



Door Trim Switch Module Interface

1 Introduction

Note: Nothing in this standard supercedes applicable laws and regulations.

Note: In the event of conflict between the English and domestic language, the English language shall take precedence.

1.1 Purpose. This standard defines the interface performance requirements and test conditions for a switch module and other different type of switches attached to an interior door trim panel assembly.

1.2 Applicability. This standard is applicable for all switch modules and switch plates interfaces to the door trim panel including the following types of switch modules:

- Driver's side multi-switch module
- Lock/unlock switch module
- Window lifter switch module
- Mirror control switch module
- Seat memory switch module
- Trunk release switch module
- Switch plates (bezels)

2 References

Note: Only the latest approved standards are applicable unless otherwise specified.

2.1 External Standards/Specifications.

None

2.2 GM Standards/Specifications.

GMW3059 GMW14144

2.3 Additional References.

- CG1945 Door Trim VCRI SOR Appendix G3 Template

3 Test Preparation and Evaluation

3.1 Resources.

3.1.1 Facilities. Not applicable.

3.1.1.1 Calibration. The test facilities and equipment shall be in good working order and shall have a valid calibration label.

3.1.1.2 Alternatives. Alternative test facilities and equipment may also be used. However, all measuring variables as specified in this standard shall be determined correctly with respect to their physical definition. Approved alternatives are shown in Section 4.

3.1.2 Equipment.

3.1.2.1 Climatic chamber that is large enough to accommodate the test apparatus.

3.1.2.2 Tensile/compression gauge (measuring range (0 to 500) N) with the equipment required by the appropriate test method.

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3.1.3 Test Vehicle/Test Piece.**3.1.3.1 Test Vehicle.** Not applicable.**3.1.3.2 Test Part.** The finished component shall be tested. The test sample shall be a production representative part.**3.1.3.3 Test parts** shall not be tested within 72 h of manufacture.

3.1.3.4 Test Part Supports/Fixtures. The switch module shall be installed on a door trim panel that is mounted onto a rigid fixture. Unless otherwise specified in the CG1945 Door Trim Validation Component Reference Index (VCRI) Statement of Requirements (SOR) Appendix G3 Template per GMW14144 or applicable Subsystem Technical Specification (SSTS), at least three door trim panels will be required for each requirement shown in Section 4, if not otherwise agreed upon with the responsible Validation Engineer. The wiring is not to be connected to the switch module.

3.1.4 Test Time.

Calendar time: 4 days

Test time: 48 h

Coordination time: 48 h

3.1.5 Test Required Information. Not applicable.**3.1.6 Personnel/Skills.** Not applicable.**3.2 Preparation.** Not applicable.**3.3 Conditions.**

3.3.1 Environmental Conditions. All testing is to be performed in the order shown in Section 4 using the following temperatures and relative humidity:

- +23 °C ± 5 °C
- +38 °C ± 3 °C and 95% relative humidity (RH)

3.3.2 Test Conditions. Deviations from the requirements of this standard shall have been agreed upon. Such requirements shall be specified on component drawings, test certificates, reports, etc.

The test is to be conducted in the climatic chamber after a minimum part soak time of 1 h. The tests are to be performed in the chamber at the temperature specified. Parts to be tested are not to be soaked in the chamber and subsequently removed from the chamber for the duration of the test (i.e., soaking the parts in the chamber and bringing them into an ambient temperature lab for the duration of the test is not permissible under this specification).

3.4 Instructions. Not applicable.**3.5 Data.** Not applicable.**3.6 Safety.**

This Engineering Standard may involve safety requirements for hazardous materials, the method of operations and equipment. This standard does not propose to address all the safety issues associated with its use. It is the responsibility of the user of this standard to ensure compliance with all appropriate safety and health practices. This would include any specific training that may be required. The safety and health standards include site specific rules and procedures, company rules and procedures, and Government Standards. Contact shall be made with the appropriate site Safety and Health personnel for further direction and guidance in these matters.

3.7 Documentation. Samples of components or material released to this standard shall be tested for conformity with the requirements of this standard and approved by the responsible GM department prior to the start of delivery of production level components or materials.

Any change to the component or material, e.g., design, function, properties, manufacturing process and/or location of manufacture requires a new release of the product. It is the sole responsibility of the supplier to provide the customer, unsolicited, with documentation of any change or modification to the product/process, and to apply for a new release.

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If not otherwise agreed to, the entire verification test shall be repeated and documented by the supplier prior to start of delivery of the modified or changed product. In some cases, a shorter test can be agreed to between the responsible GM department and the supplier.

3.7.1 Test Results. The results of the testing shall be presented in a test report along with pictures of the switch module in and out of the door trim panel prior to the testing and at the end of test.

3.7.2 Storage. Test reports shall be stored at General Motors at the completion of testing in the Global Document Management (GDM) system.

4 Requirements and Procedure

4.1 Push-Out Test Interface to Trim Panel and/or Switch Plate.

4.1.1 Push-Out Test of Driver's Side Switch Bank Interface to Trim Panel and/or Switch Plate. The driver side switch module interface shall comply with the requirements provided in Table 1.

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Table 1: Driver's Side Switch Bank Interface Push-Out Retention Requirements

General	
1	Unless otherwise specified in the CG1945 Door Trim VCRI SOR Appendix G3 Template per GMW14144 or applicable Subsystem Technical Specification (SSTS), at least three door trim panels will be required.
2	This test is applicable to Driver's Side Switch Bank module attached to the door trim panel.
Equipment	
1	An indenter with a 10 mm diameter rubber stamp with a minimum thickness of 5 mm and hardness < 60 shore A shall be used (Figure 1 only as a reference).
Measurement Point	
1	The test shall be performed with a force applied from the back side of the switch assembly toward the a-surface of the trim (as shown in Figure 1).
Environmental Conditions	
1	Use $+23\text{ }^{\circ}\text{C} \pm 5\text{ }^{\circ}\text{C}$ testing temperature when either the device or trim plate contains Acrylonitrile Butadiene Styrene/Acrylonitrile Butadiene Styrene+Polycarbonate/Polypropylene (ABS/ABS+PC/PP) or Thermoplastic Polyolefins (TPO) within the interface.
2	Use $+38\text{ }^{\circ}\text{C} \pm 3\text{ }^{\circ}\text{C}$ and 95% relative humidity when either the device or trim plate contains nylon within the interface.
Instructions	
1	Maintain the test part for at least 1 h soak time at $+23\text{ }^{\circ}\text{C} \pm 5\text{ }^{\circ}\text{C}$ and/or at $+38\text{ }^{\circ}\text{C} \pm 3\text{ }^{\circ}\text{C}$ and 95% relative humidity depending on the material within the interface as shown in the preceding Environmental Conditions items 1 and 2.
2	The push-out direction of the switch is perpendicular to the switch module (Figure 1).
3	The load is to be applied to the underside of the switch (Figure 1).
4	While applying the load, measure the force applied.
5	Continue to increase the force application until the force is reached per following Force Requirement item 1 or until the switch detaches from the interfacing panel (switch plate or door trim panel).
6	If full or partial detachment occurs, record the force.
7	Release the force.
Force Requirement	
1	To evaluate customer usage, the push-out force of the switch interface to the trim panel shall be > 150 N applied from the back side of the switch assembly underneath the most rearward and inboard switch location (See Figure 1).
Alternative Test Method	
1	None.

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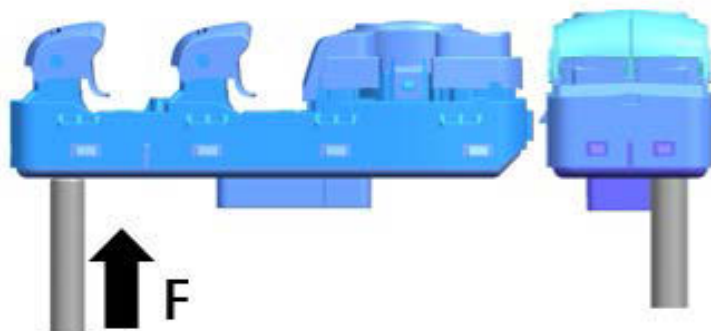


Figure 1: Push-Out Retention Force of Driver Side Switch Bank Customer Usage Evaluation

4.1.2 Push-Out Test of Mirror Control Switch Interface to Trim Panel and/or Switch Plate. The switch module interface shall comply with the requirements provided in Table 2.

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Table 2: Mirror Control Switch Interface Push-Out Retention Requirements

General	
1	Unless otherwise specified in the CG1945 Door Trim VCRI SOR Appendix G3 Template per GMW14144 or applicable Subsystem Technical Specification (SSTS), at least three door trim panels will be required.
2	This test is applicable to mirror control switch module attached to the door trim panel.
Equipment	
1	An indenter with a 30 mm diameter rubber stamp with a minimum thickness of 5 mm and hardness < 60 shore A shall be used. A smaller 10 mm diameter tensile/compression gauge can be used to fit the connector size (Figure 2 and Figure 3 only as a reference).
Measurement Point	
1	The test shall be performed with a force applied from the back side of the switch assembly (Figure 2 and Figure 3).
Environmental Conditions	
1	Use $+23\text{ }^{\circ}\text{C} \pm 5\text{ }^{\circ}\text{C}$ testing temperature when either the device or trim plate contains Acrylonitrile Butadiene Styrene/Acrylonitrile Butadiene Styrene+Polycarbonate/Polypropylene (ABS/ABS+PC/PP) or Thermoplastic Polyolefins (TPO) within the interface.
2	Use $+38\text{ }^{\circ}\text{C} \pm 3\text{ }^{\circ}\text{C}$ and 95% relative humidity when either the device or trim plate contains nylon within the interface.
Instructions	
1	Maintain the test part for at least 1 h soak time at $+23\text{ }^{\circ}\text{C} \pm 5\text{ }^{\circ}\text{C}$ and/or at $+38\text{ }^{\circ}\text{C} \pm 3\text{ }^{\circ}\text{C}$ and 95% relative humidity depending on the material within the interface as shown in the preceding Environmental Conditions Items 1 and 2
2	The push-out direction of the switch is perpendicular to the switch module (Figure 3).
3	The load is to be applied to the underside of the switch, on the switch connector box (Figure 2).
4	While applying the load, measure the force applied.
5	Continue to increase the force application until the force is reached per following Force Requirement item 1 and 2 or until the switch detaches from the interfacing panel (switch plate or door trim panel).
6	If full or partial detachment occurs, record the force.
7	Release the force.
Force Requirement	
1	To evaluate wiring connection, the push-out force of the switch interface to the trim panel shall be $> 75\text{ N}$ in the direction shown (Figure 2). Load shall be applied to the backside of the switch and/or parallel to the connector insertion direction.
2	To evaluate customer usage, the push-out force of the switch interface to the trim panel shall be $> 110\text{ N}$ applied from the back side in the direction shown at the rear of the switch assembly (See Figure 3). If the connector insertion direction is perpendicular to the mounting surface, the 110 N force supercedes the 75 N load.
Alternative Test Method	
1	None.

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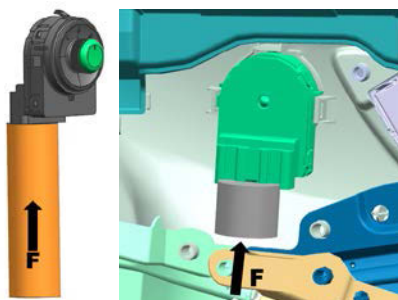


Figure 2: Push-Out Retention Force of Mirror Control Switch Wiring Connection Evaluation

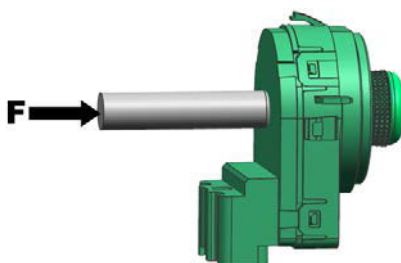


Figure 3: Push-Out Retention Force of Mirror Control Switch Customer Usage Evaluation

4.1.3 Push-Out Test of Single Window Switch Interface to Trim Panel and/or Switch Plate. The switch module interface shall comply with the requirements provided in Table 3.

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Table 3: Single Window Switch Interface Push-Out Retention Requirements

General	
1	Unless otherwise specified in the CG1945 Door Trim VCRI SOR Appendix G3 Template per GMW14144 or applicable Subsystem Technical Specification (SSTS), at least three door trim panels will be required.
2	This test is applicable to single window switch module attached to the door trim panel.
Equipment	
1	An indenter with a 10 mm diameter rubber stamp with a minimum thickness of 5 mm and hardness < 60 shore A shall be used. (Figure 4 only as a reference).
Measurement Point	
1	The test shall be performed with a force applied from the back side of the switch assembly toward the a-surface of the trim (Figure 4).
Environmental Conditions	
1	Use $+23\text{ }^{\circ}\text{C} \pm 5\text{ }^{\circ}\text{C}$ testing temperature when either the device or trim plate contains Acrylonitrile Butadiene Styrene/Acrylonitrile Butadiene Styrene+Polycarbonate/Polypropylene (ABS/ABS+PC/PP) or Thermoplastic Polyolefins (TPO) within the interface.
2	Use $+38\text{ }^{\circ}\text{C} \pm 3\text{ }^{\circ}\text{C}$ and 95% relative humidity when either the device or trim plate contains nylon within the interface.
Instructions	
1	Maintain the test part for at least 1 h soak time at $+23\text{ }^{\circ}\text{C} \pm 5\text{ }^{\circ}\text{C}$ and/or at $+38\text{ }^{\circ}\text{C} \pm 3\text{ }^{\circ}\text{C}$ and 95% relative humidity depending on the material within the interface as shown in the preceding Environmental Conditions items 1 and 2.
2	The push-out direction of the switch is perpendicular to the switch module (Figure 4).
3	The load is to be applied to the underside of the switch, on the switch connector box (Figure 4).
4	While applying the load, measure the force applied.
5	Continue to increase the force application until the force is reached per following Force Requirement item 1 or until the switch detaches from the interfacing panel (switch plate or door trim panel).
6	If full or partial detachment occurs, record the force.
7	Release the force.
Force Requirement	
1	The push-out force of the switch interface to the trim panel shall be $> 150\text{ N}$ in the direction shown (Figure 4). Load shall be applied parallel to the connector insertion direction.
Alternative Test Method	
1	None.

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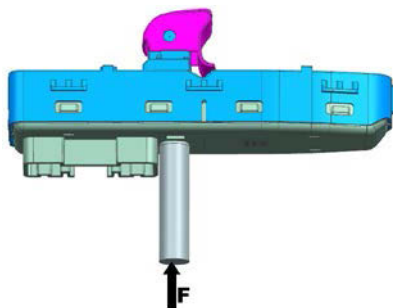


Figure 4: Push-Out Test of Single Window Switch Interface to Trim Panel and/or Switch Plate

4.1.4 Push-Out Test of Trunk Release Switch Interface to Trim Panel and/or Switch Plate. The switch module interface shall comply with the requirements provided in Table 4.

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