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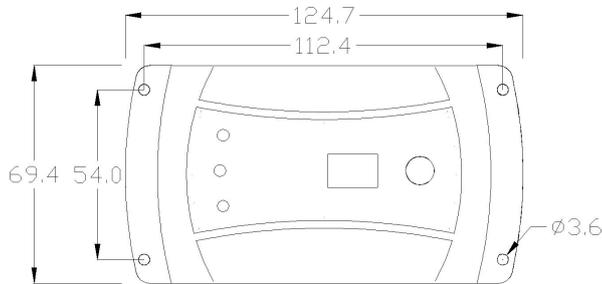
**CR2410 series solar power intelligent PV controller  
Instruction book**

**I. Main features**

1. Automatic identification of 12V/24V system voltage.
2. LED digital display and single key operations which makes operate simply and conveniently.
3. Adopting ternary form charging algorithm, charge the storage battery in equalizing charge mode once a week .It can prevent battery from imbalance and vulcanization effectively, also battery service life will be extended.
4. Four working modes which made it convenient to use in all kinds of street lamps and monitoring devices.
5. External temperature sensor can realize high-precision temperature compensation.
6. Has the electricity protection data function .Parameter can be stored when the power system failure. No need to setting again. It is very simple and convenient to use.
7. Various status indications.
8. Over charging protection, over discharging protection, over load, short circuit protection, reverse polarity protection
9. TVS lightning protection.

**II. Installation and wiring**

1. Installation of controller should be stable and dimensions are as follows:  
Overall dimension:124.7×69.4×34.0(mm)  
Installation dimension:112.4×54.0(mm)  
Installation hole diameter:3.6(mm)



2. CR2410 series controller can work under 12V or 24V voltage. Please connect the storage battery at first, controller will work after recognize the battery volt automatically. If 12 V, the digital tube will shows “0.”.If 24V, the digital tube will shows “1.”.
3. First, connected to the storage battery: Pay attention to the “+” and “-”, in case of reverse connection. If connected well, the indicator light will be on. Otherwise, please check the connection.
4. Second, connected to the solar panel: Pay attention to the “+” and “-”, in case of reverse connection. If connected well and have sunshine, the indicator light will be on. Otherwise, please check the connection.
5. Third, connected to the load: connect the load lead with the load output end of controller, be care that the current must be less than the current rating of the solar controller.
6. Controller can identify voltage of storage battery the circuit is powered on. Please connect storage battery at first and ensure the installation is reliable.
7. Controller will become hot during running. Therefore, it is suggested to install it in a ventilated environment.
8. Controller will test the ambient temperature and then charge the storage battery. Therefore, please place the storage battery and the controller in the same environment.
9. Choose the cable with enough capacities for connection to avoid excessive consumption on circuit which may result in wrong judgment of controller.
10. Controller is designed with share positive poles. If grounding needs to be connected, please use the positive pole.
11. It is important to completely charge the storage battery, at least once a month. Otherwise, battery will suffer from permanent damage. Only when power that enters into the battery is more than that used by the load can the battery be fully charged. When configuring the system, please keep this point in mind.

**III. Outside view of the controller**



**IV. Status indications**

LED lamp	Indications	Status	Functions
	Charging indication	Long-term On	There is voltage on battery panel
		Long-term Off	No voltage on battery panel
		Slow twinkling	Be on charged
		Fast twinkling	Overpressure of system
	Storage Battery	Long-term On	Storage battery works normally
		Long-term Off	Storage battery is not connected
		Slow twinkling	Storage battery is undervoltage
		Fast twinkling	Storage battery is excessively discharged
	Load	Long-term On	Load is open
		Long-term Off	Load is close
		Fast twinkling	Overload protection or Short circuit protection or system voltage unusual.

**V. Introduction of modes and table of settings**

- CR2410 series controller has four working modes. Table of settings is as below:
1. Purely light-operated (0): When there is no sunlight, the light intensity will fall to the starting point. The controller will affirm the starting signal after a delay of 10 minutes. Load will be opened as per set parameters to start working. When there is sunlight, the light intensity will rise up to the starting point. The controller will close output after confirming closing signal in a delay of 10 minutes and the load will stop working.
  2. Light-operated + time-controlled (1~4): Starting process is same to that of pure light control. The load will automatically close when it works to the preset time. Set time will be 1 to 14 hours. At the same time can setting the lighting time in the morning, this function just can use under the Light-operated and time-controlled mode.
  3. Manual mode (5.): Under this mode, users can control the load-on and load-off by key-press no matter day or night. This mode is suitable to occasions in need of special loads or for debugging.
  4. Long-term On mode (6.): If being powered on, the load will be under the output status all the time. This mode is suitable for loads in need of 24-hour power supply.

LED Display	LED1 mode	LED Display	LED1 mode
0	Purely light-operated	9	Light-operated + time-controlled for 9hours
1	Light-operated + time-controlled for 1 hour	0 . (0 point)	Light-operated + time-controlled for 10hours
2	Light-operated + time-controlled for 2 hours	1 . (1 point)	Light-operated + time-controlled for 11hours
3	Light-operated + time-controlled for 3 hours	2 . (2 point)	Light-operated + time-controlled for 12hours
4	Light-operated + time-controlled for 4hours	3 . (3 point)	Light-operated + time-controlled for 13hours
5	Light-operated + time-controlled for 5 hours	4 . (4 point)	Light-operated + time-controlled for 14hours
6	Light-operated + time-controlled for 6 hours	5 . (5 point)	Manual mode
7	Light-operated + time-controlled for 7hours	6 . (6 point)	Long-term On mode
8	Light-operated + time-controlled for 8hours		

**VI. Methods for setting**

Setting mode: Press a key for more than 3s, the nixie tube will start to twinkle and the system will enter into debug mode. Release the key and then press the key again, figures of nixie tube will change one digit each time until digits shown on the nixie tube match the digits corresponding to the mode the user' request. Wait until the nixie tube stop twinkling or press the key again for more than 3s to finish the setting process.

**VII. Safety suggestions**

1. When connecting 24V system, terminal voltage of battery panel may surpass the human body safety voltage. If operations are needed, insulating tools should be used and hands must be dry.
2. If storage battery is connected in reverse, the controller would not be damaged. However, there may be output of negative voltage at the load end which may damage your load equipments. Pay attention to avoid such things.
3. In 24V system, if one end of storage battery or solar battery panel is connected in reverse, controller may very likely be damaged.
4. There is a great deal of power stored in the storage battery. Therefore, short circuit of storage battery must not happen in any case. We suggest tandem connection of fuses on storage battery.
5. Storage battery may generate combustible gas and therefore should be far away from sparks.
6. Please make sure that children are far away from the storage battery and the controller. Please follow the safety suggestions given by the battery manufacturer.

## VIII. Instructions for parameters

System voltage	12V/24V Auto
System current	10A
No-load loss	< 10mA/12V;10mA/24V
Solar energy input voltage	< 55V
Overvoltage protection	17.0V; ×2/24V
Equal charging voltage	14.6V; ×2/24V(25°C), duration:1h
Ascending charging voltage	14.4V; ×2/24V(25°C), duration:2h
Float charging voltage	13.8V; ×2/24V (25°C)
Return voltage during charging	13.2V; ×2/24V (25°C)
Return voltage for over-discharging	12.6V; ×2/24V
Undervoltage	12.0V; ×2/24V
Over-discharging voltage	11.1V; ×2/24V
Temperature compensation	-4.0mv/°C/2V;
Light-control voltage	Light-control open 5V; light-control close 6V
Light-control judgment time	10min
Circuit protection	Over-charge, over-discharge, short circuit and over-load protection Anti- connection-reverse protection for solar battery and storage battery.
Working temperature	-35°C to +65°C;
Protection level	IP30
Weight	106g
Dimensions	124.7×69.4×34.0(mm)(L×W×H)

**Notice1:** If reverse connection of the storage battery, the controller would not be damage, but there is the negative voltage output from the load will lead to the load damage.

**Notice2:** Time delay function when overload, the protection time is related to the ambient temperature. When overload, the overload protection will running auto.

## IX. Problems and solutions

Phenomena	Problems and solutions
There is sunlight but indicator lamp of battery panel is not on.	Please check the wiring of photocell and the contact.
Indicator lamp for charging of battery panel twinkles fast	Overvoltage of the system; please check whether voltage of the storage batter is too high.
Indicator lamp of battery panel is off; voltage of battery is normal and there is no output	Wait for 10 minutes and the load will open automatically.
Indicator lamp of battery is not on	Power supply to storage battery fails. Please check the connection of storage battery.
Indicator lamp of storage battery twinkles fast and there is output	Storage battery is over discharged. Charge the battery fully.
Indicator lamp of load twinkles fast and there is no output	Power of load exceeds rated power or short circuit. Press the key once for a long time or wait until the next day.
Indicator lamp of load is on permanently and there is no output	Please check whether connections of electric equipments are correct and reliable.
Other phenomena	Check the reliability of wiring and the automatic identification of 12V/24V system.