



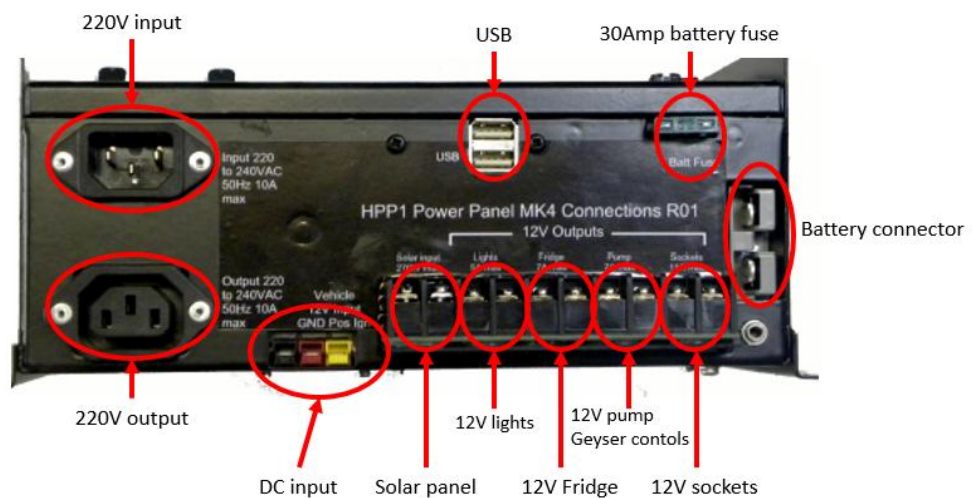
User's manual

4. Operating of HCDP power panel

1 INTRODUCTION

The HPP1 MK5 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 batteries from 220VAC/240VAC (Mains), 12VDC and Solar panels.



Technical

- ✓ The 220VAC/240VAC to 12V charger is a 12Amp multi-stage charger with temperature compensation.
- ✓ The DC to DC charger (Vehicle), also 12Amp, with a bypass function.
- ✓ The solar charge controller, is 270W.
- ✓ An 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 10.5V, thus preventing the battery from being damaged. The battery's 12V input is fused with a 30Amp fast-blow blade fuse, with the 12V being distributed to separate outputs, each with its own resettable fuse. The 220VAC/240VAC outputs are provided with a SA 3-pin socket, a EURO socket (2-pin) on the front lid, and with an IEC female socket on the base (if more 220VAC/240VAC outputs should be required). All 220VAC/240VAC outputs come via an earth leakage and 10Amp circuit breaker. The LUX models come with a dual 5V 1Amp USB charging port.

2. 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 its intended purpose.
- ✓ Do not replace fuses while the unit is connected to power (Battery, Solar, Vehicle or AC mains).
- ✓ If fuses are replaced, do so with the fuses provided, or with a fuse of the correct type and rating.
- ✓ Do not let battery discharge below 10.5V – Batteries will get damage.

3. OPERATION

3.1 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. Make sure the Aux battery fuse is inserted properly and tightly.

(BF LED indicator: The red BF led will be ON if the Aux battery fuse is blown or out.)

3.2 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 auxiliary 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 "-2.45"). If the battery is being charged, it will display a positive value (example "2.45"). If this switch is in the "V" position the auxiliary battery voltage will be displayed.

3.3 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 **12.75V** and turn OFF level at **10.5V**. If the master switch is ON and the battery level decreases below 10.5V, all outputs will be switched OFF and the "BL" led will turn ON. When the battery voltage increases above **12.75V**, the outputs will turn on automatically and the "BL" led will turn OFF. When the battery voltage is between **10.5V** and **12.75V**, 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 (under voltage lockout unit) 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.

BL LED indicator:

The red BL LED will be ON if the Master switch is ON, and the outputs turned OFF, due to the battery voltage being low.

3.4 Charging batteries with 220V:

The charger is a multi-stage charger with battery temperature compensation; the charger will adjust the charge voltage and current depending on the battery temperature (measured by the battery temperature sensor). This sensor plugs in to a socket underneath the Brad Harrison Aux battery connector. If the battery temperature increases, the charger will decrease the charge voltage. If the battery temperature decreases, the charger will increase the charge voltage. This sensor must be placed close to the battery. The charger is supplied with power through a 3.15Amp fast blow fuse and a switch marked “Charger ON/OFF”

Steps

- ✓ The power panel must be connected to a battery and 220VAC/240VAC mains supply for this charger to work.
- ✓ Connect 220V cord to power inlet socket near spare wheel arm.
- ✓ Ensure 220V main power source is switched ON.
- ✓ Ensure earth leakage and circuit breaker on power panel are switched ON.
- ✓ Ensure the 220V charge button on the power panel is switched 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. When the battery is full, the charger will go into “top up mode”. In this mode, the charger will disconnect from the battery and measure the battery voltage. When the battery voltage drops below 12.7V, the charger will automatically reconnect.

The 220V charger button on power panel may be switched off when fan is noisy at night, but remember to switch it back ON.

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 (but more than 2A).
- Flashes Green at 1Hz if battery is fully charged and waiting to top up battery.
- Turns Red if battery is faulty and battery voltage remains below 9V.
- Flashes Green and Amber alternatively at 1Hz if battery is not detected. This can happen if battery is not present, battery fuse is blown or if battery connection is faulty.
- Blinks Red if temperature sensor fault occurs or if sensor is disconnected.

3.5 Charging batteries with towing vehicle:

The DC to DC charger is a 12Amp charger with a bypass function. All loads connected to the power panel will be powered by the alternator and the full 12Amp charge current will be available to charge the battery when the DC to DC charger is charging. 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, between the ground and ignition, and will stop charging when reaching 12.5V. The charger will charge even if the voltage on the “POS” positive input goes below 12.5V, as long as the voltage on the “Ign” input stays above 12.5V after switching ON. 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.

DC LED indicator:

- The green DC LED will turn ON if the DC to DC charger is charging from the vehicle.

3.6 Charging batteries with solar panels:

The solar charge controller works with a 12V system solar panel and has a maximum input rating of 270W. The solar panel open circuit voltage must not exceed 26VDC.

Steps

- ✓ Connect solar panel cord to Brad Harrison connector found in the 220V power inlet socket near spare wheel arm.
- ✓ Move panel into position where cells face directly to the sun. Change position of panel as the sun moves.

When a solar panel is connected, the “SP” LED will be ON when the charge controller is charging. If the **220V charger is charging (ON), the solar charge controller will automatically switch OFF.**

SP LED indicator:

The green SP LED will be ON if the solar charge controller is charging from solar panels.

3.7 180W pure sine wave inverter (Optional):

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 shut down. The inverter ON/OFF switch needs to be cycled (switch OFF and then ON) for the inverter to switch ON again after shutting down. The inverter has a fan on the side and will control this fan to regulate its temperature. Keep inverter switched off when not in use.

3.8 USB charging port (LUX models):

The USB charging port is a dedicated dual 5V 1A USB charging port and meets China YD/T1591-2009 dedicated charging port specifications. The output is a combined output of 1Amp. If one port is used, the full 1Amp can be drawn from it; if both are used, each can deliver 0.5Amp. The master ON/OFF switch must be ON, and the Aux battery voltage must be above 10.75V for the USB charging port to work.

4 TROUBLESHOOTING

Problem Check the following

Battery Monitor not working: -

- ✓ Check whether the monitor is switched ON.
- ✓ Check whether 30Amp battery fuse is loose or blown.
(NB: Disconnect the battery when checking or replacing the fuse.)
- ✓ Check battery connections (connectors and terminals).

No 12V outputs switching ON (Lights, Fridge, Pump, Sockets):

- ✓ Check if master 12V ON/OFF switch is ON.
- ✓ Cycle master 12V ON/OFF switch (switch OFF and then ON).
- ✓ Check if battery is above 10.75V.
- ✓ Check whether 30Amp battery fuse is loose or blown.
(NB: Disconnect the battery when checking or replacing the fuse.)
- ✓ Check battery connections (connectors and terminals).

Lights output not switching ON: -

- ✓ Check if master 12V ON/OFF switch is ON.
- ✓ Check if lights switch is switched on.
- ✓ Check lights' wiring.

Fridge output not switching ON: -

- ✓ Check if master 12V ON/OFF switch is ON.
- ✓ Check fridge wiring.

Pump output not switching ON: -

- ✓ Check if master 12V ON/OFF switch is ON.
- ✓ Check if pump switch is switched ON.
- ✓ Check pump wiring.

Sockets output not switching ON: -

- ✓ Check if master 12V ON/OFF switch is ON.
- ✓ Check sockets' wiring

30Amp battery input fuse keeps on blowing: -

- ✓ Check battery wiring, correct polarity.
- ✓ Check all 12V output wiring.
- ✓ Summation of loads can draw a maximum of 30Amp.

Loads are switching ON and OFF, panel making clicking noise:

- ✓ Check battery connections (connectors and terminals) - can be caused by a bad connection.
- ✓ Check Aux battery fuse- can be caused by a loose fuse.
- ✓ Check 12V output wiring - can be caused by a short or overload.
- ✓ Check battery - can be caused by a faulty battery or flat battery

220VAC/240VAC to 12V charger not working, the "AC" LED doesn't come ON:

- ✓ Check if charger ON/OFF switch is ON.
- ✓ Check if earth leakage and 10A circuit breaker is switched ON
- ✓ Check if 220VAC is present (the lamp above earth leakage will indicate if 220VAC is present; Lux and StdAC models).
- ✓ Check if 3.15Amp fuse is blown. !!Remove 220VAC mains input when checking or replacing the fuse.
- ✓ Check 220VAC mains input connections.

"AC" LED keeps on flashing green and amber:

Battery is not detected (When the AC LED flashes green and amber, the charger is detecting for a battery and will remain in this state until a battery is detected).

- ✓ Check battery connections (connectors and terminals).
- ✓ Check if 30Amp battery fuse is loose or blown.
(NB: Disconnect the battery when checking or replacing the fuse.)

"AC" LED flashes red and amber, or red and green:

- ✓ Check battery temperature probe (this will happen if the battery temperature probe is not detected by the charger. The charger will default to 35°C and will adjust output voltages and currents accordingly).

"AC" LED flashes red:

- ✓ Check battery (the "AC" LED will turn red if the battery voltage does not increase above 9V when the charger is charging; this can be caused by a faulty battery).

DC to DC 12V charger not working, the "DC" LED does not come ON:

- ✓ The DC to DC charger will only switch ON if the DC to DC Charger Input voltage is above 13.3V (between Ground and ignition) and 10.5V between ground and the positive ("POS") and the ignition input voltage remains above 12.5V after switching ON.
- ✓ Check DC to DC input wiring, connections and polarity, see diagram.
- ✓ If the Vehicle 12V input polarity is incorrect an internal fuse will blow. (The unit must be opened to replace this fuse)

DC to DC 12V making clicking noise:

- ✓ 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 clicking. This problem can be overcome by the preferred wiring method, see diagram.

Solar charge controller not working, the "SP" LED does not come ON:

- ✓ Check solar input wiring, connections and polarity.

- ✓ Check solar panel.
- ✓ If 220VAC to 12V charger is ON, the solar charge controller will be switched OFF.

Inverter not switching ON: -

- ✓ Check if inverter switch is ON.
- ✓ Check battery voltage. The battery voltage must be above 11.3V to switch ON. Inverter stays ON for a while and then turns OFF:
- ✓ Check loads plugged into the inverter output socket. The inverter is rated at 180W and will shut down if the load exceeds 180W.
- ✓ If the ventilation holes of the inverter are blocked it can shut down due to overheating.
- ✓ Check battery voltage; the inverter will switch OFF if the “BL” LED is ON:
- ✓ The “BL” battery low LED will be ON if the master 12V ON/OFF switch is ON and the Aux battery voltage goes below 10.75V, causing the under voltage lockout to switch off.
- ✓ Check battery connections (connectors and terminals).
- ✓ Check battery, can be caused by a flat or faulty battery. USB charging port not working: - Check if master 12V ON/OFF switch is ON.
- ✓ Cycle master 12V ON/OFF switch (switch OFF and then ON).
- ✓ Check if battery is above 10.75V.