

Protocols for the Proper Storage and Maintenance Li Expander Pak 2400

The Li Expander Pak 2400 has a low self-discharge rate at 77 °F (25 °C) and can be stored for up to 6 months before it needs to be recharged (if it was charged fully when placed in storage). However, the self-discharge rate increases as the storage temperature increases. The increased self-discharge rate at high temperatures is a phenomenon common to all rechargeable batteries.

This Technical Bulletin provides easy instructions to ensure that the Li Expander Pak 2400s function optimally in all environments. Conversely, failure to follow these instructions will result in irreversible damage to the Li Expander Pak 2400s within a short period of time.

This Technical Bulletin provides protocols for:

- 1. Li Expander Pak 2400 storage and charging maintenance in climate-controlled environments (page 2)**
- 2. Li Expander Pak 2400 storage and charging maintenance in high temperature environments (page 6)**
- 3. Solutions (by reference to other Technical Bulletins) if one or more Li Expander Pak 2400s displays a flashing RED Battery Status LED (page 6)**
- 4. A Preventive Maintenance Checks and Services Table for two storage-temperature scenarios (page 7).**





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1. Protocol for Li Expander Pak 2400 storage and charging maintenance in climate-controlled environments

The following protocol shows a sequence of steps that will allow simultaneous charging of all ten (10) batteries of a single system using shore power or generators as the charging source. The basic, system-charging connection scheme is shown in the diagram below.

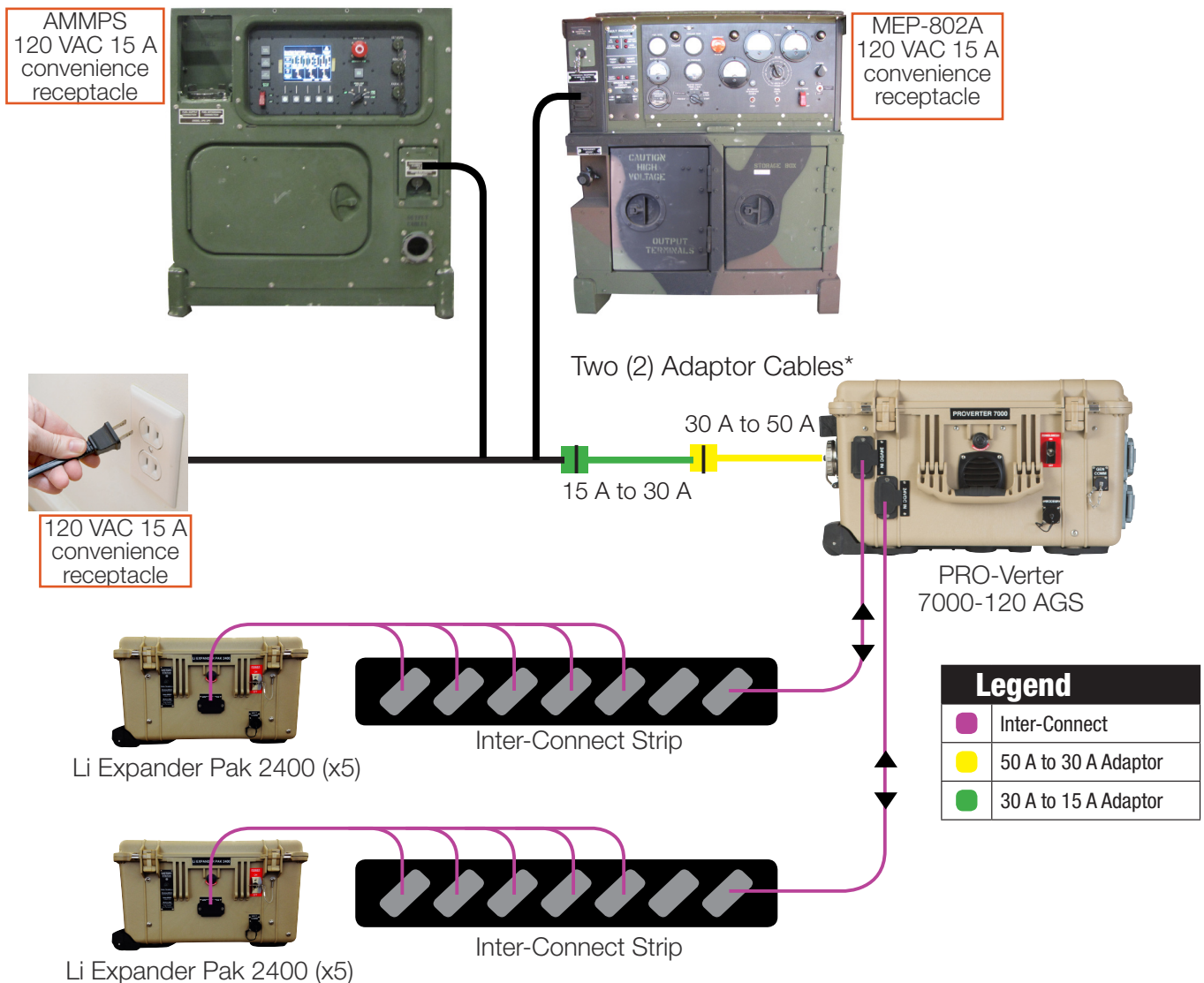


Figure 1 - Wiring Diagram for In-storage Charging

*Adaptor Cables sold separately



The AES components should be arranged so that the necessary ports are accessible. Two adaptor cables (figures 3 and 4) allow connection of a 120 VAC 15 A power cord into the 120 VAC 50 A Port on the left-hand side of the PRO-Verter 7000. The method described here will work no matter how the individual components are arranged as long as they are close enough for the cables to reach between the ports.

1. Slide the stack of PAM Solar Array Cases on the left, to the left (red arrow; figure 2) to expose the 120 VAC L5-50 Port on the PRO-Verter 7000.



Figure 2 - PAM cases moved/50 A Port accessible

2. The Adapter Cables are sold separately* (figures 3 and 4) and can be stored with the AES in the Cable Case (figure 2).

*50A to 30A Adapter Cable Item # 07-1001182

*30A to 15A Adapter Cable Item # 07-1001181



Figure 3 - 50 A to 30 A Adapter Cable



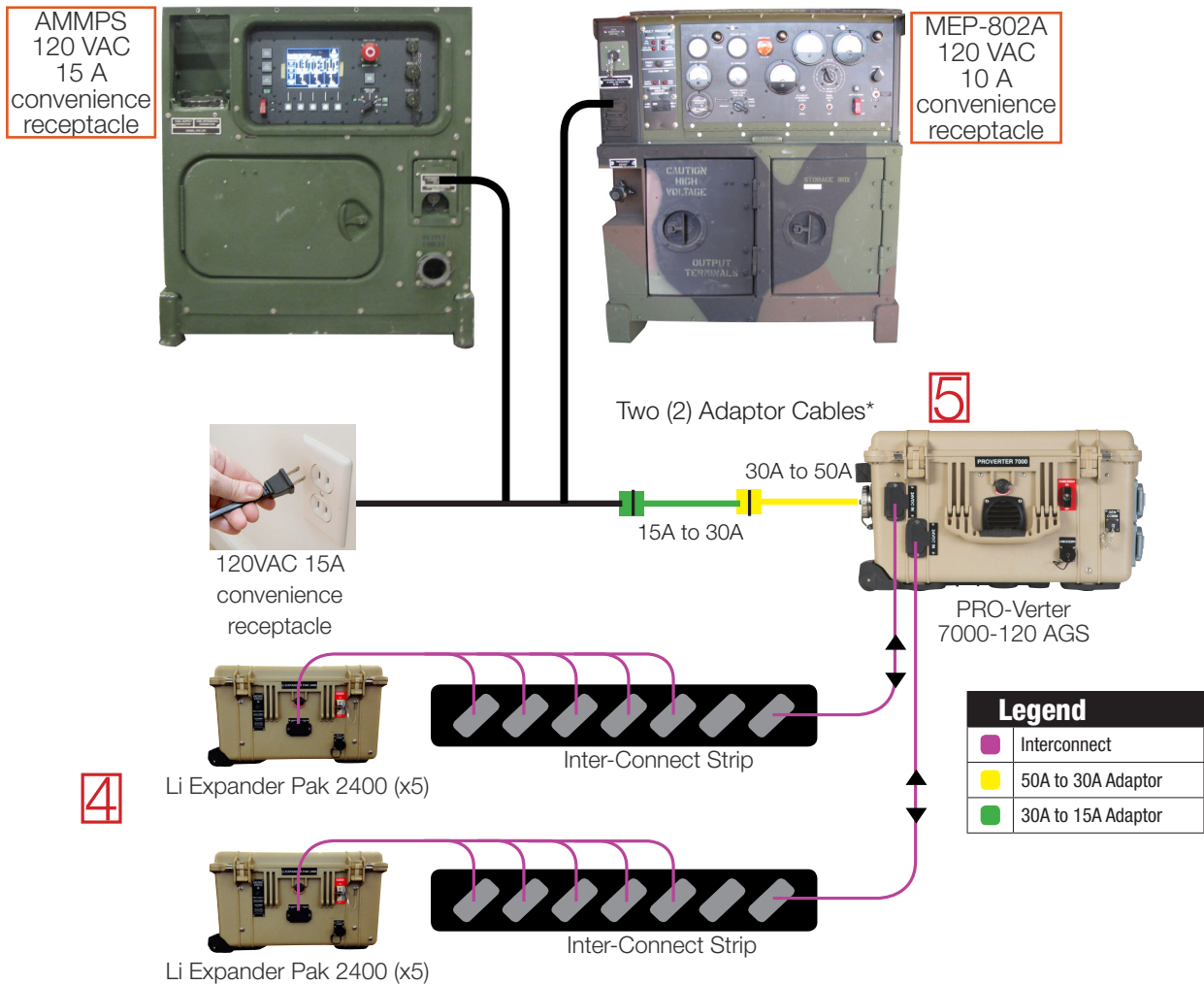
Figure 4 - 30 A to 15 A Adapter Cable

3. Connect the 30 A and/or 15 A adaptor to the PRO-Verter 7000 50 A port (Figure 5).



Figure 5 - Adaptor Cables attached to the AC input connection on the PRO-Verter 7000

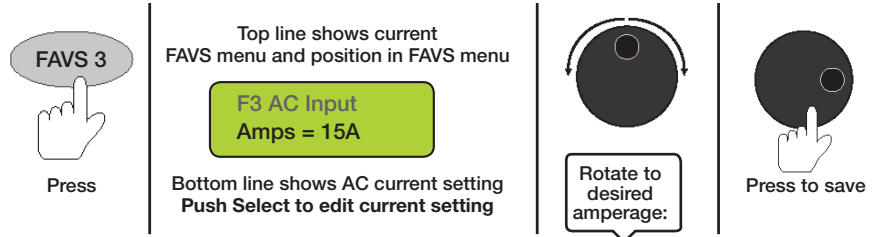




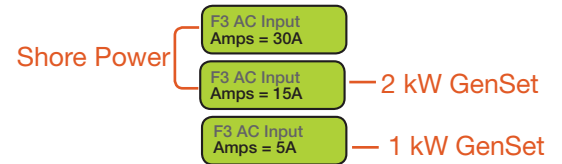
- Connect five (5) Li Expander Paks to one (1) Inter-Connect Strip and five (5) Li Expander PAK 2400s to the other Inter-Connect Strip using a 5' Inter-Connect Cable for each as shown in the diagram above.
- Connect the two (2) Inter-Connect Strips to the 24VDC IN ports on the front left side of the PRO-Verter 7000 using two (2) 5' Inter-Connect cables as shown in the diagram above.



- Remove the cotter pin from the Power Switch of all Expander Paks and PRO-Verter 7000-120 and toggle the switches to “ON”.
- Determine the Battery Status by pushing the button for the Battery Status LED report. Each one should be GREEN or AMBER.



- Adjust the input amperage on the PRO-Verter 7000. See diagram to the right. The diagram provides setting values for charging using shore power) and fuel-powered generators.



NOTICE

Failure to properly set “AC Input” may overload the AC power source.

Minimum charge times based on AC input amperage

5 amps AC (600 watts of charging power)	~40 hours charge time if the batteries were fully discharged*
10 amps AC (1200 watts of charging power)	~20 hours charge time if the batteries were fully discharged*
15 amps AC (1800 watts of charging power)	~13 hours charge time if the batteries were fully discharged*
30 amps AC (3600 watts of charging power)	~6.7 hours charge time if the batteries were fully discharged*

NOTICE

*Extending the charge times beyond the minimum will not result in damage to the Li Expander Pak 2400s. However, they should not be left to charge indefinitely.

- The PRO-Verter LCD user interface will display zero (0) charging amps when the batteries are charged fully and the LED Status indicator will be GREEN.

- Turn off Li Expander Pak and reinsert cotter pins.





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2. Protocol for Li Expander Pak 2400 storage and charging maintenance in high-temperature environments

*** If the Expander Paks are stored at temperatures above 90 °F (32 °C), then the time between maintenance checks and/or charges must be reduced to one (1) month.**

The importance of reducing the time between maintenance charges (i.e., charging more frequently) and maintaining the Expander Paks in a fully charged state increases as the storage temperature increases. The higher the storage temperature, the faster the Li Expander Pak 2400s will self-discharge.

It is absolutely imperative to follow these instructions. Failure to maintain a full charge prior to and during storage can result in permanent damage to the Li Expander Pak 2400s.

3. If one or more Li Expander Paks displays a Blinking RED Battery Status LED, please refer to Technical Bulletin 1B.



4. In-storage Preventive Maintenance Checks and Services

Failure to follow these instructions may result in permanent equipment failure and/or personal injury.

Required Tools

- Multimeter
- LiFePO₄ battery maintenance charger or a Solar Stik PRO-Verter

Optional Tool

MKM BMS Reader

Item #	Item to be Inspected	Interval at 91-140 °F (33-60 °C) Storage Temp	Interval at 77-90 °F (≤ 25-32 °C) Storage Temp	Procedures	Non-mission Capable
1	Visual inspection of 24VDC Li Expander Pak 2400	M ¹	Q ²	<ol style="list-style-type: none"> 1. Inspect case for visible damage and missing items. 2. Clean excessive dust or dirt accumulation from the exterior and ports. 3. Close all unused port covers. 	~If the case is broken or split or if ports are damaged, contact Solar Stik Technical Support for advice on how to proceed.
2	Expander Pak State of Charge (SOC) ⁴	M	Q	Measure the Expander Pak SOC using the MKM BMS Reader ⁴ . (See Operator Manual for the MKM BMS Reader for details.) If the SOC is ≤ 50% Skip to and perform Item #4 of this chart.	If Expander Pak SOC = zero (0)%, contact Solar Stik Technical Support or FSR.
3	Battery Status LED color	M	Q	<ol style="list-style-type: none"> 1. Push and hold the Battery Status LED button. 2. Record the color of the Battery Status LED in the maintenance/service log 3. If the Battery Status LED is flashing red on any Li Expander Pak, proceed to Item #3. 	~If the Battery Status LED emits no light, contact Solar Stik Technical Support or FSR.

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¹Monthly (M)—every month; ²Quarterly (Q)—every three months; ³Semiannually (S) – every 6 months

⁴The BMS Reader (Item # 20-0001004) is an optional tool available from Solar Stik. Contact Solar Stik for information.





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Item #	Item to be Inspected	Interval at 91-140 °F (33-60 °C) Storage Temp	Interval at 77-90 °F (< 25-32 °C) Storage Temp	Procedures	Non-mission Capable
4	In-storage maintenance charging	Q	S ³	<ol style="list-style-type: none"> 1. Charge Li Expander Paks for 24 hours at 29.0 V. Follow the instructions for the lithium battery charger used. 2. Charge until the Battery Status LED on all Li Expander Paks is flashing green (if flashing red to begin with). 3. If the Battery Status LED flashes red on any Li Expander Pak after 24 hours, continue charging all Li Expander Paks for another 24 hours. 	~If any Li Expander Pak has a red-flash Battery Status LED after 48 hours of charging OR if the LED emits no light after charging, contact Solar Stik Technical Support.

