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## GENERAL MAINTENANCE PROCEDURES

### SAFETY

#### INTRODUCTION

When working with the FPC, follow proper laboratory procedures. Be alert and use caution when working around any potential electrical, physical, or biological hazards.

Follow appropriate safety precautions to avoid electrical shock, biohazard exposure, or physical injury.

#### ELECTRICAL HAZARDS

The FPC has an AC power-entry assembly located at the rear of the chassis. The standard safety practice is to disconnect the AC input power cord before removing the instrument covers for service. If power is not required, the electrical connection should not be installed until the servicing is complete.

If system power is required while servicing the instrument, the Field Service Engineer (FSE) should follow the following simple precautions before restoring power to the exposed chassis:

1. Ensure that all personnel in the area are aware of the hazard.
2. Remove the static dissipating band from your wrist.

3. Locate and remove all tools from inside the instrument.
4. Keep hands out of the instrument whenever power is present.

### DECONTAMINATION



#### Biohazard Icon



Warning: Potential Biohazard. Identifies the actual or potential presence of a biological hazard. The symbols depicted conform to OSHA regulation. Follow biosafety procedures to complete tasks identified with this icon.

### BIOHAZARDS

Since the FPC is used to pipette patient or donor blood products, precautions must be observed during the operation and servicing of the instrument to avoid possible contact with the blood products. Use and observe the following decontamination procedures to reduce the potential of exposure during instrument maintenance:

1. Consider all clinical specimens and reagent controls, calibrators, etc. that contain human blood or serum as potentially infectious. Wear gloves, lab coats, and safety glasses, and follow other biosafety practices as specified in the *OSHA Bloodborne Pathogen Rule, 29 CFR 1910.1030*, or other equivalent biosafety procedures.

2. The probe (and electrode, etc., as applicable) is sharp and contaminated with potentially infectious materials. Avoid contact with it. Wear gloves, safety glasses, and follow other appropriate biosafety practices.
3. Dispose of all clinical specimens that may be contaminated such as reagents, controls, calibrators, standards (as appropriate), cuvettes, and other disposables according to local, state, and federal regulations governing the treatment of regulated medical waste.

## Solid Wastes and Contaminated Parts

Discard contaminated materials into the appropriate biohazard waste system in the laboratory.

## Sharps

Place sharps, such as contaminated probes, in an appropriately marked puncture-resistant container before treatment and disposal.

## Liquid Wastes

Neutralize liquid wastes containing acid before the addition of a disinfectant or disposal.

Addition of a disinfectant to the waste container helps to inactivate the infectious organisms that may be collected in the waste and thus reduce the risk to personnel handling this material. Sodium hypochlorite and glutaraldehyde solutions are effective in inactivating organisms such as HBV, HCV, and HIV, and can be used for this purpose. Appropriate

personal protective equipment should be worn when these materials are handled.

## Exposure Incident Reporting

Notify the customer immediately if any accident or injury occurs. Report all exposure incidents to your manager or supervisor.

## SOLUTION MIX

Disinfectants listed below are approved for operations involved in this operating procedure.

### Surface Disinfectants and Preparation Instructions

1. Not less than 2% Chlorine Bleach solution or 0.1% Sodium Hypochlorite solution.

Add 1 part Chlorine Bleach (which is approximately 5.25% Sodium Hypochlorite) to 49 parts water. Expiration Date: 30 days from date of preparation.

**NOTE:**

**DO NOT USE CHLORINE SOLUTIONS WITH RADIOACTIVE MATERIALS.**

2. The following EPA registered tuberculocidal disinfectants may be used for surface decontamination when prepared according to the manufacturer's directions:
  - a) Alcide LD - Alcide Corp., Norwalk, CT.
  - b) Amphyl -National Laboratories, Montvale, NJ.
  - c) Metrispray - Metrex Research Corp., Parker, CO.
  - d) Exspor - Alcide Corp., Norwalk, CT.
  - e) Lysol - National Laboratories, Montvale, NJ.
  - f) Wescodyne - American Sterilizer Co. (AMSCO), Erie, PA.

### Disinfectants for Soaking Parts or for Fluid Pathway Decontamination (Prior to Disposal)

1. Not less than 10% Chlorine Bleach solution or 0.525% Sodium Hypochlorite solution.

Add 1 part Chlorine Bleach (which is approximately 5.25% Sodium Hypochlorite) to 9 parts water. Expiration Date: 30 days from date of preparation.

**NOTE:**

**DO NOT USE CHLORINE SOLUTIONS WITH RADIOACTIVE MATERIALS.**

2. 2% Activated Glutaraldehyde (commercially available or prepared by user).  
  
Add 303 ml of 25% Glutaraldehyde Solution to 3480 ml of water. Mix. Before use, the Glutaraldehyde Solution must be activated by adding 24 gm of Sodium Bicarbonate or equivalent. Dissolve by inverting the closed container approximately 10 times.
3. Instrument Germicide - National Laboratories, Montvale, NJ.

## Exterior Surfaces

1. Apply a detergent solution before disinfecting. If an area is soiled, scrub the area to dislodge the material. For inaccessible areas that cannot be scrubbed with detergent, liberally apply a disinfectant approved for soaking to the area and allow to stand for a minimum of 10 minutes before processing further.
2. Coat exterior surfaces with the chlorine solution. Let stand for 30 minutes and wipe until dry with disposable towels.
3. Rinse all surfaces thoroughly with the rinsing solution and wipe until dry with disposable towels.
4. Place the towels in a plastic bag and dispose of as instructed by the laboratory personnel.
5. Use a rinse solution of water or detergent on the unit to remove the chlorine solution at completion.

## **ELECTROSTATIC DISCHARGE (ESD)**

### **INTRODUCTION**

Many of the electronic components on the FPC circuit boards are susceptible to damage from electrostatic discharge (ESD). In some instances, static discharge of as little as 100 - 200 volts can damage or destroy a component. To put that in perspective, walking across a floor can generate between 250 - 35,000 volts in that person (depending on the floor covering, relative humidity, and other factors). Attempts to ground oneself and remove the static charge by grasping the instrument chassis provides only momentary resolution. Movement of arms, etc. also creates a static voltage potential.

### **STATIC PROTECTIVE PROCEDURES**

Static protective procedures are used during the manufacture of PC Boards. Replacement PC Board assemblies are also protected by use of static protective packaging besides being boxed to prevent physical damage.

Assemblies that have failed and are returned for repair are also handled at the repair shop under static protection procedures. It is requested that the FSE observe the following prescribed guidelines to protect the system PC Boards against electrostatic discharge:

1. Retain spare PC Board subassemblies in the static protective bags.

2. Use an approved Static Protective Field Service Kit and procedures whenever a board is removed from an instrument or the protective bag.
3. Replace the defective PC Board in the same protective bag to return the board for repair.

Following these three guidelines ensures a high degree of protection against component failures created by static electrical discharge. Additionally, continued use of the protective shipping boxes from the service kit for shipping and storage eliminates most failures caused by physical damage.

## STATIC SERVICE KIT

The Static Protective Service Kit is designed to keep the FSE, the replacement part, work surface, and instrument at the same ground potential level. Generally, an instruction set accompanies the kit; however, in the absence of specific instructions, the following is a generic description of the setup and operation:

### Kit Parts

- Static protective work surface.
- Wrist strap and attaching cable.
- Grounding clip or cable.

## SETUP PROCEDURE

1. Place the work mat on a solid surface near the instrument allowing the ground strap to reach the instrument.
2. Attach the ground clip to the instrument chassis.
3. Attach the other end of the ground clip cable and the connector from the wrist strap to the work mat. Some wrist strap cables provide a clip to connect to the same ground source as the mat cable.
4. Attach the wrist strap to your wrist.

### CAUTION

**HAZARDOUS VOLTAGES ARE PRESENT IN VARIOUS LOCATIONS THROUGHOUT THE FPC. REMOVE THE AC POWER CORD FROM THE INSTRUMENT OR POWER SOURCE PRIOR TO SERVICING THE UNIT. APPROVED STATIC PROTECTIVE KITS INCLUDE CURRENT LIMITING PROTECTION FOR OPERATOR SAFETY. THE GROUNDING CABLE AND WRIST STRAP MAY SERVE AS A CONDUCTIVE PATH TO THE USER IF IMPROPERLY USED, THEREFORE, PROPER PRECAUTIONS MUST BE OBSERVED.**

## HOW TO USE THE STATIC SERVICE KIT

1. Place the PC Board(s) removed from the instrument on the work mat.
2. The replacement PC Board(s) should be placed on the work mat before removing it from the protective bag. The board(s) should remain on the mat until installation.
3. The defective PC Board(s) should be replaced in the static protective bag before removing them from the work mat area.
4. The grounded wrist strap should be worn at all times during the above procedures.

### PHYSICAL HAZARDS

The FPC is large and heavy. Under no circumstances should the FPC be lifted manually, assisted or otherwise, by the FSE. During servicing, the FPC may need reorienting to access the sides or the back. Make sure to slide the instrument. Do not lift it. Do not allow the instrument to be unsupported at any time.