![National Luna logo]

Portable Power Pack II
Dual Battery System & Isolator

OWNERS MANUAL

Index

Introduction

The Portable Power Pack II is a dual-battery system and isolator for use in automotive applications. It allows an auxiliary battery to charge when the vehicle is running and isolates it from the main battery when the vehicle is turned off. This prevents the main battery being drained by accessories such as fridges, lights, pumps, fans, etc.

The Power Pack II features a dual-display that can show the respective voltages of the main battery and auxiliary battery. The respective displays can be switched to show charge current and load current.

Battery status, system status and preferences can be viewed and configured on a Bluetooth-connected smart device using the new CONNECT application.

The Power Pack offers a variety of power outputs including standard automotive sockets (cigar type), Hella type, USB charge ports and heavy-duty 50A couplers.

> **NOTE :**
> The Portable Power Pack II relies on the vehicle alternator to provide charge.
> It is intended for use in vehicles with alternator voltage above 13.5V.
> Battery charge performance will be affected by the alternator voltage.

Supported battery types :
*   12V Lead-acid (Calcium, Flooded, AGM, Gel, VRLA)
    including high-cycle / deep-cycle variants of these.
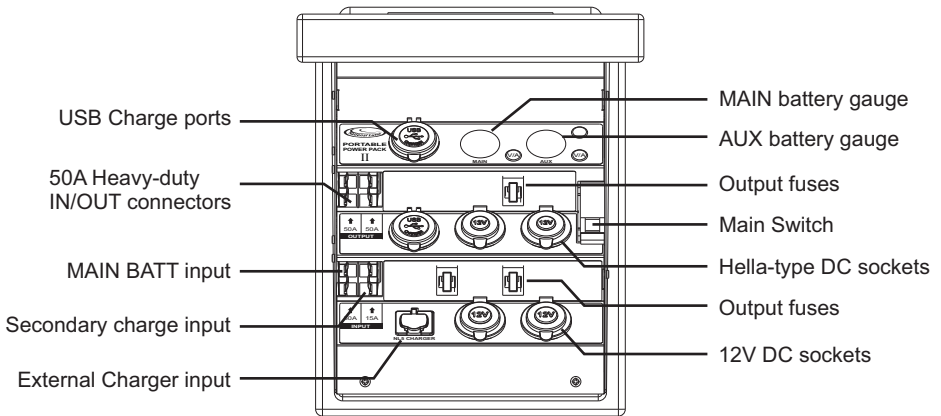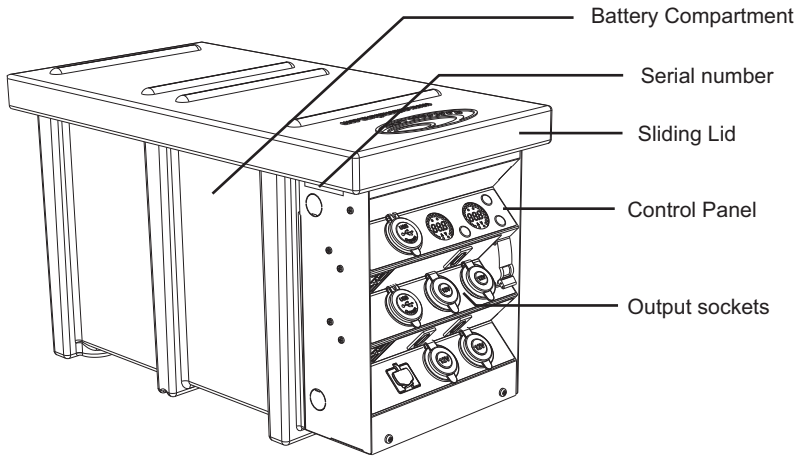   *Lithium-based batteries are not supported*
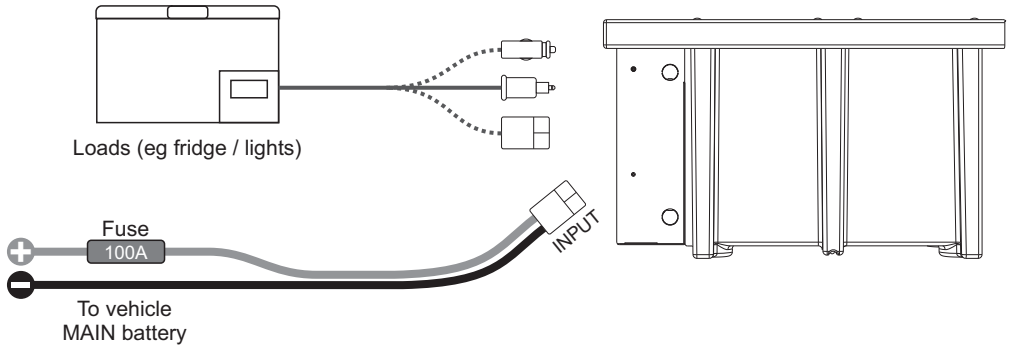
Max battery size :
*   350mm x 180mm x 270mm (L x W x H)

SAFETY INFORMATION :

*   Before installation, read the instructions carefully.
*   Before installation, disconnect any existing batteries.
*   The Portable Power Pack is intended for use with 12V lead-acid batteries only.
*   Do not attempt to use Lithium batteries with the Power Pack II
*   Do not use for any purpose other than indicated in this manual.
*   Do not attempt to charge a non-rechargeable or battery other than 12V.
*   Never attempt to charge a damaged or leaking battery.
*   Avoid open flames in the vicinity of the battery.
*   Do not alter or modify the Portable Power Pack under any circumstances.
*   Do not expose the Portable Power Pack to liquids. Do not immerse in water.
*   Unauthorized disassembly, repairs or modifications will void any warranty.
*   Attempts to use the Portable Power Pack for purposes other than indicated in this manual will void the warranty.
*   Ensure all connections are secure and cables are installed in a safe manner.
*   Keep cables away from sources of high temperature.
*   Ensure cables are not clamped or pinched.
*   Use the correct cabling size and fuses in accordance with the installation instructions.
*   Ensure the Portable Power Pack is secured in mobile applications.

Features

Battery Compartment

Serial number

Sliding Lid

Control Panel

Output sockets

USB Charge ports

MAIN battery gauge

AUX battery gauge

50A Heavy-duty
IN/OUT connectors

Output fuses

Main Switch

MAIN BATT input

Hella-type DC sockets

Secondary charge input

Output fuses

External Charger input

12V DC sockets

Wiring diagram - Typical Installation

Loads (eg fridge / lights)

Fuse
100A

To vehicle
MAIN battery

INPUT
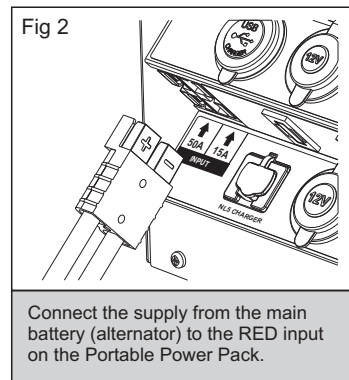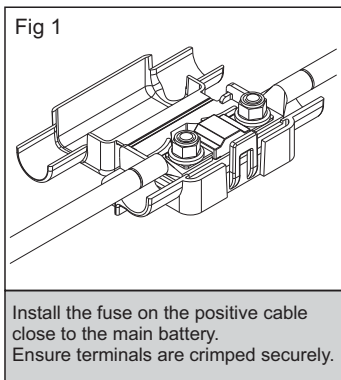
Preparing for Installation

The Portable Power Pack is a complete dual-battery system, it does not require any isolator, solenoid or other battery system. If there any pre-existing dual-battery systems or isolators, they should be removed or bypassed for the Power Pack to function properly.

Locate the Portable Power Pack such that the input cables are not restricted or under strain. The Power Pack should also be secured to prevent movement in a mobile application.
All cables should be protected from high temperature and potential physical damage.

Use $16mm^2$ cables for the input from the vehicle main battery and install a 100A in-line fuse close to the main battery on the positive cable (*Fig 1*).
Make sure all connections are secure and terminated correctly with appropriate tools.

The input cables must be terminated with a RED 50A coupler matching the input on the Portable Power Pack marked "INPUT" (*Fig 2*).

Fig 1

Install the fuse on the positive cable close to the main battery.
Ensure terminals are crimped securely.

Fig 2

Connect the supply from the main battery (alternator) to the RED input on the Portable Power Pack.

Installing Battery

To hold a battery securely in the Power Pack, install the U-bolt and hold-down bracket.
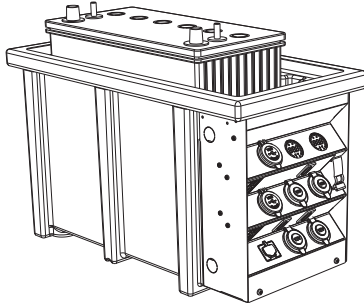It is best to lay the Power Pack on its side or end to do this.

1
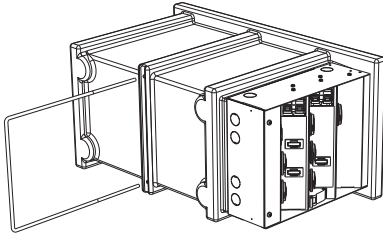
Insert the U-bolt through the holes drilled into the bottom of the Power Pack.
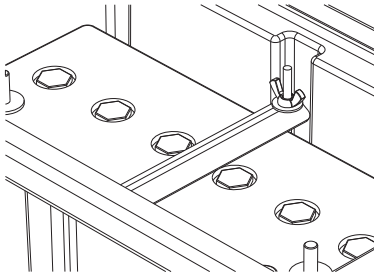
Return the Power Pack to the upright position.

2

Remove the Power Pack sliding lid and insert the auxiliary battery into the battery compartment.
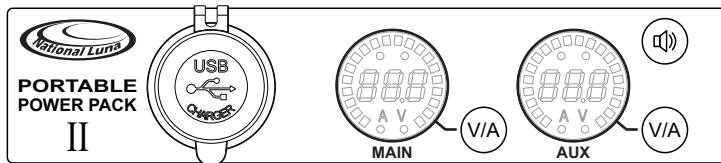
3

Attach the hold-down bracket, washers and wing-nuts.

Take care not to over-tighten the screws.

Connect the positive (RED) and negative (BLACK) cables to the respective battery terminals. Make sure the connections are clean and secure.
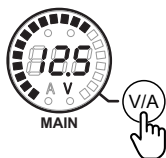
Control Panel

The Portable Power Pack control panel comprises of two displays marked as MAIN and AUX.
The MAIN display can show the input voltage or charge current.
The AUX display can show the auxiliary battery voltage or discharge current.

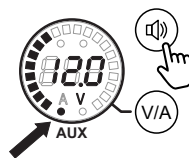The low-battery alarm voltage and start timer can be adjusted from the control panel.

Changing display mode

Each display can be toggled to show voltage or current.

Press and hold the V/A button for the respective display to toggle the display mode. The "V" or "A" symbols will indicate the selected mode.
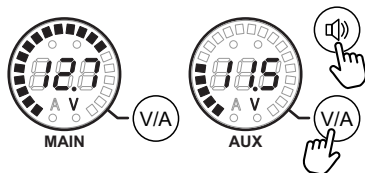
Toggle alarm on / off

The low-voltage audible alarm can be muted or un-muted by pressing and holding the alarm button.

The alarm on/off indicator will show if the alarm is enabled or disabled.

Changing low-battery level

The low-battery warning voltage can be adjusted to suit the application and battery being used.

Press and hold the AUX (V/A) button and (🔊) together. The current value will be shown.
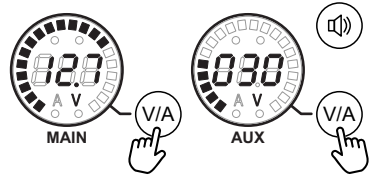
Press the (🔊) button to increase the value.

Press the AUX (V/A) button to decrease the value.

Release all buttons when done. The new value will be saved and the display will return to normal.

- The low-voltage alarm is used to warn of excessive battery discharge and potential battery damage. Regular deep-discharge will reduce battery cycle life.

- A voltage of 11.9V is typical of 60% depth-of-discharge and is recommended for high-cycle batteries.

- A voltage of 11.5V is typical of 80% depth-of-discharge and is the deepest recommended discharge for deep-cycle batteries.

- Discharging below 11.4V is not recommended for most batteries.

Changing Start Timer

The Start Timer defines the delay after starting the vehicle when the Power Pack connects the auxiliary battery and allows charge to flow to it. This delay can be adjusted for various vehicles and applications.

The start timer can be adjusted to suit the application.

Press and hold both (V/A) buttons together. The current value will be shown.
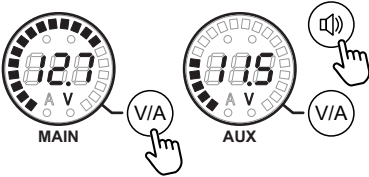
Press (🔊) to increase the value.

Press (V/A) to decrease the value.

Release all buttons when done. The new value will be saved and the display will return to normal.

• A longer delay is useful for vehicles with lower-power alternators. It allows for the Main battery to receive charge for longer before charge is shared to the Auxiliary battery. This can prevent alternator over-load.

• For vehicles with more powerful alternators, a shorter delay can be chosen. This connects the Auxiliary battery sooner but can put more load on the alternator initially.

• The start timer can be set between 30 seconds and 8 minutes in increments of 30 seconds.

Changing Voltage Profile

The Power Pack detects when the vehicle has started and when it has stopped by measuring the voltage on the MAIN input. The Voltage Profile is used to adjust this threshold to ensure reliable detection in a variety of different vehicles and applications.

A voltage profile can be chosen to suit a particular vehicle or application.

To select a voltage profile, press and hold the MAIN (V/A) button and (🔊) button together.

Press the AUX (🔊) button to increase the value. Press (V/A) to decrease the value.

Release all buttons when done. The new value will be saved and the display will return to normal.

• The voltage profile selected will also affect the turn-off voltage (when the Power Pack isolates the Auxiliary battery).

• Vehicles with a higher alternator voltage can use a higher voltage profile.

• Vehicles with a lower alternator voltage can use a lower voltage profile. This may be necessary for vehicles with "smart" alternators.

• A value of 13.2V-13.3V is recommended for most applications.

Dedicated Charger Port
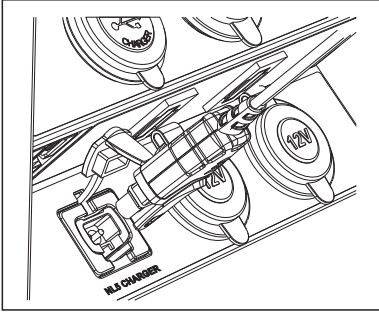
The Portable Power Pack has a charge port specifically for use with National Luna Intelligent Battery Chargers.

Insert the charger quick-connector into the charge port labeled "NL5 CHARGER" until it clicks securely.

In order to connect other brands of chargers to this input, a quick-connector cable is available separately.
This port can support up to 10A charge current.

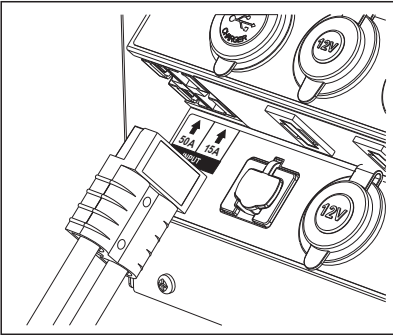Make sure the main breaker switch is in the ON position during charge.

Connecting External Chargers

The Portable Power Pack has a secondary charge input that is designed for use with larger AC battery chargers and solar regulators up to 15A.

SOLAR CHARGE - In order to supply the Power Pack with Solar power, an external solar regulator is required. Connect the output from the regulator to the secondary input.

If the charge source has a current greater than 15A, connect it directly to the battery terminals.

Connecting inverters and high-power loads.
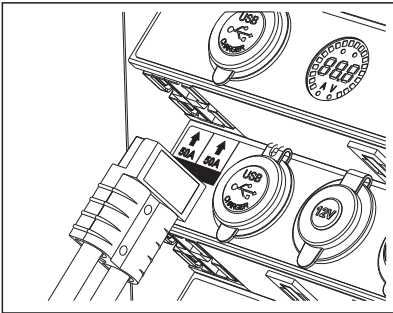
High-current loads such as AC Inverters can be connected to the OUTPUT plugs for powers up to 600W.

Larger-power loads exceeding 600W (50A) should be connected directly to the battery terminals instead.

When using chargers or inverters connected to the OUTPUT plugs, the main switch must be ON.

USB charge ports

The Portable Power Pack offers multiple USB charge ports ideal for charging smart devices (mobile phone, tablet, GPS, cameras, power bank, etc)

Each port is able to deliver up to 18W of power compatible with QuickCharge 3.

```
 5V  :  3A
 9V  :  2A
12V  :  1.5A
```

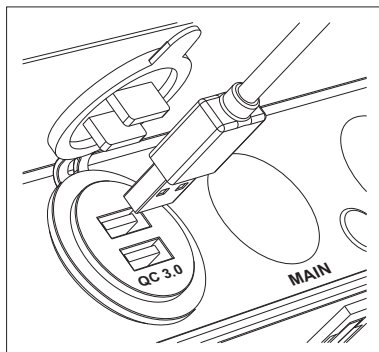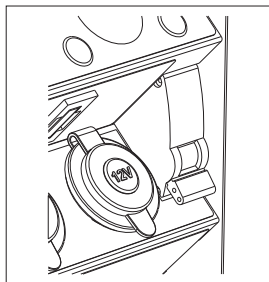NOTE : The charge rate is device-dependent. Not all USB devices will utilize QuickCharge.

System operation

Main Isolator Switch

In order to charge or supply power to accessories connected to any of the plugs & sockets, the main switch must be in the ON position.

If the Portable Power Pack is not in use then it is best to turn this switch OFF. This will completely isolate the auxiliary battery.

The Portable Power Pack will detect when the vehicle is started and begin the Start Timer when the voltage present on the MAIN input exceeds the value set by the Voltage Profile.
The auxiliary battery remains isolated at this stage.

Following the Start Timer (period set by user), the Power Pack connects the auxiliary battery and allows it to receive charge. Charge current can be viewed on the MAIN display by setting the mode to Current (A). During this time, input voltage and current is monitored. If a fault condition is detected, the auxiliary battery is disconnected.

If the input voltage falls below the Stop voltage (derived from Voltage Profile), the auxiliary battery is isolated and the Power Pack enters a paused state.
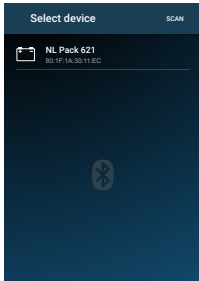If the input voltage remains below the stop voltage, the Power Pack enters a standby state.

CONNECT Mobile APP

The Portable Power Pack can communicate with a mobile device using the NL CONNECT application.
This application is available for iOS and Android systems and can be downloaded from the respective APP stores.

Once installed, open NL CONNECT. It will start to scan for nearby compatible devices. Only compatible devices that are in range are listed.

The Power Pack will be listed as "NL Pack" with a 3-digit number. This number corresponds to the last 3 digits of the Power Pack serial number.

If a custom name has been set for a device, the custom name will be shown instead.

If a device has been connected previously, it will be saved in the devices list. To forget a device, tap the trash bin icon next to the listed device.
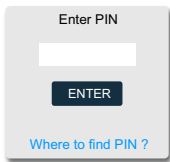
Tap the desired device to connect to it.

The first time a device is connected, a prompt to enter the PIN will be displayed. Use the Power Pack serial number as the PIN (listed on the side of the Pack).

After a successful connection, this device and its PIN will be saved into the device list.

APP Dashboards
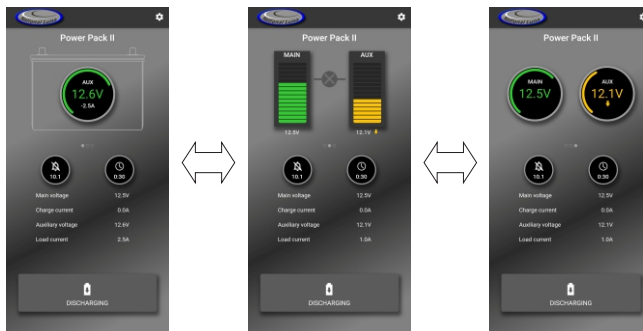
There are 3 different dashboards that can be chosen depending on your preferences. The preferred display can be chosen at any time by swiping left or right.

The dashboard is split into 3 sections :
The top section shows the battery and system status at a glance either on a single gauge, dual-bar or dual gauge display.
The middle section shows the Alarm and Timer settings as well as additional system data.
The bottom section shows a status block. This will shows the system current mode and any errors.
This block is also used when making changes to the alarm or timer values.

Adjusting Alarm and Timer values

To adjust the low-battery alarm voltage, tap the alarm button.

The alarm voltage can be adjusted by pressing the + or - buttons shown at the bottom.
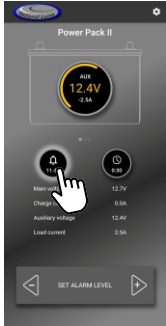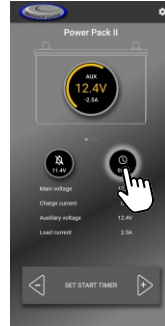
The alarm can be adjusted between 10.0V and 11.9V.

Press OK when done or anywhere else on the screen to cancel.

To adjust the start timer, tap the timer button.

The start timer can be adjusted by pressing the + or - buttons.

The timer can be adjusted between 0:30 and 8:00.

Press OK when done or anywhere else on the screen to cancel.

Device status and warnings

STANDBY — Standby - The system is isolating the main and auxiliary batteries. No charge or discharge currents are detected.

START DELAY — Start Delay - The system has detected that the vehicle has started. The Start Timer is active and will run for the configured duration.

PAUSED — Paused - If the vehicle has been turned off before the Start Timer has completed, the system enters a paused state. If the vehicle re-starts during this state, the Start Timer will resume.

CHARGING — Charging - The auxiliary battery is receiving charge. The charge current is shown on the dashboard.

DISCHARGING — Discharging - The auxiliary battery is being discharged. The discharge current is showed on the dashboard.
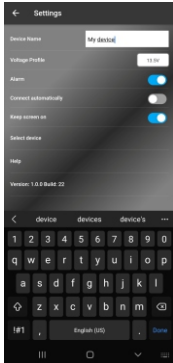
BATTERY LOW — Battery Low- The auxiliary battery voltage is below the configured low-voltage threshold.

CHARGER CONNECTED — Charger Connected - A charge source is connected to the secondary charge input and the auxiliary battery is being charged. eg. An external battery charger is connected to the charge port.

Set a custom device name

A custom name can be set for your Power Pack in the settings.

Press the ⚙ icon to access the settings page.

A custom name is associated with this specific device and will appear in the device scan list and on the selected dashboard whenever the device is connected.

To set a custom name, tap in the "Device Name" block.
Use the keypad to set a new name.

APP Preferences

Voltage profile

The Voltage Profile can be selected from this screen. Tap the currently-displayed voltage to cycle through the options. The value will update on the Power Pack immediately.

Alarm

The audible alarm can be enabled or disabled by tapping the switch.
This will be updated on the Power Pack immediately.

Connect automatically

With this enabled, the APP will attempt to connect to the last connected device automatically when opened.

Keep screen on

This option will keep the mobile device screen on and prevent it entering standby. *Note - this can increase power consumption on the mobile device.*

Select device

Disconnect from the current device and return to the scan screen.
This is useful to connect to a different device without closing the APP.

Help

This opens a help page that describes the functions and features of the APP.

Specifications

Inputs	
MAIN BATTERY input	10V - 15V 50A max
Secondary charge input	5V - 15V 15A fused
NL5 Charge port	5V - 15V 15A fused
Supported Battery	
Battery voltage	12V lead-acid
Battery types	(Wet, Gel, AGM, VRLA)
ON Voltage	13.0V - 13.5V user selectable
OFF Voltage	12.4V - 12.9V user selectable
Start delay	0:30 - 8:00 user selectable
Alarm voltage range	10.0V - 11.9V user selectable
Outputs	
Heavy-Duty Grey x2	50A
CIGAR x2	10A (15A fused)
HELLA Type x2	10A (15A fused)
USB x4	18W (QuickCharge)
Other	
Operating temperature	-10°C to 70°C
Standby current	< 160mA
Battery gauge display range	10.7V - 14.7V
USB charge output (each port)	5V-3A, 9V-2A, 12V-1.5A
Outer dimensions	495mm x 258mm x 305mm
Max battery size	350mm x 180mm x 270mm
Protection	
Reverse-polarity	

495mm

305mm

448mm

258mm

215mm

292mm

145mm
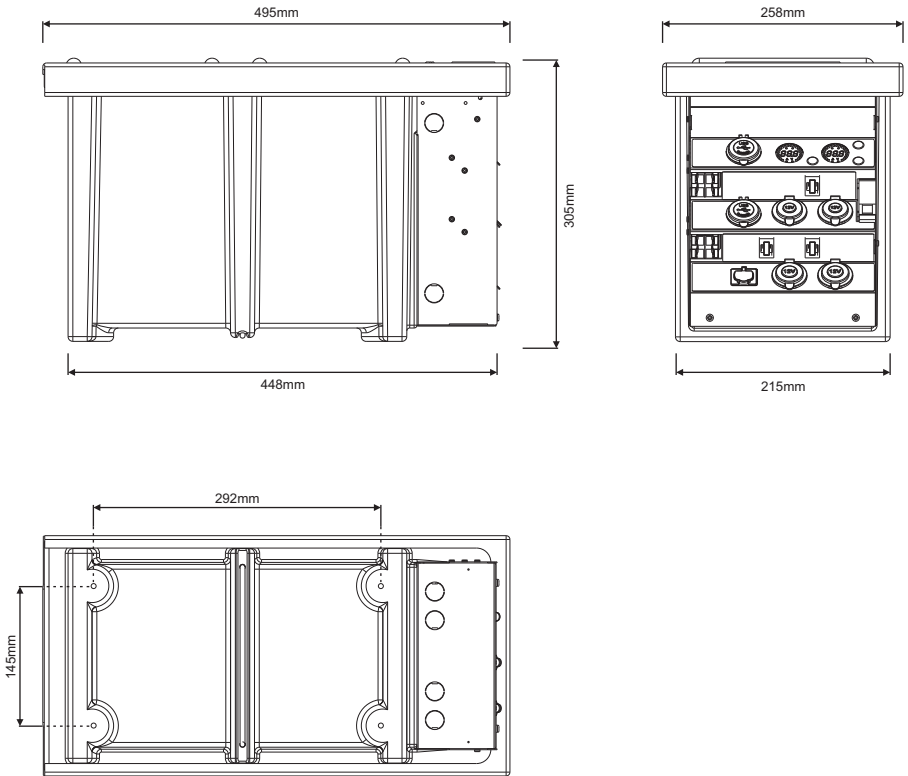
Maximum Battery Size

350mm

270mm

180mm
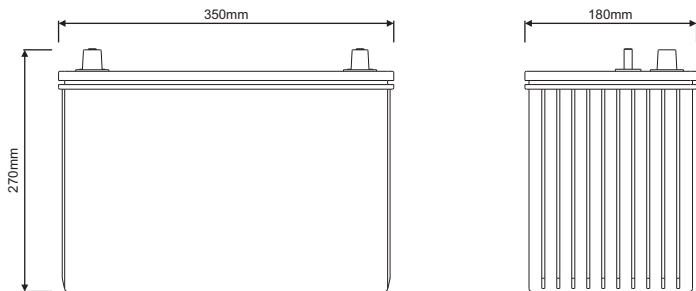
Warranty - South Africa

This National Luna Warranty supersedes any other advertised Guarantee or Warranty provided with this appliance by any wholesaler or retailer.

National Luna warrants this product to be free from defects in materials and / or workmanship under normal use and service to the original purchaser subject to the following :

1. At any time within THREE YEARS from the date of purchase by the original purchaser, National Luna will at its discretion replace or repair without cost to the owner, through an authorised service agent, any part found to be defective by National Luna.

2. Where parts are replaced by an authorised service agent, the labour costs for the work done will be for the owner's account.

3. This warranty does not apply to accessories or items where the length of life depends on the amount of use and care given.

4. This warranty is valid in South Africa only.

5. National Luna may consider a warranty void if modifications have been made to this product which may cause undesirable or hazardous operation or may be the cause of the malfunction of this product.

6. National Luna shall not be responsible for any damages of any kind resulting from incorrect voltages or faults with regards to power supply which fall outside of the appliance operating specifications.

7. National Luna shall not be responsible for damage to the product caused by negligent use, storage of hazardous chemicals, use of corrosive substances, fire, flood, civil-disturbances, lightning or any other natural phenomenon.

8. Warranty returns to the factory for repairs - in the event where the unit has been shipped to the factory for repairs, transport costs will be for the owners account.

9. National Luna will not accept any responsibility for the consequential loss or damage caused by, or due to the malfunctioning of this appliance.

10. National Luna shall not be held responsible for any injuries to persons caused by the incorrect or negligent usage of this appliance.

11. Repair work to be done in terms of this warranty must be referred to National Luna for written authorisation before any work is performed.

12. National Luna reserves the right to refuse repair or service under warranty if the original proof of purchase cannot be produced.

13. Removal of serial numbers may render the warranty void.

National Luna Limited Warranty - International

The standard National Luna Warranty in South Africa cannot be applied outside the South African borders for practical reasons.

1. National Luna has a world wide distributor network. These distributors import products and carry the warranty (at their cost) in line with the various countries' conditions of sale.

2. Cross-border customs and duties apply. A National Luna manufactured product that is returned to the factory in South Africa will have the South African warranty applied. However, all transport costs incurred will be for the purchaser's account.

3. It is important to note that a private purchase of this product in South Africa and exported will not carry a warranty. Any labour and parts required for repairs would incur costs in foreign currency and be for the owner's account.

4. In the event of a National Luna product being fitted as standard equipment in caravans and trailers and subsequently being exported from South Africa, the warranty must be carried by the persons responsible for the importing into a country other than South Africa.

5. It is recommended that National Luna products be purchased from the authorised importer in a particular country who carries the applicable warranty and back-up service.

National Luna sales and support :

www.nationalluna.com