

Off Grid Hydroelectric Generator Controller

User Manual

★ Read the user manual carefully before use



The Safety Matter

Please read this user manual carefully before installation, running, maintenance or check-up.

As electronic product , it is all dangerous when touching the electricity part.



Warning: Dismantlement of the dump load in the use is forbidden. The dump load must be connected in accordance with the wiring diagram strictly. Otherwise the hydroelectric generator will be damaged because loss of control and the controller will be damaged due to the over voltage!

Prohibit operating the fuse when it is on load. Please cut off all loads when checking, replacing and operating the fuse!



Attention :This device must request electrician to install.

Using Direction

- Make sure read this user manual carefully before appliance;
- The equipment must be installed by professionals;
- To avoid personal injury, make sure it must be a good ground connection when installation;
- No running in humidity or high temperature , volatile gases or flammable environment ;
- When moving machines, please put down carefully;
- Open the package, please check controller and its attachment. If you find any missing parts or damaged parts in the process of transportation, please contact us in time , then you will get satisfactory service;
- If the controller is damaged, as not follow instructions of this manual to install the controller, our company shall have the right not to supply guarantee.

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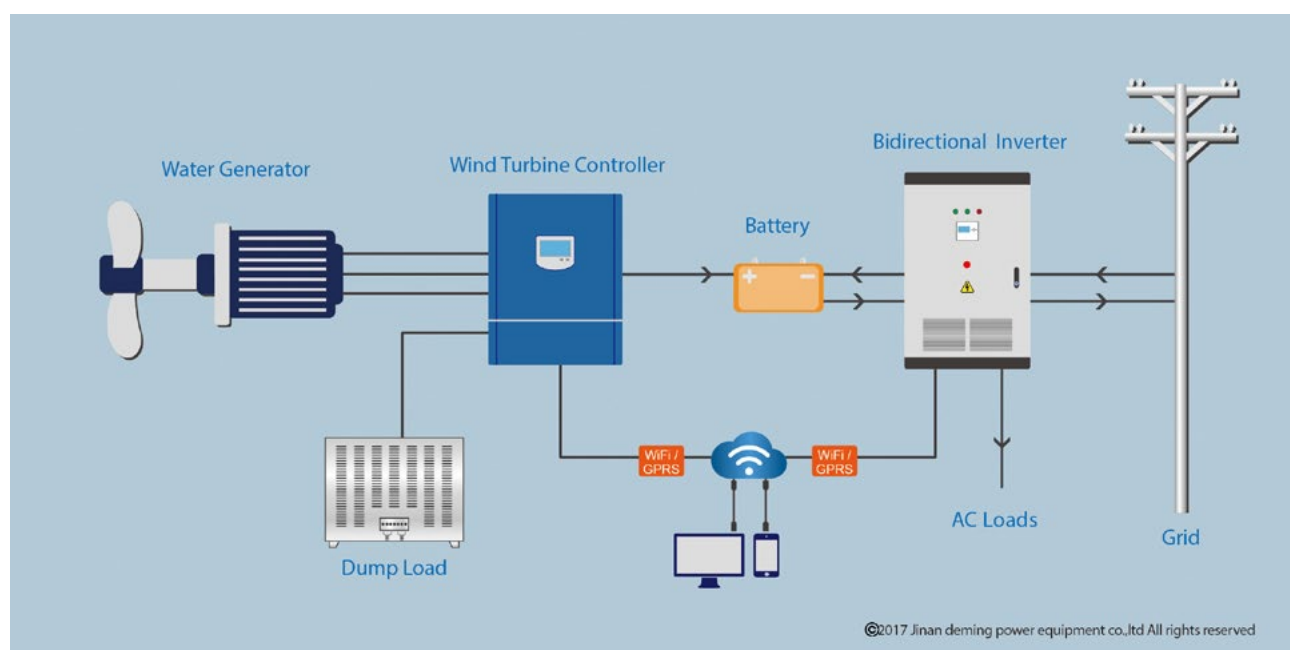
Overview

Our company is a high-tech enterprise which specializes in the research and development, production, sales and service for renewable energy and power equipment used in wind and solar power. It has a high reputation in the industry and it is also a permanent member of China Wind Energy Association. Our Products are designated products for State Aid Projects abroad and 90% of our products are exported oversea.

Our main products include off-grid wind charge controller, on grid wind charge controller, solar charge controller, wind solar hybrid controller, wind solar hybrid streetlight controller, on grid inverter and off grid inverter, etc.

We take technical innovation as our company's fundamental development, and we invest not less than 20% of sales revenue every year in products research and development. We have been continuously exploring advanced technology in the field of new energy power, such as wind turbines electromagnetic control technology, MPPT technology, remote monitoring of wind solar hybrid system, etc. Now, we have five National Invention Patents for core technologies, eight Utility Model Patents. Our wind turbine control technology has reached international advanced level.

All products have perfect quality assurance system and ISO:9001 Certificate. We carry out comprehensive, all-staff and whole-process quality control system, and all product are strictly tested one by one before delivery from factory. The performance of each product is superior to national relevant standards, and all products have passed CE Certification to ensure safety and reliable use for customers.



PWM Model Product Characteristics

- The product is manufactured according to the JB/T6939.1-2004 industrial standard and GB/T 19115.1-2003 national standard, and also with users' technical requirements.
- Big LCD Display. The graphics visually show the working status of controller. Abundant data display: real-time hydroelectric generator voltage, current, power; battery voltage, current, accumulative total generating electricity (The main-board is with battery, in the case of power off, history data can be stored for 30 days.)
- Two sets of control systems: PWM constant voltage system and three-phase dump load system.
- PWM constant voltage control is 120% of the rated power of the hydroelectric generator. In case exceeding of PWM's capacity, the three-phase dump load will automatically start immediately to ensure safe running of the overall hydroelectric generator system.
- Under the circumstances of disconnecting or damage of the battery, the three-phase dump load will start automatically to avoid the idling for hydroelectric generator and the occurrence of runaway accident.
- When strong or super-strong flow, PWM control to ensure battery charged by the hydroelectric generator with constant voltage and current.
- The protection function: Battery reverse polarity protection; Battery disconnected protection; Battery damage protection;
- Over-charging protection of the battery: When the battery is full (the battery voltage getting 125% of the rated voltage), three-phase dump load of controller will automatically start and stop charging the battery. The hydroelectric generator will be on braking status.
- Auto recharging of battery: When the battery voltage reduces to 108% of the rated voltage, controller stops three-phase dump load automatically and recharge battery.
- The controller is equipped with manual three-phase dump load switch. To using this switch, the hydroelectric generator will carry out three-phase dump load forcibly.
- The inside of controller is equipped with surge arrester. Limit instantaneous over voltage into hydroelectric generator within the controller or system bearable voltage range, or conduct the strong lightning current into earth to protect the equipment from lightning shock damage.

- ▲ Adopt Modbus communication protocol. It is convenient for customers to develop again.
- ▲ Adjust controller technical parameters, through RS485 interface. It is convenient for professional customers to adjust different wind turbines.
- ▲ Support WIFI and GPRS. Customer can monitor the working status of hydroelectric generator system in real time through PC or mobile terminal, or check historical working status. Mobile terminal is compatible with Android and OS.
- ▲ Solar panel control system can be added according to customers' demand.
- ▲ For different hydroelectric generator type, the controller can be equipped with hydraulic, pneumatic, electric magnetic and other brake functions.

Pictures Of Controller



Operation Steps

1. The controller shall be strictly operated by professional personnel in accordance with operation steps and wiring diagram :

- Before operation, keep the Battery Switch in the state of OFF, the Manual Brake in the state of STOP, PWM dump load breaker in the state of OFF, then install and wire the controller.
- PWM dump load terminal of dump load is connected with PWM dump load terminal of controller, and three-phase dump load terminal of dump load is connected with three-phase dump load terminal of controller.(see the wiring diagram)
- Connect the three phase wires from generator with three phase wires terminals of controller. (see the wiring diagram)
- Keep the Battery Switch (or fuse) in the state of OFF, connect the battery group; misconnecting of positive electrode and negative electrode of the battery is forbidden.
- Connect the grounding wire with the controller grounding terminal; Connect the grounding terminal of dump load with the grounding wire. Grounding connection must be reliable and well.
- Optional connection: RS485 communication cable connection
RS485 terminal is connected with two wires (A and B). These two wires should be also connected to RS485/232 converter terminals, then connected with the supervising computer.

2. Manual three-phase dump load switch:

- When the battery is connected correctly, place the switch of the hydroelectric generator on the back plate on RUN, the hydroelectric generator is in operation state.
- When the machine is not in use or the flow is too strong or in dismantlement of the battery, loof the hydroelectric generator, then place the switch of the manual brake on STOP and make the hydroelectric generator in three-phase dump load state.

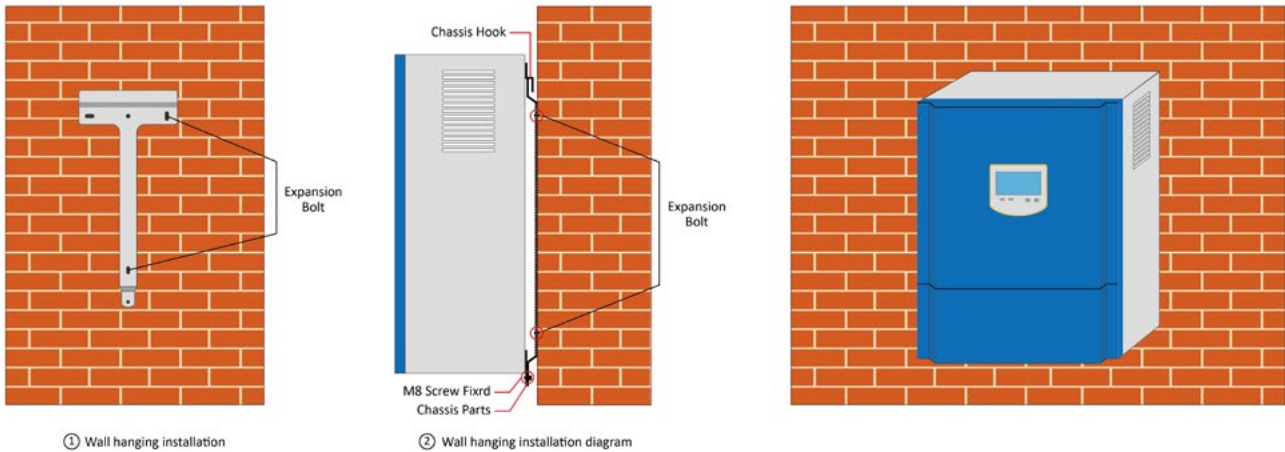
3. Follow operation steps to start the controller:

- Place the PWM breaker in the state of ON and connect well;
- Place the battery switch (or fuse) in the state of ON;
- Place the Manual Brake in the state of RUN.

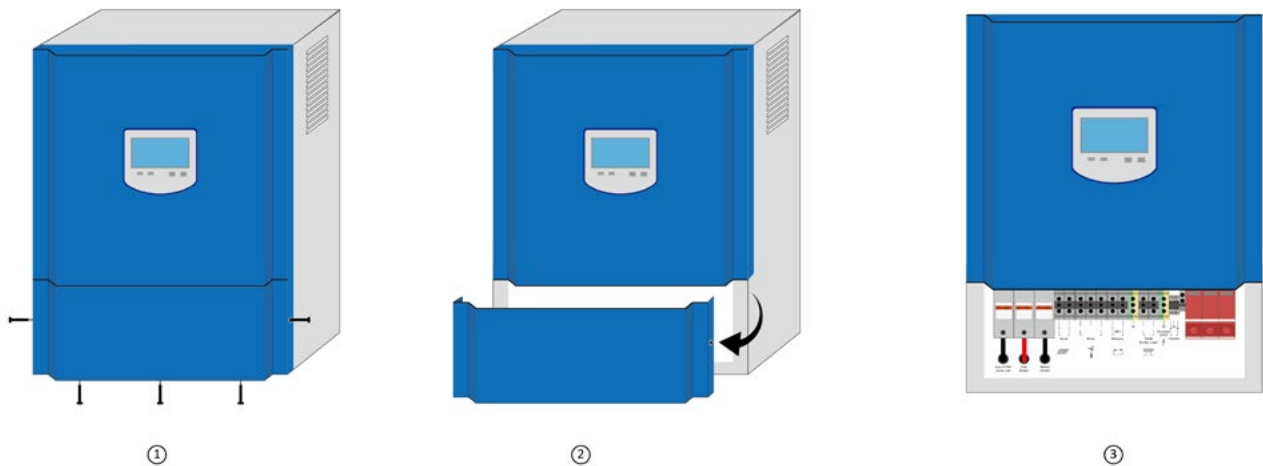
4. When the controller is maintained regularly, Please follow the operation steps as bellow:

- Before operation, keep the Manual Brake in the state of STOP;
- Place the Battery Switch (or fuse) in the state of OFF;
- Maintain or repair the controller;
- Start up the controller and place the battery switch (or fuse) in the state of ON;
- Place the Manual Brake in the state of RUN.

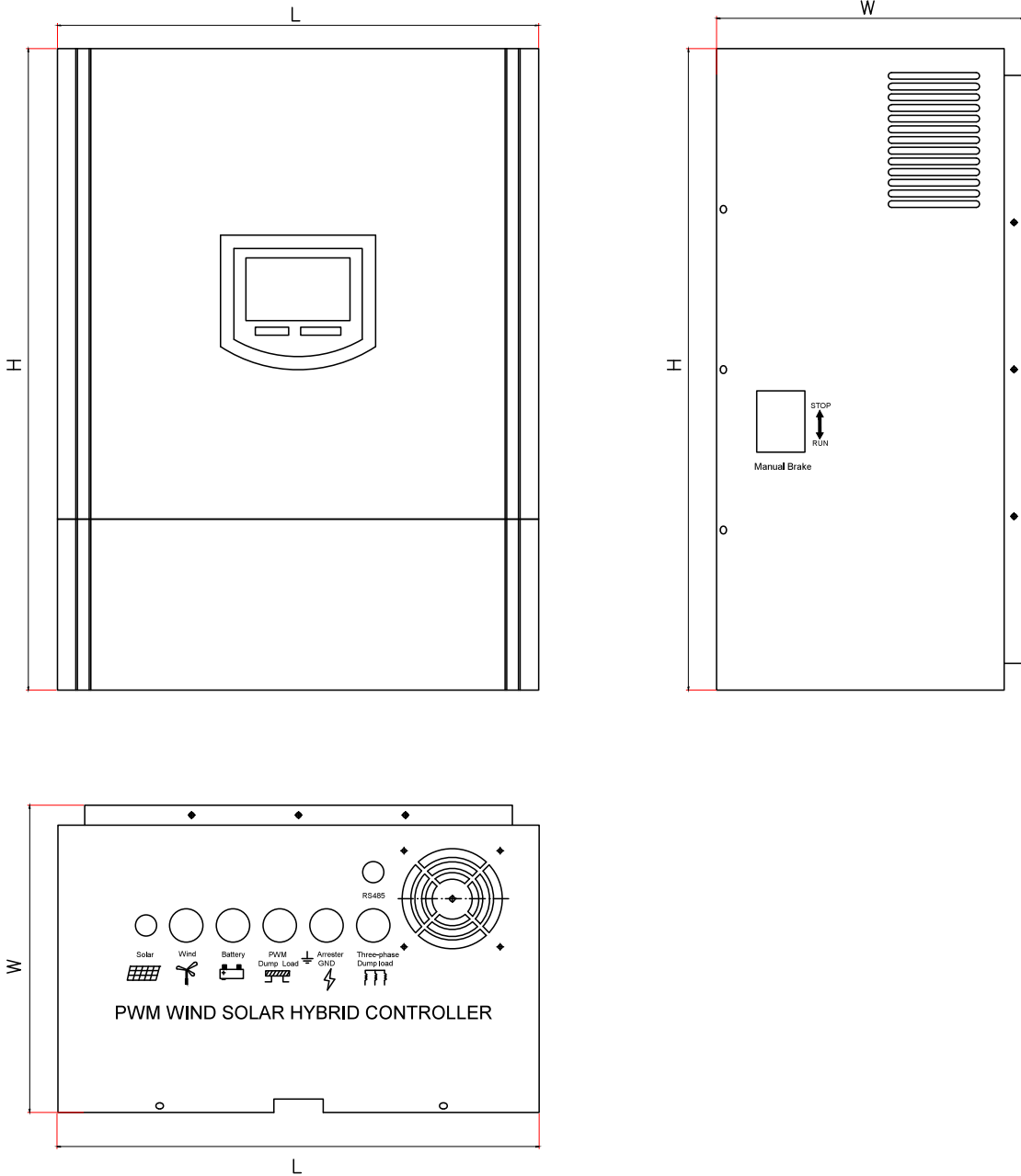
Installation Diagram



Remove Controller Wiring Step



Case Dimensions



Case Dimensions

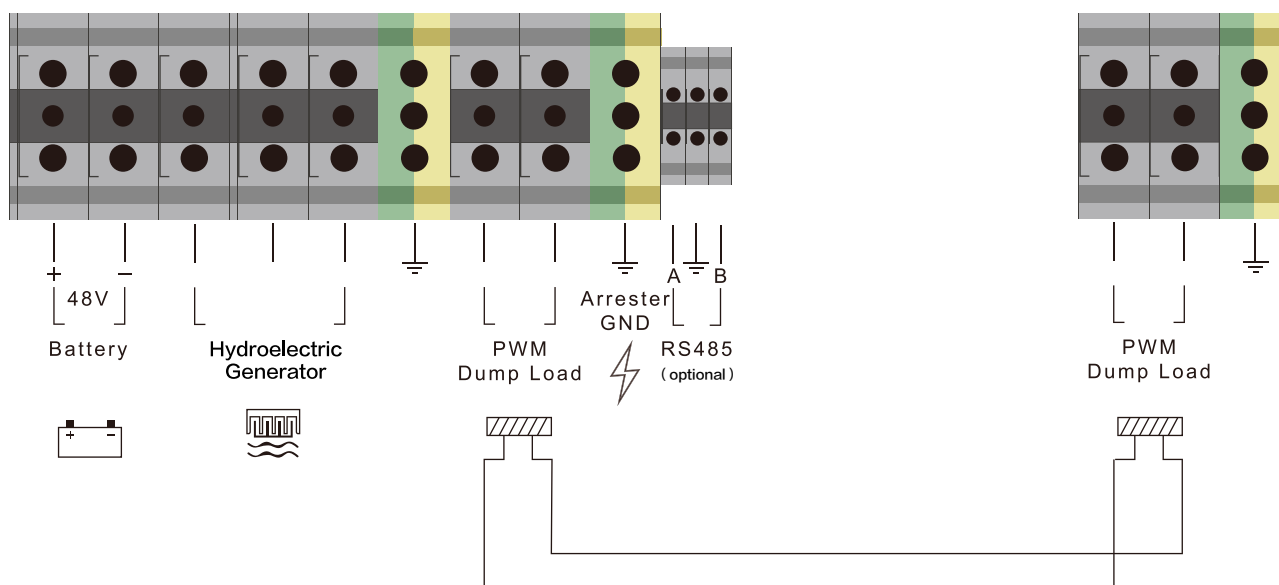
Model	L	H	W
1-3KW off grid hydroelectric generator controller	360mm	480mm	230mm
5-15KW off grid hydroelectric generator controller	400mm	550mm	230mm

Wiring Diagram

The connection wires adopt insulated copper cables. You can select cables according to 5A/mm² current density (for reference only). When connecting wires, ensure all wires reliable. Prevent terminal block and burned from overheating by large current phenomenon.

hydroelectric generator controller

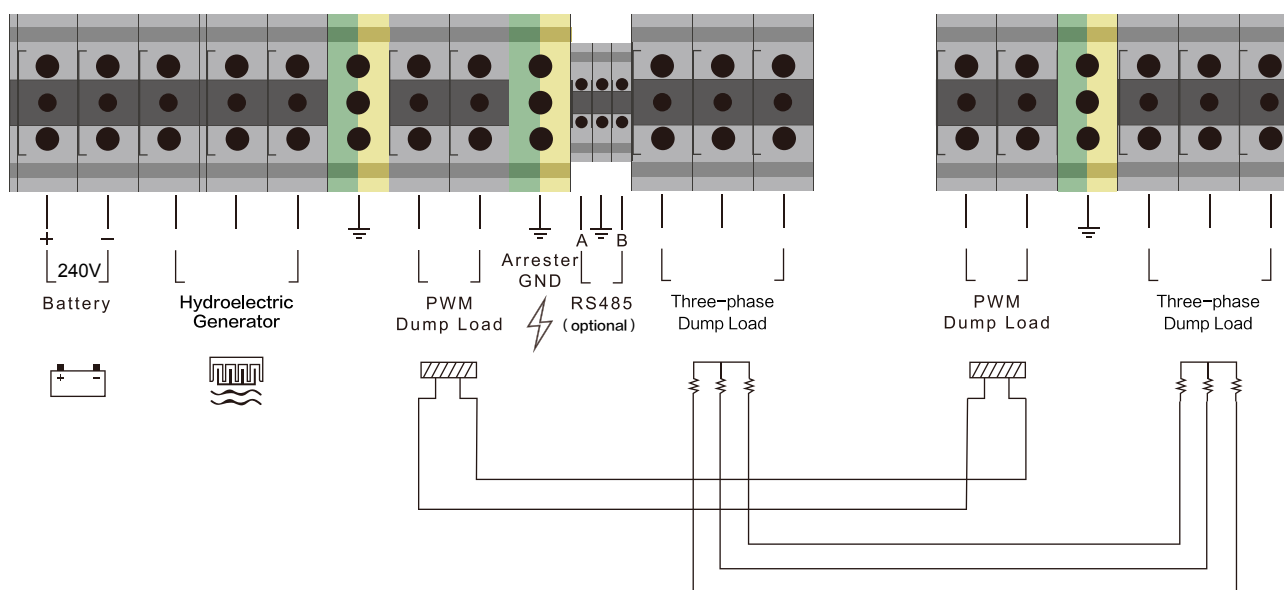
Dump load



1-3kw hydroelectric generator controller

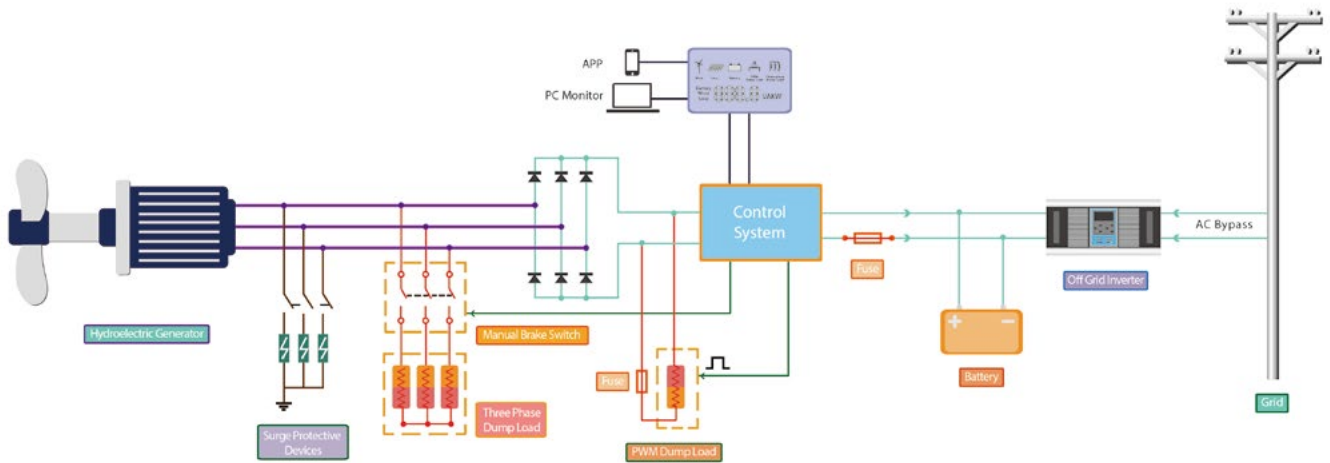
hydroelectric generator controller

Dump load



5-15kw hydroelectric generator controller

Functional Diagram



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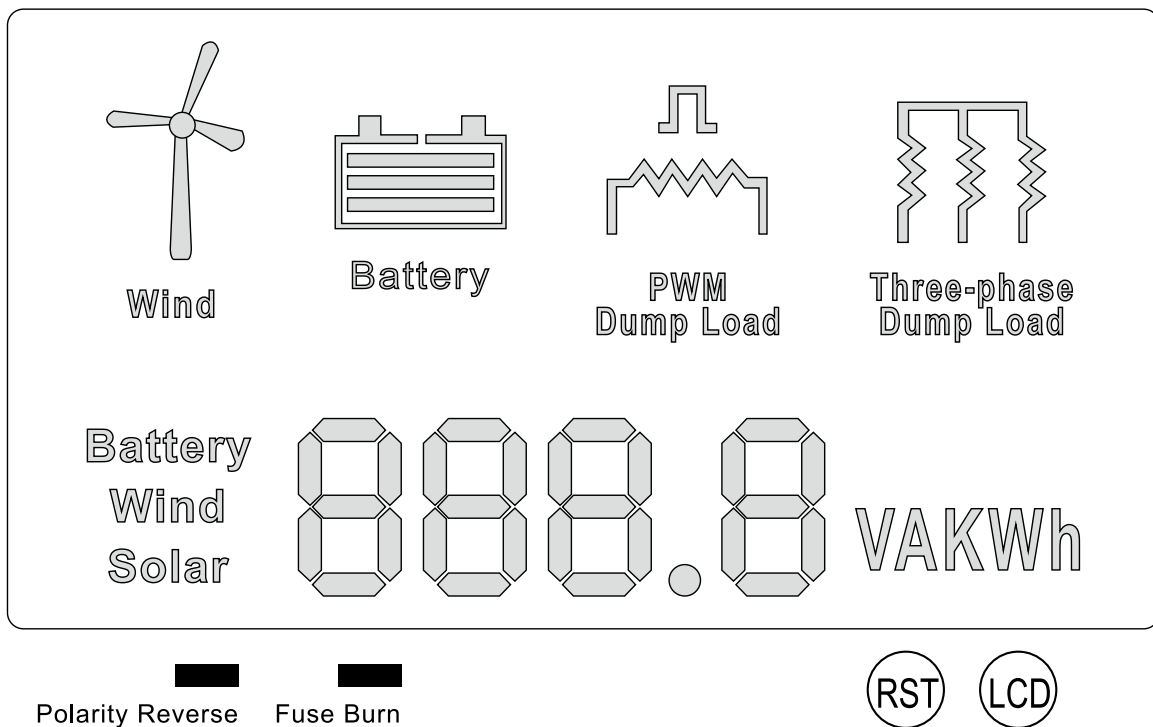
Liquid Crystal Screen Operation And Display

1. Operation Explanation

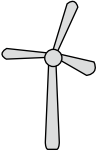
Press the front panel of the case, LCD screen light. Each press, parameters change again. Stop the operation 1 minute, LCD screen automatically put out, to save electricity.

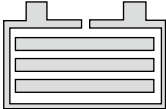
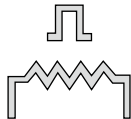
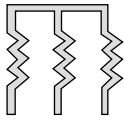
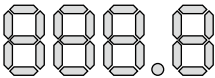
2. Display Explanation

LCD Screen Complete Content.



Including all contents displayed

IMAGE	EXPLANATION
 <p>Wind</p>	<p>Hydroelectric Generator The wind turbine images display, showed that hydroelectric generator running normally.</p>

 <p>Battery</p>	<p>Battery Battery internal strip graphics, showed battery power.</p> <p>When the battery charged enough, the battery voltage reached 125% of the rated voltage. The hydroelectric generator will automatically carry out three-phase dump load discharging to stop charging. The 3 strip graphics in battery box all display. When the battery voltage drops to 108% of the rated voltage, the wind turbine recovers to charge the battery.</p> <p>When the battery voltage is too low, the frame of the battery image will flashing, remind users battery is low voltage, at this time, please stop using battery, to charge battery, until stop flashing, just can be used.</p>
 <p>PWM Dump Load</p>	<p>PWM Dump Load In the conditions of strong or super-strong wind, battery charged by the wind turbine generator under constant voltage and current. Then this image display. When voltage of the battery drops to 108% of the rated voltage, the image not displayed.</p>
 <p>Three-phase Dump Load</p>	<p>Three-phase Dump Load When the battery is full (the battery pressure reaching 125% of the rated pressure), the controller will automatically carry out three-phase dump load discharging to stop charging battery. Then this image display.</p> <p>When the battery voltage reduces to 108% of the rated pressure, the three-phase dump load will stop discharging to automatically recover battery charging. Then the image not displayed.</p>
	<p>LCD display in digital form show the parameters value.</p>
<p>Fuse burn</p>	<p>Fuse burn indicator light, when fuse burn, remind users replace the fuse.</p>

3.LCD display parameters browse

- (1) After plus electric, system is in viewing conditions, LCD display battery voltage: Battery XXX.XV.
- (2) In viewing conditions, press the front panel of the case, will according to the following order cyclic display parameters.
 Battery voltage → charge current → charge power → Wind turbine voltage → Wind turbine charge current → Wind turbine power → Battery voltage.

Attentions

The controller has been fully designed to take into account the possibility of various accidents and take the corresponding protective measures. But not all protection measures are perfect, Frequently start some protection functions, such as short circuit protection and reverse connection protection, it will cause damage to the internal components of controller. So users should not rely on these protection functions, and the following notices are very important to extend the service life of controller.



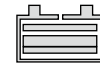
1. When generator is running, it is strictly prohibited to open or replace fuse, to prevent people from being injured or prevent the controller from being damaged. When replacing fuse, please place generator in three-phase dump load status and close off all switches of the controller, disconnect battery bank switch before checking or replacing fuse.



2. Operating Environment
 - The operating environment shall be dry, clean and well ventilated.
 - Avoid to use it in direct sunlight, exposed to sunshine, rain, humidity, acid fog environment.
 - Avoid to use it in dust and dirt environment.
 - The controller should be fixed on dry insulation board and equipped with a dust cover , where it is with good ventilation and heat dissipation; It is strictly prohibited to use in inflammable and explosive gases environment, be ware of sparks.



3. **Running out of battery or battery bank, and poor connection is one of the main factors causing fault.**
 - Running out of battery or poor connection, it will cause the charging voltage be too high or too low, over- discharge or overcharge protection function and frequent stop action cannot work normally
 - It is suggested that you check the battery capacity (check them with battery special measuring tool , please do not use multimeter), voltage, connection status periodically, clean rust stains on the terminals of positive and negative electrodes. (wind turbine should be in three-phase dump load status when checking the battery)



- When the battery voltage drops to less than 85% of rated voltage, **Battery** image will flash, please stop using battery immediately, and charge battery timely. Otherwise, battery will be damaged.
- This controller can not charge the running out or damaged battery. When battery voltage is 75% lower than the rated voltage, please replace the battery in time or charge the battery separately.



4. The maintenance-free battery shall be maintained periodically in accordance with user manual.



5. Do not connect inversely connect positive and negative electrodes of the battery.



6. The dump load matching with this controller produces high temperature when it is working, please place it in the place with better ventilation and heat dispersion , 2 meters away from the controller where human or livestock can not reach easily. Please do not cover it with other articles, do not use it in flammability, explosive gas environment to prevent from fire.



7. The controller should be managed by professional people for your personal safety, and it should be well and reliably grounded in case of electric shock. Grounding resistance should be less than 1 Ω , and connecting should be more than 10²mm.

Failure Analysis

1. When generator is running normally but the controller makes repeated pi-pa noises (or generator can not work), please turn off generator immediately and check whether the fuse is burn,whether battery positive and negative is disconnected or batteries are damaged.
2. After batteries are connected, but wind turbine can not work and the indicator is not on, please check whether the charging fuse is burn out, whether batteries are connected well, whether battery positive and negative is disconnected or batteries are damaged.

Battery Maintenance

Battery maintenance is very important in daily work. Different maintenance methods are used to different types and series of batteries.

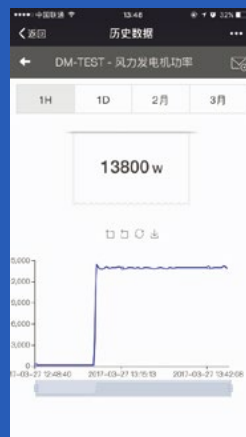
For lead-acid battery, except maintenance free type, the following points should be noted for daily maintenance:

1. Keep the battery clean always.
2. Prevent any external impurities falling into the battery.
3. All tools and materials must be kept in clean and covered place.
4. Sulfuric acid traces and dust on entire external of battery must be cleaned periodically.
5. The contact devices and connecting wires among every battery must be completely reliable.
6. If there is sealing cap and vent hole on the battery, it is necessary to check and clean the vent hole.
7. Pay attention to the liquid height of the electrolyte level, do not let the pole plate and the partition board be out of the level.
8. The electrolyte must be adjusted at normal density (1.26—1.28)g/cm³. (This parameter can be based upon user manual) and it can only be adjusted after battery is finished charging.
9. During the discharge process, the terminal voltage and electrolyte density of each battery should be checked frequently and pay close attention to the discharge degree of battery and never allow the electrolyte density and terminal voltage to be lower than the allowable range of this type battery discharge rules.
10. The electrolyte temperature shall not exceed the rated value in the user manual, which is usually 45°C .
11. If the battery is laid aside for a long time, in order to avoid excessive self-discharge and severe sulfuric acid salination, it should be recharged once a month.
12. Check the battery once a month, and replace those batteries which are damaged or with excessively low capacitance.

DeMing APP

DeMing APP is intelligent terminal for hybrid wind solar power, PV power station monitoring and management person. It helps users to master power station running status at anytime and anywhere, realize remote data monitoring of hybrid wind solar power and PV power station, ensure convenient management and monitoring timeliness. System displays hybrid wind solar power station and PV power station running data by visual table, includes power station power generation, benefit, CO2 emission reduction benefit, equipment running status, equipment real-time data, history data query, power generation comparison, equipment performance comparison. As fashion and intelligent application, it can let user demonstrate his hybrid wind solarpower station and PV power station at any occasion, user has intuitive feeling, enhance user confidence.

- Various data output interface, support Android, iphone, ipad, windows, macOS
- Delicate and precise data, easy to operate, download and install, Wechat binded, real-time monitoring, data synchronization
- 24-hour monitoring
- Low maintenance cost
- Power station information sharing function



Optional Parts



1.RS485 to WIFI



2.RS485 to GPRS



3.RS485 to Ethernet



4.RS485 to USB



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