

**(R) HAZARD WARNING SIGNAL SWITCH**

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

1. **Scope**—This standard defines the test conditions, procedures and performance specifications for 6, 12 and 24-V manually actuated hazard warning signal switch.

2. **References**

2.1 **Applicable Publication**—The following publication forms a part of the specification to the extent specified herein. Unless otherwise indicated the latest revision of SAE publications shall apply.

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

SAE J589b—Turn Signal Switch

3. **Definitions**

3.1 **Hazard Warning Switch**—An operator actuated device whose function is to cause at least one turn signal lamp on the left and right of the front, and left and right of the rear of the vehicle to flash simultaneously to indicate to the approaching driver the presence of a vehicular hazard.

3.2 **Combination Turn Signal and Hazard Warning Signal**

3.2.1 A combination switch is defined as a hazard warning switch combined in the same housing as the turn signal switch.

3.2.2 The operating motion of the hazard warning signal switch function shall differ from the actuating motion of the turn signal function.

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## 4. Test Requirements

### 4.1 Test Equipment and Instrumentation

4.1.1 POWER SUPPLY—The power supply shall not generate any adverse transients not present in motor vehicles, and shall comply with the following specifications:

- a. Output Current—The power supply shall be capable of supplying the continuous current of the design electrical load and the in-rush current, as required by the bulb load complement.
- b. Output Regulation:

Dynamic—The dynamic output voltage at the supply shall not deviate more than 1.0 V from zero to maximum load (including in-rush current) and shall recover 63% of its maximum excursion within 100 milliseconds.

Static—The static output voltage at the supply shall not deviate more than 2% with changes in static load from zero to maximum (not including in-rush current), and means shall be provided to compensate for static input line voltage variations.

- c. Ripple Voltage—The ripple output voltage shall be a maximum of 300 mV peak-to-peak.

4.1.2 VOLTMETER—A voltmeter with a 0-30 V maximum full scale deflection and  $\pm 1/2\%$  accuracy should be used.

NOTE—A digital meter having at least a 3-1/2 digit readout with an accuracy of  $\pm 1\%$  plus 1 digit is recommended for mV readings

4.1.3 AMMETER—Capable of carrying full system load current, with an accuracy of  $\pm 3\%$ .

4.2 Test Procedures—It is essential to duplicate specific environmental conditions under which the device is expected to function.

#### 4.2.1 ELECTRICAL LOADS

4.2.1.1 The design load applied to the switch is the electrical load specified by the quantity and type of bulbs (or other electrical load devices) to be operated by each circuit of the hazard warning signal switch.

4.2.1.2 The switch shall be operated with the maximum design bulb load stated by the switch manufacturer with the flasher not included in the circuit unless the flasher is an integral part of the assembly.

4.2.1.3 The switch shall be operated at 6.4 V DC  $\pm$  0.2 V DC for a 6-V system, 12.8 V DC  $\pm$  0.2 V DC for a 12-V system, or 25.6 V DC  $\pm$  0.2 V DC for a 24-V system. These voltages shall be the open circuit voltage measured at the input termination on the switch.

#### 4.2.2 TEMPERATURE TEST PROCEDURE

4.2.2.1 The switch shall be manually cycled after a 1-h exposure with no electrical load at each of these temperatures: 25 °C  $\pm$  5 °C; 74 +0, -3 °C; -32 +3, -0 °C. The switch shall be manually cycled at each temperature for 10 cycles at the designed loads.

4.2.2.2 The same hazard warning signal switch shall be used for the described endurance test described in 4.2.3.

#### 4.2.3 ENDURANCE TEST PROCEDURE

4.2.3.1 The switch shall be electrically connected to operate its design load for 7500 cycles at a temperature of  $25\text{ }^{\circ}\text{C} \pm 5\text{ }^{\circ}\text{C}$ , followed by a 1-h "on" at a temperature of  $25\text{ }^{\circ}\text{C} \pm 5\text{ }^{\circ}\text{C}$ .

4.2.3.2 One complete cycle shall consist of sequencing it through each position (with dwell in each position): Off, On, Off.

4.2.3.3 The test equipment shall be arranged to provide the following switch operating time requirements:

Travel Time—0.1–0.5 s (time from one position to next)

Dwell Time—1.0–2.0 s (time in each position)

Make and Break Rate—130–150 mm/s

#### 4.2.4 VOLTAGE DROP TEST PROCEDURE

4.2.4.1 The voltage drop from the input terminals to the corresponding output terminals shall be measured at the beginning of the test and immediately after the endurance test. Cycling the switch three times prior to taking readings is permitted and the reading should be taken right after cycling. A total of five readings can be taken and the average reading will prevail.

4.2.4.2 If wiring is an integral part of the switch, the voltage drop measurement shall be made including  $75\text{ mm} \pm 6\text{ mm}$  of wire on each side of the switch; otherwise, the measurement shall be made at the switch terminals.

### 5. Performance Requirements

5.1 During and after each of the tests described in 4.2.2 and 4.2.3, the switch shall be electrically and mechanically operable.

5.2 **Combination Turn Signal and Hazard Warning**—The same combination switch shall be used for the test of each function. The hazard warning switch shall meet the requirements of this standard. The turn signal switch shall meet the requirements of SAE J589.

5.3 The voltage drop shall not exceed 0.30 volts.

### 6. Notes

6.1 This document has been adopted by the Department of Defense. Any revisions must be coordinated with the Military preparing/coordinating activity. The responsible Military Agency is Military Coordinating Activity: Army - AT.

6.2 **Marginal Indicia**—The change bar (I) 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.