UPPLANDS Energy Inc.
an energy conservation company

ZeroSUN™ Intelligent Solar Charge Controller with built-in LED Driver

USER MANUAL

"Z" Series

Our Vision: Solar Powered lighting in any weather

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PRODUCT INTRODUCTION

Z Series intelligent solar controller, is a leading-edge technology, was designed to control and monitoring of all basic parameters of an off-grid solar system for LED lighting and provide power to the light source under any weather condition.

The controller is using DC voltage. The integrated constant current LED driver automatically adjusts to the voltage range of the LED engines of the luminaire.

Z series solar controller with built in led driver, powered by solar energy, combines the management functions of solar charging, battery charging/discharging and the operation of the constant-current driving mechanism of the LED luminaire. It is widely used for solar street lamps and solar powered area lighting system. LED output ranges from 40W to 200W and can be connected to most LED luminare.

This product series is used to manage charging of batteries with solar panels, discharging of loads from the batteries, constant-current driving of LED luminaire, and power control.

Multiple operation modes are provided including automatic mode, light-control mode, and manual mode. A test mode is also available for start up after installation.

The built-in smart modes provide a number of automatic power derating curve choices as well as extendable external controls (Infrared Motion sensor and IR remote communication).

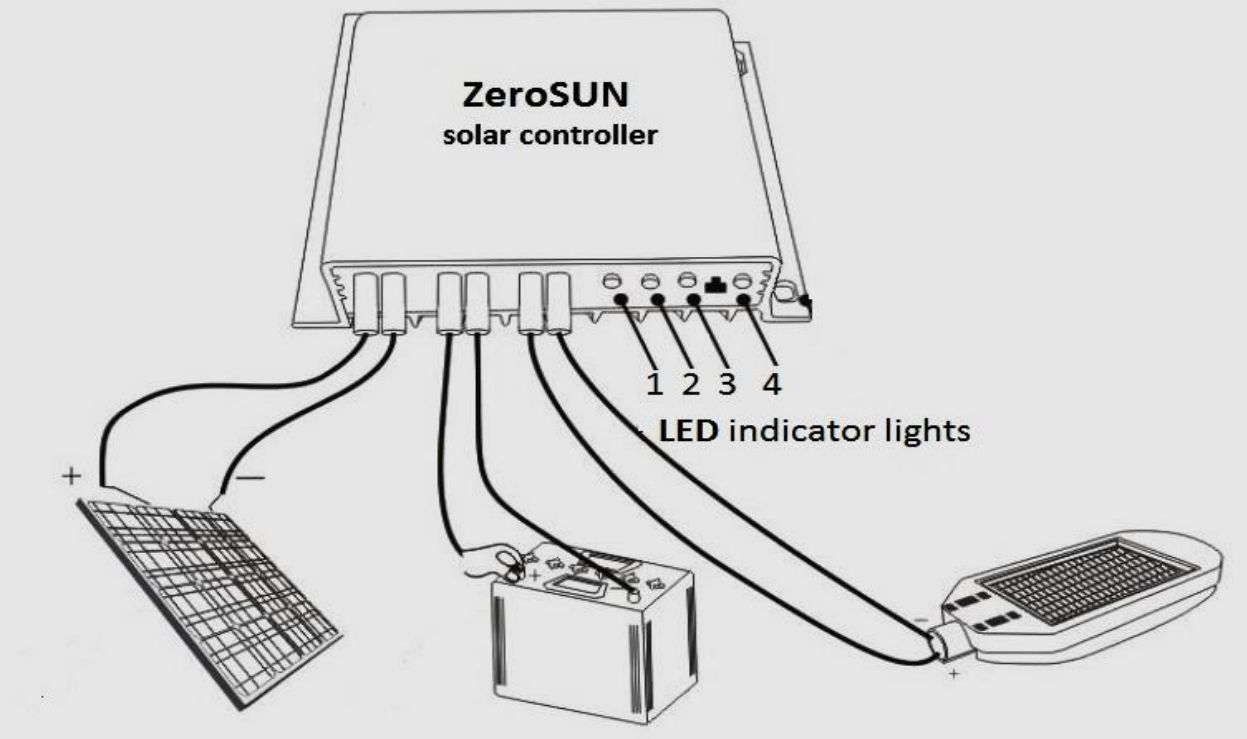
MAIN FEATURES

- Six (6) time periods load (dimming) control by IR remote programmer
- Intelligent system for environmental monitoring, automatic adjustment of power based on intensity of PV charge and status of battery charge
- Automatic 12/24VDC detection of battery voltage
- Three (3) stage battery charging mode with PWM
- Compatible with GEL, AGM and Lithium batteries
- IP67 aluminum housing with heat sink fins for better cooling
- Max output efficiency: 96%
- Operating temperature range: -40 to +55C
- Motion sensor function – Optional

TECHNICAL PARAMETERS

Models:	Z-CS-40	Z-CS-60	Z-CS-100	Z-CS-150	Z-CS-200
Output Power Batery Voltage (Vin)	40W 12/24V	60W 12/24V	50W/12V 100W/24V	75W/12V 150W/24V	100W/12V 200W/24V
Output Voltage	Range: Vin + 5V to 55V (to LED engine)				
Max input Max output	10A 2.0A	15A 3.3A	15A 3.3A	20A 6.6A	20A 6.6A
Working Temp	-40C - +55C				
No Load Current	≤5 - 15mA				
Control Setup	PWM with HF modulation by IR remote (provided)				
Safe Battery Charge modes	Trickle - Fast - Constant Voltage with Monitored Charge End cycle				
Protection	Over-Charge; Over Discharge; Over Current; Polarity; High/Low Temperature				
Size mm Weight kg	88*53*21 0.18	88*83*21 0.26		110*100*25 0.50	
Housing	Anodized Aluminum				

SYSTEM WIRING CONNECTIONS



Connection Steps to ZeroSUN™ controller

Step 1: Connect Load to Luminaire

Step 2: Connect Battery
Check minimum battery voltage: 12V - 9VDC; 24V – 18VDC

Step 3: Connect Solar Panel

LED indicator lights

1. PV indicator (green)
   On - OFF
2. Battery ON (green-yellow-red)
   Green: Work Normal
   Yellow: Battery under voltage
   Red: Battery over discharge
3. Load (current) indicator (yellow)
   ON: Load ON
   OFF: No load
   Flash fast: Load short or open circuit
   Flash slow: Over load / over current protection
4. IR communication indicator

BATTERY DISCHARGE OPERATION MODES

The controller can run automatically and unattended by following a pre-set mode. The controller provides four operation modes:

- Light-control mode: when dark, the solar panel voltage will drop to the start point. After a predefined delay time, the controller confirms the start-up signals to switch on the load for operation; At dawn, after the light intensity has risen above the start point and a predefined delay time has elapsed, the controller confirms the shutdown signals to switch off output, and the load will stop operation.

- Testing mode: This mode is used for system testing. It's almost the same as complete light-control mode. The only difference is elimination of the delay time before optical signal determination, and all other functions are preserved to facilitate checking of proper system functions during installation and testing.

- Manual mode: In this mode, the output on load side is switched on or off manually. Switching operations are performed by pressing the function key (F1) on the remote programmer.

- Automatic mode: This mode provides both light-control and timer functions. In the absence of sunlight, the light intensity will drop to the start point. After a predefined delay time, the controller will confirm the start signals and the load will be switched on. At this point, the timing sequence starts. When the total time reaches the sum of time settings for the first to five periods, the load will be switched off. Before dawn, the controller restarts the sixth time period and the load is switched ON until day break. As the daily sunshine time varies with season, the specific time settings for the six periods also change to keep ahead of day break.

  In automatic mode, the output current depends on current setting of the different periods. In other modes, the output current depends on current setting of the 1st time period.

RC-3 IR REMOTE PROGRAMMER

RC-3 is designed to program one ZeroSUN controller at a time. Same RC-3 can, however program infinite number of controllers and luminaire.

RC-3 IR Remote transfers signal via Infrared wave length.
Distance: Indoor up to 15 meters (55 ft)
Outdoor: 8-10 meters (25-30ft)
When using the Remote for programming aim it at the ZeroSUN™ controller.

If the controller is mounted inside an enclosure leave door open until all parameter settings have been completed.

Power ON/OFF
Press "Power" button for 3 seconds to start up IR remote
Power OFF, leave the remote idle for 5minutes or press "Lighting" button for 3 seconds

LCD Screen Display
Setting Parameters for all ZeroSUN™ models including Battery specifications, charge-discharge parameters and work modes.
Real-Time Data for all live ZeroSUN™ controllers

System Setting options
Including Style, Language, Alarm, Time laps, Load (current), Alarm, Factory reset and Editing

Receive and Send Signal to-from ZeroSUN™ controller
Press RECEIVE button: to receive status of all parameters from the working controller
Page UP or DOWN to check and change parameters

Time specific light mode selection
Step 1: Enter time (hours and minutes) for each time cycle of up to 6 periods followed by the load value in Amp setting. Press UP-DOWN page to find the right parameter value for your application.
Step 2: After each setting press OK to save the value and press Send to save in the Controller.

Press RETURN to get back to the previous menu.

Real-Time Data
After entering this mode, the IR Remote will receive the signal from the controller automatically, and displays the working status and specifications of the PV panel, battery, load, total capacity charged and discharged, temperature etc. Check the displayed parameters and note any discrepancies.

Remote Styles
Brief: Simple setting of parameters for testing.
Changing of Styles page UP or DOWN

Lock Functions
Press F1 and Lighting buttons simultaneously to Lock / Unlock the remote.
In Lock status parameters cannot be changed as a safeguard of changing values by mistake.

Operating Modes

Turn power ON

Press page DOWN to select desired Operating Mode or Work Mode.

Auto: Light level (power) control + Timer for all time periods

L-Ctrl: Load (luminaire) work from sunset to sunrise

Testing: In real-time without any time delay after sunset

Smart: Using functions of M1; M2; M3; M4 and M5; M6 with external Motion Sensors
This function is providing variable dimming levels based on the battery charge level and enables the Battery to power the luminaire over a longer period of time and improves the operating cycle of the Battery.