Designation: F 1689 – 96

Standard Test Method for Determining the Insulation Resistance of a Membrane Switch [1]

This standard is issued under the fixed designation F 1689; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ϵ) indicates an editorial change since the last revision or reapproval.

1. Scope

1.1 This test method covers the determination of the insulation resistance of a membrane switch.

1.2 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

2. Terminology

2.1 *Definitions:*

2.1.1 *insulation resistance*—the electrical resistance between test points.

2.1.2 *leakage current*—current flow through the insulation between test points.

2.1.3 *membrane switch*—a momentary switching device in which at least one contact is on, or made of, a flexible substrate.

2.1.4 *test points*—two preselected mutually insulated locations on switch assembly.

3. Significance and Use

3.1 Insulation resistance is useful for design verification, quality control of materials, and workmanship.

3.2 Low insulation resistance can cause high leakage currents.

3.3 High leakage currents can lead to deterioration of the insulation or false triggering of the associated input device, or both.

3.4 Specific areas of testing are, but not limited to:

3.4.1 Conductor/dielectric/conductor crossing point.

3.4.2 Close proximity of conductors, and

3.4.3 Any other conductive surface such as shielding or metal backing panel.

3.5 Insulation resistance measurement may be destructive and units that have been tested should be considered unreliable for future use.

4. Interferences

4.1 The following parameters may affect the result of this test:

4.1.1 Humidity,

4.1.2 Contamination,

4.1.3 Barometric pressure, and

4.1.4 Temperature.

5. Apparatus

5.1 *Electric Device*, suitable to provide a constant preselected dc voltage and suitable electronic monitoring device to measure very small current levels (micro-ampere range).

or

5.2 *Resistance Measuring Device*, such as a megohm-meter, or equivalent that can provide a specified voltage. (This would replace 5.1.)

6. Procedure—Voltage Source Method (Fig. 1)

6.1 *Pretest Setup*:

6.1.1 Connect test points of the switch assembly to the voltage source.

6.1.2 Connect leakage current measuring device in series with the voltage source.

6.2 *In-Process Test*:

6.2.1 Adjust voltage source to specified levels and record leakage current if detectable. If leakage current was undetectable, record as the smallest increment on current meter.

7. Procedure—Megohm Method (Fig. 2)

7.1 *Pretest Setup*:

7.1.1 Connect test points of the switch assembly to the megohm-meter.

7.2 *In-Process Test*:

7.2.1 Record insulation resistance.

8. Calculations—Voltage Source Method Only

8.1 Calculate the insulation resistance as follows:

Insulation Resistance = Applied Voltage/Leakage Current

If leakage current was undetectable then record insulation resistance as greater than calculated value.

[1] This test method is under the jurisdiction of ASTM Committee F-1 on Electronics and is the direct responsibility of Subcommittee F01.18 on Membrane Switches.

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