



MPPT Solar Charge Controller

User manual



GB: Read these instructions carefully before use and keep it safe for future reference

2606 / 3906

Thank you for selecting the Vechline 2606/3906 series for MPPT solar charge controller. Please read this manual carefully before using the product and pay attention to the safety information

1. SAFETY INFORMATION

- Read all of the instructions in the manual before installation.
- DO NOT disassemble or attempt to repair the controller.
- Install external fuse or breaker as required.
- Do disconnect the solar module and fuse/ breakers near to battery before installing or moving the controller.
- Power connections must remain tight to avoid excessive heating from a loose connection.
- Only charge batteries that comply with the parameters of controller.
- Battery connection may be wired to one battery or a bank of batteries.
- Risk of electric shock, the PV and load can produce high voltages when the controller is working.

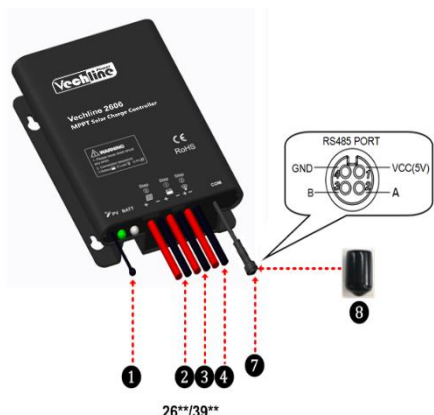
2. OVERVIEW

The 2602/3906 series solar charge controller adopt to the advanced Maximum Power Point Tracking charging methods, it enables the system charging and discharging management to obtain the most radical optimization. Increase the system flexibility, yet lower down the system cost. The controller support a variety of battery, for example sealed, gel, flooded and lithium battery. User can view and modify the working status and parameters. It can be widely used on solar home system, traffic signal, solar street light, solar garden lamp, etc.

The features are listed below:

- Adopt high quality components of ST,IR and Infineon, make sure product using lifespan
- Wide working environment temperature
- Apply to lead-acid battery and lithium battery
- Lithium battery self-activating and low temperature protection function
- Maximum conversion efficiency of 98%
- Advanced Maximum Power Point Tracking (MPPT) technology, with tracking efficiency no less than 99%
- Ultra-fast tracking speed and guaranteed tracking efficiency
- Accurately recognizing and tracking of multiple power points
- PV power limitation function
- Monitoring and setting parameter via Mobile APP, PC Monitor setting software with RS485 communication interface.
- Use of standard Modbus communication protocol for RS485 bus connections, communication protocol compatibility much better
- Connecting the IOT(Internet of Things) module and Cloud Server monitoring software to realize remote monitoring of the multi-machine system
- The RS485 connector can provide power supply
- Aluminum housing for better cooling
- Real-time energy statistics function
- IP68 waterproof degree

3. PRODUCT FEATURES



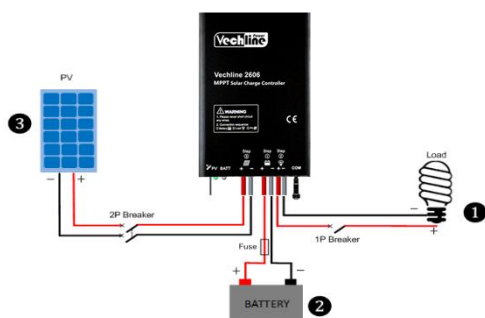
| | | | |
|---|-------------------------------------|---|------------------------------------|
| ① | Temperature Sensor ^ω | ⑤ | Charging Status LED indicator |
| ② | PV Positive and Negative Wires | ⑥ | Battery Status LED indicator |
| ③ | Battery Positive and Negative Wires | ⑦ | RS485 waterproof port ^ω |
| ④ | Load Positive and Negative Wires | ⑧ | Waterproof cap(Included) |

- (1) The temperature sensor short-circuited or damaged, the controller be charging or discharging at the default temperature 25° C.
- (2) The port can provide the DC power supply of 5VDC/150mA and have the short circuit function.



Note: When the RS485 communication port is not working, the waterproof cap must be installed to prevent water getting in.

4. WIRING





Connection order

- 1) Connect components to the charge controller in the sequence as shown above and pay much attention to the “+” and “-”. Please don't insert the fuse or turn on the breaker during the installation. When disconnecting the system, the order will be reserved.
- 2) After power on the controller, check the battery LED indicator on the controller, it will be green. If it's not green, please refer to chapter 10.
- 3) Connect a fuse in series through battery positive (+) in the circuit and the battery circuit fuse must be 1.25 to 2 times to the rated current. The installed distance is within 150mm.

Load self-test function

The load is ON when the controller power on 10s. After 10s it will restore to set working mode.

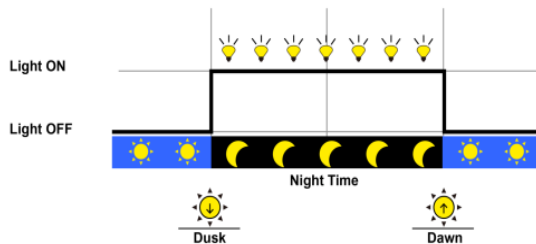
5. LED-INDICATORS

| Indicator | Color | Status | Instruction |
|---|--------|---------------------|---|
|  | Green | On Solid | PV connection normal but low voltage(irradiance) from PV, no charging |
| | Green | OFF | No PV voltage(night time) or PV connection problem |
| | Green | SlowlyFlashing(1Hz) | In charging |
| | Green | FastFlashing(4Hz) | PV Over voltage |
|  | Green | On Solid | Normal |
| | Green | SlowlyFlashing(1Hz) | Full |
| | Green | FastFlashing(4Hz) | Over voltage |
| | Orange | On Solid | Under voltage |
| | Red | On Solid | Over discharged |
| | Red | FastFlashing(4Hz) | BatteryOverheating Low temperature |
| Charging(green) and battery indicator(orange)flashing simultaneously | | | System voltage error※ |

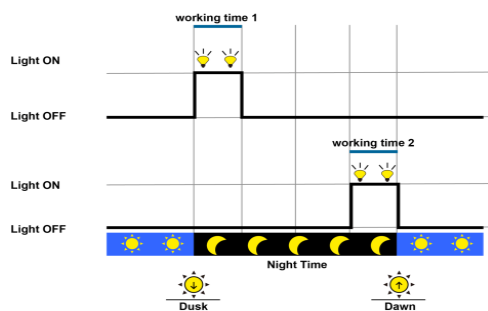
When the battery type is Lithium Battery, the controller do not recognize the system voltage automatically.

6. LOAD WORKINGMODE

- 1).Manual mode (default on)
- 2). Light on/off



- 3). Light on + timer



- 4). Real time control

Control the load on/off time through setting real-time clock.



Note. In the mode of Light ON/OFF and Light ON/Timer, the load is turned on after 10 minutes delay.

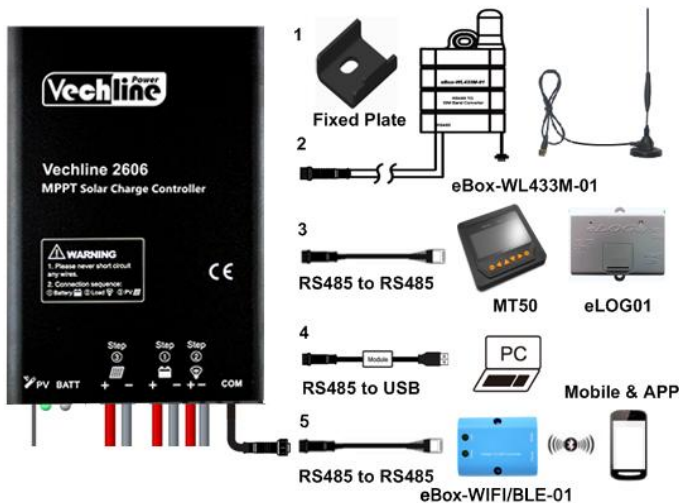
7. ACCESSORIES AND SOFTWARE

1) PC Software

For download, visit the item on the website of www.ocs-recreatie.nl and download the QR code.

2) APP Software

Android / iPhone. Visit the item on the website of www.ocs-recreatie.nl and download the QR code.



8. PROTECTION

PV Over Current

- The controller will limit battery charging current to the Maximum Battery Current rating. Therefore an over-sized solar array will not operate at peak power.

PV Short Circuit

- When PV short circuit is powered on or PV input is short circuit on low-power, the controller will stop charging. Clear it to resume normal operation.



WARNING: The controller may be damaged, when PV input is short circuit on high-power.

- PV Reverse Polarity

The PV can be reversely connected with a controller when:

- ✓ Only the PV is connected with the controller;
- ✓ The battery is positively connected, and the open-circuit voltage of the PV is lower than 85V.



WARNING: Controller will be damaged when the PV array straight polarity and the actual operation power of the PV array is 1.5 times greater than the rated charge power!

- Battery Reverse Polarity

When the PV is not connecting or connecting reversed, fully protection against battery reverse polarity, correct the wire connection to resume normal operation.



WARNING: Controller will be damaged when the PV connection is correct and battery connection reversed!

- Battery Over Voltage

When the battery voltage reaches to the set point of Over Voltage Disconnect Voltage, the controller will stop charging the battery to protect the battery from being over charged to break down.

- Battery Over Discharge

When the battery voltage reaches to the set point of Low Voltage Disconnect Voltage, the controller will stop discharging the battery to protect the battery from being over discharged to break down.

- Battery Overheating

The controller detects the environment temperature through the external temperature sensor. If the environment temperature exceeds 65 °C, the controller will automatically start the overheating protection to stop working, and recover below 55 °C.

- Lithium battery Low Temperature
- The temperature sensor is less than the low temperature value, Lithium battery stop charging/discharging. It is higher than the low temperature value, Lithium battery start charging/discharging.
- Load Overload

If the load current exceeds the maximum load current rating 1.05 times, the controller will disconnect the load. Overloading must be cleared up through reducing the load and restarting controller.

- Load Short Circuit

Load will be switched off when load short circuit (≥ 4 times rated current) happens. Controller will automatically attempt to reconnect load for 5 times. If short circuit protection still exist after controller's 5 times attempts, user have to clear short circuit ,then restart the controller or wait for one night-day cycle (night time >3 hours).

- Temperature sensor break down

If the temperature sensor short-circuited or damaged, the controller will be charging or discharging at the default temperature 25 °C to prevent the battery damaged from overcharging or over discharged.

- High Voltage Transients

The controller is protected against small high voltage transients. In lightning prone areas, additional external suppression is recommended.

9. TECHNICAL SPECIFICATION

| Item | Model | Tracer2606BP | Tracer3906BP |
|--------------------------------|---------------------------|--|-------------------|
| Nominal system voltage | | 12/24VDC Auto(Lithium battery do not automatic identification system voltage) | |
| Battery input voltage range | | 8.5~32VDC | |
| Rated charge/discharge current | | 10A | 15A |
| Rated charge power | | 130W/12V;260W/24V | 200W/12V;400W/24V |
| Max. PV open circuit voltage | | 60V(at minimum operating environment temperature) 46V(at 25°C environment temperature) | |
| MPP Voltage range | | (Battery voltage+2V)~36V | |
| Battery Type | | Lead-acid battery: Sealed(Default) / Gel / Flooded/User; Lithium battery: LiFePO4/ Li-NiCoMn/User | |
| Lead-acid | Equalize Charging Voltage | Sealed :14.6V/Gel: No / Flooded:14.8V/User:9-17V (×2/24V) | |

| | | | |
|--------------------------------------|----------------------------------|--|-----------------|
| | Boost Charging Voltage | Sealed :14.4V/Gel: 14.2V/Flooded:14.6V/User:9-17V (× 2/24V) | |
| | Float Charging Voltage | Sealed/Gel/Flooded:13.8V/User:9-17V (× 2/24V) | |
| | Low Voltage Reconnect Voltage | Sealed/Gel/Flooded:12.6V/User:9-17V (× 2/24V) | |
| | Low Voltage / Disconnect Voltage | Sealed/Gel/Flooded:11.1V/User:9-17V (× 2/24V) | |
| Lithium | Boost Charging Voltage | LiFePO4:14.5V/ Li-NiCoMn:12.5V / User:9-17V (× 2/24V) | |
| | Low Voltage / Disconnect Voltage | LiFePO4:12.8V / Li-NiCoMn:10.5V / User:9-17V (× 2/24V) | |
| | Low Voltage / Disconnect Voltage | LiFePO4:11.1V / Li-NiCoMn:9.3V / User:9-17V (× 2/24V) | |
| Self-consumption | | ≤13mA/12V;≤11.5mA/24V | |
| Temperature compensation coefficient | | -3mV/°C/2V(Lithium battery don't have temperature compensation coefficient) | |
| Communication | | RS485 | |
| Working environment Tem. | | -40°C~+60°C | |
| Enclosure | | IP68 | |
| Overall dimension | | 124×89×30mm | 150×93.5×32.7mm |
| Mounting hole size | | Φ3.5mm | |
| Mounting dimension | | 88×76mm | 120×83mm |
| Power cable | | 14AWG(2.5mm ²) | |
| Net weight | | 0.54kg | 0.74kg |

10. TROUBLESHOOTING

| Faults | Possible reasons | Troubleshooting |
|---|--------------------------------------|---|
| LED Charging indicator turn off during daytime when sunshine falls on PV modules properly | PV array disconnection | Confirm that PV and battery wire connections are correct and tight |
| No LED indicator | Battery voltage maybe less than 8.5V | Measure battery voltage with the multi-meter. Min.8.5V can start up the controller |
| Battery LED indicator green fast Flashing | Battery over voltage | Check if battery voltage is higher than OVD, and disconnect the PV |
| Battery LED indicator red | Battery over discharged | When the battery voltage is restored to or above LVR point (low voltage reconnect voltage), the load will recover |
| Battery LED indicator red flashing | Battery Overheating | The controller will automatically turn the system off. But while the temperature decline to be below 50 °C, the controller will resume. |
| Load is not output | Load Overload① | ①Please reduce the number of electric equipment ②Restartthe controller. ③wait for one night-day cycle (night time>3 hours). |
| | Load Short Circuit ① | ①Check carefully loads connection, clear the fault. ②Restartthe controller. |

| | | |
|--|--|--|
| | | ③ wait for one night-day cycle (night time > 3 hours). |
|--|--|--|

11. DISCLAIMER

This warranty does not apply under the following conditions:

Damage from improper use or use in an unsuitable environment. PV or load current, voltage or power exceeding the rated value of controller. The controller's working temperature exceed the limit working environment temperature. User disassembly or attempted repair the controller without permission. The controller is damaged due to natural elements such as lightning. The controller is damaged during transportation and shipment.



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