BMPRO

OWNER'S MANUAL

ASPERO



TEAMBMPRO.COM

BMPRO

POWERING YOUR ADVENTURES

With over 50 years' experience in power solutions combined with manufacturing and design facilities in Melbourne, Australia, BMPRO are the leading experts in RV power and control management.

Inspired by the great outdoors, we have created a range of rugged, smart and reliable products to power your adventures.

Our range of battery, power and RV management and control systems gives you peace of mind when you are on the road, so that you can relax in even the most far flung destinations, knowing you have control over your power needs.

To learn more about the BMPRO range of products, please visit our website **teambmpro.com**

BMPRO TEAM BMPRO .COM

SAFETY PRECAUTIONS

Please read the Safety Precautions before installing or using the ASPero system. Be sure to observe all precautions without fail. Failure to observe these instructions properly may result in personal damage, or personal injury which depending on the circumstances may be serious and cause loss of life.

WARNING	
⚠	Correct installation is the most critical factor in ensuring the safe use of the ASPower. If every consideration of these instructions has been satisfied, the ASPower will be safe to operate.
⚠	Children shall not play with this product. Cleaning and user maintenance should not be performed by unsupervised children.
⚠	Ensure that the product is well ventilated and that if the product has a fan, the fan is not covered or obstructed.
⚠	Metal conducts electricity. Take care not to drop or touch metal objects onto the battery terminals, which if contacts the battery terminals, could cause short circuits and may lead to serious personal injury. Take care and remove unwanted metal objects from the vicinity of the battery and the ASPower. Remove any personal metal adornment such as chain, watch or ring before handling the battery and ASPower.
⚠	Do not attempt to charge non-rechargeable batteries. Charging a non-rechargeable battery may result in the battery catching fire or possible explosion.
⚠	Do not replace a damaged mains power cord. If the power cord is damaged, the product must be discarded.
⚠	Batteries are always electrically live and must be treated with extreme caution. They can supply high short circuit currents, even if they appear damaged or undamaged.
⚠	Before servicing a battery, disconnect the power supply from all power sources.
⚠	Only charge battery types which are supported by this charger. For more information, refer to the section **Compatible Battery Types**.
⚠	Do not drop or vigorously shake the product as this may cause damage. Do not shock the product, its accessories or batteries as this may cause the product or battery to fail.

⚠ WARNING

⚠	Stay away from magnetic equipment. Radiation may erase the information stored on this product causing it to become inoperative.
⚠	Electricity and water do not mix. Keep this product and your battery dry and do not expose it to water or water vapour. Do not operate this product or battery near any sort of liquid. Do not operate this product with wet hands.
⚠	Do not use this product in environments that are excessively hot, cold, dusty or humid or where it will be exposed to magnetic fields or long periods of sunshine. Such exposure may cause the product or your battery to fail.
⚠	Only use this product with the supplied power cable and with batteries or accessories recommended in this manual. Use of other batteries or accessories not recommended in this manual may cause damage to the unit and will void the warranty.
⚠	The ASPower is a high precision electronic product. It contains no user-serviceable parts inside. Do not try to dismantle, modify or repair it yourself. Disassembly, service or repair by an unauthorised person will void the warranty.
⚠	Before using this product, check that cable connections to the battery are of correct polarity. To protect against accidental short circuit, ensure that the shrouding supplied with the batteries are always fitted to the battery terminals.
⚠	Consult a caravan dealer or qualified personnel before servicing your batteries.
⚠	Do not install this product in the same compartment where flammable materials, such as petrol is stored.
⚠	Product specifications are subject to change and improve without notice.

CONTENTS

SAFETY PRECAUTIONS 4

ABOUT THE ASPERO 8

ASPOWER 8
ASDISPLAY 8
OPTIONAL ACCESSORIES 9
COMPATIBLE BATTERY TYPES 9

DESCRIPTION OF PARTS 10

ASPOWER 10
ASDISPLAY 14

INSTALLATION INSTRUCTIONS 17

MOUNTING THE ASPOWER 17
MAINS CABLE 18
MOUNTING THE ASDISPLAY 18
ASPERO WIRING DIAGRAM 19
CONNECTING A BATTERY TO THE ASPOWER 20
DISCONNECTING A BATTERY FROM THE ASPOWER 22
CONNECTING MULTIPLE BATTERIES 22

USING THE ASPERO SYSTEM 23

BATTERY CHARGING AND MANAGEMENT WITH THE ASPOWER 23
ECO MODE 24
STORAGE MODE 25
WATER PUMPS 26
BATTERY CHEMISTRY 26
BATTERY CAPACITY 26
USING THE ASPOWER AS A POWER SUPPLY (BATTERYLESS OPERATION) . 28
FAULT PROTECTION 28

MANUAL PART 037187
REV 1.0

Designed by BMPRO, one of Australia's leading power solution experts, the BMPRO product range is proudly designed and manufactured in Melbourne, Australia, and represent a high-quality product that will provide years of service.

BMPRO

Copyright © 2022

DISCLAIMER BMPRO accepts no liability for any loss or damage which may occur from the improper or unsafe use of its products. Warranty is only valid if the unit has not been modified or misused by the customer.

SERVICING, MAINTENANCE AND STORAGE 29
SERVICING. 29
SERVICEABLE FUSES 29
MAINTENANCE 29
STORAGE 29
FAQS AND TROUBLESHOOTING 30
BATTERY 30
CARAVAN LOADS 30
APPENDICES 33
ASPOWER OPERATIONAL STATUS INDICATORS 33
BATTERY CHARGING MANAGEMENT ALGORITHM 34
CHARGING MODES 35
SPECIFICATIONS 36
WARRANTY TERMS AND CONDITIONS 38

ABOUT THE ASPERO

BMPRO's ASPero is a combined battery management system and information display designed for recreational vehicles. The ASPero powers your loads, charges your battery and provides you with live and easy to understand information about your battery, water tanks and other useful information.

ASPOWER

The ASPower is a lithium battery-compatible battery management system designed specifically for use in recreational vehicles.

The ASPower operates from 240V AC mains power supply, towing vehicle auxiliary and solar panels to simultaneously power caravan loads and charge the caravan battery.

The ASPower employs intelligent charging algorithms, ensuring optimal battery health. Automatic battery preservation mode saves remaining battery power until you're ready and able to charge.

The ASPower is designed to suit any RV and battery management need.

FEATURES	
Load Connections	14
Maximum Current Output	35A
Maximum Charging Current	30A
Solar Input	450W
SLA and Lithium Compatible	✔

Table 1: ASPower features

ASDISPLAY

The ASDisplay is an information display designed to show up-to-date information about your battery, water tanks and other connected loads.

The ASDisplay shows you the battery level of the connected battery, the charging/discharging state, battery chemistry, active power sources and the water levels of any water tanks with a BMPRO Dipper water level indicator.

OPTIONAL ACCESSORIES

To get the most from your ASPero system it may be used with the following products (sold separately) from the BMPRO range:

- **BC300 + CommLink** External Shunt for integration of additional accessories and high current loads such as inverters.
- **Dipper** water level indicators.

COMPATIBLE BATTERY TYPES

The ASPower is rated to charge battery banks of up to 600Ah in capacity for the following battery types:

- Lead-acid valve-regulated (VRLA)
- Lead-acid absorbed glass mat (AGM)
- Lead-acid gel
- Lithium LiFePO4.

The ASPower is configured to charge LiFePO4 batteries by default.

⚠ WARNING

The ASPower designed for use with LiFePO4 Lithium and lead-acid batteries only. Do not connect other types of Lithium batteries to the ASPower.

⚠ WARNING

Ensure you check your battery configuration before use.

DESCRIPTION OF PARTS

ASPOWER



Figure 1: The ASPower

1. Load Terminal Block – Positive Connection

Positive wire connection point for the caravan's 12V loads.

TERMINAL/LOAD	CURRENT RATING	TERMINAL/LOAD	CURRENT RATING
1 Output	15A	8 Output	10A
2 Output	15A	9 Output	10A
3 Pump (1)	10A	10 Output	10A
4 Pump (2)	10A	11 Output	10A
5 Output	10A	12 Output	15A
6 Output	10A	13 Output	10A
7 Output	10A	14 Output	5A

Table 2: Designated terminal-load outputs for the load terminal block-positive connection

Each output is protected by an internal, electronic, auto-recoverable fuse. This eliminates the need for the user to replace a blown fuse. If an electronic fuse is activated, the LED Status Indicator on the ASPower will flash a solid red. The ASPower will power off the faulty load and resume normal operation once the fault is fixed.

⚠ WARNING

The water pumps must be connected to the correct terminal output in order to be controlled from the ASDisplay.

2. Load Terminal Block – Common Negative Connection

Negative wire connection point for the caravan's 12V loads.

3. Mains Cable

The ASPower is pre-cabled with a permanent mains power supply cord. The AC mains input is fitted with an Australian 10A plug.

4. Fan

Regulates the internal temperature of the ASPower.

⚠ WARNING

To ensure continuous air-flow, the fan ventilation holes must never be blocked, otherwise the temperature of the ASPower may rise and inhibit the optimal operation of the ASPower and/or cause the ASPower to shut down. The ASPower will automatically restart once it has cooled to an acceptable level.

5. CAN Bus Communication

To connect to and power BMPRO accessories, such as the ASDisplay and BC300 + CommLink.

6. Load Isolation Switch

To connect the caravan's load isolation switch. This switch is used to enter Storage Mode and power off all outputs (load terminal block and CAN bus) on the ASPower, except for the 40A output.

Battery charging is not affected by use of the load isolation switch.

7. Auxiliary (AUX) Input

AUX input is designed for use with 12V DC power sources. The voltage of the DC power source connected to the AUX input must not exceed 14.8V.

AUX will be available to charge the battery if the AUX voltage exceeds the battery voltage by at least 0.5V.

⚠ WARNING

Not all DC-DC chargers in the market used to boost auxiliary charging voltage from the towing vehicle are compatible with the ASPower.

The ASPower is designed to work with BMPRO's **MiniBoost** DC-DC charger.

8. Solar Input

The ASPower supports the use of panels up to a total of 450W. Input current to the solar regulator is limited to 27A, the equivalent of 3x150W solar panels.

The solar input is unable to operate in Power Supply Mode, i.e. with no caravan battery connected.

9. Battery Fuse

40A automotive battery fuse.

10. Battery Connection Terminal
Screw connection for the caravan's battery.

11. LED Status Indicator
Indicates the operational status of the ASPower.

For more information, refer to the section **ASPower Operational Status Indicators.**

12. 40A Fuse
40A automotive fuse.

13. 40A Output
Connection point to power the caravan's 40A loads.

⚠ WARNING

The 40A output is not controlled by the Load Isolation Switch circuitry. Engaging Load Isolation will not affect the operation of the caravan's 40A output.

ASDISPLAY

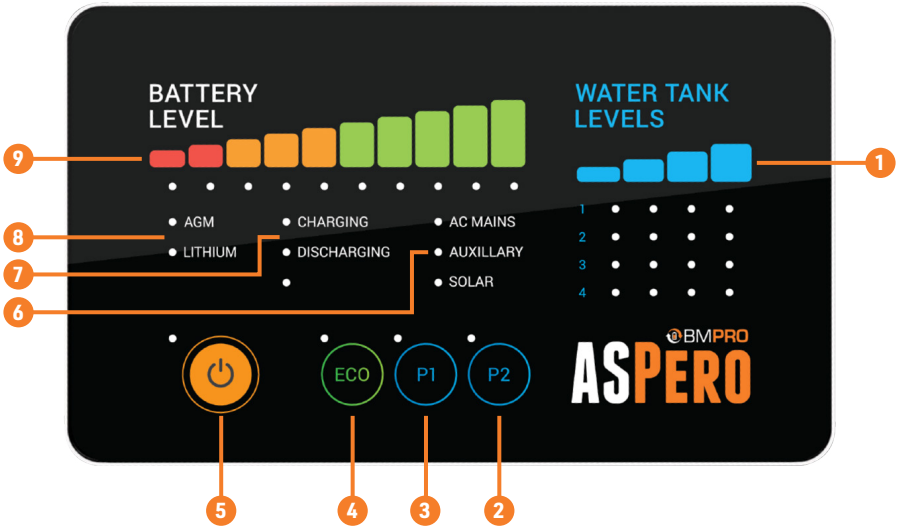


Figure 2: The ASDisplay

1. Water Tank Levels

Displays the current water tank levels measured by connected BMPRO Dippers. Blue LEDs indicate the water level of the tank.

NOTE: The ASDisplay cannot distinguish between clean and grey water tanks., it can only display water levels. You must make note of which tanks are grey water tanks yourself.

2. Pump 2 Button

Turns water pump 2 on or off.

A green LED means the pump is running, no LED means the pump is not running.

For more information, refer to **Water Pumps**.

3. Pump 1 Button

Turns water pump 1 on or off.

A green LED means the pump is running, no LED means the pump is not running.

For more information, refer to **Water Pumps**.

4. ECO Mode Button

Turns ECO Mode on or off, which turns off all outputs on the ASPower except output 14.

A green LED means ECO Mode is on, no LED means ECO Mode is off.

NOTE: This will look similar to the ASDisplay being powered off, except the ECO Mode LED will be on.

For more information, refer to **ECO Mode**.

5. Power Button

Turns the ASDisplay on or off. All LEDs will be off, however this will not affect the functionality or state of the ASPower.

A green LED means the ASDisplay is on, no LED means the ASDisplay is off.

NOTE: This ASDisplay will turn itself off after 24 hours if no buttons have been pressed.

6. Power Source

Displays whether power is coming from AC Mains, Auxillary, Solar or multiple sources. The active sources are indicated with a green LED.

7. Charging / Discharging Status

Displays if the battery connected to the ASPower is charging or discharging. The current status is indicated with a green LED.

8. Battery Chemistry

Displays the battery chemistry of the battery connected to the ASPower. The set battery chemistry is indicated with a green LED.

9. Battery Level

Displays the state of charge of the battery connected to the ASPower.

INSTALLATION INSTRUCTIONS

MOUNTING THE ASPOWER

The ASPower should be securely mounted to a suitably rigid surface, using four pre-drilled mounting holes.

The preferred orientation is with the load connection at the bottom.It is recommended the mounting holes are located so that there is a minimum of 80mm free air space from all vented sides of ASPower. This allows for the lowest operating temperature of the internal electronics and the highest reliability of the product.

The final enclosure must provide adequate ventilation to the outside world (or larger internal cavity) to prevent excessive heating of the air within the enclosure.

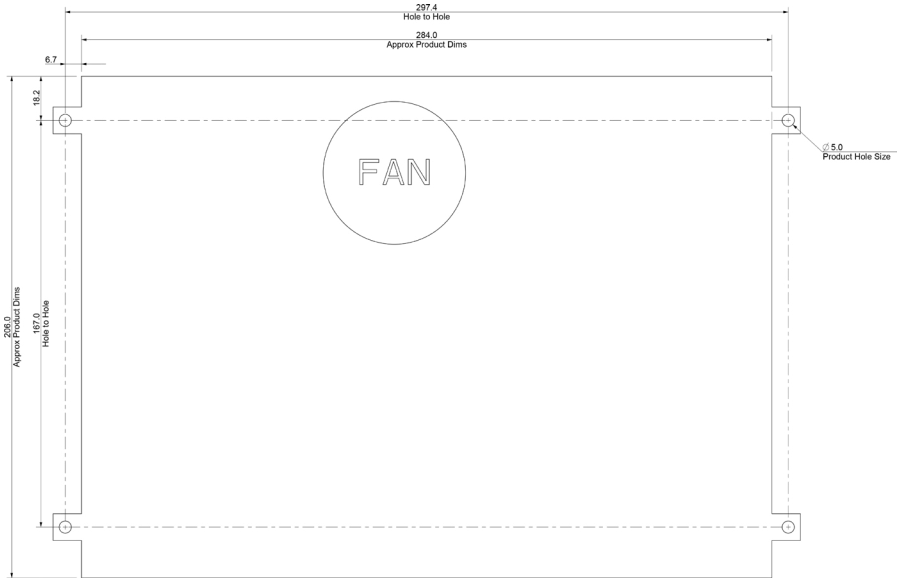


Figure 3: ASPower Mounting Diagram

MAINS CABLE

The ASPower is pre-cabled and fitted with a mains plug. Ensure that the connections to the mains supply are in accordance with the national wiring rules, and that the earth connection is installed.

The plug must be accessible during installation. If it is not possible, an accessible mains disconnection switch must be incorporated in the mains wiring where the plug is connected.

MOUNTING THE ASDISPLAY

The ASDisplay is designed to be mounted to the wall directly with screws. Holes for the connectors must be drilled before mounting.

Screws with a maximum diameter of 4mm must be used for mounting.

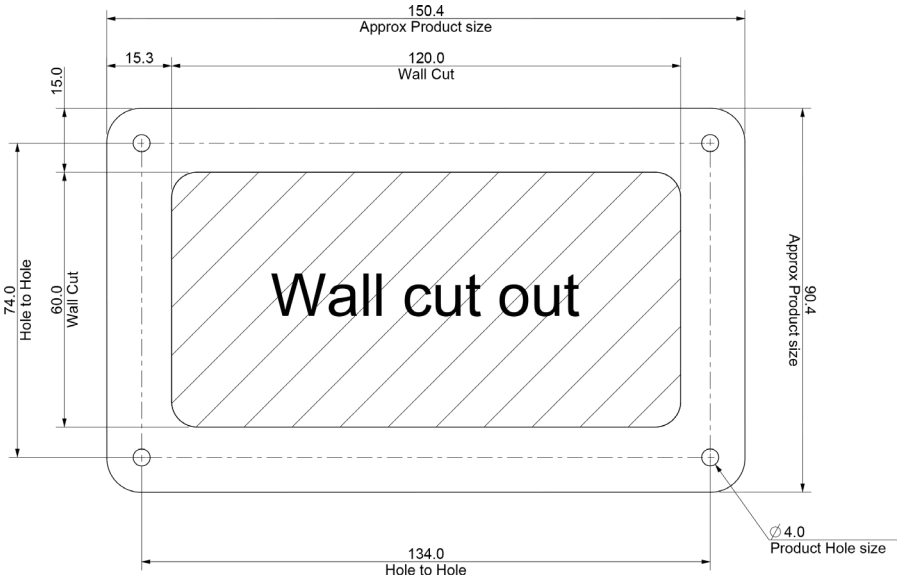
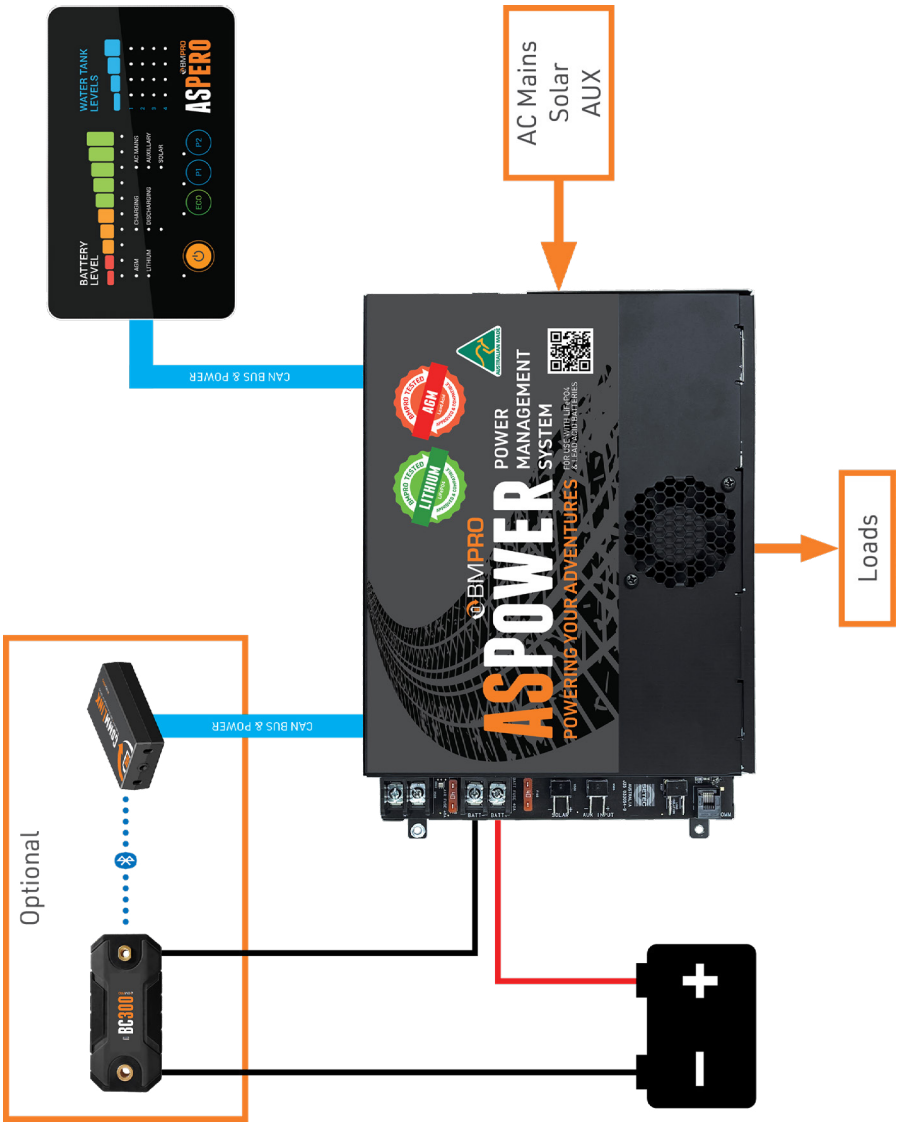


Figure 3: ASDisplay Mounting Diagram

ASPERO WIRING DIAGRAM



CONNECTING A BATTERY TO THE ASPOWER

⚠ WARNING

Sparks have the potential to cause an explosion should combustible gases be present. The following procedures are designed to minimise the risk of spark generation when connecting or disconnecting the battery. The positive terminal of the battery must not be connected to the chassis.

To connect a battery to the ASPower and ensure the system is wired correctly:

1. Power off all loads connected to the ASPower. The simplest way is with the switch connected to the ASPower Load Isolation input.
2. Turn off the ASPower and remove the battery fuse and all power sources (mains/solar/AUX).
3. Remove the battery fuse on the ASPower.
   For the location of the fuse, refer to the **Description of Parts**.
4. Connect the battery's positive (red) terminal from the ASPower Batt+ connection point.
5. Connect the battery's negative (black) terminal from the ASPower Batt- connection point.
6. Reinsert the battery fuse.
7. Reconnect the mains/solar/AUX.

You are now ready to make your system live.

⚠ WARNING

Before using a battery other than that which was installed at the caravan dealership, consult with the battery manufacturer for a detailed description of the installation, uses and maintenance of the battery. Verify that the type and capacity of the battery or batteries used are compatible for use with the ASPower.

⚠ WARNING

Do not install a battery in the same compartment where flammable material, such as petrol, is stored.

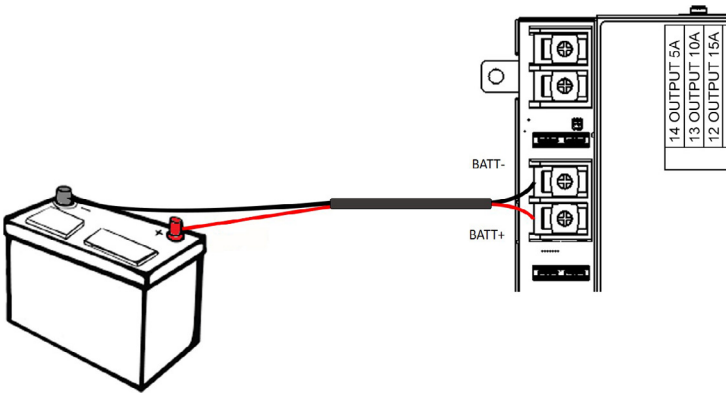


Figure 3: Connecting a house battery to the ASPower

After fitting a new battery to the ASPower, make sure that it is configured in the ASDisplay.

Correctly configuring the battery capacity and profile will ensure that the ASDisplay will select the best charging parameters for the caravan battery in use, and the software accurately estimates battery usage.

DISCONNECTING A BATTERY FROM THE ASPOWER

To disconnect a battery from the ASPower:

1. Power off all loads connected to the ASPower. The simplest way is with the switch connected to the ASPower Load Isolation input.
2. Turn off and remove all power sources (mains/solar/AUX) to the ASPower.
3. Disconnect the battery's negative (black) terminal from the ASPower Batt- connection point.
4. Disconnect the battery's positive (red) terminal from the ASPower Batt+ connection point.

CONNECTING MULTIPLE BATTERIES

Before connecting multiple batteries in parallel to the ASPower, check that all batteries are:

- Of the same type, for example a deep cycle AGM battery.
- Of the same capacity, for example 100Ah.
- By the same manufacturer.
- Fully charged.
- Of the same age-never use batteries that differ in age.

The recommended wiring for connecting multiple batteries in parallel to the ASPower is given in Figure 4. Depending on system requirements, a qualified auto-electrician may wire the batteries differently.

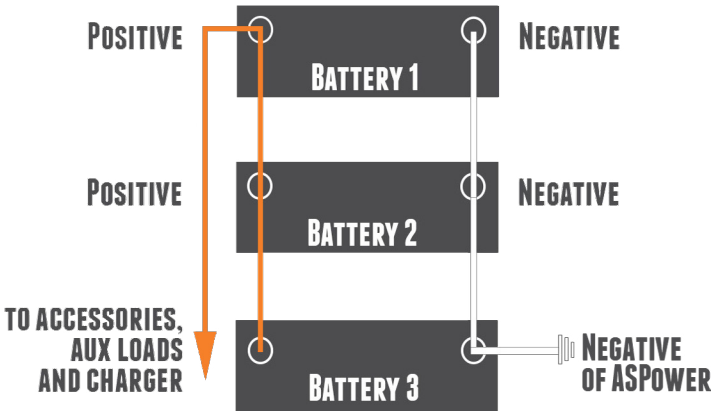


Figure 4: Recommended wiring for connecting batteries in parallel

USING THE ASPERO SYSTEM

BATTERY CHARGING AND MANAGEMENT WITH THE ASPOWER

Input Power Sources

The ASPower may be powered from mains, AUX or solar inputs to provide battery charging current and power to caravan loads.

If mains and one or more other sources are available to the ASPower, the ASPower will be powered exclusively by the mains source.

If both AUX and solar inputs are available and the mains is not, the ASPower will draw power from both the AUX and solar inputs. As full charge approaches, one of these sources may dominate the other as appropriate.

Battery Charging

The ASPower can simultaneously deliver up to 35A to the caravan battery and loads from the mains input source, with a maximum charging current of 30A.

The maximum charging current will be reduced if loads are drawing significant current and as the battery approaches full charge. To ensure that the caravan battery is charged by the maximum charging current, switch off non-essential loads.

When charging the battery from mains, the ASPower applies a multi-stage charging process.

For charging from AUX and/or solar sources, the ASPower monitors the battery voltage level and charges as needed.

The current charging status is indicated on the ASDisplay. Charging and discharging, as well as estimated battery capacity charge from 0-100% are displayed in approximately 10% increments.

Battery Health Preservation

The ASPower preserves battery health by preventing the battery from excessive discharge. The ASPower will start a two-stage shutdown or Low Voltage Disconnect (LVD), powering down all ASPower outputs except for the 40A output. This is to conserve remaining battery capacity until the battery can be charged.

⚠ WARNING

The 40A output is not affected by LVD and will remain operational throughout. The remaining battery capacity will drain quickly if the 40A output is enganged while the ASPower is in LVD.

LVD MODE	LEAD-ACID	LiFePO4
ECO Mode	10.8V	12.0V
Storage Mode	10.5V	11.5V

Table 3: LVD Mode voltage thresholds

The ASPower will enter the two stages of LVD, ECO Mode and Storage Mode, when the caravan's battery voltage falls below the LVD thresholds.

ECO MODE

The ASPower will enter ECO Mode if the the battery voltage runs low or if the ECO Mode button is pressed on the ASDisplay.

When in ECO Mode, all outputs on the ASPower except output 14.are turned off including the water pumps, however the CAN power will remain on, meaning the ASDisplasy will remain functional.

ECO Mode will be exited if either the the ECO Mode button is pressed again on the ASDisplay, or battery charging begins.

If the ECO Mode button is not pressed on the ASDisplay, and the battery is charging, the ASPower will exit ECO Mode when the battery is sufficiently charged. Upon exit of ECO Mode, the ASPower will automatically return to its previous state of operation.

When in ECO Mode you may temporarily turn on caravan loads by cycling the caravan's Load Isolation Switch. This allows you to retract slide-outs or electric steps if you need to pack your caravan.

STORAGE MODE

The ASPower will enter Storage Mode if the the battery voltage runs low or if the load isolation switch on the ASPower is activated.

When in Storage Mode, power to the CAN bus will be turned off, meaning there will be no communication or power to the accessories connected to the ASPower CAN bus.

Storage Mode is a convenient way to save the remaining power of your battery if you are on the road and have limited ability to charge the battery. When charging, Storage Mode ensures that all available charging current is dedicated to charging your battery.

To exit Storage Mode, start battery charging. The ASPower will exit Storage Mode when the battery is sufficiently charged. Upon exit of Storage Mode, the ASPower will not automatically return to its previous state of operation. Caravan loads will need to be powered on manually.

When in Storage Mode you may temporarily turn on caravan loads by cycling the caravan's Load Isolation Switch.

Heavily Discharged Lead-Acid Batteries

The ASPower will not charge lead-acid batteries if the battery voltage is below 7V.

In normal use, and with the ASPower battery health preservation, batteries should never become heavily discharged.

If your battery is heavily discharged, disconnect it from the ASPower and charge with a stand-alone charger. Reconnect the battery once the battery voltage has recovered to normal levels.

Heavily Discharged LiFePO4 Batteries

The ASPower can recover and charge a heavily discharged LiFePO4 battery. The internal Battery Management System (BMS) of a LiFePO4 battery will turn off if it detects that the battery is heavily discharged. The ASPower will provide the voltage to restart the LiFePO4 battery's BMS and then commence charging of the LiFePO4 battery.

WATER PUMPS

The ASDisplay can be used to operate water pumps connected to the ASPower.

Water pumps can be activated by pressing the P1 Button and P2 Button on the ASDisplay.

NOTE: The P1 Button and P2 Button will not work if the ASPower has entered ECO Mode.

BATTERY CHEMISTRY

The battery chemistry of the battery connected to the ASPero system should be set correctly so the correct charging algorithm is used.

NOTE: The ASPero system is configured by default to charge lithium LiFePO4 batteries.

To set the battery chemistry of the battery connected to the ASPero system:

1. On the ASDisplay, hold down the Power Button for three seconds to enter Settings Mode.
   The Power Button LED will flash when you have entered Settings Mode.
2. Press the ECO Mode Button to toggle battery chemistry between AGM and Lithium. The toggled battery chemistry LED will flash when selected.

NOTE: If you have a lead-acid VRLA, lead-acid AGM or lead-acid gel battery, select **AGM**.

3. Press the Power Button to exit Settings Mode and save your selection.

BATTERY CAPACITY

The battery capacity of the battery connected to the ASPero system should be set correctly so the correct charging algorithm is used.

When in Settings Mode, the ASDisplay will show the current set battery capacity with flashing LEDs in the Water Tank Levels and Battery Level sections.

Each flashing LED in the Water Tank Levels section represents 100Ah, and each flashing LED in the Battery Level section represents 10Ah.

The value from both sections added together shows the total set Battery Capacity.

Battery Capacity Example

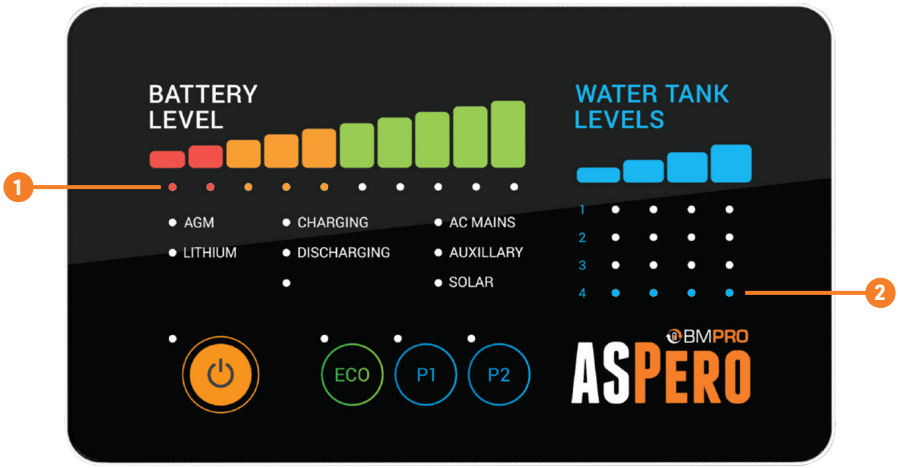


Figure 5: Battery Capacity set to 450Ah

1. Battery Level LEDs

Each flashing Battery Level LED represents 10Ah. In this case, 5 LEDs are flashing, representing 50Ah.

2. Water Tank Level LEDs

Each flashing Water Tank Level LED represents 100Ah. In this case, 4 LEDs are flashing, representing 400Ah.

Adding the two together, 5 flashing Battery Level LEDs and 4 flashing Water Tank Level LEDs represents 450Ah.

Setting Battery Capacity

To set the battery capacity of the battery connected to the ASPero system:

1. On the ASDisplay, hold down the Power Button for three seconds to enter Settings Mode.
   The Power Button LED will flash when you have entered Settings Mode.
2. Press the P1 Button to decrease the battery capacity.
3. Press the P2 button to increase the battery capacity.
   NOTE: The battery capacity will be adjusted in increments of 10Ah. The minimum battery capacity is 50Ah and the maximum battery capacity is 600Ah.
4. Press the Power Button to exit Settings Mode and save your selection.

USING THE ASPOWER AS A POWER SUPPLY (BATTERYLESS OPERATION)

The ASPower will act as a power supply if the following conditions are met:

1. A battery is not connected to the ASPower, and
2. The ASPower is connected and powered from mains, or
3. The ASPower is connected and powered from AUX input.

Power Supply mode allows you to control and power your caravan's loads directly from mains or AUX without the need to connect the caravan battery.

When powered from the mains, the ASPower provides an output voltage of 12.8V and 35A.

When powered from an AUX input, the output voltage will vary depending on the AUX input voltage.

FAULT PROTECTION

Overload and Short-Circuit Protection

If an overload or short circuit is detected the affected output will shut down. The ASPower will automatically attempt to restart the output every 30 seconds until the fault is removed.

Overvoltage and High Internal Temperature Protection

If an overvoltage or high internal temperatures are detected the ASPower will automatically turn off. Once the overvoltage is rectified, or the internal temperature drops to normal levels, the ASPower may be restarted by cycling the mains input on and off.

Reverse Battery Protection

The ASPower battery fuse fitted by your dealership at the battery protects from accidentally connecting the battery to the ASPower in reverse polarity.

SERVICING, MAINTENANCE AND STORAGE

SERVICING

The ASPower contains hazardous voltages and energy hazards that may cause death or injury. Only qualified service personnel may service the ASPower. Except where stated in the following sections, do not attempt to service the ASPower yourself, or dismantle, modify or repair the ASPower yourself; this will void your warranty.

If your ASPower requires servicing other than what is stated in this Owner's Manual, please consult your caravan dealer for assistance.

SERVICEABLE FUSES

The ASPower 40A and battery fuses, if required, may be replaced by the owner. To further protect from short circuits or overloading, the dealership will have fitted a 40A fuse in-line with the caravan battery and a 30A fuse at the AUX input.

If any fuse continues to fail, please contact your dealership for guidance.

MAINTENANCE

Use a dry or moist cotton cloth to lightly remove dust or dirt from the ASPower. Do not use alcohol, thinners, benzene or any other chemical cleaner as these products may degrade the housing surface. Do not allow any liquids to enter the housing.

Be sure to turn off all power sources to the ASPower and disconnect the battery before cleaning.

STORAGE

Once your adventure is over be sure to charge the caravan's battery and power off all loads connected to the ASPower. Use the switch connected to the ASPower Load Isolation input to enter Storage Mode and power off all loads.

When not in use, it is recommended that you recharge the caravan's battery, ideally monthly, or every three to six months. Regular recharge prevents the battery from becoming heavily discharged, a condition which can significantly shorten the battery's lifespan.

FAQS AND TROUBLESHOOTING

Need more help troubleshooting your ASPero system? Contact our customer service team online at **teambmpro.com/technical-support**

BATTERY

I've fitted a battery to the ASPower, but it's not detected by the ASDisplay?

Check the following:

- The battery connections are tight and not loose or corroded.
- Battery polarity: red lead is positive, black lead is negative.
- The battery fuse on the ASDisplay is fitted and not blown. The correct value is 40A.

CARAVAN LOADS

I think one of my loads is not receiving power?

The load may be faulty, activating the protective electronic fuse and turning the load off. If this is the case, the LED Status Indicator on the ASPower will flash a solid red.

Should you encounter any faulty loads, please contact your caravan dealership.

None of my loads appear to be powered but I can still use the ASDisplay?

All loads will power down, but the ASDisplay will still be in use if the ASPower was put into ECO Mode.

The ASPower will be put into ECO Mode if:

1. The ECO Mode button on the ASDisplay has been pressed. This turns off power to all caravan loads connected to the ASPower, except output 14.

   Check if there is a green LED light next to the ECO Mode button on the ASDisplay. If there is, press the ECO Mode button again to exit ECO Mode.

2. Battery voltage is very low. The ASPower will enter ECO Mode to conserve remaining battery voltage, which will disable power to all caravan loads connected to the ASPower.

   Connect the ASPower to a power source and begin battery charging.

None of my loads appear to be powered, and I can't use my ASDisplay?

All loads, including any battery monitor in use with the ASPower will power down if the ASPower was put into Storage Mode.

The ASPower will be put into Storage Mode if:

1. The switch connected to the ASPower Load Isolation input has been activated. This turns off power to all caravan loads and accessories connected to the ASPower CAN bus, such as your battery monitor.
   Check that the switch has not been activated.
2. Battery voltage is very low. The ASPower will enter Storage Mode to conserve remaining battery voltage, which will disable power to all caravan loads and accessories connected to the ASPower CAN bus.
   Connect the ASPower to a power source and begin battery charging.

I had an external shunt connected but I have removed it. Do I need to do anything else?

You will need to configure the ASPero system to forget the external shunt, otherwise it will still behave as if one was connected.

To configure the ASPero system to forget an external shunt:

1. On the ASDisplay, hold down the Power Button for three seconds to enter Settings Mode.
   The Power Button LED will flash when you have entered Settings Mode.
2. Press and hold both the P1 Button and P2 Button simultaneously for five seconds. This will cause the ASPero system to forget the external shunt.
3. Press the Power Button to exit Settings Mode and save.

Why is my solar output lower than expected?

If the battery is close to fully charged, the ASPower will periodically turn off solar to protect the batteries from overcharging. As a result, you may see less output on your solar display.

The following tips will also make sure you are getting the most of your solar set-up:

1. Make sure your solar panels are clean.

   For optimal performance of your solar panels, regularly clean them (when cool) with warm, soapy water.

2. Consider the location of your caravan/RV.

   A shadow (for example from trees, buildings and even other accessories on the roof of your caravan) across any part of the solar panel can reduce the panel performance by up to 80%.

3. The time of day and time of year is important as well.

   In some parts of the year (especially in southern parts of Australia) the sun will never be directly overhead, so your solar output will be reduced-sometimes by up to 50%.

APPENDICES

ASPOWER OPERATIONAL STATUS INDICATORS

The following details the operational status of the ASPower, as shown by the coloured flash of the LED Status Indicator on the ASPower.

		Colour Code	Flashing Status
White	Internal Error		On, Solid
	Identify Device		Flashes, 5 Times Quickly
	Storage Mode		Flashes Every 2min
Yellow: Charging	AC, Charging Normally		On, Solid
	AC, Low Battery Voltage		Flashes, 1 Time
	AC Connected, No Battery		Flashes, 1 Time
	Solar, Charging Normally		Flashes, 2 Times Quickly
	Aux, Charging Normally		Flashes, 3 Times Quickly
Green: OK	AC, Battery OK or No Battery		On, Solid
	Solar, Battery OK		Flashes, 2 Times Quickly
	Aux, Battery OK		Flashes, 3 Times Quickly
	Normal, No source present		Flashes, 1 Time
Red: Error	One (or more) Output is Overloaded		On, Solid
	Critical Fault		Flashes, 4 Times Quickly
	Solar Fault		Flashes, 3 Times Quickly
	Battery Fault		Flashes, 2 Times Quickly
	Over Voltage Fault, or High Temperature Fault		Flashes, 1 Time
OFF	ASPower Powered Off		Off

BATTERY CHARGING MANAGEMENT ALGORITHM

The following describes the Battery Charging Management Algorithm used by the ASPower when charging the caravan battery from a mains power source. The ASPower will operate as described when the caravan loads are connected directly to the ASPower and not the caravan battery.

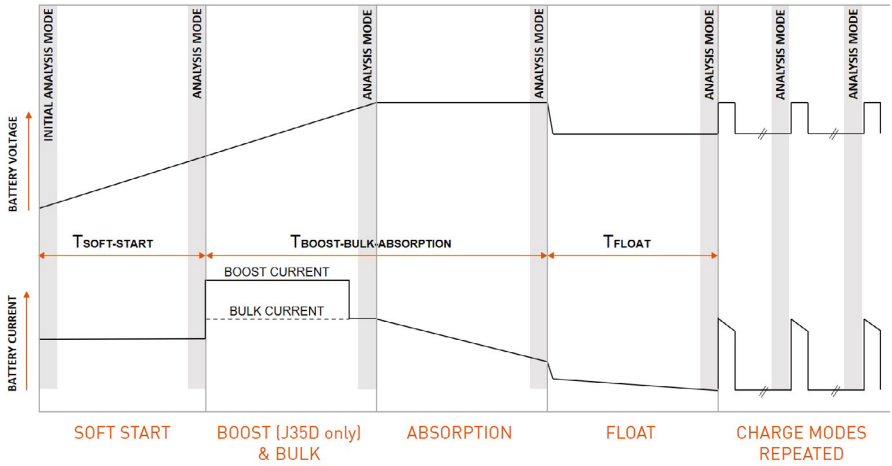


Figure 5: ASPower Battery Charging Management Algorithm

Battery Capacity	Soft Start	Boost + Bulk-Absorption	Float
≤ 100AH	6 Hours	5 Hours	6 Hours
150AH	6 Hours	7.5 Hours	6 Hours
200AH	6 Hours	10 Hours	6 Hours
250AH	6 Hours	12.5 Hours	6 Hours
≥ 300AH	6 Hours	15 Hours	6 Hours

Table 4: Timeout for each charging mode based on battery capacity

Charge Mode	Voltage Limit (V) Lead-Acid Battery	Voltage Limit (V) LifePO4	Current Limit (A)
Soft Start	12.0	12.0	10
Boost	14.0	14.0	30
Bulk	14.4	14.6	15
Absorption	14.4	14.6	15
Float	13.6	13.6	10

Table 5: Battery charging management algorithm voltages and currents

The ASPower's intelligently-controlled charging algorithm automatically sets charging parameters so that the caravan battery will maintain the best state of health.

CHARGING MODES

Soft Start Mode

Charging current is maintained at 10A until the battery voltage reaches 12V or soft start timeout (see table 7) occurs.

Boost Mode

During Boost Mode, current is boosted to 30A to bring the battery voltage up to 14V, after which charging proceeds to Bulk Mode.

Bulk Mode

Charging current is maintained at 15A until the battery reaches the Bulk voltage (see table 8), after which charging proceeds to Absorption Mode.

Absorption Mode

Battery is charged at Absorption voltage until the current drops below 2A or Boost-Bulk-Absorption timeout occurs.

Float

Charging current is limited to 10A to keep the battery level topped up. Charging will remain in Float for 6 hours. After Float timeout, the ASPower will enter back into Boost-Bulk-Absorption modes.

SPECIFICATIONS

ASPOWER SPECIFICATIONS	
Input Voltage Range	230-240V, 50Hz
Input Surge	< 40A (cold start)
Output Current (Load + Battery Current)	35A
Factory Set Voltage (Float Voltage)	13.65 V +/0.1 V
Output Ripple Voltage	< 150mV
Over Voltage Protection	< 18V
Over Current Protection (Load + Battery Current)	35-38A
Battery Current Limit	30A
Low Voltage Disconnect Lead-Acid	10.5 ± 0.2V
Low Voltage Disconnect LiFePO4	11.5 ± 0.2V
Battery Drain (when in Storage Mode)	< 8mA
AC/DC Efficiency	> 83%
Cooling Fan	Thermally controlled
Solar Input Current	<27A
Solar Input Voltage	15-25V
Ambient Temperature	0-50°C
Communication	CAN Bus
Dimensions	284mm x 206mm x 68mm
Weight	2kg
Standards	Safety: AS/NZS 60335.1, AS/NZS 60335.2.29, EMC:AS/NZS CISPR 32, Approvals: RCM

ASDISPLAY SPECIFICATIONS	
Input Voltage Range	10-16V
Operating Temperature	10C to 50C
Storage Temperature	-10C to 70C
Humidity	90% non-condensing
Battery Drain (when inactive)	<15mA
Dimensions	150.4mm x 90.4mm x 15mm

WARRANTY TERMS AND CONDITIONS

Registering your BMPRO product is an important step to ensure that you receive all the benefits you are entitled to. Please visit **teambmpro.com** to complete the online registration form for your new product today.

1. Our goods come with guarantees that cannot be excluded under the Australian Consumer Law. You are entitled to a replacement or refund for a major failure and compensation for any other reasonably foreseeable loss or damage. You are also entitled to have the goods repaired or replaced if the goods fail to be of acceptable quality and the failure does not amount to a major failure.
2. BMPRO warrants products against defects for a period of one year, commencing from the original date of purchase. Proof of purchase is required before you can make a claim under this warranty.

HOW TO PROTECT YOUR RIGHTS UNDER THIS WARRANTY:

3. The ASPower and ASDisplay designed to be installed by a suitably qualified installer. You or your installer should carefully inspect the products before installation for any visible manufacturing defects. We accept no responsibility in addition to our consumer guarantee obligations where a product has been installed incorrectly.
4. This warranty does not extend to product failures or defects caused by, or associated with, but not limited to: failure to install or maintain correctly, unsuitable physical or operating environment, accident, acts of God, hazard, misuse, unauthorised repair, modification or alteration, natural disaster, corrosive environment, insect or vermin infestation and failure to comply with any additional instructions supplied with the product.
5. BMPRO may seek reimbursement of any costs incurred by BMPRO when a product is found to be in proper working order or damaged as a result of any of the warranty exclusions mentioned in point
6. To enquire or make a claim under this warranty, please follow these steps:

   a) Prior to returning a BMPRO product, please email **customerservice@teambmpro.com** to obtain a Return Material Authorisation (RMA) number

   b) Package and send the product to:

   BMPRO Warranty Department
   19 Henderson Road
   Knoxfield, VIC 3180

   Please mark RMA details on the outside of the packaging

   c) Please ensure the package also includes: a copy of the proof of purchase, a detailed description of the fault and your contact details including phone number and return address.
7. BMPRO will not be liable for any costs, charges or expenses incurred in the process of returning a product in order to initiate a warranty claim.

POWERING YOUR ADVENTURES.

BMPRO
customerservice@teambmpro.com
19 Henderson Rd, Knoxfield VIC 3180 Australia
teambmpro.com