The Engineering Society For Advancing Mobility Land Sea Air and Space®
SAE INTERNATIONAL
400 Commonwealth Drive, Warrendale, PA 15096-0001

SURFACE VEHICLE RECOMMENDED PRACTICE

SAE J68

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Submitted for recognition as an American National Standard

TESTS FOR SNOWMOBILE SWITCHING DEVICES AND COMPONENTS

***Foreword*—**This Document has not changed other than to put it into the new SAE Technical Standards Board Format.

***1. Scope*—**This SAE Recommended Practice covers standardized basic tests, test methods, and requirements applicable to electromechanical switching devices which may be used on snowmobiles as defined in SAE J33.

2. References

2.1 Applicable Publications—The following publications form a part of this specification to the extent specified herein. The latest issue of SAE publications shall apply.

2.1.1 SAE PUBLICATIONS—Available from SAE, 400 Commonwealth Drive, Warrendale, PA 15096-0001.

SAE J33—Definitions for Snowmobiles

SAE J45—Brake System Test Procedure—Snowmobiles

SAE J575—Tests for Motor Vehicle Lighting Devices and Components
The following sections from SAE J575 are a part of this document.

a. Paragraph 2.1—Samples for Tests
b. Paragraph 2.2—Lamp Bulbs
c. Paragraph 2.3—Test Fixture
d. Section 3—Laboratory Facilities
e. Paragraph 4.1—Vibration Tests
f. Paragraph 4.4—Corrosion Test

NOTE—To expedite testing, separate switching device samples may be used for the vibration and corrosion test.

SAE J1222—Speed Control Assurance for Snowmobiles

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3. *Definitions*

3.1 **Headlamp Beam Switch—**A headlamp beam switch is a driver-controlled device used to select the high or low beam headlamp circuit.

3.2 **Headlamp Switch—**A headlamp switch is a driver-controlled device used to activate headlights, taillights, and certain marking lights.

3.3 **Stop Lamp Switch—**A stop lamp switch is a device used to energize the stop lamp circuit with the operator actuation of the brake.

3.4 **Accessory Switch—**An accessory switch is a driver-controlled device used to activate accessories (i.e., hand warmers, etc.).

3.5 **Ignition System Switch—**An ignition system switch is a device(s) used to interrupt engine ignition such as: emergency shutoff switch, key switch, or speed control assurance device.

3.6 **Starter Motor Switch—**A starter motor switch is a driver-controlled device used to activate the starter motor.

4. *High Temperature Test*

4.1 Determine effect of high temperature on the basic function of the switching device.

4.1.1 The switching device shall be exposed to a temperature of 49 °C ± 3 °C (120 °F ± 5 °F) for a minimum of 2 h; however, if the switching device is exposed to a higher temperature in service, then the device shall be tested at this higher temperature. (Refer to 4.1.1.1.)

4.1.1.1 To determine the maximum temperature to which the switching device is exposed, the snowmobile shall be operated for a minimum of 30 min under load, immediately followed by the fade and recovery test of paragraph 6.5 of SAE J45 at a temperature of at least 10 °C (50 °F) and use this temperature to conduct 4.1.1. If a minimum ambient of 10 °C (50 °F) cannot be obtained, subtract the available ambient temperature from 10 °C (50 °F) and add this difference to the maximum temperature to which the switching device is exposed.

4.1.2 After conditioning per 4.1.1, the switching device, while still at 49 °C ± 3 °C (120 °F ± 5 °F) or the higher service temperature, shall be manually cycled for 10 cycles per sequence requirements of Table 1. The switching device shall be electrically and mechanically operable during and after each cycle.

4.1.3 The same switching device shall be used for the Low Temperature and Humidity Test, Section 5.

5. *Low Temperature and Humidity Test*

5.1 Determine effect of low temperature and high relative humidity on the basic function of the switching device.

5.1.1 The switching device shall be exposed to a temperature of –40 °C ± 3 °C (–40 °F ± 5 °F) for a minimum of 2 h and then within no more than 2 min be exposed to a minimum relative humidity of 60% at a temperature of 21 °C ± 6 °C (70 °F ± 10 °F) for 30 min ± 10 min, after which the switching device shall be exposed again to a temperature of –40 °C ± 3 °C (–40 °F ± 5 °F) for 2 h ± 30 min.

5.1.2 After conditioning per 5.1.1, the switching device, while still at –40 °C ± 3 °C (–40 °F ± 5 °F), shall be manually cycled for 10 cycles per sequence requirements of Table 1. The switching device shall be electrically and mechanically operable during and after each cycle.

TABLE 1—ENDURANCE TEST AND REQUIREMENTS

Device	Sequence	Cycle	Design Performance Requirements
Headlamp beam switch	Hi-beam-Lo-beam-Hi-beam	10 000	The switch shall be designed so that the headlight circuits are never maintained open
Headlamp switch	Off-on-off	5000	
Brake light switch	Off-on-off	50 000	
Accessory switch	Off-on-off	5000	
Ignition system switch			
Emergency shutoff switch	On-off-on (Single throw switch) or On-off-on-off-on (Dual throw switch)	10 000	
Key switch	On-off-on	5000	May include headlamp and start switch
Speed control assurance device			
Passive (Device used only during speed control malfunction)	On-off-on	10 000	Refer to J1222
Active (Device actuated during every operation of speed controller)	Off-on-off	300 000	
Starter motor switch	Off-on-off	5000	Shall include solenoid if used

5.1.3 The same switching device shall be used for the Endurance Test, Section 6.

6. Endurance Test and Requirements

6.1 Determine effect of cycling on the basic function of the switching device.

6.1.1 The switch shall be operated at no less than the rated electrical load of the circuit it is switching (i.e., headlamp, stop lamp, ignition system, etc.). The test shall be run with DC except systems designed to operate on AC only, which may be tested with AC.

6.1.1.1 The power supply shall not generate any adverse transients not present in the snowmobile and shall comply with the following specifications:

a. Output Current—Capable of supplying output and inrush current as required in 6.1.1.
b. Regulator—DC supplies

Dynamic—The output voltage shall not deviate more than 1.0 V from zero to maximum load (including inrush current). DC supplies should recover 63% of maximum excursion within 5 ms.

Static—The output voltage shall not deviate more than 2% with changes in static load (not including inrush current) and means shall be provided to compensate for static line voltage variations.

Ripple Voltage—(DC supplies only) Maximum 300 MV peak to peak.

6.1.1.2 Speed control assurance devices actuated during every operation of the speed control shall be mechanically sequenced 300 000 cycles, per Table 1. However, those same switching devices interrupting their electrical load only during speed control malfunction shall have the electrical load applied only during the last 10 000 of the total 300 000 cycles.

6.1.2 The switch shall be subjected to an endurance test as specified in Table 1, at a temperature of 21 °C ± 6 °C (70 °F ± 10 °F) and at a rate not exceeding 30 cycles/min.

a. Travel time—0.1 to 0.5 s maximum. (Time from one position to the next position.)
b. Dwell time—0.4 s minimum (in each position).

The switch shall be electrically and mechanically operable during and after this test.

6.1.3 The voltage drop from the input to output terminals of the switching device shall be measured before and after the completion of the endurance test. This voltage drop shall not exceed 2% of the applied voltage at the rated electrical load of the circuit as in 6.1.1. If the wiring is an integral part of the switching device, the voltage drop measurement is to be made including 76 mm (3 in) of wire on each side of the switch terminals.

7. Notes

7.1 Marginal Indicia—The change bar (l) located in the left margin is for the convenience of the user in locating areas where technical revisions have been made to the previous issue of the report. An (R) symbol to the left of the document title indicates a complete revision of the report.

PREPARED BY THE SAE SNOWMOBILE COMMITTEE