

## OD10 10A Outdoor Solar Charge Controller

CHC-OD12-10

User's Manual

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# 1 INTRODUCTION

The WindyNation OD10 Solar Charge Controller provides an intelligent multifunctional charging and power management solution for the solar charging of 12 and 24-volt battery systems and is suitable for outdoor use.

The controller features an automatic 12V or 24V DC detect function that will identify the battery voltage upon initial battery connection and uses Pulse-Width Modulation (PWM) allowing for a highly efficient and battery-friendly charge control.

Built in protection includes overload, short circuit, reverse polarity, PV panel reverse current, over charging, and discharging protection. In the event of a short circuit or overload event, the system will be protected and remain undamaged.

**Read this manual carefully before installing or using the controller and keep it for future reference.**

## 1.1 FEATURES

- ✓ Compact size is easy to mount directly on the rear of the solar panel.
- ✓ Intelligent PWM Charging Mode
- ✓ Maintains batteries and extends battery life
- ✓ Auto sensing for 12V or 24V systems
- ✓ IP68 Rated Suitable for Outdoor Use
- ✓ Separate connections for PV panel, Battery, and Load
- ✓ Pre-wired MC4 connector for easy panel install
- ✓ Built-in overload and short circuit protection
- ✓ Automatic self-recovery after fault removal
- ✓ LED system status indicators

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- ✓ Preset Dusk to Dawn Load timer setting
- ✓ Wide operating temperature range -35°C to +60°C (-31°F to +140°F)

### 1.2 SAFETY INFORMATION

Please read the installation and operating instructions carefully prior to use. Pay special attention to the **IMPORTANT** and **WARNING** statements in the manual.

#### **WARNING:**

Never install during a lightning storm or where unsafe voltages are present.

Solar panels produce power when exposed to light. Shade solar panels whenever solar panel wires are exposed.

Do not use with equipment that exceeds the rated power for this device.

### 1.3 SPECIFICATIONS

#### 1.3.1 Electrical Specifications

Parameter	CHC-OD12-10
Rated Charge Current	10 Amps
Rated Load Current	10 Amps
Typical Idle Consumption	At idle < 10mA
Maximum Solar Input Voltage	41V DC
Battery System Voltage	12V DC or 24V DC (auto detected)
Battery Type	All Lead Acid including AGM and Flooded

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Float Charging Voltage	13.8V DC 27.6V DC
Bulk Charging Voltage	14.5V DC 29.0V DC
Absorption Charging Voltage	14.8V DC 29.6V DC
Low Voltage Protection	11.2V DC 22.4V DC
Low Voltage Recovery	12.6V DC 25.2V DC
Charge Voltage Drop	<200mV
Dusk/Dawn Voltage Sense	Solar Panel $\leq$ 8V DC (delay 10s on; 60s off)

### 1.3.2 Physical Specifications

Parameter	Value
Dimension (H x W x D)	3.23" (82mm) x 1.77" (45mm) x 0.83" (21mm)
Unit Weight	4.3 oz. (120g)
Operating Temperature	-31°F to 140°F (-35°C to 60°C)
Wire Size	16 AWG

## 2 INSTALLATION

- Insure all terminating connections are clean and tight to prevent arcing and overheating.

### 2.1 ELECTROSTATIC (ESD) PRECAUTIONS

All electronic circuits may be damaged by static electricity. To minimize the likelihood of electrostatic damage, discharge yourself by touching an electrical ground (e.g.: copper pipe) prior to handling the unit. The risk of electrostatic damage is highest when relative humidity is below 40%.

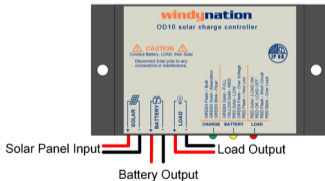
### 2.2 MOUNTING

Mounting is optional and the controller can be mounted vertical or horizontal on any flat surface. The controller includes a piece of double-sided tape so the controller can be mounted on the underside of the solar panel, inside the parameter of the frame

**IMPORTANT:** For best results, mount the charge controller and batteries as close to the panels as practical.

### 2.3 CONNECTIONS

**WARNING:** Loose connectors result in excessive voltage drop and may over heat wires, which can cause the wire insulation to melt. This can cause electrical fires. Verify all connections are secure and have no voltage drop.



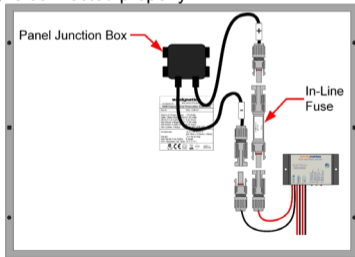
**IMPORTANT:** A 15-amp fuse needs to be placed in the positive wire connecting the charge controller to the battery and the positive wire connecting the charge controller to the solar panel (s).

### 1) Connect the Battery

Connect the charge controller to the battery BEFORE connecting the solar panels to the charge controller. The battery output wires can be terminated with lugs or alligator clips depending on the application. Be sure to note the polarity of each terminal; the charge controller self-protection feature will prevent damage from reverse polarity connections, but the charge controller will not function until the battery is connected properly.

### 2) Connect the Solar Panel (PV) Array

The controller solar wires are pre-terminated with MC4 connectors for an easy connection. Be sure to note the polarity of each terminal; the charge controller self-protection feature will prevent damage from reverse polarity connections, but the charge controller will not function until the PV Array is connected properly.



**WARNING:** High voltages may be present on the solar panel output wiring. Solar panels produce electricity when exposed to light. Make sure the solar panels are placed in the shade and are NOT in direct sunlight. Use caution and avoid touching any conductors in the system circuit to avoid electric shock.

### 3) Connect the Load (Optional)

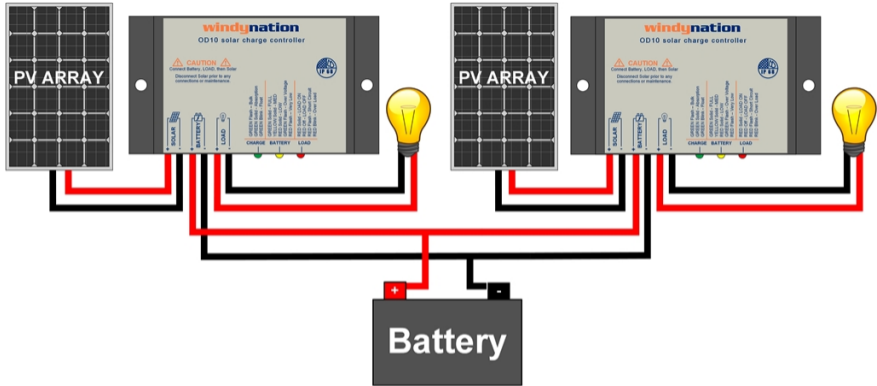
This step is optional and only required if you want to power a small (less than 10A) DC load through the charge controller. Connect the wires from the appliance to the LOAD wires from the charge controller and ensure a good connection is made. Be sure to note the polarity of each terminal; the charge controller self-protection feature will prevent damage from reverse polarity connections, but the charge controller will not function until the load is connected properly. **A 15-amp fuse needs to be placed in the positive wire connecting the charge controller to the load.**

## 2.4 PARALLEL CONNECTIONS

Multiple controllers can be installed in parallel on the same battery bank to achieve higher charging current. For example, connecting two units in parallel can allow for 20 amps of charging current, and connecting three units in parallel can allow for up to 30 amps of charging current.

Additional parallel controllers can also be added in the future, however, each Controller must have its own PV array as shown below.





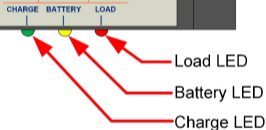
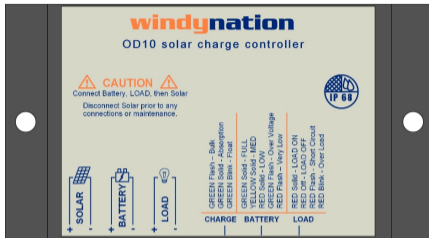
### 3 OPERATION

#### 3.1 POWER

Once properly connected to a battery and solar panel array, the charge controller will immediately begin operating.

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## 3.2 LED INDICATORS



LED	State	Description
Charge	OFF	No Charge (Night time)
	Slow Flash Green	Bulk Charging
	Solid Green	Absorption Charging
	Blinking Green	Float Charging

Battery	Solid Green	Battery level is full (100%)
	Solid Yellow	Battery level is medium (50%)
	Solid Red	Battery level is low (25%)
	Slow Flash Green	Battery over voltage
	Slow Flash Red	Battery is very low (10%)
Load	Solid Red	Load output is on
	OFF	Load output is off
	Flash Red	Load is short circuited
	Blinking Red	Load is over loaded

### 3.2.1 Charge LED

When the connected solar panel is exposed to sunlight, the Charge LED will be green, indicating that the system is charging normally. In some case, the Charge LED will be green during non-sunlight hours. This because the solar panels are picking up ambient light (street lights, moon light, etc.).

The Charge LED will flash green during the various charging stages. PWM mode is used during charging. If an over-discharge of the battery has occurred, the charger will switch to boost voltage for 10 minutes, then will return to direct voltage for at least 10 minutes to activate the battery, and finally to the float voltage state where it will remain to maintain the best state of the battery. This multistep charging process will help bring the battery to full charge and maximize life span.

### 3.2.2 Battery LED

The Battery LED is green when the battery voltage is full, yellow when the voltage of the battery is around 50% charge, and red when it is about 25%.

When battery voltage goes down continuously into an over-discharge condition, the Battery LED will flash red and the Load output will switch off.

The system will automatically resume normal operation and switch on the load output and when the battery voltage recovers to the over-discharge return voltage.

### 3.2.3 Load LED

The load LED is red when the load output is on and operating normally.

If the load current is 1.25 times higher than the rated current of the controller for 60 seconds or 1.5 times higher than the rated current for 5 seconds, then the controller will shut down the output and the Load LED will blink red slowly to indicate that an overload condition occurred.

To resume normal operation, disconnect the load at fault. The charge controller will resume normal operation after 30 seconds.

The Load LED will flash red rapidly to indicate that a short circuit condition occurred. If a load short circuit occurs, the controller will shut down the output. If this happens, verify load connections. To resume normal operation, remove the short circuit at the load. The charge controller will resume normal operation after 30 seconds.

## 3.3 LOAD TIMER MODE

The charge controller has a timer mode function that is preset at the factory for dusk to dawn operation. The load will start working when it gets dark until it gets light. There is a 10-minute delay before turning on the load in order to make sure it is really dark and not a passing cloud etc.

## 4 TROUBLESHOOTING AND SUPPORT

The Controller requires minimal care. It is recommended to inspect all the connections at least two times per year for insulation damage or corrosion and to ensure all connections are tight and secure.

### 4.1 MAINTENANCE & CARE

- Clean the area around the controller of any dirt or debris with a cloth.
- Tighten the screws on the terminals. Inspect for loose, broken, or burnt wire connections.
- Inspect batteries for cracked or bulging cases and corroded terminals.
- Make sure the PV array is clean and remove any debris.

### 4.2 TROUBLESHOOTING

Problem	Possible Remedies
The charge LED indicator doesn't light green when the solar panel is exposed to sunlight.	<ol style="list-style-type: none"> <li>1. Check if the solar panel cables are connected properly.</li> <li>2. Check to make sure the battery is charged to at least 11VDC.</li> <li>3. Check all wiring connections to make sure they are in their designated locations and make sure that there are no loose connections.</li> <li>4. Measure the PV array open-circuit voltage and confirm it is within its normal limits.</li> </ol>
The load LED indicator is on but there is no power output.	<ol style="list-style-type: none"> <li>1. Load open circuit.</li> <li>2. Check cables and connections and any other load switches.</li> <li>3. Over discharge of the battery. The controller will resume normal operation after the battery has finished charging.</li> </ol>

The load LED indicator light flashes and there is no power output.	Check the output circuit for load short circuit or over load condition
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### 4.3 SUPPORT

If you are experiencing technical problems, and cannot find a solution in this manual, you can contact Windy Nation Inc. for further assistance.

- Call: (805) 323-6445
- Email: [support@windynation.com](mailto:support@windynation.com)
- Write: 1404 Fleet Ave, Ventura, CA 93003

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