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## Motorcycle and Motor Driven Cycle Electrical System Maintenance of Design Voltage

**1. Scope**—This SAE Recommended Practice pertains to electrical systems of motorcycles both with and without batteries.

**1.1 Purpose**—This document provides minimum illumination voltage values for all motorcycle classifications as specified in SAE J213 describes test procedures to determine that these voltages are maintained.

### 2. Reference

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

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

SAE J213—Motorcycle Classifications

### 3. Test Apparatus

**3.1 Voltmeter**—0 to 20 V maximum full-scale deflection, accuracy  $\pm 1/2\%$  (two voltmeters required).

**3.2 Ammeter**—Capable of carrying full system load current. Accuracy  $\pm 3\%$  Full Scale.

**3.3 Means for Measuring Engine rpm**—Accuracy  $\pm 3\%$  Full Scale.

### 4. Test Procedure

**4.1** Install fully charged original equipment or equal battery on the motorcycle (if motorcycle is battery equipped).

**4.1.1** Maintain battery temperature at  $27^\circ\text{C} \pm 6^\circ\text{C}$  ( $80^\circ\text{F} \pm 10^\circ\text{F}$ ).

**4.2** Connect one voltmeter between the headlamp low beam terminal and the ground; connect the other voltmeter between the tail lamp terminal and the ground.

**4.3** Connect the ammeter in series with the battery.

**NOTE**—Disregard 4.3 for motorcycles without batteries.

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4.4 Start engine and turn on headlamp(s).

4.4.1 Switch headlamp to the low beam position.

4.4.2 External fan cooling may be applied to the motorcycle engine.

4.5 Run the engine at an rpm equivalent to 50 km/h  $\pm$  2 km/h (30 mph) in top gear for 10 min.

4.5.1 Record the lowest and highest headlamp voltage and tail lamp voltage observed during the 10 min period.

4.6 Run the engine at an rpm equivalent to 90 km/h  $\pm$  2 km/h (55 mph) in top gear for 10 min.

4.6.1 Record the lowest and highest headlamp voltage and taillamp voltage observed during the 10 min period.

4.7 Increase speed to manufacturer's suggested maximum rpm.

4.7.1 Record the highest and lowest headlamp and tail lamp voltages observed during a 5 s period.

4.8 Run the engine at manufacturer's rated idle speed for 10 min.

4.8.1 Record the lowest and highest tail lamp voltage observed during the 10 min period.

4.8.2 Record the lowest and highest headlamp voltage observed during the 10 min period.

4.9 Slowly increase the engine speed until generating equipment cancels the system load, indicated by "0" reading on the ammeter.

NOTE—Disregard 4.9 for motorcycles without batteries.

4.9.1 Record the engine rpm at ammeter zero point.

5. **Test Limits**

5.1 Voltages recorded in 4.5.1, 4.6.1, 4.7.1, and 4.8.1 shall be between 90 and 120% of the rated headlamp design voltage.

5.2 Voltages recorded in 4.8.2 shall be between 60 and 120% of the rated headlamp design voltage.

5.3 Engine rpm recorded in 4.9.1 shall be less than the motorcycle equivalent speed at 50 km/h  $\pm$  2 km/h (30 mph) in top gear operation as defined in 4.5.

6. **Notes**

6.1 **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 MOTORCYCLE COMMITTEE

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