

## 30A Flush Mount LCD PWM Solar Charge Controller

CHC-LCD-30FM

### User's Manual

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# 1 INTRODUCTION

The WindyNation 30FM Flush Mount Solar Charge Controller provides an intelligent multifunctional charging and power management solution for the solar charging of 12 and 24 volt battery systems. Operation is conveniently presented and parameters are controlled via a customized LCD display screen interface.

The controller features an automatic 12V or 24V DC auto-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. An external temperature sensor provides software controlled charge compensation that accurately adjusts the over-discharge and over-charge voltages to maximize your batteries' life.

Built in protection includes overload, short circuit, reverse polarity, lightning/surge, 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.

The enclosure is designed to be flush mounted into a cut-out of the wall of an RV, boat, or any indoor structure leaving the wires out of sight and providing an aesthetically appealing look. The front panel will remain accessible with visual LCD graphic symbols to provide status indications of charge, battery status, and system faults.

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

## 1.1 FEATURES

- ✓ Visual LCD display
- ✓ Intelligent 4-Stage PWM Charging (Bulk, Boost, Float, and Equalization)
- ✓ Automatic battery charging temperature compensation
- ✓ User settable charging parameters offering full control to user
- ✓ User settable working mode of load connection
- ✓ User selectable battery type
- ✓ Accumulative function of charging & discharging AH
- ✓ Protection for battery bank discharging
- ✓ Protection for battery low voltage
- ✓ Battery reverse polarity protection
- ✓ Delayed auto restart after overloading protection
- ✓ Negative Ground
- ✓ Rear mounted screw terminals for clean wiring
- ✓ Built-in overload and short circuit protection
- ✓ Wide operating temperature range -10°C to +60°C (14°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:**

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	P30LF
Rated Charge Current	30 Amps
Rated Load Current	30 Amps
Typical Idle Consumption	At idle < 5mA
Maximum Solar Input Voltage	55V DC
Rated Working Voltage	12V DC or 24V DC (auto-detect)

Boost Charging Voltage (adjustable)	14.0V-15.0V DC / 28.0V-30.0V DC Default: 14.5V
Float Charging Voltage (adjustable)	13.0V-13.8V DC / 26.0V-27.6V DC Default: 13.7V
Equalization Charging Voltage (adjustable)	14.0V-15.5V DC / 28.0V-31.0V DC Default: 15.0V
Low Voltage Protection (adjustable)	11.0V-12.5V DC / 22.0V-25.0V DC Default: 11.1V
Low Voltage Recovery (adjustable)	11.8V-13.3V DC / 23.6V-26.6V DC Default: 12.6V
No Load Loss	≤15mA
Loop Voltage Drop	≤170mV
Temperature Compensation	-3.33 mV/Cell/C (Float); -4.17 mV/Cell/C (Boost, Equal)

**1.3.2 Physical Specifications**

Parameter	Value
Dimension (H x W x D)	4.56" (116mm) x 6.63" (168mm) x 1.33" (34mm)
Unit Weight	9.5 oz. (270g)
Operating Temperature	14°F to 140°F (-10°C to 60°C)
Operating Humidity	≤90% relative humidity (non-condensing)
Wire Size	Up to 25mm <sup>2</sup> (6AWG)
Case Protection Rating	IP32

**2 INSTALLATION**

- Insure all terminating connections are clean and tight to prevent arcing and overheating.
- The controller must be installed in an area that satisfies all of the following conditions:
  1. Dry: Avoid any location where water can contact the controller
  2. Cool: Ambient air temperature between 30°F and 105°F (0°C and 40°C)
  3. Ventilated: Allow at least 4 in (10 cm) of clearance above and below and at least 1 in (25 mm) on each side for proper air flow.

**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 and avoid touching components on the circuit boards. The risk of electrostatic damage is highest when relative humidity is below 40%.

**2.2 MOUNTING**

The P30LF is designed to be flush mounted in the required cut-out of a flat surface (eg wall), where the wire connections will be made from the back side of the controller and out of visible sight. If the back side of the controller is not accessible when mounted, it is important to make all the connections prior to securing the controller to the wall

1. Select Mounting Location
  - Dry, well ventilated, and away from any heat sources.
  - Suitable to run the necessary wire connections
    - From solar panel(s)
    - To battery
    - To any loads that will be connected through the controller.
  - No more than 1.25" thick and able to be cut out
  - At least 3" clearance from the front of the surface for wire connections
2. Cut rectangular hole for controller using template locations in Section 6
3. Drill four pilot holes using the template from Section 6
  - The drill hole size will depend on the fastener being used

**IMPORTANT:** If the wires are not accessible from the rear of the mounting surface, you will need to make the connections in Section 2.3 prior to mounting the controller.

4. Place the controller into the cut-out made in step 2

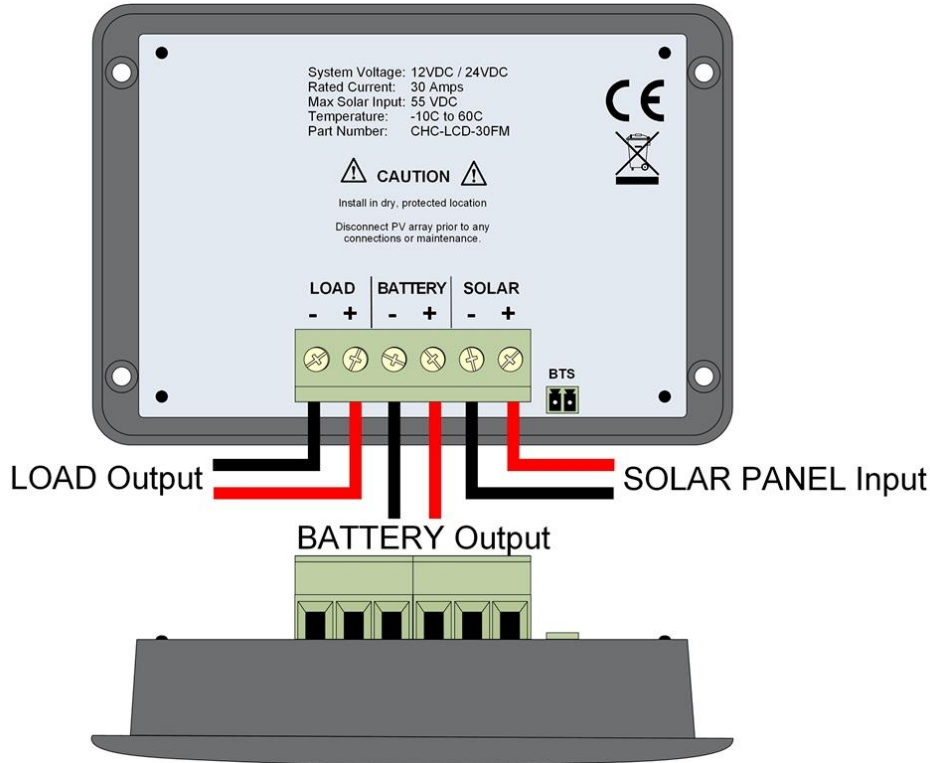
5. Install four user-supplied fasteners through the four mounting holes in the controller and into the mounting surface.
6. Tighten all the fasteners to ensure the controller cannot slide in any direction.

**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:** The NEC requires that the wires carrying the system current never exceed 80% of the conductor's current rating (sizing recommendations are located in Section 4).



**IMPORTANT:** The screw-down terminals on the charge controller accept 6~26AWG wire.

**IMPORTANT:** Strip the wire ends approximately 0.3" (7.6mm) before connecting to the charge controller. Use caution when handling the stripped wires to avoid electric shock.

#### 1) Connect the Battery

Connect the charge controller to the battery BEFORE connecting the solar panels to the charge controller. Insert the battery wiring into the BATTERY terminals on the back of the charge controller and tighten the terminals from the top of the terminal block using a screwdriver to 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 battery is connected properly.

A 30-amp fuse is recommended in the positive wire connecting the charge controller to the battery; See Section 3.5 for a complete fusing diagram.

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

Insert the solar panel wiring to the SOLAR terminals on the back of the charge controller and tighten the terminals from the top of the terminal block using a screwdriver to 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 PV Array is connected properly.

A 30 amp MC4 in-line fuse is recommended in the positive wire connecting the charge controller to the solar panel(s); See Section 3.5 for a complete fusing diagram.

**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)

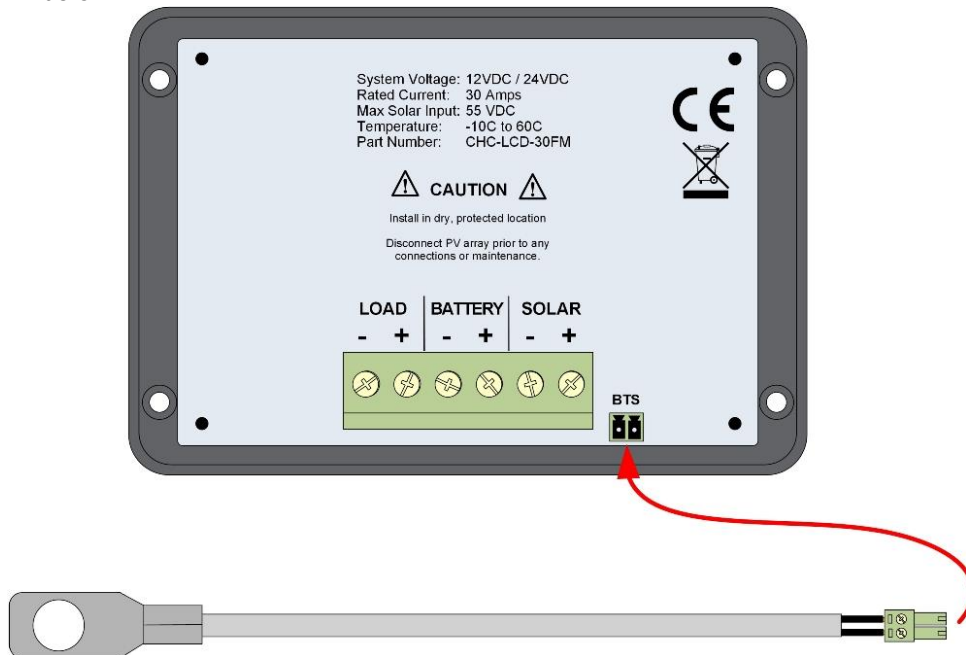
This step is optional and only required if you want to power a small (less than 30A) DC load through the charge controller. Connect the wires from the appliance to the LOAD terminals on the back of the charge controller and tighten the terminals from the top of the terminal block using a screwdriver to 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 load will not function until the load is connected properly.

A 30-amp fuse needs to be placed in the positive wire connecting the charge controller to the load; See Section 3.5 for a complete fusing diagram.

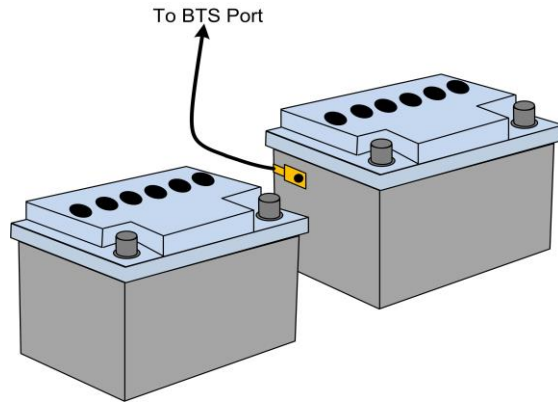
### 4) Connect the Battery Temperature Sensor – BTS (Optional)

The charge voltage required by batteries changes with battery temperature. Temperature compensation of the charge voltage enhances battery performance and life, and decreases battery maintenance. Automatic temperature compensation can be provided through use of the optional battery temperature sensor (included). The Temperature compensation is  $-3.33 \text{ mV/Cell/}^\circ\text{C}$ .

- 1) Plug the provided BTS cable into the socket labeled “BTS” located on the back of the controller as shown below.



- 2) Secure the ring terminal on the BTS directly to any side of the battery to be monitored, below the electrolyte level as shown below. When multiple batteries are used, it is best to place the sensor between batteries and place the batteries in an insulated box to reduce the influence of the ambient temperature outside the battery enclosure.

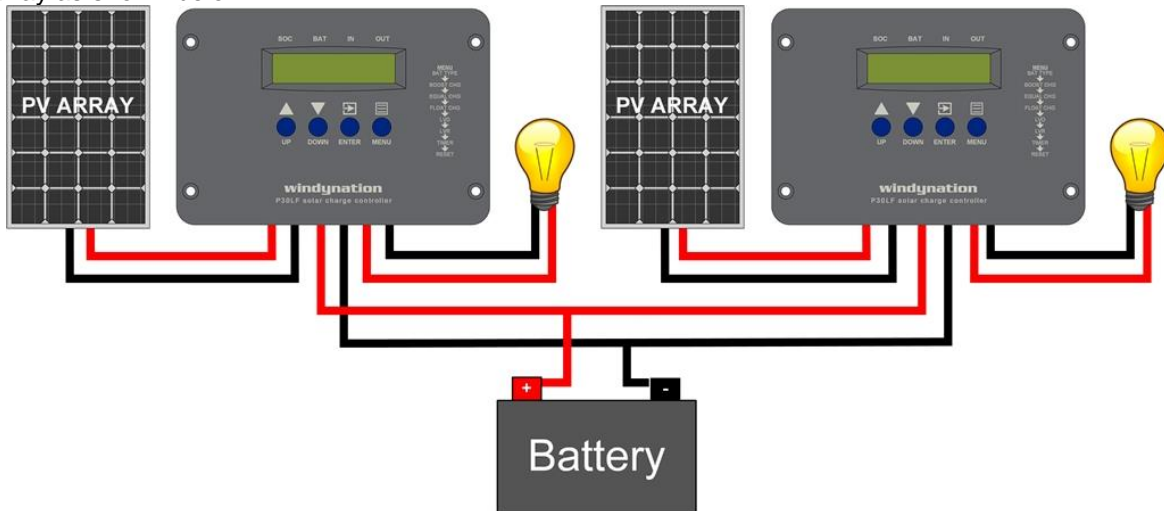


**CAUTION:** High power electrical systems pose dangers and it is the user's responsibility to be familiar with these dangers and take any necessary action to ensure safe use. Shorting a battery or connecting your controller to a battery can supply huge currents and have serious consequences including explosions, causing fire damage to equipment, and personal injury including death.

### 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 60 amps of charging current, and connecting three units in parallel can allow for up to 90 amps of charging current.

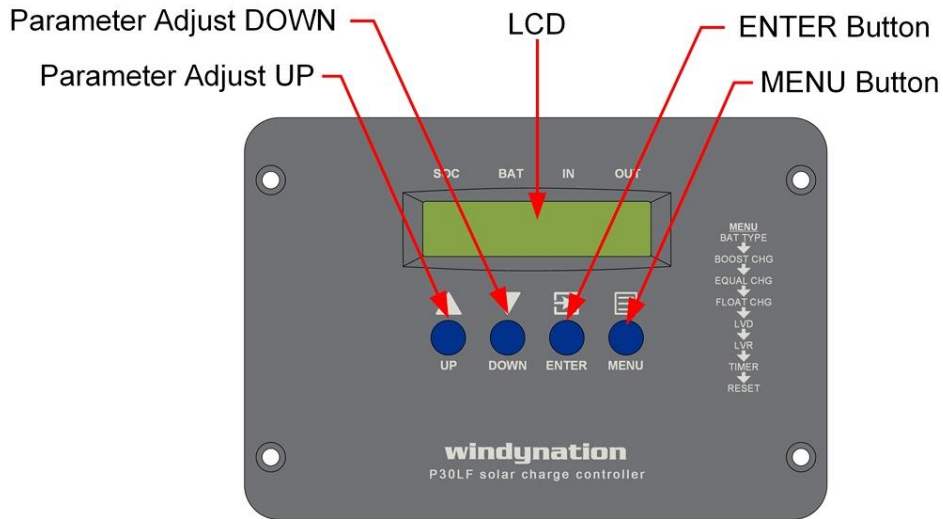
Additional parallel controllers can also be added in the future, however, each Controller must have its own PV array as shown below.



## 3 OPERATION

Once the controller is properly connected, the main display interface will appear in the LCD and the current battery State of Charge (SOC), the battery voltage, and the current generated and consumed will be displayed.

Press the **MENU** button to cycle through the eight different configurable interfaces available on the P30LF controller. The cycle pattern of the interfaces is presented in Section 3.3 and the definition of each interface is presented in Section 3.4.



### 3.1 BUTTON DEFINITIONS

Button	Name	Description
	MENU	Toggles the active LCD interface to enter the edit menu as defined in Sec 3.3
	ENTER	Accept or confirmation of parameter selections.
	UP / DOWN	UP: Positive (+) parameter adjustments DOWN: Negative (-) parameter adjustments.

### 3.2 LCD DISPLAY

The controller features a two-line display to provide a snap shot of the system. This information is only displayed while the controller is in normal operating mode

Parameter	Description
SOC	State of Charge: Battery Capacity presented as a percentage* *NOTE: Display will never show 100% due to character limitations
BAT	Battery: Actual Battery Voltage
IN	Input current to the battery from the controller*; i.e.: the current being generated by the solar panels (displayed in Amp Hours). *NOTE: Amount of current sent to battery depends on battery State of Charge (SOC)
OUT	Output current from the controller to the load; i.e.: the current being consumed by the load (displayed in Amp Hours)

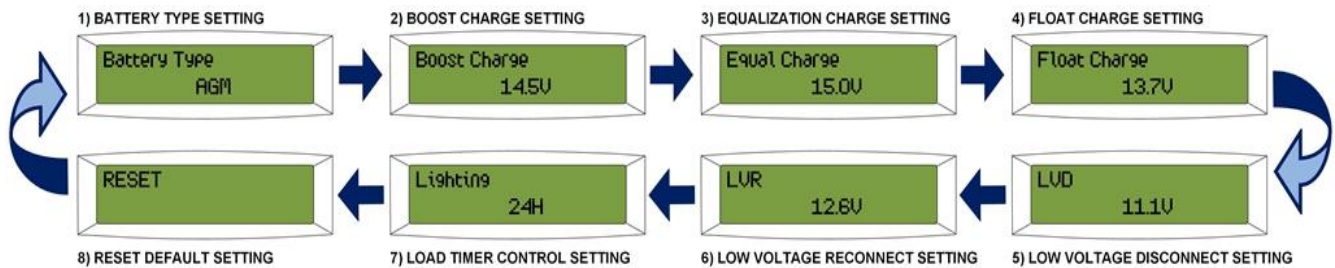
**NOTE: IN / OUT Range is 0 – 999kAh and can be reset to “0” by removing battery power**

Second Display Line	
Cycles between charging stage / status and BTS temperature readings	
Parameter	Description



<b>Bulk Charging</b>	Controller will provide the battery as much of constant current as it will accept (up to 30 amps) as voltage increases.
<b>Boost Charging</b>	Also referred to as Absorption stage, the controller will hold the voltage at the Boost set point, decreasing the current until the battery is fully charged.
<b>Float Charging</b>	Voltage is reduced to controller set point and held constant, while the current is reduced to less than 1% of battery capacity. This mode can be used to maintain a fully charged battery indefinitely
<b>Equal Charging</b>	Controlled over charge where the voltage is brought up above typical peak charging voltage into the gassing stage, and held for a fixed period, "equalizing" the electrolyte, removing loose sulphation that may be on the battery plates
<b>No Charging</b>	Battery is charged or there is no charge to transfer to battery
<b>Temp</b>	Displays the measured temperature* from the BTS *NOTE: Temperature is displayed in Celsius and Fahrenheit
<b>Error Condition</b>	The Controller will display various Error Conditions; See Section 3.6 for details

**3.3 LCD MENU INTERFACE CYCLE**



**3.4 MENU INTERFACE DEFINITIONS**

The P30LF has eight different user menu interfaces to provision the controller accessible by pressing the **MENU** button on the front panel of the controller. Once the **MENU** button is pressed, you can use the **UP** and **DOWN** buttons to navigate to the desired parameter. Once visible, press **ENTER** to adjust the parameter.

**3.4.1 Battery Type Setting**

In this menu, you may select the battery type you are using.



By pressing the **UP** and **DOWN** button from this interface, you can select from the following: AGM, Flooded, Gel; *Default: AGM.*

**3.4.2 Boost Charge Setting**

The value displayed is the Boost Charge Parameter and should be set per your battery manufacturer's recommendations.



By pressing the **UP** and **DOWN** button from this interface, you can set the value to 14.0~15.0V / 28.0~30.0V; *Default: 14.5V/29.0V.*

**3.4.3 Equalization Charge Setting**

The value displayed is the Equalization Charge Parameter and should be set per your battery manufacturer's recommendations. The Equalization Charge Setting is NOT available if you have selected Battery Type "Gel"

and will only be performed if the battery voltage is allowed to get to below 40% SOC (~12.1V) and will last for approximately two hours.



By pressing the **UP** and **DOWN** button from this interface, you can set the value to 14.0~15.5V / 28.0~31.0V;  
*Default: 15.0V/30.0V.*

**IMPORTANT:** Check the battery manufacturer's data sheet for maximum equalizing voltage.

**WARNING:** The battery charging voltage is passed to the loads by the solar charge controller. Therefore, during equalization charging, high charging voltages may damage some loads. Please select the equalization charge voltage very carefully and be sure the voltage will not damage any loads that are being powered through the controller's load terminals.

#### **3.4.4 Float Charge Setting**

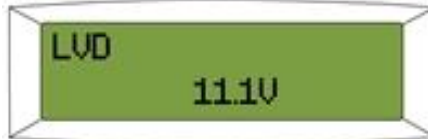
The value displayed is the Float Charge Parameter and should be set per your battery manufacturer's recommendations.



By pressing the **UP** and **DOWN** button from this interface, you can set the value to 13.0~13.8V / 26.0~27.6V;  
*Default: 13.7V/27.4V.*

#### **3.4.5 Low Voltage Disconnect (LVD) Setting**

The value displayed in this interface is the Low Voltage Disconnect protection voltage set for the controller. If the battery voltage is lower than the set protection voltage, the controller will automatically disconnect the load to prevent the battery from over-discharging.

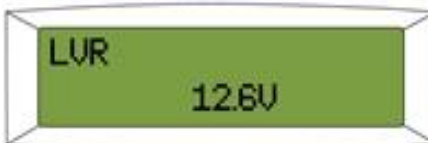


By pressing the **UP** and **DOWN** button from this interface, you can set the value to 11.0~12.5V / 22.0~25.0V;  
*Default: 11.1V/22.2V.*

**IMPORTANT:** The smallest difference between LVD and LVR allowed is 0.8V/1.6V. Be sure to first increase the LVR level for higher LVD levels.

#### **3.4.6 Low Voltage Reconnect (LVR) Setting**

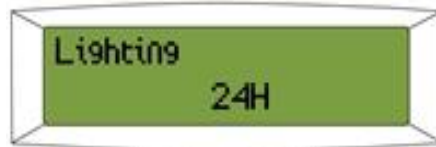
The value displayed in this interface is the Low Voltage Reconnect voltage set for the controller. After the controller enters into a low voltage protection state (Section 3.5.1), and the battery voltage recovers to the value set for the Low Voltage Reconnect, the controller will reconnect the load automatically.



By pressing the **UP** and **DOWN** button from this interface, you can set the value to 11.8~13.3V / 23.6~26.6V;  
*Default: 12.6V/25.2V.*

#### **3.4.7 Load Timed Control Setting**

The P30LF charge controller has a mode setting function to set specific operation parameters. It is preset to the factory default of normal control (24 hours). In 'Normal' mode, the load will draw from the battery at all times, and the PV panel will charge the battery when sunlight is available. It is also possible to have the load remain on for a set duration, and when that set time period has elapsed, the load will switch off. The duration setting is available in increments of 1 hour and 1 through 15 hour delays can be selected.



By pressing the **UP** and **DOWN** button from this interface, you can set the value as follows:

Value	Mode	Function
24h	Normal (Default)	Load is supplied continuous power.
1h – 15h	Timed Control	Load is supplied power at nighttime and continues working for the specified duration (in hours). For example, if the Load Control Value is set to 2h, then the load will be turned on at night time and remain on for a period of 2 hours.
0h	Light Control	Load starts to supply power after dark and stops at dawn (sunrise).

**IMPORTANT:** 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.

**3.4.8 RESET Default Setting**

By entering this mode, you can reset the controller to its default settings.

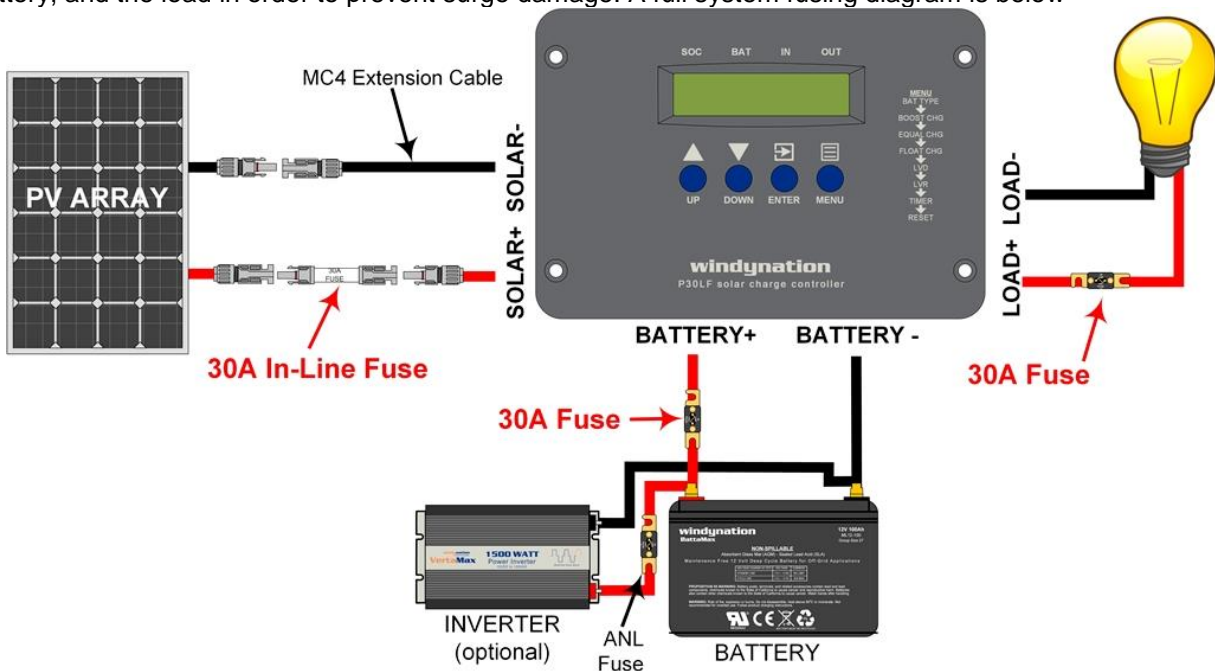


By pressing the **UP** and **DOWN** button from this interface, you can select [Yes] and then press **ENTER** to reset the controller.

**IMPORTANT:** All Settings and values are reset when this action is executed and confirmed by **“DONE”**.

**3.5 PROTECTION FEATURES**

The P30LF has several built-in protection features, but as stated in the Connection Section of the manual, external fuse are strongly recommended in the positive lines between the controller and the panel array, the battery, and the load in order to prevent surge damage. A full system fusing diagram is below



**3.5.1 Electronic Short Circuit Safety**

An electronic short circuit safety device is built into the solar charge controller and prevents both destruction of the solar charge controller and the blowing of the safety fuse in case of short circuits on the load terminals. The second line of the LCD display indicates this error as "**Short circuit**". After elimination of this fault, the solar charge controller automatically switches back to normal operation after about 60 seconds.

**3.5.2 Internal Safety Fuses**

In addition to the short circuit safety, the solar charge controller has also been protected by regular fuses which have been rated far beyond nominal currents to prevent false blowing of the fuses during surges. The safety fuses are wired in parallel so before the fuses blow, the short circuit safety should prevent any excessive current flow.

**3.5.3 Safety Per Terminal**

FAULT	SOLAR Terminal	BATTERY Terminal	LOAD Terminal
Reverse Polarity	Protected <sup>1</sup>	Protected <sup>1</sup>	Protected <sup>2</sup>
Short Circuit	Protected	Protected <sup>3</sup>	Protected
Over Current	-	-	See Section 3.5.5
Reverse Current	Protected	-	-
Over Voltage	Max. 55V <sup>4</sup>	Max. 40V	-
Low Voltage	-	-	See Section 3.5.4
Over Temp	switches off the load if the temperature reaches max value		

<sup>1</sup> Controller cannot protect itself in a 24V system when polarity of battery or solar is reversed.

<sup>2</sup> Controller can protect itself, but loads might be damaged.

<sup>3</sup> Battery must be protected by fuse, or battery will be permanently damaged.

<sup>4</sup> The solar panel voltage cannot exceed this limit for more than a few seconds

**Warning:** The combination of different error conditions may cause damage to the controller. Always remove the error before you continue connecting the controller.

**3.5.4 Low Voltage Protection**

If the battery voltage is lower than the protection voltage (Section 3.4.5), the controller will enter the low voltage protection state and the load will be disconnected. The use of solar panels or an alternate charger is required to charge the battery to the recovery level (Section 3.4.6). The controller will enter into the normal working state and power will be supplied to the load once the battery voltage exceeds the Low Voltage Protection voltage.

**3.5.5 Overload Protection**

If the Load is drawing a current 1.2 times the rated current of the controller for three (3) seconds or more, the controller will enter into an Overload Protection State. When in this state, any loads applied will need to be removed one by one until power is again supplied to the loads. The controller will supply power to the loads automatically within seconds of being within an acceptable level. However, if the load is not at an acceptable level, the controller will go back into the protection state.

**3.6 ERROR CONDITIONS**

The solar charge controller is protected against damage by various measures. Nevertheless, always take utmost care in the proper operation of the solar charge controller. Short hints of the malfunctions are indicated with the help of the LCD display. However, errors are only properly indicated in which the system has been properly installed. If there are other malfunctions than the ones described below, please check first if the solar charge controller has been connected to the battery, the module and the loads are connected in the right polarity. Afterwards, check the safety fuses.

Error	Problem	Possible Remedies
Short Circuit	Short circuit	Remove all loads and reconnect smaller loads until the output is restored and error cleared
Over Current	Load current exceeds current limits.	
Low Voltage	Battery has low charge. All loads powered by the solar charge controller will be disconnected.	<ul style="list-style-type: none"> <li>• Reduce loads so battery is not discharged deeply</li> <li>• Increase solar array or battery capacity.</li> <li>• Connect loads through the controller so discharge is cut-off before battery is discharged</li> </ul>

Over Heat	The maximum allowable temperature has been exceeded.	<ul style="list-style-type: none"> <li>• Check ventilation at rear of controller</li> <li>• Protect the controller from direct sunshine.</li> <li>• Reduce heat near the controller.</li> <li>• Allow controller to cool to restore LOAD power</li> </ul>
Over Voltage	Battery voltage exceeds target charging voltage.	Disconnect charger(s) until battery voltage is lower than target charging voltage.

## 4 APPLICATION

### 4.1 WIRE GAUGE REFERENCE

#### 4.1.1 Wire Thickness

AWG	Diameter inches (mm)	Ohms per 1000ft	Break Force	Square mm2
16	0.051 (1.29)	4.016	75 lbs	1.30
14	0.064 (1.63)	2.525	119 lbs	2.08
12	0.081 (2.05)	1.588	197 lbs	3.30
10	0.102 (2.59)	0.999	314 lbs	5.26
8	0.129 (3.26)	0.628	480 lbs	8.30
6	0.162 (4.11)	0.395	760 lbs	13.30
4	0.204 (5.19)	0.249	1210 lbs	21.15
2	0.258 (6.54)	0.156	1930 lbs	33.62
1	0.289 (7.35)	0.124	2430 lbs	42.41
0 (1/0)	0.325 (8.25)	0.098	3060 lbs	53.49
00 (2/0)	0.365 (9.27)	0.078	3860 lbs	67.43
000 (3/0)	0.410 (10.4)	0.062	4860 lbs	85.01
0000 (4/0)	0.460 (11.68)	0.049	6120 lbs	107.22

## 5 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.

### 5.1 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.

### 5.2 TROUBLESHOOTING

Problem	Possible Remedies
LCD indicator never enters charging cycle.	<ol style="list-style-type: none"> <li>1. Check if the solar panel cables are connected properly.</li> <li>2. Check all wiring connections to make sure they are in their designated locations and make sure that there are no loose connections.</li> <li>3. Measure the PV array open-circuit voltage and confirm normal limits.</li> <li>4. Measure the PV voltage and the battery voltage at the controller terminals.               <ol style="list-style-type: none"> <li>a. If voltage at terminals is within specifications, PV array is charging battery.</li> <li>b. If the PV voltage is within specifications to the open circuit voltage rating of the panels, but the battery voltage is low, the charge controller may not be charging the battery and it may be damaged.</li> </ol> </li> </ol>

No Display on LCD	<ol style="list-style-type: none"> <li>1. Check the battery voltage on the battery terminals of controller to ensure at least 9VDC is present</li> <li>2. Reset controller by removing battery power for ~1 minute and reconnecting</li> </ol>
The 'LOAD ON' 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>

### 5.3 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

For challenging issues or to just ask a question, consider using our FREE Community Forums! Consult our community of DIY'ers for fast answers to all your questions.

Post on our Forums: <http://www.windynation.com/community/>

### 5.4 WARRANTY

Windy Nation warrants that the Power Controller (the "Product"), will be free from manufacturing defects in materials and workmanship under normal authorized use consistent with product instructions for a period of one (1) year from the date the original purchaser ("Customer") receives the Product (the "Warranty Period"). This warranty extends only to the original purchaser. The Customer's sole and exclusive remedy and the entire liability of Windy Nation, its suppliers and affiliates for breach of the warranty is, at Windy Nation's option, either (i) to replace the Product (or defective component part(s)) with a new or reconditioned Product (or component part(s)); (ii) to repair the reported problem; or (iii) to refund the purchase price of the Product. Repaired or replaced products are warranted for the remainder of the original warranty period only. No employee, agent, dealer or other person is authorized to give any warranties on behalf of Windy Nation not expressly set forth in this limited warranty.

#### 5.4.1 Restrictions

No warranty will apply if the Product (i) has been altered or modified except by Windy Nation; (ii) has not been installed, operated, repaired, or maintained in accordance with instructions supplied by Windy Nation; (iii) has been subjected to abnormal physical, thermal or electrical stress, misuse, negligence, or accident. If Windy Nation determines that the problem with the Product is not due to a manufacturing defect in Windy Nation's workmanship or materials, or otherwise does not qualify for warranty repair, then the Customer will be responsible for the costs of all necessary repairs and expenses incurred by Windy Nation.

#### 5.4.2 Warranty Claims & Return Procedures

To be eligible for service under this warranty, the Customer must submit a service request within the Warranty Period by contacting Windy Nation in writing or via telephone and obtaining a Returned Materials Authorization ("RMA") number. This RMA must be obtained before returning any product under this warranty. Notification must include a description of the alleged defect, the manner in which the Product was used, the serial number (if applicable), and the original purchase date in addition to the name, address, and telephone number of the Customer. Within five (5) business days of the date of notification, Windy Nation will provide the Customer with an RMA number and the location to which the Customer must return the defective Product. Any Product returned for warranty service shall be shipped at the expense and risk of the Customer. The Customer must return the entire Product kit (or, if authorized by Windy Nation, the defective component parts), within fifteen (15) days after issuance of the RMA number. Windy Nation will be under no obligation to accept any returned Product that does not have a valid RMA number. Customer's failure to return the Product within fifteen (15) days of its receipt of an RMA number may result in cancellation of the

RMA. All parts that Windy Nation replaces shall become Windy Nation's property on the date Windy Nation ships the repaired Product or part back to the Customer. Windy Nation will use all reasonable efforts within thirty (30) days of receipt of the defective Product to repair or replace such Product. If a warranty claim is invalid for any reason, the Customer will be charged at Windy Nation's then-current rates for services performed and will be charged for all necessary repairs and expense incurred by Windy Nation. If Windy Nation determines that a warranty claim is valid, it will ship the repaired or replaced Product to Customer at Windy Nation's cost.

#### **5.4.3 Disclaimer**

EXCEPT FOR THE EXPRESS LIMITED WARRANTY SET FORTH IN THE PREVIOUS PARAGRAPH, WINDY NATION DISCLAIMS ALL WARRANTIES, EXPRESS, IMPLIED AND STATUTORY INCLUDING, WITHOUT LIMITATION, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE WITH RESPECT TO ANY PRODUCTS PROVIDED BY WINDY NATION. NO ORAL OR WRITTEN INFORMATION OR ADVICE GIVEN BY WINDY NATION, ITS DEALERS, DISTRIBUTORS, AGENTS OR EMPLOYEES SHALL IN ANY WAY INCREASE THE SCOPE OF THIS WARRANTY. WINDY NATION DOES NOT WARRANT THAT THE QUALITY OR PERFORMANCE OF THE PRODUCTS WILL MEET YOUR REQUIREMENTS OR THAT YOU WILL BE ABLE TO ACHIEVE ANY PARTICULAR RESULTS FROM USE OR MODIFICATION OF THE PRODUCTS.

Some jurisdictions do not allow the limitation or exclusion of implied warranties or how long an implied warranty may last, so the above limitations may not apply to you. In any such jurisdiction, the warranty shall be limited to the minimum warranty and period required by law.

WINDY NATION EXPRESSLY DISCLAIMS ALL LIABILITY FOR BODILY INJURIES OR DEATH THAT MAY OCCUR, DIRECTLY OR INDIRECTLY, BY USE OF THE PRODUCT BY ANY PERSON.

#### **5.4.4 Limitation of Liability**

UNDER NO CIRCUMSTANCES WILL WINDY NATION OR ITS AFFILIATES OR SUPPLIERS BE LIABLE OR RESPONSIBLE FOR ANY LOSS OF USE, INTERRUPTION OF BUSINESS, LOST PROFITS, LOST DATA, OR INDIRECT, SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES OF ANY KIND REGARDLESS OF THE FORM OF ACTION, WHETHER IN CONTRACT, TORT (INCLUDING NEGLIGENCE), STRICT LIABILITY OR OTHERWISE, EVEN IF WINDY NATION OR ITS AFFILIATE OR SUPPLIER HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.

Some states do not allow the exclusion or limitation of incidental or consequential damages, so these limitations may not apply to you. Neither Windy Nation nor its affiliates or suppliers will be held liable or responsible for any damage or loss to any items or products connected to, powered by or otherwise attached to the Product. The total cumulative liability to Customer, from all causes of action and all theories of liability, will be limited to and will not exceed the purchase price of the Product paid by Customer. This warranty gives the Customer specific legal rights and the Customer may also have other legal rights that vary from state to state.

## 6 MOUNTING TEMPLATE

