



# CHARGECONTROLLER CC10000

## Operating Instructions



The Sunsei™ CC10000 is a highly reliable charge controller that is ideal for Sunsei™ SolarChargers up to 10A. 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
- > 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)
- > Status LED – LED indicates battery charging
- > Reverse leakage protection – Prevents power loss at night
- > Incorrect Wiring Protection – Reverse battery and solar panel protected
- > Terminal Block – For sound and easy wire connections

PARAMETERS	UNITS	Sunsei™ CC10000
Nominal Voltage	Volts	12
Array Voltage, Max (Voc)	Volts	30
Charging Current, Continuous (Ip)	Amps	10
Operating Voltage at Battery, Min Charging starts at :	Volts	7
Current Consumption Quiescent (Night)	Milliamps	2
Boost Charge Voltage (2 hours)	Volts	14.5
Float Charge Voltage	Volts	13.7
Regulation Accuracy	Volts	±0.150
Voltage Drop, Array to Battery	Volts	< 170 mV
Operating Temperature Range	°C (°F)	-40 to 50 (-40 to 122)
Dimensions	inches (mm)	2.2x2.8x1.1 (57x70x28)
Weight	lbs. (kg)	0.26 (0.12)

### RELATED SYSTEM EQUIPMENT

The Sunsei™ CC10000 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™ CC10000 is compatible with all makes and models of photovoltaic solar panels. The entire solar array's

open circuit voltage (Voc) cannot exceed 30V (the sum of the Voc of all solar panels in series). Also, the solar array's peak operating current (Ip) cannot exceed 10A. (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 (12V) and current.

The Sunsei™ CC10000 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™ CC10000. All charging sources need to connect directly to the battery on independent lines and have their own form of over-charge protection.

**Sunsei™ CC10000 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™ CC10000 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™ CC10000 needs to connect directly to one of the batteries or an output from the isolator.

**LOADS:** System loads such as lights, radios and DC/AC inverters must be 12V 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.

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

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

**Do not** exceed the maximum open circuit voltage (Voc) rating of 30V. This is the sum of the Voc of all solar panels in series.

**Do not** exceed the maximum current rating 10A. 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 10A (150W)** of solar power with the Sunsei™ CC10000.
- > **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™ CC10000 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™ CC10000 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.



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Operating Instructions



## OPERATION

The operation of the Sunsei™ CC10000 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.

**GREEN LIGHT ON:** Solar panel is charging the battery.

Charger will charge battery until float voltage of 13.7V and maintain using Pulse Width Modulation (PWM). If battery voltage falls below 12.5V, the charger will charge the battery until boost mode of 14.5V is reached and maintain it for two hours and then go into float mode of 13.7V using PWM.

**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, 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 indefinitely as long as the load current does not surpass the charging current.

## 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.

**WHAT TO CHECK:** Check to confirm all wire connections are sound and free from corrosion. Tighten terminal block screws and inspect any fuse in the system, 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.

## 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 panel's 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.

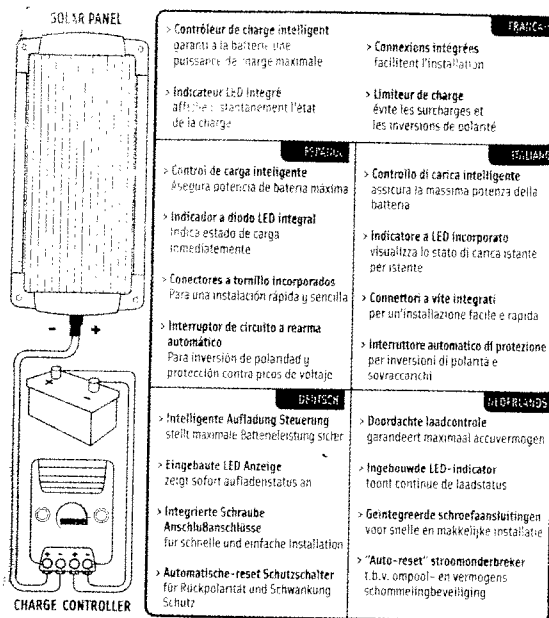
### CHARGE CONTROLLER

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

## WARRANTY

ICP Solar Technologies grants the original purchaser of the Sunsei™ CC10000 Charge Controller a **2-year** warranty against any defects of materials or workmanship. This warranty does not cover installation or costs derived thereof. ICP shall 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.



**IMPORTANT! Please read the instructions before operating.**

- When working around batteries and other electrical equipment, please observe industry standard and manufacturer's safety procedures.
- Make connections in a well-ventilated area free from flammable gases or vapors.
- For 12V systems, ALL connections should be in PARALLEL: Positive (+) to Positive (+), Negative (-) to Negative (-).
- DO NOT attempt to recharge NON-RECHARGEABLE batteries.
- Always CONNECT the charge controller to the battery FIRST.
- When disconnecting your solar panel DISCONNECT the battery LAST.

**PRODUCT DESCRIPTION**

**SolarCharger 1200:** Solar powered battery charger 1200mA, 15V (18W)

**Standard accessories included in all kits:** (see FIG. 1)

- (1) Extension power cable (10ft.)
- (2) Panel-to-panel jumper cable (1ft.)
- (3) O-ring connector wire (1.5ft.)
- (4) Battery clamp wire (1.5ft.)
- (5) Male CLA adapter cable (1.5ft.)
- (6) Female 12V socket cable (1.5ft.)
- (7) Bare wire adapter (for connecting to charge controller)
- (8) Two (2) wire twist connectors
- (9) Stainless mounting screws (4)
- (10) Center legs with screws (2)

**\*Charge Controller** (model SE-1201 only)  
CC-10000 – overcharge protection up to 10A

**Important Note:** We highly recommend using a Sunsei™ Charge Controller with the SolarCharger 1200 because it will protect your battery from overcharging and will optimize the charging process. If the vendor from whom you have purchased this solar panel does not carry Sunsei™ Charge Controllers, please visit [www.sunseisolar.com](http://www.sunseisolar.com) for a dealer near you.

**STEP 1 – TESTING THE PANEL**

Press the sun-shaped button. The LED will light up when the panel receives sufficient daylight to produce power (see FIG. 2).

**STEP 2 – INSTALLATION**

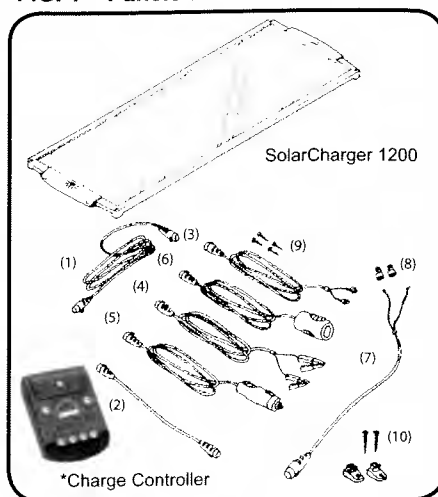
Position the solar panel where you would like it to be permanently installed. Angle the panel in such a way that it will be perpendicular to the strong midday sun (straight up in most cases), between 10 a.m. and 2 p.m. Insert the center legs at the bottom of each aluminum frame (see FIG. 3). Insert each mounting screw and tighten carefully. Do not over-tighten (see FIG. 3).

**STEP 3 – CONNECTION**

**Note:** Remove the connector caps before connecting the cables.

First, connect the GREY plug of the 10-foot extension cable to the connector of the solar panel. Then, connect the charge controller to your battery. (For more details concerning the operation of the charge controller, consult the instructions included with the charge controller.) Connect the cable of your choice to the battery (see FIG. 4). Finally, connect the other end of this cable with the BLACK plug of the extension cable.

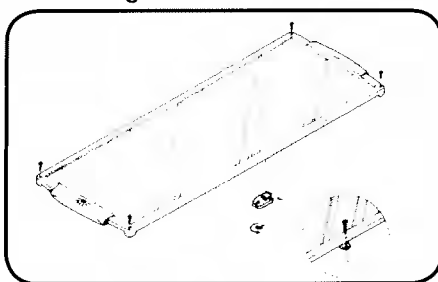
**FIG. 1 – Panels and accessories**



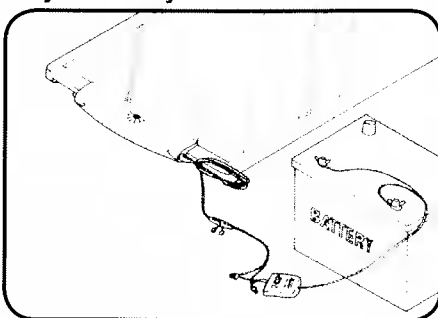
**FIG. 2 – Testing the unit**



**FIG. 3 – Mounting the SolarCharger 1200**

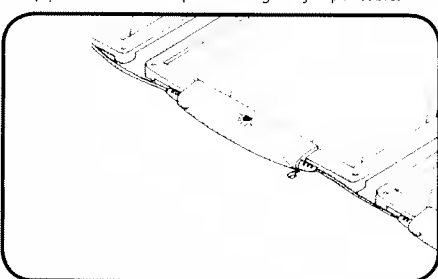


**FIG. 4 – Completing the connection to your battery**



**MULTI-PANEL CONNECTION**

If you have more than one Sunsei™ SolarCharger panel, simply interconnect the panels using the jumper cable.



**FREQUENTLY ASKED QUESTIONS (FAQ)**



**Q1: What types of batteries can I charge?**

**A:** You can charge all types of 12V batteries with the SolarCharger 1200, including lead-acid automotive batteries, deep cycle (traction type) batteries, gel-cell batteries and heavy-duty (stationary type) batteries.

**Q2: How long will it take for the SolarCharger 1200 to charge a dead battery?**

**A:** The SolarCharger 1200 can recharge a depleted battery. It will supply the battery with 1.2A per hour in the sun. Therefore, depending on type of battery and the conditions, a battery that requires 30AH for full charge would take approximately 25 hours of full sunshine to recharge. You can use multiple panels in order to decrease the total charging time.

**Q3: Do I need a charge controller with the SolarCharger 1200?**

**A:** Yes. It is important to use a charge controller with the SolarCharger 1200 to protect your battery from overcharge.

**Q4: Can the SolarCharger 1200 drain my battery at night?**

**A:** No. All Sunsei™ solar panels are equipped with a built-in diode that prevents any reverse current.

**Q5: Can the SolarCharger 1200 be left outdoors without protective covering?**

**A:** Yes, these panels have been weather protected and can be mounted outdoors. They are completely weatherproofed, and can withstand 1/2 inch hailstones, up to 180°F heat, and operate under 3 inches of snow (on sunny days).

**Q6: Can I mount the SolarCharger 1200 directly to a surface or do I need to use some sort of bracket?**

**A:** The SolarCharger 1200 can be installed directly to a flat surface, using the screws and center legs provided.

**Q7: Do I have to disconnect the panels from the battery when I drive or while I am recharging my battery with my generator?**

**A:** No. Sunsei™ solar panels are designed to be connected to the battery permanently. There is no need to disconnect them when charging the batteries by other means such as AC chargers or your vehicle's generator or alternator.

**WARRANTY**

ICP Solar Technologies grants the original purchaser of the Sunsei™ SolarCharger 1200 a **10-year** warranty on the power output and a **2-year** warranty on the materials of the module. ICP guarantees that the unit will produce a minimum 80% of its original minimum power rating for the Warranty Period from the purchase date. ICP warrants the module to be free from defects in materials and workmanship under normal applications, installation, use and service conditions for the Warranty Period from the purchase date. ICP will, at its option, either repair or replace the product if it becomes inoperable due to a defect in material or labor during the Warranty Period. This warranty does not cover installation or costs derived thereof. ICP shall 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 product. This warranty does not cover any module that has been damaged by misuse, neglect, improper installation or acts of God, including lightning, floods, earthquakes, fire and high winds. This warranty does not cover accessories included with the product. This warranty does not cover product that is broken after purchase. 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.

**Warranty for accessories:** A **2-year** warranty is given on accessories such as, but not limited to, cables included with the product. The warranty applies from the original purchase date.

**APPROXIMATE CHARGING TIMES**

(in hours full sunlight) for batteries 50% discharged

BATTERY SIZE	SE-1200 / SE-1201*
U1 (40AH)	17
Group 24 (80AH)	33
Group 27 (100AH)	42
Group 31 (120AH)	50
4-D (180AH)	75
8-D (220AH)	92
Golf cart (220AH)	92
L-16 (400AH)	167

\* with charge controller

**SolarCharger Product Information Chart**

	SE-1200 / SE-1201	SE-4000	SE-6000	SE-8000
Operating voltage	15V	16.5V	16.5V	16.5V
Maximum current	1200mA	4A	6A	8A
Open circuit voltage	21.5V	21.5V	21.5V	21.5V
Dimensions	105 cm x 46.51 cm x 7.49 cm	97 cm x 78 cm x 8.99 cm	134.01 cm x 78 cm x 8 cm	156.21 cm x 80.49 cm x 6.5 cm
Weight	15 lbs / 6.8 kg	17.2 lbs / 7.8 kg	25.5 lbs / 11.57 kg	35.7 lbs / 16.19 kg

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