to enter the destination drive and in which directory to install the software.
6. If operator does not wish to accept the default, type in the correct destination and press ENTER, or click the OK button. Follow the instructions.
7. To run the program, click on the icon in the Windows program manager desktop, or use the START button.

3.22.3 Programming File Names

NOTE: Access to monitor PROG or FUNC menus is protected by a pass code. Only authorized persons or a qualified technician may have access to them. Refer to Section 3.22.10, Setting Passcodes.

The user can enter a file name to identify the recordings being made. The file name can be any valid DOS file name up to a maximum of 8 characters, e.g. BATCH1 or SAMPLE5. This file name is applied to all pen files, the alarm file and the configuration file. Thus, if the name "BATCH1" is entered, pen 1 file will be BATCH1.DT1; pen 2 will be BATCH1.DT2 and so on; the alarm file will be BATCH1.ALM and the configuration file will be BATCH1.CFG. A disk can hold files with different names. For example, you may run three batches and name files for each batch (BATCH1, BATCH2, and BATCH3) on all the same disk.

1. Press MENU at the bottom right corner of the LCD Screen. The COMMAND button bar appears.
2. Press PROG. The Passcode Menu appears.
3. Use numeric keyboard to enter the passcode.
4. Use the UP or DOWN Arrow Keys to scroll the highlight bar to RECORD SETUP. Then, press ENTER.
5. In the Record Set-Up program menu, use the UP or DOWN Arrow Keys to scroll the highlight Bar

to "Filename" and press ENTER. Display shows:

FILENAME

(where filename is the current filename)

6. Use the alphanumeric keypad to enter a new file name.

Regarding filename, note the following:

- 1) *The file name cannot contain spaces and must consist of the letters A through Z, the numbers 0 through 9 and the characters #, %, &, (,), @. Do not try to type DOS extensions.*
- 2) *STERIS suggests using the date along with the number of the washer as a file identification; i.e. 211101W2 (DDMMYY recorded on washer 2).*
7. Once a file name is entered, press the ENTER key to save it and return to the recorder menu.

3.22.4 Programming and Safety Backup Copy

The Independent Monitor has been pre-programmed so no extra programming is necessary. Nevertheless, STERIS recommends doing a safety backup copy of the configuration. Thus, in case that original configuration was erased, it would be possible to reinstall it from the safety backup copy.

NOTE: Before programming a safety backup copy, note the following:

- 1) *Access to monitor PROG or FUNC menus is protected by a passcode. Only authorized persons or a qualified technician may have access to them. Refer to Section 3.22.10, Setting Passcodes.*
- 2) *Before a disk can be used for recording, it must be FORMATTED. For best results, only format the disk inside the Independent Monitor.*

1. Open pull-down panel from Cycle monitor.
2. Ensure the disk is not write protected. The plastic slide in one corner of the floppy disk must be in such a position that it exposes the hole in the plastic cover.
3. Insert a formatted disk into the drive, label side up and metal slide first.
4. Name the files (see Section 3.22.3, Programming File Names)
5. Press Menu at the bottom right corner of the LCD screen. The Command Button Bar appears.
6. Press PROG. The passcode menu appears.
7. Use numeric keyboard to enter passcode.
8. Use UP or DOWN Arrow Keys to scroll the highlight bar to: "RECORD SETUP", then press ENTER.

9. Use UP or DOWN Arrow keys to highlight: SAVE CFG FILE. Then, press ENTER.

10. A pop-up window will display:

SAVE CONFIGURE = NO

11. Select: YES. Then, press ENTER. Display will show:

CONFIGURATION SAVED OK?

12. Press OK. Remove disk and store in a secure place.

NOTE: Never remove disk from the drive while the drive light is ON.

3.22.5 Starting Data Recording (Trigger Mode)

NOTE: Access to monitor PROG or FUNC menus is protected by a pass code. Only authorized persons or a qualified technician may have access to them. Refer to Section 3.22.10, Setting Passcodes.

Once a file name was determined, the Independent Monitor must be set to Trigger to start recording data again.

1. On Cycle Monitor, enter the Function Menu by pressing MENU at the right of the Main Button Bar at the bottom of the display.

2. The Command Menu Button Bar appears.

3. Press FUNC to enter the Function menu. The passcode menu appears.

4. Use numeric keyboard to enter passcode. The Function menu appears.

5. Use the UP or DOWN Arrow Keys to highlight: RECORD ON/OFF, then press ENTER.

6. Use the UP or DOWN Arrow Keys to select: TRIGGER, then press ENTER.

7. A pop up window will ask to confirm the selection:

TRIGGER?

8. Press YES to set recording or NO to exit.

9. Press EXIT to return to the FUNCTION menu.

3.22.6 Stopping Data Recording

NOTE: Access to monitor PROG or FUNC menus is protected by a pass code. Only authorized persons or a qualified technician may have access to them. Refer to Section 3.22.10, Setting Passcodes.

1. On Independent Monitor, enter the Function Menu by pressing the MENU button at the right of the Main Button Bar at the bottom of the display.

2. The Command Menu Button Bar appears.

3. Press FUNC to enter the Function menu.

4. The Passcode Menu appears. Use numeric keyboard to enter passcode. The Function Menu appears.

5. Use the UP or DOWN Arrow Keys to highlight: RECORD ON/OFF, then press ENTER.

6. Use the UP or DOWN Arrow Keys to select: RECORD OFF, then press ENTER.

7. A pop-up window will ask to confirm the selection:

RECORD OFF?

8. Press YES to stop recording or NO to exit.

9. Press EXIT to return to the FUNCTION menu.

NOTE: Never remove a disk from the drive while the drive light from floppy disk compartment is on.

10. Change floppy disk.

Store recorded disks in a safe place to later view, print, and interpret information contained in them by using the companion software (provided by STERIS).

3.22.7 Getting Recorded Data

Printed graphics from monitor can be compared to washer printouts containing parameters of the same cycle.

NOTE: Data produced by the recorder is in a proprietary format and must be read with Independent Monitor's own software.

Once the Independent Monitor Companion Software is loaded, the operator can read and analyze data files in disk in graphical or tabular format or export the data files to spreadsheets such as Excel™ and Quattro™.

NOTE: Refer to companion disk to get more information.

1. To run the program, click on the icon in the Windows program manager desktop, or use the START button.

2. To export files, select the "File - Export" option.

3. The export dialog box appears (see Figure 3-33). This box allows the user to select the start and end times, the format for the time and date, and optionally break up into smaller files based on a time interval.

4. Select the time to start exporting data.

5. Select the time to stop exporting data.

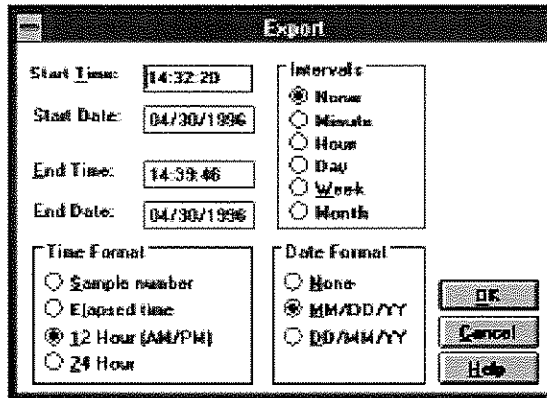


Figure 3-33 Export Dialog Box

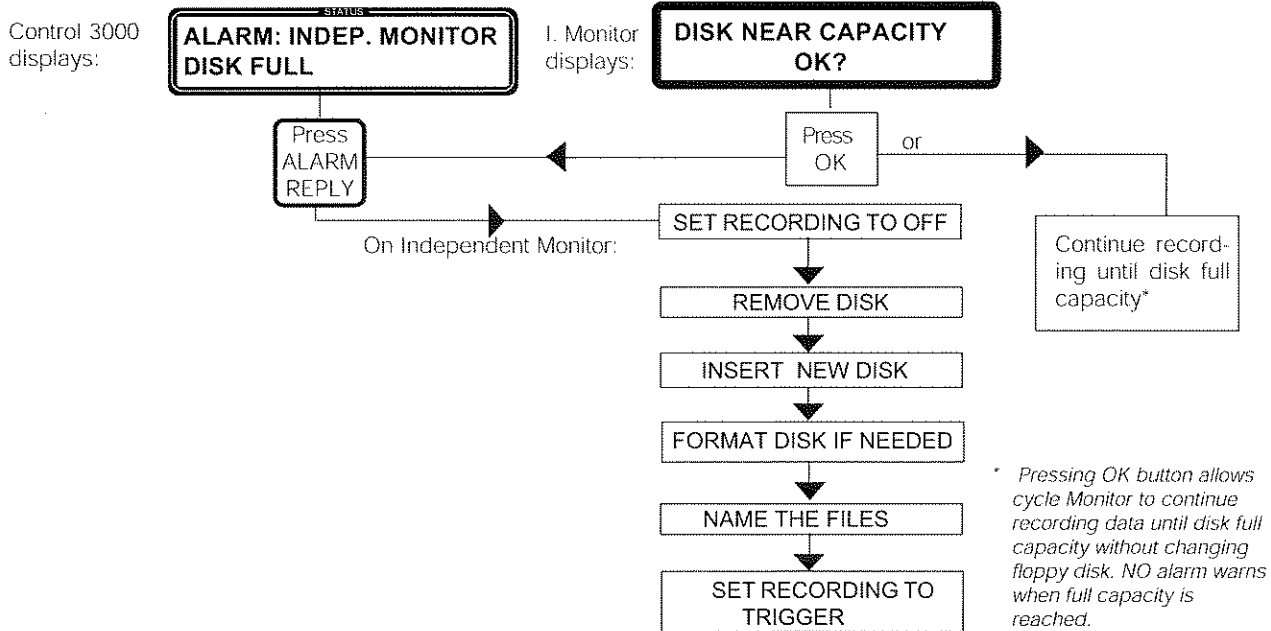


Figure 3-34. Disk Full Alarm Flowchart

6. Select the time format either as sample number, where each value output will be numbered, elapsed time, where the first sample is time 0:00:00 and each sample is then time incremented, or select an absolute time format, 12 or 24 hour.
7. Select date format: either month day MM/DD/YY, or day month DD/MM/YY or None to suppress the date.
8. Select the Interval. The Intervals option allows the user to export "Blocks" of data rather than the whole file which may be too large for certain spreadsheets. The block may be selected as intervals of 1 minute, 1 hour, 1 day, 1 week or 1 month. An interval of none exports the entire file.
9. Once the export options have been selected, click on the OK button or press ENTER.
10. A dialog box will appear to select or enter the name and location of the export file.
11. Select a filename and click OK. The data will be exported into that file.

NOTE: Once all data has been exported, it is possible to reuse the same floppy disk during 1 month (average). Be sure to erase disk contents before starting a new recording.

3.22.8 Disk Full Alarm

IMPORTANT: Use good quality floppy disks only.

The following sequence shows the steps to follow when the Disk Full Alarm is given (see Figure 3-34).

NOTE: Independent monitor may display: "Abort: Open" at any time to indicate that floppy disk is defective. Remove disk and insert a replacement.

Disk recording capacity is displayed in percent on upper right corner of monitor display. When 98% of disk is full or if there is not enough room to store new information, an alarm is activated and Control 3000 will warn operator to change the disk before starting a new cycle.

NOTE: Any disk error (e.g. Read/Write, File not found, etc.) will activate the pop-up window: ABORT: OPEN.

1. Alarm tone sounds and washer/disinfector Eagle Control 3000 display shows:

**ALARM: CYCLE MONITOR
DISK FULL**

2. Independent Monitor display shows:

**DISK NEAR CAPACITY
OK?**

3. Press OK touch pad.
4. On Control 3000, press ALARM REPLY touch pad to silence alarm tone.

IMPORTANT: After pressing OK touch pad, operator or authorized person may continue data recording until disk capacity is full. Doing so may cause the loss of some data because recording will automatically stop when disk full is reached.

IMPORTANT: Before changing the disk, operator or authorized person must stop the recording of data.

3.22.9 Loading Configuration File Parameters from Safety Configuration Copy

1. To load Independent Monitor Configuration, insert configuration floppy disk into Independent Monitor's front compartment.
2. Press the MENU button displayed in the bottom right corner of the screen to bring up the Command Button Bar.
3. Press the PROG button. The Passcode Menu appears.
4. Use numeric keyboard to enter passcode.
5. Use the UP and DOWN Arrow Keys to scroll the highlight bar to RECORD SETUP. Then, press ENTER.
6. Use the UP or DOWN Arrow Keys to select: **Load CFG File menu**. Press ENTER.
7. A pop-up window will display:

LOAD CONFIG=NO

Press the YES then the ENTER buttons.

8. The unit will look on the disk for any configuration files which will be displayed on the File Browser Directory. If more than one file exists on the disk, the directory will list them one above the other, with the current file to be loaded indicated by the "<" symbol alongside it as shown:

**OLDFILE.CFG<
NEWFILE.CFG**

9. If no configuration file is found, the unit will indicate:

NO FILES FOUND

10. CONFIG*.CFG will be displayed.

NOTE: The ending of the file name will differ depending on the measurement units and/or the language configuration. See floppy disk 117021-332 for details.

11. If more than one configuration file exists, use the UP or DOWN Arrow Keys to select wished configuration. Then, press ENTER.

NOTE: If there are more files on the disk than what will show on the screen, the list will scroll down with the "<" symbol.

12. The unit will load the selected configuration file from the disk and the disk status window will show:

LOAD CFG.

13. If the loading is successful, a window will pop up indicating:

CONFIGURATION LOADED

14. Press the OK button. The unit will automatically RESET and begin with the newly loaded parameters.

3.22.10 Setting Passcodes

Access to monitor PROG or FUNC menus is protected by a passcode. Only authorized persons or a qualified technician may have access to them.

Passcodes protect the setup from unauthorized change. It is possible to design separate passcodes for the Program Menu and for the Function Menu.

IMPORTANT: Factory-set passcode for Independent Cycle Monitor is 2030. Use numeric keypad appearing in pop-up window from Independent Monitor to enter passcode.

Once set, any attempt to enter the programming menu by pressing the PROG or the FUNC touch pads, will bring up the Passcode Menu. Use the numeric keypad to enter the passcode and have access to the programming menu. Note that if a passcode is forgotten, the configuration of the unit cannot be changed. The only way to change or delete a passcode is to know the present passcode.

IMPORTANT: Write and keep your passcodes in a safe place. If lost, there is NO WAY to clear or reset them.

To enter or change a passcode it is necessary to access the Program Menu.

1. Press MENU to bring up the Command Button Bar. Then, press PROGRAM. The Program Menu appears.
2. Use numeric key board to enter Passcode.
3. Use the UP or DOWN Arrow Keys to highlight: **SYSTEM**. Then, press ENTER.

4. Use the UP or DOWN Arrow Keys to highlight: **PASSCODES**. Then, press ENTER. There are two options:

- **FUNCTION:** Enter a passcode to protect the FUNCTION menu.
- **PROGRAM:** Enter a passcode to protect the PROGRAM menu and the Hidden menu.

5. Use UP or DOWN Arrow Keys to select which desired passcode to enter then press ENTER.
6. Use numeric keypad to enter a passcode containing up to 6 numeric characters from 1 to 6.
7. The passcode is displayed entered for operator accuracy.

NOTE: Entering a passcode of 000000 on all spaces is equivalent to setting NO passcode.

8. Write down the passcode and keep it in some place safe. Press ENTER to accept the passcode and return to passcode menu. Repeat the same procedure for the other passcode.

Once a passcode is entered, the operator will be prompted for it the next time the main menu is accessed. If passcode is not entered correctly, access to menu will be denied.

The two passcodes may be the same, different, or may be disabled.

3.22.11 Time and Date

NOTE: Access to monitor PROG or FUNC menus is protected by a passcode. Only authorized persons or a qualified technician may have access to them. Refer to Section 3.22.10, Setting Passcodes.

In some cases such as daylight saving time (summer time), it will be necessary to reset time and/or date as follows:

1. Press the MENU button displayed in the bottom right corner of the screen to bring up The Command Button Bar.

NOTE: The Status Line may display: "Command?" or any other preprogrammed item that the user has chosen.

2. Press the PROG button to bring up the Program Menu.
3. The Passcode Menu appears. Use numeric keypad to enter passcode. The Program Menu appears.
4. Use UP or DOWN arrow keys to select Time and Date.
5. Press ENTER to confirm selection. The current time will be displayed in 24-hour format. If the

time is correct, the operator may choose not to program the time by pressing **YES** or **ENTER** to accept the current time.

6. To change the time, press **NO**. A menu showing the hours and a numeric keypad appear.
7. Use the **LEFT** and **RIGHT** buttons to move the cursor or enter the hours using the numeric keys. Use the **SPACE** button (**SPC**) to clear any digit.
8. Press **ENTER** to confirm hours.
9. The menu showing the minutes appears. Proceed as per the hours to enter the minutes.
10. The menu showing the seconds appears. Follow the same procedure to enter the seconds.
11. Once the time has been programmed, the current date is presented. Press **YES** or **ENTER** to accept the date.
12. To change date, select **NO**. Follow the same procedure to program date.
13. Once the date has been programmed or accepted, the operator is returned to the Program Menu.

Section 4: Service Mode Procedures

⚠ WARNING - PERSONAL INJURY AND/OR EQUIPMENT DAMAGE HAZARD: Only fully qualified service personnel should make repairs or adjustments to this equipment. Maintenance done by inexperienced, unqualified personnel, or installation of unauthorized parts could cause personal injury, invalidate the warranty, or result in costly equipment damage.

4.1 SERVICE MODE PROCEDURES

The Service Mode allows service personnel to set general operating parameters, operate solenoid valves for test purposes, verify inputs to the control for proper operation, perform calibration, set alarm time, etc. Before performing any modifications in Service Mode, always obtain a printout of current cycle parameters, service mode, and factory setup values, so that current values can be easily reentered. See Section 4.9, *How to Print Service Mode Values*.

Enter Service Mode as Follows:

1. Position POWER-OFF/STANDBY switch to OFF/STANDBY (see Figure 4-1).
2. Position Main Power Switch (located on the load side, behind the top portion of the control access panel) to OFF.
3. Lower control assembly to a horizontal position, as for service.
4. Locate Double EPROM PC Board, on Control PC Board (see Figure 9-36). Position Dip Switch #1 to ON, for Service Mode.
5. Lift control assembly to vertical position.
6. Position Main Power switch to ON.
7. Position POWER-OFF/STANDBY switch to POWER.
8. Display shows:

*** RELIANCE SYNERGY ***

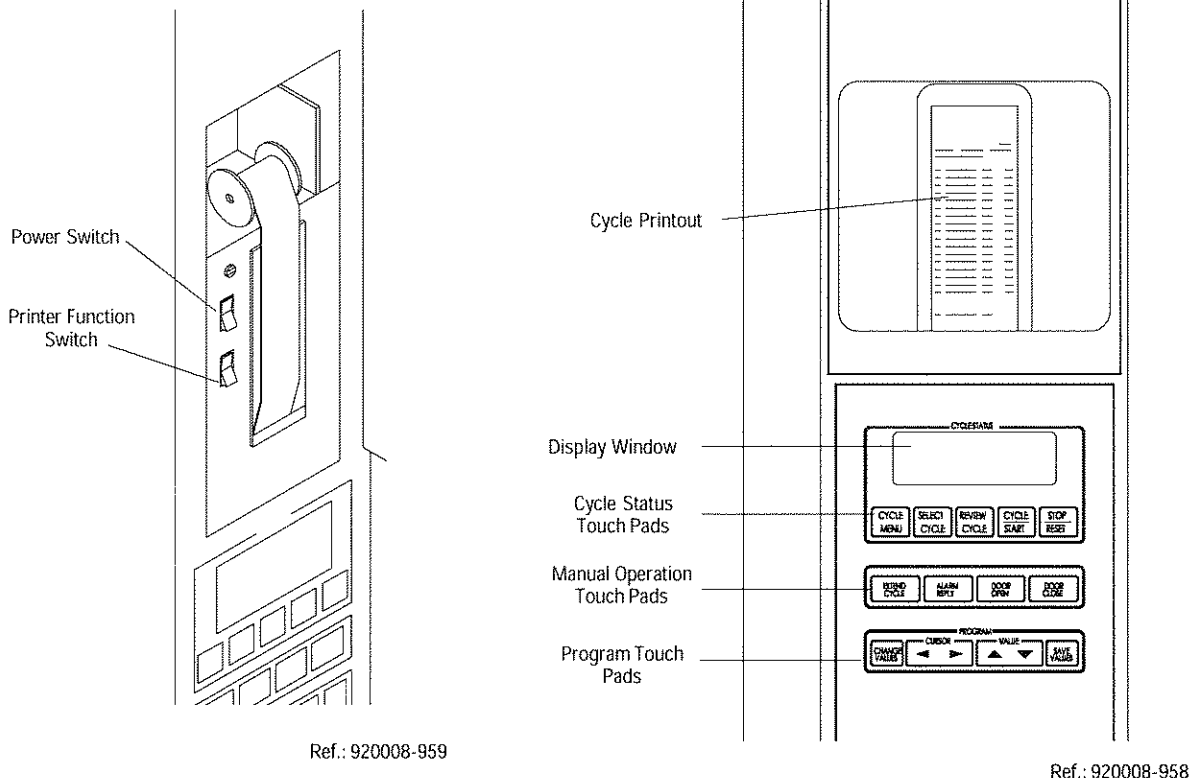


Figure 4-1. Control Location

then:

**ENTER SERVICE MODE
ACCESS CODE: 1091**

__ indicates flashing position.

and printer records:

```
*CONTROL ON HH:MM:SS
                                     YY/MM/DD
*****
RELIANCE SYNERGY
S/N 36XXXXXXXXX
*****
```

4.2 HOW TO ENTER SERVICE MODE (SUPERVISOR) ACCESS CODE

To enter Service Mode the Service Access Code must be known. The Service Access Code is composed of the **last four digits of the unit serial number, inverted by pairs**. For example, if the last four digits are 1234, Service Access Code is 3412.

NOTE: Unit Serial number (i.e., last four digits composing Access Code) is printed at the beginning of the Service Mode printout, and written on Nameplate located on right bottom corner on load side.

Enter correct Service Access Code, as explained above. Press **CHANGE VALUES** touch pad to confirm. Display shows:

**SERVICE TEST
RELIANCE SYNERGY**

then:

**TESTS BURN-IN
CALIBRATE VALUES**

__ indicates flashing position.

and printer records:

```
RELIANCE SYNERGY
*SERVICE TEST
                                     YY/MM/DD
117-XXX-XXX
REV. X
117-XXX-XXX
REV. X

S/N 36XXXXXXXXX

CYCLE COUNT ISXXXXXXXXX
ACCESS CODE ISXXXXX
```

See Figure 4-2 for the options available through the Service Mode.

4.3 HOW TO PERFORM TESTS

See Figure 4-2 for list of options available through the TESTS menu.

1. Enter Service Mode as explained in Section 4.1. Display shows:

**TESTS BURN-IN
CALIBRATE VALUES**

__ indicates flashing position.

2. Use **CURSOR arrows** (left or right) and/or **VALUE arrows** (up or down) touch pads to select TESTS, then press **CYCLE START** touch pad to see available selections. Display shows:

**OUTPUTS INPUTS
TP TEST BAR CODE**

__ indicates flashing position.

See Sections 4.3.1 through 4.3.4 for details about each test procedure.

4.3.1 How to Test (Energize and De-energize) Outputs

NOTE: When testing outputs, note the following:

1) It is possible to alternate between Outputs (DRIVERS) test and Inputs test by pressing **CYCLE MENU** touch pad.

2) It is possible to view the readings for each Resistive Thermal Detector (RTD) while reviewing the outputs or the inputs. To do so, press **SELECT CYCLE** touch pad.

1. From the Service Mode menu, use **CURSOR arrows** (left or right) and/or **VALUE arrows** (up or down) touch pads to select TESTS, then press **CYCLE START** touchpad to see available selections. Display shows:

**OUTPUTS INPUTS
TPS TEST BARCODE**

__ indicates flashing position.

2. Press **CYCLE START** touch pad to confirm OUTPUTS. Display shows:

I/O OUT CTRL OUT

__ indicates flashing position.

3. Use **CURSOR arrows** (left or right) touch pad to select board outputs to be tested (I/O Board Outputs = I/O-OUT or Control Board Outputs = CTRL OUT) then, press **CYCLE START** touch pad to confirm.

Figure 4-2. Reliance® Synergy™ Washer/Disinfector – Service Mode Program Tree

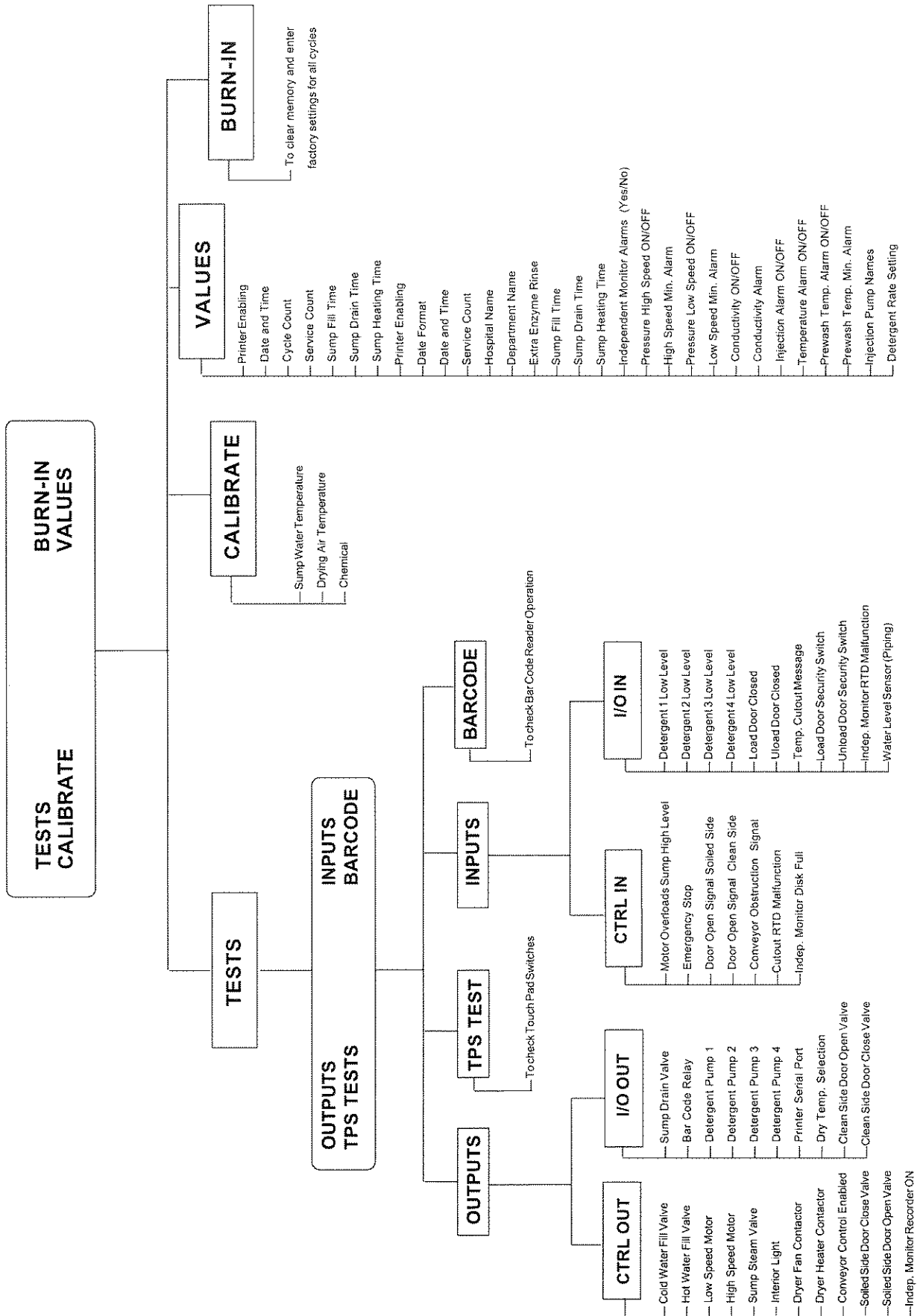


Table 4-1. Outputs (Drivers) Test, All Units

CONTROL BOARD OUTPUTS (DRIVERS) TEST (STEAM-HEATED UNITS)

| | | | | | | |
|---|--|--|--|---|--|---|
| CB CONTROL BOARD OUTPUTS | CW COLD WATER FILL VALVE (AC0) | HW HOT WATER FILL VALVE (AC2) | LS LOW SPEED MOTOR CL1 (AC8) | HS HIGH SPEED MOTOR CH1/CH2 (AC9) | SS SUMP STEAM VALVE (AC4) | LC LOAD SIDE POWER DOOR CLOSE VALVE (AC3) |
| LO LOAD SIDE POWER DOOR OPENING VALVE (AC5) | CD SUMP DRAIN DISCHARGE COOLDOWN VALVE (AC1) | DF DRYER FAN CONTACTOR (AC10) | DH DRYER HEATER CONTACTOR (AC6) | C0 ¹ CONVEYOR (AC11) | ² — | TR INDEPENDENT MONITOR RECORD CR3 (AC12) |

I/O BOARD OUTPUTS (DRIVERS) TEST (STEAM-HEATED UNITS)

| | | | | | | |
|--|---|---|--|---|--|---|
| I0 I/O BOARD OUTPUTS | DV SUMP DRAIN VALVE (IAC3) | RB RS232 RELAY CR12 (IAC7) | P1 DETERGENT PUMP 1 (IAC10) | P2 DETERGENT PUMP 2 (IAC8) | P3 DETERGENT PUMP 3 (IAC11) | P4 DETERGENT PUMP 4 (IAC9) |
| P5 DETERGENT PUMP 5 (IAC12) | SP SERIAL PORT RELAY CR4 (IAC0) | HL DRYING TEMP. PLASTIC/GLASS- WARE SELECTION CR5 (IAC6) | PF PURE WATER INLET FILL (IAC2) | WC COLD WATER FILL TO CONDENSER (IAC1) | UC UNLOAD SIDE DOOR CLOSE VALVE (IAC4) | U0 UNLOAD SIDE DOOR OPEN VALVE (IAC5) |

CONTROL BOARD OUTPUTS (DRIVERS) TEST (ELECTRIC-HEATED UNITS)

| | | | | | | |
|---|--|--|--|--|---|---|
| CB CONTROL BOARD OUTPUTS | CW COLD WATER FILL VALVE (AC0) | HW HOT WATER FILL VALVE (AC2) | LS LOW SPEED MOTOR CL1 (AC8) | HS HIGH SPEED MOTOR CH1/CH2 (AC9) | SH SUMP HEATER CONTACTOR C4 (AC4) | LC LOAD SIDE POWER DOOR CLOSE VALVE (AC3) |
| LO LOAD SIDE POWER DOOR OPENING VALVE (AC5) | CD SUMP DRAIN DISCHARGE COOLDOWN VALVE (AC1) | DF DRYER FAN CONTACTOR (AC10) | DH DRYER HEATER CONTACTOR (AC6) | C0 ¹ CONVEYOR (AC11) | ² — | TR INDEPENDENT MONITOR RECORD CR3 (AC12) |

I/O BOARD OUTPUTS (DRIVERS) TEST (ELECTRIC-HEATED UNITS)

| | | | | | | |
|--|--------------------------------------|---|--|---|--|---|
| I0 I/O BOARD OUTPUTS | DV SUMP DRAIN VALVE (IAC3) | RB RS232 RELAY CR12 (IAC7) | P1 DETERGENT PUMP 1 (IAC10) | P2 DETERGENT PUMP 2 (IAC8) | P3 DETERGENT PUMP 3 (IAC11) | P4 DETERGENT PUMP 4 (IAC9) |
| P5 DETERGENT PUMP 5 (IAC12) | SP SERIAL PORT (IAC0) | HL DRYING TEMP. PLASTIC/GLASS- WARE SELECTION CR5 (IAC6) | PF PURE WATER INLET FILL (IAC2) | WC COLD WATER FILL TO CONDENSER (IAC1) | UC UNLOAD SIDE DOOR CLOSE VALVE (IAC4) | U0 UNLOAD SIDE DOOR OPEN VALVE (IAC5) |

¹ RL Ready to load on unit with ATS (AC7)
² RU Ready to unload on unit with ATS (AC11)

NOTE: Press **CYCLE MENU** touch pad to toggle between Input and Output modes

4. Display shows outputs as shown in Table 4-1. Use **CURSOR arrows** (left or right) to move from one output to another, and **VALUE arrows** (up or down) to energize and de-energize output (capital letters indicate output is energized).
5. Press **SELECT CYCLE** touch pad to move from one output page to another.
6. After testing desired outputs, press **STOP/RESET** touch pad **three times** to return to Service Mode main menu.

4.3.2 How to Test Inputs

NOTE: When testing inputs, note the following:

1) It is possible to alternate between Outputs (DRIVERS) test and Inputs test by pressing **CYCLE MENU** touch pad.

2) It is possible to view the readings for each Resistive Thermal Detector (RTD) while reviewing the outputs or the inputs. To do so, press **SELECT CYCLE** touch pad.

1. From the Service Mode menu, use **CURSOR arrows** (left or right) and/or **VALUE arrows** (up or down) touch pads to select TESTS, then press **CYCLE START** touchpad to see available selections. Display shows:

OUTPUTS INPUTS
TPS TEST BARCODE

— indicates flashing position.

2. Use **CURSOR arrows** (left or right) and/or **VALUE arrows** (up or down) touch pads to select INPUTS. Press **CYCLE START** arrows touch pad to confirm. Display shows:

I/O IN CTRL IN

— indicates flashing position.

3. Use **CURSOR arrows** (left or right) touch pads to select board inputs to be tested (I/O Board Inputs = I/O IN or Control Board Inputs = CTRL IN), then press **CYCLE START** touch pad to confirm.

Display gives the status of each input as shown on Table 4-2.

Table 4-2. Inputs Test, All Units

CONTROL BOARD INPUTS TEST

| | | | | | | |
|--|---|---|---|---|---|--|
| CB CONTROL BOARD INPUTS | MO MOTOR OVERLOAD OL1, OL2, OL3 (LS0) | SH SUMP HIGH LEVEL (LS4) | ES LOAD/UNLOAD & ATS EMERGENCY STOP (LS5) | OL LOAD/UNLOAD & ATS OPEN LOAD DOOR (LS6) | OU LOAD/UNLOAD & ATS OPEN UNLOAD DOOR (LS7) | BJ LOAD/UNLOAD & CONVEYOR OBSTRUCTED (LS8) |
| OF SUMP SAFETY LEVEL SWITCH (LS2) | LL SUMP LOW LEVEL (LS1) | RM CUTOUT RTD MALFUNCTION CR8 (LS3) | RF DISK FULL (INDEPENDENT MONITOR) CH2 (LS9) | — | — | — |

I/O BOARD INPUTS TEST

| | | | | | | |
|---|---|--|---|--|--|--------------------------------------|
| I/O I/O BOARD INPUTS | D1 DETERGENT 1 LOW LEVEL (ILS7) | D2 DETERGENT 2 LOW LEVEL (ILS8) | D3 DETERGENT 3 LOW LEVEL (ILS9) | D4 DETERGENT 4 LOW LEVEL (ILS10) | D5 DETERGENT 5 LOW LEVEL (ILS11) | LD LOAD DOOR CLOSED (ILS1) |
| UD UNLOAD DOOR CLOSED (ILS2) | TC DRYING TEMP. CUTOUT MESSAGE CR7 CONTACT (ILS4) | LS LOAD SENSOR SAFETY SWITCH CR10 CONTACT (ILS5) | US UNLOAD DOOR SAFETY SWITCH CR9 CONTACT (ILS6) | TM INDEPENDENT MONITOR RTD MALFUNCTION CH1 (ILS0) | SL LOW WATER LEVEL SENSOR (PIPING) (ILS3) | — |

4.3.3 How to Test Touch Pads

1. From the Service Mode menu, use **CURSOR arrows** (left or right) and/or **VALUE arrows** (up or down) touch pads to select **TEST**, then press **CYCLE START** touchpad to see available selections. Display shows:

```

OUTPUTS      INPUTS
TPS TEST     BARCODE
  _ indicates flashing position.
  
```

2. Use **CURSOR arrows** (left or right) and/or **VALUE arrows** (up or down) touch pads to select **TPS TEST**, and **CYCLE START** touch pad to test front panel touch pads. Display shows:

****TOUCH PAD TEST****

then:

```

0 1 2 3 4 5 6 7 8 9 A B C D E F G H
  - - - - -
  
```

3. When a touch pad is pressed, a "P" (for Pushed) appears on the display as long as the pad is held, to confirm that touch pad is operating properly, for example:

```

0 1 2 3 4 5 6 7 8 9 A B C D E F G H
  - - - - P - - - - -
  
```

NOTE: Test STOP/RESET touch pad last, as pressing this touch pad returns the display to TEST menu. This also confirms that STOP/RESET touch pad is operating properly.

4. After testing touch pad, press **STOP/RESET** touch pad twice to return to Service Mode main menu.

4.3.4 How to Test Bar Code Reader

1. From the Service Mode menu, use **CURSOR arrows** (left or right) and/or **VALUE arrows** (up or down) touch pads to select **TEST**, then press **CYCLE START** touch pad to see available selections. Display shows:

```

OUTPUTS      INPUTS
TPS TEST     BARCODE
  _ indicates flashing position.
  
```

2. Use **CURSOR arrows** (left or right) and/or **VALUE arrows** (up or down) touch pads to select **BARCODE**, then **CYCLE START** to test bar code reader. Display shows:

```

  • BARCODE      •
  • TEST         •
  
```

then...

```

  • WAITING     •
  • FOR CODE    •
  
```

3. Use any bar code tag from one of the processing baskets to pass in front of bar code reader. If no bar code is available, or if bar codes are worn out, scan Figure 4-3. Ensure display shows:

```

  • CODE         •
  • RECEIVED    •
  
```

then...

CODE = XX

and printer records:

CODE = XX

4. If display shows appropriate code, bar code reader operation is normal. Press **STOP/RESET** touch pad to return to menu.

4.4 HOW TO PERFORM MANUFACTURER'S BURN-IN

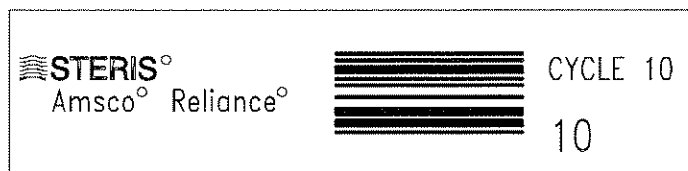
See Figure 4-2 for list of options available through the **BURN-IN** menu.

Manufacturer's Burn-In should be performed if you wish to clear the memory, and reenter factory settings, treatments, and values.

NOTE: Before performing a burn-in, note the following:

1) All current cycle parameters are erased and replaced by factory-programmed default values. Default values are listed in **Table 5-6, Cycle Description Chart**.

2) Always generate a printout of the currently set treatments and values to ease reprogramming of custom-programmed cycles (by pressing **PRINT** portion of



REF.: #920-008-277

Figure 4-3. Bar Code

1. Enter Service Mode as explained in Section 4.1, *Service Mode Procedure*. Display shows:

TESTS BURN-IN
CALIBRATE VALUES

_ indicates flashing position.

2. Use **CURSOR arrows** (left or right) and/or **VALUE arrows** (up or down) touch pads to select **BURN-IN**, then press **CYCLE START** touch pad to confirm. Display shows:

SET DEFAULT VALUES?
CVTP=YES SVTP=NO

IMPORTANT: If **CHANGE VALUES** touch pad is pressed, to confirm **BURN-IN**, all current cycle parameters are lost and default values are set instead. Default values are listed in **Table 5-6, Cycle Description Chart**.

3. Make appropriate selection. After pressing **CHANGE VALUES** touch pad for **Burn-In**, or **SAVE VALUES** touch pad to exit without **Burn-In**, display shows:

TESTS BURN-IN
CALIBRATE VALUES

_ indicates flashing position.

4.5 HOW TO CHOOSE MEASUREMENT UNITS

IMPORTANT: Always generate a printout of the currently set treatments and values (by pressing **PRINT** portion of the **PRINT/PRINT VALUES** switch) to ease reprogramming. Changing measurement units procedure ends with an automatic manufacturer's burn-in. All current cycle parameters are lost and default values are set instead. Default values are listed in **Table 5-6, Cycle Description Chart**.

1. From the Service Mode menu, use **CURSOR arrows** (left or right) and/or **VALUE arrows** (up or down) touch pads to select **CALIBRATE**, then press **CYCLE START** touch pad to see available selections. Display shows:

SUMP CHEMICAL
DRYING IMP./MET.

_ indicates flashing position.

2. Using **CURSOR arrows** (left or right) and/or **VALUE arrows** (up or down) touch pads to select **IMP./MET.**

3. Press **CYCLE START** touch pad to confirm, display shows:

MEASUREMENT UNITS?
CVTP=IMP. SVTP=MET.

_ indicates flashing position.

4. Press **CHANGE VALUES** touch pad to choose imperial measurements (°F, oz/gal, etc.) for displays and printouts;

or

Press **SAVE VALUES** touch pad to choose imperial measurements (°C, mL/L, etc.) for displays and printouts.

5. Press **SAVE VALUES** touch pad to return to Service Mode main menu.

4.6 HOW TO PERFORM WASHER/ DISINFECTOR CALIBRATION

⚠ CAUTION – POSSIBLE EQUIPMENT DAMAGE: DO NOT attempt to perform calibration unless fully prepared to do so. Incorrect procedures can destroy Factory calibration. Read the entire procedure before attempting to calibrate the unit.

See Figure 4-2 for list of options available through the **CALIBRATE** menu.

1. First perform procedure explained in Section 7.4, *Cycle Test* and Section 7.5, *Gentle Cycle (Low Speed)* to verify if RTD's need calibration.
2. If RTD's need calibration, enter Service Mode as explained in Section 4.1, *Service Mode Procedures*. Display shows:

TESTS BURN-IN
CALIBRATE VALUES

_ indicates flashing position.

2. Use **CURSOR arrows** (left or right) and/or **VALUE arrows** (up or down) touch pads to select **CALIBRATE**, then press **CYCLE START** touch pad to see available selections. Display shows:

SUMP CHEMICAL
DRYING IMP./MET.

_ indicates flashing position.

4.6.1 How to Calibrate Sump and Drying RTDs Without Independent Monitor Option

⚠ CAUTION – POSSIBLE EQUIPMENT DAMAGE: DO NOT attempt to perform calibration unless fully prepared to do so. Incorrect procedures can destroy Factory calibration. Read the entire procedure before attempting to calibrate the unit.

Temperature calibration requires the use of an accurate, recently calibrated potentiometer.

1. From the Service Mode menu, use **CURSOR arrows** (left or right) and/or **VALUE arrows** (up or down) touch pads to select **CALIBRATE**, then press **CYCLE START** touch pad to see available selections. Display shows:

SUMP CHEMICAL
DRYING IMP./MET.
 _ indicates flashing position.

2. Using **CURSOR arrows** (left or right) and/or **VALUE arrows** (up or down) touch pads, select **SUMP** or **DRYING** temperature RTD to calibrate
3. Remove RTD from its compression fitting.

4. Press **CYCLE START** touch pad to confirm. If **SUMP** is selected, for example, display shows:

PUT PROBE IN LOW TMP
BATH - PRESS CVTP

5. Put probe in low temperature bath (cold water) with potentiometer lead, then press **CHANGE VALUES** touch pad to confirm. Display shows for at least 10 seconds:

STABILIZING...

then:

LOW SET PT = XX.XF
PRESS CVTP TO SET

_ indicates flashing position.

6. Change the low setpoint to match the reading on the potentiometer by pressing the **VALUE arrows** (up or down) touch pad, then press **CHANGE VALUES** touch pad to set. Printer records:

LOW POINT SET @ XXX.X

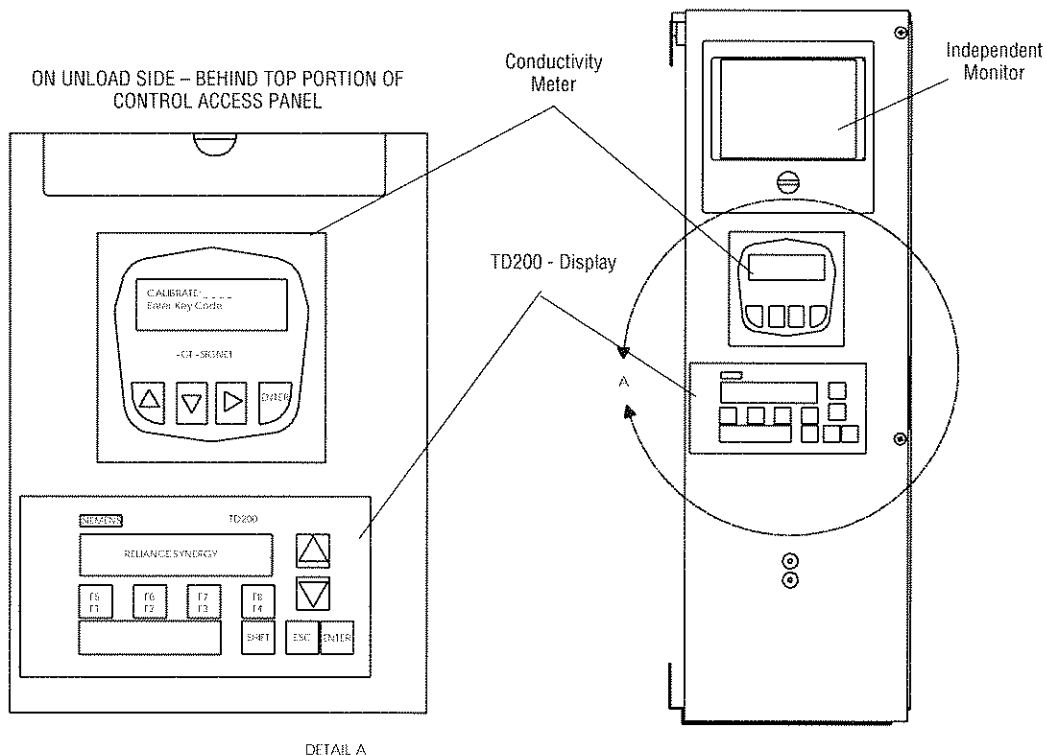


Figure 4-4. Conductivity Meter and TD200 Display Location

REF. 520-014-044

and display shows:

**PUT PROBE IN HI TMP
BATH - PRESS CVTP**

- Put probe and potentiometer lead in high temperature bath (hot water), then press **CHANGE VALUES** touch pad to confirm. Display shows for at least ten seconds:

STABILIZING...

then:

**HI SET PT = XXX.XF
PRESS CVTP TO SET**

__ indicates flashing position.

- Change the high setpoint to match the reading on the potentiometer by pressing **VALUE** arrows (up or down) touch pad, then press **CHANGE VALUES** touch pad to set. Display shows:

**SUMP RTD
IS CALIBRATED**

printer records:

HI POINT SET @ XXX.XF
SUMP IS CALIBRATED

then display goes back to main menu:

**SUMP CHEMICAL
DRYING IMP./MET.**

__ indicates flashing position.

4.6.2 How to Calibrate Sump and Drying RTDs With Independent Monitor Option

▲ CAUTION—POSSIBLE EQUIPMENT DAMAGE: DO NOT attempt to perform calibration unless fully prepared to do so. Incorrect procedures can destroy Factory calibration. Read the entire procedure before attempting to calibrate the unit.

- From the Service Mode menu, use **CURSOR** arrows (left or right) and/or **VALUE** arrows (up or down) touch pads to select **CALIBRATE**, then press **CYCLE START** touch pad to see available selections. Display shows:

**SUMP CHEMICAL
DRYING IMP./MET.**

__ indicates flashing position.

- Using **CURSOR** arrows (left or right) and/or **VALUE** arrows (up or down) touch pads, select **SUMP** or **DRYING** temperature RTD to calibrate

- Remove RTD from its compression fitting.

- Press **CYCLE START** touch pad to confirm. If **SUMP** is selected, for example, display shows:

**PUT PROBE IN LOW TMP
BATH - PRESS CVTP**

- Put probe in low temperature bath (cold water) wait for temperature to stabilize on Independent Monitor display : Pen # 1 for sump temperature, Pen # 5 for drying temperature . Press **CHANGE VALUES** touch pad to confirm. Display shows for at least 10 seconds:

STABILIZING...

then:

**LOW SET PT = XX.XF
PRESS CVTP TO SET**

- Change the low setpoint to match the reading on the Independent Monitor display (Pen # 1 in this case) by pressing the **VALUE** arrows (up or down) touch pad, then press **CHANGE VALUES** to set. Printer records:

LOW POINT SET @ XXX.X

and display shows:

**PUT PROBE IN HI TMP
BATH - PRESS CVTP**

- Put probe in high temperature bath (hot water) wait for temperature to stabilize on Independent Monitor display (Pen # 1 for sump temperature, Pen # 5 for drying temperature), then press **CHANGE VALUES** touch pad to confirm. Display shows for at least 10 seconds:

STABILIZING...

then:

HI SET PT = XXX.XF*
PRESS CVTP TO SET

__ indicates flashing position.

8. Change the high setpoint to match the reading on the Independent Monitor display (Pen # 1 in this case) by pressing VALUE arrows (up or down) touch pad, then press CHANGE VALUES touch pad to set. Display shows:

• SUMPRTD •
• IS CALIBRATED •

printer records:

HI POINT SET @ XXX.XF
SUMP IS CALIBRATED

then display goes back to main menu:

SUMP CHEMICAL
DRYING
— indicates flashing position.

4.6.3 How to Calibrate Conductivity, Chemical Injection, and Pressure With Independent Monitor Option

⚠ WARNING – PERSONAL INJURY AND/OR EQUIPMENT DAMAGE HAZARD: Risk of explosion: Do not remove from pressurized lines. Do not exceed maximum temperature/pressure specifications. Do not install/service without following installation instructions (see sensor manual). Wear safety goggles and face shield during installation/service. Do not alter product construction. Failure to follow safety instructions could result in severe personal injury.

⚠ WARNING - CHEMICAL BURN AND/OR EYE INJURY HAZARD: Detergents are caustic and can cause adverse effects to exposed tissues. Do not get in eyes, on skin, or attempt to swallow. Read and follow the precautions and instructions on the detergent label and in the Material Safety Data Sheet (MSDS) prior to handling the detergent, refilling the detergent container, or servicing the detergent injection pump. Wear appropriate Personal Protective Equipment (PPE) whenever handling the detergent or servicing the detergent injection pumps and lines.

⚠ CAUTION – POSSIBLE EQUIPMENT DAMAGE: DO NOT attempt to perform calibration unless fully prepared to do so. Incorrect procedures can destroy Factory calibration. Read the entire procedure before attempting to calibrate the unit.

• Conductivity Calibration

1. Disconnect the conductivity sensor from the system.
2. Rinse the sensor in a small amount of pure water.
3. Place the sensor into a 84 $\mu\text{S}/\text{cm}$ traceable solution. Place a reference thermometer into the same solution. Allow sufficient time to stabilize temperature.
4. Locate conductivity meter behind the top portion of the unload side control access panel (see Figure 4-4). Follow these steps on the conductivity meter to enter the Calibration Mode (see Table 4-3).
 - a. Press and hold ENTER key for two seconds
 - b. When display asks for key code you must press: UP-UP-UP-DOWN keys in sequence.
 - c. With the UP/DOWN arrow keys, scroll the menu to edit the items described further.
 - d. Press the RIGHT arrow key to select menu item to be edited.

Table 4-3. Calibration Menu

| ITEMS TO BE SET | SETTINGS |
|---------------------------|--|
| Cell Constant: | Select: STANDARD |
| Cell: Standard | Select: 0.01 |
| Cond Units: | Select: μS |
| Set: Temperature | Set the temperature to the solution temperature of the reference thermometer. |
| Set: Conductivity | Set the conductivity value of the solution. (Note: This value depends of the solution temperature, verify the table on the bottle) |
| Loop Source: Cond | Select: Cond |
| Loop Range: μS | Set the minimum to 0.0000 Set the maximum to 100.000 |
| Output source: | Select: Cond |
| Output mode: | Select: OFF |
| Last Cal: mm-dd-yy | Use this item to record the date of the calibration. |

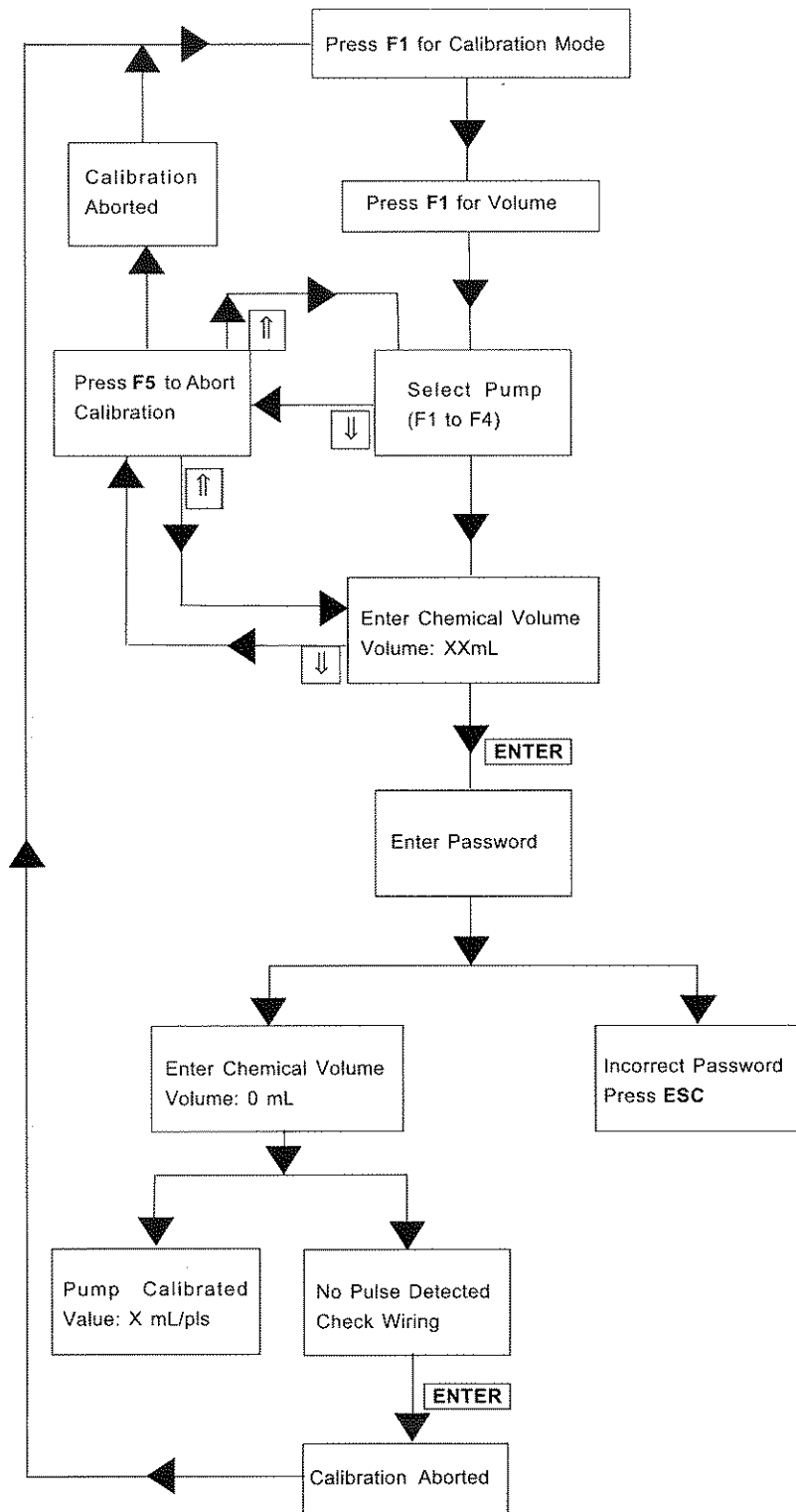


Figure 4-5. TD 200 Display: Chemical Pump Calibration Flow Chart

- e. Press **UP** or **DOWN** keys to edit the flashing element.
- f. Press **ENTER** key to save the new setting and return to step a. Once all the items from Calibration Menu have been set, press **UP/DOWN** arrow keys simultaneously to return to normal operation.

4.6.3.1 Chemical Injection Calibration

A) On Independent Monitor

1. Locate TD 200 Display, behind the top portion unload side control access panel, below the conductivity meter (see Figure 4-4). Press **F1** to enter the Calibration Mode (see Figure 4-5).
2. Press **F1** again to select the volume calibration.
3. Then, press **F1** (pump 1), **F2** (pump 2), **F3** (pump 3), or **F4** (pump 4) depending on the Chemical pump that you want to calibrate.

NOTE: To calibrate pump 1 to pump 4, you must follow the complete procedure. To calibrate pump 5 perform steps listed under Washer Control section ONLY.

B) On Washer Control

1. Enter Service Mode as explained in Section 4.1, *Service Mode Procedures*. Display shows:

TESTS BURN-IN
CALIBRATE VALUES

_ indicates flashing position.

2. Use **CURSOR** arrows (left or right) and/or **VALUE** arrows (up or down) touch pads to select **CALIBRATE** and press **CYCLE START** touch pad to confirm. Display shows:

SUMP CHEMICAL
DRYING IMP./MET.

_ indicates flashing position.

3. Use **CURSOR** arrows (left or right) and/or **VALUE** arrows (up or down) touch pads again to select **CHEMICAL**. Press **CYCLE START** touch pad to confirm.

SELECT PUMP
PUMP 1

_ indicates flashing position.

4. Use **VALUE** arrows (up or down) touch pad to select the Chemical pump to calibrate.
5. Place a 250 mL graduated cylinder under the cor-

responding sampling port of the chemical pump. Place the sampling port to **ON** position to open.

6. On the washer control, press **CHANGE VALUES** touch pad (the unit will inject detergent during 40 seconds). Display shows:

PUMP 1 IS INJECTING
TIME = 0:40

Once injection is completed, display shows:

ENTER QUANTITY IN ML
QUANTITY = 190 ML

_ indicates flashing position.

7. Check the amount of chemical collected in the cylinder. Use **CURSOR** arrows (left or right) or **VALUE** arrows (up or down) touch pads on washer control to enter the amount of detergent collected. Press **CYCLE START** touch pad to confirm. Display shows:

SUMP CHEMICAL
DRYING IMP./MET.

_ indicates flashing position.

8. Place the sampling port to **OFF** position to close. Carefully discard collected detergent.
9. Repeat **Steps 3 of A, Steps 3 to 8 of B, and Steps 1 to 3 of C** for each chemical injection pump.

C) On Independent Monitor

1. Press **ENTER** on the TD 200 display (see Figure 4-5).
2. Use the arrows on TD 200 display to enter the factory-set password: **2030**. Press **ENTER** after each selected digit.
3. On the TD 200 display, press the **UP** arrow to program the amount of detergent collected into the cylinder. Once you have reached the value, press **ENTER**.

The TD 200 display will indicate the ratio mL/pulse.

Calibration is now completed.

4.6.3.2 Pressure Calibration

1. Disconnect the pressure transmitter from piping and connect pressure transmitter to the pressure transmitter port (P11702-270) on pneumatic box (see Figure 4-7).
2. Install pressure gauge (0-60 psig, or 0-414 kPa if units 380/400/415V, 50 Hz) where shown on Figure 4-7.
3. Turn ball valve to allow air going to the calibration jig.

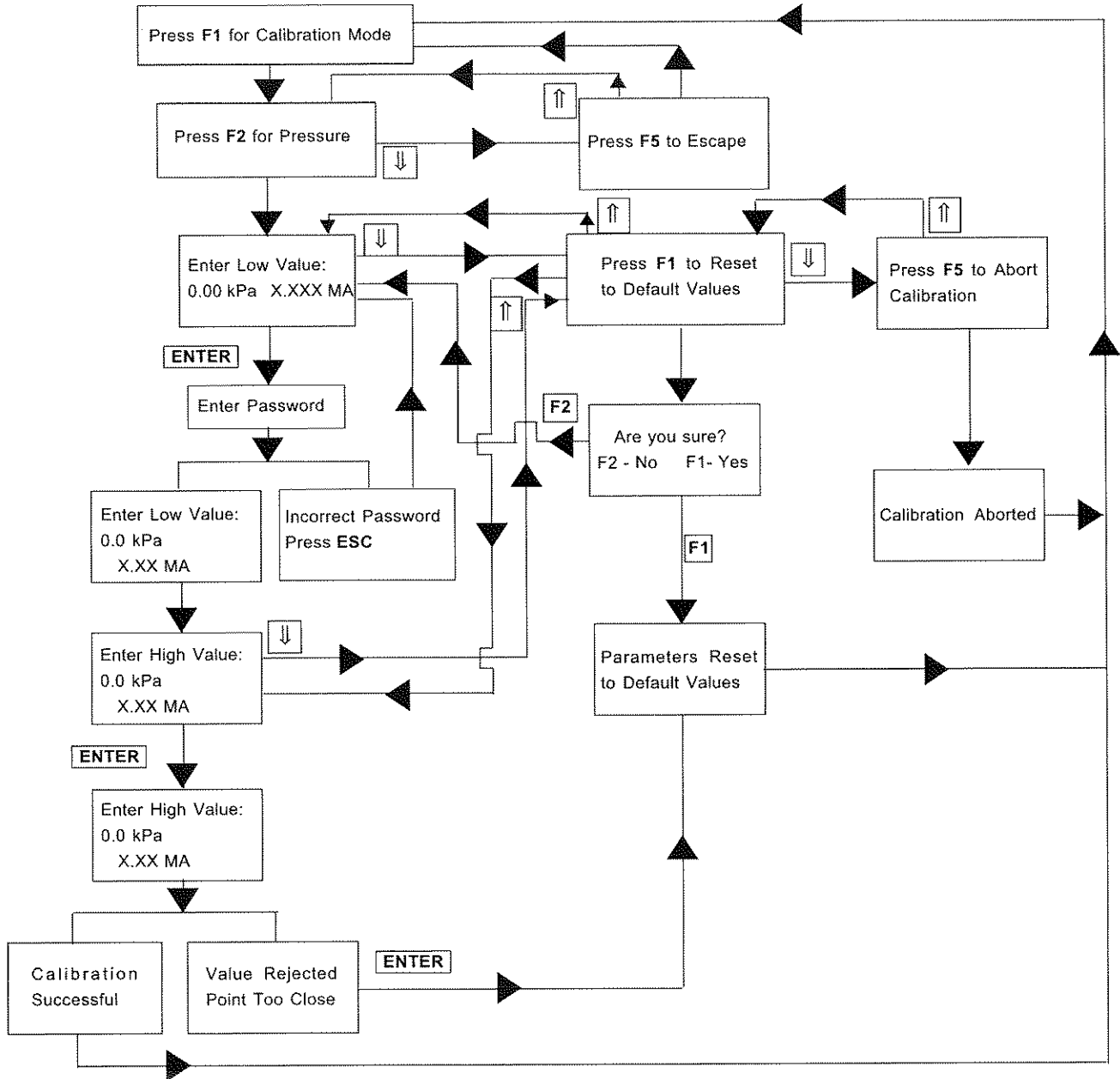


Figure 4-6. TD200 Display: Pressure Calibration Flow Chart

4. Turn the adjustment knob on the pressure calibration jig to adjust pressure to read 0 psi on the pressure gauge.
5. Locate TD 200 Display, behind the top portion unload side control access panel, below the conductivity meter (see Figure 4-4). Press F1 on the TD 200 display to access calibration mode (see Figure 4-6).
6. Press F2 to select the "Pressure Calibration". Then, press ENTER.
7. Use the arrows on TD 200 display to enter factory-set password: 2030. Press ENTER after each digit selected.
8. Program the pressure low value. Use the UP/DOWN arrows on the TD 200 display, set the pressure to 0 psi (or 0 kPa if unit is 380/400/415 V, 50 Hz), and press ENTER.
9. With the adjustable knob on the pressure calibration jig, adjust pressure to read 60 psi, or 414 kPa if units is 380/400/415V, 50 Hz on the pressure gauge.
10. Program the pressure high value. Use the UP/DOWN arrows on the TD 200 display, set the pressure to 60 psi (or 414 kPa if unit is 380/400/415 V, 50 Hz), and press ENTER.

11. Turn ball valve to close air supply.
12. Disconnect the pressure transmitter from the pressure transmitter port and reconnect pressure transmitter to washer piping.

4.7 HOW TO PERFORM INDEPENDENT MONITOR (OPTION) CALIBRATION

⚠ CAUTION - POSSIBLE EQUIPMENT DAMAGE:

- **DO NOT attempt to perform calibration unless fully prepared to do so. Incorrect procedures can destroy Factory calibration. Read the entire procedure before attempting to calibrate the unit.**
- **Allow the Independent Monitor to warm up and stabilize before attempting calibration. Warm up time of 15 minutes at room temperature is recommended.**

4.7.1 General

Calibration should be performed to maintain the accuracy of the instrument. The following items must be performed for a calibration:

- Calibrate the ADC Scales
- RTD Current

4.7.2 Calibration Equipment

The following equipment items are necessary to calibrate the instrument:

- One precision voltage source (accurate to ± 5 microvolts) adjustable from 10 microvolts to 10 Volts.
- One precision resistor 250 ohms 0.05% - required for calibrating RTD.

4.7.3 Hidden Menu

To access the Hidden menu:

Press the MENU key and immediately press the upper right-hand corner of the display.

4.7.4 Calibrating the Scales

The Recorder menu supports full calibration for the voltage and current input ranges of the instrument. Each range requires a unique calibration constant, which is automatically calculated during the calibration of each range.

NOTE: Actual voltage calibration constants are automatically stored in EEPROM on the analog to digital converter boards.

Follow the procedures below to calibrate scales:

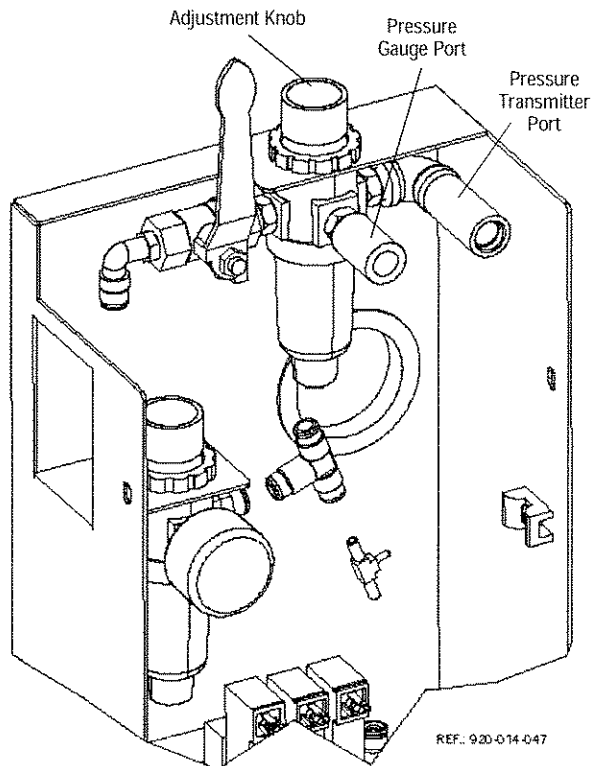


Figure 4-7. Pressure Calibration Jig

• **Zero Calibration**

Before the scales are calibrated, a zero calibration must be done.

1. Insert a jumper into channel 1.
2. From the Hidden menu, use the **UP (↑) or DOWN (↓) Arrow Keys** to select: **ADC Control**. Press **ENTER**.
3. Use the **UP (↑) or DOWN (↓) Arrow Keys** to select: **Cal ADC**. Press **ENTER**.
4. Use the **UP (↑) or DOWN (↓) Arrow Keys** to select: **Cal Scales**. Press **ENTER**.
5. Use the **UP (↑) or DOWN (↓) Arrow Keys** to select: **Zero Cal**. Press **ENTER**.

NOTE: Zero calibration can only be done on channel 1.

6. Once the Zero calibration is done, remove the jumper from channel 1. Press **EXIT** three times to return to Hidden menu.

• **Connecting Voltage Source**

Connect the precision voltage source to any available direct input at the rear upper (lower) analog Input terminals (see Figure 4-8). Select any channel and connect the voltage source to the + and - inputs ensuring the correct polarity. Turn on the Voltage Source and allow 10 minutes for it to warm up and stabilize.

• **Programming from COMMAND Prompt**

1. In the Hidden menu (refer to 4.7.3) use the **UP (↑) or DOWN (↓) Arrow Keys** to select: **ADC Control**. Press **ENTER**.
2. Use the **UP (↑) or DOWN (↓) Arrow Keys** to select: **Cal ADC**. Press **ENTER**.
3. Use the **UP (↑) or DOWN (↓) Arrow Keys** to select: **Cal Scales**. Press **ENTER**.

4.7.5 Calibrating the Voltage Ranges

To calibrate any of the voltage ranges, a known good input must be supplied to the Recorder as shown in the table below. The following steps are used to guide the user through calibration of all the voltage ranges.

Set the precision Voltage Source for the appropriate range. Use the **UP (↑) or DOWN (↓) Arrow Keys** to select the range in need of calibration and press **ENTER**. Use the **UP (↑) or DOWN (↓) Arrow Keys** to select to select the Channel Input Number 1, 2, 3, 4, 5, or 6 to which the voltage source is connected and press **ENTER**. With voltage source connected and turned on, press **ENTER**. A window will appear

showing the reading of the voltage source connected.

NOTE: If the calibration is not correct, the value shown in the window will not be correct. You will then be prompted with an "Are you sure?" message.

Select **YES** to continue the calibration or **NO** to abort. If **YES** is selected, the Recorder calibrate the selected range. Repeat for the remaining voltage ranges.

| Range to Calibrate | Voltage Source |
|--------------------|----------------|
| 150 mV | 150 mV |
| 1.25 V | 1.25 V |
| 2.5 V | 2.5 V |
| 12.5 V | 12.5 V |
| 25 V | 25 V |

4.7.6 RTD Current Calibration

The ADC current source is used for RTD measurements and needs calibration for the RTDs.

• **Calibrating the RTD Current**

The following procedure contains step-by-step instructions on calibrating the current source. A 250. +0.05% resistor must be connected across the + and - terminals of a free input and the current source return path C must be connected to the - input terminal (see Figure 4-9). The Recorder then applies 1mA of current through the resistance to calibrate current. These programming steps are discussed in menu order.

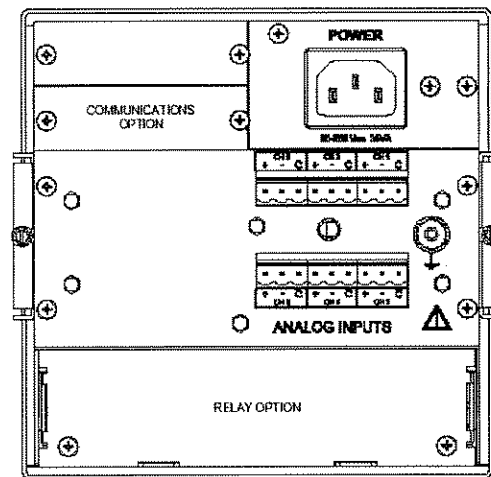


Figure 4-8. DC2000 Rear Panel Connections

NOTE: Before calibrating currents, ensure the 1.25 Volt Scale range has been calibrated per the above, as this will affect the accuracy of Current Calibration.

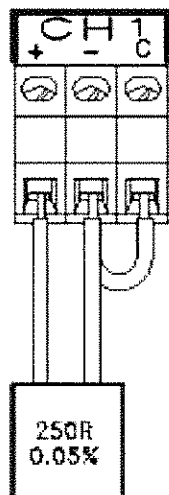


Figure 4-9. Calibration Resistor Connection

• Connecting Resistance

Select a free set of input terminals on the rear of the unit, or remove any connections from the set of terminals to be used. Connect the 250. +0.05% resistor across the + and - terminals of this input and connect the current source return path C to the - input terminal.

• Calibrating the RTD Current

The following steps are used to guide the user in calibrating current.

1. In the Hidden Menu (see Section 4.7.3, *Hidden Menu*), use the UP (↑) or DOWN (↓) Arrow Keys to select: ADC control. Press ENTER.
2. Use the UP (↑) or DOWN (↓) Arrow Keys to select: Cal ADC. Press ENTER.
3. Use the UP (↑) or DOWN (↓) Arrow Keys to select: Cal Currents. Press ENTER.
4. Use the UP (↑) or DOWN (↓) Arrow Keys to select the Input Number to which the resistor is connected, 1, 2, 3, 4, 5, or 6 and press ENTER.
5. To allow the Recorder to detect the actual value of the current, press ENTER.
6. The Recorder program will store the adjusted value from a nominal 1mA of current. Calibration of Currents is complete.

4.7.7 Calibration Recall

If the calibration equipment listed above is not available, the factory calibration for the scales (see section 4.7.4) can be recalled. All channels will be recalled.

1. In the Hidden Menu (see Section 4.7.3, *Hidden Menu*), use the UP (↑) or DOWN (↓) Arrow Keys to select: ADC control. Press ENTER.
2. Use the UP (↑) or DOWN (↓) Arrow Keys to select: Cal ADC. Press ENTER.
3. Use the UP (↑) or DOWN (↓) Arrow Keys to select: Cal Recall. Press ENTER.
4. Independent Monitor Display shows: Are You Sure?
5. Press YES to retrieve the factory calibration settings or press NO to exit without changing the calibration settings.

4.8 HOW TO RESET MISCELLANEOUS VALUES

See Figure 4-2 for list of options available through the VALUES menu.

1. Enter Service Mode as explained in Section 4.1, *Service Mode Procedures*. Display shows:

```

TESTS      BURN-IN
CALIBRATE  VALUES
  
```

— indicates flashing position.

2. Use CURSOR arrows (left or right) and/or VALUE arrows (up or down) touch pads to select VALUES, then press CYCLE START touch pad to see sequence of questions.

See Sections 4.8.1 through 4.8.3 for details about each value setup.

4.8.1 How to Enable/Disable Printer

1. From the Service Mode menu, use CURSOR arrows (left or right) and/or VALUE arrows (up or down) touch pads to select VALUES, then press CYCLE START touch pad to confirm. Display shows:

```

PRINTERENABLED?
YES
  
```

— indicates flashing position.

2. Press CHANGE VALUES touch pad to confirm YES to leave printer enabled. To disable printer, use VALUE arrows (up or down) touch pad to change YES to NO (disable printer).
3. Press CHANGE VALUES touch pad to confirm, then SAVE VALUES touch pad to return to Service Mode main menu.

4.8.2 How to Reset Date and Time

1. From the Service Mode menu, use **CURSOR** arrows (left or right) and/or **VALUE** arrows (up or down) touch pads to select **VALUES**, then press **CYCLE START** touch pad to confirm. Display shows:

PRINTERENABLED?
YES

— indicates flashing position.

2. Use **CURSOR** arrows (left or right) and/or **VALUE** (up or down) touch pads to select **VALUES** and press **CYCLE START** touch pad until display shows:

SET DATE FORMAT?
YY/MM/DD

— indicates flashing position.

3. Use **CURSOR** arrows (left or right) and/or **VALUE** (up or down) touch pads to select between the available date formats: **YY/MM/DD**, **MM/DD/YY**, **DD/MM/YY**. Press **CYCLE START** touch pad to confirm. Display shows:

| | |
|-------------|-----------------|
| DATE | YY/MM/DD |
| TIME | HH:MM:SS |

— indicates flashing position.

4. Press **CURSOR** arrows (left or right) and/or **VALUE** arrows (up or down) to set current time and date, press **CHANGE VALUES** touch pad to confirm
5. Press **SAVE VALUES** touch pad to return to Service Mode main menu.

4.8.3 How to Reset Cycle and Service Counts

Cycle and Service counts are used to plan preventive maintenance of the unit. After the number of cycles and/or days (whichever comes first) set, a message warns the customer that it is time to call the technician. The following reset procedure must be performed every time the following alarm message is displayed:

MAINTENANCE DUE!
CALL SERVICE

1. If alarm tone signal and alarm message are present, first press **ALARM REPLY** touch pad.
2. From the Service Mode menu, use **CURSOR** arrows (left or right) and/or **VALUE** arrows (up or

down) touch pads to select **VALUES**, then press **CYCLE START** touch pad to confirm. Display shows:

PRINTERENABLED?
YES

— indicates flashing position.

3. Press **CHANGE VALUES** touchpad until the following is displayed:

CYCLE CNT = 00000001
RESERVICE AFTER 1000

— indicates flashing position.

4. Use **CURSOR** arrows (left or right) and/or **VALUE** arrows (up or down) touch pads to reset desired values, then press **CHANGE VALUES** touch pad to confirm. Display shows:

RESERVICE IN
0100 DAYS

— indicates flashing position.

5. Use **CURSOR** arrows (left or right) and/or **VALUE** arrows (up or down) touch pad to reset desired values, press **CHANGE VALUES** touch pad to confirm.

6. Press **SAVE VALUES** touch pad to return to Service Mode main menu.

IMPORTANT: Reset **RESERVICE** Values **EVERY TIME** alarm tone signal is heard and alarm message is displayed. If customer is not on preventive maintenance plan, set **RESERVICE AFTER...** and **RESERVICE IN... DAYS** to maximum value (9999). The alarm message occurs every 10,000 cycles only.

4.8.4 How To add an Enzyme Rinse and To Modify Sump Fill, Drain, and Heating Alarm Time

1. From the Service Mode menu, use **CURSOR** arrows (left or right) and/or **VALUE** arrows (up or down) touch pads to select **VALUES**, then press **CYCLE START** touch pad to confirm. Display shows:

PRINTERENABLED?
YES

— indicates flashing position.

2. Press **CHANGE VALUES** touch pad until the following is displayed:

EXTRA ENZYME RINSE
NO

— indicates flashing position.

- Use **CURSOR** arrows (left or right) and/or **VALUES** arrows (up or down) touch pad to select **NO** or **YES**, then press **CHANGE VALUES** touch pad to confirm. Display shows:

SUMP FILL TIME
TIME = 04:00 (default)

— indicates flashing position.

- Use **CURSOR** arrows (left or right) and/or **VALUES** arrows (up or down) touch pad to modify value, press **CHANGE VALUES** touch pad to confirm.

Press **SAVE VALUES** touch pad to return to main menu,

... or **CHANGE VALUES** touch pad to confirm and continue sequence of displays. Display shows:

SUMP DRAIN TIME
TIME = 01:15 (default)

— indicates flashing position.

- Use **CURSOR** arrows (left or right) and/or **VALUE** arrows (up or down) touch pad to modify value, press **CHANGE VALUES** touch pad to confirm.

Press **SAVE VALUES** touch pad to return to main menu,

...or **CHANGE VALUES** touch pad to confirm and continue sequence of displays. Display shows:

SUMP HEATING TIME
TIME = 10:00

— indicates flashing position.

- Use **CURSOR** arrows (left or right) and/or **VALUE** arrows (up or down) touch pads to modify value, press **CHANGE VALUES** touch pad to confirm, then **SAVE VALUES** touch pad to return to main menu.

4.8.5 How to Customize Chemical Name and Reset Chemical Rate

- From the Service Mode menu, use **CURSOR** arrows (left or right) and/or **VALUE** arrows (up or down) touch pads to select **VALUES**, then press **CYCLE START** touch pad to confirm. Display shows:

PRINTERENABLED?
YES

— indicates flashing position.

- Press **CHANGE VALUES** touch pad until display shows:

PUMP 1 DET. NAME?
PUMP 1 (default)

— indicates flashing position.

- Press **CHANGE VALUES** touch pad to leave name unchanged,

... or to change detergent pump name, use **CURSOR** arrows (left or right) and/or **VALUE** arrows (up or down) touch pads to modify detergent name.

IMPORTANT: Detergent pump name must be 9 characters-long or less.

- Press **CHANGE VALUES** touch pad to confirm. Display shows:

SET (CHEMICAL NAME) RATE?
NO (default)

— indicates flashing position.

- Press **CHANGE VALUES** touch pad, then **SAVE VALUES** touch pad to leave detergent injection rate unchanged and to return to Service Mode main menu.

... or, to change detergent injection rate, use **VALUE** arrows (up or down) touch pad to change **NO** to **YES**, then press **CHANGE VALUES** arrows to confirm. Display shows:

RESET (DETERGENT NAME)
RATE? 4 mL/L

— indicates flashing position.

- Scroll available quantities (2 mL to 16 mL, in 2 mL increments), using **VALUE** arrows (up or down) touch pad, and press **CHANGE VALUES** touch pad to confirm, then **SAVE VALUES** touch pad and return to Service Mode main menu.

4.8.6 How to Customize Hospital and Department Names

- From the Service Mode menu, use **CURSOR** arrows (left or right) and/or **VALUE** arrows (up or down) touch pads to select **VALUES**, then press **CYCLE START** touch pad to confirm. Display shows:

PRINTER ENABLED?
YES

— indicates flashing position.

- Press **CHANGE VALUES** touch pad until display shows:

HOSPITAL NAME
ENTER HOSPITAL NAME

— indicates flashing position.

- Press **CHANGE VALUES** touch pad to leave name unchanged,

... or to change hospital name, use **CURSOR** arrows (left or right) and/or **VALUE** arrows (up or down) touch pads.

IMPORTANT: Hospital name must be 20 characters-long or less.

4. Press **CHANGE VALUES** touch pad to confirm. Display shows:

DEPARTMENT NAME
ENTER DEPARTMENT NAME

— indicates flashing position.

IMPORTANT: Department name must be 20 characters-long or less.

5. Press **CHANGE VALUES** touch pad then **SAVE VALUES** touch pad to leave department rate unchanged and to return to Service Mode main menu.

... or, to change department name, use **VALUE arrows** (up or down) touch pads. Press **CHANGE VALUES arrows** to confirm then **SAVE VALUES** touch pad and return to Service Mode main menu.

4.8.7 How to Reset Independent Monitor Values (Option) (See Figure 4-10 for Summary of Independent Monitor Values)

1. From the Service Mode menu, use **CURSOR arrows** (left or right) and/or **VALUE arrows** (up or down) touch pads to select **VALUES**, then press **CYCLE START** touch pad to confirm. Display shows:

PRINTERENABLED?
YES

— indicates flashing position.

2. Press **CHANGE VALUES** touch pad until display shows:

I. MONITOR ALARMS?
YES (default)

— indicates flashing position.

3. Use **VALUE arrows** (up or down) touch pads to select **YES** or **NO**. Press **CHANGE VALUES** touch pad to confirm. If **NO** is selected, display returns to Service Mode menu. If **YES** is selected, display shows:

PRESSURE H.S. ON/OFF
ON (default)

— indicates flashing position.

4. Use **VALUE arrows** (up or down) touch pad to set high speed pressure monitoring **ON** or **OFF**, then

press **CHANGE VALUES arrows** to confirm. If **OFF** is selected, display goes to **Step 7**. If **ON** is selected, display shows:

H.S. MIN. ALARM
30.0 KPA (4.4 PSI)

— indicates flashing position.

5. Use **CURSOR arrows** (left or right) and/or **VALUE arrows** (up or down) touch pad to modify value, press **CHANGE VALUES** touch pad to confirm. Maximum pressure value allowed is 200 kPa (29.1 psi)

Press **SAVE VALUES** touch pad to return to main menu,

...or **CHANGE VALUES** touch pad to confirm and continue sequence of displays. Display shows:

PRESSURE L.S. ON/OFF
ON

— indicates flashing position.

6. Use **VALUE arrows** (up or down) touch pad to set low speed pressure monitoring **ON** or **OFF**, then press **CHANGE VALUES arrows** to confirm. If **OFF** is selected, display goes to **Step 9**. If **ON** is selected, display shows:

L.S. MIN. ALARM
30.0 KPA (4.4 PSI)

— indicates flashing position.

7. Use **CURSOR arrows** (left or right) and/or **VALUE arrows** (up or down) touch pad to modify value, press **CHANGE VALUES** touch pad to confirm. Maximum pressure value allowed is 200 kPa (29.1 psi)

Press **SAVE VALUES** touch pad to return to main menu,

...or **CHANGE VALUES** touch pad to confirm and continue sequence of displays. Display shows:

CONDUCTIVITY ON/OFF
ON (default)

— indicates flashing position.

8. Use **VALUE arrows** (up or down) touch pad to select **ON** or **OFF**, then press **CHANGE VALUES arrows** to confirm. If **OFF** is selected, display goes to **Step 11**. If **ON** is selected, display shows:

CONDUCTIVITY ALARM =
10.0 µS/cm

— indicates flashing position.

9. Use **CURSOR arrows** (left or right) and/or **VALUE arrows** (up or down) touch pad to modify value, press **CHANGE VALUES** touch pad to confirm. Maximum conductivity value allowed is 50 $\mu\text{S}/\text{cm}$. Maximum temperature value allowed for pre-wash is 65°C (149°F).

Press **SAVE VALUES** touch pad to return to main menu,

...or **CHANGE VALUES** touch pad to confirm and continue sequence of displays. Display shows:

INJECTION ON/OFF
ON (default)

— indicates flashing position.

10. Use **VALUE arrows** (up or down) touch pad to select ON or OFF, then press **CHANGE VALUES arrows** to confirm. Display shows:

TEMPERATURE ON/OFF
ON (default)

— indicates flashing position.

11. Use **VALUE arrows** (up or down) touch pad to select ON or OFF, then press **CHANGE VALUES arrows** to confirm. If OFF is selected, display goes to **Step 14**. If ON is selected, display shows:

TEMPERATURE RANGE
05.0 C (9.0 F)

— indicates flashing position.

12. Use **CURSOR arrows** (left or right) and/or **VALUE arrows** (up or down) touch pad to modify value, press **CHANGE VALUES** touch pad to confirm.

Press **SAVE VALUES** touch pad to return to main menu,

...or **CHANGE VALUES** touch pad to confirm and continue sequence of displays. Display shows:

PREWASH TEMP ON/OFF
ON (default)

— indicates flashing position.

13. Use **VALUE arrows** (up or down) touch pad to select ON or OFF, then press **CHANGE VALUES arrows** to confirm. If OFF is selected, display goes to **Step 16**. If ON is selected, display shows:

PREWASH TEMP. ALARM =
035.0 C (095.0 F)

— indicates flashing position.

14. Maximum conductivity value allowed is 50 $\mu\text{S}/\text{cm}$. Maximum temperature value allowed for pre-wash is 65°C (149°F).

4.9 HOW TO PRINT SERVICE MODE VALUES

1. After entering Service Mode and setting values as desired, press **CHANGE VALUES** touch pad until display shows:

PRINT VALUES?
CVTP=YES SVTP=NO

2. Press **CHANGE VALUES** touch pad to print all values just set or **SAVE VALUES** touch pad to return to Service Mode main menu.

4.10 HOW TO ENTER FACTORY SETUP MODE

The Factory Setup Mode has three different purposes: it is used for resetting all options when new Flash Memory Chips and/or Battery Backup are installed into unit; to set a new option just added to the unit; or to temporarily lock out the use of an option. This feature can be used, for example, if an option's component is defective. It is still possible, however, to run cycles with one or more optional treatments locked out.

Enter Service Mode, as explained in Section 4.1, *Service Mode Procedures*, but without entering Service Mode Access Code. Display shows:

ENTER SERVICE MODE
ACCESS CODE: 1091

— indicates flashing position.

1. Enter Factory Setup Access Code:

- Press **DOOR CLOSE**
- Press **DOOR OPEN**
- Press **DOOR CLOSE**
- Press **DOOR OPEN**
- Press **CHANGE VALUES**

2. Display shows:

DELETE CONFIGURATION
CVTP = YES SVTP = NO

IMPORTANT: If installing a new Flash Memory Chip and/or Battery Backup, press **CHANGE**

VALUES touch pad to erase configuration and reset hardware options.

3. If adding a new option to the unit, press SAVE VALUES to select NO and answer questions without erasing current option hardware settings. Display shows:

STEAM HEAT UNIT?
NO

— indicates flashing position.

4. Press VALUE arrows (up or down) touch pad to select NO or YES, then press CHANGE VALUES touch pad to confirm selection and continue the sequence of displays. Display shows:

AUTOMATION OPTION?
NO

— indicates flashing position.

Select YES for Load/Unload Modules.

5. Go to Step 9 if unit is equipped with Load/Unload Modules.
6. For units with ATS modules** direct in the feeding line, press CHANGE VALUES touch pad to confirm NO to load/unload modules** automation option. Display shows:

LOAD END ATS*
NO

* Question asked on automated unit only.

** Typical ATS module shown in Figure 3-4. Typical load/unload module shown in Figure 3-3.

7. If unit without ATS on load-end, press change values touch pad to confirm NO. If unit with ATS on load end, press value (up) touch pad to change NO to change values touch pad to YES then press CV to confirm selection. Display shows:

UNLOAD END ATS*
NO

* Question asked on automated unit only.

8. If unit without Automation option, press CHANGE VALUES touch pad to confirm NO. If unit with automation option, press VALUE (up) touch pad to change NO to YES, then press CHANGE VALUES touch pad to confirm selection. Display shows:

NOTE: Questions on ATS are only asked if answer to AUTOMATION option is NO.

SERIAL NUMBER
360000000

9. Set Serial Number, using CURSOR arrows (left or right) and VALUE arrows (up or down) touch

pads. Press CHANGE VALUES touch pad to confirm entry of serial number. Display shows:

REVIEW OPTIONS AGAIN
CVTP=YES SVTP=NO

10. Press CHANGE VALUES touch pad to review options again, or SAVE VALUES touch pad to set values just entered. Display shows:

PRINT CONFIGURATION
CVTP=YES SVTP=NO

11. Press CHANGE VALUES touch pad if you wish to review the new setting, or SAVE VALUES touch pad to return to Service Mode main menu. Display shows:

TESTS BURN-IN
CALIBRATE VALUES

— indicates flashing position.

4.11 HOW TO RETURN TO AUTOMATIC MODE

1. Service Mode main menu shows:

TESTS BURN-IN
CALIBRATE VALUES

— indicates flashing position.

2. Position POWER-OFF/STANDBY switch to OFF/STANDBY (see Figure 4-1).
3. Position Main Power Switch (located on the load side, behind the top portion of the control access panel) to OFF.
4. Lower control assembly to a horizontal position, as for service.
5. Locate Double EPROM PC Board, on Control PC Board. Position Dip Switch #1 to OFF, for Automatic Mode.
6. Lift control assembly to vertical position.
7. Position Main Power switch to ON.
8. Position POWER-OFF/STANDBY switch to POWER.
9. Display shows:

GENTLE INSTR.
GLASSWARE UTENSILS

— indicates flashing position.

10. Set cycles and cycle values, using printout obtained at the beginning.

Figure 4-10. Independent Monitor Values

| CYCLE PHASE | PARAMETER | LIMITS | | CHECK |
|---|---|---|---------------------------------------|--|
| | | Lower | Higher | |
| <ul style="list-style-type: none"> Pre-Wash (Cold Water) | Water Temperature | --- | 35°C (95°F) | Each 5 seconds during recirculation |
| | Water Pressure | 30kPa (HighSpeed) ON/OFF Adjustable 0-200 KPa 30 KPa (Low Speed) ON/OFF Adjustable 0-200 KPa | --- | --- |
| <ul style="list-style-type: none"> Enzyme (Hot/Waternon-heated) | Chemical Injection Volume (pump 1) | ON/OFF | ON/OFF | After injection completed |
| | Chemical Injection Volume (pumps 2, 3, 4) | ON/OFF | ON/OFF | After injection completed |
| <ul style="list-style-type: none"> Wash (Settemperature 60°C to 82°C [140°F to 180°F]) | Water Temperature | Set temperature -5°C [23°F] ON/OFF | Set temperature +5°C [41°F] ON/OFF | Each 5 seconds once set temperature is reached |
| | Water Pressure | 30kPa (High Speed) ON/OFF Adjustable 0-200 KPa | --- | Each 5 seconds once set temperature is reached |
| | Water Conductivity | --- | 10µS/cm ON/OFF | 15 seconds after beginning of pure water filling |
| | Water Temperature | Set Temperature | Set Temperature +5°C [41°F] ON/OFF | Each 5 seconds once set temperature is reached |
| <ul style="list-style-type: none"> Thermal Rinse (Settemperature 82°C to 95°C [180°F to 203°F]) | Water Pressure | 30 KPa (High Speed) ON/OFF Adjustable 0-200 KPa 30 KPa (Low Speed) ON/OFF Adjustable 0-200 KPa | --- | Each 5 seconds once set temperature is reached |
| | Water Temperature | Set Temperature | Set Temperature +5°C [41°F] ON/OFF | Each 5 seconds once set temperature is reached |

Section 5: Principles of Operation

IMPORTANT: For Service Mode adjustments, see Section 4.1, *Service Mode Procedures*.

5.1 GENERAL

The Reliance® Synergy™ Washer/Disinfector is equipped with an automatic control, which operates all preprogrammed cycles. Refer to the schematics at the end of this section when reviewing the cycle description below.

5.2 POWER UP

As soon as the unit is powered, the soiled door closing valve (AC3) and the clean door-closing valve (1AC4) are energized.

Control energizes the sump drain valve (1AC3) to close valve.

5.3 CYCLE PROCESSING

5.3.1 Filling the Sump (High level)

IF sump water level switch does detect water (LS4=0),

The control energizes the sump hot water fill valve (AC2) or the cold-water fill valve (AC0).

The control energizes the detergent pump #1 (1AC10) for Wash treatment or pump #4 (1AC9) for Enzyme treatment until detergent concentration is reached.

5.3.2 Filling Alarm

If, after 4 minutes, sump water level switch does not detect water (LS4=1), the control emits an audible alarm.

5.3.3 Recirculation Treatment

The control energizes the low speed of the pump low speed (AC8).

If the treatment is recirculated at high speed, 3 seconds later, the control de-energizes the low speed of the recirculation pump and energizes pump high speed (AC9).

If the treatment is heated, the sump heater (AC4) is energized until the temperature setpoint is reached or if temperature goes below the set point. The condenser (1AC1) is activated when the sump heater is activated and the temperature is over 65.5°C (150°F).

The timer starts counting down as soon as temperature is reached or if treatment is non-heated.

If the safety level switch is tripped (LS2=1), the control emits an audible alarm and the sump is drained.

The timer is stopped if temperature is under the setpoint. The control de-energizes the recirculation pump and the sump steam valve once the phase is completed.

5.3.4 Sump Heating Alarm

If the sump water temperature is not reached within 10 minutes for a steam-heated unit (default value adjustable from 01:00 to 15:00 minutes in Service Mode) or 30 minutes for an electric-heated unit (default value adjustable between 30:00 to 59:00 minutes in Service Mode), the control emits an audible alarm and de-energizes the recirculation pump, and the sump steam valve (AC4) or the sump heater (AC4).

5.3.5 Draining

- Complete Draining Phase

Open drain valve (1AC3), start the draining timer, wait until the timer is timed out.

For temperature ranges from 60°C to 71.1°C (140°F-160°F), from 71.1°C to 87.7°C (160°F-190°F), and from 87.7°C (190°F) and over, the drain valve (1AC3) and the drain discharge cooldown valve (AC1) opening and closing times depend if the washer is in high or low speed. If either the cooldown option is off or the temperature is lower than the minimum 60°C (140°F), then a normal drain is done.

If the sump low-level sensor (1LS3) detects water when timer is finished, sound alarm Sump Too Long In Drain, close drain valve (1AC3).

If high (LS4) or low (LS1) water level sensors detects water, sound alarm Water Level Defective.

5.3.6 Vapor Removal Phase

If not, the last treatment and hot water are selected, dryer fan (AC10) is energized for 1 minute.

5.4 PREPROGRAMMED GENTLE CYCLE (RECIRCULATING PUMP AT LOW SPEED)

5.4.1 Pre-Wash 1

• Filling

If sump water level sensor indicates that sump is not filled with water (LS1 = 1), the control energizes the sump cold-water fill valve (AC0). Once the sump water level sensor indicates that sump is filled with water (LS1 = 0), the control de-energizes the sump cold-water fill valve (AC0).

If, after 4 minutes (default value adjustable in Service mode only), the sump water level sensor does not indicate that sump is filled with water (LS1 = 1), an alarm sounds, and control de-energizes the sump cold water fill valve (AC0).

• Recirculation

Control energizes the recirculation pump (AC8) for 2 minutes (default value, adjustable in Automatic mode only). After 2 minutes, control de-energizes the recirculation pump (AC8).

• Draining

After a two-second delay, the control de-energizes the sump drain valve (1AC3). Open drain valve (1AC3), start the draining timer, wait until the timer is timed out.

For temperature ranges from 60°C to 71.1°C (140°F-160°F), from 71.1°C to 87.7°C (160°F-190°F), and from 87.7°C (190°F) and over, the drain valve (1AC3) and the drain discharge cooldown valve (AC1) opening and closing times depend if the washer is in high or low speed. If either the cooldown option is off or the temperature is lower than the minimum 60°C (140°F), then a normal drain is done.

If the sump low-level sensor (1LS3) detects water when timer is finished, sound alarm Sump Too Long In Drain, close drain valve (1AC3).

If high (LS4) or low (LS1) water level sensors detects water, sound alarm Water Level Defective. Refer to section 5.3.5.

5.4.2 Enzyme Wash

• Filling and Injecting

Control energizes the sump hot water fill valve (AC2) until sump water level sensor indicates that sump is filled with water and the enzyme pump (1AC9) for 1 minute. Detergent injection rate is 30 mL/L (1 oz/gallon), and there are 47.6 L (12.6 gallons) of water in the sump.

When the sump water level sensor indicates that sump is filled with water (LS1 = 0), the control de-energizes the sump hot water fill valve (AC2).

If the detergent is injected, the control de-energizes the enzyme pump (1AC9).

If, after 4 minutes (default value, adjustable in Service mode only), the sump water level sensor does not indicate that sump is filled with water (LS1 = 1), an alarm sounds, and control de-energizes the sump hot water fill valve (AC2).

• Pulsed Recirculation

Control energizes the recirculation pump (AC8) alternately runs for 3 seconds then stops for 27 seconds during 3 minutes 10 seconds. In the last 50 seconds of the 4-minute pulsed recirculation phase, recirculation pump (AC8) is off.

• Draining

After a two-second delay, the control de-energizes the sump drain valve (1AC3). Open drain valve (1AC3), start the draining timer, wait until the timer is timed out.

For temperature ranges from 60°C to 71.1°C (140°F-160°F), from 71.1°C to 87.7°C (160°F-190°F), and from 87.7°C (190°F) and over, the drain valve (1AC3) and the drain discharge cooldown valve (AC1) opening and closing times depend if the washer is in high or low speed. If either the cooldown option is off or the temperature is lower than the minimum 60°C (140°F), then a normal drain is done.

If the sump low-level sensor (1LS3) detects water when timer is finished, sound alarm Sump Too Long In Drain, close drain valve (1AC3).

If high (LS4) or low (LS1) water level sensors detects water, sound alarm Water Level Defective.

5.4.3 Enzyme Rinse 1

• Filling

Control energizes the sump hot water fill valve (AC2).

When the sump water level sensor indicates that sump is filled with water (LS1 = 0), the control de-energizes the sump hot water fill valve (AC2).

If, after 4 minutes (default value adjustable in service mode only), the sump water level sensor does not indicate that sump is filled with water (LS1 = 1), an alarm sounds, and control de-energizes the sump cold water fill valve (AC2).

• Recirculation

Control energizes the recirculation pump (AC8) for 15 seconds (default value, not adjustable). After 15 sec-

onds, the control de-energizes the recirculation pump (AC8).

- **Draining**

After a two-second delay, the control de-energizes the sump drain valve (1AC3). Open drain valve (1AC3), start the draining timer, wait until the timer is timed out.

For temperature ranges from 60°C to 71.1°C (140°F-160°F), from 71.1°C to 87.7°C (160°F-190°F), and from 87.7°C (190°F) and over, the drain valve (1AC3) and the drain discharge cooldown valve (AC1) opening and closing times depend if the washer is in high or low speed. If either the cooldown option is off or the temperature is lower than the minimum 60°C (140°F), then a normal drain is done.

If the sump low-level sensor (1LS3) detects water when timer is finished, sound alarm Sump Too Long In Drain, close drain valve (1AC3).

If high (LS4) or low (LS1) water level sensors detects water, sound alarm Water Level Defective.

5.4.4 Wash 1

- **Filling**

If sump water level sensor indicates that sump is not filled with water, control energizes the sump hot water fill valve (AC2) and the detergent pump 1 (1AC10) for 15 seconds. Detergent injection rate is 7 mL/L (1/4 oz/gallon) and there are 47.6 L (12.6 gallons) of water in sump.

If the sump water level sensor indicates that sump is filled with water (LS1 = 0), the control de-energizes the sump hot water fill valve (AC2).

If the detergent is injected, the control de-energizes detergent pump 1 (1AC10).

If, after 4 minutes, the sump water level sensor does not indicate that sump is filled with water (LS1 = 1), an alarm sounds, and control de-energizes the sump hot water fill valve (AC2).

- **Recirculation**

The control energizes the recirculation pump (AC8) for 4 minutes (default value, adjustable in Automatic mode only).

The control also energizes the sump steam valve (AC4) or, if unit is electric-heated, the sump heater contactor (AC4), to maintain the preset temperature at 65.5 °C (150 °F) (default value adjustable, in Automatic mode only).

The sump steam valve (AC4) or, if unit is electric-heated the sump heater contactor (AC4), is energized as long as the preset temperature is not reached.

If the sump water temperature has not been reached within 10 minutes (default value adjustable, in Service mode only), an alarm sounds and control de-energizes the recirculation pump (AC8) and the sump steam valve (AC4) or if it is an electric-heated unit, the control will de-energize the sump heater contactor (AC4).

If the sump temperature has not been reached, the preset temperature, the timer will not start counting down.

After 2 minutes at 65.5 °C (150 °F), control de-energizes the recirculation pump (AC8) and the sump steam valve (AC4), or if unit is electric-heated, the control will de-energize the sump heater contactor (AC4).

- **Draining**

After a two-second delay, the control de-energizes the sump drain valve (1AC3). Open drain valve (1AC3), start the draining timer, wait until the timer is timed out.

For temperature ranges from 60°C to 71.1°C (140°F-160°F), from 71.1°C to 87.7°C (160°F-190°F), and from 87.7°C (190°F) and over, the drain valve (1AC3) and the drain discharge cooldown valve (AC1) opening and closing times depend if the washer is in high or low speed. If either the cooldown option is off or the temperature is lower than the minimum 60°C (140°F), then a normal drain is done.

If the sump low-level sensor (1LS3) detects water when timer is finished, sound alarm Sump Too Long In Drain, close drain valve (1AC3).

If high (LS4) or low (LS1) water level sensors detects water, sound alarm Water Level Defective.

5.4.5 Rinse 1

- **Filling**

Control energizes the sump hot water fill valve (AC2). When the sump water level sensor indicates that sump is filled with water (LS1 = 0), the control de-energizes the sump hot water fill valve (AC2).

If, after 4 minutes (default value, adjustable in Service mode only), the sump water level sensor does not indicate that sump is filled with water (LS1 = 1), an alarm sounds, and control de-energizes the sump hot water fill valve (AC2).

- **Recirculation**

Control energizes the recirculation pump (AC8) for 15 seconds (default value, adjustable in Automatic mode only). After 15 seconds, the control de-energizes the recirculation pump (AC8).

- **Draining**

After a two-second delay, the control de-energizes the sump drain valve (1AC3). Open drain valve (1AC3), start the draining timer, wait until the timer is timed out.

For temperature ranges from 60°C to 71.1°C (140°F-160°F), from 71.1°C to 87.7°C (160°F-190°F), and from 87.7°C (190°F) and over, the drain valve (1AC3) and the drain discharge cooldown valve (AC1) opening and closing times depend if the washer is in high or low speed. If either the cooldown option is off or the temperature is lower than the minimum 60°C (140°F), then a normal drain is done.

If the sump low-level sensor (1LS3) detects water when timer is finished, sound alarm Sump Too Long In Drain, close drain valve (1AC3).

If high (LS4) or low (LS1) water level sensors detects water, sound alarm Water Level Defective.

5.4.6 Thermal Rinse

- **Filling**

Control energizes the sump hot water fill valve (AC2). When the sump water level sensor indicates that sump is filled with water (LS1 = 0), the control de-energizes the sump hot water fill valve (AC2).

If, after 4 minutes (default value, adjustable in Service mode only), the sump water level sensor does not indicate that sump is filled with water (LS1 = 1), an alarm sounds, and control de-energizes the sump hot water fill valve (AC2).

- **Recirculation**

The control energizes the recirculation pump (AC8) for 1 minute (default value, adjustable in Automatic mode only).

Control also energizes the sump steam valve (AC4) or, if unit is electric-heated, the sump heater contactor (AC4), to maintain the preset temperature at 82°C (180°F) (default value adjustable in Automatic mode only).

The sump steam valve (AC4) or, if unit is electric-heated, the sump heater contactor (AC4) is energized as long as the preset temperature is not reached.

If the sump water temperature is not reached within 10 minutes (default value, adjustable in Service mode only), an alarm sounds, control de-energizes the recirculation pump (AC8) and the sump steam valve (AC4) or, if unit is electric-heated, the sump heater contactor (AC4).

If the sump temperature has not reached the preset temperature, timer does not start counting down.

After 1 minute at 82°C (180°F), control de-energizes the recirculation pump (AC8) and the sump steam valve (AC4), or if unit is electric-heated, the control de-energizes the sump heater contactor (AC7).

- **Draining**

Open drain valve (1AC3), start the draining timer, wait until the timer is timed out.

For temperature ranges from 60°C to 71.1°C (140°F-160°F), from 71.1°C to 87.7°C (160°F-190°F), and from 87.7°C (190°F) and over, the drain valve (1AC3) and the drain discharge cooldown valve (AC1) opening and closing times depend if the washer is in high or low speed. If either the cooldown option is off or the temperature is lower than the minimum 60°C (140°F), then a normal drain is done.

If the sump low-level sensor (1LS3) detects water when timer is finished, sound alarm Sump Too Long In Drain, close drain valve (1AC3).

If high (LS4) or low (LS1) water level sensors detects water, sound alarm Water Level Defective.

5.4.7 Drying Treatment

The control energizes the dryer fan (AC10) for the drying time.

The dryer heater (AC6) is energized to maintain the drying temperature, if the unit is a non-vented unit the condenser (1AC1) is on.

During the last minute of the drying treatment there is a 1-minute cooling phase the dryer heater (AC6) is deenergized while the dryer fan (AC10) and the condenser (1AC1) remain energized.

5.5 STANDBY CYCLE

The Standby cycle dumps water from the sump to the drain.

Position the POWER-OFF/STANDBY rocker switch located on the printer control panel to OFF/STANDBY. The operator has 1 minute to decide whether or not to cancel the Standby cycle (to cancel, reposition the POWER-OFF/STANDBY rocker switch to POWER position). The drain valve is energized during this minute.

If after 1 minute the rocker switch stays in the OFF STANDBY position and the door(s) are not closed, the control displays a message to the operator to close the door(s). If the door(s) is closed, the control de-energizes the sump drain valve (1AC3) for 5 minutes.

During the Standby cycle the doors cannot be opened.

During the Standby cycle, no other cycle can be activated.

After the 5-minute cycle, the control energizes the sump drain valve.

If the POWER-OFF/STANDBY rocker switch remains in the OFF/STANDBY position, the control displays the time of day, instead of the main menu. The interior light stays energized (AC10).

5.6 OPERATION OF AMSCO® RELIANCE® 444 LOAD/UNLOAD MODULES (OPTION)

5.6.1 General

Refer to Tables 5-1 through 5-3, to Figures 5-1 and 5-2, and to Schematics 920-012-510, page 1 of 6 (located at the end of this Section) to assist in understanding Amsco Reliance 444 Load/Unload Modules operation.

5.6.2 Controls

All conveyor operations are controlled by a separate, integral controller. The conveyor controller has 13 inputs identified as *i/n.n* (e.g., *i/0.1*, *i/0.2*, *i/1.1*, etc.) The inputs are biased with 24V DC and go low (0V DC) when activated (signal received). A corresponding LED on the controller lights up to indicate when a specific input has been activated. All photoelectric sensors (see 5.6.3) are activated (low LED on) when no basket is detected, and deactivate when a basket is detected.

The conveyor controller provides 15 outputs to the system, labeled *o/n.n* (e.g., *O/2.2*, *O/2.3*, etc.). Outputs *O/0.0* through *O/1.1* and *O/2.4* to *O/2.7* are connected to 24V DC supplying voltage to operate the pneumatic cylinder solenoids (when active). Outputs *O/2.0* through *O/2.3* and *O/2.0* to *O/2.3* are connected to 12V DC to provide signals back to the 444 washer/disinfecter control (when active).

O/2.5 provides a contact closure between CR4 (when active) for interfacing the unload module with an external conveyor system.

O/0.7 provides a contact (load conveyor empty signal, when active) for interfacing the load module with an external conveyor system.

The conveyor controller sends the following signals to the Eagle® 3000 Control.

- From *O/2.0* Door open/closed signal, soiled side, to LS6 on the control board.
- From *O/2.1* Door open/closed signal, clean side, to LS7 on the control board.
- From *O/2.2* Emergency Stop Signal to LS5 on the control board.

- From *O/2.3* Conveyor obstruction/or reposition basket Signal to LS8 on the control board.

The Eagle 3000 Control sends the following to the conveyor controller:

- Power ON, CR3 Relay is energized when the main power switch is activated on the 444 washer.
- Conveyor START/STOP signal, the Control Board output (AC11) sends an output that energizes the CR1 relay which provides a signal (low) to *i/1.4* conveyor input enabling the conveyor system.

5.6.3 Photoelectric Sensors

The conveyor system is provided with photoelectric sensors (max. seven provided). They are used to monitor basket position on the conveyor system. They are identified *i/n.n* (e.g., *i/0.1*, *i/0.2*, *i/1.1*, etc.) See Figure 5-1. The LED mounted on the sensor turns ON, indicating that the output signal has been detected. The input LED programmable controller turns OFF.

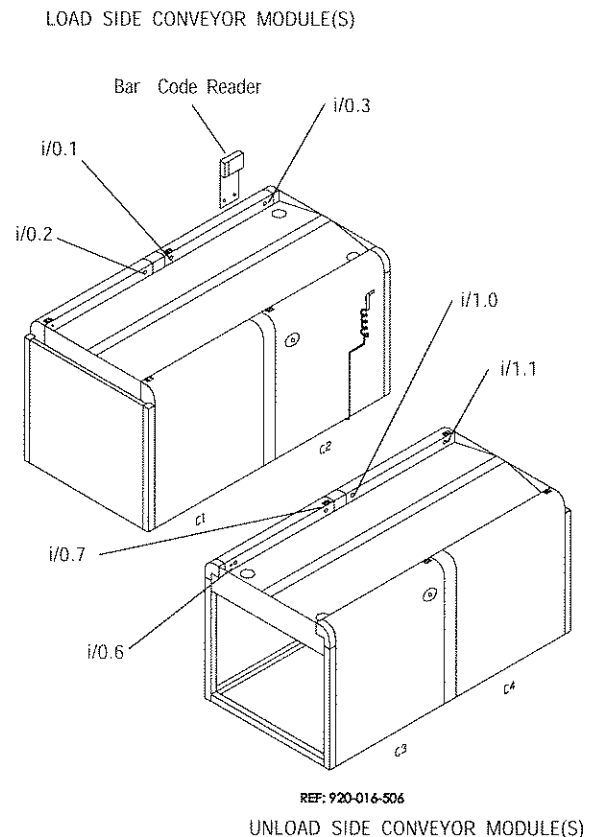


Figure 5-1. Amsco Reliance 444 Load/Unload Modules – Photoelectric Sensors

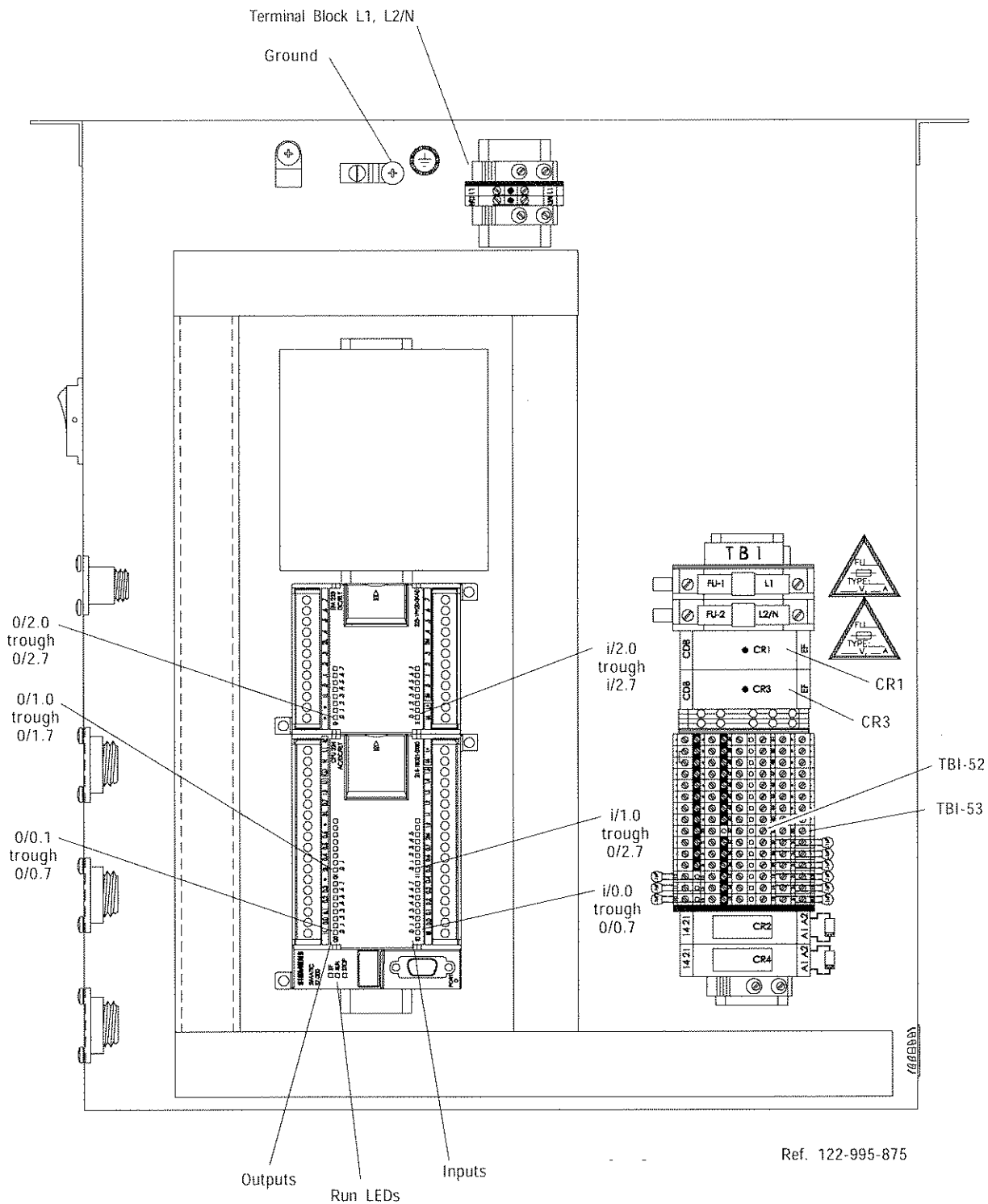


Figure 5-2. Central Processing Unit in C3 Conveyor Main Control Box

5.6.4 Proximity Sensors

The system uses two proximity sensors (i/0.4 and i/0.5) to detect the fully open position of the soiled side (i/0.4) and clean side doors (i/0.5). When a door is open, a metal tab activates the sensor. Once the tab is near enough, the sensor emits an output signal (a DC ground to the conveyor input main control box). The corresponding LED on the input module turns ON.

5.6.5 Solenoid Valves

Conveyors are supplied with pneumatic valves, which operate using 24V DC. The first valve, when energized, allows the cylinder to extend. The second one, when energized, allows the cylinder to retract. Inside Conveyor section C3, O/2.4 valve is used to lift up the cylinder pawls mounted on Cylinder #3 and #4. The pawls lift up only when those cylinders retract in normal operation.

5.6.6 Configuration Inputs

The conveyor controller program handles the four conveyor configurations. Inputs i/1.2 and i/1.3, are used to configure the controller. See electrical schematics 920-012-510 at the end of the section and table 5-2 for proper setting of these inputs.

5.6.7 Stop Touch Pad Operation

The STOP touch pad on the washer/disinfector control is provided to stop the cycle when unit is processing a load in the chamber. When load/unload modules are attached to the washer/disinfector, the STOP touch pad performs the same function.

However, when the washer/disinfector is in IDLE position (no cycle in progress), pressing the STOP touch pad has no effect on the conveyor system. If conveyors need to be stopped, press the EMERGENCY STOP Button.

The STOP touch pad stops conveyor operation under certain conditions. The basic condition is that the washer/disinfector must be processing a cycle. Then, if STOP touch pad is pressed, the following conditions apply to the conveyor's system:

Conveyor Section C1: If Cylinder 1 is indexing, it completes sequence. Then Cylinder #1 comes inactive until START touch pad is pressed to resume cycle.

Conveyor Section C2: If Cylinder 2 is indexing, a basket is being loaded into the chamber. Pressing STOP touch pad has no effect on the conveyor's operation. Only pressing the EMERGENCY STOP Button can stop the conveyor system.

Conveyor Section C3: If Cylinder 3 is indexing, a basket was being pulled out of the chamber. Pressing STOP touch pad has no effect on the conveyor's operation. Only pressing the EMERGENCY STOP button can stop the conveyor system.

Conveyor Section C4: If Cylinder 4 is indexing, it completes sequence. Then Cylinder #4 comes inactive until START touch pad is pressed to resume cycle.

5.6.8 Emergency Stop

Two EMERGENCY STOP Buttons are supplied with the load/unload modules. They are located on each side of the washer/disinfector. The function of the EMERGENCY STOP Buttons is to stop all pneumatic cylinder motion. When the Emergency Stop Button is pressed, CR2 relay is de-energized, removing power to all AC outputs on the conveyor. Also, an input of the conveyor controller is de-energized (i/0.0), and an output is de-energized (O/2.2) to stop washer/disinfector operation.

5.7 SEQUENCE OF OPERATION

The following sequence of operation applies to a complete load/unload conveyor system (C1, C2, C3, and C4). Sequence of operation is listed with one basket which is loaded on C1 and isprocessed automatically through the washer/disinfector, and then pushed on C3 and C4 conveyors.

5.7.1 Conveyor System Power Up

NOTE: Refer to Autoload/Unload System Schematic 920-012-510.

This sequence assumes that power is applied to the controller box (located under conveyor C3) and the ON/OFF switch of this box is set to on. The POWER/OFF STANDBY switch on the washer/disinfector control is set to OFF STANDBY position.

When the ON/OFF switch located on the main electrical box, underneath the load side control, is set to ON, CR3 relay in the conveyor main control box is energized. CR3 NO contact (D, C) closes (see P920-012-510), thus energizing the primary power supply and the programmable controller.

Five seconds later, the "RUN" LED on the programmable controller lights up, indicating that it is ready for operation.

In main control box, CR2 relay supplies the outputs to 24 VDC.

If any pneumatic cylinder is not fully retracted, when power is applied, the controller will energize the retract output of the cylinder(s).

Conveyor Section C1. Output O/0.1 energizes, Cylinder #1 moves to its retracted position.

Conveyor Section C2. Output O/0.3 energizes, Cylinder #2 moves to its retracted position.

Conveyor Section C3. Output O/0.5 energizes, Cylinder #3 moves to its retracted position.

Conveyor Section C4. Output O/2.7 energizes, Cylinder #4 moves to its retracted position.

The EMERGENCY STOP output O/2.2 is energized, the EMERGENCY STOP signal goes to the Eagle 3000 control (causing input LS5 on the control board to go low). A cycle menu appears on the screen. As when the EMERGENCY STOP output O/2.2 is de-energized (i.e., when it is pressed in), the LS5 output goes high and the conveyor system and the washer/disinfector will not start. The display shows:

**E-STOP PRESSED
PULL TO RESUME...**

If power is removed from the controller box, or if FU-1 or FU-2 is open, or if the DC power supply fails, an emergency stop condition is sent to the washer/disinfector (O/2.2 will turn off). The washer/disinfector stops all operation. The display shows:

**E-STOP PRESSED
PULL TO RESUME...**

In normal operation, the ON/OFF switch on the main control box should be left in ON position.

When all conveyors are empty, the POWER OFF/STANDBY switch on the washer/disinfector is set to OFF/STANDBY position. The I/O pattern on the conveyor control must be as shown in **Tables 5-1, 5-2, and 5-3**. Input is on when the LED of the input is on.

Table 5-1. Conveyor System Inputs

| INPUT | ON | OFF | DESCRIPTION |
|----------------|----|-----|--------------------------------|
| i/0.0 | X | | Emergency Stop |
| i/0.1 | X | | Photocell Sensor conv. 1 |
| i/0.2 | X | | Photocell Sensor conv. 2 |
| i/0.3 | X | | Photocell Sensor conv. 2 |
| i/0.4 | | X | Door open, load side |
| i/0.5 | | X | Door open, unload side |
| i/0.6 | X | | Photocell Sensor conv. 3 |
| i/0.7 | X | | Photocell Sensor conv. 3 |
| i/1.0 | X | | Photocell Sensor conv. 4 |
| i/1.1 | X | | Photocell Sensor conv. 4 |
| i/1.2 | | | Refer to Table 5-2* |
| i/1.3 | | | Refer to Table 5-3* |
| i/1.4 | | X | Conveyor START/STOP |
| i/1.5 | | | For Test only (Ext cycle) |
| i/2.0 | | | For Test only (Start sequence) |
| i/2.1 to i/2.7 | | | No connection |

*i/1.1 through i/1.3 are used for module configuration.

Table 5-2. Configuration Inputs

| Jumper Setting (J1, J2) | | |
|-------------------------|-----------|---|
| J1, i/1.2 | J2, i/1.3 | |
| OFF | OFF | Double Load Module/Double Unload Module |
| OFF | ON | Double Load Module/Single Unload Module |
| ON | OFF | Single Load Module/Double Unload Module |
| ON | ON | Single Load Module/Single Unload Module |

NOTE: Input is on when the LED of the input is on. Depending on installation, jumper J1 may need to be removed in the field. J2 jumper is set at factory. When the jumper is attached, the corresponding input is ON (goes low). See schematic P920-012-510, page 4 of 6.

Table 5-3. Conveyor System Outputs

| OUTPUT | ON | OFF | DESCRIPTION |
|--------|----|-----|--------------------------------------|
| O/0.0 | | | Cylinder 1, Fully Forward Solenoid |
| O/0.1 | X | | Cylinder 1, Fully Retracted Solenoid |
| O/0.2 | | X | Cylinder 2, Fully Forward Solenoid |
| O/0.3 | X | | Cylinder 2, Fully Retracted Solenoid |
| O/0.4 | | X | Cylinder 3, Fully Forward Solenoid |
| O/0.5 | X | | Cylinder 3, Fully Retracted Solenoid |
| O/2.6 | | X | Cylinder 4, Fully Forward Solenoid |
| O/2.7 | X | | Cylinder 4, Fully Retracted Solenoid |
| O/0.7 | | X | Load Conveyor Empty |
| O/2.0 | | X | Door Open Signal, load side |
| O/2.1 | | X | Door Open Signal, unload side |
| O/2.2 | X | | Emergency Stop Signal |
| O/2.3 | | X | Conveyor Obstruction Signal |
| O/2.4 | | X | C3 and C4 cylinder pawls |
| O/2.5 | | X | Unload Conveyor Full (CR4) |
| CR1 | | X | Conveyor Start/Stop |
| CR2 | X | | Emergency Stop Relay |
| CR3 | X | | Power Relay |
| O/0.6 | | | No connection |
| O/1.0 | | | No connection |
| O/1.1 | | | No connection |

5.7.2 Power Up On Washer/Disinfector

When the POWER/OFF STANDBY switch is set to POWER position, outputs AC11, (TB2-12 in contactor box of washer/disinfector) of Eagle 3000 Control is energized, thus energizing CR1 relay coil in the conveyor main control box. Input i/1.4 on conveyor controller turns on, enabling conveyor operation.

If load module is empty, output O/0.7 (Load conveyor empty) is energized. Output O/2.1 (door open signal, clean side) is energized because conveyor C3 is empty.

A) Basket Loading, C1 Conveyor Operation

NOTE: If unit has only a single basket load module, go to Step B) below.

When a basket is loaded on conveyor C1 by the operator, photoelectric sensor i/0.1 senses the basket and the i/0.1 input goes high, and LED turns off. Two seconds later, output O/0.0 is energized, energizing Cylinder #1 fully forward. Basket moves forward.

Photoelectric sensor i/0.2 senses the basket and input i/0.2 goes high and LED turns off. 15 seconds later output O/0.0 is de-energized, output O/0.1 is energized and energizes Cylinder #1 fully retracted solenoid. Cylinder #1 retracts.

The basket is halfway between C1 and C2 conveyors. Five seconds later, output O/0.1 is de-energized and output O/0.0 turns on, energizing Cylinder #1 fully forward solenoid. Cylinder #1 moves forward.

Photoelectric sensor i/0.3 senses the basket and input i/0.3 goes high and LED turns off. Photoelectric sensor X1-R senses no basket, and input i/0.1 goes low and LED turns on. 15 seconds later, output O/0.0 is de-energized, output O/0.1 is energized and energizes Cylinder #1 fully reversed solenoid. Cylinder #1 retracts.

Basket is now located on C2 conveyor. Both i/0.2 and i/0.3 inputs go high and Leds turn off.

B) Door Opening, Soiled Side

When both inputs i/0.2 and i/0.3 are turned off for at least three seconds, output O/2.0 is energized (soiled side door open signal). This output is connected to the input LS6 of the control board in the washer/disinfector. Input LS6 goes low. The Eagle 3000 control opens the load door of the washer/disinfector. The barcode reader turns on. On the display, the following message is shown:

LOADING...

When the door is fully open, proximity sensor i/0.4 goes low, and the i/0.4 conveyor input LED turns on. Three seconds later,

C) Basket Loading, C2 Conveyor Operation

Output O/0.2 is energized, energizing Cylinder #2 fully forward. Basket is moved forward.

Photoelectric sensor i/0.2 senses no basket and input i/0.2 goes low and the LED on the control turns on. 15 seconds later, output O/0.3 is energized, which in turn energizes Cylinder #2 fully retracted solenoid. Cylinder #2 retracts.

The basket is halfway between C2 conveyor and the chamber. Five seconds later, output O/0.3 is de-energized and output O/0.2 is energized, energizing Cylinder #2 fully forward solenoid. Cylinder #2 moves forward.

Photoelectric sensor i/0.3 senses no basket and input i/0.3 goes low and LED turns on. Barcode tag attached to the basket is read by the Bar Code reader when tag faces the barcode lens. Output O/0.2 is energized for 15 seconds. Output O/0.2 is de-energized, output O/0.3 is energized and energizes Cylinder #2 fully retracted solenoid. Cylinder #2 retracts.

Basket is now located in the chamber.

If code was read, output O/2.0 (door open signal, soiled side) is de-energized (goes low). In the Eagle 3000 Control, LS6 goes high, and the soiled side door closes. The following message is displayed:

**CAUTION
DOOR CLOSING...**

When the door is closed, the cycle read by the barcode reader starts automatically. If the code cannot be read or is unrecognized, the load door stays open. Eagle 3000 Control de-energizes AC11 output, CR1 relay is de-energized, i/1.4 input goes high and the LED turns off. All outputs except O/2.2 (emergency stop signal), and O/0.1, O/0.3, O/0.5, O/0.7 (retract solenoids valves) are de-energized. The following alarm is displayed:

**LOAD CHAMBER
THEN CLOSE DOOR...**

Press ALARM REPLY touch pad to silence alarm tone.

Operator must make sure that basket is fully in chamber and press DOOR CLOSE touch pad. Once the load door is closed, display shows:

**PRESS START
TO SELECT CYCLE...**

When START touch pad is pressed, displays shows a cycle menu. Cycle must be manually started. When cycle is started, the Eagle 3000 control energized AC11 output. CR1 relay is energized, and i/1.4 input goes low (led turns on) enabling conveyor operation. Output O/0.7 (load conveyor empty) and O/2.1 (door open signal clean side) turns on.

D) Door Opening Clean Side

Output O/2.1 is energized, (input LS7 on Eagle 3000 Control board goes low). This means there is no basket on conveyor section C3, both photoelectric sensors i/0.6 and i/0.7 are unobstructed and i/0.6 and i/0.7 inputs low (input Leds are turned on).

Basket is now being processed in the washer/disinfector. At the end of the cycle, Eagle 3000 control reads (input LS7 on the control board) the status of the O/2.1 (door open signal clean side).

IMPORTANT: If at this time, output O/2.1 is off (input LS7 is high), the following messages are displayed:

**ALARM: UNLOAD
CONVEYOR FULL**

and

**CYCLE STOPPED
PRESS START TO RESUME**

This means that the obstruction (probably a basket) on conveyor C3 must be cleared. Both i/0.6 and i/0.7 sensors must be cleared. When C3 conveyor is cleared i/0.6 and i/0.7 inputs go low (input Leds on). output O/2.1 is on sending a low signal to LS7 on the washer/disinfector control board. Then Eagle 3000 control opens the unload door of the washer/disinfector and the following message is displayed:

UNLOADING...

NOTE: If START touch pad is pressed while basket is still on conveyor C3, the same alarm is displayed (ALARM UNLOAD CONVEYOR FULL).

When door is fully open, proximity sensor i/0.5 (clean door) emits an output signal, and input i/0.5 to the conveyor goes low (input LED turns on).

E) Basket Unloading, C3 Conveyor Operation

Three seconds later, Output O/0.4 is energized and energizes Cylinder #3 fully forward solenoid.

Five seconds later, output O/0.4 is de-energized, outputs O/2.4 and O/0.5 are energized, which in turn energizes cylinder pawls (pawls of cylinder #3 and #4 lift up) and Cylinder #3 fully retracts solenoids.

Cylinder #3 retracts. Basket moves from chamber to C3 conveyor. Photoelectric sensors i/0.6 senses basket and i/0.6 input goes low (input LED turns off).

The basket is halfway between chamber and C3 conveyor), 15 seconds later outputs O/0.5 and O/2.4 are de-energized, output O/0.4 is energized, energizing Cylinder #3 fully forward solenoid.

Five seconds later, output O/0.4 is de-energized, outputs O/2.4 and O/0.5 are energized, which in turn energizes cylinder pawls (pawls of cylinder #3 and #4 lift up) and Cylinder #3 fully retracts solenoids. Cylinder #3 retracts. Photoelectric sensor i/0.7 senses basket, and i/0.7 goes high (input LED turns off). 15 seconds later, output O/2.4 turns off.

Basket is now located on C3 conveyor. Output O/2.1 (door open clean side) is de-energized. Eagle 3000 Control input LS7 is now high, then the washer/disinfector's clean side door closes. The following message is displayed:

**CAUTION
DOOR CLOSING...**

F) Basket Unloading, C4 Conveyor Operation

Output O/2.6 is energized and energizes Cylinder #4 fully forward solenoid.

Five seconds later, output O/2.6 is de-energized, output O/2.0 and O/2.4 are energized, which in turn energizes cylinder pawls and Cylinder #4 fully retracts solenoids. Cylinder #4 (o/2.7) retracts. basket moves from C3 to C4 conveyor. Photoelectric sensor i/0.6 senses no basket and input i/0.6 goes low (input led turns on). Photoelectric sensor i/1.0 senses basket and input i/1.0 goes high (input LED turns off). 15 seconds later,

(the basket is halfway between C3 conveyor and C4 conveyor) and output O/2.7 is de-energized. Output O/2.6 energizing Cylinder #4 fully forward solenoid.

Five seconds later, output O/2.6 is de-energized, output O/2.4 and O/2.7 are energized, which in turn energizes cylinder pawls and Cylinder #4 fully retracted solenoids. Cylinder 4 retracts. Photoelectric sensor i/0.7 senses no basket and i/0.7 goes low (input led turns on).

15 seconds later, output O/2.4 (cylinder pawls) is de-energized. The basket is now located on C4 conveyor. Photoelectric sensor i/1.1 may or may not sense the edge of the basket. The function of this sensor is to prevent Cylinder #4 from moving baskets forward beyond this point.

G) Emergency Stop Operation

The following describes the sequence of events after an EMERGENCY STOP button is pressed while Cylinder #1 is pushing a basket (washer/disinfector is idle).

The I/O pattern is:

- Before the Emergency Stop button is pressed, relays CR1, CR2, CR3 in the conveyor main control box are energized.
- Outputs: O/0.0 (Cylinder #1 fully forward solenoid), O/0.3, O/0.5, O/2.7 (Cylinder #2,3,4 fully retracted solenoid), O/2.1 (door open, clean side signal) O/2.2 (emergency stop signal), are energized.

When the Emergency Stop pushbutton is pressed, conveyor input i/0.0 goes high (LED turns off), relay CR2 is de-energized, NO contact CR2 opens, and output O/0.0 is de-energized, stopping Cylinder #1. All outputs are de-energized. Eagle 3000 Control LS5 go high (because O/2.2 is de-energized). Eagle 3000 control de-energizes output AC11, relay CR1 de-energizes and i/1.4 goes high (input LED turns off).

The following message is displayed:

**E-STOP PRESSED
PULL TO RESUME...**

When EMERGENCY STOP pushbutton is pulled out, relay CR2 is energized, input i/0.0 goes low (input LED turns on).

Output O/2.2 is energized. This causes all cylinders to return to their retracted positions. Output O/0.1, O/0.3, O/0.5, and O/2.7 (cylinder retract solenoid) are energized. Eagle 3000 control energizes output AC11, relay CR1 energizes and i/1.4 goes high (input LED turns on).

The Cycle menu appears on the display, and the conveyors are ready to operate.

If a basket was being loaded by the conveyor and the emergency stop button is pressed, CR2 relay and output O/2.2 are de-energized and the display shows:

**E-STOP PRESSED
PULL TO RESUME...**

All outputs are de-energized. Eagle 3000 Control de-energizes output AC11, CR1 relay is de-energized, and input i/1.4 goes high (input LED turns off). Operator must pull-out the emergency stop button. Once button is pulled, CR2 relay and output O/2.2 (emergency stop output) are energized, and all retract solenoids too (O/0.1, O/0.3, O/0.5, O/2.7), display shows:

**LOADCHAMBER
THEN CLOSE DOOR...**

Operators must push basket inside chamber and press DOOR CLOSE touch pad and the cycle must be started manually. When the cycle is started, Eagle 3000 Control energizes output AC11, CR1 relay is energized, and input i/1.4 goes low (input LED turns on). Conveyors are ready to operate.

NOTE: When a cycle is aborted, or if an alarm occurred while a cycle is in progress (e.g., "ALARM: SUMP TOO LONG IN FILL", "ALARM: DET 1 EMPTY", etc.), the Eagle 3000 control turns off its output AC11, relay CR1 turns off, i/1.4 goes low (input LED turns off) and the conveyor system is disabled. The operator must initiate a cycle to re-start the conveyor system.

If a basket was being unloaded by the conveyor system and the Emergency Stop button is pressed, CR2 relay and output O/2.2 (emergency stop) are de-energized and the display shows:

**E-STOP PRESSED
PULL TO RESUME...**

All outputs are de-energized. Eagle 3000 Control de-energizes output AC11, CR1 relay is de-energized and input i/1.4 goes high (input LED turns OFF). Operator must pull-out the emergency stop button. Once button is pulled, CR2 relay and output O/2.2 (emergency stop output) are energized, and all retract solenoids too (O/0.1, O/0.3, O/0.5, O/2.7). Display shows:

**UNLOADCHAMBER
THEN CLOSE DOOR**

Operator must pull out basket from chamber and position basket onto C3 conveyor. Once basket is in position on Conveyor C3, the DOOR CLOSE touch pad must be pressed to close the unload door. Once door is closed, the Eagle 3000 control energizes its output AC11 and relay CR1 energizes. The conveyor system is now ready to operate.

H) Reposition Basket Message

When the following message is displayed by the Eagle 3000 control:

REPOSITION BASKET!

This means, for any reason a basket from either side of the conveyor system needs to be reposition. Pressing alarm reply will not silent alarm tone. Basket must be manually placed on a valid position onto the module. When basket is in proper position, alarm tone and message are automatically cleared.

This message is initiated by the PLC controller. The system recognizes invalid positions of baskets on the conveyor. Basket positions are analysed by the photo-electric sensors. If an invalid position is found, output O/2.3 (conveyor obstruction/reposition basket signal) is energized, thus transmitting a signal to the Eagle 3000 control. When any cylinders are energized, the system ignore all invalid positions. The following tables show the invalid position as per module configuration:

FOR THE LOAD SIDE,

For Single load module:

i/0.2 and i/0.3 are the inputs associated with photo-electric sensors i/0.2 and i/0.3.

| i/0.1 | i/0.2 | i/0.3 | |
|-------|-------|-------|------------------|
| X | 0 | X | REPOSITIONBASKET |
| X | X | 0 | REPOSITIONBASKET |
| 0 | X | 0 | REPOSITIONBASKET |
| 0 | 0 | X | REPOSITIONBASKET |

X = photo-electric sensor unobstructed, input energized.

0 = photo-electric sensor obstructed, input de-energized.

FOR THE UNLOAD SIDE

- For Single load module:

No invalid position defined.

- For double unload module:

i/0.6, i/0.7, i/1.0 and i/1.1 are the inputs associated with photo-electric sensors i/0.6, i/0.7, i/1.0 and i/1.1.

| i/0.6 | i/0.7 | i/1.0 | i/1.1 | |
|-------|-------|-------|-------|---------------|
| X | 0 | 0 | X | REPOS. BASKET |
| X | 0 | X | X | REPOS. BASKET |
| 0 | X | X | X | REPOS. BASKET |

X = photo-electric sensor unobstructed, input energized.

0 = photo-electric sensor obstructed, input de-energized.

Table 5-4. Software Evolution Chart

| Date | Program | Description | Part Number/Revision |
|---------------|---------|---|----------------------|
| February 2002 | 444V39 | From the 444 HTM platform | 117912-119 /Rev. 0 |
| | | From the 444 HTM platform | 117912-120 /Rev.0 |
| | | <i>NOTE: The Reliance Synergy program is not compatible with Amsco® Reliance® 444 Single-Chamber Washer/Disinfector program 117912-671 Rev. 1</i> | |

Table 5-5. Schematics Reference List

| Reference Number | Title |
|--------------------------|---|
| Table 5-6 920-014-948 | Reliance Synergy Washer/Disinfector – Cycle Description Chart |
| 920-016-018 | Reliance Synergy Washer/Disinfector – GENTLE Cycle Graph |
| 920-014-025 | Reliance Synergy Washer/Disinfector – Equipment Drawing – Steam/Electric Heated |
| 920-013-332 | Reliance Synergy Washer/Disinfector – Electric Diagram Power Section 380/400/415V, 3PH, 50Hz |
| 920-015-367 | Reliance Synergy Washer/Disinfector – Process and Instrument Diagram |
| 920-081-010 | Console Assembly - Printer Display Schematic (Page 3 of 3) |
| 122993-509 | Amsco® Reliance® 444 Load/Unload Modules |
| 920-012-510 | Amsco® Reliance® 444 Load/Unload Modules – Electrical System Schematic, 100-240 Vac, 50/60 Hz (Units from S/N 3601002000) |
| 122-993-549 | Amsco® Reliance® 444 Load/Unload Modules – Pneumatic Schematics |

Table 5-6. Reliance Synergy Washer /Disinfector – Cycle Description Chart

| RE-CIRCULATION TIME (4) | PRE-WASH (1 TO 4) | | PULSED ENZYME | | WASH | | NEUTRALIZER | | RINSE (1 TO 4) | | THERMAL RINSE | | DRYING | |
|---------------------------------|-------------------|-------|-------------------|-------|---|-------|---------------------|-------|---|-------|---|-------|--|------|
| | SELECT | | SELECT | | SELECT | | SELECT | | SELECT | | SELECT | | SELECT | |
| | DEFAULT | TO | DEFAULT | TO | DEFAULT | TO | DEFAULT | TO | DEFAULT | TO | DEFAULT | TO | DEFAULT | TO |
| 00:00 | 00:15 | 02:00 | 04:00 | 04:00 | 02:00 | 02:30 | 01:00 | 01:00 | 00:15 | 00:15 | 01:00 | 01:00 | 05:00 | 6:00 |
| | 15:00 | | 15:00 | | 15:00 | | 15:00 | | 15:00 | | | | TO 60:00 (1) | |
| INJECTION PUMP SELECTION: | | | PUMP 4 | | PUMP 1 | | PUMP 2 | | PUMP 1 | | PUMP 5 | | | |
| INJECTION RATE: | | | 1 oz/gal [8 mL/L] | | 1/4 oz/gal [2 mL/L] | | 1/4 oz/gal [2 mL/L] | | 1/4 to 2 oz/gal [2 to 16 mL/L] | | Lubricant 10-15mL CR Rinse-add 0.1 or 0.2 mL | | | |
| WATER TYPE & TEMP. OR AIR TEMP. | CTW | | HTW | | HEATED 140.0°F [60.0°C] TO 160.0°F [71.1°C] | | HTW | | HTW HEATED 140.0°F [60.0°C] TO 160.0°F [71.1°C] | | PW or HTW HEATED 180.0°F [82.2°C] | | LOW 160.0°F [71.1°C] CR HIGH 240.0°F [115.5°C] (5) | |

| | MOTOR SPEED | | X | X | X | X | X | X | X | X | X | X | X | X |
|--------------------------------------|-------------|----------|---|---|---|---|---|---|---|---|---|---|---|-------|
| | DEFAULT | SELECT | | | | | | | | | | | | |
| 00 INSTRUMENTS (2) | HIGH | | | | | | | | | | | | | |
| 01 UTENSILS | LOW | LOW/HIGH | | | | | | | | | | | | |
| 03 GLASSWARE | LOW | LOW/HIGH | | | | | | | | | | | | |
| 04 PLASTIC GOODS | LOW | LOW/HIGH | | | | | | | | | | | | |
| 05 ANAESTHESIA RESPIRATORY GOODS (2) | HIGH | | | | | | | | | | | | | |
| 06 GENTLE CYCLE (2) | LOW | LOW/HIGH | | | | | | | | | | | | |
| 07 RIGID MIS (2) | HIGH | | | | | | | | | | | | | |
| 08 CYCLE | LOW | LOW/HIGH | | | | | | | | | | | | |
| 09 CYCLE | LOW | LOW/HIGH | | | | | | | | | | | | |
| 10 CYCLE (3) | LOW | LOW/HIGH | | | | | | | | | | | | |
| DECONTAMINATION | HIGH | | | | | | | | | | | | | 30:00 |

CTW- COLD TAP WATER
HTW- HOT TAP WATER
PW- PURE WATER

NOT APPLICABLE

IF SELECTED

Notes:

- (1) If drying temperature is HIGH, the maximum drying time is 30 minutes
- (2) Cycle selection and minimum default values have been selected to ensure that the intended use will be achieved under typical conditions of use. National regulations or validation requirements may demand that the selection be changed.
- (3) Cycle 10 is not open for maintenance. The Balance Sensor/Washer/Disinfector may not achieve its intended use if the selected cycle phases and cycle values do not match the minimal selections of the programmed cycles.
- (4) These temperatures are for reference only and are not guaranteed
- (5) A second enzyme tank can be added

Reliance Synergy Washer/Disinfector - GENTLE Cycle Graph

| Legend | |
|-------------------------------------|--|
| Inputs | |
| <input type="checkbox"/> | Not applicable. |
| <input checked="" type="checkbox"/> | Input must be activated for the specified time. |
| Outputs | |
| <input type="checkbox"/> | Output is not energized. |
| <input type="checkbox"/> | Output is not energized for the specified time. |
| <input checked="" type="checkbox"/> | Output is energized for the specified time. |
| <input checked="" type="checkbox"/> | Output is energized for the specified time if an option is present, or based on operator action. |
| <input checked="" type="checkbox"/> | Output is energized for the specified time + the heating time. |
| <input checked="" type="checkbox"/> | Output is modulated to maintain the specified temperature. |
| <input checked="" type="checkbox"/> | Output is activated based on temperature. |
| <input checked="" type="checkbox"/> | Output activation is based on an input or another output. |
| <input checked="" type="checkbox"/> | Multiple conditions combined. |

Reliance Synergy Washer/Disinfector - GENTLE Cycle Graph

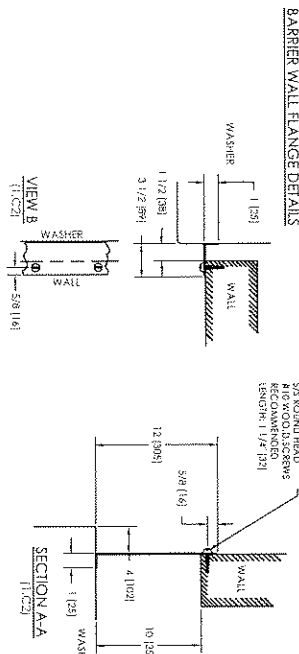
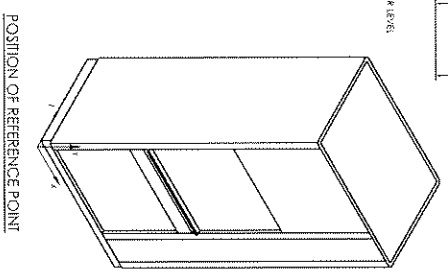
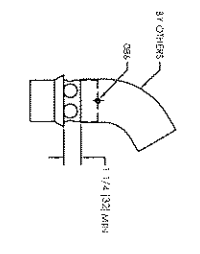
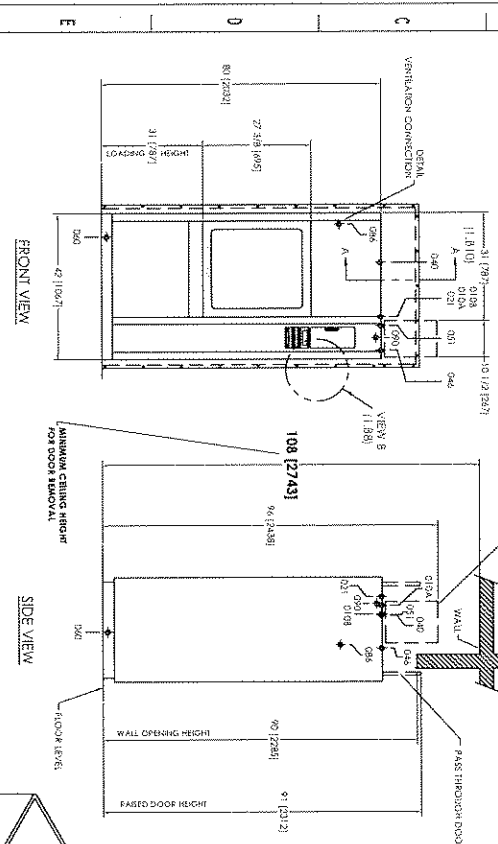
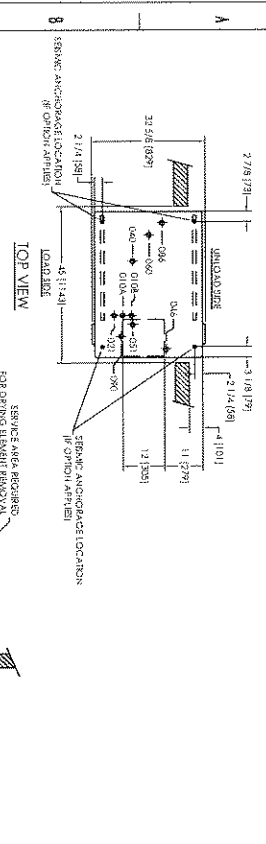
| Inputs | PREWASH 1 | | ENZYME WASH | | ENZYME RINSE 1 | |
|---|-----------|-------|---------------|-------|----------------|-------|
| | Filling | Drain | Rectification | Drain | Filling | Drain |
| X0 - Motor Overload (LS0) | | | | | | |
| X1 - Motor Level (LS1) | | | | | | |
| X2 - Safety Level Switch (LS2) | | | | | | |
| X3 - Circuit RMD Malfunction (LS3) | | | | | | |
| X4 - Pump High Level (LS4) | | | | | | |
| X5 - Emergency Stop (LS5) | | | | | | |
| X6 - AFS Open Load Door (LS6) | | | | | | |
| X7 - AFS Open Unload Door (LS7) | | | | | | |
| X8 - Conveyor Obstructed (LS8) | | | | | | |
| X9 - Disk Full (I Monitor) (LS9) | | | | | | |
| X0 - Indicator RMD Malfunction (LS0) | | | | | | |
| Y0 - Load Door Closed (LS1) | | | | | | |
| Y1 - Unload Door Closed (LS2) | | | | | | |
| Y2 - Water Level Sensor (Piping) (LS3) | | | | | | |
| Y3 - Temp. Cutout Message (LS4) | | | | | | |
| Y4 - Load Sensor Safety Switch (LS5) | | | | | | |
| Y5 - Unload Sensor Safety Switch (LS6) | | | | | | |
| Y6 - Detergent 1 Low Level (LS7) | | | | | | |
| Y7 - Detergent 2 Low Level (LS8) | | | | | | |
| Y8 - Detergent 3 Low Level (LS9) | | | | | | |
| Y9 - Detergent 4 Low Level (LS10) | | | | | | |
| Y0 - Detergent 5 Low Level (LS11) | | | | | | |
| Outputs | | | | | | |
| Z0 - Cold water fill valve (AO) | | | | | | |
| Z1 - Cooling Discharge Valve (AO) | | | | | | |
| Z2 - Hot water fill (AO) | | | | | | |
| Z3 (SU) - Pump Steam Valve/Sump Heater (AO) | | | | | | |
| Z4 - Load Power Door Open Valve (AO) | | | | | | |
| Z5 - Dryer Heater Contactor (AO) | | | | | | |
| Z6 - AFS Ready to Load (AO) | | | | | | |
| Z7 - High Speed Motor (AO) | | | | | | |
| Z8 - Drying Fan (AO) | | | | | | |
| Z9 - Conveyor Control R/O AFS (AO) | | | | | | |
| Z0 - AFS Ready to Unload (AO) | | | | | | |
| Z1 - Indicator Record (AO) | | | | | | |
| Z2 - Serial Port (AO) | | | | | | |
| Z3 - Cold Water Fill to Condensor (AO) | | | | | | |
| Z4 - Pure Water Inlet Valve (AO) | | | | | | |
| Z5 - Drain Valve (AO) | | | | | | |
| Z6 - Unload Power Door Open Valve (AO) | | | | | | |
| Z7 - Unload Power Door Close Valve (AO) | | | | | | |
| Z8 - Drying Temp. Selection (AO) | | | | | | |
| Z9 - Rg-232 Relay (AO) | | | | | | |
| Z0 - Detergent Pump 2 (AO) | | | | | | |
| Z1 - Detergent Pump 4 (AO) | | | | | | |
| Z2 - Detergent Pump 1 (AO) | | | | | | |
| Z3 - Detergent Pump 3 (AO) | | | | | | |
| Z4 - Detergent Pump 5 (AO) | | | | | | |
| Estimated time: 00:46 | | | | | | |
| Total estimated time: 26:05 | | | | | | |

Reliance Synergy Washer/Disinfecter - GENTLE Cycle Graph

| Inputs: | WASH | | | | RINSE | | | | THERMAL RINSE | | | | | | | | |
|--|---------|-----------|-------|---------|---------|-----------|-------|---------|---------------|-----------|-------|---------|-------|--|-------|--|-------|
| | Filling | Injection | Drain | Recirc. | Filling | Injection | Drain | Recirc. | Filling | Injection | Drain | Recirc. | | | | | |
| LD - Motor Overload (LS0) | | | | | | | | | | | | | | | | | |
| LE - Sump Level (LS1) | | | | | | | | | | | | | | | | | |
| LF - Safety Level Switch (LS2) | | | | | | | | | | | | | | | | | |
| LM - Circuit RPD Malfunction (LS3) | | | | | | | | | | | | | | | | | |
| LN - Sump High Level (LS4) | | | | | | | | | | | | | | | | | |
| LO - Emergency Stop (LS5) | | | | | | | | | | | | | | | | | |
| LP - AFS Open Load Door (LS6) | | | | | | | | | | | | | | | | | |
| LQ - AFS Open Unload Door (LS7) | | | | | | | | | | | | | | | | | |
| LR - Conveyor Obstructed (LS8) | | | | | | | | | | | | | | | | | |
| LS - Disk Full (Monitor) (LS9) | | | | | | | | | | | | | | | | | |
| LT - Monitor RPD Malfunction (LS0) | | | | | | | | | | | | | | | | | |
| LU - Load Door Closed (LS1) | | | | | | | | | | | | | | | | | |
| LV - Water Level Sensor (Piping) (LS1) | | | | | | | | | | | | | | | | | |
| LU - Temp. Circuit Message (LS4) | | | | | | | | | | | | | | | | | |
| LS - Load Sensor Safety Switch (LS5) | | | | | | | | | | | | | | | | | |
| LU - Unload Sensor Safety Switch (LS6) | | | | | | | | | | | | | | | | | |
| D1 - Detergent 1 Low Level (LS7) | | | | | | | | | | | | | | | | | |
| D2 - Detergent 2 Low Level (LS8) | | | | | | | | | | | | | | | | | |
| D3 - Detergent 3 Low Level (LS9) | | | | | | | | | | | | | | | | | |
| D4 - Detergent 4 Low Level (LS10) | | | | | | | | | | | | | | | | | |
| D5 - Detergent 5 Low Level (LS11) | | | | | | | | | | | | | | | | | |
| Outputs: | | | | | | | | | | | | | | | | | |
| CH - Cold Water Fill Valve (AC9) | | | | | | | | | | | | | | | | | |
| CD - Cooling Discharge Valve (AC1) | | | | | | | | | | | | | | | | | |
| HM - Hot Water Fill (AC2) | | | | | | | | | | | | | | | | | |
| LC - Load Power Door Close Valve (AC3) | | | | | | | | | | | | | | | | | |
| LS (SH) - Sump Steam Valve/Sump Heater (AC4) | | | | | | | | | | | | | | | | | |
| LO - Load Power Door Open Valve (AC5) | | | | | | | | | | | | | | | | | |
| LM - Dryer Heater Controller (AC6) | | | | | | | | | | | | | | | | | |
| LU - AFS Ready to Load (AC7) | | | | | | | | | | | | | | | | | |
| LS - Low Speed Motor (AC8) | | | | | | | | | | | | | | | | | |
| HS - High Speed Motor (AC9) | | | | | | | | | | | | | | | | | |
| DF - Drying Fan (AC10) | | | | | | | | | | | | | | | | | |
| CO - Conveyor Control W/O AFS (AC11) | | | | | | | | | | | | | | | | | |
| RU - AFS Ready to Unload (AC1) | | | | | | | | | | | | | | | | | |
| RM - X Monitor Sensor (AC12) | | | | | | | | | | | | | | | | | |
| SP - Social Port (AC10) | | | | | | | | | | | | | | | | | |
| WC - Cold Water Fill to Condenser (AC1) | | | | | | | | | | | | | | | | | |
| DV - Drain Valve (AC3) | | | | | | | | | | | | | | | | | |
| UC - Unload Power Door Open Valve (AC4) | | | | | | | | | | | | | | | | | |
| UL - Unload Power Door Close Valve (AC5) | | | | | | | | | | | | | | | | | |
| UL - Drying Temp. Baljection (AC6) | | | | | | | | | | | | | | | | | |
| UB - RS-32 Relay (AC7) | | | | | | | | | | | | | | | | | |
| P2 - Detergent Pump 2 (AC9) | | | | | | | | | | | | | | | | | |
| P4 - Detergent Pump 4 (AC9) | | | | | | | | | | | | | | | | | |
| P1 - Detergent Pump 1 (AC10) | | | | | | | | | | | | | | | | | |
| P3 - Detergent Pump 3 (AC11) | | | | | | | | | | | | | | | | | |
| P5 - Detergent Pump 5 (AC12) | | | | | | | | | | | | | | | | | |
| Estimated Time: | 00:40 | | 02:30 | | 01:05 | | 00:40 | | 00:15 | | 01:00 | | 00:40 | | 01:00 | | 01:30 |

Reliance Synergy Washer/Disinfecter - GENTLE Cycle Graph

| Inputs: | | DRY | |
|--|--|-----------------|-------|
| NO - Motor Overload (LS0) | | | |
| IL - Sump Level (LS1) | | | |
| OF - Safety Level Switch (LS2) | | | |
| RM - Cutout RFD Malfunction (LS3) | | | |
| SH - Sump High Level (LS4) | | | |
| ES - Emergency Stop (LS5) | | | |
| OL - MTS Open Load Door (LS6) | | | |
| OU - MTS Open Unload Door (LS7) | | | |
| BJ - Conveyor Obstructed (LS8) | | | |
| RF - Disk Full (I Monitor) (LS9) | | | |
| TM - I Monitor RFD Malfunction (LS0) | | | |
| LD - Load Door Closed (LS1) | | | |
| UD - Unload Door Closed (LS2) | | | |
| BU - Water Level Sensor (Piping) (LS3) | | | |
| TC - Temp. Cutout Message (LS4) | | | |
| LS - Load Sensor Safety Switch (LS5) | | | |
| US - Unload Sensor Safety Switch (LS6) | | | |
| D1 - Detergent 1 Low Level (LS7) | | | |
| D2 - Detergent 2 Low Level (LS8) | | | |
| D3 - Detergent 3 Low Level (LS9) | | | |
| D4 - Detergent 4 Low Level (LS10) | | | |
| D5 - Detergent 5 Low Level (LS11) | | | |
| Outputs: | | | |
| CW - Cold water fill valve (AO) | | | |
| CD - Cooling Discharge Valve (AC1) | | | |
| HW - Hot water fill (AC2) | | | |
| LC - Load Power Door Close Valve (AC3) | | | |
| SS (SH) - Sump Steam Valve/Sump Heater (AC4) | | | |
| LO - Load Power Door Open Valve (AC5) | | | |
| DH - Dryer Heater Contactor (AC6) | | | |
| RL - MTS Ready to Load (AC7) | | | |
| LS - Low Speed Motor (AC8) | | | |
| HS - High Speed Motor (AC9) | | | |
| DF - Drying Fan (AC10) | | | |
| CO - Conveyor Control H/O MTS (AC11) | | | |
| BU - MTS Ready to Unload (AC11) | | | |
| TR - I Monitor Alarm (AC12) | | | |
| SP - Serial Port (AC0) | | | |
| WC - Cold Water Fill to Condensor (IAC1) | | | |
| FF - Pure Water Inlet Valve (IAC2) | | | |
| DV - Drain Valve (IAC3) | | | |
| VO - Unload Power Door Open Valve (IAC4) | | | |
| UC - Unload Power Door Close Valve (IAC5) | | | |
| HC - Drying Temp. Selection (IAC6) | | | |
| RS - RS-232 Relay (IAC7) | | | |
| P2 - Detergent Pump 2 (IAC8) | | | |
| P4 - Detergent Pump 4 (IAC9) | | | |
| P1 - Detergent Pump 1 (IAC10) | | | |
| P3 - Detergent Pump 3 (IAC11) | | | |
| P5 - Detergent Pump 5 (IAC12) | | | |
| | | Estimated time: | 06:00 |



| SYNERGY STEAM-HEAT | CONNECTION POSITION WITH REFERENCE POINT | | |
|--------------------|--|------------|-------------|
| | X | Y | Z |
| 010A | 30' (9143) | 80' (2438) | 8' (243) |
| 010B | 30' (9143) | 80' (2438) | 10' 1/2\"/> |
| 021 | 35' (7921) | 80' (2438) | 5' 1/2\"/> |
| 040 | 14' 1/4\"/> | | |
| 051 | 32' 1/2\"/> | | |
| 056 | 3' 1/4\"/> | | |
| 060 | 4' 8 1/8\"/> | | |
| 066 | 39' 1/2\"/> | | |
| 090 | 35' 7/8\"/> | | |

| SYNERGY ELECTRIC-HEAT | CONNECTION POSITION WITH REFERENCE POINT | | |
|-----------------------|--|------------|-------------|
| | X | Y | Z |
| 010A | 30' (9143) | 80' (2438) | 8' (243) |
| 010B | 30' (9143) | 80' (2438) | 10' 1/2\"/> |
| 021 | 35' (7921) | 80' (2438) | 5' 1/2\"/> |
| 040 | 14' 1/4\"/> | | |
| 051 | 32' 1/2\"/> | | |
| 056 | 3' 1/4\"/> | | |
| 060 | 4' 8 1/8\"/> | | |
| 066 | 39' 1/2\"/> | | |
| 090 | 35' 7/8\"/> | | |

STERIS STERIS Canada Corporation

STERIS SINGLE-CHAMBER WASHER/DISINFECTOR

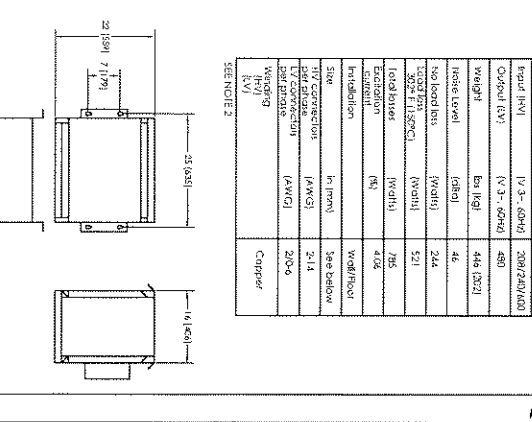
DOMESTIC / INTERNATIONAL

920-014-025

1 SHEET 6

DYNAMIC UTILITY REQUIREMENTS CHART

| DESCRIPTION | UNIT | OPERATING RANGE | OPERATING CONSUMPTION | |
|----------------------|------|--------------------------|---|---|
| | | | STEAM (kg/hr) | WATER (liters/hr) |
| 010A HOT WATER | 100 | 13-50 pmg (103-345 l/hr) | 9.2 US gpm (345 l/hr) | 1.72 US gpm (65 l/hr) |
| 010B COLD WATER | 100 | 30-50 pmg (264-445 l/hr) | 13.2 US gpm (50 l/hr) to 21.1 US gpm (80 l/hr) | 1.2 US gpm (45 l/hr) to 2.1 US gpm (80 l/hr) |
| 020 STEAM | 100 | 30-50 pmg (264-445 l/hr) | 300 l/hr at 1.80 pmg (1.38 kg/hr) at 1.050 x 10 ⁵ Pa | 200 l/hr at 1.20 pmg (0.90 kg/hr) at 1.020 x 10 ⁵ Pa |
| 030A VENTILATION | 100 | 317.800 | 1.500 | 1.500 |
| 040 COMPRESSOR | 100 | 1/2 | 60.000 | 60.000 |
| 050 ELECTRICAL | 100 | 394.119 | 11.200 | 11.200 |
| 060 OPERATING WEIGHT | 100 | 48 | 1.000 | 1.000 |
| 070 OPERATING WEIGHT | 100 | 48 | 1.000 | 1.000 |
| 080 OPERATING WEIGHT | 100 | 48 | 1.000 | 1.000 |
| 090 OPERATING WEIGHT | 100 | 48 | 1.000 | 1.000 |



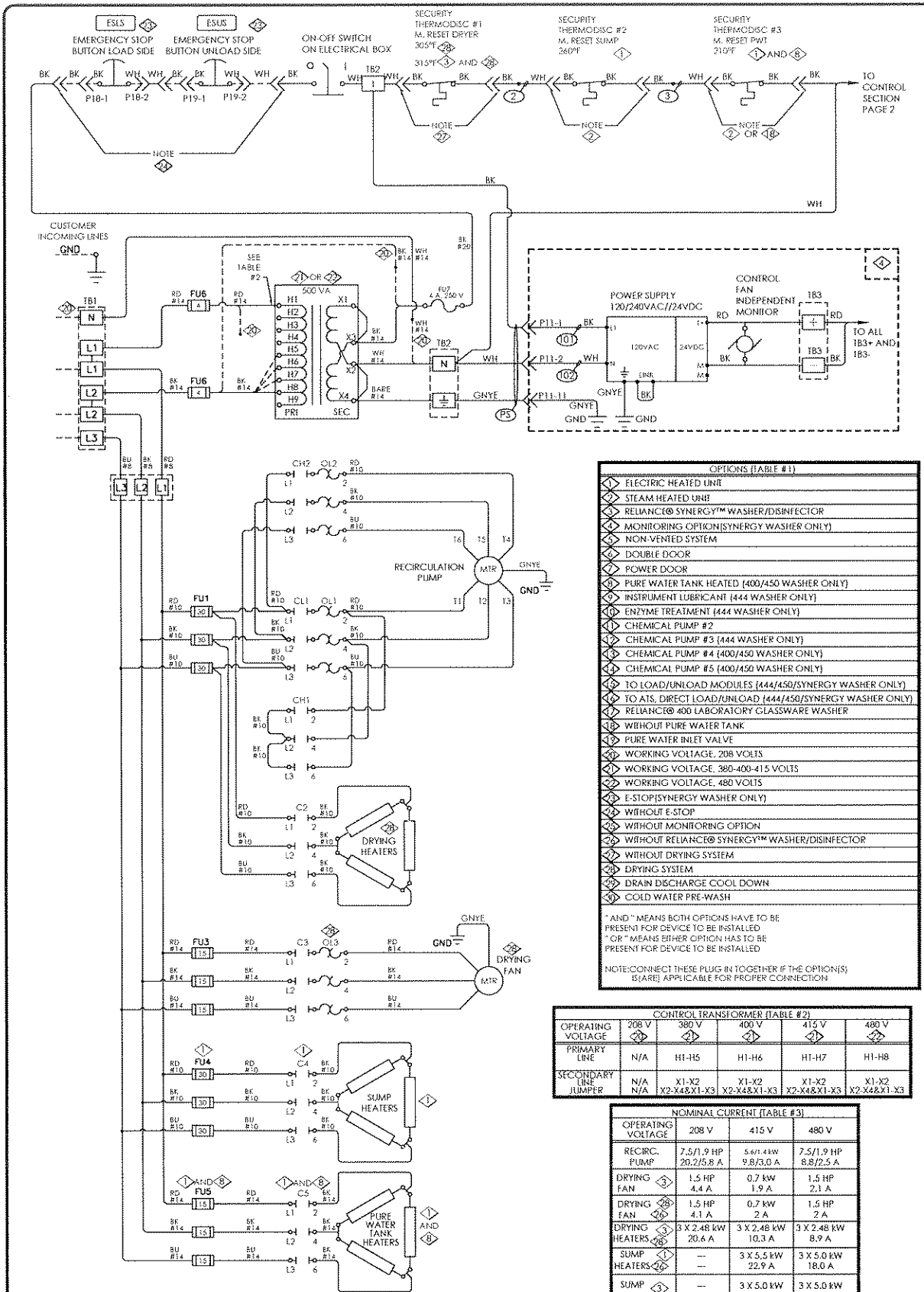
ENGINEERING DATA: COMPRESSOR BEANSFORMER
 POWER: 4.0
 MODEL: 3003/0722

| INSTRUMENT CYCLE | UTILITIES | CONSUMPTION PER PHASE | | | | | | | | |
|------------------|-----------------------|-----------------------|------|------|-------|------|--------|-------------|--------|------|
| | | PREWASH | WASH | WASH | RINSE | HEAT | DRYING | TONAL/CYCLE | REPAIR | |
| 010A | HOT WATER (liters) | 13.2 | 13.2 | 13.2 | 13.2 | 13.2 | 13.2 | 13.2 | 13.2 | 13.2 |
| 010B | COLD WATER (liters) | 13.2 | 13.2 | 13.2 | 13.2 | 13.2 | 13.2 | 13.2 | 13.2 | 13.2 |
| 020 | STEAM (kg/hr) | 300 | 300 | 300 | 300 | 300 | 300 | 300 | 300 | 300 |
| 030A | VENTILATION (m³/hr) | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 |
| 040 | COMPRESSOR (kWh) | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 |
| 050 | ELECTRICAL (kWh) | 11.2 | 11.2 | 11.2 | 11.2 | 11.2 | 11.2 | 11.2 | 11.2 | 11.2 |
| 060 | OPERATING WEIGHT (kg) | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 |
| 070 | OPERATING WEIGHT (kg) | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 |
| 080 | OPERATING WEIGHT (kg) | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 |
| 090 | OPERATING WEIGHT (kg) | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 |

STERIS
 Reliance Snergy
 Washer/Inspector
 Washers/Inspectors

NOTE: 1. CUSTOMER MUST BE SURE THAT MACHINE STARTS ON A NON-COMMERCIAL CLOCK.
 2. STEAM RECOMMENDED AIR LEAKAGE IN THE SERVICE AREA, IF APPLICABLE, ALONG WITH
 3. ISOLATION VALVES CHECK VALVES, VALVE BACKSEALS AND TIGHT DISCONNECT SWITCH
 4. PRESSURES SHOWN IN LOCAL TERMINAL PANEL ONLY FOR THE EQUIPMENT.
 5. FOR ALL VENTILATION DISCHARGE FROM WASHERS, STEAM RECOMMENDS INSTALLATION OF A
 DEDICATED CORROSION-PROOF WATER-HIGH DUCT TO THE EXTERIOR OF THE BUILDING.
 6. STEAM RECOMMENDS THE WASHERS AS 3/4" HD FIBRE TRACT IS RECOMMENDED.
 7. ALL CONNECTIONS SHOULD BE IN ACCORDANCE WITH LOCAL CODES.
 8. THE MINIMUM INLET STEAM PRESSURE TAKING INTO ACCOUNT THE NATURAL PRESSURE LOSSES AS
 IN THE STEAM LINES OF THE WASHERS AS WELL AS A COMPENSANT RETURN MAINS
 PRESSURE LOSSES AND ADDITIONAL PRESSURE LOSSES WILL HAVE TO BE COMPENSATED EITHER BY
 INCREASING THE INLET STEAM PRESSURE BEING CAREFUL NOT TO EXCEED THE ALLOWABLE MAXIMUM
 OR BY ENSURING THAT THE STEAM SYSTEM OF THE CUSTOMER TAKES CHANGE OF THE COMPENSATE
 RETURN AT THE LOCATION INDICATED BEFOREHAND.

| | | | |
|------------------------------------|---------------------|---------------------|--------------|
| OPERATING VOLTAGE | 208 V, 60Hz | 380 V, 50Hz | 415 V, 50Hz |
| OPERATING CURRENT | 27 A @ 208 V | 13 A @ 380 V | 31 A @ 415 V |
| HEAT LOSS - STEAM AT 175°C (325°F) | 1320 BTU/Hr (167 W) | | |
| HEAT LOSS - STEAM AT 175°C (325°F) | | 2200 BTU/Hr (256 W) | |



OPTIONS (TABLE #1)

| | |
|---|---|
| ◇ | ELECTRIC HEATED UNIT |
| ◇ | STEAM HEATED UNIT |
| ◇ | RELIANCE [®] SYNERGY [™] WASHER/DISINFECTOR |
| ◇ | MONITORING OPTION (SYNERGY WASHER ONLY) |
| ◇ | NON-VENTED SYSTEM |
| ◇ | DOUBLE DOOR |
| ◇ | POWER DOOR |
| ◇ | PURE WATER TANK HEATED (400/450 WASHER ONLY) |
| ◇ | INSTRUMENT LUBRICANT (444 WASHER ONLY) |
| ◇ | ENZYME TREATMENT (444 WASHER ONLY) |
| ◇ | CHEMICAL PUMP #2 |
| ◇ | CHEMICAL PUMP #3 (444 WASHER ONLY) |
| ◇ | CHEMICAL PUMP #4 (400/450 WASHER ONLY) |
| ◇ | CHEMICAL PUMP #5 (400/450 WASHER ONLY) |
| ◇ | TO LOAD/UNLOAD MODULES (444/450/SYNERGY WASHER ONLY) |
| ◇ | TO ATS, DIRECT LOAD/UNLOAD (444/450/SYNERGY WASHER ONLY) |
| ◇ | RELIANCE [®] 400 LABORATORY GLASSWARE WASHER |
| ◇ | WITHOUT PURE WATER TANK |
| ◇ | PURE WATER INLET VALVE |
| ◇ | WORKING VOLTAGE, 208 VOLTS |
| ◇ | WORKING VOLTAGE, 380-400-415 VOLTS |
| ◇ | WORKING VOLTAGE, 480 VOLTS |
| ◇ | E-STOP (SYNERGY WASHER ONLY) |
| ◇ | WITHOUT E-STOP |
| ◇ | WITHOUT MONITORING OPTION |
| ◇ | WITHOUT RELIANCE [®] SYNERGY [™] WASHER/DISINFECTOR |
| ◇ | WITHOUT DRYING SYSTEM |
| ◇ | DRYING SYSTEM |
| ◇ | DRAIN DISCHARGE COOL DOWN |
| ◇ | COLD WATER PRE-WASH |

* AND * MEANS BOTH OPTIONS HAVE TO BE PRESENT FOR DEVICE TO BE INSTALLED
 * CR * MEANS EITHER OPTION HAS TO BE PRESENT FOR DEVICE TO BE INSTALLED
 [BARE] APPLICABLE FOR PROPER CONNECTION

CONTROL TRANSFORMER (TABLE #2)

| OPERATING VOLTAGE | 208 V | 380 V | 400 V | 415 V | 480 V |
|-----------------------|-------|----------------------|----------------------|----------------------|----------------------|
| PRIMARY LINE | N/A | H1-H5 | H1-H6 | H1-H7 | H1-H8 |
| SECONDARY LINE JUMPER | N/A | X1-X2 X2-X4&X1-X3 | X1-X2 X2-X4&X1-X3 | X1-X2 X2-X4&X1-X3 | X1-X2 X2-X4&X1-X3 |

NOMINAL CURRENT (TABLE #3)

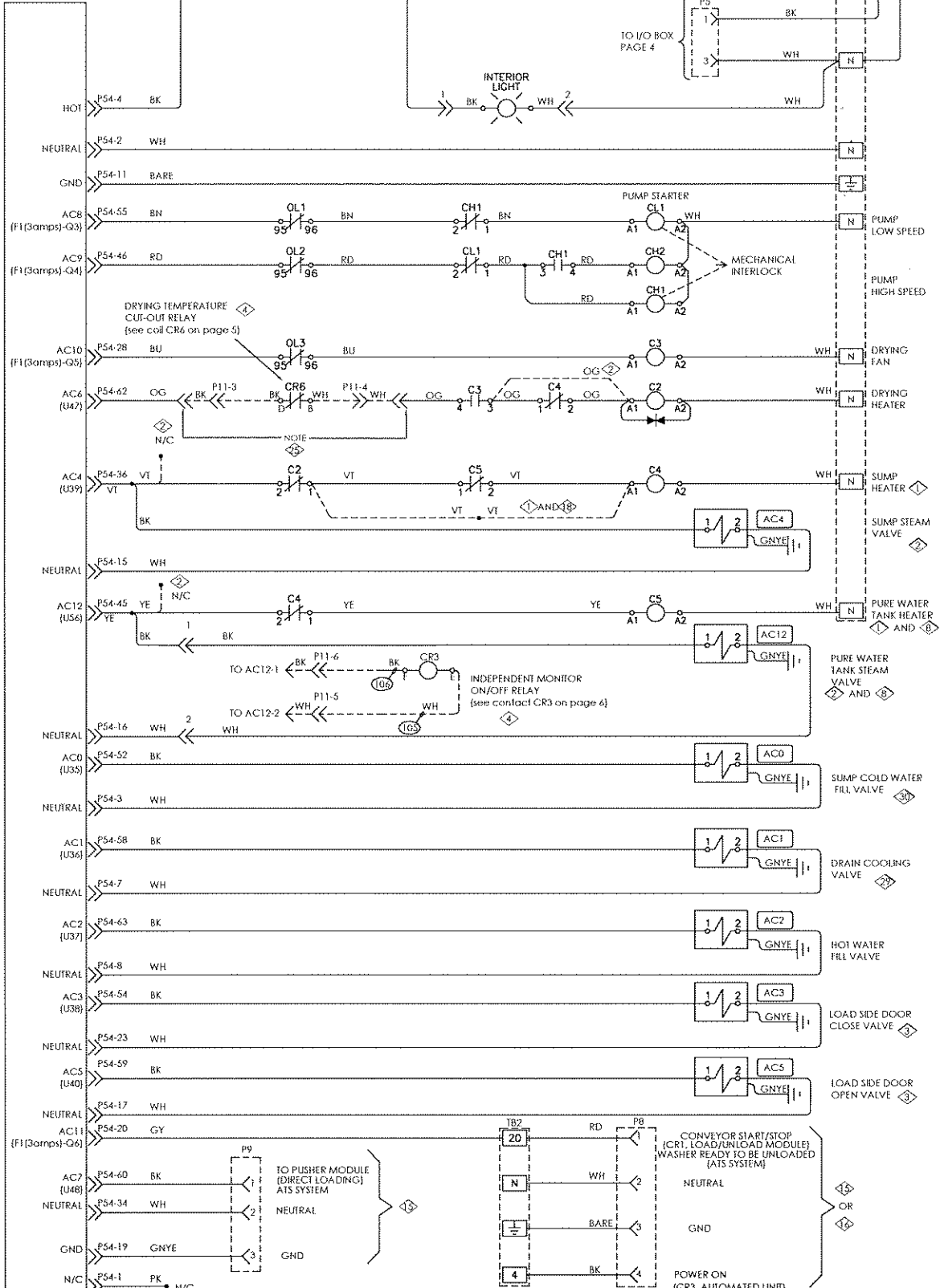
| OPERATING VOLTAGE | 208 V | 415 V | 480 V |
|-------------------|--------------------------|-------------------------|-------------------------|
| RECIRC. PUMP | 7.5/1.9 HP 20.2/5.8 A | 5.6/1.4 kW 9.8/3.0 A | 7.5/1.9 HP 8.8/2.5 A |
| DRYING FAN | 1.5 HP 4.4 A | 0.7 kW 1.9 A | 1.5 HP 2.1 A |
| DRYING FAN | 1.5 HP 4.1 A | 0.7 kW 1.9 A | 1.5 HP 2 A |
| DRYING HEATERS | 3 X 2.48 kW 20.6 A | 3 X 2.48 kW 10.3 A | 3 X 2.48 kW 8.9 A |
| SUMP HEATERS | --- | 3 X 5.5 kW 22.9 A | 3 X 5.0 kW 18.0 A |
| SUMP HEATERS | --- | 3 X 5.0 kW 20.9 A | 3 X 5.0 kW 18.0 A |
| P.W.I. HEATERS | --- | 3 X 2.5 kW 10.4 A | 3 X 2.5 kW 9.0 A |

FROM S/N: 3624502000
 NOTE: THIS DRAWING INCLUDE THE INTERNATIONAL MARKET

| | | | | | |
|--|----------------------|------------|------------------------|-------------|---|
| STERIS <small>STERIS Canada Corporation</small> | 1.1 | 2003-01-22 | D.C.T. #5006 | TC | TITLE: Amsco [®] Reliance [®] 444/Reliance [®] Synergy Single-Chamber Washer Disinfector Reliance [®] 400/450 Glassware Washer Electrical System Schematic Pwr section, Steam or Electric Heated |
| | 1.2 | 2003-02-13 | D.C.T. #5048 AND #5071 | TC | |
| | 1.3 | 2003-03-05 | D.C.T. #5104 | TC | |
| | 1.4 | 2003-03-20 | D.C.T. #5120 | TC | |
| NO | | DATE | DESCRIPTION | DWN | |
| REVISION | | | | | |
| Own. M.J. | Drawing not to scale | CHK. | Appro. | Drawing no. | |
| Date: 2002-06-11 | | Date: | Date: | 920-013-332 | Sheet 1 of 6 |

FROM POWER SECTION PAGE 1

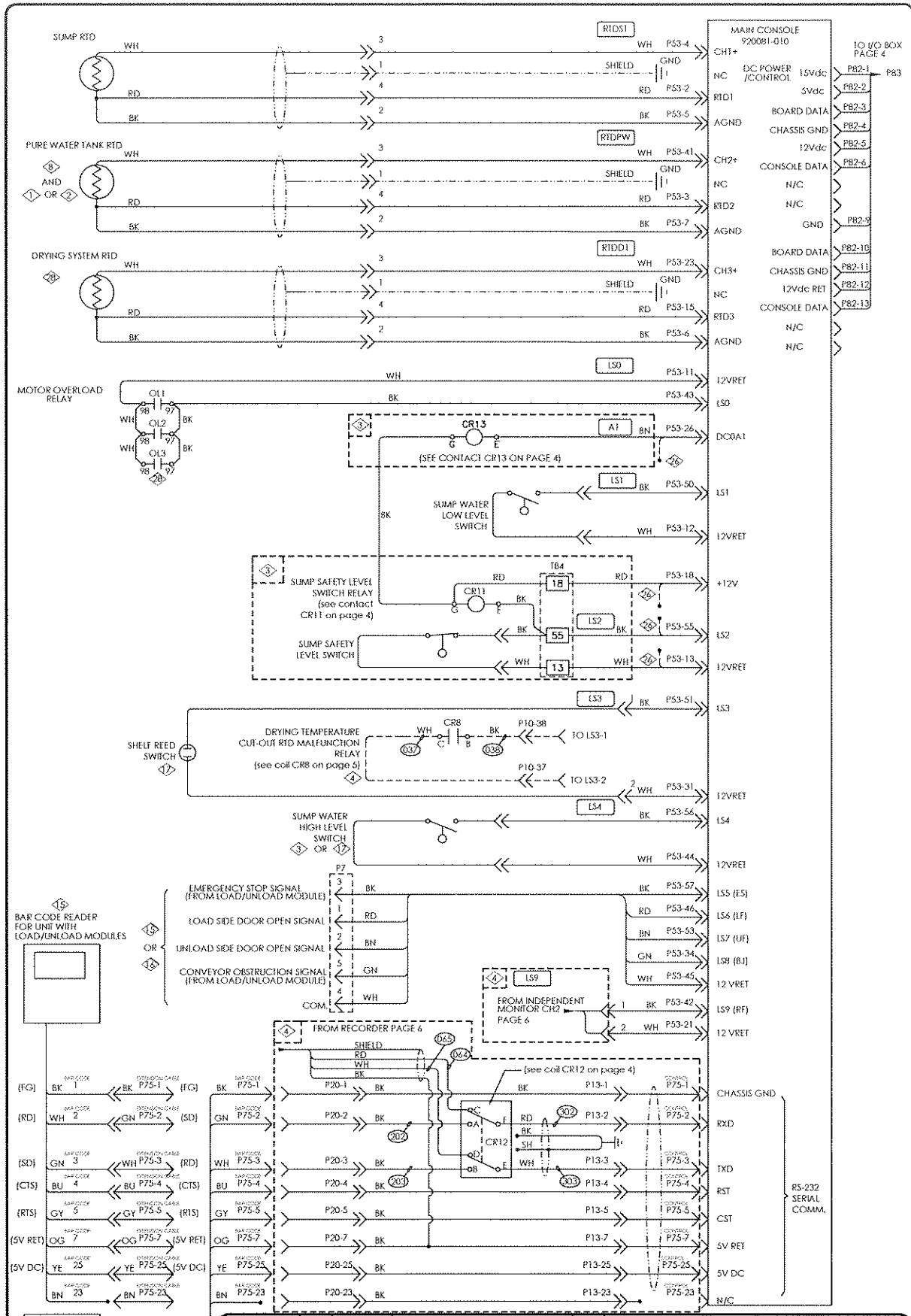
MAIN CONSOLE
920081-01D



| | | | | |
|--|------|-------------|------------------------|-------------|
| <p>STERIS Covidien Corporation</p> | 1.1 | 2003-01-22 | D.C.T. #5006 | TC |
| | 1.2 | 2003-02-13 | D.C.T. #5048 AND #5071 | TC |
| | 1.3 | 2003-03-05 | D.C.T. #5104 | TC |
| | 1.4 | 2003-03-20 | D.C.T. #5120 | TC |
| NO | DATE | DESCRIPTION | DWN | |
| Dwn. M.J. | | Chk. | Appr. | Drawing no. |
| Date: 2002-09-11 | | Date: | Date: | 920-013-332 |

TITLE: AmSCO®Reliance®444/Reliance®Synergy Single-Chamber Washer/Disinfector Reliance®400/450 Glassware Washer Electrical System Schematic Cntl Section, Steam or Electric Heated

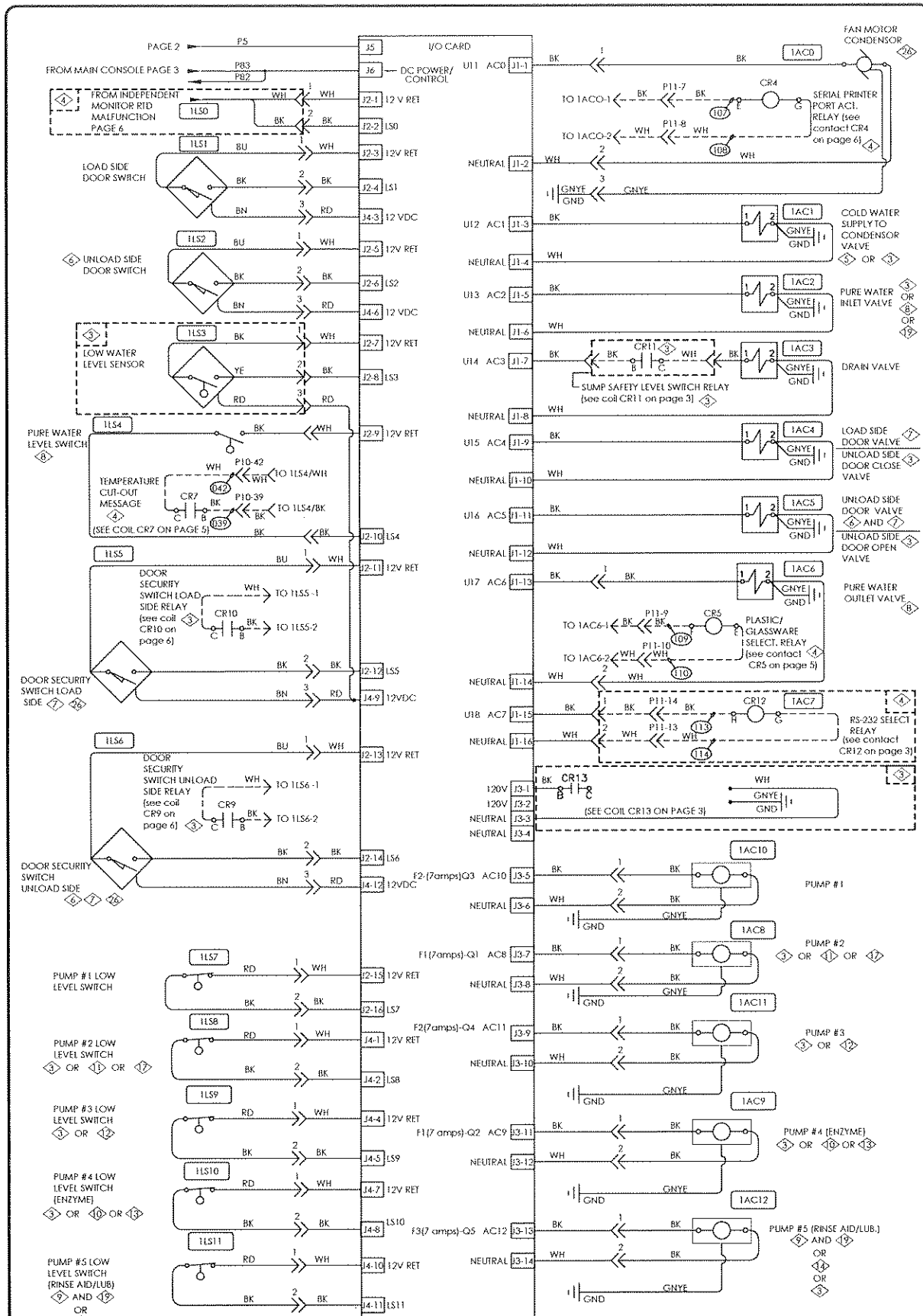
Drawing no. 920-013-332 Sheet 2 of 6



| NO | DATE | DESCRIPTION | BY | CHK | APPRO | DATE |
|-----|------------|------------------------|----|-----|-------|------|
| 1.1 | 2003-01-22 | D.C.I. #5006 | | TC | | |
| 1.2 | 2003-02-13 | D.C.I. #5048 AND #5071 | | TC | | |
| 1.3 | 2003-03-05 | D.C.I. #5104 | | TC | | |
| 1.4 | 2003-03-20 | D.C.I. #5120 | | TC | | |

| REVISION | | REVISION | DATE | DESCRIPTION | BY | CHK | APPRO | DATE |
|----------|------------|------------------------|------|-------------|----|-----|-------|------|
| 1 | 2003-01-22 | D.C.I. #5006 | | | | TC | | |
| 2 | 2003-02-13 | D.C.I. #5048 AND #5071 | | | | TC | | |
| 3 | 2003-03-05 | D.C.I. #5104 | | | | TC | | |
| 4 | 2003-03-20 | D.C.I. #5120 | | | | TC | | |

| | | |
|--------------|---------------------------|--|
| STERIS | STERIS Canada Corporation | TITLE: Amsco® Reliance® 444/Reliance® Synergy Single-Chamber Washer /Disinfecter Reliance® 400/450 Glassware Washer Electrical System Schematic Ctrl Section, Steam or Electric Heated |
| Drawn: M.J. | Date: 2002-06-11 | Drawing no. 920-013-332 |
| Sheet 3 of 6 | | |

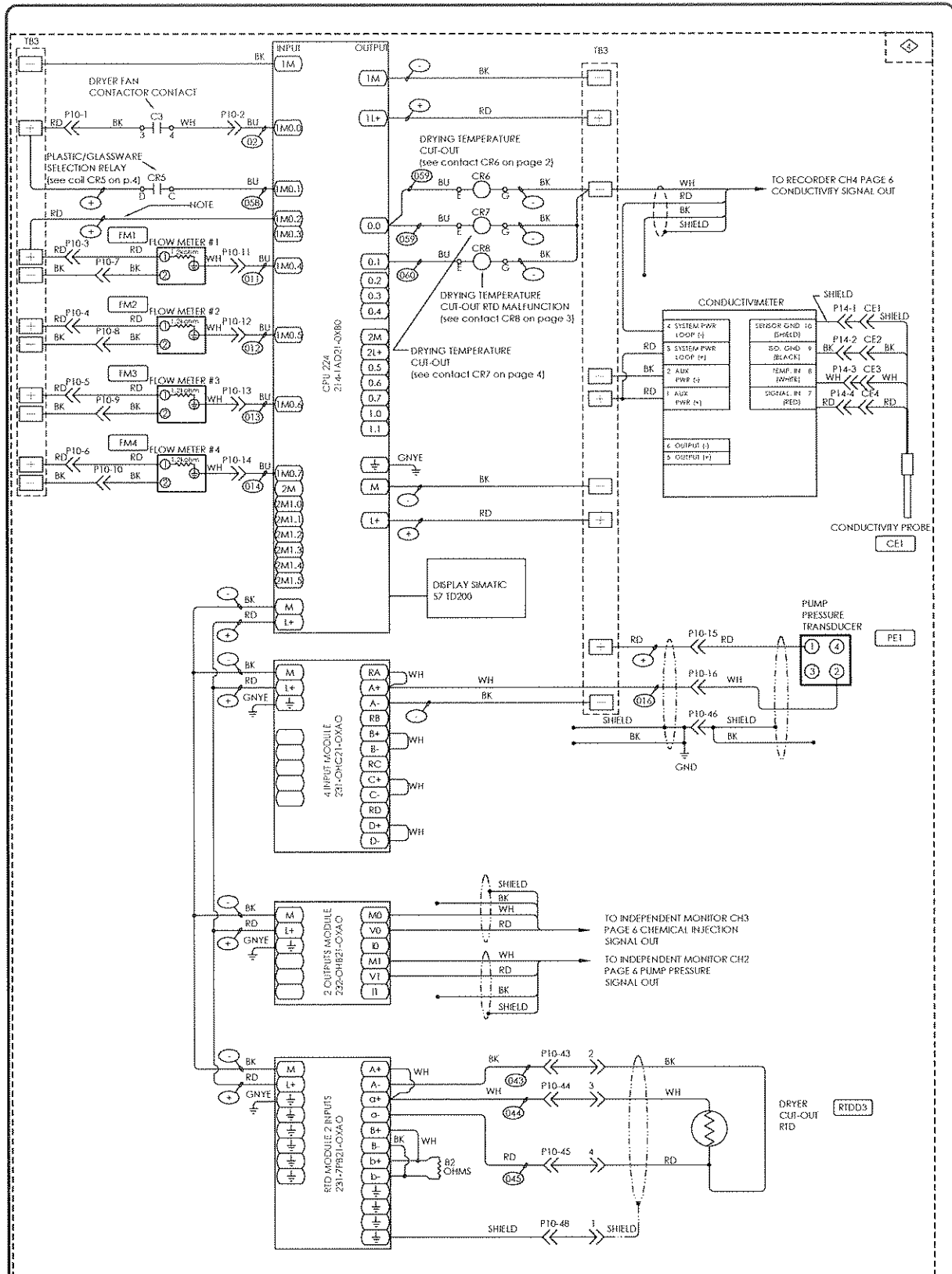


| NO | DATE | DESCRIPTION | DWH |
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| 1.1 | 2003-01-22 | D.C.T. #5006 | TC |
| 1.2 | 2003-02-13 | D.C.T. #5048 AND #5071 | TC |
| 1.3 | 2003-03-05 | D.C.T. #5104 | TC |
| 1.4 | 2003-03-20 | D.C.T. #5120 | TC |

| REVISION | DATE | DESCRIPTION | APPROVED |
|----------|------------|----------------------|----------|
| 1 | 2003-06-11 | Drawing not to scale | |

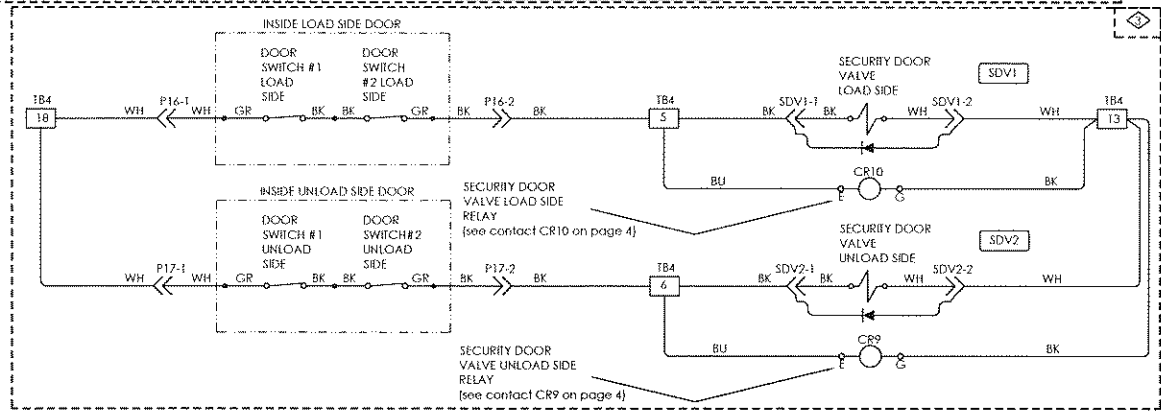
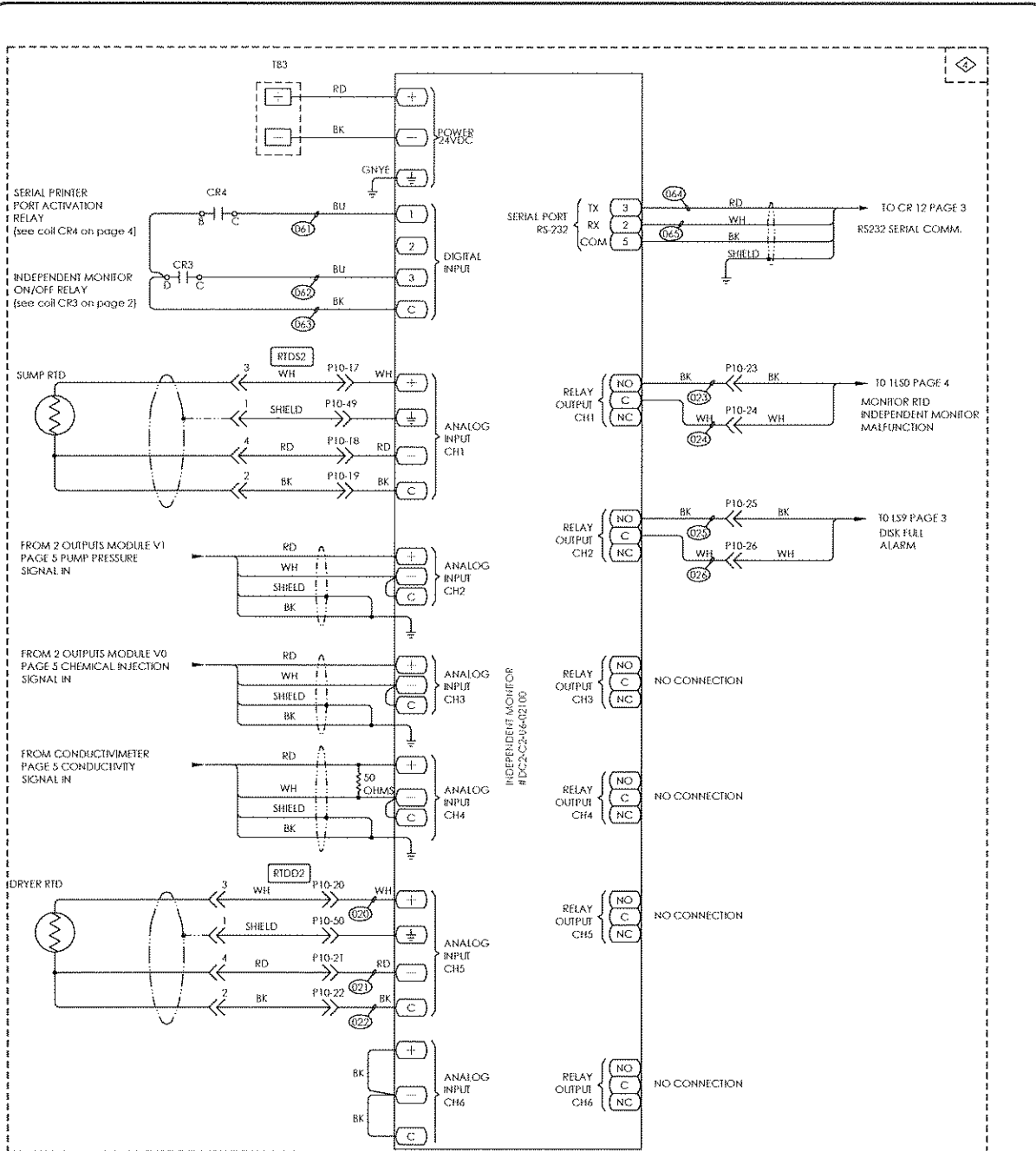
| | | | |
|--------|---------------------------|-------------------------|--------------|
| STERIS | STERIS Canada Corporation | Drawing no. 920-013-332 | Sheet 4 of 6 |
|--------|---------------------------|-------------------------|--------------|

TITLE: Amsco® Reliance®444/Reliance®Synergy Single-Chamber Washer/Disinfecter Reliance® 400/450 Glassware Washer Electrical System Schematic C/H Section, Steam or Electric Heated



NOTE:- INTERNATIONAL UNITS, WIRE IS CONNECTED TO TB3+
 -IMPERIAL UNITS, WIRE IS NOT CONNECTED TO TB3+ BUT ISOLATED WITH AN END TERMINAL.

| | | | | | |
|----------------------------------|----------------------|------------|------------------------|-------------|---|
| STERIS Canada Corporation | 1.1 | 2003-01-22 | D.C.T. #5006 | TC | TITLE: AmSCO Reliance® 444/Reliance® Synergy Single-Chamber Washer Disinfecter Reliance® 400/450 Glassware Washer Electrical System Schematic Mon. Section, Steam or Electric Heated |
| | 1.2 | 2003-02-13 | D.C.T. #5048 AND #5071 | TC | |
| | 1.3 | 2003-03-05 | D.C.T. #5104 | TC | |
| | 1.4 | 2003-03-20 | D.C.T. #5120 | TC | |
| | NO | DATE | DESCRIPTION | DWN | |
| REVISION | | | | | |
| Dwn. M.J. | Drawing not to scale | Chk. Date | Appr. Date | Drawing no. | 920-013-332 |
| Date: 2002-06-11 | | | | Sheet | 5 of 6 |

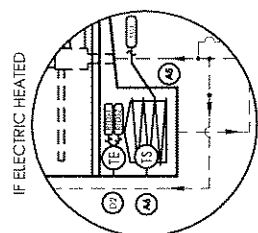
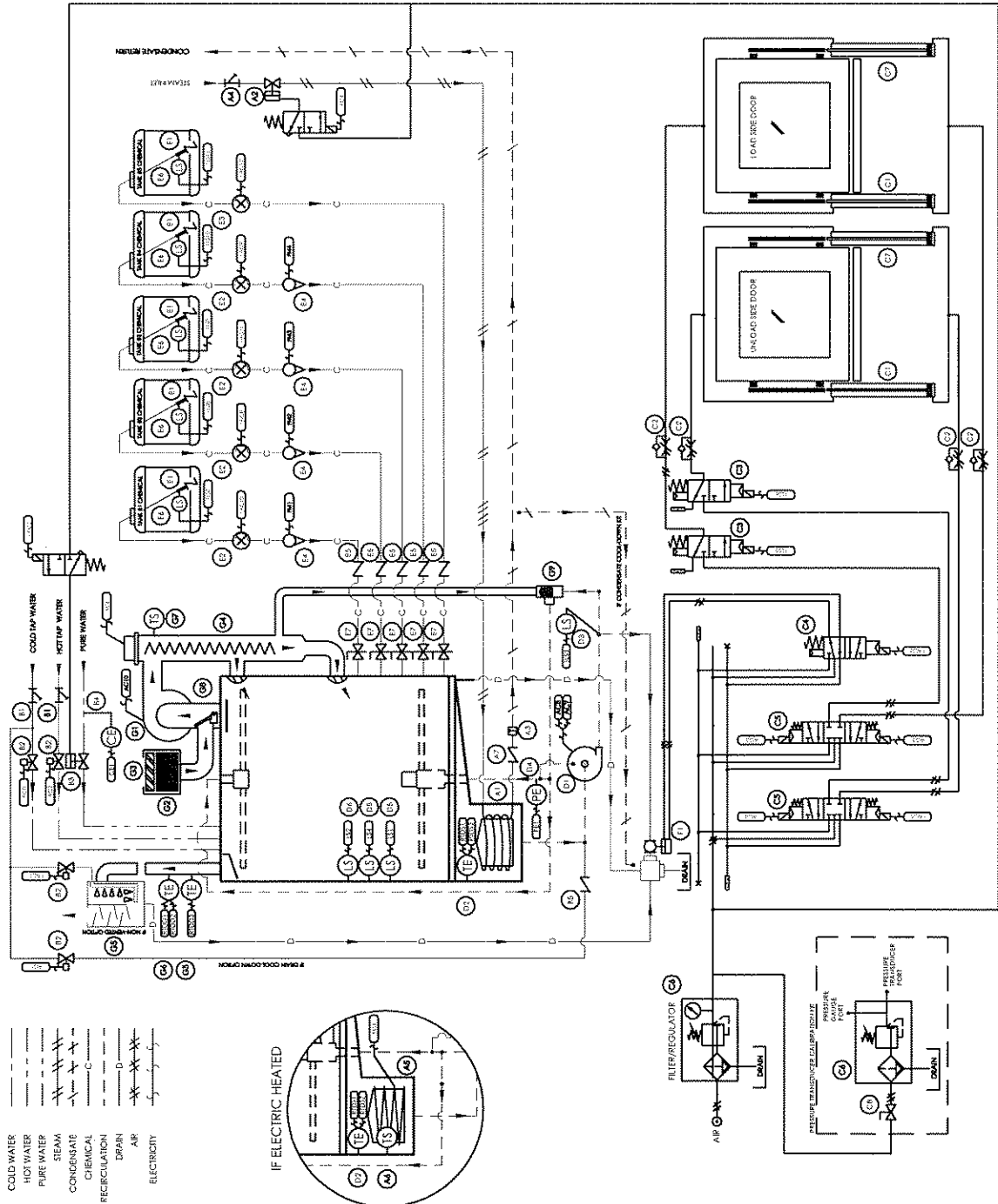


| | | | | |
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| <small>STERIS Canada Corporation</small> | 1.1 | 2003-01-22 | D.C.T. #5006 | TC |
| | 1.2 | 2003-02-13 | D.C.T. #5048 AND #5071 | TC |
| | 1.3 | 2003-03-05 | D.C.T. #5104 | TC |
| | 1.4 | 2003-03-20 | D.C.T. #5120 | TC |
| | NO | DATE | DESCRIPTION | DWN |
| REVISION | | | | |
| Dwn, M.J. | | Chk. | Appr. | Drawing no. |
| Date, 2002-04-11 | Drawing net to scale | Date, | Date, | 920-013-332 |
| | | | | Sheet 6 of 6 |

TITLE: Amsco® Reliance® 444/Reliance® Synergy Single-Chamber Washer Disinfecter Reliance® 400/450 Glassware Washer Electrical System Schematic Mon.Section, Steam or Electric Heated

| LEGEND | |
|--------|-------------------------------|
| | PUMP MOTOR |
| | FAN BLOWER |
| | STEAM COIL |
| | ELECTRIC HEATING ELEMENT |
| | HEPA FILTER |
| | PRE-FILTER |
| | STRAINER |
| | CHECK VALVE |
| | FLOW METER |
| | STEAM TRAP |
| | PNEUMATIC BALL VALVE |
| | PNEUMATIC PUMP |
| | LEVEL SWITCH |
| | TEMPERATURE SWITCH |
| | TEMPERATURE SENSOR |
| | PRESSURE INDICATOR |
| | PRESSURE SENSOR |
| | CONDUCTIVITY SENSOR |
| | FOOT CYLINDER |
| | FLOW CONTROL |
| | PRESSURE REGULATOR |
| | AIR FILTER |
| | PNEUMATIC DIRECT ACTING VALVE |
| | SOLENOID VALVE |

NOT TO SCALE SHEET 1 OF 3
 ALL DIMENSIONS ARE IN INCHES (MILLIMETERS)
 ALSO REFER TO GENERAL NOTES APPLICABLE TO EQUIPMENT DRAWINGS
 RELIANCE@SYNERGY.FRM
 WASHER/DISINFECTOR
 PRECESS & PATENTING DIAGRAM
STERIS
 EQUIPMENT DRAWING NUMBER 920-015-367



SUMP HEATING (STEAM OR ELECTRIC)

| REF. NO. | PART NO. | PART NAME | SPECIFICATION | DESCRIPTION | CONTROL V/O | DISPLAY MNE/MONIC | OPTIONS | QTY |
|----------|-------------|-----------------------|-----------------------|---|-------------|-------------------|-----------------|-----|
| A1 | 117-021-220 | STEAM COIL, SUMP | 1 1/8" ID I/F, S/S | SUMP STEAM COIL, WATER HEATING | - | - | STEAM HEATED | 1 |
| A2 | 117-912-836 | VALVE, STEAM | 1/2" NPT, BRASS, 120V | STEAM VALVE FOR SUMP STEAM COIL | AC4 | SS | STEAM HEATED | 1 |
| A3 | 117-903-854 | TRAP, STEAM | 1/2" NPT #1XST-21 | STEAM TRAP FOR SUMP STEAM COIL | - | - | STEAM HEATED | 1 |
| A4 | 117-904-468 | STRAINER | 1/2" NPT F, BRASS | STRAINER FOR STEAM INLET | - | - | STEAM HEATED | 1 |
| A5 | 117-021-219 | ELEMENT, HEATER | 415V, 5Kw, 50Hz | SUMP ELECTRIC ELEMENT, WATER HEATING (IF ELECTRIC UNIT) | AC4 | SH | ELECTRIC HEATED | 3 |
| | 117-021-223 | ELEMENT, HEATER | 480V, 5Kw, 60Hz | SUMP ELECTRIC ELEMENT, WATER HEATING (IF ELECTRIC UNIT) | - | - | ELECTRIC HEATED | 3 |
| A6 | 117-904-055 | THERMOCUT, MAIN RESET | 260PF, 24" | SUMP ELECTRIC ELEMENT THERMAL PROTECTION (IF ELECTRIC UNIT) | - | - | ELECTRIC HEATED | 1 |
| A7 | 117-950-216 | SWING CHECK, VALVE | 1/2" NPT F, BRONZE | - | - | - | STEAM HEATED | 1 |

TAP WATER

| REF. NO. | PART NO. | PART NAME | SPECIFICATION | DESCRIPTION | CONTROL V/O | DISPLAY MNE/MONIC | OPTIONS | QTY |
|----------|-------------|--------------------------|------------------------------------|--|-------------------|-------------------|------------|-----|
| B1 | 117-950-177 | STRAINER | 1/2" NPT F, BRONZE | HOT WATER INLET STRAINER COLD WATER INLET STRAINER | - | - | | 2 |
| B2 | 117-956-559 | VALVE, WATER | 1/2" NPT F, COPPER 120V | HOT WATER INLET VALVE COLD WATER INLET VALVE COLD WATER VALVE FOR DRAIN COOL-DOWN COLD WATER VALVE FOR CONDENSER+CONDENSATE COOL-DOWN | AC2 AC0 AC1 | RW CW | NON-VENTED | 4 |
| B3 | 117-912-717 | VALVE, WATER | 1/2" NPT F, S/S, 120V | PURE WATER INLET VALVE | 1AC2 | PF | | 1 |
| B4 | 117-015-973 | CONDUCTIVITY SENSOR ASSY | 3/4" NPT, POLYPROPYLENE, 0.01 CELL | CONDUCTIVITY READING FOR CHART RECORDER | CE1 | CHANNEL 4 | IM | 1 |
| B5 | 117-009-283 | CHECK VALVE | CHECK VALVE 1/2" POLYPROPYLENE | - | - | - | | 1 |

PNEUMATIC

| REF. NO. | PART NO. | PART NAME | SPECIFICATION | DESCRIPTION | CONTROL V/O | DISPLAY MNE/MONIC | OPTIONS | QTY |
|----------|-------------|--|---|--|----------------------|-------------------|---------|--------|
| C1 | 117-021-245 | CYLINDER PNEUMATIC LEFT | 1 1/16" ID X 29 13/16" LG | DOOR CYLINDER LEFT | - | - | | 2 |
| C2 | 117-020-233 | DISTRIBUTION BLOCK, PNEU, 3 PORTS | BLOC WITH FLOW CONTROL VALVE | DOOR FLOW CONTROLS | - | - | | 1 |
| C3 | 117-021-102 | VALVE, PNEUMATIC, SINGLE SOLENOID 2 POSITION, SPRING RETURN ASSY | 3/2 1/8" #1MNONB645A 24 VDC | SAFETY VALVE FOR LOAD SIDE DOOR SAFETY VALVE FOR UNLOAD SIDE DOOR | 1LS5 1LS6 | LS US | | 1 1 |
| C4 | 117-907-504 | VALVE, PNEUMATIC, SINGLE SOLENOID 2 POSITION, AIR RETURN | 3/2 1/8" #8310BC553C CV=0.75 110 VAC | DRAIN VALVE PILOT AIR VALVE | 1AC3 | DV | | 1 |
| C5 | 117-015-475 | VALVE, PNEUMATIC, DOUBLE SOLENOID 3 POSITION, APB | 3/2 1/8" #8350BC553C, CV=0.60 110 VAC | LOAD SIDE DOOR PILOT AIR VALVE UNLOAD SIDE DOOR PILOT AIR VALVE | AC5 AC3 1AC5 1AC4 | LO LC UO UC | | 1 1 |
| C6 | 117-903-144 | PRESSURE REGULATOR/FILTER | 0-150 PSIG, ADJUSTED TO 90 PSIG # 14E0CB3FB | COMPRESSED AIR PRESSURE REGULATION COMPRESSED AIR PRESSURE REGULATION | - | - | IM | 1 2 |
| C7 | 117-021-250 | CYLINDER PNEUMATIC RIGHT | 1 1/16" ID X 29 13/16" LG | DOOR CYLINDER RIGHT | - | - | | 2 |
| C8 | 117-940-083 | VALVE, MANUAL BALL | 1/4" NPT F, BRASS | PRESSURE TRANSDUCER CALIBRATION KIT | - | - | IM | 1 |

RECIRCULATING SYSTEM

| REF. NO. | PART NO. | PART NAME | SPECIFICATION | DESCRIPTION | CONTROL V/O | DISPLAY MNE/MONIC | OPTIONS | QTY |
|----------|-------------|---------------------------|--|---|---------------|-------------------|---------|--------|
| D1 | 117-909-064 | PUMP ASSY | 7.5hp, 2 SPEEDS SMP-2000 | RECIRCULATION PUMP | AC8 AC9 | HS LS | | 1 |
| D2 | 117-015-503 | DUAL ELEMENT RTD | DUAL ELEMENT QUANTUM #223-12021-01 | WATER TEMPERATURE READING FOR CONTROL | RTD51 | SMP | IM | 1 |
| | 117-910-872 | RTD 100 OHMS | QUANTUM #223-11286-01 | WATER TEMPERATURE READING FOR CHART RECORDER DRYING TEMPERATURE READING FOR CONTROL DRYING TEMPERATURE READING FOR CHART RECORDER | RTD2 #1D51 | CHANNEL 1 | | 1 1 |
| D3 | 117-015-616 | SENSOR WATER LEVEL ASSY | OPTIC, 3/8" NPT, POLYETHYLENE | LCW LEVEL SWITCH FOR DRAINAGE MONITORING | 1LS3 | SL | | 1 |
| D4 | 117-015-400 | TRANSMITTER, PRESSURE | 1/4" NPT SS1, 0-60 PSIG | RECIRCULATION PUMP OUTPUT PRESSURE FOR CHART RECORDER | PE1 | - | IM | 1 |
| D5 | 117-015-620 | SENSOR WATER LEVEL ASSY | REAR SWITCH LEVEL SENSOR 7" LONG, ADJUSTABLE | HIGH SPEED LEVEL LOW SPEED LEVEL | LS4 LS1 | SH LL | | 2 |
| D6 | 117-015-530 | SENSOR WATER LEVEL SAFETY | REAR SWITCH LEVEL SENSOR | SAFETY LEVEL SWITCH | LS2 | SS | | 1 |

Not to scale

SHEET 2 OF 3

ALL DIMENSIONS ARE IN INCHES (MILLIMETERS)
ALSO REFER TO GENERAL NOTES APPLICABLE TO EQUIPMENT DRAWINGS

RELIANCE® SYNERGY™
WASHER/DISINFECTOR

PROCESS & INSTRUMENT DIAGRAM

STERIS

EQUIPMENT DRAWING NUMBER

920-015-367

CHEMICAL

| REF. NO. | PART NO. | PART NAME | SPECIFICATION | DESCRIPTION | CONTROL I/O | DISPLAY MNEMONIC | OPTIONS | QTY. |
|----------|-------------|----------------------------------|---|--|--|----------------------------|-----------------|------|
| E1 | 117-908-973 | FOOT VALVE (SMALL) | FOR POLYFLO TUBE 3/8" OD, 1/4" ID | PICK UP TUBE INLET CHECK VALVE | - | - | - | 5 |
| E2 | 117-021-277 | PERISTALTIC PUMP ASSEMBLY | 270 ml/min, 120V, 50/60 Hz 2 ROLLS, C-FLEX TUBE 1/4" ID 1/2" OD # KP-5100X | WASH 1 INJECTION PUMP (PUMP 1) WASH 2 INJECTION PUMP (PUMP 2) WASH 3 INJECTION PUMP (PUMP 3) ENZYME INJECTION PUMP (PUMP 4) | IAC10 IAC8 IAC11 IAC9 | F1 F2 F3 F4 | - | 4 |
| E3 | 117-015-522 | PERISTALTIC PUMP (INTERNATIONAL) | 12.4 ml/min, 120V, 50/60Hz 20 RPM, MARRPRENE TUBE 5/32" ID 1/16" WALL, 0.62 ML/REV. | RINSE AID INJECTION PUMP (PUMP5) | IAC12 | F5 | RIF L (50Hz) | 1 |
| | 117-021-277 | PERISTALTIC PUMP (DOMESTIC) | 270 ml/min, 120V, 50/60 Hz 2 ROLLS, C-FLEX TUBE 1/4" ID 1/2" OD # KP-5100X | LUBRICANT INJECTION PUMP (PUMP 5) | - | - | DOMESTIC (60Hz) | 1 |
| E4 | 117-013-900 | FLOW METER | 1/4" BSP, DIGIMESA, Ø2mm NOZZLE, 130 ml/min, MIN. # PHE-20 | PUMP 1 FLOWMETER PUMP 2 FLOWMETER PUMP 3 FLOWMETER PUMP 4 FLOWMETER | FM1 FM2 FM3 FM4 | CHANNEL 3 | IM | 4 |
| E5 | 117-011-637 | CHECK VALVE | 1/4" BARB POLYPROPYLENE | CHAMBER INLET CHECK VALVE | - | - | - | 5 |
| E6 | 117-021-296 | SENSOR AND TUBE, DETERGENT ASSY | DETERGENT LOW LEVEL SENSOR 38" with 50" EXTENSION | PUMP 1 PUMP 2 PUMP 3 PUMP 4 PUMP 5 | ILS7 ILS8 ILS9 ILS10 ILS11 | D1 D2 D3 D4 D5 | - | 5 |
| E7 | 117-021-213 | PLASTIC BALL VALVE PVC | 1/4" BARB | PUMP 1 PUMP 2 PUMP 3 PUMP 4 PUMP 5 | - - - - - | - - - - - | - | 5 |

DRAIN

| REF. NO. | PART NO. | PART NAME | SPECIFICATION | DESCRIPTION | CONTROL I/O | DISPLAY MNEMONIC | OPTIONS | QTY. |
|----------|-------------|-----------------------|---------------------|-------------|-------------|------------------|---------|------|
| F1 | 117-021-327 | VALVE, PNEUMATIC 1/2" | 1 1/2" TRI CLAMP SS | DRAIN VALVE | - | - | - | 1 |

VENTILATION

| REF. NO. | PART NO. | PART NAME | SPECIFICATION | DESCRIPTION | CONTROL I/O | DISPLAY MNEMONIC | OPTIONS | QTY. |
|----------|-------------|---------------------------|---------------------------------------|---|-------------|------------------|-----------|------|
| G1 | 117-021-240 | BLOWER, DRYING ASSY | 380-415V, 50 HZ | DRYING RECIRCULATION BLOWER | AC10 | DF | - | 1 |
| G2 | 117-021-203 | HEPA FILTER | 6" X 8" X 5 7/8", GALVANIZED STEEL | DRYING AIR INLET HEPA FILTRATION | - | - | - | 1 |
| G3 | 117-005-940 | PRE-FILTER | 6 1/2" X 8" X 1" WIRE FRAME | DRYING AIR INLET PREFILTRATION | - | - | - | 1 |
| G4 | 117-021-201 | ELEMENT, HEATER | 415V - 2500W | DRYING ELECTRIC ELEMENT HEATER | AC6 | DH | 415 VOLTS | 1 |
| | 117-021-202 | ELEMENT, HEATER | 480V - 2500W - 65Hz | DRYING ELECTRIC ELEMENT HEATER | - | - | 480 VOLTS | 1 |
| | 117-021-200 | ELEMENT, HEATER | 208V - 2500W - 65Hz | DRYING ELECTRIC ELEMENT HEATER | - | - | 208 VOLTS | 1 |
| G5 | 117-015-303 | DEAL ELEMENT RTD | DEAL ELEMENT QUANTUM #223-15020-01 | DRYING TEMPERATURE READING FOR CONTROL | RTD01/RTD02 | DRY | IM | 1 |
| | 117-910-872 | RTD 100 OHMS | QUANTUM #223-11286-01 | DRYING TEMPERATURE READING FOR CHART RECORDER | RTD01 | CHANNEL 5 | - | 1 |
| G6 | 117-910-872 | RTD 100 OHMS | QUANTUM #223-11286-01 | TEMPERATURE READING FOR THERMAL CUT OUT | RTD02 | SM7-200 | IM | 1 |
| G7 | 117-009-219 | THERMOCIS, MANUAL RESET | THERMOCIS, MAN RESET, 300°F | THERMAL PROTECTION FOR DRYING ELEMENTS | - | - | - | 1 |
| G8 | 117-021-067 | ADAPTOR VENTILATION COVER | - | INLET DRYING AIR CHECK VALVE | - | - | - | 1 |
| G9 | 117-021-170 | DRYING VALVE ASSEMBLY | 3 WAY VALVE | MANIFOLD DRYING AIR INTO THE ACCESSORY | - | - | - | 1 |

Not to scale

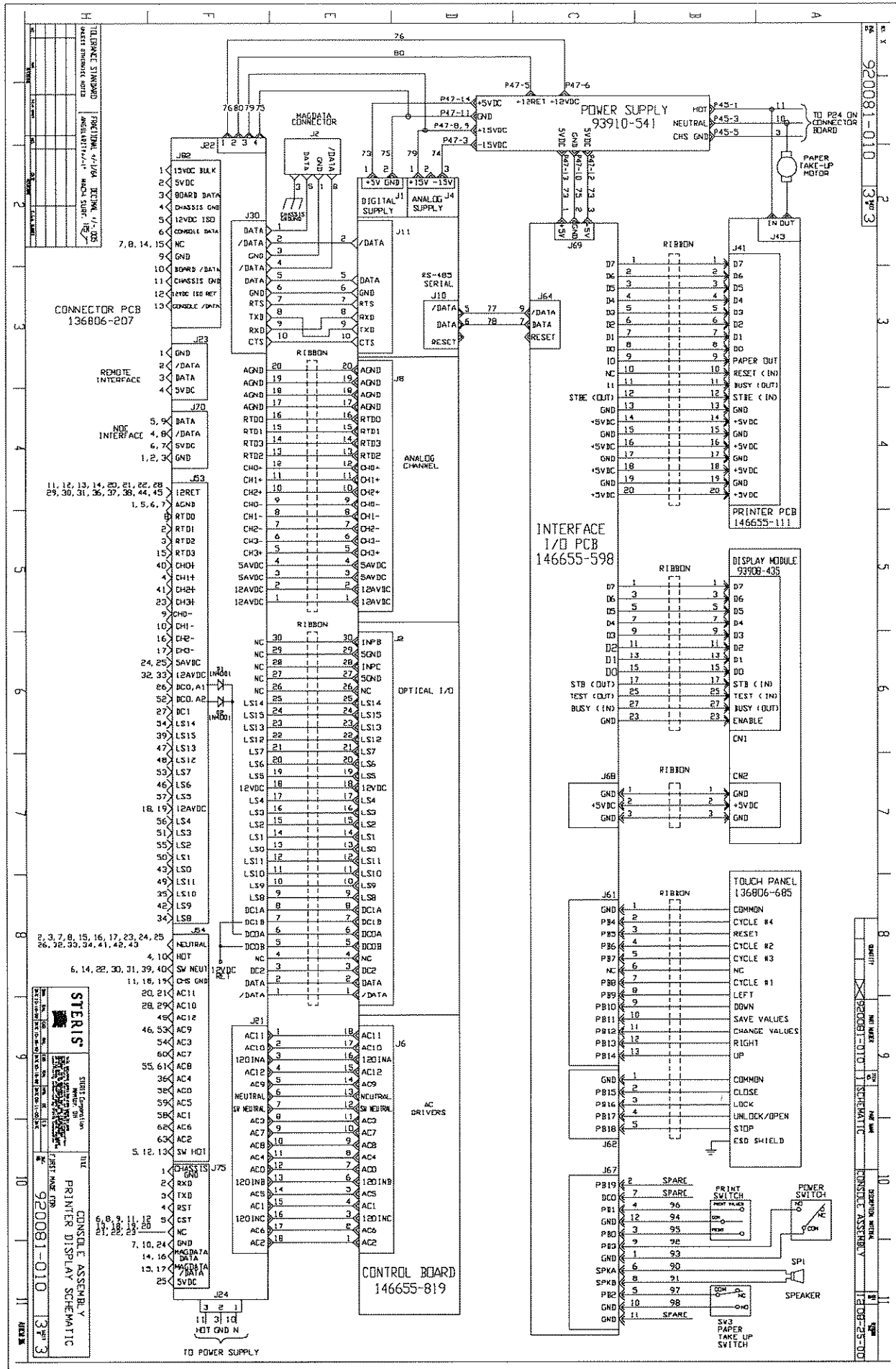
SHEET 3 of 3

ALL DIMENSIONS ARE IN INCHES (MILLIMETERS)
ALSO REFER TO GENERAL NOTES APPLICABLE TO EQUIPMENT DRAWINGS

RELIANCE@SYNERGY™
WASHER/DISINFECTOR

PROCESS & INSTRUMENT DIAGRAM

STERIS EQUIPMENT DRAWING NUMBER
920-015-367



TABLET STRIP

| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|-----|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 | 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 | 61 | 62 | 63 | 64 | 65 | 66 | 67 | 68 | 69 | 70 | 71 | 72 | 73 | 74 | 75 | 76 | 77 | 78 | 79 | 80 | 81 | 82 | 83 | 84 | 85 | 86 | 87 | 88 | 89 | 90 | 91 | 92 | 93 | 94 | 95 | 96 | 97 | 98 | 99 | 100 |
|---|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|-----|

CONNECTOR PCB
136806-207

REMOTE
INTERFACE

MOE
INTERFACE

11, 12, 13, 14, 20, 21, 22, 28,
29, 30, 31, 36, 37, 38, 44, 45

STERIS

STERIS Corporation
10000 W. 16th Ave.
Boulder, CO 80501
Tel: 303-440-1000

THE
PRINTER DISPLAY SCHEMATIC
920081-010 3RD 3

TO POWER SUPPLY

CONTROL BOARD
146655-819

POWER SUPPLY
93910-541

INTERFACE
I/O PCB
146655-598

DISPLAY MODULE
93908-435

TOUCH PANEL
136806-685

PRINT SWITCH

POWER SWITCH

SW3
PAPER
TAKE UP
SWITCH

SPEAKER

920081-010 3RD 3

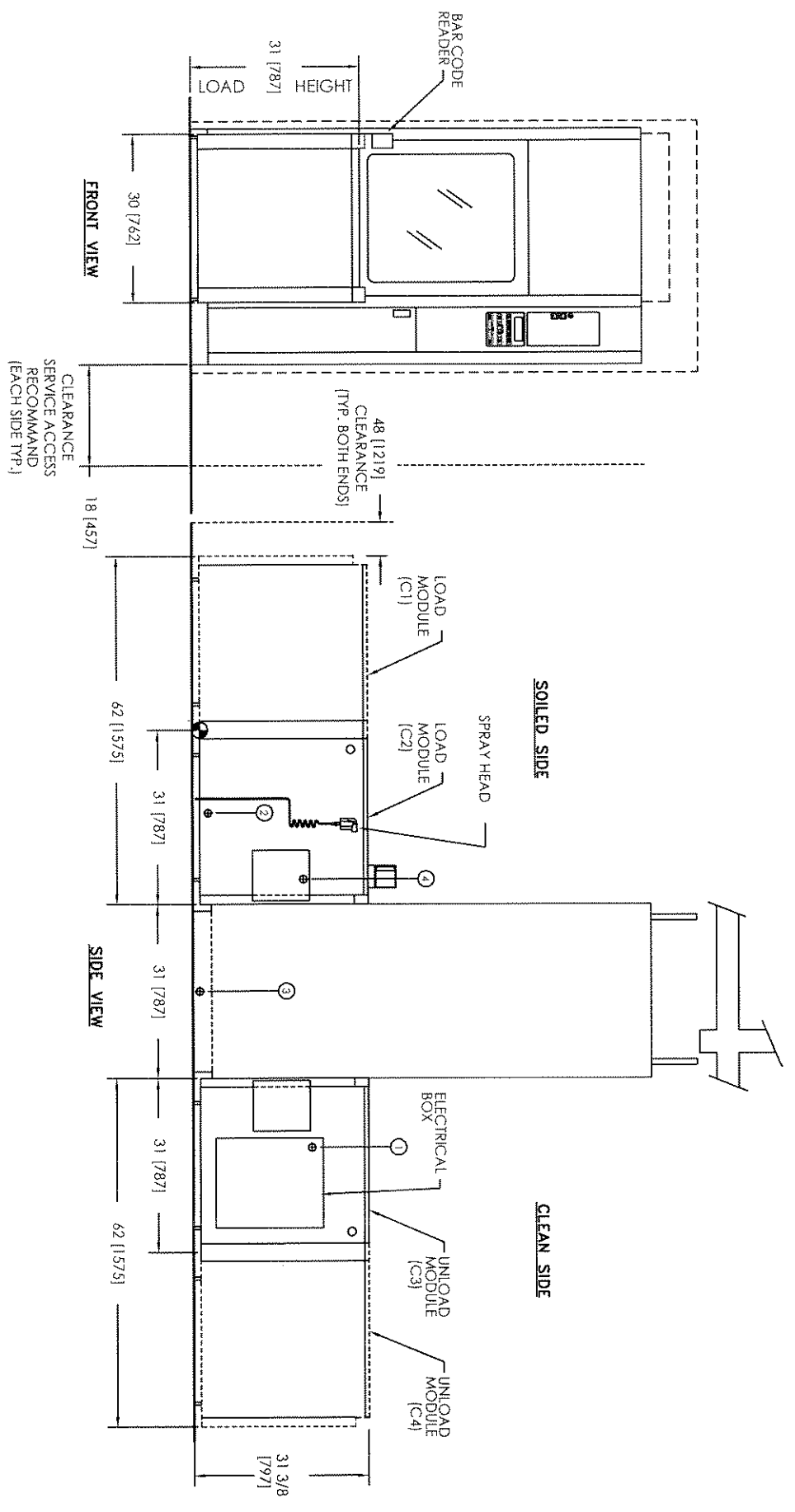
QUANTITY

920081-010 11

CONSOLE ASSEMBLY

920081-010 11

STERIS



NOTES

- 1- C1 and C4 modules are optional.
- 2- C2 module include a spray head for rinsing purposes.
- 3- Modules are seismic-designed.
- 4- Modules are shipped in two crates.
- 5- Shipping weight is 300 lbs [136 kg] for single module, 600 lbs [272 kg] for double modules.
- 6- Shipping weight is 450 lbs [204 kg] per module.
- 7- Height adjustment is 3 [76] maximum from floor.
- 8- All connections should be in accordance with local codes.

Not to scale SHEET 1 OF 2

ALL DIMENSIONS ARE IN INCHES (MILLIMETERS)
ALSO REFER TO GENERAL NOTES APPLICABLE TO EQUIPMENT DRAWINGS

Amsco® Reliance® 444
Single-Chamber Washer/Disinfecter
Load/unload modules

| | |
|--|---|
|  STERIS | EQUIPMENT DRAWING NUMBER 122-993-509 |
|--|---|

| UTILITIES | CONNECTION POSITION WITH REFERENCE POINT | | | | |
|---------------|--|------------------|-----------------|-----------------|---------------------------|
| | DYNAMIC PRESSURE | X | Y | Z | SIZE |
| ① ELECTRICITY | / | 72 3/4 [1848] | 17 1/2 [445] | 21 3/4 [552] | 3/4 conduct size [19] |
| ② COLD WATER | 30-50 psig [207-345 KPa] | 17 3/4 [451] | 1 1/4 [32] | 3 [76] | 1/2 BARBED [13 BARBED] |
| ③ DRAIN | / | 34 1/2 [876] | | 15 [381] | 1 I.D. [25] |
| ④ AIR(A) | 80-125 psig [552-860 KPa] | 29 1/4 [743] | 17 1/4 [438] | 27 3/4 [705] | 1/8 NPTF [1/8 BSPF] |

(A) Air Specifications: Max. particle size : 5 micron, max. particulate density : 4.15 ppm [5 mg/m³], max. dew point for water content : 37 to 45°F [3 to 7 °C] and the max. oil concentration for the oil content is: 4.15 ppm [5 mg/m³] as per ISO-8573-1.

| ① 1-PHASE SUPPLY REQUIRED | MAX PROTECTION | 120 Vac | 230 Vac |
|---------------------------|----------------|----------|----------|
| DOMESTIC 60 Hz | 1A / 15A | 1A / 15A | 1A / 15A |
| INTERNATIONAL 50 Hz | ----- | ----- | 1A / 15A |

Not to scale

SHEET 2 OF 2

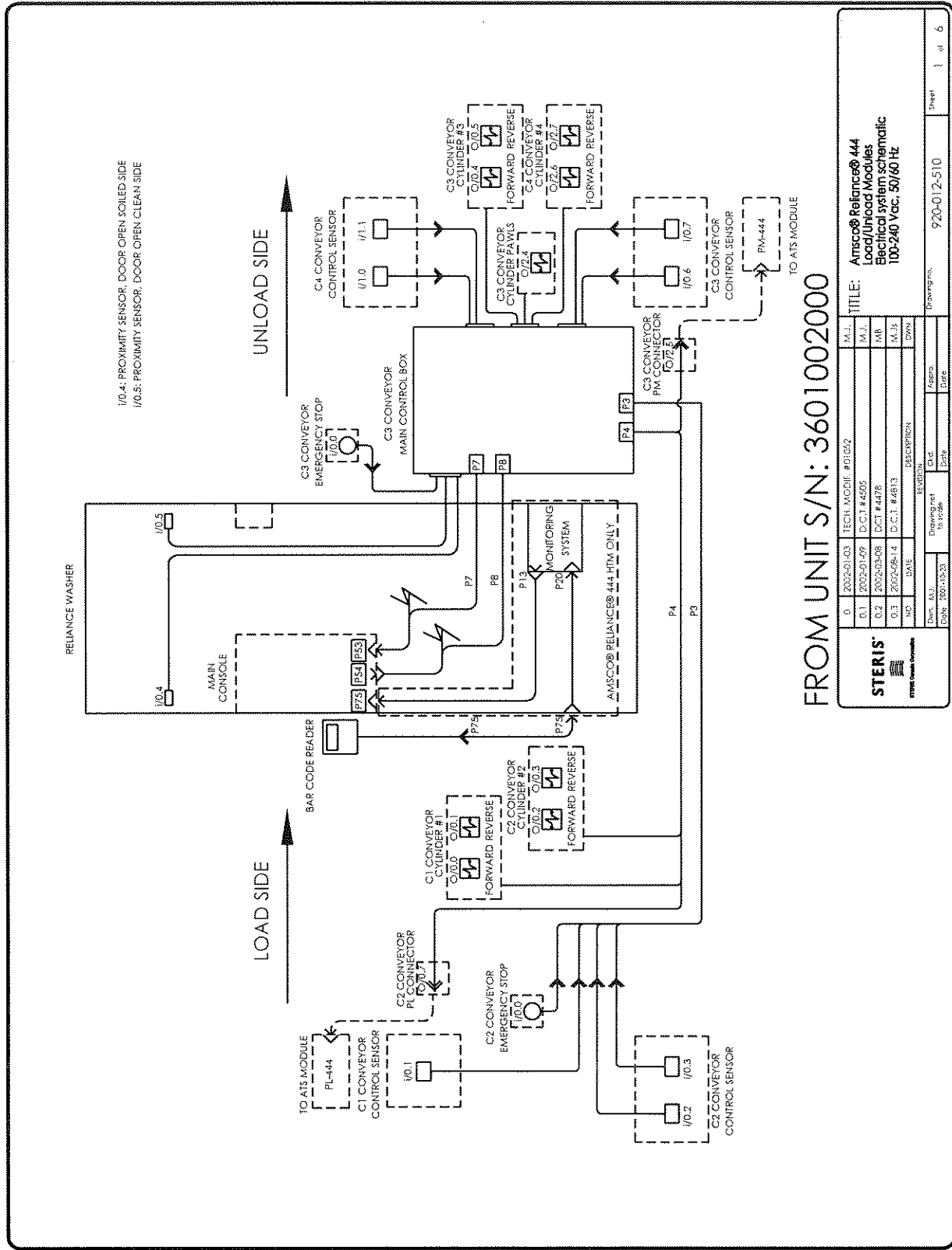
ALL DIMENSIONS ARE IN INCHES (MILLIMETERS)
ALSO REFER TO GENERAL NOTES APPLICABLE TO EQUIPMENT DRAWINGS

Amisco® Reliance® 444
Single-Chamber Washer/Disinfecter
Load/unload modules



STERIS

EQUIPMENT DRAWING NUMBER
122-993-509



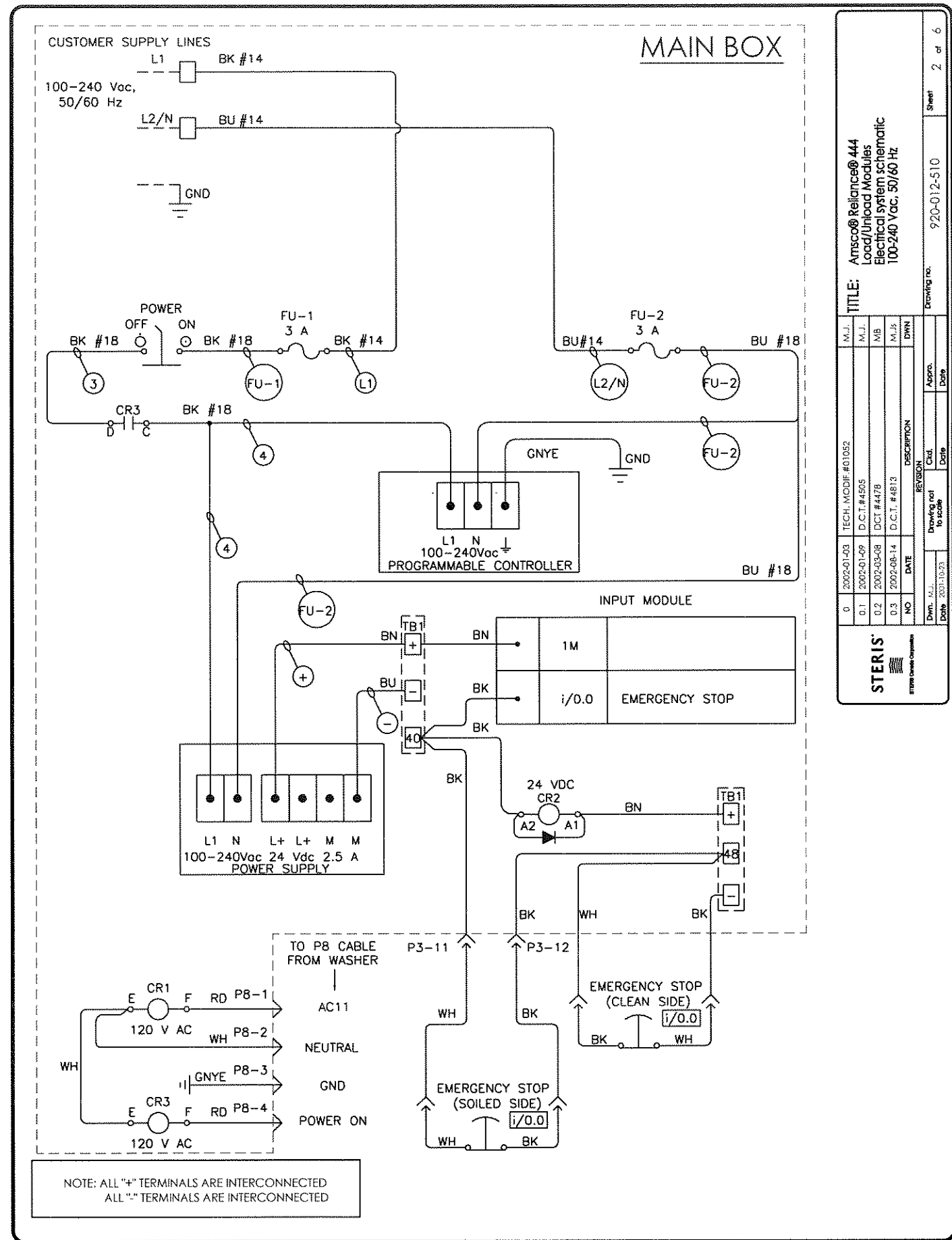
I/O.4: PROXIMITY SENSOR, DOOR OPEN SOILED SIDE
 I/O.5: PROXIMITY SENSOR, DOOR OPEN CLEAN SIDE

UNLOAD SIDE

LOAD SIDE

FROM UNIT S/N: 3601002000

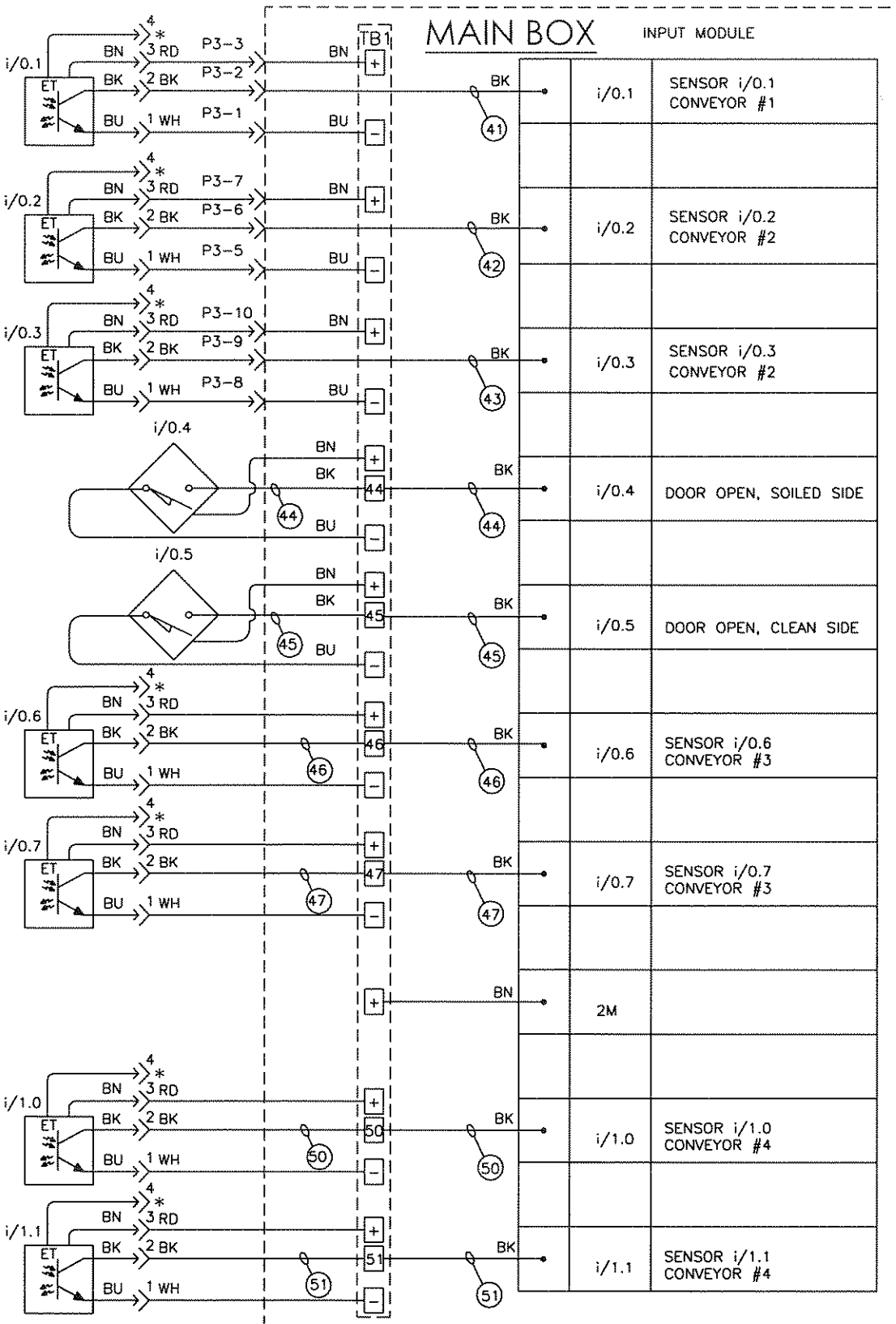
| | | | | |
|--|------------|-------------------------|----|--------------|
| STERIS STERIS HealthCare Company | | Drawing no. 920-012-510 | | Sheet 1 of 6 |
| REV. | DATE | DESCRIPTION | BY | CHKD. |
| 0 | 2002-01-03 | TECH. MODIF. #D1622 | | |
| 0.1 | 2002-01-09 | D.C.T. #4205 | | |
| 0.2 | 2002-03-08 | D.C.T. #4478 | | |
| 0.3 | 2002-08-14 | D.C.T. #4813 | | |
| NO. | DATE | DESCRIPTION | BY | CHKD. |
| | | | | |
| TITLE: Anasco@Reliance@444 Load/Unload Modules Electrical system schematic 100-240 Vcc, 50/60 Hz | | | | |



TITLE:
 AmSCO@Reliance@444
 Load/Unload Modules
 Electrical system schematic
 100-240 Vac, 50/60 Hz

| M.J. | TECH. MODIF # | D.C.T. # | D.C.T. # | D.C.T. # | DATE | DESCRIPTION | REVISON | Drawn not to scale | Checked | Approved |
|------|---------------|--------------------|----------|----------|------|-------------|---------|--------------------|---------|----------|
| 0 | 2002-01-03 | TECH. MODIF #01062 | | | | | | | | |
| 0.1 | 2002-01-09 | D.C.T. #4505 | | | | | | | | |
| 0.2 | 2002-03-08 | D.C.T. #4478 | | | | | | | | |
| 0.3 | 2002-08-14 | D.C.T. #4813 | | | | | | | | |

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MAIN BOX INPUT MODULE

| | |
|-------|-----------------------------|
| i/0.1 | SENSOR i/0.1 CONVEYOR #1 |
| i/0.2 | SENSOR i/0.2 CONVEYOR #2 |
| i/0.3 | SENSOR i/0.3 CONVEYOR #2 |
| i/0.4 | DOOR OPEN, SOILED SIDE |
| i/0.5 | DOOR OPEN, CLEAN SIDE |
| i/0.6 | SENSOR i/0.6 CONVEYOR #3 |
| i/0.7 | SENSOR i/0.7 CONVEYOR #3 |
| 2M | |
| i/1.0 | SENSOR i/1.0 CONVEYOR #4 |
| i/1.1 | SENSOR i/1.1 CONVEYOR #4 |

NOTE: ALL "+" TERMINALS ARE INTERCONNECTED
 ALL "-" TERMINALS ARE INTERCONNECTED
 * = EXTERNAL TEACH

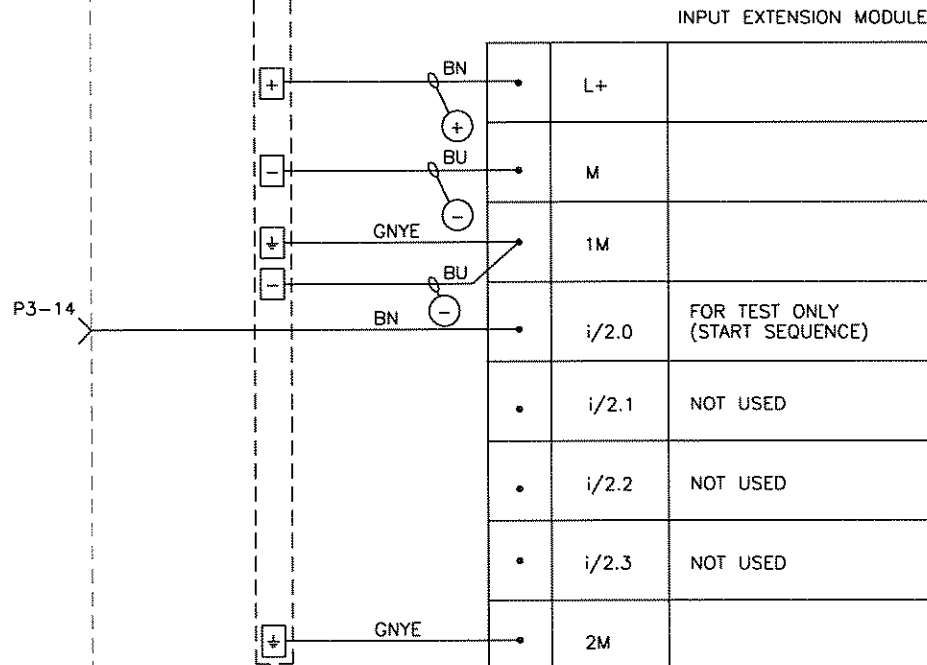
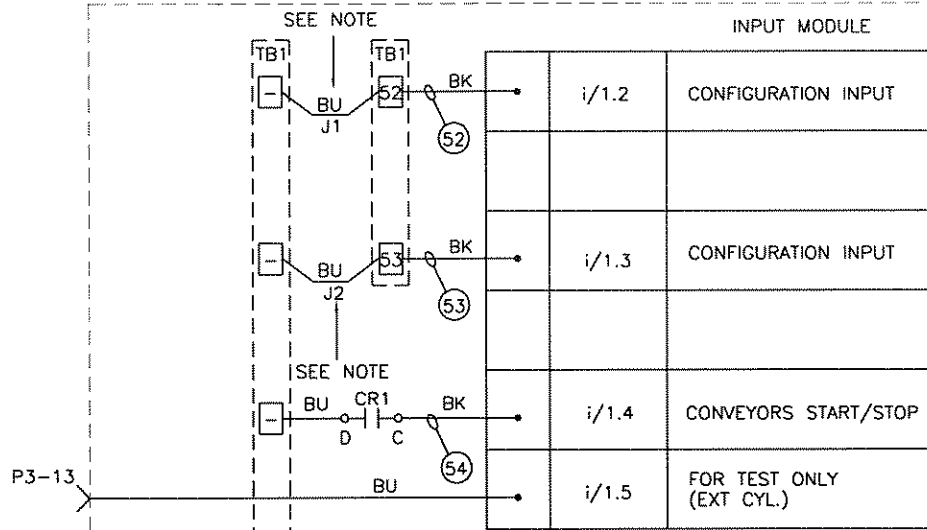
STERIS
 STERIS Canada Corporation

TITLE: Amsco® Reliance® 444
 Load/Unload Modules
 Electrical system schematic
 100-240 Vac, 50/60 Hz

| NO. | DATE | DESCRIPTION | DRWN. |
|-----|------------|--------------------|--------|
| 0 | 2002-01-03 | TECH. MODIF #01032 | M.J. |
| 0.1 | 2002-01-09 | D.C.T. #4505 | M.J. |
| 0.2 | 2002-08-08 | D.C.T. #4478 | MB |
| 0.3 | 2002-08-14 | D.C.T. #4813 | M.J.S. |

| NO. | DATE | DESCRIPTION | DRWN. |
|-----|------------|----------------------|-------|
| 1 | 2001-10-23 | Drawing not to scale | MB |
| 2 | | As per | |

Drawing no. 920-012-510 Sheet 3 of 6



MAIN BOX

| JUMPER SETTING (J1, J2) | | |
|-------------------------|--------|---|
| J1, 52 | J2, 53 | |
| OFF | OFF | DOUBLE LOAD MODULE / DOUBLE UNLOAD MODULE |
| OFF | ON | DOUBLE LOAD MODULE / SINGLE UNLOAD MODULE |
| ON | OFF | SINGLE LOAD MODULE / DOUBLE UNLOAD MODULE |
| ON | ON | SINGLE LOAD MODULE / SINGLE UNLOAD MODULE |

NOTE: INPUT IS ON WHEN THE L.E.D. OF THE INPUT IS ON.
JUMPERS J1 AND J2 MAY NEED TO BE REMOVED.

NOTE: ALL "+" TERMINALS ARE INTERCONNECTED
ALL "-" TERMINALS ARE INTERCONNECTED

| INPUT MODULE | |
|--------------|--------------------------|
| i/1.2 | CONFIGURATION INPUT |
| i/1.3 | CONFIGURATION INPUT |
| i/1.4 | CONVEYORS START/STOP |
| i/1.5 | FOR TEST ONLY (EXT CYL.) |

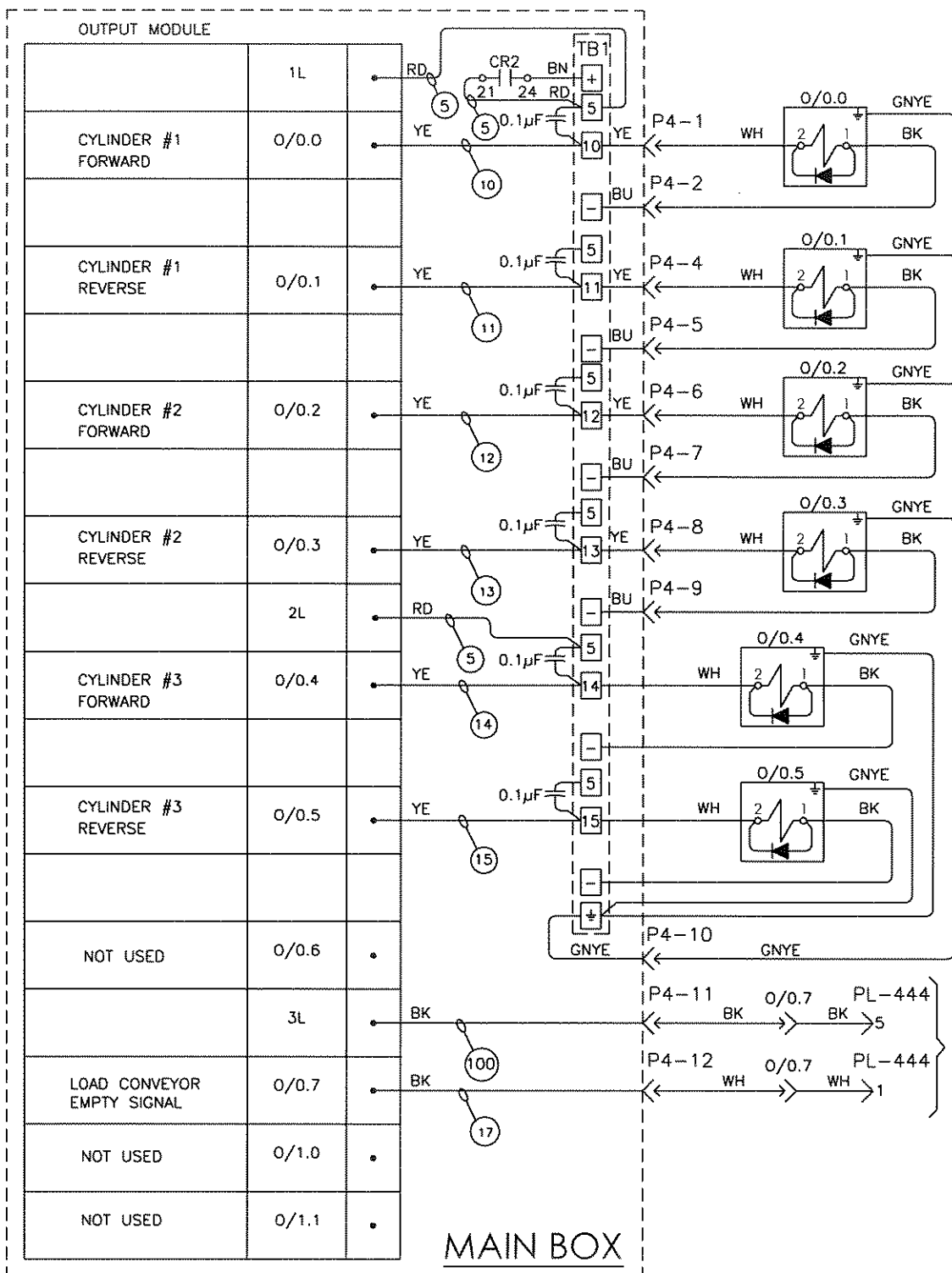
| INPUT EXTENSION MODULE | |
|------------------------|--------------------------------|
| L+ | |
| M | |
| 1M | |
| i/2.0 | FOR TEST ONLY (START SEQUENCE) |
| i/2.1 | NOT USED |
| i/2.2 | NOT USED |
| i/2.3 | NOT USED |
| 2M | |
| i/2.4 | NOT USED |
| i/2.5 | NOT USED |
| i/2.6 | NOT USED |
| i/2.7 | NOT USED |

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STERIS Dental Corporation

TITLE: Amisco® Reliance® 444 Load/Unload Modules Electrical system schematic 100-240 Vcc, 50/60 Hz

| M.J. | TECH. MODIF. # | DESCRIPTION | DATE | REVISED | Drawn not to scale | Checked | Approved |
|------|----------------|---------------------|------|---------|--------------------|---------|----------|
| 0 | 2002-01-03 | TECH. MODIF. #01052 | | | | | |
| 0.1 | 2002-01-09 | D.C.T. #4605 | | | | | |
| 0.2 | 2002-03-08 | D.C.T. #4478 | | | | | |
| 0.3 | 2002-08-14 | D.C.T. #4813 | | | | | |
| NO | | | | | | | |

Drawing no. 920-012-510 Sheet 4 of 6



TITLE:
 Amisco® Reliance® 444
 Load/Unload Modules
 Electrical system schematic
 100-240 Vac, 50/60 Hz

| REVISION | | DESCRIPTION | |
|----------|------------|--------------------|--|
| NO | DATE | | |
| 0 | 2002-01-03 | TECH. MODIF #01052 | |
| 0.1 | 2002-01-09 | D.C.T. #4605 | |
| 0.2 | 2002-03-08 | D.C.T. #4478 | |
| 0.3 | 2002-08-14 | D.C.T. #4813 | |

| Dwn. M.J. | | Appr. | |
|------------|--|-------|--|
| Date | | Date | |
| 2001-10-23 | | | |

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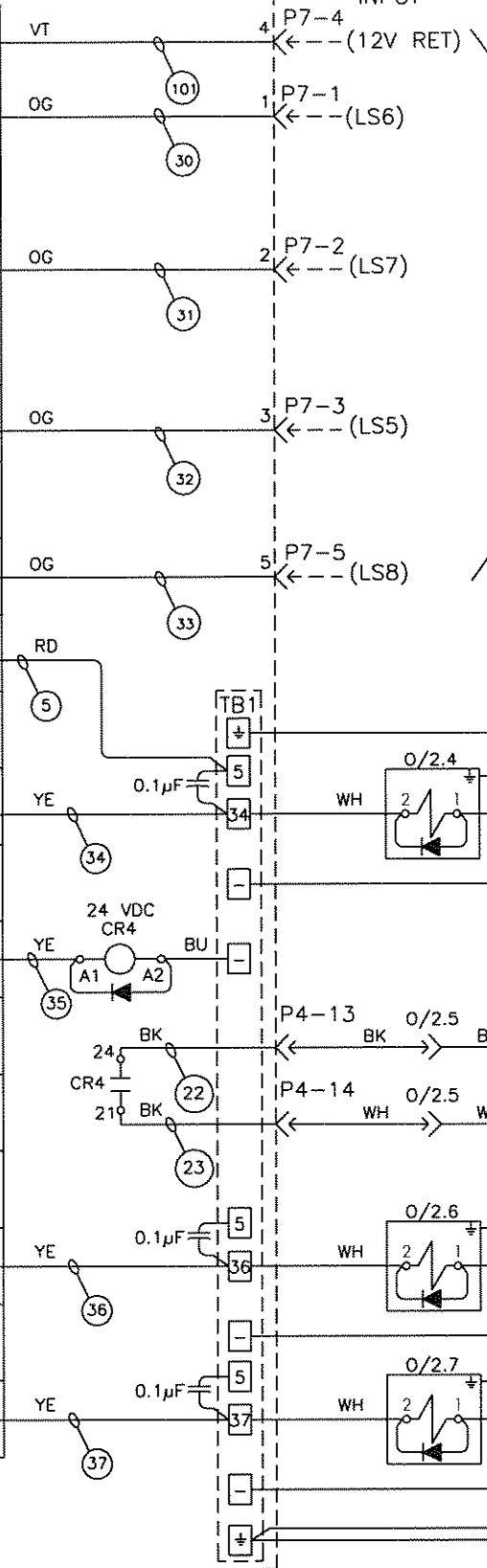
Drawing no. 920-012-510
 Sheet 5 of 6

NOTE: ALL "+" TERMINALS ARE INTERCONNECTED
 ALL "-" TERMINALS ARE INTERCONNECTED
 ALL "5" TERMINALS ARE INTERCONNECTED

OUTPUT EXTENSION MODULE

MAIN CONSOLE INPUT

| | | | |
|-------------------------------------|-------|----|--|
| | 1L1 | VT | |
| DOOR OPEN SIGNAL, SOILED SIDE (LS6) | 0/2.0 | OG | |
| | | | |
| DOOR OPEN SIGNAL, CLEAN SIDE (LS7) | 0/2.1 | OG | |
| | | | |
| EMERGENCY STOP SIGNAL (LS5) | 0/2.2 | OG | |
| | | | |
| CONVEYOR OBSTRUCTION SIGNAL (LS8) | 0/2.3 | OG | |
| | 2L1 | RD | |
| | | | |
| CYLINDER PAWLS, UNLOAD SIDE | 0/2.4 | YE | |
| | | | |
| UNLOAD CONVEYOR, FULL SIGNAL | 0/2.5 | YE | |
| | | | |
| CYLINDER #4, FORWARD | 0/2.6 | YE | |
| | | | |
| CYLINDER #4, REVERSE | 0/2.7 | YE | |



TO PLUG P53 ON MAIN CONSOLE 920081-010 FOR UNITS WITH S/N < 3632694004

OR

TO PLUG P7 ON WASHER FOR UNITS WITH S/N > 3632694004

UNLOAD CONVEYOR, FULL SIGNAL (TO ATS MODULE)

MAIN BOX

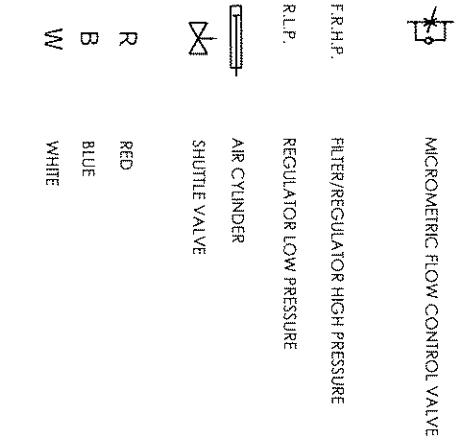
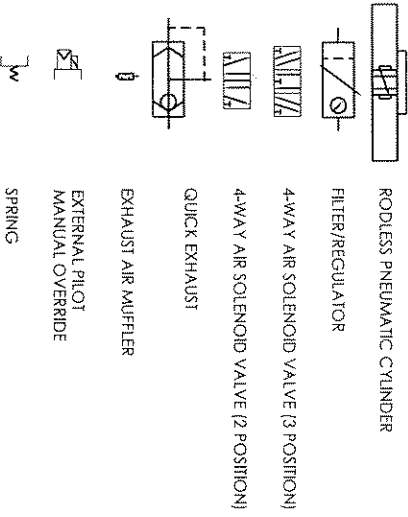
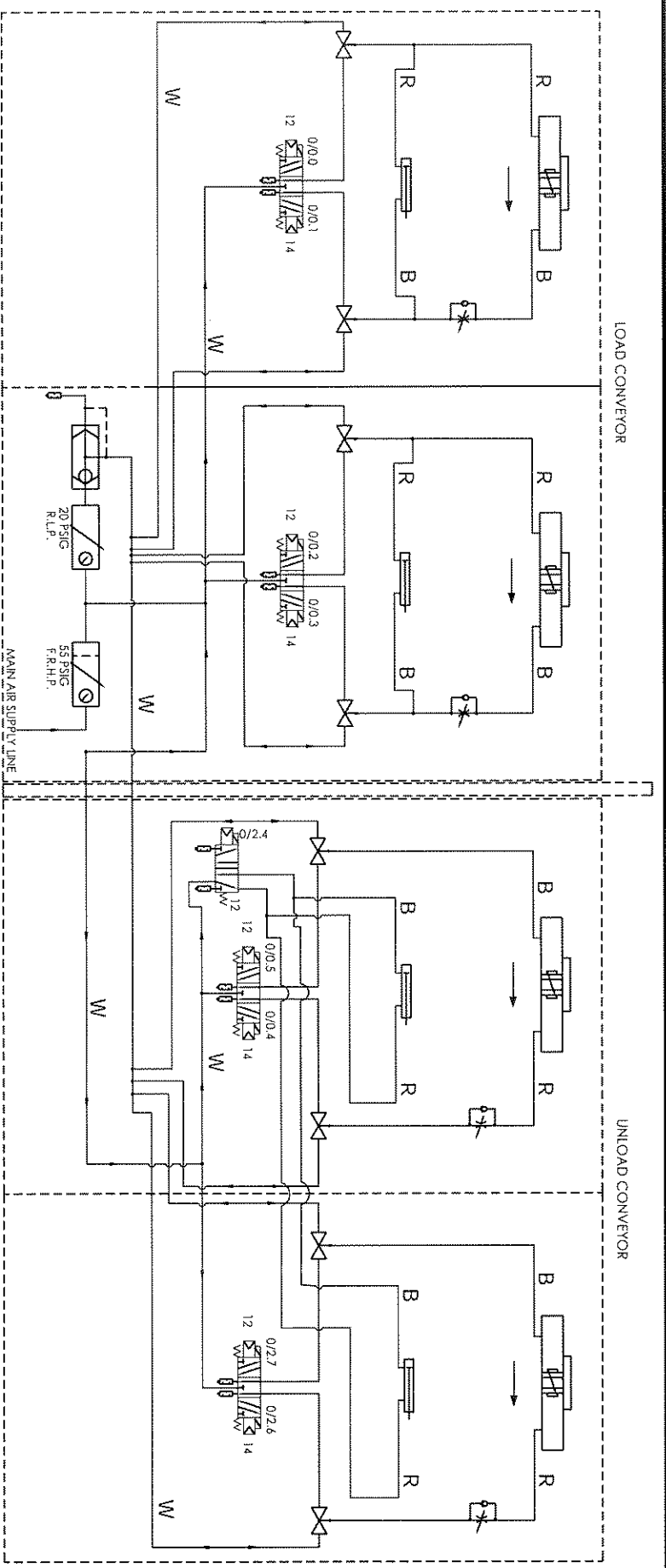
NOTE: ALL "+" TERMINALS ARE INTERCONNECTED
 ALL "-" TERMINALS ARE INTERCONNECTED
 ALL "5" TERMINALS ARE INTERCONNECTED

TITLE: Amisco® Reliance® 444 Load/Unload Modules Electrical system schematic 100-240 Vac, 50/60 Hz

| REV | DATE | DESCRIPTION | DWR |
|-----|------------|--------------------|-----|
| 0 | 2002-01-03 | TECH. MODIF #01052 | |
| 0.1 | 2002-01-09 | D.C.T. #4505 | |
| 0.2 | 2002-03-08 | DCT #4478 | |
| 0.3 | 2002-08-14 | D.C.T. #4813 | |

Drawing no. 920-012-510 Sheet 6 of 6

STERIS
 STERIS Direct Support



Not to scale

SHEET 1 OF 1

ALL DIMENSIONS ARE IN INCHES (MILLIMETERS)
 ALSO REFER TO GENERAL NOTES APPLICABLE TO EQUIPMENT DRAWINGS

Amisco@Reliance@444
 Single-Chamber Washer/Disinfecter
 Load/unload modules
 Pneumatic schematic

| | |
|--|--------------------------|
| | EQUIPMENT DRAWING NUMBER |
| | 122-993-549 |

Section 6: Inspection and Maintenance

▲ WARNING—PERSONAL INJURY AND/OR EQUIPMENT DAMAGE HAZARD:

- Regularly scheduled preventive maintenance, in addition to the faithful performance of the minor maintenance described within this manual, is required for safe and reliable operation of this equipment. Contact STERIS to schedule preventive maintenance.
- Only fully qualified service personnel should make repairs or adjustments to this equipment. Maintenance done by inexperienced, unqualified personnel, or installation of unauthorized parts could cause personal injury, invalidate the warranty, or result in costly equipment damage.

Maintenance procedures described in this section must be performed regularly at the indicated intervals. The indicated frequencies are minimums and should be increased if washer/disinfector usage warrants. If a problem occurs, refer to Section 6.11, *Troubleshooting*. A sample preventive maintenance guide is included in this section which should be used as a guide for the frequency of maintenance. Such a record proves useful in ensuring proper maintenance. Refer to Section 9 for replacement parts list.

6.1 DAILY CLEANING

▲ WARNING—SLIPPING HAZARD: To avoid slippery floor conditions, immediately wipe up any spilled liquids or condensation.

▲ CAUTION—POSSIBLE EQUIPMENT DAMAGE: Use non-abrasive cleaners when cleaning unit. Follow directions on containers and rub in a back-and-forth motion (in same direction as surface grain). Abrasive cleaners will damage stainless steel. Cleaners rubbed in a circular motion or applied with a wire brush or steel wool on door and chamber assemblies can be harmful to stainless steel. Do not use these cleaners on painted surfaces.

6.1.1 General

1. After last cycle of the day, allow unit to cool, and then remove and clean bottom filters of wash chamber. Always clean filter while they are still wet, before foreign matter dries.
2. Remove riser valve and inspect for debris. Brush off and rinse under tap water if necessary.

6.1.2 Conveyor Modules (Option)

After each work shift, Amsco® Reliance® 444 Load/Unload Module or Amsco® Reliance® ATS Automated Transport System conveyor gutters should be cleaned to remove gross soil and debris.

1. Using a damp cloth or sponge, apply cleaner on drip pans in a back-and-forth motion.
2. Thoroughly wipe off cleaner.

6.2 WEEKLY CLEANING

▲ WARNING—SLIPPING HAZARD: To avoid slippery floor conditions, immediately wipe up any spilled liquids or condensation.

▲ CAUTION—POSSIBLE EQUIPMENT DAMAGE: Use non-abrasive cleaners when cleaning unit. Follow directions on containers and rub in a back-and-forth motion (in same direction as surface grain). Abrasive cleaners will damage stainless steel. Cleaners rubbed in a circular motion or applied with a wire brush or steel wool on door and chamber assemblies can be harmful to stainless steel. Do not use these cleaners on painted surfaces.

6.2.1 Routine Cleaning Procedures

1. Clean unit exterior as outlined below. Using a general cleaner for general stains, a stainless steel stain remover for stubborn stains, and a stainless steel polish to keep equipment looking like new.
 - a. Using a damp cloth or sponge, apply cleaner in a back-and-forth motion, rubbing in same direction as surface grain.
 - b. Thoroughly wipe off cleaner.
 - c. Polish surface with a clean, dry, lint-free cloth.
2. Clean wash chamber interior with a moderately alkaline detergent solution. Rinse with tap water and dry with a lint-free cloth.

NOTE: If interior is stained, use a general cleaner to remove general stains, or a stainless steel stain remover for stubborn stains. Using a damp cloth or sponge, apply cleaner in a back-and-forth motion, rubbing in same direction as surface grain. Thoroughly wipe off cleaner and polish with a clean, dry, lint-free cloth.

3. Clean wash chamber rotary spray assemblies as follows:

- a. Remove and lower rotary spray assembly from top of wash chamber.

NOTE: There are two loose bushings between rotary spray hub and top of wash chamber. When lowering rotary spray assembly, the bushings will fall. Be certain to hold on to bushings while removing rotary spray assembly.

- b. Rinse each spray arm assembly under running water to clean out sediment.

NOTE: Do not remove spray arms from rotary spray arm assemblies.

- c. Use a fine wire (approximately the wire gauge of a paper clip) to clean sediment from spray nozzles. Rinse under running water.
 - d. Place bushings on rotary spray arm hub and reattach spray arm assembly to top of wash chamber.
4. Clean door gasket using a soft cloth containing a soapy solution or a mild detergent.
5. Clean rotary spray arms on accessories in the same way as chamber spray arms (see Steps 3a to 3d).

6. If Independent Monitor option is present, clean using a soft cloth containing a soapy solution or a mild detergent, clean front panel and display.

IMPORTANT: DO NOT USE LEMON-BASED (Citric Acid) PRODUCTS to clean the display/keyboard.

6.2.2 DECONTAM Cycle

⚠ WARNING – CHEMICAL BURN AND/OR EYE INJURY HAZARD:

- Detergents are caustic and can cause adverse effects to exposed tissues. Do not get in eye, on skin, or attempt to swallow. Read and follow the precautions and instructions on the detergent label and in the Material Safety Data sheet (MSDS) prior to handling the detergent, refilling the detergent container, or servicing the detergent injection pump. Wear appropriate Personal Protective Equipment (PPE) whenever handling the detergent or servicing the detergent injection pump and lines.
- Wear gloves and eye protection when using a descaling product. Avoid contact with the eyes or skin. If spilled or splashed, flush with water for 15 minutes. If swallowed, DO NOT induce vomiting. Administer an alkali with plenty of water. Seek medical attention immediately.

⚠ CAUTION – POSSIBLE EQUIPMENT DAMAGE:

- Always position each manifold and/or bottom rotary spray over a manifold connector before operating unit. If manifolds and/or rotary sprays are not positioned correctly, damage may result and unit will be unable to effectively wash load.
- When choosing a detergent, select one with a low chloride content. Detergents with a high chloride content can be harmful to stainless steel.

NOTE: It is the responsibility of the customer to perform the decontamination of their unit once per week, as instructed.

Decontaminate and descale chamber as follows, using DECONTAM cycle expressly designed for this purpose:

1. Place empty two-level, three-level, four-level, or five-level manifold accessory in wash chamber over manifold connector.
2. Using CYCLE MENU touch pad and SELECT CYCLE touch pad, select DECONTAM cycle on third Cycle Menu. Press CYCLE START touch pad to confirm. Display shows:

**PRESS START TO
PROCESS - DECONTAM**

3. Press CYCLE START touch pad again to confirm DECONTAM cycle selection. DECONTAM Cycle starts processing. Display shows:

**OPEN LOAD DOOR AND
ADD DESCALER**

4. Press DOOR OPEN touch pad to open load door. Display shows:

**PLEASE CLOSE DOOR
TO START DECONTAM**

5. Pour 591 mL (20 oz) of descaling product into chamber and press DOOR CLOSE to close load door.

NOTE: If an alarm occurs during wash treatment, respond to the alarm and try to repair the bad condition. Press STOP/RESET touch pad twice to abort cycle. Restart a new DECONTAM Cycle.

6. At completion of cycle, open door and allow unit to air dry.
7. Verify chamber bottom filters for debris. If debris is present, rinse filters under running water to clean.

NOTE: Contact STERIS for information on specific cleaning and descaling products recommended for use with this equipment.

6.2.3 Building Supply-Line Strainers

⚠ WARNING – ELECTRIC SHOCK AND/OR BURN HAZARD:

- **Disconnect all utilities to washer before servicing. Do not service the washer unless all utilities have been properly locked out. Always follow local electrical codes and safety-related work practices.**
- **Fasteners and star washers are used to ensure protective bonding continuity. Always reinstall any star washer which may have been removed during installation or servicing.**

⚠ WARNING–BURN HAZARD: Allow piping to cool down before inspecting and/or cleaning supply-line strainers.

NOTE: Contact facility maintenance technician for this operation.

Clean building supply-line strainers as follows:

1. Lockout/Tagout building main electrical disconnect switch to OFF position.
2. Close building supply lines: hot water, cold water, and steam (optional).
3. Put Main Power switch of the washer/disinfector to OFF position.
4. On load side, remove upper service access panel.
5. Remove and clean strainers under running water.
6. Reinstall load side upper service access panel.
7. Open building supply lines: hot water, cold water, and steam (optional)
8. Restore power to the unit.

6.2.4 Conveyor Modules (Option)

If unit is equipped with Amsco Reliance ATS Automated Transport System, see also Section 4, *Inspection and Maintenance, of Operator Manual (P122995-004)* for Routine Maintenance Procedures.

If unit is equipped with Amsco Reliance 444 Load/Unload Modules or Amsco Reliance ATS Automated Transport System:

NOTE: Contact facility maintenance technician for this operation.

Clean conveyor modules cold water supply line strainer and air filter as follows:

1. Disconnect electrical connections (lockout/tagout) and close building cold water and air supply lines.
2. On load side module, activate spray header to release all water pressure from line.
3. Remove side panel (see Figure 6-1).
4. Remove and clean cold water strainer and air filter from under conveyor module.
5. Rinse air filter under running water, or replace as required.
6. Replace strainer and filter in position.
7. Reinstall previously removed side panel.
8. Open building supply lines and restore power to unit.

6.3 MONTHLY CLEANING

6.3.1 General

⚠ WARNING – SLIPPING HAZARD: To avoid slippery floor conditions, immediately wipe up any spilled liquids or condensation

⚠ CAUTION – POSSIBLE EQUIPMENT DAMAGE:

- **Wipe all plastic surfaces or painted surfaces with 70% isopropyl alcohol cleaner or any non-abrasive household cleaner (such as glass or countertop cleaners).**
- **Use non-abrasive cleaners when cleaning unit. Follow directions on containers and rub in a back-and-forth motion (in same direction as surface grain). Abrasive cleaners will damage stainless steel. Cleaners rubbed in a circular motion or applied with a wire brush or steel wool on door and chamber assemblies can be harmful to stainless steel. Do not use these cleaners on painted surfaces.**

Once a month, conveyor module drip pans should be thoroughly cleaned to remove hard water deposits, gross soil, and debris.

NOTE: Depending on hardness of water being used, it may be necessary to remove hard water deposits more often. Remove deposits from drip pans whenever deposits become visible.

6.3.2 Conveyor Modules (Option)

If unit is equipped with Amsco Reliance ATS Automated Transport System, see also Section 4, *Inspection and Maintenance*, of *Operator Manual* (P122995-004) for Routine Maintenance Procedures.

If unit is equipped with Amsco Reliance 444 Load/Unload Modules:

1. Rinse load side module gutters with running water (using a hose, for example).
2. Pour a small amount of cleaning/descaling product on a damp cloth, and rub each drip pan surface in a back-and-forth motion (same direction as surface grain) to remove hard water deposits.
3. Thoroughly wipe off cleaner/descaler.
4. Remove filters from module drain holes (see Figure 6-1).
5. Rinse off cleaner/descaler with running water (using a hose, for example).
6. Remove the two screws on top of gutters.
7. Remove gutters to clean the back side and reach drip pan.
8. Repeat Steps 1 to 5 on back of gutters and on drip pan.
9. Polish surface with a clean, dry, lint-free cloth; use a stainless steel polish if desired.

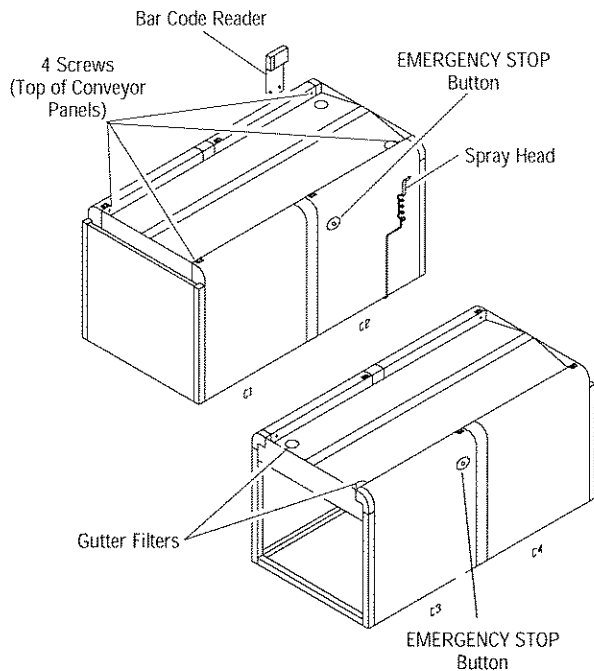


Figure 6-1. Amsco Reliance 444 Load and Unload Modules

10. Reinstall gutters and reinstall strainer in drain holes.
11. Repeat the procedure on the unload side modules.

6.4 REPLACING CHEMICAL CONTAINER

⚠ WARNING—CHEMICAL BURN AND/OR EYE INJURY HAZARD: Detergents are caustic and can cause adverse effects to exposed tissues. Do not get in eyes, on skin, or attempt to swallow. Read and follow the precautions and instructions on the detergent label and in the Material Safety Data Sheet (MSDS) prior to handling the detergent, refilling the detergent container, or servicing the detergent injection pump. Wear appropriate Personal Protective Equipment (PPE) whenever handling the detergent or servicing the detergent injection pumps and lines.

⚠ CAUTION – POSSIBLE EQUIPMENT DAMAGE: When choosing a detergent, select one with a low chloride content. Detergents with a high chloride content can be harmful to stainless steel.

NOTE: Always use a non-foaming detergent for effective cleaning and proper pump operation. Detergents with a high-chloride content should not be used, as chlorides are harmful to stainless steel. Refer to Section 2.3, *Detergent and Chemical Additive Specifications* and follow detergent manufacturer's recommendations for amount of detergent to be used.

1. If one of the chemical products is low or has run out, remove pickup tube and low-level sensor from empty container.
2. Install a new container.

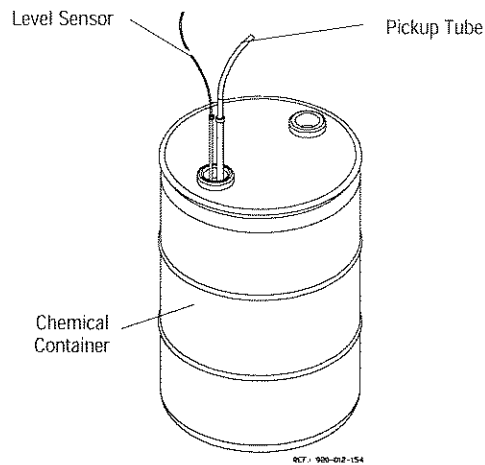


Figure 6-2. Chemical Container

- Place low-level sensor and pickup tube assembly upright in new container (see Figure 6-2).

6.5 CHECKING AND REPLACING PERISTALTIC INJECTION PUMP SQUEEZE TUBE

⚠ WARNING – CHEMICAL BURN AND/OR EYE INJURY HAZARD: Detergents are caustic and can cause adverse effects to exposed tissues. Do not get in eyes, on skin, or attempt to swallow. Read and follow the precautions and instructions on the detergent label and in the Material Safety Data Sheet (MSDS) prior to handling the detergent, refilling the detergent container, or servicing the detergent injection pump. Wear appropriate Personal Protective Equipment (PPE) whenever handling the detergent or servicing the detergent injection pumps and lines.

⚠ CAUTION – POSSIBLE EQUIPMENT DAMAGE: Always use a silicone lubricant (P117950-599) to lubricate squeeze tubes. Petroleum-based lubricants, such as Vaseline or grease, cause squeeze tubes to melt.

6.5.1 Verify and Lubricate Squeeze Tubes

See Figures 6-3, 6-4, and 6-5.

Each month, lubricate and verify squeeze tubes as follows:

- Remove top portion of control access panel.
- Position POWER-OFF/STANDBY switch to OFF/STANDBY.
- Position Main Power switch to OFF.
- Open load side lower service access panel to access detergent injection pumps. Open detergent pump panel (see Figure 6-3).
- Remove two screws attaching injection pump faceplate to injection pump head (see Figures 6-4 and 6-5). Lift faceplate away from pump head.
- Check squeeze tubes for any leaks or signs of wear. If necessary, replace squeeze tubes as explained in Section 6.5.2, *Replace Squeeze Tube*.
- Lubricate section of squeeze tube in contact with pump(s) using Silicone Lubricant (P117950-599).
- Return faceplate to pump head and fasten with two screws previously removed.
- Position Main Power switch to ON and POWER-OFF/STANDBY switch to POWER.

- Close detergent injection pump panel and reinstall lower service access panel previously removed.

6.5.2 Replace Squeeze Tubes

See Figures 6-4 and 6-5.

If necessary, replace squeeze tubes as follows:

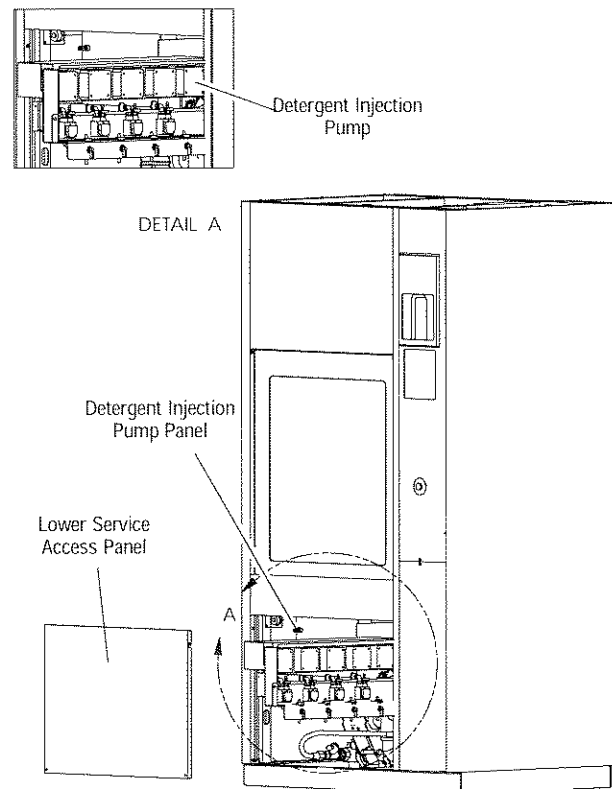
IMPORTANT: Use a small container to collect any leaking detergent.

- On detergent injection pump (all units),** remove clamps and disconnect the squeeze tube ends from the detergent feed lines (see Figure 6-4).

... or ...

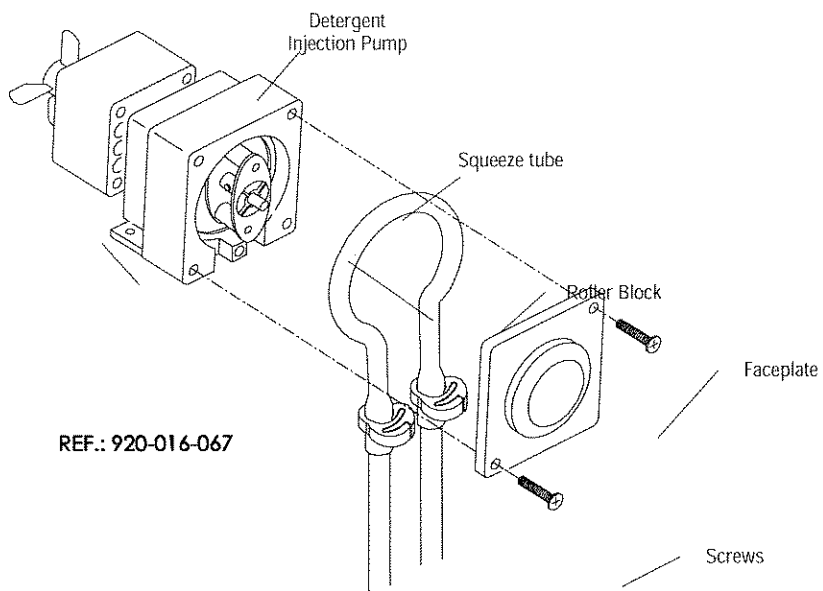
On Rinse Aid injection pump (380/400/415 V units only), remove "U" plastic bracket covering the squeeze tube. Pinch holding ring near pump head to release squeeze tube (see Figure 6-5).

- Pull out old squeeze tube from pump head. Discard the tube.
- Clean all pump surfaces.

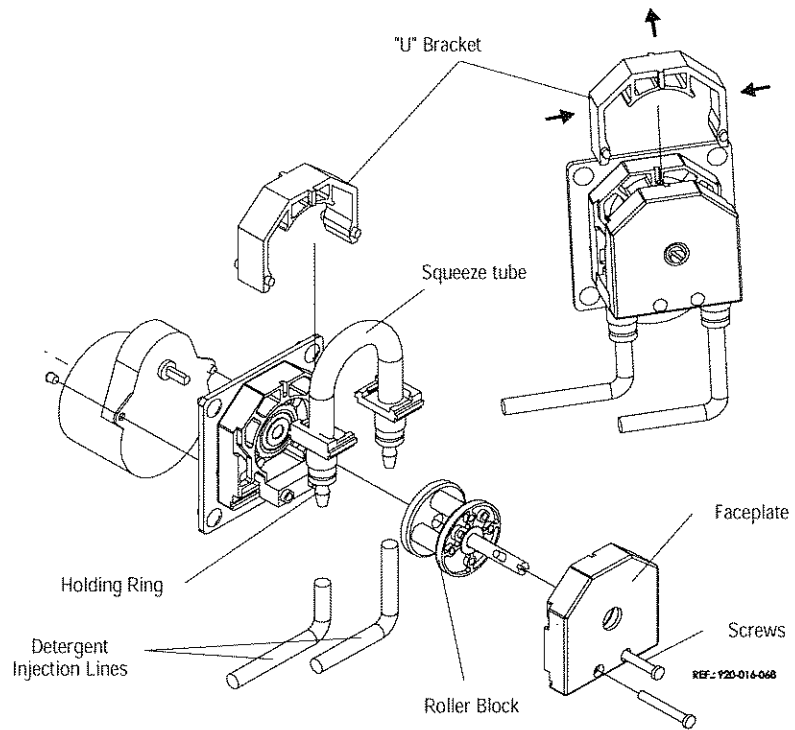


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Figure 6-3. Access Detergent Injection Pumps



**Figure 6-4. Detergent Injection Pump
(All Units)**



**Figure 6-5. Rinse Aid Injection Pump
(380/400/415 V Units Only)**

4. Insert one end of new squeeze tube into pump head and rotate roller block manually to feed.
5. Liberally spread Silicone Lubricant (P117950-599) over rollers in the roller block and all tubing surfaces in contact with the pump head.
6. **On detergent injection pump (all units)**, connect new squeeze tube ends to the detergent feed lines. Attach clamps to both detergent feed lines (see Figure 6-4).

... or...

On Rinse Aid injection pump (380/400/415 V units only), re-install "U" plastic bracket over pump head. Pinch holding ring near pump head and insert end of new squeeze tube. Repeat for second holding ring (see Figure 6-5).

7. Return faceplate to pump head and fasten with two screws previously removed.
8. Position Main Power switch to ON and POWER-OFF/STANDBY switch to POWER.
9. See Section 6.5.3, *Priming Procedure*, to fill tubing with detergent.
10. Initiate a cycle and check squeeze tube operation.
11. Re-install all panels previously removed.
12. **If Independent Monitor option is present**, perform injection pump calibration. See Section 4.6.3, *How to Calibrate Conductivity, Chemical Injection, and Pressure with Independent Monitor Option*.

6.5.3 Priming Procedure

⚠ WARNING – CHEMICAL BURN AND/OR INJURY HAZARD: Detergents are caustic and can cause adverse effects to exposed tissues. Do not get in eyes, on skin, or attempt to swallow. Read and follow the precautions and instructions on the detergent label and in the Material Safety Data Sheet (MSDS) prior to handling the detergent, refilling the detergent container, or servicing the detergent injection pump. Wear appropriate Personal Protective Equipment (PPE) whenever handling the detergent or servicing the detergent injection pump and lines

1. Open load chamber access door.
2. Use CYCLE MENU touch pad to scroll to third cycle menu.
3. Use SELECT CYCLE touch pad to select PRIME.

4. Press CYCLE START to start priming. Display shows:

PUMP TO PRIME?

Pump Name

__ indicates blinking position

5. Scroll through pump names, using VALUE arrows (up or down) touch pad until pump to be primed is displayed.
6. Press CYCLE START touch pad to confirm pump selection and start priming. Display shows:

PRIMING IN PROGRESS

TIME = XX:XX

7. When a few drops of chemical product come out of the injector, press **STOP/RESET** touch pad.

NOTE: Priming takes 5 minutes or more for pumps 1 to 4. For pump 5, priming time is 5 minutes for lubricant (208 V and 480 V units), and 20 minutes for rinse aid (380/400/415 V units).

6.6 CHANGING PRINTER PAPER ROLL

6.6.1 General

See Figure 6-6.

NOTE: Do not operate printer without paper.

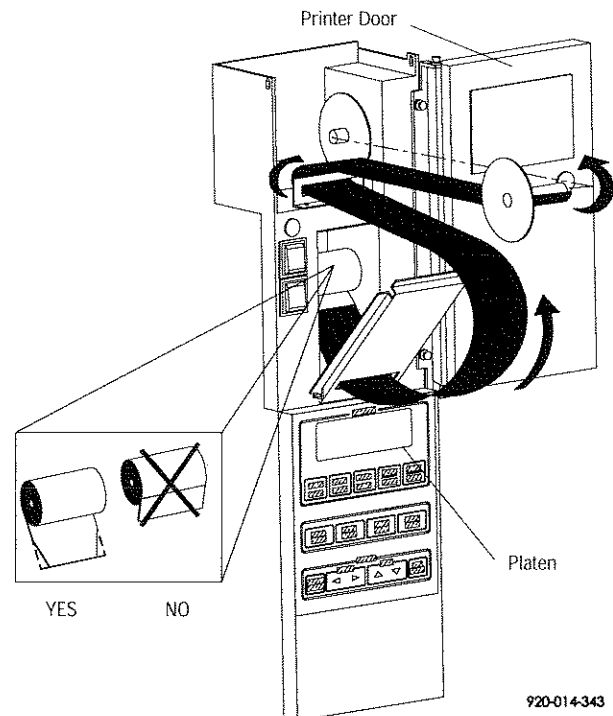


Figure 6-6. Changing Printer Paper Roll

1. Open printer door.
2. Grasp remaining paper and pull it upward and out of printer.
3. Remove take-up spindle from its drive mechanism by pulling it to the left.
4. Remove paper roll from take-up spindle and set empty take-up spindle aside.
5. Lower the platen and remove the lower paper spindle by pulling it straight forward.
6. Place new paper roll onto the lower spindle with the paper feeding downward from the back of the paper roll.

NOTE: Verify the paper roll is positioned correctly. Thermal printer will not print if the paper roll is inserted backward. Do not use other brands of thermal paper, use only STERIS thermal paper (P129359-008). Damage to printer mechanisms can occur if paper of different width or thickness is used.

7. Place lower spindle (with new paper roll) back into position by pressing from the front until it snaps into place.
8. Pull 10 or 12 cm (4 or 5") of paper out from roll and tear the corners off the end.
9. Slide tab of paper roll into printer from the back (with platen still in down position) until it exits from front of printer.
10. Grasp tab of paper, pull up 25 to 30 cm (10 or 12") of paper, and feed this paper through opening in platen.
11. Insert tab of new paper roll into slot of take-up spindle and rotate spindle to secure paper in slot.
12. Raise platen back up into position and snap in place under catch.
13. Press take-up spindle back onto the drive mechanism and allow motor to rotate spindle to verify paper is secured to take-up roll.
14. Set the POWER/OFF-STANDBY switch to OFF-STANDBY position then to POWER to verify that paper is correctly routed into mechanism and that printer prints. Printer will not print if thermal paper was placed on wrong side.
15. Close printer door.

6.6.2 Storing Thermal Paper

Thermal paper is subject to fading with time, humidity, and exposure to light.

It is the manufacturer's recommendation that thermal paper be stored in a dark place with an average

ambient temperature of less than 25°C (77°F) and a relative humidity less than 65%. Under these conditions, the paper remains readable for at least five years. It is recommended that if the printed data is to be retained for periods of time longer than five years, an additional photocopy should be made for record retention. In any case, a duplicate set of records should be maintained in the files of the engineering or maintenance departments.

Thermal paper begins to develop color at about 70°C (158°F); however, under humid conditions, it might begin to develop at an accelerated rate. If stored for 24 hours at 60°C (140°F), the paper shows some signs of development. It also shows signs of development if stored for 24 hours at 45°C (113°F) and a relative humidity of 90%.

Do not store thermal paper next to other chemically treated papers — such as pressure-sensitive paper or other types of recording round charts — as this may cause fading in print. If thermal paper is to be stored in the same area, always ensure it and other chemically treated papers are kept in separate envelopes.

Thermal paper discolors when exposed to direct sunlight.

6.7 CHECKING DOOR SAFETY (LIMIT SWITCHES)

IMPORTANT: The supervisor or an authorized person must enter access code to perform this procedure.

Every 180 days, a door safety check is required on door bottom limit switches.

1. An alarm tone sounds, and display shows:

**SAFETY CHECK
REFER TO OPERATOR MANUAL**

2. Press **ALARM REPLY** touch pad to silence alarm tone. Display shows:

**ACCESS CODE KNOWN?
NO**

___ indicates flashing position.

3. Press the **CURSOR arrows** (up or down) touch pad to change NO to YES. Enter Access Code. Press **CHANGE VALUES** touch pad. Display shows:

**DOOR SAFETY CHECK
OPEN LOAD DOOR**

4. Press DOOR OPEN. Door opens and display shows:

**CLOSE DOOR WHEN
CHECK IS COMPLETE**

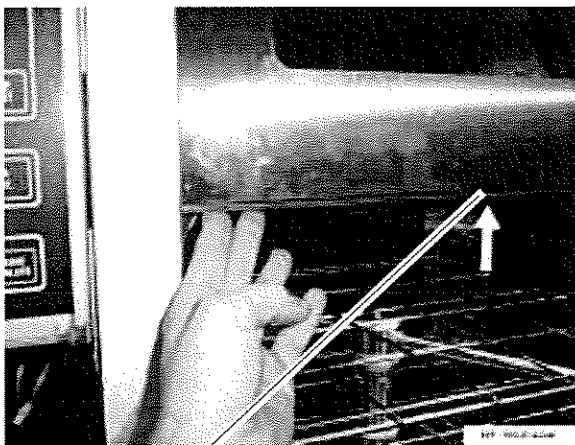
5. Wait until door is completely open; then, insert a fine wire (approximately the wire gauge of a paper clip) in the right hole of the protection bar on door bottom (see Figure 6-7).
6. A beep indicates that limit switch is working properly. If no beep is heard, reinsert wire deeply. If there is no sound, limit switch is defective; replace. For replacement procedure, see Section 8.15.2, *Door Limit Switch Replacement*.
7. Repeat Steps 5 and 6 in the left hole.
8. Press CLOSE DOOR touch pad. Door closes and display shows:

**PRESS CHANGE VALUES
CHECK UNLOAD DOOR**

9. Press CHANGE VALUES touch pad to verify limit switches on unload door. Repeat Steps 4 to 6 on both limit switches (holes on door bottom).
10. Once door safety check is completed, display shows:

**DOOR SAFETY CHECK
COMPLETE ON (DATE)**

11. Control returns automatically to main menu.



Holes Under the
Protection Bar

Figure 6-7. Location of holes under protection bar

6.8 EMERGENCY STOP BUTTONS VERIFICATION

⚠ WARNING – PERSONAL INJURY HAZARD: In case of an emergency situation involving the conveyor modules, always press the EMERGENCY STOP Button to stop all washer/disinfector and conveyor operations.

Verify EMERGENCY STOP Buttons, immediately after the limit switch verification.

6.8.1 Washer/Disinfector

Refer to Figures 3-1 and 3-5 for EMERGENCY STOP button location.

1. On load side, press CYCLE MENU touch pad to select a cycle.
2. Press CYCLE START touch pad to start cycle.
3. Allow cycle to run for 1 minute. Then press the EMERGENCY STOP Button.
4. All washer operation should stop instantly.
5. If washer operation does not stop, EMERGENCY STOP Button is defective; replace. See Section 8.4, *Emergency Stop Button Replacement* for procedure.
6. Pull out EMERGENCY STOP Button to restore energy to control.
7. Press CYCLE START touch pad to resume cycle operation.
8. Repeat Steps 1 to 7 on unload side.
9. Press STOP/RESET touch pad twice to abort cycle. Display shows:

CYCLE ABORTED

and printer records:

CYCLE ABORTED HH:MM

Control automatically returns to main menu.

6.8.2 Amsco Reliance 444 Load/Unload Modules (Option)

If unit is equipped with Amsco Reliance 444 Load/Unload Modules, verify module EMERGENCY STOP Buttons as follows (see Figure 3-5).

On load side:

1. Pull out all EMERGENCY STOP Buttons.
2. Position a basket at the beginning of the load/unload modules line to start indexation.
3. When basket starts moving, press the EMERGENCY STOP Button on load/unload module.

4. All index operation should stop instantly in the load/unload modules.
5. If index operation does not stop, EMERGENCY STOP Button is defective; replace. Refer to Section 8 for replacement procedure.
6. Manually move basket forward to the next proximity sensor or inside wash chamber if single load/unload module.
7. Pull out EMERGENCY STOP Button. Pawl retracts to its initial position.
8. Once basket is inside wash chamber, perform a short cycle.

On unload side:

9. At the end of the cycle, when basket starts moving out of wash chamber, press the EMERGENCY STOP Button.
10. All index operation should stop instantly in the load/unload modules.
11. If index operation does not stop, EMERGENCY STOP Button is defective; replace. For replacement procedure, see Section 8.26, *Emergency Stop Button Replacement on Amsco Reliance 444 Load/Unload Modules*.
12. Pull out EMERGENCY STOP Button. Pawl retracts to its initial position. Load/Unload modules are ready for operation.

6.8.3 Amsco Reliance ATS Automated Transport System (Option)

If unit is equipped with Amsco Reliance ATS Automated Transport System, verify module START/STOP Pushbuttons as follows:

START/STOP buttons are present on each powered module with gates, on loading module of return line modules, and on drawbridge modules. See Figure 3-6 for START/STOP Pushbutton location. Start verifying Pushbuttons on modules next to washer; then, continue with next module and so on.

NOTE: To perform a START/STOP Pushbutton verification, remove all baskets from the conveyor modules.

On load side:

1. Position AUTO/OFF selector switch to OFF position on all conveyor modules.
2. Position a basket at the beginning of the conveyor line to start indexing.
3. When module rollers start rolling, press the START/STOP Pushbutton on conveyor modules.

4. All index operation should stop instantly in the conveyor modules. Lights from START/STOP Pushbuttons turn OFF.
5. If index operation does not stop or light does not turn off, START/STOP Button is defective; replace. For replacement procedures, see Section 8, *Component Repair and Replacement, of Maintenance Manual (P764329-141)* for the Amsco Reliance ATS Automated Transport System.
6. Manually move basket forward to the next proximity sensor.
7. Pull out START/ STOP Pushbutton to restart sequence. When module rollers start rolling, press the next START/STOP Pushbutton. Continue this procedure until all START/STOP Pushbuttons on unload side have been verified.
8. Position AUTO/OFF selector switch to ON position.

On Unload side:

9. Position a basket at the beginning (downstream) of the conveyor unload line. Repeat Steps 3 to 8.

6.9 HEPA FILTER VERIFICATION

It is the responsibility of the customer to verify HEPA filter condition to ensure safe and reliable operation of filter. Refer to Section 8.21, *HEPA Filter Replacement* for procedure.

6.10 PREVENTIVE MAINTENANCE GUIDE

Table 6-1, *Preventive Maintenance Guide*, should be followed to properly maintain the unit. Some procedures should be carried out only by qualified service technicians. See Section 8, *Component Repair and Replacement*, for procedures.

NOTE: If unit runs more than 1300 cycles per year, minimum frequency should be increased accordingly.

Table 6-1. Preventive Maintenance Guide

| Recommended frequency of inspection is monthly. Usage and utility conditions may require more or less inspections. Tasks are defined on a yearly basis. | | Min. Freq. |
|--|---|-------------------|
| 1.0 | PREPARATION FOR PREVENTIVE MAINTENANCE | |
| 1.1 | Discuss equipment operation with department personnel. | 4 X/yr |
| 1.2 | Inspect printouts for signs of trouble. | 4 X/yr |
| 1.3 | When necessary, shut off all building services and drain all lines. | 4 X/yr |
| 2.0 | EAGLE 3000 STAGE 3 CONTROL | |
| 2.1 | Inspect for proper operation of printer. | 4 X/yr |
| 2.2 | Inspect for proper operation of touch panels. Verify all touch pads. | 4 X/yr |
| 2.3 | Verify proper date and time are displayed; if not, reset. | 4 X/yr |
| 2.4 | Verify paper take up is working properly. | 4 X/yr |
| 2.5 | Verify buzzer on control PC board is functioning properly. | 4 X/yr |
| 2.6 | Verify operation of the battery backed RAM, replace as needed. | 4 X/yr |
| 2.7 | Verify temperature displays/printouts using a digital thermometer. Calibrate if needed: <ul style="list-style-type: none"> • Sump RTD. • Dryer RTD. | 2 X/yr |
| 2.8 | Verify printout for darkness, missing dots, etc. | 2 X/yr |
| 2.9 | Verify all service-adjustable values in Service Test Mode for factory recommended settings. Verify functional operation of each valve using the Service Mode Test. | 1 X/yr |
| 2.10 | Disconnect plugs (P53, P54, etc.) from under control console. Apply contact cleaner (P117913-086) on all plugs and reconnect. | 1 X/yr |
| 3.0 | INDEPENDENT MONITOR (If Option is Present) | |
| 3.1 | Verify percentage of disk recording. | 1 X/ wk |
| 3.2 | Replace floppy disk. | 12 X/yr |
| 3.3 | Verify proper operation of Touchscreen touch pads. | 4 X/yr |
| 3.4 | Verify proper operation of display. | 4 X/yr |
| 3.5 | Verify RTD's are properly calibrated. Calibrate if necessary. | 2 X/yr |
| 3.6 | Verify Pressure Transducer is properly calibrated. Calibrate if necessary. | 2 X/yr |
| 3.7 | Verify Conductivity Sensor is properly calibrated. Calibrate if necessary. | 2 X/yr |
| 3.8 | Verify Flow Meters are properly calibrated. Calibrate if necessary. | 2 X/yr |

Table 6-1. Preventive Maintenance Guide (Cont'd)

| Recommended frequency of inspection is monthly. Usage and utility conditions may require more or less inspections. Tasks are defined on a yearly basis. | | Min. Freq. |
|--|--|-------------------|
| 3.9 | Verify Independent Monitor is properly calibrated. Calibrate if necessary. | 1 X/yr |
| 3.10 | Inspect connections and wiring to Eagle 3000 control. | 1 X/yr |
| 3.11 | Verify condition and operation of Backup Battery. Replace battery every 5 years. | 1 X/yr |
| 3.12 | Verify proper operation of Independent Monitor cooling fan. | 1 X/yr |
| 3.13 | Verify proper operation of Independent Monitor thermal cutout. | 1 X/yr |
| 4.0 | DOOR ASSEMBLY (EACH DOOR) | |
| 4.1 | Verify condition and operation of proximity sensor on top of door. | 6 X/yr |
| 4.2 | Verify condition and operation of door safety limit switch on bottom of door. | 2 X/yr |
| 4.3 | Inspect door for ease of operation. | 2 X/yr |
| 4.4 | Inspect door cylinders. Replace if necessary. | 2 X/yr |
| 4.5 | Verify condition of door gasket for wear and tear. Replace as needed. | 2 X/yr |
| 4.6 | Verify door glass for cracks. Replace door if needed. | 2 X/yr |
| 4.7 | Verify door cam adjustment. Verify bumper and plastic washer. | 1 X/yr |
| 4.8 | Inspect and lubricate door system. | 1 X/yr |
| 5.0 | EMERGENCY FEATURES | |
| 5.1 | Verify operation of EMERGENCY STOP Buttons (on each side of washer). | 2 X/yr |
| 5.2 | If option is present, verify operation of EMERGENCY STOP Buttons on Amsco Reliance 444 Load/Unload Modules or Amsco Reliance ATS Automated Transport System. | 2 X/yr |
| 6.0 | CHAMBER COMPONENTS | |
| 6.1 | Inspect rotary spray arm assemblies for free movement, and no clogged holes. | 6 X/yr |
| 6.2 | Clean bottom filter in wash chamber. | 6 X/yr |
| 6.3 | Remove hard water deposits from interior of chamber (use DECONTAM Cycle). | 6 X/yr |
| 6.4 | Verify piping system for leaks. Repair if necessary. | 6 X/yr |
| 6.5 | Verify proper operation of basket stopper. | 6 X/yr |
| 6.6 | Verify proper operation of riser valve. | 6 X/yr |
| 6.7 | Verify proper operation of water level switches (low level, high level and safety level). | 2 X/yr |
| 6.8 | Verify water is at proper temperature. | 2 X/yr |
| 6.9 | Verify plastic bushing is installed between rotary spray arm hub and top of wash chamber. Replace if necessary. | 2 X/yr |
| 6.10 | Verify proper operation of drying manifold 3-way piston valve. | 1 X/yr |
| 6.11 | Replace drying thermodisk. | 1 X/2 yr |
| 6.12 | Replace sump thermodisk (if electric-heated unit). | 1 X/2 yr |

Table 6-1. Preventive Maintenance Guide (Cont'd)

| Recommended frequency of inspection is monthly. Usage and utility conditions may require more or less inspections. Tasks are defined on a yearly basis. | | Min. Freq. |
|--|--|-------------------|
| 7.0 | SUPPLY-LINE STRAINERS AND HEPA FILTER | |
| 7.1 | Inspect supply-line strainers for debris. Clean as necessary. | 6 X/yr |
| 7.2 | Verify condition of HEPA filter. Replace if necessary. | 2 X/yr |
| 7.3 | Change pre-filter. | 4 X/yr |
| 8.0 | CHEMICAL INJECTION PUMPS | |
| 8.1 | Verify squeeze tube is not clogged, cracked, crushed, or distorted. Lubricate squeeze tube. Clean/ Replace if necessary. | 2 X/yr |
| 8.2 | Calibrate chemical injection pumps. | 2 X/yr |
| 8.3 | Verify that rollers are not binding. | 2 X/yr |
| 8.4 | Verify proper operation of chemical low level sensor. | 2 X/yr |
| 8.5 | Inspect inlet and outlet verify valve for leaks. | 2 X/yr |
| 8.6 | Inspect chemical injection system for leaks. | 2 X/yr |
| 9.0 | PNEUMATICS | |
| 9.1 | Verify proper operation of pneumatic valves, including door safety valves. | 4 X/yr |
| 9.2 | Verify for leaks in the air lines. Repair if needed. | 4 X/yr |
| 9.3 | Drain moisture from filter /regulator bowl. Verify bowl for air leaks. Replace bowl as needed. Replace filter cartridge if clogged or rusty. | 4 X/yr |
| 9.4 | Replace mufflers on air solenoid valves. | 1 X/yr |
| 9.5 | Verify cylinders for excessive wear and air leakage at seals. Replace cylinders as needed. | 6 X/yr |
| 9.6 | Verify pressure regulators are set and operating to specification. | 6 X/yr |
| 10.0 | COMPRESSOR (OPTION) | |
| 10.1 | Verify intake filter and mufflers. Change if necessary. | 2 X/yr |
| 11.0 | CONVEYOR MODULE SYSTEM (OPTION) | |
| 11.1 | Verify proper operation of actuators. | 4 X/yr |
| 11.2 | Verify for leaks on the air lines. Repair if needed. | 4 X/yr |
| 11.3 | Verify air filter regulator. Drain moisture from bowl. Replace filter element if clogged or rusty. | 4 X/yr |
| 11.4 | Replace mufflers on air solenoid valves. | 1 X/yr |
| 11.5 | Verify proper operation of bar code reader. | 4 X/yr |
| 11.6 | Verify proper operation of load/unload cylinders. | 4 X/yr |
| 11.7 | Verify proper operation and setting of proximity switches. | 4 X/yr |
| 11.8 | Verify proper operation of EMERGENCY STOP Buttons. | 4 X/yr |

Table 6-1. Preventive Maintenance Guide (Cont'd)

| Recommended frequency of inspection is monthly. Usage and utility conditions may require more or less inspections. Tasks are defined on a yearly basis. | | Min. Freq. |
|--|---|-------------------|
| 12.0 | PROTECTIVE GROUND TERMINAL* | |
| 12.1 | Verify protective conductor at equipment terminal and verify if connection is well secured inside terminal with proper torque equipment. Torque requirement for supply conductor terminals for steam-heated units or electric-heated units (L1-L2-L3- N) is: 0.8-1.0 N•m (7.1-8.9 lb/in); and Protective conductor terminal is 2.2 N•m (20 lb/in) for steam- and electric-heated units. | 1 X/yr |
| 13.0 | FINAL TEST | |
| 13.1 | Clean dirt and lint from components. Verify all wiring, terminals and socket connections for damage or fraying. | 6 X/yr |
| 13.2 | Verify that unit has proper labels (caution, warning, etc.). | 6 X/yr |
| 13.3 | Install any panel or cover that was removed during the inspection. | 6 X/yr |
| 13.4 | Test unit operation. Run machine through an instrument and gentle cycle to verify proper operation. Verify all displays and printouts. Note on tape: "STERIS TEST". | 6 X/yr |

6.11 TROUBLESHOOTING

⚠ WARNING – PERSONAL INJURY AND/OR EQUIPMENT DAMAGE HAZARD: Only fully qualified service personnel should make repairs or adjustments to this equipment. Maintenance done by inexperienced, unqualified personnel, or installation of unauthorized parts could cause personal injury, invalidate the warranty, or result in costly equipment damage.

⚠ WARNING – ELECTRICAL SHOCK AND/OR BURN HAZARD:

- Disconnect all utilities to washer before servicing. Do not service the washer unless all utilities have been properly locked out. Always follow local electrical codes and safety-related work practices.

- Fasteners and star washers are used to ensure protective bonding continuity. Always reinstall any star washer which may have been removed during installation or servicing.

⚠ WARNING – SLIPPING HAZARD: To avoid slippery floor conditions, immediately wipe up any spilled liquids or condensation.

6.11.1 General

Use the Troubleshooting Chart as follows:

- Problem
Select the problem most appropriate to the particular trouble symptom.
- Condition (or Cause) and Corrective Action
These paragraphs list the specific conditions to be verified to isolate and then correct the malfunction. Verify the conditions in the order presented.

6.11.2 Table Description

Table 6-2. General

Out of cycle conditions preventing the washer/disinfector from operating, or general mechanical problems.

Table 6-3. Eagle 3000 Control Stage 3

Abnormal conditions affecting the washer/disinfector's microprocessor control.

Table 6-4. Control Monitoring And Communications System

Abnormal conditions occurring during cycle or conveyor operation.

Table 6-2. Troubleshooting Chart: General

| PROBLEM | CAUSE AND CORRECTIVE ACTION |
|-------------------------------------|---|
| 1. Interior light does not turn on. | 1. EMERGENCY STOP Button has been pushed. Pull EMERGENCY STOP Button. 2. Interior Light Bulb is burned out. — Replace if required (see Figure 9-8). 3. Open fuse FU7 inside Console Assembly. — Replace fuse (see Section 8.13.1, <i>Fuse Replacement</i>). 4. A thermodisc contact is open. — Verify thermodisc (see Section 8.23, <i>Drying Limiting Thermostat (Thermodisk) Manual Reset Button</i>). |

Table 6-2. Troubleshooting Chart: General (Cont'd)

| PROBLEM | CAUSE AND CORRECTIVE ACTION |
|---|--|
| 2. Cycle does not start when CYCLE START touch pad is pressed. | <ol style="list-style-type: none"> 1. Door has been left open. — Close all doors and press CYCLE START touch pad. 2. If unit is equipped with a conveyor system, an EMERGENCY STOP Button is depressed. — Pull out all EMERGENCY STOP Buttons and press CYCLE START touch pad twice. 3. Thermal overload protectors on starters, located in electrical box, tripped. — Reset if necessary (see Figure 9-32). |
| 3. Water leaks from unit. | <ol style="list-style-type: none"> 1. Verify exhaust hose connection for leaks. 2. Verify gasket and adjustment of door mechanism. — Adjust (see Section 8.15.9, <i>Door Gasket Replacement</i>). 3. Piping is leaking. — Tighten or repair if necessary. 4. Door gasket is dirty. — Clean. 5. Door gutter drain clogged. — Clean. |
| 4. Pump starts before appropriate chamber water level is reached. | <ol style="list-style-type: none"> 1. Verify water level sensor float moves freely — Clean. 2. Chamber water level sensor malfunctions. — Replace if necessary (see Section 8.19, <i>Water Level Sensor Replacement</i>). |
| 5. Pump does not start during a treatment. | <ol style="list-style-type: none"> 1. Chamber doors are open. Close and press CYCLE START. 2. Faulty overload relay on pump starter. — Verify overload relay. Replace if necessary (see Figure 9-32). 3. Open fuse on Input/Output PC Board. — Replace (see Section 8.13.1, <i>Fuse Replacement</i>). 4. Pump fuse blown. — Replace (see Figure 9-32). |
| 6. Foam in chamber. | <ol style="list-style-type: none"> 1. Detergent is foaming. — Refer to detergent specifications in Section 2 and follow detergent manufacturer's recommendations for amount of detergent to be used. 2. Too much detergent is injected during treatment. — Verify injection rate. Adjust injection rate if necessary (see Section 4.8.5, <i>How to Customize Chemical Name and Reset Chemical Rate</i>). 3. If Independent Monitor option is present, chemical pump needs calibration. — Calibrate chemical pumps (see Section 4.7, <i>How to Perform Independent Monitor (Option) Calibration</i>). |

Table 6-2. Troubleshooting Chart: General (Cont'd)

| PROBLEM | CAUSE AND CORRECTIVE ACTION |
|---|---|
| <p>7. Insufficient or no water entering chamber during treatment.</p> | <ol style="list-style-type: none"> 1. Supply valves not fully open. — Open building and washer/disinfector supply valves. Supply line pressure must be between 100 and 350 kPa (15 and 50 psi) dynamic. 2. Fill solenoid valve fails in closed position. — Repair or replace as necessary (see Section 8.18, <i>Valves</i>). 3. Water level sensor needs adjustment. — Adjust (see Section 8.19, <i>Water Level Sensors Replacement</i>). 4. Drain pilot air valve defective. — Repair or replace as necessary (see Figure 9-15). 5. Water supply strainers are dirty. — Close appropriate supply line and clean water supply strainers. 6. Voltage reaching fill solenoid is too low. — Verify washer/disinfector electrical system. 7. Safety level switch malfunction. — Clean or replace (see Section 8.19, <i>Water Level Sensors Replacement</i>). |
| <p>8. Loads come out dirty at the end of the cycle.</p> | <ol style="list-style-type: none"> 1. Incorrect detergent being used. — Refer to detergent specifications in Section 2 and follow detergent manufacturer's recommendations for amount of detergent to be used. 2. Rotary spray arms clogged. — Clean spray arms (see Section 6.2.1, <i>Routine Cleaning Procedures</i>). 3. Pump rotating in wrong direction. — Ensure pump shaft is rotating in direction indicated by arrow on pump housing. |
| <p>9. Load comes out wet at the end of the cycle.</p> | <ol style="list-style-type: none"> 1. Drying not programmed in custom cycle. — Add drying treatment to cycle (see Section 3.20.4, <i>Adding Treatment to Cycle</i>). 2. Drying time too short. Extend drying treatment time (see Section 3.20.3, <i>Modifying Factory-Set Cycles</i>). 3. Drying heating element defective. — Replace if necessary (see Figure 9-6). 4. Drying heater fuse blown. — Replace. |

Table 6-2. Troubleshooting Chart: General (Cont'd)

| PROBLEM | CAUSE AND CORRECTIVE ACTION |
|--|---|
| <p>10. Unload door does not open.</p> | <ol style="list-style-type: none"> 1. Door interlock is activated. Unload Door will not open until unit has run a complete cycle. 2. Pneumatic valve defective. — Replace. 3. Low or no air pressure. Verify air pressure is as indicated on Equipment Drawing. |
| <p>11. If unit is equipped with conveyor modules option, conveyor did not move basket forward.</p> | <ol style="list-style-type: none"> 1. POWER-OFF/STANDBY Switch is in OFF/STANDBY position. Position to POWER. 2. Conveyor operation is bypassed. Go to Change Misc. Values menu and select NO for Conveyor Bypass. 3. Previous cycle was aborted. Start cycle manually by selecting cycle then pressing CYCLE START touch pad twice to initiate cycle. Conveyor operation resumes. |

Table 6-3. Troubleshooting Chart: Eagle 3000 Control Stage 3

| PROBLEM | CAUSE AND CORRECTIVE ACTION |
|--|--|
| <p>1. When power is turned on, display shows: SERVICE TEST.</p> | <ol style="list-style-type: none"> 1. Exit Service Mode, and set unit to Automatic Mode (see Section 4.11, <i>How to Return to Automatic Mode</i>). 2. Inspect and verify wiring between switch and control board. 3. Burn-in control (see Section 4.4, <i>How to Perform Manufacturer's Burn-In</i>) and reconfigure unit as per Factory Setup (see Section 4.10, <i>How to Enter Factory Setup Mode</i>). 4. Control PC board defective — Replace Control PC board (see Section 8.9, <i>Control PC Board Replacement</i>). |
| <p>2. Display has random characters. Printer operates, but printout is blank or has random characters.</p> | <ol style="list-style-type: none"> 1. Memory must be cleared. <ol style="list-style-type: none"> a. Obtain printout of current cycle parameters b. Perform Manufacturer's Burn-In procedure (see Section 4.4, <i>How to Perform Manufacturer's Burn-In</i>). This loads the default settings into memory (see Tables 8-2 through 8-7). c. Reconfigure unit as per Factory Setup (see Section 4.10, <i>How to Enter Factory Setup Mode</i>) if required, using the printout of current cycle parameters. 2. Control PC board or RAM chip defective — Replace (see Section 8.9, <i>Control PC Board Replacement</i>, Section 8.10, <i>EPROM and/or Battery-Backed Memory (RAM) Replacement</i>, Section 8-11, <i>Double EPROM PC Board Replacement</i>, or Section 8.13, <i>Input/Output Board and Fuse Replacement</i>). |
| <p>3. Normal display when power switch is turned on, but printer won't operate.</p> | <ol style="list-style-type: none"> 1. Printer has been disabled. — Enable printer (see Section 4.8.1, <i>How to Enable/Disable Printer</i>). 2. Printer ribbon cable unplugged from Printer PC board. 3. Printer PC board defective. — Replace (see Section 8.5.2, <i>Printer PC Board Replacement</i>). 4. Printer defective. — Replace (see Section 8.5.3, <i>Printer Replacement</i>). |
| <p>4. Printer printout is erratic.</p> | <ol style="list-style-type: none"> 1. Printer PC board defective. — Replace (see Section 8.5.2, <i>Printer PC Board Replacement</i>). 2. Printer defective — Replace (see Section 8.5.3, <i>Printer Replacement</i>). |

Table 6-3. Eagle 3000 Control Stage 3 (Cont'd)

| PROBLEM | CAUSE AND CORRECTIVE ACTION |
|---|---|
| <p>5. Printer printout is light or blank, or parts of characters on printout are missing.</p> | <ol style="list-style-type: none"> 1. Printer paper loaded backwards. — Reinstall (see Section 6.6, <i>Changing Printer Paper Roll</i>). 2. Wrong type thermal paper. — Use only STERIS thermal paper (P129359-008). 3. Printer head dirty. — Clean (see Section 8.5, <i>Printer</i>). 4. Printer PC board defective. — Replace (see Section 8.5.2, <i>Printer PC Board Replacement</i>). 5. Printer is defective. — Replace (see Section 8.5.3, <i>Printer Replacement</i>). |
| <p>6. Control powers up with default values.</p> | <p>RAM battery is dead. — Replace RAM chip (see Section 8.10, <i>EPROM and/or Battery-Backed Memory (RAM) Replacement</i>).</p> |
| <p>7. Touch pads cause no audible signal (i.e., do not beep) when pressed.</p> | <ol style="list-style-type: none"> 1. Touch panel may be unplugged. — Inspect and verify. 2. Bad touch panel. To confirm, test touch pad (see Section 8.8.1, <i>Touch Pad Self Test</i>). If touch panel common is bad, touch pads will not work and control will not enter Service Mode. Confirm by testing for continuity with ohmmeter between touch pad plug P-11, pin 1 and the pin for the corresponding touch pad, when pressed. 3. Alarm speaker unplugged or defective. — Inspect and verify. |
| <p>8. Display shows: PRINTER TIME OUT, printer won't print (Printer must print one line in less the three seconds).</p> | <ol style="list-style-type: none"> 1. Paper jammed in printer. — Clear out jam. 2. Drag on paper roll. — Inspect and repair. 3. Printer PC board defective. — Replace (see Section 8.5.2, <i>Printer PC Board Replacement</i>). 4. Defective printer. — Replace printer (see Section 8.5.3, <i>Printer Replacement</i>). |
| <p>9. Display locks up and displays: RELIANCE SYNERGY</p> | <ol style="list-style-type: none"> 1. Printer unplugged. 2. Printer PC board defective. — Replace (see Section 8.5.2, <i>Printer PC Board Replacement</i>). 3. Printer defective. To confirm, test touch pad (see Section 8.8.1, <i>Touch Pad Self Test</i>). — Replace (see Section 8.5.3, <i>Printer Replacement</i>). |

Table 6-3. Eagle 3000 Control Stage 3 (Cont'd)

| PROBLEM | CAUSE AND CORRECTIVE ACTION |
|--|--|
| <p>10. Paper will not be taken up into power take-up.</p> | <ol style="list-style-type: none"> 1. Verify motor or roller. 2. Verify voltage from Printer PC Board. — Replace Printer PC board if necessary (see Section 8.5.2, <i>Printer PC Board Replacement</i>). |
| <p>11. Display blank; no acknowledgment when touch pads pressed.</p> | <ol style="list-style-type: none"> 1. Unit electrical disconnect switch in OFF position — Position to ON. 2. Control Power rocker switch (located outside electrical supply box, on top of the unit) in OFF position — Position switch to ON. 3. Fuse(s) open — Inspect and replace if necessary (see Section 8.13.1, <i>Fuse Replacement</i>). 4. Overtemperature switch for Drying function has tripped. Allow unit to cool for a half hour if manual door unit, or at least one hour if power door unit. Once cooled, press manual reset button on overtemperature switch (see Figure 9-6). If unit operation does not return to normal, allow unit to cool longer. |

Table 6-4. Troubleshooting Chart: Control Monitoring and Communications System

| PROBLEM | CAUSE AND CORRECTIVE ACTION |
|---|--|
| <p>1. Alarm tone sounds, and display message is:</p> <p style="text-align: center;">STOP WAS PRESSED PRESS START TO RESUM</p> <p>and printout message is:</p> <p style="text-align: center;">CYCLE STOPPED HH:MM:SS</p> | <p>STOP/RESET touch pad was pressed.</p> <ol style="list-style-type: none"> 1. Press ALARM REPLY touch pad to silence alarm tone. 2. Press CYCLE START touch pad to resume operation, or press STOP/RESET touch pad to abort cycle. |
| <p>2. Alarm tone sounds, and display message is:</p> <p style="text-align: center;">ALARM: PUMP X DETERGENT EMPTY</p> <p>and printout message is:</p> <p style="text-align: center;">* ALARM HH:MM:SS PUMP X DETERGENT EMPTY</p> | <p>Detergent container is empty, or low-level sensor is out of the container.</p> <ol style="list-style-type: none"> 1. Press ALARM REPLY touch pad to silence alarm tone. 2. Low-level sensor out of detergent container. — Reinsert low-level sensor in container, then press CYCLE START touch pad to resume cycle. 3. Detergent container is empty. — Replace empty container with a new one (see Section 6.4, <i>Replacing Chemical Container</i>). <hr/> <p>Alarm is triggered by:</p> <p style="text-align: center;">1LS7, or 1LS8, or 1LS9, or 1LS10, or LS11, input on main console, is activated.</p> |

Table 6-4. Control Monitoring and Communications System (Cont'd)

| PROBLEM | CORRECTIVE ACTION |
|--|--|
| <p>3. Display message is:</p> <p style="text-align: center;">MAINTENANCE DUE! CALL SERVICE</p> <p>and printout message is:</p> <p style="text-align: center;">MAINTENANCE DUE!</p> | <p>Cycle count and/or Service Count time delay has expired, and message is given to operator/technician that it is time for a routine inspection and maintenance.</p> <ol style="list-style-type: none"> 1. Press ALARM REPLY touch pad to silence alarm tone. 2. Enter Service Mode, as explained in Section 4.1, <i>Service Mode Procedures</i>. 3. Reset Cycle and Service counts (see Section 4.8.3, <i>How to Reset Cycles and Service Counts</i>). 4. Perform routine inspection and maintenance, as required. |
| <p>4. Alarm tone sounds, and display shows:</p> <p style="text-align: center;">SAFETY CHECK REFER TO OPERATOR MANUAL</p> <p>and printout message:</p> <p style="text-align: center;">* ALARM HH:MM:SS SAFETY CHECK REFER TO OPERATOR MANUAL</p> | <ol style="list-style-type: none"> 1. Press ALARM REPLY touch pad, display shows: ACCESS CODE KNOWN? NO 2. Call supervisor or authorized person to enter access code. 3. See Section 6.7, <i>Checking Door Safety (Limit Switches)</i>, for procedure to check limit switch operation. 4. If alarm reoccurs sooner than every 180 days, replace limit switch (see Section 8.15.2, <i>Door Limit Switch Replacement</i>). |

Table 6-4. Control Monitoring and Communications System (Cont'd)

| PROBLEM | CORRECTIVE ACTION |
|--|--|
| <p>5. Alarm tone sounds, and display shows:</p> <p>ALARM: DOOR OBSTRUCTION</p> <p>and printout message is:</p> <p>*A LARM HH:MM:SS DOOR OBSTRUCTION</p> | <p>⚠ WARNING – PERSONAL INJURY HAZARD: Always press EMERGENCY STOP Button prior to removing conveyor and/or chamber obstruction.</p> <p>Door safety sensor detected an obstruction while load or unload door was closing.</p> <ol style="list-style-type: none"> 1. Press ALARM REPLY touch pad to silence alarm tone. 2. Clear obstruction. 3. Press DOOR CLOSE touch pad. 4. When door is closed, select and start cycle. <p>Test door obstruction limit switch (see Section 6.7, <i>Checking Door Safety (Limit Switches)</i>). – Replace as necessary (see Section 8.15.2, <i>Door Limit Switch Replacement</i>)</p> <p>If unit is equipped with conveyor modules, door safety sensor detected an obstruction while load door was closing.</p> <ol style="list-style-type: none"> 1. Press ALARM REPLY touch pad, display shows: <p style="text-align: center;">LOAD CHAMBER THEN CLOSE DOOR...</p> <ol style="list-style-type: none"> 2. Clear obstruction by pushing basket into wash chamber. 3. Press DOOR CLOSE touch pad. 3. When door is closed, press CYCLE START touch pad to return to Cycle Menu. 4. Select and start cycle. <p>If unit is equipped with conveyor modules, door safety sensor detected an obstruction while unload door was closing. Basket remained in wash chamber or was not completely pulled out from wash chamber at the end of the unload sequence.</p> <ol style="list-style-type: none"> 1. Press ALARM REPLY touch pad, display shows: <p style="text-align: center;">UNLOAD CHAMBER THEN CLOSE DOOR...</p> <ol style="list-style-type: none"> 2. Clear obstruction by pulling basket out of the chamber and unto the unload conveyor. 3. Press DOOR CLOSE touch pad, operation resumes automatically. <p>Alarm triggered by:</p> <p>Input on I/O Board LS5, or LS6, is activated.</p> |

Table 6-4. Control Monitoring and Communications System (Cont'd)

| PROBLEM | CORRECTIVE ACTION |
|--|---|
| <p>6. Alarm tone sounds, and display message is:</p> <p style="text-align: center;">ALARM: LOAD DOOR OPEN DURING PROCESS</p> <p>and printout message is:</p> <p style="text-align: center;">* ALARM HH:MM:SS LOAD DOOR OPEN DURING PROCESS</p> | <p>Load door has been opened during processing.</p> <ol style="list-style-type: none"> 1. Press ALARM REPLY touch pad to silence alarm tone. 2. Close Load Door and press CYCLE START touch pad to resume. 3. If cycle does not start, verify proximity switch (1LS1) operation (may be disconnected). <hr/> <p>Alarm is triggered by:</p> <p style="padding-left: 40px;">During a cycle 1LS2 input on I/O Board, is not activated.</p> |
| <p>7. Alarm tone sounds, and display message is:</p> <p style="text-align: center;">ALARM: LOAD DOOR DID NOT OPEN</p> <p>and printout message is:</p> <p style="text-align: center;">* ALARM HH:MM:SS LOAD DOOR DID NOT OPEN</p> | <p>Load door did not open, after DOOR OPEN touch pad was pressed.</p> <ol style="list-style-type: none"> 1. Press ALARM REPLY touch pad to silence alarm tone. 2. Load door stayed closed after DOOR OPEN touch pad was pressed. <ol style="list-style-type: none"> a. Press ALARM REPLY touch pad to silence buzzer. b. Press DOOR CLOSE touch pad. c. Press DOOR OPEN touch pad. 3. If unit is equipped with conveyor modules, <ol style="list-style-type: none"> a. Press ALARM REPLY touch pad, display shows: <p style="text-align: center;">PLEASE LOAD CHAMBER THEN CLOSE DOOR</p> <ol style="list-style-type: none"> b. Press DOOR CLOSE touch pad. c. Press DOOR OPEN touch pad. 4. Verify if building air supply line is open. If closed, open. 5. Verify for door obstruction. If present, clear door. 6. Verify air solenoid valve operation in Service Mode (see Section 4.1, <i>Service Mode Procedures</i>). 7. Verify operation of micrometric flow control valve. 8. Verify operation of proximity switch (1LS1) operation, in Service Mode (see Section 4.1, <i>Service Mode Procedures</i>). If switch fails to operate properly, verify for open/short circuit (verify wiring). 9. Verify operation of door cylinders mechanical operation. — Replace if defective (see Section 8.15.6, <i>Door Cylinder Replacement</i>). 10. Verify air pressure regulator operation. — Replace if defective. <hr/> <p>Alarm is triggered by:</p> <p style="padding-left: 40px;">Six seconds after DOOR OPEN was pressed, 1LS1 input is still activated on I/O Board.</p> |

Table 6-4. Control Monitoring and Communications System (Cont'd)

| PROBLEM | CORRECTIVE ACTION |
|--|---|
| <p>8. Alarm tone sounds, and display message is:</p> <p>ALARM: LOAD DOOR DID NOT CLOSE</p> <p>and printout message is:</p> <pre>* ALARM HH:MM:SS LOAD DOOR DID NOT CLOSE</pre> | <p>Load door stayed open after DOOR CLOSE touch pad was pressed.</p> <ol style="list-style-type: none"> 1. Press ALARM REPLY touch pad to silence alarm tone. 2. Verify for door obstruction. If present, clear door. 3. If unit is equipped with conveyor modules: <ol style="list-style-type: none"> a. Press ALARM REPLY touch pad, display shows: <p style="text-align: center;">LOAD CHAMBER THEN CLOSE DOOR</p> b. Verify for door obstruction. c. Press DOOR CLOSE touch pad. d. When door is closed, press CYCLE START touch pad to select cycle. e. Select and start cycle. 4. Verify air solenoid valve operation, in Service Mode (see Section 4.1). 5. Verify micrometric flow control valve operation (power doors only). 6. Verify proximity switch (ILS1) operation (may be disconnected). 7. Verify door cylinders mechanical operation. 8. Verify air pressure regulator operation. <p>Alarm is triggered by:</p> <p>Six seconds after DOOR OPEN was pressed, ILS1 input is not yet activated on I/O Board.</p> |
| <p>9. Display message is:</p> <p>ALARM: LOAD DOOR OPEN</p> <p>and printout message is:</p> <pre>* ALARM HH:MM:SS LOAD DOOR OPEN</pre> | <p>Unload-side DOOR OPEN touch pad has been pressed to open Unload door while Load door is open. Control will not allow Unload door opening, to avoid cross-contamination.</p> <ol style="list-style-type: none"> 1. Press ALARM REPLY touch pad to silence alarm tone. 2. Press DOOR CLOSE touch pad on Load-side of the unit, to close Load door. 3. Unload-side door can be opened by pressing Unload-side DOOR OPEN touch pad. |

Table 6-4. Control Monitoring and Communications System (Cont'd)

| PROBLEM | CORRECTIVE ACTION |
|---|--|
| <p>10. Alarm tone sounds, and display message is:</p> <p style="text-align: center;">ALARM: UNLOAD DOOR OPEN DURING PROCESS</p> <p>and printout message is:</p> <pre>* ALARM HH:MM:SS UNLOAD DOOR OPEN DURING PROCESS</pre> | <p>Unload door has been opened during processing.</p> <ol style="list-style-type: none"> 1. Press Unload side DOOR CLOSE touch pad to close Unload Door. 2. Press CYCLE START touch pad to resume. 3. If cycle does not start, verify door proximity sensor (ILS2) (may be disconnected). <hr/> <p>Alarm is triggered by:</p> <p style="padding-left: 40px;">During a cycle ILS1 input on I/O Board, is not activated.</p> |
| <p>11. Alarm tone sounds, and display message is:</p> <p style="text-align: center;">ALARM: UNLOAD DOOR DID NOT OPEN</p> <p>and printout message is:</p> <pre>* ALARM HH:MM:SS UNLOAD DOOR DID NOT OPEN</pre> | <p>Unload door did not fully open, after DOOR OPEN touch pad was pressed.</p> <ol style="list-style-type: none"> 1. Press ALARM REPLY touch pad to silence alarm tone. 2. Verify if unit air supply line is open — if open, close. 3. Verify operation of air solenoid valve, in Service Mode (see Section 4.1, <i>Service Mode Procedures</i>). 4. Verify operation of micrometric flow control valve (power doors only). 5. Verify door proximity switch (ILS2) operation, in Service Mode (see Section 4.1, <i>Service Mode Procedures</i>). If switch fails to operate properly, verify for open/short circuit (verify wiring). 6. Verify door cylinders mechanical operation. 7. Verify air pressure regulator operation. <hr/> <p>Alarm is triggered by:</p> <p style="padding-left: 40px;">Six seconds after DOOR OPEN was pressed, ILS2 input is still activated on I/O Board.</p> |

Table 6-4. Control Monitoring and Communications System (Cont'd)

| PROBLEM | CAUSE AND CORRECTIVE ACTION |
|---|---|
| <p>12. Alarm tone sounds, and display message is:</p> <p>ALARM: UNLOAD DOOR OPEN PLEASE CLOSE DOOR</p> <p>And printout message is:</p> <p>* ALARM HH:MM:SS UNLOAD DOOR OPEN</p> | <p>Load-side DOOR OPEN touch pad has been pressed to open Load door while Unload door is open. Control will not allow Load door opening, to avoid cross-contamination.</p> <ol style="list-style-type: none"> 1. Press ALARM REPLY touch pad to silence alarm tone. 2. Press DOOR CLOSE touch pad on unload-side of unit to close unload door. The load-side door may be opened by pressing load-side DOOR OPEN touch pad. 3. Verify micrometric flow control valve operation. |
| <p>13. Alarm tone sounds, and display message is:</p> <p>ALARM: UNLOAD DOOR DID NOT CLOSE</p> <p>and printout message is:</p> <p>* ALARM HH:MM:SS UNLOAD DOOR DID NOT CLOSE</p> | <p>Unload door stayed open after DOOR CLOSE touch pad was pressed.</p> <ol style="list-style-type: none"> 1. Press ALARM REPLY touch pad to silence alarm tone. 2. Verify for door obstruction. 3. If unit is equipped with conveyor modules, <ol style="list-style-type: none"> a. Press ALARM REPLY touch pad to silence alarm tone. b. Position basket onto C3 conveyor. c. Press DOOR CLOSE touch pad, operation resumes automatically. 4. Verify air solenoid valve operation, in Service Mode (see Section 4.1, <i>Service Mode Procedures</i>) — If condition recurs, verify door proximity sensor (1LS2) (may be disconnected). 5. Verify door cylinders mechanical operation. 6. Verify air pressure regulator operation. <p>Alarm is triggered by:</p> <p>Six seconds after DOOR CLOSE was pressed, 1LS2 input is not yet activated on I/O Board.</p> |

Table 6-4. Control Monitoring and Communications System (Cont'd)

| PROBLEM | CORRECTIVE ACTION |
|--|---|
| <p>14. Alarm tone sounds, and display message is:</p> <p style="text-align: center;">ALARM: SUMP RTD DEFECTIVE</p> <p>and printout message is:</p> <p style="padding-left: 40px;">* ALARM HH:MM:SS SUMP RTD DEFECTIVE</p> | <p>Sump RTD is detecting out-of-range temperatures.</p> <ol style="list-style-type: none"> 1. Press ALARM REPLY touch pad to silence alarm tone. 2. RTD connector may be unplugged. Verify RTD connection. Also verify for open/short circuit (verify wiring). 3. Manually verify steam inlet valve. Also verify operation in Service Mode (see Section 4.1, <i>Service Mode Procedures</i>); if valve fails to operate properly, verify for open/short circuit (verify wiring and/or solenoid coil). <hr/> <p>Alarm is triggered by:</p> <p style="padding-left: 40px;">Sump water temperature lower than 32°F (0°C). Channel 1 (CH1+) on main console.</p> |
| <p>15. Alarm tone sounds, and display message is:</p> <p style="text-align: center;">ALARM: SUMP WATER TEMP. TOO HIGH</p> <p>and printout message is:</p> <p style="padding-left: 40px;">* ALARM HH:MM:SS SUMP WATER TEMP. TOO HIGH</p> | <p>Sump RTD detecting out-of-range temperature.</p> <ol style="list-style-type: none"> 1. Press ALARM REPLY touch pad to silence alarm tone. 2. Manually verify steam inlet valve. Also verify operation in Service Mode (see Section 4.1, <i>Service Mode Procedures</i>); if valve fails to operate properly, verify for open/short circuit (verify wiring and/or solenoid coil). 3. If electric-heated unit, verify if contactor is stuck. 4. Check sump RTD calibration (see Section 4.6.1, <i>How to Calibrate Sump and Drying RTDs Without Independent Monitor Option</i>, or 4.6.2, <i>How to Calibrate Sump and Drying RTDs With Independent Monitor Option</i>) <hr/> <p>Alarm is triggered by:</p> <p style="padding-left: 40px;">Sump water temperature is higher to 210°F (98.8°C). Channel 1 (CH1+) on main console.</p> |

Table 6-4. Control Monitoring and Communications System (Cont'd)

| PROBLEM | CAUSE AND CORRECTIVE ACTION |
|--|--|
| <p>16. Alarm tone sounds, and display message is:</p> <p style="text-align: center;">ALARM: SUMP FAILED TO REACH SET TEMP.</p> <p>and printout message is:</p> <p style="padding-left: 40px;">* ALARM HH:MM:SS SUMP FAILED TO REACH SET TEMP.</p> | <p>Water temperature in sump (heated) is dropping below preset level.</p> <ol style="list-style-type: none"> 1. Press ALARM REPLY touch pad to silence alarm tone. 2. Verify if steam supply line shutoff valve is open. 3. Verify if steam supply line pressure meets Equipment Drawings requirements. 4. Manually verify steam inlet valve. Also verify operation in Service Mode (see Section 4.1, <i>Service Mode Procedures</i>); if valve fails to operate properly, verify for open/short circuit (verify wiring and/or solenoid coil). 5. Verify steam trap for obstruction. 6. Verify steam condensate return pressure. 7. If electric-heated unit, verify if fuses are blown. — Replace (see Section 8.13.1, <i>Fuse Replacement</i>). 8. If electric-heated unit, verify coil contactor and wiring. 9. Check sump RTD calibration (see Section 4.6.1, <i>How to Calibrate Sump and Drying RTDs Without Independent Monitor Option</i>, or Section 4.6.2, <i>How to Calibrate Sump and Drying RTDs With Independent Monitor Option</i>) <hr/> <p>Alarm is triggered by:</p> <p style="padding-left: 40px;">Heating time = 0.</p> |
| <p>17. Alarm tone sounds, and display message is:</p> <p style="text-align: center;">ALARM: SUMP TOO LONG IN FILL</p> <p>and printout message is:</p> <p style="padding-left: 40px;">* ALARM HH:MM:SS SUMP TOO LONG IN FILL</p> | <p>Chamber has taken too long to fill with water. Fault may be due to insufficient water supply, faulty water level sensor, or faulty drain valve.</p> <ol style="list-style-type: none"> 1. Press ALARM REPLY touch pad to silence alarm tone. 2. Ensure water supply line pressure meets Equipment Drawings requirements. 3. Ensure water supply line shutoff valve is open. 4. Manually verify sump water level sensor operation. If not stuck, verify operation in Service Mode (see Section 4.1, <i>Service Mode Procedures</i>). 5. Manually verify drain valve operation. Also verify operation in Service Mode (see Section 4.1, <i>Service Mode Procedures</i>). If valve fails to operate properly, verify for open/short circuit (verify wiring and/or solenoid coil). 6. Manually verify water fill valve. Also verify operation in Service Mode (see Section 4.1, <i>Service Mode Procedures</i>); if valve fails to operate properly, verify for open/short circuit (verify wiring and/or solenoid coil). <hr/> <p>Alarm is triggered by:</p> <p style="padding-left: 40px;">Sump Water Level Switch LS1 (main console) 12V DC is not activated, and filling time = 0.</p> |

Table 6-4. Control Monitoring and Communications System (Cont'd)

| PROBLEM | CAUSE AND CORRECTIVE ACTION |
|--|--|
| <p>18. Alarm tone sounds, and display message is:</p> <p style="text-align: center;">ALARM: SUMP TOO LONG IN DRAIN</p> <p>and printout message is:</p> <p style="text-align: center;">* ALARM HH:MM:SS SUMP TOO LONG IN DRAIN</p> | <p>Sump has taken too long to drain. Fault may be from faulty water level sensor, defective drain valve, or obstruction in drain line.</p> <ol style="list-style-type: none"> 1. Press ALARM REPLY touch pad to silence alarm tone. 2. Verify for obstruction in drain line. 3. Manually verify sump water level sensor operation. If not stuck, verify operation in Service Mode (see Section 4.1, <i>Service Mode Procedures</i>). 4. Manually verify drain valve operation. Also verify operation in Service Mode (see Section 4.1, <i>Service Mode Procedures</i>). If valve fails to operate properly, verify for air pressure and air solenoid valve (verify wiring and/or solenoid coil). 5. Manually verify water fill valve. Also verify operation in Service Mode (see Section 4.1, <i>Service Mode Procedures</i>); if valve fails to operate properly, verify for open/short circuit (verify wiring and/or solenoid coil). 6. Verify air pressure regulator operation (pressure gauge). Inappropriate pressure may cause pneumatic drain valve malfunction. 7. Low level sensor defective. — Replace (see Section 8.19, <i>Water Level Sensors Replacement</i>). <p>Alarm is triggered by:</p> <p style="padding-left: 40px;">Sump Water Level Switch LS1 (main console) is activated, and draining time = 0.</p> |
| <p>19. Alarm tone sounds, and display shows:</p> <p style="text-align: center;">ALARM: SUMP LOW LEVEL DEFECTIVE</p> <p>and printout message is:</p> <p style="text-align: center;">* ALARM HH:MM:SS SUMP LOW LEVEL DEFECTIVE</p> | <p>Sensor detected an air pocket, or no water is detected in piping during the Thermal recirculation.</p> <ol style="list-style-type: none"> 1. Press ALARM REPLY touch pad to silence alarm tone. 2. Verify sensor wiring. Verify for an open circuit. 3. Verify sump low-level sensor. — Replace (see Section 8.19, <i>Water Level Sensors Replacement</i>). |

Table 6-4. Control Monitoring and Communications System

| PROBLEM | CAUSE AND CORRECTIVE ACTION |
|--|---|
| <p>20. Alarm tone sounds, and display shows:</p> <p>ALARM: SAFETY LVL SWITCH REACHED</p> <p>and printout message is:</p> <p>* ALARM HH:MM:SS SAFETY LVL SWITCH REACHED</p> | <p>Sump water low level switch, high level switch, or safety level switch defective.</p> <ol style="list-style-type: none"> 1. Press ALARM REPLY touch pad to silence alarm tone. 2. Sump water low level switch or high level switch is defective: <ol style="list-style-type: none"> a. Verify sensor wiring (verify for an open circuit). b. Verify the float of each sensor is not stuck in low position. c. Sensor needs to be replaced (see Section 8.19, <i>Water Level Sensors Replacement</i>). 3. Sump Safety level switch is defective: <ol style="list-style-type: none"> a. Verify sensor wiring (verify for an open circuit). b. Verify float is not stuck in high position. 4. Check filling valve operation. |
| <p>21. Alarm tone sounds, and display shows:</p> <p>ALARM: WATER LEVEL SENSOR DEFECTIVE</p> <p>and printout message is:</p> <p>* ALARM HH:MM:SS WATER LEVEL SENSOR DEFECTIVE</p> | <ol style="list-style-type: none"> 1. Press ALARM REPLY touch pad to silence alarm tone. 2. Sump high water level sensor is defective: <ol style="list-style-type: none"> a. Verify sensor wiring (verify for an open circuit). b. Verify the float of sensor is not stuck. c. Sensor needs to be replaced (see Section 8.19, <i>Water Level Sensors Replacement</i>). 3. Check filling valve operation. |
| <p>22. Alarm tone sounds, and display message is:</p> <p>ALARM: MOTOR OVERLOADS TRIPPED...</p> <p>and printout message is:</p> <p>* ALARM HH:MM:SS MOTOR OVERLOADS TRIPPED...</p> | <p>Pump or dryer motor contactor overload tripped or is defective.</p> <ol style="list-style-type: none"> 1. Press ALARM REPLY touch pad to silence alarm tone. 2. Verify overload setting. Reset overload in contactor box. 3. Verify proper voltage is supplied on each phase. Check for open fuse (FU1, FU3). 4. Check for motor shaft binding from loose components or debris. 5. Motor is defective. Replace. <hr/> <p>Alarm is triggered by:</p> <p>Overload input LS0 on main console (OL1, OL2, OL3) is activated.</p> |

Table 6-4. Control Monitoring and Communications System (Cont'd)

| PROBLEM | CAUSE AND CORRECTIVE ACTION |
|---|--|
| <p>23. Alarm tone sounds, and display message is:</p> <p style="text-align: center;">ALARM: DRYING RTD DEFECTIVE</p> <p>and printout message is:</p> <p style="text-align: center;">* ALARM HH:MM:SS DRYING RTD DEFECTIVE</p> | <p>Drying RTD is detecting out-of-range temperatures.</p> <ol style="list-style-type: none"> 1. Press ALARM REPLY touch pad to silence alarm tone. 2. Drying RTD connector may be unplugged. Verify RTD connection. Also verify for open/short circuit (verify wiring). 3. Drying RTD defective. Replace. <hr/> <p>Alarm is triggered by:</p> <p style="padding-left: 40px;">Drying temperature is lower than 32°F (0°C). Channel 3 (CH3+) on main console.</p> |
| <p>24. Drying RTD is detecting out-of range temperature. Alarm tone sounds, and display message is:</p> <p style="text-align: center;">ALARM: DRYING TEMP. TOO HIGH</p> <p>and printout message is:</p> <p style="text-align: center;">* ALARM HH:MM:SS DRYING TEMP. TOO HIGH</p> | <p>Drying RTD is detecting out-of range temperature.</p> <ol style="list-style-type: none"> 1. Press ALARM REPLY touch pad to silence alarm tone. 2. Verify Dryer Blower operation, in Service Mode (see Section 4.1, <i>Service Mode Procedures</i>). 3. Verify operation of heater element. 4. RTD connector may be unplugged. Verify RTD connection then verify wiring. 5. Verify if contactor is stuck. 6. Check drying RTD calibration (see Section 4.6.1, <i>How to Calibrate Sump and Drying RTDs Without Independent Monitor Option</i>, or 4.6.2, <i>How to Calibrate Sump and Drying RTDs With Independent Monitor Option</i>) <hr/> <p>Alarm is triggered by:</p> <p style="padding-left: 40px;">Drying temperature is higger than 270°F (132.2°C). Channel 3 (CH3+) on main console.</p> |
| <p>25. Alarm tone sounds, and display shows:</p> <p style="text-align: center;">ALARM: UNKNOWN FAILURE DETECTED</p> <p>and printout message is:</p> <p style="text-align: center;">* ALARM HH:MM:SS UNKNOWN FAILURE DETECTED</p> | <ol style="list-style-type: none"> 1. Press ALARM REPLY touch pad to silence alarm tone. 2. Major electrical interference, such as thunderstorm or power surge) may have occurred. Shut off main power supply switch to reset. 3. Major problem with control program or control memory. If problem persists, call the manufacturer's Service Engineering to diagnose. |

Table 6-4. Control Monitoring and Communications System (Cont'd)

| PROBLEM | CAUSE AND CORRECTIVE ACTION |
|---|---|
| <p>26. If unit is equipped with conveyor modules, alarm tone sounds, and display shows:</p> <p>E-STOP PRESSED PULL TO RESUME</p> <p>and printout message is:</p> <pre>* ALARM HH:MM:SS EMERGENCY STOP PRESSED</pre> | <ol style="list-style-type: none"> 1. One of the conveyor's EMERGENCY STOP Buttons was pressed. <ol style="list-style-type: none"> a. Reposition basket. b. Pull out EMERGENCY STOP Button. c. Press ALARM REPLY touch pad to silence buzzer. d. Press CYCLE START to resume. 2. If pressing the EMERGENCY STOP Button caused an obstruction while load door was closing. <p>⚠ WARNING—PERSONAL INJURY HAZARD: Always press EMERGENCY STOP Button prior to removing conveyor and/or chamber obstruction.</p> <ol style="list-style-type: none"> a. Press ALARM REPLY touch pad, display shows: <p style="text-align: center;">LOAD CHAMBER THEN CLOSE DOOR...</p> b. Clear obstruction by pushing basket into wash chamber. c. Press DOOR CLOSE touch pad. d. When door is closed, press CYCLE START touch pad to return to Cycle Menu. e. Select and start cycle. 3. If pressing the EMERGENCY STOP Button caused an obstruction on the unload side. Basket remained in wash chamber or was not completely pulled out from wash chamber at the end of the unload sequence. <p>⚠ WARNING—PERSONAL INJURY HAZARD: Always press EMERGENCY STOP Button prior to removing conveyor and/or chamber obstruction.</p> <ol style="list-style-type: none"> a. Press ALARM REPLY touch pad, display shows: <p style="text-align: center;">UNLOAD CHAMBER THEN CLOSE DOOR...</p> b. Clear obstruction by pulling basket out of the chamber and unto the unload conveyor. c. Press DOOR CLOSE touch pad, operation resumes automatically. 4. EMERGENCY STOP Button is defective. — Replace (see Section 8.26, <i>Emergency Stop Button Replacement on Amsco Reliance 444 Load/Unload Modules</i>). |

Table 6-4. Control Monitoring and Communications System (Cont'd)

| PROBLEM | CAUSE AND CORRECTIVE ACTION |
|--|---|
| <p>27. If unit is equipped with conveyor modules, alarm tone sounds, and display message is:</p> <p style="text-align: center;">ALARM: UNLOAD CONVEYOR FULL</p> <p>and printout message is:</p> <p style="text-align: center;">* ALARM HH:MM:SS UNLOAD CONVEYOR FULL</p> | <p>Basket was to be indexed from wash chamber to C3 conveyor, but C3 and C4 are already full.</p> <ol style="list-style-type: none"> 1. Press ALARM REPLY touch pad to silence alarm tone. 2. Remove basket from C4 conveyor. 3. Wait until basket on C3 reaches C4 conveyor. 4. Press CYCLE START touch pad to resume operation. <hr/> <p>Alarm triggered by:</p> <p style="text-align: center;">1LS7 input on main console is not activated.</p> |
| <p>28. If unit is equipped with conveyor modules, alarm tone sounds, and display message is:</p> <p style="text-align: center;">LOAD CHAMBER THEN CLOSE DOOR...</p> <p>or...</p> <p style="text-align: center;">UNLOAD CHAMBER THEN CLOSE DOOR...</p> <p>And printout message is:</p> <p style="text-align: center;">* ALARM: HH:MM:SS CONVEYOR OBSTRUCTION</p> | <p>It took more than 15 seconds for one of the cylinders to complete its stroke.</p> <ol style="list-style-type: none"> 1. Press ALARM REPLY touch pad to silence alarm tone. 2. Press EMERGENCY STOP Button to stop conveyor operation. 3. ⚠ WARNING – PERSONAL INJURY HAZARD: Always press EMERGENCY STOP Button prior to removing conveyor and/or chamber obstruction. If basket is stopped while being indexed by C1 conveyor cylinder, pull EMERGENCY STOP Button, return basket to correct position (ensure basket edge reaches X1 photo-cell), then press CYCLE START touch pad to resume operation. 4. If basket is stopped while being indexed in chamber by C2 conveyor cylinder, pull EMERGENCY STOP Button then push basket into wash chamber. Press DOOR CLOSE touch pad to close washer/disinfector door, then initiate cycle manually (use SELECT CYCLE touch pad to select appropriate cycle, and press CYCLE START touch pad twice to resume operation). 5. If basket is stopped while being indexed out of wash chamber by C3 conveyor cylinder, pull EMERGENCY STOP Button, then push basket back into wash chamber. Press DOOR CLOSE touch pad on unload-side to close washer/disinfector unload-side door, then CYCLE START touch pad to resume operation. 6. If basket is stopped while being indexed onto C4 conveyor, remove basket from C4 conveyor then pull EMERGENCY STOP Button, and press CYCLE START touch pad to resume operation. |

Table 6-4. Control Monitoring and Communications System (Cont'd)

| PROBLEM | CAUSE AND CORRECTIVE ACTION |
|---|---|
| <p>29. If unit is equipped with conveyor modules, alarm tone sounds, and display shows:</p> <p>NO BAR CODE DETECTED PRESS START TO RESUM</p> | <ol style="list-style-type: none"> 1. Bar Code Tag was not read by Bar Code Reader. Bar code is not present or is placed incorrectly in bar code tag holder. <ol style="list-style-type: none"> a. Press ALARM REPLY touch pad to silence alarm tone. b. Insert bar code tag correctly (see Section 3.12, <i>Loading Unit with Conveyor Modules</i>) ... or ... Enter bar code manually (see Section 3.12.2, <i>Manual Entry of Bar Code Identification Number</i>). c. Press CYCLE START touch pad to start cycle. 2. Bar code tag is worn, dirty or defective. Replace (see Figure 9-1). 3. Bar code reader is disconnected. Verify connections. 4. Bar code reader may be misaligned or defective. Check in Service Mode (see Section 4.1, <i>Service Mode Procedures</i>) — Replace if required. |
| <p>30. If unit is equipped with conveyor modules, alarm tone sounds, and display shows:</p> <p>LOAD DOOR ERROR!</p> <p>and printout message is:</p> <p>* ALARM HH:MM:SS LOAD DOOR ERROR!</p> | <p>Loading sequence took more than 2 minutes.</p> <ol style="list-style-type: none"> 1. Press ALARM REPLY touch pad, display shows: <p style="text-align: center;">LOAD CHAMBER THEN CLOSE DOOR</p> <ol style="list-style-type: none"> a. Push basket into the wash chamber the press DOOR CLOSE touch pad. b. When door is closed, press CYCLE START touch pad to select cycle. c. Press CYCLE START touch pad to start cycle. 2. If problem persists, check load module air supply pressure is as per Equipment Drawing (P920014-025). 3. Check load cylinder for proper operation. – Replace). <p>Alarm is triggered by:</p> <p>1LS1 input on I/O board is not activated and LS6, and LS8 input, on main console are activated;</p> <p>or</p> <p>1LS2 input on I/O board is not activated and LS7, and LS8 input, on main console are activated.</p> <p>1LS1 and 1LS2 input on I/O board are activated and LS8 on main console is activated.</p> |

Table 6-4. Control Monitoring and Communications System (Cont'd)

| PROBLEM | CAUSE AND CORRECTIVE ACTION |
|---|--|
| <p>31. If unit is equipped with conveyor modules, alarm tone sounds, and display shows:</p> <p style="text-align: center;">UNLOAD DOOR ERROR!</p> <p>and printout message is:</p> <p style="text-align: center;">* ALARM HH:MM:SS UNLOAD DOOR ERROR!</p> | <p>Unloading sequence took more than 2 minutes.</p> <p>1. Press ALARM REPLY touch pad, display shows:</p> <p style="text-align: center;">UNLOAD CHAMBER THEN CLOSE DOOR</p> <p>a. Pull basket out of chamber. Press DOOR CLOSE touch pad.</p> <p>b. When door is closed, press CYCLE START touch pad to select cycle.</p> <p>c. Press CYCLE START touch pad to start cycle.</p> <p>2. If problem persists, check unload module air supply pressure is as per Equipment Drawing (P920014-025).</p> <p>3. Check unload cylinder for proper operation. – Replace if required.</p> <p>Alarm is triggered by:</p> <p style="text-align: center;">1LS1 input is activated and 1LS2 input is not activated on I/O Board and LS7 is activated on main console and unloading timer = 0</p> |
| <p>32. If Independent Monitor option is present, alarm tone sounds, and washer display shows:</p> <p style="text-align: center;">ALARM: I. MONITOR DISK FULL</p> <p>and Independent Monitor display shows:</p> <p style="text-align: center;">DISK NEAR CAPACITY OK?</p> <p>and printout message is:</p> <p style="text-align: center;">* ALARM HH:MM:SS I. MONITOR DISK FULL</p> | <p>Disk in Independent Monitor has reached 98% of its recording capacity.</p> <p>1. On Independent Monitor press OK touch pad.</p> <p>2. On washer/disinfector control, press ALARM REPLY touch pad to silence alarm tone.</p> <p>3. On Independent Monitor:</p> <p>a. Set recording to OFF.</p> <p>b. Remove floppy disk from Cycle Monitor.</p> <p>c. Insert a new disk. Format disk if needed.</p> <p>d. Name the files and set recording to TRIGGER. See <i>Operator Manual</i> (P920013-971), Section 5, for procedure.</p> |

Table 6-4. Control Monitoring and Communications System (Cont'd)

| PROBLEM | CAUSE AND CORRECTIVE ACTION |
|---|--|
| <p>33. If Independent Monitor option is present, alarm tone sounds, and display shows:</p> <p>ALARM: TEMP. CUT OUT RTD DEFECTIVE</p> <p>Printout message:</p> <p>* ALARM HH:MM:SS I. MONITOR RTD DEFECTIVE</p> | <p>RTD open wire or reading of S7-200 out of range.</p> <ol style="list-style-type: none"> 1. Press ALARM REPLY touch pad to silence alarm tone. 2. Verify wiring for open or short circuit. 3. In Independent Monitor box, verify wiring is connected to Siemens RTD module (#231-7PB21-OXAO, channel 1A). 4. In Independent Monitor box, verify channel B has a 82 ohm resistor connected between b+ and b-. |
| <p>34. If Independent Monitor option is present, alarm tone sounds, and display shows:</p> <p>ALARM: COMMUNICATION ERROR</p> <p>and printout message is:</p> <p>* ALARM HH:MM:SS COMMUNICATION ERROR</p> | <p>Information sent by Independent Monitor is invalid or no information was received.</p> <ol style="list-style-type: none"> 1. Press ALARM REPLY touch pad to silence alarm tone. 2. CR12 is defective: <ol style="list-style-type: none"> a. CR12 should not be energized (led on relay must be off) b. CR12 is energized only during a bar code reading on Load/Unload or ATS module). 3. CR12 contact is stuck to bar code signal; <ol style="list-style-type: none"> a. Verify for signal of continuity between C-F and B-E on relay, if it is not the case, replace CR12. b. Verify wiring connection of P75 (in control box). 4. Request data signal is not received by independent monitor. <ol style="list-style-type: none"> a. CR4 is defective. Start a cycle and verify that led on CR4 is lighted every 5 seconds during a recirculation phase. b. Led on CR4 is lighted, verify that there is continuity between A-B contact. c. Verify that RS-232 connection to Independent Monitor is OK. d. In Independent Monitor box, verify wiring connection of P13. 5. Data logger relay module input #1 is defective. |

Table 6-4. Control Monitoring and Communications System (Cont'd)

| PROBLEM | CAUSE AND CORRECTIVE ACTION |
|--|--|
| <p>35. If Independent Monitor option is present, alarm tone sounds, and display shows:</p> <p style="text-align: center;">ALARM: INJECTED VOLUME INCORRECT</p> <p>and printout message is:</p> <p style="text-align: center;">* ALARM HH:MM:SS INJECTED VOLUME INCORRECT</p> | <p>Quantity of chemical product read by Independent Monitor and sent to Eagle Control 3000 is out of injection range.</p> <ol style="list-style-type: none"> 1. Press ALARM REPLY touch pad to silence alarm tone. 2. Flow meter circuit is defective: <ol style="list-style-type: none"> a. Verify that pulse is sent to TD200 display during chemical injection (into monitoring box). b. Verify wiring between TD200 outputs module (#232-OMB21-OXAO) MO, VO and CH3 on Independent Monitor (analog input). Verify for short or open circuit. c. Verify that connectors on flow meter are well connected, and connection to screen is not loose. d. Verify wiring of P10-3 to P10-10. Verify for short or open circuit. 3. Injection system must be calibrated (see Section 4.6.3, <i>How to Calibrate Conductivity, Chemical Injection, and Pressure with Independent Monitor Option</i>). |
| <p>36. If Independent Monitor option is present, alarm tone sounds, and display shows:</p> <p style="text-align: center;">ALARM: RECIRCULATION PRESSURE TOO LOW</p> <p>and printout message is:</p> <p style="text-align: center;">* ALARM HH:MM:SS RECIRCULATION PRESSURE TOO LOW</p> | <p>Water pressure read by Independent Monitor and sent to Eagle Control 3000 is out of range.</p> <ol style="list-style-type: none"> 1. Press ALARM REPLY touch pad to silence alarm tone. 2. Pressure Transmitter circuit is defective: <ol style="list-style-type: none"> a. Verify wiring between TD200 outputs module (#232-OMB21-OXPO) M1, V1 and CH2 on Independent Monitor (analog input). Verify for short and open circuit. b. Verify wiring of P10-15 and P10-16. Verify for open and short circuit. c. Verify that connector on pressure transmitter is well connected and screw on connector is not loose. 3. Pressure transmitter system must be calibrated (see Section 4.6.3, <i>How to Calibrate Conductivity, Chemical Injection, and Pressure with Independent Monitor Option</i>). |

Table 6-4. Control Monitoring and Communications System (Cont'd)

| PROBLEM | CAUSE AND CORRECTIVE ACTION |
|---|---|
| <p>37. If Independent Monitor option is present, alarm tone sounds, and display shows:</p> <p>ALARM: I. MONITOR RTD DEFECTIVE</p> <p>and printout message is:</p> <p>* ALARM HH:MM:SS TEMPERATURE MONITOR DEFECTIVE</p> | <p>RTD open wire or reading is out of range on Independent Monitor.</p> <ol style="list-style-type: none"> 1. On Independent Monitor, a pop-up window appear. Press ACK touch pad. 2. On Eagle Control 3000, press ALARM REPLY touch pad to silence alarm tone. 3. Verify wiring for open or short circuit. |
| <p>38. If Independent Monitor option is present, alarm tone sounds, and display shows:</p> <p>ALARM: CONDUCTIVITY TOO HIGH</p> <p>and printout message is:</p> <p>* ALARM HH:MM:SS CONDUCTIVITY TOO HIGH</p> | <p>Conductivity read by Independent Monitor and sent to Eagle Control 3000 is out of range.</p> <ol style="list-style-type: none"> 1. Press ALARM REPLY touch pad to silence alarm tone. 2. Pure water conductivity is >10 μs. 3. Verify wiring for open or short circuit. 4. Conductivity system must be calibrated (see Section 4.6.3, <i>How to Calibrate Conductivity, Chemical Injection, and Pressure with Independent Monitor Option</i>). |

Section 7: Field Test Procedures

⚠ WARNING – PERSONAL INJURY AND/OR EQUIPMENT DAMAGE HAZARD: Only fully qualified service personnel should make repairs or adjustments to this equipment. Maintenance done by inexperienced, unqualified personnel, or installation of unauthorized parts could cause personal injury, invalidate the warranty, or result in costly equipment damage.

7.1 GENERAL

Every unit must be tested and inspected according to this procedure whenever a part is adjusted, repaired, or replaced. Items which do not comply to test procedures must be corrected and retested.

Keep records of all readings, measurements, discrepancies, corrections, tests, and reinspections. Each test must meet the standards of material and performance set forth in this procedure. Refer to Section 8, *Component Repair and Replacement*, should mechanical problems arise or adjustment be required.

Read and complete test procedure carefully to know steps to be accomplished and test equipment required before starting.

7.2 TEST INSTRUMENTATION REQUIRED

- Stopwatch — to check cycle phase timing and injection times.
- Calibrated test gauge — must read from 0 to 1100 kPa (0 to 160 psig).
- Multimeter, AC clamp-on meter and digital thermometer with thermocouple extension — to measure voltage, amperage, and water temperature.

7.3 PRELIMINARY CHECKS

⚠ WARNING – ELECTRIC SHOCK AND/OR BURN HAZARD: Disconnect all utilities to washer before servicing. Do not service unit unless all utilities have been properly locked out. Always follow electrical safety-related work practice standards.

1. Lock building electrical supply disconnect switch to OFF, and close unit supply valves.

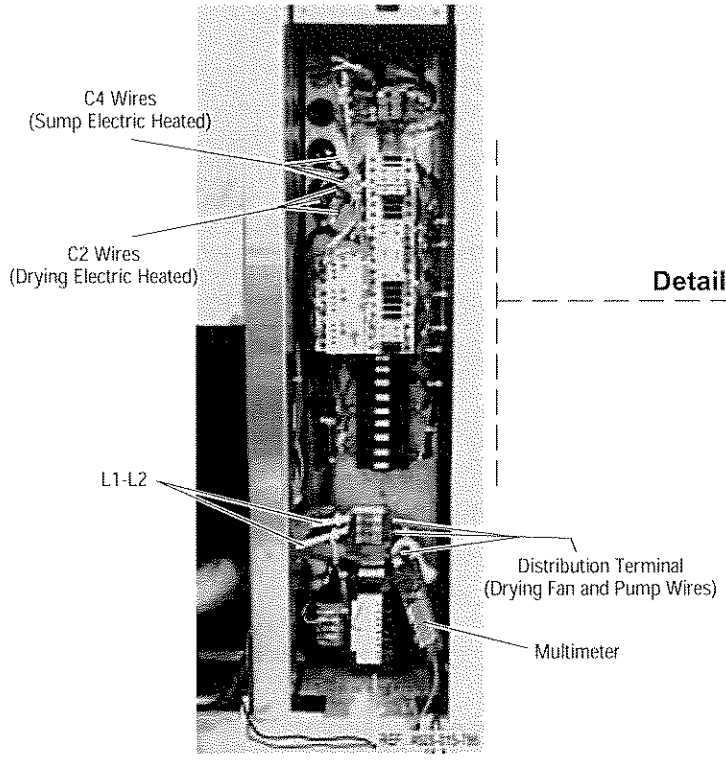
2. Remove upper and lower service access panels on load and unload side. On load side, remove control access panel and remove contactor box cover panel.
3. On contact box, check wiring and connections. Move wires from under distribution terminal and beside C2, C4 (if electric-heated unit) to allow working under it, when taking amperage readings. See Figure 7-1.
4. Reinstall Contactor box cover but DO NOT reinstall screws yet.
5. Restore electrical supply and open unit supply valves. Verify utilities are properly connected and valves are open, i.e., hot water, electric, and, if option applies, cold water, pure water, and steam.
6. Start a cycle in Automatic Mode. Record pressure of each supply at appropriate times during cycle testing.
 - dynamic pressures for
 - hot water: 103 to 345 kPa (15 to 50 psig)
 - cold water: 207 to 345 kPa (30 to 50 psig)
 - pure water: 35 to 345 kPa (5 to 50 psig)
 - steam: 206 to 550 kPa (30 to 80 psig)
 - static pressure for
 - air: 345 to 860 kPa (50 to 125 psig)

NOTE: Main utility supply manual shutoff valves and test ports for gauge connections should be on customer facility piping (not supplied by STERIS).

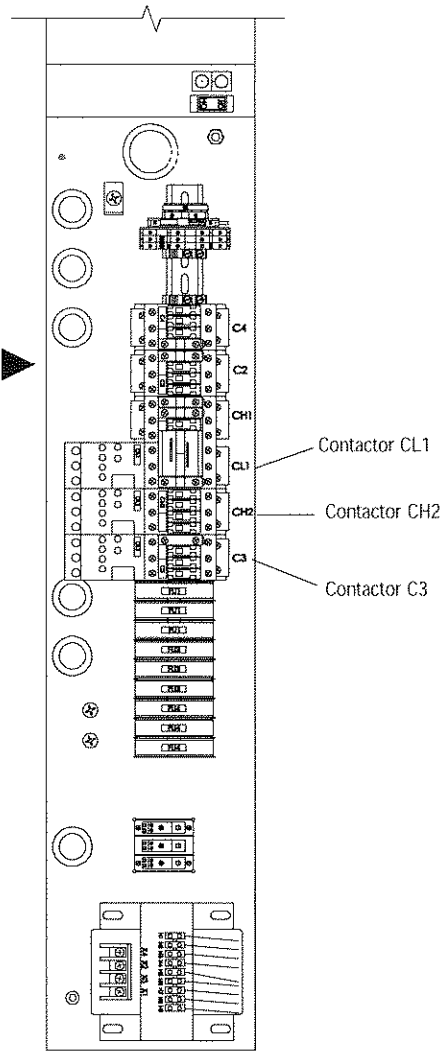
7. In Automatic Mode, check all cycle parameters and obtain a printout of all cycle values, and chamber temperature. Position PRINT-PRINT/VALUES rocker switch to PRINT VALUES.
8. In Service Mode, perform a Service Test Routine, as outlined in Section 4.3, *How to Perform Tests*, to test touch pads, inputs, and outputs.
9. While testing output for unload side door, leave unload door open. Measure water level sensors height. Measurement should be 34 mm ± 3 mm [1-11/32" ± 1/8"] and 3 mm ± 3 mm [1/8" ± 1/8"] (see Figure 7-2).

⚠ WARNING — ELECTRIC SHOCK AND/OR BURN HAZARD: Risk of electrical shock.

10. Remove contactor box cover.

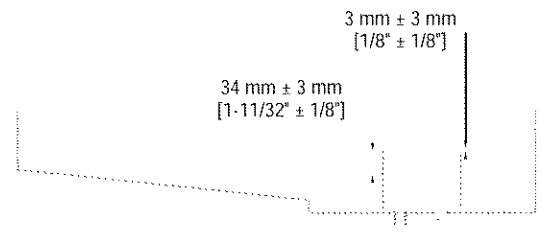


Detail



REF.: #920-016-672

Figure 7-1. Measure Voltage and Amperage



REF.: 920-016-070

Figure 7-2. Water Level Sensor Height

Table 7-1. Drying Fan Element Voltages and Amperages

| 208 Volt Units | | | |
|-----------------------|--------------|------------------|------------------|
| Voltage | +/- % | Min. Amp. | Max. Amp. |
| 187 | -10 of 208 V | 17 | 20 |
| 190 | -9 of 208 V | 17 | 20 |
| 200 | -4 of 208 V | 18 | 21 |
| 208 | -- | 19 | 22 |
| 210 | +1 of 208 V | 19 | 22 |
| 220 | +6 of 208 V | 20 | 23 |
| 229 | +10 of 208 V | 21 | 24 |

| 480 Volt Units | | | |
|-----------------------|--------------|-----------------|------------------|
| Voltage | +/- % | Min.Amp. | Max. Amp. |
| 432 | -10 of 480 V | 6 | 9.5 |
| 440 | -8 of 480 V | 6.5 | 9.5 |
| 450 | -6 of 480 V | 6.5 | 10 |
| 460 | -4 of 480 V | 6.5 | 10 |
| 470 | -2 of 480 V | 7 | 10 |
| 480 | -- | 7 | 10 |
| 490 | +2 of 480 V | 7 | 10.5 |
| 500 | +4 of 480 V | 7.5 | 10.5 |
| 510 | +6 of 480 V | 7.5 | 11 |
| 520 | +8 of 480 V | 8 | 11 |
| 528 | +10 of 480 V | 8 | 11 |

| 380-400-415 Volt Units | | | |
|-------------------------------|--------------|------------------|------------------|
| Voltage | +/- % | Min. Amp. | Max. Amp. |
| 342 | -10 of 380 V | 7 | 10 |
| 350 | -8 of 380 V | 7 | 10.5 |
| 360 | -5 of 380 V | 7.5 | 10.5 |
| 370 | -3 of 380 V | 7.5 | 11 |
| 380 | -- | 8 | 11 |
| 390 | -- | 8 | 11.5 |
| 400 | -- | 8.5 | 11.5 |
| 410 | -- | 8.5 | 12 |
| 415 | -- | 9 | 12 |
| 420 | +1 of 415 V | 9 | 12 |
| 430 | +4 of 415 V | 9 | 12.5 |
| 440 | +6 of 415 V | 9.5 | 12.5 |
| 450 | +8 of 415 V | 9.5 | 13 |
| 457 | +10 of 415 V | 10 | 13 |

11. On distribution terminal, check voltage and amperage of drying fan (C3 Contactor), and verify if within specifications (see Table 7-1).

| VOLTAGE | AMPERAGE MAX. |
|------------------------------|---------------|
| 208 V (187 to 229 V) | 4.1 A |
| 380-400-415 V (342 to 457 V) | 2.0 A |
| 480 V (432 to 528 V) | 2.0 A |

12. Check voltage and amperage from distribution terminal drying electric heaters, and C2 Contactor (C3 Contactor must be activated to activate C2 contactor) and verify if within specification. See Figure 7-1 and Table 7-1.
13. Lower control panel:
 - a. Using one hand to support the control assembly, remove the two hex socket screws (upper right and upper left) holding it in place.
 - b. Carefully lower control assembly forward and downward until it stops in a horizontal position. Stops are provided to support the control in this position.
14. On PC Board Interface, verify voltage reading from terminal P69 (between cables 73 and 75) is 5.0 - 5.1 V DC. Using circuit R48 Potentiometer, adjust voltage value to 5.0 V DC. See Figure 7-3.

⚠ WARNING – ELECTRIC SHOCK AND BURN HAZARD: Avoid contact with nearby metal heat sink radiator and transformer. Use a non conductive tool to make voltage adjustment on power supply.

15. Lock building electrical supply disconnect switch to OFF, and reinstall contactor box cover. Do not install screws yet.
16. Unplug P47 Connector at J47 on Power Supply board. Apply coating of Anti-Fretting compound to J47 sockets (use Nyogel 760G, P764329-907).

NOTE: Niogel Anti-Fretting compound reduces corrosion on pins that could cause low voltage readings.

17. Turn Main Power ON. Enter Automatic Mode.

7.4 CYCLE TEST

1. On load side LOWER service compartment, check for leaks under chemical injection pumps and injection points on manifolds.
2. Set unit to operate in Service Mode, refer to Section 4.1, *Service Mode Procedures*.
3. Inside wash chamber, visually inspect rotary spray arms to detect clogged holes. Remove obstructions if necessary.
4. Verify sump bottom filter is free from debris. Clean if necessary. Remove sump bottom filter.

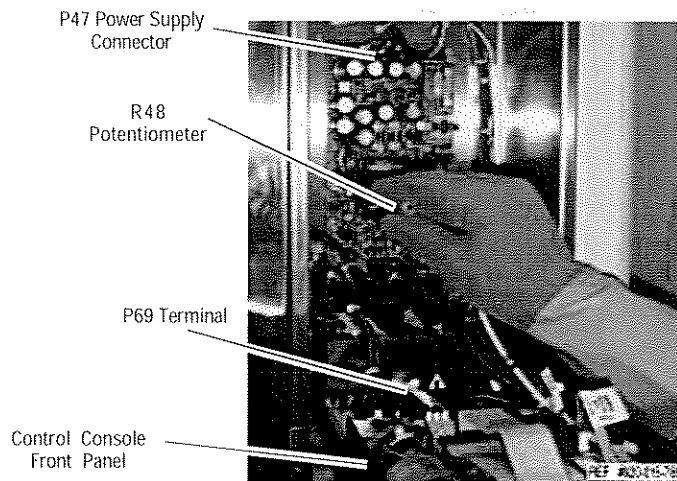


Figure 7-3. Adjust to 5.0 Volt DC

5. Install a thermocouple extension into wash chamber. Pass thermocouple by bottom left corner and run it toward sump, under bottom filters. Secure thermocouple around RTD. Ensure thermocouple cables do not obstruct rotary spray arms operation. See Figure 7-4.
6. Reinstall sump bottom filter.
7. Close unload chamber door. Set unit to operate in Automatic Mode (see Section 4-11).

7.4.1 Units Without Load Conveyors

1. If unit is not equipped with Amsco® Reliance® 444 Load/Unload Modules or Amsco® Reliance® ATS Automated Transport System option, place an empty rack without manifold into chamber.
2. Press DOOR CLOSE touch pad to close door.
3. Manually select GENTLE CYCLE and press CYCLE START to run the cycle.
4. GENTLE CYCLE starts. See Section 7.5, *GENTLE Cycle (Low Speed)*.

7.4.2 Units With Load Conveyors

If unit is equipped with Amsco Reliance 444 Load/Unload Modules or Amsco Reliance ATS Automated Transport System option, refer to Section 5, *Principles of Operation*, for detailed information on conveyor operation.

The autoloader system functions as an integral part of cycle operation. Conveyors are tested as part of the cycle operational test.

1. Begin test by loading a basket with a bar code tag for the GENTLE Cycle onto the conveyor's loading position.
2. Ensure basket indexes correctly to the bar code reader. Observe whether reader identifies correct cycle code.
3. Door should open and basket should index into chamber, then the door should close and the cycle begins.
4. Proceed to typical cycle operation. See Section 7.5, *GENTLE Cycle (Low Speed)*.

• **Check EMERGENCY STOP Button:**

1. While a basket is indexing from one conveyor module onto another, press the EMERGENCY STOP Button to ensure the conveyor system stops.
2. Press ALARM REPLY to silence alarm tone and clear alarm state.
3. Reposition basket at conveyor loading position.
4. Press STOP/RESET on the washer/disinfector control panel.
5. Pull out the EMERGENCY STOP Button.
6. The conveyor system should begin operating normally.

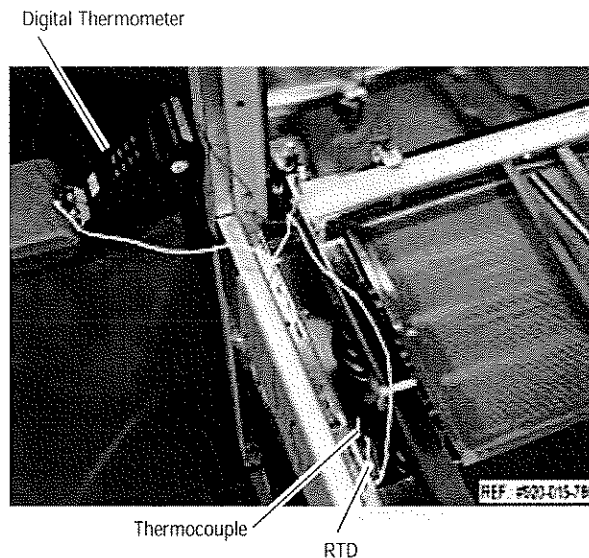


Figure 7-4. Thermocouple Around Sump RTD

7.5 GENTLE CYCLE (LOW SPEED)

IMPORTANT: Ensure a basket is inside wash chamber when the cycle starts.

IMPORTANT: During GENTLE Cycle performance, you should stop and start washer many times to proceed with verifications.

• Pre-Wash 1

1. Verify cold water fill valve opens to fill sump. On Unload side, on upper service compartment, check cold water valves for leaks. Display shows:

**GENTLE COLD
PRE-WASH 1**

alternating with:

**GENTLE COLD
FILLING**

2. Verify recirculation pump runs for 2 minutes. Display shows:

**GENTLE COLD
PRE-WASH 1**

alternating with:

**GENTLE COLD
CIRCULATE TIME = 02:00**

2. On distribution terminal, check voltage and amperage of water pump at low speed (CL1 Contactor) is within specification.

| VOLTAGE | AMPERAGE MAX. |
|------------------------------|---------------|
| 208 V (187 to 229 V) | 5.8 A |
| 480 V (432 to 528 V) | 2.5 A |
| 380-400-415 V (342 to 457 V) | 3.0 A |

4. Verify drain valve opens and recirculation pump run for 1 minute. Display shows:

**GENTLE COLD
PRE-WASH 1**

alternating with:

**GENTLE COLD
DRAINING TIME = 01:00**

• Enzyme Wash

1. Verify hot water fill valve opens to fill sump and that detergent is also injected into sump. On unload side upper service compartment, check hot water valves for leaks. Display shows:

**GENTLE HOT
ENZYME W.**

alternating with:

**GENTLE HOT
FILL/INJT**

2. Verify recirculation pump alternately runs for 3 seconds then stops for 27 seconds, during 3 minutes 10 seconds. In the last 50 seconds of the treatment, recirculation pump does not run. Display shows:

**GENTLE HOT
ENZYME W.**

alternating with:

**GENTLE HOT
CIRCULATE TIME = 04:00**

3. Verify drain valve opens for 1 minute. Display shows:

**GENTLE HOT
ENZYME W**

alternating with:

**GENTLE HOT
DRAINING TIME = 01:00**

• Enzyme Rinse

1. Verify hot water fill valve opens to fill sump. Display shows:

**GENTLE HOT
ENZYME W.**

alternating with:

**GENTLE HOT
FILLING**

Table 7-2. Sump Heating Elements – Electric-Heated Units

| 480 Volt Units | | | |
|----------------|--------------|-------------|-------------|
| Voltage | +/- % | Min. Amp. | Max. Amp. |
| 432 | -10 of 480 V | 14.5 | 18 |
| 440 | -8 of 480 V | 15 | 18 |
| 450 | -6 of 480 V | 15.5 | 18.5 |
| 460 | -4 of 480 V | 15.5 | 19 |
| 470 | -2 of 480 V | 16 | 19 |
| 480 | -- | 16.5 | 19.5 |
| 490 | +2 of 480 V | 17 | 20 |
| 500 | +4 of 480 V | 17.5 | 20.5 |
| 510 | +6 of 480 V | 17.5 | 21 |
| 520 | +8 of 480 V | 18 | 21 |
| 528 | +10 of 480 V | 18 | 21.5 |

| 380-400-415 Volt Units | | | |
|------------------------|--------------|-------------|-------------|
| Voltage | +/- % | Min. Amp. | Max. Amp. |
| 342 | -10 of 380 V | 17 | 20.5 |
| 350 | -8 of 380 V | 17.5 | 21 |
| 360 | -5 of 380 V | 18 | 21.5 |
| 370 | -3 of 380 V | 18.5 | 22 |
| 380 | -- | 19.5 | 22.5 |
| 390 | -- | 20 | 23 |
| 400 | -- | 20.5 | 23.5 |
| 410 | -- | 21 | 24 |
| 415 | -- | 21 | 24.5 |
| 420 | +1 of 415 V | 21.5 | 24.5 |
| 430 | +4 of 415 V | 22 | 25 |
| 440 | +6 of 415 V | 22.5 | 26 |
| 450 | +8 of 415 V | 23 | 26.5 |
| 457 | +10 of 415 V | 23.5 | 26.5 |

- Verify recirculation pump runs for 15 seconds. Display shows:

**GENTLE HOT
ENZYME W.**

alternating with:

**GENTLE HOT
CIRCULATE TIME = 00:15**

- Verify drain valve opens for 1 minute. Display shows:

**GENTLE HOT
ENZYME W**

alternating with:

**GENTLE HOT
DRAINING TIME = 01:00**

• **Wash 1**

- Verify hot water fill valve opens to fill sump and that detergent is also injected into sump. Display shows:

**GENTLE GUA = 65.5
PUMP 1 WASH 1**

alternating with:

**GENTLE TEMP = XXX.X
FILL/INJT**

- Verify recirculation pump runs. When pump is activated, it turns at low speed and two-minute countdown starts.
- Read voltage and amperage from sump electric heaters (C4 Contactor) if electric heated unit. See Figure 7-1 and Table 7-2.
- Once water temperature has reached minimum guaranteed setting. Display shows:

**GENTLE GUA = 65.5
PUMP 1 WASH 1**

alternating with:

**GENTLE TEMP = XXX.X
CIRC/HEAT**

- Check recirculation piping for leaks.
- Check steam valve for leaks.

- Verify recirculation pump runs for 2 minutes. Display shows:

**GENTLE GUA = 65.5
PUMP 1 WASH 1**

alternating with:

**GENTLE TEMP = XXX.X
CIRCULATE TIME = 02:00**

- Verify top and bottom rotary spray headers are working properly (clockwise) at speed between 1 and 3 sec./rotation.

- Verify drain valve opens for 1 minute 5 seconds, drain discharge cool down valve opens for 40 seconds. Display shows:

**GENTLE GUA = 65.5
PUMP 1 WASH 1**

alternating with:

**GENTLE TEMP = XXX.X
DRAINING TIME = 01:05**

• **Rinse 1**

- Verify hot water fill valve opens to fill sump. Display shows:

**GENTLE HOT
RINSE 1**

alternating with:

**GENTLE HOT
FILLING**

- Verify recirculation pump runs for 15 seconds. Display shows:

**GENTLE HOT
RINSE 1**

alternating with:

**GENTLE HOT
CIRCULATE TIME = 00:15**

- Verify drain valve opens for 1 minute. Display shows:

**GENTLE HOT
RINSE 1**

alternating with:

GENTLE HOT
DRAINING TIME = 01:00

• **Thermal Rinse**

1. Verify hot water fill valve opens to fill sump. Display shows:

GENTLE GUA = 82.0
THERMAL

alternating with:

GENTLE TEMP = XXX.X
FILLING

2. Verify recirculation pump runs once water temperature has reached minimum guaranteed setting. Display shows:

GENTLE GUA = 82.0
THERMAL

alternating with:

GENTLE TEMP = XXX.X
CIRC/HEAT

Once temperature has reached 82°C (180°F), press **STOP/RESET** touch pad once. Wait for one minute and note down temperatures. Verify temperature reading on digital thermometer and verify temperature appearing on display. Difference between these temperatures shouldn't vary more than $\pm 2^{\circ}\text{C}$ ($\pm 4^{\circ}\text{F}$).

If temperature is not within $\pm 2^{\circ}\text{C}$ ($\pm 4^{\circ}\text{F}$), refer to Section 4.6.1 or 4.6.2 for Calibration Procedure.

3. Verify recirculation pump runs for one minute. Display shows:

GENTLE GUA 180
THERMAL

alternating with:

GENTLE TEMP = XXX.X
CIRCULATE TIME = 01:00

4. Check recirculation pump for leaks.
5. Verify drain valve and drain discharge cool down valve opens for 1 minute 30 seconds and drain discharge cooldown valve operates for 55 seconds. Display shows:

GENTLE GUA = 82.0
THERMAL

alternating with:

GENTLE TEMP = XXX.X
DRAINING TIME = 01:30

• **Drying**

1. Verify air is heated at a temperature of 116°C (240°F). Display shows:

GENTLE SP = 116.0
DRYING

alternating with

GENTLE TEMP = XXX.X
DRYING TIME = 06:00

2. At the end of 6 minute drying treatment (with empty rack), the temperature in the middle of the chamber must read above 93°C (200°F) in the digital thermometer, while the temperature displayed is 116°C (240°F).

• **Cycle Complete**

Display shows:

**PLEASE OPEN DOOR AND
REMOVE LOAD**

...and that Cycle Complete alarm tone is heard. Press **ALARM REPLY** touch pad to silence buzzer and remove load from chamber.

• **Cycle Complete for Units Equipped with Unload Conveyors**

1. At the end of the cycle the door should open automatically.
2. Basket should index from the chamber onto unload module. If a double unload module, basket should then index to the unload position.

7.6 INSTRUMENT CYCLE (HIGH SPEED)

1. Place one basket or rack into wash chamber.
2. Select INSTRUMENTS Cycle. Press **CYCLE START** touch pad to initiate cycle.

• Pre-Wash 1

1. Display shows:

INSTR. COLD
PRE-WASH 1

alternating with:

INSTR. COLD
FILLING TIME = 04:00

2. Verify recirculation pump runs for 2 minutes. Display shows:

INSTR. COLD
PRE-WASH 1

alternating with:

INSTR. COLD
CIRCULATE TIME = 02:00

3. On distribution terminal, check voltage and amperage of recirculation pump at high speed (Contactor CH2) is within specification. See Figure 7-1.

| VOLTAGE | AMPERAGE MAX. |
|------------------------------|----------------------|
| 208 V (187 to 229 V) | 20.2 A |
| 480 V (432 to 528 V) | 8.8 A |
| 380-400-415 V (342 to 457 V) | 9.8 A |

4. Once voltage and amperage reading is done, press **STOP/RESET** touch pad twice to abort cycle. Display returns to main menu.

⚠ WARNING – ELECTRIC SHOCK AND/OR BURN HAZARD: Fasteners and star washers are used to ensure protective bonding continuity. Always reinstall any star washer which may have been removed during installation or servicing.

5. Reinstall all panels, covers, and/or screws removed.
6. Press **DOOR OPEN** on unload side to open unload door. Remove basket from wash chamber.

Section 8: Component Repair and Replacement

8.1 RECOMMENDED ELECTROSTATIC DAMAGE (ESD) PRECAUTIONS

NOTE: The following precautions should be taken whenever Printed Circuit Boards are being handled or replaced:

Always use an ESD safe container when transporting boards from one location to another.

No boards should be removed from their containers except at an approved static station or where personnel and machine are properly grounded.

At minimum, use a wrist strap grounded to the washer/disinfector when removing and/or replacing PC boards.

NOTE: Failure to follow the above precautions may result in electrostatic damage to the Printed Circuit Board. If a static discharge happens to go through an integrated circuit and the transient current pulse is not effectively diverted by protective circuitry, the current from the discharge can flow through the board and raise the temperature of internal junctions to their melting points. Damage can range from latent degradation to complete destruction.

8.2 OPEN CONTROL ACCESS PANEL

See Figure 9-2.

1. Remove the four screws holding control access panel in place. Two screws are in the middle and two screws are on the bottom.
2. Carefully pull the lower part of the panel and lift upward.
3. Remove control access panel and set safely aside.

⚠ WARNING – ELECTRIC SHOCK AND/OR BURN HAZARD: Fasteners and star washers are used to ensure protective bonding continuity. Always reinstall any star washer which may have been removed during installation or servicing.

4. Reinstall panel and screws once maintenance procedure is completed.

8.3 SERVICING CONTROL AND CONTROL CONSOLE

8.3.1 Prepare Control For Service

See Figure 8-1.

⚠ CAUTION – POSSIBLE EQUIPMENT DAMAGE: Observe the Electrostatic Precautions outlined in Section 8.1. Always wear a grounding wrist strap when removing or replacing PC boards or ICs.

The Eagle 3000 Stage 3 Control tilts forward and down to a horizontal position for easy service.

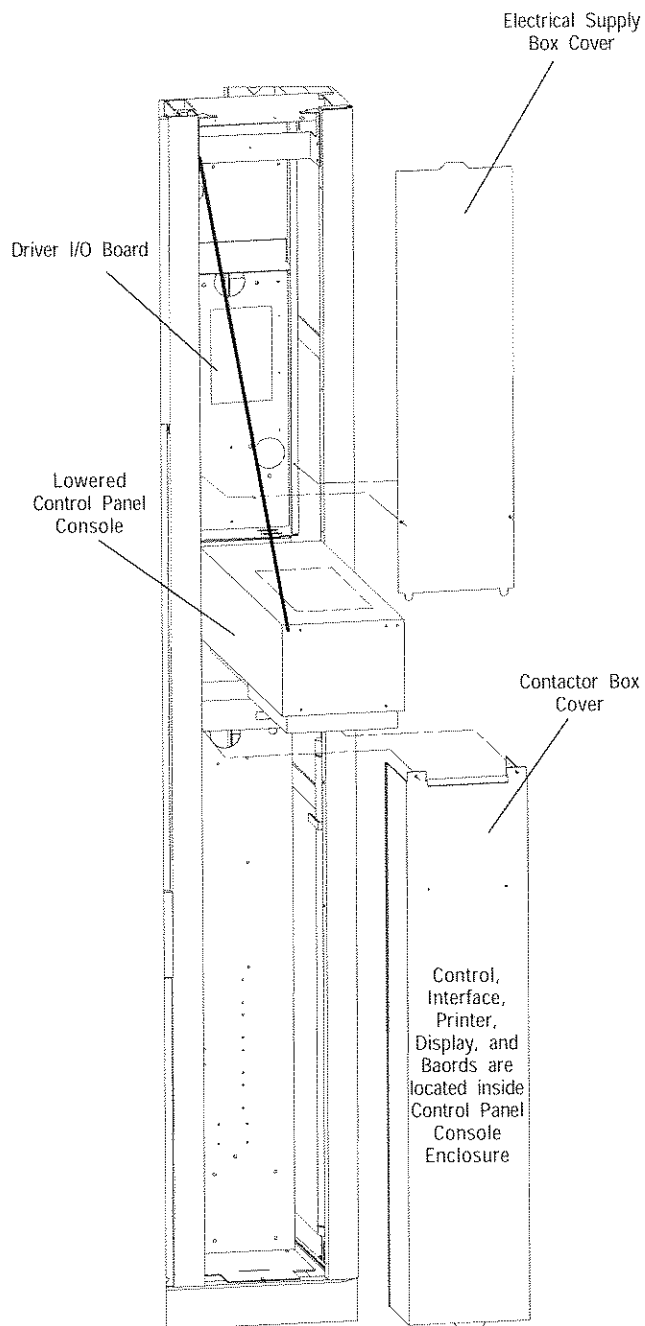
1. Position Main Power switch (located outside Electrical supply box) to OFF and position Printer POWER-OFF/STANDBY switch to OFF.
2. Follow the procedure in Section 8.2, *Open Control Access Panel*, to open control access panel.
3. Using one hand to support the control assembly, remove the two hex socket screws (upper right and upper left) holding it in place.
4. Carefully lower control assembly forward and downward until it stops in a horizontal position. Stops are provided to support the control in this position.
5. After maintenance is completed, carefully tilt the control assembly upward to its original position.

⚠ WARNING – ELECTRIC SHOCK AND/OR BURN HAZARD: Fasteners and star washers are used to ensure protective bonding continuity. Always reinstall any star washer which may have been removed during installation or servicing.

6. Reinstall the two hex socket screws (upper right and upper left).

8.3.2 Prepare Control Panel Console for Service

1. The front panel of the control console must be opened and lowered to gain access to control board, power supply, connector board, printer board, display board, and interface board (see Figures 9-34 through 9-36).
2. Remove two socket head screws in upper right and upper left sides above printer paper take up spool (see Figure 9-35).
3. Carefully lower control front panel forward and down until it stops in horizontal position (see Figure 8-1).
4. Reinstall two hex socket head screws and star washers after completing service.



REF.: #920-500-324

Figure 8-1. Lower Control Panel Console

8.4 EMERGENCY STOP BUTTON REPLACEMENT

See Figure 9-2.

1. Lock unit electrical disconnect switch in OFF position.
2. Remove service control panel.
3. Unplug cable connectors (ESB A on left side or ESB B on right side of the unit).
4. Remove protection box cover on back of EMERGENCY STOP button.
5. Disconnect white and black wires from EMERGENCY STOP button assembly.
6. Insert a small screw driver or a pen into square hole on top of EMERGENCY STOP Button to raise and release assembly.
7. Remove red EMERGENCY STOP Button.
8. Install new EMERGENCY STOP Button.
9. Reconnect white and black wires.
10. Re-install protection box cover and re-plug cable connectors (ESB x).
11. Unlock unit electrical disconnect switch and put in ON position.

8.5 PRINTER

See Figures 9-34 and 9-35.

The lifetime of the printer is approximately 500,000 lines of print. If a row of dots is missing or faint, check the print head. It may only be dirty.

To test, cut a piece of "bond" (e.g., typing or copier) paper to the width of the thermal paper and push it through the printer several times. The coarseness of the bond paper may restore the printer to normal.

8.5.1 Printer Lubrication

If printer tends to drag, wipe guide shaft clean and apply lubricant (P764321-985).

8.5.2 Printer PC Board Replacement

See Figure 9-35.

⚠ CAUTION—POSSIBLE EQUIPMENT DAMAGE: Observe the Electrostatic Precautions outlined in Section 8.1. Always wear a grounding wrist strap when removing or replacing PC boards or ICs.

1. Follow the procedure in Section 8.2, *Open Control Access Panel*, to open control access panel and Section 8.3, *Servicing Control and Control Console*, to lower control assembly in a horizontal position.

2. Open printer access door, cut paper just above printer and lower platen.
3. Remove and retain nuts holding printer to the PC board. Unplug printer ribbon cable from the PC board.
4. Unplug all plugs from the Printer PC board. Remove the Printer PC board from its standoffs.
5. Ensure to lift and hold detector below Printer PC board while removing board to avoid damage to Printer PC board.
6. Mount printer to the new Printer PC board. Plug the printer ribbon cable into the jack on the board.

⚠ WARNING – ELECTRIC SHOCK AND/OR BURN HAZARD: Fasteners and star washers are used to ensure protective bonding continuity. Always reinstall any star washer which may have been removed during installation or servicing.

7. Reinstall the Printer PC board. Reconnect all plugs and secure new board with nuts previously removed (see Table 8-2 for DIP Switch settings).

8.5.3 Printer Replacement

See Figures 9-34 and 9-35.

⚠ CAUTION – POSSIBLE EQUIPMENT DAMAGE: Observe the Electrostatic Precautions outlined in Section 8.1. Always wear a grounding wrist strap when removing or replacing PC boards or ICs.

1. Repeat Steps 1 to 5 of the procedure in Section 8.5.2, *Printer PC Board Replacement*.
2. Remove and retain three nuts and two screws of the Printer assembly.
3. Replace printer with a new one.

⚠ WARNING – ELECTRIC SHOCK AND/OR BURN HAZARD: Fasteners and star washers are used to ensure protective bonding continuity. Always reinstall any star washer which may have been removed during installation or servicing.

4. Secure new printer with nuts and screws previously removed.

8.6 DISPLAY MODULE

8.6.1 Display Module Self Test

To test display (interface board), perform touch pad self test outlined in section 8.8.1.

8.6.2 Display Module Replacement

See Figure 9-35.

⚠ CAUTION – POSSIBLE EQUIPMENT DAMAGE: Observe the Electrostatic Precautions outlined in Section 8.1. Always wear a grounding wrist strap when removing or replacing PC boards or ICs.

1. Remove the Printer PC board (see Section 8.5.2, *Printer PC Board Replacement*).
2. Unplug the three-pin power connector from the Display Module.
4. Unplug the 34-pin data cable from display module and remove module from the four standoffs.
5. Plug power connector into new display module.
6. Plug 34-pin data cable into new module.
7. Mount new display and reinstall Printer PC board.

8.7 INTERFACE BOARD REPLACEMENT

8.7.1 Interface Board Self Test

To test display (interface board), perform touch pad self test outlined in section 8.8.1, *Touch Pad Self Test*.

8.7.2 Interface Board Replacement

See Figure 9-35.

⚠ CAUTION – POSSIBLE EQUIPMENT DAMAGE: Observe the Electrostatic Precautions outlined in Section 8.1. Always wear a grounding wrist strap when removing or replacing PC boards or ICs.

1. Follow the procedure in Section 8.2, *Open Control Access Panel*, to open control access panel and Section 8.3.2, *Prepare Control Console Panel for Service*, to lower control assembly in a horizontal position.
2. Unplug all plugs from Input/Output (Interface PC) Board.
3. Remove Input/Output Board, collecting all four nuts and standoffs.
4. Replace Input/Output Board with a new one.
5. Replug all plugs into Input/Output Board.

8.8 TOUCH PANEL REPLACEMENT

8.8.1 Touch Pad Self Test

This procedure is to test the touch pad (including POWER-OFF/STANDBY switch, PRINT/PRINT VALUES switch and paper take-up switch) without

going into Service Mode (for example if the control is locked up). This test can be performed without the interface hooked up to the main control board.

IMPORTANT: Record initial DIP switch positions of the Interface Printed Circuit board (see **Table 8-3**).

1. Follow the procedure in Section 8.2, *Open Control Access Panel*, to open control access panel and Section 8.3.2, *Prepare Control Console for Service*, to lower control assembly in a horizontal position.
2. Open printer access door, cut paper just above printer and lower platen.
3. Set DIP switches 1, 2, and 3 on the Input/Output Board to the ON position (see **Table 8-3**).
4. Disconnect P64 plug from the Input/Output Board.
5. Unlock unit electrical disconnect switch and put to ON position. Display shows:

**CONSOLE SELF TEST!
PRESS ANY PB**

... and printer records:

CONSOLE SELF TEST

6. Put PRINT/PRINT VALUES rocker switch to PRINT VALUES. Display shows:

**PRESSING PB/SW WILL
PRT/DSP STATUS**

7. Press any touch pad. See **Table 8-6** for Switch/Touch Pad Identification. Display shows:

**1 2 3 4 5 6 7 8 9 A B C D E F G H I J K
1 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 0**

... and printer records:

1 2 3 4 5 6 7 8 9 A B C D E F G H I J K
1 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 0

NOTE: "0" indicates input is closed (low); "1" indicates input is open (high).

Table 8-1. Switch/Touch Pad Identification

| On Display | Corresponding Switch/Touch Pad |
|------------|--------------------------------|
| 1 | PRINT VALUES Switch |
| 2 | PRINT/Paper Take-Up Switch |
| 3 | POWER-OFF/STANDBY Switch |
| 4 | CYCLE START Touch Pad |
| 5 | STOP/RESET Touch Pad |
| 6 | SELECT CYCLE Touch Pad |
| 7 | REVIEW CYCLE Touch Pad |
| 8 | CYCLE MENU Touch Pad |
| 9 | Left CURSOR Arrow Touch Pad |
| A | Down CURSOR Arrow Touch Pad |
| B | SAVE VALUES Touch Pad |
| C | CHANGE VALUES Touch Pad |
| D | Right CURSOR Arrow Touch Pad |
| E | Up CURSOR Arrow Touch Pad |
| F | EXTEND CYCLE Touch Pad |
| G | ALARM REPLY Touch Pad |
| H | DOOR OPEN Touch Pad |
| I | DOOR CLOSED Touch Pad |
| J | Spare Input |
| K | Printer Status |

NOTE: Printer status – The "K" displays "0" if printer is present and "1" if no printer is on line.

8. Press each touch pad or toggle switches to verify. The corresponding character on display toggles between "0" and "1". When touch pad or switch is released, display returns to original setting. If status does not change, corresponding touch pad or switch is defective. See Section 8.8.2, *Touch Pad Replacement*.
9. To exit self test, put main power supply switch to OFF position.
10. Lower control assembly to a horizontal position.
11. On the Input/Output Board, reconnect P64 plug and reset DIP switches 1, 2, and 3 to their original position.

⚠ WARNING – ELECTRIC SHOCK AND/OR BURN HAZARD: Fasteners and star washers are used to ensure protective bonding continuity. Always reinstall any star washer which may have been removed during installation or servicing.

12. Re-install control assembly and attach with screws previously removed.

8.8.2 Touch Pad Replacement

See Figure 9-34.

1. Follow the procedure in Section 8.2, *Open Control Access Panel*, to open control access panel and Section 8.3.2, *Prepare Control Panel Console for Service*, to lower control assembly in a horizontal position.
2. Unplug from Printer PC board the two plugs and the ground flat cable on touch panel.
3. Place self adhesive tape below touch panel to center new touch panel when installing it.
4. Peel touch pad off the control assembly.

⚠ WARNING – HEALTH HAZARD: Vapors from solvents can be harmful. Use with adequate ventilation. Follow directions on the container.

5. Using acetone, TCE, or a similar solvent, remove any adhesive left on the control assembly.
6. Plug new touch panel into the Printer PC board.
7. Remove paper backing from the new touch panel. Turn power ON and center new touch panel over the display, then press it down into place.
8. Refer to Section 8.8.1, *Touch Pad Self Test*, to test touch pads.

8.9 CONTROL PC BOARD REPLACEMENT

See Figure 9-36.

⚠ CAUTION – POSSIBLE EQUIPMENT DAMAGE: Observe the Electrostatic Precautions outlined in Section 8.1. Always wear a grounding wrist strap when removing or replacing PC boards or ICs.

1. Follow the procedure in Section 8.2, *Open Control Access Panel*, to open control access panel and Section 8-3, *Prepare Control for Service* to lower control assembly in a horizontal position.
2. Locate Control PC Board. Carefully lift double EPROM up, about 1/16 inch at a time, by alternately lifting either end of the IC. Remove RAM the same way. Put both EPROM PC Board and RAM aside in a safe place, on a nonconductive surface, until reinstallation.
3. Unplug all plugs from the Control PC board. Plugs are either keyed, or have different numbers of pins so that reconnection can be done by inspection.
4. Remove Control PC Board, collecting all screws and standoffs.
5. Install the new PC board, locking it in place on all the standoffs. Reinstall all plugs.

6. Compare jumpers and dip switch settings between old and new boards, to ensure that new board jumpers and dip switches are correctly set.

7. Reinstall double EPROM PC Board and RAM (U7).

NOTE: A special socket (P129357-238) can be ordered and installed between the chip and the board socket to ease insertion.

8. While reinserting double EPROM PC Board and RAM, ensure that all pins engage the connectors on the board's IC socket.

- a. Ensure that the double EPROM PC Board and RAM are oriented correctly (See Figure 9-36). When facing the machine from the front, indent on both the double EPROM PC Board and the RAM should be located on upper part of the socket.

- b. Press down gently on each IC while watching the pins. Push, a little at a time, being careful that the pins slide into the socket without bending over (buckling). If in doubt, remove the IC and start over.

NOTE: Sometimes the pins on a new IC are flared slightly outward. If so, carefully bend them so that they extend straight downward.

⚠ WARNING – ELECTRIC SHOCK AND/OR BURN HAZARD: Fasteners and star washers are used to ensure protective bonding continuity. Always reinstall any star washer which may have been removed during installation or servicing.

9. Reinstall control assembly and attach with screws previously removed.

8.10 EPROM AND/OR BATTERY-BACKED MEMORY (RAM) REPLACEMENT

See Figure 9-36.

⚠ CAUTION – POSSIBLE EQUIPMENT DAMAGE: Observe the Electrostatic Precautions outlined in Section 8.1. Always wear a grounding wrist strap when removing or replacing PC boards or ICs.

8.10.1 Recording Unit Configuration

IMPORTANT: Before beginning EPROM and/or battery-backed memory (RAM) replacement, proceed as follows:

1. Enter the Service Mode (see Section 4.1, *Service Mode Procedures*) and obtain a cycle/day count printout for entry into the new memory.

Table 8-2. DIP Switch Settings

| Printer PC Board | |
|------------------|-------------------------------|
| DIP Switch | Function |
| 1 | Self Test |
| 2 | Serial = ON Parallel = OFF |
| 3 | Spare |
| 4 | Spare |
| 5 | Baud Rate |
| 6 | Baud Rate |
| 7 | Spare |
| 8 | Spare |

N.B. Default Dip Switch Settings : 2 = ON
1-3-4-5-6 = OFF

Table 8-3. DIP Switch Settings

| Operating End Panel Interface Board | |
|-------------------------------------|-------------------|
| DIP Switch | Function |
| 1 | Address - MSB |
| 2 | Address |
| 3 | Address - LSB |
| 4 | Spare |
| 5 | Printer Type |
| 6 | Display Self Test |

N.B. Default Dip Switch Settings : 1-2 = ON
3-4-5-6 = OFF
1,2,3 =ON, Invokes console self test.

Table 8-4. DIP Switch Settings

| Remote Panel Interface Board | |
|------------------------------|-------------------|
| DIP Switch | Function |
| 1 | Address - MSB |
| 2 | Address |
| 3 | Address - LSB |
| 4 | Spare |
| 5 | Printer Type |
| 6 | Display Self Test |

N.B. Default Dip Switch Settings : 1-3 = ON
2-4-5-6 = OFF
1,2,3 = ON, invokes console self test.

Table 8-5. DIP Switch Settings

| Control PC Board | |
|------------------|---|
| DIP Switch | Function |
| 1 | Printer Column Side: OFF = Soiled Side |
| 2 | ON = Rinse Aid OFF = Lubricant |
| 3 | ON = with Condenser OFF = w/o Condenser |
| 4 | ON = with Drain Discharge Cooldown OFF = w/o Drain Discharg Cooldown |
| 5 | ON = with Condensate Steam Return OFF = w/o Condensate Steam Return |
| 6 | ON = with Independent Monitor OFF = w/o Independent Monitor |

N.B. Default Dip Switch Settings : 3-4-5-6 = OFF

Table 8-6. DIP Switch Settings

| Input/Output Driver Interface Board | |
|-------------------------------------|---------------|
| DIP Switch | Function |
| 1 | Address - MSB |
| 2 | Address |
| 3 | Address - LSB |
| 4 | Spare |
| 5 | Spare |
| 6 | Spare |

N.B. Default Dip Switch Settings : 2 = ON
1-3-4-5-6 = OFF

Table 8-7. DIP Switch Settings

| Double EPROM Board | |
|--------------------|---|
| DIP Switch | Function |
| 1 | Automatic mode = OFF Service mode = ON |

N.B. Default Dip Switch Settings : 1 = OFF

2. Press PRINT VALUES or PRINT/PRINT VALUES to generate a printout for the currently set treatments and values.
3. Enter FACTORY SETUP MODE (see Section 4.10, *How to Enter Factory Setup Mode*) to take note of all options present on the washer/disinfector, along with the unit serial number, as this data will be lost when replacing the EPROM and/or RAM.
4. Use the following checklist to record unit configuration. Questions will vary depending on EPROM version installed.

NOTE: In case unit values are lost, reprogram configuration to reset factory-set values.

Checklist to Record Unit Configuration

| | YES | NO |
|-----------------|-----|----|
| Steam Heat Unit | | |
| Automated | | |
| Load End ATS | | |
| Unload End ATS | | |
| Serial Number | 36 | |

8.10.2 Replace EPROM and/or Battery-Backed Memory (RAM)

1. Follow the procedure in Section 8.2, *Open Control Access Panel*, to open control access panel and Section 8.3.2, *Prepare Control Panel Console for Service*, to lower control assembly in a horizontal position.
2. Locate Control PC Board (see Figure 9-36). Unscrew nut from double EPROM board. Carefully lever EPROM or RAM up, about 1/16 inch at a time, by alternately lifting either end of the IC.
3. Replace EPROM or RAM with new one.

NOTE: When replacing RAM, note the following:

1) A special socket (P129357-238) can be ordered and installed between the chip and the board socket to ease insertion.

2) RAM is located under the double EPROM PC Board. Remove double EPROM PC Board to reach RAM.

4. While reinserting EPROM or RAM, make sure that all pins engage the connectors on the board's IC socket.
 - a. Ensure the EPROM or RAM is oriented correctly. When facing the machine from the front, the indent on the EPROM or RAM should be located on upper part of the socket.

- b. Press down gently on the IC while watching the pins. Push, a little at a time, being careful that the pins slide into the socket without bending over (buckling). If in doubt, remove the IC start over.

NOTE: Sometimes the pins on a new IC are flared slightly outward. If so, carefully bend them so that they extend straight downward.

5. Tilt control assembly to vertical position. Position Main Power Switch to ON.
6. Enter Factory Setup Mode (see Section 4.10, *How to Enter Factory Setup Mode*), to reset all hardware options.
7. Position Main Power Switch to OFF. Lower control assembly. Position DIP switch to Automatic mode position.
8. Tilt control assembly to vertical position. Position Main Power Switch to ON.
9. Remove printed data from printer. Press CYCLE REVIEW touch pad to compare printed values with those of the unit.
10. Press CHANGE VALUES touch pad to modify values if necessary.
11. Continue reviewing values until all cycles have been reviewed and values restored.

⚠ WARNING – ELECTRIC SHOCK AND/OR BURN HAZARD: Fasteners and star washers are used to ensure protective bonding continuity. Always reinstall any star washer which may have been removed during installation or servicing.

12. Reinstall control assembly and attach with screws previously removed.

8.11 DOUBLE EPROM PC BOARD REPLACEMENT

See Figure 9-36.

⚠ CAUTION – POSSIBLE EQUIPMENT DAMAGE: Observe the Electrostatic Precautions outlined in Section 8.1. Always wear a grounding wrist strap when removing or replacing PC boards or ICs.

8.11.1 Recording Unit Configuration

IMPORTANT: Before beginning EPROM and/or battery-backed memory (RAM) replacement, proceed as follows:

1. Enter the Service Mode (see Section 4.1, *Service Mode Procedure*) and obtain a cycle/day count printout for entry into the new memory.

2. Press PRINT VALUES or PRINT/PRINT VALUES to generate a printout for the currently set treatments and values.
3. Enter FACTORY SETUP MODE (see Section 4.10, *How to Enter Factory Setup Mode*) to take note of all options present on the washer/disinfector, along with the unit serial number, as this data will be lost when replacing the EPROM and/or RAM.
4. Use the following checklist to record unit configuration. Questions will vary depending on EPROM version installed.

NOTE: In case unit values are lost, reprogram configuration to reset factory-set values.

Checklist to Record Unit Configuration

| | YES | NO |
|-----------------|-----|----|
| Steam Heat Unit | | |
| Automated | | |
| Load End ATS | | |
| Unload End ATS | | |
| Serial Number | 36 | |

8.11.2 Replace Double EPROM PC Board

1. Follow the procedure in Section 8.2, *Open Control Access Panel*, to open control access panel and Section 8.3.2, *Prepare Control Console for Service*, to lower control assembly in a horizontal position.
2. Locate Double Eprom PC Board, on Control PC Board (see Figure 9-36). Carefully lift up both EPROMs, about 1/16th inch at a time, by alternately lifting either end of the IC. Put both EPROMs aside in a safe place, on a nonconducting surface, until reinstallation.
3. Remove Double Eprom PC Board, collecting all screws and standoffs.
4. Install the new Double Eprom PC Board, locking it in place on the standoff.
5. Reinstall EPROMs.

NOTE: A special socket (P129357-238) can be ordered and installed between chips and board socket to ease insertion.

6. While reinserting EPROMs, ensure that all pins engage the connectors on the board's IC socket.
 - a. Ensure that EPROMs are oriented correctly.
 - b. Press down gently on the IC while watching the pins. Push, a little at a time, being careful that the pins slide into the socket without bending over

(buckling). If in doubt, remove the IC and start over.

NOTE: Sometimes the pins on a new IC are flared slightly outward. If so, carefully bend them so that they extend straight downward.

7. Lift control assembly to vertical position.
8. Position Main Power switch (located outside Electrical supply box) to ON.
10. Enter Factory Setup Mode (see Section 4.10, *How to Enter Factory Setup Mode*), to reset all hardware options.
11. Position Main Power Switch to OFF. Lower control assembly. Position DIP switch to Automatic mode position.
12. Tilt control assembly to vertical position. Position Main Power Switch to ON.
13. Remove printed data from printer. Press CYCLE REVIEW touch pad to compare printed values with those of the unit.
14. Press CHANGE VALUES touch pad to modify values if necessary.
15. Continue reviewing values until all cycles have been reviewed and values restored.

⚠ WARNING – ELECTRIC SHOCK AND/OR BURN HAZARD: Fasteners and star washers are used to ensure protective bonding continuity. Always reinstall any star washer which may have been removed during installation or servicing.

16. Reinstall control assembly and attach with screws previously removed.

8.12 INPUT/OUTPUT DRIVER INTERFACE BOARD AND FUSE REPLACEMENT

⚠ CAUTION – POSSIBLE EQUIPMENT DAMAGE: Observe the Electrostatic Precautions outlined in Section 8.1. Always wear a grounding wrist strap when removing or replacing PC Boards or ICs.

8.12.1 Fuse Replacement

See Figures 9-32 and 9-33.

At minimum, use a wrist strap grounded to the washer/disinfector when removing and/or replacing PC boards.

1. Follow the procedure in Section 8.2, *Open Control Access Panel*, to open control access panel and Section 8.3.1, *Prepare Control Panel Console for Service*, to lower control assembly in a horizontal position.

2. Remove two screws holding panel behind console. Remove panel.
3. Using a small screwdriver, turn fuse holder before removing fuse from fuse holder.
4. Replace fuse.
5. Reinsert fuse into fuse holder.
6. Reinstall Electrical Supply Box cover, using the two screws previously removed.
7. Position Main power switch located outside Electrical Supply Box to ON.

8.12.2 Input/Output Driver Interface Board Replacement and Jumper Setting

See Figures 9-32 and 9-33.

At minimum, use a wrist strap grounded to the washer/disinfector when removing and/or replacing PC boards.

1. Follow the procedure in Section 8.2, *Open Control Access Panel*, to open control access panel and Section 8.3.1, *Prepare Control Panel Console for Service*, to lower control assembly in a horizontal position.
2. Remove two screws holding panel behind console. Remove panel.
3. Unplug all plugs on Input/Output board.
4. Remove four nuts holding board in position.
5. Replace board.
6. Secure new board with four nuts previously removed.
7. Re-plug all plugs on new Input/Output board.
8. Transfer EPROM from old to new board. Compare dip switch settings between old and new board. Set if necessary (see Table 8-6).
8. Position Main Power switch (located outside Electrical Supply Box) to ON position.

8.12.3 Contactor Box Components Replacement

See Figure 9-32

1. Follow the procedure in Section 8.2, *Open Control Access Panel*, to open Control access panel.
2. Position Main power switch located outside Electrical Supply Box to OFF position.
3. Remove two screws holding contactor box cover and remove cover (see Figure 8-1).
2. Contactor Box components like contactor, overload, transformer, or fuse can be replaced (see Figure 9-32).

8.13 CONTROL PC BOARD AND I/O BOARD JUMPER SETTINGS

Refer to Tables 8-2 through 8-7 to check jumper setting when replacing control PC board or Input/Output board with a new one.

Dip Switch Selectable Options:

Certain options for washer/disinfector operation are selected via DIP-switch settings on the Printer PC Board, the Display PC Board, the Control PC Board and the I/O Driver Interface PC Boards (See Figure 9-36).

Remove each board as for replacement, and make the appropriate settings on the Dip switches, which are summarized in Tables 8-2 to 8-7.

8.14 INDEPENDENT MONITOR (OPTION)

8.14.1 Independent Monitor Replacement

See Figure 9-37.

⚠ WARNING – ELECTRIC SHOCK AND/OR BURN HAZARD: Lock building electric supply to OFF and close unit supply valves before performing any service on the unit. If unit is started during maintenance procedures, hot water/steam may be sprayed into wash chamber.

⚠ CAUTION – POSSIBLE EQUIPMENT DAMAGE: Observe the Electrostatic Precautions outlined in Section 8.1. Always wear a grounding wrist strap when removing or replacing PC boards or ICs.

1. Remove side panels on unload side.
2. Remove screw from under Independent Monitor compartment. Slide out compartment.
3. Unplug connectors on back of Independent Monitor.
4. Using a slotted screw driver, unscrew the long screws on both sides of independent monitor.

NOTE: For the screw on the left side (towards compartment wall) use small pliers to unscrew.

5. From the front of independent monitor, pull out monitor and replace.
6. Reverse sequence to reinstall new one.
7. Ensure that independent monitor is held firmly in place. Do not overtighten.

8.14.2 Independent Monitor Battery Replacement

See Figure 9-37 and Figures 8-2 to 8-8-6.

⚠ WARNING - ELECTRIC SHOCK AND/OR BURN HAZARD: Lock building electric supply to OFF and close unit supply valves before performing any service on the unit. If unit is started during maintenance procedures, hot water/steam may be sprayed into wash chamber.

⚠ CAUTION - POSSIBLE EQUIPMENT DAMAGE: Observe the Electrostatic Precautions outlined in Section 8.1. Always wear a grounding wrist strap when removing or replacing PC boards or ICs.

1. On independent monitor, open lower compartment door to expose disk drive.
2. Remove the two screws on either side of the disk drive (see Figure 8-2).
3. Hold front display assembly and lift it up slightly to remove from frame (see Figure 8-3).
4. Unplug the left ribbon cable from connector. For the second ribbon cable, slide the latch towards you. Slide ribbon cable out from the connector assembly (see Figures 8-3 and 8-4).

IMPORTANT: Thin side of cable must be face up.

5. Remove display completely from frame.
6. On left side, unplug the power supply connector. Unscrew the two bracket screws on both sides of the disk drive in order to remove the disk drive and main circuit (see Figure 8-4).
7. Hold disk drive and circuit board to slide out both assemblies until battery connector is exposed. Battery connector is located near the left corner of circuit board (see Figure 8-5).
8. Remove battery and replace with a new lithium battery.
9. To reassemble, follow Steps 7 to 1 in reverse sequence. Ensure that circuit board is fully seated into recorder before reinstalling the bracket assembly.
10. Once all assembled, reapply power. The Independent monitor will go through the restart process that lasts two-three minutes. Several beeps will be heard. Independent monitor is ready for use.
11. Reload monitor configuration from safety copy.
12. Reprogram date and time.
13. Reset passcode.

8.14.3 Independent Monitor Flash Memory Replacement

See Figure 9-37.

⚠ CAUTION - POSSIBLE EQUIPMENT DAMAGE: Observe the Electrostatic Precautions outlined in Section 8.1. Always wear a grounding wrist strap when removing or replacing PC boards or ICs.

1. Remove access panel on unload side (see Figure 9-2).
2. Remove screw under Independent Monitor compartment. Slide out compartment.
3. Locate S7-200 module, located in the middle part of compartment.
4. Remove Flash memory chip from module and replace with a new one.
5. Slide monitor compartment inside. Tighten screw.
6. Reinstall access panel.

8.14.4 Power Supply to Independent Monitor Replacement

See Figure 9-37

⚠ CAUTION - POSSIBLE EQUIPMENT DAMAGE: Observe the Electrostatic Precautions outlined in Section 8.1. Always wear a grounding wrist strap when removing or replacing PC boards or ICs.

1. Remove side panels on unload side.
2. Remove screw under Independent Monitor compartment. Slide out compartment.
3. Locate power supply module on the upper right corner of compartment.
4. Unlock safety latch and remove power supply module and replace by a new one.
5. Slide monitor compartment inside. Tighten screw.
6. Reinstall side panel.

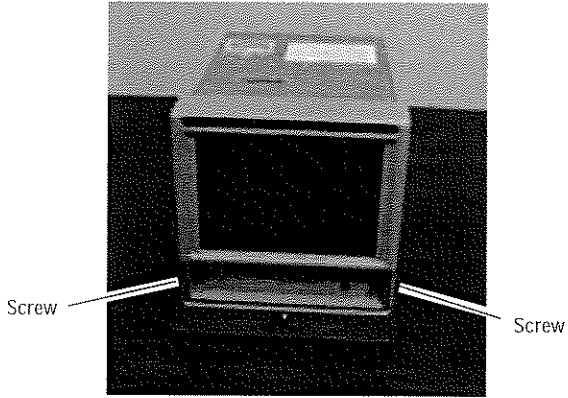


Figure 8-2. Remove Screws from Sides

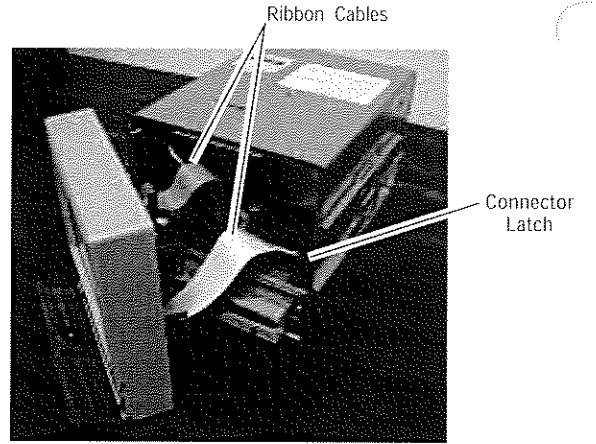


Figure 8-3. Unplug Ribbon Cables

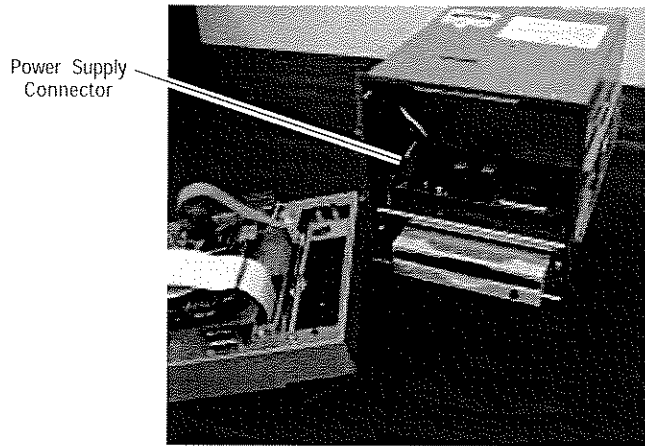


Figure 8-4. Remove Display from Frame

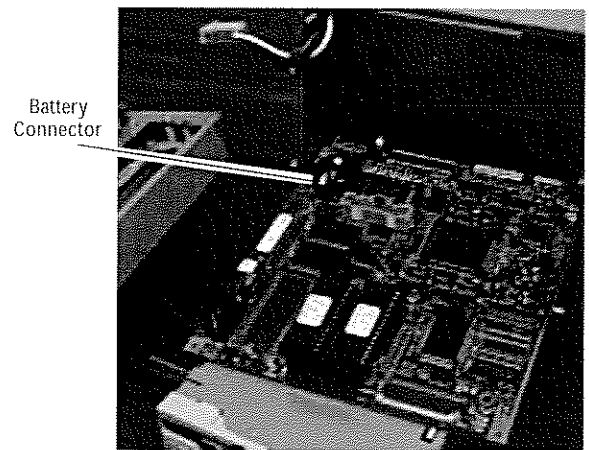


Figure 8-5. Remove Disk Drive

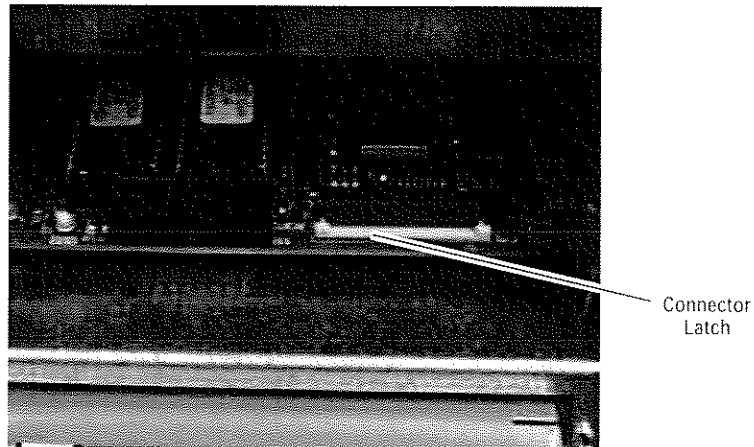


Figure 8-6. Circuit Boards

8.15 DOOR(S)

WARNING - ELECTRIC SHOCK AND/OR BURN HAZARD:

- **Disconnect all utilities to washer before servicing. Do not service the washer unless all utilities have been properly locked out. Always follow local electrical codes and safety-related work practices.**
- **Lock building electric supply to OFF and close unit supply valves before performing any service on the unit. If unit is started during maintenance procedures, hot water/steam may be sprayed into wash chamber.**

8.15.1 Power Door Replacement

See Figures 9-20, 9-21, 9-22 and 9-23

IMPORTANT: Two people will be required to remove door or window pane.

1. Lock building electrical supply disconnect switch in OFF position and close unit supply valves. Do not close air supply.
2. Remove screws holding upper access panel in position. Remove upper access panel from washer/disinfector and set aside (see Figure 9-2).
3. Remove control side panel and set aside.

WARNING – PERSONAL INJURY AND/OR EQUIPMENT DAMAGE HAZARD: Do not disconnect door electrical cables if electric supply has not been cut off. Door may lift at high speed and cause personal injury.

4. On top of door, cut tie-wraps and disconnect security door cable and ground cable P17 or P16 (see Figure 9-22).
5. Open door from air valves located on service access panel, under independent monitor (see Figure 9-24). Use a small flat screw driver to turn the screw on the air valve. Valve IAC5 for unload door, Valve AC5 for load door.
6. With your shoulder, push door bottom against washer to clear the two screws located on both door cylinders on both sides of door.
7. Use a 3/32" Allen key to loosen screws (see Figure 8-7). Use needle nose pliers to remove screws.
8. Climb a stepladder, then, lift door by the top handle. Pull it out from slide bars and remove.
9. Rest door on a flat surface (table or workbench) (see Figure 8-11). On the new door, adjust the gate door stopper in the same position as in the old door (see Figure 8-12).

10. Reinstall new door into place (see Figures 8-8, 8-9, and 8-10). Climb a stepladder to align door side rods into sliding guides.
11. Slide door carefully into sliding guides. Hold door from top door handle with one hand and with the other hold door bottom while sliding until door rest against cylinders.
12. Push against door to screw the two screws on both door sides.
13. Close door from air valves located on access panels, under independent monitor (see Figure 9-24). Use a small flat screw driver to turn the screw on the air valve. Valve IAC4 for unload door, Valve AC3 for load door.
14. Connect security door cable and ground P17 or P16.
15. Unlock building electrical supply disconnect switch and position to ON.
16. With door closed down, verify the cam adjustment. Use the mark on the door frame (see Figure 8-13, Detail A).
17. Adjust gate door stoppers on each top corner of the doors if door cams are not aligned with the door frame mark (see Figure 8-13).
18. Reinstall upper and lower access panels. Reinstall service door and secure with screws previously removed.
19. Check for door smooth operation.

8.15.2 Door Limit Switch Replacement

See Figure 9-21.

Two door limit switches are located at the bottom of the door. To replace door limit switch(es):

1. Enter Service Mode as explained in Section 4.1, *Service Mode Procedures*.
2. Open door.
3. Remove the two quick-release safety pins on top of the washer frame. Insert into the door and frame, on both side of the door to secure in open position (see Figure 8-9).
4. Lock building electrical supply to OFF.
5. On door bottom, remove the two socket shoulder screws retaining the detection bar and remove bar.
6. Unscrew screws retaining switch holder assembly and remove holder.
7. Replace limit switch(es). Remove the wires from old switch terminals. Connect wires to the terminals on the new switch.

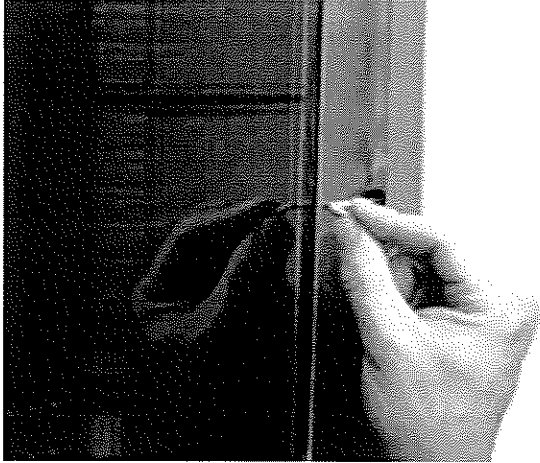


Figure 8-7. Use Allen Key

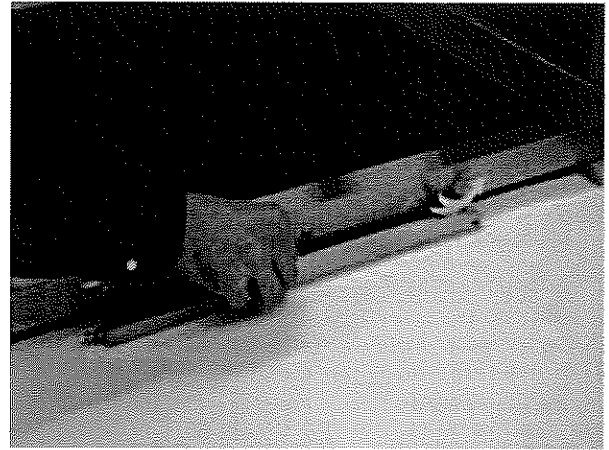


Figure 8-8. Take Slide Bars

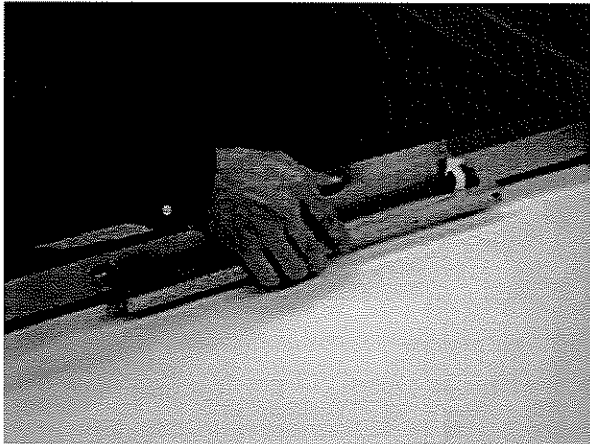


Figure 8-9. Turn Towards Front



Figure 8-10. Lift Door by the Slide Bars

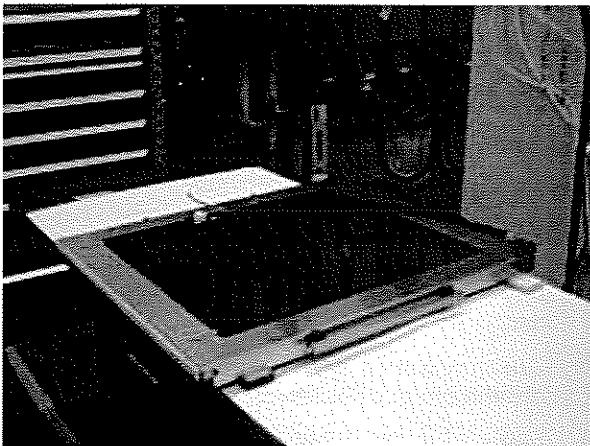


Figure 8-11. Place Door on a Flat Surface

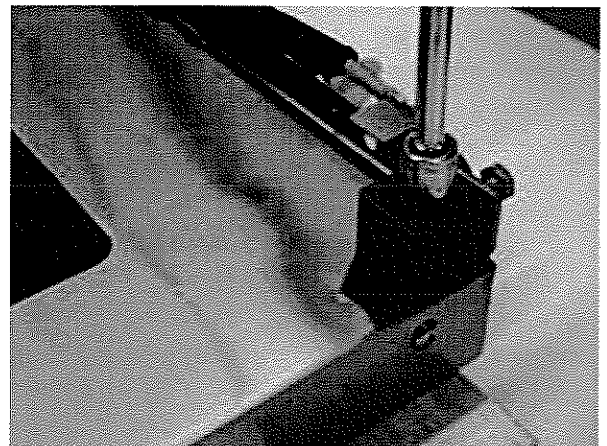
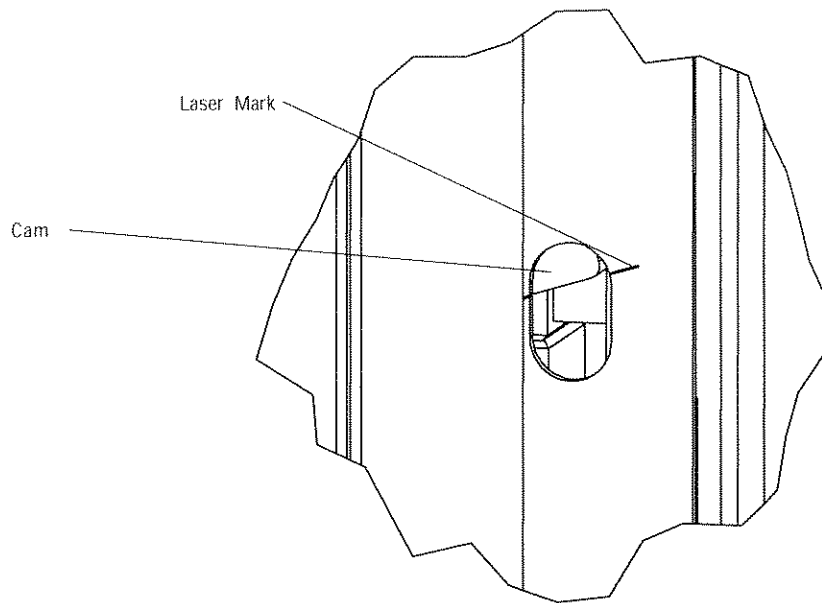


Figure 8-12. Adjust Gate Door Stoppers



DETAIL A

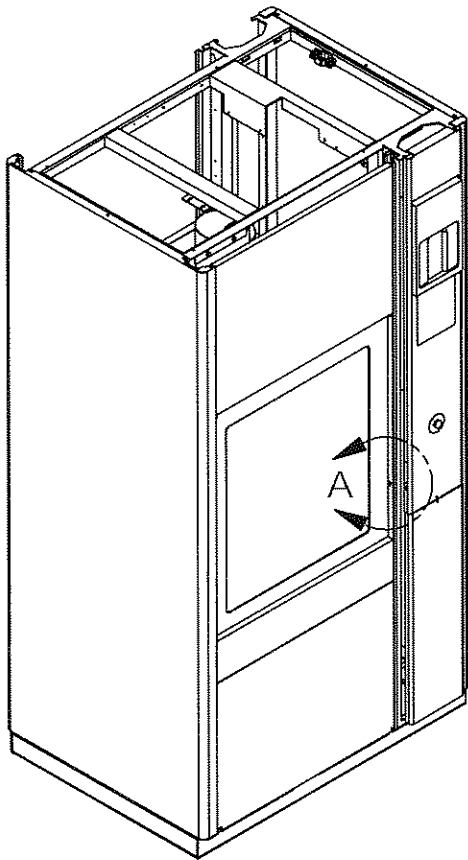


Figure 8-13. Adjust Door Distance

8. Attach switch holder to door bottom with screws previously removed. Ensure wires are not pinched by screws.
9. Reinstall protection bar with the two screws previously removed.
10. Remove the two quick-release pins from the door frame and put back in storage holes in top of washer.
11. Restore electrical supply.
12. Test limit switches in Service Mode (see Section 4.1, *Service Mode Procedure*).
13. Return to Automatic Mode.

8.15.3 Limit Switch Cable Replacement

See Figure 9-21.

1. Enter Service Mode as explained in Section 4.1, *Service Mode Procedures*.
2. Open door.
3. Remove the two quick-release safety pins on top of the washer frame. Insert into the door and frame, on both side of the door to secure in open position (see Figure 8-9).
4. On top left side of door, loosen black connector.
5. Cut cable approximately 5 cm (2") from connector.
6. Join the extremities of new cable to the old one. Use adhesive tape.
7. Remove the two screws retaining detection bar to door bottom. Remove detection bar.
8. From the door bottom, pull old cable down until new cable goes out from door.
9. Disconnect old cable from switches. Separate new cable from old one and connect new cable to switches.
10. Reinstall detection bar at bottom of door.
11. Tighten black connector on top of door.
12. Remove the two quick-release pins from the door frame.
13. Restore electrical supply.
14. Test limit switches in Service Mode, as explained in Section 6.7, *Checking Door Safety (Limit Switches)*.

8.15.4 Door Proximity Sensor Adjustment

See Figures 9-3 and 8-14.

A proximity sensor is located at the top left of the unit, behind each chamber access door, to send a signal to the control when door is closed. Proximity sensor for

load door is ILS1 and ILS2 for unload door. To test, proceed as follows:

1. Enter Service Mode, as explained in Section 4.1, *Service Mode Procedures*.
2. In control, access INPUT TEST. Load Door Closed (LC) and Unload Door Closed (UC) are capitalized when door is closed.
3. To adjust proximity sensor, move it towards the door. The small red LED located over proximity sensor will light up to indicate that sensor is detecting door.
4. Also check if LC or UC signal is capitalized after door is closed.

8.15.5 Amsco Reliance 444 Load/Unload Modules (option) Proximity Sensor Adjustment

See Figures 9-3 and 8-14.

If unit is equipped with Amsco Reliance 444 Load/Unload Modules, two additional sensors, (one load and one unload) are located on units with load/unload modules. Check adjustment of i/O.4 and i/O.5 inputs to the conveyor control.

To adjust the distance between sensor beam and door, proceed as follows:

1. Enter Service Mode as explained in 4.1, *Service Mode Procedures*.
2. Press STOP/RESET touch pad. Display shows:

| | |
|----------------|-----------------|
| I/O OUT | CRTL OUT |
|----------------|-----------------|
3. Using the CURSOR touch pad, select I/O OUT and press CYCLE START. Display shows:

| | | | | | | | |
|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| I | O | dv | fn | p1 | -- | -- | -- |
| -- | -- | -- | -- | LC | UC | wc | |

(display may vary depending on options)
4. Adjust i/0.4 proximity sensor on load end of washer. Close the door and advance proximity sensor to be at 2 mm [1/16"] of sensor target.
5. Once the sensors are correctly adjusted, tighten each locknut to hold sensor in position.

IMPORTANT: Ensure that each sensor detects door only when door is fully open (LED on back of sensor lights up). While door is in motion, ensure that top portion of door is not being detected by the sensor.

6. Follow the same procedure described on Step 4 to adjust i/0.5 proximity sensor on load end of washer.

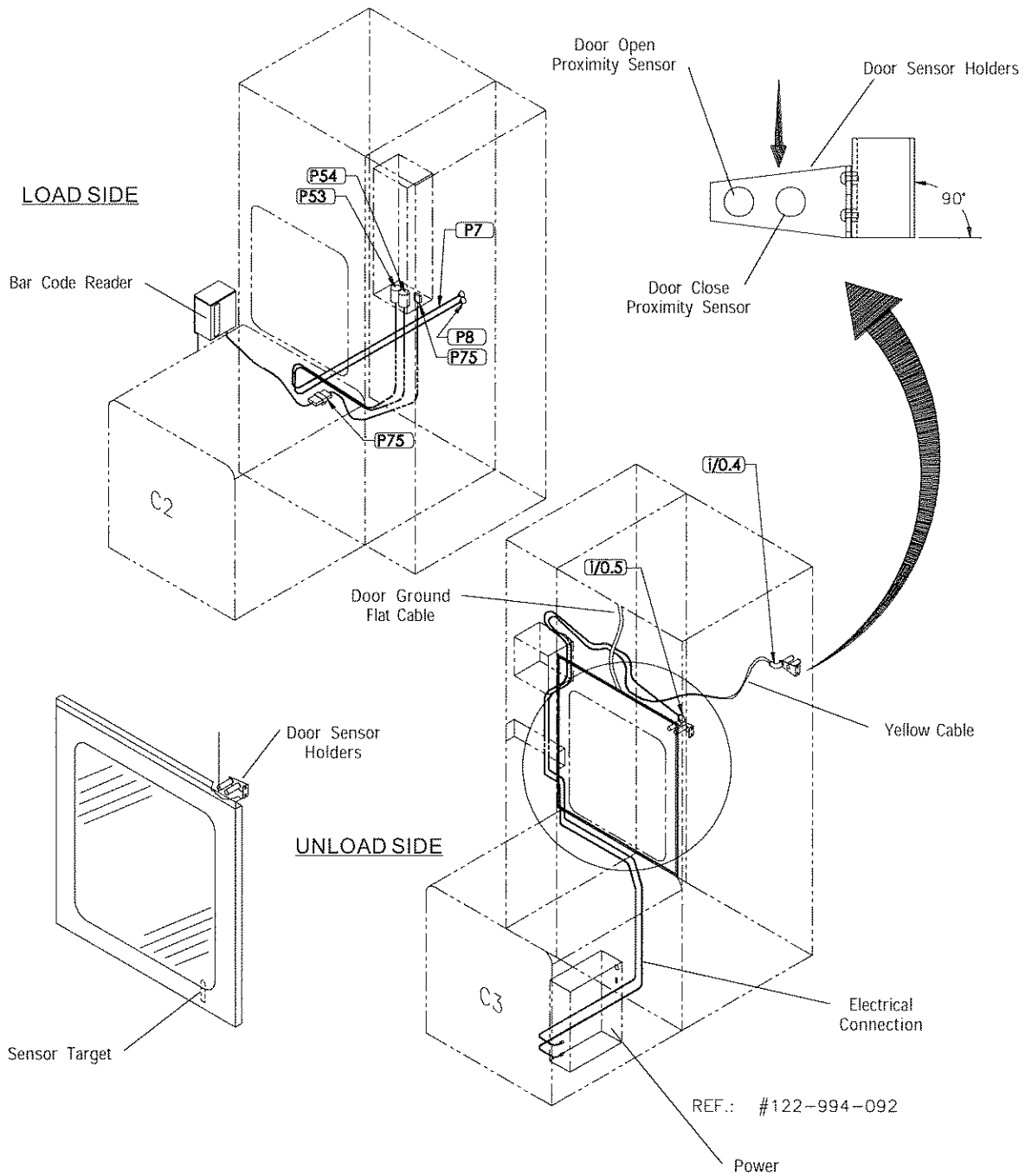


Figure 8-14. Proximity Sensor Adjustment

7. Close doors and return to TESTS menu. Display shows:

| | |
|------------------|----------------|
| TESTS | BURN-IN |
| CALIBRATE | VALUES |

8.15.6 Door Cylinder Replacement

See Figures 9-20 and 9-23.

1. Lock building electrical supply disconnect switch in OFF position and close unit supply valves.
2. Remove screws holding upper access panel in position. Remove upper access panel from washer/disinfector and set aside.
3. Remove lower access panel and set aside.
4. Remove control service panel.
5. Remove door. Refer to Section 8.15.1, *Power Door Replacement*, for procedure.
6. Use a small flat screw driver to turn air valve AC3, located on side compartment, to free air pressure. Manually retract cylinder rod.
7. Unscrew the two screws on the sliding guide to remove the first section on both sides of frame.
8. On lower service compartment, remove safety pin retaining cylinder.
9. Close air supply line valve.
10. On bottom of lower service compartment, locate blue air hoses. Unplug pneumatic connectors on both elbows to cylinders.
11. Remove cylinder. Slide it upwards.
12. Replace cylinder with new one.
13. Install new cylinder following the sequence backwards.

8.15.7 Door Side Guides

See Figure 9-23.

1. Lock electrical disconnect switch in OFF position and close unit supply valves.
2. Remove door. Refer to Section 8.15.1, *Power Door Replacement*. Position door on a flat surface.

IMPORTANT: Remove and replace door side guides one by one to reinstall in the same position. If side guides are not positioned correctly, door will not function properly.

3. Unscrew and remove screws and star washers from door side guides.
4. Unscrew screws retaining side guides to door rod. Remove screws and star washers.

5. To re-install new side guides, apply lubricant P117912-452 to side guides.

6. Reinstall star washer and replace guide on door rod. Ensure right flat corner of side guide is on the upper position.

7. Reinstall door rod and side guides on door.

8.15.8 Door Pawl Replacement

See Figures 9-20 and 9-21.

1. Lock electrical disconnect switch in OFF position and close unit supply valves.
2. Remove door. Refer to Section 8.15.1, *Power Door Replacement*, for procedure. Position door on a flat surface.
3. Remove pawl.
4. Reinstall a new one.

IMPORTANT: Ensure door block is not in reversed position.

5. Apply lubricant P117912-452, to mechanism.
6. Re-install door. Check that door operates smoothly.

8.15.9 Chamber-Door Gasket Replacement

See Figure 9-21.

1. Lock electrical disconnect switch in OFF position and close unit supply valves.
2. Open door from air valves located on service access panel, under independent monitor. Use a small flat screw driver to turn the screw on the air valve. Valve IAC5 for unload door, Valve AC5 for load door
3. With your shoulder, push door bottom against washer to clear the two screws located on both door cylinders on both sides of door.
4. Use a 3/32" Allen key to loosen screws (see Figure 8-7). Use needle nose pliers to remove screws.
5. Climb a stepladder, then, lift door by the top handle. Pull it out from slide bars. Insert safety pins into second hole (see Figure 8-15).
6. Pull out gasket from frame, starting from the top and center of the unit.
7. Remove all silicone traces.
8. Replace gasket with new one. Use about 3.5 m (12').
9. Start installing gasket by the center on top of chamber door.

IMPORTANT: Stretch gasket when inserting into groove to avoid folds.

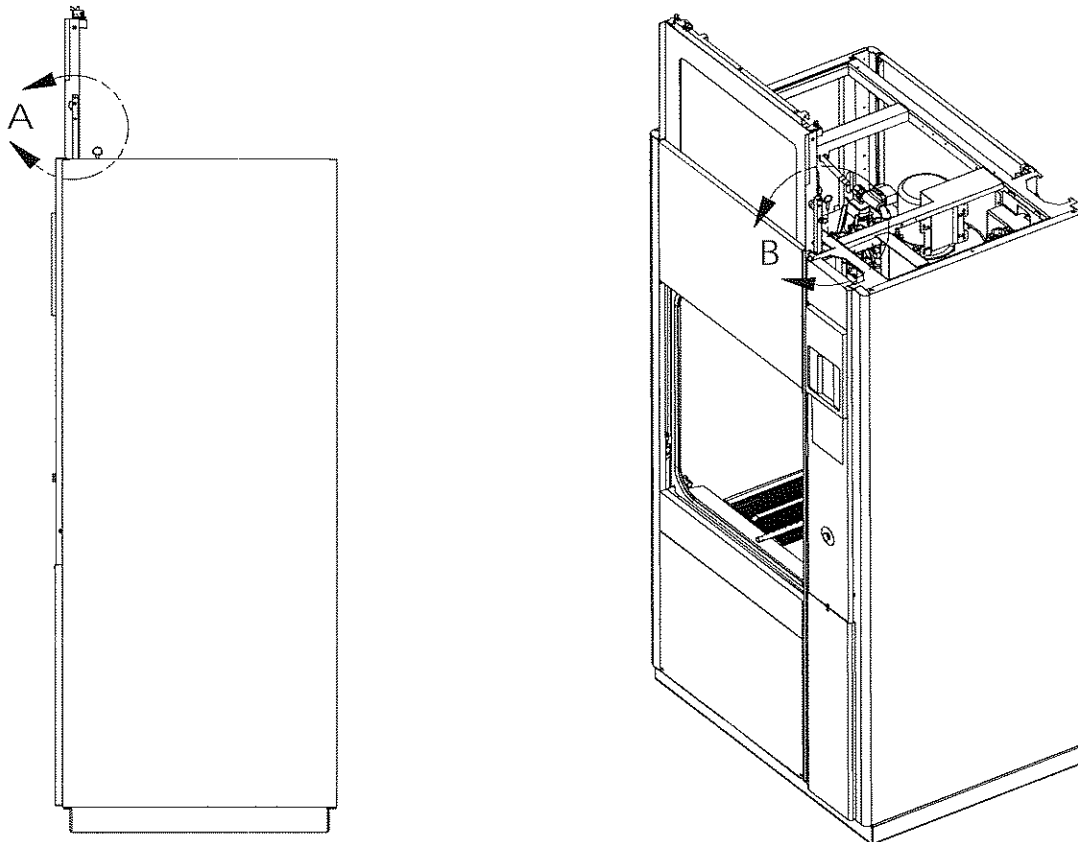
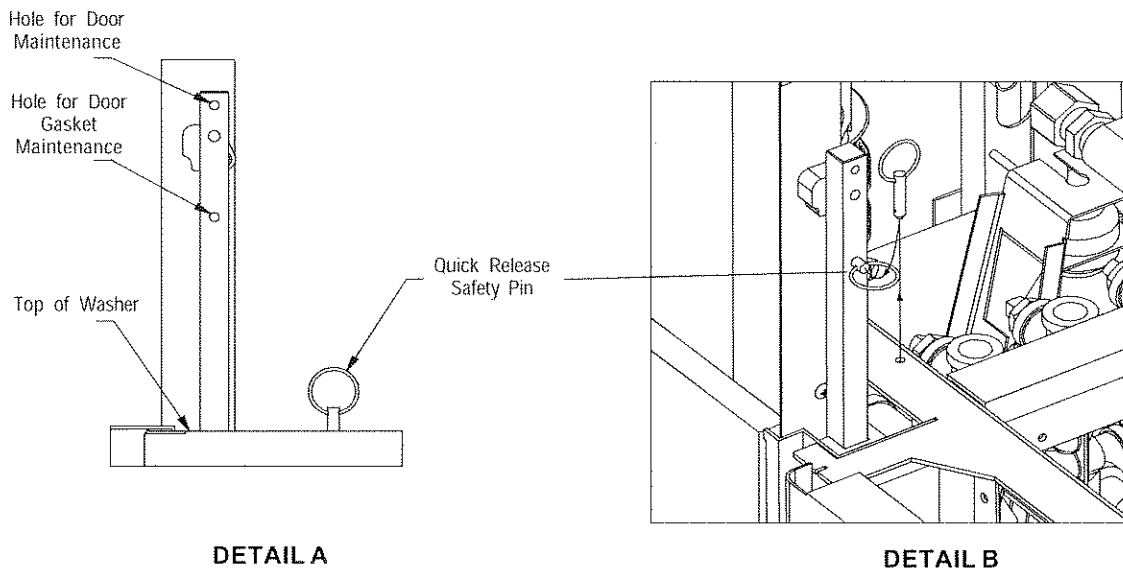


Figure 8-15. Safety Pins Position

10. Use the special tool P117912-561 to push gasket completely into groove.
11. Use a good pair of scissors to cut gasket extremes.
12. Insert a silicone sponge cord to make the junction (see Figure 9-21, Detail A).
13. Remove safety pin.
14. Reattach door. Screw slide bar to door and to cylinder
15. Unlock unit electrical disconnect switch, open unit supply valves, and check door for proper operation.

8.15.10 Outside Window Pane Replacement (or Cleaning Window Surface)

See Figure 9-21.

IMPORTANT: Two people will be required to remove door or window pane.

1. Lock electrical disconnect switch in OFF position and close unit supply valves.
2. Remove door. Refer to Section 8.15.1, *Power Door Replacement*. Position door on a flat surface.
3. Remove the nine screws retaining window pane: three on each side and three on top.
4. Use an utility knife to cut adhesive retaining window pane to door frame.
5. Remove window pane and install new one. Remove adhesive cover tape from window pane.
6. Reinstall top screws. Press on window pane to paste adhesive and install side screws.
7. Reinstall door into place.

8.15.11 Window Pane Gasket Replacement

1. Lock electrical disconnect switch in OFF position and close unit supply valves.
2. Remove door. Refer to Section 8.15.1, *Power Door Replacement*. Position door on a flat surface.
3. Remove the nine screws retaining window pane: three on each side and three on top.
4. Use an utility knife to cut adhesive retaining window pane to door frame.
5. Install gasket on interior of window pane as follows:
 - a. Start installing gasket on top. Cut top gasket to 64.1 cm (25-1/2") long.
 - b. Cut side gasket to 66 cm (26") long. Install side gasket starting 9 mm (3/8") under top gasket. See Figure 8-16, Detail A.

- c. Proceed in the same way for right side gasket.
6. Cut bottom gasket to (27-5/8") long. Start installing bottom gasket at 6 mm (1/4") from side frame and 9 mm (3/8") under side gasket. See Figure 8-16, Details B and C.

NOTE: Use a good pair of scissors to cut gasket extremes.

7. Replace old adhesive strip with a new one. Replace window pane over gasket.
8. Reinstall top screws. Press on window pane to paste adhesive and install side screws. Use a pair of pliers to apply pressure on door bottom to paste adhesive strip in the interior.

NOTE: Protect door surface from scratches when using pliers.

9. Reinstall door into place. Refer to Section 8.15.1, *Power Door Replacement*.

8.16 CHEMICAL INJECTION PUMPS

See Figures 9-28 to 9-31.

⚠ WARNING – ELECTRIC SHOCK AND/OR BURN HAZARD:

- Lock building electric supply to OFF and close unit supply valves before performing any service on the unit. If unit is started during maintenance procedures, hot water/steam may be sprayed into wash chamber.
- Disconnect all utilities to washer before servicing. Do not service the washer unless all utilities have been properly locked out. Always follow local electrical codes and safety-related work practices.

⚠ WARNING – SLIPPING HAZARD: To avoid slippery floor conditions, immediately wipe up any spilled liquids or condensation.

The chemical injection pumps are located in the chemical injection pumps compartment, under the control Console on load side. Remove panel to access to pump compartment.

For procedure to replace squeeze tubes, see Section 6.5.2, *Replace Squeeze Tubes*.

8.16.1 Roller Block Assembly Replacement

See Figures 9-30 and 9-31.

⚠ WARNING – ELECTRIC SHOCK AND/OR BURN HAZARD:

- Lock building electric supply to OFF and close unit supply valves before performing any service on

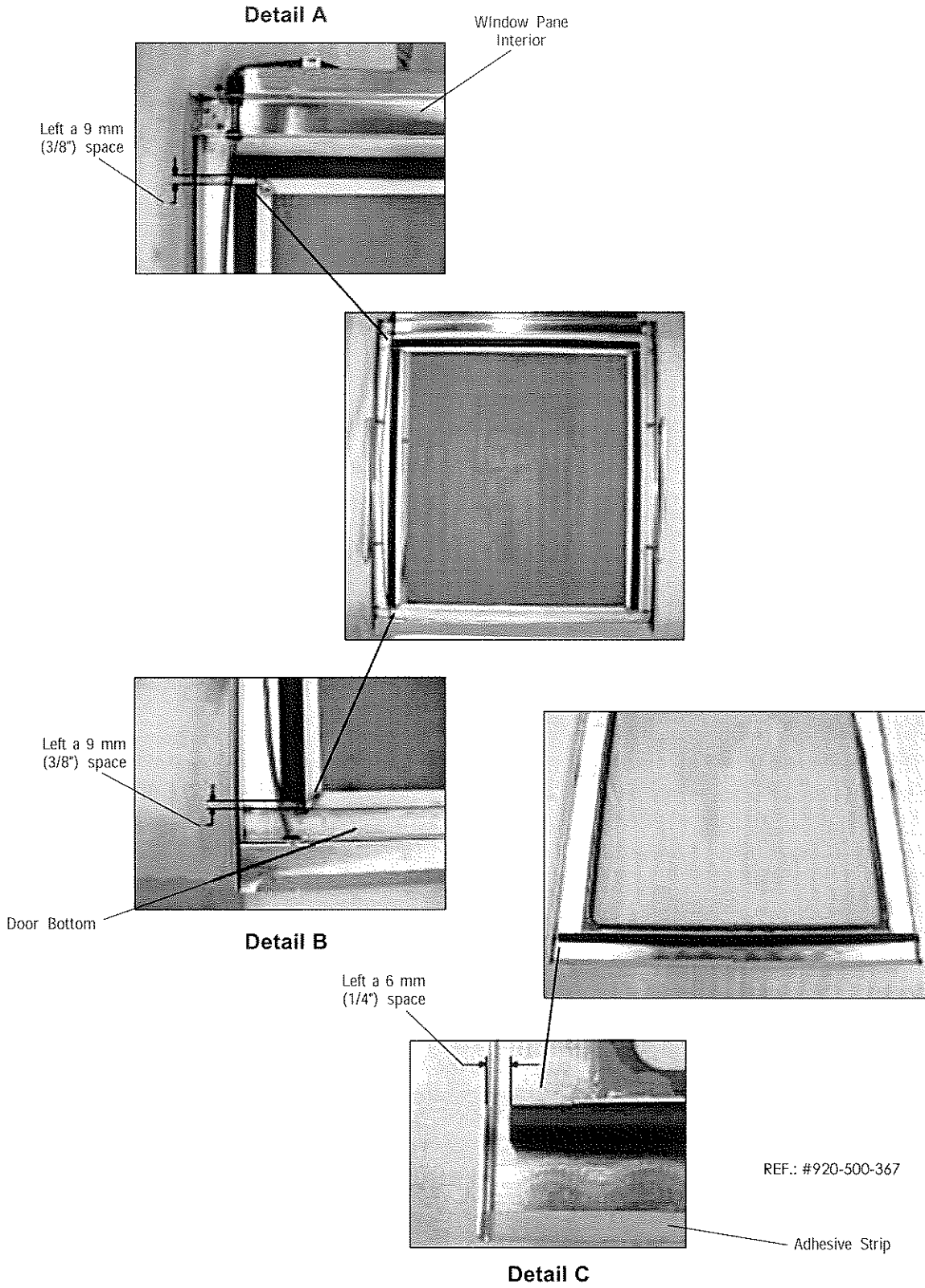


Figure 8-16. Window Pane Gasket Replacement

the unit. If unit is started during maintenance procedures, hot water/steam may be sprayed into wash chamber.

- **Disconnect all utilities to washer before servicing. Do not service the washer unless all utilities have been properly locked out. Always follow local electrical codes and safety-related work practices.**

⚠ WARNING – CHEMICAL BURN/EYE INJURY HAZARD: Wear gloves and eye protection when using a descaling product. Avoid contact with eyes or skin. If spilled or splashed, flush with water for 15 minutes. If swallowed, **DO NOT** induce vomiting. Administer an alkali with plenty of water. Seek medical attention immediately.

⚠ WARNING – BURN HAZARD: Allow unit to cool down before performing any service on the pump. Piping and valves become very hot during unit operation.

The roller block assembly, including roller block and head kit, should be replaced whenever the block shows signs of wear. Worn roller block assembly may greatly reduce pump flow.

For procedure to replace squeeze tube, see Section 6.5.2, *Replace Squeeze Tubes*.

1. Lock building electrical supply disconnect switch in OFF position. Close unit supply valves.
2. Remove clamps and squeeze tube disconnect tube end from the feed line.
3. Remove two screws attaching pump cover to pump head kit. Lift cover away from head kit.
4. Pulling on one end of squeeze tube, pull tube out of pump head kit.
5. Loosen roller block setscrew. Lift roller block out of head kit.
6. Remove two screws holding head kit in place. Pull head kit away from pump motor.
7. Clean all pump surfaces.
8. Attach new head kit to motor.

⚠ CAUTION – POSSIBLE EQUIPMENT DAMAGE: Carefully tighten setscrew. The metal setscrew can easily strip the plastic threads in the roller block assembly.

11. Place new roller block into head kit. Tighten roller block set screw.
12. Connect one end of squeeze tube to feed line and attach clamps.

13. Insert other end of squeeze tube into head kit. Feed tube through head kit by manually rotating roller block.

14. Liberally spread Silicone Lubricant (P117950-599) over rollers in roller block and all tubing surfaces in contact with the pump head kit.

15. Return cover to head kit and fasten with screws previously removed. Replace fan cover.

16. Unlock building electrical supply disconnect switch and set in ON position. Follow priming procedure as explained in Section 3.9.2, *Priming Procedure*, to fill tubing with chemical product.

17. Open unit supply valves and initiate a cycle. Check roller block assembly operation.

18. Replace panel in place.

8.16.2 Chemical Pump Motor Replacement

See Figures 9-28, 9-29 and 9-30.

⚠ WARNING – ELECTRIC SHOCK AND/OR BURN HAZARD:

- **Lock building electric supply to OFF and close unit supply valves before performing any service on the unit. If unit is started during maintenance procedures, hot water/steam may be sprayed into wash chamber.**

- **Disconnect all utilities to washer before servicing. Do not service the washer unless all utilities have been properly locked out. Always follow local electrical codes and safety-related work practices.**

⚠ WARNING – BURN HAZARD: Allow unit to cool down before performing any service on the pump. Piping and valves become very hot during unit operation.

⚠ WARNING – CHEMICAL BURN/EYE INJURY HAZARD: Wear gloves and eye protection when using a descaling product. Avoid contact with eyes or skin. If spilled or splashed, flush with water for 15 minutes. If swallowed, **DO NOT** induce vomiting. Administer an alkali with plenty of water. Seek medical attention immediately.

1. Lock building electrical supply disconnect switch in OFF position and remove panel. Close unit supply valves.
2. On load side, remove panel to access to pump compartment.
3. Remove peristaltic pump cover protector (see Figures 9-30).

4. Remove clamps and disconnect tube end from the feed line.
5. Unscrew the six screws retaining pump support to frame. There are two screws on the upper part of the support, two in the middle and two at the bottom. Remove pump support.
6. Disconnect tube ends from the detergent feed lines.
7. From back of pump, unscrew the two screws retaining pump to support.
8. Remove four screws holding terminal tracks support, to gain access to motor.

NOTE: Make note of electrical connections for reassembly.

9. Disconnect all electrical connections from the motor.
10. Remove two screws attaching base of pump assembly to bracket. Remove pump assembly from pump support.
11. Remove two screws attaching pump cover to pump head kit. Lift cover away from head kit.
12. Pulling on one end of squeeze tube, pull tube out of pump head kit.
13. Loosen roller block set screw. Lift roller block out of head kit.
14. Remove two screws holding head kit in place. Pull head kit away from pump motor.
15. Remove two screws fastening motor to pump assembly base.

⚠ CAUTION—POSSIBLE EQUIPMENT DAMAGE: Ensure a cooling fan is attached to rear motor shaft. Check that fan blades are positioned to send airflow to motor. Motor will overheat without a cooling fan.

16. Attach new motor to base.
17. Attach head kit to new motor with screws previously removed.
18. Clean all pump surfaces.

⚠ CAUTION—POSSIBLE EQUIPMENT DAMAGE: Carefully tighten setscrew. The metal setscrew can easily strip the plastic threads in the roller block assembly.

19. Place roller block in head kit. Tighten roller block setscrew.
20. Securely mount pump assembly in pump compartment.
21. Reconnect all wiring.

22. Reinstall terminal tracks support with four screws previously removed.
23. Close injection pump compartment cover, and lock it.
25. Connect one end of squeeze tube to feed line and attach clamps.
26. Insert other end of squeeze tube into head kit. Feed tube through head kit by manually rotating roller block.
27. Reinstall fan protector.
28. Liberally spread Silicone Lubricant (P117950-599) over rollers in roller block and all tubing surfaces in contact with the pump head kit.
29. Return cover to head kit and fasten with screws previously removed.
30. Place free end of tube into container.
31. Unlock building electrical supply disconnect switch and set in ON position. Follow priming procedure as explained in Section 3.9.2, *Priming Procedure*, to fill tubing with detergent.
32. Reinstall pump compartment panel.
33. Open unit supply valves and initiate a cycle. Check pump motor operation.

8.16.3 Pump 5 (Rinse Aid) Replacement (380/400/415 V Units Only)

See Figures 9-28, 9-29 and 9-31.

1. Lock building electrical supply disconnect switch in OFF position and remove panel. Close unit supply valves.
2. On load side, remove panel to access to pump compartment. Pump 5 is the one at the bottom of pump support.
3. Remove peristaltic pump cover protector ("U" bracket).
4. Unscrew the six screws retaining pump support to frame. There are two screws on the upper part of the support, two in the middle and two at the bottom. Remove pump support.
5. Unscrew connector from both tubing.
6. Press on top and bottom of pump cover. Pull pump cover sideway to remove.
7. Pull one end of squeeze tube up and the other end down. Remove squeeze tube.
8. To remove pump from support, unscrew the four screws retaining pump to support.

9. From behind pump, unscrew the four screws. Remove pump.
10. Reinstall new pump following the sequence in reverse.

8.17 RECIRCULATION PUMP

The recirculating pump is located underneath the unit (while facing it).

IMPORTANT: Pump is heavy. Two people are required to remove it.

IMPORTANT: If double-door unit, slide pump toward unload side of washer. If single-door unit, pull pump out the load side of unit.

8.17.1 Pump Replacement

See Figures 9-14 through 9-16.

⚠ WARNING – ELECTRIC SHOCK AND/OR BURN HAZARD:

- **Disconnect all utilities to washer before servicing. Do not service the washer unless all utilities have been properly locked out. Always follow local electrical codes and safety-related work practices.**
- **Lock building electric supply to OFF and close unit supply valves before performing any service on the unit. If unit is started during maintenance procedures, hot water/steam may be sprayed into wash chamber.**

⚠ WARNING – SLIPPING HAZARD: To avoid slippery floor conditions, immediately wipe up any spilled liquids or condensation.

⚠ WARNING – BURN HAZARD: Allow unit to cool down before performing any service on the pump. Piping and valves become very hot during unit operation.

1. Lock building electrical supply disconnect switch in OFF position and close unit supply valves.
2. Open lower service access door on load side.
3. Remove clamps and disconnect all hose ends from pump assembly.

NOTE: Make note of electrical connections for reassembly.

4. Disconnect all electric connections from the pump assembly.

⚠ WARNING – PERSONAL INJURY/EQUIPMENT DAMAGE HAZARD: Use an 18 x 2 x 4" piece of wood to support pump while sliding it back into the unit. Pump is very heavy and will fall if not

supported properly, causing personal injury and/or equipment damage.

5. Remove two bolts and two washers holding pump assembly to unit frame. Slide pump assembly forward to the front of the unit.

⚠ WARNING – PERSONAL INJURY/EQUIPMENT DAMAGE HAZARD: Use an 18 x 2 x 4" piece of wood to support pump while sliding it back into the unit. Pump is very heavy and will fall if not supported properly, causing personal injury and/or equipment damage.

6. Slide new pump inside unit and mount to unit frame using bolts previously removed.
7. Reconnect all wiring.
8. Connect hoses to pump assembly and attach clamps.
9. Unlock building electrical supply disconnect switch and set in ON position.
10. Open unit supply valves and initiate a cycle.
11. Verify pump shaft is rotating in direction indicated by observing arrow molded into pump housing.
12. Verify piping connections for leaks. Tighten if necessary.
12. Close lower service access door.

8.17.2 Mechanical Seal and Casing Gasket Replacement

See Figures 9-14 through 9-16.

⚠ WARNING – ELECTRIC SHOCK AND/OR BURN HAZARD:

- **Disconnect all utilities to washer before servicing. Do not service the washer unless all utilities have been properly locked out. Always follow local electrical codes and safety-related work practices.**
- **Lock building electrical supply to OFF and close unit supply valves before performing any service on the unit. If unit is started during maintenance procedures, hot water/steam may be sprayed into wash chamber.**

⚠ WARNING – SLIPPING HAZARD: To avoid slippery floor conditions, immediately wipe up any spilled liquids or condensation.

⚠ WARNING – BURN HAZARD: Allow unit to cool down before performing any service on the pump. Piping and valves become very hot during unit operation.

IMPORTANT: Pump is heavy. Two people are required to remove it.

IMPORTANT: If double-door unit, slide pump toward unload side of washer. If single-door unit, pull pump out the load side of unit.

1. Lock building electrical supply disconnect in OFF position and close unit supply valves.
2. Open lower service access door.
3. Remove clamps and disconnect all hose ends from pump assembly.

NOTE: Note electrical connections for reassembly.

⚠ WARNING – PERSONAL INJURY/EQUIPMENT DAMAGE HAZARD: Use an 18 x 2 x 4" piece of wood to support pump while sliding it back into the unit. Pump is very heavy and will fall if not supported properly, causing personal injury and/or equipment damage.

4. Remove two bolts holding pump assembly to unit frame. Slide pump toward unload side of washer.
5. Remove four bolts holding pump casing on pump assembly. Lift casing away from assembly.
6. Remove nut and washer securing impeller and lift impeller and seal spring assembly from shaft.
7. Remove bolts securing flange in position. Remove flange from shaft. Mechanical seal should come with flange. If not, push on seal to remove it.

IMPORTANT: Mark flange to reinstall correctly.

8. Return flange to shaft. Bolts should be tightened to 10 to 15 foot-pounds torque.
9. Replace old seal with new seal. If necessary, first clean shaft with ScotchBrite and apply a light coating of petroleum jelly to facilitate installation of the seal; however, ensure no lubricant gets on sealing surfaces.

NOTE: Smooth surface of carbon seal should rest against ceramic seal.

10. Reinstall impeller to compress the seal assembly spring.
11. Reinstall washers and bolt previously removed.
12. Place pump casing to assembly and secure with bolts previously removed. Bolts should be tightened to 25 foot-pounds torque.
13. Manually, verify proper rotation of impeller.

⚠ WARNING - PERSONAL INJURY/EQUIPMENT DAMAGE HAZARD: Use an 18 x 2 x 4" piece of wood to support pump while sliding it back into

the unit. Pump is very heavy and will fall if not supported properly, causing personal injury and/or equipment damage.

14. Place pump assembly in washer/disinfector and mount to unit frame using bolts previously removed.
15. Reconnect hoses to pump assembly and attach clamps.
16. Unlock building electrical supply disconnect switch and set in ON position. Open unit supply valves and initiate a cycle. Check that pump is rotating in proper direction (see arrow on pump). Check pump assembly and piping connections for leaks.
17. Close lower service access door.

8.17.3 Stub Shaft Replacement

See Figures 8-17 and 9-16.

⚠ WARNING – ELECTRIC SHOCK AND/OR BURN HAZARD:

- Disconnect all utilities to washer before servicing. Do not service the washer unless all utilities have been properly locked out. Always follow local electrical codes and safety-related work practices.
- Lock building electrical supply to OFF and close unit supply valves before performing any service on the unit. If unit is started during maintenance procedures, hot water/steam may be sprayed into wash chamber.

⚠ WARNING – SLIPPING HAZARD: To avoid slippery floor conditions, immediately wipe up any spilled liquids or condensation.

⚠ WARNING – BURN HAZARD: Allow unit to cool down before performing any service on the pump. Piping and valves become very hot during unit operation.

1. Lock building electrical supply disconnect in OFF position and close unit supply valves.
2. Open lower service access door.
3. Remove clamps and disconnect all hose ends from pump assembly.

NOTE: Make note of electrical connections for reassembly.

⚠ WARNING – PERSONAL INJURY/EQUIPMENT DAMAGE HAZARD: Use an 18 x 2 x 4" piece of wood to support pump while sliding it back into the unit. Pump is very heavy and will fall if not

supported properly, causing personal injury and/or equipment damage.

4. Remove two bolts holding pump assembly to unit frame. Slide pump toward unload side of washer.
5. Remove four bolts holding pump casing on pump assembly. Lift casing away from assembly.
6. Remove nut and washer securing impeller and lift impeller and seal spring assembly from shaft.
7. Remove bolts securing flange in position. Remove flange from shaft.
8. Remove two set screws holding stub shaft over motor shaft.
9. Remove stub shaft and replace with new one. Secure with set screws previously removed (see Figure 8-17 for stub shaft adjustment). Tighten set screws to 5 to 6 foot-pounds torque.
10. Return flange to shaft. Bolts should be tightened to 10 to 15 foot-pounds torque.
11. Reinsert mechanical seal over stub shaft. If necessary, first clean shaft with ScotchBrite and apply a light coating of petroleum jelly to facilitate installation of the seal; however, ensure no lubricant gets on sealing surfaces.
12. Reinstall impeller to compress the seal assembly spring.

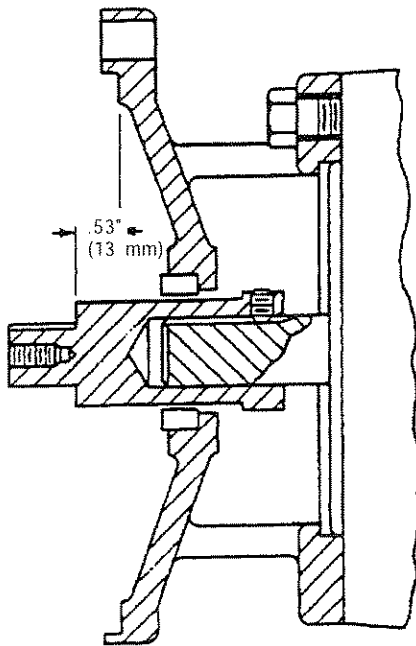


Figure 8-17. Stub Shaft Adjustment

13. Re-install washers and bolt previously removed.
14. Place pump casing to assembly and secure with bolts previously removed. Bolts should be tightened to 25 foot-pounds torque.

⚠ WARNING – PERSONAL INJURY/EQUIPMENT DAMAGE HAZARD: Use an 18 x 2 x 4" piece of wood to support pump while sliding it back into the unit. Pump is very heavy and will fall if not supported properly, causing personal injury and/or equipment damage.

15. Place pump assembly in washer/disinfector and mount to unit frame using bolts previously removed.
16. Connect hoses to pump assembly and attach clamps.
17. Unlock building electrical supply disconnect switch and set in ON position. Open unit supply valves and initiate a cycle. Check that pump is rotating in proper direction (see arrow on pump). Check pump assembly and piping connections for leaks.
18. Close lower service access door.

8.18 VALVES

A solenoid valve is a combination of two basic functional units — 1) a solenoid (electromagnet) with its pivot arm (plunger), and 2) a valve containing an orifice in which a seal or plug is positioned to stop or allow flow. The valve is opened or closed by movement of the magnetic pivot arm (plunger) which is drawn into the solenoid when the coil is energized. The solenoid is mounted directly on the valve housing.

NOTE: When installing new valves in any line, note the arrow stamped on the valve body or the words "IN" and "OUT" stamped at the inlet and outlet ports. A reversed valve cannot operate properly.

8.18.1 Pneumatic Ball Valve Replacement

See Figure 9-15.

⚠ WARNING -ELECTRIC SHOCK AND/OR BURN HAZARD:

- **Disconnect all utilities to washer before servicing. Do not service the washer unless all utilities have been properly locked out. Always follow local electrical codes and safety-related work practices.**
- **Lock building electric supply to OFF and close unit supply valves before performing any service on the unit. If unit is started during maintenance**

procedures, hot water/steam may be sprayed into wash chamber.

NOTE: Fully drain unit and piping. Run a complete DRAIN CYCLE.

1. Lock electrical disconnect switch in OFF position and close unit supply valves.
2. Remove pneumatic tubing and elbows from valve actuator.
3. Remove quick disconnect clamps holding valve in place.
4. Install pneumatic elbows on new valve and reinstall.
5. Enter Service Mode, as explained in Section 4.1, *Service Mode Procedures*, to verify valve operation.

8.18.2 Water DIN Connector Solenoid Valves Replacement

⚠ WARNING - ELECTRIC SHOCK AND/OR BURN HAZARD:

- **Disconnect all utilities to washer before servicing. Do not service the washer unless all utilities have been properly locked out. Always follow local electrical codes and safety-related work practices.**
- **Lock building electric supply to OFF and close unit supply valves before performing any service on the unit. If unit is started during maintenance procedures, hot water/steam may be sprayed into wash chamber.**

⚠ WARNING - SLIPPING HAZARD: To avoid slippery floor conditions, immediately wipe up any spilled liquids or condensation.

⚠ WARNING - BURN HAZARD: Allow unit to cool down before performing any service on the pump. Piping and valves become very hot during unit operation.

Water and steam inlet valves are generally the diaphragm type and must be serviced when the valve is leaking (constant flow in piping) or does not open.

The diaphragm-type solenoid valve has a pilot and a bleed orifice. It utilizes line pressure for operation. When the solenoid is energized, it opens the pilot orifice and releases pressure from the top of the valve piston or diaphragm to the outlet side of the valve. This results in an unbalanced pressure which causes the line pressure to lift the piston or diaphragm off the main orifice, thereby opening the valve. When the solenoid is de-energized, the pilot is closed and full line pressure is applied to the top of the piston or

diaphragm through the bleed orifice, thereby providing a seating force for tight closure.

8.18.3 Constant Flow (Leaking Valve)

A leaking valve is usually due to a worn diaphragm. Diaphragm must be replaced according to the manufacturer's instructions included in the repair kit. The valve repair kit includes all parts necessary for a complete valve overhaul.

NOTE: When replacing a diaphragm, bonnet bolts should be torqued to 50 in/lb. (5.65 N•m) on reassembly.

Valve may also leak due to foreign matter interfering with diaphragm movement. When overhauling valve, thoroughly inspect valve for small solder beads or Teflon tape.

NOTE: When installing/repairing ASCO diaphragm or piston-type valves, it will be necessary to separate solenoid base from valve bonnet to facilitate removal, repair and/or installation. When valve is reassembled, make sure no Teflon tape or pipe sealer is used between solenoid base and valve bonnet. When Teflon tape or pipe sealer is used, it can find its way into core tube and inhibit proper traveling of core/disc. If core/disc does not seat correctly into copper ring at top inside of core tube, valve will emit an audible buzzing sound.

8.18.4 No Flow (Valve Does Not Open)

1. Check strainers. Strainer can easily become clogged enough to prevent flow.
2. Energize the solenoid coil. A metallic click signifies solenoid operation. Absence of the click can indicate loss of power supply, defective coil or improper connection. To correct, check the following:
 - a. Voltage across the coil leads. When energized by the controller, it should be approximately 120 volts. When de-energized, it will be approximately two volts. Solenoid coil resistance is 212.5 ohms for 1/2" NPT water solenoid valves, 214.1 ohms for 1/2" NPT steam solenoid valves, and 103 ohms for 3/4" NPT steam solenoid valves.
 - b. Solenoid coil for open/short circuit or ground.
3. Check valve diaphragm. Pinhole on downstream side of diaphragm may be clogged or diaphragm may be installed backwards.
4. Energize and de-energize the coil. Check valve operation for proper opening and closing. A loud hum and sluggish operation indicate the coil is

probably defective and must be replaced. Replace coil as follows:

⚠ CAUTION – POSSIBLE EQUIPMENT DAMAGE: Solenoid valves are equipped with a special material which can be attacked by oils and grease. When replacing entire valve, wipe threads clean of cutting oils and use Teflon tape to seal pipe joints.

- a. Remove setscrew holding DIN Plug Connector in place.
 - b. Put DIN Disconnect DIN Plug Connector from solenoid housing.
 - c. Remove both red cap and ID Plate from top of solenoid housing.
 - d. Lift off solenoid housing from solenoid valve assembly.
 - e. Replace with new solenoid housing.
 - f. Put ID Plate and red cap back on top of solenoid housing.
 - g. Plug Connector setscrew back to hold Connector in place.
5. Check valve diaphragm. Pinhole on downstream side of diaphragm may be clogged, or diaphragm may be installed backwards.
 6. Inspect the valve for evidence of leakage. A worn valve seat will cause the valve to leak when closed. A damaged or worn seat cannot be repaired. If seat is damaged, valve must be replaced.

8.18.5 Air DIN Connector Solenoid Valves

⚠ WARNING - ELECTRIC SHOCK AND/OR BURN HAZARD: Lock building electric supply to OFF and close unit supply valves before performing any service on the unit. If unit is started during maintenance procedures, hot water/steam may be sprayed into wash chamber.

An air solenoid valve must be serviced whenever sluggish valve operation, excessive noise or leakage occurs. Also clean valve strainer or filter when cleaning the valve. If valve fails to operate, proceed as follows:

1. Check air filter. Filter can easily become clogged enough to prevent flow.
2. In Service mode, energize the solenoid coil. A metallic click signifies solenoid operation. Absence of a click can indicate loss of power supply, defective coil or improper connection. To correct, check the following:
 - a. Voltage across the coil leads. When energized by the controller, it should be at least 85% of

nameplate rating. Solenoid coil resistance is approximately 611 ohms.

- b. Solenoid coil for open/short circuit or ground.
 - c. Pressure. Pressure to valve must be within range specified on nameplate.
3. Energize and de-energize the coil. Check valve operation for proper opening and closing. A loud hum and sluggish operation indicate the coil is probably defective. To replace coil, proceed as follows:
 - a. Disconnect the DIN plug connector from solenoid housing.
 - b. Remove retaining clip and slip coil off plugnut/core subassembly.
 - c. Install new coil and replace retaining clip.
 - d. Reconnect the DIN plug connector to solenoid housing.
 4. If excessive leakage occurs, disassemble valve and install a complete rebuild kit, according to manufacturer's instructions included in the repair kit. The repair kit includes all parts necessary for a complete valve overhaul.

For pilot valve only replacement:

1. Disconnect the DIN plug connector from solenoid housing.
 2. Remove two pilot valve screws using an hex key wrench.
 3. Remove pilot valve and gaskets.
 4. Install new gaskets, pilot valve and pilot valve screws.
- NOTE: When replacing pilot valve, pilot valve should be screwed evenly to 14 inch-pounds (1.6 N·m) when valve is reassembled.*
5. Reconnect the DIN plug connector to solenoid housing.

8.19 WATER LEVEL SENSORS REPLACEMENT

See Figures 8-18, 9-10, and 9-11.

If one of the water level sensors fails, it must be replaced.

1. On unload side, remove lower service panel.
2. Open unload door.
3. From lower service compartment, locate water level sensors, under the sump.

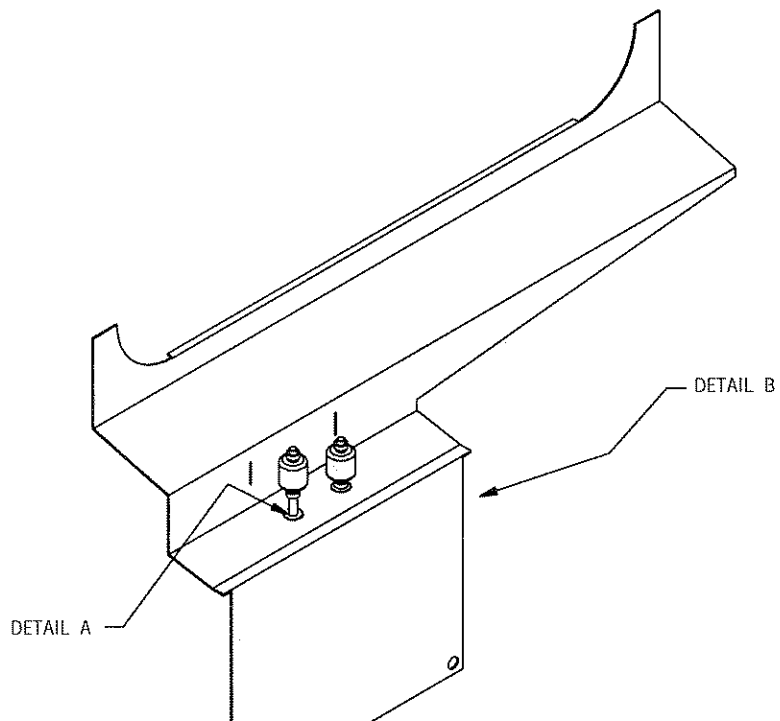
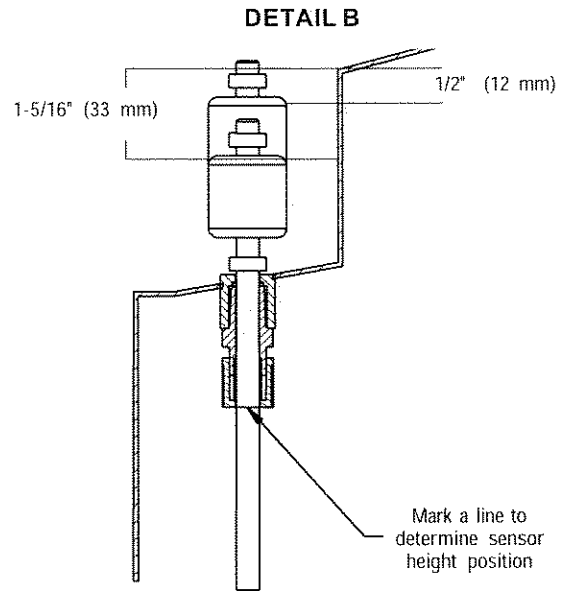
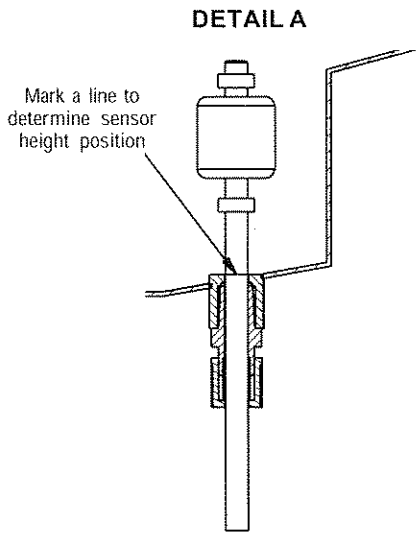


Figure 8-18. Water Level Sensors

4. Use a permanent marker to make a line flush with antiwave protection for water level sensor in the high position and make a line under nut on water level sensor under sump, to determine the height at which they are placed.
5. Unscrew nuts from water level sensor. Note the position of notch on water level sensor (see Figure 8-11) Pull down water level sensors to remove from sump.
6. Take new water level sensor, and transfer the mark made on the old sensor to the new one. Make the same thing for the other sensor.
7. From under sump, insert water level sensor until the mark done. Ensure that notch is in the correct position. Tighten nut.
8. To verify water level into wash chamber, enter Service Mode as explained in Section 4.1, *Service Mode Procedures*.
9. Verify which input is activated (capital letter): SH for the high level sensor or LL for the low level sensor.
10. According to Equipment Drawing, pour manually water into sump: 36 L (9.5 US gal) for the high level, 22 L (5.8 US gal) for the low level, or 25 L (6.5 US gal) if electric-heated unit).
11. If quantity of water is not correct, drain water from sump and adjust water level sensor height.
12. Repeat the same procedure to measure water quantity.

8.20 AIR FILTER/REGULATOR ADJUSTMENT AND MAINTENANCE

See Figures 9-25 and 9-27.

⚠ CAUTION – POSSIBLE EQUIPMENT DAMAGE: Do not use carbon tetrachloride, trichloethylene, thinner, acetone, or similar solvents in cleaning any part of airline regulator or filter. Water and a mild soap is recommended.

8.20.1 Installation

When installing filter/regulator, make sure that manual drain is located at the bottom, and that gauge port opposite to outlet pressure gage is plugged.

IMPORTANT: Ensure air flow is in direction indicated by arrow on filter body.

8.20.2 Adjustment

See Figures 8-19, 8-20, and 8-21.

1. Before turning on system air pressure, turn filter/regulator adjustment counterclockwise until all load is removed from the regulating spring.
2. Turn on system pressure.
3. Turn filter/regulator adjustment clockwise until the desired outlet pressure is reached.
4. To avoid minor readjustment after making a change in pressure setting, always approach the desired pressure from a lower pressure. When reducing from a higher to a lower setting, first reduce to some pressure less than that desired, then bring up to the desired pressure.
5. Push adjusting knob downward to lock pressure setting. To release, pull knob upward.

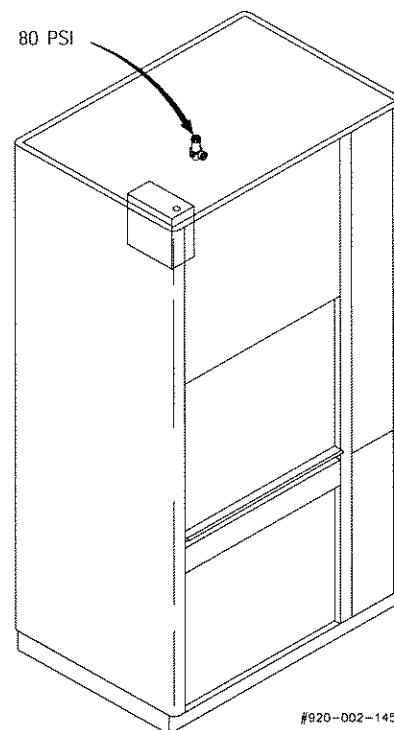
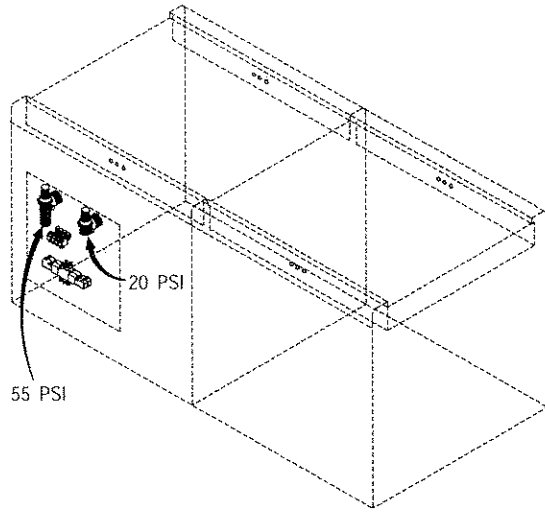
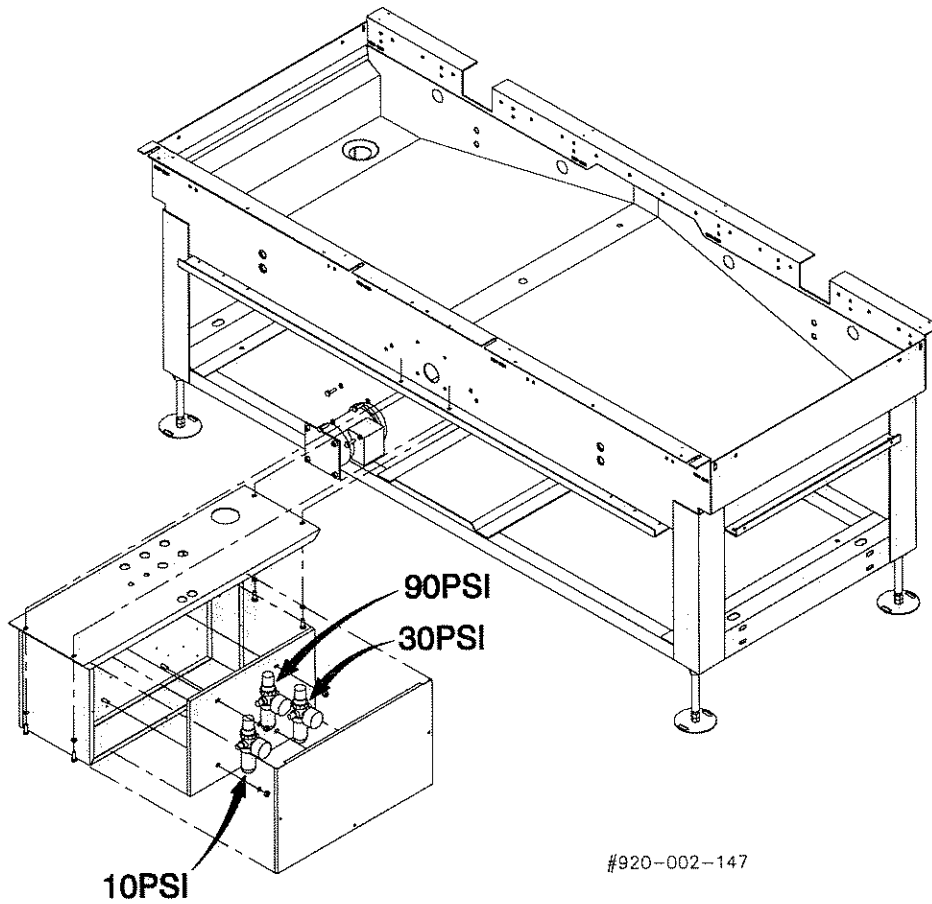


Figure 8-19. Reliance Synergy Washer/Disinfector Air/Filter Regulator Adjustment



#920-002-146

**Figure 8-20. Amsco Reliance 444 Load/Unload Modules
Air/Filter Regulator Adjustment**



#920-002-147

**Figure 8-21. Amsco Reliance ATS Automated Transport System
Air/Filter Regulator Adjustment**

8.20.3 Maintenance

Filter/regulators with manual drain must be drained as frequently as necessary to keep accumulated liquids below element. Liquid will be carried downstream if it is allowed to reach the element. Replace filter/regulator when element is plugged.

1. To drain liquid, simply press upward on manual drain valve.
2. If bowl becomes dirty, wash with warm water only.
3. Blow clean dry compressed air through white filter element from inside to outside to dislodge surface contaminants. Replace filter if damaged by heavy contamination.

8.21 HEPA FILTER AND PRE-FILTER

See Figures 9-3 and 9-7.

1. From unload side, remove Service Upper side panel.
2. Unlock HEPA filter cover on both sides and remove.
3. Remove pre-filter.
4. Remove HEPA filter.
5. Re-install new HEPA filter. Make sure that arrow on filter box is facing washer/disinfector.
6. Install new pre-filter.
7. Replace filter cover and lock.
8. Reinstall upper service panel.

8.22 QUICK-DISCONNECT PNEUMATIC FITTINGS

To remove tubing from a quick-disconnect pneumatic fitting (connector) that must be replaced, push outer ring inward and pull on tubing for release.

8.23 DRYING LIMITING THERMOSTAT (THERMODISK) MANUAL RESET BUTTON

See Figure 9-6.

If, for any reason, heat exchanger air temperature should rise above 152°C (315°F), unit operation will be stopped. Unit must cool down with door(s) open for at least 30 minutes. To return to normal operation, thermodisc manual reset button must be pressed.

8.24 THERMOSTATIC STEAM TRAP BELLOW REPLACEMENT

See Figure 9-19

If steam trap stays open or closed all the time, repair as follows :

1. Lock unit electrical disconnect switch in OFF
2. Remove steam trap from unit.
3. Open steam trap, using a pipe wrench.
4. Remove bellow from steam trap core, inspect for debris, clean inside of trap as required. Trap usually requires replacement once per year.
5. Install new trap or reconnect two parts of steam trap together, and re-install in unit.
6. Unlock unit electrical disconnect switch, position to ON, and open unit supply valves.
7. Check for proper operation.

NOTE: Due to manufacturer variances, replacement of entire trap body and element with new trap assembly is recommended.

8.25 DRYING DIVERTER VALVE INSPECTION

See Figure 9-15, Detail A, and Figure 9-17.

1. To verify drying diverter valve is functioning properly, it must be disassembled for inspection.
2. Remove hose clamp fittings on top of drying valve cover. Unscrew drying valve cover (see Figure 9-17).
3. Remove internal piston and inspect for deterioration. Piston should move freely up and down within drying valve body.

NOTE: Extra long needle nose pliers or equivalent required to remove piston by grasping center stub on top of piston.

8.26 OVERLOAD RELAYS AMPERAGE SETTING

See Figure 9-32.

When an overload relay has been replaced, the amperage needs set. Use the following data for proper setting.

8.26.1 Overload Relay OL1 For Low Speed Pump Setting

- For 208 V units, range is 4.5 to 6.3 A: set to **5.8 A**.
- For 380/400/415 V units, range is 2.2 to 3.2 A: set to **3.0 A**.

- For 480 V units, range is 2.2 to 3.2 A: set to 2.5 A.

8.26.2 Overload Relay OL2 For High Speed Pump Setting

- For 208 V units, range is 17.0 to 22.0 A: set to 20.2 A.
- For 380/400/415 V units, range is 7.0 to 10.0 A: set to 9.8 A.
- For 480 V units, range is 7.0 to 10.0 A: set to 8.8 A.

8.26.3 Overload Relay OL3 For Dryer Fan Setting

- For 208 V units, range is 3.5 to 5.0 A: set to 4.4 A.
- For 380/400/415 V units, range is 1.8 to 2.5 A: set to 1.9 A.
- For 480 V units, range is 1.8 to 2.5 A: set to 2.1 A.

For all three overload relays, MAN/AUTO relay mode pointer must be positioned to MAN, and white pointer located on top of blue reset button must be set to Reposition.

8.27 EMERGENCY STOP BUTTON REPLACEMENT ON AMSCO RELIANCE 444 LOAD/UNLOAD MODULES

See Figures 8-22, and 9-49.

1. Unscrew two bottom screws on Load/Unload module service panel, where EMERGENCY STOP button is located.
2. Lift up side panel slightly to detach from conveyor module.
3. Pivot service panel on EMERGENCY STOP Button side.
4. Insert a small screw driver or a pen into tab on top of EMERGENCY STOP assembly. Push and slide tab to the right.
5. Unscrew nut retaining assembly and remove EMERGENCY STOP Button.
6. Replace EMERGENCY STOP Button with a new one.

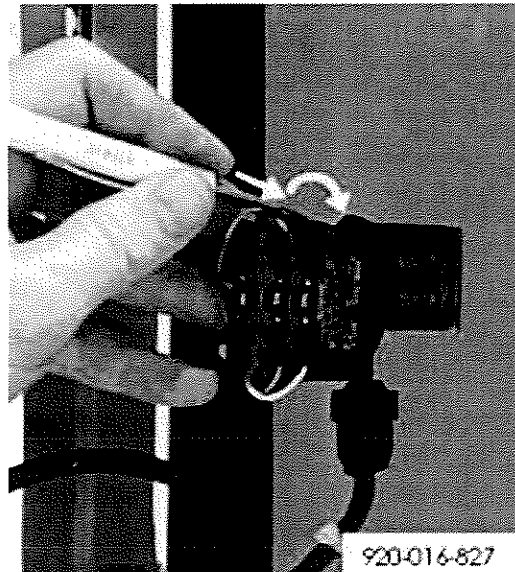


Figure 8-21. Push and Slide Tab

8.28 HOW TO ADJUST PHOTOCELL SENSITIVITY ON AMSCO RELIANCE 444 LOAD/UNLOAD MODULES

See Figure 8-22 and 9-47.

1. Ensure photocell is aligned with perforation on conveyor side (photocell does not detect conveyor).
2. Place a rack or a metallic object in front of sensor in normal position where it is in sensors path.
3. Press the button during 3 seconds until both LEDs flash synchronously (the first operation position is stored).
4. Remove rack or metallic object out of the scanning area.
5. Press the button during one second. The green LED flashes and stays ON; the second operation position is stored. The sensor is ready to operate.
6. If both LEDs continue to flash after button is released means calibration was unsuccessful (start procedure again).

NOTE: When calibrating, note the following:

1) The sensor will retain calibration settings for the life of the device. It does not use a backup battery; it uses a non-volatile flash memory chip.

2) Do not hold calibration button in for more than 8 seconds; otherwise, it will change output logic from NO to NC.

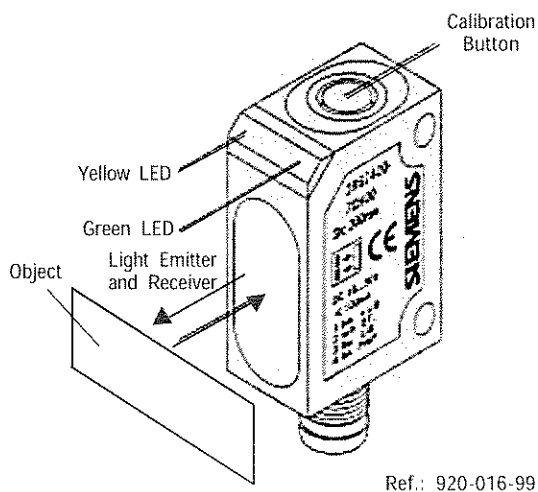


Figure 8-22. Photocell Adjustment

Section 9: Illustrated Parts Breakdown

Significant assemblies and components of the Reliance® Synergy Washer/Disinfector are illustrated and identified in this section. 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 sub-assembly level.

2. Turn to the page indicated and locate the desired part on the illustration.
3. From the illustration, obtain the item number assigned to the desired part. Refer to the accompanying tabular list (usually on the facing page) for the part number and description of the part.

9.1 HOW TO USE THE ILLUSTRATED PARTS BREAKDOWN

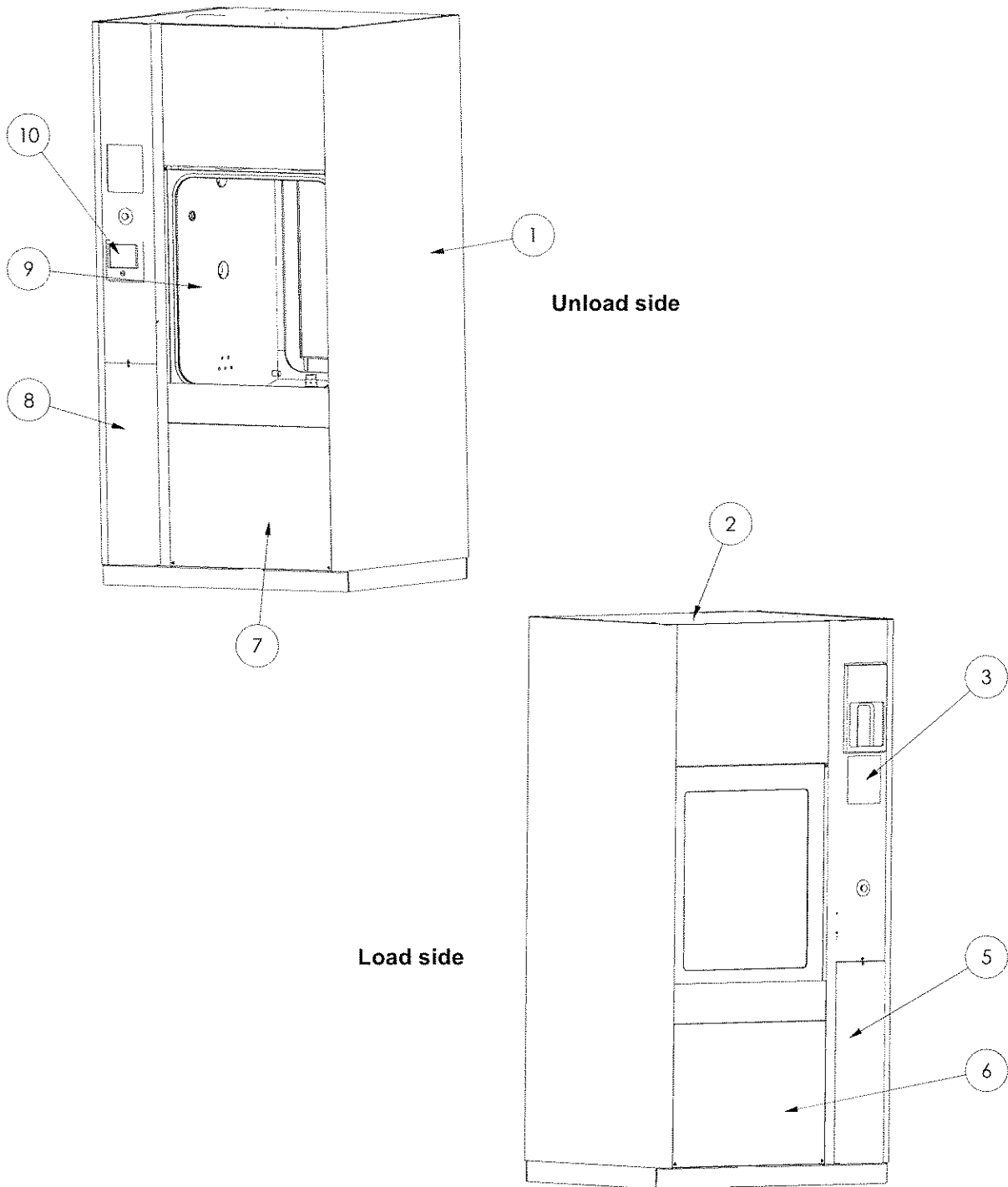
1. Determine the function and application of the part required. Select the most appropriate title from the *List of Illustrations* in the *Table of Contents*. Note the illustration page number.

9.2 PREVENTIVE MAINTENANCE PACKS

Repair parts needed to perform preventive maintenance of equipment components are grouped together in Preventive Maintenance (PM) packs. PM packs allow the customer to order all necessary repair kits using one part number.

Typical Indentation Example

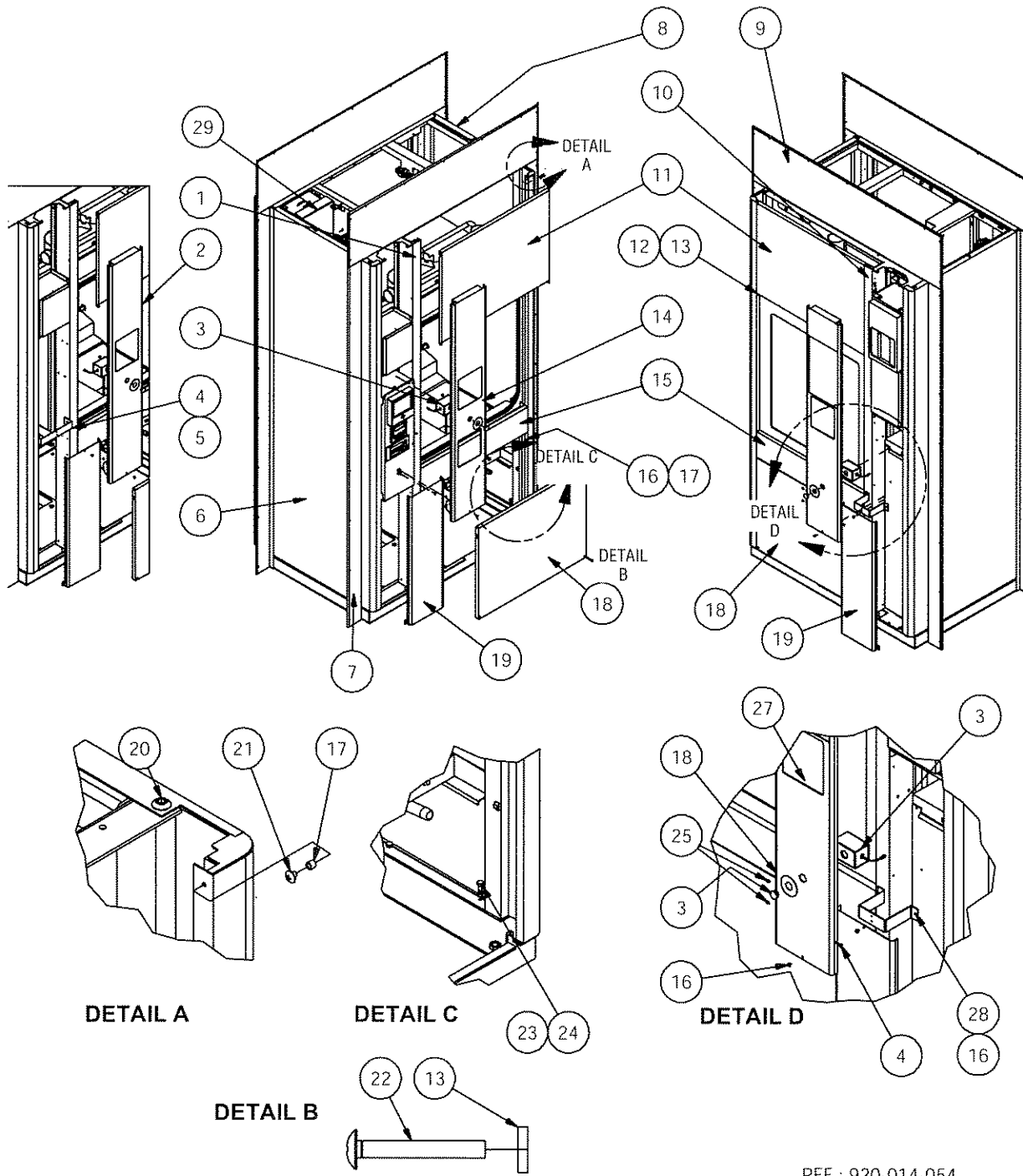
| | | | | | | |
|--|-----|---|--------|-----|--|--|
| <p>No indentation -- part of top assembly</p> | 8-9 | | | | | |
| | 1 | P | 117950 | 177 | | HOT WATER SUPPLY PIPING, PURE AND COLD WATER SUPPLY TO COM |
| | 2 | P | 117956 | 359 | | Strainer, Water, 1/2" f |
| | | P | 117950 | 174 | | Valve, Solenoid, Water, 1/2" |
| | | P | 117955 | 186 | | • Kit, Repair |
| | | P | 117955 | 186 | | • Coil, Spare |
| | 3 | P | 117950 | 216 | | Valve, Swing Check, 1/2" |
| | 4 | P | 117956 | 362 | | Valve, Solenoid, S/S, Water, 1/2" |
| | | P | 117955 | 193 | | • Kit, Repair |
| | | P | 117955 | 194 | | • Coil, Spare |
| | 5 | P | 117954 | 297 | | Adapter, Pure Water Inlet, 1/2" NPT ... |
| <p>One indentation -- first sub-assembly, part of assembly under which it is indented</p> | | | | | | |



REF.: 920-014-053

Figure 9-1. Reliance® Synergy™ Washer/Disinfector, Complete

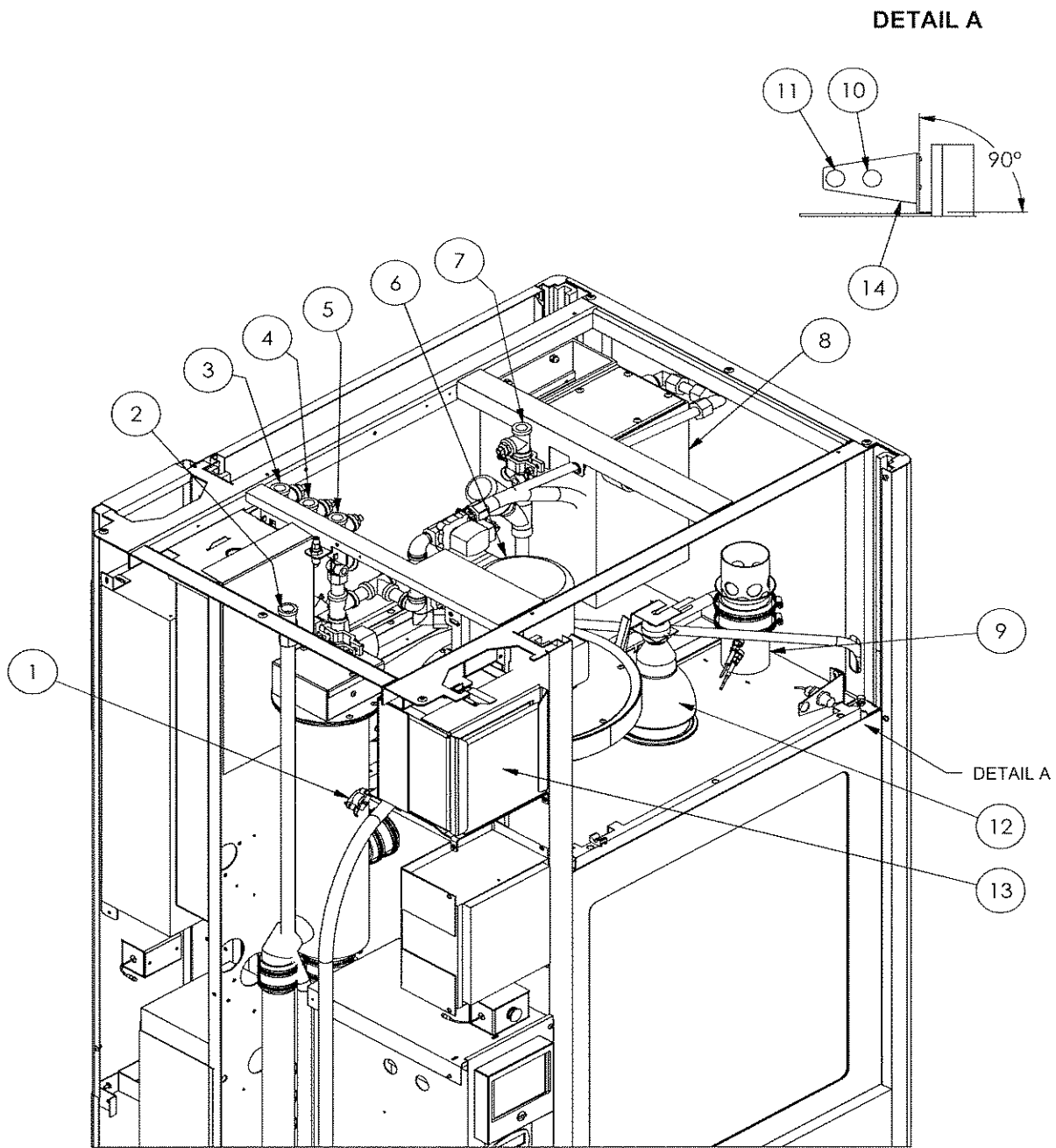
| FIG. & ITEM NO. | PART NUMBER | | DESCRIPTION | UNITS PER ASSEMBLY |
|-----------------|-------------|------------|---|--------------------|
| 9-1 | | | RELIANCE SYNERGY WASHER/DISINFECTOR, COMPLETE . | X |
| 1 | | | EXTERIOR PANELS, (see Figure 9-2) | 2 |
| 2 | | | WASHER/DISINFECTOR TOP VIEW, (see Figure 9-3) | 1 |
| 3 | | | CONTROL PANEL ASSEMBLY (see Figures 9-34 to 9-36)..... | 2 |
| 4 | | | DOOR ASSEMBLY (see Figures 9-20 to 9-22) | 2 |
| 5 | | | ELECTRICAL POWER SUPPLY BOX, INPUT/OUTPUT BOARD, AND CONTACTOR BOX (see Figures 9-33 and 9-34) | 1 |
| 6 | | | CHEMICAL INJECTION PUMP (see Figures 9-28 to 9-34) | 4 |
| 7 | | | RECIRCULATION PUMP AND PIPING (see Figures 9-14 to 9-16) ... | 1 |
| 8 | | | DOOR PNEUMATIC SYSTEM AND CYLINDER (see Figures 9-23 to 9-27) | 2 |
| 9 | | | WASH CHAMBER INTERIOR (see Figures 9-10 and 9-11) | 1 |
| 10 | | | INDEPENDENT MONITOR BOX OPTION (see Figure 9-37) | 1 |
| | | | AMSCO® RELIANCE® 444 LOAD/UNLOAD MODULES OPTION (Not Shown - See Figures 9-47 to 9-54) | 1 |
| | | | AIR COMPRESSOR OPTION (Not Shown - See Figure 9-55) | 1 |
| | | | ACCESSORIES (Not Shown - see Figures 9-38 to 9-45)..... | A/R |
| | | | ID TAGS FOR ACCESSORIES (Not Shown) | X |
| | P | 117905 817 | ID TAG, INSTRUMENT CYCLE (00) | A/R |
| | P | 117905 818 | ID TAG, UTENSILS CYCLE (01) | A/R |
| | P | 117905 819 | ID TAG, GLASSWARE CYCLE (03)..... | A/R |
| | P | 117905 820 | ID TAG, PLASTIC GOODS CYCLE (04) | A/R |
| | P | 117905 821 | ID TAG, ANESTHESIA/RESPIRATORY CYCLE (05) | A/R |
| | P | 117905 822 | ID TAG, GENTLE CYCLE (06) | A/R |
| | P | 117905 823 | ID TAG, CYCLE 7 (07) | A/R |
| | P | 117905 824 | ID TAG, CYCLE 8 (08) | A/R |
| | P | 117905 825 | ID TAG, CYCLE 9 (09) | A/R |
| | P | 117905 826 | ID TAG, CYCLE 10 (10) | A/R |
| | P | 764327 626 | HOLDER, BAR CODE TAG | A/R |



REF.: 920-014-054

Figure 9-2. Exterior Panels and Door Assemblies

| FIG. & ITEM NO. | PART NUMBER | | DESCRIPTION | UNITS PER ASSEMBLY | | |
|-----------------------|----------------|------------|---|-----------------------|--|--|
| | | | | | | |
| 9-2 | | | EXTERIOR PANELS AND DOOR ASSEMBLIES | X | | |
| 1 | P | 117021 085 | COLUMN, CENTRAL, CABINET, CLEAN SIDE | 1 | | |
| 2 | P | 117021 120 | DOOR, ACCESS, CLEAN SIDE CONTROL | 1 | | |
| 3 | P | 117015 650 | PUSHBUTTON, EMERGENCY STOP, ASSEMBLY | 2 | | |
| | P | 117950 856 | SCREW, TRUSS HEAD, S/S, 8-32 X 3/8" | 4 | | |
| 4 | P | 117950 855 | SCREW, TRUSS HEAD, S/S, 8-32 X 1/4" | 9 | | |
| 5 | P | 117021 116 | SUPPORT, ACCESS DOOR | 1 | | |
| 6 | P | 117021 075 | SIDE PANEL, RIGHT | 1 | | |
| 7 | P | 117988 846 | BARRIER WALL FLANGE, VERTICAL | 4 | | |
| 8 | P | 117021 070 | SIDE PANEL, LEFT | 1 | | |
| 9 | P | 117903 142 | BARRIER WALL FLANGE, HORIZONTAL | 2 | | |
| 10 | P | 117021 080 | COLUMN, CENTRAL, CABINET, SOILED SIDE | 1 | | |
| 11 | P | 117903 124 | PANEL, UPPER SERVICE | 2 | | |
| 12 | P | 117021 235 | SCREW, TRUSS HEAD, S/S, 8-32 X 3/16" | 4 | | |
| 13 | P | 117911 855 | WASHER, FLAT, INTERNAL RETAINING, #8 | 8 | | |
| 14 | P | 117021 212 | DOOR, ACCESS, CLEAN SIDE CONTROL, INDEPENDENT MONITOR SYSTEM | 1 | | |
| 15 | P | 117021 090 | THRESHOLD, CABINET | 2 | | |
| 16 | P | 117950 855 | SCREW, TRUSS HEAD, S/S, 8-32 X 1/4" | 4 | | |
| 17 | P | 117903 118 | PIN, PIVOT, UPPER SERVICE PANEL | 8 | | |
| 18 | P | 117021 185 | PANEL, SERVICE, DOWN | 2 | | |
| 19 | P | 117021 092 | DOOR, ACCESS, DOWN | 2 | | |
| 20 | P | 117910 357 | SCREW, TRUSS HEAD, S/S, 1/4-20 X 1/2" | 6 | | |
| 21 | P | 117021 334 | SCREW, TRUSS HEAD, S/S, 8-32 X 5/16" | 5 | | |
| 22 | P | 117950 861 | SCREW, TRUSS HEAD, S/S, 8-32 X 1-1/4" | 4 | | |
| 23 | P | 117021 214 | TAB WASHER, S/S, 1/4" | 5 | | |
| 24 | P | 117950 899 | BOLT, S/S, 1/4-20 X 1/2" | 4 | | |
| 25 | P | 117950 849 | SCREW, TRUSS HEAD, S/S, 6-32 X 1/4" | 2 | | |
| 26 | P | 117909 909 | PLATE, LEGEND, EMERGENCY STOP, YELLOW | 2 | | |
| 27 | P | 117015 247 | DOOR, ACCESS, LOAD SIDE CONTROL | 1 | | |
| 28 | P | 117021 187 | SUPPORT, CABINET, SOILED SIDE | 1 | | |
| 29 | P | 117912 857 | PROTECTOR, REAR, ELECTRIC BOX | 1 | | |

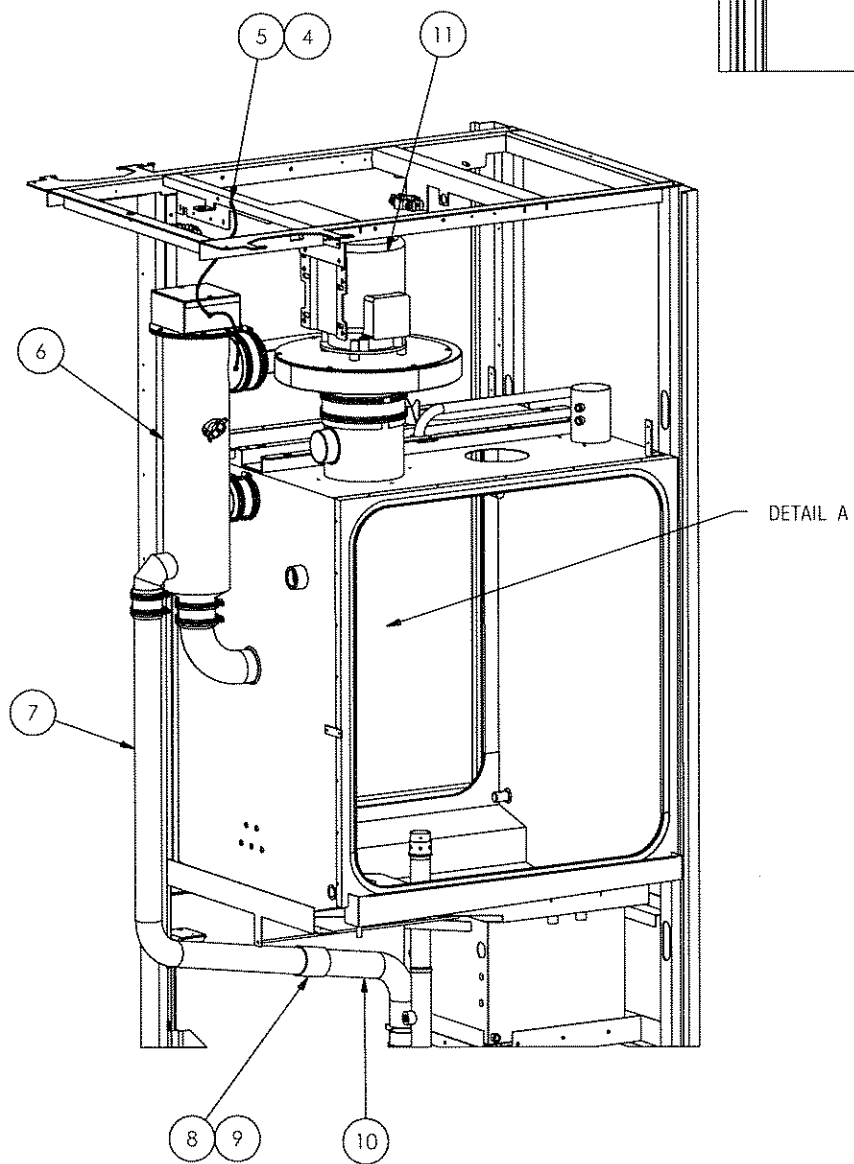
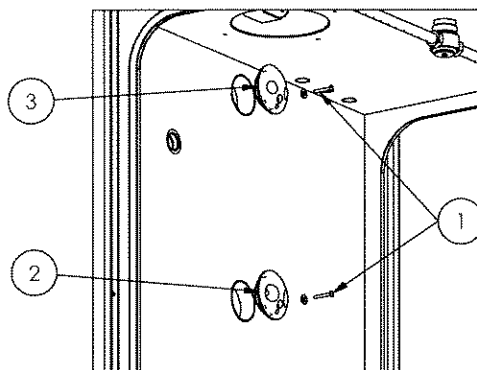


REF.: 920-014-055

Figure 9-3. Washer/Disinfecter, Top View

| FIG. & ITEM NO. | PART NUMBER | | DESCRIPTION | UNITS PER ASSEMBLY |
|-----------------|-------------|------------|--|--------------------|
| 9-3 | | | WASHER/DISINFECTOR, TOP VIEW | X |
| 1 | | | MANIFOLD DRYING ASSEMBLY (see Figure 9-6) | 1 |
| 2 | | | STEAM SUPPLY AND STEAM RETURN PIPING (see Figure 9-19) | 1 |
| 3 | | | PURE WATER SUPPLY PIPING (see Figure 9-18) | 1 |
| 4 | | | HOT WATER SUPPLY PIPING (see Figure 9-18) | 1 |
| 5 | | | COLD WATER SUPPLY PIPING, WITH CONDENSER (see Figure 9-19) | 1 |
| 6 | | | DRYING BLOWER SYSTEM (see Figure 9-5) | 1 |
| 7 | | | STEAM RETURN PIPING (see Figure 9-19) | 1 |
| 8 | | | CONDENSER SYSTEM (see Figure 9-9) | 1 |
| 9 | | | SUMP ASSEMBLY(see Figure 9-9) | 1 |
| 10 | P | 117903 111 | PROXIMITY SENSOR, DOOR, DOWN | 2 |
| 11 | P | 117903 584 | PROXIMITY SENSOR, DOOR, UP (With Amsco Reliance 444 Load/Unload Modules or Amsco Reliance ATS Automated Transport System Option) | 2 |
| | P | 117904 126 | CABLE, PROXIMITY SENSOR, YELLOW | 2 |
| 12 | | | INTERIOR LIGHT(see Figure 9-7) | 1 |
| 13 | | | DRYING HEPA PRE-FILTER (see Figure 9-7) | 1 |
| 14 | P | 117906 253 | HOLDER DOOR DETECTOR | 2 |

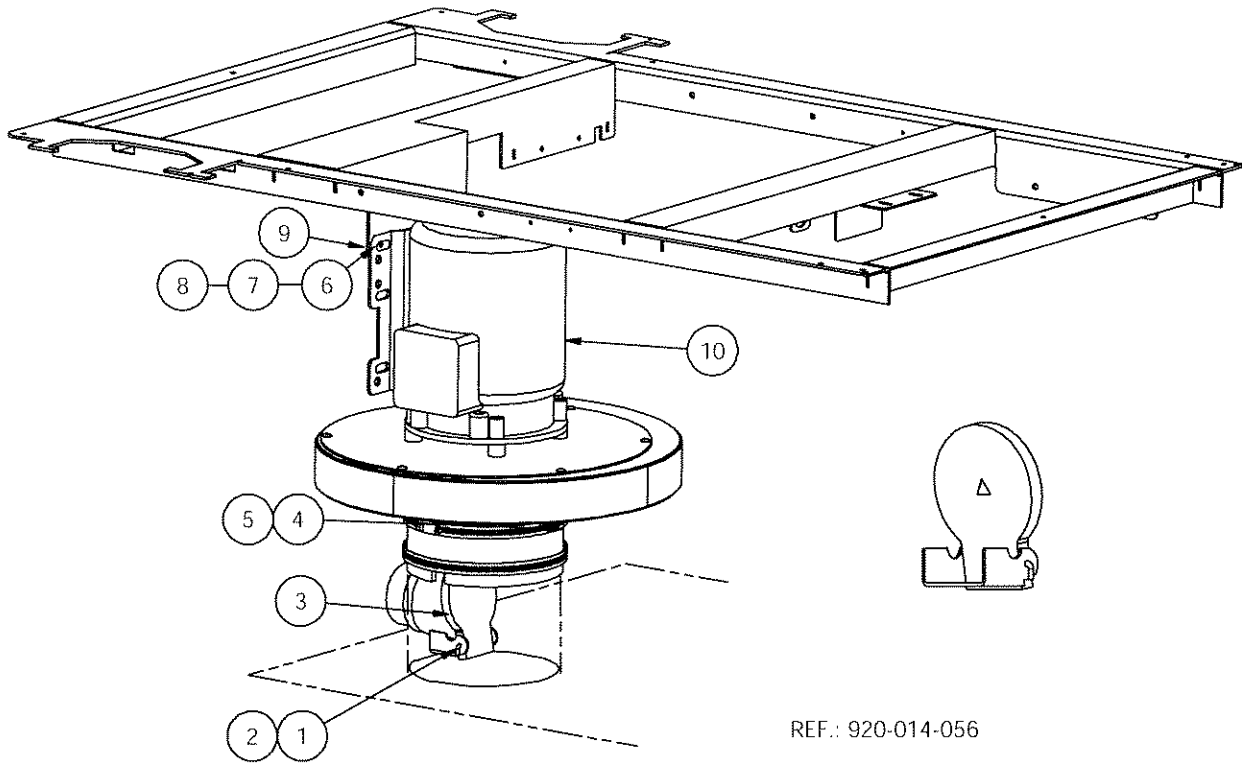
DETAIL A



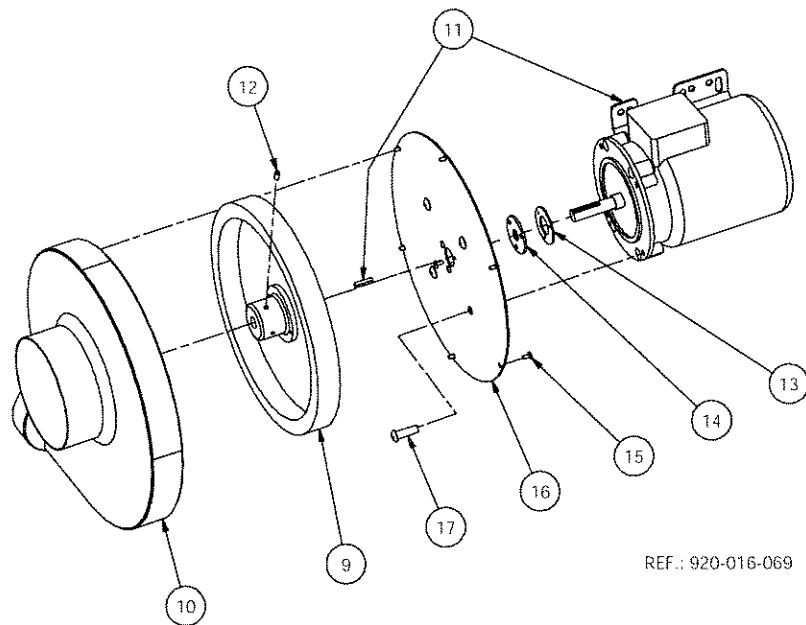
REF.: 920-016-080

Figure 9-4. Drying System

| FIG. & ITEM NO. | PART NUMBER | | DESCRIPTION | UNITS PER ASSEMBLY | | |
|-----------------------|----------------|------------|---|-----------------------|--|--|
| | | | | | | |
| 9-4 | | | DRYING SYSTEM | X | | |
| 1 | P | 117950 861 | SCREW, TRUSS HEAD, S/S, 8-32 X 1-1/4" | 2 | | |
| 2 | P | 117021 047 | DIFFUSER, BOTTOM, DRYING | 1 | | |
| 3 | P | 117021 123 | DIFFUSER, TOP, DRYING | 1 | | |
| 4 | P | 117950 855 | SCREW, TRUSS HEAD, S/S, 8-32 X 1/4" | 1 | | |
| 5 | P | 117909 999 | WASHER, LOCK, FOR #8 SCREW | 1 | | |
| 6 | | | MANIFOLD, DRYING, ASSEMBLY (see Figure 9-6) | 1 | | |
| 7 | P | 117021 115 | TUBE, FOR DRYING MANIFOLD AND VALVE | 1 | | |
| 8 | P | 117950 688 | HOSE, 2" X 2-1/4", BLACK | 1 | | |
| 9 | P | 117950 673 | CLAMP, S/S, #32, 1-9/16" @ 2-1/2" | 1 | | |
| 10 | P | 117021 328 | PIPING, DRYING VALVE | 1 | | |
| 11 | | | DRYING BLOWER SYSTEM (see Figure 9-5) | 1 | | |



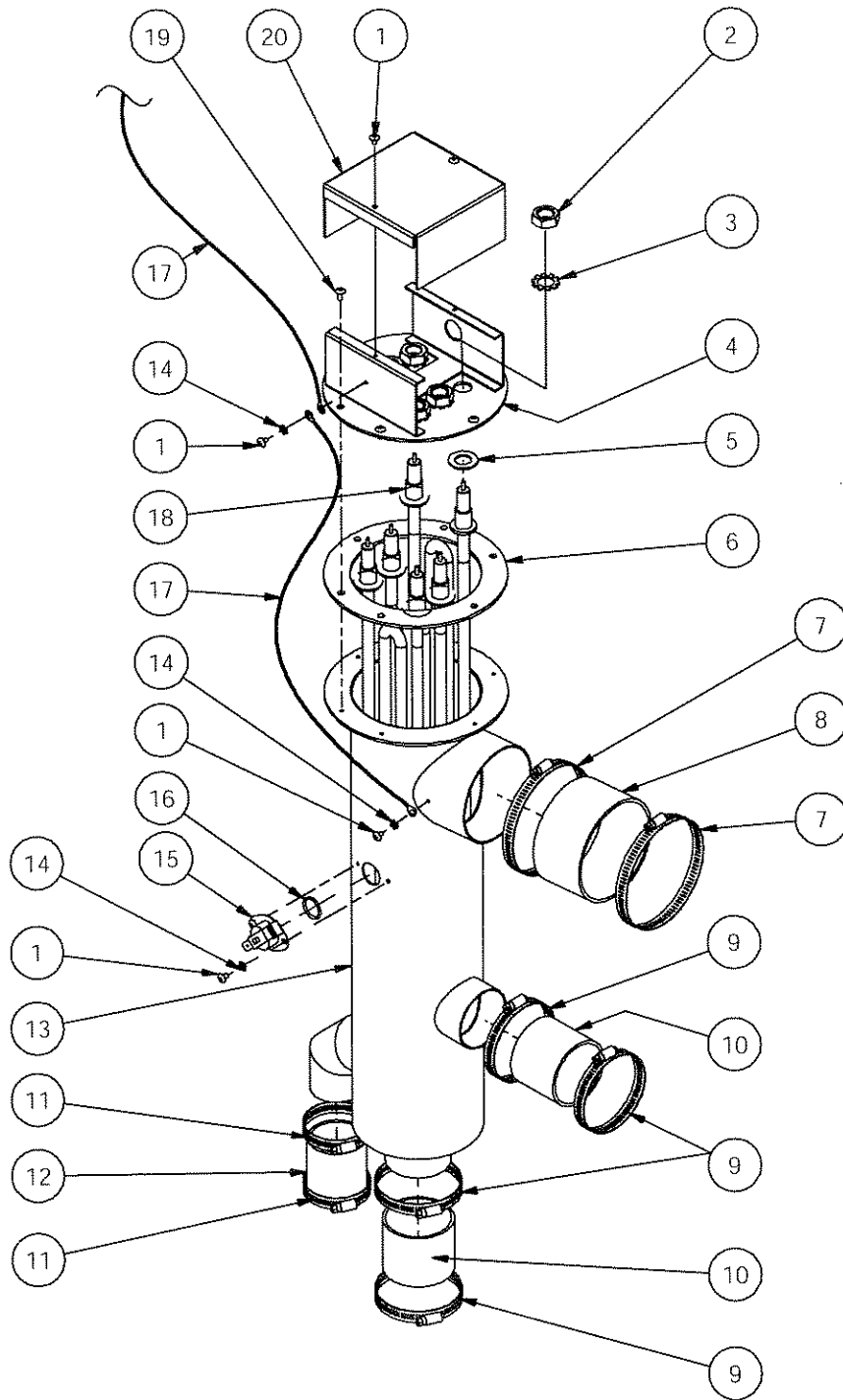
REF.: 920-014-056



REF.: 920-016-069

Figure 9-5. Drying Blower

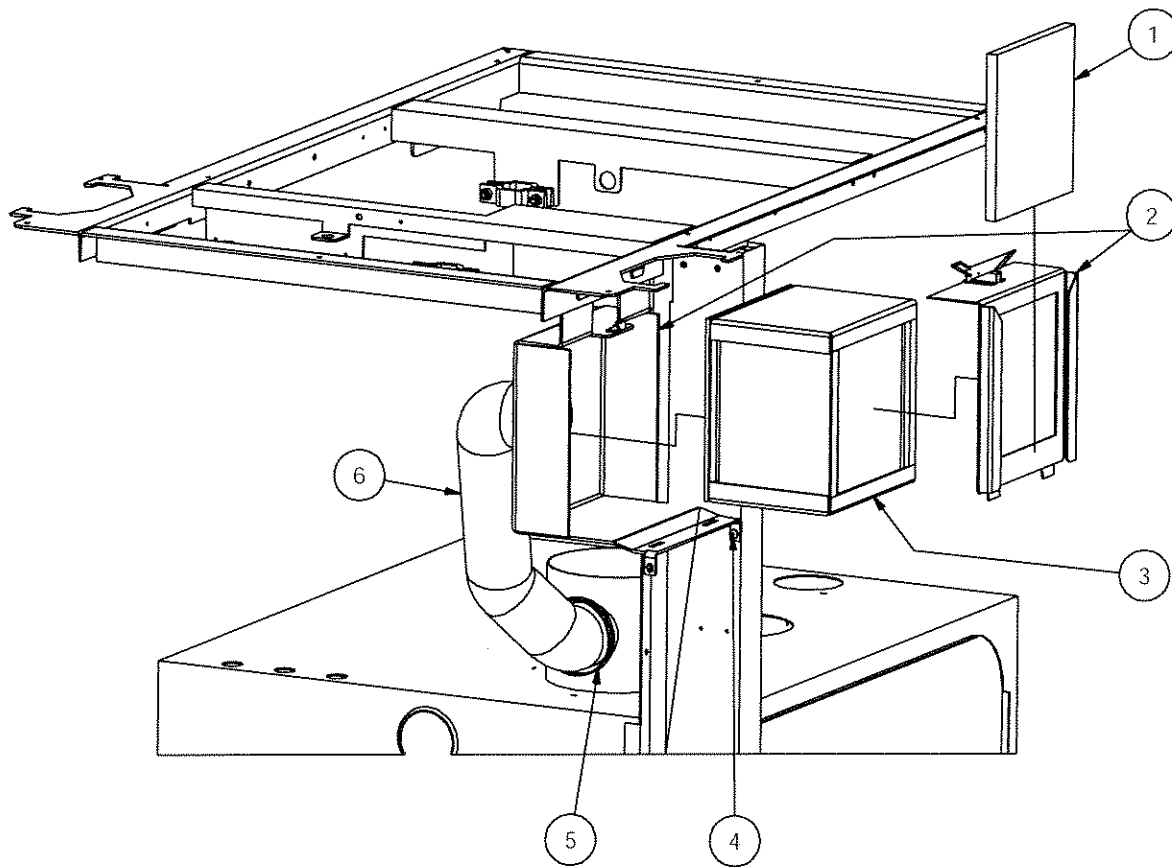
| FIG. & ITEM NO. | PART NUMBER | | | DESCRIPTION | UNITS PER ASSEMBLY | | | |
|-----------------------|----------------|---|------------|--|-----------------------|-----|--|--|
| | | | | | | | | |
| 9-5 | | | | DRYING BLOWER, 208 V, 60 Hz | X | | | |
| | | | | DRYING BLOWER, 380/415 V, 50 Hz - 460 V, 60 Hz | | X | | |
| | 1 | P | 117021 071 | ROD, ADAPTOR COVER, VENTILATION | 1 | 1 | | |
| | 2 | P | 117951 016 | PIN, COTTER, S/S, 1/16" X 1/2" | 1 | 1 | | |
| | 3 | P | 117021 067 | ADAPTOR COVER, VENTILATION | 1 | 1 | | |
| | 4 | P | 117950 793 | CLAMP, S/S, #96, 4-1/2" @ 6-1/2" | 2 | 2 | | |
| | 5 | P | 117021 046 | HOSE, NEOPRENE, 1/4" X 3" X 6" I.D. | 1 | 1 | | |
| | 6 | P | 117950 976 | WASHER, S/S, 1/4" | 2 | 2 | | |
| | 7 | P | 117950 901 | BOLT, S/S, 1/4-20 X 1" | 2 | 2 | | |
| | 8 | P | 117950 986 | WASHER, LOCK, S/S, 1/4" | 2 | 2 | | |
| | 9 | P | 117950 952 | NUT, S/S, 1/4-20 | 2 | 2 | | |
| | 10 | P | 117021 293 | FAN, ASSEMBLY, 208 V, 60Hz | 1 | | | |
| | | P | 117021 294 | FAN, ASSEMBLY, 380/415 V, 50 Hz - 460 V, 60 Hz | | 1 | | |
| | 11 | P | 117021 172 | MOTOR, 1.5 hp, 208 V, 60 Hz, ASSEMBLY | 1 | | | |
| | | P | 117021 173 | MOTOR, 1.5 hp, 380/415 V - 460 V, ASSEMBLY | | 1 | | |
| | 12 | P | 117953 833 | SCREW, SOCKET HEAD, 1/4"-20 X 1/2" | 2 | 2 | | |
| | 13 | P | 117021 133 | FIXTURE, WASHER, FOR DRYING FAN | 1 | 1 | | |
| | 14 | P | 117021 132 | SEAL, TEFLON, SHAFT FOR FAN, SYNERGY | 1 | 1 | | |
| | 15 | P | 117950 856 | SCREW, TRUSS HEAD, S/S, 8-32 X 3/8" | 9 | 9 | | |
| | 16 | P | 117021 242 | COVER, FAN, ASSEMBLY, SYNERGY | 1 | 1 | | |
| | 17 | P | 117021 122 | BUTTON SOCKET CAP SCREW, S/S, 3/8" X 1-1/4" | 4 | 4 | | |
| | | P | 117958 665 | ISOLATION, RIGID, WITH VAPOR BARRIER (Not Shown) | A/R | A/R | | |
| | | P | 117958 888 | ADHESIVE TAPE, ALUMINIUM, 3" X 300' (Not Shown) | A/R | A/R | | |



REF.: 920-016-079

Figure 9-6. Manifold Drying Assembly

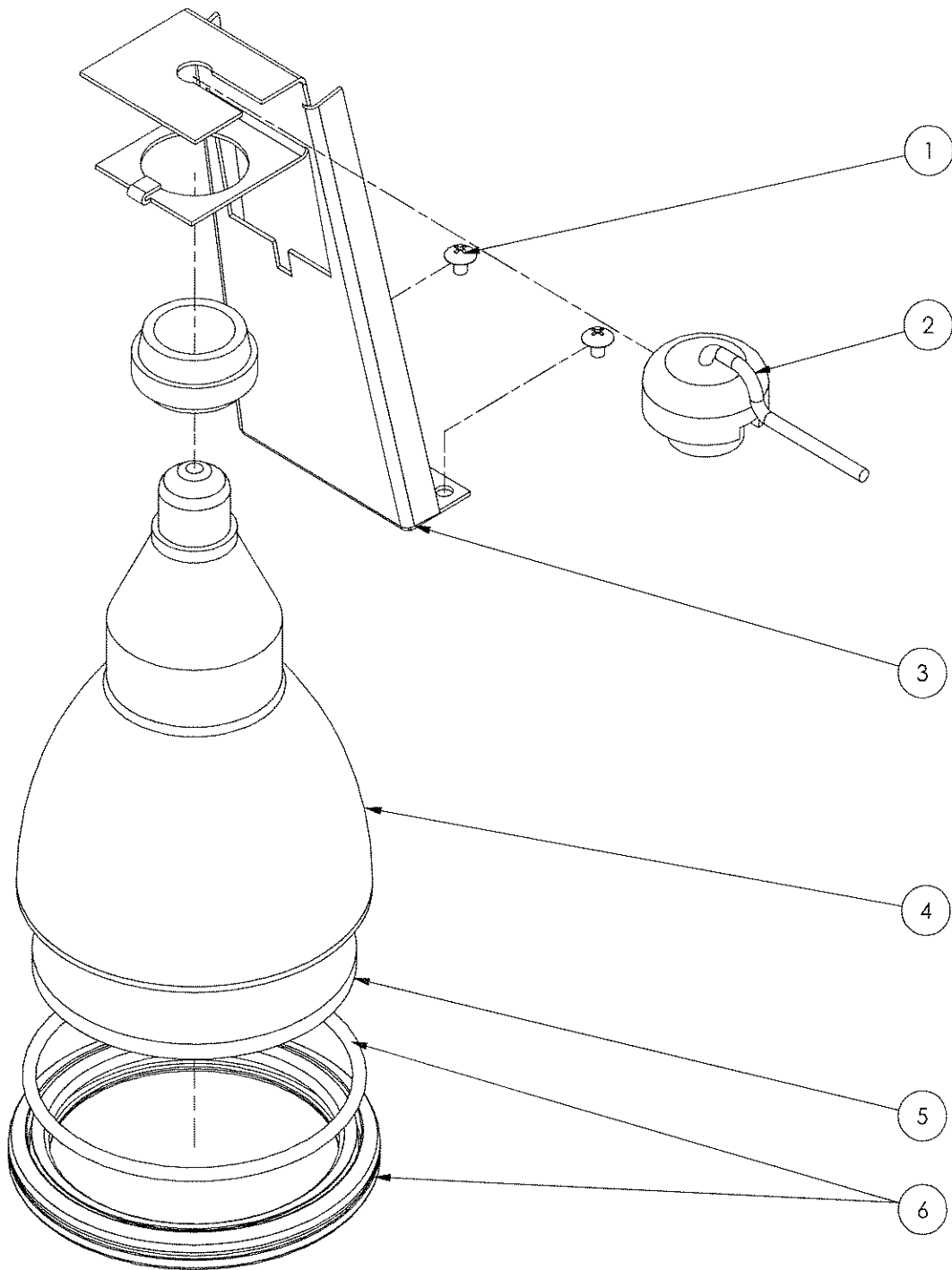
| FIG. & ITEM NO. | PART NUMBER | | DESCRIPTION | UNITS PER ASSEMBLY | | |
|-----------------------|----------------|------------|--|-----------------------|-----|-----|
| | | | | | | |
| 9-6 | P | 117021 195 | DRYING MANIFOLD, 208 V | X | | |
| | P | 117021 286 | DRYING MANIFOLD, 415 V | | X | |
| | P | 117021 287 | DRYING MANIFOLD, 480 V | | | X |
| 1 | P | 117950 855 | SCREW, TRUSS HEAD, S/S, 8-32 X 1/4" | 4 | 4 | 4 |
| 2 | P | 117953 466 | NUT, LOCK, S/S, 5/8"-18 | 6 | 6 | 6 |
| 3 | P | 117909 000 | WASHER, LOCK, 5/8" | 6 | 6 | 6 |
| 4 | P | 117021 125 | COVER, DRYING MANIFOLD, ASSEMBLY | 1 | 1 | 1 |
| 5 | P | 117911 079 | GASKET, ELEMENT, HEATING, DRYING | 6 | 6 | 6 |
| 6 | P | 117021 191 | GASKET, COVER, DRYING MANIFOLD | 1 | 1 | 1 |
| 7 | P | 117950 792 | CLAMP, S/S, #64, 3-9/16" @ 4-1/2" | 2 | 2 | 2 |
| 8 | P | 117950 686 | HOSE, 4" X 2-1/4", BLACK | 1 | 1 | 1 |
| 9 | P | 117950 790 | CLAMP, S/S, #44, 2-5/16" @ 3-1/4" | 4 | 4 | 4 |
| 10 | P | 117950 687 | HOSE, 2-1/2" X 2-1/4", BLACK | 2 | 2 | 2 |
| 11 | P | 117950 673 | CLAMP, S/S, #32, 1-9/16" @ 2-1/2" | 2 | 2 | 2 |
| 12 | P | 117950 688 | HOSE, 2" X 2-1/4", BLACK | 1 | 1 | 1 |
| 13 | P | 117021 190 | MANIFOLD, DRYING | 1 | 1 | 1 |
| 14 | P | 117909 999 | WASHER, LOCK, FOR #8, SCREW | 4 | 4 | 4 |
| 15 | P | 117009 219 | SWITCH, OVERTEMPERATURE, MANUAL RESET, 315F | 1 | 1 | 1 |
| 16 | P | 117912 426 | O-RING, SILICON, 15/16" O.D. X 3/4" I.D. | 1 | 1 | 1 |
| 17 | P | 117021 283 | GROUND, DRYING | 2 | 2 | 2 |
| 18 | P | 117021 200 | ELEMENT, HEATER, 208 V, 2500 W | 3 | | |
| | P | 117021 201 | ELEMENT, HEATER, 415 V, 2500 W | | 3 | |
| | P | 117021 202 | ELEMENT, HEATER, 480 V, 2500 W | | | 3 |
| 19 | P | 117950 856 | SCREW, TRUSS HEAD, S/S, 8-32 X 3/8" | 6 | 6 | 6 |
| 20 | P | 117021 139 | COVER, ELECTRIC BOX, DRYING | 1 | 1 | 1 |
| | P | 117958 665 | ISOLATION, RIGID, WITH VAPOR BARRIER (Not Shown) | 1 | 1 | 1 |
| | P | 117958 888 | ADHESIVE TAPE, ALUMINIUM, 3" X 300' (Not Shown) | A/R | A/R | A/R |



REF.: 920-014-057

Figure 9-7. Drying Filters

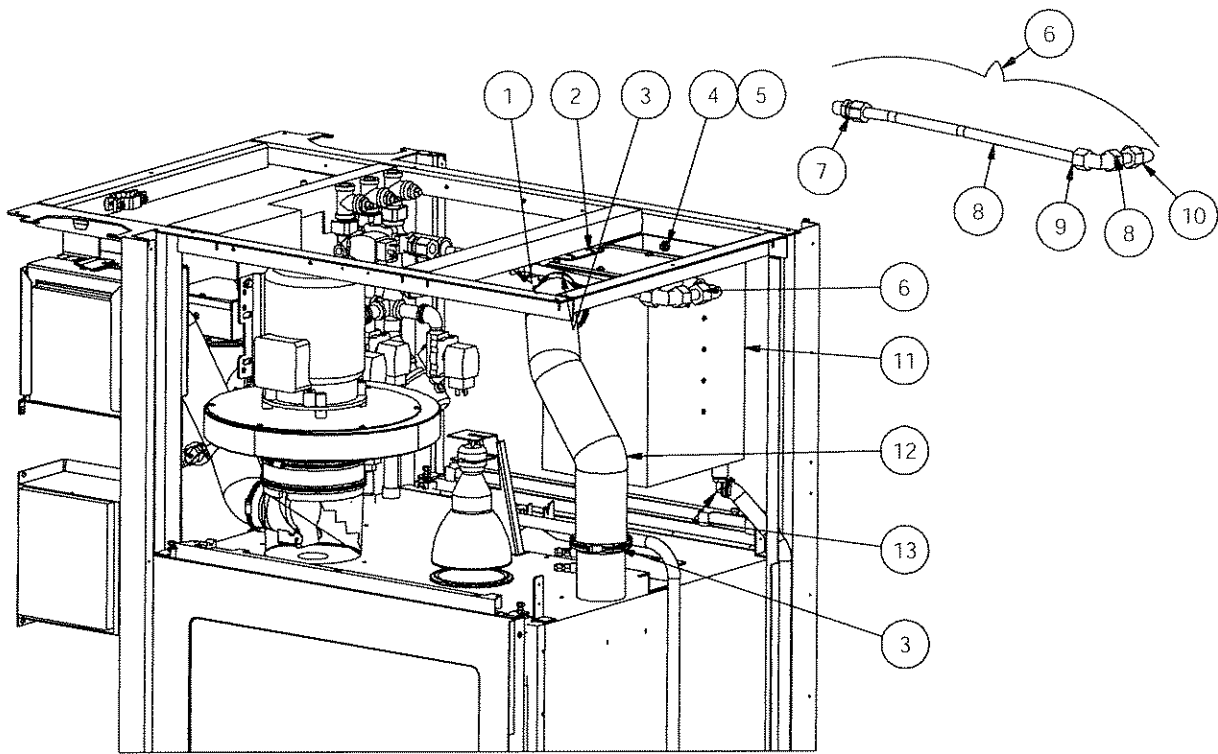
| FIG. & ITEM NO. | PART NUMBER | | DESCRIPTION | UNITS PER ASSEMBLY | | |
|-----------------------|----------------|------------|---|-----------------------|--|--|
| 9-7 | | | DRYING FILTERS | X | | |
| 1 | P | 117005 940 | FILTER, DRYING | 1 | | |
| 2 | P | 117021 239 | BOX, HEPA FILTER, ASSEMBLY | 1 | | |
| 3 | P | 117021 203 | HEPA FILTER, 8" X 8" X 5-7/8" | 1 | | |
| 4 | P | 117950 855 | SCREW, TRUSS HEAD, S/S, 8-32 X 1/4" | 2 | | |
| 5 | P | 117950 790 | CLAMP, S/S, #44, 2-5/16" @ 3-1/4" | 2 | | |
| 6 | P | 117024 334 | HOSE, VENTILATION, 2-1/2" DIAMETER X 23" LONG | 1 | | |
| | P | 117943 331 | HOSE, AIR, FLEXIBLE, 2-1/2" DIAMETER | A/R | | |



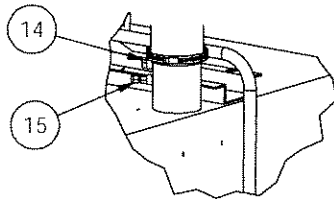
REF.: #920-014-825

Figure 9-8. Interior Light

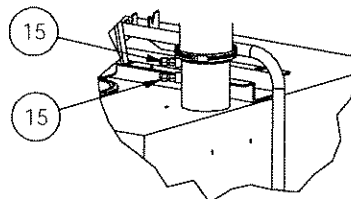
| FIG. & ITEM NO. | PART NUMBER | | | DESCRIPTION | UNITS PER ASSEMBLY | | |
|-----------------------|----------------|--------|-----|--|-----------------------|--|--|
| 9-8 | | | | INTERIOR LIGHT | X | | |
| 1 | P | 117950 | 865 | SCREW, TRUSS HEAD, S/S, 10-32 X 1/4" | 2 | | |
| 2 | P | 117903 | 815 | SOCKET, INTERIOR LIGHT, ASSEMBLY | 1 | | |
| 3 | P | 117018 | 047 | HOLDER, LIGHT | 1 | | |
| 4 | P | 117906 | 132 | REFLECTOR, FLUORESCENT, FLOOD, 20 W | 1 | | |
| 5 | P | 117906 | 131 | GLASS, ROUND, TEMPERED, 4 1/2" | 1 | | |
| 6 | P | 117906 | 137 | GASKET, LIGHT | 1 | | |



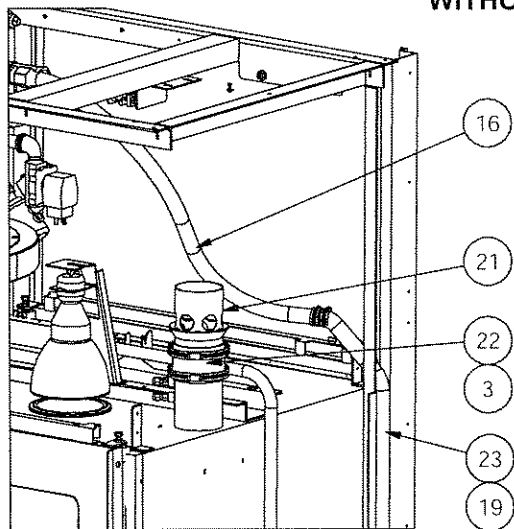
WITH CONDENSER



WITHOUT MONITORING



WITH MONITORING



WITHOUT CONDENSER

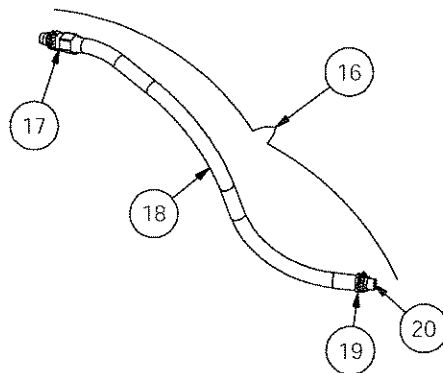
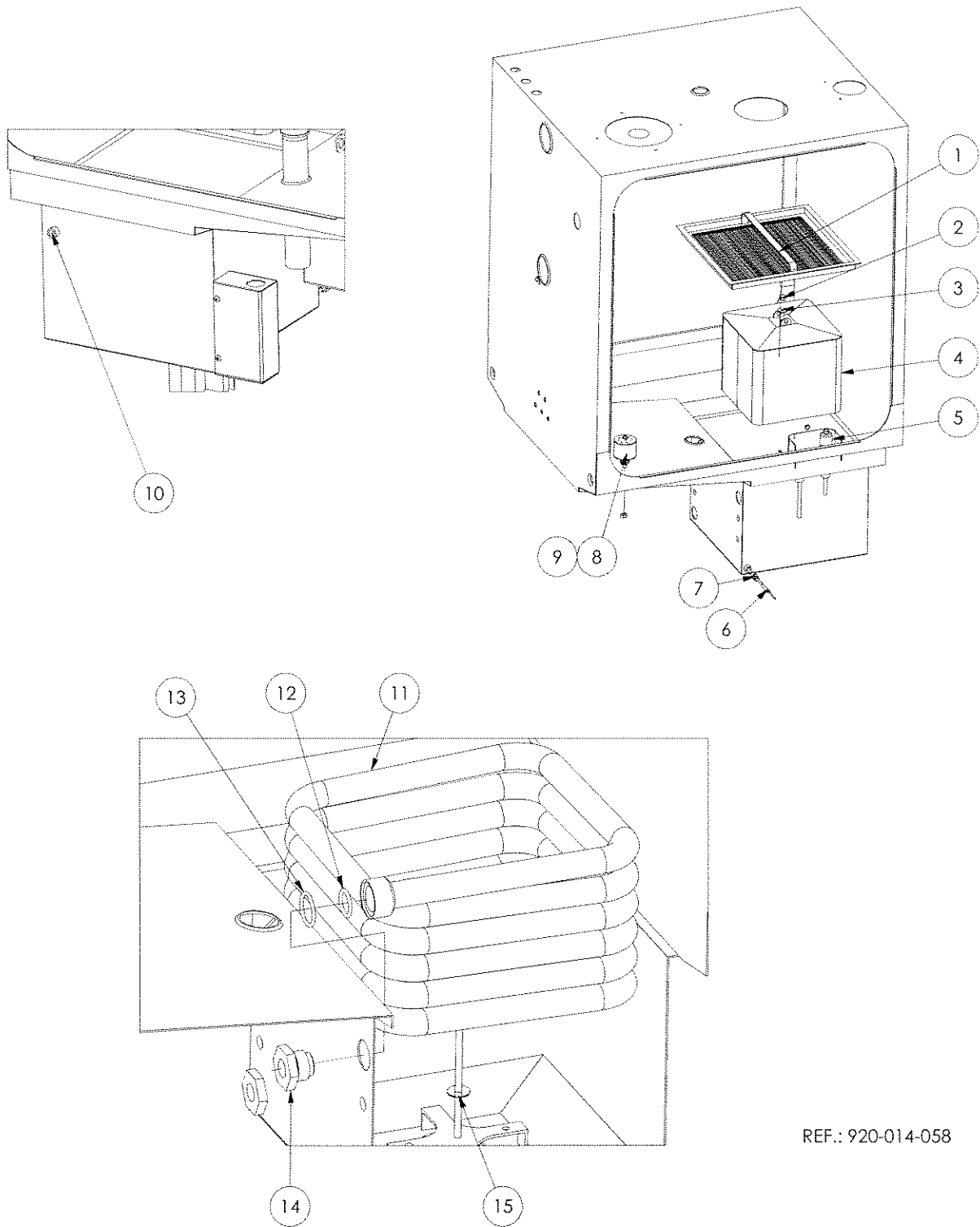


Figure 9-9. Condenser System, Top View

REF.: 920-016-073

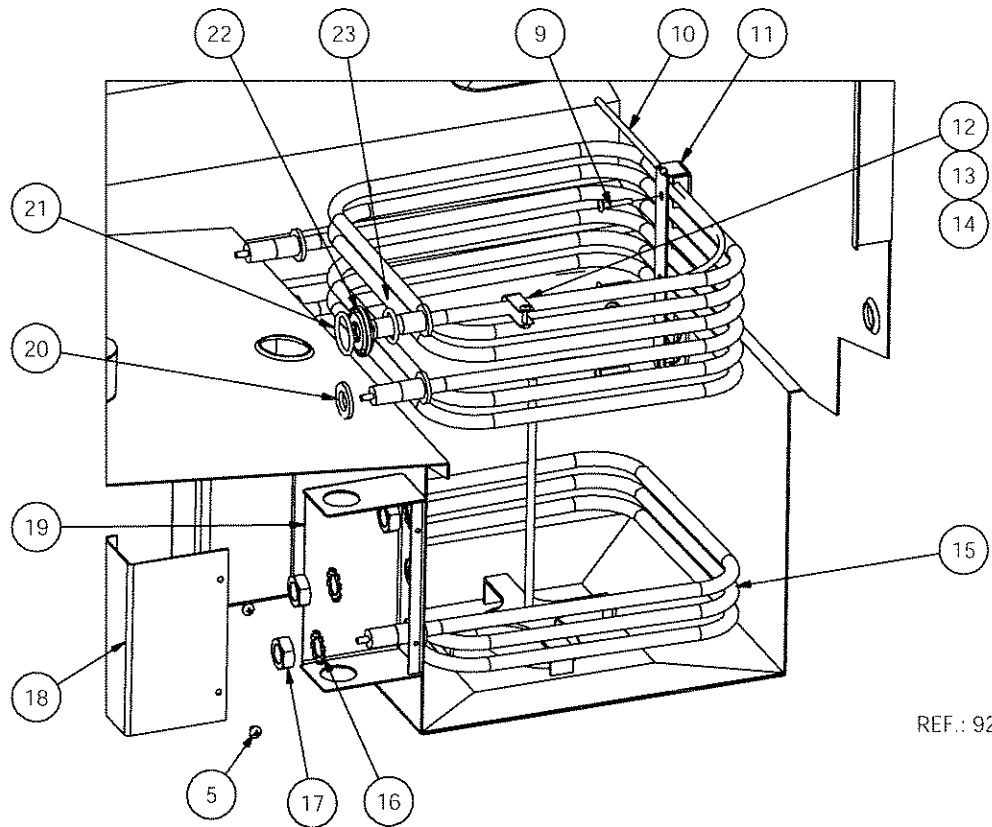
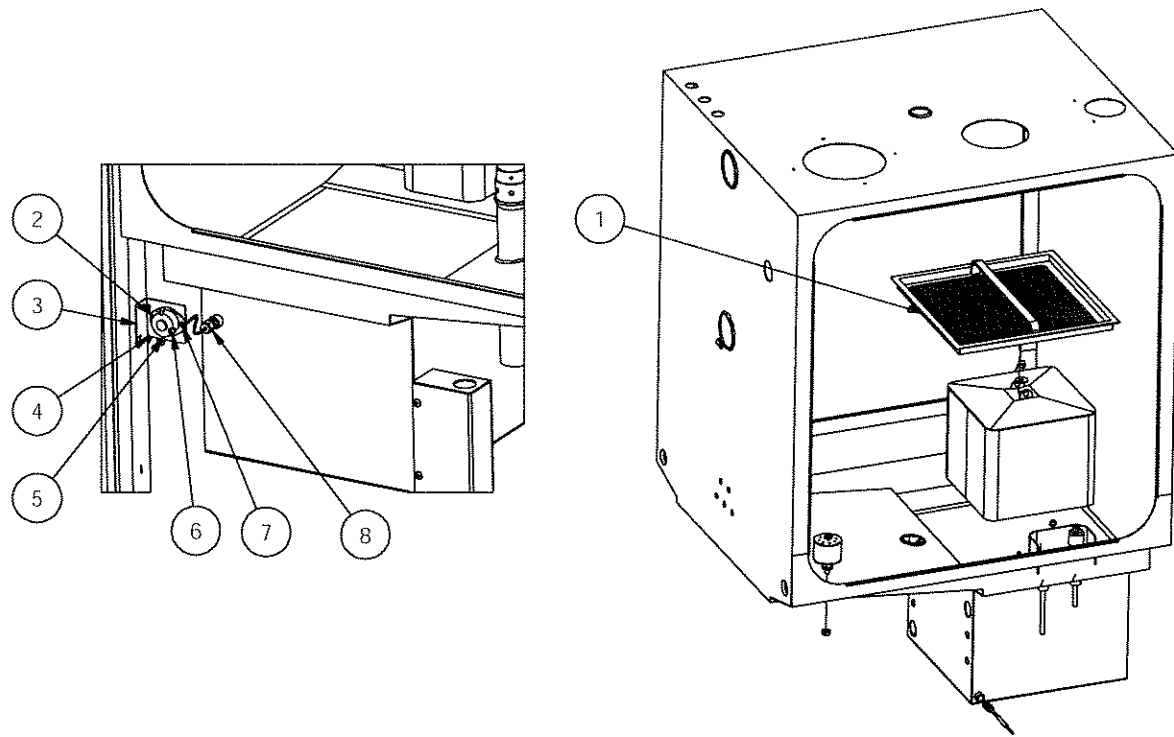
| FIG. & ITEM NO. | PART NUMBER | | | DESCRIPTION | UNITS PER ASSEMBLY | | |
|-----------------|-------------|--------|-----|---|--------------------|--|--|
| | | | | | | | |
| 9-9 | | | | CONDENSER SYSTEM, TOP VIEW | X | | |
| 1 | P | 117021 | 339 | SNAP-IN BUSHING, NYLON, 5/8" I.D. X 3/4" HOLE | 1 | | |
| 2 | P | 117908 | 485 | TAPPING SCREW, S/S, 1/4-20 x 3/4", PAN/PHILIPS | 2 | | |
| 3 | P | 117950 | 791 | CLAMP, S/S, #52, 2-13/16" @ 3-3/4" | 2 | | |
| 4 | P | 117950 | 952 | NUT, S/S, 1/4-20 | 2 | | |
| 5 | P | 117950 | 976 | WASHER, S/S, 1/4" | 2 | | |
| 6 | P | 117021 | 335 | WATER INLET, CONDENSER | 1 | | |
| 7 | P | 117912 | 577 | ADAPTOR, POLYPROPYLENE, 1/2" M X 5/8" O.D. | 1 | | |
| 8 | P | 117912 | 580 | TUBING, PEX, 1/2" I.D. | 1 | | |
| 9 | P | 117912 | 573 | ELBOW, POLYPROPYLENE, 90°, 5/8" O.D. X 5/8" O.D. | 1 | | |
| 10 | P | 117912 | 570 | ELBOW, POLYPROPYLENE, 90°, 1/2" M X 5/8" O.D. | 1 | | |
| 11 | P | 117021 | 260 | CONDENSER & COVER, ASSEMBLY | 1 | | |
| 12 | P | 117906 | 923 | HOSE, AIR, FLEXIBLE, 3" DIAMETER | A/R | | |
| 13 | P | 117913 | 234 | ELBOW, POLYPROPYLENE, 90°, 3/4" BARB X 1/2" M | 1 | | |
| 14 | P | 117909 | 491 | PLUG, S/S, 1/8" M, HEXAGONAL HEAD (Without Independent Monitor Option) | 1 | | |
| 15 | P | 117955 | 591 | FITTING, COMPRESSION, S/S, 1/8" M X 1/8" O.D. (Without independent Monitor Option, Qty = 1) | 2 | | |
| 16 | P | 117021 | 348 | CONNECTOR, FAN, OUTLET | 1 | | |
| 17 | P | 117021 | 126 | RESTRICTION (Without Condenser) | 1 | | |
| 18 | P | 117952 | 304 | HOSE, PVC, 5/8" I.D. X 7/8" O.D., CLEAR (Sold by Foot) | A/R | | |
| 19 | P | 117950 | 785 | CLAMP, S/S, #10, 9/16" @ 1-1/16" | 4 | | |
| 20 | P | 117913 | 024 | HOSE FITTING, POLYPROPYLENE, 5/8" BARBED X 5/8" BARBED | 1 | | |
| 21 | P | 117021 | 351 | CONNECTOR, FAN, OUTLET | 1 | | |
| 22 | P | 117950 | 667 | HOSE, 3" X 2-1/4", BLACK | 1 | | |
| 23 | P | 117913 | 233 | HOSE, REINFORCED VINYL, 5/8" (Sold by Foot) | A/R | | |



REF.: 920-014-058

Figure 9-10. Wash Chamber Interior, Steam-Heated Unit

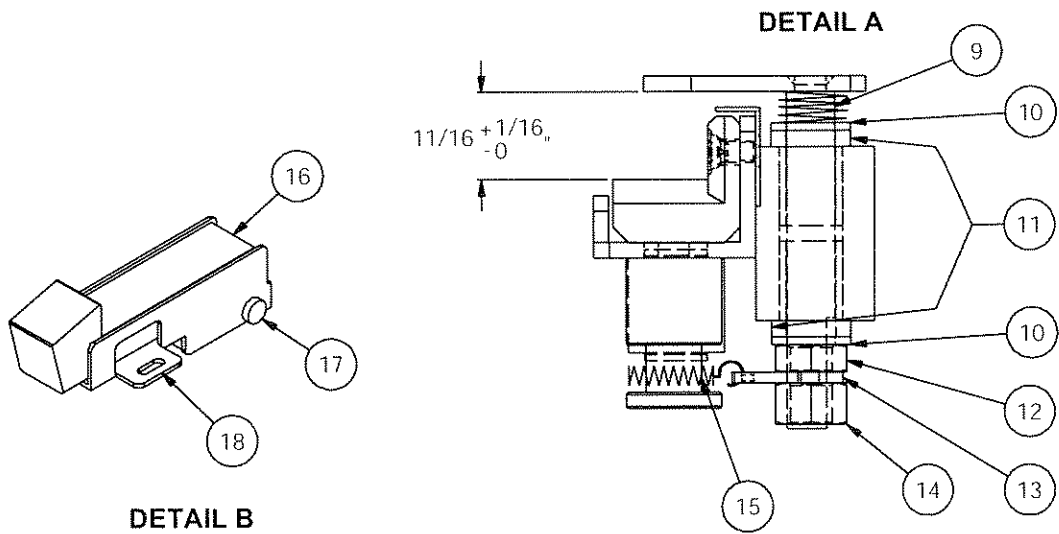
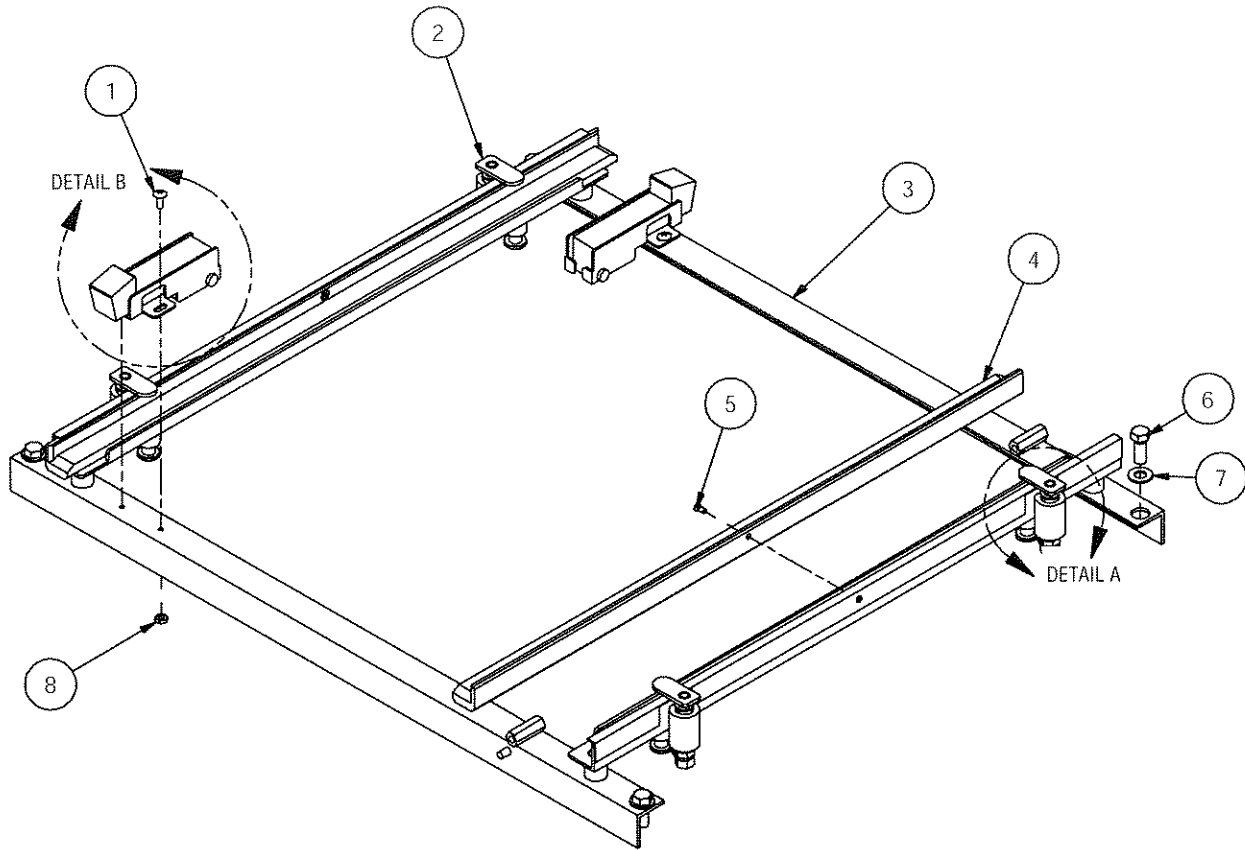
| FIG. & ITEM NO. | PART NUMBER | | | DESCRIPTION | UNITS PER ASSEMBLY |
|-----------------------|----------------|--------|-----|---|-----------------------|
| 9-10 | | | | WASH CHAMBER INTERIOR, STEAM-HEATED UNIT | X |
| 1 | P | 117021 | 150 | FILTER, BOTTOM SUMP, EPO | 1 |
| 2 | P | 117021 | 251 | NUT, WATER REDUCTION BOX, SUMP | 1 |
| 3 | P | 117911 | 645 | O-RING, SILCON, 11/16" O.D. X 9/16" I.D. | 1 |
| 4 | P | 117021 | 165 | BOX, WATER REDUCTION | 1 |
| 5 | P | 117015 | 620 | SENSOR, WATER LEVEL, ASSEMBLY | 2 |
| 6 | P | 117910 | 872 | RTD, 100 OHMS (Without Independent Monitor Option) | 1 |
| 7 | P | 117015 | 503 | RTD, DUAL ELEMENT (With Independent Monitor Option) | 1 |
| 8 | P | 117955 | 591 | FITTING, COMPRESSION, S/S, 1/8" M X 1/8" O.D. | 1 |
| 9 | P | 117020 | 405 | O-RING, SILICON, 9/16" O.D. X 3/8" I.D. | 1 |
| 10 | P | 117021 | 340 | WATER LEVEL SENSOR, SUMP, ASSEMBLY | 1 |
| 11 | P | 117954 | 461 | PLUG, S/S, 1/8" M | 1 |
| 12 | P | 117021 | 220 | COIL, STEAM, SUMP | 1 |
| 13 | P | 117013 | 939 | O-RING, EPDM, 1-1/8" O.D. X 7/8" I.D. | 2 |
| 14 | P | 117013 | 940 | O-RING, EPDM, 1-3/8" O.D. X 1-1/8" I.D. | 2 |
| 15 | P | 117013 | 937 | CONNECTOR, MALE, STEAM COIL | 2 |
| 15 | P | 117021 | 181 | SEAL, WATER REDUCER BOX | 1 |



REF : 920-014-059

Figure 9-11. Wash Chamber Interior, Electric-Heated Unit

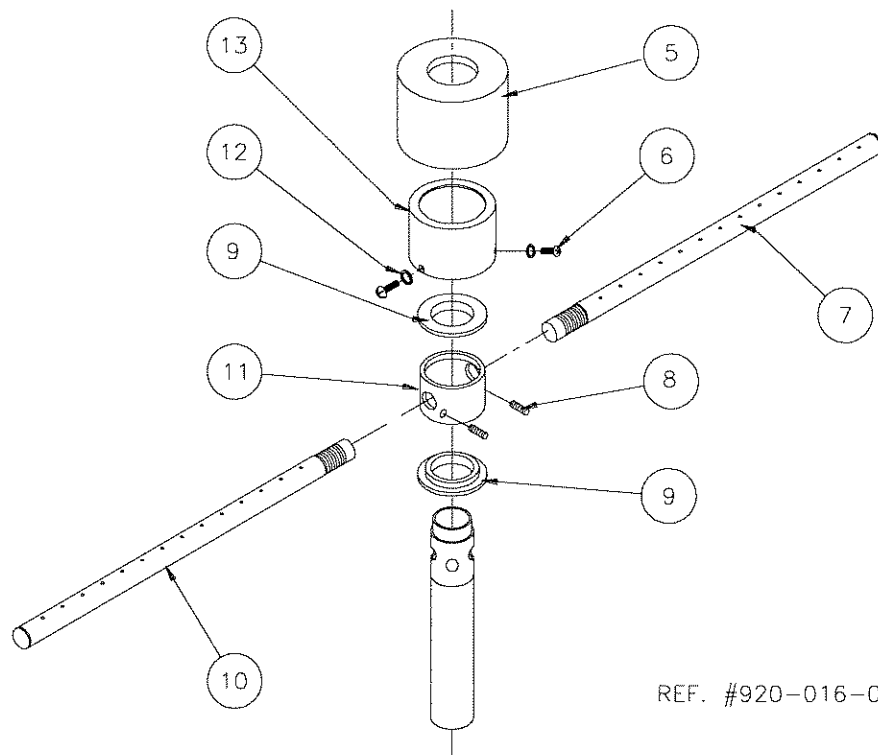
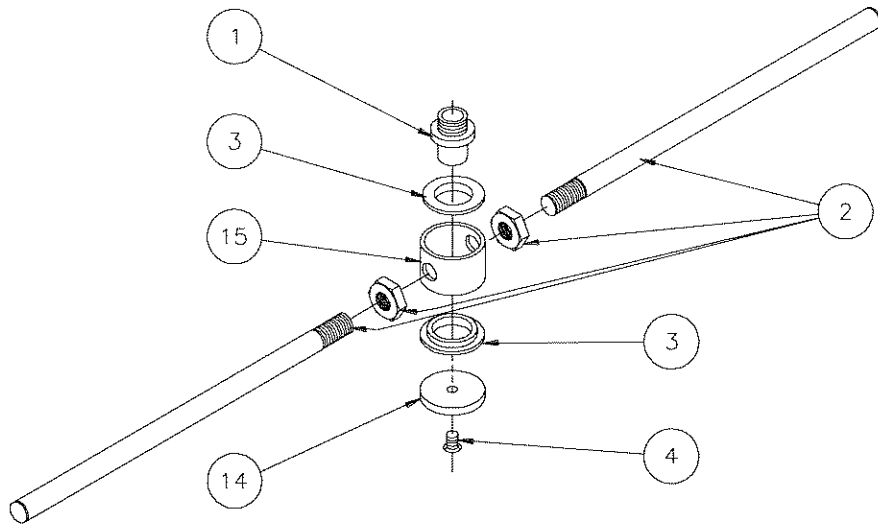
| FIG. & ITEM NO. | PART NUMBER | | DESCRIPTION | UNITS PER ASSEMBLY | |
|-----------------------|----------------|---|--|-----------------------|---|
| | | | | | |
| 9-11 | | | WASH CHAMBER INTERIOR, ELECTRIC-HEATED UNIT, 415 V | X | |
| | | | WASH CHAMBER INTERIOR, ELECTRIC-HEATED UNIT, 480 V | | X |
| | 1 | P 117021 150 | FILTER, BOTTOM SUMP, EPO..... | 1 | 1 |
| | 2 | P 117020 839 | THERMODISC, MANUAL RESET, 260 F, ASSEMBLY..... | 1 | 1 |
| | 3 | P 117021 268 | SUPPORT, THERMODISK, HEATING ELEMENT, SUMP..... | 1 | 1 |
| | 4 | P 117909 999 | WASHER, LOCK, FOR #8 SCREW..... | 2 | 2 |
| | 5 | P 117950 855 | SCREW, TRUSS HEAD, S/S, 8-32 X 1/4"..... | 6 | 6 |
| | 6 | P 117950 849 | SCREW, TRUSS HEAD, S/S, 6-32 X 1/4"..... | 2 | 2 |
| | 7 | P 117909 007 | WASHER, LOCK, #6..... | 2 | 2 |
| | 8 | P 117954 593 | FITTING, COMPRESSION, S/S, 1/8" M X 3/16" O.D..... | 1 | 1 |
| | 9 | P 117950 859 | SCREW, TRUSS HEAD, S/S, 8-32 X 1"..... | 3 | 3 |
| | 10 | P 117021 254 | SLEEVE, THERMODISC, SUMP..... | 1 | 1 |
| | 11 | P 117021 274 | SUPPORT, HEATING ELEMENT, SUMP..... | 1 | 1 |
| | 12 | P 117984 793 | CLIP, RETAINING..... | 1 | 1 |
| | 13 | P 117950 949 | NUT, S/S, 6-32..... | 1 | 1 |
| | 14 | P 117950 851 | SCREW, TRUSS HEAD, S/S, 6-32 X 1/2"..... | 1 | 1 |
| | 15 | P 117021 219 | ELEMENT, HEATER, 415 V, 5 kW..... | 3 | |
| | | P 117021 223 | ELEMENT, HEATER, 480 V, 5 kW..... | | 3 |
| | 16 | P 117909 000 | WASHER, LOCK, 5/8"..... | 6 | 6 |
| | 17 | P 117953 466 | NUT, LOCK, S/S, 5/8"-18..... | 6 | 6 |
| | 18 | P 117021 265 | COVER, BOX, HEATING, ELEMENT SUMP..... | 2 | 2 |
| | 19 | P 117021 266 | BOX, HEATING ELEMENT, SUMP..... | 2 | 2 |
| | 20 | P 117984 794 | WASHER, HEATING ELEMENT..... | 4 | 4 |
| 21 | P 117013 940 | O-RING, EPDM, 1-3/8" O.D. X 1-1/8" I.D..... | 2 | 2 | |
| 22 | P 117021 299 | ADAPTER, HEATING ELEMENT, SUMP..... | 2 | 2 | |
| 23 | P 117021 290 | O-RING, EPDM, 15/16" O.D. X 11/16" I.D..... | 2 | 2 | |



REF.: 920-016-071

Figure 9-12. Loading Rack Assembly

| FIG. & ITEM NO. | PART NUMBER | | | DESCRIPTION | UNITS PER ASSEMBLY |
|-----------------------|----------------|--------|-----|--|-----------------------|
| 9-12 | | | | LOADING RACK ASSEMBLY | X |
| 1 | P | 117950 | 867 | SCREW, TRUSS HEAD, S/S, 10-32 X 1/2" | 4 |
| 2 | P | 117999 | 297 | ROD, RETAINING, FOR BASKET LOADING | 4 |
| 3 | P | 117020 | 245 | LOADING RACK | 1 |
| 4 | P | 117015 | 515 | GUIDE, LOADING RACK, SLIDING | 2 |
| 5 | P | 117950 | 827 | SCREW, FLAT HEAD, S/S, 8-32 X 3/8" | 2 |
| 6 | P | 117950 | 916 | BOLT, S/S, 3/8"-16 X 1" | 4 |
| 7 | P | 117950 | 978 | WASHER, S/S, 3/8" | 4 |
| 8 | P | 117950 | 951 | NUT, S/S, 10-32 | 4 |
| 9 | P | 117999 | 279 | SPRING, UP, FOR RETAINING ROD | 4 |
| 10 | P | 117999 | 298 | WASHER, S/S, 3/8" X 5/8" O.D. | 8 |
| 11 | P | 117906 | 586 | BUSHING, LOCKING BASKET | 8 |
| 12 | P | 117906 | 024 | NUT, S/S, LOCKING, 3/8"-24 | 4 |
| 13 | P | 117999 | 275 | SPRING, FIXTURE, BASKET, LOCKING | 4 |
| 14 | P | 117907 | 518 | NUT, S/S, 3/8"-24 | 4 |
| 15 | P | 117003 | 201 | SPRING, DOWN | 4 |
| 16 | P | 117015 | 509 | STOPPER, BASKET | 2 |
| 17 | P | 117015 | 508 | PARTITION, SEX BOLT, S/S, 10-24 | 2 |
| 18 | P | 117015 | 510 | SUPPORT, STOPPER, BASKET | 2 |



REF. #920-016-056

Figure 9-13. Rotary Spray Arm Assembly

| FIG. & ITEM NO. | PART NUMBER | | DESCRIPTION | UNITS PER ASSEMBLY |
|-----------------|-------------|------------|---|--------------------|
| 9-13 | | | ROTARY SPRAY ARM ASSEMBLY | X |
| 1 | P | 117988 384 | HOLDER, ROTARY SPRAY | 1 |
| 2 | P | 117903 739 | ARM, ROTARY SPRAY (Two Spray Arms, With Nuts) | 1 |
| 3 | P | 117987 854 | BUSHING, ROTARY SPRAY | 2 |
| 4 | P | 117950 835 | SCREW, FLAT HEAD, S/S, 10-32 X 3/8" | 1 |
| 5 | P | 117988 265 | INLET, SLIDING | 1 |
| 6 | P | 117950 849 | SCREW, TRUSS HEAD, S/S, 6-32 X 1/4" | 3 |
| 7 | P | 117996 191 | ROTARY SPRAY, SUMP, ASSEMBLY | 1 |
| 8 | P | 117951 017 | SCREW, SOCKET SET, S/S, 6-32 X 1/4", CUP | 2 |
| 9 | P | 117988 267 | BUSHING, ROTARY SPRAY | 2 |
| 10 | P | 117988 273 | ARM, ROTARY SPRAY | 1 |
| 11 | P | 117988 269 | HUB, SPRAY ARM | 1 |
| 12 | P | 117950 985 | LOCKWASHER, S/S, 3/10" | 3 |
| 13 | P | 117988 268 | RING, RETAINING | 1 |
| 14 | P | 117987 856 | WASHER, ROTARY SPRAY | 1 |
| 15 | P | 117988 386 | HUB, TOP, ROTARY SPRAY | 1 |

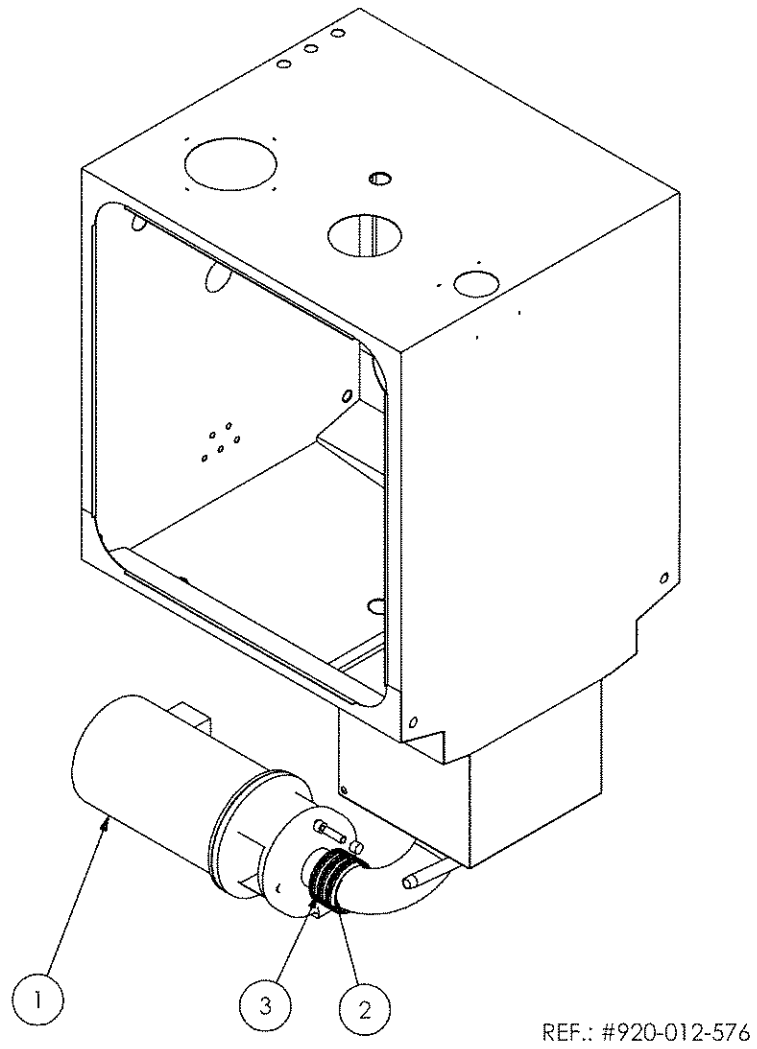


Figure 9-14. Recirculation (Pump Inlet) Piping

| FIG. & ITEM NO. | PART NUMBER | | DESCRIPTION | UNITS PER ASSEMBLY | | |
|-----------------------|----------------|-----|---|-----------------------|--|--|
| 9-14 | | | RECIRCULATION (PUMP INLET) PIPING | X | | |
| 1 | | | RECIRCULATION PUMP, 7.5hp (see Figure 9-16) | 1 | | |
| 2 | 117950 | 667 | HOSE, 3" X 2-1/4", BLACK | 1 | | |
| 3 | 117950 | 791 | CLAMP, S/S, #52, 2-13/16" @ 3-3/4" | 3 | | |

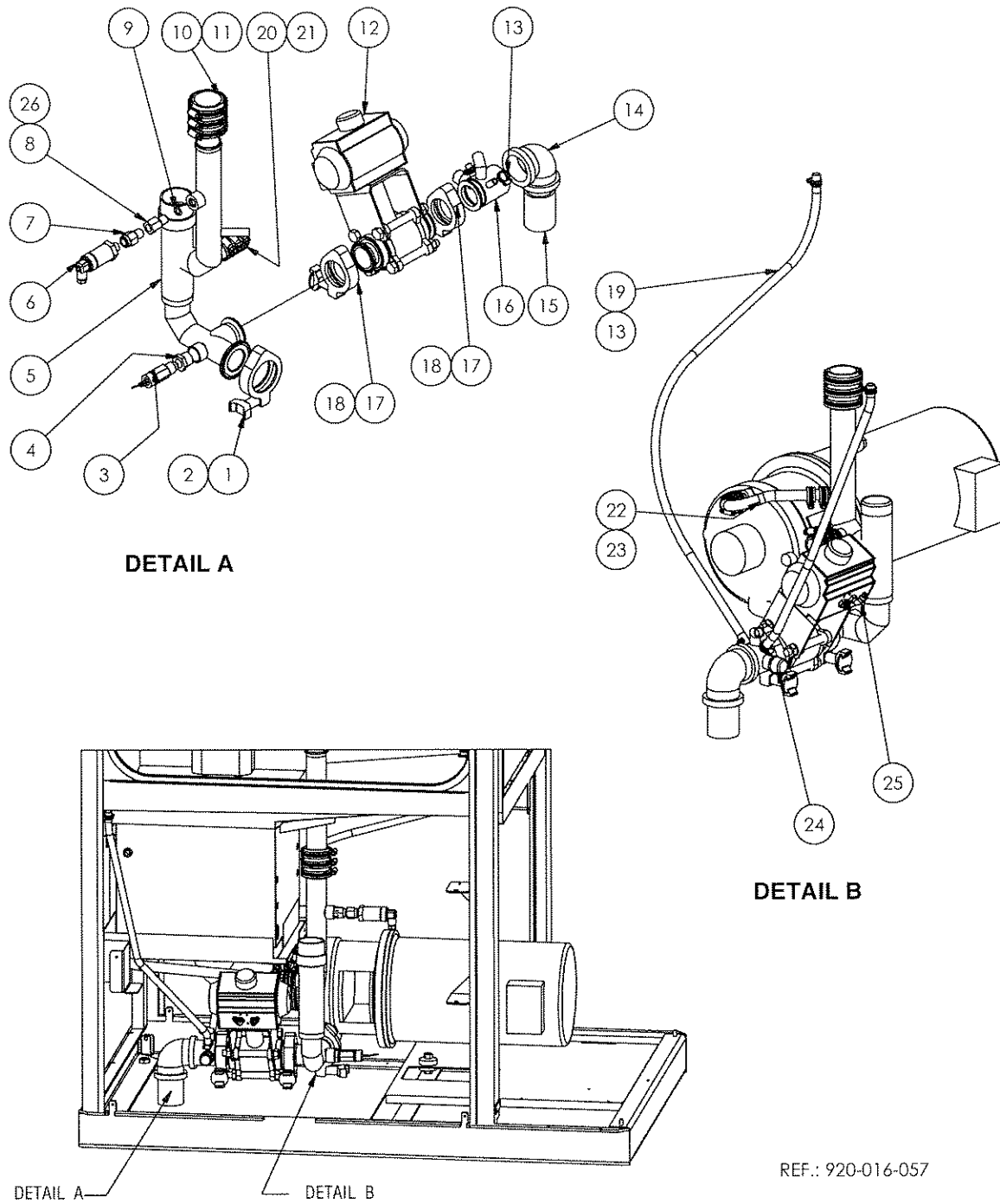
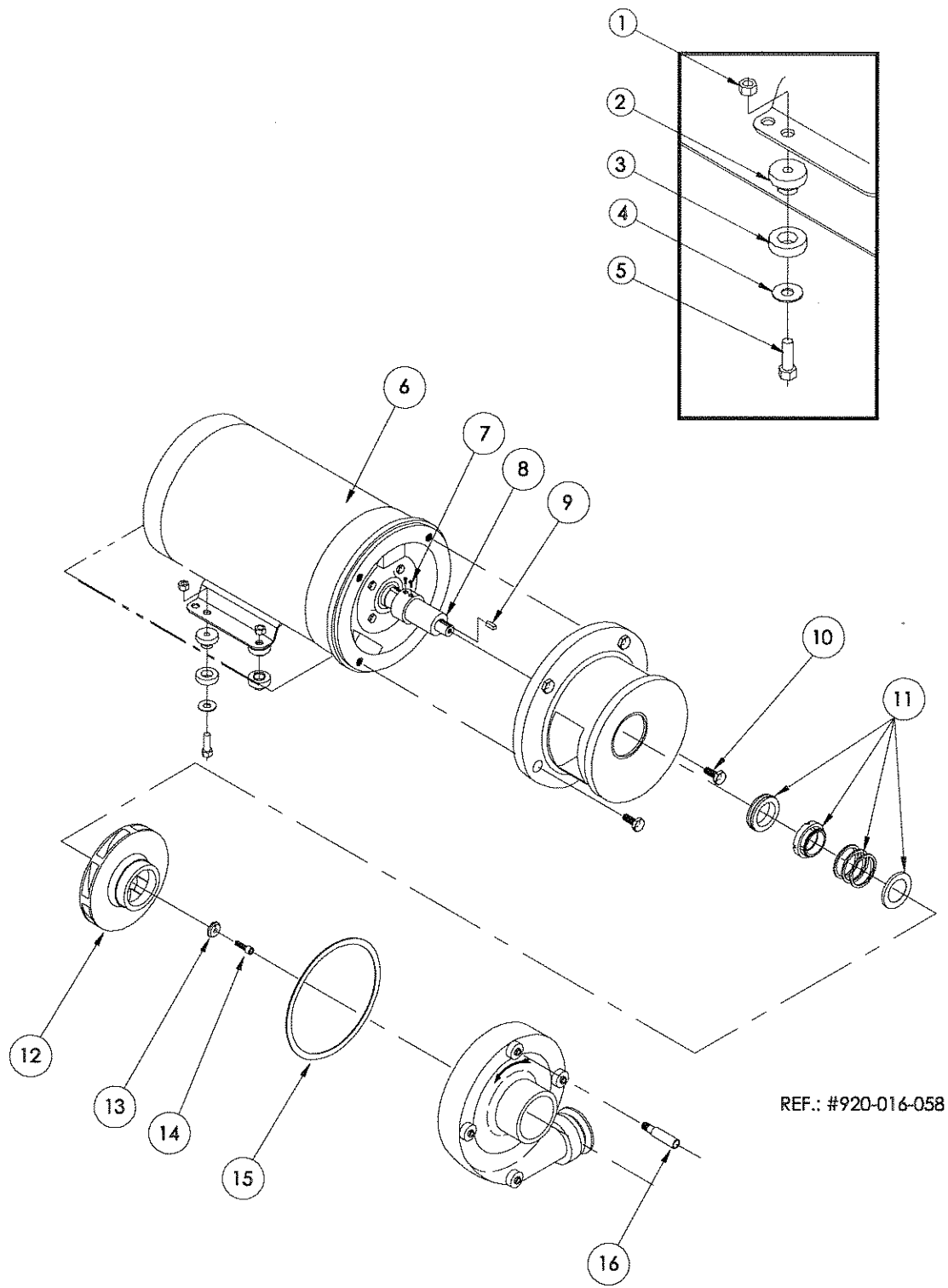


Figure 9-15. Recirculation (Pump Outlet) Piping

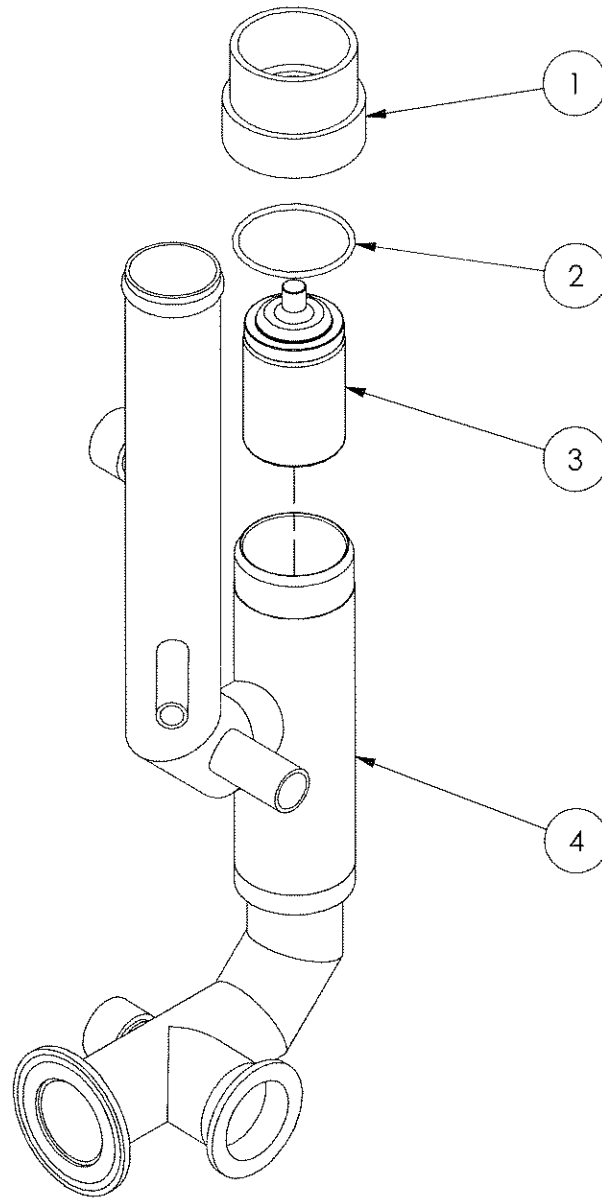
| FIG. & ITEM NO. | PART NUMBER | | DESCRIPTION | UNITS PER ASSEMBLY |
|-----------------|-------------|------------|--|--------------------|
| 9-15 | | | RECIRCULATION (PUMP OUTLET) PIPING | X |
| 1 | P | 117951 568 | O'RING, 2" | 1 |
| 2 | P | 117950 808 | CLAMP, QUICK DISCONNECT, 2" | 1 |
| 3 | P | 117909 396 | SENSOR, LIQUID LEVEL | 1 |
| 4 | P | 117021 249 | REDUCER, POLYPROPYLENE, 1/2" NPT X 3/8" NPT | 1 |
| 5 | | | DRYING VALVE (See Figure 9-17) | 1 |
| 6 | P | 117015 400 | TRANSMITTER, PRESSURE, 0-60 PSI | 1 |
| 7 | P | 117018 625 | SNUBBER, POROUS DISC | 1 |
| 8 | P | 117015 520 | ADAPTOR, PRESSURE TRANSMITTER | 1 |
| 9 | P | 117015 629 | O-RING, EPDM, 9/16" O.D. X 3/8" I.D. | 1 |
| 10 | P | 117950 796 | HOSE, 1-1/2" X 2-1/4", BLACK | 1 |
| 11 | P | 117950 789 | CLAMP, S/S, #28, 1-5/16" @ 2-1/4" | 3 |
| 12 | P | 117021 327 | VALVE, PNEUMATIC, 1-1/2" | 1 |
| | P | 117943 209 | REPAIR KIT, #RKN111TT FOR VALVE 1.5" | 1 |
| | P | 117913 538 | ACTUATOR, PNEUMATIC, FOR VALVE 117-021-327 | 1 |
| 13 | P | 117950 783 | CLAMP, S/S, #4, 1/4" @ 5/8" | 4 |
| 14 | P | 117954 487 | ELBOW, 2" | 1 |
| 15 | P | 117954 465 | UNION, S/S, 1-1/2" X 2-1/2" | 1 |
| 16 | P | 117021 316 | BOX, DRAIN | 1 |
| 17 | P | 117953 306 | O'RING, 1-1/2" | 2 |
| 18 | P | 117951 196 | CLAMP, QUICK DISCONNECT, 1-1/2" | 2 |
| 19 | P | 117952 302 | HOSE, REINFORCED VINYL, 3/8" | 1 |
| 20 | P | 117950 786 | CLAMP, S/S, #12, 9/16" @ 1-1/4" | 3 |
| 21 | P | 117950 798 | HOSE, 3/4" X 2-1/4", BLACK | 1 |
| 22 | P | 117903 700 | HOSE, 1/2" X 15-1/2", RED | 1 |
| 23 | P | 117950 784 | CLAMP, S/S, #6, 5/16" @ 7/8" | 4 |
| 24 | P | 117952 207 | PLUG, S/S, 1/2" F | 1 |
| 25 | P | 117902 319 | ELBOW, PNEUMATIC, 1/8" M X 5/32 | 2 |
| 26 | P | 117904 838 | BOLT, S/S, 1/2"-20 X 3/4" LONG (Plug without monitoring, optional) . | 1 |



REF.: #920-016-058

Figure 9-16. Recirculation Pump

| FIG. & ITEM NO. | PART NUMBER | | DESCRIPTION | UNITS PER ASSEMBLY | | |
|-----------------|-------------|------------|--|--------------------|---|---|
| | | | | | | |
| 9-16 | P | 117020 924 | RECIRCULATION PUMP, 7.5 HP, 208V, 60 Hz, ASSEMBLY | X | | |
| | P | 117020 925 | RECIRCULATION PUMP, 7.5 HP, 415 V, 50 Hz, ASSEMBLY ... | | X | |
| | P | 117020 926 | RECIRCULATION PUMP, 7.5 HP, 460 V, 60 Hz, ASSEMBLY ... | | | X |
| 1 | P | 117950 955 | NUT, S/S, 3/8-16 | 4 | 4 | 4 |
| 2 | P | 117015 409 | BUSHING, DOWEL | 4 | 4 | 4 |
| 3 | P | 117015 410 | BUSHING | 4 | 4 | 4 |
| 4 | P | 117950 978 | WASHER, S/S, 3/8" | 4 | 4 | 4 |
| 5 | P | 117957 207 | BOLT, S/S, 3/8-16 X 1-1/4" | 4 | 4 | 4 |
| 6 | P | 117024 301 | MOTOR, 7.5 HP, 208V, 60Hz, WITH TERMINAL | 1 | | |
| | P | 117024 303 | MOTOR, 7.5 HP, 415 V, 50Hz, WITH TERMINAL | | 1 | |
| | P | 117024 302 | MOTOR, 7.5 HP, 460V, 60 Hz, WITH TERMINAL | | | 1 |
| 7 | P | 117957 221 | SETSCREW, S/S, 1/4-20 X 1/4" | 2 | 2 | 2 |
| 8 | P | 117903 643 | SHAFT, STUB, PUMP | 1 | 1 | 1 |
| 9 | P | 117909 494 | KEY, PUMP SHAFT, 7.5 hp, | 1 | 1 | 1 |
| 10 | P | 117903 642 | KIT, BOLTS, FLANGE, MOUNTING | 4 | 4 | 4 |
| 11 | P | 117903 641 | SEAL, CERAMIC, MECHANICAL, PUMP | 1 | 1 | 1 |
| 12 | P | 117903 638 | IMPELLER, 7.5 hp, PUMP | 1 | 1 | 1 |
| 13 | P | 117903 639 | SPACER-WASHER, PUMP | 1 | 1 | 1 |
| 14 | P | 117903 645 | BOLT, MOUNTING, IMPELLER | 1 | 1 | 1 |
| 15 | P | 117903 640 | GASKET, CASING | 1 | 1 | 1 |
| 16 | P | 117902 916 | PIPING, AIR VENT | 1 | 1 | 1 |

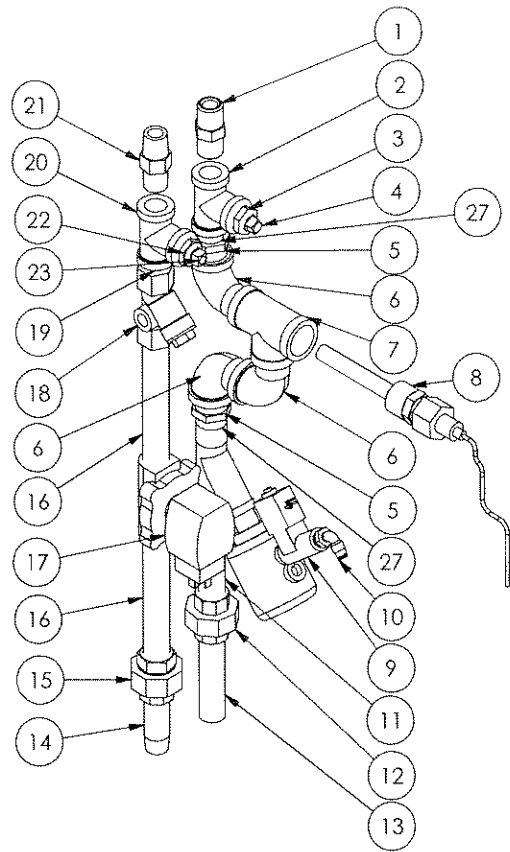


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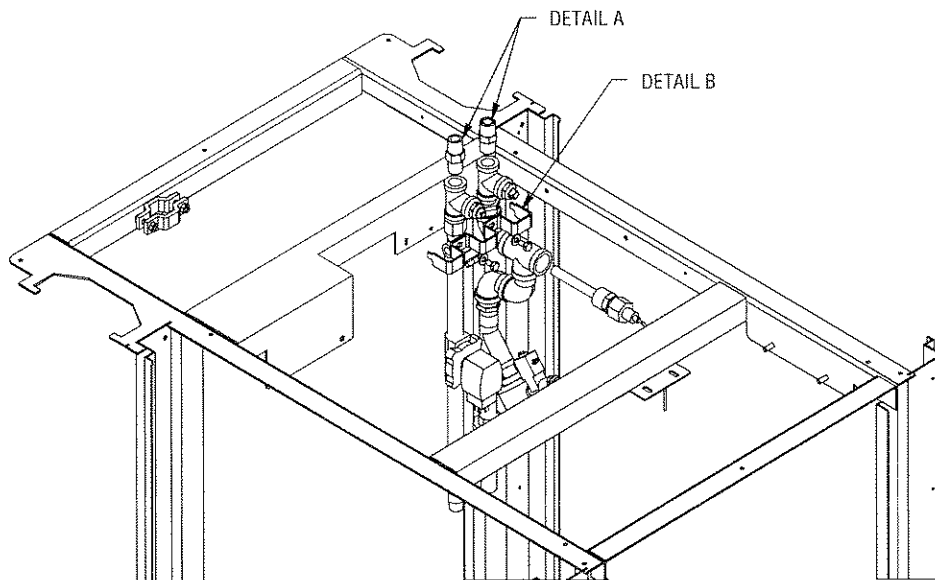
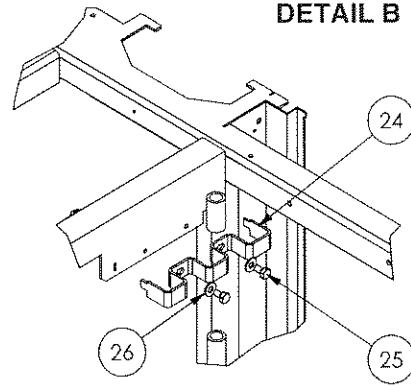
Figure 9-17. Drying Valve

| FIG. & ITEM NO. | PART NUMBER | | DESCRIPTION | UNITS PER ASSEMBLY |
|-----------------------|----------------|------------|--|-----------------------|
| 9-17 | | | DRYING VALVE | X |
| 1 | P | 117021 171 | COVER, DRYING VALVE | 1 |
| 2 | P | 117956 032 | RING, SEAL, 1-15/16" O.D. X 1-3/4" I.D. | 1 |
| 3 | P | 117021 352 | PISTON, DRYING VALVE, ASSEMBLY | 1 |
| 4 | P | 117021 140 | BODY, DRYING VALVE | 1 |

DETAIL A



DETAIL B



REF.: 920-016-059

Figure 9-18. Hot Water Supply Piping,
and Pure Water Supply Piping

| FIG. & ITEM NO. | PART NUMBER | | DESCRIPTION | UNITS PER ASSEMBLY |
|-----------------|-------------|------------|--|--------------------|
| 9-18 | | | HOT WATER SUPPLY PIPING, AND PURE WATER SUPPLY PIPING | X |
| 1 | P | 117015 539 | NIPPLE, HEXAGON, S/S, 1/2" NPT M X 1/2" BSPT M | 1 |
| 2 | P | 117953 728 | TEE, S/S 316, 1/2"F X 1/2"F X 1/2"F | 1 |
| 3 | P | 117942 797 | REDUCING BUSHING, S/S 316L, 1/2" M X 1/4" F | 1 |
| 4 | P | 117954 462 | PLUG, S/S, 1/4" NPT | 1 |
| 5 | P | 117953 971 | REDUCER, S/S 316 , 3/4" M X 1/2" F | 2 |
| 6 | P | 117902 062 | ELBOW, S/S 316, 90°, 3/4" M X 3/4" F | 3 |
| 7 | P | 117940 418 | TEE, S/S, 3/4" F X 3/4" F X 3/4" F | 1 |
| 8 | P | 117015 617 | SENSOR, CONDUCTIVITY (If Independant Monitor Option) | 1 |
| 9 | P | 117912 717 | VALVE, WATER, S/S 316L, 1/2" F, PNEUMATIC | 1 |
| | P | 117913 495 | KIT, REPAIR | 1 |
| 10 | P | 117903 707 | ELBOW, 90°, 1/4" M X 5/32" O.D. | 1 |
| 11 | P | 117954 472 | NIPPLE, S/S, 1/2" X 4" | 1 |
| 12 | P | 117952 166 | UNION, S/S, 1/2" F | 1 |
| 13 | P | 117905 926 | UNION, S/S 316, 1/2" X 3-1/2" | 1 |
| 14 | P | 117952 054 | NIPPLE, BRASS, 1/2" NPT X 2-1/2" | 1 |
| 15 | P | 117952 176 | UNION, BRASS, 1/2"F | 1 |
| 16 | P | 117952 060 | NIPPLE, BRASS, 1/2" X 5-1/2" | 2 |
| 17 | P | 117956 359 | VALVE, WATER, COPPER, 1/2", CONNECTOR 120 V, | 1 |
| | P | 764316 147 | KIT, REPAIR (Alternate Item 117950-174) | 1 |
| | P | 764323 940 | COIL, Spare (Alternate Item 117955-186) | 1 |
| 18 | P | 117950 177 | STRAINER, BRONZE, 1/2" F, WATER | 1 |
| 19 | P | 117952 051 | NIPPLE, BRASS, 1/2", CLOSED | 1 |
| 20 | P | 117952 139 | TEE BRASS 1/2"F X 1/2"F X 1/2"F | 1 |
| 21 | P | 117907 262 | NIPPLE, BRASS 1/2"NPT X 1/2"BSPT X 2"LG | 1 |
| 22 | P | 117952 186 | ADAPTER, 1/2 NPT m x 1/4 NPT F | 1 |
| 23 | P | 117952 210 | PLUG, COPPER, 1/4" NPT | 1 |
| 24 | P | 117021 252 | SUPPORT, WATER INLET PIPING, SYNERGY | 1 |
| 25 | P | 117950 899 | BOLT, S/S, 1/4-20 X 1/2" | 2 |
| 26 | P | 117950 976 | WASHER, S/S 1/4" | 2 |
| 27 | P | 117953 727 | RACCORD, A/I 1/2" X 1-1/2" 316 | 2 |

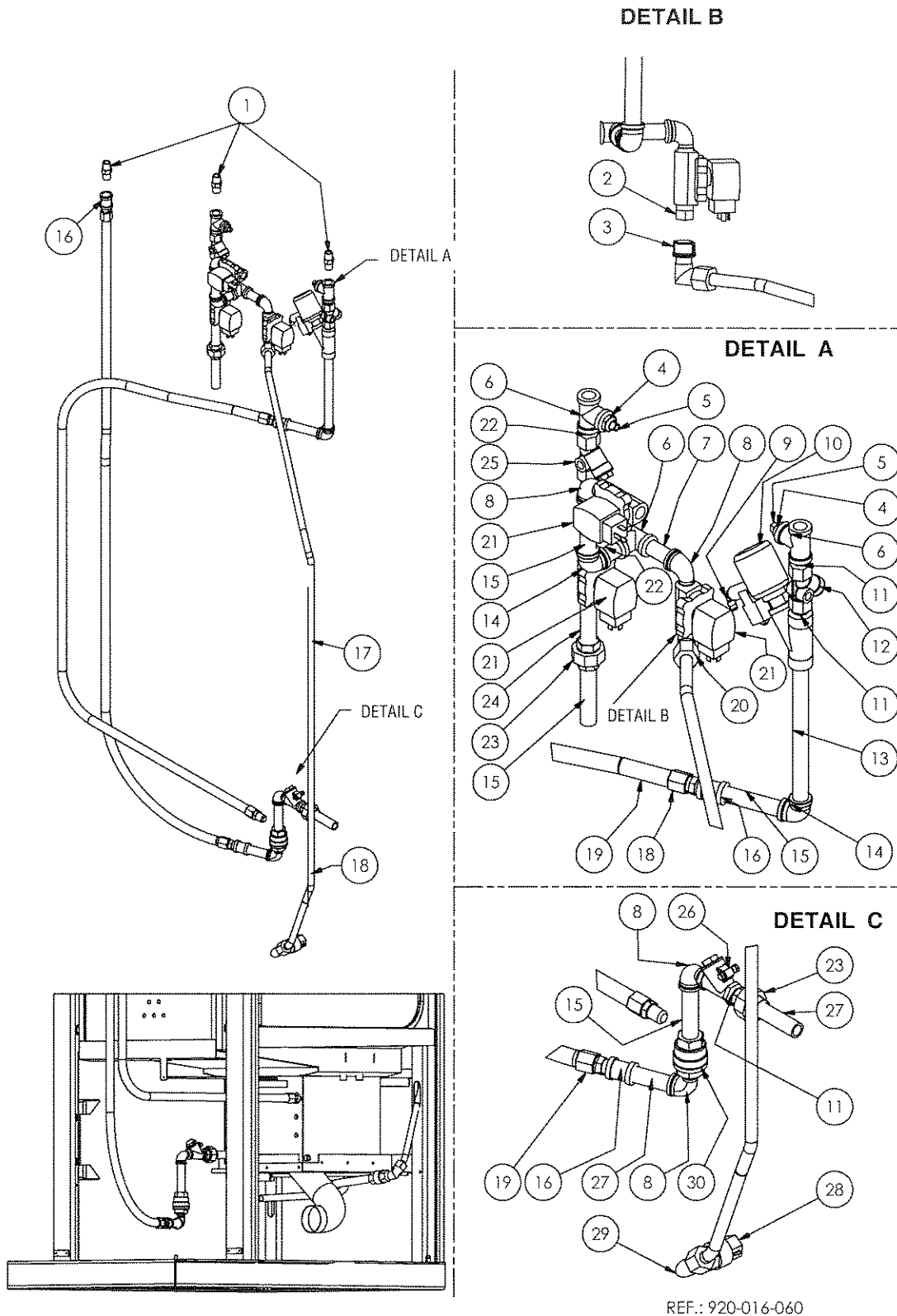
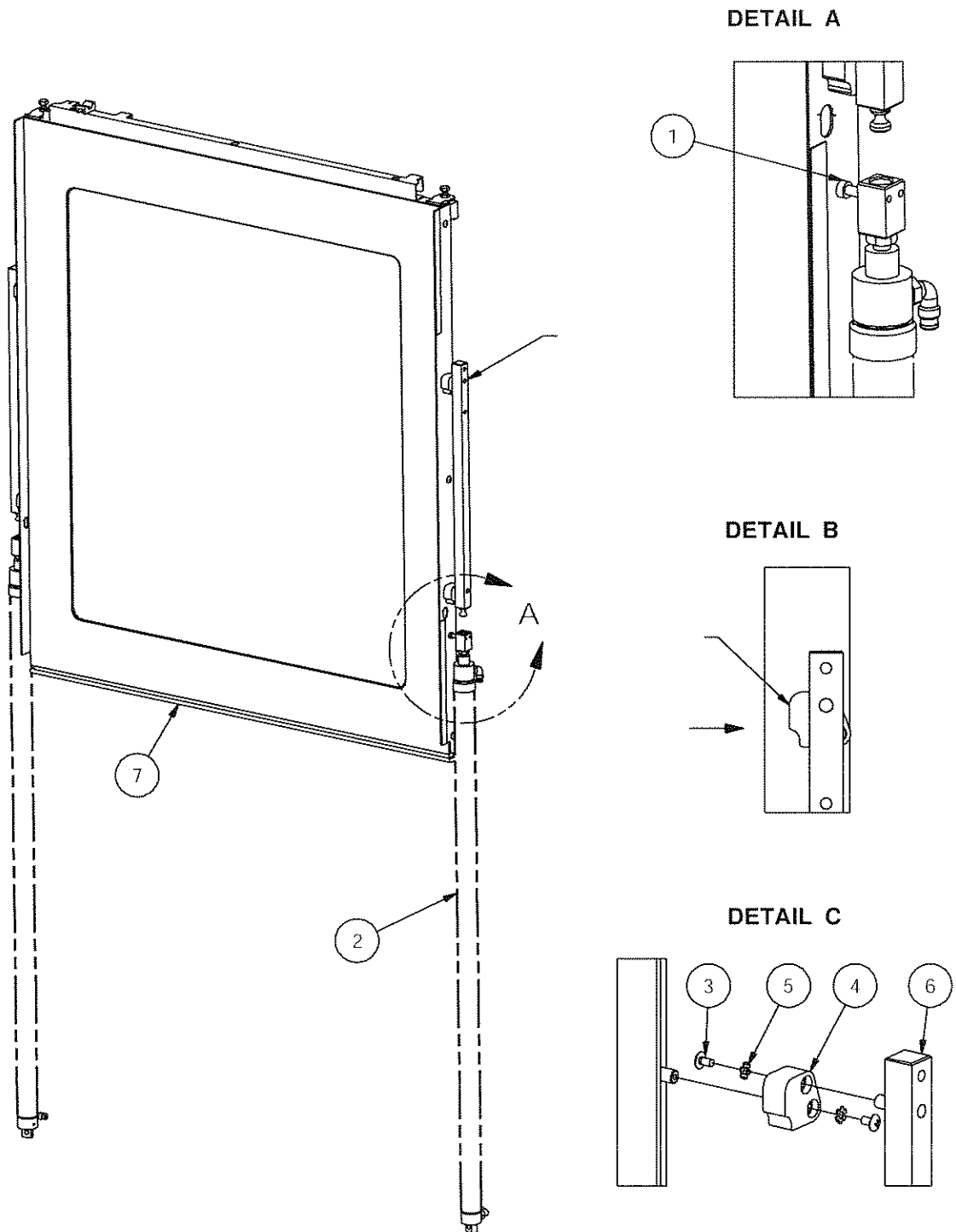


Figure 9-19. Steam Supply, Steam Return, and Cold Water to Condenser Piping

| FIG. & ITEM NO. | PART NUMBER | | DESCRIPTION | UNITS PER ASSEMBLY |
|-----------------|-------------|------------|---|--------------------|
| 9-19 | | | STEAM SUPPLY, STEAM RETURN, AND COLD WATER TO CONDENSOR PIPING | X |
| 1 | P | 117907 262 | NIPPLE, BRASS, 1/2" NPT X 1/2" BSPT X 2" LONG | 3 |
| 2 | P | 117954 544 | PLUG, COPPER, 1/2" M (International Unit Only) | 1 |
| 3 | P | 117952 212 | PLUG, COPPER, 1/2" F (International Unit Only) | 1 |
| 4 | P | 117952 186 | ADAPTER, 1/2" NPT M X 1/4" NPT F | 2 |
| 5 | P | 117952 210 | PLUG, COPPER, 1/4" NPT | 2 |
| 6 | P | 117952 139 | TEE, BRASS, 1/2" F X 1/2" F X 1/2" F | 4 |
| 7 | P | 117952 054 | NIPPLE, BRASS, 1/2" NPT X 2-1/2" | 1 |
| 8 | P | 117952 106 | ELBOW, BRASS, 90°, 1/2" M X 1/2" F | 4 |
| 9 | P | 117903 707 | ELBOW, 1/4" M X 5/32" O.D. | 1 |
| 10 | P | 117912 836 | VALVE, STEAM, BRASS, 1/2" NPT | 1 |
| | P | 117913 496 | COIL, SPARE | 1 |
| 11 | P | 117952 051 | NIPPLE, BRASS, 1/2", CLOSED | 3 |
| 12 | P | 117904 468 | STRAINER, BRASS, 1/2" F, STEAM | 1 |
| 13 | P | 117955 434 | TUBE, COPPER, 1/2" DIAMETER | 1 |
| 14 | P | 117952 105 | ELBOW, BRASS, 90°, 1/2" NPT F X 1/2" NPT F | 2 |
| 15 | P | 117952 057 | NIPPLE, BRASS, 1/2" X 4" | 4 |
| 16 | P | 117952 162 | COUPLING, BRASS, 1/2" F | 3 |
| 17 | P | 117912 580 | TUBING, PEX, 1/2" I.D. SOLD BY FOOT | A/R |
| 18 | P | 117012 346 | HOSE, PROTECTOR, DRAIN DISCHARGE COOLDOWN | 2 |
| 19 | P | 117912 581 | HOSE, S/S, FLEXIBLE, 1/2" M X 5/8" JIC X 82" | 2 |
| 20 | P | 117912 570 | ELBOW, POLYPROPYLENE, 90°, 1/2" M X 5/8" O.D. | 1 |
| 21 | P | 117956 359 | VALVE, WATER, COPPER, 1/2", CONNECTOR 120 V | 3 |
| | P | 764316 147 | KIT, REPAIR (ALTERNATE ITEM 117950-174) | 1 |
| | P | 764323 940 | COIL, SPARE (ALTERNATE ITEM 117955-186) | 1 |
| 22 | P | 117952 053 | NIPPLE, BRASS, 1/2" NPT X 2" | 2 |
| 23 | P | 117952 176 | UNION, BRASS, 1/2" F | 2 |
| 24 | P | 117952 056 | NIPPLE, BRASS, 1/2" X 3-1/2" | 1 |
| 25 | P | 117950 177 | STRAINER, BRONZE, 1/2" F, WATER | 1 |
| 26 | P | 117950 216 | VALVE, CHECK, BRONZE, SWING, 1/2" F | 1 |
| 27 | P | 117952 055 | NIPPLE, BRASS, 1/2" X 3" | 2 |
| 28 | P | 117009 283 | VALVE, CHECK, 1/2" F | 1 |
| 29 | P | 117912 570 | ELBOW, POLYPROPYLENE, 90°, 1/2" M X 5/8" O.D. | 1 |
| 30 | P | 117903 554 | TRAP, STEAM, 1/2" | 1 |



REF.: 920-016-061

Figure 9-20. Door Slide Bars

| FIG. & ITEM NO. | PART NUMBER | | DESCRIPTION | UNITS PER ASSEMBLY |
|-----------------------|----------------|------------|--|-----------------------|
| 9-20 | | | DOOR SLIDE BARS | X |
| 1 | P | 117015 433 | SHOULDER, SCREW, S/S, 8-32 X 3/16" X 3/8" | 2 |
| 2 | | | DOOR PNEUMATIC SYSTEM AND CYLINDER (See Figure 9-23) | 2 |
| 3 | P | 117950 849 | SCREW, TRUSS HEAD, S/S, 6-32 X 1/4" | 8 |
| 4 | P | 117013 934 | PAWL, DOOR | 4 |
| 5 | P | 117909 007 | LOCKWASHER, #6 | 8 |
| 6 | P | 117018 626 | BAR, SLIDE, EPO | 2 |
| 7 | | | DOOR ASSEMBLY (See Figure 9-21) | 2 |

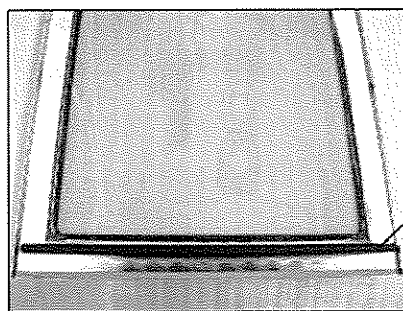
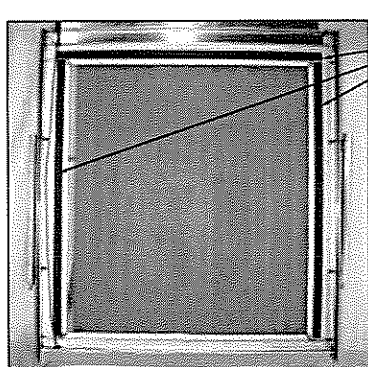
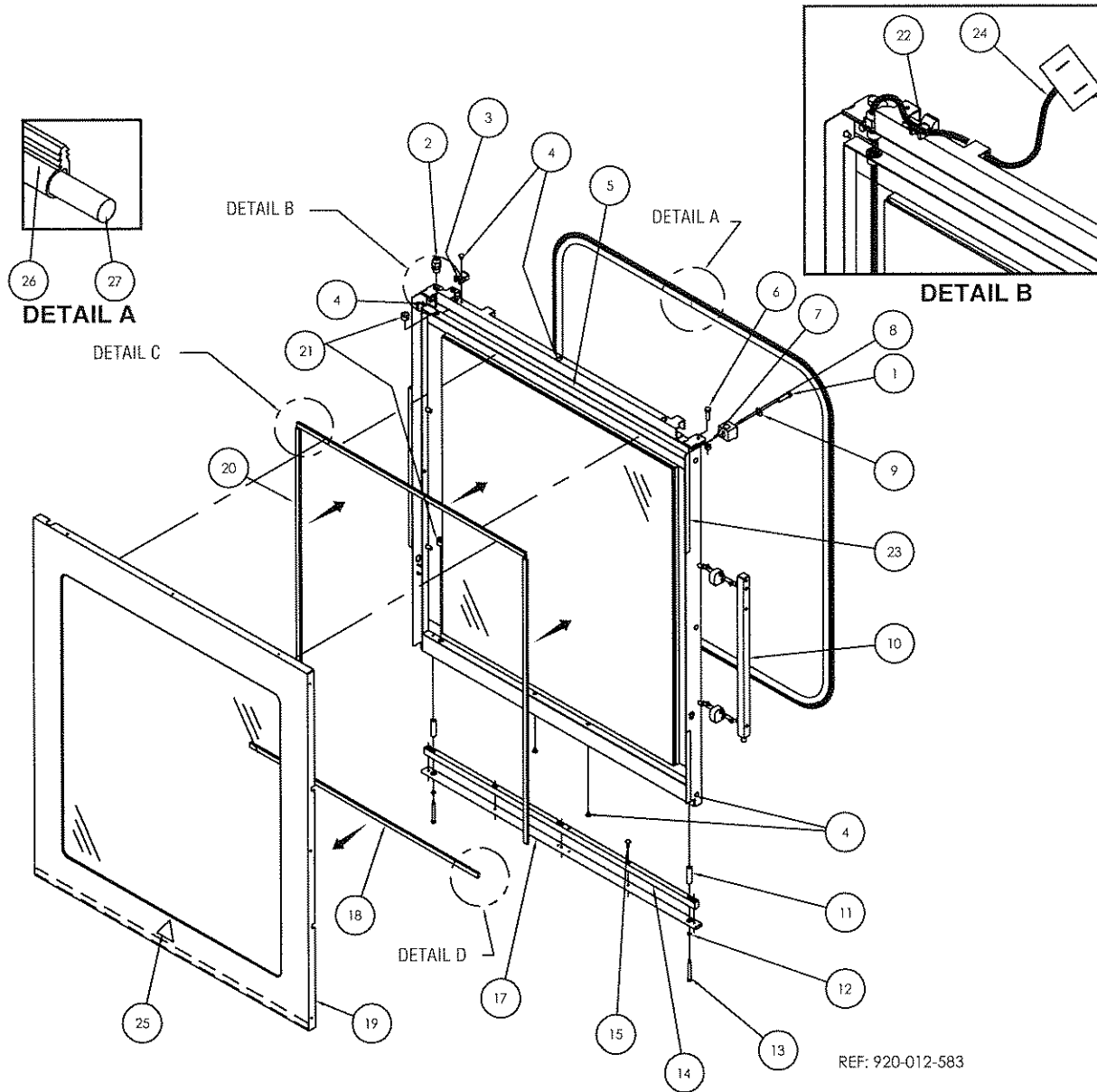
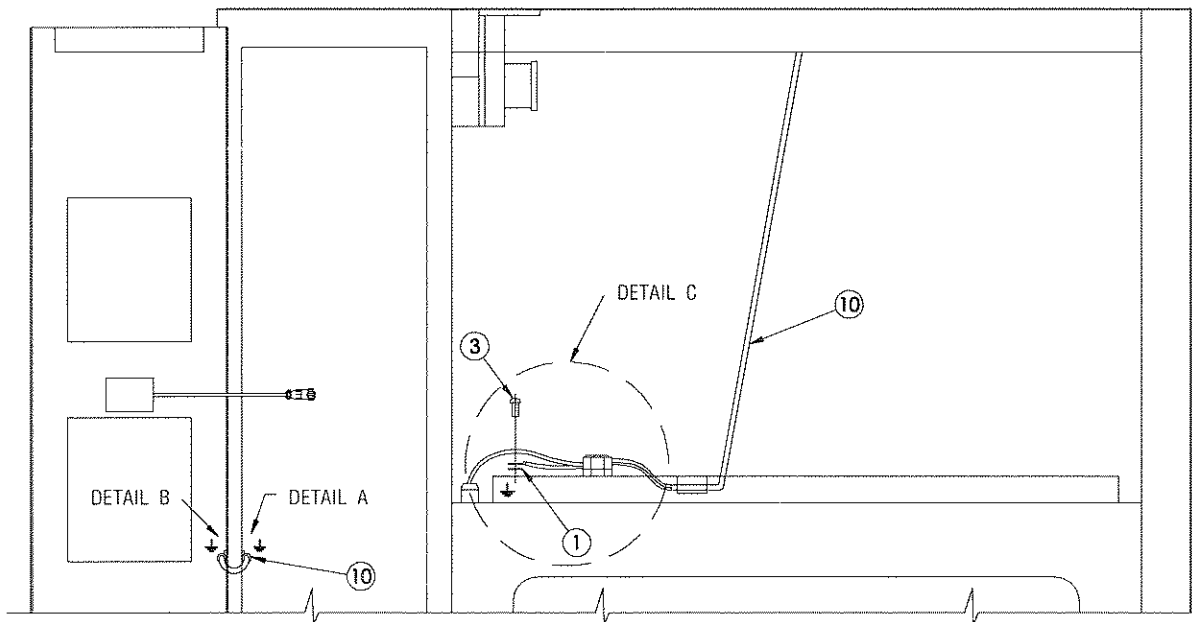
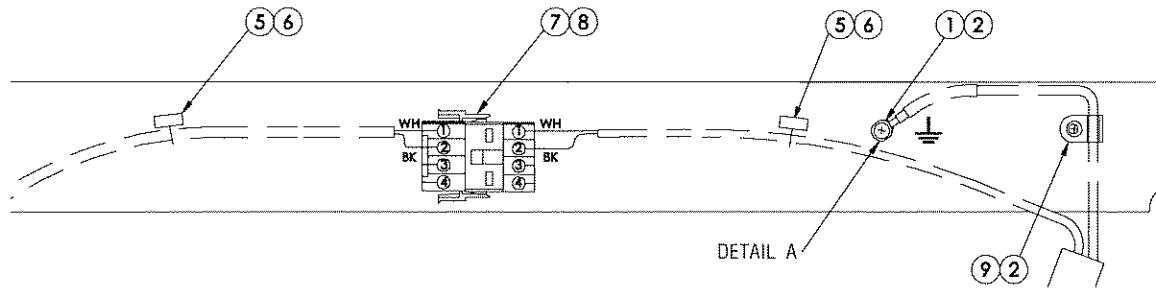
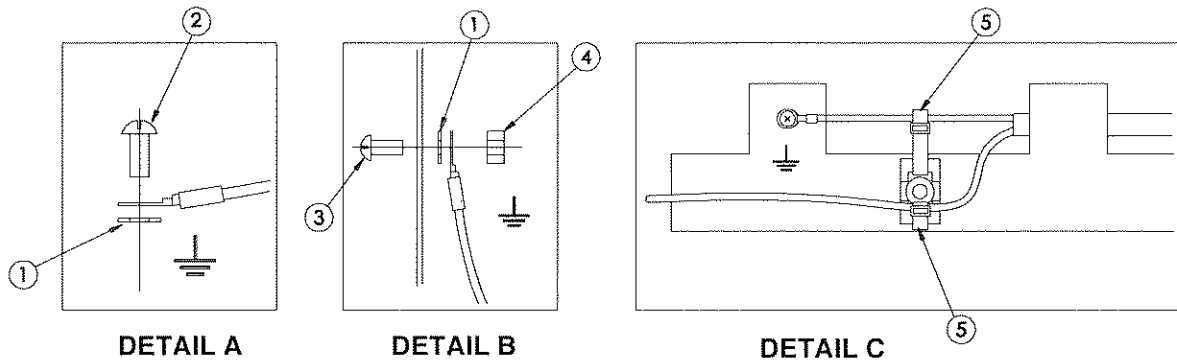


Figure 9-21. Door Assembly

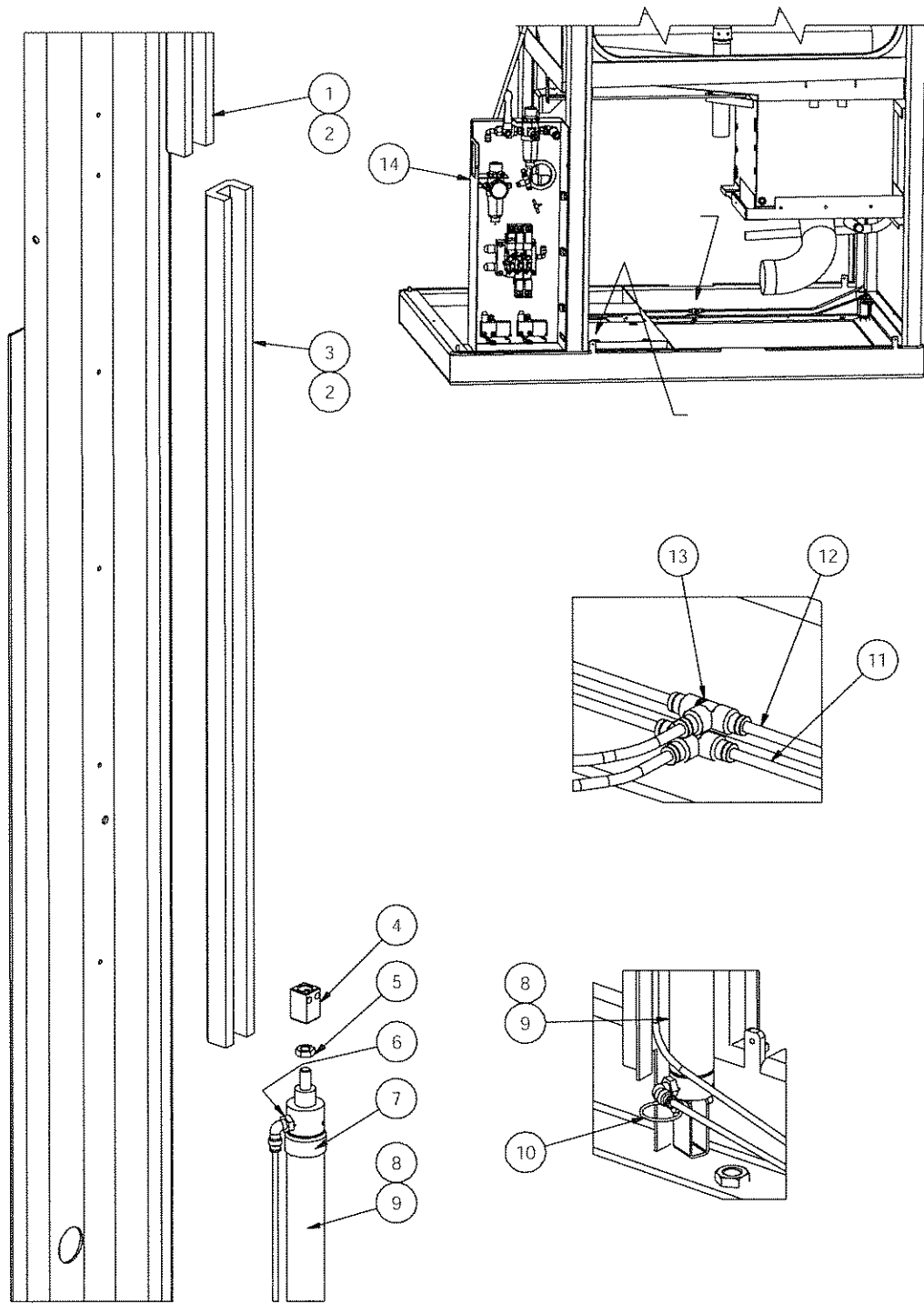
| FIG. & ITEM NO. | PART NUMBER | | DESCRIPTION | UNITS PER ASSEMBLY |
|-----------------|-------------|------------|--|--------------------|
| 9-21 | | | DOOR ASSEMBLY | X |
| 1 | P | 117950 901 | BOLT, S/S 1/4-20 X 1" | 2 |
| 2 | P | 117953 725 | CONNECTOR, NYLON, 3/32" TO 1/4" CONDUIT | 1 |
| 3 | P | 117954 196 | SUPPORT, TIE-WRAP, SCREWED, TC-142 | 1 |
| 4 | P | 117950 855 | SCREW, TRUSS HEAD, S/S, 8-32 X 1/4" | 12 |
| 5 | P | 117015 687 | DOOR, INTERIOR ASSEMBLY | 1 |
| 6 | P | 117950 900 | BOLT, S/S, 1/4"-20 X 3/4" | 2 |
| 7 | P | 117904 641 | NUT, S/S, 1/4"-20 | 2 |
| 8 | P | 117013 986 | GATE, DOOR STOPPER | 2 |
| 9 | P | 117950 976 | WASHER, S/S, 1/4" | 2 |
| 10 | | | Door Pneumatic System and Cylinder (See Figure 9-23) | 2 |
| 11 | P | 117018 628 | SPRING, S/S, 3/8" X 1-1/2" LONG | 2 |
| 12 | P | 117018 603 | WASHER | 2 |
| 13 | P | 117018 624 | SHOULDER SCREW, SOCKET, S/S, 8-32 X 3/16" X 1-1/2" | 2 |
| 14 | P | 117015 525 | BAR, DETECTION | 1 |
| 15 | P | 117907 873 | SCREW, TRUSS HEAD, S/S, 8-32 X 1/2" | 5 |
| 16 | P | 117015 681 | SWITCH, LIMIT, ASSEMBLY | 1 |
| 17 | P | 117015 540 | BASE, DETECTION BAR | 1 |
| 18 | P | 117908 938 | *GASKET, EPDM D (SOLD BY FOOT) | A/R |
| 19 | P | 117018 630 | DOOR, EXTERIOR ASSEMBLY | 1 |
| 20 | P | 117908 938 | *GASKET, EPDM D (SOLD BY FOOT) | A/R |
| | P | 117910 186 | TAPE, ADHESIVE, DARK GREY, 1/2" (sold by foot) | A/R |
| 21 | P | 117942 328 | GROMMET, RUBBER, 1/4" I.D. X 3/8" O.D. | 2 |
| 22 | P | 117954 685 | CLIP, TY-RAP, 7-3/8" LONG | 1 |
| 23 | P | 117018 678 | UHMW SHEET, .030" X 1/2" X 50', ADHESIVE | 1 |
| 24 | | | Door Ground Connection (See Figure 9-22) | 2 |
| 25 | P | 117011 219 | STICKER, HOT SURFACE, CE | 1 |
| 26 | P | 117013 907 | GASKET (Sold by Foot) | A/R |
| 27 | P | 117904 245 | CORD (Sold by Foot) | A/R |
| | P | 117912 561 | GASKET INSERT TOOL, SUMP (Not Shown) | 1 |
| | P | 117912 452 | GREASE, ANTISEIZE, FOOD-GRADE, 14 oz (118 mL) (Not Shown) | 1 |
| | | | * Refer to Section 8.15.1, <i>Window Pane Gasket Replacement</i> , for Gasket replacement. | |



REF.: 920-016-062

Figure 9-22. Door Ground Connection

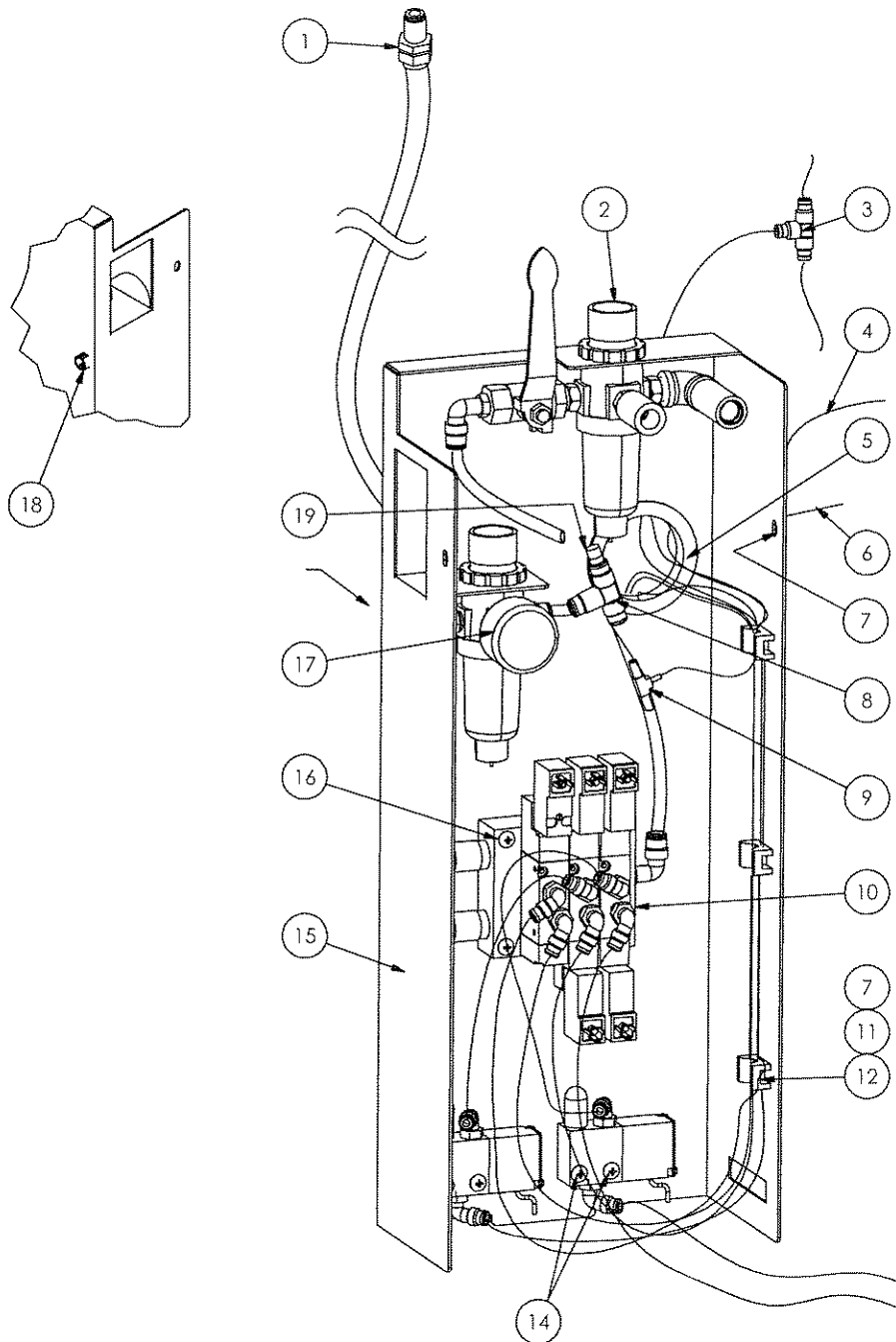
| FIG. & ITEM NO. | PART NUMBER | | | DESCRIPTION | UNITS PER ASSEMBLY | | |
|-----------------------|----------------|--------|-----|--|-----------------------|--|--|
| 9-22 | | | | DOOR GROUND CONNECTION | X | | |
| | 1 P | 117906 | 017 | WASHER, LOCK, STAR, SCREW #10 | 8 | | |
| | 2 P | 117950 | 855 | SCREW, TRUSS HEAD, S/S, 8-32 X 1/4" | 6 | | |
| | 3 P | 117950 | 865 | SCREW, TRUSS HEAD, S/S, 10-32 X 1/4" | 4 | | |
| | 4 P | 117950 | 951 | NUT, S/S, 10-32 | 2 | | |
| | 5 P | 117903 | 256 | BASE, SNAP IN, FOR TY-RAP | 4 | | |
| | 6 P | 117954 | 655 | CLIP, TY-RAP, 7-3/8" LONG | 8 | | |
| | 7 P | 117956 | 123 | PLUG, 4-POSITION, FEMALE | 2 | | |
| | 8 P | 117956 | 124 | PINS, SPLIT, MALE | 4 | | |
| | 9 P | 117942 | 160 | CLAMP, CABLE, 1/4" | 2 | | |
| | 10 P | 117021 | 279 | GROUND, DOOR | 5 | | |



REF.: 920-016-063

Figure 9-23. Door Pneumatic System and Cylinder

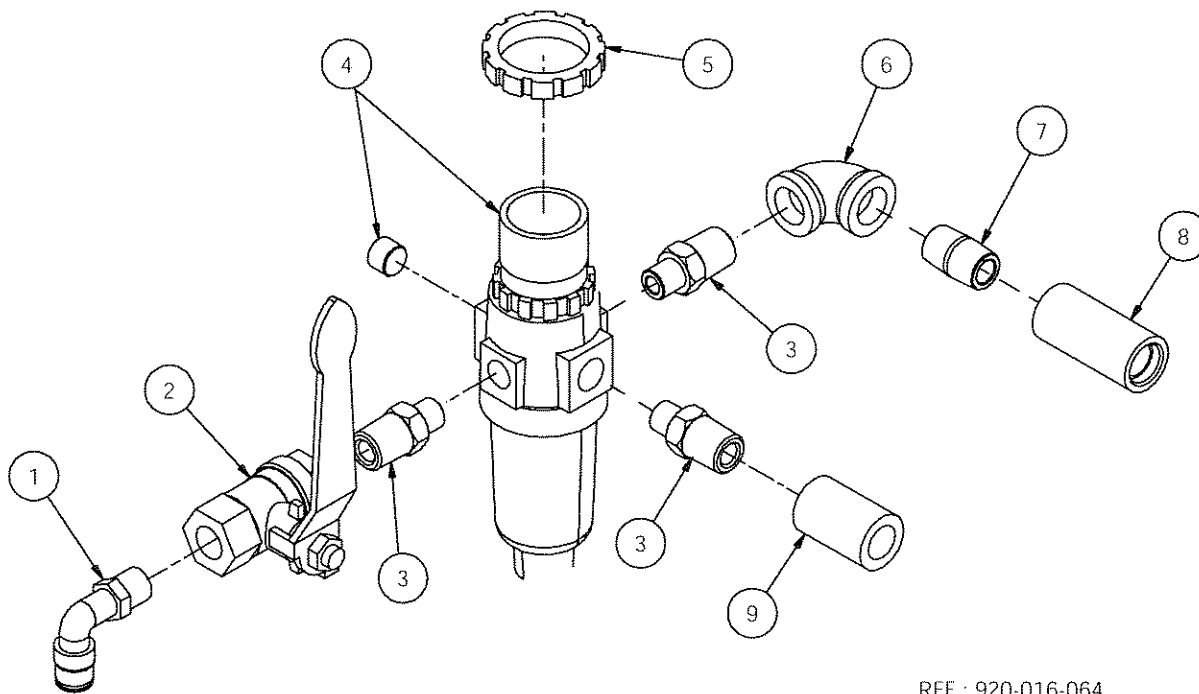
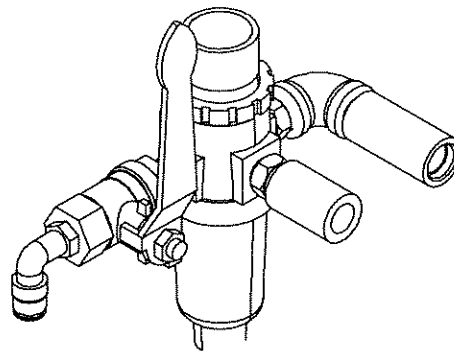
| FIG. & ITEM NO. | PART NUMBER | | DESCRIPTION | UNITS PER ASSEMBLY | | |
|-----------------------|----------------|------------|--|-----------------------|--|--|
| | | | | | | |
| 9-23 | | | DOOR PNEUMATIC SYSTEM AND CYLINDER | X | | |
| 1 | P | 117013 927 | SLIDE, UP, DOOR | 4 | | |
| 2 | P | 117950 855 | SCREW, TRUSS HEAD, S/S, 8-32 X 1/4" | 16 | | |
| 3 | P | 117013 928 | SLIDE, DOWN, DOOR | 4 | | |
| 4 | P | 117018 627 | FIXTURE, DOOR CYLINDER | 4 | | |
| 5 | P | 117957 196 | NUT, S/S, 5/16"-24 | 4 | | |
| 6 | P | 117902 319 | ELBOW, PNEUMATIC, 90°, 1/8" M X 5/32" | 8 | | |
| 7 | P | 117018 671 | SILICONE STRIP, 1/16" X 1/2", ADHESIVE | 8 | | |
| 8 | P | 117021 325 | CYLINDER, RIGHT, DOOR, ASSEMBLY | 2 | | |
| 9 | P | 117021 324 | CYLINDER, LEFT, DOOR, ASSEMBLY | 2 | | |
| 10 | P | 117018 619 | PIN, SELF LOCKING, 1/4" X 0.7" | 4 | | |
| 11 | P | 117902 323 | HOSE, BLUE, 5/32" O.D. | A/R | | |
| 12 | P | 117902 322 | HOSE, RED, 5/32" O.D. | A/R | | |
| 13 | P | 117904 229 | TEE, 5/32" O.D. X 5/32" O.D. X 5/32" O.D. | 4 | | |
| 14 | | | Pneumatic Valve Support Assembly (See Figure 9-24) | 2 | | |



REF.: 920-016-083

Figure 9-24. Pneumatic Valves Support Assembly

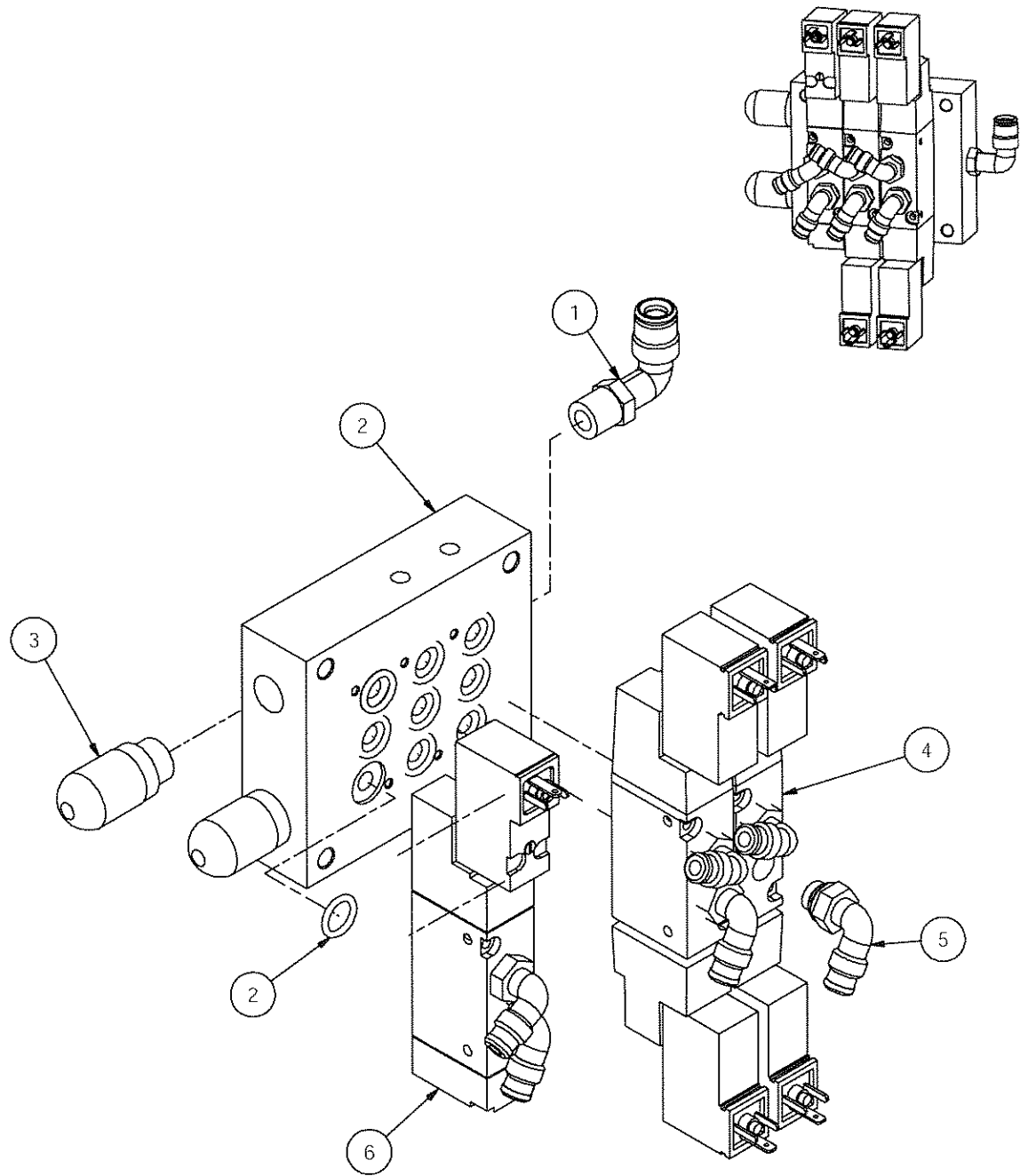
| FIG. & ITEM NO. | PART NUMBER | | | DESCRIPTION | UNITS PER ASSEMBLY | | |
|-----------------------|----------------|--------|-----|---|-----------------------|--|--|
| | | | | | | | |
| 9-24 | | | | PNEUMATIC VALVES SUPPORT ASSEMBLY | X | | |
| 1 | P | 117015 | 671 | ADAPTOR, PNEUMATIC, 1/8" M X 1/4" O.D. | 1 | | |
| 2 | | | | REGULATOR, PNEUMATIC BOX (See Figure -25) | 1 | | |
| 3 | P | 117904 | 229 | TEE, 5/32" O.D. X 5/32" O.D. X 5/32" O.D. | 1 | | |
| 4 | P | 117902 | 322 | HOSE, RED, 5/32" O.D. | A/R | | |
| 5 | P | 117953 | 843 | BUSHING, SNAP-IN, 2" I.D. | 1 | | |
| 6 | P | 117902 | 323 | HOSE, BLUE, 5/32" O.D. | A/R | | |
| 7 | P | 117950 | 855 | SCREW, TRUSS HEAD, S/S, 8-32 X 1/4" | 5 | | |
| 8 | P | 117955 | 495 | TEE, 1/4" O.D. x 1/4" O.D. x 1/4" O.D. | 1 | | |
| 9 | P | 117905 | 778 | TEE, 1/4" I.D. X 1/4" I.D. X 5/32" I.D. | 1 | | |
| 10 | | | | VALVES, PNEUMATIC BOX, ASSEMBLY (See Figure 9-26) | 1 | | |
| 11 | P | 117954 | 196 | SUPPORT, TIE-WRAP, SCREWED | 3 | | |
| 12 | P | 117908 | 811 | CLIP, TY-RAP, 4" LONG | 3 | | |
| 13 | | | | VALVE, DOOR SAFETY, ASSEMBLY (See Figure 9-27) | 2 | | |
| 14 | P | 117950 | 859 | SCREW, TRUSS HEAD, S/S, 8-32 X 1" | 4 | | |
| 15 | P | 117021 | 119 | BOX, PNEUMATIC | 1 | | |
| 16 | P | 117950 | 861 | SCREW, TRUSS HEAD, 8-32 X 1-1/4" | 4 | | |
| 17 | | | | REGULATOR, PRESSURE, PNEUMATIC BOX, ASSEMBLY (See Figure 9-27) | 1 | | |
| 18 | P | 117942 | 265 | BUSHING, SNAP-IN, 3/8" ID | 1 | | |
| 19 | P | 117906 | 759 | PLUG, PNEUMATIC, 1/4" (Without Independent Monitoring) | 1 | | |



REF.: 920-016-064

Figure 9-25. Pneumatic Box Regulator

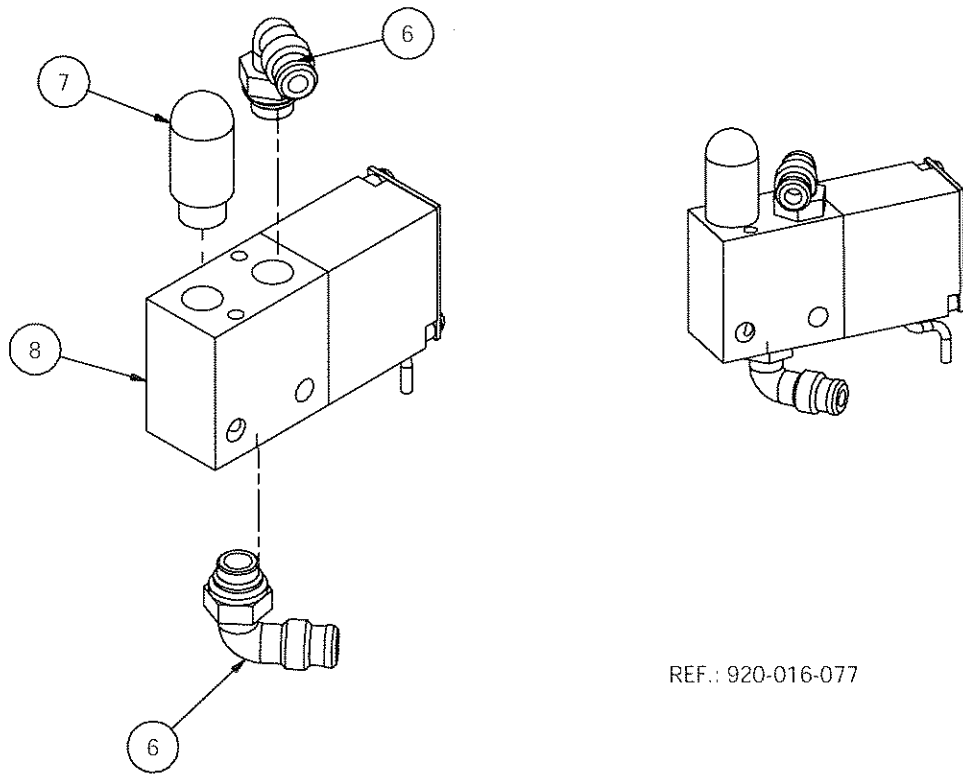
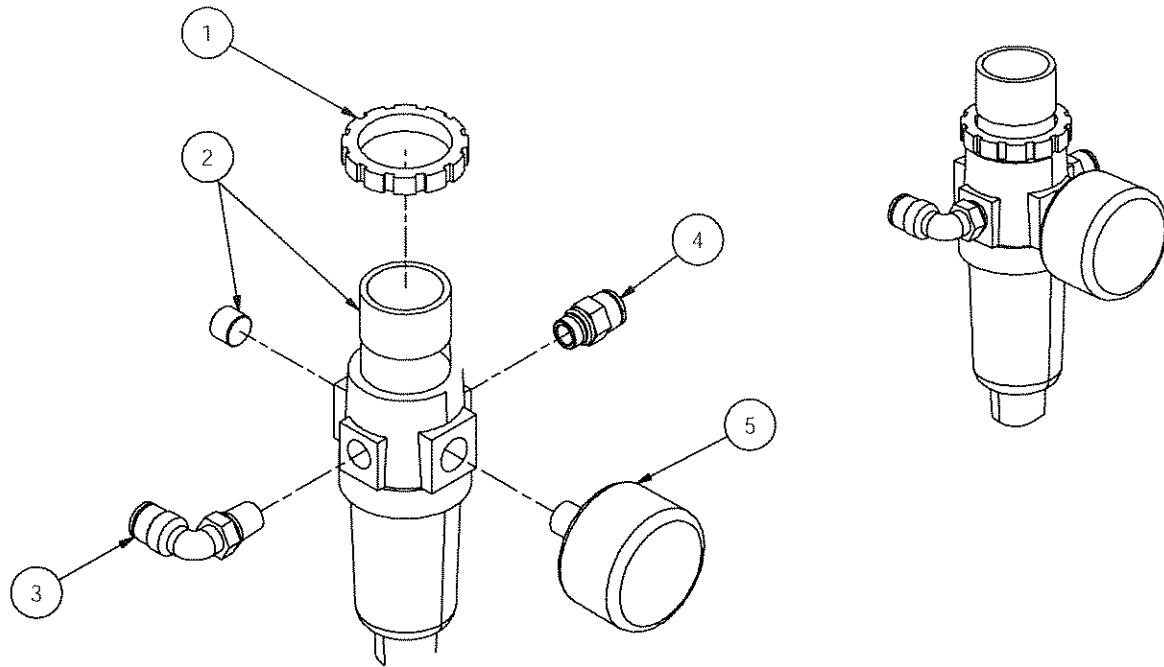
| FIG. & ITEM NO. | PART NUMBER | | DESCRIPTION | UNITS PER ASSEMBLY | | |
|-----------------------|----------------|------------|---|-----------------------|--|--|
| | | | | | | |
| 9-25 | P | 117021 671 | PNEUMATIC BOX REGULATOR | X | | |
| 1 | P | 117955 494 | ELBOW, PNEUMATIC, 90°, 1/4" M X 1/4" O.D. | 1 | | |
| 2 | P | 117940 083 | VALVE, MANUAL BALL, BRASS, 1/4" F | 1 | | |
| 3 | P | 117908 708 | REDUCER, BRASS, 1/4" M X 1/8" M | 3 | | |
| 4 | P | 117903 144 | REGULATOR, PRESSURE, AIR FILTER, 1/8" | 1 | | |
| | P | 117954 461 | PLUG, S/S, 1/8" M (Included with 117-903-144) | 1 | | |
| 5 | P | 117018 672 | NUT, S/S, FOR REGULATOR | 1 | | |
| 6 | P | 117958 728 | CONNECTOR, ELBOW, 90°, 1/4" F X 1/4" F | 1 | | |
| 7 | P | 117952 029 | UNION, COPPER, 1/4", CLOSED | 1 | | |
| 8 | P | 117015 523 | ADAPTOR, S/S, 1/4" F NPT X 1/2" F NF | 1 | | |
| 9 | P | 117005 402 | COUPLING, 1/4" NPT F x 1/4" NPT F | 1 | | |



REF.: 920-016-078

Figure 9-26. Pneumatic Box Valve Assembly

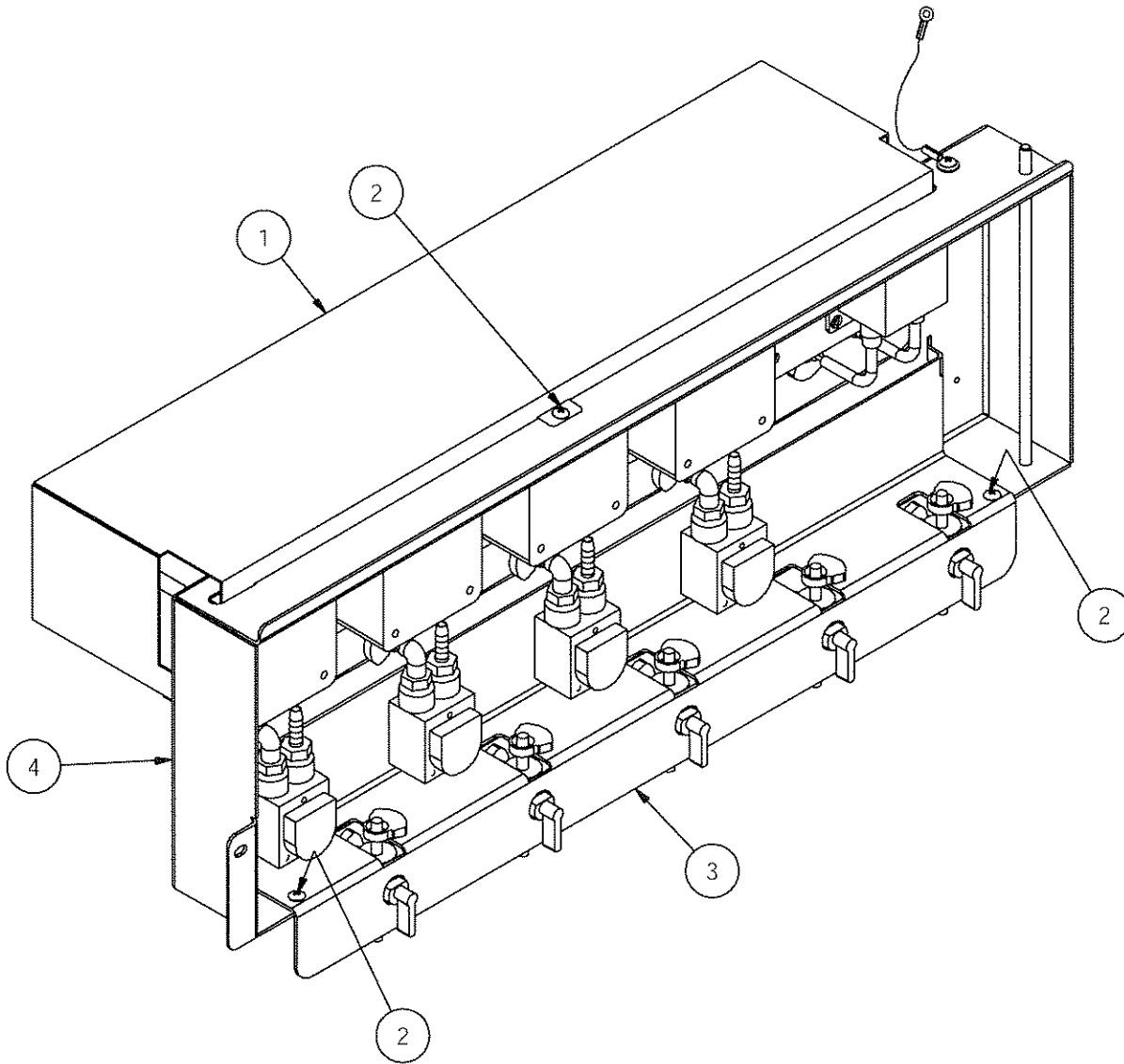
| FIG. & ITEM NO. | PART NUMBER | | DESCRIPTION | UNITS PER ASSEMBLY | | |
|-----------------------|----------------|------------|--|-----------------------|--|--|
| | | | | | | |
| 9-26 | P | 117021 273 | PNEUMATIC BOX VALVE ASSEMBLY | X | | |
| 1 | P | 117955 494 | ELBOW, PNEUMATIC, 90°, 1/4" M X 1/4" O.D. | 1 | | |
| 2 | P | 117020 233 | DISTRIBUTION BLOCK, PNEUMATIC, 3 PORTS | 1 | | |
| 3 | P | 117955 130 | MUFFLER, AIR, 1/4" P-02 | 2 | | |
| 4 | P | 117015 475 | VALVE, PNEUMATIC, 5 V, ALUMINIUM, 1/8" F | 2 | | |
| 5 | P | 117902 319 | ELBOW, PNEUMATIC, 90°, 1/8" M X 5/32" | 6 | | |
| 6 | P | 117907 304 | VALVE, PNEUMATIC, 4 WAY, 1/8" F | 1 | | |



REF.: 920-016-077

Figure 9-27. Pneumatic Box Pressure Regulator and Door Safety Valve

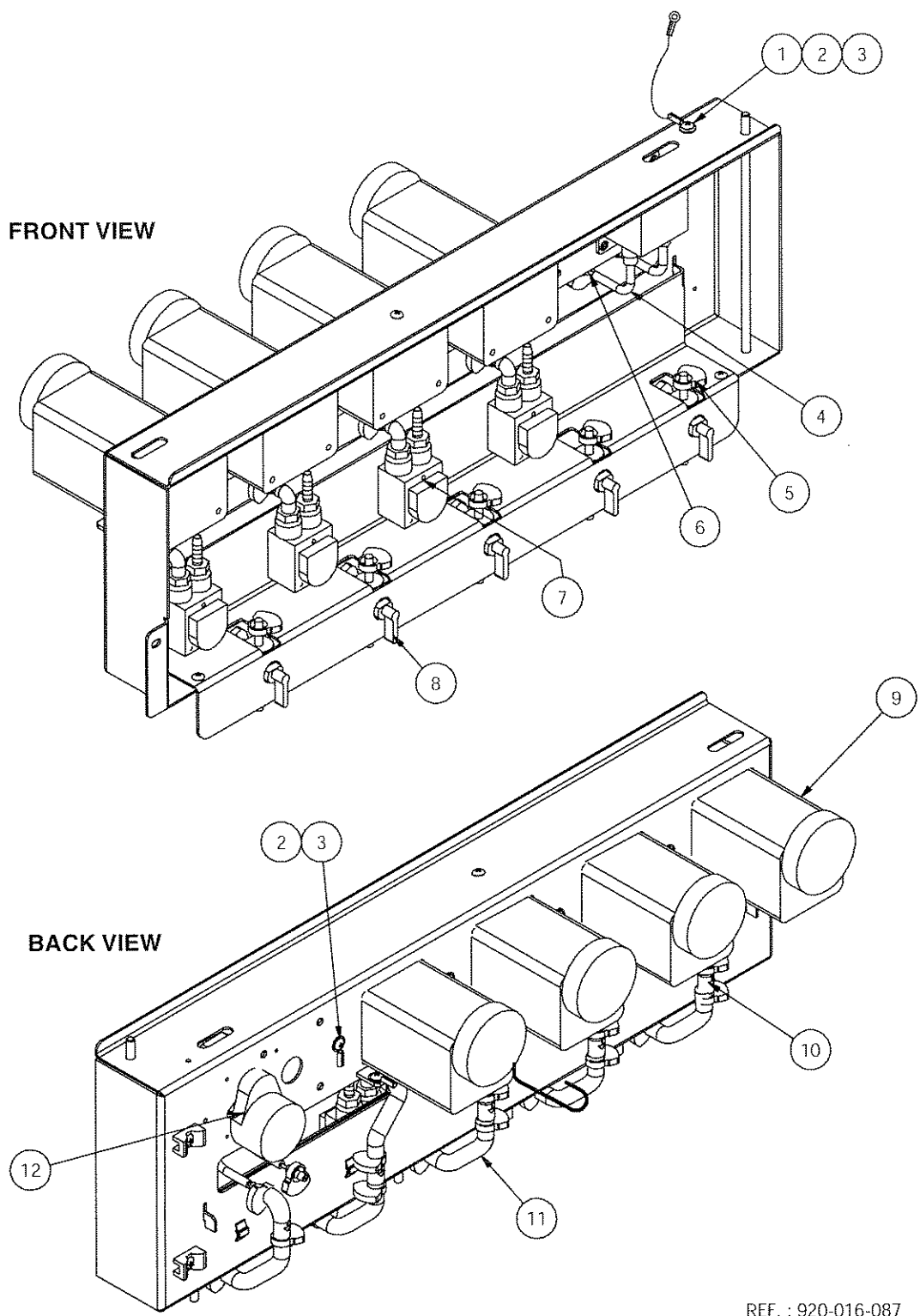
| FIG. & ITEM NO. | PART NUMBER | | DESCRIPTION | UNITS PER ASSEMBLY | | | |
|-----------------------|----------------|--------|-------------|---|---|---|--|
| | | | | | | | |
| 9-27 | P | 117021 | 271 | PNEUMATIC BOX PRESSURE REGULATOR | X | | |
| | P | 117021 | 102 | DOOR SAFETY VALVE | | X | |
| 1 | P | 117018 | 672 | NUT, ALUMINIUM, FOR REGULATOR | 1 | | |
| 2 | P | 117903 | 144 | REGULATOR, PRESSURE, AIR FILTER, 1/8" | 1 | | |
| | P | 117954 | 461 | PLUG, S/S, 1/8" M (Included with 117-903-144) | 1 | | |
| 3 | P | 117951 | 837 | ELBOW, PNEUMATIC, 90°, 1/8" M X 1/4" O.D. | 1 | | |
| 4 | P | 117951 | 836 | ADAPTER, PNEUMATIC, 1/8" M X 1/4" O.D. | 1 | | |
| 5 | P | 117953 | 975 | GAGE, PRESSURE, 0-160, 1/8", COPPER | 1 | | |
| 6 | P | 117902 | 319 | ELBOW, PNEUMATIC, 90°, 1/8" M X 5/32" | | 2 | |
| 7 | P | 117902 | 312 | MUFFLER, AIR, 1/8" | | 1 | |
| 8 | P | 117021 | 233 | VALVE, PNEUMATIC, 3 WAY, ALUMINIUM, 1/8" F | | 1 | |



REF.: 920-016-065

Figure 9-28. Chemical Injection Pump Assembly

| FIG. & ITEM NO. | PART NUMBER | | DESCRIPTION | UNITS PER ASSEMBLY |
|-----------------------|----------------|------------|--|-----------------------|
| 9-28 | | | CHEMICAL INJECTION PUMP ASSEMBLY | X |
| 1 | P | 117021 231 | PROTECTOR COVER, PERISTALTIC PUMP | 1 |
| 2 | P | 117950 855 | SCREW, TRUSS HEAD, S/S, 8-32 X 1/4" | 3 |
| 3 | P | | BOX, CHEMICAL INJECTION PUMP ASSEMBLY, FRONT VIEW (See Figure 9-29) | 1 |
| 4 | P | | BOX, CHEMICAL INJECTION PUMP ASSEMBLY, BACK VIEW (See Figure 9-29) | 1 |



REF. : 920-016-087

Figure 9-29. Chemical Injection Pump Box, Front View & Back View

| FIG. & ITEM NO. | PART NUMBER | | | DESCRIPTION | UNITS PER ASSEMBLY | | | |
|-----------------------|----------------|------------|--|--|-----------------------|----|-----|--|
| | | | | | | | | |
| 9-29 | | | | CHEMICAL INJECTION PUMP BOX, FRONT VIEW & BACK VIEW | X | | | |
| | | | | INDEPENDENT MONITOR OPTION | | X | | |
| | 1 | P | 117909 999 | WASHER, LOCK, FOR #8 SCREW | 5 | 5 | | |
| | 2 | P | 117954 646 | TERMINAL, RING, #12-10 FOR SCREW #10 | 9 | 9 | | |
| | 3 | P | 117950 855 | SCREW, TRUSS HEAD, S/S, 8-32 X 1/4" | 5 | 5 | | |
| | 4 | P | 117015 591 | HOSE, C-FLEX, 1/8" I.D. X 1/4" O.D. | | | A/R | |
| | 5 | P | 117021 322 | CLAMP, NYLON, DOUBLE SNAP-GRIP, 13/32" x 1/2" | 10 | 12 | | |
| | 6 | P | 117911 205 | REDUCER, POLYPROPYLENE, 1/4" BARBED X 1/8" BARBED | | 2 | | |
| | 7 | | | FLOWMETER (See Figure 9-30) | 12 | | | |
| | 8 | P | 117021 213 | VALVE, BALL, MANUAL, PVC, 1/4" BARBED | | 5 | | |
| | 9 | | | PERISTALTIC CHEMICAL INJECTION PUMP (See Figure 9-30) | 5 | 4 | | |
| | 10 | P | 117011 637 | CHECK VALVE, POLYPROPYLENE, 1/4" BARBED | 5 | | | |
| 11 | P | 117952 345 | HOSE, C-FLEX, 1/4" I.D. X 1/2" O.D. | A/R | A/R | | | |
| 12 | P | | PERISTALTIC CHEMICAL INJECTION PUMP - RINSE AID (See Figure 9-31) | | 1 | | | |

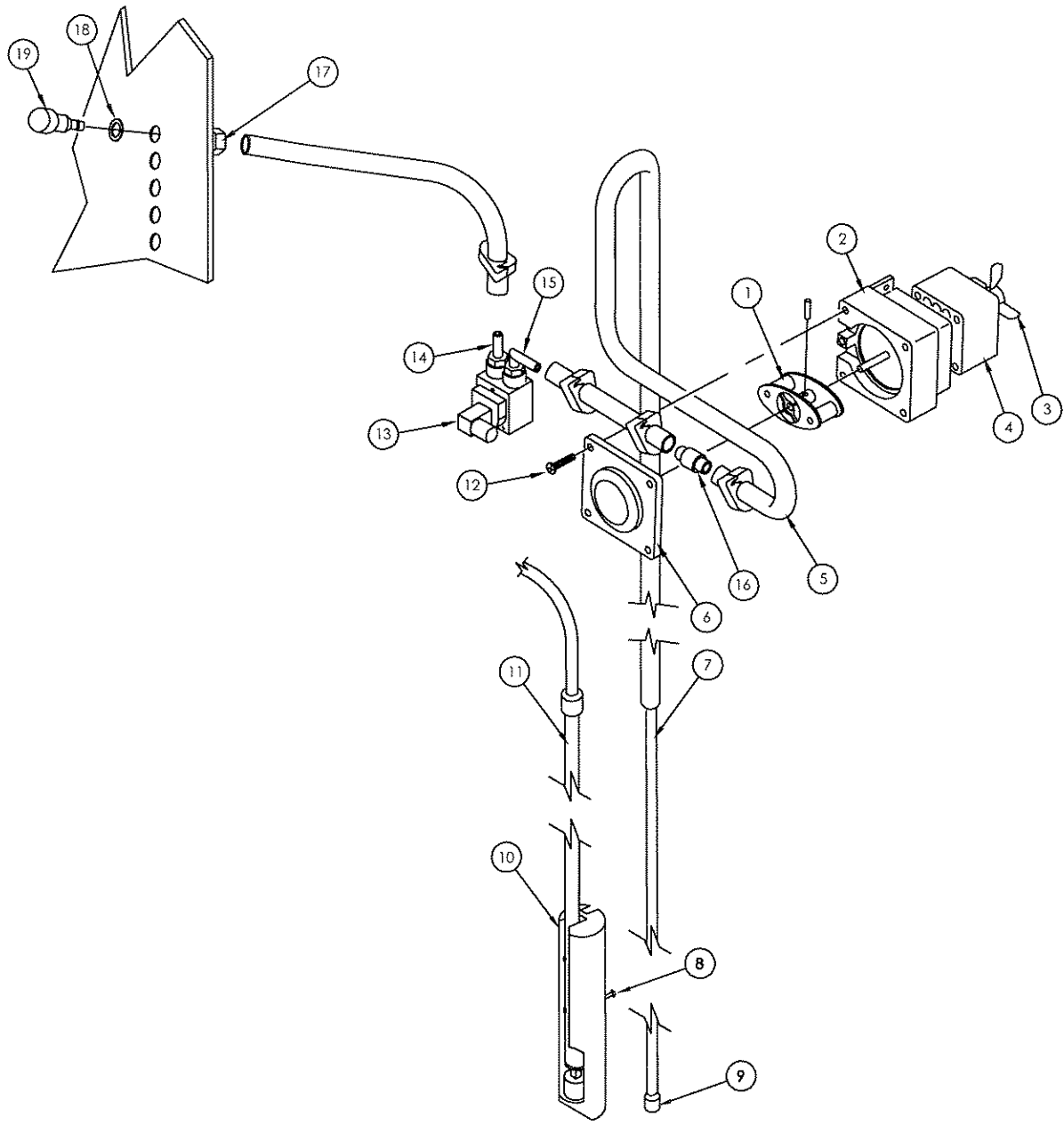
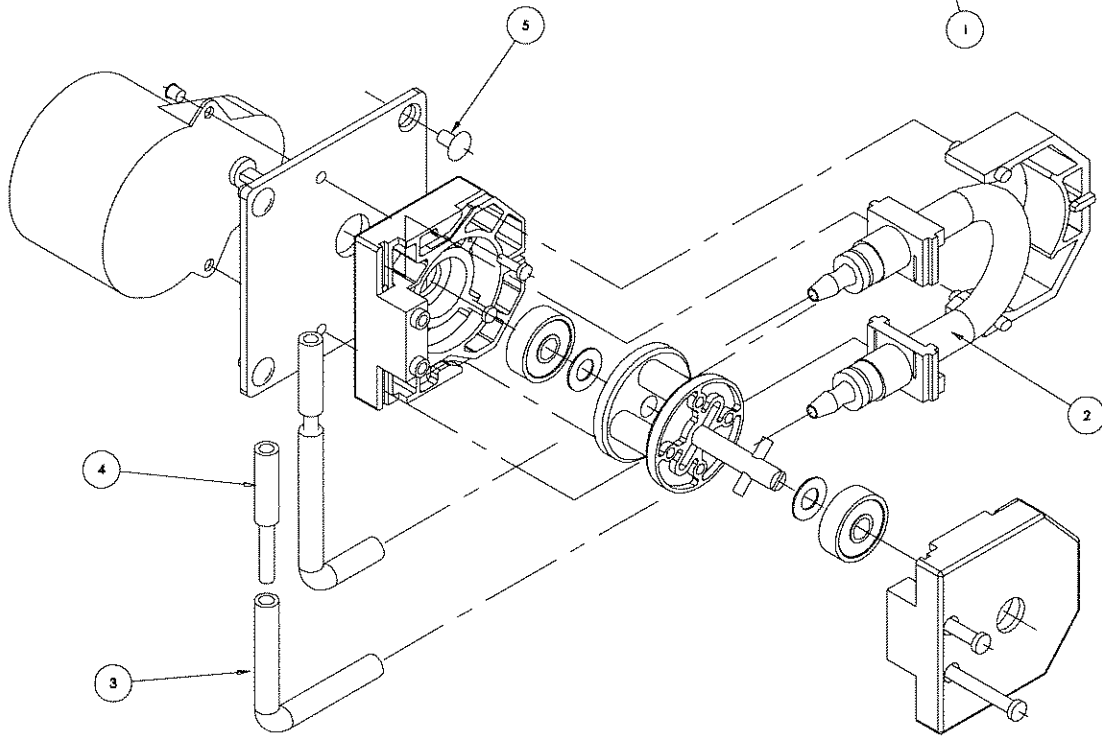
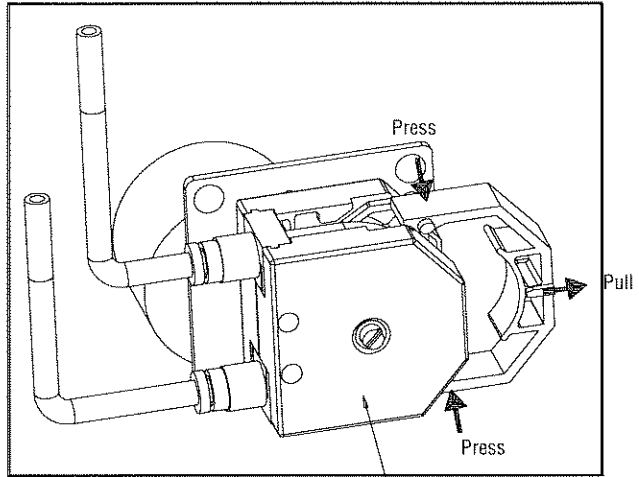
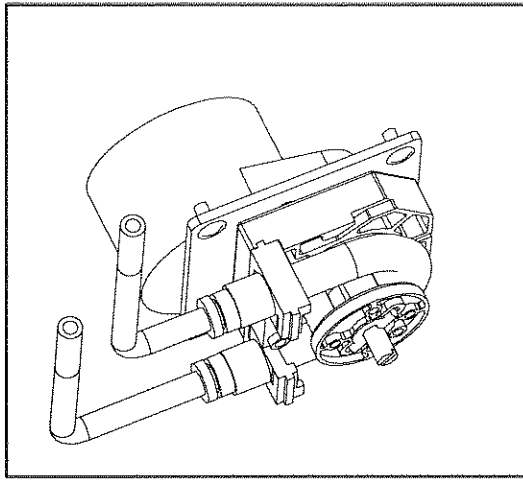


Figure 9-30. Peristaltic Chemical Injection Pump

| FIG. & ITEM NO. | PART NUMBER | | DESCRIPTION | UNITS PER ASSEMBLY | | |
|-----------------------|----------------|--------|-------------|---|-----|-----|
| | | | | | | |
| 9-30 | P | 117902 | 991 | PERISTALTIC CHEMICAL INJECTION PUMP | X | |
| | | | | INDEPENDENT MONITOR OPTION | | X |
| 1 | P | 117951 | 706 | BLOCK, ROLLER, PERISTALTIC PUMP | 1 | 1 |
| 2 | P | 117951 | 213 | HEAD, SMALL PERISTALTIC PUMP | 1 | 1 |
| 3 | P | 117955 | 181 | PROPELLER, 2-1/2", 4 STRIPS, SMALL PERISTALTIC PUMP | 1 | 1 |
| 4 | P | 117951 | 211 | MOTOR, SMALL PERISTALTIC PUMP | 1 | 1 |
| 5 | P | 117952 | 345 | HOSE, C-FLEX, 1/4" I.D. X 1/2" O.D. (Sold by Foot) | A/R | A/R |
| 6 | P | 117951 | 212 | COVER, CLEAR, SMALL PERISTALTIC PUMP | 1 | 1 |
| 7 | P | 117955 | 246 | TUBING, 3/8" O.D., TRANSLUCENT (Sold by Foot) | A/R | A/R |
| 8 | P | 117950 | 837 | SCREW, FLAT HEAD, S/S, 10-32 X 3/4" | 4 | 4 |
| 9 | P | 117908 | 973 | FOOT VALVE, SMALL, FOR PPLYFLO TUBE 3/8" | 1 | 1 |
| 10 | P | 117015 | 533 | SUPPORT, DETERGENT SENSOR | 1 | 1 |
| 11 | P | 117902 | 383 | SENSOR, LOW LEVEL, 38", WITH PLUG | 1 | 1 |
| 12 | P | 117950 | 836 | SCREW, FLAT HEAD, S/S, 10-32 X 1/2" | 4 | 4 |
| 13 | P | 117013 | 900 | FLOWMETER | | 4 |
| 14 | P | 117015 | 115 | ADAPTOR, POLYPROPYLENE, 1/4" NPT X 1/4" BARBED | | 4 |
| 15 | P | 117009 | 286 | ELBOW, POLYPROPYLENE, 90°, 1/4" M X 1/4" BARBED | | 4 |
| 16 | P | 117011 | 637 | CHECK VALVE, POLYPROPYLENE, 1/4" BARBED | 5 | 5 |
| 17 | P | 117909 | 866 | NUT, NYLON, 7/16"-20 | 20 | 20 |
| 18 | P | 117003 | 241 | O-RING, VITON, 5/8" O.D. X 7/16" I.D. | 5 | 5 |
| 19 | P | 117009 | 514 | INJECTOR, DETERGENT | 5 | 5 |
| | P | 117950 | 599 | LUBRICANT, PERISTALTIC PUMP (80 mL) (Not Shown) | 1 | 1 |



REF.: 920-012-752

Figure 9-31. Peristaltic Chemical Injection Pump - Rinse Aid

| FIG. & ITEM NO. | PART NUMBER | | DESCRIPTION | UNITS PER ASSEMBLY | | |
|-----------------------|----------------|------------|--|-----------------------|--|--|
| | | | | | | |
| 9-31 | P | 117015 522 | PERISTALTIC CHEMICAL INJECTION PUMP - Rinse Aid | X | | |
| 1 | P | 117015 522 | PUMP, PERISTALTIC, CHEMICAL INJECTION, RINSE AID | 1 | | |
| 2 | P | 117018 647 | • KIT, REPLACEMENT, TUBE, RINSE AID PUMP | 1 | | |
| 3 | P | 117015 591 | HOSE, C-FLEX, 1/8" I.D. X 1/4" O.D. | 1 | | |
| 4 | P | 117911 205 | REDUCER, POLYPROPYLENE, 1/4" BARBED X 1/8" BARBED | 2 | | |
| 5 | P | 117950 849 | SCREW, TRUSS HEAD, S/S, 6-32 X 1/4" | 4 | | |

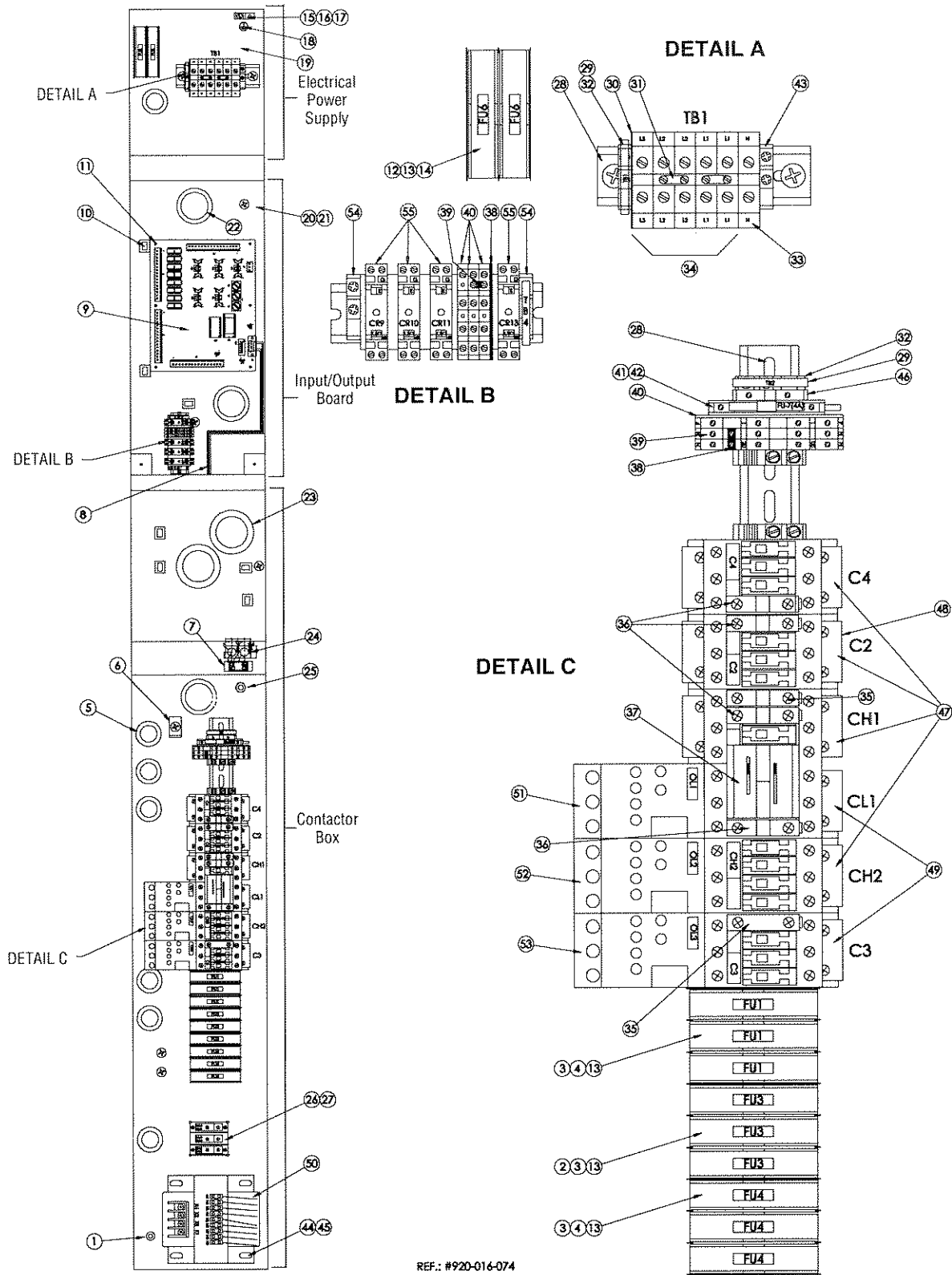


Figure 9-32. Electrical Power Supply Box, Input/Output Board, and Contactor Box

| FIG. & ITEM NO. | PART NUMBER | | DESCRIPTION | UNITS PER ASSEMBLY | | | |
|-----------------|-------------|------------|---|--------------------|-----|--|--|
| | | | | | | | |
| 9-32 | | | ELECTICAL POWER SUPPLY BOX, INPUT/OUTPUT BOARD, AND CONTACTOR BOX (ELECTRIC HEATED) | X | | | |
| | | | ELECTICAL POWER SUPPLY BOX, INPUT/OUTPUT BOARD, AND CONTACTOR BOX (STEAM HEATED) | | X | | |
| 1 | P | 117953 893 | GROMMET, RUBBER, 3/8" I.D. X 1/2" O.D. | 1 | 1 | | |
| 2 | P | 117902 669 | FUSE, CC CLASS, 15 A, 600 V | 3 | | | |
| 3 | P | 117909 751 | HOLDER, FUSE, 3P, 30 A, 600 V | 3 | 2 | | |
| 4 | P | 117902 671 | FUSE, CC CLASS, 30 A, 600 V | 6 | 3 | | |
| 5 | P | 117956 134 | BUSHING, SNAP-IN, 1-5/16" I.D. | 7 | 7 | | |
| 6 | P | 117909 085 | MOUNTING, VERTICAL WIRES | 1 | 1 | | |
| 7 | P | 117912 393 | SWITCH, ON/OFF | 1 | 1 | | |
| 8 | P | 117912 659 | CABLE, FLAT, ASSEMBLY | 1 | 1 | | |
| 9 | | | DRIVER/INTERFACE BOARD (See Figure 9-33) | 4 | 4 | | |
| 10 | P | 117903 256 | BASE, SNAP IN, TY-RAP | 15 | 15 | | |
| 11 | P | 117905 623 | SPACER | 6 | 6 | | |
| | P | 117913 012 | WASHER, LOCK, FOR SCREW #4 | 6 | 6 | | |
| | P | 117905 144 | SCREW, S/S, TRUSS HEAD, 4-40 X 1/4" | 6 | 6 | | |
| 12 | P | 117910 671 | HOLDER, FUSE | 1 | 1 | | |
| 13 | P | 117909 775 | PULLER, COVER | 11 | 8 | | |
| 14 | P | 117908 601 | FUSE, 4 A, 600 V, CLASS CC | 2 | 2 | | |
| 15 | P | 117953 869 | CONNECTOR, GROUND, T & B | 1 | 1 | | |
| 16 | P | 117906 017 | WASHER, LOCK, STAR, FOR #10 SCREW | 7 | 7 | | |
| 17 | P | 117950 865 | SCREW, TRUSS HEAD, S/S, 10-32 X 1/4" | 7 | 7 | | |
| 18 | P | 117907 027 | STICKER, PROTECTIVE EARTH | 1 | 1 | | |
| 19 | P | 117015 975 | ELECTRIC BOX | 1 | 1 | | |
| 20 | P | 117950 855 | SCREW, TRUSS HEAD, S/S, 8-32 X 1/4" | 20 | 20 | | |
| 21 | P | 117909 999 | WASHER, LOCK, FOR #8 SCREW | 2 | 2 | | |
| 22 | P | 117912 682 | BUSHING, SNAP-IN, 1-1/2" I.D. | 3 | 3 | | |
| 23 | P | 117953 843 | BUSHING, SNAP-IN, 2" I.D. | 2 | 2 | | |
| 24 | P | 117020 826 | STICKER, "ON/OFF" | 1 | 1 | | |
| 25 | P | 117953 725 | CONNECTOR, NYLON | 1 | 1 | | |
| 26 | P | 117902 787 | DISTRIBUTION TERMINAL | 1 | 1 | | |
| 27 | P | 117912 690 | TERMINAL PROTECTOR | 1 | 1 | | |
| 28 | P | 117954 400 | TRACK, TERMINAL, 35 mm | A/R | A/R | | |
| 29 | P | 117903 017 | STICKER HOLDER | 3 | 3 | | |
| 30 | P | 117954 670 | HUB CAP, EXTREMITY, GREY | 2 | 2 | | |
| 31 | P | 117903 693 | BAR, JUNCTION, 2 POLES | 2 | 2 | | |
| 32 | P | 117954 354 | STOPPER, END | 4 | 2 | | |
| 33 | P | 117954 668 | TERMINAL BLOCK, BLUE | 1 | 1 | | |
| 34 | P | 117902 846 | TERMINAL, 50 A, GRAY | 5 | 5 | | |
| 35 | P | 117912 463 | AUXILIARY CONTACT BLOCK, 1 N.O. | 2 | 2 | | |
| 36 | P | 117912 662 | AUXILIARY CONTACT BLOCK, 1 N.C. | 4 | 2 | | |
| 37 | P | 117912 663 | INTERLOCK, MECHANICAL | 1 | 1 | | |
| 38 | P | 117902 662 | JUMPER | 2 | 2 | | |
| 39 | P | 117902 422 | TERMINAL, ENTRELEC | 4 | 4 | | |
| 40 | P | 117902 663 | BARRIER, END | 2 | 2 | | |
| 41 | P | 117907 270 | FUSE HOLDER, 10 A, 250 V, 5 X 20mm | 1 | 1 | | |
| 42 | P | 117007 130 | FUSE, 4 A, 250 V | 1 | 1 | | |
| 43 | P | 117902 664 | STOPPER, END | 1 | 1 | | |

Cont'd...

| FIG. & ITEM NO. | PART NUMBER | | | DESCRIPTION | UNITS PER ASSEMBLY | | | |
|-----------------------|----------------|--------|-----|---|-----------------------|---|--|--|
| | | | | | | | | |
| 9-32 | | | | ELECTRICAL POWER SUPPLY BOX, INPUT/OUTPUT BOARD, AND CONTACTOR BOX (ELECTRIC HEATED) | X | | | |
| | | | | ELECTRICAL POWER SUPPLY BOX, INPUT/OUTPUT BOARD, AND CONTACTOR BOX (STEAM HEATED) | | X | | |
| (Cont'd) | | | | | | | | |
| 44 | P | 117910 | 357 | SCREW, TRUSS HEAD, S/S, 1/4"-20 X 1/2" | 4 | 4 | | |
| 45 | P | 117906 | 019 | WASHER, LOCK, DENTED, 1/4" | 4 | 4 | | |
| 46 | P | 117954 | 640 | CONNECTOR, GROUND | 1 | 1 | | |
| 47 | P | 117911 | 124 | CONTACTOR | 4 | 3 | | |
| 48 | P | 117015 | 563 | VARISTOR | 1 | 1 | | |
| 49 | P | 117015 | 553 | CONTACTOR | 2 | 2 | | |
| 50 | P | 117912 | 710 | TRANSFORMER, MULTI-VOLT, 500 VA | 1 | 1 | | |
| 51 | P | 117911 | 126 | RELAY, OVERLOAD, 4.5-6.3 A (208 V) | 1 | 1 | | |
| | P | 117015 | 556 | RELAY, OVERLOAD, 2.2-3.2 A (415/480 V) | 1 | 1 | | |
| 52 | P | 117911 | 658 | RELAY, OVERLOAD, 17-22 A (208 V) | 1 | 1 | | |
| | P | 117911 | 133 | RELAY, OVERLOAD, 7-10 A (415/480 V) | 1 | 1 | | |
| 53 | P | 117911 | 132 | RELAY, OVERLOAD, 3.5-5 A (208 V) | 1 | 1 | | |
| | P | 117015 | 557 | RELAY, OVERLOAD, 1.8-2.5 A (415/480 V) | 1 | 1 | | |
| 54 | P | 117902 | 664 | STOPPER, END | 2 | 2 | | |
| 55 | P | 117905 | 681 | RELAY, 12 V DC SPDT | 4 | 4 | | |

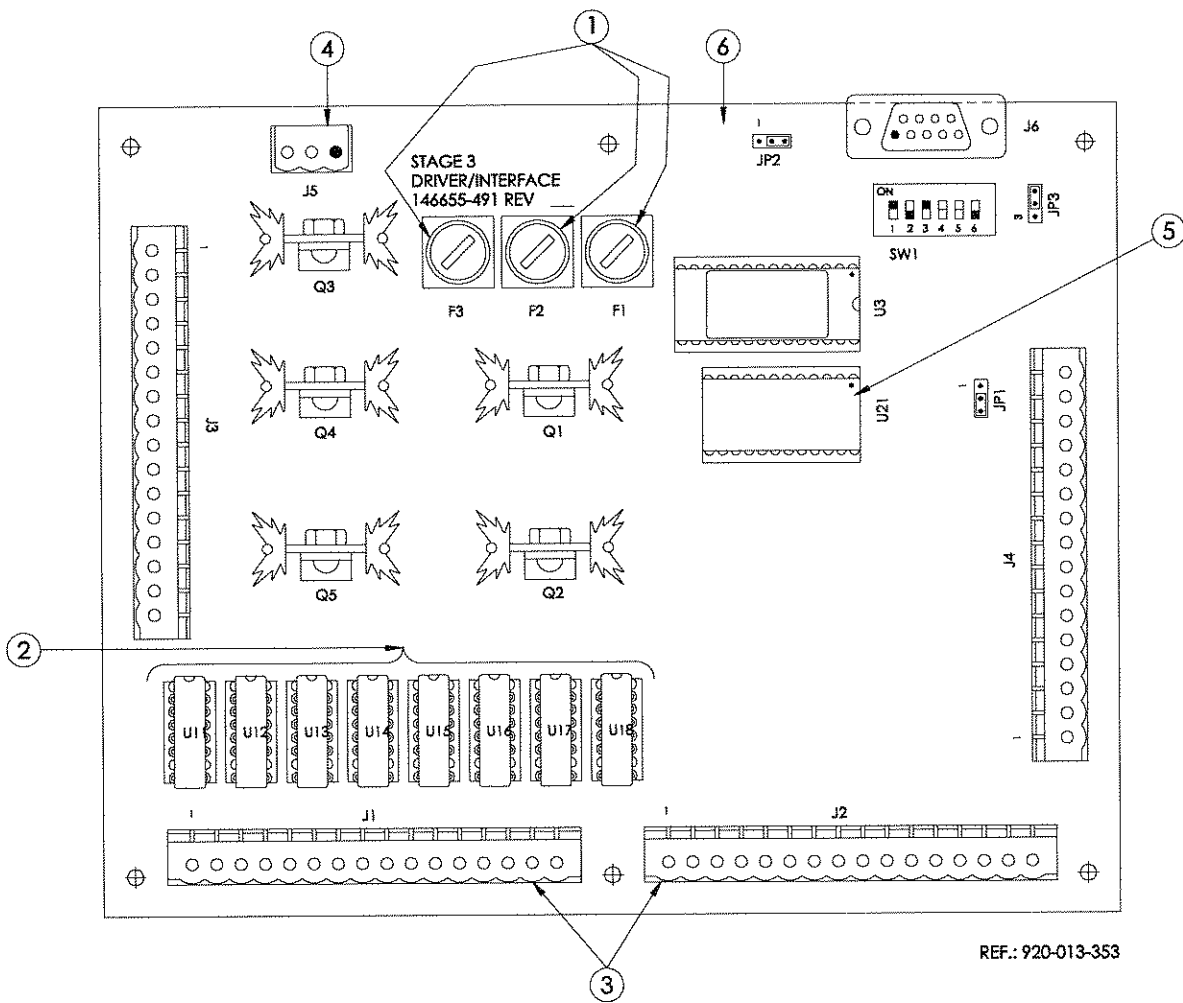
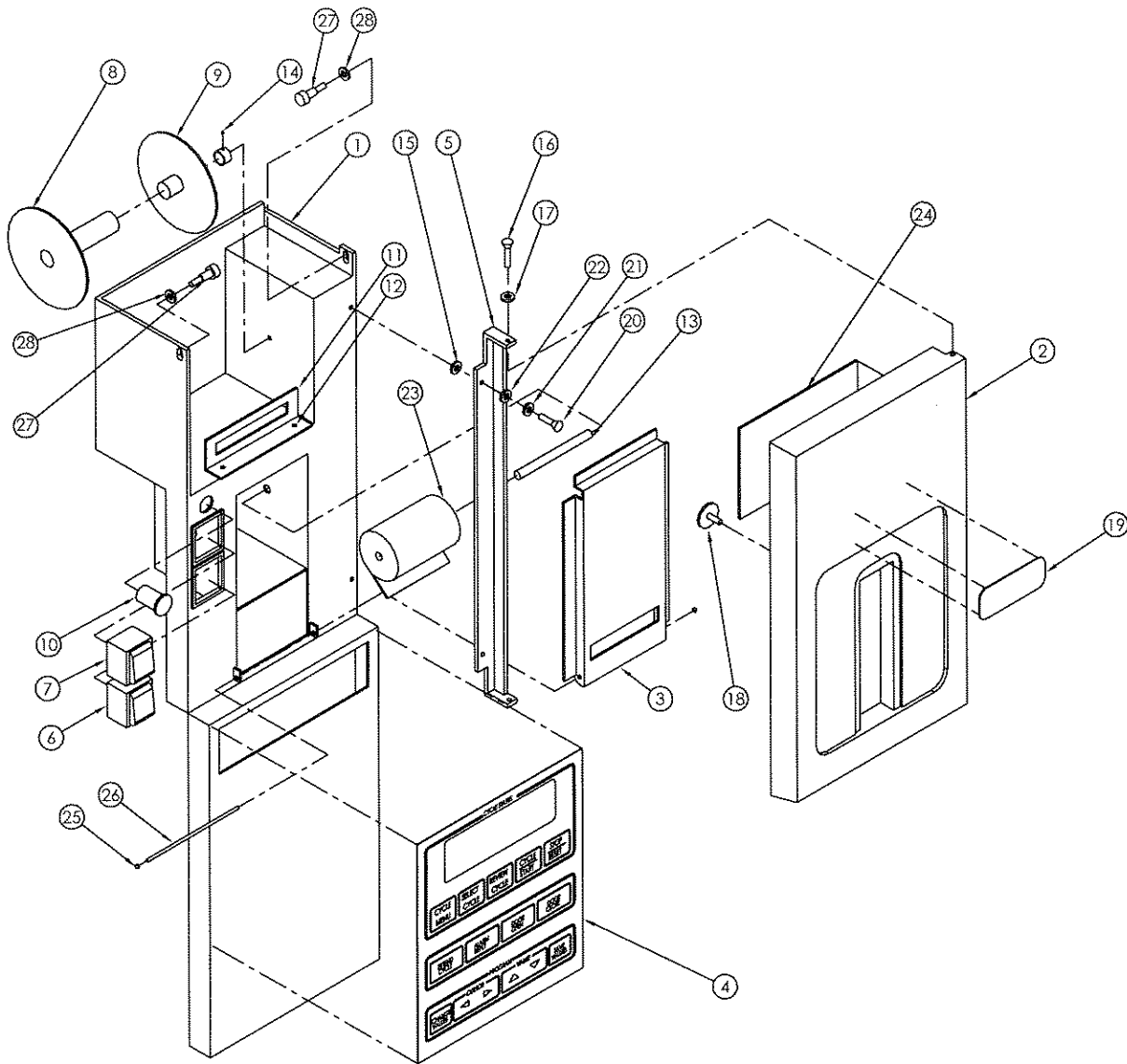


Figure 9-33. Input/Output Board

| FIG. & ITEM NO. | PART NUMBER | | DESCRIPTION | UNITS PER ASSEMBLY |
|-----------------------|----------------|--------|---|-----------------------|
| 9-33 | P | 146655 | 491 INPUT/OUTPUT BOARD | X |
| 1 | P | 129361 | 869 FUSE, 7 A, 250 V | 3 |
| 2 | P | 117902 | 412 RELAY, DIP (Alternate Item P129361-870) | 8 |
| | P | 117955 | 394 P82-P83 CABLE (Not Shown) | 1 |
| 3 | P | 117904 | 575 CONNECTOR, 16 PINS | 2 |
| 4 | P | 117904 | 576 CONNECTOR, 3 PINS | 1 |
| 5 | P | 150828 | 625 RAM CHIP | 1 |
| 6 | P | 146655 | 491 BOARD, I/O | 1 |



REF.:#920-015-553

Figure 9-34. Control Panel Assembly - Printer/Display (Part 1 of 2)

| FIG. & ITEM NO. | PART NUMBER | | DESCRIPTION | UNITS PER ASSEMBLY |
|-----------------|-------------|------------|---|--------------------|
| 9-34 | | | CONTROL PANEL ASSEMBLY - PRINTER/DISPLAY (PART 1 OF 2) | X |
| | P | 117902 735 | CONSOLE ASSEMBLY | 1 |
| 1 | P | 146655 746 | BRACKET, MOUNTING | 1 |
| 2 | P | 146653 226 | DOOR, PRINTER ACCESS | 1 |
| 3 | P | 93908 482 | PLATEN | 1 |
| 4 | P | 117901 719 | PANEL, TOUCH PAD, ENGLISH | 1 |
| | P | 117903 377 | PANEL, TOUCH PAD, FRENCH | 1 |
| | P | 117988 984 | PANEL, TOUCH PAD, SPANISH | 1 |
| 5 | P | 136806 411 | BAR, HINGE | 1 |
| 6 | P | 93908 901 | SWITCH, PRINTER FUNCTION | 1 |
| 7 | P | 93902 846 | SWITCH, CONTROL | 1 |
| 8 | P | 93910 248 | SPOOL | 1 |
| 9 | P | 93910 250 | STUD, SPOOL | 1 |
| 10 | P | 129356 001 | CATCH, MAGNETIC | 1 |
| 11 | P | 129360 448 | CLIP | 1 |
| 12 | P | 93908 031 | SCREW, SEMS, #4-40 x 1/4" | 8 |
| 13 | P | 129357 884 | SHAFT, PAPER | 1 |
| 14 | P | 93908 031 | SCREW, SET, 6-32 x 3/16" | 1 |
| 15 | P | 19677 041 | LOCKWASHER, #10 | 2 |
| 16 | P | 129359 489 | SCREW, SHOULDER, 4-40 x 1/8" x 29/64" | 4 |
| 17 | P | 129139 002 | WASHER, FLAT, FIBRE | 2 |
| 18 | P | 93909 376 | STRIKE | 1 |
| 19 | P | 129362 135 | NAMEPLATE, STAGE 3 | 1 |
| 20 | P | 129359 461 | SCREW, BUTTON HEAD, 10-32 x 1/2" | 2 |
| 21 | P | 129352 069 | NUT, RETAINING, 10-32 | 2 |
| 22 | P | 5511 041 | WASHER, FLAT, #10 | 2 |
| 23 | P | 129359 008 | PAPER, ROLL (Box of 5 rolls) | A/R |
| 24 | P | 93908 516 | PLATE, INSTRUCTION | 1 |
| 25 | P | 150828 190 | NUT, PRESS, BLACK | 2 |
| 26 | P | 150828 189 | ROD, PLATEN | 1 |
| 27 | P | 23431 041 | SCREW, SOCKET HEAD, 10-32 X 3/8 | 2 |
| 28 | P | 31705 045 | LOCKWASHER | 2 |

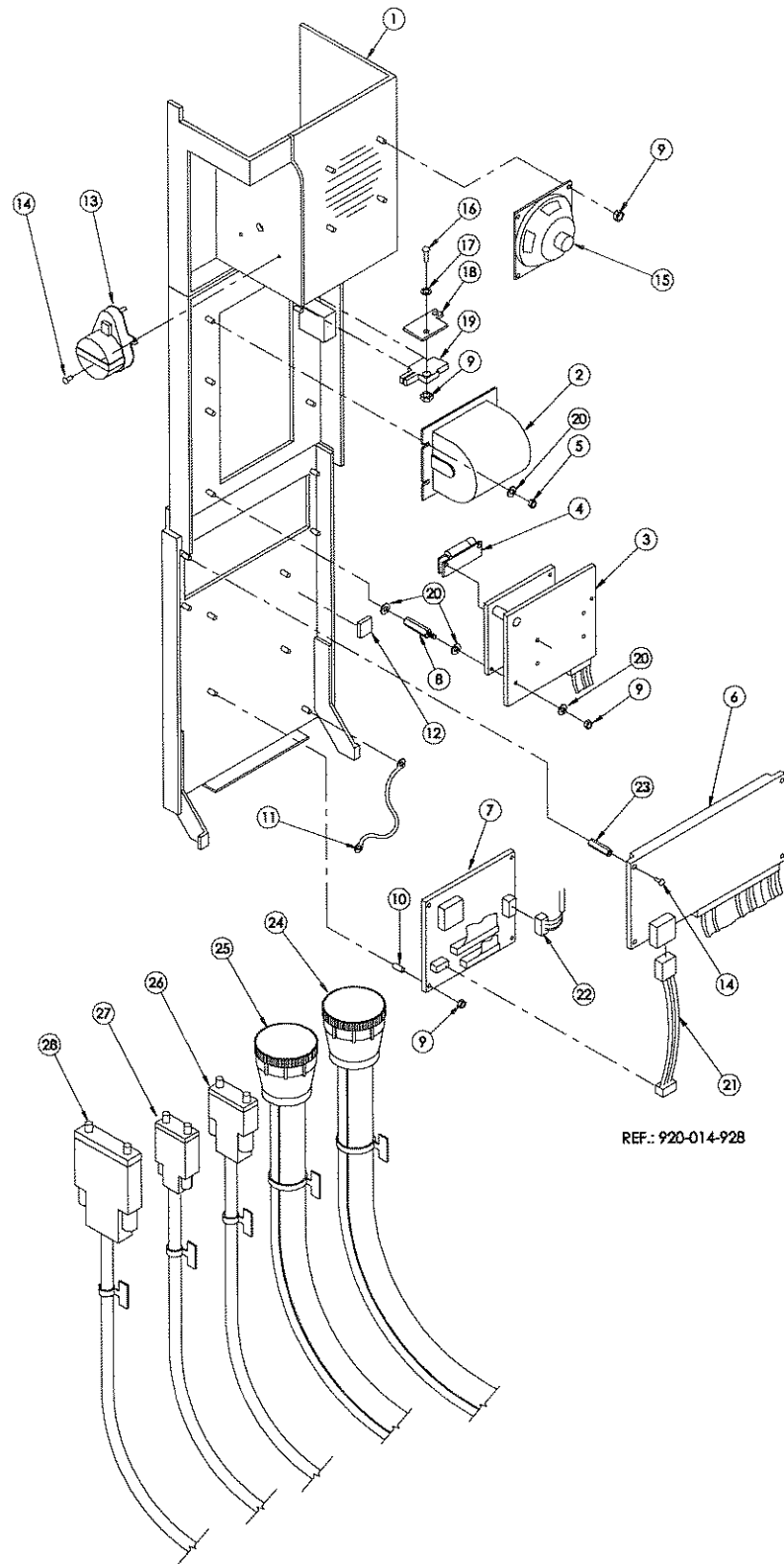
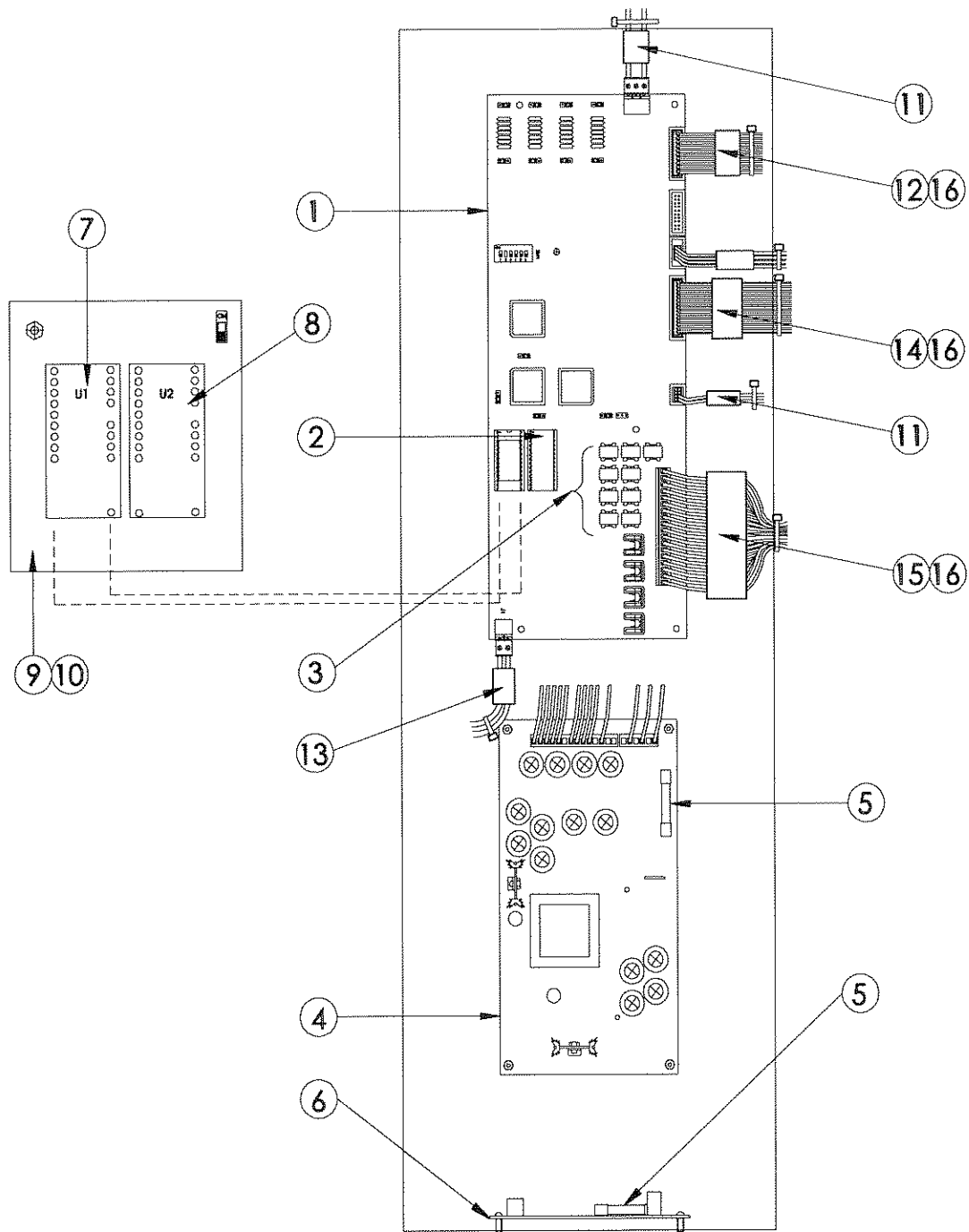


Figure 9-35. Control Panel Assembly -Printer/Display (Part 2 of 2)

| FIG. & ITEM NO. | PART NUMBER | | DESCRIPTION | UNITS PER ASSEMBLY |
|-----------------|-------------|------------|---|--------------------|
| 9-35 | | | CONTROL PANEL ASSEMBLY PRINTER/DISPLAY (Part 2 of 2) | X |
| 1 | P | 146655 352 | BRACKET, MOUNTING | 1 |
| 2 | P | 136800 949 | HOUSING, PAPER | 1 |
| 3 | P | 93910 531 | PRINTER ASSEMBLY, WITH PRINTER, THERMAL TYPE | 1 |
| 4 | P | 755716 005 | PRINTER, WITH CABLE, THERMAL | 1 |
| 5 | P | 84121 002 | NUT, KEPS, 6-32 | 4 |
| 6 | P | 93908 435 | DISPLAY | 1 |
| 7 | P | 146655 598 | BOARD, PC, INTERFACE | 1 |
| 8 | P | 129361 678 | STANDOFF, 6-32 X 1" | 3 |
| 9 | P | 84121 001 | NUT, KEPS, 4-40 | 12 |
| 10 | P | 129360 821 | SPACER | 4 |
| 11 | P | 93909 390 | WIRE, GROUND | 1 |
| 12 | P | 129326 001 | MOUNT, WIRE TIE | 3 |
| 13 | P | 93909 399 | GEAR, MOTOR | 1 |
| 14 | P | 93908 031 | SCREW, SEMS, 4-40 X 1/4" | 8 |
| 15 | P | 56401 535 | SPEAKER | 1 |
| 16 | P | 90993 091 | SCREW, ROUND HEAD, 4-40 X 3/4" | 2 |
| 17 | P | 26032 091 | WASHER, FLAT, #4 | 2 |
| 18 | P | 90124 091 | INSULATOR, SWITCH | 1 |
| 19 | P | 129359 463 | SWITCH, MICRO | 1 |
| 20 | P | 84114 002 | WASHER, FLAT, #6 | 10 |
| 21 | P | 93910 546 | CONNECTOR ASSEMBLY | 1 |
| 22 | P | 136807 690 | CABLE ASSEMBLY, P67 | 1 |
| 23 | P | 129361 676 | STANDOFF, 4-40 X 7/16" | 4 |
| 24 | | | CABLE P53 (DC) SPECIAL APPLICATION ORDER | 1 |
| 25 | | | CABLE P54 (AC) SPECIAL APPLICATION ORDER | 1 |
| 26 | P | 117955 393 | CABLE, ASSEMBLY, P70-P71 | 1 |
| 27 | P | 117940 820 | CABLE, DC, P82-P83, ASSEMBLY | 1 |
| 28 | P | 117009 370 | CABLE, DB25, M/F, 10' (For Bar Code Reader with Amsco Reliance 444 Load/Unload Module option or Amsco Reliance ATS Automated Transport System option) | 2 |



REF. : 920-013-352

Figure 9-36. Control PC Board, Power Supply, and Connector Board

| FIG. & ITEM NO. | PART NUMBER | | DESCRIPTION | UNITS PER ASSEMBLY | | |
|---|--------------|---------------------------------|---|--------------------|---|---|
| | | | | | | |
| 9-36 | | | CONTROL PC BOARD, | X | | |
| | | | POWER SUPPLY | | X | |
| | | | CONNECTOR BOARD..... | | | X |
| | 1 | P 146655 819 | BOARD, CONTROL PC | 1 | | |
| | 2 | P 129362 145 | • RAM, BATTERY BACKED-UP | 1 | | |
| | 3 | P 117902 411 | • DRIVER, 300 MA (Alternate Item P129360-870) | 9 | | |
| | 4 | P 93910 541 | SUPPLY, POWER | | 1 | |
| | 5 | P 764317 778 | • FUSE, 3 A, 250 V (Box of 5) | | 1 | 1 |
| | 6 | P 136806 207 | BOARD, CONNECTOR..... | | | 1 |
| | | P 129357 238 | SOCKET, EPROM (Not Shown) | A/R | | |
| | 7 | P | EPROM*, AUTOMATIC MODE, ENGLISH | 1 | | |
| | 8 | P | EPROM, SERVICE MODE, ENGLISH | 1 | | |
| | 9 | P 117908 028 | EPROM, BOARD EXTENSION 3000 (64K) | 1 | | |
| | 10 | P 117908 134 | SPACER, PRINTER CIRCUIT, 6-32 X 3/4" | 1 | | |
| | 11 | P 117909 041 | FERRITE, #28A0392-0A0 | 2 | | |
| | 12 | P 117909 042 | FERRITE, #28A2025-0A0 | 2 | | |
| | 13 | P 117909 040 | FERRITE, #28A2025-0A0 | 2 | | |
| 14 | P 117909 039 | FERRITE, #28S2001-000 | 2 | | | |
| 15 | P 117909 038 | FERRITE, #28S2011-000 | 2 | | | |
| 16 | P 117909 043 | FERRITE CLIP, #ASSE-001-2 | 6 | | | |
| | P 117908 811 | CLIP, TY-RAP, 4" LONG..... | 7 | | | |
| <p><i>*NOTE: When ordering a replacement EPROM chip, refer to part number printed on existing chip.</i></p> | | | | | | |

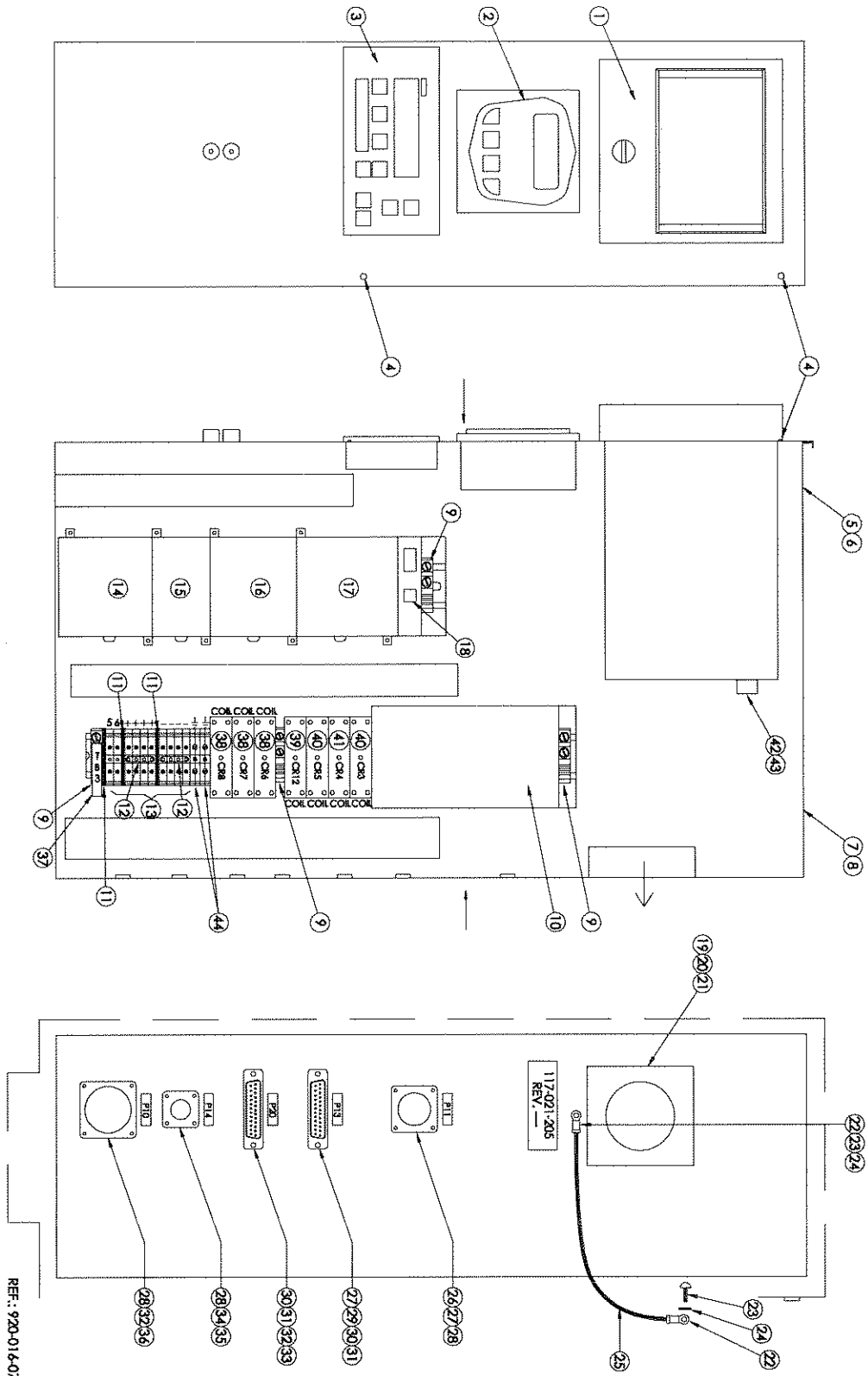


Figure 9-37. Independent Monitor Box (Option)

| FIG. & ITEM NO. | PART NUMBER | | DESCRIPTION | UNITS PER ASSEMBLY | | |
|-----------------|-------------|------------|--|--------------------|--|--|
| | | | | | | |
| 9-37 | | | INDEPENDENT MONITOR BOX (Option) | X | | |
| 1 | P | 117021 336 | RECORDER, PAPERLESS | 1 | | |
| 2 | P | 117013 974 | CONDUCTIVITY TRANSMITTER | 1 | | |
| 3 | P | 117013 982 | DISPLAY, PORTABLE, #TD-200 | 1 | | |
| 4 | P | 117950 855 | SCREW, TRUSS HEAD, S/S, 8-32 X 1/4" | 4 | | |
| 5 | P | 117021 210 | GUIDE, INDEPENDENT MONITOR BOX | 1 | | |
| 6 | P | 117950 856 | SCREW, TRUSS HEAD, S/S, 8-32 X 3/8" | 2 | | |
| 7 | P | 117021 206 | GUIDE, INDEPENDENT MONITOR BOX | 1 | | |
| 8 | P | 117021 208 | COVER, INDEPENDENT MONITOR BOX | 1 | | |
| 9 | P | 117954 354 | STOPPER, END | 4 | | |
| 10 | P | 117015 425 | POWER SUPPLY, 24 VDC, 3.5 A | 1 | | |
| 11 | P | 117954 670 | HUB CAP, EXTREMETY, GREY | 3 | | |
| 12 | P | 117954 634 | BAR, JUMPER, 10 POLES | 1 | | |
| 13 | P | 117954 353 | TERMINAL, BLOCK, 25 A, GREY | 10 | | |
| 14 | P | 117013 984 | RTD, MODULE, EM | 1 | | |
| 15 | P | 117013 983 | UNIT, EXTENSION, ANALOG, 2 OUTPUTS | 1 | | |
| | P | 117950 855 | SCREW, TRUSS HEAD, S/S, 8-32 X 1/4" | 20 | | |
| 16 | P | 117015 424 | MODULE, ANALOG INPUT, EM 231 | 1 | | |
| 17 | P | 117013 985 | PLC, MODULE, CPU, 224 | 1 | | |
| 18 | P | 117015 461 | MODULE, MEMORY, MC291 EEPROM | 1 | | |
| 19 | P | 117015 426 | FAN, 24 VDC, 37 CFM | 1 | | |
| 20 | P | 117910 565 | SCREW, S/S, 6-32 X 1-1/4" | 4 | | |
| 21 | P | 117952 276 | ENVELOPE, VINYL FIBERGLASS, BLACK, 2B (Sold by Foot - Not Shown) | A/R | | |
| 22 | P | 117954 641 | TERMINAL, ISOLATED, YELLOW RING, #10 SCREW | 2 | | |
| 23 | P | 117950 865 | SCREW, TRUSS HEAD, S/S, 10-32 X 1/4" | 2 | | |
| 24 | P | 117906 017 | WASHER, LOCK, STAR, SCREW #10 | 2 | | |
| 25 | P | 117909 308 | WIRE, #10, TEW, GREEN-YELLOW (Sold by Foot) | A/R | | |
| 26 | P | 117910 753 | CONNECTOR, STANDARD, SEX, 17-28 | 1 | | |
| 27 | P | 117955 331 | PIN, MALE, DB, MINIATURE | 21 | | |
| 28 | P | 117903 247 | SCREW, STEEL, #8 X 3/8" | 12 | | |
| 29 | P | 117904 325 | RECEPTACLE, DB25, MALE | 1 | | |
| 30 | P | 117910 050 | SPACER, PRINTED CIRCUIT, 4-40 X 3/16" AMP | 2 | | |
| 31 | P | 117950 948 | NUT, S/S, 4-40 | 4 | | |
| 32 | P | 117955 325 | SOCKET, DB, MINIATURE | 57 | | |
| 33 | P | 117955 432 | RECEPTACLE, DB25, WITHOUT PIN | 1 | | |
| 34 | P | 117956 634 | CONNECTOR, REVERSE, SEX, 11-4 | 1 | | |
| 35 | P | 117956 636 | MULTI MATE CONTACT SOCKET | 4 | | |
| 36 | P | 117005 486 | CONNECTOR, REVERSE, SEX, 23-57 | 1 | | |
| 37 | P | 117903 017 | STICKER HOLDER | 1 | | |
| 38 | P | 117905 579 | RELAY, 24 VDC, SPDT, #010004.21 | 3 | | |
| 39 | P | 117908 193 | RELAY, 120 VAC, DPDT, #010011.17 | 1 | | |
| 40 | P | 117902 421 | RELAY, 120 VAC, SPDT, #010158.07 | 2 | | |
| 41 | P | 117021 344 | RELAY, 120 VAC, DPDT, #0100115.14 | 1 | | |
| 42 | P | 117905 211 | RECEPTACLE, DB9, FEMALE, WITOUT PIN | 1 | | |
| 43 | P | 117005 398 | SCREW, ROUND HEAD, S/S, 4-40 X 3/16" | 2 | | |
| 44 | P | 117954 640 | CONNECTOR, GROUND | 2 | | |
| 45 | P | 117911 234 | RESISTOR, 82 OHMS, 1/4 W (Not Shown) | 1 | | |

Cont'd...

| FIG. & ITEM NO. | PART NUMBER | | | DESCRIPTION | UNITS PER ASSEMBLY |
|-----------------------|----------------|--------|-----|---|-----------------------|
| 9-37 | | | | INDEPENDENT MONITOR BOX (Cont'd) | X |
| 46 | P | 117912 | 095 | RESISTOR, 50 OHMS (Not Shown) | 1 |
| 47 | P | 117909 | 999 | WASHER, LOCK, FOR #8 SCREW (Not Shown) | 2 |
| 48 | P | 117955 | 487 | CABLE, 3 CONDUCTORS, SHIELDED, 22/7, RED/BLACK /WHITE (Not Shown - Sold by Foot) | A/R |
| 49 | P | 117902 | 352 | WIRE, #20, TR64, PVC, BLACK (Not Shown - Sold by Foot) | A/R |
| 50 | P | 117007 | 095 | WIRE, #20, TR64, PVC, BLUE (Not Shown - Sold by Foot) | A/R |
| 51 | P | 117902 | 730 | WIRE, #20, TR64, PVC, WHITE (Not Shown - Sold by Foot) | A/R |
| 52 | P | 117902 | 353 | WIRE, #20, TR64, PVC, RED (Not Shown - Sold by Foot) | A/R |

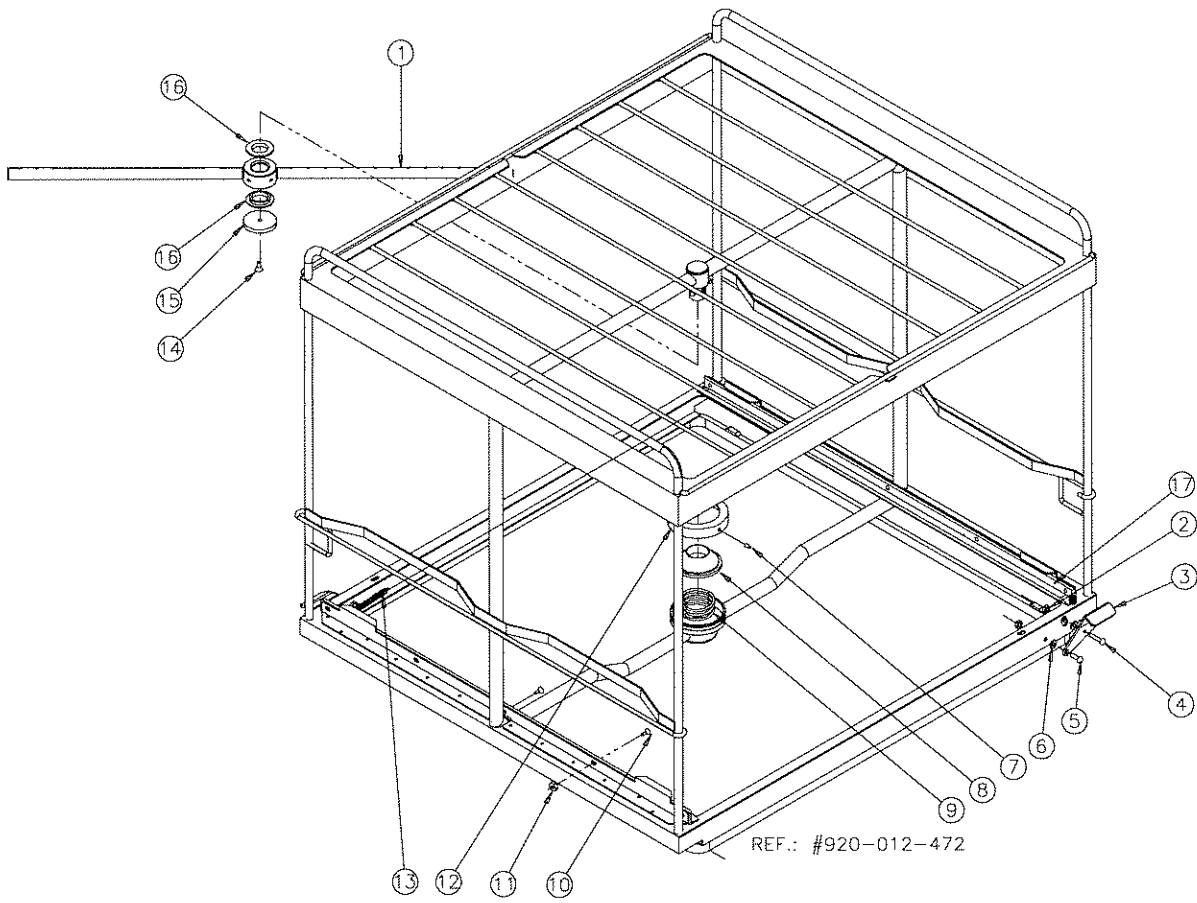
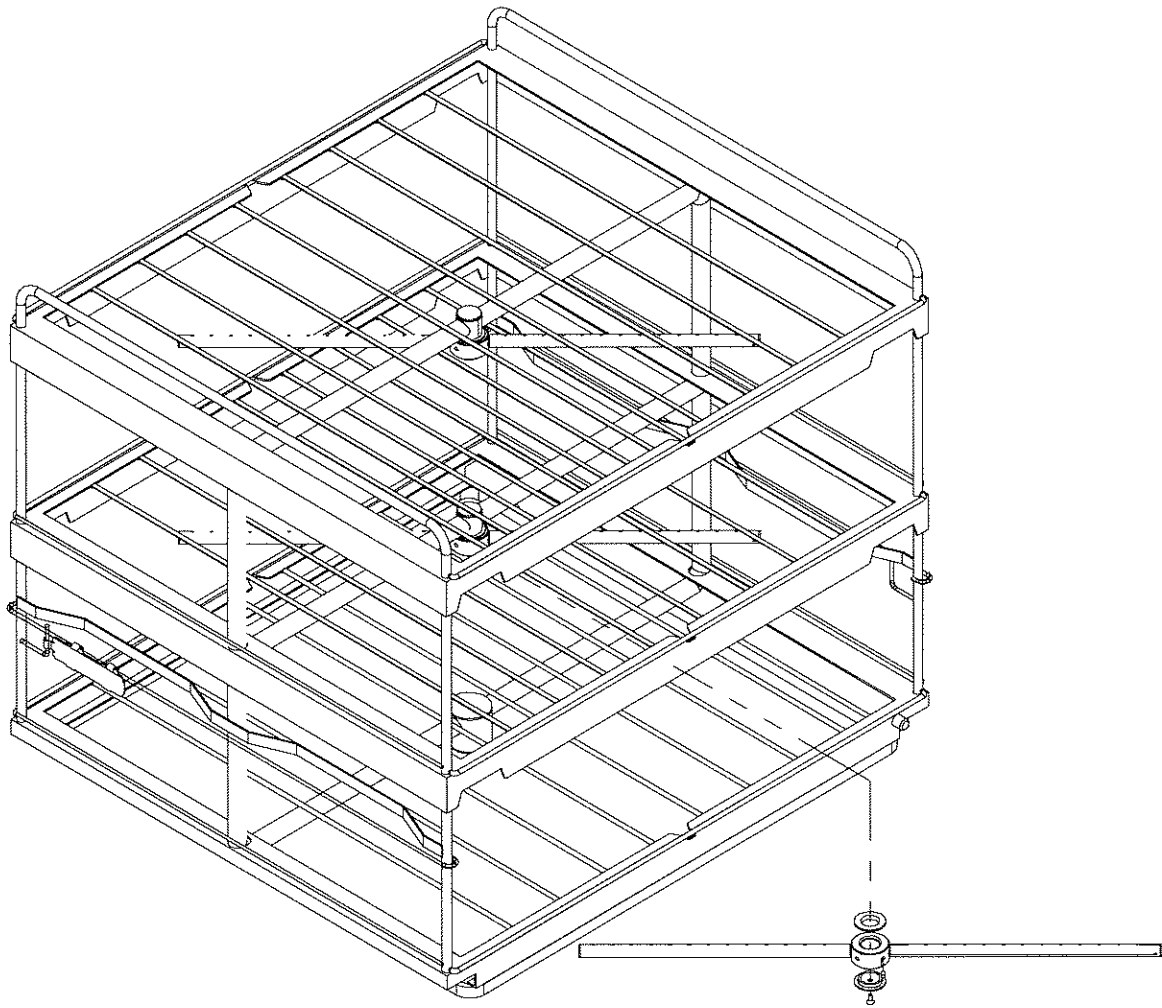


Figure 9-38. Two-Level Mixed Load Rack, Assembly

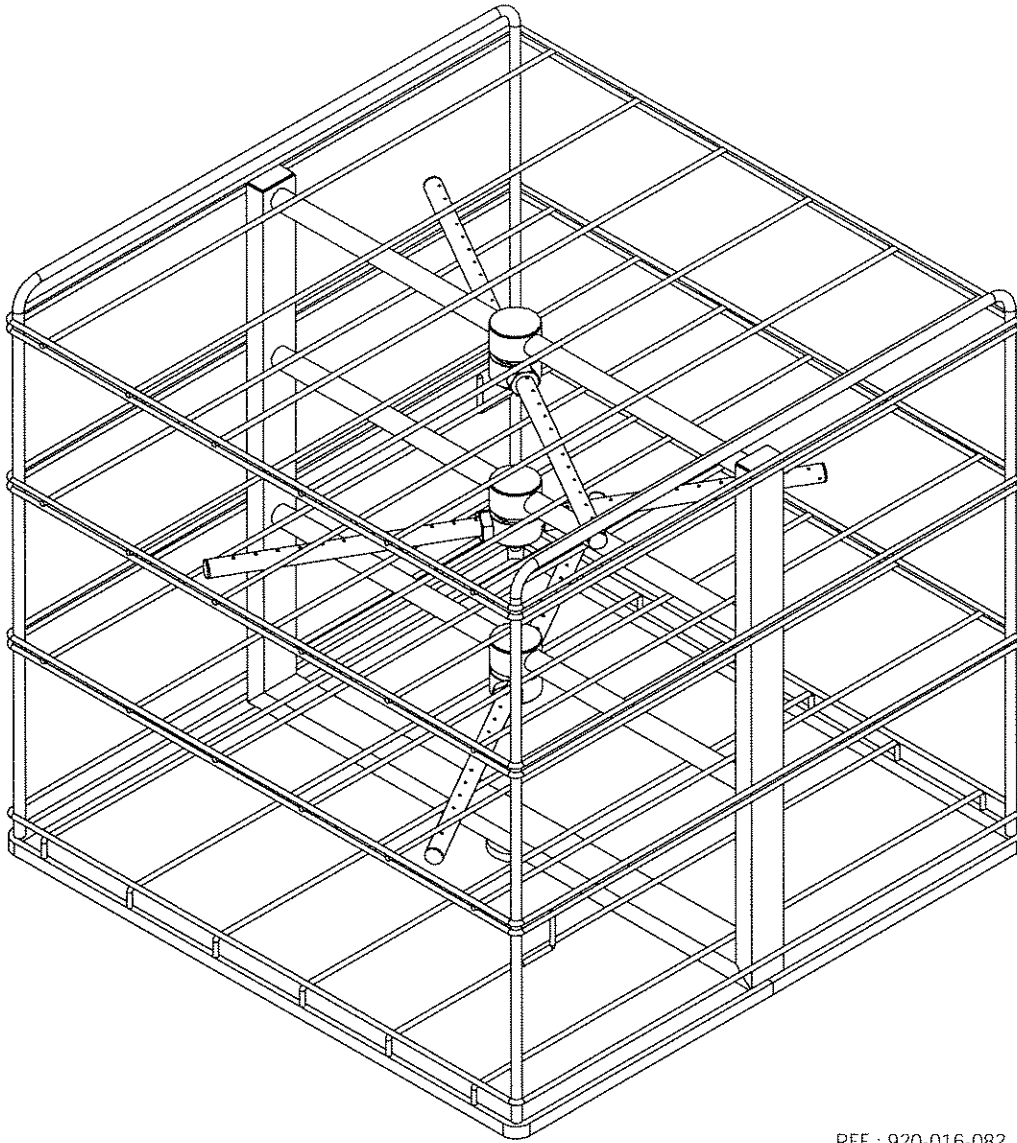
| FIG. & ITEM NO. | PART NUMBER | | DESCRIPTION | UNITS PER ASSEMBLY | | | |
|-----------------------|----------------|------------|--|-----------------------|--|--|--|
| | | | | | | | |
| 9-38 | | | TWO-LEVEL MIXED LOAD RACK, ASSEMBLY | X | | | |
| 1 | P | 117905 776 | SPRAY ARM, ROTARY (Two, with Nuts) | 1 | | | |
| 2 | P | 117950 951 | NUT, S/S, 10-32 (Alternate Item P150475-630) | 2 | | | |
| 3 | P | 117986 390 | LATCH, BASKET | 2 | | | |
| 4 | P | 117950 868 | SCREW, TRUSS HEAD, 10-32 X 3/4" | 2 | | | |
| 5 | P | 117950 867 | SCREW, TRUSS HEAD, 10-32 X 1/2" | 2 | | | |
| 6 | P | 117986 391 | BUSHING, LOCK | 2 | | | |
| 7 | P | 117951 316 | SCREW, SOCKET HEAD, S/S, 10-32 X 1/4" | 1 | | | |
| 8 | P | 117901 237 | INLET, SLIDING | 1 | | | |
| 9 | P | 117902 871 | SPRING, SLIDING INLET | 1 | | | |
| 10 | P | 117950 819 | SCREW, FLAT HEAD, S/S, 6-32 X 3/8" | 8 | | | |
| 11 | P | 117950 949 | NUT, S/S, 6-32 | 8 | | | |
| 12 | P | 117904 787 | STOPPER, SLIDING INLET | 1 | | | |
| 13 | P | 117904 209 | SPRING, SHELF LATCH | 1 | | | |
| 14 | P | 117950 827 | SCREW, FLAT HEAD, S/S, 8-32 X 3/8" | 1 | | | |
| 15 | P | 117904 606 | WASHER, HOLDING, TOP ROTARY SPRAY ARM | 1 | | | |
| 16 | P | 117905 384 | BUSHING, ROTARY SPRAY ARM, ULTEM | 2 | | | |
| 17 | P | 117906 764 | GUIDE, SLIDING, ULTEM, AMBER | 2 | | | |
| | P | 117988 859 | GUIDE, SLIDING, TEFLON, WHITE | 2 | | | |



122-993-266

Figure 9-39. Three-Level Manifold Rack, Assembly

| FIG. & ITEM NO. | PART NUMBER | | | DESCRIPTION | UNITS PER ASSEMBLY |
|-----------------------|----------------|--------|-----|--|-----------------------|
| 9-39 | | | | THREE-LEVEL MANIFOLD RACK, ASSEMBLY | X |
| 1 | P | 117950 | 827 | SCREW, FLAT HEAD, S/S, 8-32 X 3/8" | 1 |
| 2 | P | 117904 | 606 | WASHER, HOLDING, TOP ROTARY SPRAY ARM | 1 |
| 3 | P | 117904 | 808 | ARM, ROTARY SPRAY ASSEMBLY | 1 |
| | P | 117905 | 446 | • HUB, ROTARY SPRAY, S/S | 1 |
| | P | 117951 | 017 | • SCREW, ALLEN, SOCKET, S/S, 6-32 X 1/4" | 2 |
| | P | 117904 | 613 | • ARM, ROTARY SPRAY, #2, RIGHT | 1 |
| | P | 117904 | 614 | • ARM, ROTARY SPRAY, #2, LEFT | 1 |
| 4 | P | 117905 | 384 | • BUSHING, ROTARY SPRAY ARM, ULTEM | 2 |



REF.: 920-016-082

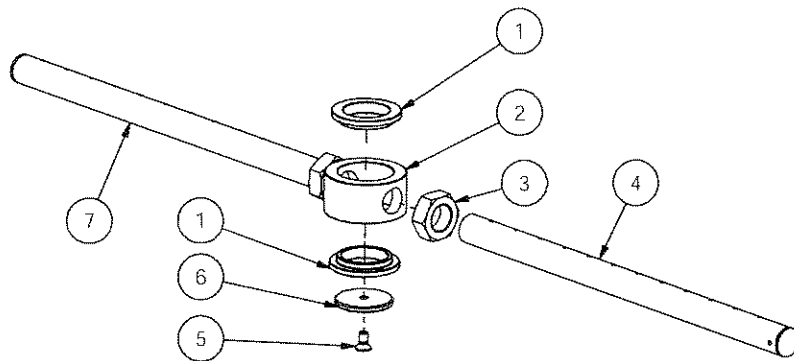
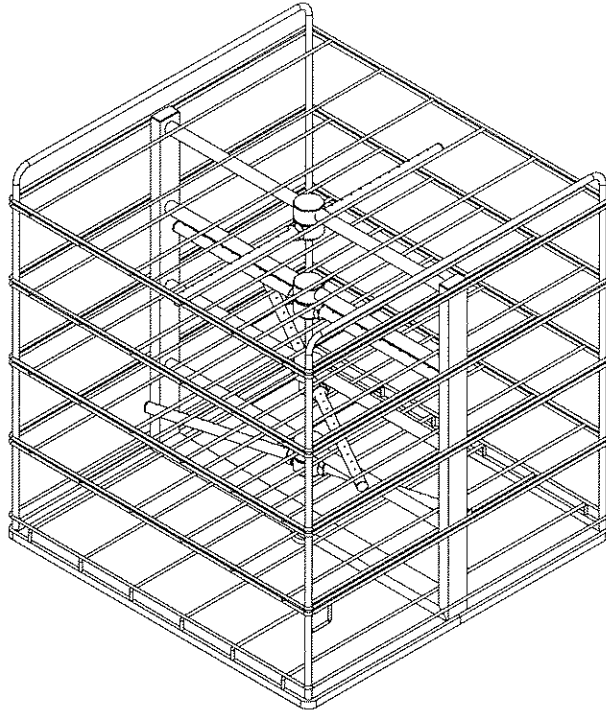


Figure 9-40. Four-Level Manifold Instrument Rack (Without Central Post), Assembly

| FIG. & ITEM NO. | PART NUMBER | | DESCRIPTION | UNITS PER ASSEMBLY |
|-----------------------|----------------|------------|---|-----------------------|
| 9-40 | | | FOUR-LEVEL MANIFOLD INSTRUMENT RACK (WITHOUT CENTRAL POST), ASSEMBLY | X |
| 1 | P | 117987 854 | BUSHING, TOP ROTARY SPRAY ARM | 6 |
| 2 | P | 117988 386 | HUB, TOP ROTARY SPRAY ARM | 3 |
| 3 | P | 117953 466 | NUT, LOCK, S/S, 5/8"-18 | 6 |
| 4 | P | 117986 883 | ARM, ROTARY SPRAY (LEFT) | 3 |
| 5 | P | 117950 835 | SCREW, FLAT HEAD, S/S, 10-32 X 3/8" | 3 |
| 6 | P | 117987 856 | WASHER, SPRAY HEADER, S/S, 1-1/4" | 3 |
| 7 | P | 117986 884 | ARM, ROTARY SPRAY (RIGHT) | 3 |



REF: 920-013-349

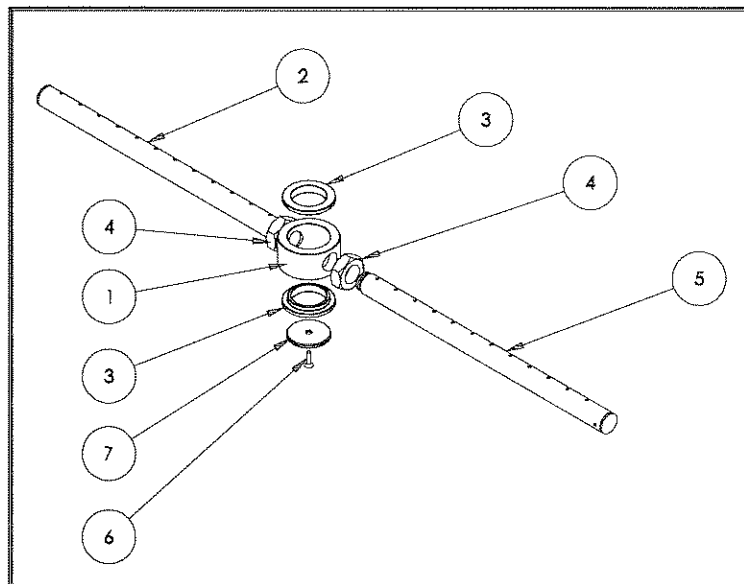
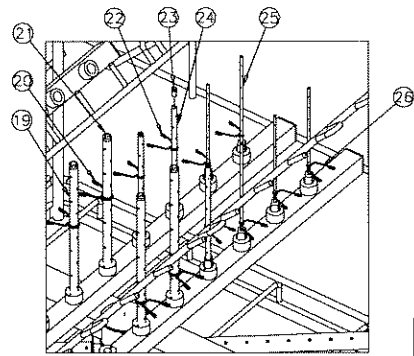
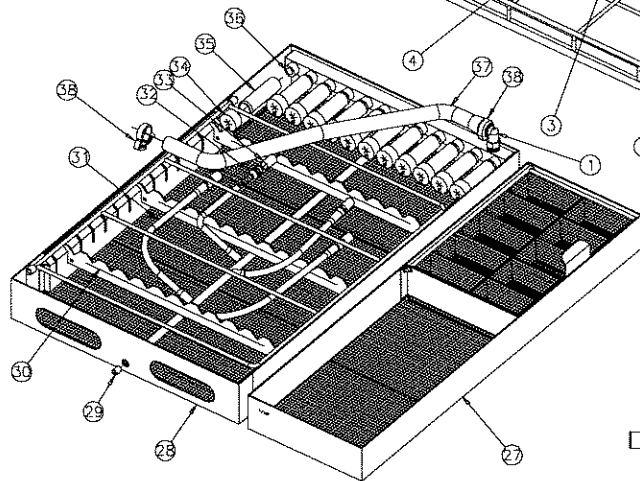
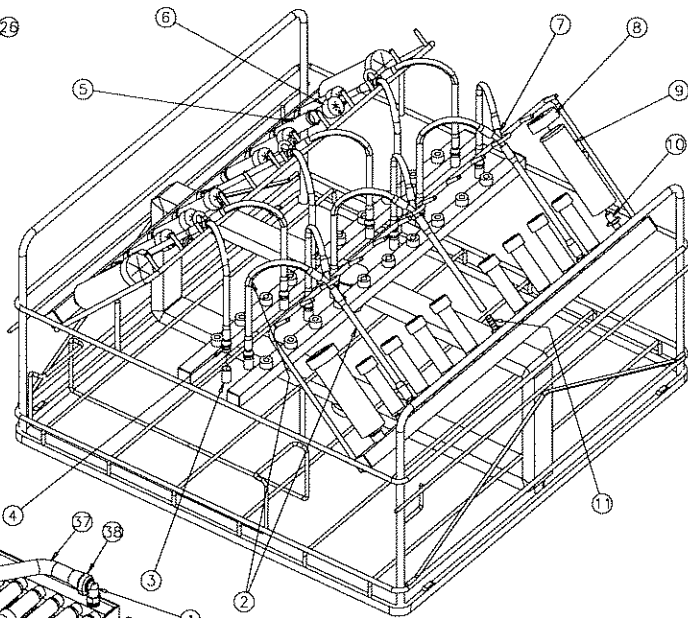


Figure 9-41. Five-Level Manifold Instrument Rack, Assembly

| FIG. & ITEM NO. | PART NUMBER | | DESCRIPTION | UNITS PER ASSEMBLY |
|-----------------------|----------------|------------|--|-----------------------|
| 9-41 | | | FIVE-LEVEL MANIFOLD INSTRUMENT RACK, ASSEMBLY | X |
| 1 | P | 117988 386 | HUB, TOP ROTARY SPRAY ARM | 4 |
| 2 | P | 117986 884 | ARM, ROTARY SPRAY (RIGHT) | 4 |
| 3 | P | 117987 854 | BUSHING, ROTARY SPRAY | 8 |
| 4 | P | 117953 466 | NUT, LOCK, S/S, 5/8"-18 | 8 |
| 5 | P | 117986 883 | ARM, ROTARY SPRAY (LIGHT) | 4 |
| 6 | P | 117950 835 | SCREW, FLAT HEAD, S/S, 10-32 X 3/8" | 4 |
| 7 | P | 117987 856 | WASHER, SPRAY HEADER, S/S, 1-1/4" | 4 |



Accessory with Spindles (detail)



REF.: 920-003-837

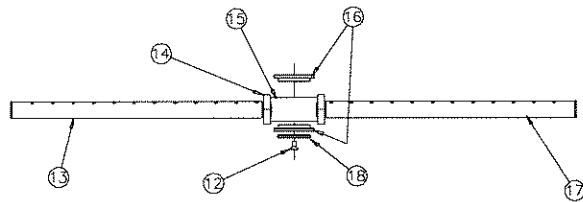
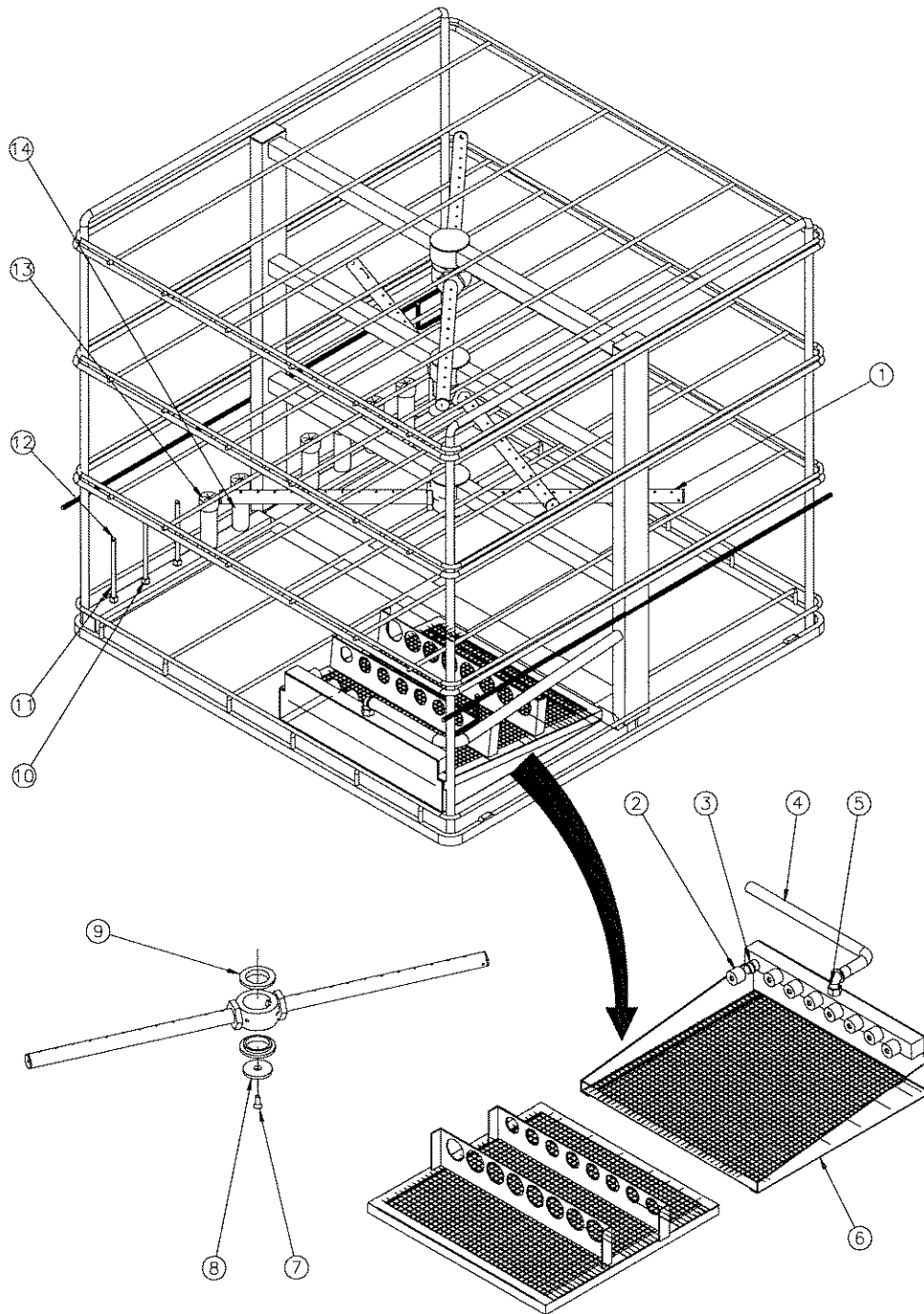


Figure 9-42. Rigid MIS Instrument Rack, Assembly

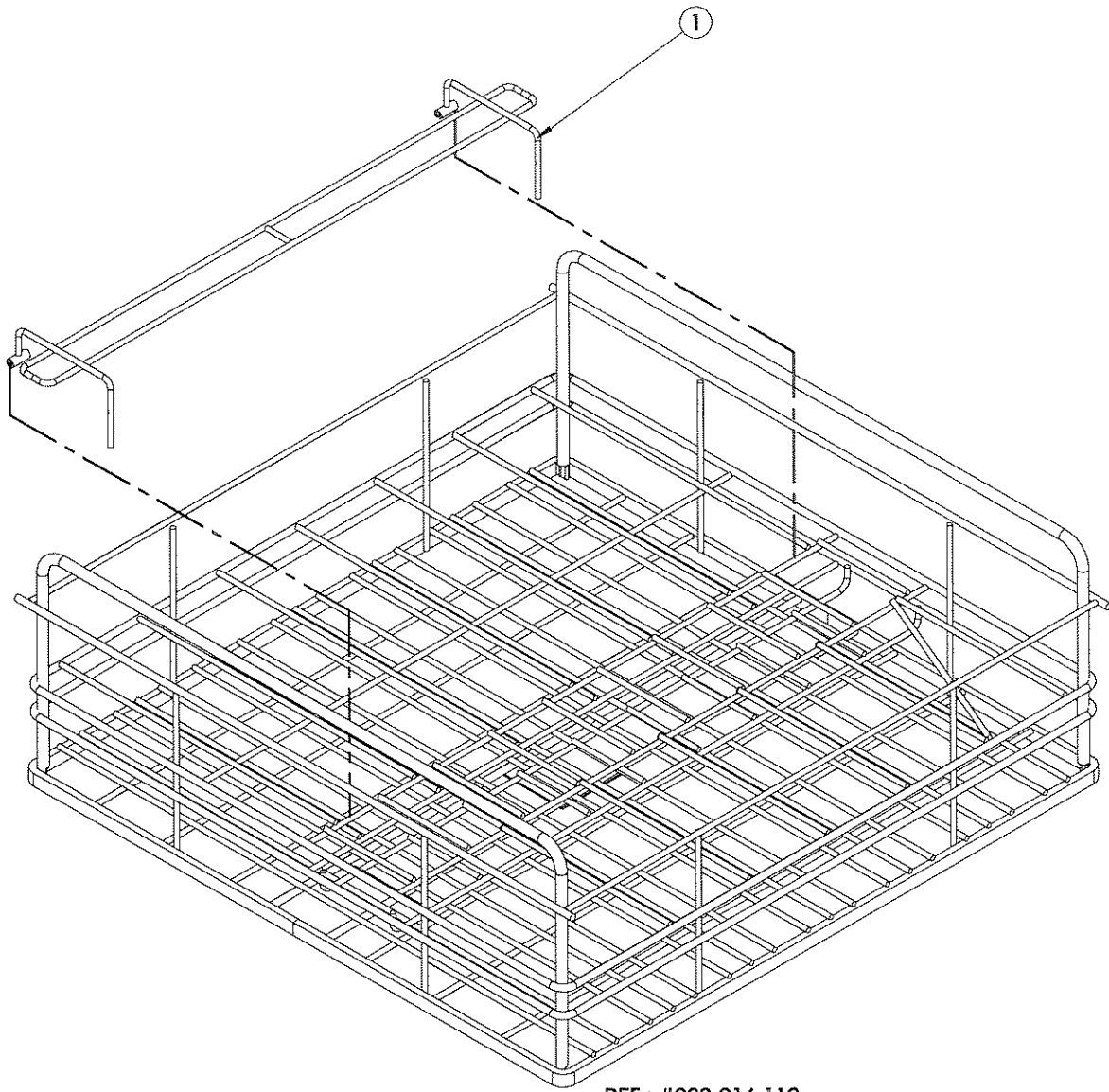
| FIG. & ITEM NO. | PART NUMBER | | | DESCRIPTION | UNITS PER ASSEMBLY | | | |
|-----------------|-------------|--------|-----|--|--------------------|--|--|--|
| | | | | | | | | |
| 9-42 | | | | RIGID MIS INSTRUMENT RACK, ASSEMBLY | X | | | |
| 1 | P | 117910 | 432 | ELBOW, PLASTIC, 90°, 1/4" M X 1/2" H | 1 | | | |
| 2 | P | 117910 | 430 | HOSE, SILICONE, 5/16" O.D. X 3/16" I.D. | 18 | | | |
| 3 | P | 117999 | 074 | CAP, EPDM, SPRAY JET, 13/32" | 12 | | | |
| 4 | P | 117999 | 073 | SPRAY JET, 13/32" | 12 | | | |
| 5 | P | 117999 | 096 | SPRAY JET, LONG, 3/4" | 16 | | | |
| 6 | P | 117999 | 030 | CAP, EPDM, LONG SPRAY JET, 3/4" | 16 | | | |
| 7 | P | 117910 | 431 | Y CONNECTOR, PLASTIC | 6 | | | |
| 8 | P | 117999 | 027 | CAP, EPDM, SPRAY JET, 1-3/8" | 4 | | | |
| 9 | P | 117999 | 065 | SPRAY JET, 1-3/8" | 4 | | | |
| 10 | P | 117999 | 025 | NOZZLE, FOR SPRAY JET | 20 | | | |
| 11 | P | 117999 | 028 | ADAPTOR, FOR SPRAY JET, 13/32" | 6 | | | |
| 12 | P | 117950 | 835 | SCREW, FLAT HEAD, S/S, 10-32 X 3/8" | 1 | | | |
| 13 | P | 117003 | 008 | SPRAY ARM (RIGHT) | 1 | | | |
| 14 | P | 117953 | 466 | NUT, LOCK, S/S, 5/8"-18 | 2 | | | |
| 15 | P | 117988 | 386 | HUB, TOP ROTARY SPRAY | 1 | | | |
| 16 | P | 117987 | 854 | BUSHING, ROTARY SPRAY | 2 | | | |
| 17 | P | 117003 | 007 | SPRAY ARM (LEFT) | 1 | | | |
| 18 | P | 117987 | 856 | WASHER, ROTARY SPRAY | 1 | | | |
| 19 | P | 117999 | 088 | SPINDLE, LONG | 4 | | | |
| 20 | P | 117910 | 406 | SPRING, STOPPER, LONG SPINDLE | 4 | | | |
| 21 | P | 117999 | 077 | NOZZLE, LONG SPINDLE | 4 | | | |
| 22 | P | 117910 | 405 | SPRING, STOPPER, SPINDLE | 6 | | | |
| 23 | P | 117999 | 071 | NOZZLE, SPINDLE | 6 | | | |
| 24 | P | 117910 | 393 | SPINDLE | 6 | | | |
| 25 | P | 117910 | 392 | SPINDLE, SMALL | 10 | | | |
| 26 | P | 117910 | 404 | SPRING, STOPPER, SMALL SPINDLE | 10 | | | |
| 27 | P | 117910 | 394 | BASKET WITH SEPARATOR | 1 | | | |
| 28 | P | 117910 | 395 | BASKET, ENDOSCOPE | 1 | | | |
| 29 | P | 117950 | 676 | SETSCREW, SOCKET, S/S, 5/16"-18 X 3/8" | 1 | | | |
| 30 | P | 117999 | 062 | GUIDE, INSTRUMENT | 3 | | | |
| 31 | P | 117910 | 430 | HOSE, SILICONE, 5/16" O.D. X 3/16" I.D. | 4 | | | |
| 32 | P | 117999 | 073 | SPRAY JET, 13/32" | 4 | | | |
| 33 | P | 117999 | 074 | CAP, EPDM, SPRAY JET, 13/32" | 4 | | | |
| 34 | P | 117999 | 026 | CAP, EPDM, SPRAY JET, 3/4" | 12 | | | |
| 35 | P | 117999 | 066 | SPRAY JET, 3/4" | 12 | | | |
| 36 | P | 117999 | 097 | NOZZLE, FOR BASKET | 12 | | | |
| 37 | P | 117910 | 429 | HOSE, SILICONE, 3/4" O.D. X 1/2" I.D. | 1 | | | |
| 38 | P | 117910 | 535 | CLAMP, NYLON DOUBLE BOND HOSE, 3/4" | 2 | | | |



Ref.: 122-999-625

Figure 9-43. Suction Tips and Instruments Rack, Assembly

| FIG. & ITEM NO. | PART NUMBER | | DESCRIPTION | UNITS PER ASSEMBLY |
|-----------------------|----------------|------------|--|-----------------------|
| 9-43 | | | SUCTION TIPS AND INSTRUMENTS RACK, ASSEMBLY | X |
| 1 | P | 117987 800 | ROTARY SPRAY ARM ASSEMBLY, 4-LEVEL, SUCTION TIP | 3 |
| 2 | P | 117987 838 | CAP, FOR NOZZLE 1/2" | 8 |
| 3 | P | 117987 837 | NOZZLE, 1/2" | 8 |
| 4 | P | 117908 366 | HOSE, SILICONE, 7/16" X 12" | 1 |
| 5 | P | 117908 356 | ELBOW ADAPTOR, 1/8" NPT X 3/8" TUBE | 1 |
| 6 | P | 117989 130 | BASKET | 1 |
| 7 | P | 117950 835 | SCREW, FLAT HEAD, S/S, 10-32 X 3/8" | 1 |
| 8 | P | 117987 856 | WASHER, SPRAY HEADER, S/S, 1-1/4" | 1 |
| 9 | P | 117987 854 | BUSHING, ROTARY SPRAY ARM | 2 |
| 10 | P | 117988 328 | BASE, SPINDLE | 3 |
| 11 | P | 117986 989 | SPINDLE | 3 |
| 12 | P | 117987 565 | NOZZLE | 3 |
| 13 | P | 117984 988 | CAP, FOR NOZZLE 2 1/2" | 7 |
| 14 | P | 117988 500 | NOZZLE, 2-1/2" | 7 |



REF.: #920-016-112

Figure 9-44. Multi-Purpose Basin Rack

| FIG. & ITEM NO. | PART NUMBER | | | DESCRIPTION | UNITS PER ASSEMBLY | | | |
|-----------------------|----------------|--------|-----|---------------------------------------|-----------------------|--|--|--|
| 9-44 | | | | MULTI-PURPOSE BASIN RACK | X | | | |
| 1 | P | 117998 | 916 | COVER, MULTI-PURPOSE BASIN RACK | 1 | | | |

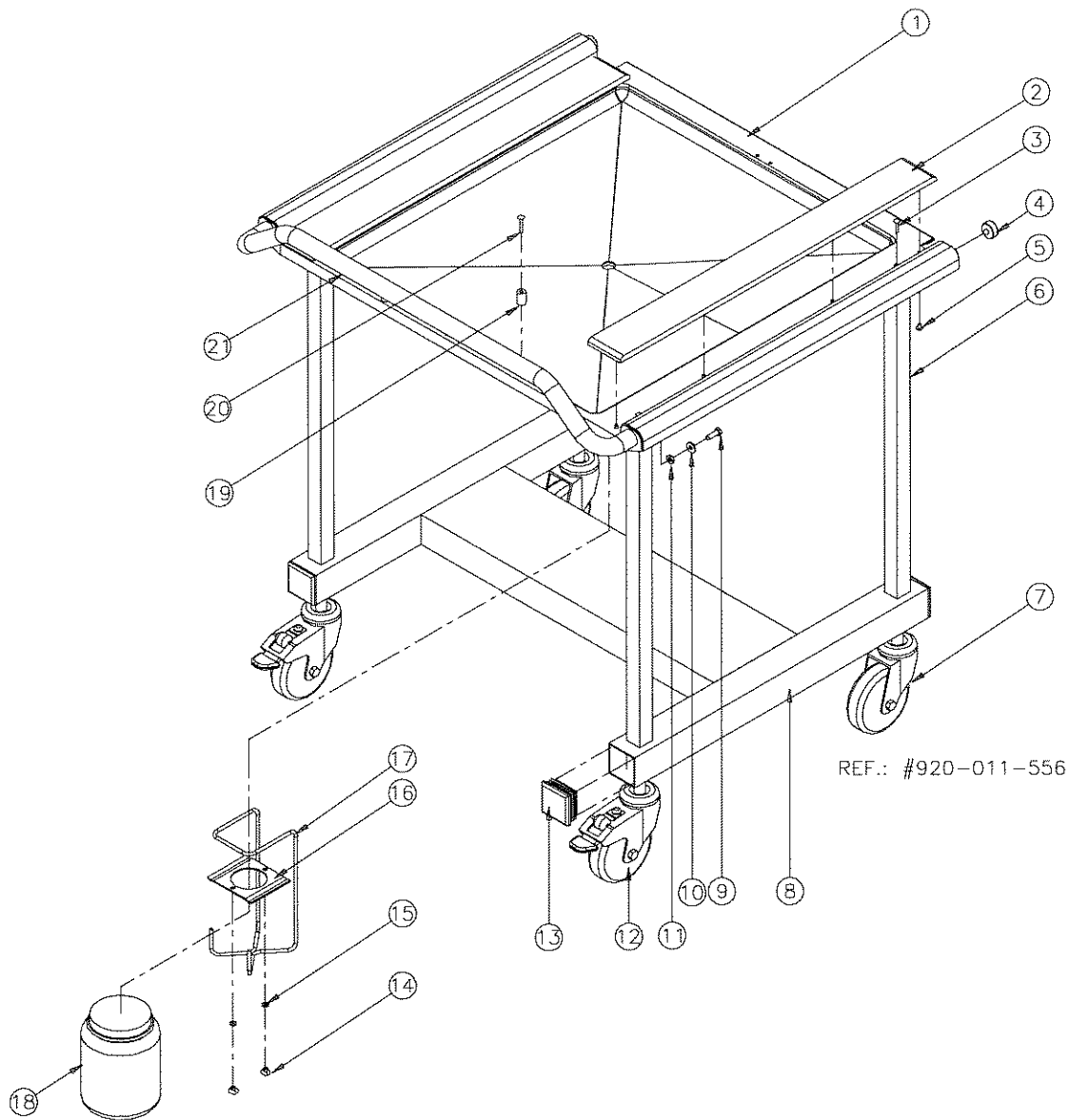
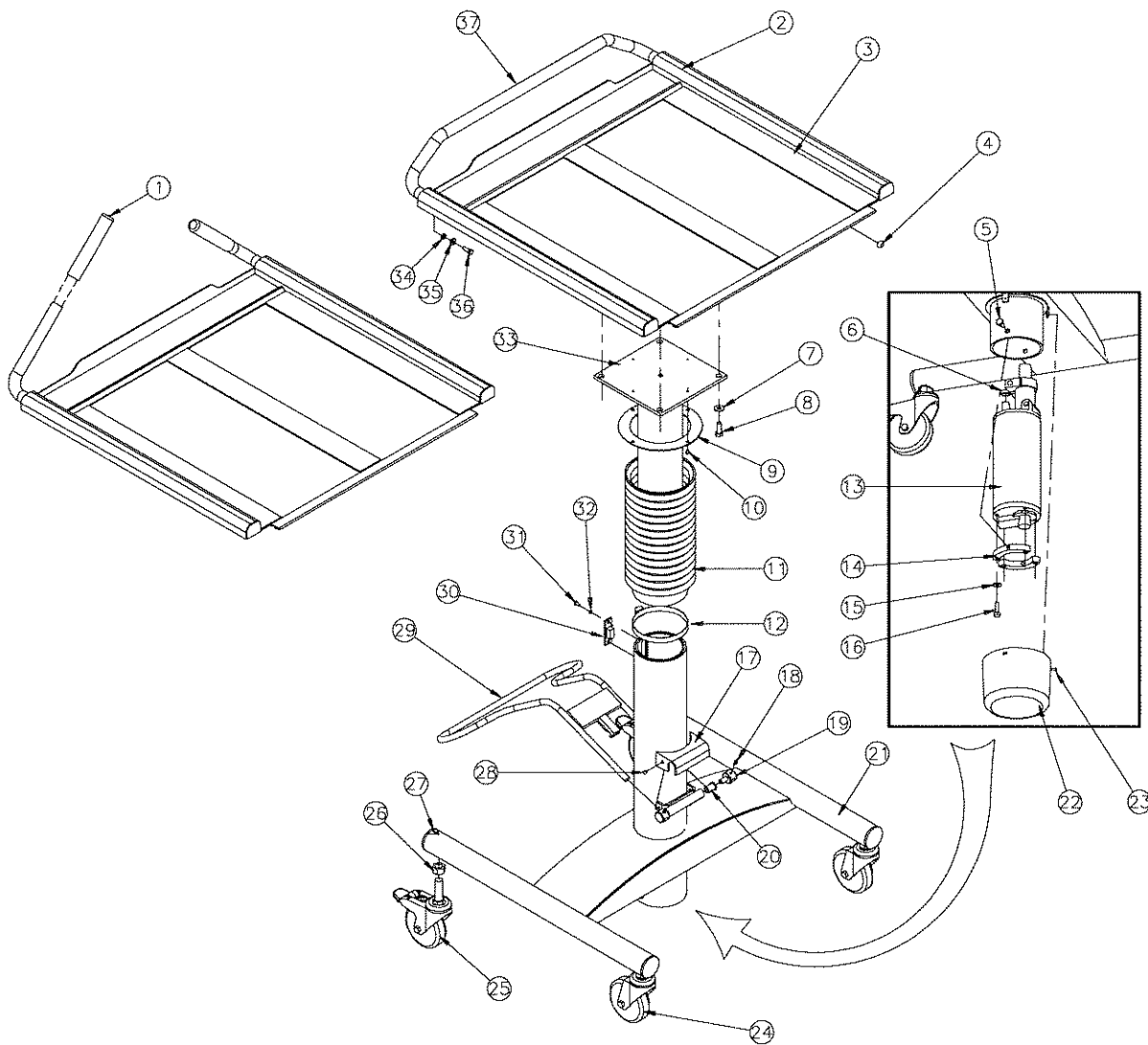


Figure 9-45. Transfer Cart

| FIG. & ITEM NO. | PART NUMBER | | DESCRIPTION | UNITS PER ASSEMBLY | | |
|-----------------|-------------|------------|---|--------------------|--|--|
| | | | | | | |
| 9-45 | | | TRANSFER CART | X | | |
| 1 | P | 117009 173 | SHELF, TC | 1 | | |
| 2 | P | 117009 132 | GUIDE, SLIDING, TC | 2 | | |
| 3 | P | 117910 357 | SCREW, TRUSS HEAD, S/S, 1/4-20 X 1/2" | 4 | | |
| 4 | P | 117009 127 | BUMPER, RUBBER | 2 | | |
| 5 | P | 117950 855 | SCREW, TRUSS HEAD, S/S, 8-32 X 1/4" | 8 | | |
| 6 | P | 117009 170 | LEG, TC | 4 | | |
| 7 | P | 117911 785 | WHEEL, SWIVEL, S/S, 4", WITHOUT BRAKE, TC, ASSEMBLY | 2 | | |
| 8 | P | 117009 171 | BASE, TC | 1 | | |
| 9 | P | 117950 900 | BOLT, S/S, 1/4-20 X 3/4" | 2 | | |
| 10 | P | 117950 976 | WASHER, S/S, 1/4" | 2 | | |
| 11 | P | 117950 986 | WASHER, LOCK, S/S, 1/4" | 2 | | |
| 12 | P | 117911 784 | WHEEL, SWIVEL, S/S, 4", WITH BRAKE, TC, ASSEMBLY | 2 | | |
| 13 | P | 117009 130 | CAP PLUG, 2" | 4 | | |
| 14 | P | 117957 193 | NUT, S/S, E, 8-32 | 2 | | |
| 15 | P | 117950 985 | WASHER, LOCK, S/S, 3/16" | 2 | | |
| 16 | P | 117009 163 | FIXTURE, SUPPORT, TC | 1 | | |
| 17 | P | 117009 135 | SUPPORT, BOTTLE, TRANSFER CART | 1 | | |
| 18 | P | 117903 679 | BOTTLE, TRANSFER CART | 1 | | |
| 19 | P | 117009 166 | SPACER, NYLON, 1/4 " O.D. X 3/4" | 2 | | |
| 20 | P | 117950 859 | SCREW, TRUSS HEAD, S/S, 8-32 X 1" | 2 | | |
| 21 | P | 117009 172 | HANDLE, TC | 1 | | |



Ref: 920-002-573

Figure 9-46. Universal Transfert Cart

| FIG. & ITEM NO. | PART NUMBER | | DESCRIPTION | UNITS PER ASSEMBLY |
|-----------------|-------------|------------|---|--------------------|
| 9-46 | | | UNIVERSAL TRANSFER CART | X |
| 1 | P | 117910 261 | HANDLE, RUBBER, BLACK, 1" I.D. X 6" LONG (Up to S/N 3621401000) | 2 |
| 2 | P | 117999 016 | SHELF FOR UTC | 1 |
| 3 | P | 117999 023 | STRIP, UHMW, 1/8" X 2-1/2" X 23 1/2", BLACK, ADHESIVE | 3 |
| | P | 117986 974 | PLATE, IDENTIFICATION (Not Shown) | 1 |
| 4 | P | 117907 663 | STOPPER, RUBBER | 2 |
| 5 | P | 117950 905 | BOLT, S/S, 5/16-18 X 3/4" | 2 |
| 6 | P | 117999 020 | PROTECTOR, PISTON | 1 |
| 7 | P | 117950 978 | WASHER, S/S, 3/8" | 4 |
| 8 | P | 117950 916 | BOLT, S/S, 3/8"-16 X 1" | 4 |
| 9 | P | 117999 015 | RING, HOLDER | 1 |
| 10 | P | 117950 865 | SCREW, MECHANICAL, TRUSS HEAD, S/S, 10-32 X 1/4" | 4 |
| 11 | P | 117910 268 | PROTECTOR, BELLOW | 1 |
| | P | 117910 462 | • REPLACEMENT KIT, BELLOW WITH TIE-WRAP | 1 |
| 12 | P | 117910 451 | TIE-WRAP, 27" | 1 |
| 13 | P | 117910 259 | CYLINDER, HYDRAULIC | 1 |
| 14 | P | 117997 281 | FIXTURE, CYLINDER | 2 |
| 15 | P | 117950 987 | WASHER, LOCK, S/S, 5/16" | 4 |
| 16 | P | 117950 906 | BOLT, S/S, 5/16-18 X 1" | 4 |
| 17 | P | 117999 008 | COVER, PEDAL PIVOT | 1 |
| 18 | P | 117957 696 | SCREW, ALLEN HEX, SOCKET SET, S/S, 1/4-20 X 3/8" | 2 |
| 19 | P | 117997 293 | PIVOT, PEDAL | 2 |
| | P | 117003 027 | STICKER, "MAX. WEIGHT" (Not Shown) | 1 |
| 20 | P | 117003 038 | BUSHING, UHMW, PEDAL PIVOT | 1 |
| 21 | P | 117999 013 | BASE FOR UTC | 1 |
| 22 | P | 117997 297 | CAP, ABS, BLACK, 5-1/2" I.D. X 4-3/16" LONG | 1 |
| 23 | P | 117950 856 | SCREW, MECHANICAL, TRUSS HEAD, S/S, 8-32 X 3/8" | 3 |
| 24 | P | 117003 029 | WHEEL, S/S, SWIVEL, WITHOUT BRAKE, 4" | 2 |
| 25 | P | 117003 028 | WHEEL, S/S, SWIVEL, WITH BRAKE, 4" | 2 |
| 26 | P | 117950 958 | NUT, S/S, 5/8-11 | 4 |
| 27 | P | 117907 586 | STICKER, WARNING BRAKE, EUROPE SMALL | 2 |
| 28 | P | 117950 855 | SCREW, MECHANICAL, TRUSS HEAD, S/S, 8-32 X 1/4" | 2 |
| 29 | P | 117999 005 | PEDAL FOR CYLINDER UTC | 1 |
| 30 | P | 117997 282 | KEY, BRASS | 1 |
| 31 | P | 117950 866 | SCREW, MECHANICAL, TRUSS HEAD, S/S, 10-32 X 3/8" | 2 |
| 32 | P | 117953 766 | BUSHING, LOCK, DENTED INTERIOR, S/S, 3/16" | 2 |
| 33 | P | 117997 283 | POST, CENTRAL, INSIDE FOR UTC | 1 |
| 34 | P | 117950 976 | WASHER, S/S, 1/4" | 2 |
| 35 | P | 117950 986 | WASHER, LOCK, S/S, 1/4" | 2 |
| 36 | P | 117950 900 | BOLT, S/S, 1/4-20 X 3/4" | 2 |
| 37 | P | 117009 172 | HANDLE, TC (From S/N 3621401000) | 1 |

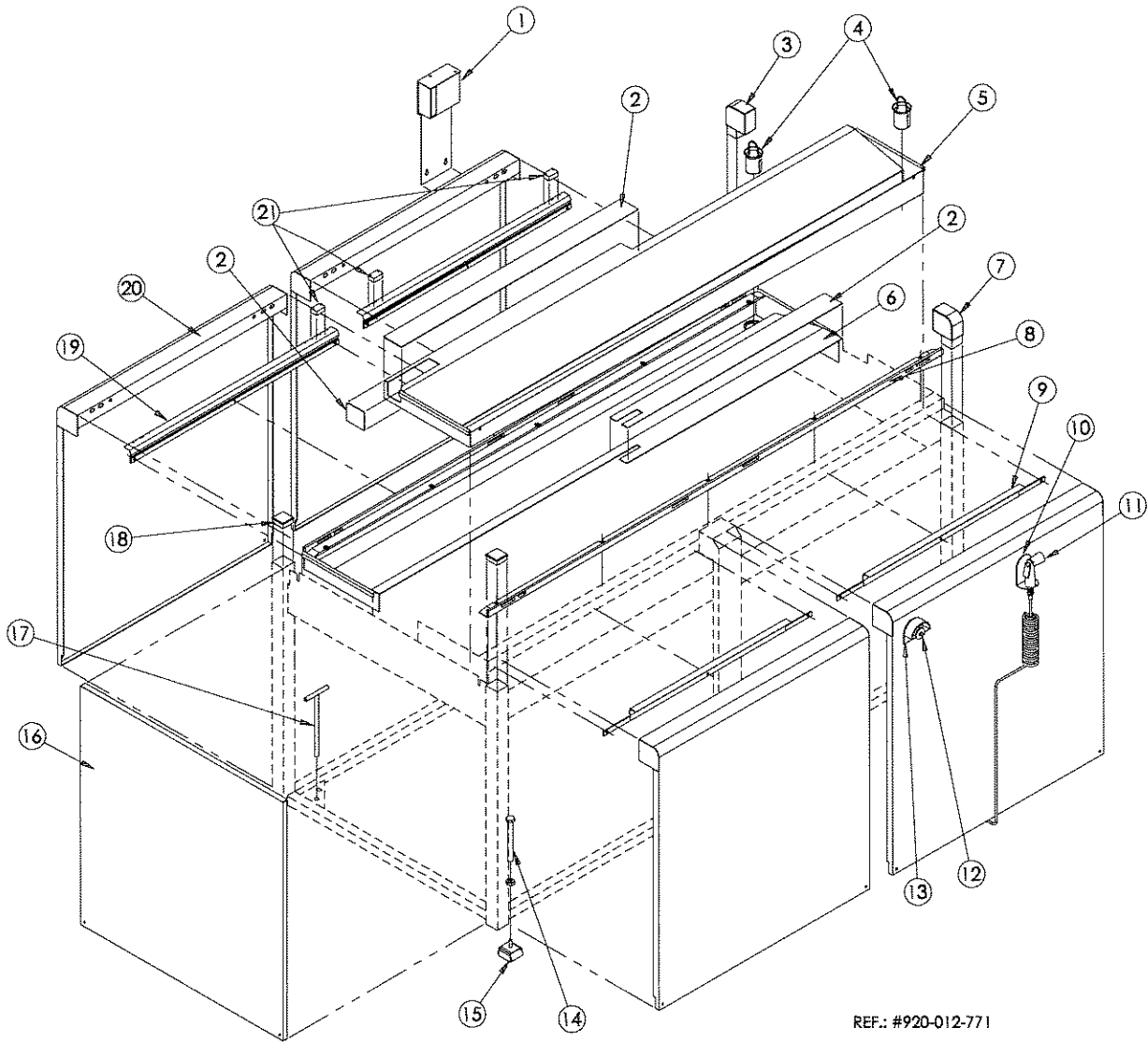


Figure 9-47. Amsco® Reliance® 444 Load/Unload Modules – C1 and C2 (Load End) Conveyors

| FIG. & ITEM NO. | PART NUMBER | | DESCRIPTION | UNITS PER ASSEMBLY | | |
|-----------------------|----------------|------------|--|-----------------------|--|---|
| | | | | | | |
| 9-47 | | | AMSCO RELIANCE 444 LOAD/UNLOAD MODULES - C1 AND C2 (LOAD END) CONVEYORS | | | X |
| 1 | P | 117018 236 | BAR CODE READER, BOX ASSEMBLY | 1 | | |
| | P | 117950 855 | SCREW, TRUSS HEAD, S/S, 8-32 X 1/4" (Bar Code Holder) | 2 | | |
| 2 | P | 117909 052 | PAD, FRICTION ADHESIVE TAPE, 1/16" X 2-3/8 (Sold by Foot) | A/R | | |
| 3 | P | 117013 867 | CAP, RIGHT CORNER | 1 | | |
| 4 | P | 117906 202 | FILTER, DRIP PAN | 2 | | |
| 5 | P | 117011 956 | TOP, CONVEYOR, RIGHT, DOUBLE | 1 | | |
| | P | 117011 955 | TOP, CONVEYOR, RIGHT, SINGLE | 1 | | |
| 6 | P | 117011 948 | TOP, CONVEYOR, LEFT, DOUBLE | 1 | | |
| | P | 117011 968 | TOP, CONVEYOR, LEFT, SINGLE | 1 | | |
| 7 | P | 117018 087 | CAP, LEFT CORNER | 1 | | |
| 8 | P | 117013 757 | SLIDING, CONVEYOR, DOUBLE | 2 | | |
| | P | 117013 756 | SLIDING, CONVEYOR, SINGLE | 2 | | |
| 9 | P | 117018 168 | SUPPORT, CABINET | 2 | | |
| 10 | P | 117018 073 | HOLDER, HEAD SPRAY, ASSEMBLY | 1 | | |
| 11 | | | SPRAY HEAD ASSEMBLY (See Figure 9-51) | 1 | | |
| 12 | P | 117906 027 | HEAD, PUSHBUTTON | 1 | | |
| | P | 117906 030 | BLOCK, CONTACT N.C. | 1 | | |
| | P | 117906 026 | PLATE, EMERGENCY STOP | 1 | | |
| 13 | P | 117018 064 | PROTECTOR, EMERGENCY STOP SWITCH | 1 | | |
| 14 | P | 117905 864 | LEGS, ADJUSTABLE | 4 | | |
| 15 | P | 117906 499 | DOUBLE WHEEL | 4 | | |
| 16 | P | 117011 938 | PANEL END | 1 | | |
| | P | 117950 858 | SCREW, TRUSS HEAD, S/S, 8-32 X 3/4" (PANELS) | 10 | | |
| 17 | P | 117906 446 | PIN, ANCHOR | 2 | | |
| 18 | P | 117910 010 | CAP, PLUG, FOR SQUARE TUBING, 1-1/2" 16G | 2 | | |
| 19 | P | 117013 770 | SUPPORT, PHOTOCELL | 2 | | |
| 20 | P | 117011 936 | PANEL, SIDE | 4 | | |
| 21 | P | 117018 246 | CELL, PHOTOELECTRIC ASSEMBLY | 3 | | |
| | P | 117950 856 | SCREW, TRUSS HEAD, S/S, 8-32 X 3/8" (Not Shown) | 14 | | |

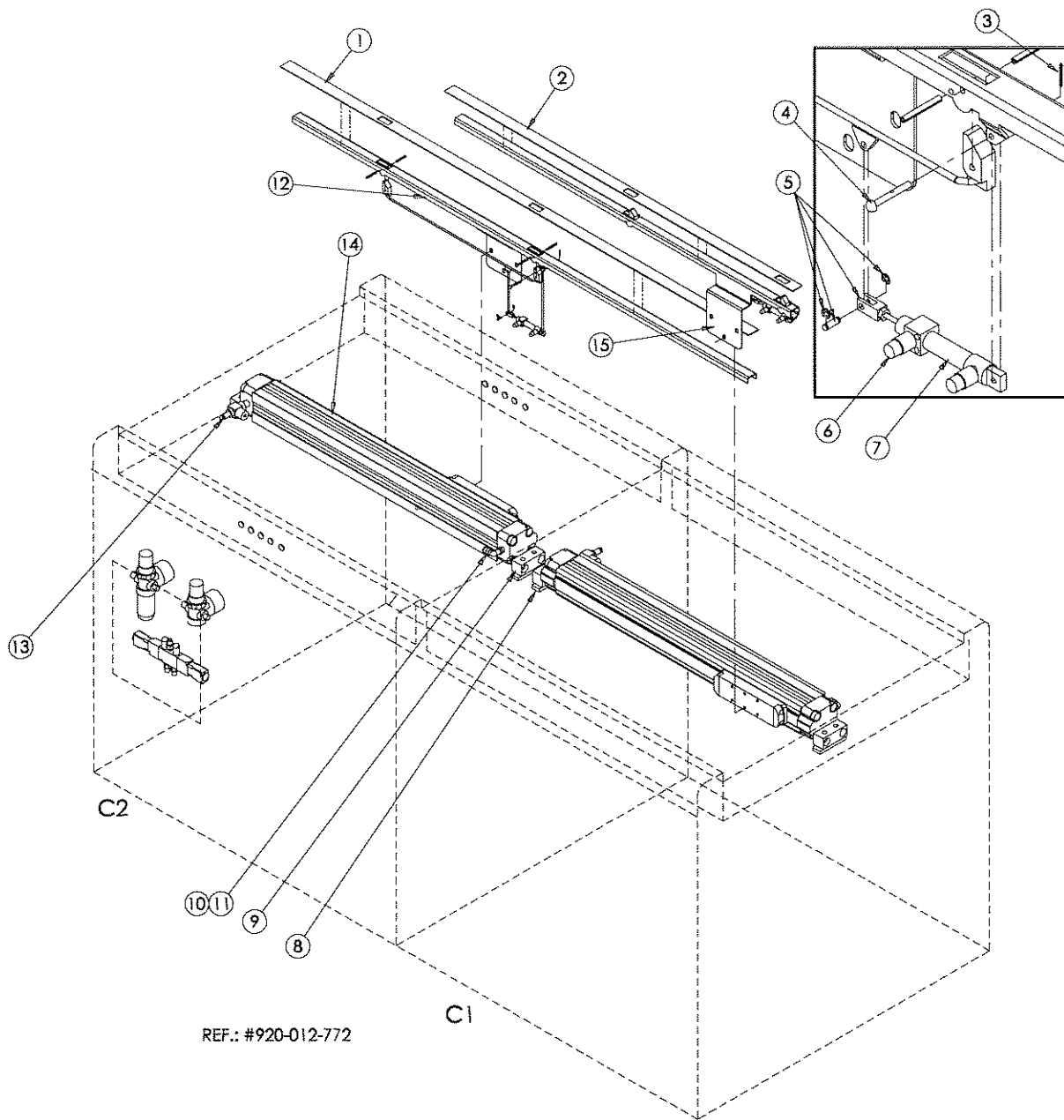
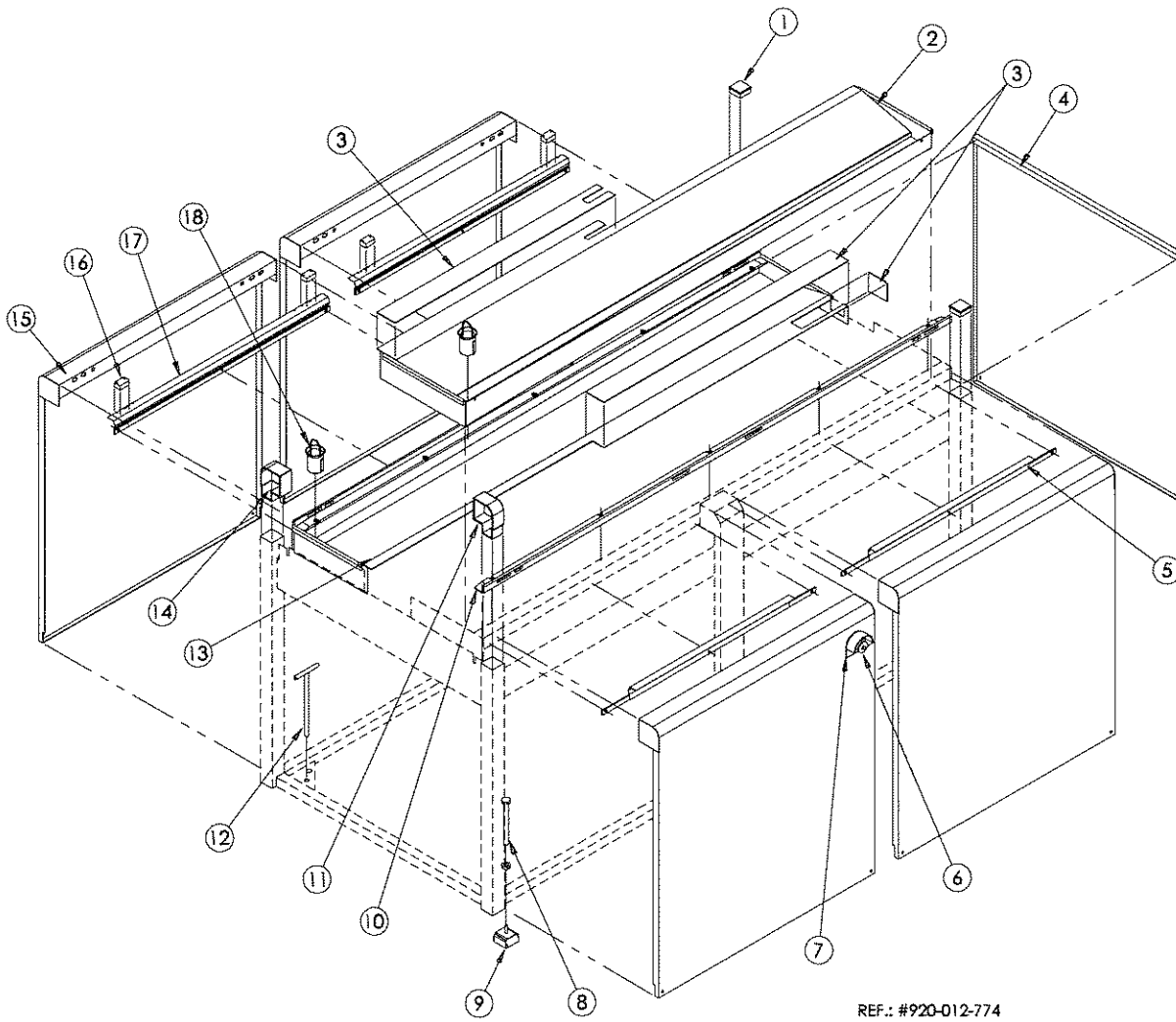


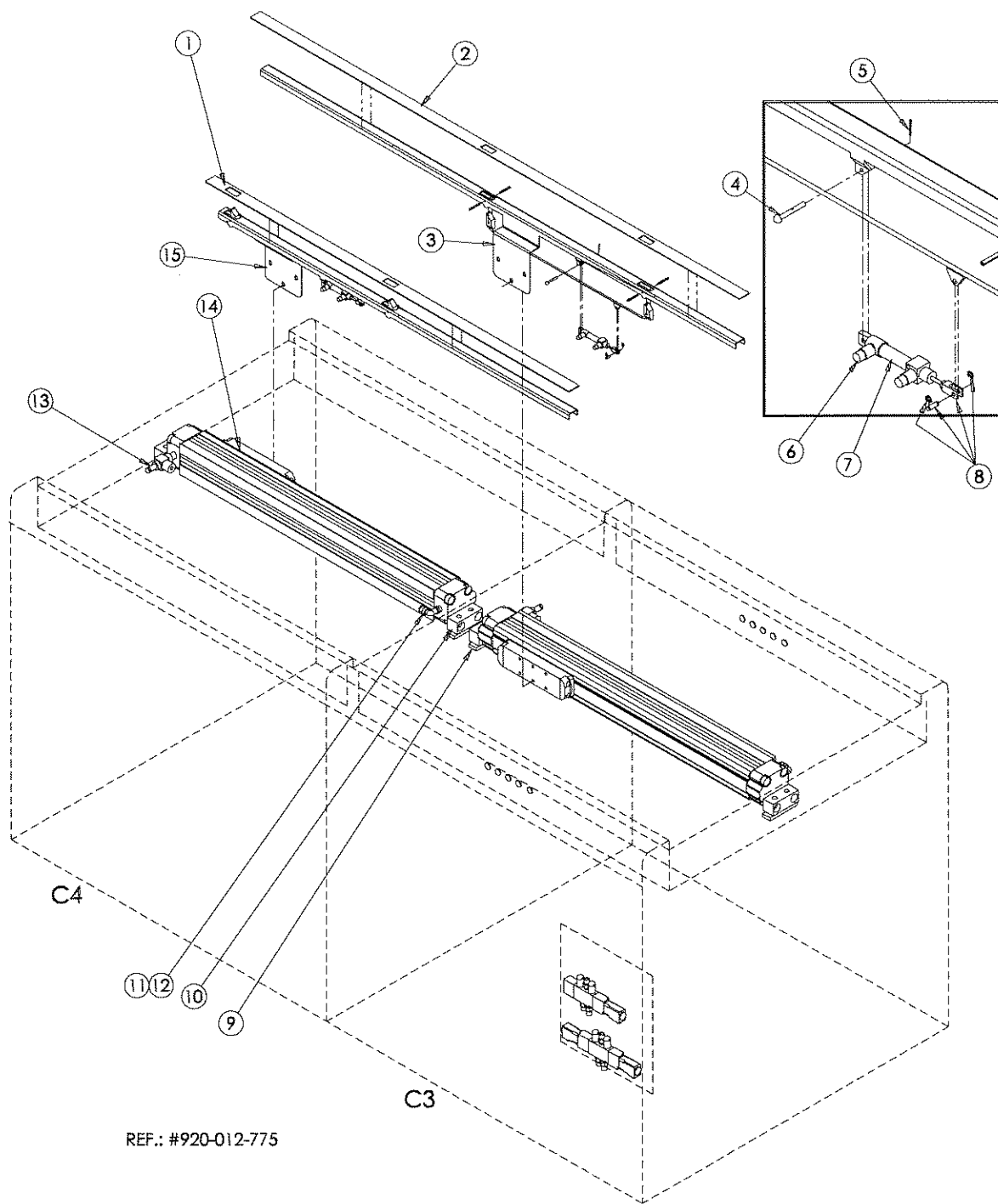
Figure 9-48. Amsco Reliance 444 Load/Unload Modules
 - C1 - C2 (Load End) Conveyors Indexing System

| FIG. & ITEM NO. | PART NUMBER | | DESCRIPTION | UNITS PER ASSEMBLY |
|-----------------|-------------|------------|---|--------------------|
| 9-48 | | | AMSCO RELIANCE 444 LOAD/UNLOAD MODULES - C1 - C2 (LOAD END) CONVEYORS INDEXING SYSTEM..... | X |
| 1 | P | 117018 079 | SLIDE, PROTECTION, DOUBLE PUSHER, C2 | 1 |
| | P | 117018 085 | SLIDE, PROTECTION, SINGLE PUSHER, C2 | 1 |
| 2 | P | 117018 077 | SLIDE, PROTECTION, DOUBLE PUSHER, C1 | 1 |
| 3 | P | 117951 016 | PIN, COTTER, S/S, 1/16" X 1/2", | 2 |
| 4 | P | 117905 860 | RIVET, 1/8", DRILLED, 1/16" | 2 |
| 5 | P | 117905 704 | CLEVIS, PIN ASSEMBLY, 5/16" | 2 |
| 6 | P | 117902 320 | ADAPTOR, PNEUMATIC, 10-32" X 5/32" O.D | 4 |
| 7 | P | 117905 703 | CYLINDER, PNEUMATIC, 1/2" | 2 |
| 8 | P | 117018 072 | RETAINING, PLATE, PNEUMATIC, CYLINDER | 4 |
| | P | 117911 878 | BOLT, S/S, 1/4-20 X 1-3/4" | 8 |
| | P | 117950 976 | WASHER, S/S, 1/4" | 8 |
| 9 | P | 117018 065 | SUPPORT, PNEUMATIC CYLINDER | 4 |
| 10 | P | 117955 494 | ELBOW, PNEUMATIC, 90°, 1/4" M X 1/4" O.D. | 2 |
| 11 | P | 117952 185 | REDUCER, 3/8" M X 1/4" F | 2 |
| 12 | P | 117018 241 | PUSHER, DOUBLE CONVEYOR C2 | 1 |
| | P | 117018 238 | PUSHER, SINGLE CONVEYOR C2 | 1 |
| 13 | P | 117906 815 | VALVE, MICROMETRIC, FLOW CONTROL, 1/4" X 1/4" | 2 |
| 14 | P | 117018 066 | CYLINDER, PNEUMATIC | 2 |
| 15 | P | 117018 240 | PUSHER, DOUBLE CONVEYOR C1 | 1 |



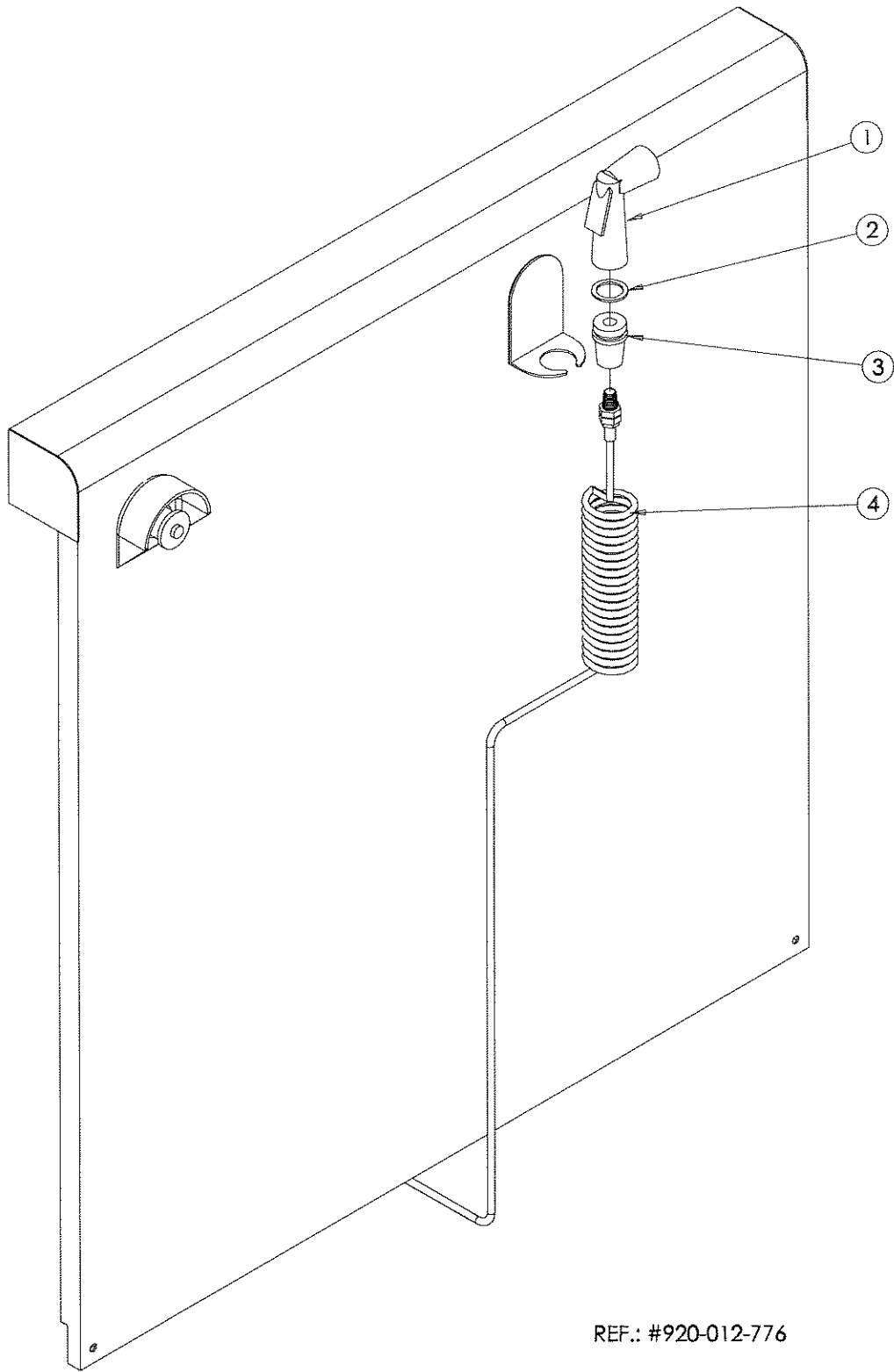
**Figure 9-49. Amsco Reliance 444 Load/Unload Modules
- C3 and C4 (Unload End) Conveyors**

| FIG. & ITEM NO. | PART NUMBER | | DESCRIPTION | UNITS PER ASSEMBLY | | |
|-----------------------|----------------|------------|--|-----------------------|--|--|
| | | | | | | |
| 9-49 | | | AMSCO RELIANCE 444 LOAD/UNLOAD MODULES - C3 AND C4 (UNLOAD END) CONVEYORS | X | | |
| 1 | P | 117910 010 | CAP, PLUG, FOR SQUARE TUBING 1-1/2" 16G | 2 | | |
| 2 | P | 117011 948 | TOP, CONVEYOR, LEFT | 1 | | |
| 3 | P | 117909 052 | PAD, FRICTION ADHESIVE TAPE, 1/16" X 2-3/8 (Sold by Foot) | A/R | | |
| 4 | P | 117011 938 | PANEL END | 1 | | |
| | P | 117950 858 | SCREW, TRUSS HEAD, S/S, 8-32 X 3/4" (PANELS) | 10 | | |
| 5 | P | 117018 168 | SUPPORT, CABINET | 2 | | |
| 6 | P | 117907 027 | STICKER, PROTECTIVE EARTH | 1 | | |
| | P | 117906 030 | BLOCK, CONTACT N.C. | 1 | | |
| | P | 117906 026 | PLATE, EMERGENCY STOP | 1 | | |
| 7 | P | 117018 064 | PROTECTOR, EMERGENCY STOP SWITCH | 1 | | |
| 8 | P | 117905 864 | LEGS, AJUSTABLE | 4 | | |
| 9 | P | 117906 499 | DOUBLE WHEEL | 4 | | |
| 10 | P | 117013 757 | SLIDING, CONVOYER | 2 | | |
| 11 | P | 117013 867 | CAP, RIGHT CORNER | 1 | | |
| 12 | P | 117906 446 | PIN, ANCHOR | 2 | | |
| 13 | P | 117011 956 | TOP, CONVEYOR, RIGHT | 1 | | |
| 14 | P | 117018 087 | CAP, LEFT CORNER | 1 | | |
| 15 | P | 117011 936 | PANEL, SIDE | 4 | | |
| 16 | P | 117018 246 | CELL, PHOTOELECTRIC ASSEMBLY | 4 | | |
| 17 | P | 117013 770 | SUPPORT, PHOTOCCELL | 2 | | |
| 18 | P | 117906 202 | FILTER, DRIP PAN | 2 | | |
| | P | 117950 856 | SCREW, TRUSS HEAD, S/S, 8-32 X 3/8" (Not Shown) | 14 | | |



**Figure 9-50. Amsco Reliance 444 Load/Unload Modules
- C3-C4 (Unload End) Conveyors Indexing System**

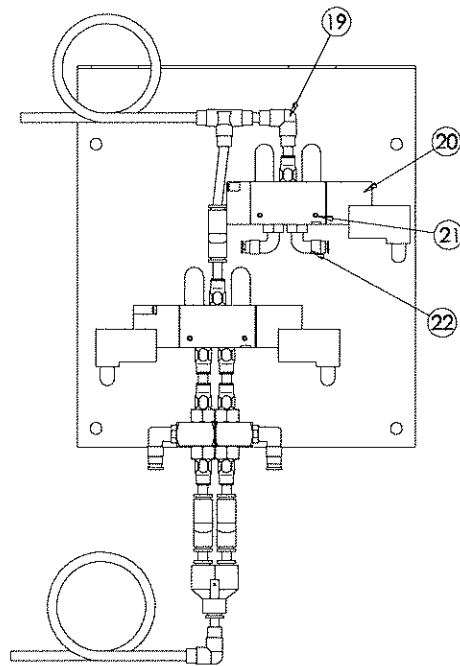
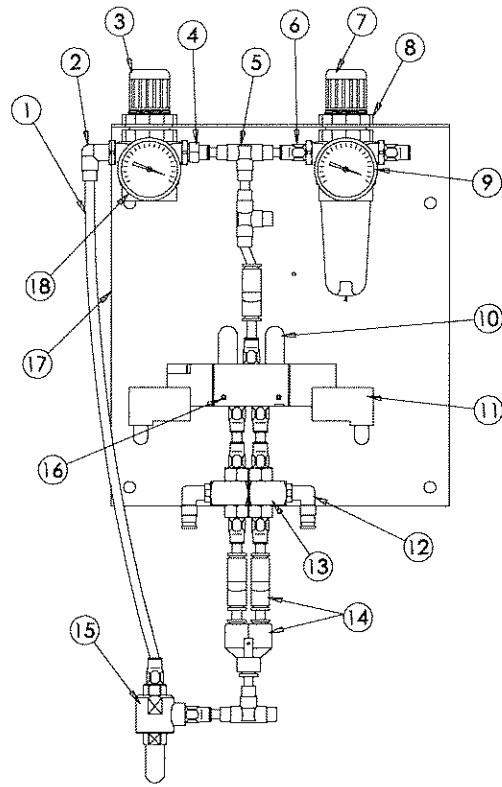
| FIG. & ITEM NO. | PART NUMBER | | | DESCRIPTION | UNITS PER ASSEMBLY |
|-----------------|-------------|--------|-----|--|--------------------|
| 9--50 | | | | AMSCO RELIANCE 444 LOAD/UNLOAD MODULES - C3-C4 (UNLOAD END) CONVEYORS INDEXING SYSTEM ... | X |
| 1 | P | 117018 | 083 | SLIDE, PROTECTION, DOUBLE PUSHER, C4 | 1 |
| 2 | P | 117018 | 082 | SLIDE, PROTECTION, DOUBLE PUSHER, C3 | 1 |
| | P | 117018 | 084 | SLIDE, PROTECTION, SINGLE PUSHER, C3 | 1 |
| 3 | P | 117018 | 242 | PUSHER, DOUBLE CONVEYOR C3 | 1 |
| | P | 117018 | 239 | PUSHER, SINGLE CONVEYOR C3 | 1 |
| 4 | P | 117905 | 860 | RIVET, 1/8", DRILLED 1/16" | 2 |
| 5 | P | 117951 | 016 | PIN, COTTER, S/S, 1/16" X 1/2" | 2 |
| 6 | P | 117902 | 320 | ADAPTOR, PNEUMATIC, 10-32" X 5/32" O.D. | 4 |
| 7 | P | 117905 | 703 | CYLINDER, PNEUMATIC, 1/2" | 2 |
| 8 | P | 117905 | 704 | CLEVIS, PIN, ASSEMBLY, 5/16" | 2 |
| 9 | P | 117018 | 072 | RETAINING, PLATE, PNEUMATIC CYLINDER | 4 |
| | P | 117950 | 903 | BOLT, S/S, 1/4"-20 X 1-1/2" | 8 |
| | P | 117950 | 976 | WASHER, S/S, 1/4" | 8 |
| 10 | P | 117018 | 065 | SUPPORT, PNEUMATIC CYLINDER, SF 13040 | 4 |
| 11 | P | 117955 | 494 | ELBOW, PNEUMATIC, 90°, 1/4" M X 1/4" O.D. | 2 |
| 12 | P | 117952 | 185 | REDUCER, 3/8" M X 1/4" F | 4 |
| 13 | P | 117906 | 815 | VALVES, MICROMETRIC FLOW CONTROL, 1/4" X 1/4" | 2 |
| 14 | P | 117018 | 066 | CYLINDER, PNEUMATIC | 2 |
| 15 | P | 117018 | 243 | PUSHER, DOUBLE CONVEYOR, C4 | 1 |



REF.: #920-012-776

Figure 9-51. Amsco Reliance 444 Load/Unload Modules – Spray Head

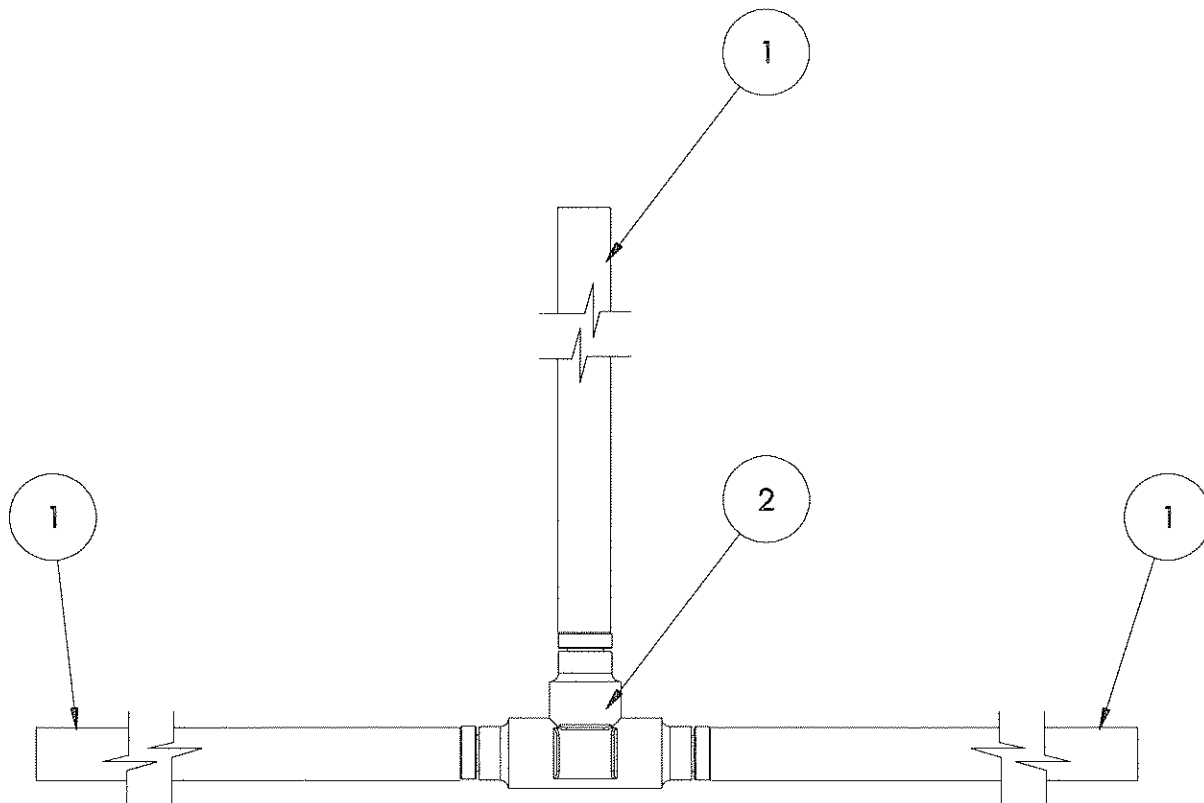
| FIG. & ITEM NO. | PART NUMBER | | DESCRIPTION | UNITS PER ASSEMBLY |
|--|----------------|------------|---|-----------------------|
| 9-51 | P | 117906 467 | AMSCO RELIANCE 444 LOAD/UNLOAD MODULES SPRAY HEAD ASSEMBLY | X |
| 1 | P | 117905 955 | HEAD, SPRAY | 1 |
| 2 | P | 117956 027 | O-RING, 7/8" O.D. X 3/4" I.D. | 1 |
| 3 | P | 117905 000 | ADAPTOR, SPRAY HEAD | 1 |
| 4 | P | 117905 709 | HOSE, WATER, 1/4", FLEXCOIL | 1 |
| <p><i>NOTE: See Figure 9-47 for Head Spray Holder and for Pushbutton</i></p> | | | | |



REF.: #920-012-824

**Figure 9-52. Amsco Reliance 444 Load/Unload Modules
- Typical Pneumatic Assembly**

| FIG. & ITEM NO. | PART NUMBER | | DESCRIPTION | UNITS PER ASSEMBLY | | |
|-----------------|-------------|-----|--|--------------------|---|--|
| 9-52 | | | AMSCO RELIANCE 444 LOAD/UNLOAD MODULES - TYPICAL PNEUMATIC ASSEMBLY | | X | |
| 1 | 117950 | 545 | HOSE, AIR, 1/4" (Sold by Foot)..... | A/R | | |
| 2 | 117955 | 494 | ELBOW, PNEUMATIC | 1 | | |
| 3 | 117955 | 558 | REGULATOR, MINIATURE | 1 | | |
| 4 | 117955 | 493 | FITTING, PNEUMATIC, 1/4" M X 1/4" O.D. | 1 | | |
| 5 | 117955 | 495 | TEE, PNEUMATIC, 1/4" O.D. X 1/4" O.D. X 1/4" O.D. | 4 | | |
| 6 | 117951 | 836 | FITTING, PNEUMATIC, 1/8" M X 1/4" O.D. | 33 | | |
| 7 | 117903 | 144 | REGULATOR, PRESSURE, 1/8" | 1 | | |
| | 117907 | 266 | ELEMENT, FILTER | 1 | | |
| 8 | 117955 | 561 | NUT, REGULATOR | 2 | | |
| 9 | 117953 | 975 | MANOMETER, 0-60 PSI, 1/8" | 1 | | |
| 10 | 117902 | 312 | MUFFLER, EXHAUST AIR, 1/8" M | 11 | | |
| 11 | 117912 | 230 | VALVE, PNEUMATIC, 4 V, A1, 1/8" F, 3 POSITIONS | 4 | | |
| 12 | 117951 | 837 | ELBOW, PNEUMATIC, 1/8" M X 1/4" O.D. | 8 | | |
| 13 | 117908 | 486 | VALVE, PNEUMATIC, BRASS | 8 | | |
| 14 | 117912 | 012 | Y, PNEUMATIC, 1/4" O.D. X 1/4" O.D. X 1/4" O.D. | 8 | | |
| 15 | 117908 | 467 | SHUTTLE VALVE | 1 | | |
| 16 | 117908 | 056 | SCREW, TRUSS HEAD, S/S, 4-40 X 1-3/4" | 4 | | |
| 17 | 117013 | 766 | SUPPORT, PNEUMATIC | 2 | | |
| 18 | 117955 | 562 | MANOMETER, 0-60 PSI, 1/8" | 1 | | |
| 19 | 117902 | 716 | ELBOW, PNEUMATIC, 1/4" O.D. X 1/4" O.D. (Not Shown) | 2 | | |
| 20 | 117908 | 882 | VALVE, PNEUMATIC, 4 W, A1, 1/8" F, 24 VDC | 1 | | |
| 21 | 117950 | 848 | SCREW, TRUSS HEAD, S/S, 4-40 X 1" | 2 | | |
| 22 | 117902 | 319 | ELBOW, PNEUMATIC, 90°, 1/8" M X 5/32" | 2 | | |



REF.: 920-013-952

**Figure 9-53. Amsco Reliance 444 Load/Unload Modules
– Hose For Pneumatic Cylinder 1/2"**

| FIG. & ITEM NO. | PART NUMBER | | | DESCRIPTION | UNITS PER ASSEMBLY |
|-----------------------|----------------|--------|-----|--|-----------------------|
| 9-53 | | | | AMSCO RELIANCE 444 LOAD/UNLOAD MODULES - HOSE FOR PNEUMATIC CYLINDER 1/2" | X |
| 1 | P | 117950 | 545 | HOSE, WATER, 1/4" (Sold by Foot) | A/R |
| | P | 117902 | 323 | HOSE, AIR, BLUE, 5/32" (Sold by Foot) | A/R |
| | P | 117902 | 322 | HOSE, AIR, RED, 5/32" (Sold by Foot) | A/R |
| | P | 117955 | 229 | HOSE, AIR, BLUE, 1/4" (Sold by Foot) | A/R |
| | P | 117955 | 228 | HOSE, AIR, RED, 1/4" (Sold by Foot) | A/R |
| 2 | P | 117905 | 778 | TEE, PNEUMATIC | 2 |

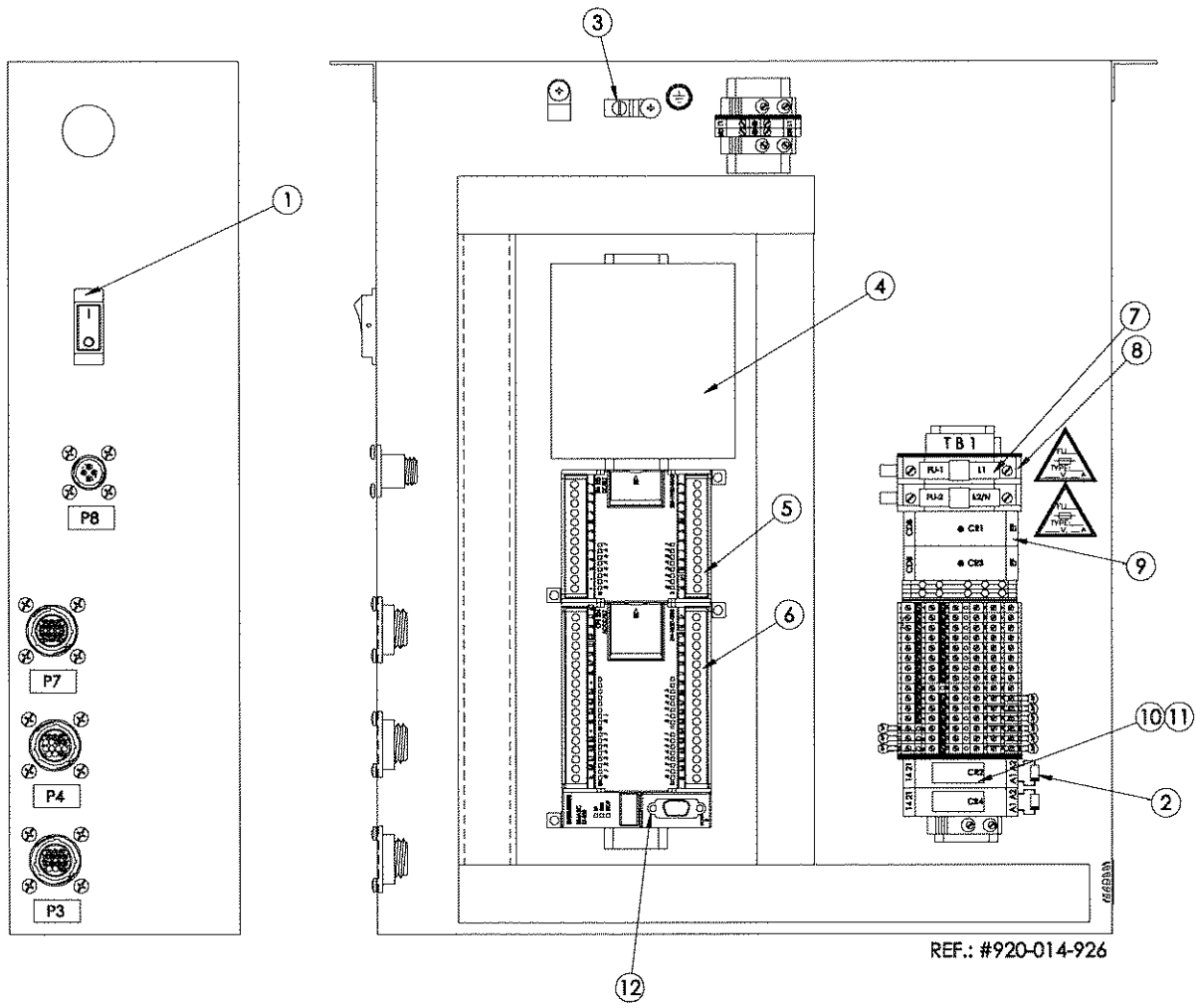
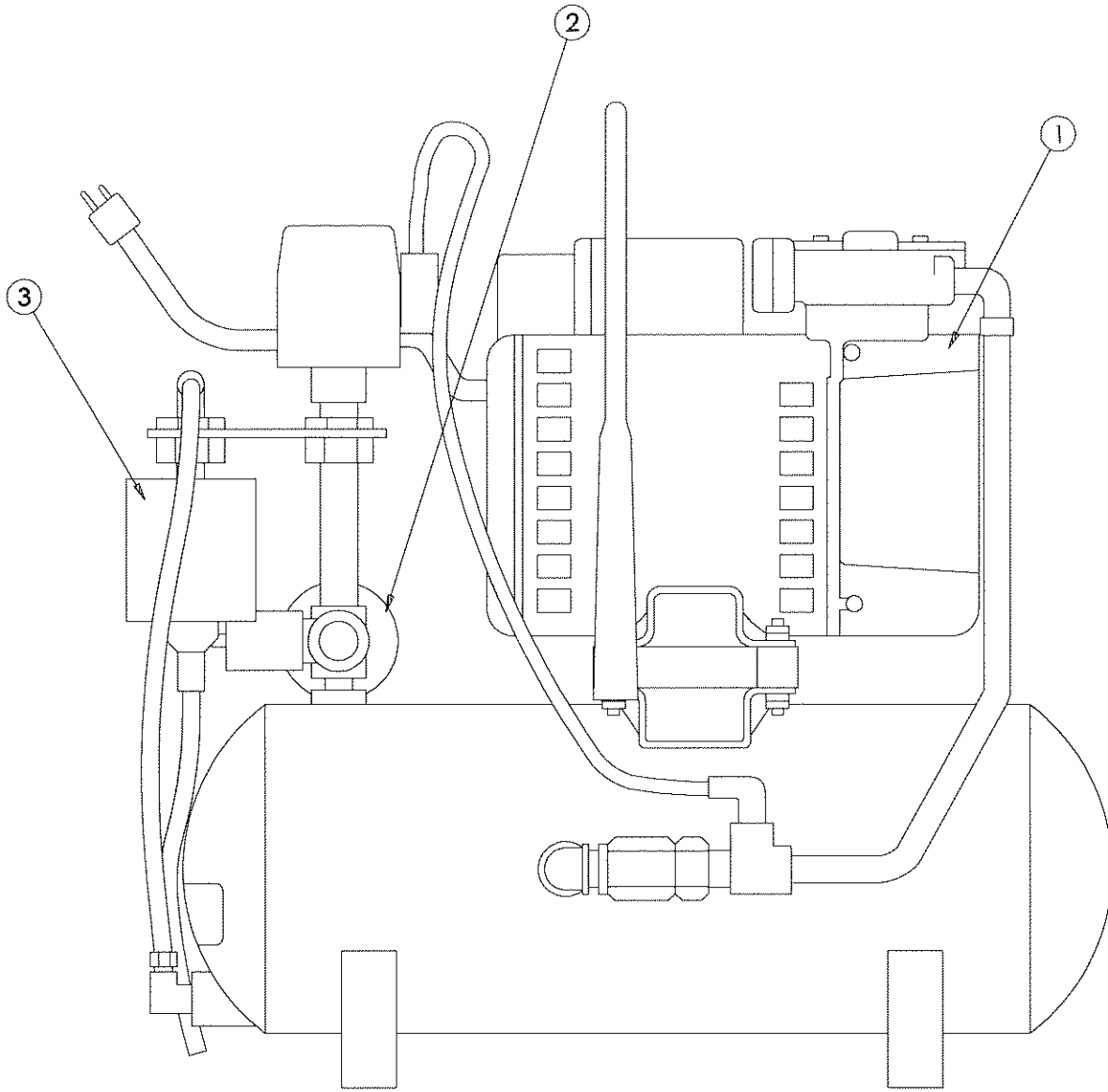


Figure 9-54. Amsco Reliance 444 Load/Unload Modules – B3 Control Box

| FIG. & ITEM NO. | PART NUMBER | | DESCRIPTION | UNITS PER ASSEMBLY |
|---|-------------|------------|---|--------------------|
| 9-54 | | | AMSCO RELIANCE 444 LOAD/UNLOAD MODULES - B3 CONTROL BOX | X |
| 1 | P | 117956 126 | SWITCH, ROCKER DPST | 1 |
| 2 | P | 117907 539 | DIODE, 1N4004 | 1 |
| 3 | P | 117953 869 | CONNECTOR, GROUND T & B | 1 |
| 4 | P | 117912 305 | POWER SUPPLY, 24 VDC, 2.5 A | 1 |
| 5 | P | 117912 307 | MODULE, EXTENSION, EM 223 | 1 |
| 6 | P | 117912 306 | CONTROLLER, PROGRAMMABLE CPU224 | 1 |
| | | | EEPROM AUTO* | 1 |
| 7 | P | 117912 287 | FUSE, 3 A, 250 V | 2 |
| 8 | P | 117907 270 | FUSE, HOLDER, 10 A, 250 V, 5 X 20 mm | 2 |
| 9 | P | 117902 421 | RELAY, 120 VAC, SPDT | 2 |
| 10 | P | 117907 797 | RELAY, 2 POLES, 5 A, 2 VDC, COIL | 2 |
| 11 | P | 117011 833 | RELAY, SOCKET | 2 |
| 12 | | | EPROM* (Standard Unit) | 1 |
| <p><i>*NOTE: When ordering a replacement EPROM chip, refer to part number printed on existing chip.</i></p> | | | | |



REF.: #920-012-968

Figure 9-55. Air compressor with Automatic Tank Drain

| FIG. & ITEM NO. | PART NUMBER | | DESCRIPTION | UNITS PER ASSEMBLY | | |
|-----------------------|----------------|------------|---|-----------------------|--|--|
| | | | | | | |
| 9-55 | P | 117910 915 | AIR COMPRESSOR WITH AUTOMATIC TANK DRAIN 110/115V 50/60 Hz | X | | |
| | P | 117910 923 | AIR COMPRESSOR WITH AUTOMATIC TANK DRAIN 220/240V 50/60 Hz | X | | |
| 1 | P | 117910 916 | KIT, REPAIR, FOR COMPRESSOR 117-910-915 | 1 | | |
| 2 | P | 117910 917 | FILTER, AIR, #B300F FOR COMPRESSOR 117-910-915 | 1 | | |
| 3 | P | 117910 918 | KIT, DRAIN, #PS506P FOR COMPRESSOR 117-910-915 | 1 | | |

