

HEADLAMP SWITCH

Foreword—This Reaffirmed Document has been changed only to reflect the new SAE Technical Standards Board Format.

1. **Scope**—This document defines the test conditions, procedures, and performance specifications for 6-, 12-, and 24-V manually actuated headlamp switches (circuit breaker(s) may be incorporated for circuit overload protection).

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

3. Definitions

3.1 **Headlamp Switch** —An operator-activated device intended primarily to control functioning of headlamps, parking lamps, tail lamps, and certain marking lamps. Secondly, the device may control functioning of various accessory and instrument lights.

4. Test Requirements

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 in-rush currents of the design load (Reference: 4.2.1.1).
- b. Regulation

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

Static - the 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 - maximum 300 mV peak-to-peak.

SAE Technical Standards Board Rules provide that: "This report is published by SAE to advance the state of technical and engineering sciences. The use of this report is entirely voluntary, and its applicability and suitability for any particular use, including any patent infringement arising therefrom, is the sole responsibility of the user."

SAE reviews each technical report at least every five years at which time it may be reaffirmed, revised, or cancelled. SAE invites your written comments and suggestions.

QUESTIONS REGARDING THIS DOCUMENT: (724) 772-8512 FAX: (724) 776-0243
TO PLACE A DOCUMENT ORDER: (724) 776-4970 FAX: (724) 776-0790
SAE WEB ADDRESS <http://www.sae.org>

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 one digit is recommended for millivolt 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 operation under general customer 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-#194 bulbs.

4.2.1.2 The switch shall be operated at 6.4 V DC ± 0.2 for a 6-V system, 12.8 V DC ± 0.2 for a 12-V system, or 25.6 V DC ± 0.2 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 PROCEDURES

4.2.2.1 The switch shall be exposed for 1 h without electrical load to each of the following temperatures: 25 °C ± 5 ; 74 + 0 °C, -3 °C; -32 + 3 °C, -0 °C. The switch shall be manually cycled at each temperature for ten cycles at design load.

4.2.2.2 The same switch shall be used for the endurance test described in 3.2.3.

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 .

4.2.3.2 The switch shall be operated for a minimum of 11 000 cycles¹. One complete cycle shall consist of sequencing through each position (with dwell in each position) and return without dwell in intermediate positions to the initial position.

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

Travel Time: 0.1 to 0.5 s (time from one position to the next)
Dwell Time: 1.0 to 2.0 s (time in each position)
Make and Break Rate: 130 to mm/s

4.2.3.3 At the completion of the cycle testing, the switch shall be operated for 1 h in the headlamp position with the design load(s) connected.

1. 11 000 cycles represents three cycles of headlamp switch operation every day for approximately 10 years, or one cycle for each 4.5 miles driven for 100 000 miles with 50% night driving.