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SURFACE VEHICLE RECOMMENDED PRACTICE

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MAINTENANCE OF DESIGN VOLTAGE – SNOWMOBILE ELECTRICAL SYSTEMS

FOREWORD

This SAE Recommended Practice is intended as a guide toward standard practice, but may be subject to frequent change to keep pace with experience and technical advances. Hence, its use where flexibility of revision is impractical is not recommended.

1. SCOPE:

This SAE Recommended Practice provides test methods and requirements for maintenance of design voltage in snowmobile electrical systems. It pertains to both battery-equipped and batteryless systems.

2. SAMPLES FOR TEST:

Samples submitted for laboratory test shall be representative of the systems as regularly manufactured and marketed. Each sample shall include not only the electrical system, but also accessory equipment necessary to operate it in the normal manner.

3. TEST APPATATUS:

3.1 Voltmeter:

(R)

Alternating current (AC) or direct current (DC), as required, capable of $\pm 2\%$ accuracy of the measured reading. For AC measurements, either a true RMS voltmeter is required or the AC and DC components of the AC wave form must be measured separately and added algebraically as follows:

$$V_{\text{True Rms}} = V_{\text{DC}}^2 + V_{\text{AC}}^2$$

For AC measurements, the voltmeter must have a minimum crest factor of 3.

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3.2 Ammeter:

(R)

DC, capable of $\pm 2\%$ accuracy of the measured reading.

3.3 Tachometer:

Means of measuring engine rpm within $\pm 3\%$.

4. TEST PROCEDURE:

4.1 Preliminary Instruction:

4.1.1 If snowmobile is battery equipped, install a fully charged original equipment battery.

4.1.2 If snowmobile is battery equipped, the ammeter is to be installed in series with the battery such that it indicates negative current for discharge and positive current for charge conditions. It shall not be in series with the electric starter motor.

4.1.3 Voltmeter Installation:

4.1.3.1 The voltmeter(s) shall be connected between the lamp terminals and the system ground. For the purpose of this document, the terminal voltages shall be designated as follows:

- a. V_1 - Headlamp low beam terminal to ground
- b. V_2 - Headlamp high beam terminal to ground
- c. V_3 - Tail lamp terminal to ground
- d. V_4 - Stop lamp terminal to ground

4.1.3.2 The required voltage readings should be taken simultaneously. If not, the readings recorded shall be the average of three consecutive readings that are within 1 V of each other.

4.1.4 Engine Rpm:

4.1.4.1 A tachometer operating from the alternator signal shall not be used unless: it is standard equipment in the system being tested, or it has less than 0.5% effect on the system's output voltage.

4.1.5 System Operation: Proper operation of all lamps, switches, and associated equipment shall be verified both before and after the test is completed.

4.1.6 Data Sheet: Prepare data sheet to record the voltage measurements indicated in Table 1 and the rpm recorded in 4.2.2.2.

4.2 Data Recording:

4.2.1 Record the voltage measurements for the various switch positions and rpms as indicated in Table 1.

4.2.1.1 Idle rpm equals manufacturer's recommended idle rpm.

4.2.1.2 Clutch engagement rpm equals the rpm of initial clutch engagement (for systems not using a centrifugal clutch, run the engine at an rpm equivalent to 40% of top speed in top gear).

4.2.1.3 Rated rpm equals the engine rpm at maximum bhp, as installed in the snowmobile.

4.2.2 RPM For "0" Ammeter Reading: For battery equipped systems only.

4.2.2.1 Switch head lamp to upper beam.

4.2.2.2 Record the engine rpm at which the ammeter reads "0."

4.2.3 Systems with Two or More Headlamps:

4.2.3.1 Simulate a field lamp failure.

4.2.3.2 Repeat 4.2.1.

5. TEST LIMITS:

5.1 Except as provided in 5.1.1, all measurements recorded in 4.2.1 and 4.2.3.2 shall be between 80 and 120% of the rated lamp design voltage.

5.1.1 At idle rpm, the lamp voltages (V_1 , V_2 , and V_3) shall be between 40 and 120% of the rated lamp design voltage.

5.2 The rpm recorded in 4.2.2.2 shall not be more than the manufacturer's clutch (R) engagement rpm.

(R) TABLE 1

Engine RPM	Switch Positions Headlamp Low V1	Switch Positions Headlamp High V2	Switch Positions Tail Lamp V3	Switch Positions Stop Lamp V4
1. Idle	0	X	X	0
2. Idle	X	0	X	0
3. Clutch Engagement	X	0	X	0
4. Clutch Engagement	0	X	X	0
5. Rated	0	X	X	0
6. Rated	0	X	X	X
7. Rated	X	0	X	0
8. Rated	X	0	X	X
9. Rated	0	0	0	X

NOTE: X = Switch in "ON" position and measure voltage

0 = Switch in "OFF" position, no voltage measurement

6. TEST CONDITIONS:

(R)

The snowmobile shall be conditioned prior to testing. Snowmobile conditioning shall consist of either running the snowmobile at the manufacturer's recommended idle rpm for 5 min, or conditioning the snowmobile for 2 h at a temperature of no less than 10°C.

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