Power Tent

SOLAR CHARGED BATTERY CASE (40W NiMH version)

PRODUCT USER MANUAL
40W Power Tent

Overview

The 40W Power Tent is supplied with a 12V DC 324Wh Nickel Metal Hydride battery pack. The Power Tent is a fold-flat portable power system designed for light weight, compact storage, aircraft-friendly transport, and rapid deployment. It is designed for outdoor use and is protected from rain and dust ingestion, but it cannot be flooded or submerged.

This manual documents the 40W version of the Power Tent with 324Wh NiMH battery pack. Other versions of the Power Tent will have different specifications but operate in much the same way.

Opening the Power Tent

When closed flat, a magnetic strip holds the back panel to the solar panel. The magnets are just strong enough to keep the two panels together while being carried in the field without flapping together. You can pry the panels apart with minimal force.
Important Safety Information

When opening the Power Tent fully to 90 degrees, set it down on its side to avoid accidental closure of the panels during setup.

The Power Tent panels have a simple hinge which does not lock open, so be careful not to lay the Power Tent on one of the flat panels on the ground in an L-shape. The vertical panel can easily fall closed and cause injuries to body parts or damage cabling that may be in vulnerable positions.

Once setup is complete, tip the Power Tent up into position, keeping the bases of the panels in contact with the ground at all times.

When it is time to pack away the Power Tent, tip it onto its side, remove any hardware and disconnect the charger and load cables. Tuck the charger cable into the recess at the top of the solar panel before closing the two panels together.

Do not pick up the Power Tent from the gap at the top as the panels will close and potentially cause injury to your hands and fingers.

If the charger cable is stowed in a manner where it will be clear of the closing parts, it is possible to gently pick up the Power Tent using the handle so that it closes as it is lifted.
Battery Box
The battery pack is fitted with a 2.1mm DC socket for charging, and a matching DC plug is fitted to the solar panel cable. A power supply with a 2.1mm DC plug can be connected to the battery box for indoor charging (available for separate purchase).

A two-pin power socket is fitted to the battery box, which is used to connect a device that will operate from 11VDC to 15VDC. The power output has an LVD (low voltage disconnect) circuit to protect the batteries from being over discharged. A matching cable plug is supplied. This connector is keyed and can only be mated when correctly aligned, then inserted & secured using the bayonet collar.

Charging Information
The NiMH charge regulator is designed for a simple DC power source like a solar panel, 12V battery, or a switched mode power supply (available separately). The regulator will draw up to 5A and float charge at a rate of 200mA once the battery is deemed fully charged. It is programmed to automatically restart the full charge cycle if the battery voltage drops below 12V, and charging will timeout after 840 minutes (14 hours) to limit overcharging.

The 27Ah 12V DC (324Wh) battery pack will take some hours to fully charge, depending on available sunlight. The 40W panel has a peak output of 2.25A, so with no load the battery would take 12 hours of full sun to fully charge, but in practice this will take several days. Using a 5A power supply should have the pack charged within 5-6 hours. The charging curve is not linear, and charge times will vary depending on initial charge levels.

The Power Tent is designed for an instrument load of 0.2A at 12V DC, hence the float charge rate, so the theoretical power backup time without charge for the 27Ah pack is 135 hours (>5 days) but in practice this will depend on battery condition, temperature, real world power consumption, and a host of other factors, so testing is recommended with your selected instrumentation to determine how long your system can survive without sun.
Operation

LED indicators

The LED near the Load output connection will glow red if the battery voltage is too low. This indicates that the battery voltage has dropped below 11.4V and has not yet reached the reconnect voltage of 12.8V.

Once a power supply is connected, the battery voltage should come up to 12.8V quickly – with a few minutes. When fully charged the battery voltage sits at 14.8-15V, which is normal.

The tri-colour LED near the Charger input connection shows the status of the charging circuit. The table below can be used to decode the status messages. Typically the LED will be orange, indicating normal charging, or green when fully charged and in float charging mode.

Decoding the Charging Status

**LED Patterns (routine)**

- Traffic light (Red-Orange-Green)
  - System reset. Occurs at power-on and when battery is connected
  - Battery disconnected
- Slow Orange blink System waiting.
  - Solid Orange
- Orange with Green blink
  - Constant current phase
- Solid Green
  - Charge Complete. Float Charge continues

**LED Patterns (exceptions)**

- Three Red Flashes
  - Charge suspended. Battery voltage too low
- Two Red Flashes
  - Charge suspended. Battery voltage too high
- Slow Red blink (Once every 5 sec)
  - Charge suspended. Battery or PCB too hot
- Fast Red blink
  - Thermistor error. Needs power reset
- Orange blink (Once every 0.5 sec)
  - Timeout
- Solid Red
  - Fault. Needs power reset
Wiring Information

There are two connections on the Power Tent – the charger input and the load output.

Charger Input

As per the standard for 2.1mm DC power connections, the outer ring is negative and the central pin/socket is positive.

Load Output

Pin 1 of the 2-pin connection is positive, and pin 2 is negative. When looking at the socket on the battery box, when the notch is at the top, pin 1 is on the right. The cable supplied will have a bare wire end with a red wire (positive) and a black wire (negative).

Warranty

The Power Tent, manufactured by ESS Earth Sciences, is warranted to the original purchaser only, to be free of defects in material and workmanship at the time of shipment and for a period of one year from the delivery date. This warranty applies to equipment purchased from ESS Earth Sciences that has been properly installed and operated, but not to equipment which has been subject to neglect, accident, improper installation, misuse, misapplication, abuse or alteration. It does not apply to damage caused by factors beyond our control including fire, flood, lightning or vandalism.

ESS Earth Sciences will, at its own option, repair at its laboratory or replace equipment covered under this warranty. All costs of freight and insurance plus any applicable customs and clearance fees will be paid by the purchaser. All goods must be sent in original packaging with appropriate protection against damage including electrostatic charge.

It is the responsibility of the purchaser: to give prompt notice of any claim; to request a return authorisation before returning any equipment to ESS Earth Sciences; and to return the goods within the warranty period.

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