POWERTECH

160W Folding Solar Panel
& Charge Controller
ZM9178
User Manual

USER MANUAL

Please ensure that you have read the product manual and instructions in full prior to use. Failure to do so may result in incorrect operation and therefore impact on the products performance.

PART LIST

1 x 12V 160W Folding Solar Panel
1 x 10A PWM Solar Charge Controller
1 x 5m Extension Lead with Anderson Connectors
1 x Anderson to Alligator Clips Lead
1 x Heavy Duty Storage Bag

SAFETY PRECAUTIONS

1. This product is designed for portable short-term use, It is NOT suitable for long term permanent installation
2. Solar panel will start producing electricity as soon as they are exposed to the sun. Care must be taken when connecting the DC clamps to the battery and joining cable. To reduce the risk of an electric shock or short circuit, it is recommended to place a blanket or tarp over the panels or block out any sunlight temporarily while all connections are made
3. Care must be taken when handing this product and while in use
4. Keep away from any flammable substances.
5. Make sure to connect with correct polarity
6. Battery must be removed from the confines of a vehicle when connected to the solar controller.
7. Always adhere to battery manufacturer's recommendations when charging batteries.
8. Always avoid charging old, damaged or overly discharged or defective batteries.
9. Keep the surface of the solar panels clean from dust by wiping with a soft cloth. Do not walk on the solar panel.
10. To reduce the risk of injury, charge only 12V lead-acid batteries, AGM and gel batteries. Other types of batteries may be subject to bursting which can lead to personal injury and property damage.
11. This system is not intended for use by young children.

INSTALLATION GUIDE

Step 1:

Locate a clear sunlit area free from overhanging branches or heavy shade.

Step 2:

Unfold the solar panels, adjust the two supports to the suitable angle.

Step 3:

Always face the front side of solar panels toward the sun.

Wipe down the panels with a microfiber cloth to remove any dust or debris.

Note:

To ensure maximum possible output we recommend that the solar panels are regularly re-aligned to follow the sun's movement.

Wipe the solar panel with microfiber cloth for maximum efficiency.

ABOUT THE REGULATOR

1. Safety Information

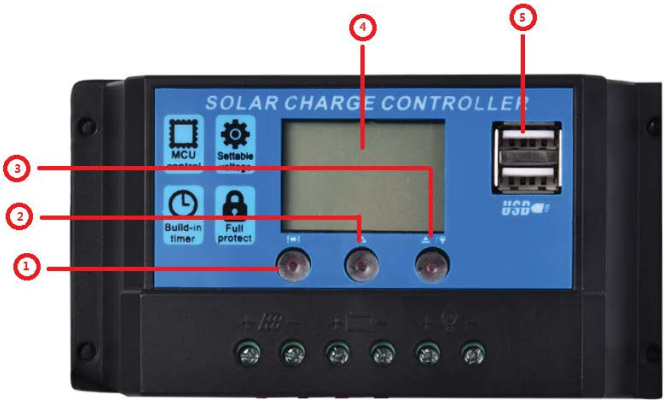
- Read all of the instructions in the manual before installation.
- DO NOT disassemble or attempt to repair the regulator.
- Disconnect the solar panel before installing or moving the regulator.
- Power connections must remain tight to avoid excessive heating from a loose connection.
- Only charge 12V batteries that comply with the parameters of regulator.
- Battery connection may be wired to one battery or a battery bank.

2. Overview

The 12V/10A regulator is a PWM charge regulator with USB output that uses the most advanced digital technique. Regulator features as follows:

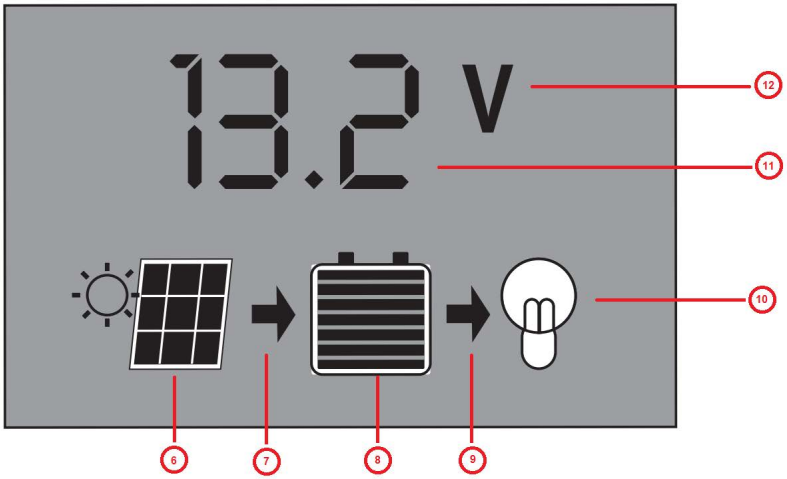
- Support 3 charging options: AGM, Gel &Flooded lead acid battery
- Battery status LED indicator indicates battery situation
- The USB will provide power supply that can charge electronic equipment
- Battery type and load output can be set via button
- Extensive Electronic protection

3. Regulator unit



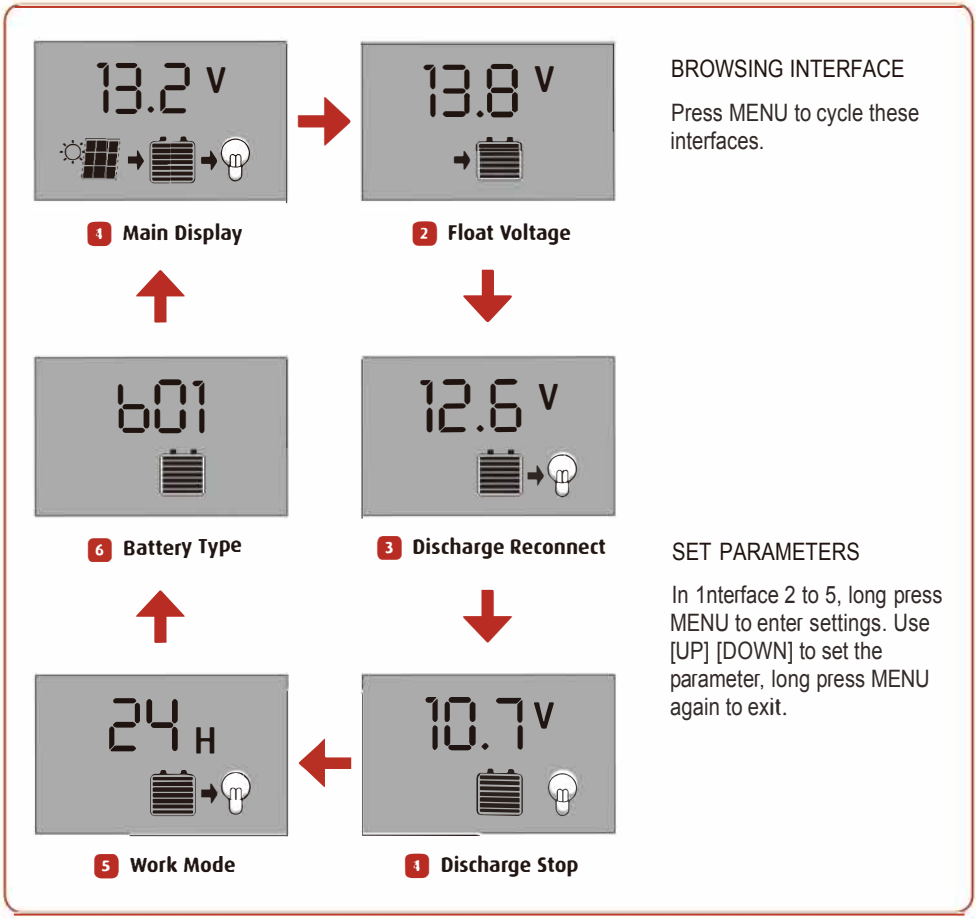
1. MENU KEY 2. PAGE UP 3. PAGE DOWN/OPERATION
4. LCD DISPLAY 5. USB CONNECTIONS

4. LCD DISPLAY



6. Sun icon: Solar panel is charging
   Moon icon: Solar panel is not charging
   Solar panel icon: Solar panel is connected to battery
7. Input-Connected battery is being charged
8. Battery is connected to solar panel
9. Output-Device is connected via USB
10. Connected battery in use to charge USB connected device
11. Voltage, battery type connected or charge hours
12. Voltage

REGULATOR FUNCTIONS



BROWSING INTERFACE

Press MENU to cycle these interfaces.

SET PARAMETERS

In 1nterface 2 to 5, long press MENU to enter settings. Use [UP] [DOWN] to set the parameter, long press MENU again to exit.

- The regulator is only suitable for lead acid OPEN, AGM and GEL batteries. It is not suited for nickel metal hydride, lithium ion or other batteries.
- Charging will stop if the battery falls below the selected'Discharge Stop' voltage. Default is 10.7V.

INSTALLATION SEQUENCE:

1. Battery to Controller
2. Panel to Controller
3. Appliance (or USB) to Controller

Uninstall in reverse

SETTINGS DESCRIPTION

1.**MAIN**
This will display only when a battery is connected. It shows the current output voltage to the battery.

2.**FLOATING VOLTAGE**
Pre-set at 13.8V. This is the maximum Voltage the battery will be charged to.

3.**DISCHARGE RECONNECT**
Pre-set at 12.6V. This is the Voltage that the
regulator will recommence output to the "output terminals" and the USB, in situations where the "Discharge Stop" Voltage (pre-set at 10. 7v) has been reached. This gives the battery some juice before power output recommences.

4.**DISCHARGE STOP**
Pre-set at 10. 7V. This is the lowest Voltage the regulator will allow the battery to reach, before disconnecting the output to the "output terminals" and the USB. This protects the battery from over-discharging. Power will recommence once the battery voltage reaches the "Discharge Reconnect" voltage (Pre-set at 12.6v)

5.**WORK MODE**
Pre-set at 24H. This means the output to the "output terminal" and USB will always be active (as long as there is sufficient power in the battery). Other hour settings mean that the output to the "output terminals" and the USB will continue for the set period of time after the last detection of light. For e.g. if set at 1H, the regulator will continue output for an hour after the last detection of light.

6.**BATTERY TYPE**
Set the type of battery you have. B01 is for sealed batteries. B02 is for colloid batteries. B03 is for open batteries.

7.**NOTICE**
THE REGULATOR IS ONLY SUITABLE FOR LEAD ACID OPEN, AGM AND GEL BATTERIES. IT IS NOT SUITABLE FOR NICKEL METAL HYDRIDE, LITHIUM ION OR OTHER BATTERIES.
CHARGING WILL STOP IF THE BATTERY FALLS BELOW THE SELECTED " DISCHARGE STOP" VOLTAGE. DEFAULT IS 10.7V.

TROUBLESHOOTING

PROBLEM	POSSIBLE CAUSE	POSSIBLE SOLUTION
Solar panel is exposed to sunlight but the charging indicator on the regulator is not lit.	Battery is not properly connected to the regulator or the regulator is not properly connection to the panel, or the sunlight is too weak.	1. Check all connections to make sure the regulator is properly connected to both the battery and the panel. 2. Wait until the sun shines more brightly or the weather condition improves.
Without load, battery indicators stay at the same level even after charging for a long period of time.	The battery is damaged or has died and no longer holds an adequate charge.	Replace the battery.
Battery indicator on regulator flashes no output.	The battery is over-discharged.	Disconnect the load from the battery and charge the battery for a longer period of time.
There is no voltage output reading from the panel.	The output cables may not be connected correctly.	Verify that the output cables are connected to the battery correctly.
The charge indicator on the regulator doesn't come on.	Battery voltage is too low. Battery fuse is blown (if applicable).	Check the battery voltage. If the battery voltage is too low (often less than 8V), the controller will not work. Check the fuse. The fuse will typically be blown for the following reasons: 1. Battery poles +/- are reversed or a short circuit occurred. 2. Solar controller output current over the level specified for that controller.

TECHNICAL SPECIFICATIONS

Type	Mono Crystalline Solar Cells
Peak Power	160W
Rated Voltage	12V
Voltage @ Peak Power	18.0V
Current @ Peak Power	8.88A
Open Circuit Voltage	22.30V
Short Circuit Current	9.19A
Maximum system Voltage	1000V DC
Gross Weight	15 kg
Panel Dimensions	1355(W)x780(H)x35(D)mm(open) 675(W)x780(H)x75(D)mm(closed)

REGULAR MAINTENANCE

To maintain the long-term and trouble-free performance of your solar panel system, it is recommended that you follow these guidelines prior to each operation:

• Always check to ensure that the product is clean and in good working condition with no visible defects or damage.
• Ensure that the environment where the solar panel system is going to be placed has adequate ventilation.
• Make sure that all connection cables and extension cables are undamaged and in good working order.
• Make sure all connectors are clean and free of dust, debris and/or rust.
• Keep the surface of the solar panels clean from dust by wiping with a soft cloth.

DISCLAIMER

This warranty does not apply under the following conditions:

- Damage from improper use or use in an unsuitable environment.
- User disassembly or attempted repair the regulator without permission.

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