User Manual

Product model	Application scene
HV6008N	Solar electric vehicle Solar golf cart Solar low-speed electric vehicle Solar DC pump irrigation system

1. Product introduction

The latest MovingTrack™ high efficiency boosting MPPT charging technology in the industry is adopted for HV6008N boosting waterproof type MPPT (Maximum Power Point Tracking) charging controller, which can guarantee the optimal status of solar panel and, realize charging to the maximum degree and effectively prolong the service life of storage battery. The product, which is mainly applied to the charging system of solar electric vehicles, is featured by high reliability, high efficiency, high accuracy, simple installation and convenient maintenance, etc.

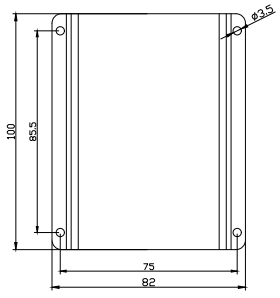
Product characteristics

- All-waterproof encapsulation; protection grade: IP 67; applicable to the electric vehicles' application environment with vibration and high humidity; it is guaranteed that the device has good heat dissipation and corrosion resistance, vibration resistance.
- The latest MovingTrack™ high efficiency MPPT technology that is specially researched and developed for mobile photovoltaic power generation system is adopted; maximum power point tracking can be quickly realized during motion, and it will not suffer from the interference from unstable illumination to battery panel. MPPT efficiency reaches as high as 99.9%.
- It supports the work of 16V ~ 50V battery panel, and the applicable scope is wider.
- Lead acid battery and lithium battery is universal.
- High efficiency and high speed intelligent MCU digital power design is adopted; there is wide voltage input range; self-adaption to solar panel input voltage.
- High quality imported components and parts are adopted to improve the system efficiency, and the circuit switching efficiency is as high as 97%.
- There is complete protection function for battery overcharging, reverse charging and reverse connection.
- External jumper design is adopted; switching between 48V and 60V battery is easy; double-color LED is adopted to indicate the battery voltage.
- It supports such communication interface as RS232/ RS485, which is convenient for connecting other main control device.
- The small volume is convenient for installation.

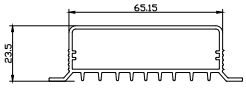
2.Use instruction

2.1Installation and connection

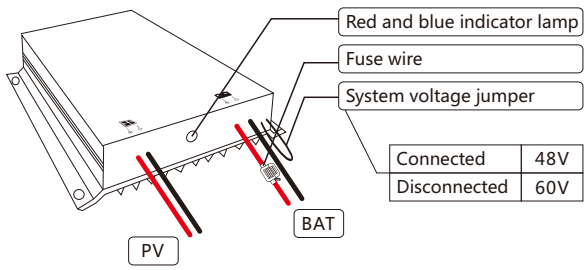
- The installation size of controller is as follows:



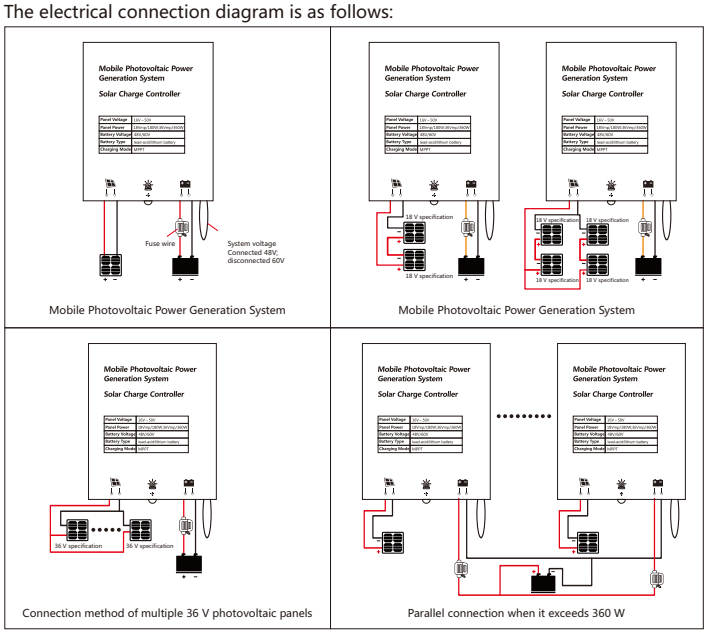
Product size: 100×82×23.5 mm
Installation size: 85.5×75mm
Hole size: Φ 3.5 mm



- The controller can perform charging for 48V or 60V battery, and switch-over can be performed via external short circuit wire. Before application of connection, please confirm whether the controller matches with the battery voltage, otherwise normal charging cannot be performed, and even danger will be caused!
- The product appearance is as follows:



- The electrical connection diagram is as follows:



The recommended battery panel specification is as follows:

Quantity of battery cell	Working voltage of maximum power point Vmp	Open circuit voltage Voc	Maximum nominal power Pmax
36cell	18V	22V	180W
60cell	30V	36V	300W
72cell	36V	44V	360W

2.2 Suggestions for use

- The controller shall not be used under overload condition, and the maximum power of 18V photovoltaic panel is 180W. If there are two 18V photovoltaic panels with the total power of exceeding 180W, please perform series connection for the photovoltaic panels for use (36V), and the maximum power of 36V photovoltaic panel is 360W. Please view the parameters at the back side of the photovoltaic panel before connection.
- The controller realizes the identification of 48V battery and 60 V battery via external short circuit wire; be sure not to connect 48V battery for charging when the controller is 60 V system, otherwise the storage battery may be damaged permanently!
- The controller will get hot during the operation period, so it is suggested that it be installed in ventilating environment.
- High voltage danger! The voltage of photovoltaic panel and storage battery may exceed the safe voltage for human body. Therefore, during use of the system, it is suggested that a switch is connected (series connection) between storage battery and controller (and between photovoltaic panel and controller). The switch shall be disconnected before connection; insulated tools shall be used during operation, and the hands shall be kept dry.
- When reverse connection or short circuit of storage battery, the current is very large, but the controller will not be damaged. However, the fuse wire on the positive wire of storage battery will be broken, and there will be serious light striking phenomenon. Under such circumstance, the impact on storage battery and on external equipment is very large. During the use process, please avoid reverse connection of storage battery as possible.
- Frequent full charging of storage battery is very important, and it shall be fully charged for one time monthly at least, otherwise the storage battery may be damaged permanently. The storage battery can be fully charged only when the energy entering into the storage battery is larger than the energy used by load. Please remember this during the use process.
- Flammable gas may be produced by storage battery, so please keep it away from spark.

2.3 Status indication

There is a red and blue indicator lamp on the controller; red represents 48 V battery, and blue represents 60V battery:

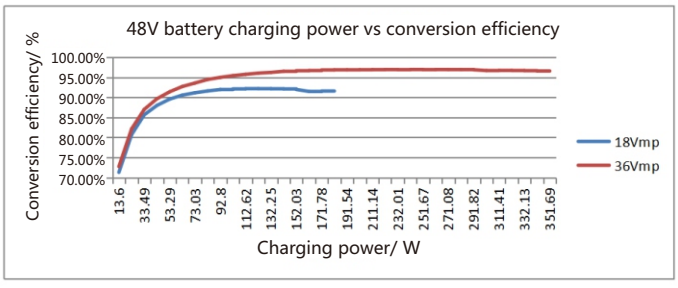
Color of indicator lamp	System voltage	Status of indicator lamp	Description on status of indicator lamp
Red	48V battery system	Extinguished	System is not powered on
		Normally ON	Idling
		Slow flash	Charging is performed
		Quick flash	Over voltage of battery cell
Blue	60V battery system	Extinguished	System is not powered on
		Normally ON	Idling
		Slow flash	Charging is performed
		Quick flash	Over-voltage of battery cell

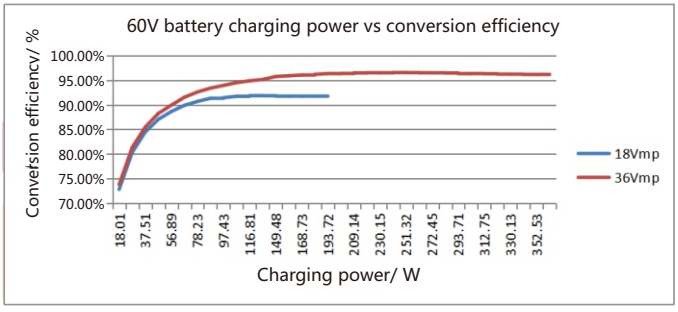
3.Technical parameters

Name of parameters	Parameter value
Model	HV6008N
Controller type	Boosting MPPT
Battery voltage/ type	48V / 60V lead acid battery or lithium battery
Static power consumption	< 15mA
Open circuit voltage of solar panel	16V ~ 50V
MPPT working voltage	14V ~ 36V
MPPT tracking power	> 99%
Charging conversion efficiency	90% ~ 97%
Maximum charging current	8A
Maximum input current of solar panel	10A
Maximum input power of solar panel	18Vmp/180W;36Vmp/360W
Over voltage	16.0V (×4/48V system; ×5/60V system)
Equilibrium charging voltage	14.6V (×4/48V system; ×5/60V system)
Equilibrium charging interval	30 days (lithium battery has no equilibrium charging function)
Boost charging voltage	14.4V (×4/48V system; ×5/60V system)
Float charging voltage	13.8V (×4/48V system; ×5/60V system)
Working temperature	-35℃ ~ +65℃
Protection grade	IP67
Protection function	Over voltage protection for storage battery, reverse connection protection for storage battery, over current protection for input and output, over voltage protection for photovoltaic panel, reverse connection protection and over temperature protection for photovoltaic panel, open circuit protection for output, anti-reverse charging protection at night
Weight	300g
Controller size (mm)	100x82x23.5
Installation size of controller	85.5x75mm
Mounting hole diameter	ϕ 3.5 mm

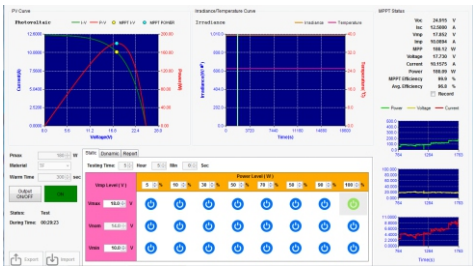
4.Typical curve

- Curve for charging conversion efficiency :

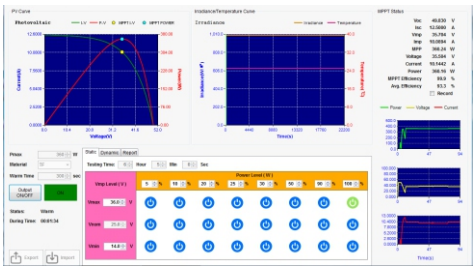




- Curve for MPPT efficiency



MPPT efficiency when Vmp=18V Pmax=180W: 99.9%



MPPT efficiency when Vmp=30V Pmax=360W: 99.8%

5.Protection function

- **Over voltage protection for storage battery**
  Over votlage protection for storage battery, stop charging
- **Current limiting protection for output**
  Input 14V- 30V Output limiting current 4A
  Input 30V-50V Output limiting current 8A
- **Open circuit protection for output**
  Controller will not be damaged
  Note: The controller will be damaged of photovoltaic panel, storage battery with specification exceeded is connected.
- **Waterproof protection**
  Waterproof level: IP67
- **Reverse connection protection for storage battery**
  The system will not work if storage battery is subject to reverse connection, but the controller will not be burnt out. However, the fuse wire on the positive wire of storage battery outside controller will be broken.
- **Over voltage protection for photovoltaic input end**
  If the voltage of input end of photovoltaic panel is too high, the controller will automatically cut off the photovoltaic input.
- **Reverse connection protection for photovoltaic input**
  When the photovoltaic array is subject to reverse connection, the controller will not be damaged; it can work normally after the reverse connection is corrected, but the current of reverse connection shall be no larger than 10A.
- **Anti-reverse charging protection at night**
  It can prevent the storage battery performing discharging via battery panel at night.

6.Common faults and troubleshooting method

Serial No.	Phenomenon	Faults	Troubleshooting method
1	The indicator lamp flashes slowly after the battery panel and storage battery are connected, but there is no charging current.	A. The connecting wire of storage battery is loose. B. The fuse wire positive wire of storage battery is burnt out or there is no fuse wire.	A. Check whether the connecting wire of storage battery is complete. B. Check whether the fuse wire on positive wire of storage battery is complete.
2	The indicator lamp flashes quickly after battery panel is connected.	A.The voltage of battery panel exceeds 50V.	A.Replace it with the battery panel with lower voltage, and ensure that the open circuit voltage of battery panel is below 50V.
3	After the battery panel and storage battery is connected, normal charging cannot be realized, or the battery cannot be fully charged, or the charging voltage is higher than the practical voltage	A.The jumper status identified by external system voltage is abnormal.	A.Ensure that the external jumper of 48V battery is subject to short connection, and the external jumper of 60V battery is disconnected.