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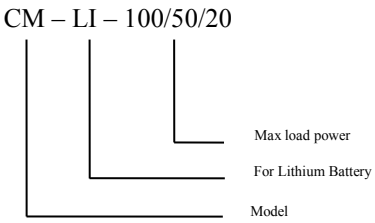
CM-LI series Intelligent Wireless Dimming LED Solar Charge Controller Specification

Main Features:

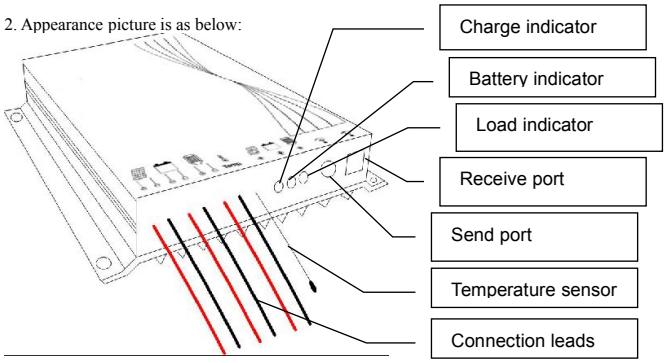
1. Exclusive controller for Lithium Battery, which suit for ternary Lithium, Lithium iron battery, Lithium cobalt oxides battery, etc.
2. Unique Lithium battery which is automatically actuated.
3. Flexible charging mode, equalizing charge or PWM charge auto switch.
4. Lithium battery low temperature charging protection, when the ambient temperature is lower than 0℃, the controller will auto stop low temperature charging so as to protect the battery.
5. Digital high precision constant-current control, the maximum efficiency can reach 96%.
6. The working current can be adjusted from 0.15A to 3.3A, the regulating precision is 30mA.
7. High dynamic performances of load insure current output stability even though the battery voltage and load sudden change.
8. 3 level time frame dimming function design, work time can be set range from 0 hour to 15 hours, power can be set range from 0% to 100%.
9. Intelligent power mode, the load power can be adjusted automatically according to the battery power, can extend the maximum working time of the battery.
10. Record the system status, can record at a max 7days and monitor the whole system.
11. The true constant current but not limited current, which can insure the current output stability thus decrease LED light failure and increase the LED service life.
12. Metal case, IP68 waterproof degree, can be used in all kinds of bad conditions.
13. Overheat protection function, when the controller reaches a certain temperature, it will decrease or close the load.
14. Varies system protection. Including the battery reverse connection, LED short circuit, open circuit protection and so on.

Installation and Wiring:

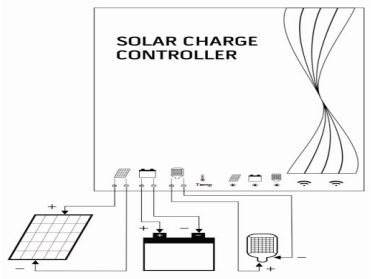
1. Mode identification:



2. Appearance picture is as below:



3. Wiring diagram is as below:



Connection sequence: Please connect the storage battery first, then connect the load, last is the solar panel. Pay attention to the "+" and "–" in case of reverse connection.

LED Connection:

1. The CM-LI- Controller is internally installed with constant current source(LED driver). The max output voltage is 60V. The max amount of LED lights can be connected is 18pcs in series.

2. The CM-LI controller can auto identify 12V and 24V system voltage. While connect to LED load, please ensure the number of LED lights in series is appropriate.

Please refer to the recommendation as below:

System voltage	TheMin No.(n) Of LED lights In series	Output voltage of load (V_{out})	Output power of load (V_{out})
12V	n ≥ 5	V_O ≥ 15V	P_{LED} ≤ 50W
24V	n ≥ 10	V_O ≥ 30V	P_{LED} ≤ 100W

3. Before open the load, Please connect LED light first.

Warning: if the number of LED in series is not appropriate, the controller or the LED load will be damaged.

Status Indication:

LED light	Indications	Status	Functions
	Charging indication	Long-term On	The solar panel voltage is higher than light control voltage
		Long-term Off	The solar panel voltage is lower than light control voltage
		Slow twinkling	on charging
		Fast twinkling	Overvoltage of the system
	Battery indication	Long-term On	Storage battery works normally
		Long-term Off	Storage battery is unconnected
		Fast twinkling	Storage battery is over discharge
	Load indication	Long-term On	Load is on
		Slow twinkling	The load is open circuit
		Fast twinkling	The load is short circuit
		off	Load is off

Load Working Modes are as follows:

The load working time of CM-LI is three time frame+morning lighting, each working time and power can be adjusted.

A.Test Mode

Normally the controller is under the light + time control mode, when during installation or debugging, you can open the load by remote controller and the load power will be changed according to the set value in the remote controller. The test mode will last 1 minute, after 1min the system will automatically recover to the normal working mode.

B. Normal Working Mode: the system run as per the set value.

C.Delay Light Time Mode: For example, set the first time working 4hours,the first power is 0%,system will lighting 4hours later.

D.Morning lighting mode: our controller can auto calculate the night length and adjust the morning lighting time so as to make a precise morning lighting time.

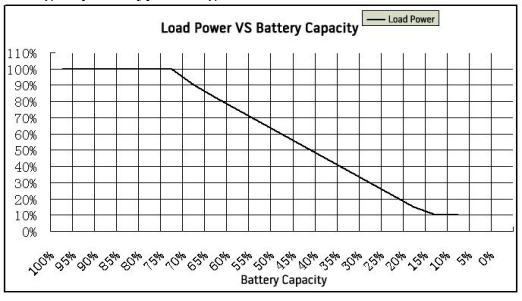
Adjust item	*Parameter*	*Default value*
The first working time	0hour ～ 15hours	4
The first working power	0% ～ 100%	100%
The second working time	0hour ～ 15hours	0
The second working power	0% ～ 100%	70%
The third working time	0hour ～ 15hours	4
The third working power	0% ～ 100%	50%
The Morning lighting time	0hour ～ 15hours	0
The Morning lighting power	0% ～ 100%	30%

LED Intelligent Power Control

While customer open the "Intelligent power" mode, the controller will enter to the intelligent power control mode, The LED load power will adjust automatically according to the battery power. The working time and load power preset before is still valid; system will compare with the automatically power and the preset power, and choose the smaller one as the load output power.

For example: when the battery power is 50%,intelligent power mode calculate the load power is 60%,if customer preset the load power as 100%,the system will choose 60% as load power. If customer preset the load power as 20%, the system will choose 20% as load power.

Intelligent power typical diagram is as below:



Read and Modify The Parameters:

CM-LI solar charge controller can set and adjust the load working time, load working power, light control delay time, charging voltage and so on. When set finished on remote control, just aim at the controller and press the "Send" key to set successfully. It also can read the current set parameters of the controller, and check whether the set parameters are correct.

Charge-Discharge Control

1.The charging mode divided into direct charging and PWM charging, users can choose different charging mode as per the feature of the battery.

A. Direct charging:

Direct charging is a tranditional cut-off charing mode, when the battery voltage reaches to the over charge voltage, it will auto cut off the circuit and stop charging. When the battery voltage drop to over charge return voltage, it will return to charging again. This charging mode is suggested when the lithium battery protection panel is sensitive to PWM charging.

B.PWM charging mode:

PWM charging mode means: when the battery voltage reaches full charged voltage, the charging mode will auto adjusted to constant voltage charging, the charging mode changes to discontinuous current charging, PWM charging mode is a safe and fast way for battery charging, so as to make a better charging efficiency.

2. 0℃ charging protection function.

Because the ambient temperature will do a influence to Lithium battery. When the temperature is lower than 0℃, the features of Lithium battery will be changed a lot and is not suit for continuous charging. When the 0℃ charging protection function is ON, if the ambient temperature is lower than 0℃, the battery charing will be stopped so as to protect the Lithium battery.

Charge-Discharge Control Case:

The parameter of the case is as below:

The setting of the case	Setting value
Working time of first stage	3 hours
Working power of first stage	100%
Working time of second stage	5 hours
Working Power of second stage	70%
Working time of third stage	2 hours
Working power of second stage	50%
Working time in the morning	2 hours
Working power in the morning	30%
Load current	1.74A
Boost charge voltage	14.4V
Float charge voltage	13.8V
Light-operated voltage	8V
Light-operated delay time	5Min

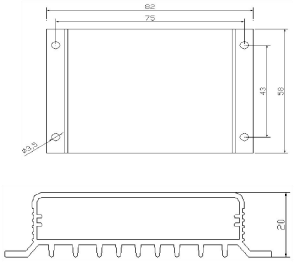
Run Stage Specification:

stage	description
1	Daytime：When the light strengthened, the charging current will increase rapidly, Battery voltage will rise.
2	Daytime: the light changes, the battery voltage is unstable.
3	Daytime: boost charge stage.
4	Daytime: boost charge finished and enter float charge stage.
5	Night: when the solar panel voltage is lower than light-operated voltage, The load will be open after delay. At the first stage, the load power is 100%.
6	Night: at the second stage, the load power is 70%.
7	Night: at the third stage, the load power is 50%.
8	Night: the fourth stage is morning time, the power is 30%. **Tip: because of the total setting time(12h) exceeds the night time, The load hasn't been shut, But the light is on over the night.**
9	Daytime：The solar panel voltage is higher than light-operated voltage, Close the load after delay. The battery voltage will raise contemporary.

System State Record:

CM-LI series controller can record the operation status of whole system, including operation day, over discharge time, full charged time, etc. It can also record the change of battery voltage weekly, give customer clearer knowledge of the system. Users need to use remote control to read its operation status, when read successfully; the data will be recorded in the remote control.

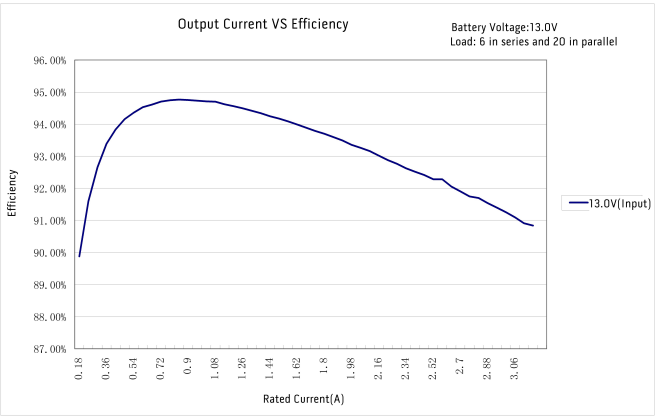
Installation Dimension:



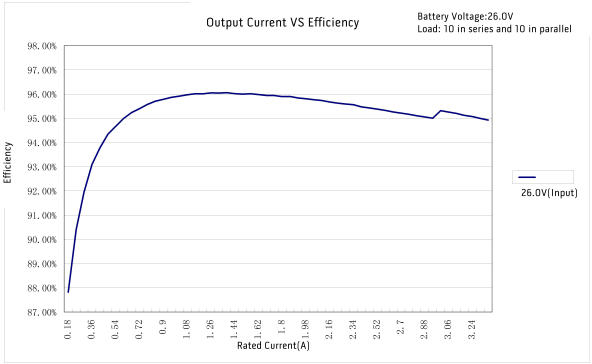
1.The size of CM100-LI is as follows：
Boundary dimension：82×100×20(mm)
Installation dimension：86×75(mm)
Installation aperture：3.5(mm)
2.The size of CM50-LI and CM20-LI：
Boundary dimension：82×58×20(mm)
Installation dimension：43×75(mm)
Installation aperture：3.5(mm)

Typical Efficiency Curve:

1.12V system



2.24V system



The Parameters:

Parameter name	Parameter value			Adjustable	Default value
Model	CM100-LI	CM50-LI	CM20-LI		
System voltage	12V/24V	12V/24V	12V		
Output power	50W/12V 100W/24V	30W/12V 50W/24V	20W		
Output current	0.15A～3.3A	0.15A ～ 1.98A	0.15A ～ 1.67A	√	330mA
No-load loss	9mA/12V; 12mA / 24V		9 mA /12V		
Charging current	15A	10A	5A		
Solar input voltage	< 55V		< 30V		
Efficiency of constant current	90% ～ 96%				
Overvoltage protection	Over charging voltage+2V；×2/24V				16.6V
Charging limits voltage	Over charging voltage +1V；×2/24V				15.6V
Overcharge voltage	9.0V-17.0V；×2/24V			√	14.6V
Overcharge return voltage	9.0V ～ 17.0V；×2/24V			√	13.6V
Over discharge voltage	9.0V ～ 17.0V；×2/24V			√	10.0V
Over discharge return voltage	9.0V ～ 17.0V；×2/24V			√	12.0V
Current precision	±3%（Load current＞300mA）				
Load output voltage	＜60V				
over-temperature protection	ambient temperature:80℃（load drop power)				
overheat protection	internal temperature:120℃(Load off)				
light control voltage	5V ～ 11V			√	5V
light control delay	1min ～ 50min			√	1min
Working temperature	-35℃ ～ +65℃；				
Protection level	IP68				
Weight	280g	170g	160g		
Dimension（mm）	100*82*20	58*82*20			

Tip: when setting the parameters, pls be sure that overcharge voltage > overcharge return voltage > over discharge return voltage > over discharge voltage.

Faults and Solutions

Faults	Solutions
After open circuit of the load, it has no output when reconnect.	Check out if the connection is correct and reliable, wait for 10s until the load is on.
After debugging short circuit of the load, it has no output.	When the load is short circuit, wait for 1 minute until the load is reopened.
The battery indicator flashes quickly without any output.	The storage battery has been over discharged, when charging to the return voltage of over discharge, it will self-recovered.
The indicator light of the solar panel is off even if there has sunshine.	Check out if the connection of the solar panel is correct and reliable, or if the solar panel is under sunshine.
The load current hasn't reach to the set value.	Check if the current value has exceeded the rated current of the controller.

Tips：The detail parameters and status please refer to the specification of CMX-LI.