

J2 LED Lighting, LLC

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Quick Set-up and Troubleshooting Guide

Solar Panel Battery Charge Controller with Dusk to Dawn function

J2 LED Lighting, LLC P/Ns: SCLED-12V1A and SCLED-12V3A

Basic Function

The SCLED Solar Panel controller uses analog circuitry consisting of various voltage comparators. The Dusk to Dawn function works by sensing the voltage of the solar panel. The Dawn mode is when ambient light load on the solar panel produces a voltage over 4.0 volts (ref.). In this mode the controller's output is off. The Dusk mode is when the panel voltage drops to below 4.0 volts (ref.), due to lack of ambient light. In this mode the controller turns the output on.

Battery Connection

The controller also functions to protect the battery (SLA, Sealed Lead Acid) from over charge and under charge. The controller has internal voltage comparators that read the battery voltage. A battery must be connected to the controller in order to determine if it is working correctly. If you attempt to measure voltage on the output wires of the controller with no battery attached you may read zero volts. The battery should be fully charged when you set-up the controller as the controller will disconnect the LED output load if the battery voltage falls below 10.5 volts (ref.). The controller will again allow operation when the battery voltage recovers to 11.8 volts (ref.).

When a system is functioning properly the battery voltage typically slowly increases to about 14.4 volts with the solar panel in full sun. The controller is set at 14.4 volts (ref.) for battery full charge voltage. A second method to test that the battery is charging is to insert a multimeter (DMM) with a DC amp function between the controller and the battery. With full sun on the panel, the battery will draw current. The current flow will reverse direction when the panel is in the dark as the controller switches to drive the output load in Dusk mode.

The battery to controller connection should be fused (1 amp maximum for the SCLED-12V1A and 3 amp maximum for the SCLED-12V3A.) A good resource for battery technical information can be found on the Powersonic web site: <http://www.power-sonic.com/technical.php> See their document link for: Technical Manual SLA batteries.

Panel Connection

A solar panel for a 12 volt system should be used. A 12 volt rated panel can have open circuit voltage approaching 22 volts; the controller circuitry limits the maximum charge voltage of the battery to 14.4 (ref.) volts. When testing the controllers Dusk to Dawn function, be sure to completely cover the panel blocking all light to activate the controller circuitry to turn the output on. The controller contains a blocking diode; an additional diode is not required between the panel and the controller.

Mounting / Sealing

If you do not want to use the mounting tabs with screws, double sided tape may be used. The 3M VHB (Very High Bond) type tapes are recommended. The controller enclosure is "weather resistant" not "water proof". To ensure an extended life of your controller, mount it in a semi-covered place out of the elements. To improve resistance to moisture, RTV (Room Temperature Vulcanizing) silicone is recommended of the non-corrosive type (no acetic acid), to seal the enclosure. For the DIY user GE Silicone II (GE500) from big box home improvement stores can be used. For OEM commercial / industrial user the Dow Corning 3145 is recommended.

J2 LED Lighting, LLC: SCLED SERIES
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