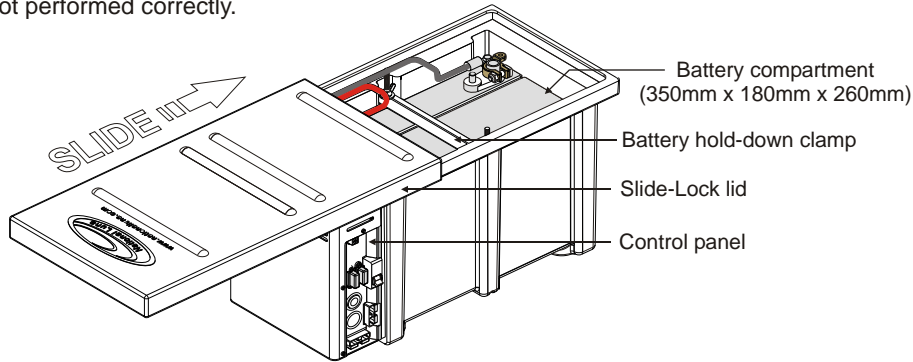
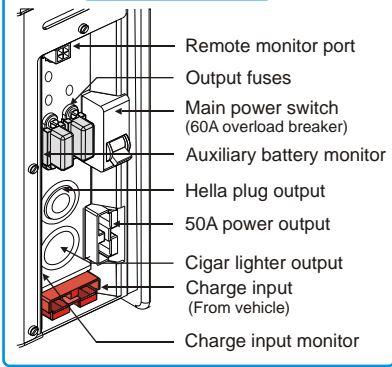


Introduction

Important safety and protection features are included in the operation of the Portable Power Pack. These features prevent short circuits, reverse polarity or overloading of the vehicle's alternator. As a protection feature, the Power Pack will not operate if the installation is not performed correctly.



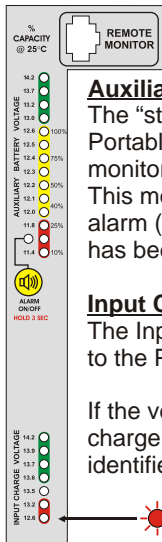
CONTROL PANEL



The Portable Power Pack is fitted with 3 x output plugs (ie. Hella, Cigar and 50A power coupler).

The Hella and cigar output sockets are individually fused with 15A fuses and the 50A output is directly fused through the 60A circuit breaker.

Provision has been made for attaching a **Dual-Battery Controller (optional)** to the Portable Power Pack via the remote monitor port. This facility allows the user to monitor the status of both the main and auxiliary batteries, as well as being able to "over-ride" the split-charge isolator and join the main and auxiliary batteries from a remote location.



Auxiliary battery monitor

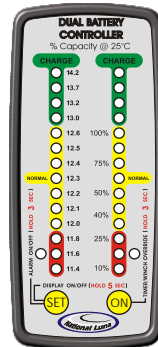
The "state-of-charge" of the battery housed in the Portable Power Pack can be read from the battery monitor on the side panel.

This monitor also includes an excessive discharge alarm (11.4V) which warns the user that the battery has been discharged by more than 80%.

Input Charge monitor

The Input Charge display shows the voltage applied to the Power Pack from the vehicle's charging system.

If the vehicle is not running, it is normal for the Input charge display to flash the bottom **RED** light. This identifies that the MAIN battery voltage is below 12.6V.



1

Installation

The Portable Power Pack is supplied with the following components :

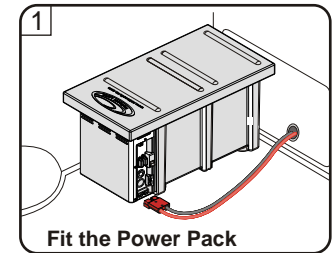
1. 7m input power cable with RED power coupler.
2. High current in-line fuse.
3. Battery hold-down bracket.
4. Positive & Negative battery terminals.
5. Assorted Lugs and screws.

Before commencing with the installation, the **NEGATIVE TERMINAL** of the main vehicle battery should be disconnected as a safety precaution. Only re-connect the negative terminal after the rest of the installation is complete and checked.

Refer to your vehicle's handbook relating to battery connections

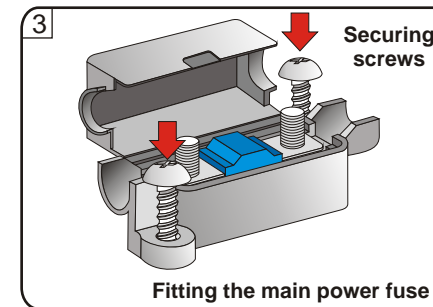
On some motor vehicles, removing any terminal of the main battery may affect alarms and/or engine management systems. In this case, the installation can be performed "live" - **EXTREME CAUTION** is advised when connecting and handling wiring.

- 1 Decide on the location of the Portable Power Pack. Ensure that there is enough clearance on the side of the pack to prevent plugs and cables from bumping or rubbing against nearby surfaces. Allow clearance for the main power cables to bend in the desired direction.

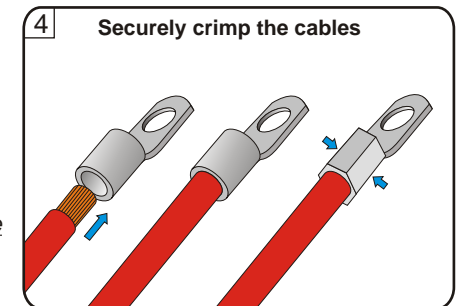


Ensure the main power switch is in the "OFF" position.

- 2 Route the input power cable (both **Black** and **Red**) from the Portable Power Pack towards the main vehicle battery. It is often best to follow existing wiring or brake lines. Secure the cables and make sure that they are not exposed to physical movement or sources of direct heat.



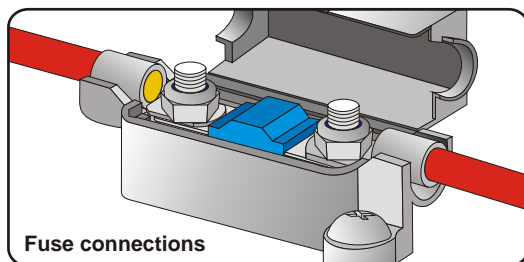
- 3 Fit the main power fuse using the securing screws provided as close to the main battery as possible. Make sure that the fuse housing is secure and not exposed to direct heat or mechanical stress.



- 4 Allow enough **RED** cable to reach the main power fuse. Trim the excess cable and terminate the ends with the 16x5 lugs supplied. Make sure that the lugs are correctly crimped and do not pull loose.

2

- 5 Fit the **RED** Power cable to one end of the fuse. Connect the remaining cable to the other end of the fuse and route to the POSITIVE terminal of the MAIN battery.



Once the **RED** cables are fitted to the fuse, re-connect the positive terminals of the MAIN battery.

Take care to ensure correct polarity.

- 6 Route the **BLACK** power cable to the NEGATIVE terminal of the MAIN battery and connect. Secure cables and double-check all connections.

WARNING - DO NOT USE THE VEHICLE BODY AS AN ELECTRICAL EARTH !!

Complete the installation by fitting the battery hold-down bracket and battery into the Portable Power Pack. Connect the auxiliary battery to the cables within the Power Pack. (Check polarity - **RED** is POSITIVE, **BLACK** is NEGATIVE) Plug the input power cable into the Power Pack RED receptacle, ensuring good contact. As power is applied to the Power Pack, the GREEN "Timer Active" light will flash once. At this point, the Power Pack is initialised and ready to receive power. The main power switch can now be turned "ON".

Operation

Make sure that your Portable Power Pack is installed properly and operational by performing the following test:

1. Make sure the input power cable is plugged into the Power Pack and that the circuit breaker is in the "ON" position.
2. Start the vehicle engine.
3. The GREEN "Timer Active" light on the control panel of the Power pack will start to flash. (expect the light to flash for approximately 5 minutes)
The Input charge voltage display will show the input voltage level applied to the Power Pack.
4. After the 5-minute internal timer has expired, the GREEN light will remain lit and the MAIN and AUXILIARY batteries will be joined.
At this point, charge from the vehicle alternator will charge both batteries. Check the auxiliary voltage display. There should be at least 2 GREEN lights on the display, for the auxiliary battery to receive sufficient charge.
5. Stop the vehicle engine.
6. The Portable Power Pack will remain connected until the MAIN battery voltage has dropped below 12.7V. At this point, the GREEN light on the control panel will go off and the auxiliary battery will be disconnected.

The Power Pack will not normally disconnect immediately after the engine is stopped. Depending on the applied load (eg. lights), the voltage on the MAIN battery will drop at different rates.

3

Connecting accessories

The Portable Power Pack is fitted with fused outputs. These outputs can be used for fridge/freezers, pumps, lights or any other 12V DC accessory which does not draw more than 15A.

The GREY 50A power coupler can be used to connect high-power accessories (such as inverters - MAX 600W) to the auxiliary battery.

Note that all inputs and outputs are fused through the 60A circuit breaker. Make sure the main power switch is in the "ON" position during use.

When the switch is in the "OFF" position, all connections to the auxiliary battery are isolated.

Battery Monitors

Since battery voltage varies with temperature, battery testing is carried out at 25°C. (This is an international test standard).

There are both Auxiliary battery voltage and Input Voltage monitors fitted to the control panel of the Portable Power Pack.

These monitors allow the user to check the available capacity of the auxiliary battery as well as the applied charge voltage from the vehicle's alternator.

Auxiliary Battery Monitor

During normal operation, the auxiliary battery display will show the available capacity of the Power Pack battery. (*Indicated Battery capacity may deviate with a change in temperature.*)

If the auxiliary battery voltage drops below 11.4V, the monitor will activate an audible alarm, notifying the user that the battery is flat and should be recharged as soon as possible.

Discharging the battery below this level may damage the battery and is not recommended.

The auxiliary battery monitor also has an over-charge alarm. This alarm will activate when a charging voltage above 14.65V is applied to the auxiliary battery.

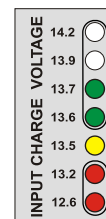
Alarm ON / OFF: Press and hold the  button for 3 seconds. (a single beep is heard)

Testing your alternator using the Input Voltage Monitor

Installing a secondary battery in your vehicle increases the work load on your vehicle's alternator.

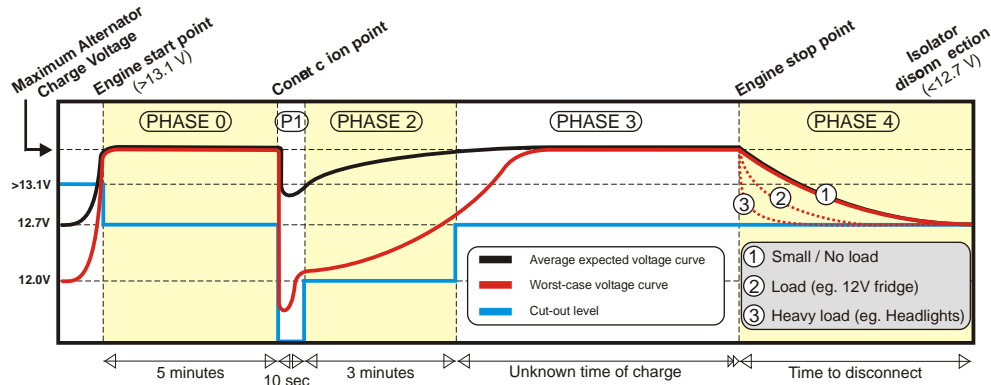
It is important to check that your alternator can maintain sufficient voltage to charge additional batteries.

With the engine running, at least 2 green lights must be showing. Turn on the vehicle's lights, air-conditioner and any other load (such as spot-lights). With this additional load, 2 green lights must still be showing. If there are no green lights displayed, the vehicle's charging system should be checked for correct operation. A charging voltage above 13.9V is preferable for optimum auxiliary battery charging. (ie. 3-4 green lights).



4

The **Portable Power Pack** has a pre-programmed cycle which operates through specific phases. The graphic illustration below represents the required voltage levels for correct operation as well as switching time cycles.



BEFORE STARTING The voltage of a car main battery will depend on temperature, battery drain due to alarm systems/accessories, time since last use/charge as well as age/general condition of the battery. Thus one can expect a main car battery (still capable of starting the car) to reflect a voltage of between 12.0V and 12.6V before starting.

PHASE 0 After starting the vehicle, the alternator will deliver a charging voltage. Depending on the rating of the alternator, one can expect to read a voltage of between 13.6V and 14.5V.

When the Power Pack detects a voltage above 13.1V (engine started), it will initiate a 5-minute timer before allowing the auxiliary battery to be connected to the charging system. (During this delay, the alternator will deliver maximum charge to the main battery, in order to recover the starting drain.)

P1 At the point of connection, an instantaneous voltage collapse can occur due to the additional load of the auxiliary battery. The Power Pack will allow a voltage collapse below 12.0V for a period of 10 seconds only. After this period, the charging voltage must be above 12.0V in order to stay connected. (If this voltage level is not maintained above 12.0V, the Isolator will automatically disconnect as a safety / protection feature.)

PHASE 2 Provided the charging voltage has risen above 12.0V, the Power Pack will monitor voltage for a period of 3 minutes, whereby the charging voltage must have risen above 12.7V. (If, after this 3 minute period, the charging voltage has not risen above 12.7V, the Isolator will assume a faulty or over-loaded alternator, and disconnect as a protection feature.)

PHASE 3 The solenoid will remain connected as long as the charging voltage is above 12.7V. (Note that a charging voltage below 13.5V is not desirable as this reduces charging rate).

PHASE 4 Once the vehicle's engine has been switched off, the battery voltages will drop. Depending on the temperature, type and capacity of battery, as well as the overall loads connected to the battery systems, the period of time to drop to 12.7V will vary. (The Isolator will disconnect automatically when it senses a voltage below 12.7V.)

NOTE - If any PHASE is not completed, the Power Pack will revert to the beginning of the cycle.

DISTRIBUTOR



Technical Enquiries

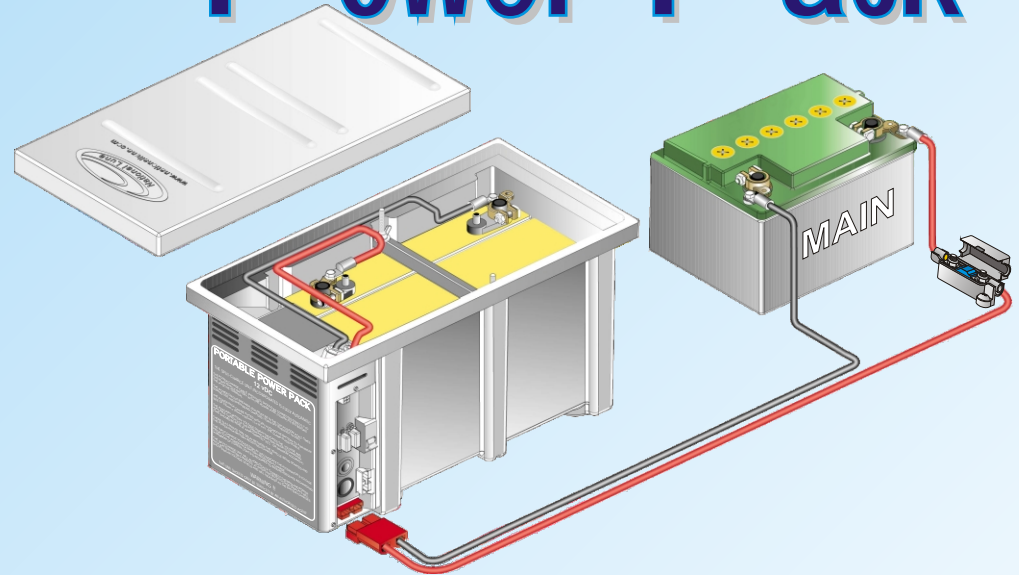
www.nationalluna.com

National Luna - South Africa

Tel : +27(0) 11 452-5438
 Fax : +27(0) 11 452-5263
 e-mail : natluna@mweb.co.za



Portable Power Pack



The Portable Power Pack is a stand-alone power source for use in 4x4 vehicles, trailers, caravans and boats.

This Split-Charging System does not interfere with any electronics or wiring on the vehicle.

- Slide-Lock lid.
- Fully fused outputs.
- Very simple to install.
- Accurate battery monitors.
- Snap-On input power coupler.
- Cables and power fuse supplied.
- Accepts any standard automotive battery.
- Fully automatic split-charge isolator included.

