
SPECTRUM POWER STATION INSTALLATION and OPERATIONAL GUIDE



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1. SPECTRUM POWER STATION OVERVIEW

The SPECTRUM Power Station is an Australian Made fully integrated battery energy storage system (BESS) designed for hybrid application. The purpose of this guide is to provide installation and operational procedures for the BESS.

The SPECTRUM is equipped with a LUX 5K Hybrid Inverter, 14.4 kWh battery storage, 8KW solar capacity, 5kW grid export capacity and 4kW continuous emergency power supply.





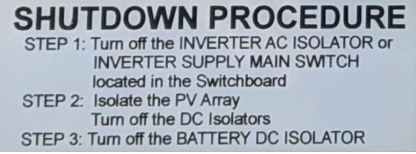
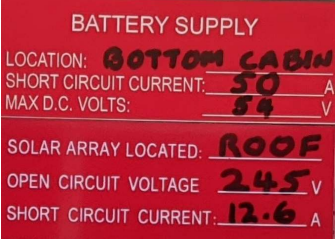
Multiple SPECTRUM cabinets can also be paralleled for increased power including 3 phase application (noting details are covered in another manual).

Specifications for single cabinet installation is given in the compliance plate below:

	
SPB 5L14.4	
Inverter Type	LUX POWER 5K HYBRID
Battery Type	4 x Dyness B3
Battery Capacity Total	14.4 kWh
Max D.O.D	90%
Nominal Voltage	48V
Operating Voltage	40.5V – 54.0V
Max Charge	80 Amps DC
Max Discharge	80 Amps DC
Continuous Pwr	4000 Watts
Solar Capacity	8000 Watts
Communications	CAN / RS485
Temp Range	0 – 50 deg C
Cabinet size	1400H x 620W x 450D mm
IP Rating	IP 34
Serial Number:	
  	
SEALED PERFORMANCE BATTERIES 1 Ant Road, Yatala Queensland, 4207 www.sealedperformance.com.au Ph: 1300 001 772	

2. SAFETY INSTRUCTIONS, LABELS AND WARNINGS

The following symbols are used within the integrated battery energy storage system:

WARNING SIGN	DESCRIPTION
	<p>This label is placed at the main metering panel to show an energy storage system is present, and also providing the UN No for the type of battery chemistry – in this case Lithium Iron.</p>
	<p>Warning of multiple supplies</p>
	<p>Hazardous Voltage warning</p>
	<p>Warning of energised supplies during grid outage</p>
	<p>Shutdown procedure – refer to section 5.</p>
	<p>Rated voltages and currents marked up by the installer depending on solar panels fitted.</p>

3. SYSTEM CONFIGURATION

The Spectrum Power Station is made up of the following components:



The Cabinet (1) is made from powder coated 3mm sheet aluminium and is suitable for installation indoors or outdoors.

The Front Cover (2) can be removed via the side latches (3). The front cover can be tilted forwards for easy access to the switch panel (5) and also can be lifted off the cabinet for open access.

The Switch Panel (5) contains pre-wired AC and DC switch gear and includes a 4 pole sub-board for back-up (Offgrid) energy supply.

The Inverter (6) is mounted below the switch panel on the inverter bracket and secured at top and bottom. The Inverter is pre-cabled via plug and play connectors and is fully programmed, apart from the local Wi-Fi connection.

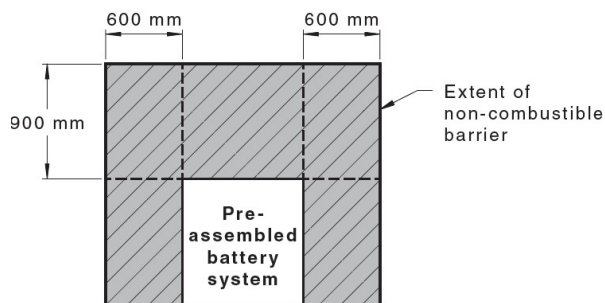
The Battery Chamber (7) houses up to 4 x Dyness B3 batteries giving a total of 14.4 kWh capacity. The Battery DC Isolator (8) is located on the left side of the cabinet for quick access in case of an emergency.

The Cabinet is ventilated via 2 x exhaust fans (8) located at the top of the Battery Chamber and extracts air via the Air Inlet (4). Air is exhausted via the top of the Front Cover (5).

4. INSTALLATION PROCEDURE

4.1 Position Cabinet

Locate the cabinet in an appropriate position, as per the battery installation guide issued by the clean energy council AS 5139.



The cabinet is IP34 rated for indoor or outdoor installation. A protective hood over the cabinet is also recommended to minimise exposure to driving rain and direct sunlight. In some situations where direct sunlight cannot be avoided the fans will run for longer duration.

The Cabinet should ideally be placed on a concrete floor or pad, ensuring the material behind the cabinet is not combustible. In some

cases a non-combustible barrier may need to be installed with the minimum clearances as per the diagram above.

If the cabinet is installed in a garage in line of vehicle traffic a bollard must be fitted to ensure its not accidentally damaged.

The cabinet can be positioned with its back against a wall, also noting the conduit entry is from the rear.

The cabinet should also be at least 600m from any heat source such as a H/W system.

4.2 Cable and Conduit connections

Run conduits as necessary into the rear cavity of the cabinet for:

- Solar pv
- Grid connection
- Backup Power circuits

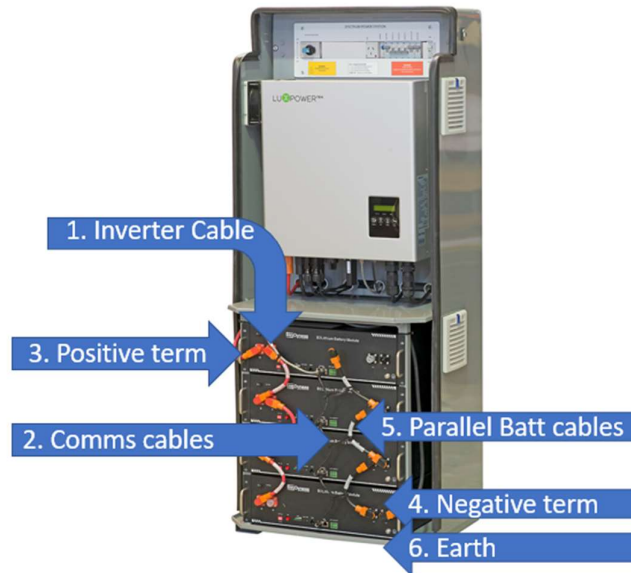


Terminate the cables into the required isolators as indicated on the Electrical Terminal Connections in section 4.5 and Attachment A.

Screw the plastic moulding back into place via 4 x screws and place a silicon bead around the edge to inhibit water ingress.

4.3 Installing the Batteries

Up to 4 x Dyness B3 batteries can be mounted in the cabinet as follows:



1. Place the bottom battery on the rubber feet located in the battery chamber and slide the battery all the way to the back.
2. Drill 4 x battery mounting holes into the aluminium vertical rails using a 5mm drill. The screws provided with the batteries will self-tap into the holes, ensuring not to overtighten.
3. Attach the inverter cable (coiled in battery chamber) to CANBUS IN port on the top battery.
4. Interconnect the short comms cables (provided in the battery box) between each battery starting at the bottom battery from CANBUS IN to CANBUS OUT.
5. Attach the RED Positive battery cable (coiled in cabinet) to the top battery left side.
6. Attach the BLACK Negative battery lead (coiled in cabinet) from inverter to the bottom battery right side.
7. Connect the parallel cables (provided in the battery box) between the battery packs, positive to positive and negative to negative.
8. Attach the earth lead from the inverter (coiled in cabinet) to bottom battery.
9. Interconnect earth battery earths with GREEN leads provided in the battery box.
10. Zip tie all leads to ensure they are not hanging out of the cabinet, also noting there is only a small amount of space between the battery and the front cover.
11. Ensure the master battery (top) has dip switch setting - off/off/on/off.
12. Ensure all slave batteries have dip switch setting - off/off/off/off.

4.3 Fixing the Cabinet

To secure the cabinet 3 methods are available:

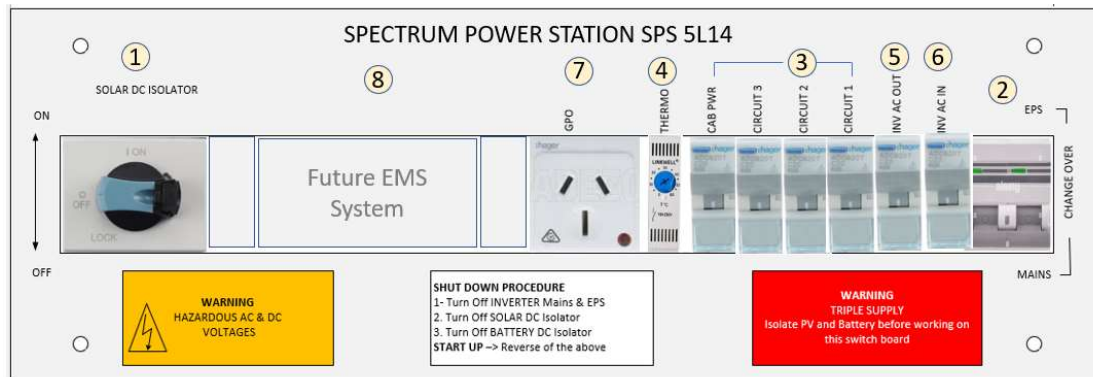


Method 1 - Attach the cabinet to a back wall via fixing screws behind the DIN panel. It may be necessary to put a spacer in behind the cabinet where there is an offset to the wall.

Method 2 - In the case of mounting on a raised floor or a trailer the cabinet can be bolted via the feet under the cabinet.

Method 3 - With the batteries fitted and cabinet positioned on a stable concrete surface, the system weighs in at over 100kG and fixing points may not be necessary, especially if located in lockable area.

4.4 Switch Panel Layout



1) **Solar DC Isolator** – pre-cabled to the inverter. Connect to the PV strings to top of isolator as per SLD diagram.

2) **Change Over Switch** – this switch is pre-cabled.

- Switch to “EPS” position for Emergency Power Supply from the battery
- Switch to “Mains ” for alternative supply from mains or Generator

Note – for some installations the Change-over switch may be located in a separate sub-board.

3) **Individual circuit breakers** – connect these breakers to power the individual loads as per the SLD diagram for the project.

4) **Temp Control** – (located behind the DIN cover) controls the ventilation fan in the top lid of the power cabinet. It is normally set to 40 deg C.

5) **Inverter EPS (Off-Grid)** – pre-cabled to the inverter, supplies power to the backup / sub circuits – refer to **Error! Reference source not found.**

6) **Inverter In (Mains)** – pre-cabled to the inverter input, requires connection to the Grid supply – refer to **Error! Reference source not found.**

7) **GPO outlet** for 4G Wifi modem

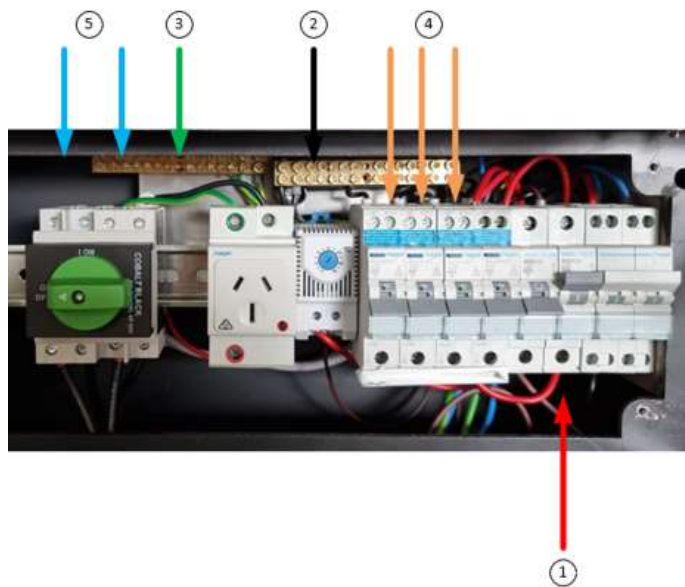
8) **Energy Management System** (optional)

Note – The Battery DC Isolator is on the left side of the cabinet.

4.5 Electrical Terminal Connections

Connect the Cabinet as follows:

- Connect Grid Active (1), Neutral (2) and Earth (3) to the grid supply
- Connect the required essential loads (4) to the sub circuits.
- Connect the Solar PV1 and PV2 strings (5)



4.6 Remote Sub-board (Optional)



Where the cabinet is located some distance away from the electrical switch board, it may be necessary to install a remote sub-board. In this case it is most likely the change over switch would be located in the sub-board, rather than in the battery cabinet. Please refer to the following section for wiring details: **Error! Reference source not found..**

4.7 Starting Battery System

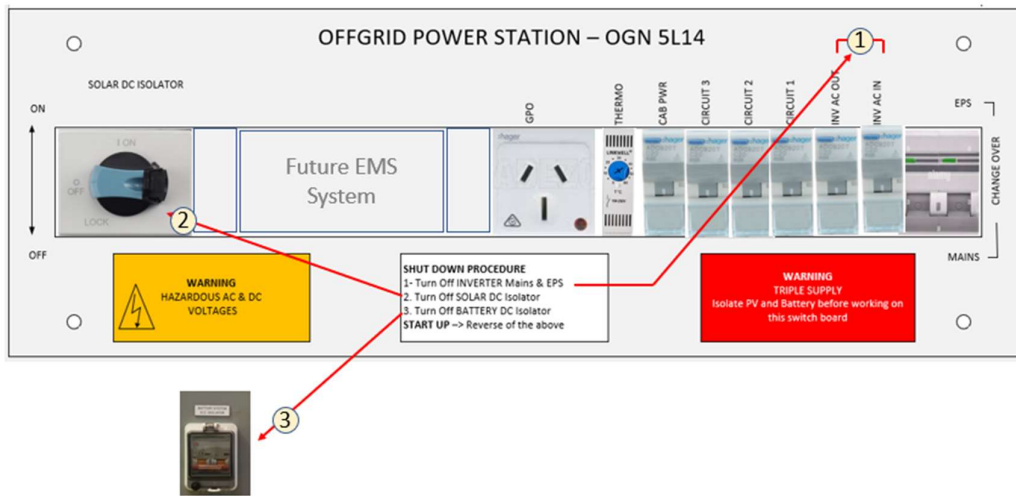
Dyness Modules:

- Switch all batteries ON via the rocker switches.
- The battery green run light should flash after a few seconds.
- Press the SW button for 2 Seconds only on the Top battery module (Master).
- Turn on Battery DC isolator on left side of the cabinet.

NOTE – to restart the battery switch all batteries OFF then apply the above sequence.

5. SHUT DOWN & STARTUP PROCEDURE

The **Shut Down** and **Start Up** procedure is located on the switch panel label as per below:



SHUT DOWN

- 1) Turn OFF Inverter AC IN and AC out
- 2) Turn OFF Solar DC Isolator
- 3) Turn OFF Battery DC Isolator (side of cabinet)

START UP

- 3) Turn ON Battery DC Isolator (side of cabinet)
- 2) Turn ON Solar DC Isolator
- 1) Turn ON Inverter AC IN and AC out

6. SERVICING THE AIR FILTERS

The air filter inlet and outlet should be checked every 6 months in case it gets blocked.

The inlet filter slides out from under the cabinet and can be removed for cleaning - as per the picture below:



The air outlet filter is located inside the top of the front cover as per picture below, and is attached to Velcro which can be peeled off for cleaning:



7. LUX INVERTER PORTAL AND SMART PHONE APP

Where the EMS is not fitted, its possible to access the system via the Inverter directly and connected Smart Phone app as follows:



- a) Google Play – download “Lux Power Monitor” app
- b) Apple Store – download “Luxpower View” app
- c) Enter username and password which is as follows:
 Username: Firstname (space) Lastname (first letter capitals)
 Password: firstname1234 (all lower case)
- d) Contact SPECTRUM support on 1300 141 255 if you require help

Wi-Fi connection please note - the Smart Phone app only operates whilst the system is connected to a wifi modem which is provided by SPECTRUM as an option with all Tiny Houses, noting the cellular data plan is only active for 3 months, after which it is the customers responsibility to pay the ongoing data plan (approx. \$10 per month) or to re-connect the Power Station to a local Wifi router.

SPECTRUM will send an email notice when the plan is about to expire offering the option to renew, or to reconnect the system to local wifi.

The cellular modem is located in the cabinet in one of 2 locations:

- a) In the battery compartment
- b) On top of the solar inverter


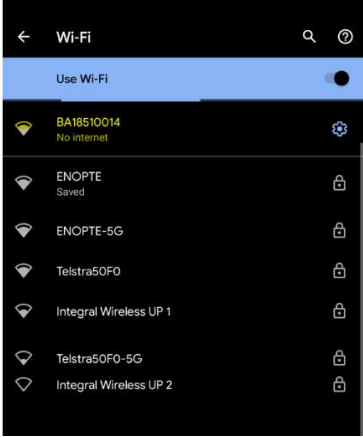
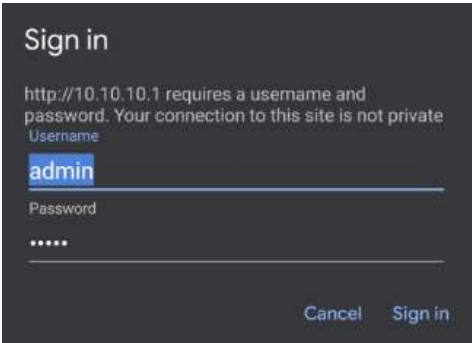
In some situations, it may be necessary to restart the modem as follows:


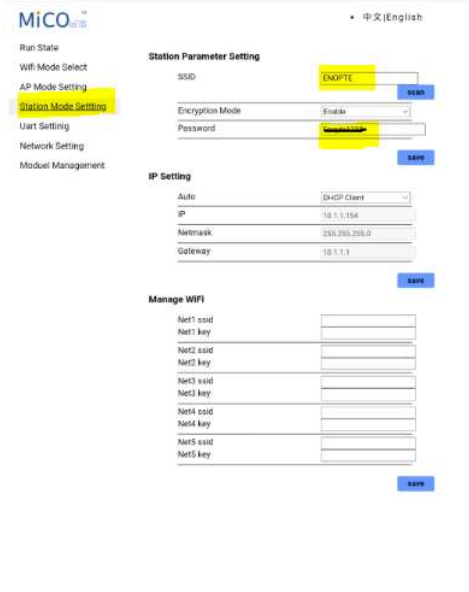
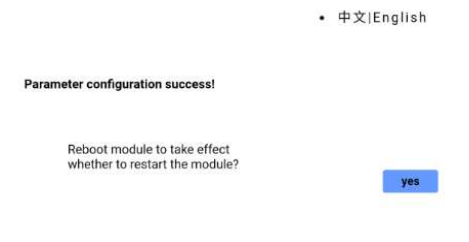
- a) Press the power button on the modem until the display turns off.
- b) Press the power button again until the modem restarts and the signal bar should appear.

8. LUX Inverter – Pairing of Wi-Fi Dongle to Router

In order to pair the LUX Inverter to a local Wi-Fi router follow the instructions below:

- 1) Ensure the Customer is pre-loaded into the LUX portal – this is normally carried out by SPECTRUM prior to the installation.

	<ol style="list-style-type: none"> 2) Using a smartphone, Tablet or PC log onto the Wi-Fi dongle connected to the Inverter. The SSID will start with BAxxxxxxx.
	<ol style="list-style-type: none"> 3) After connecting to the SSID BAxxxxxxx you should see it in your wifi connection, showing “no internet” – this is normal. <p>NOTE – some smart phones may provide a pop-up asking “do you really want to connect”, in which case please accept the request.</p>
	<ol style="list-style-type: none"> 4) Go to your internet browser and type http://10.10.10.1 <p>The login is admin / admin</p> <p>Select Sign In.</p>

	<p>5) Select English on the top right of the screen to read the menu.</p>
	<p>6) Select “station mode Settings” on the right menu</p> <p>7) Enter the correct router settings under Station Parameters. Normally only SSID and Password need to be entered.</p> <p>Press the Save button.</p>
	<p>8) Select “Yes” to reboot the Inverter Wifi dongle.</p> <p>It will take about 5 minutes for the Inverter to connect to the Internet.</p> <p>Refer to the LUX app login section to log into the LUX portal.</p>

10. WARRANTY

The BESS warranty is managed by SPB and made up of 3 components:

- LUX Power inverter – 10 year warranty
- DYNESSE Battery – 10 year warranty
- SPECTRUM Cabinet – 10 year warranty

Individual warranty documents are attached to this manual.