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

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1. Scope

1.1 This test method covers the determination of capacitance(s) of a membrane switch.

2. Terminology

2.1 *Definitions:*

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

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

3. Significance and Use

3.1 Capacitance testing is useful for design verification, quality control of materials, and workmanship.

3.2 High capacitance may interfere with the reliable performance of interface electronics.

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

3.3.1 Conductor/dielectric/conductor crossing point,

3.3.2 Close proximity of conductors, and

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

4. Interferences

4.1 The following parameters may affect the results 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 *Electronic Test Instrument*, for measuring very small capacitance (pico-farad range).

6. Procedure

6.1 *Pretest Setup*:

6.1.1 Suspend the switch specimen in air or otherwise isolate it from any interfering affects.

6.1.2 Attach to the capacitance measuring instrument any necessary leads, probes or connectors required to connect the membrane switch assembly for measurement. Place test leads as close to test points as possible without physical connection. (This will reduce any variations due to lead positioning).

6.1.3 Record the capacitance reading indicated on the instrument to equal capacitance (C_i) (this is the capacitance of the test setup).

6.2 *In-Process Test*:

6.2.1 Connect test leads to the test points.

6.2.2 Record the capacitance reading indicated on the instrument to equal total capacitance (C_t) (this is the total capacitance of the switch and device.

7. Calculation

7.1 Calculate the capacitance of the switch specimen as follows:

$$\text{Capacitance } (C_s) = C_t - C_i$$

8. Report

8.1 Report the following information:

8.1.1 Temperature,

8.1.2 Humidity,

8.1.3 Barometric pressure,

8.1.4 Date of test,

8.1.5 Part number or description of the switch specimen, or both,

8.1.6 Conductive path(s) tested and the connection points used.

8.1.7 Capacitance, (C_i),

8.1.8 Total capacitance, (C_t),

8.1.9 Capacitance of the switch specimen, (C_s),

8.1.10 Detailed description of isolation setup used, (including lead length, connection type, and sensitivity range), and

8.1.11 Detailed description of test equipment.

9. Precision and Bias

9.1 The precision and bias of this test method are under investigation.

10. Keywords

10.1 capacitance; membrane switch

[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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