

VEHICLE POWER HUB

Lithium Power Supply with in-built DC-DC charger and solar controller



USER MANUAL



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PLEASE READ THIS MANUAL BEFORE USE

Please note- this manual is relevant for models VPH1300, VPH2500 and VPH3800

GENERAL INTRODUCTION

Thank you for purchasing the Vehicle Power Hub.

The Vehicle Power Hub is a fully integrated solution combining lithium battery, in vehicle DC-DC battery charger, integrated MPPT solar controller, 12VDC and USB outputs in a single portable and movable box - Plug and play input and output Anderson connectors make install safe and easy and with supplied cables enable fast connection and removal from the vehicle when required.

The Vehicle Power Hub uses IEC certified Lithium batteries (LiFePo4), meets transport requirements (UN38.3 and MSDS) and is CE certified.

Features

Portable - the clean and safe Lithium (LiFePo4) battery provides high energy storage - burn less fuel and reduce CO2 emissions when running high loads for long periods. Fast, efficient in vehicle charging means less idling is required to maintain loads.

- Flexible charging options from high Power AC charger (up to 40A), integrated 30A DC-DC charger for connection to alternator (inc EU6) and solar input up to 30A utilising the on board solar MPPT controller
- Plug and play Anderson connections provide multiple input/output configuration enabling fast and easy deployment
- Up to 250A DC output for direct connection to power inverter (up to max 2000W)
- Strong metal and ABS case with easy to install fixing system
- LCD control panel provides battery status and voltage
- Built in multi safety protection from BMS, battery isolator, fusing and circuit breaker
- 2 x USB output and 2 x 12Vdc 10A sockets for device charging and powering 12V loads directly

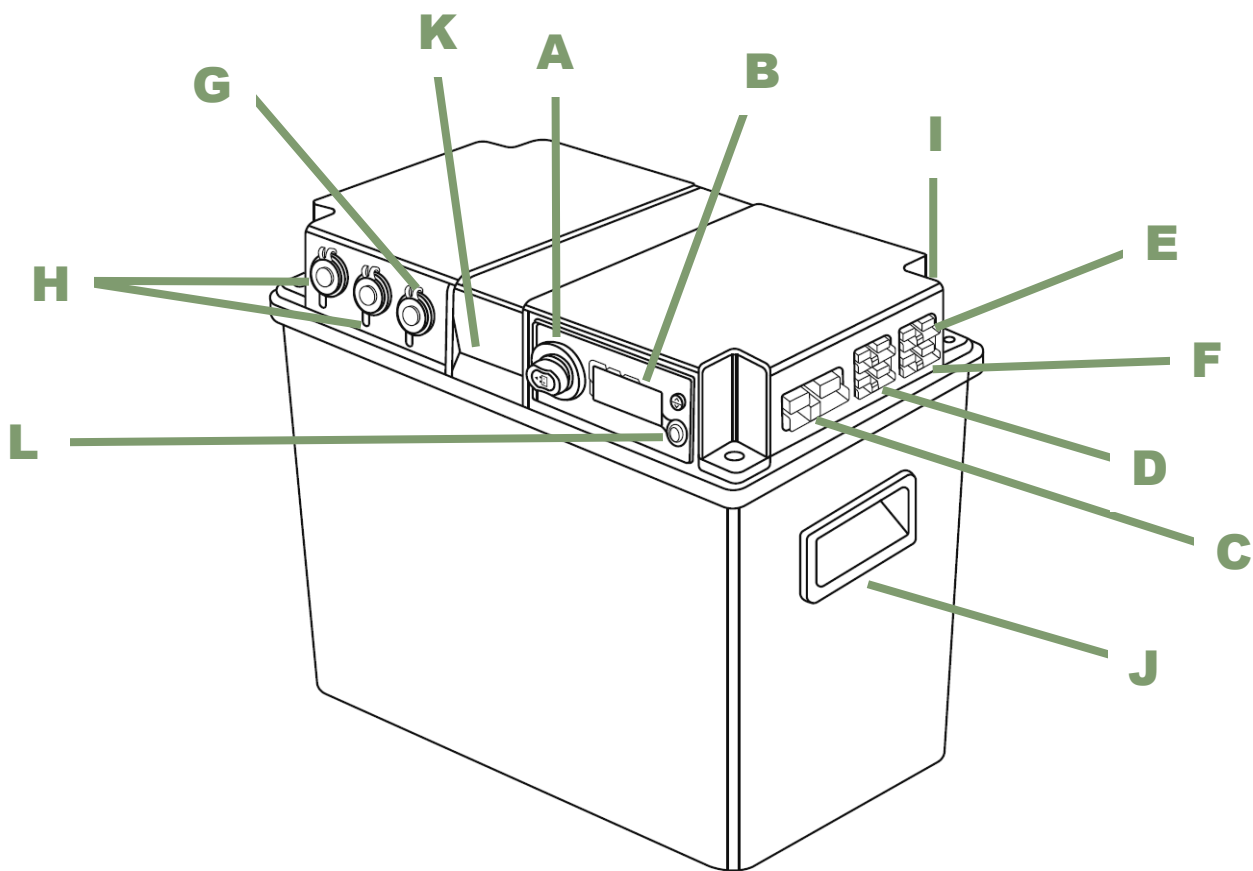


CHARGE NOW

CHARGE THE VEHICLE POWER HUB NOW

Built-in ultra-high capacity lithium-ion battery pack. Before using or storing, please charge the Vehicle Power Hub by the lithium-ion AC charger (supplied) until it's fully charged. Don't leave the Vehicle Power Hub stored for extended periods of time without being charged. For long cycle life the best thing for any battery is to use it and charge it

PRODUCT OVERVIEW



A DC ISOLATOR SWITCH

B MULTI FUNCTION DISPLAY

C EXTERNAL DC12V INVERTER OUTLET

D 50A INPUT/OUTPUT

E IN-VEHICLE CHARGE INPUT (BLUE)

F 12V SOLAR INPUT (YELLOW)

G USB 5V 2 X 2.1A

H DC 12V 10A SOCKET

I IGN SIGNAL CONNECTION

J CARRY HANDLES

K STRAPPING POINT

L DISPLAY ON/OFF

GENERAL SAFETY INSTRUCTIONS

Safety Instruction

As dangerous voltage and high temperature exist within the Vehicle Power Hub, only qualified and authorized maintenance personnel are permitted to open and repair.

This is a maintenance free product – Removal of the lid may only be required to change a fuse – seek approval from PPT Technical Team if required

Please make sure the Vehicle Power Hub (DC isolator) is turned off before opening and servicing.

This manual contains information concerning the storage and operation of the Vehicle Power Hub. All relevant parts of the manual should be read prior to the operation.

Any operation against safety requirement or against design, manufacture, safety standard will be out of manufacturer warranty.

The manufacturer accepts no liability for damage in the following cases:

*** Damage to the product resulting from improper use, mechanical influences and incorrect connection voltage.**

*** Alterations to the product without express permission from the manufacturer.**

GENERAL PRECAUTION

Energized Equipment – Electrical Shock and Explosion Hazards

- Do not submerge in liquid or operate in wet environments. Device is not waterproof or water resistant. Operate in dry environments only.
- Do not operate in flammable or explosive environments.
- Do not operate if the unit is damage in any way including loose electronics or if charging cords are frayed or wires are exposed.
- Do not place foreign objects inside the power outlets or ventilation holes.
- Always keep and use the device out of the reach of children.

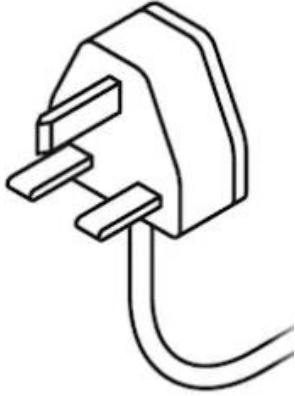


- Do not open the unit without permission and professional instruction.
- Do not put fingers or hands into the device.
- Do not attempt to replace the internal battery cells.
- Do not power any DC device >250A for risk of main switch protection.
- Please secure the device properly, when it's stored or used.
- Never connect positive terminal of Anderson plugs with negative terminals on the Vehicle Power Hub
- Only use the device between the temperature of -10°C to +50°C (-14°F to +122°F).

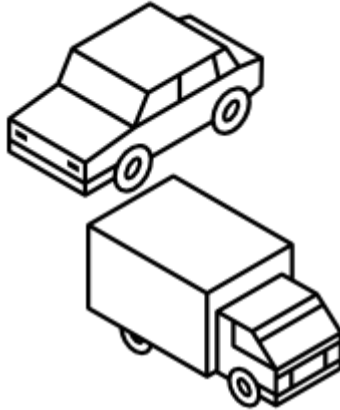


CHARGING THE VEHICLE POWER HUB

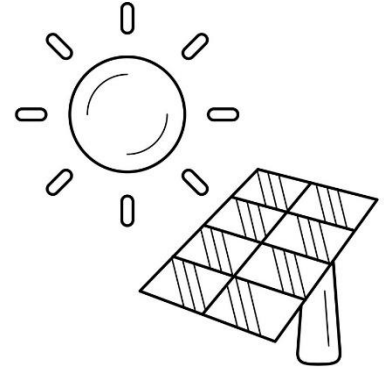
THE THREE WAYS TO CHARGE



AC CHARGER



IN VEHICLE DC-DC CHARGING



SOLAR

Charging from AC Charger

Vehicle Power Hub 1300/2500/3800 – Supplied with an AC 40A Charger
80A option available on request (connected via special cable)

1. Please make sure the DC isolator switch is always turned ON during charging;
2. Plug AC charger into wall outlet using the included power cord;
3. Connect the Anderson plug of AC charger to “50AMP INPUT/OUTPUT” outlet;
4. During the charging, the LED on the AC charger is Red, the fan of charger is working; At 95% charging the Green LED on the AC charger flickers
5. The LED on the AC charger is Green (solid), when charged fully. Please disconnect the Anderson plug from the Hub and AC plug.

Charging In-vehicle: (from Alternator)

The Vehicle Power Hub has a highly efficient, fanless and integrated battery to battery charger allowing for charging of the lithium battery directly from your vehicles' alternator. The battery to battery charger (DC-DC) is a sophisticated buck-boost convertor that accepts a wide range input (12-16V) converting it into a charging profile programmed specifically for this Lithium ion battery (LiFePo4). Subject to enough alternator current the battery to battery charger can provide 30A continuous charging current to the internal battery effectively charging it from empty to full in 3 hours, 5.5 hours or 8 hours depending on the Vehicle Power Hub fitted (1300, 2500, 3800)

NOTE : The DC-DC charger is protected with an internal 40A fuse that can be replaced. Please contact the PPT Team if you suspect this fuse is burnt out or the DC-DC charger is not working.

The integrated battery to battery charger is compatible with both older conventional alternators and new variable voltage alternators (EU6) fitted to newer vehicles.

1. For compatibility with variable voltage alternators (EU6) a connection **MUST** be made to the IGN labelled port using the supplied cable and connector. This wire should be terminated to the ignition on the vehicle – if it is not connected the battery to battery charger will revert back to conventional alternator program resulting in reduced charging.
2. For compatibility with older conventional alternators the IGN labelled port **MUST NOT** be connected to ignition
3. Using the supplied input RED/BLACK cable connect the Anderson to the BLUE port labelled “In Vehicle Charge Input”. The corresponding RED and BLACK other end have ring terminals.
RED : to allow connection to an in line midi fuse (30A). The other side of the fuse will require a DC cable terminated to the positive of the starter battery.
BLACK : requires connection to any common ground point (chassis) in the vehicle.

IMPORTANT NOTE : The black wire must be terminated to chassis for the in vehicle charging to work.



NOTE : In vehicle charging from either alternator or solar is independent of the isolator switch position – both the DC-DC charger and MPPT solar controller are directly connected to the Vehicle Power Hub battery.

Charging from Solar

Vehicle Power Hub has an integrated MPPT solar charge controller making solar charging easy.

TIP : Solar will also top up and maintain the starter battery when the Hub battery is full

1. 30A MPPT Solar Charger built-in - ensure the max charging current from the solar panel or array is not more than 30A, and open circuit voltage is not more than 25Vdc – therefore a **12V solar panel only** can be used (typically open circuit voltage would be around 20V to 23V)
2. Place the solar panel in direct sun
3. Using the supplied solar cable (Red/Black MC4 to Anderson) connect the solar panel with the **YELLOW** port marked “12V SOLAR INPUT”

OPERATING INSTRUCTIONS

Using the Vehicle Power Hub

Once fully charged, the Vehicle Power Hub is ready to work immediately. No set up is required. All outputs may be used simultaneously.

Installation

The Vehicle Power Hub comes complete with install kit for fast and easy deployment in vehicles. The hub can be securely fastened using either of the supplied solutions:

- Metal feet fixing kit – clamps bottom of the hub casing to the vehicle floor
- Strapping kit – strap is looped around the case through the supplied hold down plates that are secured to the vehicle floor

DC switch

All 12V sockets & Anderson plugs (except Blue and Yellow) are controlled by a DC isolator switch. When isolator is OFF all inputs and outputs are disconnected from the Hub battery with the exception of solar and in vehicle charging which remain independent of the isolator switch.

DC Operation – (Max 250A Total output BMS limited)

1. Please ensure the TOTAL discharging current is not more than 250A or else it may trigger the main internal power breaker protection.
2. All connecting ports are high quality, but please plug in/disconnect properly for long service life.
3. Max power of 12V DC socket is 120W each (12V 10A); max power of 50A Anderson plug is 600W (12V 50A); max power rating of larger Anderson plug is 2000W. **Max power when connected to inverter is 2000W for 30 mins and 1500W continuously.** Please ensure each port does not exceed the limit.
4. The maximum current between all 50A labelled input/output Anderson connector is **50A TOTAL**. Current higher than this will trip internal contactor that automatically resets when the current is reduced.
5. Short circuit is forbidden. Any short circuit caused by improper use, will trigger breaker protection or damage the Vehicle Power Hub. Failure by improper use will terminate warranty. If in doubt or require service contact Portable Power Technology engineer.

CAUTION: If the external 225A power breaker protection is triggered, please turn off all loads connected and turn the isolator switch to the off position. Then you can reset the breaker. Should the problem persists contact Portable Power Technology (Or purchase distributor)

CAUTION: One 50A automatic reset breaker protects “50AMP INPUT/OUTPUT” outlets. Any over discharge of “50AMP INPUT/OUTPUT” outlets, please disconnect the load immediately, reconnect in a few minutes and reduce total DC loads through these connectors to <50A

CAUTION: One internal 30A in-line fuse protect 12V DC sockets & dual USB socket. If power is lost to these sockets please call Portable Power Technology before trying to open the case.

Power Inverter Connection

The Vehicle Power Hub is designed to allow connection of a 12VDC inverter to power 230V AC loads. (inverter NOT supplied) – Max inverter power rating 2000W

Connection to the inverter is made via the larger Anderson connection labelled “External DC12V Inverter Output” using the supplied inverter connection cable (1 metre 35mm² cable (red/black) terminated with large Anderson connector and M8 ring terminals)

1. Turn off power hub using main isolator
2. Connect the correct red and black ring terminals to the corresponding + and – terminals on the power inverter
3. Connect large Anderson to inverter output connector.
4. Turn on power hub using the main isolator
5. Connect load to the inverter output
6. Turn on inverter

CAUTION : Before connecting the inverter isolate the hub using the main DC isolator switch (OFF position)

CAUTION : Maximum 250A discharge current is dependent on battery state of charge (SOC) and temperature of unit – Refer to unit specification on page 15. Discharge from inverter output is dependent on current and temperature. High discharge currents for more than 5 minutes might engage BMS over temperature protection. The unit will restart once unit has cooled and on application of voltage source to any input (see below)

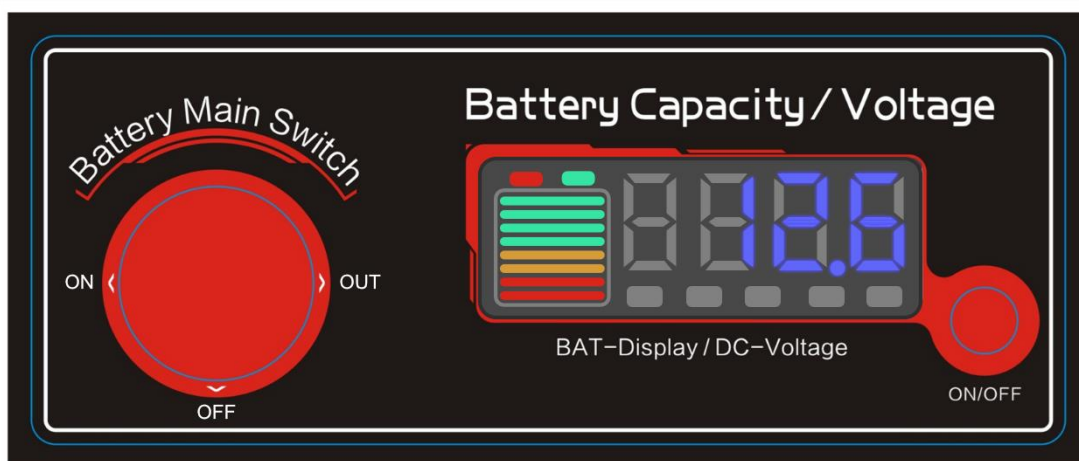
CAUTION : Maximum power inverter rating 2000W – If the maximum discharge of the Battery Management System (BMS) of 250A continuous is exceeded then the BMS will go into “Protection mode” and disconnect all loads. In order to reset the BMS a voltage source of 12Vdc+ needs to be connected to any one of the input anderson connectors. Example could be AC charger, Solar (if present), in vehicle charging with ignition on alternator on

MULTI FUNCTION DISPLAY

The Multi-function Display is designed to help the user to know the capacity of the battery inside the power hub and easily estimate the amount of usable charge left in the battery.

1. Please turn the Battery Main Switch isolator to ON, to power the multi-function display
2. Please press "ON/OFF" button to check the Battery Capacity and Voltage.

Turning the Isolator switch to "OUT" allows the isolator switch to be removed to stop the Hub being used.



NOTE : When the voltage of battery is 13.0 volt or above, BAT-Display is full, which doesn't mean the battery is charged 100% fully. Please charge the battery immediately, when BAT-Display goes down to red sector, or the voltage is 11.0V or less.

TROUBLESHOOTING

If the Vehicle Power Hub fails to operate as specified, follow these troubleshooting steps below to correct the issue.

Charging issues

1. Ensure DC isolator switch is turned “ON” (Not required for In vehicle or solar charging)
2. Please ensure all outlets and cords are connected securely.
3. Use watt meter kit to check the charging information (available on request)
4. AC charger - During AC charging, check the light of AC charger is Red and fan is working. Check the fuse inside AC charger UK plug if no output
5. DC-DC in vehicle charger – Check connection AND black ground cable is connected to vehicle chassis.
6. DC-DC in vehicle charger – Check IGN connection is made to vehicle ignition if using with EU6 vehicle
7. MPPT Solar Charger – Check all connections from solar panel to “Solar input” connector
8. DC-DC in vehicle charger and MPPT Solar Charger - Under permission and instruction from PPT remove the screws and open the lid, to inspect 40A inline fuse holder. Replace 40A fuse if needed with the same size fuse. Failure to request permission will result in warranty being terminated.

12V and USB DC outlets issues

1. Ensure DC isolator switch is turned on
2. Ensure battery is charged and above 11V on the display
3. Check if the light on the USB socket is on or not
4. If BMS has gone into protection mode (over temperature or over current) then refer to **Caution** note on page 12. Unit will require voltage source to reset. If over temperature reset will only occur after unit has reduced in temperature
5. Seek permission and instruction from PPT, remove the screws and open the lid, to inspect all breakers and the internal fuses

CAUTION: If above steps can't correct the issue - Under permission and Instruction ONLY of PPT, remove the screw and open the lid, checking main breaker and relative wirings.

Call PPT on 01474 761051 for advice or permission BEFORE opening the unit

SPECIFICATIONS

Model Type	Vehicle Power Hub 1300 VPH1300	Vehicle Power Hub 2500 VPH2500	Vehicle Power Hub 3800 VPH3800
Battery Specification			
Battery Type	LiFePO4 (Lithium Iron phosphate)		
Battery Voltage (Nominal)	12.8V		
Capacity	100Ah (1300Wh)	200Ah (2500Wh)	300Ah (3800Wh)
Max Charging Current	100 amps		
Battery Lifespan	2000+ Life Cycles		
BMS Capability (Max discharge)	250A (BMS over current and over temperature limited) max 200A – continuous		
Output Specification			
DC Outlet	Dual 5V 2.1A USB 2X 12V 10A DC socket 2x 12V 50A connector (input/output) 1x External DC12V Inverter Outlet		
Input Specification			
AC Charger -230VAC 50Hz UK	Output 14.6V 40A	Output 14.6V 40A	Output 14.6V 40A
DCDC/MPPT Solar	Alternator input : 12-16VDC Solar input : 12V-25VDC max 30A LVD : 11.6V/12.8V Output : 14.6V 30A		
Operating Environment	Relative Humidity : 10% - 90% Operating Temperature : -10 °C to +50 °C		
Dimension	455 (L) x 240 (D) x 330mm (H)		
Net Weight	21.3Kg	27.0Kg	36.3Kg
Warranty	2 Years		

IN THE BOX

The Vehicle Power Hub including:-

AC battery charger 40A with fused UK plug and terminated with Anderson connector x1

IGN cable (ignition): 3 metres and connector for smart alternator program (EU6 vehicles) x1

Inverter connection cable :1 metre 35mm² cable (red/black) terminated with large Anderson connector, M8 ring terminals x1 and inline 225A circuit breaker

Starter battery connection cable for in vehicle charging: 1 metre 10mm² cable (red and black) – Blue Anderson connector to M8 terminals to make in line fuse connection (40A recommended) and ground connection with chassis x1

Solar cable : 1 metre 6mm² - MC4 to Yellow Anderson connector x1

Strapping/ Hold down kit containing fixing strap and 2 x hold down plates

Metal feet fixing kit containing 2 feet and 4 screws

Spare Anderson connectors x 5



MAINTENANCE

1. Keep your Vehicle Power Hub in a cool and dry place
2. Please fully recharge the Vehicle Power Hub every 3 months especially when not in use
3. Turn the main battery isolator to OFF when the Vehicle Hub is not in use
4. Check the lid bolts are tight every 6 months
5. Please make sure the Power Hub is securely mounted using the strap kit or feet fixing kit when used inside a vehicle

WARRANTY

The Vehicle Power Hub is supplied with a 2 year warranty from the date of purchase against defects in material and workmanship under normal use and service. Should your Vehicle Power Hub prove defective within 2 years from the date of purchase, please contact us for a returns number quoting the serial number and return the product, along with a copy of the proof of purchase and an explanation of the fault.

We do not accept liability for any 3rd party damage however so caused.

Under this warranty we will replace or repair any parts found to be defective due to manufacturers defect.

We are not responsible in any way for damages, losses, or inconvenience caused by equipment failure or by user negligence, abuse, or use not accordance with the “User Manual” or any other additional safety, use, or warnings included in the product materials.

Further, we are not liable for incidental, data loss, or consequential damages of any nature resulting from the use of this product and any liability shall not exceed the purchase price of the products.

In the event of a fault please contact the PPT Team on +44 (0)1474 761051



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