

HPP1 MK7S Owner's Manual V5



HPP1 MK7S Power Panel

Owner's Manual

The only one to have

HPP1 MK7S Owner's Manual V5

1	Introduction.....	3
2	Models	3
3	Safety Warnings.....	3
4	Features.....	4
5	Indicators	4
6	Contents	4
7	Functional Diagram	5
8	Installation	5
8.1	Mounting the unit:	5
8.2	Wire sizes.....	5
8.3	Connecting the battery:	5
8.4	Connecting 12V loads (12V outputs):	6
8.5	Connecting 220VAC/240VAC:	6
8.6	Connecting the DC to DC charger:	6
8.7	Connecting the solar panel:.....	6
9	Operation	6
9.1	Temperature Control.....	6
9.2	Battery type.....	6
9.3	Battery Maintenance:	6
9.4	Battery monitor:	6
9.5	12VDC outputs and loads:	7
9.6	220VAC/240VAC to 12V charger:	7
9.7	DC to DC 12V charger:	7
9.8	MPPT Solar charge controller:	7
9.9	220W pure sine wave inverter (Optional on MK7S-15A, MK7S-24A and standard on MK7S-24A-Inv):	7
9.10	USB charging port:	7
10	Troubleshooting	7
11	Specifications.....	9
12	Warranty	10
13	Contact	10

HPP1 MK7S Owner's Manual V5

1 Introduction

The HPP1 MK7S 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 is available as a 15A or 24A version. The unit has the ability to charge rechargeable 12V Lead Acid and LiFePo4 batteries from 220VAC/240VAC (Mains), 12VDC and Solar panels. The 220VAC/240VAC to 12V charger is a 15/24Amp multi-stage charger. The DC to DC charger (Vehicle), is a 15/24Amp charger and the solar charge controller, is a 270/400W charger with MPPT. A 220W Pure Sine Wave inverter has an LCD display and is optional on some models. The unit has a Digital Battery Monitor with the ability to display battery voltage and current. A battery under voltage lockout unit is standard, disconnecting all loads if the battery voltage drops below 11V, thus preventing the battery from being damaged. The battery's 12V input is fused with a 25Amp ATQ 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, an IEC socket (3-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. All models have a 5V 1Amp USB charging port. A dual battery switch is not required in the towing vehicle because the MK7S panel will not discharge the towing vehicle's battery.

2 Models

FEATURE	MK7S-15A	MK7S-24A	MK7S-24A-Inv
			
Earth leakage	●	●	●
10Amp Circuit Breaker	●	●	●
3-pin SA Socket	●	●	●
2-pin Euro Socket	●	●	●
IEC Female Output Socket	●	●	●
12V AC Charger	15A	24A	24A
MPPT Solar Charger	270W	400W	400W
Voltage, Current Meter	●	●	●
Battery Protector	●	●	●
12V DC-DC Charger	15A	24A	24A
Lead-Acid/LiFePo4 selector	●	●	●
1A USB Output	●	●	●
220W Pure Sine Wave Inverter	Optional	Optional	Standard
			

“●” Indicates if feature is installed.

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.

HPP1 MK7S Owner's Manual V5

- 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.
- Only use with 12V Lead Acid batteries of 70Ah or higher capacity or LiFePo4 batteries.
- Select correct battery type.

4 Features

- 220VAC to 12 Volt 15/24 Amp Multistage Lead-Acid/LiFePo4 Battery Charger with Fast and Trickle charge indicator.
- 220VAC Earth Leakage and 10A Circuit Breaker
- Digital Voltage and Current Monitor
- USB charging port
- 220W 220VAC true sine wave inverter with LCD display
- Battery under voltage lockout to prevent deep cycling and damage to battery
- Battery low and blown fuse indicator
- Integrated 270/400 Watt MPPT Solar Charge Controller
- Integrated 15/24A DC to DC Charger
- Integrated Dual Battery function eliminating external Dual Battery Switch
- LED charge source indicator
- Integral thermostatically controlled cooling fan
- Can operate from any combination of 220VAC, Battery or Solar Panel
- Short circuit protection on all outputs
- Supplied with mounting hardware
- Supplied with all connectors required
- Easy to install
- Warranty two years

5 Indicators

Charging source and fault conditions are indicated by LEDs on the front panel

- AC LED turns ON if charging from 220VAC AC LED and will be Green if charge current is less than 4A and Amber if charge current is more than 4A
- DC LED turns Green if charging from tow vehicle and AC charger is switched OFF. Vehicle voltage must be above 13.3V to enable DC charger
- SP LED turns Green if charging from 12V Solar Panel and both AC charger is switched OFF and vehicle engine is not running
- LiFePo4 LED turns Red if LiFePo4 battery type is selected
- BL LED turns Red if battery is below 11V. All 12V outputs will switch OFF if BL LED turns ON
- BF LED turns Red if 25A blade fuse is blown or open

6 Contents

- 1x HPP1 MK7S power panel
- 1x 3.15 Amp spare replacement fast blow glass fuse for 220VAC charger
- 1x 25Amp spare replacement blade fuse
- 4x M6x16 screw
- 4x M6 hex nut
- 4x M6 flat washer
- 4x M6 spring washer
- 4x No 12x13 self-tap screw
- 1x Owner's Manual
- 1x Brad Harrison (grey) connector (Including terminals) for Aux Battery
- 1x Brad Harrison (grey) connector (Including terminals) for Car/DC to DC charger
- 1x 3m IEC female power input cable (Input 220VAC/240VAC 50Hz 10A)
- 1x 2m IEC male power output cable (Output 220VAC/240VAC 50Hz 10A)

HPP1 MK7S Owner's Manual V5

- Total time, in hours, to charge flat batteries will be approximately 1.2x Total Battery Capacity divided by either 15A or 24A. Thus for 2x 100Ah batteries and a 24A panel charging time will be: $1.2 \times 200 / 24 = 10$ hours
- Fit a 30A to 50A fuse close to the battery positive terminal to prevent a fire hazard should the position wire short to the trailer chassis.

8.4 Connecting 12V loads (12V outputs):

- Each output's polarity and the current rating are specified on the bottom label.
- Connect each load to the specified output (Lights, Fridge, Pump and Sockets).
- 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.

8.5 Connecting 220VAC/240VAC:

- An IEC female power cable is provided to connect the 220VAC/240VAC supply.
- The power cord must be plugged into the 220VAC/240VAC input on the bottom of the base of the power panel.
- 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).

8.6 Connecting the DC to DC charger:

- Use the Brad Harrison (grey) equivalent connector for connecting the DC To DC charger input to the car.
- Use wire size as specified in *wire sizes*.
- Make sure the polarity is correct (An internal fuse will blow if the polarity is incorrect).

8.7 Connecting the solar panel:

- The solar panel **must be a 12V** panel with open circuit voltage **less than 28V**
- Two or more 12V solar panels may be connected in parallel (positive to positive and negative to negative) to increase power to 270W or 400W
- The unit will not work with 24V solar panels
- Connect the solar panel to the solar input on the 10-way connector strip. Make sure the polarity is correct.
- Use wire size as specified in *wire sizes*.
- When inserting the wire into the connector, make sure all the wire strands enter the connection opening to prevent shorts.

9 Operation**9.1 Temperature Control**

The internal temperature is controlled by a fan that turns on if critical components reach a temperature of more than 80°C whilst charging batteries. The cooling fan will turn off if the temperature drops below 70°C. At high ambient temperatures and charging at more than 15A the charger will reduce its output current by 35% if the internal temperature exceeds 85°C. The charger will resume charging at 100% if the temperature drops below 80°C. This operation is normal and is designed to extend the life of critical components.

9.2 Battery type

- Ensure that the correct battery type is selected with the selector switch below the battery monitor.
- Select Lead-Acid for all AGM, GEL, Calcium and flooded batteries.
- Select LiFePo4 for Lithium Iron Phosphate batteries.

9.3 Battery Maintenance:

Keep the battery on charge when stored or not in 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.

9.4 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 "V" position the auxiliary battery voltage will be displayed. If this switch is in the "A" position the auxiliary battery's net current

HPP1 MK7S Owner's Manual V5

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 current value (example “-2.45”). If the battery is being charged, it will display a position current value (example “2.45”).

9.5 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 11.0V. If the master switch is ON and the battery level drops below 11V, 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. The Pump and Lights outputs have individual switches. The fridge and sockets do not have individual switches. All 12V outputs 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.

9.6 220VAC/240VAC to 12V charger:

This is a multi-stage charger. The charger is supplied with power through a 3.15Amp fast blow fuse and a switch marked “Charger ON/OFF” The earth leakage and circuit breaker must be 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 internal temperature. When the battery is full, the charger will go into “trickle charge” mode.

9.7 DC to DC 12V charger:

The DC to DC charger is a 15/24Amp charger. 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’s 12V Input voltage reaches 13.3V and will stop charging when it drops below 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. The DC to DC charger will not operate if the 220VAC charger is switched ON

9.8 MPPT Solar charge controller:

The MPPT solar charge controller will only work with a 12V solar panel and has a maximum input rating of 270/400W. The solar panel open circuit voltage must not exceed 28VDC. When a solar panel is connected, the “SP” LED will be ON when the charge controller is charging. The solar charger will only switch ON if the 220VAC/240VAC charger is switched OFF and the vehicle voltage is below 12.5V

9.9 220W pure sine wave inverter (Optional on MK7S-15A, MK7S-24A and standard on MK7S-24A-Inv):

The inverter is switched ON with a switch on the front panel. The 220VAC output of the inverter is brought out with a 3-pin IEC socket. Above this socket, a lamp will indicate if the 220VAC output is present when the inverter is switched ON. The battery voltage must be above 11.0V and less than 15V for the inverter to switch ON. An amber LED on the inverter will turn ON if its internal 25A fuse is blown. Another amber LED will flash if the inverter is overloaded by 20%. When overloaded by 20% the inverter will wait 3 seconds and try to switch ON five times where after it will switch OFF. If overloaded by 50% the amber LED will turn ON permanently and the inverter will switch OFF. 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. The inverter has a LCD monitor showing AC voltage, Load current, Frequency and internal temperature.

9.10 USB charging port:

The USB charging port is a dedicated 5V 1A USB charging port and meets China YD/T1591-2009 dedicated charging port specifications.

10 Troubleshooting

Problem	Check the following
Battery Monitor not working:	- Check whether the monitor is switched ON. - Check whether 25Amp 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 11V and BL LED is OFF.

HPP1 MK7S Owner's Manual V5

	- Check whether 25Amp 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
25Amp battery input fuse keeps on blowing:	- Check battery wiring, correct polarity. - Check all 12V output wiring. - Summation of loads can draw a maximum of 25Amp.
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). - Check if 3.15Amp fuse is blown. Remove 220VAC mains input when checking or replacing the fuse. - Check 220VAC mains input connections.
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 from vehicle is above 13.3V and remains above 12.5V after switching ON. - The 220VAC charger must be switched OFF for DC to DC charger to work. - Check DC to DC input wiring, connections and polarity. (see diagram). - DC to DC charger input wiring incorrect diameter. If the wire diameter is too small it can cause a voltage drop across the wire, large enough for the input voltage at the DC to DC charger to drop below 12.5V and switch OFF. Once OFF the voltage will again increase to 13.3V or more and the charger will switch ON again and repeat the ON/OFF cycle with a 5 second interval. - If the Vehicle 12V input polarity is incorrect an internal fuse will blow. (The unit must be opened to replace this fuse)
Solar charge controller not working, the "SP" LED does not come ON:	- Check solar input wiring, connections and polarity. - Ensure that it is a 12V and not a 24V panel. - If 220VAC to 12V charger and DC to DC charger is ON, the solar charge controller will not work.
"BF" LED is ON:	- The "BF" battery fuse LED will be ON if the Aux battery fuse is blown or disconnected. - Check Aux battery fuse.
"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 drops below 11V, 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.
Inverter not working	- Ensure that inverter is switched ON and that the battery voltage is between 11V and 15V. - Replace internal 25A fuse if fuse blown LED is ON. - Switch inverter OFF and ON if overload LED is ON permanently.
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 11V.

HPP1 MK7S Owner's Manual V5

11 Specifications

Operating ambient temperature	: -20°C to +45°C
Mass	: 3500 gram
Dimensions	: Without inverter 235(W)x235(D)x100(H) mm
	: With inverter 235(W)x280(D)x100(H) mm

220VAC Charger

Input voltage	: 180VAC to 265VAC 40Hz to 70Hz
Fast charge current	: 15/24 Amp Maximum (Amber AC LED ON)
Fast charge voltage	: 14,4V +/- 0,1V
Trickle charge voltage	: 13.6V +/- 0.1V only for Lead-Acid batteries

Vehicle DC Charger

Input voltage (Vehicle GND&POSITIVE):	12.5VDC to 15VDC
Ignition sense switch ON	: > 13,3V
Ignition sense switch OFF	: < 12.5V
Fast charge voltage	: 14.4V +/- 0.1V
Trickle charge voltage	: 13.6V +/- 0.1V only for Lead-Acid batteries
Charging current	: 15/24 Amp maximum
Input current	: 28A maximum
Drain from vehicle battery	: Zero Amp with vehicle voltage below 12.5V
Dual battery switch	: NOT REQUIRED

Solar Panel Charger

Input voltage	: 14VDC to 28VDC
Power input	: 270/400W maximum
Control method	: Maximum Power Point Tracking
Fast charge current	: 15/24 Amp Maximum (Amber AC LED ON)
Fast charge voltage	: 14,4V +/- 0,1V
Trickle charge voltage	: 13.6V +/- 0.1V only for Lead-Acid batteries
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 25A
Current Accuracy	: +/- 0.1A

Dedicated USB charging port

Voltage	: 5VDC
Current	: 1A maximum
Port data configuration	: Meets China YD/T1591-2009 dedicated charging port specification

220VAC 220W Inverter

Output wave form	: True sine wave
Output voltage	: 220VAC +/-5%
Output power	: 220W continuous (400W surge)
Input voltage	: 11VDC to 15VDC

Battery Under Voltage Lockout

Lockout voltage	: <11 +/-0.1 Volt
Auto turn ON voltage	: >13 +/-0.1 Volt

Battery Connection

: 50A Brad Harrison style connector

Outputs

Pump	: 1x 12 Volt 7 Amp maximum Switched
Fridge	: 1x 12 Volt 7 Amp maximum

HPP1 MK7S Owner's Manual V5

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 224AC 10A IEC Female Socket for MultiPlugs
Inputs	
AC	: 220VAC 50Hz 10A max IEC 3-pin socket
Vehicle	: 50A Brad Harrison style connector
Solar	: Connector block with screw terminals

12 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 result 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.

13 Contact

HCdP Electronics (Pty) Ltd

+27 12 548 1938

info@hcdpelectronics.co.za

www.hcdpelectronics.co.za