

# HPP1 MK6-15A/20A R00 Owners Manual

## TABLE OF CONTENTS

|   | <b>Page</b> |
|---|-------------|
| 1 Introduction.....                                 | 2           |
| 2 Model.....  | 2           |
| 3 Safety warnings.....                              | 2           |
| 4 Contents.....                                     | 2           |
| 5 Features.....                                     | 2           |
| 6 Installation.....                                 | 3           |
| 6.1 Mounting the unit:.....                         | 3           |
| 6.2 Connecting the battery:.....                    | 3           |
| 6.3 Connecting 12V loads (12V outputs):.....        | 3           |
| 6.4 Connecting 220VAC/240VAC:.....                  | 3           |
| 6.5 Connecting the DC to DC charger (vehicle):..... | 3           |
| 6.6 Connecting the solar panel:.....                | 3           |
| 7 Operation.....                                    | 4           |
| 7.1 Battery Maintenance:.....                       | 4           |
| 7.2 Battery monitor:.....                           | 4           |
| 7.3 12VDC outputs and loads:.....                   | 4           |
| 7.4 220VAC/240VAC to 12V charger:.....              | 4           |
| 7.5 DC to DC 12V charger:.....                      | 4           |
| 7.6 Solar charge controller:.....                   | 5           |
| 7.7 (Optional) 180W pure sine wave inverter:.....   | 5           |
| 8 Troubleshooting.....                              | 5           |
| 9 Specifications.....                               | 6           |
| 10 Warranty.....                                    | 7           |

# HPP1 MK6-15A/20A R00 Owners Manual

## 1 INTRODUCTION

The HPP1 MK6 power panel is a complete power managing system developed for leisure and off-road use in remote areas where utility power is not always available. The unit has the ability to charge rechargeable 12V Lead Acid/Crystal/LiFePO4 batteries from three different sources, 220VAC/240VAC (Mains), 12VDC (Vehicle) and Solar panels. A 180W Pure Sine Wave inverter is optional. The unit has a Digital Battery Monitor with the ability to illustrate battery voltage and current. A battery under voltage lockout unit is standard, disconnecting all loads if the battery voltage reaches 11.0V preventing the battery from being damaged. The battery 12V input is fused with a 25Amp (30Amp if inverter is fitted) fast blow blade fuse, with the 12V being distributed to separate outputs, each with its own resettable fuse. 220VAC/240VAC outputs are provided with a SA 3-pin socket, a EURO socket (3-pin) on the front lid and with an IEC female socket on the base, if more 220VAC/240VAC outputs are required; all 220VAC/240VAC outputs comes via an earth leakage and 10Amp circuit breaker.

## 2 MODEL

HPP1 MK6-15A R00 (15Amp version)  
HPP1 MK6-20A R00 (20Amp version)

## 3 SAFETY WARNINGS

- Do not open the unit while connected to power, the internal circuitry contains high voltages and may result in shock.
- Do not connect or work on any wiring if the unit is connected to power.
- Use the unit for what it is specified.
- Do not replace fuses while the unit is connected to power, battery or AC mains.
- If fuses are replaced, replace with the fuses provided, or with a fuse of the correct type and rating.
- Only use with Lead-Acid (AGM, Gel, Flooded, etc) or LiFePo4 12V batteries of 70Ah or higher capacity

## 4 CONTENTS

1x HPP1 MK6 power panel  
1x 3.15 Amp spare replacements glass fuse for 220VAC charger  
1x 25Amp/30Amp spare replacements blade fuse (30Amp if inverter is fitted)  
4x M6x16 screw  
4x M6 hex nut  
4x M6 flat washer  
4x M6 spring washer  
1x Brochure  
1x Brad Harrison (grey) connector (Including terminals) (Aux Battery input)  
1x IEC female power cable (Input 220VAC/240VAC 50Hz 10A)  
1x IEC male power cable (Optional) (Output 220VAC/240VAC 50Hz 10A)

## 5 FEATURES

- 220VAC to 12 Volt 15/20Amp Multistage Lead-Acid(AGM,GEL,Flooded)/LiFePO4 battery Charger with Fast and Trickle charge indicator.
- DC to DC 15/20A car charger (does not require dual battery switch or solenoid in car)
- Digital Voltage and Current Monitor
- Dual dedicated USB charging port
- Optional 180W 220VAC true sine wave inverter
- Battery under voltage lockout to prevent deep cycling and damage to battery
- Battery low and blown fuse indicator

# HPP1 MK6-15A/20A R00 Owners Manual

- Integrated 270/330Watt Solar Charge Controller with MPPT
- LED charge source indicator
- Integral thermostatically controlled cooling fan
- Can operate from any combination of 220VAC, Car or Solar Panel
- Short circuit protection on all outputs
- Supplied with mounting hardware
- Supplied with all connectors required
- Easy to install
- Warranty two years

## 6 INSTALLATION

### 6.1 Mounting the unit:

- Install the unit in a dry place where it is not exposed to rain or water.
- Install the unit with a 10cm clearance around the unit to allow ventilation.
- Do not block the ventilation holes on the sides of the unit.
- Mount the unit on a sturdy support structure.
- Use the M6 or self tap screws provided to mount the unit.

### 6.2 Connecting the battery:

- Use the Brad Harrison (grey) connector for connecting the battery.
- Use 6mm<sup>2</sup> wire from panel to Aux battery
- Make sure the wires are crimped tightly in the terminals and that the terminals are inserted all the way inside the grey housing, the terminals will clip inside the connector.
- The connector must be plugged into the Aux Battery input on the bottom on the base of the power panel. Make sure the connector is plugged in thoroughly.

### 6.3 Connecting 12V loads (12V outputs):

- Connect each load to the specified output (Lights, Fridge, Pump and Sockets).
- Make sure the polarity is correct.
- Use 4mm<sup>2</sup> wire for the fridge for up to 2m and 6mm<sup>2</sup> for distances of more than 2m
- Ensure the wires do not come out.
- When inserting the wire into the connector make sure all the wire strands enter the connection opening to prevent shorts. (Wire diameter see diagram).

### 6.4 Connecting 220VAC/240VAC:

- An IEC female power cable is provided to connect the 220VAC/240VAC supply.
- The power cord must be plugged into the “Input 220VAC/240VAC” input on the bottom on the base of the power panel.
- If more outputs are required an IEC male power cable can be provided to fit more 220VAC/240VAC outlets, this must be plugged into the 220VAC/240VAC output (this power cable is optional).

### 6.5 Connecting the DC to DC charger (vehicle):

- Connect the wires coming from the vehicle to the connector block on the base of the panel marked “Vehicle 12V Input”.
- Make sure the polarity is correct (The external 25A/30A blade fuse will blow and the BF LED will turn ON if the polarity was incorrect).
- Use 10mm<sup>2</sup> panel wire for both positive and negative wires.

### 6.6 Connecting the solar panel:

- Connect the solar panel to the connector where specified, make sure the polarity is correct.

# HPP1 MK6-15A/20A R00 Owners Manual

- Unscrew the screw on the top of the connector, insert the wires and tighten the screw thoroughly to make sure the wires do not come out.
- When inserting the wire into the connector make sure all the wire strands enter the connection opening to prevent shorts. (Wire diameter see diagram).
- See table below for suggested wire diameter for the solar cable.

| Solar Power | For 5m cable use wire size: | For 10m cable use wire size: |
|-------------|-----------------------------|------------------------------|
| 90W         | 2.5mm <sup>2</sup>          | 4.0mm <sup>2</sup>           |
| 180W        | 4.0mm <sup>2</sup>          | 6.0mm <sup>2</sup>           |
| 270W        | 6.0mm <sup>2</sup>          | 6.0mm <sup>2</sup>           |
| 330W        | 6.0mm <sup>2</sup>          | 10mm <sup>2</sup>            |

## 7 OPERATION

### 7.1 Battery Maintenance:

Keep the battery on charge when stored or not used, switch OFF all loads and leave the 220VAC/240VAC to 12V charger ON. If the battery is left connected to the panel without it being charged the battery will slowly be drained even if all loads (12V outputs) are OFF.

### 7.2 Battery monitor:

The battery monitor is switched ON and OFF with a switch below the display, marked ON/OFF, the switch above the ON/OFF switch selects the function that must be displayed. If this switch is in the “A” position the battery net current will be displayed (the battery net current is the difference of current going in and coming out of the battery) if the battery is being discharged the monitor will display a negative value (example “-2.5”), if the battery is being charged it will display a positive value (example “2.5”), if this switch is in the “V” position the battery voltage will be displayed.

### 7.3 12VDC outputs and loads:

All 12VDC outputs are supplied with power via an under voltage lockout unit and is controlled by a “Master” 12V ON/OFF switch located on the front lid, **if this switch (12V ON/OFF switch) is turned OFF, all 12V outputs will be OFF.** The under voltage lockout unit has a turn on level of **13.0V** and turn OFF level at **11.0V**, if the master switch is ON and the battery level decreases below 11.0V all outputs will be switched OFF and the “BL” will come on, when the battery voltage increases above **13.0V** the outputs will turn on automatically. When the battery voltage is between **11.0V** and **13.0V**, the 12V outputs can be forced on by switching the master OFF and then ON. The Pump and Lights outputs have individual switches, the fridge and sockets do not have individual switches and are controlled by the UVLO and Master Switch. Each output has a resettable fuse which will disconnect (open) if the output is overloaded and connect (close) if the overload disappears.

### 7.4 220VAC/240VAC to 12V charger:

The charger is supplied with power through the earth leakage, 10Amp circuit breaker, 3.15A fast blow fuse and a switch marked “Charger ON/OFF”, all of the previous mentioned components must be ON for the charger to switch ON. The status of the AC charger will be indicated by the “AC” LED on the front lid. The charger will control the fan on the side of the power panel to regulate its heat sink temperature.

#### AC LED indicator:

- Turns Amber if fast charging and charging current is more than 4A.
- Turns Green if trickle charging and current is less than 4A.

### 7.5 DC to DC 12V charger:

The DC to DC charger is a 15Amp/20Amp charger (depending on model). The “Vehicle 12V Input” on the base of the power panel must be connected to the vehicle (see diagram). The DC to DC charger will start charging automatically when the vehicle 12V Input voltage reaches 13.3V and will stop charging when reaching 12.5V. The DC to DC charger status is indicated by the “DC” LED on the front lid, the charger will control the fan on the side of the power panel to regulate its heat sink temperature.

# HPP1 MK6-15A/20A R00 Owners Manual

## DC LED indicator:

- Turns green if charging from vehicle.

## 7.6 Solar charge controller:

The solar charge controller works with a 12V system solar panel and is a MPPT (Maximum Power Point Tracking) regulator with a maximum input rating of 270W/330W (depending on model). The solar panel open circuit voltage must not exceed 26VDC. When a solar panel is connected the “SP” LED will be ON when the charge controller is charging. If the **220VAC/240VAC to 12V charger is charging (ON), the solar charge controller will automatically switch OFF.**

### SP LED indicator:

- Turns green if charging from solar panel.

## 7.7 (Optional) 180W pure sine wave inverter:

The inverter is switched ON with a switch (see diagram). The 220VAC output of the inverter is brought out with a 2-pin Euro socket, above this socket a lamp will indicate if the 220VAC output is present when the inverter is switched ON (if the 220VAC output is present the lamp will be ON). The battery voltage must be above 11.3V for the inverter to switch ON and after switching ON it must remain above 10.4V to stay ON, as soon as the battery voltage drops below 10.4V it will switch OFF. When the inverter is overloaded or overheating it will shutdown, the inverter ON/OFF switch needs to be cycled (switch OFF and then ON) for the inverter to switch ON again. The inverter has a fan on the side and will control this fan to regulate its temperature.

## 8 TROUBLESHOOTING

| Problem  | Check the following  |
|--|--|
| Battery Monitor not working:                                 | <ul style="list-style-type: none"> <li>- Check whether the monitor is switched ON.</li> <li>- Check whether 25Amp/30Amp battery fuse is loose or blown. !!Disconnect the battery when checking or replacing the fuse.</li> <li>- Check battery connections (connectors and terminals).</li> </ul>  |
| No 12V outputs switching ON(Lights, Fridge, Pump, Sockets):  | <ul style="list-style-type: none"> <li>- Check if master 12V ON/OFF switch is ON.</li> <li>- Cycle master 12V ON/OFF switch (switch OFF and then ON).</li> <li>- Check if battery is above 11.0V.</li> <li>- Check whether 25Amp/30Amp battery fuse is loose or blown. !!Disconnect the battery when checking or replacing the fuse.</li> <li>- Check battery connections (connectors and terminals).</li> </ul> |
| “BF” LED is on   | <ul style="list-style-type: none"> <li>- Check whether 25Amp/30Amp battery fuse is loose or blown. !!Disconnect the battery when checking or replacing the fuse.</li> </ul>  |
| “BL” LED is on   | <ul style="list-style-type: none"> <li>- Check if battery is above 11.0V</li> </ul>  |
| Lights output not switching ON:                              | <ul style="list-style-type: none"> <li>- Check if master 12V ON/OFF switch is ON.</li> <li>- Check if lights switch is switched on.</li> <li>- Check lights wiring.</li> </ul>   |
| Fridge output not switching ON:                              | <ul style="list-style-type: none"> <li>- Check if master 12V ON/OFF switch is ON.</li> <li>- Check fridge wiring.</li> </ul>   |
| Pump output not switching ON:                                | <ul style="list-style-type: none"> <li>- Check if master 12V ON/OFF switch is ON.</li> <li>- Check if pump switch is switched ON.</li> <li>- Check pump wiring.</li> </ul>   |
| Sockets output not switching ON:                             | <ul style="list-style-type: none"> <li>- Check if master 12V ON/OFF switch is ON.</li> <li>- Check sockets wiring</li> </ul>   |
| 25Amp/30Amp battery input fuse keeps on blowing:             | <ul style="list-style-type: none"> <li>- Check battery wiring, correct polarity.</li> <li>- Check all 12V output wiring.</li> <li>- Summation of loads drawing more than 25Amp/30Amp.</li> </ul>   |
| Loads are switching ON and OFF, panel making clicking noise: | <ul style="list-style-type: none"> <li>- Check battery connections (connectors and terminals) - can be caused by a bad connection.</li> <li>- Check 12V output wiring - can be caused by a short or overload.</li> <li>- Check battery - can be caused by a faulty battery.</li> </ul>   |

# HPP1 MK6-15A/20A R00 Owners Manual

|   |  |
|---|--|
| 220VAC/240VAC to 12V charger not working, the “AC” LED doesn’t come ON: | <ul style="list-style-type: none"> <li>- Check if charger ON/OFF switch is ON.</li> <li>- Check if earth leakage and 10A circuit breaker is switched ON.</li> <li>- Check if 220VAC is present (the lamp above earth leakage will indicate if 220VAC is present).</li> <li>- Check if 3.15Amp fuse is blown. !!Remove 220VAC mains input when checking or replacing the fuse.</li> <li>- Check 220VAC mains input connections.</li> </ul>  |
| DC to DC 12V charger not working, the “DC” LED does not come ON:        | <ul style="list-style-type: none"> <li>- The DC to DC charger will only switch ON if the DC to DC charger Input voltage initially goes above 13.3V and then remains above 12.5V after switching ON.</li> <li>- Check DC to DC input wiring, connections and polarity, see diagram.</li> <li>- If the Vehicle 12V input polarity is incorrect an internal fuse will blow. (The unit must be opened to replace this fuse)</li> </ul>   |
| DC to DC 12V charger “DC Led” comes on and then turns OFF again:        | <ul style="list-style-type: none"> <li>- DC to DC charger input wiring incorrect diameter, see diagram, if the wire diameter is too small it can cause a voltage drop across the wire big enough for the input at the DC to DC charger to drop below 12.5V when the charger switches ON and current is drawn from the vehicle, as soon as the charger switches OFF because the voltage at its input dropped below 12.5V (because of the voltage drop across the wire) the input will shoot above 13.3V because the drop disappeared due to the DC to DC charger switching OFF, this will cause the input to hop between 13.3V and 12.5V hence the led turning ON and OFF.</li> </ul> |
| Solar charge controller not working, the “SP” LED does not come ON:     | <ul style="list-style-type: none"> <li>- Check solar input wiring, connections and polarity.</li> <li>- Check solar panel open circuit voltage, must be below 26V.</li> <li>- If 220VAC to 12V charger is ON the solar charge controller will be switched OFF.</li> </ul>  |
| Inverter not switching ON:  | <ul style="list-style-type: none"> <li>- Check if inverter switch is ON.</li> <li>- Check battery voltage- the battery voltage must be above 11.3V to switch ON.</li> </ul>  |
| Inverter stays ON for a while and then turns OFF:                       | <ul style="list-style-type: none"> <li>- Check loads plugged into the inverter output socket. The inverter is rated at 180W and will shutdown if the load exceeds 180W.</li> <li>- If the ventilation holes of the inverter are blocked it can shutdown due to overheating.</li> <li>- Check battery voltage- the inverter will switch OFF if the battery voltage drops below 10.4V.</li> </ul>  |

## 9 SPECIFICATIONS

|                                 |  |
|---------------------------------|--|
| Operating ambient temperature   | : -20C to +45C   |
| Mass                            | : 3500 gram  |
| Dimensions: Without inverter    | : 235(W)x235(D)x100(H) mm:                                   |
| Dimensions: With inverter       | : 235(W)x280(D)x100(H) mm                                    |
| <b>220VAC Charger</b>           |  |
| Input voltage                   | : 180VAC to 265VAC 40Hz to 70Hz                              |
| Fast charge voltage             | : 14,4V +/- 0,1V   |
| Trickle charge voltage          | : 13.6V +/- 0.1V   |
| Charging current                | : 15A Maximum (HPP1 MK6-15A)<br>: 20A Maximum (HPP1 MK6-20A) |
| <b>Vehicle DC Charger</b>       |  |
| Input voltage (Vehicle GND&POS) | : 12.5.VDC to 15.0VDC  |
| Switch ON                       | : > 13,3V  |
| Switch OFF                      | : < 12.5V  |
| Fast charge voltage             | : 14,4V +/- 0,1V   |
| Trickle charge voltage          | : 13.8V +/- 0.1V   |

# HPP1 MK6-15A/20A R00 Owners Manual

|                  |                              |
|------------------|------------------------------|
| Charging current | : 15A Maximum (HPP1 MK6-15A) |
|                  | : 20A Maximum (HPP1 MK6-20A) |
| Input current    | : 20A Maximum (HPP1 MK6-15A) |
| Input current    | : 25A Maximum (HPP1 MK6-20A) |

Note: This DC to DC charger eliminates the need for a dual battery switch

## Solar Panel Charger

|                        |                                  |
|------------------------|----------------------------------|
| Input voltage          | : 15VDC to 26VDC                 |
| Power input            | : 270W Maximum (HPP1 MK6-15A)    |
|                        | : 330W Maximum (HPP1 MK6-20A)    |
| Fast charge voltage    | : 14.4V +/- 0.1V                 |
| Trickle charge voltage | : 13.8V +/- 0.1V                 |
| Charging current       | : Depends on Solar Panel Wattage |

## Battery Monitor

|                  |                    |
|------------------|--------------------|
| Voltage Range    | : 9.0 to 19.9 Volt |
| Voltage Accuracy | : +/- 0.1 Volt     |
| Current Range    | : 0.1A to 30.0A    |
| Current Accuracy | : +/- 0.2A         |

## Optional 220VAC 180W Inverter

|                  |                                |
|------------------|--------------------------------|
| Output wave form | : True sine wave               |
| Output voltage   | : 220VAC +/-5%                 |
| Output power     | : 180W continuous (450W surge) |
| Input voltage    | : 10.4VDC to 15VDC             |

## Battery Under Voltage Lockout

|                        |                   |
|------------------------|-------------------|
| Lockout voltage        | : 11.0V +/-0.25V  |
| Auto turn ON voltage   | : 13.0V +/- 0.25V |
| Manual turn ON voltage | : > 11.0V         |

## Battery Connection

50A Brad Harrison connector

## Outputs

|         |   |
|---------|---|
| Pump    | : 1x 12 Volt 7 Amp maximum Switched             |
| Fridge  | : 1x 12 Volt 7 Amp maximum                      |
| Lights  | : 1x 12 Volt 5 Amp total maximum Switched       |
| Sockets | : 1x 12 Volt 11 Amp total maximum               |
| 220 VAC | : 1x 3-pin 220VAC 10 Amp Switched Socket        |
|         | : 1x 2-pin 220VAC 10A Euro Switched Socket      |
|         | : 1x 220AC 10A IEC Female Socket for MultiPlugs |

## Inputs

|         |  |
|---------|--|
| AC      | : 220VAC 50Hz 16A max IEC 3-pin socket |
| Vehicle | : GND, Positive 2way Strip connector   |
| Solar   | : GND, Positive Terminal block         |

## 10 WARRANTY

Power Panels will be replaced or repaired if a failure occurs within two years, from the date of purchase, as a result of faulty materials or workmanship provided that the product is returned to the seller with proof of purchase. Replacement or repair shall be at the discretion of the manufacturer. This warranty excludes failures which results from misuse of the product. The manufacturer and/or seller shall not be liable for personal injury or consequential damages that may result through the use of this product. Lightning and water damage are excluded from this warranty.