



# CHARGECONTROLLER CC25000

## Operating Instructions



The Sunsei™ CC25000 is a highly reliable charge controller that is ideal for Sunsei™ SolarChargers up to 25A. It will efficiently charge your batteries and provide years of protection from overcharging. This protective care will prolong your battery life and reduce maintenance requirements.

### PRODUCT FEATURES

#### IDEAL SOLAR CHARGING

- > Compatible – Works with almost all types of batteries and solar panels in 12V and 24V configurations
- > Efficient – Over 98% efficiency at full current
- > Full Charging – Ensures that the batteries are always topped off
- > Battery Safe – Charging method maximizes battery life
- > Reduced Maintenance – From healthy charging and reliable operation

#### OVER-CHARGE PROTECTION

- > High Voltage Limiting – Floats battery at safe voltage when battery is full
- > Robust Circuitry – Control function 100% solid state

#### HIGH RELIABILITY

- > Simple, rugged electronics – Low component count & streamlined design ensure long-term reliability

#### FEATURES

- > Two stage charging – Boost and float charge using pulse width modulation (PWM) control
- > 12V and 24V systems – Operation for batteries and solar panels, automatic voltage detection
- > Temperature compensation – Adjusts battery voltage limits with temperature
- > LED display – Built-in battery voltage and charge function indicator by LED display
- > Advanced digital control – Uses pulse width modulation (PWM) control
- > Reverse leakage protection – Prevents power loss at night
- > Incorrect Wiring Protection – Reverse battery and solar panel protected, surge protection
- > Terminal Block – For sound and easy wire connections

<sup>1</sup> Array voltage of 50V can only be applied with a 24V battery, otherwise the unit will be damaged.

<sup>2</sup> If the battery is lower than 17V, the charger will recognize it as a 12V battery.

### RELATED SYSTEM EQUIPMENT

The Sunsei™ CC25000 is an integral part of a solar electric power system that includes a solar panel, a battery and a load.

**SOLAR PANELS** (“photovoltaic (PV) array”, “solar modules”): The Sunsei™ CC25000 is compatible with all makes and models of photovoltaic solar panels.

The entire solar array’s open circuit voltage (Voc) cannot exceed 30V with a 12V battery or 50V with a 24V battery (the sum of the Voc of all solar panels in series). Also, the solar array’s peak operating current (Ip) cannot exceed 25A. (This is the sum of the peak operating currents (Ip) of all the solar panels in parallel).

Install all panels with the correct series-parallel configuration to ensure proper system voltage and current.

The Sunsei™ CC25000 circuitry uses a MOSFET transistor to eliminate leakage of the battery power into the solar panels at night. No additional protection is needed.

**OTHER CHARGING SOURCES:** Systems with an additional source of charging (alternator, battery charger, etc.) can operate with a solar array and a Sunsei™ CC25000. All charging sources need to connect directly to the battery on independent lines and have their own form of over-charge protection.

**Sunsei™ CC25000 FOR NON-SOLAR APPLICATIONS:** These units will only operate with solar electric panels. Do not use to regulate other power sources, such as a hydro or wind generators/alternators or AC battery chargers. These charging sources can damage the controller and/or the generating equipment.

**BATTERIES:** The Sunsei™ CC25000 provides the proper charging of standard lead-acid batteries that are normally used in recreational vehicles, boats and remote stand alone systems. These include wet cell batteries (with filler caps), sealed, maintenance-free and gel-cell batteries. Automobile batteries can also be charged, but these batteries are rarely used as the primary battery in a solar system. Install all batteries with the correct series-parallel configuration to ensure proper system voltage and current.

**SYSTEMS WITH TWO BATTERY BANKS:** When solar charging two separate battery banks, a switch can be installed to allow manual selection of one battery or the other.

**BATTERY ISOLATORS:** In installations that use a diode battery isolator with two batteries, the Sunsei™ CC25000 needs to connect directly to one of the batteries or an output from the isolator.

| PARAMETERS   | UNITS       | Sunsei™ CC25000          |
|--|-------------|--------------------------|
| Nominal Voltage  | Volts       | 12 or 24                 |
| Array Voltage, Max (Voc)                               | Volts       | 30 or 50 <sup>1</sup>    |
| Charging Current, Continuous (Ip)                      | Amps        | 25                       |
| Operating Voltage at Battery, Min Charging starts at : | Volts       | 7 or 17 <sup>2</sup>     |
| Current Consumption Quiescent (Night)                  | Milliamps   | <4                       |
| Boost Charge Voltage (2 hours)                         | Volts       | 14.5 or 29               |
| Float Charge Voltage                                   | Volts       | 13.7 or 27.4             |
| Regulation Accuracy                                    | Volts       | ±0.150                   |
| Voltage Drop, Array to Battery                         | Volts       | < 220 mV                 |
| Operating Temperature Range                            | °C (°F)     | -40 to 50 (-40 to 122)   |
| Dimensions   | inches (mm) | 3.1x3.9x1.25 (80x100x32) |
| Weight   | lbs. (kg)   | 0.40 (0.18)              |

Register your warranty online and enter to win an ICP Solar product. [www.icpsolar.com/warranty](http://www.icpsolar.com/warranty)

Need help?  
[www.sunseisolar.com](http://www.sunseisolar.com)  
+1 514.270.5770



**ICP Solar Technologies**  
Montreal, Canada



# CHARGECONTROLLER CC25000

## Operating Instructions



**LOADS:** System loads such as lights, radios and DC/AC inverters must be 12V or 24V DC (unless an inverter is being used).

### INSTALLATION

**WARNING:** Electricity, even low voltage electricity, can be dangerous. Installation should be performed by a licensed electrical contractor or other qualified personnel only. The requirements of National Electrical Codes should be followed.

**WARNING:** Follow all safety precautions of the battery manufacturer. Proper ventilation must be provided for the batteries. Most batteries produce hydrogen gas when charging, which is extremely explosive. Provide adequate battery ventilation. **DO NOT** expose the battery to open flame, matches, cigarettes or sparks.

### CAUTION: DO NOT EXCEED THE UNIT'S VOLTAGE AND CURRENT RATINGS

**Do not** exceed the maximum open circuit voltage (Voc) rating of 30V for 12V operating systems or 50V for 24V operating systems. This is the sum of the Voc of all solar panels in series.

**Do not** exceed the maximum current rating 25A. This is the sum of the peak operating current (Ip) of all the solar panels in parallel.

**Do not** deviate from the recommended wiring instructions.

### INFORMATION

- > The charge controller **SHOULD NOT BE USED** in direct sunlight or temperatures exceeding 122°F (50°C) or below -40°F (-40°C). It should be installed within 5 feet (1.5m) of the battery in a cool, dry and well ventilated area. Intended for indoor use.
- > **DO NOT USE MORE THAN 25A (400W for 12V or 800W for 24V)** of solar power with the Sunsei™ CC25000.
- > **ALL** connections should be in **PARALLEL** (Positive to Positive, Negative to Negative). Ensure that connections are clean and solid.
- > Always **CONNECT** the **BATTERY FIRST**, and **DISCONNECT** the **BATTERY LAST**. It is recommended connecting a fuse close to the battery on wires extending from it, especially for longer runs. Follow electrical codes where applicable.
- > For all additions or longer distances, use up to #6 (gauge) wires. Always **CONNECT** the **BATTERY FIRST**, and **DISCONNECT** the **BATTERY LAST**.

### PROCEDURE

Mount charger on a dry non-flammable surface. Use mounting holes.

**1. CONTROLLER TO BATTERY CONNECTION:** Connect positive and negative wires into designated positive and negative terminals of the controller. Then carefully connect wires to battery and/or fuse terminal (see wire selection table below).

**2. CONNECT PANELS:** If connecting more than one solar panel, connect the solar panels to the master cable in parallel, + to + and - to -.

**3. CONTROLLER TO PANEL CONNECTION:** Connect positive and negative master cable wires to designated positive and negative terminals of the charge controller.

**4. WIRE TYPE:** When possible, use stranded wire instead of solid wire. Stranded wire does not fatigue and cause loose connections over time as easily as solid wire. Use red wire for (+) and black for (-).

**5. WIRE SIZE:** Refer to the "WIRE GAUGE" charts below to determine the minimum size wire needed for each connection. Note that the bigger the wire, the lower the AWG. When using large stranded wire, you may need to divide the ends into two groups and straddle the screw on the terminal block.

### RECOMMENDED WIRE GAUGE CHARTS

| Recommended Wire Gauge (AWG) Chart to limit voltage drop to 0.3V Charge Controller to Battery |         |         |         |         |
|---|---------|---------|---------|---------|
| Cable Length (ft.)  | SE-1200 | SE-4000 | SE-6000 | SE-8000 |
| 0 to 5  | 14      | 14      | 14      | 14      |
| 5 to 10   | 14      | 14      | 14      | 12      |
| 10 to 15  | 14      | 14      | 12      | 10      |
| 15 to 20  | 14      | 12      | 10      | 8       |

| Recommended Wire Gauge (AWG) Chart to limit voltage drop to 0.5V Panel to Charge Controller |         |         |         |         |
|---|---------|---------|---------|---------|
| Cable Length (ft.)  | SE-1200 | SE-4000 | SE-6000 | SE-8000 |
| 0 to 10   | 14      | 14      | 14      | 14      |
| 10 to 20  | 14      | 14      | 12      | 12      |
| 20 to 30  | 14      | 12      | 10      | 10      |
| 30 to 40  | 14      | 12      | 10      | 8       |
| 40 to 50  | 14      | 10      | 8       | 8       |
| 50 to 60  | 12      | 10      | 8       | 6       |

**6. COMPLETE THE INSTALLATION OF PANELS, BATTERY AND LOAD**

### LOCATION

The Sunsei™ CC25000 should be mounted where it can be easily seen and reached as needed. Carefully consider how the wires are to be run from the solar panel to the controller and from the controller to the battery. The Sunsei™ CC25000 should be mounted as close to the battery as possible to reduce voltage drop in the wires. Wires extending from the battery should be fused. Respect local electrical codes where applicable.

Register your warranty online and enter to win an ICP Solar product. [www.icpsolar.com/warranty](http://www.icpsolar.com/warranty)

Need help?  
[www.sunseisolar.com](http://www.sunseisolar.com)  
+1 514.270.5770



**ICP Solar Technologies**  
Montreal, Canada



# CHARGECONTROLLER CC25000

## Operating Instructions



### OPERATION

The operation of the Sunsei™ CC25000 is completely automatic. This controller will regulate the charging of batteries during conditions of heavy usage, or when left unattended for long periods of time.

**CHARGING STATUS LIGHTS:** There are three (3) LED status lights that indicate the charging status of the CC25000: Red = low battery indicator, Yellow = good battery voltage indicator, Green = charging status.

#### HOW TO READ THE LIGHTS:

*NOTE: Double the values for 24V systems.*

1) All LED lights off: Insufficient voltage from solar panel and battery to activate the controller.

2) Green “Charging” LED lit constant: Solar panel is charging the battery. When battery voltage falls goes below 12.5V, the charger will charge the battery in boost mode up to 14.5V maintaining for two hours and then go into float mode of 13.7V using PWM.

3) Green “Charging” LED flashing: Charger is in PWM mode either in boost mode or float mode which means that the battery is being topped off or full.

4) Yellow LED on: Yellow LED is a battery state of charge indicator based on voltage, day or night. LED “On” means the battery is 12V or above; “Off” means the battery is below 12V. The yellow LED works in conjunction with the red LED, so when the yellow LED turns off, the red LED turns on and vice-versa.

5) Red “Low battery” LED lit constant: Battery is very low voltage, between 11.5V and 12V. Load must be reduced.

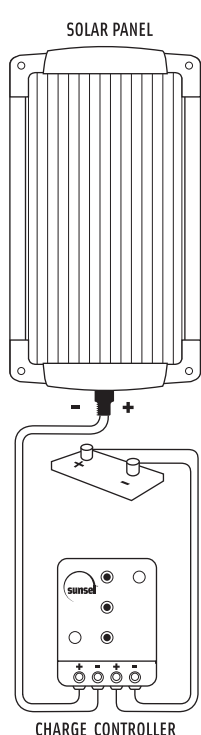
6) Red “Low battery” LED flashing: Battery has extremely low voltage, below 11.5V. Load must be disconnected and battery allowed to recharge.

**A TYPICAL DAY:** A typical daily cycle will be as follows. As the charging starts for the day and battery state of charge is low, charging will be continuous and the “CHARGING” light will be on all the time. Battery will be charged up to 14.5V or 29V, the Boost voltage, and kept at this level for two hours using PWM control. Then, the controller goes into float mode and will maintain the battery at 13.7V or 27.4V indefinitely as long as the load current does not surpass the charging current.

**WHAT TO CHECK:** Check to confirm all wire connections are sound and free from corrosion. Tighten terminal particularly at the battery. Also, consider checking for a voltage drop in the cables which should be less than 0.5V between the solar panel and the controller and less than 0.3V between the controller and the battery.

### MAINTENANCE

**RECOMMENDED CARE:** Any solar system, when designed correctly, should provide years of reliable charging with very little user involvement. To assure system reliability, a regular routine of checking the electrical connections is recommended. Especially on a moving vehicle exposed to road vibrations. Over time, electrical connections can deteriorate or corrode causing a voltage drop and possible hot-spots at the problem area.



|  |  |
|--|--|
| <b>FRANÇAIS</b>  |  |
| > Contrôleur de charge intelligent garanti à la batterie une puissance de charge maximale                      | > Connexions intégrées facilitent l'installation                                     |
| > Indicateur LED intégré affiche instantanément l'état de la charge  | > Limiteur de charge évite les surcharges et les inversions de polarité              |
| <b>ESPAÑOL</b>   |  |
| > Control de carga inteligente asegura potencia de batería máxima  | > Controllo di carica intelligente assicura la massima potenza della batteria        |
| > Indicador a diodo LED integral indica estado de carga inmediatamente   | > Indicatore a LED incorporato visualizza lo stato di carica istante per istante     |
| > Conectores a tornillo incorporados para una instalación rápida y sencilla                                    | > Connettori a vite integrati per un'installazione facile e rapida                   |
| > Interruptor de circuito a rearma automático para inversión de polaridad y protección contra picos de voltaje | > Interruttore automatico di protezione per inversioni di polarità e sovraccarichi   |
| <b>DEUTSCH</b>   |  |
| > Intelligente Aufladung Steuerung stellt maximale Batterieleistung sicher                                     | > Doordachte laadcontrole garandeert maximaal accuvermogen                           |
| > Eingebaute LED Anzeige zeigt sofort aufladenstatus an  | > Ingebouwde LED-indicator toont continue de laadstatus                              |
| > Integrierte Schraube Anschlußanschlüsse für schnelle und einfache Installation                               | > Geïntegreerde schroefaansluitingen voor snelle en makkelijke installatie           |
| > Automatische-reset Schutzschalter für Rückpolarität und Schwankung Schutz                                    | > "Auto-reset" stroomonderbreker t. b.v. ompool- en vermogens schommelingbeveiliging |
| <b>ITALIANO</b>  |  |
| <b>NEDERLANDS</b>  |  |

### TROUBLESHOOTING

These sections can assist in the troubleshooting of a solar system. If a problem is suspected, please verify all components (solar panel, battery and controller).

#### SOLAR PANEL

To verify the solar panel, disconnect it from the controller. In full sun, it should give its rated open circuit voltage (Voc). Measure across the two wires extending from the solar panels with a DC voltmeter. Then measure the output current by connecting the panel directly to the battery. Put the DC ampmeter in one of the lines and verify that the panel can put out its rated current (in full sun).

#### BATTERY

With the panel connected to the battery as above, the battery voltage should be within the maximum values indicated by the manufacturer.

#### CHARGE CONTROLLER

Reconnect the working panel and good battery and the charge controller should turn on as indicated by the charging LED lighting up.

Register your warranty online and enter to win an ICP Solar product. [www.icpsolar.com/warranty](http://www.icpsolar.com/warranty)

Need help?  
[www.sunseisolar.com](http://www.sunseisolar.com)  
+1 514.270.5770



ICP Solar Technologies  
Montreal, Canada



# CHARGECONTROLLER CC25000

Operating Instructions



## WARRANTY

ICP Solar Technologies grants the original purchaser of the Sunsei™ CC25000 Charge Controller a **2-year** warranty against any defects of materials or workmanship. This warrant not be responsible for any costs due to removal, shipment, re-installation or any other loss due to warranty servicing. The maximum liability to ICP under this warranty shall not exceed the purchase price of this controller. This warranty does not cover a controller that has been damaged by misuse, neglect or improper installation. ICP shall not be responsible for any damage to persons or property caused by improper installation, misuse or improper handling of this product. Some states do not allow exclusion or limitation of accidental or consequential losses so the exclusions may not apply to the purchase. This warranty gives you specific legal rights and you may have other rights, which vary from one state (or province) to another. Please note that ICP will not accept returns without prior authorization. The original proof of purchase is required for warranty validation.

Register your warranty online and enter to win an ICP Solar product. [www.icpsolar.com/warranty](http://www.icpsolar.com/warranty)

Need help?  
[www.sunseisolar.com](http://www.sunseisolar.com)  
+1 514.270.5770



**ICP Solar Technologies**  
Montreal, Canada