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# Headlamp Beam Switching

## —SAE J564c

SAE Recommended Practice  
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### 1. Definition

1.1 A headlamp beam switching device is a driver controlled switch used to select the high or low beam headlamp circuit.

1.2 The device may incorporate an auxiliary circuit for override of the semiautomatic beam switching control.

1.3 An auxiliary beam selection switch may be used in conjunction with the beam switching device to select between two or more upper or lower beam systems.

2. Reference Standards—The following sections from SAE J575a are a part of this recommended practice:

Section B—Sample for Test

Section C—Lamp Bulbs

Section D—Laboratory Facilities

### 3. Temperature Test

3.1 To insure basic function, the switch shall be manually cycled for 10 cycles at design electrical load:  $75 \pm 10$  F, ( $24 \pm 5.5$  C);  $165 +0, -5$  F ( $74 +0, -2.8$  C);  $-25 +5, -0$  F ( $-32 +2.8, -0$  C). This to be done after a 1 h exposure at each of these temperatures. The switch shall be electrically and mechanically operable during each of these cycles.

3.2 For each of the 1 h temperature exposures, design electrical load shall be connected to both high and low beam circuits with the switch initially set in the low beam position. After 1 h exposure at each temperature, the switch shall be cycled without interruption of the headlight current in excess of 0.10 s.

3.3 This same switch shall be used for the endurance test described in paragraph 5.

4. General Requirements—The switch shall be designed so that the headlight circuits are never maintained open.

### 5. Endurance Test Setup

5.1 The switch shall be operated with the maximum load stated by the switch manufacturer.

5.2 The test should be set up to operate the switch for the prescribed number of cycles.

One cycle shall consist of the following sequence of positions:

high beam—low beam—high beam

The switch shall be tested at a rate not to exceed 45 cycles/minute.

5.3 During the test, the system or systems specified for the switch shall be used. The switch shall be operated at 6.4 V d-c for a 6 V system, 12.8 V d-c for a 12 V system, or 25.6 V d-c for a 24 V system, measured at the input termination of the switch. The power supply shall not generate any adverse transients not present in motor vehicles and shall comply with the following specifications:

(a) Output Current—Capable of supplying a continuous current of the design load and inrush currents as required by the bulb load complement.

(b) Regulation—

Dynamic—The output voltage 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 5 ms.

Static—The output voltage 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 voltage variations.

(c) Ripple Voltage—Maximum 300 mV, peak to peak.

### 6. Endurance Requirements

6.1 The switch shall be subjected to an endurance test of 100,000 cycles.

6.2 The voltage drop from the input terminals to the output terminals of each circuit shall be measured at the beginning of the test and at intervals of 25,000 cycles.

This voltage drop shall not exceed 0.250 V at maximum design load for loads up to and including 15 A.

For loads in excess of 15 A, an additional voltage drop of 0.015 V per additional ampere will be allowed, but in no case shall the total voltage drop exceed 0.400 V.

If wiring is an integral part of the switch, the voltage drop measurement shall be made including 3 in. of wire on each side of the switch; otherwise, measurement would be made at the switch terminals.

7. Semiautomatic Beam Control Switch—The switch shall meet all the requirements above except as follows:

Endurance Requirements—Semiautomatic beam control switch. The switch shall be subjected to 50,000 cycles. One cycle shall consist of the following:

High Beam—Override Mechanism—Low Beam

Low Beam—Override Mechanism—High Beam

The dwell time in each position shall be evenly divided. The cycle rate shall not exceed 30 cycles/minute.

### 8. Installation Requirements

8.1 The following requirements apply to the device as used on the vehicle and are not part of the laboratory test requirements and procedures.

8.2 Upper Beam Indicator—An indicator shall be provided to show when the upper beam of the headlamp system is on. The indicator should consist of a red light, with a minimum area equivalent to that of a  $\frac{3}{16}$  in. diameter circle, plainly visible to drivers of all heights under normal driving conditions when headlights are required.