



SPECIAL PROVISIONS  
FOR  
CONTINUOUS OPERATING SINGLE HEAD SOLAR BEACON ON WARNING SIGN

Buchanan County

Project No.  
HRRR-C010(69)--5R-10

Effective Date  
January 18, 2012

THE STANDARD SPECIFICATIONS, SERIES 2009, ARE AMENDED BY THE FOLLOWING MODIFICATIONS AND ADDITIONS. THESE ARE SPECIAL PROVISIONS AND THEY SHALL PREVAIL OVER THOSE PUBLISHED IN THE STANDARD SPECIFICATIONS.

**096034.01 DESCRIPTION.**

**A. Summary.**

This work includes the installation of a continuous operating single head solar powered flashing beacon on a warning sign. Each unit shall consist of a self-contained solar engine, LED signal module and signal housing, and mounting hardware such that the entire assembly mounts to the top of the pole. The solar engine shall contain all electronics, batteries and solar panels. No additional cabinet is required. The system shall conform to all provisions of the MUTCD, Chapter 4K, Flashing Beacons.

**B. Quality Assurance.**

The product must be FCC certified to comply with all 47 CFR FCC Part 15 Subpart B Emission requirements. The system, including battery packs, solar panel, LED modules and all components, shall be guaranteed for a minimum of three years. Manufacturer must be ISO 9001 certified.

**096034.02 MATERIAL.**

**A. Mechanical Specifications.**

1. The solar engine shall be constructed from powder coated aluminum, and shall be no greater in size than 4.75 inches by 15 inches by 32 inches. The Solar panels shall be integrated to the solar engine. All batteries and electronics shall be mounted in the solar engine, with no external control cabinet or battery cabinet required. The solar engine shall be vented to provide cooling of the battery and electronic system. Venting shall be covered by wire mesh to prevent intrusion of insects.
2. The solar engine shall have the provision to mount an external device for remote activation. System must have capability to power such device. Solar engine must contain sufficient space to house third party device inside a sealed enclosure located inside the solar engine.
3. The overall weight of the assembly, including mounting hardware, signal housings, LED modules, and solar engine shall not exceed 75 pounds.
4. The solar engine shall have the provision to be tilted and oriented south with additional mounting hardware, or mounted completely flat to the ground such that mounting in any orientation will keep the solar engine level.

**B. Mounting.**

The entire assembly, including solar engine, signal housing and LED module, and bracket shall be provided with hardware for mounting on to the top of a 4 1/2 inch diameter round pole or 4 inch by 4 inch wood post. Mounting hardware shall be standard traffic signal mounting hardware.

**C. Solar / Battery System.**

1. The solar engine shall include two 10 watt solar panels no larger than the footprint of the housing. The solar engine shall house two, field replaceable sealed lead acid batteries no greater than 24 Ah each. The solar panel and battery system shall be 12 Volt DC.
2. The solar panel shall meet the design qualification and type approval of photovoltaic modules in accordance with IEC 61215. This specification includes radiation testing, thermal testing, and mechanical testing for environmental conditions such as UV-exposure, thermal cycling, as well as degradation of maximum power output.

3. The solar panel shall consist of no more than two solar panels, mounted to the solar engine with an aluminum flashing.
4. The batteries shall be mechanically secured into the housing. A battery bracket shall enclose each battery in a manner to restrict the thermal expansion of the battery.
5. System shall have an auxiliary 12 Volt DC power output to power third party devices such as wireless radios or sensing equipment.

**D. Signal Housing.**

The solar engine shall not overhang the signal head, so as not to restrict mounting a signal head back plate. The signal head shall be easily removable from the assembly. The bracket assembly shall be constructed such that the signal heads can be removed easily in the field without removing the solar engine. The bracket assembly shall be designed to take the torsion and bending load of the solar engine. The signal head shall not be subjected to the torsional or bending load of the solar engine.

**096034.03 OPERATIONAL SPECIFICATIONS.**

- A. The system shall conform to all standards for flashing beacons as required in the Manual of Uniform Traffic Control Devices 2003 Edition Revision 1 or current version.
- B. The beacon shall flash at a rate of not less than 50 or more than 60 times per minute. The illuminated period of each flash shall not be less than one-half and not more than two-thirds of the total cycle.
- C. The beacon shall have a night dimming feature.
- D. The beacon shall have a minimum operating autonomy of 30 days.
- E. The beacon shall automatically reduce light output in case of low battery situations, reducing risk that the beacons will fail entirely under conditions of poor solar insulation.

**096034.04 ACTIVATION.**

The beacon shall operate continuously when the battery is connected. The beacon shall have the option to be turned on by a third party switch or third party device with a compatible contact closure output.

**096034.05 ENVIRONMENTAL SPECIFICATIONS.**

- A. The system shall be able to withstand and operate at temperature extremes of -40°F to +122°F.
- B. The system shall be designed and constructed to withstand 110 mph wind loads in conformance with the requirements of the AASHTO publication, "Standard Specifications for Structural Supports of Highway Signs, Luminaires and Traffic Signals", 4<sup>th</sup> Edition 2001.
- C. The electronic circuit board housing, wire harnessing and connectors shall be designed and tested in accordance to IEC International Standard 60529, Ingress Protection IP67 requiring that the enclosure be dust tight and remain completely sealed when immersed in water to a depth of 1 meter for 1 hour.

**096034.06 ELECTRICAL STANDARDS.**

Integrated solar charger shall be approved to CSA and UL standards.

**096034.07 METHOD OF MEASUREMENT.**

The quantity of Single Head Solar Beacon on Warning Sign will be measured by each beacon installed in accordance with the contract documents.

**096034.08 BASIS OF PAYMENT.**

The Contractor will be paid the contract unit price for each Single Head Solar Beacon on Warning Sign measured as described above.