



## Standard Test Method for Non-Destructive Short Circuit Testing of a Membrane Switch<sup>1</sup>

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### 1. Scope

1.1 This standard establishes a test method for detecting unwanted electrical shorts in a membrane switch.

1.2 Since this is a non-destructive test, it can be performed on a membrane switch that is going to be mounted and used in its intended environment.

1.3 *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>

F 1680 Test Method for Determining the Circuit Resistance of a Membrane Switch

### 3. Terminology

3.1 *Definitions:*

3.1.1 *short*—unwanted electrical connection between two test points having a resistance lower than the specified open circuit resistance.

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

3.1.3 *open circuit resistance*—minimum allowable resistance as measured between two test points that, if lower than, will indicate an electrical short.

3.1.4 *test point*—an electrical input or outpoint connection on the membrane switch.

### 4. Significance and Use

4.1 Destructive and non-destructive tests characteristics must be evaluated to ensure the membrane switch will operate

and survive the application it was designed for. It is not feasible for all tests to be performed on each membrane of a production lot. However, there are some non-destructive tests that must be performed on each switch assembly to ensure 100 % functionality and checking each i/o point for unwanted electrical continuity to any other i/o point is one of these characteristics.

### 5. Apparatus

5.1 *Electrical Tester*, capable of measuring the electrical resistance between two test points.

5.1.1 Electrical Tester must be capable of detecting a short when a resistance is measured between any of the test points that is less than an open circuit resistance.

5.1.2 Since this is a non-destructive test the applied voltage should not exceed operating voltage selected appropriately.

### 6. Procedure

6.1 *Pretest Setup:*

6.1.1 Connect test points of the switch assembly to the Electrical Tester.

6.1.2 Adjust test voltage source as necessary.

6.1.3 Adjust threshold resistance to the open circuit resistance.

6.2 *In-Process Test:*

6.2.1 Test first test point for shorts between all other test points and record results.

6.2.2 Test second test point for shorts between all other test points and record results.

6.2.3 Repeat until all test points are checked between all other test points.

### 7. Report

7.1 Report the following information:

7.1.1 Specified Voltage,

7.1.2 Specified shorts resistance,

7.1.3 Shorts found,

7.1.4 Test points associated with each short, and

7.1.5 Resistance value of each short.

### 8. Keywords

8.1 electrical short; insulation resistance; membrane switch; open circuit; resistance; short circuit; switch short

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

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