

EIA STANDARD

Electromechanical Switch Test Method for Electrostatic Discharge (ESD)

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Electrostatic Discharge (ESD) Test Method

(From Standards Proposal No. 1734-A formulated under the cognizance of the EIA P-13 Committee on Switches.)

This standard contains the major technical contents of International Electromechanical Commission, recommendation 801-2, Electromagnetic compatibility for industrial - process measurement and control equipment Part 2: Electrostatic Discharge Requirements. It differs from IEC recommendation 801-2 in certain minor respects as given below.

1. Level 4 test voltage increased to 16 kV from 15 kV.
2. Test procedure II added.
3. Restricted to cover testing of discrete switches only.

ELECTROSTATIC DISCHARGE (ESD) TEST METHOD

1. PURPOSE

This test is performed to determine the level at which electrostatic discharge occurs through or around a manually operated electromechanical switch, which is not equipped with a ground plane circuit protection feature. It is intended to be used on switches which have been fabricated using normal manufacturing workmanship standard for cleanliness. This test method may not be appropriate for switch application in areas other than normal office environments.

2. SEVERITY LEVELS

The following severity levels are recommended for the ESD-test:

<u>LEVEL</u>	<u>TEST VOLTAGE (+/- 10%)</u>
1	2 kV
2	4 kV
3	8 kV
4	16 kV

NOTE 1: Details concerning the various parameters which may influence the voltage level to which the the human body may be charged are given in Appendix II. This Appendix also contains examples of the application of the severity levels related to environmental (installation) classes.

3. APPARATUS

The ESD simulator used may be of varied construction. Appendix I to this test procedure shows one possible construction. In order to make it possible to compare test results obtained from different test simulators, the following characteristics shall be verified:

3.1 Risetime of the discharge current: 5 ns +/- 30% at 4 kV

Duration of the discharge current: 30 ns +/- 30% at 4 kV

Peak value of the discharge current: +/- 30%

9 A at 2 kV	18 A at 4 kV
37 A at 8 kV	74 A at 16 kV

NOTE: Measuring instrument bandwidth 100 MHz.

- 3.2 The discharge of the ESD simulator shall be applied to a 2 ohm or less resistive load. The discharge electrode shall be advanced to the load until the discharge occurs. The discharge circuit including the ground connection shall be as short as possible.
- 3.3 The load shall be a set of at least five non-inductive resistors (carbon type, minimum 1 W power rating, 10 ohms or less) connected in parallel forming a circular array. The set of resistors shall be coaxial with the resistor for matching the impedance of the measuring circuit.

The recommended constructional arrangement of the resistive load for verifying the ESD simulator characteristics is given in Figure 2.

- 3.4 The typical waveform of output current of the simulator for the verification procedure is given in Figure 3.

4. TEST SAMPLE MOUNTING

- 4.1 The switch to be tested shall be mounted in the center of a test plate 300 mm (11.8 inches) square in a manner to simulate the intended application.
- 4.2 For switches intended for printed circuit board (PCB) termination, Figure 4 shows the mounting method to be used to the ground plane. If the switch is intended to be PCB mounted with a surrounding metal subpanel or front panel, a metal panel extending 10 mm (0.40 inch) on all sides of the switch is mounted to the switch in the intended manner. If the panel is plastic or if there is no panel adjacent to the switch, this is omitted from the test specimen.
- 4.3 For switches with terminals for wires, the mounting method to the ground plane is shown in Figure 5. If the construction of the switch prevents contact of the electrical terminals with the ground plane (recessed terminals), wires must be used to connect the terminals to the ground plane.

If the switch is intended to be mounted to or adjacent to a metal subpanel or front panel, a metal panel extending 10 mm (0.40 inch) on all sides of the switch is mounted to the switch in the intended manner. If the panel is plastic or if no panel is used, this is omitted from the test specimen.

If a clamping device is needed to hold the switch in place, it must be of insulating material and must not cover or change the minimum spacing of any metal switch parts to the ground plane or to the switch actuator.