

Instructions For
ELECTROSTATIC DISCHARGE (ESD)
FIELD SERVICE KIT
Part No. Z860-00002-0000

- **Important Notes Regarding ESD**

ESD is a transfer of an electrostatic charge that has been generated. Once generated, the charge remains stationary on a person or body of material. The charge will then transfer (discharge) when direct contact is made with another material at a lower voltage level. An electrostatic charge can also transfer to a nearby object if the electrostatic field surrounding the charged object contacts the other body of material. In this case, no physical contact is made.

ESD is experienced in our everyday activities. For example, by sliding across a vinyl car seat and touching the metal door handle, you can easily experience an electrostatic discharge totaling thousands of volts.

- **How Are Static Charges Generated?**

Electrostatic charges are generated by what is called the “triboelectric effect”. Simply put, it is the rubbing or separating of certain “non-conductive” materials. Materials such as styrofoam cups, transparent tape, and synthetic clothing are classified as “non-conductive” since they do not conduct (transmit) electrons. Voltage levels will be higher if the air is dry. If the relative humidity is below 30 percent, the generation of an electrostatic charge is greatly increased.

When you walk across a carpeted floor on a dry day and receive a shock on a doorknob, you are experiencing electrostatic discharge first hand. If it is enough of a shock to feel, you have experienced at least a 3,000-volt electrostatic discharge. A person sitting at a workbench can generate from 100 to 6,000 volts.

- **Why is ESD a Problem?**

Most electronic components installed on printed circuit modules are susceptible to ESD damage. With the growth in technology, these components have been designed to operate at faster speeds and to fit into smaller packages. As a result, it is becoming easier to cause these sensitive devices to fail.

There are basically two types of ESD damage. Catastrophic (total destruction) and degradation, which is commonly referred to as electrical overstress (EOS). EOS may cause a device to fail early in use, or perhaps operate intermittently, meaning sometimes it works and sometimes it doesn't. This type of damage is often difficult to detect.

- **How Can ESD Be Controlled?**

ESD is not an all-powerful force with a mind of its own. People cause ESD problems and people can control it. If ESD sensitive devices or assemblies are protected from damaging conditions, ESD-related problems can be controlled. This can be accomplished by practicing ESD “protective handling”. ESD protective handling can be defined as handling an ESD sensitive device or assembly in such a way that no ESD damage can occur. ESD protective handling should be practiced in accordance with your company’s established procedures. These procedures should include a work area which is free of materials that cause ESD problems and a grounded work surface. Facilities should also be available to ground the operator. Also, if ESD sensitive assemblies are to be transported, they must first be enclosed in ESD “protective covering”. This will shield the contents from an electrostatic discharge during transport.

- **Field Service Kit Contents**

Safetran’s ESD Field Service Kit consists of the following items:

- ◆ 2-foot by 2-foot static dissipating mat with two 8-inch deep pockets
- ◆ 360-degree elastic, conductive wrist strap with a detachable 8-foot coil cord. The cord is equipped with a built-in safety resistor for personnel protection and a banana plug.
- ◆ A 14-foot, insulated wire with a snap on one end for connecting to the static dissipating mat and a 3/16-inch wire lug on the other end for securing the wrist strap and mat to a convenient electrical ground.
- ◆ An alligator clip which, when installed on the wrist strap cord banana plug, permits the wrist strap to be connected directly to a convenient electrical ground.

- **Instructions For Using The Field Service Kit**

1. Place the wrist strap on either the right or left wrist and adjust for a moderately snug fit.
2. Snap the coiled wrist strap cord to the wrist strap.
3. Press the snap on one end of the 14-foot insulated ground wire onto the corresponding snap located on the lower left corner of the static dissipating mat.
4. Secure the other end of the insulated ground wire to a convenient electrical ground.
5. Insert the banana plug on the other end of the coiled wrist strap cord into the receptacle provided on the 14-foot ground wire at the static dissipating mat.

NOTE

The static dissipating mat may be rotated to any convenient angle so that the ground wire does not interfere with the work being performed.

By developing and practicing the following three ESD awareness habits, the problem of ESD can be easily controlled.

- Make certain that you are wearing a properly grounded wrist strap before handling ESD sensitive devices or assemblies. Wrist straps are to be clean, in good condition, and making good skin contact. Use of oils and lotions which could insulate the wrist strap from the wearer's skin should be avoided. Wrist straps should be tested regularly to verify continuity between the wearer and ground.

Safetran recommends regular use of a wrist strap tester (Safetran part number Z815-00068-0000 or equivalent). This device provides a quick and reliable means of verifying the current-limiting resistance of the wrist strap attached to the static dissipating mat. The wrist strap tester also checks for continuity from the wearer's skin to ground and detects poorly fitting, worn out, or dirty wrist straps. Using the tester on a regular basis to verify the integrity of the grounding system will ensure maximum protection from ESD-induced damage in the field.

- Keep ESD sensitive devices or assemblies in protective covering when not being worked on or when being transported from one area to another. When static shielding bags are not available, the pockets provided in the static dissipating mat can be used for this purpose. Static shielding bags, which are normally black, silver, smoke-gray, or grid-lined, have the ability to provide a protective guard against ESD. The static shielding bag must be securely closed to be effective.
- Drawings, notebooks, and specifications are a few examples of static generating (nonconductive) materials commonly found in the work area. Precautions should be taken to prevent direct contact between these necessary materials and ESD sensitive devices and assemblies.

For transporting and storing printed circuit modules, Safetran also offers cushioned, metalized, zip-closure, static-shielding bags designed to not only afford protection from ESD damage but from physical damage as well. When sealed, the 10x12-inch bag completely surrounds the enclosed module in a protective barrier. Each bag (part number Z860-00003-0000) is equipped with a caution label to indicate the static-sensitive nature of its contents.

For additional information regarding other ESD material applications and product specifications, contact your Safetran Sales And Service Representative or the Technical Support Staff at Safetran's Electronic Division. In addition, ESD awareness classes are also available.

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