

# **USER MANUAL**

# LCWS-B

# Boost and Buck Wind Solar Hybrid



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# **Safety Caution**

1. Thank you for purchasing our controller. Before you install and use the product, please carefully read the User's Manual and properly keep it.

2. The controller shall be installed by an experienced technician in strict accordance with the User's Manual, to guarantee that it can work normally.

3. Keep the product free of contact with corrosive gas and humid environment for a long time.

4. Be sure not to place the product at a place where it is exposed to humidity, rain, sun, severe dust, vibration, corrosion, or strong electromagnetic interference.

5. Please don't open the product's casing to repair it by yourself.

#### I Product Overview

1.1 PWM charging ways, voltage limited and current limited charging pattern, which can effectively prolong the storage batteries' service life;

1.2 The controller is provided with an accurate rotating speed measuring and controlling module, can control the fan speeds precisely.

1.3 Two 10A DC output channels, three output control modes for each DC output: \*constant on; \* light-control on, light-control off \*light-control on and time-control off.

1.4 MPPT function, with innovative maximum-power point-tracking technology, this controller can greatly improve the charging efficiency by more than two times at maximum compared with traditional controllers.

1.5 The controller is provided with a customized LCD display, so the user can easily check and set the status of controller via the human-computer interaction interface.

You can view the project there: battery voltage, battery current, battery power, fan speed, fan voltage, fan current, fan power, channel 1 output mode and it's on/off time; Channel 2 output mode and it's on/off time, light control on-off voltage points, day or night indicator, battery charge status, load status, as well as over-voltage, under voltage, overload, short-circuit fault condition.

The project can be set: Channel 1 output mode and it's on/off time points; Channel 2 output mode and it's on/off time, voltage points for light control on and off.

1.6 Unique solar charging circuit, low loss, low heat. Open way to unload, effectively extending the life of the solar battery.

1.7 Complete safety protection functions, including:

- solar cell reverse charging prevention protection
- solar cell reverse connection prevention protection
- solar cell current-limiting protection
- storage battery over-charging, over-discharging protection
- storage battery open-circuit protection
- storage battery reverse connection prevention protection
- overload, short-circuit protection
- lightning protection
- wind generator current-limiting protection
- wind generator over-speed protection
- automatic and manual brake protection of wind generator
- controller temperature monitoring, over-heat protection
- load over-voltage protection

*XNote: Except for storage battery reverse connection prevention protection, other protections above won't damage the components.*1.8 High-quality aluminum alloy case, good heat dissipation performance.

1.9 Quality industrial grade components, strict manufacturing process, in the cold, hot, humid environment for a long time reliable operation.

#### II Description of Model

#### LOWO DA DO.



Output terminal connection diagram of LCWS-Bx wind-solar hybrid controller with double-channel standard configuration



Output terminal connection diagram of LCWS-Bx wind-solar hybrid controller with single-channel dimming signal (optional)





After the parts of wind-solar hybrid generator system and photovoltaic panel are installed and external circuit construction is completed, it is required to connect and operate the system parts safely and reliably according to the following sequence.

1) Open the package to confirm that the equipment is not damaged in transportation.

2) Connect the DC load to DC OUTPUT terminal. The loads of two channels share the same anode. Connect the first-channel load to "+"and"-1" of DC OUTPUT, and the second-channel load to "+"and"-2" of DC OUTPUT.

3) Connect the storage battery to the BATTERY terminal of back panel of equipment with the cable with copper conductor of 6mm2 and above.



A reverse connection between anode and cathode of the storage batteries is forbidden, in order to avoid damaging components.

4) When wind generator is under static or low-speed running status (no wind), connect the wind generator output line to the WIND INPUT terminal of back panel of equipment.

5) Shield and then connect the solar cell panel to the SOLAR INPUT terminal of back panel of equipment according to anode and cathode.

6) Set corresponding parameters to select the load output mode via the keys on the controller's LCD.

### IV. LCD Operation and Display Instructions



Diagram of panel keys

### 4.1 Description of keys

Symbol	Function description
	Add or display the next value: if under browsing status, press it to switch to next parameter
	display; if under setting status, press it to add the current parameter value modified.
	Reduce or display the previous value: if under browsing status, press it to switch to previous
	parameter display; if under setting status, press it to reduce the current parameter value modified.
0	Setting/confirmation: if under browsing status, press it to enter the setting status; if under setting
	status, press it to store the parameters and return to the browsing status.
×	Cancellation/manual switch: if under setting status, press it to return to the browsing status but
	not to store the values modified; if under browsing status, use it as a manual setting key in case of
	load short-circuit or over-load.

#### 4.2 Description of display content



Serial No.	Symbol	Description	Notes
A	~	Indicating wind generator	
	¢	A symbol of sun, indicating daytime	
В	*	A symbol of moon, indicating nighttime	
С		A symbol of storage battery, with the bars inside indicating the battery charge status	When the battery is fully charged, 5 bars inside will all display. when the storage battery is over-discharged, the symbol will flicker and then stop flickering upon recovery from over-discharging status; when battery storage is under over-voltage status, a battery status indicator bar will appear, and the over-voltage symbol is will flicker and then stop flickering upon recovery from over-voltage status.
D	<i>\</i> \$	Load status and fault status	normal load, no output, indicator lamp will appear, while indicator lamp will appear when with output; under over-load status, load symbol flicker, at this time, you need to eliminate the excessive load, and then press Esc key to recover the output; under short-circuit protection in , short-circuit symbol will be on, at this time, you should check the load line and then press Esc key after confirmation for normality to manually recover it to original status.
E	(See Figure 4.2)	An icon of manual brake: when it is on, it indicates "under manual brake status", otherwise "status of manual brake unlocked".	
F	(See Figure 4 2)	An icon of the item browsed	
G	(See Figure 4.2)	Unit icons	A: current, unit: A; V: voltage, unit: V; W: power, unit: W; H: hour; M: minute.
Н	(See Figure 4.2)	Digital display zone	
I	SET	Indicating "under setting status"	ا بلد
	Ø	A symbol of light & time control	is a symbol of light & time control. Whe appears, it indicates light-controlled on/off; and when appears, it indicates light-controlled on / time-controlled off.
K	(See Figure	Output on/off status	
L	4.2) (See Figure 4.2)	Two-channel load output interface	Channels 1 and 2

It is night if the photocell voltage exceeds the light-controlled on voltage (can be set by users) for continuous 1min.

It is day if the photocell voltage exceeds the light-controlled off voltage (can be set by users) for continuous 1min.

#### 4.4 Output mode

Output mode	Specification
Normally open output mode	The voltage of battery is normal and within the rated load. The controller outputs will full power normally.
Light-controlled on/time-controlled off output mode	After dark (see <u>4.3 Day and night identification</u> ), it outputs according to the set load upper limit and the output off time is subject to the set time.
Light-controlled on/off output mode	After dark (see <u>4.3 Day and night identification</u> ), it outputs according to the set load upper limit and the output is off after the dawn).

#### 4.5 Instructions for control panel

#### 4.5.1 Start-up interface



In the start-up interface, 0.00V shows the current voltage of storage battery. Press key to enter into wind generator parameter state, and the current rotate speed, voltage, current and power of wind can be viewed:

#### 4.5.2 Wind generator operating parameter state:

4.5.2.1 View the current rotate speed of wind generator



0.00M in the picture shows the current actual rotate speed of wind generator. Press to enter into next parameter state, and the current voltage of wind generator can be viewed.

4.5.2.2 View the current voltage of wind generator



0.00V in the picture shows the current voltage of wind generator. Press **a** to enter into next parameter state, and the current of wind generator can be viewed.

4.5.2.3 View the current of wind generator



0.00A in the picture shows the current of wind generator. Press to enter into next parameter state, and the current power of wind generator can be viewed.

4.5.2.4 View the power of wind generator



0.00W in the picture shows the current power of wind generator. Press solar PV parameter state, and the current voltage, current and power of solar PV can be viewed.

#### 4.5.3 Operating parameter state of solar PV module

4.5.3.1 View the voltage of solar PV



0.00V in the picture shows the current voltage of solar PV. Press to enter into the next parameter state, and the current of solar PV can be viewed. 4.5.3.2 View the current of solar PV



0.00A in the picture shows the current voltage of solar PV. Press to enter into the next parameter state, and the current power of solar PV can be viewed.

4.5.3.3 View the power of solar PV



0.00W in the picture shows the current voltage of solar PV. Press 🛕 to enter into D load parameter status, and the current of DC load can be viewed.

#### 4.5.4 Operating parameter state of load

4.5.4.1 View the current of DC load



So far, the operating parameters of various parts of the system have been all viewed (if you need to look back certain parameter, press to display parameters counter-cyclically); In this interface as shown in Fig. 4.5.4.1, press to enter into output mode setting of Channel 1 and 2 DC load.



In this Manual, Channel 1 load is used as an example and its setting process is stated.

4.5.5.1 Normally open mode interface



In this interface as shown in Fig. 4.5.5.1, press and the Channel 1 or 2 load setting interface can be switched over. For each channel, press "set/confirm" key first and the screen will display a "SET" sign, and then press or annel 1 load can be switched over among the three output modes: normally open, light-controlled on/off, light-controlled on/time-controlled off. Users only need to select the mode they need, and then press to confirm and press ESC key to save and quit. 4.5.5.2 Output mode interface of light-controlled on/off



4.5.5.3 Output mode interface of light-controlled on/time-controlled off



#### The output mode setting of Channel 2 is the same and its interface is as follows:



#### 4.5.6 Manual brake operation

To ensure the operation safety of wind generator and for the convenience of users, this controller is so designed that the wind generator can be braked manually under any state. The specific process: keep  $\circ$  "confirm" key on the panel pressed first, and then press ESC key  $\rightarrow$  and hold for about 5sec. Loosen the key to enter manual braking state, and there will be "Brake" displayed at the top right corner of the display interface. If you want to quit manual braking state, repeat the above operation, namely, keep  $\circ$  "confirm" key on the panel pressed first, and then press ESC key and hold for about 5min. Loosen the key to quit manual braking state. "Brake" at the top right corner of the display interface will disappear. The specific interface is shown as follows:

1) Manual braking interface ("Brake" appears at the top right corner of the display interface)



#### "Brake" appears, and the wind generator brakes

2) Quit manual braking ("Brake" at the top right corner of the display interface):





After wind generator brakes, it will stop rotating or rotate at a very slow speed. The wind generator is unable to generate electricity.

"Brake" disappears, and the wind generator quits braking state.

# V. Protection Mechanism

Serial No.	Protection contents	Protection description	Remarks
1	General over-speed brake or brake off	If the rotate speed of wind generator exceeds the preset rotate speed of braking, it will automatically brakes through three-phase short circuit and the brake is off automatically after 3min.	The controller has automatic braking function
2	Over-speed brake or brake off under continuous strong wind	If there are more than successive 3 overspeed brakes within 30min, it will be determined as continuous strong wind and the brake can be off automatically only after 4h.	
3	Exceeding safe temperature	When it exceeds the safe temperature because of overhigh ambient temperature or overhigh temperature caused by heavy current, the system will enable over-temperate protection automatically, disable wind generator and photocell input, but the output will not be affected.	The controller has a built-in temperature testing module
4	Temperature decreases to safe temperature	Over-temperature protection is freed, and the system recovers to normal state.	
This controller has good heat dissipation measures and the over-temperature protection module will not be enabled under non-extreme cases.			

# VI. Performance Parameters

Model		LCWS-B	
System voltage	12V	24V	48V
Turbine input voltage range		0 ~ 100V	
Turbine input current range (initial value)	0 ~ 25	A(15A)	0 ~ 20A(15A)
Turbine maximum input power	350W	600W	1000W
PV Input voltage range	0 ~ 25V	0~50V	0 ~ 100V
PV Input current range (initial value)	0 ~ 30A(15A)	0 ~ 30A(10A)	0~22A(8A)
PV Maximum input power	500W	1000W	1500W
PV MPP	17 ~ 20V	34 ~ 40V	68 ~ 80V
Number of output circuits	2-cha	nnel or 1-channel with dim	ming signal
Output control mode	Always	s open;light-controlled; ligh	t on/time off
Maximum output current		10A	
Static power	about0.4W	about0.8W	about1.0W
utility power interface		Optional	
Communication interface		RS232 / RS485(optiona	al)
Operating temperature range		<b>-20 ~ +50</b> ℃	
Operating humidity range		35% ~ 85% (no condensa	ition)
Product size		190.5*150*85.5mm	
Package size		233*182*130mm	
weight		about2.2Kg	

# VII. Common Faults and Troubleshooting

If the above statements are not satisfied, or there is any abnormal phenomenon and the controller cannot return to normal, please contact the after-sale service or business personnel of our company for maintenance or replacement in a timely manner.

Phenomenon	Specification
Storage battery box 🏾 flickers and there is no output	It is over discharged. The storage battery is emptied. Please fully charge the storage battery before use.
Load icon $^{ar{V}}$ flickers and there is no output	The system detected output overload and will close one channel but keep another normal one. Please check the loads, and remove Superfluous and not normal loads. Press Esc to recover.
③ is on and there is no output	The system detected output short circuit and will close one output channel and keep normal one. Please check the loads and connection lines. After troubleshooting, press Esc to recover.
The output is normal but it is not charging.	The temperature of the controller is too high and the over-temperature protection (the wind generator brakes, the photocell has open circuit, but the output will not be affected). When the temperature decreases to recovery temperature, the system will recover.

# VIII. Warranty and Services After-sale

The quality warranty period is one year, in agreed warranty period stipulated in the contract, if found defective or faulty, the company provides free

repair service, contact the service department of the company or related business.

2, the scope of protection of this warranty does not include damage due to external factors such as accidents, natural disasters and other force majeure damage, not in accordance with product specifications, improper use, negligence, alteration, repair, improper installation, testing inappropriate, improper transport.