



# Standard Test Method for Determining Circuit Resistance of a Membrane Switch<sup>1</sup>

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## 1. Scope

1.1 This test method covers the determination of the circuit 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. Referenced Documents

2.1 *ASTM Standards:*<sup>2</sup>

**F2592 Test Method for Measuring the Force-Displacement of a Membrane Switch**

## 3. Terminology

3.1 *Definitions:*

3.1.1 *circuit resistance*—electrical resistance as measured between two test points whose internal contacts, when held closed, complete a circuit.

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

## 4. Significance and Use

4.1 Resistance is useful to manufacturers and users when designing membrane switch interface circuitry.

## 5. Apparatus

5.1 *Test Probe*, as defined in Test Method **F2592**.

5.2 *Test Surface* to be flat, smooth, unyielding and larger than switch under test.

5.3 *Device*, to hold test probe securely and provide perpendicular movement into and away from switch under test.

<sup>1</sup> This test method is under the jurisdiction of ASTM Committee F01 on Electronics and is the direct responsibility of Subcommittee F01.18 on Membrane Switches.

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<sup>2</sup> For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

5.4 *Resistance Measuring Device*, (for example, ohm meter). The device should not apply a voltage outside the operating range of the switch contacts.

5.5 *Suitable Device*, to apply a controlled and measurable force on the test probe.

## 6. Procedure

6.1 *Pre-Test Setup:*

6.1.1 Precondition switch until approximation of steady state condition is achieved. (Note this will typically occur between 5 to 25 cycles, and it is recommended that the instrument and test probe be used when practical.)

6.1.2 Secure switch on test surface so that the unit under test can be removed and replaced in the same position after subsequent operations (probe contact position within 0.010 in. of its original position on the switch).

6.1.3 Position test probe over desired area of switch.

6.1.4 Lower probe until tip is just above top surface of switch without touching.

6.1.5 Connect switch terminals to resistance measuring device.

6.2 *In-Process Test:*

6.2.1 Slowly depress switch with probe until the resistance does not change for very small increments of force (for example 28 g).

6.2.2 Slowly retract probe until the resistance shows minimal change.

6.2.3 Record force and resistance retract probe to 6.1.4.

6.2.4 Depress switch with probe at the force recorded in 6.2.3 four additional times. Record resistance.

6.2.4.1 If resistance levels are not within 5 % of each other repeat 6.2.1 through 6.2.3 using a different force. The force will need to be adjusted to achieve the five sequential resistance measurements.

## 7. Report

7.1 Report the following information:

7.1.1 Barometric pressure,

7.1.2 Test probe,

7.1.3 Force,

7.1.4 Average Resistance,

7.1.5 Description of probe holding fixture and monitoring device,



- 7.1.6 Part number or description of switch, or both,
- 7.1.7 Identify termination points, and
- 7.1.8 Date of test.

8.2 Repeated testing will improve precision.

## **9. Keywords**

- 9.1 membrane switch; resistance

## **8. Precision and Bias**

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

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