

(R) HEADLAMP BEAM SWITCHING

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

1. **Scope**—This SAE Standard defines the test conditions, procedures and performance specification for 6, 12, and 24 V manually actuated headlamp beam control switches.

2. **References**—There are no referenced publications specified herein.

3. **Definitions**

3.1 **Headlamp Beam Control Switching**—An operator activated device intended primarily to select the high or low beam headlamp circuit. A secondary function may incorporate an auxiliary circuit for override of the semiautomatic beam switching control.

4. **Test**

4.1 **Test Equipment and Instrumentation**

4.1.1 **POWER SUPPLY**—The power supply shall comply with the following specifications:

- a. Output current: Capable of supplying the continuous and inrush currents of the design load (reference: 4.2.1.1.).
- b. Regulation:
 1. Dynamic: The output voltage at the supply shall not deviate more than 1.0 V from zero to maximum load (including inrush current) and should recover 63% of its maximum excursion within 100 ms.
 2. Static: The output voltage at the supply shall not deviate more than 2% with changes in static load from zero to maximum (not including inrush current), and means shall be provided to compensate for static input line variations.
- c. Ripple Voltage: Maximum 300 mV peak-to-peak.

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4.1.2 VOLTMETER—0 to 30 V maximum full-scale deflection, accuracy $\pm 1/2\%$.

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, accuracy $\pm 3\%$.

4.2 Test Procedures—Environmental conditions have been selected for this document to help assure satisfactory operations under general use conditions. 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 number and type of bulbs (or other electrical load devices) to be operated by each circuit of the switch. For example, the design load for the headlamp circuit may be four sealed beam headlamp units (2-4651 and 2-4652) and four - No. 194 bulbs.

4.2.1.2 The switch shall be operated at 6.4 V DC ± 0.2 V for a 6 V system, 12.8 V DC ± 0.2 for a 12 V system, or 25.6 V DC ± 0.2 V 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 exposed for 1 h without electrical load to each of the following temperatures: 25 °C ± 5 °C; 74 + (0 °C - 3 °C); -32 + (3 °C, -0 °C). The switch shall be manually cycled at each temperature for 10 cycles at design load.

4.2.2.2 The same switch shall be used for the 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 (both primary and secondary circuit function design electrical loads) at a temperature of 25 °C ± 5 °C.

4.2.3.2 Beam Control Switch (primary function): The switch shall be operated for a minimum of 50 000 cycles¹. One complete cycle shall consist of sequencing through each position (high beam - low beam - high beam with dwell in each position) and return without dwell in any of the intermediate positions to the initial position.

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

- a. Travel Time: 0.1 to 0.5 s
(time from one position to the next)
- b. Dwell Time: 0.5 to 2.0 s
(time in each position)
- c. Make and
Break Rate: 130 to 150 mm per s

1. 50 000 cycles represents 14 cycles of headlamp switch operation every day for approximately 10 years, or 1 cycle for each 2 miles driven for 100 000 miles with 50% night driving.