# JSM POWER CONVERTION CC

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***For the development and production of power electronic products***

# User Manual

# 80 A MPPT Solar Regulator




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## Specifications

| | | |
|---|---|---|
| **Solar Input Voltage Range** | **:** | 30 - 200 Vdc |
| **MPPT Voltage Range** | **:** | 30 – 160 Vdc |
| **Battery Output Voltage** | **:** | 24V, 36V or 48V (self detect) |
| **Output Current** | **:** | 80A max (settable) |
| **Charging scheme** | **:** | Equalize/Boost/Float |
| **Efficiency** | **:** | >95% |
| **Dimensions (dxhxw)** | **:** | 160mm x 305mm x 240mm |
| **Weight** | **:** | 7 kg |

## Protection

| | | |
|---|---|---|
| **Over Current Protection** | **:** | Electronic/DC circuit breaker on Battery |
| **Over Voltage Protection** | **:** | 200 V |
| **Over Temperature Protection** | **:** | >70°C |
| | **:** | Switch on again under 65°C |

## Other Features

| | | |
|---|---|---|
| **Zero Spark Connection** | **:** | DC Circuit Breaker |
| **Cooling** | **:** | Fan cooled( switch on @ 50°C) |
| **Auxiliary Relay** | **:** | Dump excess power |



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## Mounting of the Regulator

The Regulator must be wall mounted in a vertical position as shown in the picture.


## Connecting the Regulator

**Make sure the DC Breaker is switched off, before the solar panels and battery is connected.** Connect the battery and solar panels as indicated ( see picture below ).




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**Do not reverse polarity the Battery connections.** The Battery wires should be at least 16 mm². The MPPT voltage of the solar panels must always be bigger than the battery voltage. It is always better to connect the solar panels to get the highest voltage as possible (below 200V). If the voltage is high the current is low and the wire size is smaller. Use the following formula to calculated the size of the solar panel wire:

$$A = \frac{Power}{Vmppt * 5}$$

Were A = area of wire in mm²
Power is the Max power of the solar array in Watts
Vmppt is MPPT voltage of the solar array

Example : 3 kW of solar panels with MPPT voltage = 100V;

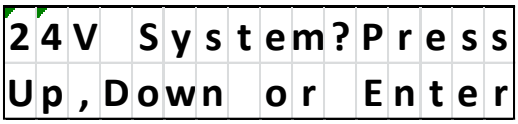
$$A = \frac{3000}{100 * 5}$$

A = 6mm²

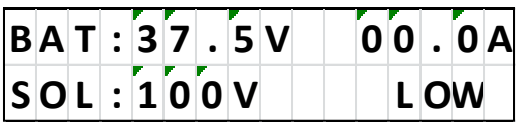
## Operation

Before the DC Breaker is switched on, make sure of the polarity of the wires and make sure all the connections are tightened. Switch on the DC Breaker. One of the following screens will be displayed :

**1.**




**2.**




If screen (1) is displayed it means that the regulator is connected to a different battery than before. The regulator measures the battery voltage at start-up and decides what battery pack it is (24V, 36V or 48V). For safety this needs to be confirmed by the user. If you are happy with the selection of the battery pack, just press ENTER.

If screen (2) is displayed it means the battery pack did not change from the last time the regulator was start-up. After 5 s the Regulator will start charging the battery if there is enough power available from the sun. While the regulator is charging the batteries it will keep changing the Solar Voltage to determine what the MPPT Voltage of the panels is, for optimum performance.



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## LCD Display and keypad

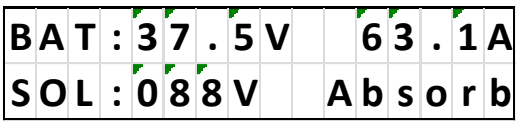
On the front of the Regulator is a LCD display and keypad to view and set certain parameters.

### Viewable parameters :

1. Battery Voltage
2. Battery Current
3. Solar Voltage
4. In what state the Regulator is
5. Power into Battery
6. Today's Energy into Battery (kWh)
7. Heatsink Temperature
8. Ambient Temperature – not used

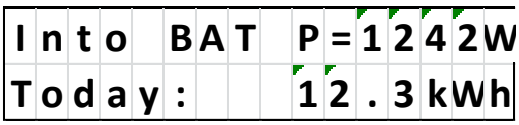
The Viewable parameters are displayed on 3 different screens. The 3 screens are shown below. Use the UP and DOWN buttons to scroll through the screens.

**1**.



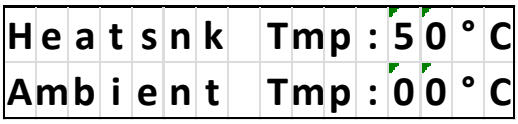

On this screen the Battery voltage, Battery current and Solar voltage is displayed. This screen also displays the state of the regulator, *Absorb*, *Equalize* or *Float*. If *Low* is displayed it means the power for the sun is to low and the batteries will not charge, after 5 minutes the regulator will try again to see if there is enough power to charge the batteries.

**2.**




This screen displays the instantaneous power into the battery and the energy (kWh) into the battery for today. This counter is cleared each morning when the sun rise.

**3.**




This screen displays the heatsink temperature. If the heatsink temperature goes above 50°C the fan out the back of the regulator will switch on to cool down the heatsink and the inside of the box. Ambient Temp is not used and will display 00°C



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## Settable Parameters :

To access these parameters you need to press the "Menu/Enter" button till the following screen appears.

| Password to Set |
|---|
| Parameters 000 |

Press the "Up" or "Down" buttons (can be held in for quick counting) till the Password is 234, and then press "Menu/Enter". The different settable parameters will appear. The values can be changed by using the "Up" and "Down" buttons and then press the "Menu/Enter" button to go to the next parameter.

You need to go through all the screens till you get the following screen,

| PRESS |
|---|
| RESET |

You need to press "Reset" before the parameters will be updated.

The screens will appear in the following sequence. (Default setting in bold)

1. Float Voltage (12V – 15V/ 12V battery) – **13.5 V / 12V battery**
2. Absorb Voltage (12V – 15V / 12V battery) - **14V / 12V battery**
3. Absorb Time ( 0 – 600 min ) – **60 min**
4. Equalize Voltage ( 12V – 15V / 12V battery) – **14V / 12V battery**
5. Equalize Time ( 0 – 600 min ) – **60 min**
6. Maximum Charge Current ( 10A – 80A ) – **80A**
7. Days between Equalize ( 0 – 90days ) – **OFF**
8. Aux Relay Mode - **OFF**
9. Aux Relay ON Voltage ( 12V – 16V / 12V battery) – **14 V**
10. Aux Relay OFF Voltage ( 12V – 16V /12V battery ) – **13.5V**



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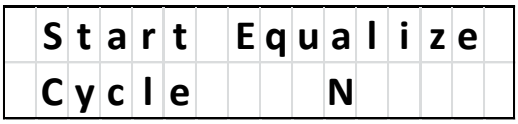
## Equalizing Batteries

Some batteries needs to be equalized from time to time. The Regulator can be set to do an automatic equalize cycle every few days or the user can do an equalize cycle manually. To do a manual equalize press the "Menu/Enter" button until the following screen appears :




Press the "Up" or "Down" button to change *"N"* to *"Y"* , then press the "Menu/Enter" button. The Regulator will start an Equalize Cycle immediately.
For automatic equalize set the parameter *"Days between Equalize"* to the number of days you want between each Equalize Cycle.

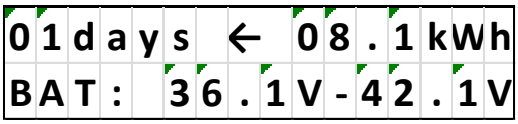
## Auxiliary Relay

The Regulator has a build-in Relay (30A max) that can be used to switch on any load if the batteries are fully charged. Parameters (8 – 10) is used to control this Relay. The relay can be switched on if the batteries reached float or at settable Voltage levels.

1. If parameter *"Aux Relay Mode"* is set to *"On in Float"* the relay switch on if the batteries is floating and will switch off if the battery voltage drops 1v below float voltage.
2. If the parameter *"Aux Relay Mode"* is set to *"Voltage Levels"* the Auxiliary Relay will switch on if the battery voltage is above *"Aux Relay ON Voltage"* for more than 1 minute. The Auxiliary Relay will switch off if the battery voltage drops below *"Aux Relay OFF Voltage"* for more than 1 minute.

## Data logging

Press the "Menu/Enter" button until the following screen appears :




Data is logged for up to 99 days back. *"01days"* means yesterday's data, *"02days"* is the data for 2 days back and so on. Data is updated in the morning when the sun rise.
The minimum and maximum battery voltage is displayed as well as the kWh's generated for that specific day. **If the Reset Button is pushed or the DC Breaker is switched off, all these saved values will be cleared.**

"The End"

**Enjoy your High Quality, South African Developed and Manufactured product.**



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