

NMRA RECOMMENDED PRACTICES	
ELECTRICAL	
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NMRA RECOMMENDED PRACTICES RP-9 Electrical

I. LINE OPERATED DEVICES (See Notes 1, 2 and 4)

- A. Devices shall be certified by the **UL, CSA** or equivalent agency.
- B. Devices provided with a **NEMA "U"** ground plug, or equal, shall have a ground terminal capable of carrying 30 amperes continuously.
- C. Speed controllers in power packs shall have a minimum operating range of 180 degrees if rotary, or 3 inches if linear.
- D. Direct current power supplies and packs for propulsion use shall produce between 12 and 16 volts while delivering rated current.
- E. Alternating current power supplies and packs for propulsion use shall produce between 18 and 24 volts while delivering rated current.
- F. The maximum resistance of rheostats (if any) shall be marked on the case of power packs, or listed in the instruction manual.

II. MOTORS FOR PROPULSION SERVICE

- A. Nominal torque or power, and speed data shall be supplied with motors.

- B. The manufacturer's recommended maximum continuous current rating under conditions of poor ventilation shall be supplied with motors.

III. POWERED EQUIPMENT (See Note 3)

- A. Powered equipment shall operate at a speed within 25 percent of their nominal maximum prototype speed divided by the appropriate scale factor (See **STANDARD S-1**) under the following conditions: The input voltage shall be the minimum voltage stated in **Section I A** of **STANDARD S-9**. The unit running "light" after a run in and lubrication according to the manufacturer's instructions, on level, tangent track laid at minimum gage.
- B. A low resistance connection shall be provided from motor terminals to the wheels without relying on axle to side frame contact, or truck bolster to body bolster contact, or drawbar to pin contact.
- C. The front coupler (including metal replacement coupler) of a model steam type locomotive shall be insulated from the frame.

IV. GENERAL

- A. Tenders used with model steam type locomotives shall have the body insulated from both rails.

NOTES

1. Line operated devices shall be tested with "resistive" loads and an input of 115 volts, 60 Hz, or the commercial line voltage and frequency for the country in which they are initially to be sold. Power packs shall be tested with the speed controls set at maximum.
2. Throughout this **RECOMMENDED PRACTICE**, alternating current quantities are expressed as Root Mean Square (RMS) values and direct current quantities are expressed as Average Values. These are the values measured by conventional meters.
3. The term "insulation" shall mean that not less than 100K ohms resistance shall exist between the points specified as measured with a conventional ohmmeter.
4. Hertz, or Hz., has replaced "cycles per second" as the name of the basic unit of frequency.